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ABSTRACT BOOK

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Category: Nutrition and Sustainable Development

DEHP 和 DBP 联合暴露对大鼠生长发育和糖脂代谢的影响

Effects of DEHP&DBP Co-exposure On Growth And Glycolipids Metabolism Of Rats

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OBJECTIVE: To investigate the effects of the exposure to Di-(2- ethylhexyl) -phthalate (DEHP) & Dibutyl phthalate（DBP）on the glycolipids metabolism in male Wistar-rats.

METHODS：44 healthy adult-male-Wistar-rats were randomly divided into four groups, including three experimental groups: low-dose (DEHP 50 / DBP 10 mg/Kg·bw, i.g.), medium-dose (DEHP 250 / DBP 50 mg/Kg·bw, i.g.), and high-dose (DEHP 1250 / DBP 250 mg/Kg, i.g.) groups, and one blank-control group(corn oil, i.g.). Fasting blood sugar and body weight were measured weekly during the 28-day-feeding period. At last, the oral glucose tolerance test (OGTT) was performed, with insulin, glycolipid biochemical indicators and antioxidant indicators detected, organs of rats also weighed.

RESULTS：To blank-control group，the rat-weights of experimental groups got slowly, especially in high-dose group ($P<0.05$); liver-coefficients of experimental groups were all significantly higher ($P<0.01$), but testis-coefficient of high-dose group significantly less ($P<0.01$). FPG of high-dose group was highest ($P<0.01$), while HOMA-β significantly lower ($P<0.05$) and HbA1c content reduced significantly ($P<0.05$). OGTT showed that peak of blood sugar of each group appeared at 30min after taking sugar, and decreased at 60min and 120min, close to the fasting level. The AUC of high-dose group increased significantly ($P<0.01$). TG, TC, and HDLC of the experimental groups were lower, with HDLC of low- dose group decreased significantly ($P<0.01$), while LDLC of high-dose group increased significantly ($P<0.05$). T-AOC and T-SOD activity of each group had an upward trend, while the GSH-PX activity decreased, especially in high-dose group ($P<0.01$); MDA increased in each experimental group, but not significantly ($P>0.05$).

CONCLUSIONS：DEHP&DBP was found to slow down the weight gain of rats, reduce antioxidant levels, and cause glycolipids metabolism and insulin secretion disorders, also induce insulin resistance.

Key words Diethylene phthalate(2-ethylhexyl) Ester; Dibutyl phthalate; Glycolipids metabolism; Insulin resistance; Oxidative stress; Antioxidants

Category: Nutrition and Sustainable Development

外源性类固醇激素暴露与女童性早熟的关联：一项巢式病例对照研究

Association of exposure to exogenous steroid hormones and precocious puberty in girls: A nested case-control study

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Background: Exogenous steroid hormones (ESH) are universal in food. The adverse impacts of its exposure on precocious puberty remain unclear.

Objectives: To investigate the association between ESH and precocious puberty.

Methods: This nested case-control study recruited 50 girls, aged 7-10, from a school-based multi-center cohort. Urine and blood samples were collected before breakfast. ESH and endogenous steroid hormone (EGSH) were detected by ultra-performance liquid chromatography coupled with triple quadrupole mass spectrometry (UPLC-MS/MS). Precocious puberty was assessed according to the Tanner staging by pediatricians. We explored the single effects of exogenous and endogenous steroid hormones using two methods. To solve the collinearity problem, orthogonal partial least squares discriminant analysis and least absolute shrinkage and selection operator regression were separately applied to select variables. Then the multivariable logistic regression analysis was utilized to assess the association between steroid hormones and precocious puberty. The Bayesian kernel machine regression model was used to evaluate the joint effect of exogenous steroid hormones exposure.

Results: We detected 17 and 15 steroid hormones, showing high correlations, in urine and serum samples. Compared with normal girls, girls with precocious puberty had lower ESH and EGSH levels. Surprisingly, a higher risk of precocious puberty was associated with low concentrations of 11-Deoxycortisol (odds ratio: 0.16, 95% CI: 0.04-0.48) and prednisolone acetate (odds ratio: 0.14, 95% CI: 0.03-0.47) in serum. Likewise, there was an inverse correction between methyltestosterone in urine and precocious puberty (odds ratio: 0.21, 95% CI: 0.04-0.71). The Bayesian kernel machine regression analysis showed a negative relationship between ESH exposure and precocious puberty, but not significant.

Conclusion: Exposure to exogenous steroid hormones, especially prednisolone acetate, and methyltestosterone was negatively associated with precocious puberty.

Key words exogenous steroid hormone, precocious puberty, 11-Deoxycortisol, prednisolone acetate, methyltestosterone

Category: Nutrition and Sustainable Development

基于 SERS 的便携式横向流动适配体竞争法靶向干扰素-γ 的高灵敏度即时检测

Portable lateral flow aptamer competitive assay based on SERS towards highly sensitive point-of-care testing of interferon-γ

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Interferon gamma (IFN-γ), one kind of inflammatory cytokines, primarily produced by natural killer (NK) cells and thymus-derived (T) cells, is used to determine disease specific innate immune responses and serve as an active diagnostic biomarker of a broad spectrum of diseases such as auto inflammatory disease, viral and bacterial, parasites infections, and tumor control. The physiological concentration of IFN-γ at pg·mL-1 level for most diseases such as tuberculosis and lung cancer demands highly sensitive and selective detection methods. Establishing a simple, rapid, and low-cost assay for ultrasensitive and highly selective detection of IFN-γ is in urgent demand especially vitally important for diagnosis in resource-limited areas. A novel Au NPs based colorimetric LFA for rapid, visual and ultrasensitive detection of interferon-gamma (IFN-γ) in both PBS buffer and human serum is presented. The LFA platform relies on the competition of Au NPs-aptamer sequence between the complementary DNA in the test line (T-line) and IFN-γ in the sample solution. The presence of IFN-γ can be easily observed in the T-line by naked eye and detected at pg·mL-1 level by a portable colorimetric intensity reader. Linear detection range of 10-500 pg·mL-1 could be obtained. In addition, as low as 10 pg/mL of IFN-γ in human serum could be detected, which is comparable with the results from ELISA. Therefore, this aptamer-based lateral flow strip assay for IFN-γ detection developed in this study has a great potential not only to be a reliable on-site IFN-γ detection system.

Key words Lateral flow assay; interferon-gamma; gold nanoparticles; aptamer; point of care testing

Category: Nutrition and Sustainable Development

醫療中心醫院在可持續性營養的積極作為

The Positive Actions of Sustainable Nutrition in Medical Center Hospital

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In the healthcare system, common diseases lead to starvation and malnutrition (prevalence of about 20% to 50%), in addition non-communicable diseases such as obesity, diabetes, and heart disease account for 71% of global deaths. According to the World Health Organization report, unhealthy diets are a major risk factor for the above problems.

As nutrition and healthcare professionals, we consider solutions to improve these issues as well as mitigating carbon emission/climate change in our positions. For over 10 years, the Nutrition Department of Changhua Christian Hospital (CCH) in Taiwan has proposed and implemented specific actions for sustainable nutrition, such as:

1. Implemented cook-chill food production program, savings in kitchen space, building cost, equipment cost, staff cost.

2. Reducing kitchen food waste and environmental burden by food weighing pricing and rewards for bringing one’s own meal box program.

3. Cooperate with Earth Day activities to promote local ingredients.

4. Reduce carbon footprints for food production and ensure food safety.

5. Plant base nutrition education for healthcare professionals and patients.

6. Implemented friendly agriculture Co-production program, provide nutritious foods.

7. Support accessibility of local organic foods, building products supply website.

8. Food and agricultural education for healthcare professionals and the general public.

9. Comprehensive nutrition workshops for cancer patients.

10. Development of eco-friendly agriculture products, brand building, and link to hospital catering.

As Earth Day enters its 53rd year, "investing in our planet" and protecting the sustainability of nutritional resources is key to promote a sound sustainable food environment and culture, and reduce the occurrence of malnutrition and non-communicable diseases.

Key words Positive Actions of Sustainable Nutrition, Plant base nutrition education, Friendly agriculture Co-production program

Category: Nutrition and Sustainable Development

铁自噬激活和 sideroflexin1 依赖的线粒体铁超载在棒曲霉素所致心脏炎症和纤维化中的作用

Ferritinophagy activation and sideroflexin1-dependent mitochondria iron overload contribute to patulin-induced cardiac inflammation and fibrosis

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Patulin (PAT) is a mycotoxin that commonly presents throughout the ecosystem where the fungi grow, and mainly contaminates food, soil and water. PAT has been considered cardiotoxic according to previous studies. However, the detailed mechanism is yet to be fully elucidated. The present study aimed to explore the role and underlying mechanism of ferroptosis in PAT-induced cardiac injury. Here, we confirmed in vivo and in vitro that ferroptosis was involved in PAT-induced myocardial inflammation and fibrosis. Mice exposed to PAT (1 and 2mg/kg body weight for 14 days) provoked myocardial inflammation and fibrosis, along with disrupted iron homeostasis, elevated lipid peroxidation, depleted glutathione peroxidase 4, and deformed mitochondrial morphology. When the primary neonatal rat cardiomyocytes (NRCMs) and H9c2 cells were subjected to PAT, ferroptosis was initiated in a dose-dependent manner, which could be significantly restrained by ferrostatin-1. Mechanistically, we found nuclear receptor coactivator (NCOA) 4, a master regulator of ferritinophagy, bound to and degraded ferritin in response to PAT treatment, thereby releasing large amounts of ferrous iron and further leading to sideroflexin (SFXN) 1-dependent mitochondria iron redundancy. Conversely, knockdown of NCOA4 or SFXN1 with siRNAs could effectively ameliorate ferroptotic cell death, cellular or mitochondrial iron overload and lipid peroxides accumulation.
Furthermore, myocardial inflammation and fibrosis in PAT-exposed mice was alleviated by mitochondrial iron chelator deferiprone. Overall, our findings underscore that ferritinophagy activation and SFXN1-dependent mitochondrial iron overload play a critical role in PAT-induced myocardial ferroptosis and consequent cardiotoxicity.

Key words Patulin Cardiotoxicity; Ferroptosis; Ferritinophagy; Sideroflexin1; Mitochondrial iron overload

Category: Nutrition and Sustainable Development

新型合成生物食品的潜在风险因子及控制技术研究进展

Recent advances in potential risk factors and control technologies for novel synthetic biological foods

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Nowadays, more and more consumers are becoming concerned about the relationship between food, nutrition and environmental sustainability. Synthetic biology can address many of today's food safety and health issues, as well as many food challenges that may arise in the future. Novel synthetic biological food is one of the products of the combination of synthetic biology and food science, mainly through the use of different living or non-living materials and technologies to develop a variety of products, which are rich taste and can meet people's pursuit of health, while effectively reducing the use of animal-derived materials, in line with the needs of environmentally friendly food. In this paper, the essence, consumer acceptability, advantages and disadvantages of four representative novel synthetic biological foods, namely plant-based food, cell-based food, fermented food and microalgae food, are reviewed, focusing on their current situation and future prospects. At the same time, the potential risk factors, such as allergens, mycotoxins and antitrophic factors, are also elaborated. Novel food control technologies, including screening technologies such as aptamer and microfluidic, and processing technologies such as ohmic heating and low-temperature plasma, can alter the protein structure of risk factors in order to affect their biological activities, so as to facilitate the industrial upgrading of novel synthetic biological foods. In conclusion, with the increase of environmental and health awareness, the potential for the development of novel synthetic biological foods will grow in the future.

Key words Novel synthetic biological foods; Potential risk factors; Screening technology; Processing technology

Category: Nutrition and Sustainable Development

基于核酸适配体识别和 DNA 步行者扩增策略的荧光传感器构建及对雌二醇的测定研究

A novel fluorescent sensor based on aptamer recognition and DNA walker amplification strategy and its determination of 17β-estradiol

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Objective: Studies about 17β-estradiol have shown that excessive estrogen will disturb the endocrine balance of human body and lead to diseases, Therefore, it is very necessary to develop various detection methods suitable for low concentration estradiol. Based on aptamer specific recognition, DNA walker molecular machine and Exonuclease III-assisted dual cycle signal amplification technology, a fluorescent aptamer sensor was constructed and applied to the detection of 17β-estradiol. The fluorescent aptamer sensor designed in this study is mainly composed of DNA walker.

Methods: The system of DNA walker consists of graphene oxide with fluorescence quenching function, signal probe double-stranded DNA (dsDNA), hairpin probe 1 with 17β-estradiol aptamer sequence, hairpin probe 2, and Exonuclease Ⅲ. By adding 17β-estradiol of different concentrations into the system, DNA S1 solution of different concentrations can be obtained through the action of Exo Ⅲ. At the same time, as the starter chain that triggers DNA walker, it can perform the second round of signal amplification reaction with dsDNA on graphene oxide, thus realizing the double amplification of fluorescence signal. Therefore, the quantitative detection of 17β-estradiol was realized by increasing the amount of fluorescence signal. Atomic force microscopy and polyacrylamide gel electrophoresis were used to verify the feasibility of DNA walker participating in the reaction.

Results: Under the optimal conditions, 17β-estradiol concentration showed a good linear relationship with fluorescence in the range of 5.0×10-10-1.8×10-8 M, and the detection limit was 5.6×10-11 M.

Conclusion: The fluorescent aptamer sensor established in this study has good selectivity, simple operation and good specificity, and the results of its application in the determination of milk samples are satisfactory.

Key words Aptamer; Fluorescence sensor; DNA walker; Exonuclease Ⅲ;17β-estradiol

Category: Nutrition and Sustainable Development

长期航天飞行的食品系统:了解非营养性的多酚在宇航员健康中的作用

Food systems for long-term spaceflight: Understanding the role of non-nutrient polyphenols in astronauts' health

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Background: Manned space exploration missions have developed at a rapid pace, with missions to Mars likely to be in excess of 1000 days being planned for the next 20 years. Meanwhile, until now the formulation of space food systems has not focused on non-nutrients, and has not considered issues arising from their absence during space missions or the possibility of them to solve the challenges caused by space hazards.

Aims: This study investigates, by systematic review, current space food systems and the potential for non-nutrients, such as flavonoids and polyphenols, to counteract radiation- and low gravity-induced degeneration of bone, vision, muscle strength, immune function and cognition.

Results and Discussion: A systematic approach found 39 related animal model studies, and that polyphenol dietary interventions have been shown to mitigate radiation-related physiological problems and cognitive decline, as well as reduce the implications of radiotherapy. From the results of these studies, it appears that berry extracts have a significant effect on preventing cognitive problems through attenuating the expression of NADPH-oxidoreductase-2 (NOX2) and cycloocygenase-2 (COX2) in both frontal cortex and hippocampus and immune system problems caused by radiation similar to that experienced in space. For physiological problems like alteration of blood-testicular barrier permeability and oxidative stress in kidney and liver caused by gamma rays and X-rays, various polyphenol compounds including resveratrol and tea polyphenols have a certain degree of protective effect like enhancing metabolism of heart and decreasing DNA damage respectively. Only one study showed no difference in the performances of a blueberry extract-fed group and a control group exposed to ^{56}Fe irradiation after 12 months.

Conclusion: In conclusion, current animal studies have shown that polyphenols can mitigate radiation damage to some extent, but more research is needed to enable the application of a polyphenol diet to actual space flights.

Key words space radiation, space flight, nutrient, polyphenols, oxidative stress, cognition

分类：营养与可持续发展

酵母蛋白的氨基酸组成分析及与乳清/大豆蛋白的营养价值比较

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酵母蛋白的氨基酸组成分析及与乳清/大豆蛋白的营养价值比较

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摘要：

目的：利用不同的高效液相色谱检测（HPLC）技术，从氨基酸组成角度对酵母蛋白进行营养评价，与乳清蛋白、大豆蛋白进行比较分析，评价其作为新型来源蛋白质替代动物蛋白与植物蛋白的潜力，并以此三种蛋白质计算得出营养价值较高的混合蛋白比例。

方法：以 HPLC 分析为基础，利用酸水解方式处理三种蛋白质样本，6-氨基喹啉基-N-羟基琥珀酰亚氨基甲酸酯（AQC）为柱前衍生剂，以乙腈、磷酸盐-醋酸盐缓冲液、水为流动相进行梯度洗脱，流速 1.0 ml/min，进样量为 10 ul，柱温 37℃，紫外检测波长 248 nm，C18 色谱柱（3.9mm ×150 mm, 4μm）分离检测天冬氨酸（Asp）、丝氨酸（Ser）、谷氨酸（Glu）、甘氨酸（Gly）、组氨酸（His）、苏氨酸（Thr）、丙氨酸（Ala）、脯氨酸（Pro）、酪氨酸（Tyr）、缬氨酸（Val）、赖氨酸（Lys）、亮氨酸（Leu）、异亮氨酸（Ile）、苯丙氨酸（Phe）。利用氧化酸水解的处理方式，2，4-二硝基氟苯（FDNB）为衍生剂，乙腈、磷酸盐-醋酸盐缓冲液、水为流动相进行梯度洗脱，流速 1.0 ml/min，进样量为 10 ul，柱温 37℃，紫外检测波长 360 nm，C18 色谱柱分离检测蛋氨酸（Met）和半胱氨酸（Cys）。利用碱水解的处理方式，乙酸钠水溶液、甲醇为流动相进行等度洗脱，流速 1.0 ml/min，进样量为 20 ul，柱温 35℃，激发波长 283 nm，发射波长 343 nm，C18 色谱柱分离检测色氨酸（Trp）。采用氨基酸评分、必需氨基酸/总氨基酸比值等方法评价三种蛋白质的营养价值。

结果：乳清蛋白、大豆蛋白、酵母蛋白三种蛋白质的必需氨基酸含量分别为 40.62%，33.99%，39.24%，必需氨基酸与总氨基酸比值分别为 46.37%，39.98%，48.12%，其中酵母蛋白的必需氨基酸含量高于 FAO/WHO 的标准 36%，且与乳清蛋白接近。与 FAO/WHO 氨基酸评分模式相比可得，乳清蛋白、大豆蛋白、酵母蛋白的氨基酸评分别为 94.8，46.4，76.2，第一限制性氨基酸分别为 Val、Thr、Thr。相比乳清蛋白，酵母蛋白缺乏 Leu、Thr、含硫氨基酸（SAA），但 Val 含量更高。与大豆蛋白相比，酵母蛋白含有更高的 Thr 和 Val，在氨基酸组成上更为平衡。将乳清蛋白与酵母蛋白按照 5：2 比例配制混合蛋白，既能弥补酵母蛋 Leu、Thr、含硫氨基酸（SAA）的不足，也能相对补充乳清蛋白 Val 的不足，可作为一种良好的膳食蛋白质来源。

结论：酵母蛋白的必需氨基酸含量丰富，相比大豆蛋白氨基酸构成平衡度较高，作为一种新型来源蛋白质，具有部分代替动物蛋白和植物蛋白作为膳食蛋白质来源的潜力，能与乳清蛋白通过蛋白质互补作用获得营养价值更高的混合蛋白。

关键词：酵母蛋白；乳清蛋白；大豆蛋白；氨基酸评分

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关键字 酵母蛋白；乳清蛋白；大豆蛋白；氨基酸评分

分类：营养与可持续发展

上海地区食药物质应用现状及其影响因素研究

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目的：探讨食药物质在上海地区的应用历史、现状及其影响因素，并探索性提出相关应用管理与促进发展的措施建议。

方法：采用综合文献回顾性分析研究，结合专家座谈、个人访谈和实地走访调研、德尔斐法等方法，梳理了国内外食药物质使用管理的相关工作，搜集了上海地区历史上食药物质相关食疗食养文化资料、国家或地区发布的相关法律法规文件以及居民中医药健康素养水平、食药物质的生产销售和使用等情况，并调研分析了上海地区食药物质应用的管理基础、制度保障及其影响因素等情况。

结果：食药物质作为一类特殊的食品营养资源，按照传统既是食品又是药品，具有特定药理和营养作用，对维护正常人群的健康体质、帮助亚健康人群、临床患者的康复治疗，均具有十分重要的实用价值。上海地区居民相对其他地区具有较高的中医药健康文化素养水平，中医食疗养生理念在民间长期广为盛行，且中西合璧运用食药物质维护保障个体健康的历史久远，形成了独特的海派食疗食养文化，具有深厚的海派中医文化积淀。而且早期上海从事食药物质相关开发生产的工业基础较雄厚，在食药物质生产加工市场具有巨大潜力。但也存在一定局限性，比如本地中药材资源受地理环境和农业资源等局限仅有两味道地药材，其他以外地市场输入为主，且随着本地市场功能和定位的调整，近年来本地食药物质相关生产加工业产业规模有缩小趋势，地方食药物质相关标准与法规还需不断完善，居民中医药健康素养水平需不断提升，营养科普和健康促进还需要持续加强等。

结论：食药物质作为祖国传统医学与现代营养科学有机结合的健康新领域，其应用开发处于重大政策机遇期，已成为国家大健康战略和新一轮健康产业发展的增长点，对助力打响“上海制造”品牌建设、助推中国特色的健康管理模式具有重要意义。上海作为改革创新发展的先行者，可以在进一步充分且深入调研的基础上，围绕“健康上海”建设和“十四五”发展机遇期，在引领现代医药健康高质量发展的过程中以体制机制和产业创新为突破口，进行贯穿产品研发与市场推广、标准制定与风险评估、市场扶持与行业监管、营养科普与健康促进等环节的综合布局，为国家进一步完善食药物质目录管理和推广应用，加强传统食疗食养文化对营养健康的促进工作提供参考。

关键字 食药物质；海派中医；药食同源；食疗食养；营养

分类：营养与可持续发展

优化“你点我检”活动，促进食品安全社会共治 ——基于监管人员和公众的认知对比

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目的：食品安全“你点我检”是市场监督管理总局“我为群众办实事”专项活动之一。本研究拟通过了解监管人员和公众对该活动开展的认知及评价，针对性提出促进活动继续有效开展的建议对策，提升食品安全社会共治能力。

方法：选取 15 省市 20 名食品安全监督抽检人员，7 省市及自治区 30 名公众作为研究对象，进行个人深度访谈，采用 Colaizzi 7 步分析法，利用 NVIVO12.0 编码、分类、整理，提炼主题。

结果：（1）各地“你点我检”在活动推广、民意征集、信息交流、制度建设等方面开展形式多样。

（2）“你点我检”对提升政府关切民生形象、公众食品安全治理参与和食品安全风险防控能力有深远意义。活动可促进食品监管与民众的契合，通过公众参与，打破监管专业信息壁垒，提升公众对食品监管的认知，提升公众对政府食品安全保障的动机信任和能力信任，进而通过广泛社会参与，提升食品生产经营单位主观规范和风险防控主体意识，最终加强公众对食品安全的获得感、幸福感和安全感。

（3）“你点我检”开展可能面临区域开展不均衡、影响、执行、舆情风险等方面困境。活动开展能力受各地经济发展、技术能力等因素影响，存在区域不均衡性；活动还存在普及率和影响力不够广泛的“圈内玩”现象；各级市场监管人员对活动开展的认识理解和具体执行方面存在差异，上级“社会参与”理念在下达过程中容易出现偏差；监督抽检专业性强，而民众认知有限，可能产生民众对活动满意度边际效应递减风险，此外，在活动推广、结果公布等环节，可能产生负面舆情事件。

（4）公众参与意愿普遍较高，但受活动影响力、个体参与社会治理意识、对食品安全的信任和对政府监管的动机信任影响。多数未参与源于缺乏对活动的知晓。部分未参与群众认为不能转嫁食品监管工作，未通过提供物质或精神奖励刺激参与等，反映出食品安全社会治理意识不足；食品安全风险意识不足，认为活动是形式主义，也影响参与意愿。

结论：“你点我检”能推动食品安全社会共治共享。应推广各地有效经验，进一步丰富活动形式，加大宣传，增强影响力。可制作短视频，在网民互动性较高的平台传播，并注重舆情监控。可通过持续创新直播、投票、实验室体验等活动形式，提升公众兴趣，吸引更多民众参与；多展现消费者形象、传播消费者声音，提升公众参与感。

关键字 “你点我检”，食品监管，社会治理

分类：营养与可持续发展

超高效液相色谱法测定分析花粉中黄酮醇成分

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花粉作为植物的精华，包含了维生素、氨基酸、矿物质和糖类等200多种营养成分，被称为完全营养食品。花粉中含有丰富植物化学物，包括类黄酮成分。研究表明，膳食中的黄酮类化合物有助于提高机体免疫力、防治糖尿病及其并发症、预防动脉粥样硬化和心血管疾病、减少癌症、肿瘤以及骨质疏松等疾病的发病率等作用。虽然有以上多种的功效，目前为止，对植物中黄酮醇类化合物的研究还十分有限。

目的：建立同时测定花粉中主要黄酮醇成分含量的超高效液相色谱法(UHPLC)，测定分析由中国蜂产品协会花粉专业委员会提供的在全国各花粉产地收集到的蜂花粉19份（包括油菜花粉、荞麦花粉、玉米花粉、向日葵花粉、茶花花粉、莲花花粉、紫云英、芝麻花粉共8种），松花粉12份（包括黑松、云南松、马尾松、油松共4种），共计31份花粉样品中槲皮素、山柰素、异鼠李素的含量。方法：花粉样品经破壁、均质、超声、酸水解提取后，以乙腈和0.1%三氟乙酸为流动相，经超高效液相色谱 ACCUCORE C18 色谱柱梯度洗脱，流速 0.4 mL• min－1，检测波长 369 nm，柱温为35℃。结果：3种主要黄酮醇类成分槲皮素、山柰素、异鼠李素依次分别在0.2512～251.2μg•g－1， 0.2063～206.3μg•g－1， 0.2200～220.0μg•g－1线性范围内线性良好，r值均大等于0. 9998。经方法学验证，3个组分3个水平加标回收率均>90 %; 精密度相对标准偏差（RSD）均<5%;方法检测限（LOD）：槲皮素为0.3ug•g－1,山奈素为0.4ug•g－1，异鼠李素为 0.4ug•g－1。比较蜂花粉与松花粉两类花粉的测定结果发现：19 种蜂花粉的槲皮素、山奈素、异鼠李素含量的中位数分别为264.3μg/g，250.6μg/g，49.72μg/g，三者含量之和的中位数为705.4μg/g；12种松花粉的槲皮素、山奈素、异鼠李素含量的中位数分别为6.727μg/g，13.535μg/g，4.1325μg/g，三者含量之和的中位数为23.25μg/g。大部分蜂花粉中槲皮素、山柰素、异鼠李素的含量大大高于松花粉。各类花粉中各组分大部分均能检测到，但含量差异较大，其中玉米花粉及油菜花粉的含量较高，具有较高的应用及研究价值。大部分蜂花粉3种组分含量大大高于松花粉各花粉样品中，油菜花粉与玉米花粉的含量较高。上海玉米花粉的槲皮素、山奈素含量均最高，山西玉米花粉的异鼠李素含量最高。因此，玉米花粉就黄酮醇成分方面具有较高的应用及研究价值。此外，蜂花粉中芝麻花粉的槲皮素含量最低，安徽向日葵花粉的山奈素含量最低，甚至低于部分松花粉。结论:该法操作便捷，结果准确、可靠，可用于各种花粉中3种主要黄酮醇类物质的含量测定；测定结果为各类花粉的成分分析、质量控制或评价及相关研究提供初步数据及参考。

关键字 花粉 黄酮醇 槲皮素 山柰素 异鼠李素 超高效液相色谱法

分类：营养与可持续发展

CRISPR/Cas12a 驱动的 ELASA 传感对谷物样品中 OTA 的超灵敏检测研究

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目的　赭曲霉毒素 A（OTA）是一种主要由镰刀菌、青霉菌和曲霉产生的有毒的次生代谢产物，已被列为 2B 类致癌物。由于其在生物体内的半衰期长，且化学性质十分稳定，容易在体内蓄积。人或动物长期摄入食品中低浓度 OTA 不但会造成肝肾等脏器以及免疫系统的严重损害，甚至会导致致癌和致畸效应的发生。因此准确检测食品中 OTA 含量对于保护人与动物健康十分重要。许多技术已被应用于 OTA 检测，包括薄层色谱法、高效液相色谱法、液相色谱-质谱联用法、毛细管电泳法和酶联免疫吸附测定（enzyme linked immunosorbent assay，ELISA）等。其中 ELISA 法是一种比较常用的 OTA 快速检测策略。然而，它具有抗体价格高、灵敏度低和容易出现假阳性等缺陷。为了克服这些缺点，我们在 ELISA 用微孔板的基础上，结合了 OTA 适配体易于合成、价格便宜、化学性质稳定可长期储存等特点，和聚集规则间隔短回文重复序列/聚集规则间隔短回文重复序列相关蛋白(CRISPR/Cas12a)系统高检测灵敏度与特异性的优势，设计了一种由 CRISPR/Cas12a 系统驱动的酶联适配体吸附测定（enzyme-linked aptamersorbent assay, ELASA）法，用于 OTA 的低成本、高灵敏度和高特异性快速批量检测。

方法　首先在 96 孔透明微孔板内孵育链霉亲和素，再通过链霉亲和素与生物素的稳定结合将生物素修饰的 OTA 适配体固定在板上，随后在孔板内孵育待测样品，最后加入由 Cas12a 蛋白、CRISPR RNA（crRNA）和单链荧光报告基因（ssDNA-fluorophore quencher, ssDNA-FQ）组成的 CRISPR/Cas12a 系统。本研究利用 OTA 与 crRNA 竞争性结合 OTA 适配体的原理，实现对 OTA 的定量检测。当待测样品中没有 OTA 时，crRNA 与 OTA 适配体互补结合，激活了 Cas12a 切割任意 ssDNA 的特性，ssDNA-FQ 被切割，荧光团与猝灭剂分离，产生大量荧光信号；反之，当待测样品中存在 OTA 时，由于 OTA 和 OTA 适配体的高特异性结合，导致一部分 OTA 适配体被 OTA 竞争性结合，与 crRNA 结合的 OTA 适配体数量减少，荧光信号相应降低。OTA 浓度的对数与荧光信号降低的程度在一定范围内成反比，从而实现对 OTA 的定量检测。

结果　该方法对 OTA 的检测限为 0.39 pg/mL，定量检测范围在 0.5 pg/mL~1 ng/mL 之间。用此法对大米和燕麦样品中 OTA 含量进行测定，并与 ELISA 法获得的结果进行比较，结果相近，说明此法可靠。此外，通过在 Web of Science 网站对已发表的 OTA 检测策略进行检索对比，本方法对于 OTA 的检测灵敏度普遍高于其他方法。

结论　我们构建了一个基于 OTA 适配体的 CRISPR/Cas12a 驱动的 ELASA 传感，可用于 OTA 的高灵敏度检测。与传统的 ELISA 方法相比，我们的方法有更高的特异性和灵敏度，且所用原料成本更低、更容易制备与保藏。与其他许多快速检测方法相比，我们的策略具有更高的灵敏度，并且可以实现批量检测，有广泛的应用前景。

关键字 CRISPR/Cas12a 系统；适配体；赭曲霉毒素 A；ELISA；荧光

分类：营养与可持续发展

“森态”概念对于标记食材营养与安全品质具有认证体系建设价值

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[目的]探讨“森态”概念作为生态理念的创新、细化和延伸，对于标记类长白山环境及其物产资源的独特品质极具识别度和成长价值。

[方法]分析现阶段以种植、养殖为主要食材供给源头的农牧生产状态，以及森态体系的基本架构、生态人文之间的互动效应和动态走势，论述食材营养和安全品质与生存生长生产环境之间的密切关联，以及营养品质和安全质量认证体系研发建设的意义和价值。

[结果] 森态环境对食材营养与安全品质具有积极影响，“森态”概念对于标记食材营养与安全品质具有认证体系建设价值。

[结论]“森态”物产作为源自生态环境的稀缺资源，其涵养能力、营养构成和安全系数亟需规范认知认证，以确认并保护森态食材的生物效价、资源品质和时空存续。我国对森林效益评价的研究始于 20 世纪 70 年代末,通过储备评估和架构分析，对其社会价值和经济价值进行了综合定位。但环林资源的研究多沉浸在环境物表和固化结构层面，对其生态、人文的互动效应、动态走势认识不充分。品质优异的特色食材做为资源物产的重要载体，其营养品质和安全质量认证体系的研发和建立，将对推动和带动生态保护、科技提升、社会进步，实现规范管理、资源整合和效益升级起到举足轻重的作用。森态食材兼具绿色、有机两个质量认证标准的体系优势，作为陆地生态系统的食药物源和再生资源,对于优化环境区位长期、远期的生态效益、社会效益、经济效益意义显著。森态认证体系的建设和规范，是对环森林资源食材的高标赋能和价值确认，是在绿色食品、有机食品的基础上，经过长期的食品认证体系化建设，经过试用、改进、提高等循环积累，对食材生态、产地、遴选、分级、生产、仓储、物流、销售、服务等环节进行从标准到流程到认证的全产品线科学管理和无缝对接，进而实现国产标准体系的创新、升级和国际化，从而在生态反哺、资源品质、产业结构、产品定位、价值提升等方面进行体系化建设和责权利分配，形成生态、健康、文化、经济和时空等学科整合、持续改进和良性循环，为人类社会整体的健康发展筑基建模。森态食材，因由得天独厚的资源条件和生长条件，具有营养浓缩安全、底蕴深厚稀缺、能效持续积累、时空双效循环、品质保值增值等特殊的生态效益、社会效益和经济效益，亟需建立系统的评价体系、运行标准以及区位研发、对接、管理、保护、反哺的专业运营团队，以提高品质认知、资源认知、价值认知，实现研发定位、产业赋能、生态保护的良性循环和成长性发展，为人类健康高端选品、高效赋能提供建设依据、方向引导和行动坐标。

关键字 森态资源　食材品质　认证体系

分类：营养与可持续发展

Cry1Ab 蛋白体外发育毒性的实验研究

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【目的】以 Cry1Ab 蛋白为受试物，进行全胚胎培养、微团细胞培养、胚胎干细胞实验和非靶向代谢组学检测，以评估 Cry1Ab 蛋白对非目标生物的体外发育毒性和可能的影响机制。

【方法】（1）全胚胎培养：收集 SD 大鼠 9.5 d 胚胎，Cry1Ab 蛋白暴露浓度分别为 0、2.15、4.64、10.00 和 21.50 ng/mL，体外培养 48 h 后测量胚胎卵黄囊发育情况，并使用 Brown's 评分法进行评分。（2）微团细胞培养：收集 SD 大鼠 13 d 胚胎肢芽细胞，Cry1Ab 蛋白暴露浓度分别为 0、10.0、20.0、40.0、80.0、160.0、320.0 和 1000.0 ng/mL，连续培养 5 d 后检测细胞增殖和分化受到的影响。（3）胚胎干细胞实验：使用小鼠胚胎干细胞 D3（ES-D3）和小鼠 3T3 成纤维细胞，Cry1Ab 蛋白暴露浓度分别为 31.2、62.5、125.0、250.0、320.0、1000.0、2000.0 ng/mL，培养 7 d 后检测细胞活性。培养 ES-D3 细胞，Cry1Ab 蛋白暴露浓度分别为 125、250、320、1000、2000 ng/mL，诱导其分化为拟胚胎体，记录其 16 d 内的生长分化情况，检测心肌分化相关标志物（Oct3/4、GATA-4、Nkx2.5 和 β-MHC）的基因表达情况。（4）非靶向代谢组学检测：使用小鼠 3T3 细胞，Cry1Ab 蛋白暴露浓度为 0 和 1000 ng/mL，培养 3 d 后收集细胞进行检测，分析可能的差异代谢物及相关通路。

【结果】（1）全胚胎培养显示，与对照组相比，21.50 ng/mL 浓度 Cry1Ab 蛋白组胚胎卵黄囊直径、冠臀长、头长较对照组减小，卵黄囊直径的变化呈现出剂量相关趋势（P<0.05）。0、21.50、4.64、10.00、21.50 ng/mL Cry1Ab 蛋白组的平均总形态学评分分别为 51.00、49.00、48.88、49.12、45.38 分。4.64 ng/mL 及更高浓度的 Cry1Ab 蛋白可减少胚胎体节数量，诱导胚胎发育畸形，胚胎体节数的变化呈现剂量相关趋势（P<0.05）。Cry1Ab 蛋白对大鼠胚胎的半数致畸浓度为 11.78 ng/mL。（2）微团细胞培养显示，暴露浓度为 0 至 1000.0 ng/mL 的 Cry1Ab 蛋白均未引起大鼠微团细胞增殖能力降低，且各实验组的最低细胞活性均大于 70%。80.0 ng/mL 及以上浓度的 Cry1Ab 蛋白可降低大鼠肢芽细胞分化为软骨细胞的能力（P<0.05），160.0 和 1000.0 ng/mL 浓度的 Cry1Ab 蛋白可减少微团形成数目（P<0.05），细胞分化率的降低呈现剂量相关趋势（P<0.05），但未见 Cry1Ab 蛋白暴露对微团细胞的迁移造成明显影响。Cry1Ab 蛋白对大鼠微团细胞的分化半抑制浓度为 3.91×10^{4} ng/mL。（3）胚胎干细胞实验显示，所有 Cry1Ab 蛋白实验组的小鼠 3T3 细胞和 D3 细胞活性与对照组相比无统计学差异（P>0.05）。各实验组的拟胚胎体直径和心肌细胞分化率无统计学差异（P>0.05），各组细胞团的形态、规模、搏动能力相似。各实验组的成熟心肌标志物 β-MHC、心肌早期分化标志物 Nkx2.5 和 GATA-4、多能性相关标志物 Oct3/4 的基因表达水平与对照组相比均无统计学差异（P>0.05）。（4）非靶向代谢组学检测显示，Cry1Ab 蛋白可使小鼠 3T3 细胞内内 25 种代谢物浓度显著上升，7 种代谢物浓度显著下降（P<0.05，含量变化倍数绝对值>2），并使细胞内生物素代谢通路受到显著影响（P<0.05，通路受影响程度>0.10）。

【结论】（1）在本研究条件下，Cry1Ab 蛋白可影响大鼠胚胎的正常发育并影响微团细胞的正常分化，对微团细胞和小鼠 3T3 细胞的增殖过程未见影响；未观察到 Cry1Ab 蛋白对小鼠胚胎干细胞分化为心肌细胞的过程产生影响。（2）在本研究条件下，Cry1Ab 蛋白可扰乱小鼠 3T3 细胞代谢，导致细胞内 32 中代谢物的浓度和生物素代谢通路受到显著影响，可能与部分体外发育毒性测试中出现的毒性效应相关，需要更多实验评估以确保相关食品的安全性。

关键字 Cry1Ab 蛋白，发育毒性，全胚胎培养，微团细胞培养，胚胎干细胞

分类：营养与可持续发展

不同来源特种玉米种皮中阿拉伯木聚糖的结构、理化特性和抗氧化潜力研究

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目的：全球环境污染和资源稀缺问题频发促使人们研究利用可再生资源生产有价值的产品。基于此，积极推动利用农副产品生产具有社会经济价值的产品具有重要意义。作为玉米淀粉加工过程的低附加值产品，全球玉米种皮的年产量约为5500万吨，主要用作动物饲料添加剂，非淀粉玉米种皮含有50%以上的半纤维素，许多研究发现其主要成分是阿拉伯木聚糖（AX），这是一种结构复杂的非淀粉多糖。作为一种不能被胃肠道酶水解的益生元膳食纤维，AX还可以促进健康肠道菌群的生长和短链脂肪酸的产生。研究发现，不同植物来源的AX结构差异会影响人类粪便发酵特性，此外，从不同基因型玉米中提取的AXs具有不同的阿拉伯糖/木糖（A/X）比例，以及不同的半乳糖和葡萄糖醛酸含量，从而导致不同的肠道微生物群落变化。因此，AX的精细结构将影响其物理化学性质、功能性质，最终影响其应用。

方法：本研究选取了不同来源的三种特种玉米种皮，分别是糯玉米（粤彩糯2号）、甜玉米（粤甜39号）和甜糯玉米（粤鲜糯6号），通过碱法处理分离得到三种不同来源的AXs：AX2，AX6和AX39，我们确定了其单糖组成和分子量的差异，通过核磁氢谱研究了其精细结构，通过原子力显微镜研究了其形貌及糖链特征，并进一步通过红外，X-射线衍射，热重分析和流变研究了其理化特性差异，最后通过体外抗氧化实验和体外厌氧发酵了解了其功能特性，确定了在体外发酵过程中产生短链脂肪酸的差异，促进特种玉米的综合利用。

结果及结论：研究发现AX39的A/X值最大，为0.68，说明其阿拉伯糖侧链的支化程度较高。与AX2和AX6相比，AX39的分子量更大，为3.92 ×105 Da，阿拉伯糖侧链分支更高。此外，AX6含有较高的二取代木糖，这使得它更难以消化。原子力结果表明，侧链较多的AX39含有较多的羟基，导致分子链的柔性化程度较低，而AX2允许单个AX分子的可视化，AX6可以形成不规则的形状，如细长的条形。红外及X-射线衍射结果表明三种AXs的官能团差异不显著且均呈无定形。流变学分析表明，高浓度时，AX39表现出明显的剪切变稀行为。此外，阿魏酸和对香豆酸是AX中的两种主要酚酸，体外DPPH和ABTS自由基清除结果表明，AX的抗氧化能力与其酚酸含量成正比。结构的差异导致了AXs体外发酵过程中短链脂肪酸含量的差异。分支度较高的AX39和酚酸含量较高的AX2的总短链脂肪酸含量均高于AX6。基于以上结果，我们发现不同来源的AXs具有不同的结构和性质，可以根据不同的需求选择合适的AXs来生产高附加值的产品。

关键字 阿拉伯木聚糖；特种玉米；体外酵解；抗氧化

分类：营养与可持续发展

新型淀粉基膳食纤维的益生活性研究

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目的：随着社会经济发展和生活水平提高，我国糖代谢异常及代谢综合征易发人群呈快速上升趋势。《健康中国 2030》提出引导合理膳食，实施营养干预，为人民群众提供全方位全周期健康服务。淀粉是日常主食的主要组分，是机体摄入能量的最主要来源。其中淀粉类膳食纤维能有效调节餐后血糖反应和肠道菌群，有利于预防糖代谢异常诱发的代谢综合征。本报告主要介绍类罗伊多糖作为新型淀粉类膳食纤维的潜在益生活性，阐述多糖结构营养品质的相互关系，为促进我国健康食品设计制造提供新的思路。

方法：在本研究中，利用来源于 *Azotobacter chroococcum* NCIMB 8003 的 4,6-α-糖基转移酶改性麦芽糊精（DE 29），通过重构糖链的键接方式制备出一种高分子量类罗伊糖结构的多糖。多角度激光光散射凝胶色谱系统结合酶指纹图谱法和核磁氢谱分析例了类罗伊糖的结构；体外模拟消化和模拟发酵探究了类罗伊糖的益生活性以及酵解过程。

结果：类罗伊糖是一种分子量为 1.5×10^{7} g/mol 的多糖，是由麦芽三糖、麦芽四糖、麦芽五糖等麦芽低聚糖通过 α-1,6-glc-α-1,4 转折结构和 α-1,4/6 分支结构形成的葡聚糖，其中 α-1,6 糖苷键的比例达 33.33%。体外模拟消化实验表明类罗伊糖包含 37.4%的抗消化组分，且类罗伊糖在口腔以及胃部消化阶段只有轻微降解，在小肠消化阶段被降解到 1.2×10^{6} g/mol，随后未被吸收的组分充当碳源在大肠中被肠道微生物酵解。与商业化抗性糊精相比，类罗伊糖可以更大限度的促进肠道微生物的增殖，降低肠道环境的 pH 值，产生更多的短链脂肪酸。

结论：4,6-α-糖基转移酶在重构麦芽糊精糖链结构时引入更多的 α-1,6 糖苷键，合成的类罗伊糖结构的新型多糖，可以在人体胃肠道中保留较多的抗消化组分，具有作为益生元的潜力。在体外模拟肠道发酵实验中，类罗伊糖作为碳源显著增加了肠道微生物发酵产有机酸和短链脂肪酸的产量，尤其是丁酸。实验中，类罗伊糖组的丁酸含量是抗性糊精组的 1.4 倍。丁酸在提供能量和抑制肠道细胞癌变方面发挥着重要作用，体现了类罗伊糖对维持人体肠道健康的巨大潜力。另外，类罗伊糖的益生作用主要与其在小肠中抗消化、大肠中较高的生物利用度有关。通过测定发酵液中的总糖含量变化发现，类罗伊糖比抗性糊精更易被肠道微生物降解利用，生物利用度在 50%左右，远高于商业化的抗性糊精。表明了类罗伊糖作为新型淀粉基膳食纤维的巨大潜力。

关键字 新型淀粉基膳食纤维，类罗伊糖，模拟胃肠消化，模拟肠道发酵

分类：营养与可持续发展

中国 18 岁及以上成人中心性肥胖变迁趋势的分析

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目的：中心性肥胖也称腹型肥胖，是指过多的脂肪堆积于腰腹部皮下或腹腔内脏器官、肠系膜、主动脉周围。中心性肥胖已成为全球重大公共卫生问题，与一般性肥胖相比，中心性肥胖与高血压、糖尿病、脑卒中等的关联性更为密切，给我国的医疗卫生体系造成了较为严重的负担。本研究分析我国 18 岁及以上成人中心性肥胖的患病状况及变化趋势，为成人中心性肥胖的防控提供理论依据与基础数据依据。方法：利用 2010-2012 中国居民营养与健康状况监测数据和 2015-2017 年中国居民营养与健康状况监测数据，采用多阶段分层整群抽样的方法，监测对象为全国 31 个省（自治区、直辖市）的常住人口。腰围的测量方法要求使用统一规定的腰围尺，空腹状态下进行，调查对象直立，腹部放松，双臂自然下垂，双脚合并，露出腹部皮肤，测量时平缓呼吸，以腋中线肋弓下缘和髂嵴连线中点的水平位置为测量点，并在双侧测量点做标记，记录调查对象平静呼气末时的腰围尺读数，以厘米为单位，精确到 0.1 厘米，重复测量两次，两次测量之间，误差不得超过 1 厘米。根据《中国成人体重判定》（WS/T 428-2013），将 85cm≤成年男性腰围<90cm，80cm≤成年女性腰围<85cm 定义为中心性肥胖前期，；成年男性腰围≥90cm，成年女性腰围≥85cm 定义为中心性肥胖。结果：（1）2015 年纳入分析的样本数为 181817 人，其中男性 84849 人，占 46.7%，女性 96968 人，占 53.3%。（2）2015 年我国 18 岁及以上成人的中心性肥胖率为 29.3%（95%CI：27.8~30.8%），男性的中心肥胖率为 30.1%（95%CI：28.3~31.9%），女性为 28.5%（95%CI：27.1~30.0%）;城市居民的中心性肥胖率为 30.5%（95%CI：28.1~32.8%），农村居民的中心性肥胖率为 28.1%（95%CI：26.2~30.0%）；东部地区居民中心性肥胖率为 32.1%（95%CI：29.1~35.1%），中部为 28.1%（95%CI：25.7~30.5%），西部为 26.3%（95%CI：24.7~27.9%）。整体来看，我国 18 岁及以上成人的中心性肥胖率男性高于女性，城市高于农村，地区以东部最高，西部最低，东、中、西部逐渐降低。（3）与 2012 年相比，2015 年我国 18 岁及以上成人的中心性肥胖率上升了 3.6 个百分点；男性上升了 4 个百分点，女性上升了 3.1 个百分点；城市居民上升了 1.5 个百分点，农村居民上升了 5 个百分点；且不同年龄段均有上升。结论：2012-2015 年，我国 18 岁及以上成人的中心性肥胖率呈上升趋势；其中男性的中心性肥胖上升速度高于女性，城市居民的上升速度高于农村；男性和女性的中心性肥胖率差距加大，城市和农村居民的中心性肥胖率差距缩小。需要尽快采取相应的政策和干预措施对我国成人中心性肥胖进行防控，包括积极进行营养健康教育，倡导居民合理饮食、积极运动等，降低中心性肥胖的发生风险。

关键字 成人；中心性肥胖；趋势

分类：营养与可持续发展

低温等离子体和超声波处理对蛋清过敏蛋白结构及致敏性的影响

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目的 卵类粘蛋白（Ovomucoid，OVM）和卵清蛋白（Ovalbumin，OVA）既是鸡蛋中的营养成分和主要构成，也是较为常见的过敏原。其中，卵类粘蛋白约占蛋清蛋白的 11%，其致敏能力最强。卵清蛋白在蛋清的中蛋白含量最高约为 54%，致敏性弱于卵类粘蛋白。开发新型食品加工技术用于降低蛋清过敏原的致敏性对儿童摄取充足的营养具有重要指导意义。方法 研究拟采用不同食品加工技术：低温等离子体和超声波来分别处理卵类粘蛋白和卵清蛋白鸡蛋过敏原。检测加工前后鸡蛋过敏原结构及理化特性的变化。通过电子鼻分析处理前后蛋清的气味变化，研究加工方式对蛋白的体外消化率影响。采用扫描电子显微镜研究蛋清过敏蛋白微观形貌的变化，通过十二烷基硫酸钠聚丙烯酰胺凝胶电泳、傅里叶红外变换光谱和圆二色性光谱探索蛋清过敏蛋白分子构象和分子间相互作用。从原子及分子水平上阐明低温等离子体和超声波改善蛋清过敏蛋白的微观结构和功能性质的分子机制，旨在为新型食品脱敏加工技术在食品工业中的应用提供理论基础和实验支撑。结果 超声波处理蛋清前后的气味差别较小，但是处理时间越长，气味越相似。低温等离子体和超声波处理后蛋清的可溶性蛋白浓度减少，体外消化率略微增加，微观结构上分子粒径减小。蛋白凝胶电泳结果显示蛋清过敏原有 4 种主要过敏原，分布在 10-98 kDa 范围内，其中卵类粘蛋白的分子量是 28KDa，而电泳中的条带分子量大约是 38 KDa。这可能是因为在煮沸的过程中，卵类粘蛋白发生了交联造成的。由于蛋白质间交联反应，疏水和静电相互作用以及二硫键的形成，蛋白质可以转化为更高分子量的聚集体。在圆二色谱和傅里叶红外光谱分析中，蛋清过敏蛋白二级结构主要以 α-螺旋为主，β-转角和 β-折叠含量低。随着超声和低温等离子体持续时间的增加，二级结构含量没有明显变化。结论 随着超声波和低温等离子体的处理时间增加，蛋清蛋白的气味愈加相似，可溶性蛋白含量减少，体外消化略有增加，微观结构的颗粒更加细碎，处理后的蛋白二级结构较不处理的蛋白未发生明显变化。原因可能是处理强度和时间不够，需要加大功率或者时间。但还需要进一步的免疫学实验证实处理后蛋清过敏蛋白的 IgE 结合能力变化，以更好地了解这两种加工方法对过敏原的影响。

关键字 新型食品加工技术;低温等离子体；超声波；食物过敏;过敏蛋白;蛋白二级结构；

分类：营养与可持续发展

基于适配体识别和双循环扩增策略的荧光传感器构建及对雌二醇的测定研究

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目的：雌二醇是最典型的环境雌激素之一，它可通过食物链在体内富集，激活或抑制内分泌系统，破坏内环境稳定，对机体造成不可逆转的损害。基于适配体特异性识别，切口内切酶和分子信标辅助的双循环信号放大技术，构建了荧光适配体传感器，并应用于雌二醇的检测。

方法：本研究创新性地提出了一种三倍扩增的新策略来检测雌二醇。设计了 DNA 链 S1 和发夹 DNA HP1、HP2。DNA S1 可以和适配体配对结合形成双链 DNA，将不同浓度雌二醇加入至体系中会使双链解离，释放出作为第一步循环扩增的启动链 DNA S1，S1 与发夹 DNA HP1 结合，借助缺口内切酶产生两个单链 DNA S2，分别开启两个循环扩增反应。通过将 FAM 荧光基团从猝灭基团旁解离出来，使荧光恢复。由于触发链与 HP1、HP2 可同时进行信号扩增反应，从而导致荧光信号多倍增高。通过荧光信号增加量实现对雌二醇的定量检测。因此，结合适配体、分子信标和缺口酶辅助信号放大法建立了一种灵敏、便捷的雌二醇荧光检测方法。利用聚丙烯酰胺凝胶电泳技术验证了传感器中酶循环反应的可行性。借助 X 射线光电子能谱仪（XPS）检测验证了雌二醇适配体与金磁微球结合。为了获得更好的分析性能，对重要的影响因素进行了优化，包括 S1 浓度、雌二醇与适配体的孵育时间、HP1 浓度、HP2 浓度、酶浓度、酶反应时间、以及 S1 与适配体互补碱基数量。

结果：在最佳优化条件下，应用该传感器测定了不同浓度的雌二醇溶液，所有样品平行测定三次。结果发现，随着雌二醇浓度的增加，荧光强度变化量逐渐增大，这表明在反应体系中有越来越来的荧光基团产生，也证明雌二醇传感器已被成功构建。雌二醇浓度在 3.0×10-10-10.0×10-9 mol/L 范围内，与荧光强度变化呈现出良好的线性关系。回归方程是 ΔF =121.1C + 159.7（C：nM），相关系数为 0.995，检出限为 8.910-12 mol/L。本研究方法和现有报道的雌二醇检测传感器的性能对比结果表明，本方法具有更好的线性范围和更低的检出限。采用标准加入法对该种适配体荧光传感器的实用性进行了测试。对牛奶样品的加标回收实验的回收率和相对标准偏差范围分别为 98.50-117.50%和 0.13-2.90%。由上可知，所制备的适配体荧光传感器可应用于实际样品的测定。

结论：该传感器检测效率高，可在短时间内实现信号的快速增大，相比于单循环扩增方法，检测效率提升了近 70%，且无需复杂的样品前处理，灵敏度高、特异性强、操作简便，可用于水样和牛奶样品的测定，结果准确可靠。本研究可通过改变适配体种类来为其他目标物的检测提供一个通用平台，这为食品检测和生物分析提出了新的思路和理论依据。

关键字 适配体、荧光传感器、切口内切酶、分子信标、17β-雌二醇

分类：营养与可持续发展

食物系统转型中营养健康问题及评价指标研究

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背景：食物系统是人类赖以生存的基础。食物系统的健康发展关系国民素质提高和经济社会发展，以营养健康为导向重塑食物系统对实施健康中国战略具有重大战略意义。我国食物系统的发展已取得了长足进步，但随着生活方式、饮食结构、疾病负担等方面的变化，对营养健康提出了新的需求，中国食物系统要向提供更合理、更营养、更健康食物的模式转型升级。目前，中国居民面临膳食营养需求升级、营养不均衡问题加剧、营养相关疾病负担加重等营养健康问题，当前的食物系统无法满足中国居民膳食结构变化与营养需求升级的要求，这就要求中国食物系统战略任务必须由供给保障逐步转型升级到食物系统的可持续供给与营养健康保障的更高层面，形成食物供给—营养需求—健康促进的更高水平的食物系统。从已有研究来看，对可持续食物系统的评价主要集中在资源、环境、成本维度，缺乏将营养、健康综合考虑的评价指标探讨。本文探讨了食物系统转型中面临的营养健康问题，系统梳理了未来中国营养健康发展目标，提出了食物系统转型中营养健康相关评价指标。

目的：构建中国食物系统转型中营养健康评价指标体系，为未来中国可持续性食物系统综合评价提供初步的参考点和科学依据。

方法：本文探讨了食物系统转型中面临的营养健康问题，系统梳理了中国食物系统转型中营养健康发展目标，及国内外食物系统营养健康相关评价指标，利用目标规划方法，探讨营养和健康目标下的未来食物消费结构。

结果：中国可持续食物系统的重塑，必须要以中国居民面临的营养健康问题为导向，将食物、营养、健康作为可持续食物系统的重要参数进行考量，使中国居民在物质和经济上都能够获得充足、营养、健康和安全的食物，同时积极构建更加健康、生态、可持续的食物消费观和生产观。结果表明，实现可持续食物系统需要重点优化优质蛋白质食物供给结构，减少红肉摄入，适当增加白肉摄入，同时增加豆类摄入。

结论：中国可持续食物系统的重塑必须要以中国居民面临的营养健康问题为导向，从食物结构合理、营养摄入充分、促进生命健康三个方面构建可持续食物系统中营养健康指标评价体系。

关键字 食物系统转型；可持续性；营养；健康；评价指标

分类：营养与可持续发展

2 型糖尿病相关炎症通路与抗炎治疗的研究进展

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目的　2 型糖尿病（Type 2 diabetes mellitus，T2DM）是最常见的代谢性疾病之一，是一个全球性的公共卫生问题，且中国的糖尿病患者占全球的四分之一，已经高居全世界首位。T2DM 多发于老年人，但现如今由于肥胖，缺乏身体活动和不良饮食水平的上升，也越来越多地出现在儿童，青少年和年轻人当中。流行病学研究表明，肥胖个体患 T2DM 的风险比正常体重者高出七倍。反过来，大约 80%的 T2DM 患者超重。有学者用慢性低度炎症理论（也称为代谢性炎症）来解释肥胖和 T2DM 这两种疾病的关系。这种慢性低度炎症状态是 T2DM 的典型表现，可增加促炎细胞因子的产生，这些炎症细胞因子不仅会损害胰腺的 β 细胞，导致胰岛素分泌减少，而且还会通过降低葡萄糖摄取和外周组织的利用效率来促进胰岛素抵抗。因此，抑制炎症或炎症细胞因子被视为治疗 T2DM 的重要步骤。

方法　本文通过计算机检索文献，从与 T2DM 相关的 5 种炎症通路、4 种相关促炎因子以及基于抗炎的药物和天然植物活性成分对 T2DM 治疗的多个方面进行分析。

结果　5 种炎症通路分别是 IKK/NF-κB 通路、JNK/AP-1 激酶通路、NFAT 通路、JAK/STAT 通路和 NLRP3 炎症体信号通路。4 种相关促炎因子分别是肿瘤坏死因子-α、白细胞介素-1β、白细胞介素-6 和 C 反应蛋白。基于抗炎的 T2DM 治疗药物可以分为直接针对代谢性炎症的治疗药物和潜在的具有抗炎作用的抗糖药物。以炎症为靶点的治疗 T2DM 的天然植物活性成分根据其生物合成来源，可统分为酚类化合物、萜类化合物以及含氮生物碱和含硫化合物。相较于其他几类，酚类化合物对人体健康有很大的益处。

结论　炎症的出现加剧了 T2DM 的发病及其继发性并发症。围绕炎症与胰岛素抵抗和相关并发症联系起来的潜在机制，开发新型抗炎治疗药物，对未来 T2DM 及其并发症患者的健康管理极其重要。天然植物活性成分可作为慢性炎症性疾病的治疗工具。多酚或黄酮类化合物更是天然植物活性成分中功能性强的物质代表，是重要的代谢调节剂，它们能够通过影响各种细胞和分子途径靶标而发挥治疗 T2DM 的作用。本综述进一步为 T2DM 的预防和治疗提供新见解。

关键字 2 型糖尿病；炎症通路；促炎因子；植物活性成分

分类：营养与可持续发展

图形化营养信息标示对餐饮食品碳足迹的影响

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【摘 要】目的 以碳足迹（Carbon Footprint）作为碳排放量评价指标，通过网络模拟点餐观察图形化营养信息标示对餐饮食品碳排放的影响，探索实践减少餐饮食品浪费的有效措施。 方法 设计图形化营养信息标示，包括雷达图和条形图两部分。其中雷达图借鉴英国“交通灯”标签系统将食品的能量、脂肪、胆固醇、钠和添加糖 5 种限制性营养指标以绿、黄、红三色在雷达图中标示，绿色表示限制性营养指标含量低于 6%营养素参考值（nutrient reference values，NRV）或建议值，黄色表示限制性营养指标含量为 6%~25%NRV 或建议值，红色表示限制性营养指标含量＞25%NRV；条形图标示各食品具有代表性的推荐性营养指标，如蛋白质、维生素、矿物质及其 NRV%。采用方便抽样，共纳入 1407 名调查对象，设计带有包括调查对象基本信息、营养知识、模拟点餐、对餐饮食品营养信息标示的态度、对图形化餐饮食品营养信息标示的满意度 5 部分的问卷调查其对菜品的选择，模拟点餐时，第一次使用普通菜单，第二次使用与普通菜单菜品相同但带有图形化营养信息标示的菜单。模拟点餐部分共设牛肉类、猪肉类、鸡肉类、鱼肉类、蔬菜类及豆制品类等 6 类菜品，每类 4 个菜品。基于过程分析法计算调查对象前后两次选择菜品的碳足迹及营养分值。 结果 在两次模拟点餐中，调查对象选择菜品的总营养分值与总碳足迹均呈负相关（P＜0.05），5 种限制性营养指标与总碳足迹均呈正相关（P＜0.05）。与使用普通菜单相比，使用带有图形化营养信息标示的菜单进行模拟点餐时，调查对象选择牛肉类、鱼肉类、猪肉类、蔬菜类、豆制品类菜品的碳足迹均下降（P＜0.05），6 类菜品的总碳足迹下降（P＜0.05）。结论 图形化餐饮食品营养信息标示作为膳食认知干预方式，有助于指导人群合理选择餐饮食品、改善人群健康状况，同时有望成为减少餐饮食品浪费进而降低餐饮食品消费碳足迹的有效措施。

关键字 膳食认知干预；餐饮食品；营养信息标示；碳足迹

Category: Nutrition Education

How did the elementary students' perceptions of food change through learning activities about sustainable agriculture?

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Background and Objectives: BISTRO GESUIDO, a sustainable agriculture system which uses resources from municipal wastewater to produce food, has been implemented as a pioneer project since 2016 in Tsuruoka city, Yamagata prefecture, Japan. However, it is still difficult to obtain consumer acceptance of foods produced by BISTRO GESUIDO. Food education would be significant, especially for children, to promote not only their own health but also sustainable food systems in our society. The objective of this study is to investigate the effects of learning about sustainable agriculture and its effect on students' perceptions of food.

Methods and Study Design: Sixty-nine 6th graders in elementary school attended our learning program in 2022. They visited a local wastewater plant on a school trip. They received a lecture about BISTRO GESUIDO from the staff, then they watched how *Ayu*, "Sweetfish", were reared in the pool filled with filtered wastewater. They ate vegetables produced by BISTRO GESUIDO. We implemented a questionnaire and the image mapping method before and after our program.

Results: Before the program, under 20% of students knew about the wastewater. After the program, over 75% of them understood it, and it suggested the positive effects of our program. The majority of students (45%) wrote "dirty" as the first word in their image maps on wastewater before learning. However, the percentage decreased to half after the program. Also, new words such as "wastewater plant" and "producing nutrients" were added to the maps. These changes might have been as a result of practical activities such as visiting and watching the actual system of BISTRO GESUIDO.

Conclusions: BISTO GESUIDO could be a good topic for elementary students to learn about sustainable eating. In addition, their perceptions of food could be improved by practical learning activities at school.

Key words wastewater, sustainable agriculture, food education, elementary school students

Category: Nutrition Education

护士与药师在肠内营养管饲的实践情况调研

A survey of enteral feeding tube practice between nurses and pharmacists

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Background and Objectives: The enteral nutrition and medication administration with an enteral feeding tube is complex and prone to errors. Data on adherence to the standard protocols on tube feeding remain scanty. To assess nurses'and pharmacists' knowledge of enteral nutrition procedures and medication preparation and administration through enteral feeding tube.

Methods and Study Design: In this study, a 22-item online questionnaire was developed. Questions reflected key aspects of guidelines recommendations on enteral nutrition procedures and medication administration via enteral feeding tube. Average scores of knowledge and practice questions as well as the proportion of answering correctly to the individual questions were compared between nurses and pharmacists. The relationship between the scores and the different conditions of the participants was studied.

Results: A total of 393 valid questionnaires were completed by nurses and pharmacists. The average score of nurses, CSPEN-member and non-CSPEN-member hospitals' pharmacists were 28.3, 30.4 and 22.8. Nurses had significantly better knowledge on the prevention of regurgitation and aspiration and the tube flushing. The accuracy of pharmacists from CSPEN-member hospitals was higher than those from non-CSPEN-member hospitals of each question. The CSPEN-member hospitals' pharmacists scored better than nurses in the aspect of drug-drug, drug-nutrient interactions and selection and preparation of drugs even if there were no statistical differences found.

Conclusion: Our findings demonstrate that nurses' and pharmacists' knowledge of enteral nutrition procedures, medication preparation, and administration through enteral feeding tube was poor. It is suggested that routine in-servicetraining should be conducted immediately and the standard operating procedure and clinical-practice guidelines should be standardized developed. Enteral tube feeding is complex and prone to errors, which requires the collaborative efforts of doctors, nurses and pharmacists, with the aim of reducing operating errors of enteral tube feeding and improving patient care in hospitals.

Key words Enteral feeding tube, Questionnaire, Nurses, Pharmacists

Category: Nutrition Education

Mindful eating, satisfaction and portion size applied to snacking - how all can influence eating behaviour?

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Snacking (eating between the traditional main meals), per se, is not unfavorably associated with health-related outcomes. This is a food habit which has become very popular worldwide. It accounts for significant amounts of nutrients and energy, as snacking contributes between 5% and 33% of daily energy intake. Portion size, and especially oversizing lead to overconsumption without compensation at next meals. This has been well demonstrated in children and in adults. Many high energy dense foods are usually highly liked and may easily be overconsumed if presented in large portions. Downsizing showed interesting reduction in energy intake, especially in lab conditions. To successfully reduce portion size, food satisfaction, based on three complementary dimensions (sensory properties of foods, physical sensations of the subject as satiation, satiety, quantity of energy provided) may contribute to a successful strategy of downsizing. Snacking practices are known to be susceptible to environment and emotional influences, which makes snacking both a potential challenge for energy balance and diet quality and an opportunity to apply the principles of mindful eating. This concept draws on the wisdom of both the mind and the body by helping individuals cultivate greater awareness of the distinctions between physical and psychological sources of hunger, taste and satiety/ fullness. Applying mindful eating concepts to snacking occasions by paying attention to the present moment and avoiding multitasking and distraction seems beneficial by lowering energy intake at snacking moment, but also at the following eating occasion, and possibly impacting food intake over the whole day.

To conclude, the combination of prepacked portions of pleasurable foods defined to reach a high satisfaction when eating in a context of mindfulness could help populations to control better their daily food intakes.

Key words food behaviour, mindful eating, satisfaction, portion size

Category: Nutrition Education

從腎病前期到血液透析階段的營養教育

Nutrition Education through the Pre-Renal disease to Hemodialysis stages.

Biling Yu*
HK Baptist Hospital

My Abstract topic: Nutrition Education through the Pre-Renal disease to Hemodialysis period.

Our Team member: Nephrologist(s), Renal center nurse(s), Dietitian (s), volunteer(s), Renal patient(s) and their carer(s).

Education period: August 2022 to March 2023 (8 months)

Education method: Talks, Cooking Demonstration, Interactive discussion, Q&A sessions. Videos and online links to elderly center and nephrologist clinics

Objectives: Our team aims to increase awareness of Renal health to elderly group, at the same time to encourage the participation of Renal disease patients' group to increase knowledge, nutrition, and cooking skills for their daily life.

Key words Pre-Renal, Hamodialysis, Cooking demonstration, Recipes

Category: Nutrition Education

Teachers' Insights in Achieving Better School Food Literacy Education and School Food Environment: A Qualitative Study

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2. Deakin University, Geelong, Australia, Institute for Physical Activity and Nutrition (IPAN), School of Exercise and Nutrition Sciences
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Background and Objectives: Teachers are a main stakeholder group for food literacy education who are involved directly in the teaching-learning process. This study examined teachers' insights in relation to food literacy education in Sri Lankan schools from grades 6 to 11.

Methods: This qualitative study was conducted with eleven participants as key informants representing different types of government schools in six provinces in Sri Lanka. Teachers who teach Home Economics, Agriculture, Practical and Technical Skills, and Science were interviewed. The average duration of the interviews was sixteen minutes. The interviews were conducted until data saturation was reached. All the interviews were conducted in local languages and they were recorded, transcribed, and translated to English. Data were analyzed using NVivo (Version 11) software following the Thematic Analysis Technique.

Results: The findings revealed that the present curricula are exam-oriented, and the practical component is insufficient to improve the skills or the interest of the students in food literacy. Furthermore, the teachers suggested that the school food environment needs some improvements to support food literacy education, including making all school communities food literate, and establishing healthy school canteens as directed by government circular. Uneven distribution and limited resources among schools, undervaluing of food literacy-related subjects, and inadequate professional development for teachers to update knowledge were identified as the main obstacles to food literacy education. The support provided by parents, other school communities, and education administrators for food literacy education was the main plus point reported by the teachers.

Conclusion: The Sri Lankan school food literacy curriculum does not sufficiently address the food skills of school children, and school food environments need improvement to support food literacy education.

Key words Food literacy education, Key informant interviews, Qualitative analysis, Sri Lanka, Thematic analysis

Category: Nutrition Education

Plant-Based Nutrition Education Program for Healthcare Professionals

Clara Ming Pi*,Mei Yu Gigi So
The University of Hong Kong, School of Professional and Continuing Education

Global food production is the cause of one third of the world's greenhouse gas emissions. Livestock for meat and dairy production alone accounts for 18% of greenhouse gases, more than all of earth's cars, trains and planes put together. High consumption of resource intensive meat, dairy, fat and sugar has taken its toll on global health. It is estimated that 1.3 billion people in the world are living with obesity. In the 2016 ADA paper, researchers updated the 2009 ADA position paper on vegetarian diets and concluded that not only are vegetarian and vegan diets appropriate for all stages of the life cycle (pregnancy, infancy, childhood, etc.), but they also help reduce the risk for heart disease, high blood pressure, type 2 diabetes, stroke, obesity, and some types of cancer. The updated position paper also presents a section on environmental issues which concludes plant based diets are more sustainable and less damaging to the environment.

The Physicians Association for Nutrition (PAN) is an international NGO established in 2018 on a mission to eliminate diet-related deaths globally by making nutrition a core part of healthcare and by engaging health professionals in efforts towards healthy and sustainable food environments. Currently, PAN International has established partnership with HKU SPACE to promote healthy food education among physicians and health professionals in the greater China region. A short certificate course has been designed by PAN International to kick-start this endeavour focusing on whole foods plant-based nutrition and impact on health and chronic diseases, climate change and pandemic risks and the connections between food and individual and planetary health.

This course is designed to equip physicians and healthcare professionals on the latest research on plant-based nutrition and understand the immense power of plant-based nutrition to prevent and treat disease, as well as to mitigate climate change.

Key words Plant-based nutrition, education, healthcare

Category: Nutrition Education

Food Alegy

Yuri Kinoshita*,Emi Takahashi
Tohoku Seikatsu Bunka Junior College

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Key words vvv

Category: Nutrition Education

Positive feedback of PUTRA Community Nutrition Ambassador Programme (PUTRACNAP) among Malaysian mother-child pairs living in low-cost flats in Kuala Lumpur

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3. Faculty of Environment and Resource Studies, Mahidol University

Background: The PUTRA Community Nutrition Ambassador Programme (PUTRACNAP) is developed to address food and nutrition insecurity among Malaysian urban-poor households living in low-cost flats. The programme integrates nutrition education and urban gardening activities, providing a healthier and more sustainable diet for the intervention respondents while creating a supportive environment to improve food security. This study aims to report the feedback of the intervention respondents, who are mothers as the primary caregivers and their children who act as supporters for their mothers in PUTRACNAP. **Methods:** The PUTRACNAP is a cluster randomized-controlled trial (c-RCT), whereby the intervention group consists of 33 pairs of mothers and their children (age: 7 to 12 years old) who participated in the PUTRACNAP for 3 months, while another 31 counterparts were in the control group. Both groups completed the questionnaires at baseline, while the intervention group completed the programme feedback questionnaires after the programme. **Results:** Nearly two in five (39.5%) of the intervention groups experienced food insecurity and three in five (58.0%) in the control group. All mother-child pairs (100%) reported that they were satisfied with PUTRACANP interactive education workshops on nutrition and urban gardening, respectively. All mothers (100%) indicated that they would share their learnings and knowledge with their families and friends, and apply it to their daily lifestyle. **Conclusions:** This programme is feasible to conduct at household levels and can be an alternative to improve their food and nutrition security. However, further reports on the effectiveness of the programme are required to be considered.

Key words food and nutrition security; mother-child pairs; low-income; integrated approach

Category: Nutrition Education

Garden-based Nutrition Intervention Increased Knowledge, Self-Efficacy, and Vegetable Intake of the Urban Poor Children: "GrowEat" A Cluster Randomised Control Trial

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Background and objectives: School gardening programme has shown improvement on children's vegetable intake. However, it is not known if gardening programme in urban poor home setting would show similar results. This study was conducted to evaluate the effectiveness of "GrowEat", a garden-based nutrition intervention for improving psychosocial factors (knowledge, attitude, practice, and self-efficacy) of vegetable intake of the urban poor children.

Methods: A cluster randomized controlled trial (cRCT) was conducted from September 2022 to November 2022 among 125 urban poor children aged 9-12 years in low-cost flats in Kuala Lumpur, Malaysia. The intervention group (IG; n=70) received a 12-weeks intervention programme which consisted of gardening, nutrition education and cooking sessions, while the control group (CG; n=55) received no intervention. Children's psychosocial factors of vegetable intake were evaluated using questionnaires while vegetable intake was obtained using a 2-days 24-hour dietary recall at three timepoint (baseline, post and 3-months follow-up).

Results: After the 12-weeks intervention, knowledge towards vegetable intake of children from IG significantly improved from baseline to post intervention (Δ: +0.83 $p < 0.001$) and at 3-months follow-up (Δ: +0.88, $p < 0.001$). The IG was reported to eat more vegetables at post intervention (Δ: +0.77, $p < 0.001$) and during follow-up (Δ: +0.41, $p=0.004$). Although the increased vegetable intake across timepoints was significant among the IG, the intake was still below the recommended level. The self-efficacy to eat vegetables of IG significantly improved from baseline to post intervention (Δ: +4.64, $p=0.015$). No significant mean differences were observed between these psychosocial factors on vegetable intake over time among the CG.

Conclusions: The study suggests that garden-based nutrition programme can improve knowledge and self-efficacy of vegetable intake, which in turn improved vegetable intake of the urban poor children. Future research on ways to scale and sustain gardening efforts in urban poor setting is warranted.

Key words gardening intervention, nutrition education, psychosocial factors, vegetable consumption, urban poor

Category: Nutrition Education

WhatsApp-based Education Intervention to Promote a Healthy Lifestyle in Indonesia

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3.

Tea flavonoids have been shown to reduce risks of Cardiovascular Disease (CVD), and tea consumption might help reducing the problem in the community. The aim of this research was to evaluate the effect of a WhatsApp-based education intervention “HaH (Heart at Home)” program in increasing the knowledge, attitude, and practices in a healthy lifestyle. Subjects were women/men who are married, members of IHF (Indonesia Heart Foundation), aged 25-50 years old, and had a smartphone. The intervention included videos/ picture posts and online discussion and was conducted for 2 months using Whatsapp platform. Wilcoxon and McNemmar tests were implemented to examine the differences of subjects’ KAP (knowledge, attitude, and practices) before and after the intervention. Most subjects were women (96.3%), aged 25-40 years (78.8%), and housewives (67.5%). The score of knowledge increased about 17.5% ($p<0.05$). More than 10% of subjects increased their knowledge related to the risk of CVD. Almost all subjects already had a positive attitude at baseline (94%) and was slightly increased to 97.0% ($p<0.05$). After the intervention, positive health practices such as exercises, consuming vegetables, relaxation, and sleep were increased, while negative practices such as smoking, stress symptoms, and consuming high-cholesterol food were decreased. The present study showed that an online program application such whatsapp quiet effective in improving subject’s behaviour, although this can be maximized by having more interaction with subjects.

Key words CVD, online education, tea consumption

Category: Nutrition Education

Low-income Filipino Mothers' Cultural Concepts of Healthy Mothers and Children Do Not Align with Standard Nutrition Definitions

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2. Philippine Women's University, Manila, Philippines
3. Nestle Philippines Inc.

Background and objectives: The health of Filipino children has not improved in the past years, despite implementation of several nutrition programs. The study explored cultural concepts of health among low-income mothers, to serve as input for planning nutrition education programs that seek to achieve behavior change. The objectives were to: 1) describe the qualities of healthy mothers and children from mothers' point of view; 2) compare these cultural concepts with scientific nutrition recommendations; 3) identify concepts that need to be clarified or corrected. The information can be incorporated in nutrition education programs to improve mothers' child care and nutrition practices.

Methods: The qualitative study was based on grounded theory. In-depth interviews via Zoom (due to the pandemic) were conducted among 26 mothers from urban and rural areas in the country's major islands. A conversation guide was used to elicit mothers' concepts of a strong healthy child, strong healthy mother, and nutrition practices to achieve strong healthy children. Responses were transcribed verbatim. Thematic analysis was conducted on the resulting transcripts. An inductive approach was used wherein statements with common thoughts were coded and categorized into specific themes.

Results: Mothers believed 1) a strong healthy child is one who is physically active and highly engaged with his/her environment; 2) a strong healthy mother is one who is mentally strong in the face of problems; 3) while a healthy diet is important, the best way to promote child health is to provide daily vitamin and mineral supplements.

Conclusion: Filipino mothers possess cultural health concepts that are not necessarily consistent with standard nutrition definitions. These cultural concepts should be taken into account when planning nutrition education programs so that despite the presence of these beliefs, compliance with scientific nutrition recommendations to achieve optimal health can still be assured.

Key words health beliefs, culture, mothers, children, qualitative

Category: Nutrition Education

马来西亚校园营养推广活动（MySNPP）：新冠疫情的多样化策略

Malaysia School Nutrition Promotion Programme (MySNPP): diversifying strategies during COVID-19 pandemic

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1. BATU PAHAT HEALTH OFFICE
2. NUTRITION SOCIETY OF MALAYSIA
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4. TANGKAK HEALTH OFFICE
5. MUAR HEALTH OFFICE

In view of the higher prevalence of overweight and obesity and thinness and stunting in Johore school-aged children, the Malaysia School Nutrition Promotion Programme (MySNPP) was initiated by Johore State Health Department and Nutrition Society of Malaysia. It aims to provide nutrition knowledge to the children and healthier school food environment in canteens. This presentation shares the programme concept, implementation approaches and experiences during COVID-19 pandemic in three districts in Johore.

The MySNPP comprises two components: (1) delivery of nutrition education to the children using the “Good Nutrition Key to Health Children (GNKHC)” modules (2) provision of nutritious meal to the children during recess. When schools were closed during the COVID-19 pandemic outbreak (Year 2021 and 2022), the interactive activities of the GNKHC were modified to suit the virtual learning platform, and nutritionists conducted the modules online as holiday camps. Seven primary schools, involving children, 57 teachers and completed these online camps. When the children returned to schools, 196 children and 26 teachers from another three schools completed the on-ground nutrition education camps. Pre- and post-questionnaires indicated that the children made significant improvements in the nutrition knowledge, attitude, and practice scores ($p<0.05$). Majority of the children, teachers and parents gave positive feedback to the programme.

Although various challenges were faced when conducting the online and on-ground nutrition education of the MySNPP, the co-operation and support given by the school authorities, parents, and children are the main reasons for the programme success. The nutritious meals provision component of the MySNPP was resumed when the school re-opened (Mac 2022), and 91.4% of the children who completed the nutrition education session consumed and enjoyed the meals. In view of the positive impact of MySNPP, it is highly recommended to be extended to all primary schools in Malaysia.

Key words school nutrition promotion programme; nutrition education; school canteen; knowledge, attitude, and practice on nutrition

Category: Nutrition Education

Sustainability of a Culinary Nutrition Education Intervention: Examining the Impact on Children's Dietary Practices and Variety

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Background and objectives: Culinary nutrition programs have received growing attention as a promising avenue to improve nutrition practices among children. However, these interventions must be further evaluated to determine the outcomes' sustainability, ideally among populations in developing nations given the limited evidence. The present study aimed to evaluate the sustainability of a culinary nutrition education program at a 3-month follow-up, in terms of children's dietary practices and variety.

Methods: This cluster randomized-controlled trial was conducted among Malaysian schoolchildren aged 10-11 years (n=83). The 12-week intervention included one introductory session with parents and five hands-on healthy meal preparation sessions. Children's dietary practices and variety were self-reported using a guided form adapted according to Malaysian Dietary Guidelines for Children and Adolescents, at baseline and three months after the intervention. Outcomes were analyzed using independent samples t-test and Mann-Whitney U test.

Results: Findings demonstrated that the intervention group sustained a significant increase in the consumption of healthful foods including whole grains (Δmean= +1.11 times/day, $p<0.001$), vegetables (Δmean= +1.37 times/day, $p<0.001$), and fruits (Δmean= +1.15 times/day, $p=0.047$) in comparison with the control group, even after 3 months post-intervention. Similarly, the reduction of less healthful foods such as refined grains (Δmean= -0.48 times/day, $p=0.001$), processed foods (Δmean= -1.48 times/day, $p<0.001$), and sweetened beverages (Δmean= -1.03 times/day, $p<0.001$) were observed in the intervention group. Further, children in the intervention group had good diet variety during dinnertime, compared to the controls ($p=0.017$).

Conclusions: The current study presented the sustainability of a culinary-focused intervention in improving dietary practices and variety. Findings highlighted the prospect of experiential culinary nutrition programs in advocating healthy eating behaviors and as such, similar programs deserve implementation in schools, ideally with stakeholders' support.

Key words culinary nutrition, dietary practice, diet variety, children, intervention

Category: Nutrition Education

Effectiveness of the “Carbohydrate Counting” Teaching Aid in Pediatric Diabetes

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2.

Abstract

Introduction prevalence of diabetic in children and adolescents is increasing rapidly, reflecting inappropriate consumption which creates health problems and increases the risk of complications. In addition, diabetic in children and adolescents also means longer infliction compared to adults. Therefore, the research team chose Carbohydrate Counting teaching aid to provide targeted health education for young diabetic patients in combination with snacks nutritional modelling.

Objectives of this research is to ensure that young patients and their family are equipped with necessary skills to assess food that are appropriate for the disease. The study looked at the effectiveness of the Carbohydrate Counting.

Methodology teaching aid in 30 young diabetic patients who volunteered to be part of the study.

Each patient received individual nutritional counseling and was followed up over the period of 3 months.

Results the study found that patients receiving counseling using the Carbohydrate Counting teaching aid were able to control their blood sugar level better than before they received counseling. There was a significant increase of knowledge from a mean score of 6.333 and standard deviation of 1.709 during the pre-test to a mean score of 20.467 and standard deviation of 4.666 during the post-test. The increase is statistically significant at p-value < 0.001.

Conclusion in addition, each patient received a regular follow-up from a multidisciplinary team for a period of 3 to 6 months to review their knowledge and change their consumption habit under the pluralistic culture in a way that is appropriate for their treatment until the patients have sufficient skills to live happily in the society.

Keywords Carbohydrate Counting

Conflict of interest -

Key words Carbohydrate Counting

Category: Nutrition Education

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Key words 34

Category: Nutrition Education

营养素养的研究现状及热点分析：一项文献计量学研究

Research status and hotspots of nutrition literacy: a bibliometric study

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kunming medical university

Objective: To analyze the research status and hotspots of nutrition literacy, and to provide reference for the further development of nutrition literacy. Methods: Using "nutrition literacy" as the search term, the Web of Science database was searched from the establishment of the database to June 1, 2023. Citespace was used for bibliometric analysis. Results: A total of 1537 literatures were included, and the number of publications increased year by year, with the peak in 2022. The country with the most publications was the United States, and the countries with close cooperation with China were the United States and Australia. The journal with the most articles was nutrition. The high-frequency joint words included health literacy, obesity, education, knowledge, adolescents, intervention, behaviors, self-efficacy, determinants, etc. Conclusions: Scholars from all over the world have paid increasing attention to nutrition literacy, and the number of publications has increased rapidly since 2009, which may be related to the fact that scholars have paid more attention to the nutrition and health of the social population after the economic crisis. Most of the research focused on the fields of public health, nutrition, education and so on. The research mainly focused on the health literacy, nutrition and health, obesity, health education and its influencing factors of children and adolescents. With the improvement of global living standards, people pay more attention to the balance of nutritious diet, and scholars from various countries have carried out many studies in this field. China has also become the main research subject, but there is little cooperation with other countries, and there is still a big gap with the developed countries in the United States. In the future, interdisciplinary and multi-field cooperation can be carried out to strengthen international exchanges and promote the further development of nutrition literacy research in China

Key words Nutrition literacy; Bibliometrics; Research hotspots; Visualization;

Category: Nutrition Education

二十四节气背景下的幼儿园食育教育探索研究

Research On Kindergarten Nutrition Education Under The Background Of 24 Solar Terms

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Research On Kindergarten Nutrition Education
Under The Background Of 24 Solar Terms

Research background: Nutrition is closely related to children's life, and has important value for children's healthy growth. Through consulting relevant literature, it is found that nutrition is still in the embryonic stage in the preschool education stage, and there are few practical explorations and studies. At the same time, the 24 solar terms are excellent traditional Chinese culture, which needs to be passed on through education.

Purpose of research: Combining the 24 solar terms with nutrition education will beneficial to cultivate children's nutrition awareness, healthy eating habits, carry forward the traditional food culture, and enhance children's cultural confidence.

Research design: Constructed the implementation path of "systematic promotion, segmented implementation, and multiple fusion", and innovated the 24+6+N nutrition education course model.

Research method: Comprehensively uses observation method and case analysis method.

Results and conclusions: Through the series of nutrition education activities in the kindergarten to cultivate children's love for traditional Chinese culture and national pride. Secondly, through nutrition activities, children can understand the relevant nutritional knowledge, and help children to change their dietary behavior, develop scientific and healthy eating habits, and internalize it into their own life attitude and healthy lifestyle.

Key words: school nutrition; nutrition education; nutrition under the 24 solar terms;

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Key words school nutrition; nutrition education; nutrition under the 24 solar terms;

Category: Nutrition Education

基于可持续发展的营养科普模式探究——以Z世代为例

Exploration of the Nutrition Science Popularization Pattern Based on Sustainable Development - Taking Generation Z as an Example

Wei Liu*
H&H Gorup

Background and objectives:

- Nutrition science popularization has gained higher attention.
- The influence of pseudo-science popularization has expanded.
- The content and methods of science popularization should be subdivided based on different groups of people.

This paper explores a nutrition science popularization pattern that can be adapted to the characteristics of different populations.

Methods: On the basis of Generation Z, literature investigation have been conducted with some actual industry successful projects and education models.

Results:

- Give full play to the advantages of professional strengths and consolidate the core of "Science and Speciality":

1) Utilize the authority of experts and scholars.
2) Draw support from authoritative organizations and institutional platforms.
3) Practices based on scientific research.

- Analyze the characteristics of population and innovative the patterns of dissemination:

i. Characteristics analysis of Generation Z: Generation Z presents the distinctive characteristics of "interest-oriented ", "obsessed with the Internet", "concerned about socialization " on the tendency of behavior.

ii. Innovation for dissemination patterns targeting the characteristics of Generation Z:

1) Content innovation: Igniting the curiosity and inquisitiveness of Generation Z with new perspectives and viewpoints.
2) Form innovation: Instead of simple textual, the form of science popularization can be further innovated, for example, cartoon explanation and short video interpretation.
3) Scene innovation: Adding some properties of "interactive" and "current" to the nutrition science popularization scene.
4) Tool innovation: Providing professional inquiries and personalized nutritional supplementation schemes depending on digital tools.

Conclusions: Nutrition science popularization mode should consolidate the core of "Science and Speciality ", and innovate the transmission pattern from four dimensions of content, form, scene and tool according to the characteristics of population.

Key words Nutrition science popularization; Pattern innovation; Population characteristics; Generation Z

Category: Nutrition Education

超重/肥胖妇女对肥胖和多囊卵巢综合征的认识、态度和实践

Knowledge, attitude and practice regarding obesity and polycystic ovary syndrome among overweight/obese women

Yibing Mu*,Xia Chen,Chanchan Chen,Ying Zou
Hunan Provincial Maternal and Child Health Care Hospital

Abstract

Background and objective: Overweight and obesity in women of childbearing age are associated with an elevated risk of polycystic ovary syndrome (PCOS). This study aimed to investigate the knowledge, attitude, and practice (KAP) among overweight and obese women of childbearing age towards obesity and PCOS.

Methods: This cross-sectional study enrolled overweight and obese women of childbearing age in Hunan Provincial Maternal and Child Health Care Hospital between November 2022 and April 2023. Structural equation modeling (SEM) was used to analyze interrelationships among knowledge, attitude, and practice.

Results: A total of 740 valid questionnaires were collected, with 51.08% of participants aged 18-30 years. The knowledge, attitude, and practice scores were 13.55±5.06 (possible range: 0-24), 27.27±2.19 (possible range: 8-40), and 50.14±6.49 (possible range: 14-70), respectively. Pearson's correlation analysis indicated a significant positive correlation between knowledge and attitude scores ($r=0.313$, $P<0.001$), as well as between knowledge and practice scores ($r=0.454$, $P<0.001$). Furthermore, a positive correlation was observed between attitude and practice scores ($r=0.415$, $P<0.001$). Based on the SEM of KAP, knowledge had a direct and positive effect on both attitude ($\beta=0.13$, $P<0.001$) and practice ($\beta=0.46$, $P<0.001$). Additionally, attitude had a direct and positive association with practice ($\beta=0.90$, $P<0.001$). Knowledge had an indirect effect on practice through attitude ($\beta = 0.12$, $P < 0.001$).

Conclusion: Participants exhibited insufficient knowledge, neutral attitude, and suboptimal practice regarding obesity and PCOS. The SEM was suitable for explaining women's KAP regarding obesity and PCOS, in which knowledge had direct and positive effect on attitude and practice, while attitude also played a role as an indirect effect between knowledge and practice.

Key words Knowledge, Attitude, Practice, Overweight, Obesity, Polycystic ovary syndrome

Category: Nutrition Education

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Key words AAA

Category: Nutrition Education

近现代中国营养观念的传播与普及
Transmission and Education of Yingyang as a Scientific Notion in Modern China

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My paper mainly deals with the transmission and education of such scientific notions as nutrition and nutrients in the social context of modern China, as their Chinese counterpart yingyang reconciled traditional cosmology with modern scientific discoveries and local knowledge with experimental research.

The first part centers on how Ding Fubao and his disciples enthusiastically embraced Western nutriology and integrated it in their theories on Chinese medicine. They claimed nutrients like carbonhydrate and protein as the origin of pneuma (qi) and the driving force of blood circulation (xue), and categorized different types of nutritional (you yingyang) food according to their warm or cold nature. Furthermore, the vital role played by yingyang in gaining favor from the social public against the abolition of Chinese medicine in the 1920s will also be closely examined.

The second part investigates the emergence of the first generation of Chinese nutriologists, who paid most attention to the nutritional status of nursing mothers, babies and school children and suggested them to take in more proteins to enhance their health conditions. Given the impoverished state of China and a lack of high protein food, they examined the nutritional ingredients contained in everyday Chinese diet and proposed to eat bean products as substitutes, and promoted their proposal by engaging the prevailing discourse of nation building.

The third part explores the institutionalization of yingyang-related affairs at the state level, as the nationalist government formulated a set of guiding principles for Chinese people's daily intake of essential nutrients, established new administrative departments to regulate the production and processing of food, and officially encouraged scientists to breed high-yielding crops and develop food supplements. During the Anti-Japanese War, confronted with a severe shortage of military provisions, the issue of nutrition was directly associated with China's survival and eventually gained its legitimacy in society.

Key words Nutrition; Chinese Medicine; Public Health; Nation Building; Experimental Research; Food Supplements

Category: Nutrition Education

在校大学生营养健康教育探究
Nutrition education among college students

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Abstract Proper dietary nutrition is essential for maintaining normal physiological function, promoting health and preventing diseases. Nutrition education is an effective way to improve nutrition literacy and promote healthy eating behaviors. Studies have indicated that unhealthy food choices and imbalanced nutrient intake are widely existed among college students in China, such as insufficient energy supply from dietary carbohydrates, higher dietary fat intake compared to the recommended dietary guidelines, and inadequate intakes of vitamins, minerals and dietary fibers, which may then lead to obesity, cardiovascular diseases and other chronic health conditions, and this possibly due to the lack of nutrition knowledge. There are many effective ways to enhance the nutrition awareness of college students, develop healthy dietary habits and thus improve their health. Multimedia equipment could be used to enrich the nutrition education courses, the use of case studies and sitcom performance to innovate nutrition education mode, and the combination of new dietary survey methods such as computer software and cell phone applications to design dietary intervention programs, all of them could improve nutrition education of college students. Given that the current status of nutrition curriculum construction in colleges, it is important to develop appropriate nutrition teaching materials and corresponding curriculum training programs based on the nutrition status of college students in different grades, and to explore nutrition education approaches that suitable for the college students in China, therefore to further implement nutrition education initiatives and improve the nutrition literacy level for college students.

Key words College students; Nutrition education; Nutrition literacy

Category: Nutrition Education

基于微信小程序的中国成年人膳食纤维摄入模式评估工具可用性和可接受度研究

Usability and Acceptability of a Mobile WeChat Assessment Tool to Capture Dietary Fiber Intake Patterns in Chinese Adults

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Backgrounds and objectives:

In Chinese adult, dietary fiber intakes have decreased due to changing dietary habits in past decades. A mobile application with good usability to capture dietary characteristics may help individuals to make healthier dietary decision. This work aims to test the usability and acceptability of a mobile assessment tool based on WeChat Mini-Program to capture dietary fiber intake patterns in China.

Methods:

A WeChat Mini-Program was developed to characterize dietary fiber intake patterns. The food survey was designed based on 4.9 million self-reported food records from 1.6 million Chinese users through a dietary app from 2018 - 2019 and contained 55 food items from high fiber-contributing food groups: grains (n = 9), vegetables (n = 23), legumes (n = 7), tubers (n = 4), fungus (n = 3), and fruits (n = 7). In June 2022, usability measured by the System Usability Scale (SUS, scoring between 0-100) was tested in 1000 participants. Completion rate and time were recorded through WeChat system function. Based on usability test results, the user-interface was revised before a pilot launch. Informed consents were gained from all users.

Results:

For the usability test, a total of 741 participants logged on to the WeChat Mini-Program and 571 completed the food survey (completion rate = 77%) with average 199 seconds. Average SUS score was 60.27 (n=331), close to 68 as the acceptability threshold. To enhance usability, the number of screens was reduced by re-organizing food items from food group to frequency. The updated version achieved an improved performance in the pilot launch: 712 out of 800 users opened and completed the food survey (completion rate = 89%) with average 48s.

Conclusions:

Our results showed usability test could help enhance completion rate with shorten completion time for a WeChat assessment tool to capture dietary fiber intake patterns in China.

Key words Digital Nutrition, Dietary Fiber Intake Patterns, Food Survey, Usability Test

Category: Nutrition Education

女子攀岩运动员营养评价及膳食干预效果研究

Nutritional Evaluation and Effectiveness of Dietary Intervention for Female Rock Climbers

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Objective: Each sport has completely differentdo body composition requirements, as excess fat mass, or even muscle mass, can be a burden for female rock climbers. Atheletes need scientific guidance in their nutritional management and training.

This study Investigated the nutritional knowledge, nutritional attitudes, dietary behaviours, dietary intake and body composition of female rock climbers in Hubei Province before and after a nutritional intervention through the Knowledge, Attitudes and Behaviour Questionnaire (KAP), dietary surveys and body composition tests, and to evaluate the effects of the nutritional intervention.

Method:The body composition of the athletes was measured using the Inbody720 body composition tester and the athletes' blood parameters were measured. The athletes were given a dietary nutrition intervention by means of nutrition education.

Results: (1) The mean scores on the KAP nutrition questionnaire before the intervention were: general nutrition knowledge 9.13±1.63, sports nutrition knowledge 6.13±1.38, nutritional attitude 12.63±3.13, nutritional behaviour 26.38±3.13 and the athletes' total score 54.25±4.56. (3) After the intervention, the athletes scored 13.75±0.375 on general nutrition knowledge, sports (3) After the intervention, athletes scored 9.50±0.50 on nutrition knowledge, 19.88±2.88 on nutrition attitudes, 39.25±6.00 on nutrition behaviours and 82.38±8.63 on the total KAP questionnaire. there were significant differences ($p<0.05$) in the scores on each section of the KAP nutrition questionnaire and the total score compared to the pre-intervention period. (4) The total energy score of the athletes after the intervention was 82.38±8.63.

Conclusion:The study concluded that the 12-week nutrition education intervention significantly improved the nutritional knowledge of rock climbing mobilisers and improved their nutritional attitudes and behaviours. Regular monthly body composition testing, combined with the nutrition education intervention, optimised the body composition of the climbers, increased muscle mass and significantly reduced body fat and body fat percentage, and the nutrition education intervention increased the athletes' ferritin levels and haemoglobin levels.

Key words Athlete nutrition; Dietary interventions;rock climber; Nutrition KAP questionnaire

Category: Nutrition Education

河南省居民平衡膳食知识知晓率状况分析

Analysis on the awareness rate of balanced diet knowledge among residents in Henan province

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Abstract： [backgroud] The Healthy China Action (2019-2030) clearly states that "balanced diet is the basis of health". Four of the six core recommendations in the "Chinese Dietary Guidelines 2016" are related to balanced diet. [objective] To assess the awareness rate of residents in Henan Province on the balanced diet knowledge based the Chinese DG 2016, and to provide a data support for the future education of dietary guidelines in Henan Province. [Method] adult people were surveyed with a standard questionnaire (household inquiry) in 14 survey sites in September, 2021. The full score is 30 points. If the score is more than or equal to 22.5, it will be determined as "knowing", and if the score is less than 22.5, it will be determined as "not knowing". [Result] Most of the 4735 respondents had correct understanding of the intake of eight kinds of food, namely, vegetables, fruits, lean meat of fish and poultry, eggs, processed meat products and sugary food or beverages. However, only 23.5% and 23.8% of the respondents knew that milk and soybean food should be "eaten more", respectively. About the salt, cooking oil and added sugar, more than half of the respondents were not clear about the scientific intake amount. 87.1% of the people know that "vegetables for every meal", 82.9% of the people know that "eat more dark vegetables, account for at least half of the total intake of vegetables", 66.5% of the people know that "fruits every day". Only 25.5% of respondents knew that "eat more than 12 kinds of food every day and more than 25 kinds of food every week".[Conclusion] The overall awareness rate of balanced diet knowledge was 4.79% among Henan Province adult residents, more propagate should carried about soybean products, dairy products, oil, salt and added sugar.

Key words awareness rate/ balanced diet knowledge/ Chinese Dietary Guidelines 2016/ adult residents/ Henan Province

分类：营养教育

多组分、多靶点在体重管理中的应用

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摘要：肥胖非常普遍，不少人多次尝试减肥，都已失败告终，本文通过梳理肥胖的危害，减重误区，以及梳理目前在体重管理方面，行之有效的营养研究成果，通过控制热量、营养强化、调整肠道菌群，达到优化身体成分、强化脏腑功能的目的，让大家轻松实现健康体重，并成为易瘦体质。
关键词：体重管理、营养、肠道菌群、脏腑功能、易瘦体质
一．致胖因素、健康指标
二．肥胖危害、减重益处与减重误区
三．重塑健康饮食
四．与代谢有关的营养素
五．与代谢有关的器官

体重管理是一辈子的事，唯有养成健康的生活方式，才能长久保持健康体重。除了减少伤害因素，还要增加养护措施。在合理膳食基础上，补充营养、补充有益菌、适量运动、充足睡眠、乐观心态。通过多组分、多靶点的综合干预，不仅轻松快乐减脂，而且成为易瘦体质。因此大力开展营养科普，让更多国人做自己健康的第一责任人。

多组分、多靶点在体重管理中的应用
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摘要：肥胖非常普遍，不少人多次尝试减肥，都已失败告终，本文通过梳理肥胖的危害，减重误区，以及梳理目前在体重管理方面，行之有效的营养研究成果，通过控制热量、营养强化、调整肠道菌群，达到优化身体成分、强化脏腑功能的目的，让大家轻松实现健康体重，并成为易瘦体质。
关键词：体重管理、营养、肠道菌群、脏腑功能、易瘦体质
一．致胖因素、健康指标
二．肥胖危害、减重益处与减重误区
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体重管理是一辈子的事，唯有养成健康的生活方式，才能长久保持健康体重。除了减少伤害因素，还要增加养护措施。在合理膳食基础上，补充营养、补充有益菌、适量运动、充足睡眠、乐观心态。通过多组分、多靶点的综合干预，不仅轻松快乐减脂，而且成为易瘦体质。因此大力开展营养科普，让更多国人做自己健康的第一责任人。

多年来营养享瘦的成功实践，与大家共享，通过全面系统的学习食物营养、人体结构与功能等，让大家学会健康管理。

关键字 体重管理、营养、肠道菌群、脏腑功能、易瘦体质

分类：营养教育

視訊與實體教學對預防慢性病飲食工作坊的學習成效分析

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慢性非傳染性疾病（non-communicable diseases, NCDs）簡稱「慢性病」，已經成為全球主要的公共衛生問題，慢性病是導致突發性中風、心腦血管梗塞與破裂、阿茲海默症、癌症等嚴重疾病造成高齡族群失能，嚴重影響國家醫療資源及家庭生活負擔。COVID-19 疫情前，預防慢性病飲食工作坊以實體教學社區民眾為主，第一階段以營養教育課程建立參加者對良好飲食與營養攝取預防慢性病發生之正確知識，第二階段進行餐食製作體驗促進參加者對預防慢性病營養照護之正向態度與行為改變，透過預防慢性病飲食工作坊提供民眾可近性的營養服務與提升健康飲食型態。COVID-19 疫情期間，預防慢性病飲食工作坊將營養教育課程及餐食製作體驗錄製成視訊教學，餐食製作體驗製作成健康識能友善單張及食譜提供給預防慢性病飲食工作坊的參加者。

本研究透過預防慢性病飲食工作坊課程結束後收集知識的前後測驗與態度、滿意度調查及感官品評問卷，比較視訊與實體教學兩者對於預防慢性病飲食工作坊參加者的學習成效之差異性。經過 Wilcoxon 等級檢定統計分析，實體教學的前後測驗之知識作答正確率皆為 94%，態度問卷的非常同意與同意皆占 100%，滿意度問卷的平均分數為 99.61 分，最高分為活動安排、上課方式、時間安排及場地安排皆為 100 分，感官品評問卷的整體喜好分數為 96.25 分。視訊教學的前測之知識作答正確率為 80%、後測之知識作答正確率為 96%，態度問卷的前測之非常同意與同意占 90.5%、後測之非常同意與同意占 96%，滿意度問卷的平均分數為 96.67 分，最高分為上課方式及時間安排皆為 97.50 分，感官品評問卷的整體喜好分數為 95.75 分。

從視訊與實體教學的學習成效分析可發現，視訊教學對於預防慢性病飲食工作坊之參加者的後測之知識正確率有顯著提升，參加者對於飲食預防慢性病之態度則是實體教學有正向幫助，在滿意度調查發現參加者較喜歡實體教學而得到較高的平均分數，而是視訊教學在時間安排項目得到較高的分數，視訊與實體教學在餐食製作體驗的感官品評問卷的整體喜好對於參加者接受度皆高而獲得較高分數且差異性低。由結果可知，實體教學的參加者在預防慢性病飲食工作坊有較佳的學習成效，在疫情期間，視訊教學不受時間及場地的影響，仍有助於參加者提升飲食正確知識及正向態度來預防慢性病。

关键字 視訊教學、預防慢性病、學習成效

分类：营养教育

腹部患者(乳腺和直肠)在放疗期间营养风险发生率、体重指数（BMI）及消化道反应的调查

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腹部患者（乳腺和直肠）在放疗期间营养风险发生率、体重指数（BMI）及消化道反应的调查
贾颖
中国医学科学院肿瘤医院
目的：描述乳腺癌和直肠癌患者在放疗期间营养风险发生率、体重指数及消化道反应情况，为临床营养支持的合理实施提供依据
方法：回顾性纳入 2021.6-2022.3 月期间乳腺癌患者和直肠癌患者为研究对象，所有患者均在治疗期间接受营养风险筛查，计算 BMI，记录患者放疗过程中出现的消化道情况。判断标准：NRS-2002≥3 分者提示存在营养风险；BMI<18.5 者提示营养不良
结果：（1）共纳入乳腺癌女性患者 224 人，直肠癌患者 45 人（男 29 人，女 16 人），年龄在 27-71 岁之间。
（2） 营养风险评分（NRS-2002）≥3 分患者，其中乳腺癌患者占 7.1%（16/224），直肠癌患者占 22.2%（10/45）
（3） BMI<18.5：乳腺癌患者占 1.3%（3/224），直肠癌患者占 2.2%（1/45）；
（4） 放疗过程中乳腺癌患者出现上消化道反应（恶心、呕吐、胃胀）占 25%（56/224），出现下消化道反应（腹泻、便秘）占 21%（47/224），出现放射性食管炎患者占 19.2%（43/224）；直肠癌患者放疗过程中出现的放射性肠炎占 68.9%（32/45）；上消化道反应（恶心、呕吐、胃胀）占 26.7%（12/45）.
结论：放疗损伤部位较局限，但对消化道的影响仍然会波及更大范围，因此临床治疗应加强患者在放疗期间的综合营养管理和局部的损伤预防，合理进行营养干预，以有效减轻放疗过程中出现的消化道症状，降低营养风险，保障患者顺利完成放疗，提高生活质量。
腹部患者（乳腺和直肠）在放疗期间营养风险发生率、体重指数（BMI）及消化道反应的调查
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关键字 营养风险、营养干预、消化道症状、生活质量

分类：营养教育

100 例胸部恶性肿瘤放疗住院患者存在的营养风险研究和营养教育的重要性

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100 例胸部恶性肿瘤放疗住院患者存在的营养风险研究和营养教育的重要性

目的：探讨胸部放疗住院患者营养风险的发生情况、放疗不良反应与营养教育的重要性。

方法：采用营养风险筛查 2002（NRS2002）对 2020 年 6 月至 2020 年 12 月期间于中科院肿瘤医院住院且进行放射治疗的肺癌、食管癌共 100 例患者进行营养风险筛查和营养教育。

结果：100 例胸部放疗患者中存在营养风险者为 16 例，营养风险发生率为 12%。其中肺癌患者 74 例，有营养风险 4 例，营养风险发生率 5%，食管癌患者 26 例，有营养风险 12 例，营养风险发生率 46%。肺癌、食管癌的放疗过程当中，咽痛发生率 30%，胃肠道症状发生率 42%，食道疼痛症状发生率 13%，睡眠障碍发生率 15%。胸部放疗患者新入院未经任何治疗情况下，白蛋白低于正常值发生率为 29%，治疗结束后白蛋白低于正常值发生率为 51%。

结论：放射治疗是恶性肿瘤常用的治疗手段，越来越多的肿瘤患者通过放射治疗减轻了病痛，延长了生命，甚至战胜病魔。但是往往有些患者由于射线的作用引起一系列放疗反应如胃肠道反应，使患者食欲减退，恶心，呕吐，进食量下降，甚至血细胞数目减少被迫中断治疗，影响放疗全过程的顺利进行。NRS2002 有助于发现肿瘤放疗住院患者营养风险，从而进一步指导营养治疗。对于存在较高的营养风险的患者，应积极与临床医护人员沟通，力求给予合理的营养支持治疗和营养教育指导，使患者及家属能够明确地认识到自身的营养状况，以便为及时调整营养干预提供有效的科学依据。

关键词：营养风险筛查　　营养教育　　肿瘤放射治疗

营养风险是基于机体本身的营养状态，结合因临床疾病的代谢性应急因素所造成营养功能障碍的风险所共同定义的，它可以动态地评估患者有无营养风险。NRS2002 是欧洲肠外肠内营养学会推荐的适用于住院患者营养风险筛查方法，简单易行，操作性强。住院患者的营养状态会影响其住院时间和疾病的恢复，但目前临床医护人员和患者很少能认识到营养的重要性，导致很多患者未能接受合理的营养治疗。肿瘤放疗期住院患者营养风险发生率较高，但营养干预率极低，应积极与临床医护人员沟通，向临床医护人员进行宣教，给予患者合理的营养支持治疗，使更多患者受益。营养教育应该是营养治疗环节中重要的一部分，临床医护人员应该重视起来，为患者的康复之路保驾护航。

关键字 营养风险筛查　　营养教育　　肿瘤放射治疗

分类：营养教育

食品相关专业高职生营养知识、饮食态度和饮食行为的调查及相关性分析

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摘要：本研究旨在调查食品相关专业高职生营养知识、饮食态度和饮食行为现状，并分析其相关性。本校食品相关专业包含食品智能加工技术、食品检验检测技术、食品药品监督管理专业。采用年级分层，从食品相关专业班级随机选取 362 名大学生作为调查对象，发放调查问卷。营养知识、行为、态度(KAP)调查问卷共有关于营养知识题目 15 题，饮食态度题目 8 题，饮食行为 10 题。采用 r 值表示两个变量之间的皮尔逊相关系数，P 值表示相关性显著性水平。采用 x^2 检验比较不同年级和性别大学生营养知识得分等级、每个营养知识知晓率、饮食态度及饮食行为差异。

食品相关专业一年级大学生男女生营养知识平均分分别为 81.56 分，83.48 分；食品相关专业二年级大学生男女生营养知识平均分分别为 85.12 分，88.59 分；食品相关专业三年级大学生男女生营养知识平均分分别为 82 分，85.17 分。三个年级男女生均判定为良好且差异具有统计学意义，76.5%大学生营养知识得分等级为优秀。通过问卷调查大学生营养知识获取的主要途径得知大学生主要从电视、广播、报刊杂志、医学书籍、亲人朋友和网络的方式。

在饮食态度方面，数据显示有超过 90%的大学生认为早餐至关重要，且在购买食品时会查看保质期和生产日期。如果学校提供饮食营养知识课程，有 84.25%的大学生愿意报名参加，这表明大部分大学生对饮食保持良好态度。然而，在饮食行为方面，尽管超过 70%的大学生保持规律的三餐以及合理的荤素搭配，但仅有 69.61%的大学生每天都吃早餐。此外，仍有部分大学生存在不良饮食习惯，如偏爱高糖、高盐、高脂食物，过度依赖外卖等。在营养知识得分方面，女生普遍比男生得分较高，可能与饮食行为和饮食态度方面上女生往往更关注营养和健康饮食有关。

此文与其他类似研究的摘要进行了对比，对本研究在样本数量、调查对象的代表性以及采用的问卷调查方法方面均有所改进。同时，为了更准确地分析营养知识、饮食态度和饮食行为之间的相关性，本研究采用了更为合理的统计方法。

结论：食品相关专业大学生营养知识、饮食态度和饮食行为总体表现良好，但在某些方面仍然存在一定的问题，营养知识水平与饮食态度和行为存在一定的相关性。鉴于此，建议学校和相关部门加强对大学生营养健康教育，提高大学生营养知识水平和饮食健康意识，引导他们养成良好的饮食习惯。此外，对于不同性别和年级的大学生，可以针对性地开展针对性的教育活动，以提高他们在营养知识、饮食态度和行为方面的表现。

关键字 食品相关专业高职生；营养知识；饮食态度；饮食行为；相关性分析

分类：营养教育

头颈部肿瘤放化疗患者留置胃管不适反应及相关因素分析

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目的：分析调查头颈部肿瘤放化疗留置胃管患者不适反应程度及相关因素。临床上适合放疗的头颈部肿瘤类型主要有：鼻咽癌，喉癌，舌癌，扁桃癌，下咽癌及口咽癌，放射线在杀灭肿瘤细胞的同时，也会对照射范围内的正常组织造成损害，此时，就会导致放疗副作用的发生，延长患者的治疗周期，最常见的放疗副作用包括皮肤及口腔黏膜的损伤，恶心呕吐，疼痛，骨髓抑制及疲乏，患者会有明显的痛苦和不适感，留置胃管操作过程也会带来疼痛，恶心，呕吐，异物感及窒息感的不舒适体验，因此头颈部肿瘤患者在预防性留置胃管和治疗期间留置胃管的过程中均存在不同程度的不适反应。方法：研究选择 2019 年~2022 年我院收治的 45 例头颈部肿瘤放化疗留置胃管患者作为研究对象，护士采用吞咽法，置管前加强护患沟通，做好患者心理护理，使患者接受留置胃管的现实并取得配合，动作轻柔，操作熟练规范，将胃管沿鼻孔送至患者咽喉部，插入 14-16cm 时，嘱患者做吞咽动作，直至插至预定长度并证实胃管在胃内，妥善固定，吞咽动作可使舌根与咽后壁之间的宽度增加，更好的暴露食管入口，这些共同的作用使胃管置入顺畅，观察操作过程中给患者带来的不舒适体验，对患者不适反应程度及相关因素展开分析。结果：45 例患者中，女性 10 例，男性 35 例，舌癌 4 例，扁桃体癌 2 例，口咽癌 11 例，右颊部癌 2 例，左腭部癌 2 例，牙龈癌 1 例，下咽癌 9 例，颈部转移癌 3 例，喉癌 3 例，鼻咽癌 1 例，腮腺癌 1 例，放疗前置管 6 例，放疗中置管 39 例，置管时平均放疗次数为 8-10 次，化疗前置管 16 例，化疗中置管 29 例，置管时平均化疗次数为 2-4 次，置管过程中轻度反应患者 30 例，占比 66.67%；中度患者 10 例，占比 22.22%；重度患者 5 例，占比 11.11%。45 例患者当中，39 例患者一次置管成功，置管成功率为 86.67%。结论：留置胃管过程中患者均会存在不同程度的不适反应，头颈部肿瘤放化疗患者置胃管常见的不适反应包括：鼻咽部疼痛，流泪，恶心，呛咳，呕吐，鼻出血，在临床中如何顺利置入胃管，避免误入气管，同时降低患者置管时的不适感，若不及时干预将会导致感染的发生，降低患者的生存质量，护理人员应根据患者不同不适程度给予针对性的护理干预，从而缓解患者的不适感，最大程度地减轻患者的痛苦，稳定和改善患者病情及舒适度，提高患者对置管的耐受性及依从性，提高护理干预效果，体现个性化护理。

关键字 留置胃管患者；不适反应；相关因素；护理；研究

分类：营养教育

新冠疫情后中小学生居家分餐与公筷的认知和行为研究

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新冠疫情后中小学生居家分餐与公筷的认知和行为研究

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摘要：目的　分餐公筷是新时代饮食文明撬动的一个关键点。中小学生在接受新事物上有较强的能力，是我们需要重点关注的对象。了解新冠疫情后中小学生对在家分餐与使用公筷的认知和行为现况，分析其主要影响因素，为倡导中小学生居家逐步实行分餐制和使用公筷，有效实施健康教育提供科学参考。 方法　采用问卷调查法，基于新冠疫情相关文献和中小学生实际情况自行编制调查问卷，经过课题组成员和专家反复讨论修改，并经过预调查进一步修改完善，最终形成调查问卷。问卷内容包括性别、年龄、父母文化程度、父母职业、分餐公筷认知、分餐公筷行为等。其中分餐公筷认知共设 5 个问题，分餐公筷行为共设 5 个问题，被调查者根据实际情况作答。选取重庆地区中小学生作为调查对象，2023 年 1 月 14 日—22 日采用网络问卷的方式完成。使用 SPSS20.0 软件，以“您家是否正在执行分餐制？”、“您家是否尝试过或正在执行公筷？”为因变量，年龄、性别、父母文化程度等相关变量为协变量进行多因素非条件 logistics 回归分析，研究后疫情时代中小学生分餐制与公筷的使用情况、认知情况，以及主要影响因素。　结果　收集 25693 份有效问卷纳入分析。调查对象中，听说过分餐制的有 20148 人(78.4%)；认为分餐制非常有必要的有 8274 人（32.2%）；认为公筷非常有必要的有 8274 人（32.2%）；非常支持在家分餐制的有 9601 人（37.4%）；非常支持在家使用公筷的有 10924 人（42.5%）；家中每个人用餐有固定碗的有 13153 人(51.2%)；家中用餐使用公筷的有 10525 人(41.0%)；正在执行分餐制得有 3700 人（14.4%）；尝试过或正在执行公筷的有 13513 人(52.6%)；阻碍分餐与公筷的原因主要为合餐制的习惯不容易改变（57.3%）。多因素非条件 logistics 回归分析结果显示：家庭正在执行分餐制与调查对象对分餐及使用公筷的认识、调查对象的年龄、性别、父母文化程度、家庭成员对分餐公筷的认知均显著相关（p＜0.05）。结论　新冠疫情后中小学生对分餐制及使用公筷行为的认知及态度较好，但实践行为方面欠佳，家庭分餐的施行亟待提高。迫切需要继续加强中小学生健康教育，倡导文明健康饮食行为。提高中小学生分餐制知、信、行水平，有利于促进家庭分餐制的实施，进而推动社会健康饮食方式的形成。

关键词　新冠疫情；中小学生；分餐制；公筷；认知；行为

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关键字 新冠疫情；中小学生；分餐制；公筷；认知；行为

分类：营养教育

国际视野下的《营养咨询与教育》课程设计——基于美国四所高校的课程优化方案

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目的：《营养咨询与教育》是注册营养师必修课程。上海交通大学医学院自2018年起率先在我国营养学本科生中开设了这门课程。本研究旨在分析课程发源地美国4所高校的全日制营养专业本科生专业该课程的课程设计，与我校所开设该课程进行比较，在此基础上对我国《营养咨询与教育》这一注册营养师核心课程提出优化方案，提高我国营养专业人才的营养咨询和教育实践能力。

方法：选取美国4所在营养学人才培养方面处于一流水平的不同类型高校（哥伦比亚大学、伊利诺伊大学香槟分校、迈阿密大学和特拉华大学）所开设的营养咨询与教育课程，采用文献研究法、比较分析法和访谈法，从培养目标、课程内容、教学模式和成绩评定方式等多维度进行分析和研究，把握课程国际发展趋势，比较美国高校和我校该课程的设计方案的核心要素,提出适合我国实际情况的课程优化方案。

结果：美国高校的《营养咨询与教育》课程在培养目标、课程内容、教学模式和成绩评定方面的总体特征如下。（1）培养目标：强调学生运用所学的知识和技能在实践中解决真实的问题和职业道德的养成。（2）课程内容和模式：各校授课内容各有侧重，将动机性访谈、营养教育理论等内容的具体应用作为课程的核心，理论知识方面注重生涯发展、咨询、教育和心理学等专业核心知识的整合，实践方面采用多样化的模拟和实训项目；教师课堂授课只占一部分，其他课时都是以学生为主导，以学生展示、模拟和实训等一系列形式开展。（3）成绩评定方式：注重过程性考核，形式多样，包括课内作业、课后作业、个人实践项目和团体实践项目。我校《营养咨询与教育》课程从知识目标、能力目标和价值目标三方面设定培养目标，将教学内容的理论知识点和技能点按照“课堂讲授-案例分析-情景模拟-实践项目”这一教学模式展开，成绩评定采用多元化的过程评价。与美国高校比较，我校该课程在知识和能力培养目标、理论课与实践课的比例、成绩评定方式基本与之接轨，但实践课形式不够多样化、部分知识的实践技能点不够突出。

结论：我校《营养咨询与教育》课程设计在符合我国国情的基础上基本与国际接轨，在实践课程类型、实践能力细化方面仍需通过丰富实课程形式、加强校企间合作、建立实践基地和编写实践指导手册等多种方式加以优化。

关键字 营养咨询，营养教育，课程设计，课程优化

分类：营养教育

二十四节气背景下的幼儿园食育探索研究

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二十四节气背景下的幼儿园食育探索研究

食育与幼儿的生活息息相关，对幼儿的健康成长具有重要价值。通过查阅相关文献，发现食育在学前教育阶段尚处于萌芽阶段，实践的探索研究较少。同时，二十四节气是中国优秀的传统文化，二十四节气传统文化需要教育传承。将二十四节气与食育结合，作为幼儿园园本特色活动，有利于培养幼儿的营养意识、健康饮食习惯，弘扬了传统饮食文化，增强幼儿文化自信。因此，本文就二十四节气背景下的幼儿园食育教育进行课程开发研究，以期促进幼儿的健康发展，探索幼儿园活动的创新路径。

山东省济南市历下区景城幼儿园（历下区蒙润幼教集团总园）自 2015 年就组建食育团队研发食育课程体系，开发了学校 24 节气饮食文化、24 节气烹饪实践、主题节日美食烹饪实践、农耕体验、膳食礼仪、志愿帮厨六大课程内容，形成了从小班到大班系列化学习文本，构建了“系统推进、分段实施、多元融合”的实施路径，创新了 24+6+N 食育课程模式，即 24 节气饮食+食知、食味、食趣、食操、食礼、食运六大维度+N 种教学活动内容。充分融合教室、食堂、种植基地、家庭、社区等教育空间，做到“即教场”、“食堂即课堂”、“用餐即教育”。

本研究以蒙润幼教集团下设的两所幼儿园为研究对象，综合运用观察法、案例分析法考察幼儿园二十四节气背景下食育教育的开展情况，存在问题及存在问题的原因。

通过在园的食育教育系列活动，对幼儿进行 24 节气下的食育文化的熏陶和教育，可以为幼儿感受 24 节气传统饮食文化提供一条形象、直观的途径，同时使幼儿产生对 24 节气传统文化的亲近感，培养幼儿对中华传统文化的热爱和民族自豪感。其次通过食育活动，让幼儿了解相关的营养知识，帮助幼儿饮食行为发生改变，养成科学健康的饮食习惯，并将其内化成为自己的生活态度和健康的生活方式。帮助家长提高对科学饮食的认知，让家长能根据幼儿的发育特点和饮食习惯，提供和制作满足幼儿身体发育所需的营养膳食，从而提高幼儿的身体抵抗力，促进幼儿的健康成长。

最后，对食育教育活动的设计与实施进行评价，存在的问题一是部分家长的不配合不重视，为食育工作开展带来了困难。二是研究水平有待继续提高。食育内容的体系内容有待完善，食育课程实施的深度欠佳，幼儿园教师理论水平有限，逻辑思维能力相对薄弱，导致研究思路还需继续完善。

关键词：学校食育；营养教育；二十四节气下食育；
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关键字 学校食育；营养教育；二十四节气下食育

分类：营养教育

大健康背景下食品与营养相关本科专业设置的调查分析

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目的 为分析食品与营养相关本科专业在我国设置的特点，为大健康背景下食品与营养相关本科专业的布局和设置提供参考，更好地服务健康中国建设。

方法 采用网络检索法收集国内外食品与营养相关专业信息。国外检索策略：利用“Dietetics”，“nutrition”，“Bachelor of nutrition”，“Food hygiene and nutrition”等作为检索词，于 2022 年 5 月进行文献检索及网页搜索，根据各国营养学发展情况和大学排名，于美国、英国、澳大利亚、日本，分别选取 3 所、6 所、6 所、3 所学校作为研究对象，再在学校官网查找并收集信息。国内检索策略：2022 年 3 月通过阳光高考教育平台搜索国内（不含港澳台）营养专业设置，首次检索词为“营养”、“食品”，二次检索词为“食品卫生与营养学”。

结果 18 所国外大学中有 33 个食品与营养相关本科专业，采用“营养学”、“食品科学与营养学/营养与食品科学”作为专业名称的较多，所占比例分别为 39%、27%。其他如“人类营养学”、“营养与营养学”、“健康科学（营养与运动/营养）”均占 6%。只有少数采用“运动和营养科学”、“食品和人类营养”、“营养与食品消费科学”、“营养与食品销售”、“心理学与营养学”等名称。其中将营养与食品作为两个专业或只设立营养一个方向的大学占 44%，仅有 3 所院校（17%）的专业名称将营养与食品合并，且不另设其余相关专业。18 所国外大学相关专业设置中，学制有 2~5 年，其中 4 年和 3 年占比为 30%和 60%。食品与营养相关本科专业大部分设在“化学、食品和药物学院”，“生物科学学院”，“生物科学与医学院”，“生物医学、营养和运动科学学院”，“食物科学和营养学院”，“自然资源学院”。

阳光高考显示国内开设食品与营养相关本科专业的共 652 所，国内食品与营养相关本科专业有 6 个，其中开设“食品科学与工程”专业的有 305 所（47%），开设“食品质量与安全”专业的有 268 所（42%），开设“食品卫生与营养学”的有 33 所（5%）。阳光高考显示的 33 所中有 4 所院校的官网显示无此专业设置或近两年未招生。72%（21/29）院校将食品卫生与营养学专业设置在“公共卫生学院”或“医学院”，4 所院校由“健康学院”承办该专业，占 14%。所有院校的食品卫生与营养学均授予理学学士学位。安徽省设食品卫生与营养学的院校最多，占 17%（5/29），其次为四川省、上海市、江苏省，各占 10%（3/29）。45%（13/29）院校集中在华东地区；24%（7/29）在西南地区。医学院校有 23 所，综合类院校 4 所，农业院校和工科院校各 1 所。2021 年食品卫生与营养学共招收学生 1067 人，平均每所院校招生 44 人。其中，成都中医药大学招生最多（70 人），上海中医药大学最少（15 人）；华东地区招生规模最大（占 44%），其次为西南地区（占 20%），华北地区招生规模较小（占 7%），而东北地区在 2021 年未招生。

结论 国外对“食品”专业与“营养”专业的定位有所区分，国内更倾向于将食品与营养合并为一个专业。国内食品卫生与营养学专业布点不均。营养专业人才缺口较大。

关键字 营养；食品；专业设置

分类：营养教育

以口腔专科医疗机构为依托的健康教育模式探索

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目的：口腔卫生保健需求和国民经济的增长、人口的文化水平的提高是紧密相关的。据最新的全国口腔流行病调查资料，以至少患以下一种口腔疾病计算，口腔疾病的患病率为 97.6%[1-3]，口腔门诊的日门诊量也最大的，本研究以智慧营养宣教与线上诊疗为主要内容，通过调研和实际尝试探索和完善以口腔专科医院为依托的营养教育推广模式。方法：通过问卷调查、访谈以及门诊量变化情况分析，结合信息化手段，开展智慧营养诊疗与宣教实践。结果：笔者对 1189 名住院患者进行了营养需求调查。结果显示：表示希望得到针对性分类指导的患者占 82.67%，京外患者对住院期间营养相关支持诊疗的意愿略高于京内患者，希望得到针对性指导的患者比例占 80%以上；各年龄段对于营养相关支持诊疗的需求意愿差别不大，随着患者年龄的增长，趋势相对平缓。各年龄段需求均在 70%以上，与总体需求意愿一致，不同各年龄段之间无明显差异。此外，口腔专科医疗机构门诊量大，患者具有更为集中的特点，故健康教育受众广，开展营养教育更具有专业性和权威性。医疗卫生机构开展健康教育是健康教育工作向多层次、多领域发展的重要体现和进步，具有针对性强、可信度强、专业性强、有效性强的特点，患者重视医护人员的医嘱和要求。在推进“互联网+营养健康”工作，提高人群健康服务智能化、专业化水平的信息化时代背景下[4-6]，与口腔营养线上诊疗相结合，具有极大的便捷性和可操作性，且可以很大程度的提高患者的依从性，强化健康教育的效果。因此，营养教育可以与智慧医疗服务相结合，可操作性强。结论：开展智慧营养诊疗与营养教育的可操作性强，可以利用口腔专科医院“大门诊、小病房”的特点，提高营养诊疗服务水平和口腔专科医院综合诊疗水平，拓展健康教育的受众数量。未来在口腔专科的营养诊疗可以构建与医院健康教育工作相融合的工作模式：（1）完善营养诊疗系统，开放营养咨询门诊号源，实现以线上诊疗为主的服务模式。（2）建立营养风险预警和医护营之间的沟通诊疗体系；（3）引入营养膳食智能分析系统，形成知识库，实现个体化、精准化的住院期间和居家期间肠内营养支持指导和个性化营养制剂的配置与指导；（4）进一步深化营养宣教和营养随访工作，运用智能化手段对不同人群进行精准宣教；（5）推动“互联网+营养健康”服务，推动互联互通与数据共享，运用大数据分析技术，进行智能营养随访和干预。

关键字 口腔；营养教育；智慧营养

分类：营养教育

以口腔专科医疗机构为依托的营养教育模式探索

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目的：口腔卫生保健需求和国民经济的增长、人口的文化水平的提高是紧密相关的。据最新的全国口腔流行病调查资料，以至少患以下一种口腔疾病计算，口腔疾病的患病率为 97.6%[1-3]，口腔门诊的日门诊量也最大的，本研究以智慧营养宣教与线上诊疗为主要内容，通过调研和实际尝试探索和完善以口腔专科医院为依托的营养教育推广模式。方法：通过问卷调查、访谈以及门诊量变化情况分析，结合信息化手段，开展智慧营养诊疗与宣教实践。结果：笔者对 1189 名住院患者进行了营养需求调查。结果显示：表示希望得到针对性分类指导的患者占 82.67%，京外患者对住院期间营养相关支持诊疗的意愿略高于京内患者，希望得到针对性指导的患者比例占 80%以上；各年龄段对于营养相关支持诊疗的需求意愿差别不大，随着患者年龄的增长，趋势相对平缓。各年龄段需求均在 70%以上，与总体需求意愿一致，不同各年龄段之间无明显差异。此外，口腔专科医疗机构门诊量大，患者具有更为集中的特点，故健康教育受众广，开展营养教育更具有专业性和权威性。医疗卫生机构开展健康教育是健康教育工作向多层次、多领域发展的重要体现和进步，具有针对性强、可信度强、专业性强、有效性强的特点，患者重视医护人员的医嘱和要求。在推进“互联网+营养健康”工作，提高人群健康服务智能化、专业化水平的信息化时代背景下[4-6]，与口腔营养线上诊疗相结合，具有极大的便捷性和可操作性，且可以很大程度的提高患者的依从性，强化健康教育的效果。因此，营养教育可以与智慧医疗服务相结合，可操作性强。结论：开展智慧营养诊疗与营养教育的可操作性强，可以利用口腔专科医院“大门诊、小病房”的特点，提高营养诊疗服务水平和口腔专科医院综合诊疗水平，拓展健康教育的受众数量。未来在口腔专科的营养诊疗可以构建与医院健康教育工作相融合的工作模式：（1）完善营养诊疗系统，开放营养咨询门诊号源，实现以线上诊疗为主的服务模式。（2）建立营养风险预警和医护营之间的沟通诊疗体系；（3）引入营养膳食智能分析系统，形成知识库，实现个体化、精准化的住院期间和居家期间肠内营养支持指导和个性化营养制剂的配置与指导；（4）进一步深化营养宣教和营养随访工作，运用智能化手段对不同人群进行精准宣教；（5）推动“互联网+营养健康”服务，推动互联互通与数据共享，运用大数据分析技术，进行智能营养随访和干预。

关键字 口腔；营养教育；智慧营养

分类：营养教育

某高校营养专业学生食物重量估算能力调查及训练教材设计

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目的

对于食品营养专业的学生而言，烹饪加工和食谱设计是需要掌握的基本技能之一。在校期间，通过学习对相关知识和方法有了初步了解，但是由于青年学生在家庭中几乎不做饭，实训操作时能把菜肴做熟已属不易，烹饪的同时还要求他们考虑食材的重量则显得十分困难。缺少对食物重量把控的意识影响了专业技能的提高，不利于学生们步入社会后更好的发挥专业特长。国内关于食物重量预测水准和专业能力的关联性研究几乎是空白。本研究着眼于营养专业学生经过一定时期的训练后，判断食物重量的估算力发生了何种变化，这些变化对营养意识的提高有什么影响，为提升教育效果在训练教材的开发上应做哪些工作。

方法

1、食物重量估算力实际状况把握：以某高校营养专业学生为对象，选择日常使用频度较高的食物（6 种）进行目测实验。计算平均估算重量率。

平均估算重量率（%）=目测重量平均值（g）/实测重量（g）x 100

2、训练教材开发：选择使用频度较高的各类食物 160 种，设计有尺寸比例的背景纸作为参照物，将食物置于纸面上方拍照，用作食物图片数据库建设。开发一款带问答统计功能的训练程序，利用照片进行食物估重训练。

3、设计营养意识调查问卷，确认食物估重能力与营养意识之间的关系。

结果

1、以某高校营养专业学生 140 名为对象进行食物估重调查，日常使用频率较高的 6 种食材（菠菜、圆白菜、紫菜/干、土豆、猪里脊肉、青鱼/块）中，得分最高的是青鱼块，重量率为 105.3%，但从最大值 300g，最小值 10g 也看出，个体差非常大。菠菜的平均估算重量率为 61.1%，相比实际重量被轻估了。与此对应的是紫菜（干），平均估算重量率 290.0%，较实际重量估重过高。

2、食物估重训练教材开发时，对如何真实表现食物的物理形态经调研后确定设计长 30 厘米，宽 20 厘米，带有 10 厘米方格的背景板为拍摄基准，参照解读食物尺寸。

3、选择 9 类 160 种食物拍照，做成训练教材图片库。设计问卷形式的训练程序，自动统计得分结果。

4、营养意识问卷调查显示，食物估重训练对烹饪能力的提升（$p<0.001$）和饮食管理能力提升（$p<0.001$）有实际意义。

结论

1、高校学生之间，食物重量估算能力个体差较大，特别是绿叶菜和晒干食材的重量把握比较困难。2、基于尺寸参照物背景板拍摄的食物图片，对于估重训练效果明显。3、食物估重能力的提高，对营养专业学生食谱设计和营养指导能力的提升，有一定的意义。

关键字 食物预测 重量估算 食物模型 食物图谱

分类：营养教育

中国传统饮食文化融入幼儿园学前儿童食育实践活动研究

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陕西学前师范学院

中国传统饮食文化融入幼儿园学前儿童食育实践活动研究
[中文摘要]
背景：2021 年 9 月国务院印发《中国儿童发展纲要（2021-2030 年）》从 7 个领域出发，明确未来十年儿童发展方向，其中针对改善儿童营养状况中首次明确提出“加强食育教育”，引导科学均衡饮食，吃动平衡，预防控制儿童超重和肥胖，为幼儿园开展食育实践提供政策保障。目的：旨在通过传统饮食文化进课堂提升幼儿园食育实践活动，引导学前儿童养成良好饮食习惯，建立科学均衡饮食食谱，推动幼儿园开展营养健康膳食指导，认识膳食宝塔，学习营养知识，养成良好的卫生饮食习惯，建立科学规范的“三餐两点制”,促进幼儿一日生活管理科学化、规范化、精细化。方法：本文围绕食育的概念由来和发展，立足我国学前儿童现阶段食育政策的不断发展完善，《3-6 岁儿童学习与发展指南》《“健康中国 2030”规划纲要》《国民营养计划（2017-2030 年）》《健康儿童行动提升计划（2021-2025 年）》《幼儿园保育教育质量评估指南》等，梳理出我国幼儿园食育的具体内容要求，同时针对幼儿园食育活动开展实际情况进行实地调研并深度剖析。结果：通过调研发现，幼儿园食育活动开展情况不尽如人意，幼儿园教师对食育活动或营养膳食认识还有待提升，同时幼儿对于食育课程的开展展现出极大积极性。由此开展幼儿园食育主题系列课程活动研究，从中国传统饮食文化角度出发探寻幼儿园食育实践活动，包括饮食习惯、卫生习惯、珍惜粮食、礼仪文化、感恩自然、参与劳动共 6 个具体方面，每一方面可围绕幼儿园班级活动引申出若干实践活动展开，如非物质文化遗产二十四节气立春开展如竖蛋活动，利用昼夜平衡之日体现人与自然和谐，以蛋为主题进行蛋壳创意画制作，从鸡蛋衍生到对家禽类动物的认识，以鸡蛋为原材料进行美食烹饪制作，并邀请幼儿园老师一起进行美食分享学会感谢师恩等活动。结论：通过中国传统文化理念、习俗、节日等内容在幼儿园食育实践活动的展开，让幼儿选择应季食材做时令食物，帮助孩子以食物来感知季节变化，加强对自然和生活的热爱，提升幼儿对食物的认识，萌发孩子对食物的情感，并引领孩子经历主动学习探索食物历程，帮助幼儿建立良好饮食习惯，生活即教育，是健康的生活就是健康的教育，通过食育实践活动，有效推动幼儿营养健康饮食教育开展。

关键字 幼儿园；学前儿童；中国传统饮食文化；食育实践活动

分类：营养教育

地方应用型院校营养教育对在校大学生营养素养影响分析

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摘要： 目的 了解在校大学生的营养素养现况，分析其影响因素，为引导在校大学生提升营养素养水平提供参考。**方法** 采用分层整群抽样的方法对 1628 名在校大学生进行问卷调查，调查内容包括基本情况和营养素养，其中营养素养包括营养知识、技能和行为 3 部分；营养素养得分＝（营养知识得分+技能得分+行为得分）/三部分满分*100，实际得分达到该方面总分 60%及以上，被判定具备该方面素养。**结果** 在校大学生具备营养素养的比例为 25.00%，营养素养的 3 个维度即营养知识知晓率、技能素养、行为素养具备率分别是 41.27%、35.32%和 36.36%。在营养素养具备比例上，女生（27.33%）高于男生（21.22%），医科（33.92%）、工科（29.71%）高于文科（18.20%）、理科（17.53%）和农科（24.34%），差异均有统计学意义（$P<0.01$）；接受过营养教育的学生（36.18%）高于未接受过营养教育学生（13.35%），且必修课（50.57%）高于选修课（32.37%）、线下选修课（36.00%）高于线上选修课（20.89%），差异有统计学意义（$P<0.01$）。在营养知识知晓率上，女生（46.42%）高于男生（33.00%），医科（50.61%）、工科（48.63%）高于文科（33.82%）、理科（37.74%）和农科（34.47%），差异均有统计学意义（$P<0.01$）；接受过营养教育的学生（60.94%）高于未接受过营养教育学生（28.71%），且必修课（67.24%）高于选修课（49.70%）、线下选修课（52.00%）高于线上选修课（42.41%），差异有统计学意义（$P<0.01$）。在行为素养具备比例上，女生（38.90%）高于男生（32.31%），医科（45.91%）、工科（45.14%）高于文科（31.49%）、理科（27. 42%）和农科（30.14%），差异均有统计学意义（$P<0.01$）；接受过营养教育的学生（44.43%）高于未接受过营养教育学生（28.00%），且必修课（54.02%）高于选修课（39.51%）、线下选修课（42.02%）高于线上选修课（31.64%），差异有统计学意义（$P<0.01$）。在技能素养具备比例上，女生（38.98%）高于男生（31.12%），医科（45.33%）、工科（44.60%）高于文科（28.64%）、理科（28.10%）和农科（28.13%），差异均有统计学意义（$P<0.01$）；接受过营养教育的学生（42.31%）高于未接受过营养教育学生（28.00%），且必修课（53.87%）高于选修课（39.51%）、线下选修课（43.60%）高于线上选修课（26.58%），差异有统计学意义（$P<0.01$）。多因素 Logistic 回归分析结果显示，女性相比男性（OR=1.768，95% *CI*: 1.351～2.315）、年级高（OR=1.189，95% *CI*: 0.870～1.752）、学科为医科（OR=1.750，95% *CI*: 1.146～2.670）和工科（OR=1.283，95% *CI*: 0797～2.056）、接受过营养教育（OR=2.538，95% *CI*: 1.976～3.276）是在校大学生营养素养的影响因素。**结论** 在校大学生营养素养整体水平不高，行为素养和技能素养的具备率低于营养知识知晓率；未接受过营养教育的学生整体认知度不高，且知行不一致；男生营养认知低且饮食行为随意性强；低年级学生、农科、文科、理科及工科中除食品专业外的学生营养认知差，技能和行为均不佳；性别、年级、学科在一定程度上影响学生营养素养水平；营养教育能够提高在校大学生营养素养水平，但不同课程效果不同，学校应在课程设置上适当加以调节，避免营养教育课程流于形式，同时应组织开展形式多样的营养与健康技能培训和实践活动，以提高学生的营养素养水平。

关键字 营养教育；在校大学生；营养素养；营养知识；技能；行为

分类：营养教育

综合设计性实验在食谱编制实验教学中的应用

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目的：本研究从实际生活角度出发，在公共营养学和特殊营养学的理论知识基础上，旨在让学生编制出能够提高机体对各种特殊自然环境的适应能力、维护机体健康及提升工作效率的营养食谱，是非常具有实际意义的。

方法：选择预防医学本科专业大五的学生，课前准备阶段将学生随机分三组，提供指定配套资料（针对不同人群生理特点和营养特点及食谱编制的配套微课），设计相关问题分层次、递进式引导学生通过课前自学的方式，自行设计高温环境、低温环境和高原环境三种特殊自然环境下作业人群的营养食谱。课堂实施阶段随机抽签选择代表汇报食谱设计并进行 PPT 展示，除汇报组外的其他两组学生对汇报组的食谱设计报告进行打分。三组汇报结束后结合互相打分结果由授课教师进行整体指导评价，提出修改意见。

结果：从课堂效果来看，不同组别的学生均能够自觉完成资料查阅、线上课程学习、组内讨论及 PPT 的汇报的准备工作。课前准备的配套微课内容全面且针对性强，学生基本可以在课前一周完成 PPT 的准备工作。大部分学生都能够良好的掌握食谱编制的步骤，根据设定问题制定的食谱考虑因素较为全面，具备根据实际情况编制一日食谱的能力。通过学生反应情况来看，在食谱编制的讨论过程中，同组学生能够相互讲解，共同完成 PPT 汇报方案，巩固了前期的理论课内容并在讨论过程中打开了彼此的视角，课堂上通过倾听和评价其他组学生的食谱编制过程，进一步加深了对食谱编制的理论知识的理解，强化了实操技能。

结论：传统食谱编制的实验课缺乏自主设计性，导致学生的参与度和积极性降低且无法获得良好的教学效果，本研究在食谱编制实验课程的传统授课方法基础上，探索综合性、设计性实验教学方法的授课效果，从而使学生更好的将理论与实验相结合，充分发挥主观能动性，提高编制食谱的能力。实验课程全程由学生主导，授课教师仅进行目标引导及辅助纠错，提升了学习自主性，发挥了主观能动性，不仅加深了学生对理论课的知识理解，又切实提升了学生实际解决问题的能力，为今后进入工作岗位提供了知识和技能储备，达到了专业课教学目的。同时，通过团队直接的研究探讨与合作，本次实验课使得学生的综合素质也得到提升。

关键字 食谱编制；特殊自然环境；设计性实验教学

分类：营养教育

云南省边疆地区特有少数民族营养健康知识知晓情况的分析

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[摘要]目的 分析 2018-2020 年云南省特有基诺族、景颇族、德昂族、阿昌族、布朗族、普米族 6 种少数民族营养健康知识知晓情况。方法 数据来源于“云南省少数民族营养健康调查项目”，采用多阶段分层整群抽样在云南省德宏州芒市、陇川县、西双版纳州景洪市、勐海县 4 个项目点对年龄 18 岁及以上居民进行人口学特征和膳食营养相关知识调查数据等方面的问卷调查，分析不同民族成人居民对《中国居民膳食指南》(以下简称膳食指南)或《中国居民平衡膳食宝塔》(以下简称宝塔)及具体膳食营养知识的知晓率情况，最终 6 个特有少数民族 18 岁以上居民 3148 人纳入研究。结果 云南省 6 种特有少数民族 3148 名调查对象中，男性 1353 人占 42.98%，女性 1795 人占 57.02%，年龄以 38-57 岁为多数，占 46.92%，小学及以下文化占 77.22%，仅有 9.88%的人知道膳食宝塔或膳食指南，13.85%的人会主动去了解或收集与膳食知识相关的知识，膳食知识获得的途径主要是网络或朋友圈，占 33.65%，其次是通过家人、朋友或同学，占 31.73%，通过专题讲座获得膳食知识的比例最低，占 0.64%。17 个营养膳食相关问题中，平均分为 8.67±3.39，分数在 8-11 分之间的占多数（44.09%），调查对象对食物营养方面的认知较差，其中知晓率最低的三个问题是，“精米、精面比粗粮、糙米含有更多的维生素和矿物质”回答正确率仅为 18.42%、“蔬菜比主食（大米或面粉）含有更多的淀粉”回答正确率仅为 20.71%、“每天吃很多肉类食品 (如鱼、家禽、鸡蛋、瘦肉)对健康有益”回答正确率仅为 26.49%。知晓率最高的三个问题是“吃很多新鲜水果和蔬菜的饮食习惯对健康非常有益”回答正确率为 85.32%、“吃豆类及豆制品对健康有益”回答正确率为 77.51%、“吃饭时少吃肥肉和动物脂肪对健康有益”回答正确率为 71.41%、景颇族、德昂族、阿昌族、布朗族均是对“精米、精面比粗粮、糙米含有更多的维生素和矿物质”回答正确率最低，分别为 13.04%、12.27%20.44%、6.93%、18.92%，基诺族对“精米、精面比粗粮、糙米含有更多的维生素和矿物质”回答正确率最低，为 18.27%，普米族对“猪油比植物油更健康”回答正确率最低，为 18.92%。结论 云南省 6 个特有少数民族成年居民对《中国居民膳食指南》或《中国居民平衡膳食宝塔》的知晓率及膳食营养知识总体知晓率较低，特别对粗粮、蔬菜、肉类食物营养相关知识的知晓情况，随着移动终端和网络的普及，边疆少数民族地区接受营养知识的途径以网络或朋友圈为主，建议探索膳食知识在云南省少数民族中的传播方式，从而提高营养知识宣传教育的接受度和营养知识知晓率。

关键字 云南，边疆，特有少数民族，营养，知晓率

分类：营养教育

以学定教式饮食营养教育在子宫肌瘤合并糖尿病患者围术期中的效果

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以学定教式饮食营养教育在子宫肌瘤合并糖尿病患者围术期中的效果

目的：探讨以学定教式饮食营养教育在子宫肌瘤合并糖尿病患者围术期中的应用效果。

方法：随机选取 2020 年 3 月—2023 年 1 月就诊于牡丹江医学院附属二院的 124 例子宫肌瘤合并糖尿病患者作为研究对象，按照随机数字法将其分为两组，每组 62 例。对照组患者给予围术期常规健康宣教，实验组患者则给予学定教式饮食营养教育。具体方法为：（1）责任护士在患者入院 24 小时内发放糖尿病知识问卷量表，同时给予食物频率问卷评估患者饮食习惯。调查患者情况及饮食规律以作为以学定教式饮食教育的基础。（2）按照呈现目标、指导自学、自学检测、讲解及培训的流程进行饮食教育。责任护士根据入院当天的饮食习惯及患者个人情况评估结果，确立患者个性化的饮食任务。为其呈现目标后使患者充分理解既定目标的意义，通过宣教及饮食指导使其了解医学营养治疗内容，告知科学饮食可延缓糖尿病的进展。（3）患者按照责任护士的指导自学糖尿病饮食计划，学习内容还包括食物卡路里的热量换算、食物成分分析、食物及血糖关系。责任护士每日检查患者自身的饮食规划，并联系营养师、内分泌医师指出其不足，及时帮助患者改善饮食结构。干预时间为 3 周。组间比较采用独立样本 t 检验进行统计学分析，以 P＜0.05 为差异具有统计学意义。分析两组患者干预前后空腹和餐后 2 小时的血糖水平，干预后临床效果。

结果：实验组干预前空腹血糖值为（9.36±0.26）mmol/L、餐后 2h 血糖值为（12.64±0.77）mmol/L；干预后空腹血糖值为（6.23±0.93）mmol/L、餐后 2h 血糖值为（8.23±0.41）mmol/L。对照组干预前空腹血糖值为（9.32±0.43）mmol/L、餐后 2h 血糖值为（12.58±0.81）mmol/L；干预后空腹血糖值为（7.22±0.47）mmol/L、餐后 2h 血糖值为（10.33±0.78）mmol/L。实验组肛门排气时间为（29.3±4.23）h，自主排尿时间为（12.3±2.71）h，下床活动时间为（13.5±2.62）h，住院时间为（5.3±1.90）h。对照组肛门排气时间为（41.4±6.35）h，自主排尿时间为（15.2±4.14）h，下床活动时间为（17.8±3.51）h，住院时间为（6.8±1.25）h。结果显示干预前两组空腹血糖、 餐后 2h 血糖比较无显著差异（P＞0.05）。干预后实验组患者空腹血糖、 餐后 2h 血糖低于对照组，差异有统计学意义(P＜0.05)。实验组患者临床效果明显优于对照组，差异有统计学意义（P＜0.05）。

结论：以学定教式营养教育模式可充分调动患者饮食对治疗的积极性，提高患者对营养与健康的认识，改善患者的饮食结构从而更好地进行围术期血糖的控制，改善患者术后机体恢复情况，利于患者的康复。

关键字 营养教育；子宫肌瘤；糖尿病

分类：营养教育

电话跟踪随访对胃癌术后围化疗期患者口服肠内营养制剂依从性影响的研究

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【目的】研究电话跟踪随访对胃癌术后围化疗期患者口服肠内营养制剂依从性的影响。

【方法】于 2022 年 6 月-2022 年 12 月时段采取病例开展研究，对象为 80 例胃癌术后围化疗期患者，围化疗期患者包括静脉注射给药及口服给药治疗期间的患者，围化疗期间为此疗程用药开始至用药结束。以随机数字法分两组，为对照组与观察组各 40 例。对照组为接受常规口服肠内营养制剂指导的患者，常规指导的流程为：患者入院-护士进行营养评估-医生开口服肠内营养制剂医嘱-医生开口服肠内营养制剂药物-药物送达病房-护士核对药品并发放给患者-医生/营养师指导口服方法-观察在院期间患者口服肠内营养制剂情况-患者出院。对照组为每周微信沟通了解其口服情况。观察组为在常规口服肠内营养制剂指导的基础上，增加电话随访工作内容。通过电话随访，了解患者口服肠内营养制剂的状态，并再次给予口服肠内营养制剂补充方法的指导，对于不能按时补充的患者给予相关知识的科普。随访频次为 1 周 1 次，共随访 3 次，每次随访并记录，对于数据进行整理分析，并给予个体化的指导意见。评估对比两组患者口服肠内营养制剂依从性的差异。

【结果】通过电话随访能够掌握患者口服肠内营养制剂的情况，以及未能常规进行口服肠内营养补充的原因。未能按时口服肠内营养制剂的原因有：对口服肠内营养制剂补充不重视、自觉口感差、口服次数多较麻烦、购买不便利、饮用后引起身体不适、影响进食。跟踪随访中还了解到患者对于口服肠内营养制剂过程中还需要护理人文关怀。现对随访过程中患者依从性的汇报如下：对照组患者每周以微信随访的方式进行情况了解，第一周有 3 名患者可遵医嘱剂量要求及次数口服，第二周有 5 名患者可遵医嘱剂量要求及次数口服，第三周有 5 名患者可遵医嘱剂量要求及次数口服。观察组患者在第一周随访中，有 4 名患者可每日遵医嘱剂量要求及次数口服肠内营养制剂。第二周随访中，有 13 名患者可每日遵医嘱剂量要求及次数口服肠内营养制剂，其中包括第一周的 4 名患者。第三周随访中，有 18 名患者可遵医嘱剂量要求及次数口服肠内营养制剂，包括第一周的 3 名患者及第二周的 9 名患者。

【结论】电话跟踪随访可以准确了解到患者不能规范进行口服肠内营养制剂补充的原因，能够有效的提高胃癌术后围化疗期患者对营养相关知识知晓情况，提高患者对口服肠内营养补充重视程度，从而提高规范口服肠内营养制剂补充的依从性。

关键字 跟踪随访 口服肠内营养制剂 依从性

分类：营养教育

基于炎症和营养参数的评分系统预测胃上部癌新辅助化疗效果的研究

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背景及目的：胃上部癌的发病率高，胃上部癌与其它类型的肿瘤相比，还具有特殊的临床、病理学特征，且具有显著的预后差异。胃上部癌的构造中存在隐蔽的解剖学结构，且无特定的前期临床表现，因而难以被发现。目前指南建议首选化疗，既往研究表明新辅助化疗（Neoadjuvant Chemotherapy，NACT）较单纯手术可明显提高肿瘤根治性切除率和改善患者预后。故本研究探讨主要炎症营养指标、化疗前后腰三平面机体组成成分变化以及其他影响因素与局部进展期胃上部癌患者行 NACT 后疗效的关系，并根据以上结果构建临床预测模型。方法：回顾性收集行新辅助化疗的胃上部癌患者临床病理信息，共收集病例 117 人，统计患者年龄、性别、吸烟史、饮酒史、肿瘤分化程度、NACT 前和 NACT 后血象、化疗前后临床分期、化疗方案；统计并计算相关指标，经单因素分析与多因素分析所得结果构建列线图模型。从以下几方面进行模型的验证：一致性指数（C-index）、受试者工作特征曲线（ROC）、校准曲线以及临床决策曲线（DCA），根据区分度、校准度和临床应用 3 个角度验证该模型的性能。结果：117 名患者中化疗有效患者 55 人（47.0%），单因素分析结果显示：T 分期（P=0.008）、分化程度（P=0.034）、新辅助化疗前后中性粒细胞与淋巴细胞比率（Neutrophil -Lymphocyte ratio,NLR）差值（ΔNLR，P=0.001）、新辅助化疗前后血小板与淋巴细胞比率（Platelet-Lymphocyte Ratio, PLR）差值（ΔPLR，P=0.002）、新辅助化疗前后血清白蛋白（Albumin, Alb）差值（ΔAlb，P=0.015）为影响新辅助化疗疗效的影响因素。将上述单因素分析结果中有统计学意义的相关影响因素纳入 Logistic 回归模型，分析结果显示，T 分期（OR=4.04，95%CI：1.16～15.35，P=0.032）、新辅助化疗前后 NLR 差值（ΔNLR）（OR=2.04，95%CI：1.39～3.26，P=0.001）、新辅助化疗前后 PLR 差值（ΔPLR）（OR=1.01，95%CI：1.00～1.01，P=0.048）、新辅助化疗前后血清白蛋白差值（ΔAlb）（OR=0.94，95%CI：0.88～1.00，P=0.04）等是能够独立影响新辅助化疗疗效的因素。通过以上结果构建出预测模型并进行验证，结果显示，区分度：根据以上结果绘制 ROC 曲线图，通过 ROC 曲线分析得到最佳截断值。胃上部癌新辅助化疗疗效有效预测模型的 ROC 曲线下面积（AUC）为 0.881（95%CI：0.808-0.933）。最佳截断值为 0.56，灵敏度为 74.19，特异度为 90.91。使用 Bootstrap 自我采样方法，在 1000 次的重复采样中，对以上的模式进行了内部检验，求出 C-index 的数值为 0.8561；校准度：本研究构建的预测模型预测 NACT 疗效的校准度优良，两者具有较高的一致性。实际临床应用：绘制列线图模型的临床决策曲线（DCA），本研究所构建的模型正向净收益较为突出。结论：T 分期、ΔNLR、ΔPLR 及 ΔAlb 为新辅助化疗疗效评估的独立预测因子，胃上部癌新辅助化疗疗效预测模型具有良好的预测性能和临床应用价值。

关键字 胃上部癌；炎症营养指标；新辅助化疗；危险因素；回归分析

分类：营养教育

含糖饮料警示标识对上海市居民健康警示作用的效果评估研究

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目的 了解上海居民对实行含糖饮料（Sugar-Sweetened Beverages，SSBs）警示标识政策、SSBs 警示标识构成元素及整体设计的看法，评估标识对上海市居民的健康警示作用，为我国 SSBs 控制政策制定提供科学证据。方法　采用随机抽样的方法，共纳入上海市 16 个区 3391 名研究对象。通过问卷调查收集研究对象年龄、性别、居住地、文化程度、职业、身高、体重、含糖饮料饮用习惯等信息。在 Grummon 等设计 SSBs 警示标识的评估问卷基础上，结合我市居民营养健康知识水平进行调整，利用经调整后的问卷在线调查研究对象对在 SSBs 售卖场所设置警示标识措施、标识构成要素（形状、颜色、警示图形等）和整体设计的看法、对标识反应（喜爱度、注意力、信息思考度、讨论度、触发负面情绪）和健康警示作用（健康提示效应、行为意愿改变、购买可能性变化）的看法。采用多因素 logistic 回归分析校正年龄、性别、城乡地区、文化程度、BMI、SSBs 摄入频率等因素后，SSBs 警示标识对上海居民健康警示作用。结果 研究共收集有效样本量为 3191 例，其中男性占 41.5%；＜18 岁、18-29 岁、30-39 岁、40-49 岁、50-59 岁和≥60 岁者分别占比 12.3%、15.8%、25.4%、20.3%、10.0%和 16.2%；营养/健康/医学相关行业者占 34.5%，其他职业占 65.5%；初中及以下学历者占比 17.0%、高中及大专占比 34.4%、大学本科及以上占比 48.6%。94.4%的上海市居民同意在 SSBs 售卖场所设置警示标识，98.3%的居民认为易拉罐形状比矩形更能让其联想到饮料，74.6%的居民认为红色更能引起对标识的注意。超过 70%的居民认为本研究设计 SSBs 警示标识在吸引注意力、引发思考和讨论，以及引起焦虑、后悔等负面情绪方面是有效的，并认为其健康警示作用优于国内先行标识。超过四分之三居民 SSBs 警示标识具有健康警示效应、可降低其 SSBs 购买意愿；65.2%的居民在看到 SSBs 警示标识后表示会减少为 0-18 岁儿童购买 SSBs。调整年龄、性别、城乡地区、文化程度、BMI、SSBs 摄入频率等因素后的 logistic 回归分析表明，女性、年龄较大、正常体重及 SSBs 摄入频率低的人群更加支持设置 SSBs 警示标识措施；与男性相比，标识对女性降低 SSBs 购买意愿及减少为孩子购买的可能性更大（均 $P<0.05$）。趋势分析发现，SSBs 警示标识会引发文化程度和 SSBs 摄入频率高的人群更强烈的负面情绪。结论 我国尚无经过科学评估的、具有健康危害警示作用的 SSBs 警示标识。本研究基于形状、颜色、警示图形等标识构成要素设计出的 SSBs 警示标识在吸引注意力、引发思考和讨论、触发焦虑/后悔等负面情绪，以及健康警示、降低购买意愿等维度是有效的。不同文化人群对标识构成要素有偏好差异性，该 SSBs 警示标识及其效果评估可为我国 SSBs 控制措施探索奠定基础。

关键字 含糖饮料警示标识；营养教育；健康促进

分类：营养教育

创新性大学生营养教育课程研究

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目的：创建一门以“全人教育”为目标，引导学生具备终身学习的能力，将可持续营养助力未来作为核心思想，实践与理论相结合为教学纲要的创新型营养与健康生活课程。

方法：本课程研究创新的方法主要体现在在教学理念、教学活动以及教学资源三个方面。教育理念是 OBE 理念和 BOPPPS 模型相结合的创新性教学理念重视“知行合一”，纠正了以往的“重知轻行”的教育理念，再结合 BOPPPS 模型设计丰富创新的教育活动。教学活动中，分组后的学生针对不同慢性病，通过查资料自学相关病理及营养推荐内容，并根据以上知识，结合减油减盐减糖的技术研发一道适合该慢性病人食用的健康菜肴，并在导修课上烹饪出来给大家品尝。通过简单的课程内容传授和小组团队协作，不光从浅到深逐步提高了学生的学习兴趣和实践应用能力，也达到全人教育的目标。团队负责人还主动邀请世界各地的顶级专家来为学生讲授相关课程，丰富创新的教学活动。这样在帮助学生放眼全球拓宽视野的同时，也能让学生去尝试本土化创新。在教学资源的创新上首先是不再拘泥于教室中的黑板与书籍，而是将课程的内容与互联网相结合并分别制作了针对儿童的卡通视频，少年的在线游戏，老年人的微信公众号文章，编写并演唱了针对痛风病人的《痛风之歌》等。本团队还申请了 200 平方米的场地，包含一个传统实验室和一个专门的烹饪实验室，为课程中的营养实验和菜肴改造提供场地设备，激发学生对营养学的兴趣。

结果：在结课之际我们也对参与本次课程创新的学生进行了数据分析。本团队开发了一站式在线膳食评估平台，该平台具备营养值存储和查询的数据库，膳食数据输入、计算和比较的网站界面，涵盖大量中国食品的营养成分和含量信息，让学生在 140 种食品模型的帮助下，填写食物频率问卷并记录过去 24 小时的饮食，把自己记录的数据导入后显示，学生们在上完本门课之后增加了大豆和坚果、五谷杂粮和水产品的摄入量，同时天天吃早餐、不再盲目追求体型美、避免过多食用零食和饮料等，完成了健康行为的改变。

结论：本篇课程研究对营养与健康生活这门通识课程的创新相关的教学改革曾在 2021 年得到省高等教育教学研究和改革项目的资助。同时课程坚持思政双修，坚持以学生健康为本是本篇课程研究的核心理念，也得到了中宣部所属的全国学习平台“学习强国”的多次报道。

关键字 Keywords：营养教育，创新型营养与健康生活，教学理念

分类：营养教育

运动员营养教育干预效果系统综述

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目的：运动员的营养教育干预旨在提高运动员营养知识、提高营养认知和改善其饮食习惯，帮助其优化膳食摄入并达到当前的运动营养指南推荐值，以满足其机体代谢需求、维持最佳运动表现、促进机体疲劳恢复。目前已有大量关于运动员营养教育的研究，但对于实践应用中的最佳干预方案尚未达到共识。本研究旨在综述营养教育干预对运动员营养知识、饮食摄入、生化指标和运动表现等方面的影响，同时比较不同营养教育干预方案的效果，以便更好地指导今后的营养教育实践。

方法：在 PubMed/MEDLINE, Web of Science 等英文数据库平台，使用英文检索词：“education intervention”、“nutritional intervention”、“nutrition education”、“programs”、“strategy”、“nutrition knowledge”、“health knowledge”、“food knowledge”、“diet knowledge”、“dietary behavior”、“dietary behavior”、“dietary intake”、“dietary assessment”、“food habit”、“body composition”、“biochemical index”、“performance”、“sport”、athlete”，在 CNKI、万方、维普等中文数据库平台，检索关键词：“教育干预”、“营养干预”、“营养教育”、“干预方式”、“营养知识”、“膳食行为”、“饮食习惯”、“膳食摄入”、“身体成分”、“生化指标”、“运动能力”、“运动表现”、“运动”、“运动员”，检索截止时间为 2023 年 1 月。将检索结果进行筛选、整理和分析。

结果：共计 29 项关于运动员营养教育干预的文献纳入研究，在实验设计方面，14 项研究采用单臂设计，15 项研究采用双臂设计；对饮食摄入量进行了两次评估，分别在干预前和干预后进行评估，一些研究在干预期间也进行了评估。干预周期为 10 天至 2 年不等，课程设计为 2-12 节课不等。具体的营养教育干预形式包括：运动营养课程、营养知识讲座、一对一营养指导、小组研讨会、游戏、漫画书、营养知识手册、线上课程、微信公众号等。研究对象包括足球、排球、曲棍球、手球、棒球、冰球、田径、篮球、游泳、垒球、网球、摔跤等运动项目。营养教育干预后，运动员运动营养知识（SNK）得分提高（如水合知识、合理选择食物）；膳食中的总能量、碳水化合物、蛋白质或特定营养素（铁）摄入量增加，饮食习惯（水果和蔬菜摄入、补水习惯）得到改善。营养教育干预可改善（脂肪量减少）或维持运动员身体成分，但未改变营养相关的血液生化指标，且对运动员运动表现影响的结果不一。

结论：营养教育干预在提高运动员营养认知、合理选择食物和改善身体成分方面具有一定的积极作用。而营养教育干预对运动员血液生化指标及运动表现方面的文献有限，其影响有待进一步探究。此外，由于研究对象的特征及采用的干预形式存在异质性，未能确定最佳营养教育干预方案。建议结合运动员的营养认知水平和特定的营养需求，制定运动员易于接受的营养教育干预方案，并进行持续性的营养教育干预。

关键字 营养教育；干预效果；运动员

分类：营养教育

太原市城乡居民营养素养调查研究

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目的：营养是生命和健康的物质基础，也是免疫系统的物质基础。作为健康素养的重要组成部分，营养素养同样不容忽视。本研究通过对太原市居民营养素养现状进行调查，了解居民营养素养的一般状况，更深入的对影响居民营养素养的影响因素进行分析，从而有指向性的制定公众营养教育和健康促进策略，实施更有效的干预方式，为提高居民健康水平提供参考依据。

方法：通过对太原市城乡居民采用分层多阶段整群随机抽样的方法进行调查，共获取 1580 份有效问卷，得到了太原市城乡居民营养素养的相关情况，将调查结果整理后用软件 SPSS 24.0 进行数据分析。计数资料运用构成比来描述，单因素分析运用卡方检验进行分析，多因素分析运用 Logistic 回归分析。

结果：结果显示，太原市城乡居民总体营养素养水平处于“高关注、低认知”水平，主要受文化程度、收入水平与是否患有慢性疾病的影响。在营养素养三大部分中，基本知识和理念素养水平主要受文化程度、职业、是否患有慢性疾病影响；健康生活方式与行为素养水平受文化程度、收入水平等影响；基本技能素养水平受城乡、文化程度、收入水平和是否患有慢性疾病影响。

结论：1.在城乡方面，城市居民营养素养高于农村居民，针对农村居民，要利用现代大众传媒的方式与手段，拓宽农村居民获取营养信息的渠道，拓宽营养信息的传播途径，以提升农村居民的营养素养水平。

2. 在文化程度方面，营养素养水平随文化程度的增高而增高，提升文化程度是促进城乡居民营养素养提高的有效手段。重点关注学生营养素养的提高、健康饮食行为的培养、注意体格监测等内容，并形成家庭、学校和社会共建健康食物环境的良好局面。

3. 在收入水平方面，收入水平高的个体，有更多的渠道去获取营养知识，提高营养技能，享受更高层次的营养服务，因此对低收入群体应根据其实际情况进行更有针对性的宣传教育，提供多种多样的营养咨询宣传服务。

4. 在是否患有慢性疾病方面，患有慢性疾病的居民营养素养水平更高，这说明慢性病患者对营养知识和指导有更深层次的需求，需要通过多种方式满足其对营养健康的追求。同时也要重视无慢性病患者的营养健康教育。

综上所述，太原市城乡居民的营养素养仍有待提高，并且受多种因素的影响，在提升居民的营养素养水平方面应加强营养教育，实施更精准的营养促进工作，更好地提升居民营养素养水平，从而实现全民健康的目标。

关键字 营养素养；营养知识；营养教育；城乡居民

分类：营养教育

营养干预在妊娠期糖尿病中的应用效果研究

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目的 探讨对妊娠期糖尿病患者进行营养干预的效果。**方法** 选择在2022年3月-2023年3月山西省太原市妇幼保健院收治的112名孕6-8周孕妇，将其随机分为对照组和研究组，各56例。对照组实施常规营养指导，包括妊娠期糖尿病运动及饮食健康教育，同时每天监测空腹及用餐后两小时血糖变化。研究组在此基础上实施个体化营养干预，包括对妊娠期糖尿病孕妇进行营养评估、健康宣传教育、制定饮食计划、体重管理计划、体育运动计划，并建立微信、电话的跟踪指导模式。比较分析两组在干预前后妊娠期糖尿病知识知晓率、合理饮食得分情况、治疗前后血糖控制情况、孕期体重增长情况。**结果** 1. 干预组与对照组的一般资料对比：干预组孕妇的平均年龄为30.288±3.14，身体体重指数（BMI）为24.690±1.623；对照组孕妇的平均年龄为3.218±3.23，BMI为23.985+1.654，差异无统计学意义（p＞0.05），具有可比性。2. 干预后两组孕妇对妊娠期糖尿病知晓率都有明显上升，干预组孕妇糖尿病知识问卷得分明显高于对照组。干预前两组孕妇知晓率差异无统计学意义（p＞0.05），干预后差异有统计学意义（p＜0.05）。3. 干预前两组孕妇在合理饮食上得分较差，干预组为6.25+1.21，对照组为6.31±1.25。干预后两组孕妇合理饮食得分差异有统计学意义（p＜0.05），干预组平均得分8.96+0.57，对照组平均得分7.32±1.21。4. 两组治疗后血糖值比较：（1）干预前：干预组孕妇空腹血糖和餐后2小时血糖分别为：5.14±0.546，8.81±1.149；对照组孕妇空腹血糖和餐后2小时血糖分别为：5.11±0.682、8.97±1.102，干预组与对照组差异有统计学意义（p＜0.05）。（2）干预后：两组孕妇空腹及餐后2小时血糖均有明显下降，干预组孕妇空腹血糖和餐后2小时血糖分别为：4.91±0.346，5.8±0.716；对照组孕妇空腹血糖和餐后2小时血糖分别为：5.24±0.391、6.93±1.27；干预后干预组血糖有明显下降，干预组与对照组差异有统计学意义（p＜0.05）。5. 孕期增重比较：干预组体重增长低于对照组，差异有统计学意义（p＜0.05）。**结论** 早期发现妊娠期糖尿病，及时确诊，实施个性化营养干预，使孕妇及时调整营养方案，在妊娠期糖尿病中的应用可以显著改善孕妇血糖控制情况。利用微信、电话等辅助手段能够更好的确保糖尿病孕妇的营养干预效果，确保个体化营养干预措施有效实施。实施个体化营养干预可以明显提高孕妇糖尿病知晓率，帮助妊娠期糖尿病的孕妇将体重增长控制在合理范围内，从而有助于妊娠期糖尿病孕妇健康。因此孕期加强营养干预和监督可以提高产科质量，多样化的监督形式应纳入考虑。

关键字 妊娠期糖尿病；营养干预；血糖；BMI指数

分类：营养教育

关于围产期母亲营养科普知识及需求方式现状研究

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摘要：目的 通过收集围产期母亲营养科普知识问卷,了解围产期母亲关于孕产期营养知识的正确认知，围产期母亲对营养科普形式的需求，母亲对围产期营养状况的关注度，营养科普能不能解决围产期母亲目前存在的营养困惑、是否有妊娠期疾病、妊娠期疾病如何进行营养摄入等。**方法** 本研究采用问卷调查法，通过问卷星收集 2022 年 8 月-2022 年 10 月期间，在 XX 妇幼保健进行产检或分娩的母亲关于营养科普的知识问卷，共收集问卷 372 份，有效问卷共 356 份，问卷有效回收率为 95.7%。**结果** 根据调查内容分析了解到营养科普知识知晓率为 65.7%，围产期母亲获取营养知识的途径多样，接受媒体宣传的占比为 63.4%，接受报纸、杂志、文献为 20.1%，接受身边亲朋好友、邻居的宣传交流为 48.6%，接受社区医院和疾控部门的宣传册和活动讲座为 52.1%，接受医护人员、家庭医生的面对面介绍的为 87.6%。需求最多的医院营养科普方式为微信公众号科普小视频和微信一对一知识解答。接受调查的围产期母亲中，对围产期营养状况十分关注的为 92.6%，一般关注的为 5.3%，不关注的为 2.1%。其中初中文化及以下的人占多数（54%）。在妊娠期疾病上，有 13.3% 的围产期母亲有妊娠期高血压，7.9%的围产期母亲有妊娠期高血糖，17.8%的围产期母亲有妊娠期肥胖，5.7%的围产期母亲有其他妊娠期疾病。在接受宣教时间的调查上，45.5%的围产期母亲希望时长为 20 分钟，70.8%母亲希望 30 分钟，15.3%母亲希望在 40 分钟。在运动方式选择上，89%的围产期母亲选择散步，34%的围产期母亲选择游泳，47%的围产期母亲选择瑜伽，60%的围产期母亲选择其他方式。**结论** 通过对问卷结果进行分析，围产期母亲对营养科普知识宣教的需求较大，方式多为社交媒体方面，也为医院的社交媒体运营方式提出需求建议，医生和营养师根据分期（孕早期、孕中期、孕晚期）、分时段（分娩前、分娩后）、分问题（妊娠期肥胖、妊娠期高血糖、妊娠期高血压等）进行孕期营养科普视频。根据孕期和妊娠期问题分人群进行重点宣教或进行个体化营养膳食指导。通过对宣教时间的调查，为医院为围产期母亲营养知识宣教调整合适的时间提供了理论基础，提高孕妇的科普舒适度和满意度。运动方式的科普教育需求迫切，家庭医生和营养师需要根据个体不同体质指数和受孕方式等情况进行运动方式的科普宣教，对禁忌的运动方式进行着重强调科普，减少围产期母亲的困惑。

关键字 围产期；营养科普；知识调查；母亲；需求方式

分类：营养教育

山西省高等院校学生营养健康教育的现状分析

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目的：随着社会经济的不断发展，健康已成为社会各界关注的焦点，其中食品营养是健康的重要影响因素。高校学生正处于生长发育阶段，他们是未来社会建设的重要力量，重视高校学生营养教育至关重要，提高他们对于食品营养的认识，保持一个健康的体魄。本研究旨在了解山西省高等院校开展营养教育现状以及高等院校学生营养知识掌握程度，为促进山西省高等院校营养健康教育提供依据。

方法：本研究以山西省高等院校在校大学生为研究总体，自行设计封闭自填式调查电子问卷。问卷内容包括四个部分：基本情况、学校营养健康教育开展情况、营养健康知识以及营养健康行为。通过问卷平台收集后筛选出合格问卷,所得结果经整理后录入 EXCEL 表格，再使用 SPSS20.0 软件进行统计分析。

结果：本研究发放问卷 280 份，收回合格问卷 264 份，有效率 94.2%。五分之二的学生反映其所在院系没有开设过营养健康教育课程，说明目前营养健康教育课程开展不足。但是五分之四以上的学生对营养健康教育的必要性给予了充分的肯定。对于营养健康知识获取的来源，位于前三位的依次是大众传媒、书籍和报纸、家人和朋友，所以高等院校应该充分利用广播、校报、学校微博微信平台宣传营养健康知识，提高大学生的营养健康知识掌握程度。对于希望的营养健康教育形式来说，位于前三位的依次是营养健康知识讲座、选修课、影视和多媒体课件。

结论：目前，高等院校营养健康教育开展不足，学生营养健康知识欠缺且存在很多不健康行为，应该加强对高等院校学生进行营养健康教育。

１、高等院校应该根据大学生的需求有针对性的开设营养健康教育课程，选取合理的营养健康教学内容。

２、将营养健康教育融入传统文化中。将饮食文化教育融入传统文化中，运用传统文化的教育来为学生提供营养健康知识，使学生能够在学习过程中既能够学到营养健康知识，又能够学习到传统文化知识，使我国传统文化得到传承，从而使学生能够具有一个健康的体魄。

３、加强校园宣传。进行多形式的营养与卫生知识科普,比如开展大学生营养与卫生相关的社团宣传活动，举办专家讲座，组织食品营养与卫生知识竞赛等。还可以张贴营养宣传图、印发营养科学知识与卫生知识小折页等，拓宽学生对于营养知识的了解渠道，从而提高高校学生对营养健康的认知。

关键词:大学生;营养健康教育;营养知识;饮食行为

关键字 关键词:大学生;营养健康教育;营养知识;饮食行为

分类：营养教育

糖尿病肾脏病患者膳食模式的潜在剖面及其影响因素分析

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摘要：目的　了解糖尿病肾脏病（DKD）患者的膳食摄入状况，并探讨 DKD 患者膳食模式及其影响因素。方法　2022 年 3 月~10 对广州市五所综合性医院便利抽样的 270 例 DKD 患者进行膳食调查，通过一般资料问卷和食物频率问卷调查其一般资料特征和膳食摄入情况，采用潜在剖面分析提取膳食模式并分析其影响因素。结果　与中国居民平衡膳食宝塔（2022 年）相比，DKD 患者谷薯类、水果类、大豆坚果类、奶类的摄入量低于膳食宝塔推荐量；蔬菜类、动物性食物和油的摄入量与膳食宝塔推荐量一致；盐的摄入量超过膳食宝塔推荐量。与中国居民膳食营养素参考摄入量相比，DKD 患者每日能量摄入量低于推荐量；蛋白质摄入供能比在推荐范围内，优质蛋白摄入比例低于推荐范围；脂肪摄入供能比高于推荐范围；碳水化合物供能比低于推荐范围。DKD 患者有 4 种膳食模式，分别为节约型膳食模式（79.63%）、动物型膳食模式（6.67%）、植物型膳食模式（9.26%）、富足型膳食模式（4.44%）。不同膳食模式 DKD 患者除了油外，对于其余各类食物日均摄入量比较均有差异（均 P＜0.001）。节约型膳食模式能量摄入量和碳水化合物摄入供能比偏低，蛋白质摄入供能比适宜，脂肪摄入供能比偏高。动物型膳食模式、富足型膳食模式和植物型膳食模式的能量摄入量、蛋白质摄入供能比和脂肪摄入供能比均偏高，碳水化合物摄入供能比偏低。经无序多分类 logistic 回归分析显示，年龄较小（OR=12.849，95%　CI：1.373~120.240）、人均月收入较低（OR=0.135，95%CI：0.030~0.609）和有饮酒史（OR=5.604，95%CI：1624~19.343）是动物型膳食模式的影响因素，相较于老年人，＜60 岁的 DKD 患者更倾向于动物型膳食模式，过去一年有饮酒史的 DKD 患者比不饮酒的患者更容易形成动物型膳食模式；有饮酒史（OR=4.348，95%CI：1.135~16.656）是植物型膳食模式的影响因素，过去一年有饮酒史的 DKD 患者比不饮酒的患者更容易形成植物型膳食模式；文化程度较高（OR=5.784，95%CI：1.722~19.425）是富足型膳食模式的影响因素，文化程度较高的 DKD 患者越可能形成富足型膳食模式。结论　DKD 患者膳食营养素摄入不均衡。DKD 患者膳食模式有 4 个分类，分别为节约型膳食模式、动物型膳食模式、富足型膳食模式和植物型膳食模式，DKD 患者普遍存在膳食模式不合理的问题。不同膳食模式的 DKD 患者间膳食摄入情况存在差异性，应根据不同膳食模式特征对 DKD 患者进行针对性的膳食指导。不同的膳食模式间有不同的影响因素，医护人员应结合患者的个人特征和膳食模式分类特点进行个性化膳食健康教育。

关键字 糖尿病肾脏病

分类：营养教育

浅析限时进食对青年人群适用性研究

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目的：随着国家“十四五”工作的不断推进，作者想通过食育教育提升人们饮食理念。本文从减肥话题入手，结合热点减肥方法，旨在改变青年人的饮食认知，改善其饮食习惯，使青年人在不伤害健康的情况下养成可持续发展的饮食方式。通过对限时进食相关领域研究思路和演进过程的探讨分析，基于青年群体饮食现状，为我国膳食模式提供相关研究参考。方法：本文在 Web of Science 核心合集数据库中搜集以“time-restricted feeding”为主题的文献，文献类型为"Article"，语种为"English"，检索年份为 2012 年 1 月 1 日至 2023 年月 1 日，得到 303 篇文献。接着从关键词、主题分析、期刊、国家与作者分布等方面利用 CitespaceV 进行可视化处理和分析。在中国知网上同步查阅大量关于“限时进食”主题文献并进行文献分析。结果：结果发现饮食限制对人体健康的促进非常有益。对该主题的研究重点主要围绕昼夜节律、隔天进食、机体组成、肌肉健康、新陈代谢、热量和体重限制展开，随着时间演变，热量限制主题逐渐演变为健康相关主题。158 种学术期刊共收录 TRF 文献 298 篇；瑞士《Nutrients》杂志发表 TRF 文章最多(34 篇，占比 11.37%)；在 48 个国家中，美国以 126 篇排名第一，且中介中心性最高(0.86)，美国的 La Jolla 机构发文量最高(20 篇)；在 302 位作者中，Panda 发表了 23 篇文章，排名第一。对比美国在限时进食研究领域的领先地位，我国也在把限时进食作为一种新的膳食模式推广给青年群体。相比随意饮食，成年期进行饮食限制可以改善不同物种的代谢健康甚至大大延长寿命；在与新陈代谢中的昼夜节律保持一致的情况下，白天早点进食可以增强减肥效果；同等热量饮食晚吃会增加超重和肥胖成人的饥饿感，减少能量消耗并改变其在人体代谢途径，提升肥胖风险；多项随机临床试验研究给出的具体方案如 16：8 轻断食法，即将进食控制在早上七点到下午三点，其余时间除喝水外不再摄入热量，坚持 14 周能有效减重 6.3 千克。结论：从 2019 年起限时进食相关文章发表数量急剧增加。美国在该领域处于领先地位，聚集了一批尖端人才和高水平的科研机构。目前限时进食研究的热点是限时进食对人体生物节律和氧化应激的影响。已知进食节律与明暗周期的不一致会导致外周生物钟紊乱和肥胖，那么通过控制进食的时间，而非长期限制营养或热量摄入来促进体重减轻的方法则显得尤为科学。对于青年群体而言，适用性最高的方法是 16：8 的轻断食饮食法。

关键字 限时进食、昼夜节律、减肥

分类：营养教育

青年医务工作者的体重认知与身体组成的关系

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目的：肥胖不仅是一个医学问题，还涉及社会文化。体重异常往往是身心问题的外部表现。一方面，人们对体重的主观认知往往存在偏差和错位（高估或低估）；另一方面，传统的体重评价指标，如身体质量指数（Body Mass Index, BMI）可能不足以评估体重的影响，特别是脂肪、肌肉等不同身体成分对健康的影响。此前的大多数研究主要从社会心理学的角度解释了体重认知偏差的原因。本研究拟通过比较年轻医务工作者的主观和客观体型的差异，特别是体脂肪率对体型认知偏差的独立影响，扩展了现有关于肥胖和身体形象扭曲的文献，尝试从 BIA 衍生的身体成分指标角度，为主观体型认知偏差提供了潜在的新的生理学观点。

方法：作者在华中地区一家综合医院共招募了 264 名受试者（41.3%为男性，平均年龄 26.2±3.1 岁，BMI 21.7±3.1 kg/m2）参与研究，通过问卷收集基本信息和包含体型自我评估在内的主观体型认知指标。通过生物电阻抗分析（Bio-Impedance Analysis，BIA）进行身体成分测量，包括体重、BMI、体脂肪率、腰围（Waist Circumference，WC）和腰臀比（Waist-to-Hip Ratio, WHR）等客观指标。根据主观体型和实际体型之间的差异，受试者被分为高估、一致和低估三组。使用独立的样品 T 检验（或 Mann -Whitney U 检验）来比较连续变量，并且使用 χ 2 检验（或 Fisher 的精确测试）进行分类变量。单变量逻辑回归用于检查脂肪％和其他协变量是否影响体型认知偏差。进行了多元逻辑回归分析，以确定体型认知偏差的独立风险因素，并针对各种混杂因素（包括年龄，BMI，WHR 和 FAT％）调整。考虑到专业教育背景的潜在影响，我们还针对后类型（医生，护士，医疗技术人员，药剂师和行政人员）进行了调整。然后，我们通过平滑曲线拟合来探索脂肪％与体型认知偏差之间的关系，并调整潜在的混杂因素。

结果：研究人群中存在体型认知偏差者的占比为 63.26%。在女性受试者中，单因素回归分析显示，体脂肪率与体型认知偏差显著相关（优势比（OR）1.10，95％置信区间（CI）1.03-1.18，p = 0.007）。WC（OR：1.07，95%CI：1.01-1.14，P =0.019）也可能与体型认知偏差呈正相关。在调整了年龄、BMI、WHR 和岗位类型后，体型认知偏差风险随着体脂肪率的增加而降低，直到第一个拐点（26.8%）（OR：0.78，95%CI：0.62-0.98；P=0.036），然后它又逐渐增加至第二个拐点（33.0%）。当体脂肪率高于 33.0%时，这种关系失去了统计学意义。在男性受试者中未发现有统计学意义的相关关系。

结论：本研究显示体重认知偏差现象在青年医务工作者中较为普遍，这种偏差可能是由脂肪等身体成分的结构占比和分布异常所造成的。在调整年龄，BMI，WHR 和后类型后，发现体型的认知偏差风险在非常低且非常高的脂肪％的女性中要高得多。提示体脂肪率是女性体型认知偏差的一个独立的、非线性的影响因素。鉴于脂肪％和体型认知偏差之间的性别差异，今后在建立预防肥胖的体重管理公共干预方案时，应注意考虑性别和体脂肪率的影响，采取相适宜的策略。同时应提供更多信息和身体组成测量，例如脂肪％，以改善公共肥胖症的预防。

关键字 肥胖；体重认知；身体成分；体脂率

分类：营养教育

基于动机保护理论的营养教育在肝癌化疗患者中的应用效果分析

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目的 探讨以动机保护理论为基础的营养教育对肝癌化疗患者营养知识-态度-行为(KAP)、营养指标水平、营养状况及生活质量的影响，旨在为制定肝癌化疗患者营养教育方案提供参考。**方法** 选取 2022 年 4 月-2022 年 12 月在山西省某三甲医院肿瘤科的肝癌化疗患者为研究对象，按随机数字表法分为对照组和观察组，每组 57 例。两组均接受常规营养教育,干预组在此基础上进行基于保护动机理论的营养教育策略，具体过程如下：成立干预小组，小组成员包括 1 名肿瘤科医生、1 名高年资护士长、1 名营养师、1 名心理咨询师和 2 名具有 2 年以上肿瘤科工作经验的护士组成，医生负责疾病治疗及专业知识的解答，护士长负责质量把控和工作协调，营养师负责营养评估和治疗，心理咨询师负责患者的心理咨询，护士负责干预方案的具体实施。小组成员通过学习保护动机理论的知识框架建立干预方案，并对干预内容进行培训，以确保质量的统一性。干预内容包括：感知威胁严重性：营养不良对疾病转归及预后的影响等；感知威胁脆弱性：营养不良发生率高、营养不良发生原因、肝癌常见的营养症状等；内部奖励奖励：患者对不良行为的认知；外部奖励：邀请家属给予患者更多亲情的支持；反应效能：对患者的成果给予肯定，对错误的方面给予纠正和指导，组织患者之间分享经验；自我效能：指导患者采取自我营养管理和饮食调整的行为，且给予更多的心理与社会支持，从根本上提升患者的自我效能；反应代价：为对病情预后的好处、询问患者进行应营养管理过程中遇到的问题和阻碍，并提供解决问题的办法。干预频率：每周一对一干预 2 次，每次 30～40min，并进行一次集体教育，持续 60～80min，为期干预 3 个化疗周期。营养教育形式: 化疗期进行线下干预、化疗间歇期进行线上干预，涉及集体教育、个体化指导、知识讲座、视频教育、电话随访、微信教育等。干预 3 个化疗周期后比较两组患者 KAP、营养指标水平、营养状况及生活质量。**结果** 干预后，观察组患者的 KAP 总分及各因子得分明显高于对照组，体重、BMI、外周血营养指标（血清白蛋白、前白蛋白和血红蛋白）、PG-SGA 评分显著高于对照组，生活质量总分及 5 个维度(躯体功能、角色功能、情绪功能、认知功能、社会功能)得分高于对照组（均 $p<0.05$）。**结论** 基于动机保护理论的营养教育可有效提高肝癌化疗患者的营养知信行水平，改善其营养状况和生活质量水平，临床效果优异，建议推广。

关键字 动机保护理论；营养教育；营养状况；生活质量

分类：营养教育

以 Cox 健康行为互动模式为基础的营养教育对结直肠癌化疗患者干预效果的研究

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【目的】

验证以 Cox 健康行为互动模式为基础的营养教育模式，对结直肠癌化疗患者的 AHEI 饮食指数，PG- SGA 营养评估以及生存质量的干预效果。

评价营养教育对结直肠癌化疗患者饮食质量、营养状态以及生存质量的干预效果。

建立以 Cox 行为互动模式为基础的结直肠癌患者营养教育新模式，为今后营养教育方案的构建提供思路。

【方法】选取 2022 年 1 月～2022 年 12 月收治在某三甲医院肿瘤科的 100 名结直肠癌患者为研究对象，随机分配至观察组（Cox 模式营养教育组）、营养教育组（E 组）以及空白对照组（C 组）。C 组患者给予结直肠癌患者营养健康宣教；E 组分次给予营养教育课程，课程内容包含营养基础知识、肿瘤患者饮食误区、肿瘤患者饮食设计以及操作实践等内容；Cox 组干预方案在 E 组的基础上，融合 Cox 健康行为模式相关原理，组建专家团队构建干预方案，具体包括：营养课程教育，患者独特性评估以及患者与医护人员互动 3 个主要步骤，其中，独特性评估以患者饮食习惯为重点内容，与医护人员互动以个性化饮食调整和实践为重点内容。干预持续 5 个周期（T0～T4）。应用替代饮食指数（Alternate healthy diet index, AHEI）评估换患者饮食质量；应用患者主观整体营养评估量表（Patient-generated subjective nutrition assessment, PG-SGA），估患者营养状况；应用肿瘤患者生活质量评价量表第 3 版(version 3.0 of the European Organization for Research and Treatment of Cancer Core Questionnaire，EORTC QLQ-C30），评估患者生存质量，比较三组患者各周期改善情况。资料收集后，采用 SPSS 24.0 软件对数据进行处理和统计分析。计量资料的统计描述用均数±标准差表示，计数资料的统计描述采用例数、百分比表示。使用单因素方差分析、卡方检验比较患者的社会人口学资料和营养相关资料的基线可比性。干预后，采用单因素方差分析比较同一时间结局指标的组间差异；采用配对 t 检验比较干预前、后结局指标组内差异；采用重复测量方差分析比较不同时间、不同组别结局指标间差异。所有数据分析前均进行正态分布和方差齐性检验。a=0.05。

【结果】干预结束后，共计失访 7 人，共 93 人完成研究，其中 C 组 28 人，E 组 31 人，Cox 组 34 人。结果显示，三组患者 T0 时饮食质量（C 组：44.98±5.90；E 组：47.35±5.08；Cox 组：46.88±6.02）差异无统计学意义（P=0.555）。T4 时各组饮食质量（C 组：47.11±4.23；E 组：59.98±1.12；Cox 组：63.38±1.84）均显著改善（P<0.05），其中 Cox 组改善效果最明显；且时间与干预间存在协同作用（P<0.001）。与 T0 相比，T4 时各组患者 PG-SGA 评估结果（C 组：3.83±1.15；E 组：3.79±1.25；Cox 组：3.28±1.10）均显著改善（P<0.05），与其他 2 组相比，Cox 组 PG-SGA 评分在 T4 时仍有较多下降趋势，但未见统计学差异。干预前后，患者生存质量未见下降（P>0.05）。

【结论】以 Cox 健康行为互动模式为基础的营养教育，可有效改善结直肠癌患者饮食质量和营养状态，可能有助于维持患者生存质量，对营养状态的独立临床干预效果仍需进一步观察证实。

关键字 Cox 健康行为互动模式，饮食记录法，营养教育，结直肠癌，化疗

分类：营养教育

营养教育对中山市小学生营养知识和饮食行为的干预效果评价

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目的

儿童时期是获取营养相关知识和建立饮食行为的关键时期，丰富的营养知识和健康的饮食行为是儿童合理营养的基础。然而，营养知识缺乏以及饮食行为不良在中国儿童中较为常见。营养教育是改善儿童营养知识和饮食行为的一个有效途径，由于营养教育课程内容丰富，成本低，受益群体广，现已被多个国家和地区作为改善儿童营养状况的主要手段，此外，学校是学生获取知识，养成健康行为的重要场所。因此，我们制定了一项以学校为基础的营养教育计划，以评估其对小学生营养知识和饮食行为的干预效果。

方法

本研究选取了中山市区三所公立学校的三年级全体学生作为研究对象，其中 1 所学校作为干预组（n = 199）， 2 所学校作为对照组（n = 151）。干预组学生在学校健康教育课程的基础上增设营养教育课程，学生每周接受一节 40 分钟的营养教育课程，干预时长为六个月，对照学校则维持原有的健康教育课程不变。营养课程内容根据中国儿童少年膳食指南（2016 年）设定，并且设置了闪卡、课堂视频、课堂小游戏和小实验等互动环节。采用自制问卷在干预前后对学生营养知识及饮食行为进行问卷调查。

结果

共有 325 名学生最终被纳入分析（干预组 186 名，对照组 139 名），基线调查显示平均年龄为 8.26 ± 0.45 岁，平均 BMI z 分数为-0.06 ± 1.75，男生 171 名，占 52.6%，母亲学历为高中或以下占 53.3%，父亲学历为大专或以上占 55.7%，干预组和对照组在年龄（8.31 ± 0.48 vs. 8.19 ± 0.39，P = 0.016）及母亲学历（高中或以下：44.6% vs. 64.2%，P = 0.003）上的差异有统计学意义，其余基线特征差异无统计学意义。在营养知识得分方面，从基线到 6 个月随访，干预组总体知识得分的平均差值（随访平均得分 - 基线平均得分）显著高于对照组（1.99 ± 3.22 vs. 0.66 ± 3.60, P = 0.001）。然而，亚组分析进一步表明，上述差异在男生和营养不良的学生中无统计学意义。在饮食行为方面，营养教育计划显著增加了干预组学生的肉类、坚果消费频率和早餐摄入食物种类的数量，更重要的是，它还显著降低了学生对于含糖饮料和快餐的消费频率。结构方程模型分析进一步表明，营养教育计划可以通过提高营养知识而对饮食行为有显著影响。

结论

营养教育计划有效提高了小学生的营养知识得分，并改善小学生的饮食行为，为学校营养教育开发与推广提供了良好依据。此外，未来研究应更多地关注男孩和营养不良儿童在营养教育计划中的参与度和积极性。

关键字 营养教育；营养知识；饮食行为；儿童；效果评价

分类：营养教育

走出“治病”误区

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人们潜意识当中都有这样一个概念——病了去医院治，病是治好的。

这句话只对了一部分,借用樊代明院士的一段话“三分之一的病是治好的，三分之一的病是治不好的，三分之一的病不治也好”不要夸大医院的治疗作用。

大量的临床研究统计发现影响人类健康和寿命的主要因素有五个方面如图：自然环境占 7%、医疗条件占 8%、社会条件占 10%、遗传因素占 15%、生活方式占 60%。

《中国居民营养与慢性病状况报告（2020 年）》显示 2019 年我国因慢性病导致的死亡占总死亡 88.5%。

改革开放这几十年来，我国医疗系统的发展速度是很快的，医院的建设规模、检测设备、外科手术技术都有大大提高，可是依然满足不了国民就医需求，慢性病患者发展速度超出了医院的建设速度，什么原因呢？

一位美国医生做了一个形象的比喻，说现在的医生就好像在河下游打捞落水人群，总是在研究如何改进打捞设备和打捞方法，却没有研究到上游修筑河坝，防止人们落水，所以总也捞不完，而且还有人反复落水。

我们国家也发现了这个问题，卫生系统改革就是从以治病为中心向以健康为中心转变，预防疾病。但是到目前为止“预防为主”对大部分人来说还只是停留在口头上，没有行动，包括我们的部分医护人员。有些医护人员觉得：我是负责治病的，预防不是我的事，甚至有的医护人员自身就健康堪忧。

在影响人类健康和寿命的主要因素当中，医疗条件的作用只占了 8%，即使你的治疗水平发挥到极致，那么你起到的作用也只有 8%，所以医护人员只有走出治疗这个误区，治疗与生活方式干预相结合，才能真正发挥出应有的作用。

近几十年来国家在医疗卫生的投入很大，可是对慢性病控制作用并不明显，不是我们的医生无能，而是医学研究方向不对，如果我们研究如何健康，怎样不生病，得小病、晚得病，这样我们既能少花钱又能获得健康。

高血压、肥胖、糖尿病这些中间危险因素，通过合理膳食、适量运动、改掉不良习惯是可以逆转的，如果放任自由它就会促进慢性病并发症的发病。即使是已经出现了并发症，改掉不良习惯，控制这些危险因素也是有助于疾病的康复，所以在任何一个阶段改变不良习惯都有益健康。

现代医疗有 5 个步骤：预防、保健、诊断、治疗、康复。我们现在忽视了预防、保健和康复，大部分都是在重复“诊断、治疗”这两步，缺失了预防保健，甚至没有做到早诊断、早治疗，一些患者错过了最佳治疗期。只有少数患者手术治疗后得到了康复指导，多数人不懂康复知识。

所以我们要想健康就一定要改变“治病”的观念，预防大于治疗，因为当疾病发展到一定阶段是不可逆转的，是无法治愈的。

关键字 治病

分类：营养教育

移动媒体使用对备孕期女性营养健康知识的影响

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目的:备孕期女性的营养状况直接关系着孕育和哺育新生命的质量，备孕期女性的营养知识关系到自身和下一代的健康。本研究描述备孕期女性通过移动媒体获取营养健康知识情况，并探讨移动媒体对备孕期女性营养健康知识的影响，了解如何利用现代的移动媒体技术传播正确的营养健康知识。

方法：目标样本量是根据世界卫生组织关于流行率研究所需最小样本量的建议进行估算，选取北京和成都分别作为一线城市和新兴一线城市的代表，于 2020 年 12 月-2021 年 4 月在北京东城区、西城区妇幼保健院，四川省妇幼保健院对参加孕前咨询并计划在半年内怀孕的女性采用电子问卷方式展开调查。问卷包括一般社会情况、移动媒体使用情况、营养健康知识和食物选择偏好四个部分。营养健康知识问题共 10 道，每题答对计 1 分答错计 0 分，满分 10 分。采用 t 检验和卡方检验分别对定量资料和定性资料进行单因素分析，采用广义线性模型对影响备孕期女性健康知识得分的因素进行多因素分析。此次调查在征求被调查者知情同意后进行，最终共有 654 名备孕期女性参加了此次调查。

结果：被调查对象平均年龄为（29.0±4.4）岁， 初中、高中及大专、本科、硕士及以上比例分别为：1.2%、24.0%、46.8%、28.0%。一周手机使用累计时间中位数为 16.0（6.0,35.0）小时，平均每日使用时间 137.1 分钟，获取备孕期营养知识途径的前三位分别为：微信朋友圈（50.82%）、专门的 APP（44.99%）、电脑自查（34.98%）。有 41.5%的被调查者表示无法通过可靠途径获取备孕期营养相关知识。营养健康知识问题全部答对的比例为 0.8%，答对一半以上的占比 33.6%。采用两种或两种以上途径获取备孕相关营养健康信息的女性营养知识得分均值为（4.8±2.2）分，高于通过单一途径获得信息的女性（4.3±2.3）分，（t=-3.23，p＜0.001）。将营养知识得分作为因变量，年龄、学历、收入、是否曾经怀孕、是否曾经生育、同质信息多渠道推荐（单一/多种）、手机使用时间作为自变量建立广义线性模型，结果显示手机使用时间不会影响备孕期女性营养健康知识得分，年龄较长、文化程度较高和多渠道获取同质信息的备孕期女性营养知识得分较高。

结论：移动媒体对备孕期女性营养健康知识水平的影响不受手机屏幕使用时间限制，仅与多渠道的信息推荐相关，今后可考虑通过多个平台和不同形式建立权威营养信息平台，有助于提高备孕期女性营养知识水平。

关键字 移动媒体　　备孕期女性 营养健康知识

分类：营养教育

科学膳食，守住营养健康

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我们深知合理膳食对于保持健康的重要性，合理的饮食可以帮助我们预防和控制许多疾病，如肥胖、高血压、糖尿病等等。而不合理的饮食习惯则会导致营养不良、肥胖等问题。据世界卫生组织的数据，全球有超过 3 亿人口患有肥胖症。在中国，肥胖问题也日益突出，目前我国儿童青少年肥胖率高达 15.4%。而中国卫生健康委员会公布的数据，我国儿童青少年膳食结构不合理导致的疾病逐年增加，如糖尿病、高血压等疾病。儿童青少年膳食需要注意的几个方面：保证摄入足够的优质蛋白质，有助于促进生长发育；增加蔬菜、水果、全谷类食物等的摄入；减少儿童吃零食的行为，限制油炸、糖果等食品的摄入；

根据现实的健康状况，我为此提出以下建议：

一、了解儿童的营养需求

儿童在成长发育过程中需要各种营养物质，如蛋白质、碳水化合物、脂肪、维生素、矿物质等。其中，蛋白质是儿童生长发育的基础，碳水化合物则提供儿童所需的能量，脂肪则对儿童的神经系统和大脑发育有着重要的作用。维生素和矿物质则是儿童身体健康所必需的。

二、合理搭配食物

在儿童的饮食中，我们应该合理搭配食物，保证他们摄入到足够的营养物质。例如，儿童的早餐应该包含牛奶、鸡蛋、面包、水果等，午餐和晚餐则应该搭配蔬菜、肉类、豆类等。此外，我们还应该注意食物的种类和质量，尽量选择新鲜、营养丰富的食材。

三、培养良好的饮食习惯

良好的饮食习惯对于儿童的健康成长至关重要。因此，我们应该教育孩子们养成良好的饮食习惯，例如少吃零食、多吃水果蔬菜、适量饮水等。同时，我们还应该注意孩子们的饮食环境和心理状态，保证他们能够在愉悦的氛围中享受美食。

四、避免过度营养和不良饮食习惯

尽管儿童需要各种营养物质，但过度营养和不良饮食习惯同样会对他们的健康造成伤害。例如，过度摄入油腻食物会导致肥胖和心血管疾病，过量食用含糖饮料则会增加儿童患龋齿的风险。因此，我们应该避免孩子们过度食用高热量、高脂肪、高糖分的食物，尽量让他们选择健康的食品。

五、科学补充营养物质

在孩子们的饮食中，有时难以保证每种营养物质的充足摄入。在必要时，我们可以选择科学补充营养物质，例如维生素、矿物质等。但是，我们应该遵循医生或营养师的建议，合理选择补充方式和剂量。

科学食养对于儿童的健康成长至关重要。我们应该教育家长们关注孩子们的饮食健康，帮助他们养成良好的饮食习惯，避免过度营养和不良饮食习惯，科学补充营养物质。只有这样，我们才能够助力孩子们健康成长，迎接美好的未来。

关键字 儿童营养，饮食习惯 ， 健康成长

分类：营养教育

美国营养服务流程对我国营养师专业服务的启示

宋自强*
杭州金纤健康科技有限公司

目的　养成健康行为习惯对于慢性疾病防控意义重大，而营养服务在其中发挥着关键作用，然而我国营养服务体系尚未成熟，缺乏标准化流程。本文研究美国自2003年搭建的标准化营养服务流程，通过对其背景、内容和实施情况进行分析与总结，探讨该营养服务流程在我国的应用场景和潜力，为我国营养师的营养服务提供可借鉴的经验。

方法　本文通过文献检索，使用“标准化营养服务流程”、“营养服务”、“障碍因素”、“促成因素”作为中文关键词，使用“Nutrition Care Process”、“Nutrition Care”、“Barriers”、“Enablers”作为英文关键词检索中国知网、维普、万方、谷歌学术、PubMed等数据库中涉及美国标准化营养服务流程背景、内容和实施情况的相关文献进行综述。

结果　为保证高质量的营养服务，评估所采取干预策略对于客户健康行为和健康结果的影响，美国饮食与营养学会于2003年制定了营养服务流程（Nutrition Care Process，NCP），包括相互关联的四大板块内容：①营养评估，目的是收集和评价与营养状况相关的数据，用于发现营养问题并寻找原因，以便做出营养诊断。②营养诊断。与医学诊断不同，其目的是识别和描述可以通过营养专业人员的营养干预手段解决或改善的营养问题，需使用营养问题（problem）、病因(etiology)、体征和症状(signs /symptoms)的PES格式进行简单、明确的声明。③营养干预。针对PES格式中已确定的病因，根据客户的情况制定与实施干预计划，以解决或改善营养问题。④营养再评价与监测。即判断营养干预策略是否在解决或改善营养问题上起作用，以便发现问题并改进未来的干预策略。实施NCP体系存在很多障碍和促成因素。例如“营养学会推动”和“同行支持”是最常见的促成因素，而“缺乏时间”和“缺乏培训和教育”是最主要的障碍因素。目前越来越多的营养学会、营养师协会和其他组织已经公开承认并支持采用NCP的重要性，但不同国家地区之间实施水平有所差异，有更多实施经验、明确实施战略的地区往往实施水平更高。

结论　美国营养专业人员采取标准化营养服务流程（NCP）对我国营养师的专业服务具有启发与借鉴意义。由于营养服务目前已经不再局限于医院内部照护，而更多地进入社会服务领域，实施NCP时需按照国情、机构和服务对象的特点，对流程细节进行调整，并充分了解其障碍和促成因素，发挥各地营养学会及其营养学术组织、高校等单位的优势，鼓励营养师在营养服务工作中运用该流程，更好地为人民健康而服务。

关键字 标准化营养服务流程、营养服务、障碍因素、促成因素

分类：营养教育

营养职业人才发展：挑战与机遇

多克·多丽娜*
新疆生产建设兵团第九师医院

营养是人类生命活动所必需的物质， 它在人类健康中的作用越来越被重视。营养学作为 一个独立的学科， 在过去几十年中得到了迅速发展， 为人们提供了更多的营养知识和健康饮 食指导。然而， 营养行业目前面临着人才短缺的问题， 这已经成为影响营养行业发展的一个 重要因素。 随着全球健康意识的不断提高， 人们对于营养行业的需求也不断增加。根据世界 卫生组织的数据， 全球慢性病的发病率不断上升， 其中营养与健康密切相关。同时， 全球营 养食品市场也在不断扩大， 预计到 2025 年，全球营养食品市场的规模将达到 1,450 亿美元。 这都表明营养行业发展的巨大潜力和市场需求。

然而， 营养职业人才的短缺已经成为制约营养行业发展的瓶颈之一。营养行业人才的培 养和发展面临着多重挑战， 包括缺乏高素质的专业人才、培训机制不够灵活、薪酬待遇不高 等问题。此外， 当前营养行业也面临着新的挑战， 如人工智能和大数据技术的应用、基因工 程和食品安全等领域的发展， 这些都需要具备相关技能和知识的营养人才。 为了解决这个问 题，我们需要进行一系列的探究和创新。

本文的目的是研究营养职业人才的发展问题， 并提出相应的解决方案。我们采用了文献 研究、问卷调查和访谈等方法，以了解营养职业人才的现状和需求。

通过我们的研究， 发现了几个问题。首先，现有的培训机构无法满足职业人才的需求， 培训内容和形式不够灵活多样化。其次， 营养职业人才的薪酬待遇不高， 导致了人才流失的 问题。再次，缺乏适当的职业晋升路径， 难以提高职业技能和职业发展。最后，大众对营养 行业的了解不够，对营养职业的认可度不够高。

为了解决这些问题， 我们提出了以下的建议。首先， 建立灵活多样的培训机制， 包括线上和线下的培训， 以及针对不同岗位和不同需求的个性化培训。其次， 提高营养职业人才的 薪酬待遇， 加强职业技能的培训和提升， 并建立合理的职业晋升路径。此外， 我们还需要加 强营养知识的普及，提高公众对营养行业的认识和认可度。

总之， 营养职业人才的发展是一个需要重视的问题。我们需要不断地探究和创新， 以解决当前存在的问题，并提高营养行业的整体水平和发展。

关键字 关键词：营养职业人才；短缺；发展；

分类：营养教育

儿童青少年营养：多层面的关注与行动

多克·多丽娜*
新疆生产建设兵团第九师医院

儿童青少年时期，是一个人的生长发育阶段。据估计，个人约 50%的人体体重和 15%的身高是在此期获得的。此时期人体新陈代谢旺盛，单位体重的营养素和能量需要量高于成人。同时，儿童青少年期也是建立健康信念和形成健康饮食行为的关键时期，从小养成健康的饮食行为和生活方式将使其受益终生。因此，全面、充足的营养是促进儿童青少年正常生长发育，乃至一生健康的物质保障。

随着人民的生活水平逐渐提高，现今儿童青少年的营养状况已经显现出不少问题，这主要是由于平时不注重营养饮食以及营养的均衡摄入，不少儿童青少年处在一种亚健康的状态。

本文以充分了解当前儿童青少年营养状况为前提，在了解他们真实的饮食结构与营养观念后，深刻全面分析了如今这一群体在营养健康方面存在的问题，并提出了建议，希望通过全面共同关注、解决这一问题，促进儿童青少年们更加健康快乐的成长。

首先，当前社会中仍大量存在不健康食品的营销，部分人员通过在包装和营销上下功夫，起到了蒙骗儿童青少年甚至家长群体的目的。其次，学校层面对学生营养健康关注较少，没有起到很好的宣传引导效果。还有，家长层面没有起到很好的教育作用，唯有健康饮食从小做起，养成良好的饮食习惯，才能确保这一群体的健康发展。

针对以上问题，我们也提出了相关建议。首先，国家相关部门要致力于制定相关政策与法规，以遏制日益增长的不健康食品和饮料营销，例如禁止在学校内外宣传和营销不健康食品等。其次，要深入贯彻“学校教育要树立健康第一指导思想”的精神，学校要加大对学生营养的重视，多多针对教职工以及学生群体开展营养科普，向儿童青少年传播更多的营养知识。当然，在针对青少年儿童营养问题时，家长更应提高儿童青少年群体对营养饮食的重视度，培养子女合理饮食和科学膳食的习惯，使他们获得尽可能充足、全面、平衡的营养素。

总之，儿童青少年营养问题及相关工作是国家培养合格的社会主义接班人进程中必须关注的，因此更要在各方面提升社会群众的营养素养，加强关注，落实行动，保证儿童青少年的营养健康。

关键字 儿童青少年营养；儿童青少年健康；政策；学校教育；家庭教育

分类：营养教育

健康理念的家庭实现

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健康的概念：1989 年联合国世界卫生组织（WHO）对健康作了新的定义，即“健康不仅是没有疾病，而且包括躯体健康、心理健康、社会适应良好和道德健康 ”。

健康的基石：1992 年，世界卫生组织在著名的《维多利亚宣言》中首次提出健康四大基石概念，即合理膳食、适量运动、戒烟限酒、心理平衡。

膳食指南的家庭实现。我国 2022 年中国膳食指南是目前最新版的膳食指南，是确保每个家庭健康饮食的指导，具有科学性、普遍性，是保障《“健康中国 2030”规划纲要》、《“十四五”国民健康规划》落实，提升国民幸福指数的重要基础性保障。民以食为天，吃得科学营养是身心健康的基本物质保障。

运动健康的日常开展：生命在于运动，如何运动需要科学指导，现状是多数国民吃得过多，营养过剩，运动缺乏导致的亚健康普遍存在。吃动平衡，科学适量运动让身体更好地保持健康状态，提升生活质量。

强化社区教育普及：充分发挥基层社区的作用，让科学的健康理念与切实可行，通俗易懂的健康知识和做法更好地走入千家万户，大幅提升国民身体素质，快速地由吃饱、吃好到吃得健康，拥有健康高级的生活品质，确保《“健康中国 2030”规划纲要》、《“十四五”国民健康规划》尽快顺利实施。

充分利用抖音、快手等群众喜闻乐见的短视频等新媒体，寓教于乐，方便群众随时随地学习掌握健康知识、理念和方法。

利用央视覆盖面广、权威性强的长处，在新闻联播后的高收视时间连续不断播放健康知识、理念、方式、做法，让健康深入人心。

充分发挥医院的权威性，用医疗案例讲解不健康生活方式的种种后果，让群众更加深刻地体会暴饮暴食垃圾食品等富贵病的严重后果和危害。特别是对青少年儿童的营养与健康教育意义非凡。

建议在小学学校开设营养与健康课程。让孩子从小养成良好的生活习惯，远离垃圾食品，拥有健康身心。

推广轻断食理念，让更多人认识到适度饥饿、细胞自噬对身体修复保持健康状态的重要意义。

深入落实推动全民健身活动，开展群众性体育赛事。

健康知识竞赛。

关键字 落实推广进家庭

分类：营养教育

肥胖教育才是减肥最好的良药

李春风*
永康东城春春日用品咨询服务部

肥胖的社会代价、经济代价、精神消耗实在太多大了，然而通过十多年的从事减肥工作经验，得出了一套侧底解决肥胖问题的方法，并在实践过程中取得了非常大的成果，才写文公之于众。

古人云：上医治未病，要想侧底治愈肥胖，得先从预防开始。

而肥胖预防应该追溯到怀孕前的 180 天，夫妻双方的知识储备、心理准备及营养准备，一方面解决了男女双方的健康问题，提升了精子卵子的质量，不仅预防了大部分的胎儿畸形，还能在怀孕前父母双方拥有标准的体重和健康身体。

孩子在营养均衡又健康的母体茁壮成长，各个器官发育完全，宝宝出生后身体的能量代谢利用率非常高，不仅不容易挑食厌食，也不容易近视和肥胖。

预防肥胖依然得从娃娃抓起，孩子从小就要营养均衡，而决定孩子的营养及饮食的一定是爸爸妈妈的营养供给和饮食习惯，一个学过基础营养学知识的爸爸或妈妈，首先会引导孩子荤素搭配，粗细平衡，营养不足的情况下还会及时补充蛋白质、矿物质及维生素

成年后，成年人依然需要健康教育、观念教育和社会环境，成年人只有重视健康，重视营养，注意劳逸结合，饮食有度，才能维持健康体重。

中年朋友有时候经常找借口，工作忙，应酬喝酒，加班熬夜，暴饮暴食，多年不体检，虽大腹便便却不以为然，自认为身体健康，却经常遇到晴天霹雳，都是缺乏健康认知及教育导致的。

老年朋友也是，虽然都已经有了保养保健、延年益寿的观念，却总是被骗，被骗的原因也是缺乏基础的健康认知，如选择保健品要认准蓝帽子，如老年人最缺乏的营养应该是七大类营养素，甚至老年朋友要是有专门的培训机构，还可以从事营养健康方面的教育培训，可以一举多得，即预防了肥胖，也提升了价值，还增加了养老金

所以健康教育，要贯穿生命全周期，我们应该重视书籍的出版，让我们的孩子，从小就有自己是健康的第一责任人的观念，从小注重营养补充，加强体育锻炼，健康、学习两不误，中年人能做到劳逸结合，老年人能做到自己健康，让家人健康，甚至能帮助他人健康。

最终实现富强、民主、团结、友爱、健康的现代化社会主义国家

总之，只有家家都有一名懂营养的人，才能全生命周期预防和治愈肥胖，从今天开始，完善理论，深入社区、各健康及商业平台，将健康教育纳入小学课程、医院、优生优育及各企业、事业单位，人人都了解自己的身体结构，都懂基础营养知识，都学会一日三餐，将健康把握在自己手里

关键字 健康教育 健康认知 治愈肥胖

分类：营养教育

食育之“萌芽”大作战

王飞*
温州经济技术开发区滨海第一幼儿园

学习的主体是幼儿，滨海一幼是食育特色实践园，有一套专门的食育实践课程。在教学中尊重幼儿的独特体验，鼓励幼儿大胆探索，促进家园协同共育，在活动过程中，幼儿获得有益的经验、自身得到发展。

一、基于教学活动，捕捉学习兴趣

基于园本食育特色教学的豆豆课上，孩子们对于种植豆豆产生了极大的兴趣。孩子们在自由活动时间里不断讨论着豆豆的一切，因此老师及时组织了谈话活动，孩子们一致同意种植豆豆。

二、关注真实所需，促进学习发生

在种植角种植豆豆是孩子们的兴趣所在，那关于种植豆豆，孩子们已经知道了什么呢？教师将他们的前期共同经验进行整理。在已有经验的基础上，孩子们根据自己的种植兴趣自主分成了水培组和土培组，并且为了客观了解各组的种植情况，孩子们决定在 5 月 6 日起共同使用绿豆、黄豆、红豆进行种植。

播种之后，孩子们看着种植区的环境觉得不甚满意，于是，孩子们运用班级以及园所已有材料进行了种植区的装饰。在种植过程中，孩子们十分认真地根据豆豆生长情况进行浇水、除虫等，记录着豆豆生长的情况，以了解不同种植方式下豆豆的生长。在种植豆豆的过程中，孩子们发现了一些问题记录下来，并通过调查表的形式，请家长和孩子一起寻找需要的信息，为下一步种植提供知识基础。家园协同之后，孩子们得到了关于种植豆豆后的一些知识。

为什么会发臭？孩子们有不同的想法，于是进行了集体讨论活动把想法进行了汇总。到底哪个才是真正原因导致豆子发臭的呢?老师根据孩子们的猜测做了调查表，旨在通过问卷的形式进行家园共育，让家长和孩子一起共同寻找原因。

三、总结实践所得，家园共享美食

回收问卷、经过一番讨论后得出是因为豆豆种植区在闷热的区域中没有及时换水导致的，于是，换水小组诞生了。经过不断地实践，孩子们得到了健康的黄豆、绿豆芽，高兴地进行了摘豆芽根的活动，并把劳动所得的豆芽带回家与家人进行了美食创作、快乐品尝。

“学起于思，思源于疑”，孩子们对种植区的观察的对象敏于生疑，产生内驱力去解决问题，在解决问题的过程中发挥自己的观察力、结合家园共育，源生出多彩的具有发展性、创造性的新思想，在活动中品尝到了食育的果实。让我们共同来激活孩子的心田，让它遍长好奇的树，盛开“问号”的花，结满智慧的果，享受收获的快乐。

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关键字 家园协同　食育成长

分类：营养教育

食育干预对大学生饮食相关健康素养的影响——以某地方医学院校为例

熊妍、郭丹、程景民*
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目的：通过对某地方医学院校大学生进行食育干预，探讨食育干预对改善大学生饮食相关健康素养的影响，为高校开展食育提供参考。方法：采用方便抽样，选择该医学院校大一、大二和大三年级且自愿接受食育教育的 124 名学生开展为期两个月（2022 年 9 月—11 月）的食育干预，教育形式为每周一次的线下食育课堂、海报张贴以及线上的科普视频和文章的推送学习，并于干预前后分别对宣教对象进行连续 3d 24 h 膳食回顾调查和"饮食相关健康素养"的问卷调查。数据分析利用卡方检验、t 检验或 Mann-Whitney 秩和检验比较组间差异，检验水准 α=0.05。结果：某地方医学院校大学生在干预前，女生的整体饮食相关健康素养优于男生，但饮食相关行为的个体间差异较小，得分整体较低。食育干预后，饮食营养认知正确率、各类膳食营养素摄入达标率、食物中毒知晓率和规律进餐及三餐进餐时间均有显著提高(P<0.05)；干预后经常食用零食（方便面、糕点、饼干、豆制品零食、膨化食品、干果、糖果）的比例由干预前的 65.5%降至 56.9%(P<0.05)，经常食用饮料（果汁饮料、碳酸饮料、乳味饮料）的比例由干预前的 42.8%降至 34.2%(P<0.001)；大学生的营养标签查阅率、认知率和行为规范率干预后均有明显改善(P<0.001)，选购食物时关注标签中营养成分的人数比例提升 38.4%(P <0.05)；而且在食育干预后，86.5%的大学生对食品安全及营养相关知识的喜爱程度有所提升，但干预后大学生仍存在高盐、高油食物（油炸/烧烤食品）摄入较多，禽畜肉、蛋类和乳制品摄入不够；干预后在运动频率方面的影响不显著，大学生仍存在运动量不足的问题，36.9%的大学生一周运动量低于 1 次，一周一周运动量 5 次以上的仅有 19.8%。结论：食育干预对提升某地方医学院校大学生的饮食相关健康素养有一定的促进作用，高校应注重从健康饮食理念、饮食文化、饮食习惯等方面进行相关知识宣教，从而提高大学生饮食相关健康素养的综合水平。

关键字 食育干预；健康素养；营养教育

分类：营养教育

利用網路發行營養 online 增進員工營養知識

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題目:
利用網路發行營養 online 增進員工營養知識
目的:
隨著科技的進步，大眾時常求知於社群媒體，對於網路上普及的知識及各階段流行性的飲食型態，需要專業營養師證實，因此藉由網路媒體做為營養推廣教育的媒介，使廣大員工獲得營養新知並實際運用於生活當中，來增進健康觀念，改善生活品質，降低未來患病率及住院率。
方法:
由機構營養師來撰寫文章，並利用機構信箱於每月 15 號發送營養 online 文章至 7000 名的員工信箱，針對近期流行性飲食及食物中的實證營養做為文章發表，使員工增加營養新知及判斷流行性飲食的可信度。
為了瞭解營養 online 文章發行是否能有效提升機構員工的營養知識並透過回饋來瞭解是否對員工有幫助，因此於每半年度舉辦一次營養 online 有獎徵答，使員工反覆瀏覽本年度撰寫文章，以此來加深印象，達到營養教育複習之成效。
利用 google 表單做為有獎徵答工具，發送 QR code 至 7000 名員工信箱，有獎徵答內容包含本年度所發表的 12 篇營養 online 文章，時間為期 1 星期，填答完畢立即提供正確答案，深化正確的營養觀念，達成營養教育目的。
結果:
營養 online 文章自 2007 年發行首期，至 2022 年 12 月總計發行 190 期，每月發送 7,000 份，估計有 133 萬次的營養知識傳遞，透過每半年度的有獎徵答方式，來加深營養知識。 2022 本年度已達 1000 位員工參加測驗，參與半年度有獎徵答人數日漸增加，由 2021 年上半年 376 位員工參與，下半年有 415 位員工，2022 年上半年 468 位員工，下半年度增加至 615 位員工參與有獎徵答活動。以 2022 下半年測驗為例，有 65%可達滿分，未達滿分者則會透過網路表單回饋正確解答，來檢視知識的正確性，達有效的營養教育目的。
結論:
營養 online 文章為機構專業營養師撰寫的，此活動已持續進行長達 16 年時間，員工回饋表示能帶來多方面的營養新知，除了能夠使員工健康意識抬頭，也能實際將營養教育內容運用在實際生活當中，透過參與有獎徵答的人數增加，也表明營養 online 發行及後續營養知識追蹤皆能夠達營養教育之成效。

關鍵詞:營養教育、線上有獎徵答
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关键字 營養教育、線上有獎徵答

分类：营养教育

新冠疫情下临床营养教学对护理学生营养知信行的影响

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目的 了解临床护理专业学生学习《临床营养学》后营养知信行的变化，对比不同授课方式（一班“互联网+临床营养学”改革教学方式/二班常规授课方式）对学生营养意识和营养行为的影响。方法 采用问卷的形式分别进行两次调查，即学生课前及课后的营养意识和膳食摄入（食物频率法问卷调查）情况，对比并分析课前课后以及不同授课方式的两个班级的学生的营养态度及营养行为，应用 SPSS25.0 对获得的数据进行统计学分析。 结果 本次研究纳入临床护理专业的两个班级，共 187 人，问卷共 374 份。结果表明，对于每日食盐推荐摄入量的知晓率有所提高，对饮食搭配的重视程度有所提高，差异有统计学意义（P＜0.001）；三餐摄入能量比例分配正确率，对营养知识的感兴趣程度有所提高，但并未发现差异有统计学意义。对于食用盐推荐摄入量知晓率，两班课前课后均有统计学差异，一班知晓率高于二班；在三餐摄入能量比例分配正确率、对营养知识的感兴趣程度等方面，两班并未发现统计学差异，但一班营养态度改善的比率高于二班。通过营养知识的学习，更多的学生开始注意通过饮食控制体重（P＜0.001）；吃零食和油炸食品的频率显著降低（P＜0.05）；进餐规律、每天吃早餐的学生显著增多（P＜0.01）；蔬菜摄入量在推荐摄入量范围的人数有所提高（P=0.034）。通过控制饮食控制体重的学生数在课前无差别，课后有统计学差异（P=0.009）；两班同学吃零食的频率在课前有统计学差异（P=0.047），课后无明显差别；两班同学吃早餐的频率在课前无差别，课后统计学差异（P=0.013）。临床营养教学前后，学生膳食情况有了一定改变，其中一班学生碳水摄入比例（P=0.007）、脂肪摄入比例（P<0.001）有了较明显的变化；二班学生蛋白质摄入量（P=0.016）、镁摄入量（P=0.003）、维生素 E 摄入量（P=0.009）有了较明显的变化，教学后蛋白质、镁、维生素 E 摄入充足的学生增加。课后两班同学脂肪摄入比例（P=0.029）、蛋白质摄入量（P=0.044）、硫胺素摄入量（P=0.040）、镁摄入量（P=0.025）、维生素 E 摄入量（P=0.002）有较为明显的差异。 结论 营养教育在一些方面会对学生的营养意识和营养行为产生影响，而且通过“互联网+临床营养学”的改革教学方式更有利于学生营养意识的提高。

关键字 临床营养；大学生；营养意识；膳食营养素

分类：营养教育

测试

郑泽*
.云南小木虫会议展览有限公司

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关键字 122

分类：营养教育

2022 北京冬残奥会中国国家队运动员运动营养教育与实践研究

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研究目的：针对于职业残疾人项目运动员的运动营养研究较少，缺乏成熟的研究和干预范式供参考。在 2018-2022 年北京冬残奥会备战周期，全程对残疾人越野滑雪、冬季两项及轮椅冰壶队进行运动营养科技助力和科研攻关，通过开展针对性运动营养教育和实践研究，发现三个项目运动员营养及营养保障存在的问题，构建出一条科学化、系统化、个性化的运动营养干预模式，为今后开展运动营养研究与科技服务提供参考。

研究方法：实地调查法；测试法；逻辑推理法

研究结果：（1）通过对营养及营养保障情况进行调查和测试分析，发现缺乏针对各项目运动员特异性的运动营养诊断与评价方法或手段；缺乏特殊环境及特殊需求下，如高原环境训练、残疾运动员减重等运动营养干预手段或措施；（2）针对实地调查中发现的问题，进行运动营养干预模式构建的探索，具体为：经过长期的跟踪测试和数据采集，逐步建立出各项目运动员能量代谢与营养需求智能系统数据库，包括能量和各营养素的需要量、残疾人运动员体成分、提高运动能力及消除疲劳的营养措施等；结合尿液检测、Omega Wave 等生理生化及心理、体能测试结果，对运动员营养状况及身体机能进行监测、诊断与评价；定期开展运动营养讲座、制定和编写出各项目运动营养指南为运动员普及运动营养知识、指导营养配餐、掌握提高运动能力及消除疲劳的营养措施；将运动营养干预与现代化信息技术手段创新融合，搭建运动营养指导系统，在移动 APP 和小程序上将专项运动营养知识推送给运动员，在线解答运动员各类营养相关问题。（3）以上各类手段或方法互为补充，作为一种成熟的运动营养干预模式，在为三支队伍在备战 2022 年北京冬残奥会过程中积累体能、促进恢复、调整最佳竞技状态及助力队伍取得好成绩提供了有力的支持。

研究结论：（1）在备战初期缺乏针对三个项目运动员较成熟的运动营养干预模式;（2）本研究构建出包括运用运动生理生化、体能、心理测试结果、运动营养讲座、运动营养指南、能量代谢与营养需求智能系统数据库、智能营养指导系统在内的提供运动营养监控、诊断、评价与调控的各项目系统而全面的运动营养干预模式；（3）构建的运动营养干预模式经过了实践检验，可考虑作为今后在其他项目队伍开展运动营养研究与科技服务范式。

关键字 北京冬残奥会；国家队运动员；运动营养教育与实践

分类：营养教育

患者营养知识教育肿瘤内科临床路径

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肿瘤营养教育是一种面向所有病理组织学或细胞学确诊的恶性肿瘤患者的经常性营养干预工作。帮助患者及其家属获得膳食和营养知识、了解相关政策、养成合理饮食习惯及健康生活方式的活动，是院内肿瘤患者临床诊疗过程中的重要且关键环节，是肿瘤营养代谢内科易行且有效方法。

目的

帮助肿瘤患者及其家属掌握营养知识和健康生活方式，以改变饮食行为方式而达到改善营养状况。增加患者的主动性，积极配合临床实施营养代谢治疗，降低患者营养不良代谢紊乱对肿瘤患者带来的风险。逐步形成科学合理的饮食习惯，改善营养状况。

适用对象

所有恶性肿瘤患者。

营养教育方法　教育应具针对性，内容更丰富：回答患者的营养问题；告知营养诊断的目的；完成膳食、营养和功能评估；查看实验室及仪器检查结果；提出饮食、营养建议，纠正饮食误区；讲解肿瘤知识，破除恐怖心理；讨论个体化营养治疗的方案；告知营养治疗可能遇到的问题及对策；讲解营养代谢诊断的临床意义，评估或预测抗肿瘤联合营养治疗的效果；规划并实施营养随访方案。

营养咨询　门诊健康咨询、电话咨询、互联网咨询、现场营养咨询；在病区健康教育栏投放宣传资料，针对患者及家属，定期开展营养宣教工作,每周在患者服务中心进行授课和咨询，每月举办一次营养知识讲堂。

提高对营养治疗的重视:开展营养培训、交流等工作，让全员真正的意识到营养工作的重要性,以全民营养周等为契机，大力开展科普宣教活动，带动宣教活动常态化。

肿瘤患者膳食原则：膳食食材多样化，每周植物食材不少于 30 种；适度降低碳水化合物的摄入量，尽量杜绝游离糖摄入，尤其是肿瘤活动期患者；采取高蛋白饮食，尽量摄入优质蛋白质；中等量的脂肪摄入即可；适度增加可溶性膳食纤维的摄入量。

肿瘤患者膳食营养误区：轻视膳食营养，只依赖抗肿瘤治疗；充足的营养供给增加促肿瘤生长的风险；忌口食物太多：肿瘤患者不适用民间“发物”的定义；静脉补充营养替代饮食；喝汤有营养。

随访

所有患者完成抗肿瘤药物治疗和营养治疗后，依托现有微信、抖音平台，推动“互联网+营养健康”，两周内进行一次电话随访；四周内再次电话随访，必要时进行家庭营养指导治疗做好社区营养膳食指导工作，以及返院接受定期的营养代谢和肿瘤学复查。

关键字 恶性肿瘤，营养不良，营养教育

Category: Food & Nutrition

Dietary Inclusion of Kulitis (Amaranthus viridis) to Enhance Laying Hens' Egg Quality

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Philippine poultry manufacturers choose selectively-bred hens over native hens in commercial egg-laying operations due to the native hens' lower egg production and lower egg weights. As such, it was decided to ascertain whether including 15% Kulitis (*Amaranthus viridis*) leaves in the hen diet can enhance egg quality, specifically overall egg weight, yolk color, and eggshell thickness. Two 26-week-old Darag hens weighing 1 kg were selected and fed standard feed (untreated hen) and Kulitis-infused feed pellets (treated hen) for 21 days. Water was given ad libitum. The first five eggs laid by each hen were collected and evaluated for overall egg weight and eggshell thickness, and the colors of the yolks were labeled utilizing the DSM Yolk Color Fan's hex color codes and their corresponding DSM values (1-16). Independent Samples T-test showed that the Kulitis-infused feed pellets increased egg weight and darkened the yolk color significantly ($P<0.05$), while eggshell thickness was not significantly affected ($P>0.05$). Overall, Kulitis-infused feed pellets enhanced overall egg weight and yolk color without affecting eggshell thickness.

Key words Kulitis leaf; feed additive; overall egg weight; eggshell thickness; yolk color

Category: Food & Nutrition

Quality Characteristics of Bread Made with Autumn Sown Wheat Flour In Korea

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This study investigated the quality characteristics of bread made with eight Korean wheat flours (Hanbaek, Sooan, Eunpa, Topdong, Alchan, Goso, Dajoong, and Baekkang cultivar) sown in autumn. The volume of Hanbaek and Alchan bread was 1,860 and 1,810 ml, respectively, which were higher than other cultivar, and the volume of Eunpa bread was the smallest value of 1,355 ml. The specific volume was the highest value of 4.46 mL/g in Hanbaek bread, and the lowest value of 3.20 mL/g in Eunpa bread. The hardness of Alchan and Baekkang bread was 305.10 and 271.13 g, respectively, and these value as similler to control. The highest hardness value was 662.87 g in Dajoong bread. From the above results, breads made with Hanbaek and Alchan cultivar have the larger volume and specific volume then other cultivar. Alchan and Baekkang bread have a soft texture like control. So Alchan cultivar is considered most suitable for baking than other cultivar.

Key words wheat flour, cultivar, sowing time, bread, quality characteristics

Category: Food & Nutrition

Quality Characteristics of Waxy Corn with Number of Used Times of Boiling Water

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This study investigated the quality characteristics according to the number of uses of water that boils wax corn. Five corn was added to 2 liter of water, and water and salt were added each time, and boiled five times. The salinity of corn ranged from 0.18% to 0.22%, and the difference according to the number of times was small. The yellowness of corn ranged from 18.32 to 21.11, and there was no significant difference depending on the number of times. The total sugar content of corn was high at 28.42% and 28.51% in 1st and 2nd boilings, respectively, and decreased after that. The content of reducing sugar was high at 3.97% during 2nd treatments, and decreased thereafter. The hardness of boiled corn was the highest value of 827.77g at 2nd boiling and decreased thereafter. As a result of the sensory evaluation, the color, aroma, texture, taste, and overall preference showed the highest score in 2nd boiling. From the above results, it is judged that up to two times of boiling wax corn is the most suitable.

Key words waxy corn, quality characteristics, water, salt, sensory evaluation

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Comparison of Quality Characteristics on Korean Traditional Wines Made with High-Yielding and Special Rice Cultivar

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This study compared the quality characteristics of traditional wine made with high-yielding rice (Namil cultivar), pigmented rice(Jeogjinju, Jeogjinjuchal, and Shenhyangheugmi cultivar) and special rice(Keunnunjami, Wolbaek, Haepyeongchal and Aromatic rice2 cultivar). The pH of wine ranged 4.77-5.07 and was higher in pigmented rice than white rice. Total acidity ranged from 0.26 of Namil to 0.32% of Jeogjinjuchal cultivar. The total sugar content was the highest value of Namil and Wolbaek was the lowest value. The alcohol content of rice wine was 15.07-17.43%, and white rice was higher than pigmented rice. In the case of lightness, pigmented rice wine was lower than white rice, and black rice was lower than red rice. In the sensory evaluation, Wolbaek cultivar was the lowest sensory score of 3.05, and Namil cultivar showed the highest score of 4.15 in overall preference. From the above results, it is suggest that special rice has a fermentation efficiency similar to that of white rice, and its good flavor makes it possible to manufacture high-quality traditional Korean rice wine.

Key words Traditional Korean rice wine, pigmented rice, aromatic rice, special rice, sensory evaluation

Category: Food & Nutrition

Physicochemical Characteristics of Carrot with Heating Temperature

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This study investigated the changes in physicochemical and quality characteristics of carrots with heating temperature. As heating temperature increased, the pH decreased from 7.26 to 5.79 and the total acidity increased from 0.06 to 0.15. The 5-HMF content was not detected until 120℃, and increased from 22.99 ppm of 130℃ to 1740.62 ppm of 150℃. The browning index increased from 0.043 to 0.318 as heating temperature increased. Sucrose content decreased from 71.50 to 6.14 mg/g with increasing heating temperature, whereas glucose and fructose increased from 4.30 to 20.21 and 4.48 to 25.47 mg/g, respectively. Reducing sugars content also increased from 42.53 to 73.10 mg/g. Total organic acids content was increased as heting temperature increased to 140℃. The β-carotene content decreased from 1853.84 to 698.79 μg/dry g with increasing heat treatment temperature. From the above results, it can be concluded that heat treatment affects the physicochemical and quality of carrots, and suatable heat treatment is necessary for the development of carrot processed products.

Key words heat treatment tmeperature, carrot, physicochemical, quality characteristics

Category: Food & Nutrition

Development of a fiber rich food supplement for the elderly

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Background and objectives: Old age is a vulnerable stage of life. With increasing age, elderly persons are exposed to the risk of developing various health related diseases and disorders, among which constipation is quite common. Adequate consumption of dietary fiber is often not taking place in elderly persons, leading to the occurrence of several health complications including medical surgery. In this backdrop, the development of a low-cost dietary fiber rich supplement is being attempted.

Methods: The basic ingredients used were wheat, maize, millet, puffed rice, fruit pulp and others. Additional sugar, flavorant or preservatives was not added. The supplement is developed through several cooking, drying and processing steps. Sensory tests were carried out and nutrient contents were analyzed.

Results: 100 g of the supplement contains approx. 51.85 g of total fiber with 26.8 g of soluble fiber and 25.05 g of insoluble fiber, 1113 KJ of energy, 10 g of protein, 1.69 g of fat and 76.78 g of carbohydrate. As per sensory tests, consumption with mild hot water is recommended.

Conclusions: The high fiber content of the supplement may be useful as a supplementary diet to meet the dietary fiber requirement of elderly persons.

Key words High fiber supplement, supplement for elderly, dietary fiber.

Category: Food & Nutrition

Food material as a potential candidate for sport nutrition and prevention of sarcopenia

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Muscle mass and strength are reduced with aging, movement decrease, and obesity. Muscle loss is closely associated with acute and chronic disease, increased insulin resistance, and rheumatoid arthritis. Moreover, skeletal muscle strength is inversely associated with all-cause mortality in men. Prevention of muscle loss may therefore contribute to improved quality of life, and attenuate chronic disease and mortality for the aged. Physical exercise and protein supplementation can prevent skeletal muscle loss and promote skeletal muscle growth, but pharmacological treatments that aid this process have not yet been developed. Recently, several food extracts and phytochemicals have been described as helping to improve the quality of skeletal muscle and increase muscle mass. Recently, we investigated that the effect of Codium fragile extract on exercise endurance muscle weight, and muscle strength and identified its molecular mechanism. These results suggest that Codium fragile extract is potential candidates for sport nutrition or prevention of sarcopenia.

Key words Sarcopenia, Sport nutrition, Codium fragile, muscle mass, muscle strength

Category: Food & Nutrition

Dangjo chili pepper: Adding High Value through Jumping Functional Ingredients in Korean Agricultural Products

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Dangjo chili peppers (*Capsicum annuum* L. cv. Dangjo) have been reported to have beneficial effects in reducing postprandial blood glucose levels. These effects have been recognized in Japan and have led to their registration as "foods with function claims". Through a series of breeding processes, Dangjo chili peppers were successfully enhanced to contain many α-glucosidase inhibitors (AGIs) compared to other varieties of peppers. α-Glucosidase is a membrane-bound enzyme located in the epithelium of the small intestine that catalyzes the hydrolysis of oligosaccharides and disaccharides into monosaccharides, which is subsequently absorbed. Therefore, inhibition of the α-glucosidase activity can contribute postprandial hyporglycemia. Several research studies have indicated that the effects of AGI can be attributed to phenolic or flavonoid compounds. In order to enhance the value of agricultural products, it was essential to establish a strategy for registration as the functional ingredients associated with the postprandial hypoglycemic effects of Dangjo chili peppers. Firstly, using ultrahigh-performance liquid chromatography coupled with linear trap quadrupole-orbitrap-mass spectrometry, the major compound was identified among various metabolites present in Dangjo chili peppers. Secondly, the postprandial hypoglycemic activity of Dangjo chili peppers was demonstrated through multiple approaches, including evaluating their α-glucosidase inhibitory activity and inhibition of glucose uptake in Caco-2 cell, conducting an oral carbohydrate tolerance test in C57BL/6 mice, and performing a human study with Koreans. This finding jumped up Dangjo chili peppers from being a common agricultural product to a functional ingredient. We hope this can become a first step in promoting the excellence of Korean agricultural products to the world.

Key words Dangjo chili pepper; α-Glucosidase inhibitor; Postprandial blood glucose; Quercitrin; Type 2 diabetes mellitus

Category: Food & Nutrition

Sensory-Chemical Quality Factors of Alcoholic Beverages Made from Apples and Pears - Role of Yeast Selection

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In recent years, there has been growing interests to utilize alternative yeasts besides traditional Saccharomyces cerevisiae yeasts in production of alcoholic beverages in order to produce more and versatile flavors to the end-products and potentially lower ethanol contents. Moreover, certain yeasts may have specific activities to reduce some undesirable properties of the fruit. At the same time, apples and pears are good sources of various phytonutrients. Although they have been traditionally used in production of alcoholic beverages, fruit farmers and beverage producers have growing interests to utilize locally important cultivars in the products. Aim of this presentation is to assess and combine multiple of our recent studies focusing on chemical and sensory quality factors of beverages made from Finnish apples and pears using so-called non-Saccharomyces yeasts. Alcoholic beverages in the studies were made from traditional Finnish apple and novel pear cultivars. Non-Saccharomyces yeast strains were used in the fermentations of both fruits and compared to beverages made with S. cerevisiae strains. Compositional factors of the beverages were determined by chromatographic and mass spectrometric methods, and sensory quality of the beverages were determined using different descriptive methods. Fruit cultivar selection resulted primarily in more differences in the studies in comparison to the yeast factor. However, yeast strains showed significant differences. For example, Schizosaccharomyces pombe strain reduced the malic acid content of apple ciders resulting in less intense sourness, and Torulaspora delbrueckii strain resulted in sweeter pear beverages with more floral and cooked pear odors. At the same time, yeast strain selection affected significantly the phenolic compound contents of the beverages. These studies demonstrated the importance of fruit cultivar selection, as well as, the role and potential of non-Saccharomyces yeasts in production of alcoholic beverages.

Key words apple, pear, non-Saccharomyces yeasts, beverages, quality

Category: Food & Nutrition

ADMINISTRATION OF BELIMBING WULUH LEAF HERBAL TEA (Averrhoa Bilimbi L) TO REDUCE BLOOD PRESSURE IN HYPERTENSIVE PATIENTS

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Background: The use of starfruit leaves is an alternative for overcoming the incidence of hypertension. Therefore, this study aims to determine the effect of education as well as the administration of herbal tea from belimbing wuluh leaves on blood pressure in hypertensive patients.

Research Method: This is a quasi-experimental study with a non-randomized pre-test and post-test as well as a control group design. The sample population consists of 50 people, who were divided into 2 treatment groups. Furthermore, group I was given herbal tea from 7 g of belimbing wuluh leaves and education, while II was only educated. Data analysis was then carried out using the Wilcoxon Signed Rank Test and the Mann-Whitney Test.

Results: The hypertensive patients in the group administered with herbal tea and education experienced a significant decrease in systolic blood pressure from 158.16 mmHg to 138.24 mmHg as well as diastolic blood pressure from 94. 32 mmHg to 84.68 mmHg ($p<0.05$). Similar findings were also observed in the control group, which was only educated. However, a higher reduction in blood pressure was found in the intervention group than in the control group.

Conclusions: Herbal tea from belimbing wuluh leaves has the ability to reduce blood pressure. Furthermore, future studies can modify the ingredients of the drink to improve its taste and effectiveness.

Key words Herbal Tea, Belimbing Wuluh Leaves, Education, Hypertension.

Category: Food & Nutrition

Evaluation of different recipes and determination of the presence of lactic acid bacteria in Sri Lankan traditional 'diyabath'

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Background and objectives: The indigenous fermented foods are getting increasing attention as low cost food to improve health and sustain the food supply. Diyabath' is a breakfast meal prepared by overnight fermentation of leftover cooked rice. Though its main purpose has been to reduce food wastage in households, Sri Lankan indigenous medical practitioners (IMP) recommend 'diyabath' to improve health. Fermented foods with lactic acid bacteria (LAB) enhance the digestive health in humans. Apart from the eight different traditional recipes of 'diyabath' identified in our previous survey, records on its scientific value and composition are limited. This study aimed at prioritising the recipes identified and assessing the LAB content to determine its potential use in an intervention-based investigation to promote health.

Methods: The eight recipes were presented to an expert panel of nutritionists, food scientists, community physicians and IMPs for evaluation according to 'Delphi method' on the rice variety, pot material, fermentation duration and additional ingredients used in post-fermentation. Via in-depth discussion conducted in two rounds of ranking, the panel agreed on most acceptable recipes for a health promoting intervention. The selected recipes were then analysed for the presence of LAB on Man-Rogosa-Sharpe agar -pH 5.7 (24-48 hrs at 30° C).

Results: The expert panel agreed on using red-raw rice(RR), traditional Mawee rice(TMWR) and parboiled rice(PR)for preparing 'diyabath' and using a clay pot for fermentation for 12-hours. After the fermentation, it was recommended to add coconut milk, red onion, salt and roasted red chili to the preparation. Diyabath prepared from the three selected rice showed LAB in the range of 106CFU/g, which is comparable with that of other probiotic-rich fermented cereal-based food.

Conclusion: Diyabath' prepared from cooked RR, TMWR and PR are recommended for further investigations. Further, LAB counts suggest 'diyabath' as a potential food to enhance digestive health in humans.

Key words Fermented cooked rice, Diyabath, Lactic acid bacteria, Fermentation

Category: Food & Nutrition

Anti-Obese Effects of Cinnamon Extracts Dietary Supplementation by modulating AMPK and SREBP-1c in High-Fat diet induced male mice model

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Background and objectives: Obesity is a prominent health issue occurred by excessive lipid accumulation in the body. Cinnamon is a widely used spice that has been known for anti-diabetic effect but little on obesity. The aim of this study was to determine the inhibition of fat accumulation and anti-obese effects of cinnamon extracts dietary supplementation in high-fat diet induced male mice model.

Methods: After one week of adaptation period, the 40 of 6-week-old male C57BL/6J mice were randomly divided into 4 groups (n=10 for each group): Normal diet group (ND), normal diet with 1% Cinnamon extracts group (NC), high-fat diet group (HF), and high-fat-diet with 1% with cinnamon extracts group (HC).

Results: After 14 weeks, body weight, body weight gain, hepatic and white adipose tissue(WAT) hormone-sensitive lipase(HSL) activity, AMP-activated protein kinase (AMPK) and sterol regulatory element-binding protein 1(SREBP-1c) in liver and size of the adipose tissue in epididymis fat were measured. Body weight and Body weight gain showed significant lower increase in cinnamon fed group NC and HC($p<0.000$). Hepatic and WAT HSL activity showed the lowest level in HF among all groups($p=0.000$). The liver protein expression of AMPK showed the lowest level in HF among all groups($p<0.05$) and SREBP-1c showed significant decreased level in cinnamon fed group NC and HC($p=0.01$).

Conclusion: This study demonstrates that dietary cinnamon extracts supplementation can inhibit fat accumulation and have anti-obese effect via indicators such as HSL, AMPK and SREBP-1c and can reduce the size of adipose tissue in high-fat diet induced mice model.

Key words Anti-Obese, High-fat diet, Cinnamon, AMPK, SREBP-1c

Category: Food & Nutrition

Blackcurrant Extract (Ribes nigrum L.) Ameliorates Serum Lipid Profiles and Hepatic TG Content in High-Fat-High-Fructose Diet-Induced Hyperlipidemic Rat Model

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Background and objectives: Blackcurrant(Ribes nigrum L.) is high in polyphenols, phytochemicals which are linked with antioxidant effects. This research evaluated the effect of blackcurrant extract in lipid profiles of serum and liver tissue of rats fed with high-fat-high-fructose diet.

Methods: Thirty two 6-week-old male SD rats were fed normal diet(ND) (n=9) or high-fat-high-fructose diet group(HF) (n=23) for 14 weeks. After 7 weeks, oral administration of blackcurrant extract with doses of 0 mg/kg.b.w/day(HF) (n=9), 150 mg/kg.b.w/day(LC) (n=7), and 250 mg/kg.b.w/day(HC) (n=7) were given by gavage to HF groups. Serum lipid profiles, such as triglyceride(TG), total cholesterol(TC), and high density lipoprotein-cholesterol(HDL-C), and hepatic TG content were assessed through ELISA kit. In addition, liver function index such as glutamic oxaloacetic transaminase(GOT), and glutamic pyruvic transaminase(GPT) were also examined.

Results: The result of serum TG, TC, and LDL-C in LC and HC group had significant decrease compared to HF group, and similar result was shown in hepatic TG. HDL-C level of LC and HC group were higher than HF group but no significant differences were shown. The serum GOT levels were significantly lower in HC compared to HF group, while GPT levels had significant difference in both LC and HC compared to HF group.

Conclusions: Overall, the data in this study suggest that blackcurrant extract may attenuate lipid profiles in serum causing hypolipidemic effect, ameliorate hepatic TG, and lower liver function index. Further study of blackcurrant extract ameliorating hepatic lipid accumulation pathway is needed.

Key words Blackcurrant, hyperlipidemia, lipid profiles, hepatic TG

Category: Food & Nutrition

Effect of Storage conditions on the Cooking and Sensory Properties of Rice (Oryza sativa L.)

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The measurement of rice grain quality is crucial because it's the scale of rice innovation success to meet up the consumer's demand. Rice grain quality involves traits that cover biochemical composition (such as amylose, and protein), milling, and cooking, eating, sensory properties. Milling, storage, cooking, eating, nutrition, and market quality of rice grain. Cooking quality refers to the inclusive estimation of the color, smell, shape, taste, palatability, and some sensory properties after cooking. Gel consistency (GC), apparent amylose content (AAC), gelatinization temperature, cooking method and overall storage conditions are the main indicators affecting cooking and sensory quality of rice. In this study, the effect of storage conditions (5, 10, 30 oC) on the cooking quality of rice was investigated with 10 major rice varieties after 9 months storage. The Overall consumer acceptability had highest correlation with grain quality of rice (r = 0.865), followed by b* value of CR (r = −0.815), fat acidity (r = −0.754), cohesiveness (r = 0.659), and hardness (r = −0.560). Finally, the decline pattern of aroma profile with storage duration were observed for all the tested rice varieties. By contrast, the GT, AC and GC were increase up to 6 month and decrease rate were observed for the last 3 months.

Key words Keywords: Cooking and sensory quality; Nutrition parameter; Amylose, Taste, Palatability.

Category: Food & Nutrition

Opportunities and Barriers to Fruit and Vegetable Consumption among Consumers in Sri Lanka

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Background and Objectives: Fruit and Vegetables (F&V) are an essential part of a balanced diet. Consumption of F&V is still below the recommended level among Sri Lankans. Understanding the factors affecting their consumption can have a positive impact on interventions to promote F&V consumption. Therefore, this study aimed to identify the opportunities and barriers for F&V consumption among adolescents, adult pregnant and non-pregnant women in Sri Lanka.

Methods: A qualitative study was carried out in Western, North Western and Northern provinces in Sri Lanka. A total of 50 Focus Group Discussions (FGDs) were conducted among adolescents (18 FGDs), adult non-pregnant women (16 FGDs) and pregnant women (16 FGDs) in selected areas. Data were analyzed using Nvivo 12 software.

Results: Discussions revealed four main themes: 1. Perceptions (knowledge, attitudes and perceived health benefits); 2.Practices; 3. Opportunities and barriers of F&V consumption; and 4. Suggestions to improve F&V consumption. The majority were aware of the health benefits of F&V, but not of the recommendations. Consumption patterns were affected by cost, quality, availability, shelf life, and seasonal variations. Individual factors such as knowledge, personal preference, lifestyle, myths and medical concerns; and socio-demographic characteristics such as nationality, gender, income, education level, preferences of children, household size and accessibility were identified as the factors affecting F&V consumption. High cost and low availability were identified as major barriers to F&V consumption. Promoting home gardening, awareness of the health benefits of F&V, popularizing farmers' markets and financial support were given as suggestions to improve F&V consumption.

Conclusions: F&V consumption is influenced by cost, availability, preferences and convenience. In addition to addressing the above, targeted behavioral change interventions are required to improve F&V consumption in different population segments.

Key words Consumers, Focus Group Discussions, Fruit and Vegetables, Perceptions, Sri Lanka

Category: Food & Nutrition

中链甘油三酯联合 DHA 改善 APP/PS1 转基因小鼠 Aβ 沉积及脑能量代谢机制研究

MCTs combined with DHA intervention inhibit amyloid β-peptide accumulation by improving brain glucose metabolism in APP/PS1 transgenic mice

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Background and Objectives: MCTs and DHA supplementation may improve glucose metabolism and reduce amyloid β-peptide accumulation. In senile neurodegenerative diseases, deterioration of glucose metabolism in the brain precedes symptoms and induces other pathological changes. The aim of this study was to evaluate the effects of combined intervention of MCTs and DHA on brain glucose metabolism and Aβ level in APP/PS1 mice.

Methods and Study Design: Three-month-old male mice were randomly assigned to four groups for eight months: (1) DHA diet group fed with the 0.233% DHA supplemented diet; (2) MCT diet group fed with the 10% MCTs supplemented diet; (3) DHA+MCT diet group fed with the 0.233% DHA and 10% MCTs supplemented diet; (4) Control diet group (Con-P) fed with the control diet. C8:0, C10:0, DHA, β-hydroxybutyric (β-HB) acid levels, the uptake of 18F-fluorodeoxyglucose (18F-FDG), Aβ, APP, BACE1, PS1 levels were detected after the intervention.

Results: The results showed that supplementation with MCTs and DHA improved hippocampal and whole brain glucose intake in APP/PS1 transgenic mice, the combined intervention improved hippocampus, cortex and whole brain glucose intake in mice and can be better than the intervention alone. Meanwhile, supplementation with MCTs and DHA inhibited amyloid β-peptide accumulation, decreased the abundance of APP, BACE1 and PS1 in the hippocampus and cerebral cortex of APP/PS1 transgenic mice, and the combined intervention was better than the intervention alone.

Conclusions: MCTs and/or DHA supplementation delayed inhibited amyloid β-peptide accumulation in the hippocampus and cerebral cortex of APP/PS1 transgenic mice, and the combination of MCTs and DHA was significantly more effective than an individual nutrient. The possible mechanism was that MCTs combined with DHA decreased the abundance of APP, BACE1 and PS1 by improved glucose intake, thus inhibiting amyloid β-peptide accumulation in APP/PS1 transgenic mice.

Key words MCTs; DHA; glucose metabolism; 18F- FDG PET/CT; Amyloid β-peptide

Category: Food & Nutrition

Flavonoids in the Bajakah Stem Plant Extract Effect on HOMA-IR Diabetic Wistar Male Rats with Streptozotocin Induction

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Background: The prevalence number of Diabetic people increases rapidly each year. Health practitioners continue to work on the most effective treatment possible to reduce the prevalence. However, the result has not yet been optimal, while people try many alternative ways to treat Diabetes. One of the ways is using the local plant that has been believed to treat many diseases, called the Bajakah plant originally from Borneo Island, Indonesia. Therefore, our study aimed to test the effect of the Bajakah stem plant extract on diabetic male Wistar rats. **Methods**: We used 25 Wistar male rats grouped into five groups (C1, C2, X1, X2, and X3), got 7 days of acclimatization, and fed with 20 gr of BR-1, except for the intervention groups were added 50, 100, and 150 mg/kg body weight of the Bajakah extract on the day 24 until the end. We weighed and collected the blood results to see the HOMA-IR. **Results**: The study results are significantly different between the positive control group (C2) and the intervention group on the HOMA-IR value. The highest HOMA-IR value was in the positive control group (6.02±1.14) with 3 times higher than the other groups (1.14±0.12 - 1.58±0.21). **Conclusion**: The homeostasis model assessment of insulin resistance between the control and the intervention group shows that by the end of the intervention, the value of the rats in the intervention groups is the same as the negative control group (below 1.85). The Bajakah stem plant extract may be an alternative to treat Diabetic conditions.

Key words HOMA-IR, Bajakah extract, Diabetes, Wistar rats

Category: Food & Nutrition

Indigenous Foods and Their Nutritional Values of Ethnic Minority(Indigenous) Groups in Guangdong Province and Guangxi Region, China

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Indigenous peoples' food systems involve valuable knowledge of traditional cultures and local ecosystems. In China, the Indigenous and traditional foods of ethnic minorities inherit a long history and are rich in nutrients. Guangdong Province and Guangxi Zhuang Autonomous Region in China share a common historical origin, similar geographical features, and a common language. The two regions are rich in ethnic minorities and Indigenous foods which play an important role in the attempt to enhance food and nutrition security. However, to date, no systematic review of the Indigenous foods and their nutritional values of the ethnic minorities in the two regions has been published. Therefore, this paper selects publications on Indigenous foods from the two regions, specifying the names of the ethnic minorities, and publications published within the last 10 years. The authors finally cited 151 Chinese publications from Wanfang Data and 30 English publications from Google Scholar. The main conclusions are: First, there are 112 kinds of ingredients related to the 12 ethnic minorities in the Guangxi Region, with a variety of species and close integration with ethnic ritual culture; most of the ingredients in Guangdong Province are related to the 3 major Han groups, while the number of Indigenous ingredients of the minority groups is only 32. Second, the above-mentioned ingredients in Guangxi Region contain a more diverse range of nutrients, while the researches in Guangdong Province mainly focus on herbal tea plants, which do not have many types of nutrients, but have traditional Chinese medicine values. The results suggest that Indigenous foods of ethnic minorities are undervalued and knowledge is being lost from generation to generation. Therefore, it is necessary to recognize the unique nutritional value and multiple functions of Indigenous foods, and more researches on Indigenous food systems in Guangdong Province are essential to address this issue.

Key words Indigenous foods; Ethnic minorities; Nutritional value; Food systems; China

Category: Food & Nutrition

Mechanism of Taurine on Improving Hypercholesterolemia Using Transcriptomics

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Background and objectives:

Taurine, an important amino acid, is capable of lowering plasma cholesterol, increasing CYP7A1 (cytochrome P450 family 7A1) and mitigating atherosclerosis, while the underlying mechanisms remain for investigation. Here, we elucidated the molecular mechanisms of taurine-action, and explored its novel functions and potential direct target genes.

Methods:

Male Wistar rats were fed a high-cholesterol diet with or without 5% taurine for 14 days, blood lipids were assayed, hepatic transcriptome analysis was performed by DNA microarray and mRNA level. And DNA microarray analysis was performed on rat primary hepatocytes after exposure to 10 mM taurine for 24 hours.

Results:

Taurine significantly decreased the level of serum cholesterol, and increased hepatic CYP7A1 mRNA and transcriptional rate in rats fed the high-cholesterol diet. One hundred eighty-one genes (out of 20,500 genes) were regulated by taurine, and "pathway analysis" revealed that drug metabolism, lipid metabolism, amino acid metabolism and gluconeogenesis associated with insulin signaling pathways were regulated. SHP (Nuclear receptor subfamily 0 group B member 2, NROB2), one of the seven transcription factors regulated by taurine, was reduced, and "network analysis" showed that it was correlated with induction of CYP7A1 and CYP8B1. Taurine also reduced mRNA level of PEPCK (phosphoenolpyruvate carboxykinase) and IGFBP1 (insulin-like growth factor binding protein 1), increased the mRNA level of CYP8A1 and BHMT (betaine homocysteine methyltransferase) in a high-cholesterol fed rat livers. In primary hepatocytes, in line with animal experiments notably BHMT and OATP (organic anion transporting polypeptide) were up-regulated by taurine.

Conclusions:

The cholesterol-lowering effect of taurine was mainly achieved by the induction of CYP7A1 through the SHP pathway, and the inhibitory effects on drug metabolism, lipid hypermetabolism and gluconeogenesis were identified. Moreover, we have found that taurine directly regulates the gene expression of BHMT and OATP.

Key words Taurine, Cholesterol, Rat Liver, Hepatocyte, Transcriptomics

Category: Food & Nutrition

Dietary Diversity, Nutrition Status and Health Outcome Disparities in Rural and Urban India: Evidence from the Large-Scale Household Surveys

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Background and objectives: Nutrition status and health are ultimate outcomes of dietary diversity determining human capital quality. With changing dietary patterns in rural-urban India, the present study examines the effect of dietary diversity on nutrition status and health outcomes, followed by prioritizing regions for improvement.

Methods: Data marshaled from National Sample Survey Office and National Family Health Survey were used to construct dietary diversity index(DDI) using Simpson's approach, nutrition status index(NSI) using per-capita nutrients intake, and health outcome index(HOI). NSI+HOI were estimated using principal components approach. Multivariate regression was executed to capture the causal effect of DDI on NSI and HOI. Finally, biplot analysis was done to prioritize regions for better nutritional status and health outcomes.

Results: Dietary diversity indicated that most Indian states consume less/moderately diversified foods. Calorie intake witnessed significant reductions over time, corroborating its linkage with dietary diversity. Per-capita protein-intake remained steady, whereas fat-intake increased and higher in urban-India. Concerning children health outcomes, stunting increased in coastal states during 2019-20 relative to 2015-16. Wasting increased in Andhra Pradesh, Assam, and Bihar. Underweight increased in Kerala, Andhra Pradesh, Assam, West Bengal, and Gujarat. Overall, malnutrition (HOI) increased across regions. Men whose body mass index (BMI) is below normal decreased across regions, and obesity increased in all. Women whose BMI is below normal decreased, and obesity increased in majority. Anemic pregnant women increased majorly in southern states. Regression indicated a significant causal relationship between DDI and NSI/HOI. Regional prioritization registered a strong linkage between DDI, NSI, and HOI.

Conclusions: The dietary diversity level is low in most regions which gets reflected in the nutritional status and health outcome level, especially in children and women. It is suggested to reduce the inequality and variation accompanied by increasing the composition of fooditems in the consumption basket, especially by spending more on nutrient-dense commodities.

Key words Dietary diversity, NFHS, nutrition status, health outcome, biofortification

Category: Food & Nutrition

Nutritional Compositions, Bioactive Properties and Glycaemic Response of Nipa Palm (Nypa fruticans Wurmb) Syrup

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Background and objectives: The Nipa Palm (Nypa fruticans wurmb.) is a native plant inhabits along the coastline of Pak Panang, Nakhon Si Thammarat, Thailand. This study aimed to determine the nutritional composition, bioactive compounds, antioxidant capacities and glycaemic index (GI) of Nipa palm sugar.

Methods: Nipa palm was studied in vitro for its nutritional value, antioxidant properties and total phenolic compounds. The GI of Nipa palm sugar compared to honey, cane sugar and Palmyra palm sugar was evaluated in a human study by recruiting healthy volunteers who were randomly assigned to consume 50 g of available carbohydrates for each different sugar (ISO/FDIS 26642:2010).

Results: In Nipa palm sugar, potassium (K) was the main mineral (735.0±4.0 mg/100 g), followed by sodium (311.0±10.0 mg/100 g) and phosphorus (37.2±1.8 mg/100 g).The content of total phenolic compounds in Nipa palm sugar with Kiam wood (2.36±0.03 g GAE/L) is significantly higher ($p \leqslant 0.05$) than that of Nipa palm sugar without Kiam wood (0.82±0.03 g GAE/L). The antioxidant capacities of Nipa palm sugar with Kiam wood were 3.20±0.01mmol/L for Ferric Reducing Antioxidant Power, 596±004 mmol Trolox equivalents/L for ABTS and 16.60±0.04 mmol/L for DPPH radical scavenging ability, which was significantly higher than that of Nipa palm sugar without Kiam wood ($p \leqslant 0.05$). The GI results of Nipa palm sugar (38.7±2.8%), honey (46.7±3.6%) and Palmyra palm (43.3±2.8%) are classified as low GI diet, while cane sugar is classified as high GI diet (60.6±3.4%).

Conclusions: The present study shows that Nipa palm sugar could be an alternative natural sweetener with low GI, high total phenolic content and high antioxidant capacity.

Key words Nipa palm, Alternative natural sweetener, Glycaemic index, Glycaemic response

Category: Food & Nutrition

Lipid Oxidation Stress : Botanical Antioxidant Strategies for Health

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[Objectives] Lipid oxidation stress has been an area of interest because of its involvement in aging as well as various diseases. Recently, we developed a sensitive liquid chromatography-tandem mass spectrometry (LC-MS/MS) method to analyze lipid hydroperoxide (LOOH) isomers, the primary oxidation products of lipids. LOOH is formed by the oxidation of unsaturated fatty acids that constitute lipids. Importantly oxidation takes place at different positions within the lipid structure (i.e., hydroperoxyl groups are introduced at different positions) depending on oxidation mechanisms (i.e., enzymatic oxidation, radical oxidation, or singlet oxygen oxidation). Our LC-MS/MS method, by utilizing sodium ions, can induce position-specific fragmentation of the hydroperoxide group of LOOH. Thus, the position of the hydroperoxide group can be accurately determined, and lipid oxidation mechanisms can be evaluated. Such identification of oxidation mechanisms should allow for the efficient prevention of lipid oxidation stress via selection of antioxidants that effectively prevent each oxidation mechanism. In this presentation, we would like to introduce the application of our LC-MS/MS method to achieve the antioxidant strategies for health.

[Methods and Results] An example of our studies involves ferroptosis, a new type of cell death. Using our LC-MS/MS method, we are currently investigating whether ferroptosis is induced by radical oxidation-induced LOOH, as previous studies have hypothesized. We also participated in collaborative studies on ferroptosis and discovered that vitamin K effectively inhibits ferroptosis via its antioxidant properties that trap radicals. We suspect that botanical extracts such as quercetin, rosemary and turmeric may also have such an inhibitory effect on ferroptosis and are currently investigating this possibility. We believe that these antioxidant strategies should contribute to the realization of a healthy society.

Key words Lipid oxidation; Oxidative stress; Oxidation mechanism; Antioxidant strategies; Botanical antioxidants

Category: Food & Nutrition

Evaluating the Association between the Cost of Diets and Dietary Intake: Assessing Diet Cost Indicators in 161 Countries

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This study aimed to analyze secondary data from global databases to reveal the associations between multiple diet cost indicators, and dietary intakes, and to compare the indicators in terms of sensitivity to the dietary outcomes.

We computed the weighted population-level nutrient adequacy levels and food intakes for 9 nutrients and 13 food groups for 8 adult sex-age groups in 161 countries, with estimated daily nutrient and food intake data retrieved from the Global Dietary Database. We then tested the association between dietary outcomes in 2018 and the diet cost and food price indicators in 2017 (Cost of a Health Diet, Cost of a Nutritious Adequate Diet, Cost of a Calories Adequate Diet, and Food Price Level Index), using logistic regression models adjusted for log GDP per capita and log daily food expenditure per capita as covariates.

For nutrient intakes, we found negative associations between intakes for riboflavin, vitamin C, zinc, and magnesium, while positive association for carbohydrates, and diet cost indicators. For food group intakes, we found negative associations between starchy vegetables, whole grain intakes, and unsaturated fats, while positive associations between refined grain intakes and non-starchy vegetables, and diet cost indicators.

This overview of population-stratified intakes for selected nutrients and food groups indicated that increased diet cost indicators are associated with higher intakes of carbohydrates and refined grains, but lower intakes of certain essential nutrients and healthy food groups, potentially signaling lower dietary quality. The least costs of diets meeting nutrition and health goals are generally more sensitive to changes in dietary intakes compared to the least cost diet indicator focused on energy only, and the traditional price level index for food. Therefore, the cost of a healthy diet could be used as a nutrition-sensitive diet cost indicator providing evidence for policymakers to guide agriculture, food and nutrition interventions and policies.

Key words Nutrient Intake, Food Intake, Diet Cost, Healthy diet

Category: Food & Nutrition

Optimization of seaweed flour (kappaphycus alvarezii) on physical analysis of Butter Cookies

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Inadequate intake of foods with high concentration of dietary fibre (DF) has been identified as one of the major dietary risk factors contributing to the burden of non-communicable diseases. Seaweed (Kappaphycus alvarezii) is rich in DF and low in carbohydrates can be used as raw functional ingredient in formulating foods to reduce the risk of having obesity, diabetes, cancer and dyslipidaemia. Moreover, a regular diet rich in seaweed can increase the nutritional content of food. Butter cookies are one of the most popular bakery products today and are loved by many consumers. Therefore, the addition of this natural ingredients of seaweed flour in butter cookies can increase their DF content and reduce the high calorie content of butter cookies. The general objective for this study is to optimize the formulation of butter cookies made from Seaweed Flour (Kappaphycus alvazerii) as partial replacement for wheat flour. Kappaphycus alvazerii flour manufactured by Imtanomic Sdn Bhd (ISB)'s was used as wheat flour substitute. Data optimization was performed according to Box Behnken Design (BBD) response surface methodology (RSM) using Design-Expert software. The BBDs of experiments provide modeling of the response surface to optimize the independent variables for the responses of physical characteristics (weight, spread ratio, firmness, crispness, thickness and diameter) of butter cookies. The results showed that the 16 experimental samples were first subjected to texture analysis in physical analysis and the data was obtained. Then the formulations were optimized using the RSM get two sets of optimized formulations, 12 sample and 14 sample respectively. In conclusion, adding seaweed flour to baked products could be an effective way to produce nutritious and health benefits. The optimized formula containing 8% seaweed, 6% butter, 6% margarine and 6% OBS. The good textural quality containing 8% seaweed, 12% butter and 12% OBS.

Key words Seaweed Flour (Kappaphycus alvarezii), Butter Cookie, Optimization

Category: Food & Nutrition

体外模型结合电脑模拟预测 EGCG 及其肠道微生物代谢物的 Nrf2 信号通路激活特征

In vitro and in silico based approach to study Nrf2 induction by EGCG and its colonic metabolites

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Background and Objectives

(-)-Epigallocatechin gallate (EGCG) is the most abundant and bioactive nutrient in green tea. It has been attributed to multiple beneficial effects. However, it has limited bioavailability and is prone to microbial metabolism when reaching the colon. Therefore, the formed low-molecular-weight metabolites could contribute to the observed bioactivities of EGCG. The present study aimed to characterize EGCG and its catechol-moiety-containing microbial metabolites gallic acid (GA) and pyrogallol (PG) in inducing Nrf2-mediated gene expression and also to develop a human physiologically based kinetic (PBK) model to predict kinetics of EGCG, GA, and PG in vivo.

Methods and Study Design

The Nrf2 activation by chosen compounds was characterized using an U2OS-Nrf2 CALUX reporter gene assay. The software Berkeley Madonna was used to optimize the human PBK model for EGCG, with sub-models for GA and PG. The resulting in vitro concentration-response curves were used to extrapolate the in vitro data to an in vivo dose-response curve for EGCG-mediated Nrf2 induction using PBK modeling-based reverse dosimetry.

Results

Results show that GA and PG were potent in activation of Nrf2-mediated gene expression than EGCG. By comparing to literature data, that the developed PBK model could adequately predict in vivo time-dependent blood concentrations of EGCG under different exposure conditions. The predicted in vivo dose response curve revealed that at daily intake levels of green tea or EGCG supplements, the resulting blood Cmax of EGCG was in the sub-micromolar range, concentrations at which Nrf2 activation was shown to be limited. Contribution GA and PG to the overall systemic Nrf2 induction upon EGCG exposure is expected to be limited.

Conclusion

Combining in vitro data with a human PBK model allowed the prediction of a dose-response curve for EGCG induced Nrf2-mediated gene expression in humans, and provided insight into the contribution of gut microbial metabolites to this effect.

Key words EGCG, gallic acid, pyrogallol, microbial metabolism, PBK model

Category: Food & Nutrition

Phenomenological analysis on whipping behavior of rice flour batter

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Background and objectives

Rice flour has many advantages for human health compared with wheat flour. So, we tried to use rice flour and soybean products instead of wheat, milk and eggs to develop allergy-free foods. However, rice flour is difficult to form network to keep air, so the optimization of process control method is crucial to develop a new rice flour-based cellular food with attractive texture. Therefore, the aim of this study is to evaluate the whipping properties of the rice flour-based batter by controlling the bubbles.

Methods

Six rice flours (RFa~RFf) were prepared from Hitomebore by different milling methods.

Powder properties: the mean particle size, the particle density and dynamic wetting test of rice flour were measured.

Physical properties of the liquid phase: both of 40-60% w/w sucrose-sodium dodecyl sulfate (SDS) aqueous solution and 10-40% w/w sucrose-soymilk solution were prepared to measure the surface tension and the viscosity.

Whipping properties: 5-50 g of each rice flour was added to the solutions of soymilk or SDS with sucrose to prepare rice flour-based batter, and the mean bubble size was obtained.

Results

The relationship between Bo (Bond number) and the wettability parameter $d_c\cos\theta/d_p$ clearly suggested that differences in the powder properties of rice flour could be evaluated by particle size and wettability. The foam was strongly dependent on the inertial force, viscous force, and surface tension, and affected by solids in the three-phase dispersion. In the solid-gas-liquid three-phase dispersion system, the normalized mean bubble diameter reflecting whipping behavior can be predicted by We, Re, Fr, Bo, and $d_c\cos\theta/d_p$ according to the amount of solid addition.

Conclusions

These results successfully demonstrated the potential to evaluate the whipping process by dimensionless parameters.Understanding the characteristics of air bubbles in the batter might lead to the optimization of processing for rice flour-based foods.

Key words Bubble size, dimensionless equation, dynamic wettability, three-phase dispersion, whipping

Category: Food & Nutrition

Effect of Nacre Extract from Pearl Oyster Shells against BPSD-like Symptoms in Senescence-Accelerated mouse P8 (SAMP8)

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Background and objectives:

Pearl powder has been utilized in traditional Chinese medicine for convulsions, epilepsy, and myopia, as well as in functional foods and cosmetics. Patients with Alzheimer's disease (AD) and other types of dementia exhibit behavioral and psychological symptoms of dementia (BPSD), including aggression, wandering, anxiety, and depression. We previously showed that an extract from nacreous layer in pearl oyster shells can ameliorates lipopolysaccharide (LPS)-induced depression- and anxiety-like behavior. In this study, we aimed to investigate the effect of nacre extract against BPSD-like behavior in SAMP8 mice.

Methods:

SAMP8 mice were grouped in three groups and fed either a basal diet without nacre extract or with 125mg/kg nacre extract or 250mg/kg nacre extract. Control mice (SAMR1) were fed a basal diet for 6 months. Behavioral tests were performed to assess anxiety, depression, circadian rhythm, and aggressiveness of mice. Following the behavioral tests, RNA-seq analyses were conducted to investigate the bioactive mechanisms of nacre extract.

Results:

Nacre extract improved anxious and depressive behaviors of SAMP8 mice in the forced swimming test and the elevated plus maze test. Treatment with nacre extract also decreased aggressiveness and normalized circadian rhythm disorder in SAMP8 mice. These results indicate that the nacre extract is effective in mitigating BPSD-like behavior in SAMP8 mice. RNA-seq analysis showed that the expressions of some ER stress-related genes were down-regulated in SAMP8 mice compared to the SAMR1 mice and the treatment with nacre extract restored the expressions. Furthermore, nacre extract suppressed the neuronal degenerations in hippocampus accompanying aging of SAMP8 mice.

Conclusion:

Our findings suggest that the nacre extract can alleviate BPSD-like behavior in SAMP8 mice by suppressing ER stress and apoptosis. Nacre extract may be useful as a functional food.

Key words Functional foods, Dementia, pearl, BPSD,industrial waste

Category: Food & Nutrition

Development of a Photographic Food Atlas as a Portion Estimate Tool for Adolescents in Sri Lanka

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Inaccurate portion size estimation by the respondents in dietary assessment causes estimation errors in food and nutrient intakes. Although weighing foods is considered the gold standard to assess food amounts in dietary assessments, it is time-consuming and requires high motivation. This hampers the use of weighing methods in large-scale dietary surveys. A food atlas is a set of food photographs portraying varying portion sizes of selected food items, that are bound together in a single volume that can be sued to estimate the portion sizes. This study aimed to develop a photographic food atlas with portion sizes of commonly consumed food in Sri Lanka for adolescents.

From 15 different food groups, 250 food items that are commonly consumed by Sri Lankan adolescents were prioritized based on the data collected from previous dietary surveys. Out of these prioritized food items, selected food items were cooked following standard recipes while other ready-to-eat food items were purchased from the local market. A series of photographs were taken using a smartphone with a 13-megapixel camera from 90-degree angles to capture the aerial views and 45-degree angles to capture the view of a person, sitting at a table and looking at a plate, respectively. White color crockery with a gray color background was used to present the food items.

A total of 250 food items with different portion sizes (6 portion sizes (n=138 foods), 4 portion sizes (n=68 foods), 2 portion sizes (n=14 foods), and single foods (n=30 foods)) that are commonly consumed by Sri Lankan adolescents were depicted in the Food Atlas.

This photographic Food Atlas will be a valuable tool for accurately estimating portion sizes of most common dishes consumed by adolescents in Sri Lanka. It can be used in educating, and counseling on appropriate portions of food to help improve dietary intake.

Key words Adolescents, Dietary Assessment, Food Atlas, Sri Lanka

Category: Food & Nutrition

Opportunities and Challenges for School Garden-Based Food Literacy Promotion in Secondary Schools in Sri Lanka

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Opportunities and Challenges for School Garden-Based Food Literacy Promotion in Secondary Schools in Sri Lanka

Background and Objectives:

Addressing food literacy early in life is important to persuade adolescents to make healthier food choices. Different countries incorporate food literacy into children's lives through school garden. The exploration of multiple stakeholder perceptions regarding school-based gardens provides valuable insights into developing appropriate interventions. However, there are limited studies to understand the potential of implementing school gardens in Sri Lanka. Thus, this study aimed to explore the different stakeholders' opinions associated with school garden-based food literacy promotion.

Methods:

Key informant interviews (n=28) were conducted with teachers and principals of ten government schools in Western and North-Western provinces in Sri Lanka. In-Service Teacher Advisors (n=3) in zonal education offices and professionals in the field of nutrition (n=5) were also interviewed. Data were analyzed using thematic analysis.

Results:

The main themes identified during interviews include; 1. Perceptions (implementation of school gardens); 2. Opportunities and challenges of school gardens to promote food literacy; and 3. Suggestions for the effective conduct of school gardens. Present school gardens have been mainly initiated to provide agricultural knowledge and skills. Many participants indicated the significance of skill-based food literacy education through school gardens, referring to low food-related knowledge, skills, and practices among adolescents. Time constraints, the negative attitudes of teachers and students and lacking resources were the main challenges. Suggested recommendations included allocating a specific time for gardening, integrating food literacy concepts into school curricula, and facilitating teacher training resources.

Conclusions: The findings suggest that education administrators should consider the multidisciplinary stakeholders' opinions, in designing school garden projects focusing on effective food literacy promotion whilst, exploiting the opportunities and addressing the challenges

Keywords: Food Literacy Promotion, Adolescents, School Gardens, Nutrition, Sri Lanka

Conflicts of Interest: No conflict of interest to report with this study.

Key words Food Literacy Promotion, Adolescents, School Gardens, Nutrition, Sri Lanka

Category: Food & Nutrition

Reduction of micronutrients intake inadequacy by young child milk consumption in Indonesian children 1-5 years: a diet modelling analysis

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Background and objectives: Indonesian children under-five have a high prevalence of micronutrient deficiencies. Dairy products are the key food sources of nutrients for young children. The commonly consumed dairy products are young child milk (YCM, fortified milk tailored for young children), condensed milk and cow's milk. We hypothesized that the consumption of appropriate dairy products could help to reduce nutrient inadequacy. In this study we applied diet modelling approach to assess the potential impact of YCM on the nutrient intakes among children aged 1-5 years.

Methods: Data of children aged 1-5 years from Indonesian Individual Dietary Consumption Survey 2014 were analyzed in this study. Nutrient intakes of each child were estimated based on 1 day 24-hour dietary recall using Nutri-Survey software. Diet modelling was conducted among condensed milk consumers in two scenarios, substitution of condensed milk with an isovolumetric and isocaloric YCM. Subjects were separated into two age groups, 1-2 years (n=507) and 3-4 years (n=797), the prevalence of nutrient inadequate intakes were compared before and after substitution.

Results: The prevalence of nutrient inadequate intakes were high in condensed milk consumers, such as in Vit A (67%, 64%), folate (92%, 91%), Vit D (87%, 84%), iron (84%, 76%), and zinc (76%, 76%) in 1-2y and 3-4y, respectively. Compared to the baseline of each age group, both scenarios of substitution of condensed milk with a YCM reduced the prevalence of inadequate intakes of micronutrients by 20-40% (Vit A and folate) and 40-50% (Vit D and zinc). The reduction of prevalence of inadequate iron intake was 31% in 1-2y and 63% in 3-4y.

Conclusions: Substitution of condensed milk with a YCM reduced the prevalence of inadequate intakes of analyzed micronutrients. Nutrient intakes could be improved by YCM consumption in 1-5 years old children in Indonesia, along with nutrition education on feeding practices.

Key words Children under-five, nutrient intake, Young Child Milk, dietary modelling

Category: Food & Nutrition

Anti-obesity and anti-diabetic effects of the peel of a new citrus cultivar 'Mizuki' in high-fat diet induced obese mice

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Background: Obesity and type 2 diabetes (T2D) are closely associated with higher incidence of serious diseases such as fatty liver and renal disease. In recent years, functional foods have been explored and expected to prevent obesity and T2D. A new citrus cultivar '*Mizuki*' was recently developed in Japan, and in this study, we investigated dietary effects of *Mizuki* powder on obesity and diabetes development in mice.

Methods and Results: 6 weeks-old C57BL/6J mice were fed with normal diet, 60% kcal high-fat diet (HFD) and HFD with 5%w/w *Mizuki* powder for 8 weeks. Blood glucose level and white adipose tissue weight were significantly decreased in *Mizuki* group compared to HFD group. RNA-seq analysis showed hepatic mRNA expressions of inflammatory markers were suppressed in *Mizuki* group. We analyzed *Mizuki* ethanol extract by LCMS method and showed high concentration of neohesperidine and naringin in the extract. Next, we examined the effect of ethanol extract in HFD-induced obese mice and showed that supplementation of *Mizuki* ethanol extract significantly decreased glucose level and improved glucose tolerance in mice, suggesting an important role of polyphenol-rich ethanol extract. Finally, we investigated the preventative effect of *Mizuki* powder on diabetic nephropathy. Male C57BL6 mice were injected with low-dose streptozotocin (55mg/kg/day, five consecutive day) and fed 45% HFD with or without 5%w/w *Mizuki* powder for 16 weeks. Interestingly, kidney weight and glomerular area were significantly reduced by dietary *Mizuki* powder.

Conclusion: Dietary *Mizuki* can ameliorate obesity development and improve glucose metabolism in HFD obese mice. Moreover, dietary *Mizuki* prevents renal pathologies in diabetic nephropathy mice possibly through polyphenols effects.

Key words obesity, diabetes, polyphenol, kidney disease, high-fat diet

Category: Food & Nutrition

Anti-obesity effect of root extract of Peucedanum japonicum Thunb in mice and induction of hepatic CYP2B gene expression

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Background and Objectives: Obesity is becoming a major concern in the world because it increases risk of lifestyle diseases. Many kinds of phytochemicals from plant extracts reportedly show their ability to ameliorate obesity and its complications. *Peucedanum japonicum Thunb* (PJT) has been widely used as traditional medicine in East-Asia and examined for anti-obesity effects with the leaf extract. The root of PJT is also expected as functional foods, however, the dietary effect has not been explored. In this study, we examined anti-obesity effect of root extract of PJT in high-fat diet induced mice and propose its new mechanism responsible for its preventive effect on disease development.

Methods: 6 weeks-old C57BL/6J mice were fed a normal diet (Control), 60%kcal high fat diet (HFD), and a pair-fed HFD with 1% w/w PJT root ethanol extract (80%PJT) for 10 weeks. Blood serum and tissue samples such as liver and white adipose tissue (WAT) were collected for further analyses. We investigated the gene expression profiles of both liver and WAT using DNA microarray and qPCR analyses.

Results: 80%PJT supplementation significantly decreased not only the body weight gain, blood glucose level and WAT weight, but also blood AST and hepatic triglyceride levels. qPCR analysis showed that dietary 80%PJT lowered mRNA level of inflammatory markers such as Saa3 and MMP3 in WAT. 80%PJT supplementation also decreased inflammatory markers mRNA levels in liver and, interestingly, increased hepatic mRNA level of CYP2B which reportedly plays a role in lipid metabolism as an anti-obesity enzyme.

Conclusions: PJT root extract exerts anti-obesity effect, improves blood glucose level and prevents fatty liver development. This study suggests that PJT root is useful as a novel functional food to ameliorate obesity-related diseases partially through an upregulation of hepatic CYP2B gene expression.

Key words Obesity, Peucedanum japonicum Thunb, fatty liver, Cytochrome P450, CYP2B

Category: Food & Nutrition

Effects of Chinese Heart-Healthy Diet on Blood Lipids, Glucose and Estimated 10-year Cardiovascular Risk Among Chinese Adults: Results From the DECIDE-Diet Trial

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Background/Aims: Healthy diet is essential for the management of cardiovascular risk factors, but its effects among Chinese patients whose diet differ from Western diet remain largely unknown. The aim of this study was to analyze effects of the Chinese heart-healthy (CHH) diet on blood lipids, glucose and cardiovascular risk among Chinese adults.

Methods: In this multicenter, patient- and outcome assessor-blind, randomized controlled feeding trial, participants (baseline systolic blood pressure: 130 - 159mmHg) were randomized into CHH diet or local diet for 28 days of intervention after a 7-day run-in period on local diet. Blood lipids and glucose were measured with over-night fasting blood samples before and after intervention period, and 10-year cardiovascular risk was estimated using models previously developed and validated in Chinese adults. The changes in blood lipids, glucose and 10-year cardiovascular risk over the intervention period were compared between intervention groups adjusting for center. Sensitivity analyses were done with further adjustment for sex, age, baseline body mass index and medication use; and among per protocol population.

Results: Among 256 eligible participants (130 on CHH diet and 126 on control diet), 42% had hypercholesterolemia and 15% had diabetes at baseline. Compared with usual diet, the CHH diet lowered TC (-0.14mmol/L, equivalent to 3% reduction from the baseline, P=0.017) and 10-year cardiovascular risk (-1.24%, equivalent to 27% reduction, P=0.001) further. No effect on blood glucose was found. All sensitivity analyses confirmed the results on TC and 10-year cardiovascular risk, and analysis with multiple variables adjusted showed a borderline significant effect on blood glucose (-0.17mmol/L, equivalent to 3% reduction, P=0.051).

Conclusions: The CHH diet reduced TC and 10-year cardiovascular risk and was likely to reduce blood glucose among Chinese adults with mild hypertension. Further studies with longer term are warranted. (clinical trial: NCT03882645)

Key words China, Heart-healthy diet, Cardiovascular Risk, Blood Lipids, Blood Glucose

Category: Food & Nutrition

绿藻硫酸化多糖生物活性的新见解

New Insight in Biological Activities of Sulfated Polysaccharides from Ulvophyte Green Algae

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Background and objectives: Green algae are natural bioresources that have excellent bioactive potential, partly due to sulfated polysaccharides (SPs) which are still rarely explored for their biological activity. There is currently an urgent need for studies exploring the biological activity of SPs extracted from two Indonesian ulvophyte green algae: the sulfated polysaccharide of *Caulerpa racemosa* (SPCr) and sulfated polysaccharide of *Caulerpa lentillifera* (SPCl). To address the information gap, this study aims to identify the characteristics and health benefits of SPs extracted from Indonesian *C. racemosa* and *C. lentillifera* in terms of antioxidant, anti-obesity, anti-diabetic, and anticancer capacities; results are drawn from *in vitro* assays. **Methods**: This study's method of isolating SPs and their assessment of biological activities are based on previous and similar studies. Fresh samples of both green algae (*Caulerpa racemosa* and *Caulerpa lentillifera*) were collected from Indonesian sea waters. The SPs isolation protocol was carried out based on a previous similar study via enzymatic extraction by Protease. Characterization of total sugar concentrations was estimated using volumetric-chromatography procedures. The sulfate and monosaccharides content was measured using a High performance liquid chromatography. **Results**: The highest yield sulfate/total sugar ratio was presented by SPCr than that of SPCl. Overall, SPCr exhibits strong antioxidant activity, as shown by smaller EC_{50} values obtained from a series of antioxidant activity assays compared to the EC_{50} values of Trolox (Control). As an anti-obesity and antidiabetic, the overall EC_{50} value of both SPs was close to the EC_{50} of positive control (orlistat and acarbose). Even more interesting was that SPCl showed wide-ranging anticancer effects on colorectal, hepatoma, breast cancer cell lines, and leukemia. **Conclusions**: Finally, this study reveals new insight that SPs from two Indonesian green algae have the potential to be promising nutraceuticals as novel antioxidative actors and to fight obesity, diabetes, and even cancer

Key words Antioxidant activity, Sulfated Polysaccharides, Green Algae, Anti-obesity, Antidiabetic

Category: Food & Nutrition

槟榔果实提取物的代谢物概况、自由基清除和葡萄糖苷酶抑制活性

Metabolites Profile, Free Radical Scavenging, and Glucosidase Inhibitory Activities of Areca vestiaria Fruit Extract

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Background and objectives: *Areca vestiaria* is a natural food that has the potential to be a new herbal and nutritionsupplement, but their metabolite profile is still not available. A better understanding of the bioactive compound profile of *A. vestiaria* will provide clearer insights into its benefits for health. The study aims to explore bioactive compounds, free radical scavenging (antioxidant activities in by 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2′-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) or ABTS inhibition, and its antidiabetic potential through carbohydrate (α-glucosidase) inhibition assay. **Methods**: Fresh samples of *A. vestiaria* fruit were collected from North Sulawesi Province, Indonesia. The dried simplica of *A. vestiaria* was extracted by maceration using 96% methanol (MeOH) solvent. Non-targeted metabolomic profiling studies were conducted with ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS) and electrospray ionization-mass spectrometry (ESI-MS). Mass spectrometry parameters were in positive ion mode (ESI+) and negative ion mode (ESI−) mode, and results are identified based on compatibility with the library. **Results**: The metabolomic profiling obtained 2504 raw compounds in ESI- and 2645 raw compounds in ESI+. After the compatibility has been analyzed, 356 compounds in ESI- and 543 compounds in ESI+ were successfully observed. The main compounds Alpha-Chlorohydrin (PubChemID:7290) and Tagatose (PubChemID:439312) were found in ESI+ and ESI-, respectively. The efficacy of ABTS and DPPH radical capture activity of *A. vestiaria* showed a dose-dependent curve, and the EC_{50} value of radical scavenging activity against ABTS and DPPH were similar to positive controls (Trolox and Glutathione). *In vitro* studies not only showed potential antioxidant activity but also showed that *A. vestiaria* (153.8 μg/mL) was more potent than the positive control (Acarbose;162.6 μg/mL) based on EC_{50} values in its inhibitory test against α-glucosidase (EC_{50} *A. vestiaria* <EC50 α-glucosidase). **Conclusions**: In conclusion, *A. vestiaria* fruit extract can be a bioresource of antioxidants and antidiabetics that has the potential to be further developed as nutraceuticals.

Key words Functional Food, Metabolites, Antioxidants, Antidiabetics, Areca vestiaria

Category: Food & Nutrition

The Difference in dietary quality between dietary supplements users and non-users among Korean adults: results from the Korean National Health and Nutrition Examination Survey 2018-2020

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Background and Objective

Dietary supplements are believed to be used to compensate nutritional shortcomings and improve various nutritional concern. This study aimed to compare Korean adults' dietary quality based on the Korean Healthy Eating Index (KHEI) between dietary supplement users and non-users using a national-level data.

Methods and Study Design

Data were obtained from the Korea National Health and Nutrition Examination Survey conducted between 2018 and 2020, which included a nationally representative sample of 11,038 adults aged 19-64 years. Participants were classified as supplement users or non-users based on their response to a dietary supplement use questionnaire. Scores of the 14 components of KHEI were calculated to evaluate dietary quality, with higher scores indicating better dietary quality. Data analyses methods pertinent to the complex sampling design were adopted.

Results

Between 2018 and 2020, the KHEI score decreased from 61.04 to 58.64 ($P<0.05$), while supplement use increased from 44.76% to 59.57% ($P<0.05$). Non-users had lower dietary quality than users (58.55 vs. 60.94, $P < 0.001$), with lower intake of dairy products (3.55 vs. 4.08, $P < 0.001$), breakfast (5.82 vs. 6.34, $P < 0.001$), and fresh fruit (2.04 vs. 2.28, $P < 0.001$), even after adjusting for socio-demographic factors, health behaviors and health conditions as potential confounding variables.

Conclusion

The findings suggest that the use of dietary supplements may not serve as a substitute for a low-quality diet, underscoring the necessity of improving the overall dietary quality among Korean adults, especially in those who do not use supplements. Potential correlates of dietary supplement use need to be further explored in order to have a better understanding to the associations between dietary behaviors and quality with individuals' belief and attitudes regarding dietary supplement use.

Key words dietary supplements, dietary quality, Health eating index,

Category: Food & Nutrition

In vitro Glycaemic Index of Food Products with Less Refined Sugar compared to Refined Sugar

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Excessive consumption of sugar in food is always related to the negative impact on diet quality and health. Cake, cookies, ice cream, sweetened creamer and coffee are popular sugar-rich food that contribute significant amounts of added sugar to people's diets. Reformulation of food allow efficient reduction in dietary sugar intake at a population level without shifting the individual's dietary pattern. The study aimed to replace the use of refined sugar (RS) in selected foods with less refined sugar (LRS) to reduce the glycaemic index. LRS was used in both solid and liquid foods (cake, cookies, ice cream, sweetened creamer and coffee) to replace RS and submitted to in vitro digestion to predict the in vitro glycaemic index (eGI). Results showed reduction in the predicted eGI of food samples (butter cake, sweetened creamer, ice cream, coffee B, C, D, E) after LRS substitution ranging from 2 to 8 units lower compared to the eGI using RS. The present findings suggest that LRS is a potential refined sugar replacer in high-sugar food to reduce the glycaemic index and should be considered as alternate ingredient for RS in product reformulation in coming years.

Key words Glycaemic index, in vitro, refined sugar, less refined sugar, starch hydrolysis

Category: Food & Nutrition

巴基斯坦学龄前儿童的食物恐新症的相关因素以及其与儿童膳食摄入的关联研究

Associate factors and dietary outcomes of food neophobia among Pakistani preschool children

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Background and Objectives: Food neophobia is the aversion to new or unfamiliar foods, a common childhood problem that leads to a limited and unhealthy diet. So, this study aimed to explore the prevalence, associate factors and dietary outcome of food neophobia among Pakistani preschoolers.

Methodology: A cross sectional study was conducted using printed questionnaires and the target population was preschoolers aged 3-6 years and their primary caregivers. Statistical tests included student t-test, chi square test, and linear regression analysis. A two-tailed $P<0.05$ was considered statistically significant in all analyses.

Results: A sample of 400 preschoolers and their primary caregiver from 12 kindergartens across 6 cities participated in this study. The mean age of preschooler's was 55.3 ± 11.0 months and about 52.0% of them were girls. The prevalence of food neophobia among preschoolers was recorded to be 85.6%. Moreover, factors such as maternal education level ($\beta = 1.761$, $P<0.05$), child food fussiness score ($\beta = 4.099$, $P<0.001$), and caregiver's food neophobia score ($\beta = 0.199$, $P<0.001$) were positively associated with preschooler's food neophobia score. While, factors such as child breastfeeding history ($\beta = -2.644$, $P<0.05$), child enjoyment of food score ($\beta = -1.633$, $P<0.001$), and child food responsiveness score ($\beta = -0.869$, $P<0.05$) were negatively associated with preschooler's food neophobia score. In addition to these, preschooler's food neophobia score was negatively associated to preschooler's dietary diversity score ($\beta = -0.049$, $P<0.05$), fruits preference score ($\beta = -0.016$, $P<0.01$) and fast-food preference score ($\beta = -0.014$, $P<0.05$).

Conclusion: A high prevalence of food neophobia among Pakistani preschoolers was observed and factors such as breastfeeding, enjoyment of food, food fussiness, food responsiveness, and maternal food neophobia, were significantly associated with preschooler's food neophobia. Whereas, food neophobia of Pakistani preschoolers was negatively correlated with their dietary diversity and fruit preferences.

Key words Food neophobia; preschool children; associated factors; and dietary outcomes.

Category: Food & Nutrition

Assessment of optimal combinations of therapeutic bacteria for metabolic associated fatty liver disease: a systematic review and network meta-analysis

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Background: Probiotics administered is a promising therapy in improving conditions in patients with MAFLD. This systematic review and network meta-analysis aimed to compare and estimate the relative effects and the optimum species for probiotics used in the treatment of MAFLD patients.

Methods: The PubMed, Web of Science, Embase, and Cochrane databases were searched from inception to 16 February 2023 for RCTs that were only available in the English language. The heterogeneity and bias risk of the qualifying studies were evaluated. The GRADE framework was used to assess the quality of evidence contributing to each network estimate. We also used meta-regression to explore whether the treatment length, country, and dose influenced the efficacy.

Results: A total of 2,276 patients with MAFLD from 39 RCTs were included in the analysis. The quality of evidence was rated as high in most comparisons. For primary outcomes, Lactobacillus + Bifidobacterium + Streptococcus exhibited the best probability to be the optimal probiotics in enhancing acceptability and alleviating AST (SMD: -1.65 95% CI: -2.49, -0.81), ALT (SMD = -1.44, 95% CI: -2.12, -0.76), and GGT (SMD = -1.60, 95% CI: -2.64, -0.56). In terms of the secondary outcomes, Lactobacillus + Bifidobacterium + Streptococcus was also the best choice for improving BMI (SMD = -0.46, 95% CI: -0.79, -0.12), HDL (SMD = -1.00, 95% CI: -1.50, -0.50), TC (SMD = -0.82, 95% CI: -1.36, -0.28), and TNF-α (SMD = -1.74, 95% CI: -2.81, -0.66).

Conclusion: This network meta-analysis revealed that the combination of Lactobacillus + Bifidobacterium + Streptococcus was likely to be the most effective and optimum species for probiotics in the treatment of MAFLD through improving liver enzymes, lipid profiles, and inflammation. A treatment guideline for MAFLD with probiotics could be formed using this network meta-analysis since there are currently few direct comparisons between different medications.

Key words metabolic-associated fatty liver disease, probiotics, efficacy, network meta-analysis, acceptability

Category: Food & Nutrition

Effect of drying temperature ranges on the efficacy of probiotics

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Background and Objectives:

The drying process is a crucial step in the production of probiotics. Currently, freeze drying is the most commonly used process in the industry due to the absence of oxygen and low temperatures. However, this process requires probiotic bacteria to endure hours of extremely low-temperature frozen conditions, which may weaken their efficacy after passing through the digestive tract. The aim of this study was to evaluate the efficacy of probiotics dried using different processes, with a focus on factors beyond viable bacteria count, such as colonization ability, competitive capacity, and beneficial metabolite productivity after digestion.

Methods and Study Design:

To achieve our objective, we designed different drying processes to ensure that the probiotic bacteria were dried similarly, regardless of the temperature ranges used. We then evaluated the efficacy of probiotics from different drying processes by comparing key probiotic function-related indicators. We assessed the colonization ability, competitive capacity, and beneficial metabolite productivity after digestion.

Results:

Our results showed that the drying temperature ranges had a significant effect on the efficacy of probiotics. Although freeze drying may produce a high viable count of bacteria, it may not guarantee probiotic efficacy. Therefore, additional evaluation criteria need to be used to assess the suitability of an industrial process for probiotic production. Our study suggests that an alternative drying process, such as mild temperature drying, may be more suitable for the production of live bacteria.

Conclusion:

In conclusion, our study highlights the need to consider factors beyond viable bacteria count when evaluating the efficacy of probiotics. We recommend the use of additional evaluation criteria to assess the suitability of industrial processes for probiotic production. Mild temperature drying may be a more suitable alternative to freeze drying for the production of live bacteria.

Key words Probiotics; Freeze Drying; Efficacy; Production Process

Category: Food & Nutrition

彩色花青素颜料的广泛应用
A Wide Application of Colored Anthocyanin Pigments

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Anthocyanins are colored pigments naturally occur in plants. Most red, blue, and purple-colored fruits and vegetables contain anthocyanins as their main colorful bioactive compounds. Types of anthocyanins, sources, and their wide applications are the main focuses of this topic, where the types and sources of anthocyanidins are reported. These colored pigments are found in different parts of plants, such as flowers, fruits, leaves, grains, roots, or tubers. The reported health benefits of anthocyanins are antioxidants, cardioprevention, anticancer, antidiabetes, antiobesity, antimicrobial, and neuroprotective agents. Anthocyanin is the glycosylated form of anthocyanidin, and acylated forms of anthocyanins are found in many parts of the plant. Glycosylation of anthocyanidin occurs at the R3 position of its structure. Deoxylated and methylated derivatives of anthocyanidins occur in nature on top of the hydroxyl group in the anthocyanidins. These colored pigments exist as flavylium ions at low pH. The colors of anthocyanins are dependent on their type. The antioxidative effect of these colored pigments is due to their hydroxyl and methoxyl functional groups. These functional groups notably reduce oxidative stress by scavenging free radicals via electron and many medical complications, a reduction in oxidative stress remarkably reduces inflammation. It prevents cancers and lessens many other metabolic complications. Anthocyanins can also improve visual and neuro health besides these communicable and non-communicable diseases. The disease-preventive and protective effects of these colored pigments are mainly through direct and indirect pathways. The direct pathway is via reduction of oxidative stress, whereas indirect pathways involve cyclooxygenase, mitogen-activated protein kinase, and inflammatory cytokines signaling mechanisms. Anthocyanins are the sources of functional foods, nutraceuticals, and pharmaceutical ingredients besides their red, purple, and blue hues. These colored pigments have broad applications, from food ingredients and medicine to industrial usages.

Key words Aglycone, berries, colorant, oxonium ion, reactive oxygen species

Category: Food & Nutrition

影响贝宁北部阿塔科拉地区家庭消费被忽视和利用不足的物种的因素

Factors influencing the consumption of neglected and underutilized species by households in atacora, northern Benin

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Local resources, although excellent sources of nutrients that can contribute to dietary health, are being marginalized or ignored because of their unexploited potential. This article aimed to determine the factors influencing consumption of some species in the diet of the populations of three communes of Atacora. First of all, the socio-demographics data were collected. Then, a food consumption survey based on consumption frequencies was conducted during two periods (abundance and scarcity food) in two villages randomly selected by commune. A size n=80 households were surveyed per commune. Almost all of the households consumed all the food groups except sugar, eggs and egg products, milk and milk products, and others (insects) in both periods. Considering specifically the plant species targeted, Adansonia digitata (>30%) and Moringa oleifera (>35%) were the most consumed species in the form of fresh leaves in soups by households during both periods, regardless of the study commune. As for Vigna radiata and Occimum gratissimum, seeds boiled of mung bean and fresh African basilic leaves soup were consumed by households to a lesser extent (<15%). The period (abundance and scarcity) as well as the profession of mothers have an influence on the frequency of consumption of these different plant species ($P<0.05$). It is important to promote their consumption through some conservation methods and improvement of some foods based on them.

Key words Plant species, availaibility, Benin, consumption frequency

Category: Food & Nutrition

泰國食用野生蘑菇（Amanita hemibapha 和 Termitomyces clypeatus）不同烹飪方法甲醇提取物的植物化學篩选和抗氧化潛力

Phytochemical screening and antioxidant potential of methanol extracts from Thai edible wild mushrooms (Amanita hemibapha and Termitomyces clypeatus) in different cooking methods

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Background and aims: Wild mushrooms consumption has grown extraordinarily owing to their high nutritional value, desirable taste, and aroma. In the present study series of experiments were performed to screen phytochemical constituents and antioxidant capacity of two wild edible mushrooms (*Amanita hemibapha* and *Termitomyces clypeatus*) from the forest area around Srinakarin Dam in Kanchanaburi province, Thailand.

Methods: Samples were prepared to be raw, boiled, and stir-fried mushrooms. The methanolic extracts of freeze-dried samples were analyzed for antioxidant activity by 1,1-Diphenyl-2-picrylhydrazyl (DPPH) radical scavenging and phytochemical screening tests.

Results: The phytochemical screening test showed that an extract of raw *Termitomyces clypeatus* had positive results for flavonoids, saponins, coumarins and cardiac glycosides while boiling and stir-frying gave positive results only for saponins. The *Amanita hemibapha* extracts showed no different screening results of phytochemical components in raw, boiled and stir-fried samples, except there was no positive result for flavonoids at all cooking methods. The extracts of raw *Termitomyces clypeatus* and *Amanita hemibapha* had the antioxidant capacity of 19.21±0.69 and 11.77±0.45 μg Trolox/100 g dry weight, respectively. The boiling and stir-frying significantly reduced ($p < 0.05$) antioxidant activity by 60% and 55% for *Termitomyces clypeatus* and by 75% and 56% for *Amanita hemibapha*.

Conclusions: These results make it possible to infer the future development of healthy recipes and food products from these two wild edible mushrooms, as well as evidenced by scientific knowledge-based and antioxidant capacities for further experiments.

Key words Edible wild mushroom, Termitomyces clypeatus, Amanita hemibapha, phytochemical screening test, antioxidants, Boiling, Stir-frying

Category: Food & Nutrition

棕榈糖康普茶作为益生菌饮料的抗糖尿病潜力和理化特性

Antidiabetic potential and physicochemical characterization of palm sugar kombucha as a probiotic drink

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Background and objectives: Type 2 Diabetes Mellitus (DMT2) can be prevented through the consumption of functional foods. Functional foods contain vitamin C, polyphenols, and antioxidant activity that play an important role in insulin regulation, inflammation, and oxidative stress. Palm sugar can be incorporated into kombucha which has a variety of health benefits. This study aims to determine the best formulation of palm sugar (*Arenga pinnata*) kombucha based on antioxidant activity, vitamin C, total phenolic levels, and inhibition activity of α-amylase and α-glucosidase. The characteristics of kombucha were also analyzed based on the proximate composition and ethanol content. **Methods**: Kombucha formulations were varied into several formulations (A - K) based on the composition of palm sugar and starter kombucha solution. Kombucha samples were fermented for 12 days at room temperature. Vitamin C analysis was performed by iodometric titration, while the antioxidant activity and total phenolic content were observed through 2,2-diphenyl-1-picrylhydrazyl inhibition testing and Folin-Ciocalteu method, respectively. Enzymatic inhibition activities of α-amylase and α-glucosidase were observed in vitro against the breakdown of sucrose. Quantification of ethanol levels was carried out using a UV-Vis spectrophotometer. The data obtained in triplicates were analyzed with the Shapiro-Wilk approach and analysis of variance. **Results**: There were significant differences in vitamin C, total phenolic, and antioxidant activity between formulations ($p<0.05$), with formula I, J, and K determined as the best formulations. There were also significant differences in inhibition activity α-amylase and α-glucosidase between the three best formulations, with formula K as the best formulation. Formula K had an ethanol content of 0.41 ± 0.08%. **Conclusions**: Palm sugar kombucha consisting of 40 g of palm sugar, 50 mL of water, 10 g of SCOBY gel, and 5 mL of kombucha starter solution was the best formulation with antidiabetic potential and relatively low ethanol levels.

Key words Kombucha, Palm Sugar, Antioxidant, α-Amylase, α-Glucosidase

Category: Food & Nutrition

海葡萄提取物补充剂对 7,12-二甲基苯并 [a] 蒽诱导的心血管肿瘤大鼠模型中胆固醇和超氧化物歧化酶变化的影响

Effects of Sea grapes Extract Supplementation on Cholesterol and Superoxide dismutase Changes in 7,12-dimethylbenz [a] anthracene-induced Cardio-oncological Rat Models

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Background and objectives: Increasing cholesterol levels and radical-oxidants is associated with higher breast cancer risk. Cholesterol-lowering supplements (as a functional food) exhibit beneficial effects by reducing the risk and mortality of cancers, as well as their radical scavenging activity. Therefore, this research aimed to study the anticancer activity of Sea grapes (*Caulerpa racemosa*) extract (SGE) that is associated with cholesterol and Superoxide dismutase (SOD) levels on 7,12-dimethylbenz(a)anthracene (DMBA) induced breast cancer in rats. **Methods**: Fifty Sprague-Dawley male rats (4 weeks; 200-250 g) were divided into 5 groups (A = normal control; B = negative control; C = 2.7mg/200gBW (Body Weight) of SGE; D = 5.4mg/200gBW of SGE; E = 10.8mg/200gBW of SGE). All rats received a standard diet and ad libitum water. Rats from group B until D was given 80mg/kgBW of DMBA (C20H16; PubChem CID: 6001) on the 38th day of life to induce mammary gland tumors. Carcinogenic agents dissolved in rapeseed oil were selected as DMBA senders. After 8 weeks, the rats were decapitated, blood was taken from the cardio tissue, weighed, and stored at -80℃ for further analysis. The research protocol has received internationally ethical approval (International Register of Preclinical Trials Protocols; PCTE0000283). **Results**: There was a significant decrease in low-density lipoprotein (LDL) and triglyceride levels along with an increase in the number of SGE supplements given to the group ($p<0.001$). A similar tendency was also observed in the increase of High-density lipoprotein and SOD levels. The value of total cholesterol in each group given SGE also showed a significant difference when compared to group B ($p<0.05$). **Conclusions**: Supplementation of SGE may improve lipid profile conditions by altering cholesterol levels in DMBA-induced rats with great radical scavenging activity (SOD Level). SGE has the potential as a functional food against breast cancer, human clinical trials is urgently needed.

Key words Cancer, Breast cancer, Caulerpa racemosa, Cholesterol, 7,12-Dimethylbenz [a] anthracene

Category: Food & Nutrition

在曲奇配方中使用辣木粉、辣木叶和黑豆豆豉来促进贫血青少年的功能性食品

The use of porang flour, moringa leaves, and black soybean-based tempe in cookies formulations to promote functional food for adolescents with anemia

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Background and Objectives: Anemia is a global public health problem that includes 32% of Indonesian adolescents. This study aims to incorporate porang flour (*Amorphophallus muelleri*), moringa leaves (*Moringa oleifera*), and tempe into cookies and examine their iron (Fe), folic acid, cobalamin (vitamin B12), unsaturated fatty acids, amino acids, and antioxidants activity to determine their potential as functional food snacks for adolescents with anemia. **Methods**: This study is experimental with a completely randomized trial design (CRD) with three treatments or formulations based on the combination of porang, moringa leaves, and black soybean-based tempe as follows: F1 (91:3:3:3)%, F2 (85:3:6:6)%, and F3 (77:3:10:10)%. The cookie sample was then analyzed for water content, ash, iron, folic acid, cobalt, and antioxidant activity. The differences between the samples were analyzed based on the activity of antioxidants, iron, folic acid, unsaturated fatty acids, amino acids, and vitamin B12 (cobalamin) in data obtained from triplicates using multivariate ANOVA analysis with 95% CI (0.05%). **Results**: The results of the ash and water content tests of all three cookie formulations showed values in accordance with the Indonesian National Standard (SNI) for cookie products. F3 has significantly higher iron, folic acid, and cobalt levels than F1 and F2 ($p<0.05$). Antioxidant activity is highest in F3, but there is no statistical difference between F2 and F3 ($p>0.05$). The results showed a significant difference in the unsaturated fatty acid parameter between the groups ($p<0.001$). The highest essential and non-essential amino acid content were found in F3. **Conclusions**: The combination of porang's tubers, moringa leaves, and tempe made from black soybeans, especially F3, has the potential to be used as a functional cookie as a source of iron (Fe), folic acid, cobalamin, unsaturated fatty acids, amino acids, and antioxidants for adolescent anemia. *In vivo* and human clinical trial studies are urgently needed.

Key words Tempe, Antioxidant, Anemia, Functional Food, Cookies

Category: Food & Nutrition

Clitoria ternatea 康普茶作为功能性饮料的抗肥胖潜力的代谢组学分析、体外和体内研究

Metabolomic assay, in silico, in vitro and in vivo studies of antiobesity potential of Clitoria ternatea kombucha as functional beverage

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Backgrounds: Obesity prevalence is increasing rapidly and the nutraceuticals made from natural ingredients against obesity and its comorbidities needs to be explored. This study aims to innovate a fermented drink from *Clitoria ternatea* kombucha (CTK), find out their metabolites profile, and determine the antiobesity potential through molecular docking (*in silico*), *in vitro* and in metabolically disorder mice that receive a diet rich in cholesterol and fat (CFED). **Methods**: CTK formulation refers to previous research while metabolomic profiling was determined using HPLC-ESI-HRMS/MS. 40 male *Mus musculus* were categorized into four groups, i.e., A = Control/Normal Diet; B = CFED Only; C = CFED + CTK 65 mg/kg BW (Body Weight); D = CFED + CTK 130 mg/kg BW, and then sacrificed after 6 weeks of intervention. **Results**: A total of 79 compounds were identified in CTK, and 13 ideal compounds were selected for *in silico* study. The study found that Kaempferol, Quercetin-3β-D-glucoside, Quercetin, Dibenzylamine, and α-Pyrrolidinopropiophenone showed the best potential as the functional antiobesity compounds since their affinity value ranked high in against obesity receptors (human pancreatic lipase, α-amylase, α-glucosidase, porcine pancreatic lipase, and fat mass- and -obesity-associated (FTO)protein). *In vitro* studies showed the potential activity of CTK in inhibiting not only ABTS, but also lipase, α-amylase, α-glucosidase to levels similar to acarbose (control) at 50–250 μg/mL. In the *in vivo* study, the administration of CTK (130 mg/kg BW) significantly alleviated obesity markers caused by high-fat diet ($p<0.05$). Specifically, lipid profile (HDL, LDL, TC, TG), blood glucose, markers of oxidative stress (SOD liver), metabolic enzymes (lipase, amylase), and markers of inflammation (PGC-1α, TNF-α, and IL-10) were in most cases restored to normal values. **Conclusions**: In conclusion, major metabolites compounds of CTK have the potential to be promising functional foods antiobesity. However, further human clinical trial studies should validate these health benefits.

Key words Obesity, kombucha, Clitoria ternatea, metabolites, functional food

Category: Food & Nutrition

印度尼西亚现代和传统人群的饮食模式和超加工食品消费：营养状况和身体成分分析

Dietary patterns and ultra-processed foods consumption in modern and traditional populations in Indonesia: An analysis of nutritional status and body composition

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Dietary patterns play an important role in the emergence of non-communicable diseases such as obesity, hypertension, and metabolic syndrome. This study aims to examine the impact of ultra-processed food on the nutritional status and body composition of modern and traditional population groups in Makassar city and Tana Toa Village, Kajang Subdistrict, Bulukumba Regency, South Sulawesi Province, Indonesia. The study has received ethical approval from the Research Ethics Commission of the Faculty of Medicine, Hasanuddin University with ethics number No.633/UN4.6.4.5.31/PP36/2022. The inclusion criteria in this study included: people in the Makassar population > 50 years old. Exclusion criteria were (1) having chronic gastrointestinal disease/chronic inflammation, (2) having Diabetes Mellitus, (3) consuming antibiotics in the last 3 months, (4) consuming prebiotics/probiotics, (5) having income > IDR 3,400.000,-, (6) rarely (<1x/week) consumes UPF.About 100 samples were taken from people over 50 years old, where 50 samples were taken from both the modern group and the traditional group. To evaluate the dietary pattern, the diet of the sampling persons was analyzed by using a semi-quantitative Food Frequency Questionnaire (SQ-FFQ), and a 24-hours food recall (FR) to examine the food intake. Body Mass Index (BMI) and Waist Circumference (WC) were used to determine the nutritional status, while the body composition was assessed by Tanita BC 730. According to the scatter plot, the higher the ultra-processed food energy consumed, the higher the BMI, Waist Circumference, and Fat Mass results, with the respective effects of 18.4%, 35.3%, and 13.7%. From this study, it was found that there were significant differences ($p<0.05$) between the traditional and modern groups in all variables except for height based on the independent t-test found no significant difference ($p>0.05$). In conclusion, dietary patterns with higher consumption of ultra-processed foods influence the increase of body mass index, waist circumference, and fat mass.

Key words dietary patterns, ultra-processed food, nutritional status, body composition, food science

Category: Food & Nutrition

基于胰高血糖素样肽-1 的“肠促胰素效应”研究枸杞多糖的降糖机制

Hypoglycemic mechanism of polysaccharide in Gouqi based on the “incretin effect” of glucagon-like peptide 1

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Studies have shown that sodium/glucose cotransporter 1 has the function of regulating glucagon-like peptide 1 that promotes insulin secretion in a glucose-dependent manner. We found that Lycium barbarum polysaccharide could reduce sodium/glucose cotransporter 1 levels. Thus, the effects of Lycium barbarum polysaccharide on the first- and second-phase secretion of glucagon-like peptide 1 were systematically assessed in vitro using STC1 cells and in vivo using diabetic KK^{Ay} mice. Results show that the level of glucagon-like peptide 1, the expression of Gcg gene, and β-catenin, Epac and cAMP protein increased gradually with the increase of Lycium barbarum polysaccharide concentration; Lycium barbarum polysaccharide is related to the reduction of blood fasting glucose, decrease of postprandial blood glucose, inhibiting activity of alpha-glucosidase and suppression of the level of glucagon-like peptide 1. Thus, Lycium barbarum polysaccharide could induce the first-phrase secretion of glucagon-like peptide 1 by stimulating calcium iron influx in vitro and inhibiting alpha-glucosidase activity in vivo. Expression of Gcg gene regulating by Wnt/β-catenin and cAMP/Epac pathways, as well as inhibition of alpha-glucosidase activity was responsible for the second-phrase secretion of glucagon-like peptide 1. Therefore, Lycium barbarum polysaccharide has the function to stimulate secretion of glucagon-like peptide 1. However, dipeptidyl peptidase 4 activated by Lycium barbarum polysaccharide might offset the second-phrase secretion of glucagon-like peptide 1. We suggest considering simultaneous use of Lycium barbarum polysaccharide and dipeptidyl peptidase 4 inhibitor to stimulate secretion of glucagon-like peptide 1. This subject is supported by the National Natural Science Fund of China (81803235, 81973046), Ningxia Natural Science fund (2022AAC03206) and Top Discipline of Public Health and Prevent Medicine, Education Department of Ningxia (NXYLXK2017B08).

Key words Lycium barbarum polysaccharide; Incretin effect; Glucagon-like peptide 1; alpha-glucosidase; Dipeptidyl peptidase 4

Category: Food & Nutrition

基于中医传承辅助平台探讨气阴两虚型糖尿病中药食同源中药的用药规律

Law of medicine and food homologous traditional Chinese medicine used in Qi-Yin deficiency type diabetes based on the TCM inheritance assistant platform

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Abstract Objective To analyze the medicine characteristics and prescription regularity on medicine and food homologous traditional Chinese medicine (TCM) for Qi-Yin deficiency type diabetes through data mining. Methods The clinical TCM prescriptions for the treatment of Qi-Yin deficiency diabetes mellitus were collected in Chinese National Knowledge Infrastructure, Wanfang Data, PubMed, Web of science in the past 5 years, and the TCM Inheritance Assistant Platform Management System (V3.0) was used to operate data mining such as association rules, clustering, complex system entropy clustering, etc., to summarize the drug composition and law of the treatment on Qi-Yin deficiency type diabetes mellitus with medicine and food homologous TCM. Results Up to March 2023, a total of 420 formulations were included. The most commonly used drug flavor was sweet, four qi was cold, the channel tropism were spleen meridian and lung meridian, and 62 TCM homologous of medicine and food were involved. Among them, 32 herbs with a frequency > 1% were used, and 10 herbs with a frequency of more than 50 times were Huangqi (Astragali Radix), Shanyao (Dioscoreae Rhizoma), Gegen (Puerariae Lobatae Radix), Fuling (Poria), Gancao (Glycyrrhizae Radix et Rhizoma), Shanzhuyu (Corni Fructus), Dangshen (Codonopsis Radix), Danggui (Angelicae Sinensis Radix), Huangjing (Polygonati Rhizoma), Renshen (Ginseng Radix et Rhizoma).The correlation analysis of "medicine pair", such as "Dioscoreae Rhizoma - Puerariae Lobatae Radix" was obtained. Conclusion This study can provide data basis for the development of auxiliary hypoglycemic health food and the compatibility of prescriptions, provide a new basis for the compatibility of prescription, and broaden the research ideas of products on blood glucose control with medicine and food homologous TCM.

Key words medicine and food homologous traditional Chinese medicine, Qi-Yin deficiency type diabetes, traditional Chinese medicine Inheritance Assistant Platform, medication characteristics, prescription regularity.

Category: Food & Nutrition

胶原蛋白三肽补充剂对中青年女性面部改善的作用：一项随机、双盲、安慰剂对照实验

Effect of Collagen Tripeptide Supplements on Facial Skin Improvement in Young and Middle-aged Women: A Randomized, Double-Blind, Placebo-Controlled Trial

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Objective: To evaluate the effect of a dietary supplement containing collegan tripeptide on skin anti-aging and skin hydration.

Methods: A randomized controlled trial was performed on 70 healthy women aged between 30 to 50. Participants were randomized to receive the food supplement or placebo daily for 8 weeks. The food supplements provide a blend of 12g of collagen peptides, which contains 2.4g collagen tripeptide, elastin peptide, Sodium Hyaluronate complex. Facial skin assessment was carried out at baseline, 4 weeks, and 8weeks. Moreover, in order to evaluate the absorption of collagen peptides in vivo, the concentration of Gly-Pro-Hyp (GPH) and Pro-Hyp (PH) in the blood were detected at baseline and 8 weeks. GPH and PH are major active constituent of collagen-derived peptides.

Results: 63 volunteers completed the trial after 8 weeks intervention. The placebo group showed no improvement throughout the entire trial. On the contrary, the skin of volunteers taking Collagen tripeptide supplements was significant improved at 4 weeks, and further skin improvement was showed at 8 weeks. Skin improvement includes better skin hydration, transepidermal water loss, collagen content in dermis, skin elasticity and wrinkle. In addition, the concentration of GPH and PH in blood of collagen group significatly increased by 67.12% and 102.21% at 8 weeks respectively, compare with the baseline ($p<0.0001$).

Conclusions: Continuous intake of collagen tripeptide can effectively improve the facial skin condition of young and middle-aged female.

Key words Collagen tripeptide, collagen peptide, skin anti-aging, skin hydration, GPH

Category: Food & Nutrition

类益生元成分膳食多酚根皮苷的肠道微生物分解动力学
intestinal microbiota catabolic kinetics of the prebiotic-like dietary polyphenol phlorizin

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Dietary polyphenols are an integral part of many foods and are associated with some beneficial health effects. Even so, dietary polyphenols in the form of prototype compounds have limited bioavailability and hardly enter the circulatory system, which is contradictory to its good biological activities. Phlorizin is an important component of apple polyphenol to maintain blood glucose homeostasis. Previous studies on fecal excretion kinetics of phlorizin have shown that phlorizin is extensively utilized by gut microbiota in the form of prebiotic-like effects. In this study, the in vitro anaerobic incubation was used to investigate the interaction of phlorizin with microbiota by metabolomics and microbiolomics techniques. The apparent catabolic rate and cumulative metabolic rate were used to compare the catabolic kinetic characteristics of phlorizin and its metabolites from different angles. Besides, we found that about 30% of phlorizin was metabolized and consumed by the gut microbiota, and that *Lactobacillus* might be involved in the process of producing phloretin by catabolism of phlorizin, Bacteroides might be involved in the process of producing phloretic (3-(4-hydroxyphenyl) propionic acid) by catabolism of phloretin, and *Lachnospiraceae* might be involved in the process of producing 4- hydroxyphenylacetic acid by catabolism of phloretic. In addition, seven strains belonging to *Lactobacillus animalis* and *Limosilactobacillus reuteri* were isolated by selective culture medium, both of which were confirmed to participate in the catabolic process of phlorizin to phloretin. These signatures can be used to define nutritional phenotypes with different kinetic characteristics for the bioconversion capacity for polyphenols. This approach will pave the way for personalization of nutrition based on gut microbial functionality of individuals or populations.

Key words Prebiotic ; Dietary polyphenols; Gut microbiota; Beneficial bacteria; Metabolites

Category: Food & Nutrition

2015年中国老年人膳食纤维摄入与糖代谢状况的关联性分析
Relationship between dietary fiber intake and glucose metabolism in the elderly of China in2015

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Objective To investigate the dietary fiber intake status and analyze the relationship between dietary fiber and glucose metabolic disorder of the elderly in China. METHODS Data were collected from the participants of Chinese adult chronic diseases and nutrition surveillance in 2015.A total of 20996 elderly people aged 60 years and above were included.General information were collected by standardized questionnaires, anthropometric index and blood pressure of respondents were measured according to standard method. Food intake was collected by three consecutive day 24h dietary recalls, dietary fiber was calculated through China food composition.Fasting venous blood samples were collected to measure biochemical indicators related to diabetes. Subjects were divided into three groups: normal glucose (NG, normal glucose), pre-diabetes (Pre-DM, pre-diabetes mellitus) and diabetes (T2DM, type 2 diabetes mellitus) .Multiple logistic regression model was used to analyze the relationship between dietary fiber intake and Pre-DM as well as T2DM. RESULTS A total of 6526 cases of pre-diabetes were detected in 20996 elderly participants with detection rate of 31.1%.There 3274 cases were male and 3252 cases were female, the detection rates of both genders were 30.4% and 31.8%,respectively.While 1572 participants were detected as T2DM(784 of males and 788 of females),the detection rate of T2DM was 7.5%, 7.3% for males and 7.7% for females.After adjusting for potential confounding factors, compared to participants with very low fiber intake, participants in subgroups of higher,lower and low fiber intake were associated with decreased risk of pre-diabetes, and OR and 95% CI were (OR= 0.911,95% CI:0.835-0.993),(OR= 0.861,95% CI:0.790-0.938)and(OR=0.913,95% CI:0.838-0.994),respectively.However, there was only a statistically significant negative association between the higher intake of dietary fiber and T2DM (OR = 0.848; 95% CI: 0.726-0.991). CONCLUSION Dietary fiber intake was negatively related with diabetes and pre-diabetes mellitus. The risk of glucose metabolic disorder was decreased with the increase of dietary fiber intake.

Key words dietary fiber,type 2 diabetes, elderly,cross-sectional study

Category: Food & Nutrition

孕期食用人工甜味剂与后代超重和肥胖的风险

Artificial Sweetener Consumption During Pregnancy and Risk of Overweight and Obesity in Offspring

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Background Artificial sweeteners (AS) are widely replacing caloric sweeteners to benefit health. However, AS consumption during pregnancy could have long-term impacts on the health of offspring. **Objective** We aimed to review the possible association of AS consumption during pregnancy with childhood overweight and obesity. **Methods** Databases for the literature search included PubMed, Cochrane, CNKI, and Wanfang. **Results** Five to ten percent of women consumed artificially sweetened beverages (ASB) daily during pregnancy. Compared to never consumption, daily ASB intake during pregnancy was associated with a higher risk of offspring large-for-gestational age at birth (aRR = 1.57, 95% CI: 1.05 ~ 2.35) and overweight or obese in childhood (aOR = 2.19, 95% CI:1.23 ~ 3.88 at one year of age; aRR = 1.93, 95% CI: 1.24 ~ 3.01 at seven years of age). Associations of maternal AS consumption during pregnancy with offspring BMI z-scores became stronger with increasing age from 3 to 18 years old (P<0.0001). In addition, compared to lowest quartile of AS consumption (0.00 servings/day), the highest quartile of AS consumption (0.98 servings/day) during pregnancy was associated with higher skinfolds at three years old (β = 1.17 mm, 95% CI: 0.47 ~ 1.88), seven years old (β = 2.33 mm, 95% CI: 0.80 ~ 3.87), and 13 years old (β = 2.27 mm, 95% CI: -0.06 ~ 4.60). Human studies have shown that AS can be transported from mother to offspring through the placenta and breast milk. The AS intake during pregnancy was associated with gut microbiota structure in infants, and the latter was associated with infant BMI. **Conclusion** Artificial sweetener consumption during pregnancy is associated with childhood overweight or obesity, and more scientific evidence is needed to reveal the impact of AS consumption during pregnancy or lactation on the health of offspring.

Key words artificial sweetener; pregnancy; offspring; overweight; obesity

Category: Food & Nutrition

基于多组学联合分析探究丁香酚经鼻入脑改善高能量饮食导致神经功能损伤的作用机制

Investigation of the mechanism of high-energy-diet induced neurological impairment by intranasal eugenol based on combined multi-omics analysis

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Purpose: High energy dietary patterns rich in fat and fructose can lead to neurological dysfunction that is not directly improved by oral functional compounds. This study found that the edible flavor eugenol may act directly on the hippocampus via the transnasal route to the brain to improve neurological dysfunction.

Method: Fifty 6-week-old male C57/BL6N mice were divided into five groups: the control group received basal chow, and the model group was fed a high-fat (45% calories), high-fructose (15% water) diet for 18 weeks and given eugenol by intranasal drip (10 mg/kg) and different doses by gavage (10 mg/kg, 20 mg/kg). Neurological function was assessed by behavioral and pathological measures; the distribution and retention of eugenol in the brain was analyzed by metabolomics; the molecular mechanism of eugenol action in the hippocampus was analyzed by transcriptomics.

Result: Both the oral and intranasal eugenol groups significantly reduced body weight, blood lipids, and blood glucose in mice compared to the control group. The intranasal drop of eugenol significantly improved the performance of mice on a high energy diet in the water maze and novel object recognition experiments. Time-metabolomics results showed that eugenol accumulated in the hippocampus and hypothalamus of mice within 12 hours of intranasal administration, whereas oral administration did not. The combined transcriptomic and metabolomic analyses showed that eugenol was significantly different from the model group in signaling pathways such as hippocampal neurotransmitter transmission, TRP signaling and apoptosis after transnasal drip. Subsequent cytological validation results showed that eugenol affected neuronal cell Ca2+ influx via TRPV1 signaling after brain entry, which in turn ameliorated neuronal apoptosis caused by high glucose environment via PI3K-Akt signaling.

Conclusion: Eugenol improves neurological function at lower doses by the intranasal route compared to the transoral route.

Key words High-Energy-Diet, Intranasal, Neurological function, Edible spices, Multi-omics

Category: Food & Nutrition

植物乳杆菌 NX-1 发酵黄芪的抗炎活性研究

Anti-inflammatory activity of Astragalus fermented by Lactobacillus plantarum NX-1

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Aims:

To establish a stable probiotic fermentation protocol for traditional Chinese medicine *Astragalus*, which obtain more active ingredients. Furthermore, to evaluate the anti-inflammatory activity of fermented *Astragalus*.

Methods:

A certain amount of crushed *Astragalus* was extracted three times with 5, 5, 6 volumes of distilled water. Concentrated the water extract to 0.5 g/mL and the supernatant was collected by centrifugation and sterilized. *Lactobacillus plantarum* NX-1 was added into the supernatant with 3% initial inoculum and fermented at 36℃ for 7d. After that, the fermentation supernatant was centrifuged and sterilized for cell experiments.

After the RAW264.7 macrophages were incubated at 5% CO_2 and 37℃ for 12h, cells were divided into four groups including inflammatory group, test sample group, positive control group and blank group. To build cellular inflammation model, all groups were treated with LPS expect the blank group. The anti-inflammatory activity tests included cell viability assay, determination of NO content, and ELISA for inflammation-related cytokines detection.

Results:

As it turns out, the content of active ingredients in fermentation broth was increased compared with that in water extracts. The content of polysaccharides, saponins and flavonoids in fermented *Astragalus* increased by 0.23%, 0.16% and 0.14%, respectively. In the cell viability assay, fermented *Astragalus* showed no apparent inhibition to the viability. In addition, fermented *Astragalus* could significantly inhibited the release level of NO by 28%, and inhibited the levels of TNF-a, IL-1β and IL-6 by 0.43, 0.34 and 0.58 folds compared to the water extracts.

Conclusions:

Fermentation with *Lactobacillus plantarum* NX-1 can effectively increase the content of active components in *Astragalus* and enhance its anti-inflammatory activity.

Key words Astragalus, Lactobacillus plantarum NX-1, fermentation, anti-inflammatory activity

Category: Food & Nutrition

鼠李糖乳杆菌 NX-2 在斑马鱼模型中的降尿酸作用

Lowering uric acid effect of Lactobacillus rhamnosus NX-2 in zebrafish model

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Abstract: Objective The aim of this study is to screen the lowering uric acid effect of probiotics by using the zebrafish model. Methods Firstly, zebrafish hyperuric acid model was established by using 10 mM potassium oxalate with 0.5 mM xanthine sodium salt. Secondly, the zebrafish hyperuric acid model was treated with Lactobacillus rhamnosus NX-2 culture supernatant, suspension (1×109 CFU/mL) and intracellular cell-free supernatant at 37° C for 48 h. Finally, the activity of xanthine oxidase and concentration of uric acid in zebrafish were measured using xanthine oxidase assay kit and uric acid assay kit. Results Compared with the control group (8.79 ± 0.48 U/L), the activity of xanthine oxidase in zebrafish in the model group (14.51 ± 0.70 U/L) was significantly increased (P < 0.001), meanwhile, compared with the control group (21.01 ± 1.42 μmoL/L), the level of uric acid in zebrafish in the model group (58.18±1.52 μmoL/L) was significantly increased (P < 0.001), indicating that the zebrafish hyperuric acid model was successfully established. (Fig. 1A and 1B). Compared with the model group (14.51 ± 0.70 U/L), allopurinol significantly reduced the activity of xanthine oxidase (10.16 ± 0.62 U/L) in zebrafish(P < 0.001), indicating that this test is effective in evaluating the lowering uric acid effect. In addition, Lactobacillus rhamnosus NX-2 culture supernatant, suspension and intracellular cell-free supernatant significantly reduced the concentration of uric acid (31.25 ± 1.24 μmoL/L), (46.03 ± 1.38 μmoL/L), (41.59 ± 1.49 μmoL/L) in zebrafish compared with the model group (58.18±1.52 μmoL/L) (P < 0.001).
Conclusions Lactobacillus rhamnosus NX-2 can significantly reduce the uric acid concentration in zebrafish hyperuric acid model, suggesting that it has potential applications in regulating uric acid levels.

Key words Zebrafish; Probiotics; hyperuricemia

Category: Food & Nutrition

GOS 和 2'-FL 组合的互补益处，通过对早期肠道微生物群发育和活动的影响 - 涵盖局部和全身影响。

The complementary benefits of combined GOS and 2'-FL through the impact on gut microbiota development and activity in early life - covering both local and systemic effects.

Arjen Nauta*
FrieslandCampina

The gut microbiota plays a central role and setting the right scene early in life is key, as disturbances in microbiota colonization and development can impact health and well-being even later in life. The protective role of the gut microbiota in preventing invading pathogens to thrive has been known for decades, as well as making food components (bio-)available for the human host. However, the gut microbiota and their metabolites also contribute to, amongst others, gut physiology, gut mobility and even signal to the brain and, thus, not only have a local impact but also support systemic (metabolic) processes.

It has become apparent that breast milk, the gold standard of infant nutrition, not only nourishes the newborn infant but also pampers the gut microbiota. Amongst others, it contains many different human milk oligosaccharides (hMOs), that jointly suppress the outgrowth of undesired microbiota members and stimulate e.g. the beneficial Bifidobacteria. In case breast milk is not or insufficiently available, infant milk formula can be provided to the infant. Most infant milk formulas today are supplemented with oligosaccharides and give rise to a more breastfed-like microbiota composition as compared to formulas used some 20 years ago. Galacto-oligosaccharides (GOS), a mixture of many oligosaccharide structures on basis of two hMO building blocks differing in length and linkages, can in part fulfill the role of hMO mixtures and can complement the benefits of single hMOs. We will present several complementary benefits of the combination of GOS and 2’-fucosyllactose (2’-FL), the first commercially available hMO, and opportunities for steering relative Bifidobacterium (sub-)species abundances which are of relevance for cross-feeding and the production of beneficial metabolites, the reduction of undesired microbiota members, and targeting of different sites in the colon with both gastro-intestinal and metabolic relevance.

Key words GOS; 2'-FL; gut microbiota; early life

Category: Food & Nutrition

膳食摄入与女性膝关节骨关节炎的关系：一项医院病例对照研究

The association of dietary intake and knee osteoarthritis in females: a hospital-based case-control study

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Objective: The quantity and quality of diet may be involved in the pathogenesis of osteoarthritis (OA). Our aim of this study was to investigate associations of dietary factors, including the type and consumption of food and female knee osteoarthritis (OA) in northeastern area of China.

Material: We conducted a case-control study of females, including 136 primary knee OA cases and 136 controls matched in age. Data was collected using interview-based questionnaires. A Conditional logistic regression model was established to estimate the relationship between the type and consumption of food and female knee OA with adjusting for potential confounders.

Results: Tobacco smoking (P=0.002), working posture (P=0.001) and BMI ≥28 (P=0.007) were positively correlated with knee OA in female. Conversely, increasing intakes of meat and poultry, aquatic products, soybeans and nuts consumption were negatively associated with knee OA. Compared to those who consumed meat and poultry group, aquatic products, soybeans and nuts in lower tertile, ORs for those who consumed in the upper tertile were 0.993(95%CI 0.990-0.997), 0.988(95% CI 0.977-0.999), 0.987(95% CI 0.977-0.997) and 0.984(95% CI 0.975-0.993), respectively.

Conclusion: Increased dietary intake of soybeans, meat and poultry, aquatic product and nuts appears to be a beneficial factor for preventing the occurrence of knee OA.

Key words Osteoarthritis, Risk factors, Diet, Case-control study, food frequency questionnaire

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植物乳杆菌 NX-1 在斑马鱼模型中的降糖作用

Hypoglycemic effects of Lactobacillus plantarum NX-1 in zebrafish model

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Objective The aim of this study is to screen the hypoglycemic effect of probiotics by using the zebrafish model. **Methods** Firstly, zebrafish diabetic model was established by using 20 mg/mL glucose with 0.02 mM alloxan. Secondly, the zebrafish diabetes model was treated with *Lactobacillus plantarum* NX-1, *Lactobacillus gasseri* LS03, and *Lactobacillus reuteri* C2 (1×10^6 CFU/mL) at 28 ° C for 72 h, and replaced with a new solution every 24 h. Finally, the concentration of glucose in zebrafish was measured using a glucose (GO) assay kit. **Results** Compared with the control group (1.12 ± 0.10 nmoL/fish), the concentration of glucose in zebrafish in the model group (4.29 ± 0.21 nmoL/fish) was significantly increased ($P < 0.005$), indicating that the zebrafish diabetes model was successfully established (**Fig. 1A** and **1B**). Compared with the model group (4.29 ± 0.21 nmoL/fish), acarbose significantly reduced the concentration of glucose (1.92 ± 0.15 nmol/fish) in zebrafish with a glucose-lowering rate of 74.91 ± 4.61% ($P < 0.005$), indicating that this test is effective in evaluating the hypoglycemic effect. In addition, *Lactobacillus plantarum* NX-1 significantly reduced the concentration of glucose (2.91 ± 0.15 nmoL/fish) in zebrafish with a glucose-lowering rate of 43.39 ± 4.83 ($P < 0.005$) compared with the model group (4.29 ± 0.21 nmoL/fish) ($P < 0.005$). **Conclusions** *Lactobacillus plantarum* NX-1 can significantly reduce the glucose concentration o in zebrafish diabetes model, suggesting that it has potential applications in regulating blood glucose levels.

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Key words Zebrafish; Probiotics; Diabetes

Category: Food & Nutrition

蛋清源多肽通过 ceRNA 调控网络在雌性原发性高血压大鼠中发挥降压作用

Egg white-derived peptides decreased blood pressure via the competing endogenous RNA regulatory networks in female spontaneously hypertensive rats

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Introduction: Food protein-derived antihypertensive peptides have been considered as a promising strategy of nutritional intervention for the management of high blood pressure. Despite numerous studies reporting the effects and mechanisms of antihypertensive peptides including peptides derived from egg white proteins, the role of peptides in female hypertensive animal model is unknown. On the other hand, the role of epigenetic modulation by the peptide treatment has been rarely investigated.

Objectives: The objectives of this study were to investigate the effect of egg white protein hydrolysate (EWH) in female spontaneously hypertensive rats (SHRs) as well as to explore the underlying mechanisms from the perspectives of transcriptome and the profiles of non-coding RNAs.

Methods: Young (12-14-week-old) female SHRs were orally administrated with 500 mg/kg body weight or 1000 mg/kg body weight of EWH daily for 10 weeks. Blood pressure of the rats were monitored by the tail-cuff method weekly. The mRNA and non-coding RNAs (miRNA, lncRNA, and circRNA) were profiled by the high-throughput RNA-seq technique. Differentially expressed (DE) RNAs in the aorta were identified for the construction of the competing endogenous RNA (ceRNA) networks. Key molecules in the networks were identified and validated by qRT-PCR.

Results: The treatment of high dose 1000 mg/kg body weight EWH showed a significant effect in reducing blood pressure in female SHRs. Bioinformatic analyses revealed 813, 90, 347 and 869 DE-mRNA, DE-miRNA, DE-LncRNA and DE-CircRNA, respectively. The CNTN5-LncRNA-XR_001835895.1- miR-384-5p was identified the central network which was validated in both aorta and circulation of the female SHRs.

Conclusion: The results from this study demonstrated that the treatment of EWH reduced blood pressure via regulating the ceRNA networks in female SHRs, which provided novel insights into the view of the mechanisms of food protein-derived antihypertensive peptides.

Key words Bioactive peptides; Antihypertensive peptides; Egg white proteins; Epigenetic regulations; Female spontaneously hypertensive rats

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山药多酚通过调节 NF-KB/COX-2 信号通路改善肠黏膜损伤的分子靶点及其机制

Molecular Targets and mechanisms of Chinese yam pholyphenol alleviates intestinal mucosal injury via modulation of the NF-KB/COX-2 signaling pathway

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Background and objectives: Chinese yam tuber has been edible with a history for more than 3000 years in China. According to the records of Chinese Pharmacopoeia, it has a significant effect of invigorating the intestines and improving long-term diarrhea. However, the related material basis and mechanism of action are lack of scientific explanation.

Methods: we evaluated the protective effect and molecular mechanism of Chinese yam phenolic extract (CYPE) and a dominant phenanthrene (6,7-dihydroxy-2,4-dimethoxyphe-nanthrene, CYP4) with DSS induced intestinal mucosal injury in BALB/c mice. Further, the target and molecular mechanisms of the modulation effect on the NF-kB/COX-2 signaling pathway were explored by means of molecular docking and gene silencing.

Results: both disease activity index, histological damage scores and survival rate in DSS mice were improved with pre-intervention of CYPE and CYP4, which exhibited better efficiency than PC. In addition, CYP4 treatment ameliorated the inflammatory cytokine production including TNF-α, IFN-γ, IL-10, and IL-23 in colon. Furthermore, the protein expression of ERK1/2, NF-κB p65, pNF-κB and COX-2 were suppressed in CYE4 groups as compared with MC. The binding of PC4 and COX-2 was stronger due to the hydrogen bond between hydroxyl group and Tyr385. No significant differences were found in pIκBα, pNF-κB and pERK1/2 expression between control and CYE4 group after COX-2 gene silencing, while these protein expressions significantly decreased in CYE4 group without silencing.

Conclusions: It was demonstrated for the first time that CYPE and CYP4 protected intestinal mucosal from damage and prevented DSS induced colitis in mice. CYP4 was one of the active principles obligatory for biological effect of Chinese yam in protecting intestinal health. Our findings confirmed that COX-2 was the important target for CYE4 in alleviating ulcerative colitis. These findings indicated that PC4 was supposed to inhibiting NF-κB pathway via suppression of positive feedback target COX-2.

Key words Chinese yam polyphenols; intestinal mucosal damage; NF-κB/COX-2 signaling pathway; molecular docking; gene silencing

Category: Food & Nutrition

综合网络药理学和细胞实验探讨玉米黄素改善非酒精性脂肪肝作用机制

Integrated network pharmacology and cellular assay for the investigation of an anti-NAFLD effect of Zeaxanthin

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BACKGROUND: NAFLD is one of the most prevalent liver diseases in the world. This study uses network pharmacology methods to predict and verify the molecular targets and pathways of ZEA's resistance to NAFLD and explore the anti-NAFLD effect and mechanism of ZEA. Furthermore, these results were confirmed by molecular docking and cell experiments.

RESULTS: 33 core targets of zeaxanthin targeting NAFLD were identified. Through GO enrichment analysis and KEGG pathway analysis on 33 common targets, it was found that PPARs are the most relevant pathway for ZEA to improve NAFLD. Molecular docking results showed that ZEA and PPARα bind and have good affinity through hydrogen bonds. In vitro, experimental studies have demonstrated that ZEA can activate PPARα, downregulate mRNA expression of Srebp1c and Fas, reduce adipogenesis in HepG2 cells, upregulate mRNA expression of mitochondrial and peroxisome fatty acid oxidation-related factors Cpt1a and Acox1, increase fatty acid oxidation in HepG2 cells, and improve FFA induced lipid deposition in HepG2 cells.

CONCLUSION: This study found the potential mechanism of zeaxanthin in improving NAFLD, confirmed the role of zeaxanthin in activating the PPARα pathway in improving NAFLD, and provided evidence for the development of zeaxanthin as a functional food resistant to NAFLD.

Key words zeaxanthin; Non-alcoholic fatty liver disease; Network pharmacology; Molecular docking; PPARα

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昆布多糖对洛哌丁胺所致功能性消化不良小鼠的胃肠调节作用

Regulatory Effects of Laminarin on Functional Dyspepsia Mice Induced by Loperamide

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Regulatory Effects of Laminarin on Functional Dyspepsia Mice Induced by Loperamide

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Background and Objectives: Gastrointestinal dysmotility is a common cause of functional dyspepsia. Laminarin possesses many physiological properties, however, its relative abilities in regulating gastrointestinal motility have not been illustrated yet. In this study, we aimed to investigate the regulatory effects of laminarin on functional dyspepsia mice induced by loperamide.

Methods and Study Design: 18-20g BALB/c mice were used to establish the model of gastric dysmotility. We chose loperamide subcutaneous injection for seven days to induce representative symptoms of gastrointestinal hypomotility. During this period, the treatment groups were intervened with oral administration of laminarin. Meanwhile, we employed mosapride as a positive control in our study.

Results: As a result, laminarin could reverse this dysfunction mainly through regulating gastrointestinal hormones (motilin and ghrelin), cholinergic pathway, and gastric contraction-related gene expression (ANO1). Besides, the administration of laminarin partially recovered the gut microbial imbalance induced by loperamide, it not only increased the diversity of gut microbial profile, but also modulated the abundance of gut microorganisms including the raised richness of Lachnospiraceae, Prevotella, Oscillibacter, etc.

Conclusion: We provided evidence to support that laminarin might have potential abilities to regulate gastrointestinal motility and maintain the stability of gastrointestinal microecology. It’s of great significance for further exploration and utilization of marine plant-derived bioactive substances.

Key words Functional dyspepsia; Laminarin; Gastric motility

Category: Food & Nutrition

黄瓜葫芦素C抗结肠癌作用：网络药理学分析与实验验证

Preliminary Investigation on the Anti-Colon Cancer of Cucurbitacin C from Cucumber: A Network Pharmacological Study and Experimental Validation

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Background: Colon cancer (CC) is a common malignant tumor of the gastrointestinal tract and is one of the leading causes of death among cancer patients worldwide. Cucurbitacin is a group of tetracyclic triterpenoids widely present in cucurbitaceae plants with various pharmacological activities. Cucurbitacin C (CuC) is a cucurbitacin derivative only found in cucumber, but its pharmacological activity remains unclear.

Methods: Potential targets and anti-CC activity of CuC were screened using a network pharmacology and bioinformatics approach. The proliferation and migration inhibitory activities of CuC were investigated by human CC cell model.

Results: The anti-CC targets of CuC were obtained from the database, differentially expressed genes in CC patients were identified from The Cancer Genome Atlas, and drug-disease target crossover formed 64 crossover targets. The PPI network screened 20 central genes, including matrix metalloproteinase family (MMP) genes and genes that regulate growth factors (GF). Enrichment analysis showed that cross-targets were enriched in four signaling pathways, including PI3K-Akt, Ras, MAPK, and IL-17 signaling pathways, and correlation and expression analysis of the enriched central genes identified 7 key targets. Predictive analysis and receiver operating characteristic (ROC) results showed that MMP-1, MMP-3, and MMP-13 were significantly associated with poor patient prognosis. Finally, in vitro experiments demonstrated that CuC significantly inhibited the proliferation and migration activity of human CC cells HCT-116, and large doses of CuC induced apoptosis of HCT-116 cells. The expression of PGF, MMP-1, MMP-3, MMP-9, and MMP-13 was decreased in CuC-treated HCT-116 cells.

Conclusions: Network pharmacology and bioinformatics identify MMP family members as key targets for CuC in the treatment of colon cancer. CuC was found to promote apoptosis as well as inhibit the migratory activity of HCT-116 cells and downregulate the expression of MMP family and PGF genes. The results suggest that CuC may be a promising agent for the treatment of colon cancer.

Key words Colon cancer, Cucurbitacin C, Network pharmacological, Matrix metalloproteinases

Category: Food & Nutrition

青岛地区非酒精性脂肪肝患者饮食模式及肠道菌群分析

Dietary pattern and intestinal flora of patients with nonalcoholic fatty liver disease in Qingdao area

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Aim

To investigate the relationship between dietary pattern, Dietary inflammatory index (DII) and Nonalcoholic fatty liver disease (NAFLD) in Qingdao area, and explore the correlation between the gut microbiota and dietary factors and biochemical indexes.

Methods

A total of 234 NAFLD patients and 235 controls were enrolled in this case-control study. Food frequency questionnaire survey dietary intake of participants, factor analysis was used to extract dietary patterns, DII was calculated using 20 nutrients or foods. Multivariate Logistic regression model was to analyze the relationship between the scores of different dietary patterns, DII and NAFLD. Illumina novaseq6000 was used for 16S rDNA sequencing of gut microbiota, and analyze α, β-diversity, relative abundance of gut microbiota and LEfSe analysis. Spearman rank correlation was used to analyze the correlation between different intestinal bacteria with biochemical indexes and dietary factors.

Results

After multivariate adjustment, the rice noodle processed meat dietary pattern was positively correlated with the risk of NAFLD, while the multi-grain vegetable dietary pattern was negatively correlated with the risk of NAFLD. The OR (95%CI) was 2.62 (1.91,3.61) and 0.64 (0.51,0.82), respectively. Compared with the lowest quintile of DII score, the highest quintile significantly increased the risk of NAFLD, OR (95%CI) was 2.30 (1.14,4.65).

Compared with controls, the relative abundance of Escherichia_Shigella and Klebsiella increasing were higher in NAFLD participants, and the relative abundance of Faecalibacterium and Subdoligranulum rare were lower. The relative abundance of Escherichia_Shigella was positively correlated with serum total cholesterol, low density lipoprotein cholesterol and intake of livestock and meat in NAFLD patients, and the relative abundance of Klebsiella was positively correlated with serum glutamic-oxaloacetic transaminase level.

Conclusion

Multi-grain vegetable dietary pattern and lower dietary inflammatory intake were associated with a lower risk of NAFLD. The difference of microflora between NAFLD patients and controls was related to meat intake and lipid metabolism.

Key words Nonalcoholic fatty liver disease; Dietary pattern; intestinal flora

Category: Food & Nutrition

坚果消费、肠道微生物群和体脂分布：一项基于社区的大型人群研究结果

Nut consumption, gut microbiota and body fat distribution: results from a large community-based population study

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Background & objective: Limited researches have shown the relationship among nut consumption, gut microbiota and body regional fat accumulation. We aimed to investigate the association between nut intake and fat distribution, and the mediating role of gut microbiota in the association.

Methods: This study included 2255 Chinese adults (63.33% female) aged 56.95 ± 11.91 y (mean ± SD) in the urban area of the Lanxi cohort. Body fat was assessed by dual-energy x-ray absorptiometry (DXA). We used both anthropometry and DXA measurements to evaluate the fat distribution. Nut intake was calculated by food frequency questionnaires (FFQ). 1787 individuals with stool samples were measured using 16S rRNA sequencing. We used multivariable-adjusted linear regression and Spearman correlation to investigate the associations of nut consumption with fat distribution and gut microbial characteristics as well as the associations of identified nut-associated microbial features with fat distribution. Validation study was performed in the rural area of Lanxi cohort involving 1409 participants.

Results: Nut consumption was beneficially associated with all regional fat accumulation indicators. Gut microbial analysis suggested that a high intake of nuts was associated with an increased α-diversity and overall structure (β-diversity). 7 genera were identified to associate with nut consumption, among them 3 genera significantly associated with fat distribution. Moreover, favorable associations of α-diversity indices and two nut-microbiota scores (created based on abovementioned genera) with fat distribution were found. Functional annotation analysis revealed that several discrepant metabolic pathways, identified within different intake level of nuts based on 16S data, were associated with fat distribution indicators.

Conclusion: This study suggested higher nut consumption was associated with favorable body fat distribution, potentially mediated by gut microbiota and related metabolic pathways. Our results supported the importance to consume nuts in accordance with dietary recommendations for preventing abdominal obesity and improving body shape.

Key words nut consumption; gut microbiota; body fat distribution

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猪油或加大豆油对健康超重和肥胖受试者心血管代谢性疾病风险因子和肝功能标志物的影响：一项随机对照喂养试验

Effect of Lard or Plus Soybean Oil on Cardiometabolic Risk Factors and Markers of Liver Function in Healthy Overweight and Obese Subjects: A Randomized Controlled-Feeding Trial

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Aim: The association between dietary fat and cardiometabolic risk factors or liver diseases is increasingly recognised. The present parallel, three-arm, randomized controlled-feeding trial compared the effects of lard, soybean oil, and both (blend oil: 50% lard and 50% soybean oil) on biomarkers of blood pressure (BP), serum lipid profile, and liver function in healthy overweight and obese subjects.

Methods: The 171 volunteers were randomized into three groups and consumed isoenergetic diets with 30 g of three different edible oils each day, which were added into diets during cooking for 12 weeks.

Results: The 122 (71.3%) volunteers completed the study. Diastolic BP (DBP) in the blend oil group decreased compared with those in the two other groups after 12 weeks of intervention ($P = 0.004$ for the interaction between diet group and time). Blend oil decreased DBP compared with lard ($P < 0.001$) and soybean oil ($P = 0.002$). Correspondingly, the serum concentration of nitric oxide increased in the blend oil group ($P = 0.024$ for the interaction between diet group and time). Blend oil increased nitric oxide compared with lard ($P = 0.001$) and soybean oil ($P = 0.016$). Markers of liver function, including aspartate aminotransferase (AST), alanine aminotransferase (ALT), and gamma-glutamyltransferase (γ-GT), declined in the blend oil group relative to the two other groups ($P = 0.015$, 0.001, and 0.007 for the interaction between diet group and time, respectively). Blend oil decreased AST, ALT, and γ-GT compared with lard ($P < 0.001$, < 0.001, and < 0.001, respectively) and soybean oil ($P = 0.045$, 0.011, and 0.006, respectively). There were no significant differences in changes in serum lipids, glucose, body weight, or waist circumference between groups.

Conclusion: This study provides evidence for the metabolic benefits of consuming lard plus soybean oil in healthy overweight and obese subjects.

Key words lard; soybean oil; obesity; cardiometabolic risk factors; markers of liver function

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杀菌方式对红烧牦牛酸醡肉风味特性的影响

Effects of sterilization methods on flavor characteristics of braised sour yak meat

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【Background】Sour yak meat has a unique taste and was a characteristic product in Tibetan areas of western Sichuan. However, there are fewer products that deeply process sour yak meat.【Objective】The production of braised yak sour meat enriched the types of deep-processed products of sour yak meat. It is of great significance to study the sterilization method of braised sour yak meat for large-scale production and promotion.【Method】Unsterilized samples were used as control (CK). The Euclidean distances (Ed) of different samples in artificial sense and intelligent sense(electronic nose (E-nose), electronic tongue (E-tongue), texture, color) were measured. The effects of water sterilization, ultrasonic water sterilization, high pressure sterilization and irradiation sterilization (4kGy, 6kGy, 8kGy) on the flavor profile of samples were evaluated.【Results】The results showed: The smallest differences in color, texture, E-nose and E-tongue between 4kGy irradiated samples and CK, and the Ed were 4.17, 2.11, 0.34 and 197.56, respectively. Compared with the CK, the color, texture, E-nose and E-tongue of the sample by high pressure sterilization were the most different, and the Ed were 15.17, 44.52, 2.01 and 1117.83, respectively. Comprehensive analysis of intelligent sensory and artificial sensory of samples with different sterilization methods, the overall flavor of 4kGy irradiated samples and CK was the smallest difference, followed by 6kGy irradiation, 8kGy irradiation, water sterilization and ultrasonic water sterilization. High pressure sterilization had the greatest influence on flavor, and the Ed of overall flavor profile difference was 197.64, 291.35, 448.59, 607.51, 671.21 and 1118.82.【Conclusion】The study provides data reference for the selection of sterilization methods for prefabricated braised sour yak meat in large-scale production.

Key words braised sour yak meat; sterilization methods; flavor characteristics; intelligent senses

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鲜切莲藕及褐变莲藕提取物降低游离脂肪酸诱导的 HepG2 细胞胆固醇代谢通路差异比较

Comparison of fresh-cut lotus root and browned lotus root extracts in reducing free fatty acid-induced cholesterol metabolism pathway in HepG2 cells

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Objective: This study aimed to compare the mechanisms of fresh lotus root extracts (FLRE) and browned lotus root extracts (BLRE) on cholesterol metabolism and verify whether the main component's monomer regulates cholesterol metabolism as the extracts did through in vitro experiments.

Methods: The FLRE and BLRE extracts and monomeric compounds are applied to HepG2 cells induced by free fatty acids (FFA). Extracellular total cholesterol (TC) and triglyceride (TG) levels were also detected. RT-PCR and Western blot were used to observe cholesterol metabolism-related gene and protein expression.

Results: The in vitro results showed that BLRE and FLRE could reduce TC and TG levels in HepG2 cells. BLRE suppressed the synthesis of cholesterol, while FLRE promoted the synthesis of bile acid (BA) as well as the clearance and efflux of cholesterol. Furthermore, the main monomers of BLRE also decreased cholesterol synthesis, which is the same as BLRE. In addition, the main monomers of FLRE promoted the synthesis of BAs, similar to FLRE. BLRE and FLRE promote cholesterol metabolism by different pathways.

Conclusion: This study innovatively focused on the biological activity of plant enzymatic browning products. The extracts of lotus roots after browning had a cholesterol-lowering effect as the fresh lotus root extracts did, but with different metabolic mechanisms and pathways. The FLRE ameliorated cellular cholesterol elevation through two pathways: by inhibiting FXR/FGF19 signaling-pathway-mediated CYP7A1/CYP27A1 feedback regulation to promote cholesterol conversion to bile acids; and by activating SREBP2 to up-regulate LDLR, maintain cholesterol homeostasis, and promote LDL-C clearance and cholesterol-efflux-associated ABCA1 gene expression. The BLRE and FLRE mainly regulate cholesterol metabolism by inhibiting the expression of SREBP2 and HMGCR, genes related to cholesterol synthesis. In addition, catechin and caffeic acid are vital substances in fresh lotus root that promote cholesterol metabolism, and theaflavin and forsythoside A are crucial substances in browned lotus root.

Key words browned lotus root; cholesterol metabolism; bile acid synthesis; cholesterol synthesis

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β-胡萝卜素通过调控肝脏铁死亡途径减轻高脂饮食诱导的肥胖
β-carotene alleviates high-fat diet induced obesity by regulating the liver ferroptosis

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China Medical University

Background:Obesity has become a major public health problem and ferroptosis is associated with obesity and metabolic diseases.The purpose of this study was to investigate whether β-carotene can reduce high-fat diet induced obesity by regulating lipid peroxidation associated with ferroptosis in liver.

Method:Four-week-old male C57BL/6J mice were randomly divided into four groups and fed as follows:1)control group(10% of calories from fat,n=8),2)control group with β-carotene (n = 8),3)high-fat diet group(60% of calories from fat,n =8) and 4)high-fat diet with β-carotene(n =8).After 12 weeks' feeding,the obese mouse model was established and then β-carotene (3mg/kg) was given intragastric administration.

Result:1.After 8 weeks' intervention,the weight,body fat and the expression of ferroptosis related proteins between control group and control group with β-carotene were no statistical difference.Compared with high-fat diet group,the weight,body fat,the area under curve of Oral Glucose Tolerance Test and Insulin Tolerance Test,serum contents of Fe,triglyceride,low-density lipoprotein cholesterol and total cholesterol in high-fat diet with β-carotene group were significantly decreased(P<0.05).

2.Hematoxylin-eosin staining showed that compared with high-fat diet group,the lipid droplet in the liver of high-fat diet with β-carotene group were significantly reduced.

3.Compared with control group,the protein expression of Ferritin light chain,Heme oxygenase-1,Cyclooxygenase-2,Acyl-CoA synthetase long chain family member 4,Ferritin heavy chain and Transferrin in high-fat diet group was significantly increased;Glutathione peroxidase 4 and Ferroportin1 was down-regulated(P<0.05).Compared with high-fat diet group,those protein expression in high-fat diet with β-carotene group was significantly down-regulated,Glutathione peroxidase 4 and Ferroportin1 was increased(P<0.05),which is consistent with the results of Immunohistochemistry.

Conclusion:After 8 weeks of β-carotene intragastric administration,the weight,body fat,glycolipid metabolism and lipid peroxidation associated with ferroptosis of the liver in high-fat diet induced obese mice had been improved.We demonstrated that β-carotene alleviates high-fat diet induced obesity by improving hepatic lipid peroxidation induced by ferroptosis,which provided a perspective for further research on the mechanism of reducing obesity and related metabolic diseases by inhibiting ferroptosis related pathways.

Key words β-carotene ; obesity ; ferroptosis ; lipid peroxidation ; high-fat diet

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油炸食品消费、肠道微生物群、脂肪分布和 2 型糖尿病:来自两个大型社区队列研究的结果

Fried food consumption, gut microbiome, fat distribution, and type 2 diabetes: results from two large community-based cohort studies

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Objective: The aim of this study was to investigate the associations of fat distribution and type 2 diabetes (T2D) risk with fried food consumption and gut microbiota in two large community-based populations.

Methods: Our study utilized data from two separate cohorts, including 5,268 participants from the Well-China Cohort and 1,736 participants from the Lanxi Cohort. We used a validated food frequency questionnaire to assess the frequency of fried food consumption. Fecal samples were collected between 2016 and 2019. Android fat, gynoid fat, trunk fat, and legs fat mass were measured by the dual-energy X-ray absorption (DXA). We used the MaAsLin method to identify differential bacteria associated with fried food and established the microbial score (FMI) of the differential bacteria associated with fried food. Multivariable linear regression and logistic regression were used to explore the potential association between the FMI and fat distribution as well as T2D risks.

Result: In the Well China Cohort, FMI was significantly associated with the frequency of fried food consumption. FMI was positively associated with BMI (P-trend<0.001) and WC (P-trend<0.001). Moreover, FMI was positively associated with android fat mass (P-trend<0.001), gynoid fat mass (P-trend=0.01), AOI (android fat mass/gynoid fat mass) (P-trend=0.008), trunk fat mass (P-trend<0.001), and legs fat mass(P-trend=0.01). These associations were successfully replicated in the separate Lanxi Cohort. However, positive associations of FMI with glycosylated hemoglobin (P-trend<0.001), fasting glucose (P-trend<0.001), and T2D (P-trend<0.001) were only observed in Well-China Cohort.

Conclusion: Our findings suggested that a high fried food-related microbial score was associated with a higher risk of central obesity and T2D. Reduction of fried food consumption might be a potential strategy to prevent obesity and T2D.

Key words Key words: Fried food consumption, Gut microbiome, Fat, Fat distribution, Type 2 diabetes

Category: Food & Nutrition

食物数据的新领域：食品成分和品质特征数据与食品真实性判别模型建立和应用（肉和乳特征评价和真实性判别研究）

New Application of Food Data：Food Composition and Property Data and Food Authentication Modeling (Meat & Milk Properties and Authentication studies)

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Food composition data widely applied in fields of scientific research, health education, food design, quality and safety control, food labeling and standardizing, and we know how we are usually using food data, statistical parameters. That it?! actually, food data set analysis that facilitated or based on modern chemometrics and multi-omics data matrix processing, multivariate algorithm and modeling, may linked with artificial logic road-map or machine learning, can illustrate and provide us amazing or incredible direct visible projections and comprehensive analytical results. Almost all category that we made on food, including non-scientific classification such as brand, has own fingerprint. Food carrying own inner Barcode or QR code data sets that can identify themself. Certain category of food has certain nutrients or chemicals sets such as fatty acids, amino acids, minerals, carotenoids, peptides and isotopes etc profiles; physical and chemicals properties indexes as texture, color, acidity; and instrument fingerprints as optical, chromatic, mass and NMR spectra. And food composition, properties and fingerprint data matrix can be correlated with food categories, such as species/breed; geographical origin; farming and feeding patterns as organic vs non-organic, pasturing/grass feed vs barn/grain feed; processing methods as traditional vs modern, and heating, homogenizing, fermenting etc as well. And even industrial and commercial sorting as different brand, prices grade, product series and special declarations can be modeled with their industrial fingerprints. Generally, now a days, food data modeling has provided us new methodology in food evaluation, food integrity and food authenticity identification and discrimination, and further for species, breed, geographical indication, organic, grass feed, tradition and brand etc standardizing, regulation and protection. Can be applied in farming and feeding protocols improvement as well. We have conducted some preliminary studies on Inner Mongolian meat & milk authentication.

Key words Food data; Food composition; Food integrity ; Food authenticity; Food modeling

Category: Food & Nutrition

桑葚果酒生产工艺优化及其体外抗氧化活性研究

Optimization of Processing Technology for Mulberry (Morus atropurpurea) Wine Production and its antioxidant activity in vitro

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【Background】Mulberry (Morus atropurpurea) is widely known for its richness in flavonoids and anthocyanins, which make it an attractive substrate for wine fermentation. However, mulberries have a short shelf life and are prone to rapid deterioration after harvest. 【Objective】Mulberry wine exerts antioxidant, anti-inflammatory and hypoglycemic effects, which is worth studying the deep-processing to fulfill its maximizing value.【Method】The aim of this study is to investigate the production of wine from mulberry juice by optimizing the ultrasound frequency, processing time and temperature, and fermentation time to obtain the optimum technological parameters and to evaluate its antioxidant activity. 【Results】Response surface methodology coupled with the entropy weight coefficient method was used in the present study to obtain optimized process conditions. All models showed significant p-values for the interaction of variance (<0.05). The factors influencing the overall product quality score (including total phenolic content, TSS, pH, color difference, and sensory score) were ultrasonic processing time, fermentation time, ultrasonic frequency, and ultrasonic temperature, in that order. The optimal preparation process was obtained with an ultrasonic temperature of 35 ℃, ultrasonic time of 30 min, ultrasonic frequency of 300 W, and fermentation time of 4 d. Under these conditions, the total phenolic content was the highest (16.20 mg/ml), and the scavenging ability of the wine on •OH, DPPH, and ABTS+ was 55.71%, 59.90%, and 89.86%, respectively. 【Conclusion】Due to its good taste, bright color and high nutritional value, mulberry wine produced using optimal process parameters has great economic potential.

Key words Mulberry; wine; ultrasonic extraction; fermentation; optimization; response surface methodology (RSM)

Category: Food & Nutrition

川西藏区牦牛酸肉自然发酵过程中理化特性和风味品质的动态变化

Dynamic Changes in Physico-Chemical Characteristics and Flavor Quality of Yak Sour Meat during Spontaneous Fermentation in Tibetan Region of Sichuan Province, China

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Yak sour meat is a kind of prefabricated vegetable product with rich nutrition and local characteristics developed by Sichuan Tourism College. The nutritional quality of naturally fermented yak meat was greatly affected by seasonal climate. In order to explore the quality change rule of naturally fermented yak sour meat under different climatic conditions in western Sichuan Tibetan area. The effects of fermentation temperature (5 ° C, 10 ° C, 20 ° C, 30 ° C) on the physicochemical properties, free amino acids, color characteristics, texture characteristics and sensory of yak sour meat were studied. The results showed: The fermentation temperature was negatively correlated with acidity, resilience, chewiness, and moisture content, and positively correlated with nitrite content, TVB-N, firmness and total bacterial count. The TVB-N of yak sour meat fermented at different fermentation temperatures met the national standards. High temperature fermentation was conducive to the production of more essential amino acids in yak sour meat. The essential amino acid content of yak sour meat in the 30 ° C fermentation group was significantly higher than that in other fermentation groups during fermentation, and the essential amino acid content at the end of fermentation was 22.38±0.54 mg/10g. When the fermentation temperature was higher than 10 ° C, the L value of yak sour meat was higher, and the higher the fermentation temperature, the higher the a * value and the lower the b* value. The sensory scores of yak sour meat fermented at 5 ° C, 10 ° C, 20 ° C and 30 ° C were the highest at 192 h (73.42), 120 h (69.30), 60 h (65.82) and 32 h (71.00), respectively. In summary, The higher the fermentation temperature, the greater the change of quality of yak sour meat, and the shorter the fermentation maturity time.

Key words Yak Sour Meat, Spontaneous Fermentation, Physico-Chemical Characteristics, Flavor Quality

Category: Food & Nutrition

妊娠期糖尿病和健康产妇乳汁外泌体具有差异 miRNAs 表达谱和不同的调节肝细胞增殖的活性

Human Milk Exosomes from Gestational Diabetes Mellitus (GDM) and Healthy Parturient Exhibit Differential miRNAs Profile and Distinct Regulatory Bioactivities on Hepatocyte Proliferation

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Objectives: Exosomes are a novel type of bioactive component in human milk (HM) and influence infant development, growth, and health. Recent studies indicate that HM exosomes and miRNAs relate to gestational diabetes mellitus (GDM). This study aimed to compare the differential miRNAs in HM exosomes from GDM and healthy parturient, and to investigate the bioactivities of HM exosomes on regulating hepatocyte proliferation and insulin sensitivity.

Methods: Exosomes were isolated by ultracentrifugation from HM of GDM (GDM-EXO) and healthy (NOR-EXO) parturients and characterized by Western blot, nanoparticle tracking analysis and transmission electron microscopy. The exosomal miRNAs from colostrum, transitional milk and mature milk were sequenced by BGISEQ-500 system. HepG2 cells were incubated with 20, 40 or 80 μg/mL of HM exosomes and the proliferation and glucose consumption were assessed. Eighteen Balb/c mice were randomly allotted to the control (CTL), NOR-EXO and GDM-EXO group, and gavaged with 50 mg/kg·BW of PBS, NOR-EXO and GDM-EXO, respectively for 2 weeks. Upon the end, fasting blood glucose and insulin was measured. The expression of molecules relating to cell proliferation (mTOR and p-mTOR) and insulin signaling (IRS1, p-IRS1, Akt and p-Akt) in both HepG2 cells and mice liver were detected by Western blot.

Results: GDM-EXO and NOR-EXO had similar morphology, size, concentration and exosome-specific markers (CD9 and TSG101) expression. GDM-EXO and NOR-EXO specifically harbored 1299 and 8 miRNAs, respectively. Moreover, GDM-EXO had 176 up-regulated and 47 down-regulated miRNAs compared with NOR-EXO. Both GDM-EXO and NOR-EXO were absorbed in cultured HepG2 hepatocytes and mice liver, but did not affect insulin sensitivity. GDM-EXO inhibited hepatocytes proliferation by down-regulating mammalian target of rapamycin (mTOR) possibly via the delivery of exosomal miR-101-3p.

Conclusion: HM exosomes from GDM and healthy parturient exhibit differential miRNAs profiles and distinct regulatory bioactivity on hepatocyte proliferation.

Key words Gestational Diabetes Mellitus; Exosomes; miRNAs; Human milk; Hepatocyte proliferation

Category: Food & Nutrition

中国西南地区成人饮食文化营养知信行现状及影响因素分析的横断面研究

Analysis of the Current Situation and Influencing Factors of Dietary-Culture-Related Nutrition Knowledge, Attitudes, and Practices of the Southwest of China's adults: A cross-sectional Study

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Background: With the development of economy and society, people's attitudes and behaviors towards nutrition are also changing. People's nutrition Knowledge, Attitudes, and Practices (KAP) is not only influenced by the demographic characteristics, but also the dietary culture.

Objectives: To assess the dietary-culture-related nutrition knowledge, attitudes, and practices(KAP) of southwest of China’s citizens during the corona virus disease 2019(COVID-19) pandemic.

Study Design: A cross-sectional survey was conducted using an online KAP questionnaire in southwest of China. Volunteers were recruited at Southwest Medical University and were first trained to unify standards of distributing questionnaires. Participants were recruited by convenient- and snowball-sampling methods. Multiple regression analysis was used to analyze the influential factors.

Results: After 50 days of investigation, 2380 participants (38.5% men) were valid. The mean score of adults’ nutrition knowledge was 3.97±2.17 and the mean awareness rate was 39.7%. Women participants in the age group of 50-65 with higher education level had higher nutrition knowledge qualification rate. During the COVID-19 pandemic, the positive rate of attitude toward dietary-culture-related nutrition was 93.5%, and women who had higher level of education and immigrated from other places had better attitudes. Moreover, the positive rate of dietary habits was 90.4%, and older women had better dietary behavior.

Conclusions: participants’ knowledge of nutrition was poor, but their dietary habits and attitudes toward dietary-culture-related nutrition were generally positive, it is necessary to improve nutrition education.

Key words southwest of China, adults, dietary culture, nutrition knowledge-attitude-practice

Category: Food & Nutrition

刺梨提取物对溃疡性结肠炎的保护效果和机制探究

The protective effect and mechanism of Rosa Roxburghii Tratt extract on Ulcerative Colitis

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Background and objectives: Ulcerative colitis is a chronic inflammatory bowel disease, this study aimed to investigate the protective effect of Rosa Roxburghii Tratt extract(RRTE) on Ulcerative Colitis (UC) and its potential molecular mechanism.

Methods: The flavonoids and terpenoids in Rosa Roxburghii Tratt were extracted by alkali solubilization and acid precipitation method after alcohol extraction, and the content of flavonoids and terpenoids in RRTE was determined by colorimetry; additionally, the DPPH+ and ABTS+ free radical scavenging rates were measured to assess the antioxidant capacity of the RRTE. Dextran sulfate sodium (DSS) was used to establish the UC animal model. The protective effect of RRTE was investigated by Body weight, DAI score, colon length, Hematoxylin-eosin staining(HE), immunohistochemistry(IHC), and 16rRNA sequencing; furthermore, the possible molecular mechanisms were explored by using transcriptomics.

Results: The flavonoids and terpenoids content of RRTE were 453.70 ± 6.662 mg/g and 237.00 ± 21.46 mg/g, and the IC50 of $DPPH^+$ and $ABTS^+$ were 77.91 μg/ml and 367.5 μg/ml. RRTE could slow down weight loss, reduce the shortening of colon length, and decrease the DAI score($P<0.05$); which also could improve the structure of mouse colonic mucosa, reduce inflammatory infiltration, and increase the expression of the tight junction proteins to protect the mechanical barrier; furthermore, RRTE could rebalance the gut microbiota by increasing the abundance of *Firmicutes* and reducing *Proteobacteria*; NGS results showed that there were 2746, 2943 differentially expressed genes(DEGs) in the model group(M) VS the control group(C), and in the high-dose group(H) VS C, respectively, and 1747 differential genes in H VS M. KEGG pathway analysis showed that DEGs related to immune response, inflammatory signaling pathways, and IL-17 and TNF signaling pathways were significantly enriched in the high-dose group.

Conclusion: RRTE could ameliorate DSS-Induced Ulcerative Colitis, suggesting that it could be a new strategy for UC treatment.

Key words Ulcerative colitis, Rosa Roxburghii Tratt, Flavonoids, Terpenoids, RNA-seq, gut microbiota

Category: Food & Nutrition

热激结合涂膜处理维持了蓝莓果实冷藏期间的营养价值

Heat shock combined with coating treatment maintained the nutritional value of blueberry fruit during cold storage

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Previous studies have shown the 45 ° C heat shock for 60 min combined with TKL coating (HTK) treatment could prolong the cold-stored period of 21 d, compared with the control group. However, its effect on the nutritional components of blueberry fruit has not been reported. Therefore, this study explored the changes of nutrients in blueberry from the aspects of antioxidant substances, antioxidant enzymes and phenolic secondary metabolites. The results showed: 1. Compared with the control group, the HTK treatment inhibit the increase of superoxide anion, malondialdehyde content, relative conductivity and browning index of blueberry after harvest, and inhibit the decrease of proline content, so significantly reduce the oxidative stress level of blueberry fruit. At the same time, delayed peak time of SOD , POD and CAT activity, improved key defensive enzyme activity at the end of storage. 2. The HTK treatment reduced the scorbic acid-glutathione cycle efficiency, and maintained content of ascorbic acid and reduced glutathione with blueberry during low temperature storage. At the same time, the increased total phenol content of blueberry and delayed anthocyanin content decline. 3. The isolated 41 phenolic secondary metabolites from blueberries, including phenolic acids (10), flavanols (6), flavonols (22), and flavonoids (3). Compared with the control group, the HTK treatment delayed the synthesis time of phenolic compounds and inhibited the degradation of some metabolites in the biosynthesis pathway of flavonoids and phenylpropanoids, thereby increasing the total phenolic content of blueberry at the end of storage and maintaining high antioxidant capacity. In summary, HTK treatment delayed the degradation rate of phenolic metabolites, increasing the total phenolic content of blueberry at the end of storage, reduced the ASA-GSH cycle rate, inhibited the decrease content of ascorbic acid and glutathione, and thus inhibiting the loss of nutrients in postharvest blueberry.

Key words blueberry, heat shock, coating, nutritional value

Category: Food & Nutrition

刺梨不同极性提取物的抗氧化活性及缓解肺纤维化的作用

Antioxidant activity of different polarity extracts of Rosa roxburghii Tratt and the effect of alleviating pulmonary fibrosis

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Abstract: Background: Rosa roxburghii Tratt (RRT) has multiple biological activities including anti-inflammatory, antibacterial, and anticancer, which is used both as medicine and food. Objectives: To investigate the antioxidant activity of different polarity extracts of RRT and their alleviating effects on pulmonary fibrosis in vivo and in vitro. Methods: Water extract (WE), Methanol extract (ME) and ethanol extract (AE) were obtained using solvents of different polarity (water, methanol, ethanol), ethyl acetate phase (EAE) and water phase (WPE) were obtained by extracting WE using Minor polar solvent (ethyl acetate). The active components and antioxidant capacity of five extracts were determined, and the anti-pulmonary fibrosis effects were investigated by bleomycin (BLM)-induced pulmonary fibrosis mice model and TGF-β1-induced cell model. Results: The bioactive substances in the EAE were significantly more than other extracts with content of polyphenols, flavonoids and triterpene acids being 27.56±4.06, 759.97±2.92, 211.29±0.02 μg/mg respectively($P<0.01$); and it had the strongest antioxidant capacity with IC50 of 525.63±37.66, 55.98±0.60 μg/mL for DPPH and ABTS. Attractively, compared to other extracts, EAE showed better protection against pulmonary fibrosis on attenuating BLM-induced elevated lung weight coefficients in mice, reducing lung inflammatory infiltration and collagen. Moreover, EAE could modulates the composition of the intestinal flora, increasing the relative abundance of Allobaculum, Lactobacillus, Akkermansia and decreasing the relative abundance of Prevotella. Meanwhile, they exhibited similar anti-pulmonary fibrosis effects on reducing the level of Reactive oxygen species (ROS), restoring cell membrane potential, inhibiting calcium ion increase in TGF-β1-induced A549 cells. Conclusion: The EAE could regulate the BLM-induced disorder in gut microbiota of mice and regulate mitochondrial function to alleviate pulmonary fibrosis, which is consistent with the most active substance and the strongest antioxidant activity of EAE.

Key words Rosa roxburghii Tratt extracts; pulmonary fibrosis; antioxidant capacity; mitochondrial function; gut microbiota

Category: Food & Nutrition

中国农村地区6-23月龄婴幼儿看护人的喂养行为及其情境因素研究——基于生态瞬时评估法

Ecological momentary assessment of caregivers' feeding behaviors and contextual factors among children aged 6–23 months in rural China

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Background: Assessment in caregivers' feeding behaviors typically relies on retrospective self-reports, which are limited by recall bias and fails to capture how behaviors changes across context-specific factors. Ecological momentary assessment (EMA) is a novel approach to capture caregivers' feeding behaviors and contextual factors in real-time.

Objectives: This study aims to assess caregivers' complementary feeding behaviors and identify contextual factors (including internal and external factors) that contribute to feeding behaviors using EMA method.

Methods: Children aged 6–23 months and their caregivers in 29 rural townships were recruited. Complementary feeding behaviors and contextual factors were assessed for seven consecutive days via EMA method. The mixed-effects models were used to ascertain the influence of contextual factors on feeding behaviors after adjusting for potential confounders.

Results: A total of 151 children (mean age=13.8 months) and their primary caregivers included in the final analysis. EMA captured 2588 meals occasions of children. The average number of children's food groups intake was 2.6 (five food groups in total) in each occasion. Regarding external factors, 49% of meal occasions, children were walking or running; 8.7% and 20.5% of meal occasions, children were watching TV/phones and playing with toys; 48.5% of meal occasions, children were eating with family members. Regarding internal factors, the mean positive and negative emotional scores of caregivers were 3.44 and 1.45 (range from 1-5), respectively. The results of mixed-effects models indicated that children who were eating on the fixed chair compared to those who were walking or running ($p<0.0001$), children who were eating with family members compared with those who were eating alone ($p=0.006$), and higher positive emotion score of caregivers ($p=0.028$), were all associated with a higher number of food groups consumed during meal.

Conclusions: Contextual factors were associated with caregivers' feeding behaviors. EMA is a novel method, allowing identification of contextual factors associated with feeding behaviors in natural environments.

Key words Ecological momentary assessment; Food parenting practices; Contextual factors; Dietary intake; Children aged 6-23 months

Category: Food & Nutrition

粳米饭在口腔加工中的滋味变化及感知机制研究

Study on taste release and perception mechanism of japonica rice during oral processing

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The taste of japonica rice is an important factor directly affecting consumers' preferences. However, japonica rice's taste release and perceptual mechanism in oral processing are unclear. Therefore, we studied japonica rice's taste release and perception during oral processing using high-performance liquid chromatography and molecular docking simulation. The results showed that umami was the prominent taste in the early stage of oral processing. On the other hand, the sweet taste was the prominent taste in the later stage. Furthermore, 16 key taste substances were detected in the oral processing of japonica rice. The partial least squares analysis (PLSR) showed that glucose, sucrose, proline, maltose, and fructose were significantly and positively correlated with the perception of sweetness in japonica rice. Aspartic acid and glutamic acid increased umami perception and attenuated sweetness and sourness perception in japonica rice. Glucose and sucrose bind to the amino acid residues of sweet taste receptors T1R2/T1R3, forming hydrogen bonds and hydrophobic bond forces, increasing the activity of T1R2/T1R3, thereby sensing sweet taste. Aspartic acid and glutamic acid bind to amino acid residues of umami receptors T1R1/T1R3 to form hydrogen bonds and hydrophobic bond forces, resulting in increased activity of T1R1/T1R3 for umami perception.

Key words Japonica rice; Taste, Oral processing, Perception

Category: Food & Nutrition

肠道菌群对于大豆皂苷发挥减轻蛋氨酸和胆碱缺乏(MCD)饮食诱导的非酒精性脂肪性肝炎(NASH)小鼠的脂肪性肝炎的生物活性至关重要

Gut Microbiota Plays Essential Roles in Soyasaponin's Alleviative Bioactivities Against Steatohepatitis in the Methionine and Choline Deficient (MCD) Diet-induced Non-alcoholic Steatohepatitis (NASH) Mice

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Objectives: NASH is a wide-spread progressive chronic disease with complex pathogenesis which has been recently shown to be closely related to gut microbiota. This study aimed to investigate the preventive bioactivities of food-derived phytochemicals soyasaponins against NASH and further explore its mechanism by looking at the gut microbiota.

Methods: The MCD diet-fed male C57BL/6 mice were intervened with soyasaponins (40 and 80 μmol/kg BW) or obeticholic acid (0.4 mg/kg body weight, as positive control) for 16 weeks. Pseudo-germ-free mice were generated with an antibiotics cocktail (ampicillin 1 g/L, neomycin 1 g/L, metronidazole 1 g/L, and vancomycin 0.5 g/L) for 2 weeks before the experiment. Hepatic pathology was assessed by hematoxylin-eosin and Masson's trichrome staining. Gut microbiota in feces were determined by 16S rRNA amplicon sequencing. Bile acids in serum, liver, and feces were measured by a ultra performance liquid chromatography-tandem mass spectrometry.

Results: Soyasaponins alleviated steatohepatitis and fibrosis, reduced triglyceride and total cholesterol in liver, and promoted fecal triglyceride excretion. Soyasaponins improved the gut microbial composition by decreasing Firmicutes, Erysipelotrichaceae (Ileibacterium, Faecalibaculum, Allobaculum, Erysipelatoclostridium), unidentified-Clostridiales, Eggerthellaceae, Atopobiaceae, Aerococcus and Rikenella, increasing Proteobacteria, Verrucomicrobia, Akkermansiaceae (Akkermansia), Romboutsia, and Roseburia. Soyasaponins alleviated the intestinal barrier damage as evidenced by improving pathological Chiu's score and up-regulating the expression of ileal tight junction proteins, occludin and zonula occludens-1. Soyasaponins reduced the bile acids accumulation in serum and liver and promoted its fecal excretion. The preventive bioactivities of soyasaponins against NASH were vanished in the pseudo-germ-free mice.

Conclusion: Gut microbiota plays essential roles in soyasaponin's preventive bioactivities against steatohepatitis in the MCD diet-induced NASH mice.

Key words Soyasaponin, non-alcoholic steatohepatitis, gut microbiota, bile acids

Category: Food & Nutrition

低聚木糖经调控 NKG2D 信号通路修复肠道屏障功能障碍改善妊娠期糖尿病小鼠胰岛素抵抗

Xylooligosaccharide Ameliorates Insulin Resistance through Regulating NKG2D Signaling Pathway and Improving Intestinal Barrier Dysfunction in Gestational Diabetes Mellitus (GDM) Mice

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Objective: Natural killer group 2 member D (NKG2D) signaling pathway is vital for the maintenance of intestinal barrier which contributes to the improvement of insulin resistance. This study aimed to explore whether xylooligosaccharide (XOS), a well-defined prebiotics, improves intestinal barrier dysfunction and insulin resistance through regulating NKG2D signaling pathway in GDM mice.

Methods: Sixty female mice were randomly allotted to 4 groups (n=15): Control, HFD, GDM, and GDM+XOS. The control mice were fed with AIN-93 diet while mice in all other groups fed with 45% high fat diet. GDM mice were established by intraperitoneal injecting with 55 mg/kg streptozocin for 5 days from the first day of pregnancy. Mice in the GDM+XOS group were fed with high fat diet containing 2% XOS following the successful modeling of GDM. On the 18th day of pregnancy, the serum and liver tissues were collected. The relative abundance of Akkermansia muciniphila (Akk) in colonic contents was measured by qPCR. The intestinal tissues was used for Hematoxylin-eosin staining, flow cytometry and protein determination.

Results: XOS significantly reduced ($p<0.05$) fasting blood glucose, fasting insulin, HOMA-IR, impaired glucose tolerance, and increased ($p<0.05$) Akt phosphorylation in the liver. XOS decreased ($p<0.05$) TNFα, IL-1β, IL-15 and LPS in serum. XOS increased ($p<0.05$) the relative abundance of Akk in colon, improved ($p<0.05$) the intestinal mucosal barrier damage, and enhanced ($p<0.05$) the expression of tight junction proteins (Occludin and ZO-1). Furthermore, XOS reduced ($p<0.05$) the recruitment of CD8+T lymphocytes in intestinal epithelial cells and the expression of NKG2D ligand (RAE-1) in the intestinal tissues.

Conclusion: XOS ameliorates insulin resistance through regulating NKG2D signaling pathway and improving intestinal barrier dysfunction in GDM mice. This study provides theoretical basis for the reasonable use of XOS in clinical prevention and treatment of insulin resistance in GDM.

Key words Gestational diabetes mellitus; Xylooligosaccharides; NKG2D; Akkermansia muciniphila

Category: Food & Nutrition

用全基因组关联分析探究与高血压相关的饮食模式的基因-饮食相互作用位点

Genome-wide association study of dietary patterns associated with hypertension reveals gene-diet interaction loci

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Aims

While the association between dietary patterns (DPs) and hypertension has been extensively studied, there is still a lack of comprehensive research on the combined effects of genetic disposition and DPs. This study aimed to identify food-based DPs and genetic variants related to hypertension through gene-DP interaction modeling.

Methods

Dietary data were collected using a 24-h online dietary assessment on ≥2 occasions based on the UK Biobank. DPs were derived using quadratically regularized principal component analysis (PCA) regression. This method uses a quadratic penalty term on the matrix factorization that helps to overcome the limitations of traditional PCA and prevents overfitting. A phenome-wide association analysis examined the association between multiple phenotypes and DPs. Multivariable Cox-proportional hazards models assessed the relationship between the first principal component (DP1) and the risk of incident hypertension while adjusting for demographic and lifestyle factors as covariates. Additionally, the whole genome-wide analysis was conducted to investigate the gene-diet interaction effects of the hypertension-related DP on blood pressure using a cohort of up to 98,179 UK Biobank participants.

Results

We identified three DPs. DP1, correlated positively with fiber-rich foods and fruits and inversely with fried food, showed a significant association with hypertension. Hypertension was found to be significantly associated with DP1. After a median follow-up of 6.2 years, DP1 was associated with a lower risk of new onset of hypertension (HR: 0.79; 95% CI: 0.74-0.84).

Sixteen interaction loci with significant interaction effects ($P < 1\times10^{-6}$) were found, including the variant MYH14, UNC13C and VAV3 gene clusters, which exclusively exhibited interaction effects.

Conclusions

This study reveals gene-diet pattern interaction effects in genetic loci, where the effects on blood pressure are modified by hypertension-related DPs, especially those involving fiber-rich foods and fruit intake. These findings highlight the significance of personalized nutrition and its potential impact on health outcomes.

Key words Dietary patterns, Principal component analysis, Gene-Dietary pattern interaction, Hypertension

Category: Food & Nutrition

医学院校大学生营养膳食状况调查与影响因素分析

Investigation on nutritional and dietary status of medical college students and analysis of influencing factors

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Objective: To understand the nutritional status of medical college students and analyze the influencing factors, so as to provide the basis for promoting the health of medical college students. Methods: A total of 800 undergraduates in Mudanjiang Medical College were selected by multistage cluster random sampling for questionnaire investigation and medical examination. Nutrient intake was evaluated according to Dietary Guidelines for China Residents (2007); Using body mass index to evaluate students' nutritional status; Chi-square test was used for analysis. Results Among the 800 college students, the nutritional status of low weight, normal, overweight and obesity were 11.8%, 74.4%, 10.7% and 3.0%, respectively (P<0.05). The proportion of people whose intake of each nutrient was less than 80% of the recommended intake was 72.73%, 95.16% and 87.30% for boys and 64.72%, 92.42% and 91.34% for girls in protein, fat and carbohydrate respectively. The trace elements of calcium, iron and zinc were 88.15%, 65.23% and 84.68% in boys and 91.61%, 71.43% and 62.82% in girls, respectively. The percentages of vitamin A, B1, B2, PP and C in male students were 82.54%, 85.99%, 84.03%, 63.74% and 88.63%, respectively, while those in female students were 69.86%, 89.46%, 75.15%, 59.42% and 81.43%, respectively. Factors considered in the study included gender (χ^2=37.63,P=0.001), per capita monthly income of the family (χ^2=12.61,P=0.022), average monthly living expenses during school (χ^2=5.43,P=0.026), monthly food expenses during school (χ^2=7.23,P=0.034), exercise duration (χ^2=13.25,P=0.002), and exercise intensity (χ^2=6.04,P=0.021). Conclusion: A certain proportion of students in medical colleges and universities fail to reach the standard of total energy or various nutritional components in food intake. The nutritional status of medical college students was affected by many factors, such as gender, family average monthly income, average monthly living expenses during the school period, the monthly cost of food, the time and intensity of physical exercise.

Key words College students; nutritional and dietary status; food intake

Category: Food & Nutrition

孕前饮食模式与婴儿出生体重:一项前瞻性队列研究

Prepregnancy dietary patterns and infant birth weight: a prospective cohort study

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Background: Maternal nutrition can have a profound effect on fetal growth, development, and subsequent infant birth weight. Yet little is known about the influence of prepregnancy dietary patterns.

Objectives: To examine the association between prepregnancy dietary patterns and birth weight.

Methods: This study included 911 singleton live-born infants from the Taicang and Wuqiang mother–child cohort study (TAWS). Participants completed height and weight measurements and a 58-item food dietary frequency questionnaire at early-pregnancy. Newborn birth information was obtained from Wuqiang County Hospital. Macrosomia was defined as ≥4000 g. Large for gestational age (LGA) was defined as birth weight higher than the 90th percentile for the same gender and gestational age. Dietary patterns were extracted by using principal component analysis. Logistic regression models were used to investigate the association between prepregnancy dietary patterns (in tertiles) and macrosomia and LGA, and subgroup analysis was further explored by pre-pregnancy BMI.

Results: Four dietary patterns were identified based on 15 food groups: “cereals-vegetables-fruits”, “vegetables- poultry- aquatic products”, “milk-meat-eggs” and “nuts- aquatic products- snacks”. After adjustments for sociodemographic characteristics, pregnancy complications and the other dietary patterns, greater adherence to the “cereals-vegetables-fruits” pattern before pregnancy was associated with a higher risk of macrosomia (adjusted OR = 2.220, 95% CI: 1.018, 4.843), while greater adherence to the “nuts-aquatic products-snacks” pattern was associated with a lower risk of macrosomia (adjusted OR = 0.357, 95% CI: 0.175,0.725) compared with the lowest tertile. No significant associations were observed between prepregnancy dietary patterns and LGA. However, after subgroup analysis of pre-pregnancy BMI, “cereals-vegetables-fruits” pattern was associated with increased risk of LGA in overweight and obese mothers (adjusted OR = 2.353, 95% CI: 1.010, 5.480).

Conclusion: Unbalanced pre-pregnancy diet increases the risk of macrosomia and LGA, especially for those who are overweight or obese pre-pregnancy.

Key words dietary patterns, pregnancy, macrosomia, LGA , birth weight

Category: Food & Nutrition

脂肪摄入水平影响不同脂肪酸构成对大鼠生长、糖脂代谢、炎症和氧化应激的作用

Fat levels affect the effects of different fatty acid composition on the growth, glucolipid metabolism, inflammation and oxidative stress of rats

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Background: The effects of various edible oils on human health are influenced by their fatty acid profiles, micronutrients, and the quantity of dietary fats. However, the health effect resulting from different intakes of edible oils with various fatty acid profiles remains unclear.

Objective: This study compared the health effects of olive oil, soybean oil, and blended oil on rats fed normal and high-fat diets.

Methods: 36 male Sprague Dawley rats were randomly divided into six groups (n = 6 per group) and fed with olive oil, soybean oil, and blended oil in diets containing normal or high levels of fat. After 15 weeks, rats were sacrificed to measure glucolipid metabolism, oxidative stress, and inflammation.

Results: Olive oil-fed rats had lower serum triglyceride, low-density lipoprotein cholesterol, malondialdehyde, oxidized LDL-C, and TC than soybean oil-fed and blended oil-fed rats in normal-fat diets. Olive oil increased femur weight in normal-fat and high-fat diets. Soybean oil-fed rats had lower serum ApoA1 and ApoB levels and higher serum HDL-C than blended oil-fed high-fat diet rats. Soybean oil increased serum high-sensitivity C-reactive protein and tumor necrosis factor, decreased serum glutathione peroxidase in normal-fat diets, and increased serum reactive oxygen species in high-fat diets. Blended oil-fed rats had lower serum interleukin-6, higher superoxide dismutase, and lower serum non-esterified fatty acids than olive and soybean oil-fed rats.

Conclusion: The healthy fatty acid profile is characterized by a high content of monounsaturated fatty acids, a low n-6: n-3 polyunsaturated fatty acid ratio and an appropriate unsaturated fatty acid: saturated fatty acid ratio. These effects are weakened in high-fat diets compared with normal-fat diets.

Key words fat intake levels; fatty acid profiles; edible oil; blended edible oil; health effect

Category: Food & Nutrition

桑葚花青素通过缓解小鼠肝脏脂肪变性和调节肠道微生物群以预防肥胖

Mulberry Anthocyanins prevent obesity by alleviating hepatic steatosis and modulating gut microbiota in mice

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As a worldwide epidemic, obesity is usually accompanied by metabolic disorders and chronic low-grade inflammation. Polyphenol-rich nutraceuticals have attracted increasing attention for their prebiotic activity. This research was to study the effects of anthocyanin extracts of mulberry on obesity and gut microbiota. Mice were fed high-fat diets with supplementation of 1% (a low dose) and 2% (a high dose) of anthocyanin-rich mulberry extracts. Results showed that feeding mulberry anthocyanin extracts at both low and high doses significantly decreased the body weight gain, the total adipose tissue weight, and the liver lipids in high-fat diet-induced obese mice, accompanied by a significant reduction in plasma total cholesterol (TC) and tumor necrosis factor α (TNF-α). And the mulberry extracts alleviated hepatic steatosis through decreasing the mRNA expressions of acetyl-CoA carboxylase (ACC), fatty acid synthase (FAS), sterol regulatory element-binding protein-1c gene (SREBP-1c), and increasing that of peroxisome proliferator-activated receptor α (PPARα) and PPARγ. The metagenomic analysis showed that the supplementation of anthocyanin-rich mulberry extracts reduced plasma LPS, mainly mediated by reducing the relative abundance of Rikenella and Rikenellaceae. Supplementation of anthocyanin-rich mulberry extracts into a high-fat diet promoted the growth of Lachnoclostridium, Roseburia, and [Clostridium]_innocuum_group in genus level, leading to a greater production of fecal SCFAs.

Key words Mulberry, Anthocyanin, obesity, microbiota

Category: Food & Nutrition

植物甾醇上调 ROS 介导的线粒体功能障碍及抑制 Akt/mTOR 信号通路发挥抑制肺癌作用

Phytosterol exhibits antitumor effects in lung cancer through up-regulation of ROS-mediated mitochondria dysfunction and Akt/mTOR signaling inhibition

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Objetcive: To determine the efficacy of phytosterol on the development of chemical-induced lung tumors and the underlying mechanism. **Method:** Six-week-old C57BL/6J mice were fed with either a 2% phytosterol diet or matching control diet, respectively. Following 3 weeks diet adapting, lung tumor was induced using a multi-dose intraperitoneal injections of ethyl carbamate (urethane, 1 g/kg body weight) while control mice received saline injection. Tumors (number, diameter) and lung tissue transcriptomic were examined after 15-week incubation period. In vitro, β-sitosterol was used to treat lung adenocarcinoma cells (A549, NCI-H1975) to explore the effect of β-sitosterol on the viability of lung adenocarcinoma cells. **Results:** 2% phytosterol diet inhibited the progression of lung tumor and increased malondialdehyde (MDA) level in lung tissue. Oxidative phosphorylation pathway at transcriptome level was down-regulated and the expression of autophagy related genes was raised in lung tissue. β-sitosterol inhibited cell proliferation of lung adenocarcinoma cells and significantly increased the levels of intracellular reactive oxygen species (ROS) and MDA. Furthermore, phytosterol induced phosphorylation inhibition of Akt/mTOR signaling pathway in vivo and in vitro. **Conclusion:** Phytosterols have potential antitumor effect on lung cancer, and the interactions between ROS excess, Akt/mTOR signaling inhibition and protective autophagy may be involved.

Key words Phytosterol, Lung cancer, Oxidative phosphorylation, ROS, Akt/mTOR signaling

Category: Food & Nutrition

膳食补充 α-亚麻酸对血脂异常患者炎症标志物的影响：一项随机对照试验的系统评价和荟萃分析

Effect of dietary alpha-linolenic acid supplementation on inflammatory biomarkers in individuals with dyslipidemias: A systematic review and meta-analysis of randomized controlled trials

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Background and aims: Dyslipidemias are highly prevalent worldwide. Inflammation is associated with dyslipidemia and risk factors for cardiovascular disease (CVD). Alpha-linolenic acid (ALA), a plant-based essential fatty acid, has been associated with reduced CVD risks. This systematic review and meta-analysis aims to investigate the effects of supplementation with ALA on inflammatory biomarker in individuals with dyslipidemias.

Methods: This review included studies with dyslipidemic adults, using oral supplementation or food or combined interventions containing vegetable sources of ALA. All studies were randomized trials with parallel or crossover design. The Cochrane Collaboration's tool was use for assessing risk of bias.

Results: Twelve eligible RCTs, including 540 participants were included in the meta-analysis. Dietary ALA supplementation significantly reduced CRP concentration (SMD = -0.62, 95% CI: -1.11, -0.13, p < 0.001), whereas had no significant effect on hs-CRP (SMD = -0.36, 95% CI: -1.26, 0.54, p = 0.483), IL-6 (SMD = -0.21, 95% CI: -0.43, 0.02, p = 0.08), and TNF-α concentration (SMD = -0.16, 95% CI: -0.48, 0.18, p = 0.33). No significant publication bias was observed for all inflammatory markers as suggested by funnel plot and Egger's regression test.

Conclusion: ALA supplementation showed beneficial effect on reducing inflammatory biomarker CRP in individuals with dyslipidemia, but had no effect on IL-6, and TNF-α. Further investigations are needed to determine the effectiveness of difference sources of ALA in dyslipidemias.

Key words alpha-linolenic acid, inflammatory biomarkers

Category: Food & Nutrition

大豆皂苷A1经调控TLR4/MyD88和AMPK信号通路抑制HepG2肝细胞中脂多糖引起的炎症和脂质沉积

Soyasaponin A1 ameliorates lipopolysaccharide-induced inflammation and lipid accumulation by regulating TLR4/MyD88 and AMPK signaling pathways in HepG2 cells

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Objective: Soyasaponin A1 (SS-A1), an oleanane triterpenoids phytochemical extracted from soy, has been found to exhibit anti-inflammatory and lipid-lowing properties, while the molecular mechanisms for these benefits remain incompletely unknown. This study aimed to investigate the effect of SS-A1 on inflammation and lipid accumulation and its underlying mechanisms in the lipopolysaccharide (LPS)-challenged HepG2 cells.

Methods: HepG2 cells were pre-treated with SS-A1 (10, 20, 40 μmol/L) for 2 h followed by 1 μg/mL LPS treatment for 12 h. The cell viability was detected by MTT assay. The concentration of total cholesterol (TC) and triglyceride (TG) were determined after SS-A1 treatment. Filipin staining was used to analyze the free cholesterol in HepG2 cells. Western blot was used to measure the expression of inflammatory cytokines and the molecules in TLR4/MyD88 and AMPK pathways.

Results: SS-A1 significantly decreased ($p<0.05$) the LPS-elevated protein levels of iNOS, IL-6 and TNF-α through suppressing the expression of TLR4, MD-2, MyD88, p-IRAK1 and TRAF6 and phosphorylation of NF-κB p65. SS-A1 also significantly inhibited ($p<0.05$) the recruitments of TLR4 and MyD88 into lipid rafts. SS-A1 reduced ($p<0.05$) the LPS-increased content of free cholesterol, TC and TG. Moreover, SS-A1 effectively reversed ($p<0.05$) the LPS-induced phosphorylation of AMPKα and protein expression of SREBP-1c, FAS, ACC, CPT1A, SREBP-2, HMGCR, ABCA1 and LDLR.

Conclusion: SS-A1 attenuates inflammation by suppressing the activation of TLR4 pathway and reduce the hepatocytic lipid accumulation by regulating the AMPK pathway in the LPS-challenged HepG2 cells. This study provides novel understanding about the anti-inflammatory and lipid-lowing mechanism of soyasaponin in hepatocytes.

Key words Soyasaponin, inflammation, lipid accumulation, TLR4/MyD88, AMPK

Category: Food & Nutrition

磷脂或三酰甘油形式的 n-3 多不饱和脂肪酸通过介导大麻素受体 1/脂联素/神经酰胺途径减轻非酒精性脂肪肝

n-3 polyunsaturated fatty acids in phospholipid or triacylglycerol form attenuate nonalcoholic fatty liver disease via mediating cannabinoid receptor 1/adiponectin/ceramide pathway

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Objective: Supplements of n-3 polyunsaturated fatty acids (PUFA) occur in either phospholipid or triacylglycerol form. The present study aimed to compare whether the different n-3 PUFA of marine-origin, namely krill oil, DHA/EPA-phospholipid (PL), and EPA/DHA-triacylglycerol (TAG) forms had differential health effects to ameliorate nonalcoholic fatty liver disease (NAFLD).

Design: The NAFLD model was established in mice fed a high-fat and high-cholesterol diet (HFD). The mice showed evidence of weight gain, dyslipidemia, insulin resistance and hepatic steatosis after 9 weeks of HFD, while the three forms of the n-3 PUFA reduced hepatic TAG accumulation, fatty liver and improved insulin instance, and hepatic biomarkers after 9 weeks of intervention.

Results: Of these, krill oil intervention conspicuously improved adipocyte hypertrophy and hepatic steatosis in comparison with DHA/EPA-PL and EPA/DHA-TAG groups. Importantly, only krill oil intervention significantly reduced serum low density lipoprotein-cholesterol, alanine transaminase and aspartate transaminase concentrations, compared with the HFD group. Supplemental n-3 PUFA decreased high levels of circulating anandamide (AEA) and 2-arachidonoylglycerol (2-AG), compared with NAFLD model group, thereby inhibiting CB1 activation and promoting adiponectin release in adipocyte. Besides, targeted lipidomic analyses indicated that the increased adiponectin levels were accompanied by reductions in hepatic ceramide levels. The reduced ceramide levels were associated with inhibiting lipid synthesis and increasing fatty acid β-oxidation, finally inhibiting TAG accumulation in the liver.

Conclusions: Through mediating CB1/adiponectin/ceramide pathway, the present study suggested that administration of krill oil had superior health effects in the treatment of NAFLD in comparison with DHA/EPA-PL and EPA/DHA-TAG.

Key words n-3 polyunsaturated fatty acids; Endocannabinoid system; Adiponectin; Ceramides; Non-alcoholic fatty liver

Category: Food & Nutrition

大豆蛋白较乳清蛋白改善了高脂饮食喂养小鼠胰岛素抵抗：通过调节脂质代谢、AMPK/mTOR 通路和肠道菌群

Soy protein compared with whey protein ameliorates insulin resistance by regulating lipid metabolism, AMPK/mTOR pathway and gut microbiota in high-fat diet-fed mice

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The findings of soy protein *versus* whey protein supplementation on glycemic regulation are inconsistent. The aim of the present study was to investigate the preventive effect of soy protein isolate (SPI) and whey protein isolate (WPI) on a high-fat diet (HFD) induced insulin resistance and its potential molecular mechanisms. Male C57BL/6J mice were randomly divided into seven groups (n = 12 per group): normal control, HFD plus 10% SPI, HFD plus 20% SPI, HFD plus 30% SPI, HFD plus 10% WPI, HFD plus 20% WPI, and HFD plus 30% WPI. After 12 weeks of feeding, compared with the WPI groups, serum concentration of insulin, homeostasis model assessment of insulin resistance (HOMA-IR) and liver weight were significantly lower in the SPI groups. Compared with the WPI groups, the mRNA levels of *CD36*, *SLC27A1*, *PPARγ* and *AMPKα* were significantly higher, and those of *LPL*, *SREBP1c*, *FASN* and *ACC1* were significantly lower in the liver in the SPI groups. In the liver or gastrocnemius muscle, compared with the WPI groups, the mRNA levels of *GLUT4*, *IRS-1*, *PI3K* and *AKT* were significantly higher, and those of *mTOR* and *S6K1* were significantly lower, and the protein levels of GLUT4, p-AMPKα/AMPKα, p-PI3K/PI3K and p-AKT/AKT were significantly higher, and those of p-IRS-1/IRS-1, p-mTOR/mTOR and p-S6K1/S6K1 were significantly lower in the SPI groups. The Chao1 and ACE indices were higher, and the relative abundance of *Staphylococcus* and *Weissella* was lower in the SPI groups than those in the WPI groups. In conclusion, soy protein was more effective than whey protein in preventing IR in HFD-fed mice by regulating lipid metabolism, the AMPK/mTOR pathway, and gut microbiota.

Key words whey protein, soy protein, insulin resistance, lipid metabolism, AMPK, mTOR, gut microbiota

Category: Food & Nutrition

川菜系中国心脏健康膳食对高血压成年人降压效果的随机对照研究

Effects of Chinese heart-healthy diet (Sichuan cuisine) on lowering blood pressure in adults with hypertension: a randomized controlled feeding trial

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Background and Objectives: Sichuan cuisine is one of four major Chinese Cuisines which is popular, but it is characterized by high salt and oil which may adverse to blood pressure. The effects of modified Sichuan Cuisine on blood pressure (BP) have not been reported. We aim to evaluate the effects Chinese heart-healthy diet of Sichuan cuisine version (CHH-SC) on BP among hypertension adults.

Methods and Study Design: The CHH trial was a multicenter randomized controlled feeding trial among Chinese people with high BP. We conducted a secondary analysis of the CHH trial using the data from Sichuan Chengdu center, the southwest of China. Totally 53 people aged 25 to 75 with systolic blood pressure (SBP) between 130 to 159 mm Hg was recruited. Eligible participants accepted a 1-week run-in period with local usual diet and randomized 1:1 to consume CHH-SC diet (n=27) or local usual diet (n=26) for next 4 weeks. BP was measured weekly throughout the study. The primary outcome is the net change of SBP between groups and secondary outcomes include diastolic blood pressure (DBP), mean arterial pressure (MAP). Generalized estimating equations were used to estimate the intervention effects.

Results: The mean SBP, DBP and MAP all significant reduced after the intervention in both groups. Compared with control group, the SBP significant reduced 7.87, 8.80, 9.10, 10.95 mm Hg at the end of week 1 to 4 respectively in CHH-SC group ($P<0.05$); the DBP significant reduced 4.00 mm Hg at week 2 ($P=0.003$) and 3.52 mm Hg at week 4 ($P=0.008$); the MAP were 3.77, 5.60, 4.24, 6.00 mm Hg lower at the end of week 1 to 4 ($P<0.05$).

Conclusions: Adopting Chinese heart-healthy diet of Sichuan cuisine version for 4 weeks can reduce blood pressure in adults with hypertension.

Key words Chinese heart-healthy diet, Sichuan cuisine, blood pressure, hypertension, adults.

Category: Food & Nutrition

川菜系中国心脏健康膳食对10年心血管疾病风险和血管年龄影响的随机对照研究

Effects of the Chinese heart-healthy diet (Sichuan cuisine) on the 10-year cardiovascular disease risk and vascular age: a randomized controlled feeding trial

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Background and Objectives: The Chinese heart-healthy diet (CHH diet) effectively reduced blood pressure but its effects on the estimated risk of cardiovascular disease (CVD) are not fully explored among the residents who are used to Sichuan cuisine. We aimed to estimate the effects of the CHH diet-Sichuan cuisine version (CHH diet-SC) on the 10-year risk of general CVD and vascular age among local patients with mild hypertension.

Methods and Study Design: A multicenter single-blinded randomized controlled feeding trial was conducted to assess the effect of the cuisine-based CHH diet on blood pressure and cardiovascular health among adults with mild hypertension. Data of 53 participants (27 in the CHH diet-SC and 26 in the control diet) from local communities in Chengdu, the southwestern region of China, were analyzed in the manners of per-protocol and full analysis set. The sex-specific General Cardiovascular Risk Profile (GCVD) model was applied to estimate the 10-year CVD risk and calculate the vascular age.

Results: The mean absolute and relative estimated CVD risks were reduced by 4.5% and 27.9% respectively in the CHH diet-SC group, and 1.6% and 8.4% in the control group, with the corresponding between-group relative risk reduction of 19.5% (P<0.001). The sensitivity analysis with the intention-to-treat principle did not alter the results. The intraclass correlation coefficient between GCVD and Globorisk models was estimated to be 0.860 (95% CI, 0.770 to 0.916) in men and 0.637 (95% CI, 0.428 to 0.782) in women confirming the robustness. In addition, the between-group difference in the changes of vascular age was -4.4 years (95% CI, -7.4 to -1.5; P=0.004) during the intervention.

Conclusions: Compared with a typical local diet, adopting the CHH diet-SC over one month significantly reduced the estimated 10-year CVD risk and the vascular age among Sichuan local Chinese adults with mild hypertension.

Key words cardiovascular disease; cuisine culture; CHH diet-Sichuan cuisine (CHH diet-SC); healthy diet; vascular age

Category: Food & Nutrition

岩藻多糖对洛哌丁胺所致功能性消化不良小鼠的胃肠调节作用
Regulatory Effects of Fucoidan on Functional Dyspepsia Mice Induced by Loperamide

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Background and Objectives: Gastrointestinal dysmotility is a common cause of functional dyspepsia. Fucoidan possesses many physiological properties, however, its relative abilities in regulating gastrointestinal motility have not been illustrated yet. In this study, we aimed to investigate the regulatory effects of fucoidan on functional dyspepsia mice induced by loperamide.

Methods and Study Design: 18-20g BALB/c mice were used to establish the model of gastric dysmotility. We chose loperamide subcutaneous injection for seven days to induce representative symptoms of gastrointestinal hypomotility. During this period, the treatment groups were intervened with oral administration of fucoidan. Meanwhile, we employed mosapride as a positive control in our study.

Results: As a result, fucoidan could reverse this dysfunction mainly through regulating gastrointestinal hormones (motilin and ghrelin), cholinergic pathway, total bile acids level, c-kit protein expression, and gastric contraction-related gene expression (ANO1 and RYR3). Besides, the administration of fucoidan partially recovered the gut microbial imbalance induced by loperamide, it not only increased the diversity of gut microbial profile, but also modulated the abundance of gut microorganisms including the raised richness ofLachnospiraceae, Odoribacter, Oscillibacter, etc and decreased proportion of Streptococcus, etc.

Conclusion: We provided evidence to support that fucoidan might have potential abilities to regulate gastrointestinal motility and maintain the stability of gastrointestinal microecology. It’s of great significance for further exploration and utilization of marine plant-derived bioactive substances.

Key words Functional dyspepsia; Fucoidan; Gastric motility; Gastric homeostasis; Gut microbiota.

Category: Food & Nutrition

基于传统中药的功能化抗菌纳米材料的制备、应用及抗菌机理研究

Preparation, application and antibacterial mechanism of functionalized antibacterial nanomaterials based on traditional Chinese medicine

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The microorganisms caused infectious diseases that account for nearly one third of annual global mortalities. Chemical drugs and antimicrobial agents are the primary clinical treatment methods for bacteria diseases. However, it's showed that many chemical drugs have specific biological toxicity and disrupt normal tissue cells, especially for children. In addition, many pathogens have evolved and resulted in the condition of Antimicrobial resistant (AMR). WHO has declared that AMR is one of the top 10 global public health threats facing humanity. Especially alarming is the rapid global spread of multi- and pan-resistant bacteria (also known as "superbugs") that cause infections that are not treatable with existing antimicrobial medicines. New antibacterials are urgently needed.

In this work, the traditional Chinese Medicine licorice and its boiled residue were used as the precursor to synthesize the extract hydrogel and the carbon dots (CDs) by "one-step method". After characterization, it's suggested that the licorice residue extract hydrogel had shown obvious antibacterial activity for both Grams positive and negative bacteria. Furthermore, the antibacterial activity of the N-doped and multifunctional quaternized CDs, which were produced from licorice, were investigated. The unmodified licorice and coffee residue CDs was prepared as the control group which was also from the natural sources. It's showed that the quaternized licorice CDs have stronger antibacterial activity for both Grams positive and negative bacteria when the coffee residue CDs can only resist to the Grams positive one. However, the N-doped and unmodified licorice CDs showed less antibacterial activity than the coffee residue CDs.

The further research is investigating their antibacterial activity in vitro and study its cytotoxicity and damage to organisms. It's hoping that these functional carbon dots can provide new ideas and strategies for solving antibacterial resistance and development of antibacterial drugs, so as to provide new options for strive against AMR.

Key words licorice, traditional Chinese medicine, nanomaterials, antimicrobial resistance, antibacterial mechanism

Category: Food & Nutrition

酪蛋白发酵水解产物经消化和吸收后的抗氧化性体外研究

The Antioxidant Potential of the Fermented Casein Hydrolysates after Digestion and Absorption in Vitro

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Background and Objectives: Fermentation can facilitate the release of antioxidant peptides, whereas, it is unclear whether peptides from fermented milk can actually arrive at target organs and be able to contribute to the antioxidant capacity of fermented milk. Thus, this study was to evaluate the antioxidant efficacy of casein hydrolysates fermented by typical zymophytes by simulating each process of food intake.

Methods: Standard strains of Streptococcus thermophilus, Lactobacillus delbrueckii subsp., Bifidobacterium longum (1×10^8 colony-forming units/ml) were suspended in sterile 2.5% casein solution and incubated at 37℃ for 24 h. Subsequently, supernatants of fermentation broth after centrifugation were digested in vitro according to the standardized protocol INFOGEST 2.0. Caco-2 cell monolayer model was used to mimic enzymolysis and absorption in the gastrointestinal tract. Peptide concentration and degree of hydrolysis were quantified by biuret method and phthalic aldehyde method; the fractions permeated Caco-2 barrier were characterized by Coomassie brilliant blue staining and reverse phase high performance liquid chromagraphy. The antioxidant activity was evaluated by 2,2-Diphenyl-1-picrylhydrazyl free radical scavenging assay and hydroxyl radical scavenging assay.

Results: Peptide concentrations and degrees of hydrolysis after fermentation were 0.59~2.48 mg/ml and 10.77~21.32%, respectively, the hydrolysis efficiency of Bifidobacterium longum was the highest. Casein was thoroughly hydrolyzed after simulating digestion with similar peptide concentrations (3.64~3.82 mg/ml). Peptides indeed were transported to the basolateral side of Caco-2 cell monolayer. Fermented casein hydrolysates and the fractions permeated Caco-2 barrier demonstrated the hydroxyl radical scavenging capacity. Hydroxyl radical scavenging rates of the fractions permeated Caco-2 barrier were different among groups ($P<0.05$) and higher in fermented groups (Streptococcus thermophilus: 3.96±1.68%; Lactobacillus delbrueckii subsp.: 5.17±1.76%, Bifidobacterium longum: 5.09±3.29%) than unfermented control (-1.17±5.94%).

Conclusions: Fermentation improved the release of bioactive peptides, and the fractions of fermented casein hydrolysates that entering the bloodstream exhibited antioxidant potential.

Key words casein, fermentation, INFOGEST 2.0, Caco-2, antioxidant

Category: Food & Nutrition

探索中国传统饮食及其与健康状况的关系—— 一项系统综述

Exploring the Traditional Chinese Diet and Its Association With Health Status - A Systematic Review

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Background & objectives: Traditional dietary patterns can potentially reduce the increasing prevalence of non-communicable diseases. To our knowledge, there is no consistent definition of the traditional Chinese diet. The aim of this systematic review was to systematically evaluate definitions in the literature, provide a concise definition of the traditional Chinese diet and assess the diet's association with health outcomes.

Methods and study design: This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Fourteen databases were searched up to April 25th, 2022; screening, data extraction and risk of bias assessment were conducted independently by three reviewers. The narrative synthesis was applied in reporting the results.

Results: Ninety-nine studies were included, 54 of which assessed associations with health outcomes. All studies reported the food groups, and 35 reported food items characterising the traditional diet. Food groups consistently reported in at least 75% of studies were rice and leafy vegetables; the most frequent food items were white rice, spinach, bokchoy, and cabbage. Studies referring exclusively to southern China (n=19) reported fish and seafood, while studies referring exclusively to northern China (n=12) consistently mentioned wheat and wheat products, as well as wheat with a filling as characteristic of these diets. The traditional Chinese diet was associated with a lower risk of obesity, was inversely associated with weight gain, and weakly associated with reduced risk of diabetes. The associations with other non-communicable diseases were not consistent. These inconsistent findings might be due to the different definitions of the traditional diet used in these studies.

Conclusions: This study was the first to systematically evaluate the definition of the traditional Chinese diet and its association with health outcomes. More studies are needed to establish the quantities of foods in the traditional diet and its potential role in preventing non-communicable diseases in China.

Key words Chinese diet, definition, non-communicable diseases, systematic review, traditional diets

Category: Food & Nutrition

铁皮石斛合剂可调节 HFHS/STZ 诱导的 2 型糖尿病小鼠糖脂代谢并恢复其肠道菌群

Dendrobium officinale mixture regulates glycolipid metabolism and restores gut microbiota in HFHS/STZ-induced mice with type 2 diabetes mellitus

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Objective: Dendrobium officinale mixture contains polysaccharides, saponins and other bioactive ingredients and consists of Dendrobium officinale, Astragalus membranaceus, Radix pseudostellariae and Lycium barbarum. In this study, the effect of Dendrobium officinale mixture on mice with type 2 diabetes mellitus (T2DM) induced by a high-fat, high-sugar diet (HFHS) in combination with streptozotocin (STZ) was investigated.

Methods: A high-fat, high-sugar diet combined with STZ was used to induce T2DM in mice. The Dendrobium officinale mixture was administered at doses of 3.4, 6.8, and 13.6 g/kg/d for 12 weeks, metformin (200 mg/kg) served as a positive control, and high-fat diet served as a negative control. Feed intake, body weight, serum and tissue indices were measured, and gut microbiota was assessed by 16S rRNA high-throughput sequencing both at baseline and at the end of dosing.

Results: The results showed that the oral mixture at medium and high doses decreased fasting blood glucose, blood lipids, and serum glycosylated protein levels while improving glucose tolerance, HOMA-IR, and the proportion of pancreatic β-cells in T2DM mice. Meanwhile, the state of oxidative stress in the liver was improved significantly, while liver glycogen levels increased. Moreover, the oral mixture alleviated dysbiosis of the gut microbiota in T2DM mice by increasing the species richness, community diversity, and abundance of probiotics, particularly Akkermansia.

Conclusion: The mixture of Dendrobium officinale at medium and high doses showed hypoglycemic effect by regulating disorders of glycolipid metabolism in mice with T2DM, ameliorating the imbalance of gut microbiota, and increasing the abundance of Akkermansia.

Key words Dendrobium officinale mixture; Type 2 diabetes mellitus; hypoglycemic effect; gut microbiota

Category: Food & Nutrition

中国四类含糖预包装食品糖含量分析

Analysis and evaluation of sugar content in four categories of pre-packaged foods in China

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Abstract: Objective To analyse the sugar content of four categories of pre-packaged foods, including dairy products, confectionary, bakery products and non-alcoholic beverages, so as to provide suggestions on healthy snack choice.

Methods: The dataset subtracted from FoodSwitch (2017 to 2020) was used to evaluate sugar content at low (green), medium (yellow), and high (red) levels according to the UK's traffic light standards. Sugar content of each food and the percentage of nutrition reference value per serving were also presented.

Results: There were 4872 pre-packaged foods analysed, with a median of 9.5 g/100g sugar in total. Confectionary contained sugar 43.0g/100g, while bakery products contained sugar 16.1g/100g in average. 68.2% of confectionary was evaluated at red light level, and 23.1% of non-alcohol beverage at same level. Bakery products had highest green level (30.3%). Among the subgroups of food, ice cream (82.7%) and candy (71.6%) were at the highest red level of traffic lights. One portion of non-alcoholic beverages contained the highest sugar (18.0 g), accounting for 36.0% of nutrition reference value.

Conclusions: There are significant differences in sugar content among the four categories of pre-packaged foods, and percentage of confectionary with red light is the highest, while non-alcoholic beverages contain the highest sugar per serving. Scientific guidance is needed for selecting pre-packaged foods wisely to control high sugar consumption and related health risks.

Key words Sugar; Pre-packaged food; Evaluation

Category: Food & Nutrition

石斛多糖可预防高脂饮食诱导的肥胖小鼠的骨量减少

Dendrobium officinale polysaccharide prevents bone loss in high-fat diet-induced obese mice

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Background and Objective:

Obesity triggers persistent inflammation throughout the body, which ultimately results in a reduction in bone mass. Phytochemicals are potential interventions to prevent the loss of bone mass caused by obesity. Our preliminary research indicates that dendrobium officinale polysaccharide (DOP), a phytochemical from *dendrobium officinale*, can reduce body weight in obese mice and ameliorate inflammation. However, it is still unclear whether DOP can mitigate bone loss in obese mice.

Methods and Study Design:

Forty male C57BL/6J mice were randomly divided into four groups (n=10 per group): Control group (CON), High-fat diet group (HFD), lovastatin group (LOV, 5 mg/kg/day), and DOP group (200 mg/kg/day). The experiment lasted for 8 weeks, during which micro-CT was used to assess the 3D structure of the femurs and calculate the microstructural parameters, and a three-point bending test was conducted to evaluate the femurs' biomechanical properties. The levels of biomarkers related to inflammation, bone resorption, bone formation, and bone mineralization in both serum and femurs were measured using Elisa and Western Blot analysis.

Results:

After establishing the obesity model, the levels of serum TNF-α and IL-6 in the HFD group were significantly higher than those in the CON group, and impaired trabecula bone microstructure was observed. Mice in the DOP group had reduced serum IL-6 and TNF-α levels and significantly higher femoral bone mineral density and trabecular bone volume fraction compared to the HFD group. The elasticity modulus in the DOP group was significantly higher than in the HFD group. Moreover, the serum level of TRACP and PTH and the protein level ratio of OPG/RANKL in the femurs of the DOP group were significantly higher than those in the HFD group.

Conclusion:

DOP ameliorated obesity-induced inflammation, reduced bone resorption in obese mice, significantly increased the OPG/RANKL ratio, promoted osteogenesis, and effectively prevented bone loss in high-fat diet-induced obese mice.

Key words Obesity, Inflammation, Bone mass, Dendrobium officinale polysaccharide

Category: Food & Nutrition

罗汉果的药理活性和营养成分：中国药食同源植物的代表

Nutritional ingredient and Pharmacological activity of Longan (Dimocarpus longan Lour.): a representative of "edible and medicinal plants" in China.

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Longan(Dimocarpus longan Lour.) is considered the fruit of a plant with medicinal health functions and edible functions as food in China. The kinds of ″edible and medicinal plants″ were announced by the former Ministry of Health in China in 2002. Longan(Dimocarpus longan Lour.) tastes sweet, and it is rich in nutrition, rich in vitamin C, vitamin B group, calcium, magnesium, iron vitamins, and minerals beneficial to the human body, has a clear pharmacological activity on the same time, it contains polysaccharides, lipids, polyphenols, flavonoids have chemical components such as anti-stress, anti-aging, anti-anxiety, immune regulation, etc. This paper summarizes the evidence of pharmacological activity and food nutrition evidence of longan as a home variety of medicine and food, presenting challenges and prospects, and providing a basis for future development of related products.

Key words Longan; edible and medicinal plants; nutrition; pharmacological

Category: Food & Nutrition

人类母乳来源的外囊泡通过调控 AMPK/Akt/mTOR/P70s6K 信号通路，增强幼年小鼠的肌肉生长和运动表现。

Human Breast Milk Extracellular Vesicles Enhance Muscle Growth and Physical Performance of Immature Mice Associating with AMPK/Akt/mTOR/P70s6K Signaling Pathway

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Aim: Extracellular vesicles (EVs) play an important role in the composition of both human and bovine milk. It also exerts various functions in different tissues according to excellent published studies. However, the regulatory mechanism of milk-derived EVs on skeletal muscle growth and\or performance have yet to be fully explored.

Methods: To address this issue, we used grip strength analysis, rotarod performance testing, Jenner-Giemsa and HE staining and Western blotting to investigate the effects of human milk extracellular vesicles (HME) and bovine milk extracellular vesicles (BME) on the related growth markers of 4-week mouse skeletal muscle and in C2C12 cells, as well as the effects on exercise performance.

Results: Our findings demonstrated that both HME and BME significantly increase the diameter of C2C12 myotubes. Additionally, HME demonstrates higher exercise performance and muscle fiber morphology than BME. Furthermore, we quantified and analyzed the amino acid spectra of HME and BME and the mouse quadriceps muscles after intervention by targeted metabolomics. After KEGG and correlation analyses for biological function of HME and BME, results showed L-ornithine to be a key molecular target for HME or BME to affect mouse skeletal muscle function, as it demonstrates a significant positive correlation with the activation of the AKT/mTOR pathway and myogenic regulatory factors (MRFs).

Conclusion: Overall, our results provide valuable insight into the amino acid composition of HME and BME and their effects on skeletal muscle growth and performance.

Key words HME; BME; amino acid; muscle protein synthesis

Category: Food & Nutrition

L-阿拉伯糖复配糖对小鼠血糖的影响

Study on the Effect of L-arabinose Compound Sugar on Blood Glucose in Mice

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Abstract: Objective: To provide a theoretical basis for L-arabinose-sugar mixtures as low glycemic index foods, the effects of the mixtures on the blood glucose levels in C57BL/6N mice were investigated in this article. Method: Using pure glucose as the reference and metformin as the positive control respectively, L-arabinose-sugar mixtures were given to the Mice by gavage. The blood glucose of mice was measured at 0 min, 15 min, 30 min, 60 min, and 120 min after dosage. The effects on the blood glucose level in mice for all the tested substances were evaluated with the increased area under the curve (IAUC), blood glucose peak, and glycemic index (GI). Result: Compared with glucose group, white sugar or brown sugar mixing with L-arabinose can both significantly reduce the IAUC($P<0.05$) and blood glucose peak （$P<0.05$）. With the same content of available carbohydrate in white sugar, brown sugar contains significantly higher amount ($P<0.05$) of fat, protein, water, ash, potassium, magnesium, zinc, chromium, phosphorus, iodine, total polyphenols and total flavonoids. By adding the same percent of L-arabinose, the GI of white sugar mixtures in C57BL/6N mice is 52, and the GI of brown sugar mixtures in C57BL/6N mice is 42. Conclusion: The results showed that white sugar or brown sugar mixing with L-arabinose could effectively reduce the fluctuations in blood glucose levels. Through the component analysis study, it revealed that chromium, zinc, magnesium, phosphorus, iodine, polyphenols and flavonoids in brown sugar might attenuate blood glucose levels.

Key words L-arabinose; sugar mixtures; blood glucose; glycemic index

Category: Food & Nutrition

高植物甾醇玉米油改善高脂血症金黄地鼠的胆固醇代谢

Corn oil containing high phytosterol improves cholesterol metabolism in golden hamsters with hyperlipidemia

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Abstract Previous evidence showed that phytosterol provided health benefits on improving cholesterol metabolism. Phytosterol extensively existed in vegetable oils, nuts, vegetables and fruits. This study aims to explore whether corn oil rich in phytosterol could regulate cholesterol metabolism. Mechanism of actions were further explored. Golden hamsters were fed with a high-fat and high-cholesterol diet to establish a hyperlipidemia model. Corn oil containing 17 000 mg/kg phytosterol was administrated, using olive oil as control. Weight gains, blood lipid levels, organ index and intestinal microbiota of gold hamsters were monitored. Results showed that after 10 weeks of corn oil intervention, the golden hamsters' weight gain was decreased by 40.9% and serum total cholesterol and low-density lipoprotein cholesterol were decreased by 19.1% and 45.5% respectively; liver total cholesterol and arteriosclerosis index were reduced by 8.5% and 29.4% respectively. However, serum total triglycerides were not changed after the intervention. Gut microbiota was regulated. The ratio of Firmicutes/Bacteroidetes was reduced, while the abundance of Desulfovibriowas decreased. Thus, high phytosterol corn oil could reduce weight gain, serum total cholesterol and the arteriosclerosis index by inhibiting the absorption of cholesterol and regulating gut microbiota. High phytosterol corn oil showed advantages than olive oil in reducing weight gain, blood total cholesterol, low-density lipoprotein cholesterol, arteriosclerosis index and improving intestinal microbiota.

Key words phytosterol; cholesterol; arteriosclerosis; cardiovascular and cerebrovascular diseases; gut microbiota

Category: Food & Nutrition

水果营养质量综合指数评价方法的建立与应用

Development and application of evaluation method with composite nutrient quality index for fruits

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To provide an applicable method for comprehensive evaluation of fruit nutrient quality, 14 key nutritional indicators were selected by comparing and analyzing Chinese intake of dietary nutrients and the satisfaction degree of their needs. Among which vitamin A, vitamin B_1, vitamin B_2, vitamin C, vitamin E, calcium and selenium were significantly inadequate nutrients, protein, niacin, potassium, magnesium and zinc were inadequate nutrients, and fat and sodium were excessive nutrients. Combined with the corresponding nutrient content levels of various fruits, the fiducial values of key nutrients content were calculated. The nutrient quality index of key nutrients for fruit products was obtained by comparing the contents of key nutrients with the corresponding fiducial values. According to the deficiency and excessiveness degree of Chinese dietary intake of various key nutrients, the weight of the nutrients was determined and composite nutrient quality index for fruit (CNQIF) model was established. According to the distribution of CNQIF for representative fruits, the grading standards were established. The comprehensive evaluation results of nutritional quality of 48 representative fruits by using CNQIF model showed that 1 fruit of 5A grade, 2 fruits of 4A grade, 1 fruit of 3A grade, 5 fruits of 2A grade, 9 fruits of A grade, 12 fruits of B grade and 18 fruits of C grade. CNQIF and grading standards can reflect the nutritional quality of fruits comprehensively, and can be used for nutritional quality comprehensive evaluation and comparison of fruits (such as different kinds, varieties, strains and sources), setting nutrient quality standards of fruit products and guiding consumption (especially suitable for Chinese consumers), etc.

Key words fruit; nutrient quality; composite index; evaluation method; grading

Category: Food & Nutrition

视觉模拟量表在食物饱腹感评估中的可重复性，有效性和可靠性研究

Reproducibility, validity, and reliability of visual analogue scales in assessment of satiety

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Objectives: To examine the reproducibility, validity, and reliability of visual analogue scales (VAS) for the measurement of food satiety.

Methods: VAS were used to record the feelings of fullness, hunger, desire to eat, and prospective food consumption of the meals by subjects. Subsequently, an ad libitum lunch was served and the energy intake of each subject was recorded. One of the test foods was provided twice and reproducibility was assessed by the coefficient of repeatability. The validity was judged by comparing the energy intake at the next meal for two test foods with distinct satiety. The reliability was determined by repeating the tests in three independent laboratories.

Results: The intraclass CR of the four indicators of satiety were all greater than 0.5, indicating moderate reproducibility. The VAS scores at 240 min showed a positive correlation with the subsequent energy intake. Moreover, taking two test foods with different VAS scores significantly influenced the energy intake at the next meal. The VAS scores of satiety were significantly correlated with food intake at the next meal. One test food was higher in satiety in all three laboratories.

Conclusions: VAS showed moderate reproducibility, high validity, and reliability in assessing food satiety.

Key words Visual analog scales (VAS); Satiety

Category: Food & Nutrition

磷脂型 EPA 通过激活 SIRT1 缓解癌症恶病质骨骼肌萎缩作用研究

Eicosapentaenoic acid-enriched phospholipids alleviate skeletal muscle atrophy in cancer-associated cachexia via a sirtuin 1-dependent mechanism

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Scope: Skeletal muscle atrophy is a critical feature of cancer-associated cachexia (CAC) and it is responsible for poor quality of life and high mortality in cancer patients. Our previous study demonstrated that eicosapentaenoic acid-enriched phospholipids (EPA-PL) prevented body weight loss in a mouse model of CAC. However, the role of EPA-PL on cancer-induced skeletal muscle atrophy remains unclear.

Methods and results: In the present study, a Lewis lung carcinoma (LLC) mouse model was established, then the effect and underlying mechanism of EPA-PL on skeletal muscle atrophy in LLC-bearing mice were investigated. The results revealed that EPA-PL treatment significantly attenuated skeletal muscle atrophy in LLC-bearing mice, as evidenced by suppressing the reductions of skeletal muscle mass, myofiber cross-sectional area and grip strength. Besides, we found that EPA-PL alleviated cancer-induced skeletal muscle atrophy via balancing muscle protein degradation and synthesis, inhibiting type I oxidative muscle fibers atrophy and promoting mitochondrial function. Furthermore, our results also indicated that EPA-PL might counteract skeletal muscle atrophy in LLC mouse model via a sirtuin 1-dependent mechanism.

Conclusion: These findings provide evidence that EPA-PL might be beneficial as a nutritional supplement for prevention and treatment of cancer-induced skeletal muscle atrophy.

Key words cancer-associated cachexia; mitochondrial biogenesis; protein turnover; skeletal muscle atrophy; sirtuin 1.

Category: Food & Nutrition

黑米饮食通过调节肠道微生物和代谢物延缓结肠癌症的发生

Black rice diet alleviates colorectal cancer tumorigenesis through modulating gut microbiome and metabolites

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Background and Objectives: Colorectal cancer (CRC) is the third most common cancer in the world. Whole grains and dietary fiber reduce the risk of colorectal cancer. We examined the role of Black rice diet in antagonizing CRC through modulating gut microbiota and metabolites.

Methods and Study Design: Black rice diet or control diet was fed to mice littermates in CRC mouse models of ApcMin/+ mice and AOM/DSS mice. Germ-free mice for fecal microbiota transplantation were used for validation. Gut microbiota and metabolites were detected using metagenomic sequencing and high-performance liquid chromatography–mass spectrometry, respectively. Gut barrier function was determined using lipopolysaccharides level and transmission electron microscopy.

Results: Black rice diet inhibited colorectal tumorigenesis in both ApcMin/+ mice and AOM/DSS mice compared with control diet–fed mice. Black rice diet prolongs life span of colorectal cancer model mice. A significant shift of gut microbiota composition with increased probiotic Bacteroides uniformis and Lactobacillus, along with the relatively intact gut barrier function was exhibited in Black rice-fed mice. Moreover, transfer of stools from Black rice-fed mice to germ-free mice without interference decreased colonic cell proliferation and protected gut barrier function. Gut metabolites alteration, including elevated indole-3-lactic acid and folic acid, which were confirmed to activated gut AhR pathway and inhibited CRC cell proliferation and colorectal cancer tumorigenesis.

Conclusions: Black rice diet alleviates colorectal cancer tumorigenesis through antagonizing gut microbial dysbiosis and protecting gut barrier function in colorectal cancer model mice.

Key words Black rice; colorectal cancer; gut; microbiome; metabolites

Category: Food & Nutrition

健康教育联合紫苜蓿粉对血脂异常的改善效果研究

Study on the improvement of dyslipidemia by combining health education with alfalfa powder

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[Background] Dyslipidemia is a risk factor for cardiovascular diseases such as coronary heart disease and stroke. Health education is believed to improve people's health awareness, improve lifestyle, and consequently affect blood lipid levels. Alfalfa powder is health food containing natural plant components such as alfalfa saponins and flavonoids, which may have some improvement effects on dyslipidemia.

[Objective]To investigate the improvement effect of health education combined with alfalfa powder on human blood lipid disorders, and to provide a convenient, safe, and effective comprehensive intervention program for regulating blood lipid levels.

[Methods] This study adopted a randomized controlled trial design and randomly assigned 140 dyslipidemia patients into two groups, with 70 patients in each. The control group received routine health education, including guidance on diet, exercise, while the experimental group took 15g of alfalfa powder per day on the basis of the health education, continuously for 24 weeks. Before and after the experiment, the dietary conditions of the two groups were collected through questionnaires, and indicators such as total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C) were measured for each group. Data analysis was performed using R, with a significance level of $P<0.05$. [Results] Compared with before, there were changes in blood lipid indicators in both groups. TC and LDL-C of the experimental group were significantly reduced ($p<0.05$), while the TC of the control group showed a decreasing trend; compared with the control group, the experimental group showed a more significant decrease in TC, TG, and LDL-C, with statistically significant differences ($P<0.05$). [Conclusions] Health education is an effective intervention method that can help patients regulate their blood lipid levels. The combined intervention of health education and alfalfa powder has a better effect on subjects, significantly improving the levels of total cholesterol, total triglycerides, and LDL-C.

Key words Dyslipidemia, Health education, Alfalfa powder

Category: Food & Nutrition

脂肪质量指数和去脂肪质量指数：中国大学生的膳食模式和质量
Fat or fat free mass index: dietary patterns and quality of Chinese college students

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Objective: Little is known about the effects of dietary pattern and dietary quality on the risk of high body mass index (BMI) among medical university students in China. This study aimed to evaluate these associations.

Methods: A total of 498 participants from Capital Medical University were included. Dietary patterns were identified by principal components analysis. Dietary inflammatory indexes (DII) were calculated based on semi-quantitative food frequency questionnaire. Dietary quality was assessed by using diet balance index (DBI). Multivariate linear regression models and multiple logistic regression analyses were used to examine the relationship between dietary patterns, dietary quality and BMI.

Results: The majority of participants with overweight and obesity had abdominal obesity and some students who with normal BMI also had abdominal obesity. Four dietary patterns were detected in the subjects. The pattern with the higher energy intake was positively correlated with BMI and fat mass index (FMI), while being negatively correlated with fat free mass index (FFMI) ($p<0.05$). Individuals who followed the pattern similar to the Mediterranean diet had the highest fat free mass and skeletal muscle mass but the lowest FMI, visceral fat area (VFA), waist-hip ratio, and FMI/FFMI ratio ($p<0.05$). Higher energy-adjusted DII was associated with high BMI. Higher bound score (HBS) and diet quality distance (DQD) were both negatively correlated with FFMI ($p<0.05$).

Conclusion: FMI and FFMI had an important role in predicting overweight and obesity. Students who followed healthful dietary patterns or the high-quality diet that is similar to the Mediterranean diet were more likely to have a healthy BMI and normal body composition.

Key words dietary pattern; diet balance index; dietary inflammatory index; body mass index; fat mass index; fat-free mass index

Category: Food & Nutrition

海洋食品甘油磷脂在营养健康方面的构效关系及与陆生食品功效成分协同增效研究

The structure-activity relationship of glycerophospholipids from seafood in nutritional and health benefits and their synergistic effects with terrestrial functional components based on the sea-land combination perspective

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In traditional fish oil, EPA is mainly in the form of triglyceride or ethyl ester, which has important physiological functions such as prevention of cardiovascular diseases. Notably, seafood is rich in EPA, and the EPA is mainly in the form of phospholipids (PL). The common molecular species are phosphatidylcholine (PC), phosphatidylserine (PS), phosphatidylethanolamine (PE) and phosphatidylethanolamine plasmalogen (pPE). These marine novel lipids exhibit special physiological effects due to their unique molecular structure. In this study, EPA-PL was isolated from marine products, and a series of EPA-PL with regular structural features were prepared by phospholipase D biosynthesis technology. The effects of different molecular forms of EPA on lipid metabolism and brain function were compared, and the possible underlying mechanisms were also illustrated. Results showed that EPA-PL possessed better bioavailability than the EPA in the traditional ethyl ester form, and EPA-PL could not only relieve atherosclerotic lesions but also significantly improve cognitive function in mice. Interestingly, EPA-pPE exhibited unique physiological effects in regulating lipid metabolism and improving brain function, which was closely related to the vinyl ether linkage at the sn-1 position. Additionally, we have found that the digestion and absorption process of EPA-pPE was significantly different from other lipids, EPA-pPE might alter the intestinal micro-ecology due to its retention in the second half of the digestive tract rich in intestinal flora. Moreover, theanine and krill oil had a synergistic effect on improving the spatial location learning and memory ability, while nobiletin and krill oil had a synergistic effect on improving the object recognition and memory ability. These results may provide a theoretical basis for the study about the nutritional efficacy of EPA, and also provide the value guidance for the sea-land combination and the comprehensive development and utilization of resources, the development of dietary supplements or functional foods with multi-target effects.

Key words DHA/EPA; Structure-Activity Relationship; Lipid Metabolism; Brain Function; sea-land combination

Category: Food & Nutrition

花青素通过阿尔茨海默病体内外模型的自噬抑制淀粉样蛋白 β 的毒性

Anthocyanin suppresses the amyloid beta toxicity through autophagy in vivo and in vitro models of Alzheimer’s disease

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Background: The mechanism of autophagy regulated by anthocyanin in Alzheimer’s disease (AD) progression are obscure. We observed the effects of anthocyanin on the toxicity of Aβ deposits in vitro and in vivo models of AD. Methods: During the in vivo experiment, control and AD mice were fed a normalAIN-93 dietfrom the first day or pregnancy till the offspring weaning (21 d). Another group of mice weregiven an AIN-93 diet containing 2% blueberry extracts (BB). Offsprings were examined until 9 months old. The capacity of learning and memory was assessed by Morris Water Maze (MWM) test, the levels of Aβ1-42 in the brain were determined by sandwich ELISA, Aβ deposition was assessed by immunohistochemistry. During the in vitro experiment, cultured SH-SY5Y cells were treated with Aβ25-35 (10μM) for 24h, pretreated with Cy-3G (100μM) for 12h prior to Aβ25-35, and pretreated with Cy-3G. Cells apoptosis rate were detected by Hoechst 33342. The expressions of LC3B, and Beclin-1 were assessed by Western Blot in vivo and in vitro. Results：(ⅰ) Comparing to control mice, AD animals performed more poorly in the MWM test.However, the BB treatment improved AD mice’ performance. Moreover, the BB treatment suppressed the Aβ deposition. The AD mice expressed higher levelsof LC3B and Beclin-1, while the BB treatment reversed these changes. (ⅱ) Exposure of SH-SY5Y cells to Aβ25-35 (10μM) for 24h induced notably injury, significantly increased the number of apoptotic nuclei, upregulated the expression of LC3B-Ⅱ/ LC3B-Ⅰ and Beclin-1 protein level. Cy-3G plus Aβ25-35 almost completely reversed Aβ25-35-induced injury and above alterations. Conclusions: Alterations of autophagy-related proteins by anthocyanin suppresses the toxicity of Aβ deposits in in vivo and in vitro models of Alzheimer’s disease.

Key words Alzheimer’s disease, anthocyanins, perinatal period, autophagy

Category: Food & Nutrition

基于 PI3K/AKT 信号通路探讨岩藻多糖对 T2DM 大鼠骨骼肌萎缩的改善作用

The improvement of fucoidan on skeletal muscle atrophy in type 2 diabetes rats based on PI3K/AKT

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Type 2 diabetes mellitus (T2DM), a multifactorial chronic metabolic disease that is characterized by hyperglycemia. As known to all, abnormal glucose metabolism can easily induce protein metabolism disorder and eventually result in skeletal muscle atrophy. The current study aimed to explore the ameliorative effects of fucoidan on high fat diets (HFD) and low-dose streptozotocin (STZ) induced atrophy of the skeletal muscle in rats. Our results showed that treatment with fucoidan significantly decreased the levels of fasting blood glucose, while up-regulating the Insulin-like Growth Factor 1 in T2DM rats. Also, fucoidan intervention significantly up-regulated the level of total protein and down-regulated blood urea nitrogen and serum creatinine in T2DM rats, while rectifying protein metabolism disorder and ameliorating skeletal muscle atrophy. Furthermore, our results indicated that fucoidan improved glucose metabolism via activating phosphoinositide 3-kinase (PI3K)/protein kinase B (Akt) pathway in T2DM rats. Additionally, fucoidan also improved protein anabolism by up-regulating the PI3K/Akt/mammalian target of rapamycin(mTOR) pathway, and rectified protein catabolism disorder by down-regulating the PI3K/Akt/forkhead boxO (FoxO) transduction in T2DM rats. Collectively, fucoidan ameliorated skeletal muscle glucose metabolism disorder, improved protein anabolism and inhibited protein catabolism, thus ultimately ameliorating diabetes skeletal muscle atrophy, providing a new idea and treatment target for T2DM.

Key words T2DM; fucoidan; skeletal muscle; glucose metabolism; protein metabolism

Category: Food & Nutrition

碱提取法对可可荚壳进行纤维分馏
Fibrous Fractionation of Cocoa Pod Husks by Alkali Extraction Method

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This project is to fractionate cellulose, hemicellulose and lignin from CPH by using different concentration of alkali solution and characterize mainly hemicellulose fraction. Two extraction methods were used (1-Cycle extraction, 2-Cycles extraction) The composition of hemicellulose was analyzed (carbohydrates, proteins) and also the main Physical and chemical properties (water retention capacity, oil retention capacity, rheology) of hemicelluloses.

Key words cocoa pod husks, dietary fiber, hemicellulose, chemical composition, alkali extraction

Category: Food & Nutrition

海藻玉壶汤基于减少炎症因子和干扰 TGF-β/Smad 通路抑制矽肺进程的机制研究

HaizaoYuhu Decoction alleviates silicosis by reducing inflammatory factors and inhibiting the TGF-β/Smad pathway

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Abstract:

Background and Objectives: Silicosis is a progressive pulmonary disease caused by the deposition of exogenous silica, which induces inflammation and fibrosis. The development of modern Chinese medicine technique has opened up the possibility of improving silicosis with traditional Chinese medicine. Haizao Yuhu Decoction (HYD), as an ancient formula with a 400-year history, can eliminate inflammation and alleviate nodule. Our study aims to investigate the therapeutic effect and mechanism of HYD on silicosis.

Methods and Study Design: In this study, we analyzed the potential therapeutic targets and involved pathways of HYD in silicosis utilizing network pharmacology. Meanwhile, these crucial molecular targets mentioned above were identified by *in vivo* and *in vitro* experiments, and our study completed molecular biology validation, including Western Blot, enzyme linked immunosorbent assay, immunocytochemistry, and so on.

Results: The network pharmacology analysis concluded that the silicosis-related target genes of HYD were enriched on inflammatory factors and fibrosis pathways. Combined with Protein-Protein Interaction (PPI) network analysis, Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway, related inflammatory factors interleukin-1β (IL-1β), interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α) and transforming growth factor β (TGF-β) were detected. In the silicosis mouse models, HYD obviously improved inflammation and fibrosis in pathologically stained sections, and the concentration of IL-1β, IL-6 and TGF-β1 were reduced by HYD in the silicosis lung tissue. Meanwhile, HYD showed inhibitory effect on silicosis via the TGF-β/Smad pathway, manifesting that reducing proteins expression of phosphorylated Smad both *in vivo* and *in vitro* experiments.

Conclusions: These results suggested that HYD has therapeutic potential for silicosis and the mechanism is to reduce inflammatory factor secretion and inhibit the TGF-β/Smad pathway. Our study was expected to provide new insights into the application of clinical application of HYD.

Key words Silicosis; HaizaoYuhu Decoction; Inflammatory factors; Fibrosis; TGF-β/Smad pathway

Category: Food & Nutrition

补充维生素K对中老年人群不同部位骨密度和骨代谢的影响:随机对照试验和系统综述的荟萃分析

Effects of vitamin K supplementation on bone mineral density at different sites and bone metabolism in the middle-aged and elderly population: a meta-analysis of randomized controlled trials and systematic review.

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Abstract

Background and aims

Vitamin K has received attention as an important nutrient with links to bone mineral density (BMD) and bone metabolism. Previous studies remained conflicting and incomplete on this link. This meta-analysis and systematic review aimed to investigate the effects of vitamin K supplementation on BMD at different sites and bone metabolism in middle-aged and older adults comprehensively.

Method

The databases of PubMed, Web of Science and Cochrane Library were searched thoroughly for literatures from the time of construction to October 2022, and RCTs that met the inclusion criteria in this meta-analysis and systematic review were extracted.

Results

This meta-analysis included 17 studies with a total of 4800 participants. The results have shown that vitamin K supplementation increased the BMD of the lumbar spine. The overall effect of vitamin K supplementation showed a significant increase in carboxylated osteocalcin (cOC) and the ratio of cOC to ucOC. Accordingly, significant reductions of uncarboxylated osteocalcin (ucOC) and the ratio of ucOC to tOC were found with vitamin K supplementation. However, a pooled effect of vitamin K supplementation revealed no effect on total osteocalcin (tOC). In the subgroup analysis, vitamin K2 significantly increased lumbar spine BMD, cOC, and decreased ucOC, particularly in the subgroup of Asian and female. Additionally, vitamin K supplementation significantly increased lumbar spine BMD and decreased ucOC in osteoporotic patients compared to healthy participants.

Conclusion

Vitamin K, especially vitamin K2, had effects on maintaining or increasing lumbar spine BMD and reducing uncarboxylated osteocalcin (ucOC) in Asian women with osteoporosis, while vitamin K reduced the ratio of ucOC to tOC; increased the ratio of carboxylated osteocalcin (cOC) and cOC to ucOC, but had no significant effect on total osteocalcin (tOC). In conclusion, vitamin K has modulating effects on bone density and bone metabolism in middle-aged and elderly population.

Key words vitamin K; Bone mineral density; uncarboxylated osteocalcin; carboxylated osteocalcin; middle-aged and elderly

Category: Food & Nutrition

蓝莓提取物抗小鼠疲劳机制的转录组学分析

Transcriptomic Analysis of the Anti-fatigue Mechanism of Blueberry Extract in Mice

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Objective Fatigue affects the quality of life, physical health and mental state of modern people. Previous research suggested that blueberry extract (BBE) has anti-fatigue effect, but the mechanism is not clear. In this study, transcriptome technology and bioinformatics analysis were used to explore the key nodes and core target genes of the biological process of BBE's anti-fatigue effect.

Methods BALB/c mice were gavaged with 100 mg/kg • BW • d BBE for 30 days. The swimming time and anti-fatigue biochemical effect indicators were measured, and the expression of anti-fatigue related genes and proteins were detected.

Results The time of weight-loaded exhaustion swimming in mice was significantly prolonged and the related indicators of fatigue effect were reversed after treated with BBE. By sequencing and analyzing the transcriptome of mice muscle tissue, it was found that there were 36 common differential genes and 7 genes related to exercise or energy metabolism, which were Gpam, Slc8a1, Cdh10, Zfp92, Mt2, Mt1 and Kif2 respectively. The results of RT-PCR and Western blot showed that the expression levels of Gpam, Slc8a1, Mt2 mRNA and protein increased significantly.

Conclusion This study verified that BBE has a significant anti-fatigue effect, and clarified the mechanism of BBE's anti-fatigue effect by regulating the expression of Gpam, Slc8a1, Mt2 and other genes and the activation of metabolic pathways and cGMP-PKG signaling pathway. This study may serve as a basis to develop BBE into anti-fatigue nutrition preparations.

Key words blueberry extract, fatigue resistance, oxidation resistance, exhaustive swimming, transcriptomics, metabolic pathway

Category: Food & Nutrition

菜肴营养素指数对青年消费者食物选择行为的影响

The Influence of Dishes Nutrient Index on Food Choice Behavior of Young Consumers

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ABSTRACT

Backgrounds & Objective: The objective of this study was to assess the effectiveness of the Dishes Nutrition Index (DNI) as a nutrition label for catering foods in promoting healthier food choice behaviors among young consumers.

Methods: In this randomized controlled experiment, an online questionnaire with a virtual menu was used. Young consumers aged 18-44 (N=441) were randomly assigned to either a control group (N=223) or an experimental group (N=218), based on the presence or absence of DNI labels. Participants were tasked with identifying the healthiest dishes and rating their willingness to choose each dish using the Likert 11-point subscale. The dishes included three categories: vegetarian, meat and both. Additionally, subjective influencing factors (emphasis level on nutrition, taste, name and appearance) and demographic information (gender, age, education level and BMI) were collected as covariates. The outcome variables encompassed participants' ability to recognized the healthiest dishes and their willingness to choose the healthy dishes, which reflected participants' choice behavior toward healthy food.

Results: The study revealed that the DNI label effectively facilitated correct identification of the healthiest dishes among young consumers, in both dishes (OR=2.55, 95% CI=1.69-3.89, P<0.001) and vegetarian dishes (OR=5.26, 95% CI=2.89-10.12, P<0.001). Additionally, the inclination to select healthier dishes (OR=1.71, 95% CI=1.16-2.54, P=0.007) and meat dishes (OR=1.59, 95% CI=1.07-2.36, P=0.022) was augmented. Notably, consumers' priority placed on nutritional value independently influenced their intention to choose healthier dishes (OR=1.12, 95% CI=1.02-1.24, P=0.019). Furthermore, variations in the impact of healthy dish choice behavior were discerned across gender and education levels among young consumers.

Conclusion: Serving as an innovative nutrition label for catering food, the DNI label can promote healthier food choice behavior among young consumers.

Keywords: Dishes Nutrient Index; Food Choice Behavior; Young Consumers; Catering Food

Key words Nutrition Label; Dishes Nutrient Index; Food Choice Behavior; Catering Food; Effectiveness

Category: Food & Nutrition

成人补充 n-3 多不饱和脂肪酸对骨代谢标志物及骨密度的作用：随机对照试验的系统综述和荟萃分析

The effects of n-3 PUFA supplementation on bone metabolism markers, body bone mineral density in adults: A systematic review and meta-analysis of RCTs

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Background

The results of supplemental n-3 polyunsaturated fatty acids on bone metabolism remained inconsistent. The present study aimed to investigate the effects of n-3 PUFA supplementation on bone metabolism markers and bone mineral density with a meta-analysis of randomized controlled trials.

Methods

A systematic literature search was implemented with PubMed, Web of Science and EBSCO databases updated to Oct 16, 2022. The intervention effects were calculated as standard mean differences for changes in BAP, OC, serum calcium, 25(OH)D, PTH, CPR and blood n-3 PUFA. Others were calculated as mean differences. The present study also compared n-3 PUFA with untreated control, placebo control, or lower-dose n-3 PUFA supplements.

Findings

Nineteen RCTs were included. No significant effects were founded. Subgroup analyses were also calculated. For lumbar spine BMD, there was a significant increase in eastern country. For femoral neck BMD, there were significant increases in females, people aged less than 60 years, eastern country, placebo control and studies lasted no more than 6 months. For 25(OH)D, there were increases in people aged no less than 60 years, treated with n-3 PUFA only and in studies lasted no more than 6 months. For NTx-1, there was a decrease in both genders. For serum calcium, reduction was founded in studies lasted more than 6 months.

Interpretation

In this study, we did not find significant effects of n-3 PUFA on bone mineral density or metabolism markers. Although some beneficial effects of n-3 PUFA supplementation on bone health were found on younger postmenopausal women (<60 years old) in a short time (≤6 months), it also needs high quality and long-term RCT and is suggested to be supplemented as an auxiliary nutrient combined with bone health nutrient supplement, which might strengthen the effect of bone nutrient supplement in specific population.

Key words n-3 PUFA, BMD, bone marker

Category: Food & Nutrition

在从不吸烟的二型糖尿病患者中咖啡消费量和咖啡类型偏好与新发微血管疾病的关联性研究

Coffee consumption, coffee type preference, and incidence of microvascular disease in never-smoking adults with type 2 diabetes

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Abstract

Background and objective: To evaluate the associations between consumption and preference of coffee types and risk of microvascular disease among never-smokers with type 2 diabetes mellitus.

Methods and Study Design: We included 7771 never-smoking participants with type 2 diabetes mellitus from the UK Biobank without known microvascular disease or cardiovascular disease at baseline. Total coffee consumption was divided into 0, 0.5-1, 2-4, and ≥5 cups/day. Participants also reported which type of coffee they mainly consumed, including decaffeinated, ground, and instant coffee. Microvascular disease included retinopathy, peripheral neuropathy, and chronic kidney disease. Cox regression models were used to estimate hazard ratios and 95% confidential intervals of total microvascular disease and individual microvascular disease associated with coffee consumption.

Results: During a median follow-up of 12.7 years, 803 incident retinopathy, 190 incident peripheral neuropathy, and 628 incident chronic kidney disease cases were identified. There was an inverse association between coffee consumption and risk of total microvascular disease, with hazard ratios (95% confidential intervals) of 0.90 (0.77, 1.04) for 0.5-1 cup/day, 0.80 (0.69, 0.93) for 2-4 cups/day, and 0.80 (0.64, 1.00) for ≥5 cups/day when compared with no coffee consumption, and 0.94 (0.88,0.99) for each additional increment of 2 cups/day. Such an inverse association was mainly driven by the association of coffee consumption with chronic kidney disease (hazard ratio per 2 cups/day =0.85), while no associations were found for retinopathy (hazard ratio per 2 cups/day =1.00) and peripheral neuropathy (hazard ratio per 2 cups/day =0.93). Participants with different preferences of coffee had similarly lower risk of microvascular disease as compared with non-consumers.

Conclusions: Among never-smoking adults with type 2 diabetes mellitus, coffee consumption was associated with a lower risk of chronic kidney disease, but not retinopathy or peripheral neuropathy, and the associations appeared not to be varied by coffee type preferences.

Key words Coffee consumption; Chronic kidney disease; Retinopathy; Peripheral neuropathy; Type 2 diabetes mellitus.

Category: Food & Nutrition

灵芝的抗氧化特性

Antioxidant Properties of Ganoderma spp.

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Ganoderma is a kind of basidiomycetes that can be used as medicine and food. It is necessary to determine the antioxidant properties of different types of Ganoderma. The fruiting bodies of wild and cultivated red Ganoderma lucidum and black G. atrum were separated into canopy and stalk. The bioactive antioxidants of the defatted samples were extracted using absolute methanol for 60 min in a 60° C-water bath twice. Total flavonoid content and antioxidant activities were determined using spectrophotometric methods. Ash content determination was also done. The total flavonoid content of all stalk samples was significantly higher than that of the canopy samples, whereas the flavonoid content of the stalk sample of wild red Ganoderma was remarkably lower than the other stalk samples. All canopy samples of the Ganoderma had EC50 values of DPPH radical scavenging higher than the stalk samples, except for the cultivated canopy of black Ganoderma. The lower EC50 values of these Ganoderma samples reflected that they possessed a higher total flavonoid content. The high reducing power was attributed to the high flavonoid content. The reducing power of the cultivated stalk of black Ganoderma was the highest. The ash content was remarkably highest in the wild-type stalk of red Ganoderma because the polyphenolic structures had the highest carbon percentage. The lower flavonoid content of wild-type stalk of red Ganoderma among the stalk samples also showed that it contained other hydrocarbon structures, such as terpenoids, besides fatty acids and flavonoids. Wild and cultivated types of Ganoderma have their uniqueness in terms of antioxidant properties. Flavonoids are concentrated in the stalks of these Ganoderma samples, whereas their canopy could have a higher polysaccharide and saponin content. The ash content analysis revealed that the wild type of Ganoderma had higher carbon content than cultivated samples.

Key words Antioxidant Capacity, Ferric reducing antioxidant power; Lingzhi; Mycelium; Quercetin

Category: Food & Nutrition

PB-LSTM：基于高效特征表示的深度学习模型用于快速筛选二肽基肽酶 IV 的抑制肽

PB-LSTM: A Deep Learning Model Based on Efficient Features Representation for Rapid Screening of Dipeptidyl Peptidase IV Inhibitory Peptides

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Diabetes is a prevalent chronic disease that disproportionately affects the middle-aged and elderly population, often resulting in complications and significant discomfort. Dipeptidyl peptidase IV inhibitory peptides present a promising approach for treating type Ⅱ diabetes due to their many attractive benefits. However, the current experimental method for discovering new inhibitory peptides is both inefficient and costly, necessitating the development of new screening methods for relevant research. In this study, we proposed a novel deep learning model named PB-LSTM based on high-efficiency feature representation to screen for dipeptidyl peptidase IV inhibitory peptides. Specifically, we demonstrated that a combination of Pseudo amino acid composition and Binary profile patterns yielded optimal performance when representing peptide sequences related to dipeptidyl peptidase IV inhibitory peptides, as determined by comparing various peptide sequence feature extraction methods in our self-designed data set. We further presented empirical evidence to indicate that PB-LSTM, a technique utilizing long short-term memory networks, exhibited superior performance compared to other machine learning algorithms that are commonly utilized in peptide prediction. The cross-validation results indicated that PB-LSTM achieved the highest prediction accuracy of 98.02% and an area under the curve value of 0.9949. The prediction results of the model were verified using molecular docking with Autodock Vina, demonstrating its superior screening rate and precision when compared to other methods. Our study provides a promising method for discovering dipeptidyl peptidase IV inhibitory peptides, which may have significant implications for the treatment of type II diabetes.

Key words Type II diabetes; Dipeptidyl peptidase IV inhibitory peptides; Deep learning; Features representation; Molecular docking

Category: Food & Nutrition

儿童超重肥胖脂肪酸标志物及与膳食模式的关联

Fatty acids biomarkers of overweight and obesity and its associations with dietary patterns among Chinese children

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Background: Childhood overweight and obesity is becoming an emerging face of malnutrition. The aims of this study were to explore FAs biomarkers of overweight and obesity and its associations with dietary patterns among Chinese children.

Methods: An observational study was conducted on 94 children aged 5 to 7 years old (50 normal, 26 who were overweight and 18 with obesity). Plasma was analyzed for FA composition by gas chromatography-mass spectrometry (GC-MS). Diet was collected by food frequency questionnaires (FFQ) and dietary patterns were evaluated by principal component analysis (PCA).The multivariate analysis was used to exploring fatty acids biomarkers of overweight and obesity.

Results: Eleven types of FAs were detected in plasma. C16:0, C18:0, C18:1n-9 and C18:2n-6 accounted for more than 90 % of the total FAs for plasma of children. C16:0, SFA, C18:2n-6, n-6 PUFA and PUFA were related biomarkers to distinguish overweight and obesity in children. Children more adhered to plant pattern are lower lever of plasma C16:0, C18:0, SFA and C20:4n-6, but higher level of C18:2n-6, n-6 PUFA and PUFA.

Conclusion: plasma SFA and PUFA, especially for C16:0 and C18:2n-6 as potential biomarkers to distinguish overweight from obesity among children. Plant pattern was negatively associated with plasma C16:0, SFA, but positively associated with C18:2n-6, n-6 PUFA and PUFA, which may be a useful tool for prevention of children from overweight from obesity.

Key words Fatty acids, Overweight, Obesity, Dietary patterns, Children, Biomarkers.

Category: Food & Nutrition

复合益生元在急性结肠炎小鼠模型中的预防和治疗作用

Effects of compound prebiotics as prophylactic and therapeutic supplementation in a mouse model of acute colitis

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Background and Objectives: Compound prebiotics have been explored in modulation of intestinal microbiota and remission of inflammatory responses in the acute colitis. Yet, research on the roles of simultaneous prophylactic and therapeutic compound prebiotics intervention in relation to AC remains lacking.

Methods and Study Design: Here, compound prebiotics were pre-fed to examine preventive effects. Compound prebiotics, compound prebiotics combined with mesalazine (5-aminosalicylic acids), and mesalazine were used to evaluate therapeutic effects on the dextran sulfate sodium -induced acute colitis.

Results: Results showed that prophylactic compound prebiotics and therapeutic compound prebiotics combined with mesalazine alleviated acute colitis, evidenced by variations of body weight, colon length, spleen index, disease activity index score, histological score, and intestinal mucosa. Ruminococcus and Bifidobacterium were detected in significant abundance in groups of prophylactic compound prebiotics and therapeutic compound prebiotics combined with mesalazine, respectively. Phylogenetic ecological network analysis revealed that therapeutic compound prebiotics combined with mesalazine probably had the strongest coupling between microbes in changing intestinal microbiota to influence treatment. However, changes in short chain fatty acids seemed to have no persuasive results, probably due to the reduced short chain fatty acid level in feces and variability in transit, absorption, and utilization. Furthermore, therapeutic compound prebiotics exerted higher value in terms of observed species and Shannon diversity, as well as a more concentrated distribution by principal coordinates analysis.

Conclusions: Together, the favorable roles of compound prebiotics in colitis provide directions for prebiotics in designing effective prophylactic functional diets and treatment strategies.

Key words compound prebiotics; acute colitis; intestinal microbiota; prevention; treatment

Category: Food & Nutrition

螺旋藻蛋白-壳聚糖复合物稳定皮克林乳液用于虾青素递送

Pickering emulsions stabilized with spirulina protein-chitosan complex for astaxanthin delivery

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Astaxanthin is a lipid-soluble carotenoid with good anti-oxidation, hepatic steatosis reduction, anti-inflammation and intestinal microbiota regulation ability, whose poor stability and pH vulnerability limit its bioavailability. Spirulina protein derived from spirulina has good emulsifying ability with potential application in nutraceuticals, medicines and cosmetics. In this study, spirulina protein-chitosan complex were prepared by the self-assembly method, and their interaction mechanism and microstructure were characterized. Pickering emulsions were fabricated using spirulina protein-chitosan complex as an emulsifier. The particle size, zeta potential and three-phase contact angle of spirulina protein-chitosan complex with different spirulina protein to chitosan ratios were investigated. A mass ratio of 1:2.5 spirulina protein-chitosan complex showed good emulsifying ability in preparing Pickering emulsion. Higher storage modulus and viscoelasticity were observed with higher spirulina protein-chitosan complex concentrations and oil fractions. The spirulina protein-chitosan Pickering emulsion significantly improved the stability and bioavailability of astaxanthin. The results indicated that the spirulina protein-chitosan complex could act as a Pickering emulsion stabilizer and had the potential to deliver protective hydrophobic astaxanthin.

Key words astaxanthin, spirulina, Pickering emulsions, delivery, bioavailability

Category: Food & Nutrition

双靶向虾青素纳米载体对非酒精性脂肪肝的干预研究
Dual targeting astaxanthin nanocarriers for relief of nonalcoholic fatty liver disease

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Nonalcoholic fatty liver disease (NAFLD) is a metabolic syndrome disorder, and intervention of NAFLD in the early stage can prevent it from developing into a severe metabolic disease. Here, the hepatic parenchymal cell-targeted and mitochondrial-targeted glycosylated whey protein isolate (WPI) nanocarriers were constructed to delivering astaxanthin (AST) to liver tissue for maximizing AST intervention efficiency. The hepatic parenchymal cell-targeting was achieved using galactose (Gal) conjugated onto WPI through Maillard reaction by recognizing asialoglycoprotein receptors specifically expressed in hepatocytes. Grafting triphenylphosphonium (TPP) onto glycosylated WPI (WPI-Gal) by amidation reaction enabled the nanocarriers (AST@TPP-WPI-Gal) to achieve dual targeting capability to liver tissue and mitochondria and improve the bioavailability of AST. In vitro experiment results demonstrated the AST@TPP-WPI-Gal nanocarriers could target mitochondria in the steatotic HepG2 cells with an enhanced anti-oxidative and anti-adipogenesis effect. In vivo experiments in mice models of NAFLD further verified the ability of AST@TPP-WPI-Gal targeting to liver tissue, regulating blood lipid disorders, and protecting liver function. AST@TPP-WPI-Gal remarkably reduced 40% lipid accumulation in the liver compared with that of free AST, alleviating the symptoms of NAFLD in mice. The results indicate that AST@TPP-WPI-Gal has great potential as hepatic-targeted agent for nutrition intervention of NAFLD.

Key words Astaxanthin; Hepatic parenchymal cell-targeted; Mitochondrial-targeted; Nonalcoholic fatty liver disease;

Category: Food & Nutrition

ω-3 多不饱和脂肪酸、小麦低聚肽及其联合干预在预防和逆转衰老导致的肌少症中的作用

Role of fish oil-derived ω-3 polyunsaturated fatty acids, wheat oligopeptide and their combined intervention in preventing and reversing sarcopenia during aging process

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Background and Objectives: Sarcopenia, the loss of skeletal muscle mass and function with age, has recently attracted attention due to the aging of populations. Nutritional support is potentially considered an essential step to prevent muscle loss and enhance physical function in older adults. This study aimed to assess the role of potential nutritional strategies, i.e., fish oil-derived ω-3 polyunsaturated fatty acids (PUFAs), wheat oligopeptide and their combined intervention, in preventing and reversing sarcopenia in aging process.

Methods and Study Design: Here we evaluated the effects of fish oil-derived ω-3 PUFA, wheat oligopeptide and their combined intervention on muscle atrophy and fatty infiltration in natural aging rats via measurements of muscle mass, grip strength and biochemical parameters, and analyses of magnetic resonance imaging, histopathology, proteomics and western blot.

Results: The interventions of fish oil-derived ω-3 PUFA, wheat oligopeptide and their combination, to varying degrees, improved muscle mass and grip strength, and inhibited muscle atrophy and fatty infiltration. The results of biochemical parameters, proteomics and western blot suggested that the potential mechanism involves the inhibition of skeletal muscle atrophy, promotion of protein synthesis and muscle regeneration, reduction of inflammation, oxidative stress and blood lipid, and enhancement of muscle strength. In this study, the combination of 400 mg/kg body weight fish oil + 200 mg/kg body weight wheat oligopeptide (group WFM 2) was potential to be the optimal intervention strategy and therefore a promising nutritional support to prevent sarcopenia in older adults.

Conclusions: We found that all the intervention groups, to varying degrees, had protective effects against sarcopenia, while the combined intervention effect of fish oil-derived ω-3 PUFA and wheat oligopeptide may be greater than the effect of single intervention.

Key words aging; sarcopenia; fish oil-derived ω-3 polyunsaturated fatty acids; wheat oligopeptide

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脱脂核桃的蛋白水解物的生物活性：胃蛋白酶和碱性蛋白酶（体外）模型

Bioactive properties of defatted walnut protein hydrolysates: pepsin and alcalase (in vitro) model

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Bioactive peptides are hydrolysed products of proteins that have been proven to exert several biological properties such as antioxidant activity, anti-inflammation and anti-diabetes. The hydrolysates obtained from plant origins are less investigated. In the present study, defatted walnut protein isolates prepared using alkaline extraction method. To compare the biological functions of defatted walnut protein isolates and their hydrolysates, protein isolates was undergone the hydrolysis by two different proteases including pepsin and alcalase. After proteolysis, 2,2′-anizo-bis-(3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) radical scavenging activity and inhibitory properties against alpha-glucosidase of defatted walnut protein hydrolysates have been evaluated. The results from the present study suggested the hydrolysates possess more active antioxidant activity than intact protein isolates. Peptides with alpha-glucosidase inhibitory activity can be generated from peptic treatment. Therefore, the research indicates that hydrolysates derived from defatted walnut proteins could be used as a functional food ingredient and have potential health benefits to regulate type 2 diabetes.

Key words antioxidant activity, α-glucosidase inhibitor, peptide, walnut proteins

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大黄素通过影响巨噬细胞表型降低脂肪组织炎症
Emodin decreased adipose tissue inflammation via affecting macrophage phenotype

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Objective: To elucidate if Emodin is participated in adipose tissue inflammation and its underlying mechanisms. Methods: 3T3-L1 adipocytes and RAW264.7 macrophages were co-cultured to mimic adipose tissue inflammation microenvironment in obesity in vitro. Real-time PCR and enzyme-linked immunosorbent assay (ELISA) were applied to examine the levels of IL-1β, IL-6, TNFα and Adiponectin in co-cultured cells and supernatants. Real-time PCR and western blot were performed to detect the expression of M1/M2 marker genes in CD11b microbeads isolated macrophages. Western blot was applied to detect JAK1 and STAT6 expression. Transwell migration assay was applied to determine the capacity of macrophage migration. STAT6 specific inhibitor AS1517499 was applied to elucidate the molecular mechanisms by which Emodin affects adipose tissue inflammation. Results: Emodin remarkably inhibited IL-1β, IL-6 and TNFα levels, whereas enhanced Adiponectin level in co-cultured cells and supernatants. Emodin apparently suppressed the expression of M1 marker gene (iNOS), whereas elevated the expression of M2 marker genes (IL-10 and Arg1) in isolated macrophages. Emodin greatly enhanced phosphorylated JAK1 and STAT6 levels. AS1517499 significantly abrogated the inhibitory effect of Emodin on the expression of inflammatory factors. Emodin remarkably repressed macrophage migration induced by adipocyte-conditioned medium. Conclusion: Emodin may decrease adipose tissue inflammation through promoting M2 macrophage polarization via JAK1/STAT6 signaling pathway.

Key words Emodin; Adipose tissue macrophages; Inflammation; Obesity; STAT6

Category: Food & Nutrition

基于内质网应激探讨维生素 D3 对糖尿病大鼠胰岛功能的保护作用

The effect and mechanism of vitamin D3 in improving pancreas function in T2DM rats by inhibiting endoplasmic reticulum stress

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Abstract

Background: T2DM is a metabolic disease defined by chronically raised blood glucose levels, which are frequently accompanied with lipid metabolism disorders and increased occurrence of ERS. Vitamin D has various biological effects and is thought to be closely related to glucolipid metabolism and ERS mitigation. Therefore, this study was conducted to investigate the molecular mechanism of the regulatory effect of vitamin D3 intervention on the disorders of glucolipid metabolism in T2DM rats.

Materials and methods: Based on their body weight, 50 male SD rats were placed into several intervention groups for a total of 10 weeks. After intervention, the levels of blood glucose, blood lipids, insulin and 25(OH)D were measured, and the expression of GAPDH, VDR, GRP78, PERK, p-PERK, eIF2a, ATF4, CHOP, Bax and Bcl-2 in pancreatic tissues were detected by Western blot. The insulin content and pancreatic tissue apoptosis was determined by immunohistochemistry and TUNEL method.

Results: (1) High-dose vitamin D3 significantly decreased FPG and triglycerides and significantly increased HOMA-β and HDL-C in T2DM rats. (2) The intervention group rats had more islets and intra-islet cells, the morphological structure and insulin content was also improved compared with MC group by HE and TUNEL staining and insulin immunohistochemistry (3) The SOD activity in serum and pancreas was increased, the MDA level was significantly decreased, and the serum TNF-α and IL-1β levels were decreased compared to T2DM rat($P<0.05$). (4) Western blot results showed that VDR and Bcl-2 protein expressions were significantly increased and GRP78, p-PERK/PERK, eIF2a, ATF4, CHOP, and Bax protein expressions were down-regulated to different degrees ($P<0.05$) after intervention.

Conclusion: Vitamin D3 plays a beneficial role in alleviating the basal symptoms of T2DM rats, and may inhibit ERS-induced apoptosis and protect islet function through the PERK/CHOP signaling pathway.

Key words 25(OH)D3; type 2 diabetes mellitus; PERK/CHOP pathway; apoptosis

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茶皂素促进C2C12骨骼肌细胞增殖和分化作用研究

Effects of tea saponin on proliferation and differentiation of C2C12 Skeletal Muscle cells

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Background and Objectives:

In this study mainly focused on the effect of tea saponin on the proliferation and differentiation of C2C12 skeletal muscle cells. Skeletal muscle belongs to striated muscle, which is a kind of muscle tissue in animal body and the most important dynamic organ of the body. At the same time, skeletal muscle is an important regulatory organ of the nervous system and endocrine system. However, in the process of body movement or some pathological conditions, skeletal muscle is prone to injury or metabolic disorders, which will seriously affect the normal movement and life of patients. This study provided theoretical basis for the treatment and repair of damaged skeletal muscle, maintenance of normal metabolism and improvement of skeletal muscle function by exploring the natural product component tea saponin.

Tea saponin, a kind of oleanane type triterpenoid saponin, is one of the main active components in tea saponin. In recent years, the medicinal value of tea saponin has been widely concerned. A number of studies have found that it has many important effects on human health, such as anti-tumor, anti-virus and bacteriostasis. However, there are few reports on the regulation of tea saponin on skeletal muscle development and metabolism. Therefore, this experiment mainly explored the effects of tea saponin on proliferation, apoptosis, migration, differentiation and glucose consumption of C2C12 skeletal muscle cells.

Methods and Study Design:

Skeletal muscle cells of C2C12 were cultured with tea saponin in different concentrations. The effect of tea saponin on proliferation and apoptosis of C2C12 skeletal muscle cells was studied by MTT and flow cytometry. The effect of tea saponin on migration of C2C12 skeletal muscle cells was studied by scar experiment. The expression of MyoD, MyoG and MYH7 was detected by Western blot, and the differentiation promoting effect of tea saponin on C2C12 skeletal muscle cells was studied. The morphological changes of C2C12 skeletal muscle cells and the ability of cell fusion to form muscle tubes were detected by HE staining and immunofluorescence staining. The glucose consumption of C2C12 skeletal muscle cells was detected by glucose oxidase method to study the effect of tea saponin on promoting glucose uptake in C2C12 skeletal muscle cells.

SPSS 22.0, GraphPad Prism 8, ImageJ and other software were used for graphics processing and statistical analysis.

Results:

(1) Tea saponin in the range of 0~32 μg/mL significantly promoted the viability of C2C12 skeletal muscle cells in a dose-dependent manner in the range of 0~32 μg/mL. However, the number of C2C12 skeletal muscle cells was significantly reduced when tea saponin concentration increased to 64 μg/mL.

(2) Flow cytometry showed that tea saponin inhibited apoptosis of C2C12 skeletal muscle cells.

(3) Compared with the blank control group, tea saponin treatment for 12 h can promote the migration of C2C12 skeletal muscle cells.

(4) In the range of 32 μg/mL tea saponin, the number of C2C12 skeletal muscle cells increased significantly with the increase of tea saponin concentration.

(5) The differentiation was observed by HE staining and immunofluorescence staining. It was found that on the first day of differentiation, the status of C2C12 skeletal muscle cells treated with tea saponin was different from that of the blank group. The number of cells treated with tea saponin was large, but there was no significant difference in morphology. On the 3rd day of differentiation, the formation of many fine muscle tubes and cell fusion appeared in the tea saponin treated condition, while the formation and cell fusion in the blank group were lower than those in the tea saponin treated group. On the 5th day of differentiation, the number of myoducts of C2C12 skeletal muscle cells treated with tea saponin increased significantly, and the myoducts grew and became dense, while the number of cells myoducts in blank group was less and the morphology was small.

(6) Western blot analysis showed that the protein expression levels of MYOD, MYOG and MYH7 were significantly increased after tea saponin treatment. Compared with the blank group, tea saponin group (16 μg/mL) promoted the formation of muscle ducts and up-regulated the expression of MYH7 on the 1st, 3rd and 5th day of differentiation of C2C12 skeletal muscle cells, and the promotion effect became more obvious as time went on.

(7) Tea saponin can also increase the glucose consumption of C2C12 skeletal muscle cells after 5 days of differentiation, suggesting that tea saponin can promote the proliferation, differentiation and glucose uptake of C2C12 skeletal muscle cells to some extent.

Conclusions:

In conclusion, tea saponin is involved in the development, differentiation and metabolic regulation of skeletal muscle, and the incubation of C2C12 skeletal muscle cells with tea saponin can not only promote cell proliferation, improve cell viability, but also promote cell differentiation. It provides a theoretical basis for the clinical research and application of tea saponin in the repair of skeletal muscle injury, the treatment of muscle atrophy and the improvement of skeletal muscle function.

Key words Tea Saponin; C2C12 skeletal muscle cells; proliferation; differentiation; MYH7

Category: Food & Nutrition

cMIND 饮食、室内空气污染与抑郁症:一项基于 2011 - 2018 年 CLHLS 的队列研究

cMIND diet, indoor air pollution, and depression: a cohort study based on CLHLS from 2011 to 2018

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Background and Objectives The modifying effects of healthy dietary patterns on the relationship between air pollution and depression are unclear. To explore the interaction between a Chinese version of the Mediterranean-DASH diet intervention for neurodegenerative delay (cMIND) diet and indoor air pollution on depression among older adults.

Methods and Study Design This cohort study used 2011-2018 data from the Chinese Longitudinal Healthy Longevity Survey (CLHLS). Participants included 2724 adults aged 65 and older. The cMIND diet scores ranged from 0 to 12 based on responses to a validated food frequency questionnaire. The index for indoor air pollution exposure was categorized as no, moderate, and severe pollution, integrating the impacts of different types of cooking fuels and dampness/mold. Depression was measured using the Phenotypes and eXposures (PhenX) Toolkit. Cox proportional hazards regression models were used to explore the associations and further stratified the analysis by the cMIND diet scores.

Results Living with severe indoor pollution was associated with a 40% increase in the risk of depression (HR: 1.40, 95% CI: 1.07, 1.82) compared to living without indoor pollution. We observed a significant interaction between indoor air pollution exposure and cMIND diet scores, with the corresponding associations of severe pollution being more pronounced among participants with a lower cMIND diet score (HR: 1.72, 95% CI: 1.24, 2.38) than among those with a higher cMIND diet score.

Conclusions The cMIND diet may attenuate the detrimental impacts of indoor pollution on depression among older adults. The findings of this study could encourage the government to commit to promoting the cMIND diet to achieve the goals of the healthy eating campaign and mental health action programs, as outlined in the blueprint of Healthy China 2030.

Key words Depression; Indoor air pollution; cMIND diet; Elderly population

分类：食物与营养

碳水化合物质量指标以及血糖生成指数影响因素的进展

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碳水化合物与慢性病的关系密切，研究日益增多，对碳水化合物质量的描述尚未有明确的定义。本文从膳食纤维、全谷物、游离糖、血糖生成指数（Glycemic index,GI）这四个方面，描述了碳水化合物的质量,高质量的碳水化合物食物一般具有高膳食纤维、最好是全谷物食物、低游离糖、低 GI 的特性，其中血糖生成指数是传统的描述碳水化合物质量的指标。

碳水化合物（Carbohydrates）作为人类七大营养素之一，是膳食能量最主要的来源。研究表明过去几十年中，随着社会经济的发展，人们生活质量和消费水平的提高，饮食中的碳水化合物消费量持续升高。食物中的大多数碳水化合物被人体摄入后，在人体内消化吸收，最终以葡萄糖的形式进入血液，为人体供能，是引起人体餐后血糖升高的最主要原因。长期以来传统的碳水化合物质量的考察以血糖生成指数（Glycemic index,GI）为主，随着研究的深入，对碳水化合物质量的思考和研究进一步推进。以总碳水化合物—非纤维糖的比率变化为特征的新指标，正在逐步用于表征富含碳水化合物食物的质量高低。综合研究表明，碳水化合物的质量包括了以下四个维度：膳食纤维含量/摄入量、全谷物含量/摄入量、游离糖含量/摄入量、血糖指数和血糖负荷。

本文从淀粉的组成和结构、食物来源、消化吸收、加工方式等四个方面总结了影响 GI 的因素。从淀粉微观结构分析对 GI 的影响：直链淀粉和支链淀粉的结构组成不同，支链淀粉相比于直链淀粉具有更多的淀粉酶结合位点，所以支链淀粉相比于直链淀粉有更高的消化速率。因此直链淀粉含量高的食物，GI 值相对低。根据淀粉中所含支链淀粉晶型可以将淀粉分为 A 型、B 型、C 型，3 种类型的淀粉中，A 型最容易消化，B 型和 C 型不易消化。因此具有低 GI 特性。此外不同食物品类对 GI 的影响并不相同，谷薯类富含碳水化合物的食物，一般具有高 GI，但其中未经精细加工的全谷物以及生的薯类有相对低的 GI。消化慢的食物 GI 值低，控制选择合适的加工方式也可降低食物 GI 值。

碳水化合物的质量指标尚未有公认的定义，但可以肯定的是膳食纤维、全谷物、游离糖、固体碳水化合物、血糖生成指数等指标，均是考量食物的碳水化合物质量指数的组成因素，碳水化合物质量的研究是一个综合各方面的大集合，目前对碳水化合物质量指标只是间接性的一个描述，统一明确一个碳水化合物质量指标定义任重而道远。

影响 GI 的因素多种多样，探究食物本身和食物加工对 GI 的影响具有重大的意义，有利于明确食物信息和新产品的开发利用。且从微观角度探究食物 GI 值的影响因素具有广阔的发展空间。

本文为明确碳水化合物质量的定义和从微观角度以及不同食物来源角度解释影响 GI 值的因素提供依据。

关键字 碳水化合物的质量，膳食纤维，全谷物，游离糖，血糖生成指数（GI）

分类：食物与营养

酵母 β-葡聚糖对高脂饮食诱导的结肠炎的改善作用及相关机制研究

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背景：

肥胖和高脂饮食与结肠炎的严重程度有关。高脂饮食可能通过影响肠道菌群、破坏肠黏膜屏障功能，进而诱发肠道低度慢性炎性反应。酵母 β-葡聚糖作为一种天然多糖，具有很强的抗炎活性和免疫调节功能，对肠道菌群也具有潜在的调节作用。然而，酵母 β-葡聚糖在预防饮食相关结肠炎方面的作用目前仍不清楚。

目的：

探究酵母 β-葡聚糖对高脂饮食相关结肠炎的潜在改善作用，并阐明其作用机制。

方法：

研究选用 3 月龄 SPF 级雌性 SD 大鼠，随机分为四组：普通饮食组（AIN-93M，脂肪含量为 10 %）；高脂饮食组（D12451，脂肪含量为 45 %）；高脂饮食（D12451，脂肪含量为 45 %）+酵母 β-葡聚糖组（干预剂量为 50mg/kg）；高脂饮食（D12451，脂肪含量为 45 %）+酵母 β-葡聚糖（干预剂量为 50mg/kg）+抗生素处理组（氨苄青霉素，0.1g/L；万古霉素，0.05g/L；新霉素，0.1g/L 和甲硝唑，0.1g/L）；干预至 24 月龄。干预结束后，测量结肠长度，进行组织学分析，检测血清炎症因子（IL-1β、TNF-α、IL-6、LPS）、结肠炎症指标（MPO）以及肠道紧密连接蛋白（ZO-1、Claudin-1 、Occludin）的表达水平，并进行 16s rRNA 微生物学测序和转录组学分析。

结果：

酵母 β-葡聚糖减轻高脂饮食引起的结肠病理损伤，改善高脂饮食诱导的结肠粘膜受损、隐窝结构破坏、炎症细胞浸润以及杯状细胞缺失，恢复结肠长度至正常水平，并上调结肠紧密连接蛋白的表达水平（ZO-1、Claudin-1 、Occludin），改善高脂饮食引起的肠通透性增加，恢复肠黏膜屏障功能。酵母 β-葡聚糖降低血清炎症因子水平（IL-1β、TNF-α、IL-6、LPS），下调结肠炎症相关指标的水平（MPO），改善结肠炎症。这些结果表明酵母 β-葡聚糖对高脂饮食引起的结肠炎具有保护作用。此外，16s rRNA 微生物学测序结果显示，酵母 β-葡聚糖恢复了高脂饮食引起的肠道菌群失调，恢复厚壁菌门与拟杆菌门的比例，增加有益菌属如 Lactobacillus、Akkermansia 等的丰度，并增加粪便短链脂肪酸水平。抗生素处理消除了酵母 β-葡聚糖对高脂饮食诱导的结肠炎的保护作用，表明酵母 β-葡聚糖对结肠炎的有益作用依赖于肠道微生物群。转录组学分析表明，酵母 β-葡聚糖改变了高脂饮食诱导的结肠炎大鼠的结肠转录谱，显著下调了高脂饮食引起的 NF-κB 信号通路相关基因的表达。Western blot 结果显示酵母 β-葡聚糖可能通过抑制 NF-κB/NLRP3 信号通路发挥抗炎作用。

结论：

酵母 β-葡聚糖可能通过抑制 NF-κB/NLRP3 信号通路调节肠道免疫稳态，并重塑肠道菌群，恢复肠黏膜屏障功能，从而减轻长期高脂饮食诱导的结肠炎。本研究为酵母 β-葡聚糖作为调节肠道微生物群和防治饮食相关结肠炎的膳食补充剂或调节剂提供了新的见解。

关键字 结肠炎 肠道微生物群 酵母 β-葡聚糖 高脂饮食 NLRP3

分类：食物与营养

日式吞咽餐食方案在中国实施的挑战-基于帝斯曼本土风味慕斯的研究

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日式吞咽餐食方案在中国实施的挑战-基于帝斯曼本土风味慕斯的研究

1.背景与目的：

1.1 随着老龄化的趋势，老年营养成为一个重要议题。伴有吞咽障碍的问题甚至发生率高达60%以上。针对这一情况。目前国内较多的借助鼻饲喂养和肠外营养来为高龄老人供能。相应的也带来了较高误吸风险和更低的生活满意度。增加了整体治疗费用。对于其中还有部分进食能力的患者来讲，这部分功能因用失用而降低直至废用。

1.2 为还有部分进食能力的患者提供安全的食物，国际和国内专业人士都在做努力。国际吞咽困难饮食标准化委员会（IDDSI）2017 年发布了吞咽困难患者的饮食框架。我国相应的标准也在随后陆续推出。我们饮食习惯和日本更接近，有必要对日本的成熟产品进行比较。日本 2004 摄食吞咽康复学会就将吞咽困难的损害程度进行了分类，并列入了不同层次可选用的食物。食物特点为粘度降低，聚合性增加。不易松散引起呛咳和误吸。更爽滑降低吞咽难度易于咽下。由帝斯曼开发的慕斯食品已经在我国医疗机构和医养结合机构开始运行。我们对日式吞咽餐食方案和帝斯曼的本土化特点的吞咽障碍慕斯食品进行比较。

2. 方法：

2.1 本研究主要采用比较调研分析作为定性研究法，通过比较日式吞咽餐食和适宜本土风味吞咽障碍专用慕斯在医疗机构的应用，评估其 在分级、品类，产品风味、制备条件、启动时机以及医保资金支持上的优势和弊端，以帮助优化我们本土风味吞咽障碍专用套餐的品质和争取后续的介护政策支持。各饮食套餐根据患者进食能力，营养配比和营养密度根据患者能量需求进行调配。

2.2 结果：本土化吞咽障碍专用套餐能够适宜我国老年吞咽障碍患者，具有便捷高效的特点。

3. 结论：

3.1 本研究旨在探索本土化吞咽障碍专用套餐和食物改性方案的模式，体现出更具人文关怀的优势，降低制备的难度和较大操作空间的需要，病人在安全进食的同时享受食之愉悦，对于机能减退无法恢复如常的患者，避免了永远不再享用美食终身管饲的遗憾。生活质量大大改善。相对于日式的种类繁多，本土化套餐简化经济，适合目前尚无医保支持的介护营养方案。

关键词：老龄 吞咽障碍分级饮食 风味

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关键字 老龄 吞咽障碍分级饮食 风味

分类：食物与营养

潜在“药食同源”新原料——东北刺人参不定根提取物的营养成分分析与抗氧化功效评价

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目的：东北刺人参(*Oplopanax elatus* Nakai)是多年生木本药用植物，仅分布于我国吉林省长白山地区、俄罗斯远东地区和朝鲜北部山区等地。东北刺人参根药用价值极高，且没有任何毒副作用，被称作“木本人参”。然而，目前其野生资源遭到严重破坏，且人工栽培体系难以建立，致使其产品开发受到了极大限制。利用植物组织培养技术，对东北刺人参进行不定根诱导培养，进一步进行功效物质提取，所得提取物为潜在的“药食同源”食品原材料，具有抗炎、护肝、抑制肿瘤等保健功效。本研究拟探究东北刺人参提取物的营养成分组成，并对其抗氧化功效进行评价。

方法：利用气升式生物反应器，设定培养基组成为 MS 培养基添加 3 mg/L IBA、50g/L 白糖，通气量 0.1vvm，25℃暗环境下对东北刺人参进行不定根增殖培养。40 天后收获不定根，进一步对其进行乙醇提取与喷雾干燥，获得提取物。LC-GC/MS 检测东北刺人参不定根提取物代谢物组成，分析其主要的功能营养成分。根据营养成分分析结果，暗示其具有多种抗氧化成分。分别对提取物进行羟自由基、超氧阴离子、$ABTS^{+}$自由基、DPPH 自由基清除试验以及 Fe^{3+}还原活性与抗脂质过氧化检测，评价其抗氧化功效。进一步通过斑马鱼模型评价 ROS 自由基清除能力。

结果：通过生物反应器培养不定根，东北刺人参不定根的产量能够达到 34.8g/L。进一步对不定根进行乙醇提取，得到提取物，得率为 40%。LC-GC/MS 检测其代谢物组成，结果表明，东北刺人参不定根提取物主要营养成分包括多糖类（29%）、黄酮类（22%）、挥发油类（6%）、多酚类（2%）、皂苷类（1.5%）、蒽醌类（1.1%）。其中黄酮类包括 72 种，代表成分为槲皮素、山萘素、香叶木素、毡毛美洲茶素、花葵素等；挥发油类包括 9 种，代表成分为棕榈酸、乙酸、5-乙基-5H-呋喃-2-酮等；皂苷类主要成分为黄芪甲苷 IV；蒽醌类主要成分为芦荟大黄素、大黄酸、大黄素等。进一步抗氧化试验结果表明，东北刺人参不定根提取物对 DPPH 自由基清除率 IC_{50}为 29.7μg/mL，$ABTS^{+}$自由基清除率 IC_{50}为 1.58 mg/mL，Fe^{3+}还原活性 IC_{50}为 3.01 mg/mL,对其他自由基（羟自由基、超氧阴离子、抗脂质过氧化能力）则没有显著的清除作用。斑马鱼模型结果表明，东北刺人参不定根提取物能显著降低模型鱼体内 ROS 自由基含量。

结论：通过组织培养能成功获取大量东北刺人参不定根植物原料，且其提取物的营养成分主要包括多糖、黄酮、挥发油、多酚、皂苷、蒽醌等，富含多种抗氧化成分。此外，东北刺人参不定根特异性地对 DPPH、ABTS+和 Fe3+具有较强还原能力，证明其为一种潜在的具备抗氧化功效的“药食同源”新原料。

关键字 东北刺人参，组织培养，不定根，LC-GC/MS，抗氧化

分类：食物与营养

营养质量管理是健康中国的重要命题

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目　的：民以食为天，营养质量是人类维持生命、生长发育和健康的重要物质基础，事关国民素质提高和经济社会发展。

方　法：一、抓好营养质量管理关键环节

1、对食品、食品添加剂、食品相关产品，包括 供食用的食用农产品的营养质量管理。

2、对食品生产和加工（以下称食品生产），食品销售和餐饮服务（以下称食品经营），包括集体食堂、学校、托儿所、养老院等集体配餐单的营养质量管理。

3、对食品添加剂的生产经营质量管理。

4、对食品生产经营者使用食品添加剂、食品相关产品营养质量管理。

5、对食品的贮存和运输营养质量耗损管理。

二、制定相关行业、相关食品营养质量标准

制定各项食品、食物，包括餐饮标准，需要费时费力，难度较大。目前可试行重点行业示范标准。现在本协会已经在制订和完善烹饪行业、链锁超市、幼儿园等级行业和单位的食品营养管理示范标准。

三、重点人群营养质量管理

1、婴幼儿营养质量管理

开展开展孕产妇的营养筛查和干预，降低低出生体重儿和巨大儿出生率。

2、学生营养质量管理

指导学生营养就餐，鼓励地方因地制宜制定满足不同年龄段在校学生营养需求的食谱指南。制定并实施集体供餐单位营养操作规范。

3、老年人群营养质量管理

4、患者临床营养质量管理

5、贫困地区营养质量管理

四、普及营养质量管理知识

1、提升营养质量管理健康科普信息供给和传播能力。

2、推动营养健康科普宣教活动常态化。

五、加强组织实施

1、强化组织领导。地方各级政府要结合本地实际，强化组织保障，统筹协调，制定实施方案，细化工作措施，明确职责分工，将各项工作任务落到实处。

2、加强营养师生队伍建设。做好营养质量管理，除了争取各方支持，促进全民参与外，加强营养师生专业队伍建设是当务之急。目前，我们营养师队伍无论与其他国家相比，还是当前实际需要，都存在较大的缺口，应当尽快补充这块短板。

结　果：

2017 年长春市总人群主要死因构成　%、死亡率（1/10 万）及位次表。

（图表）略

从上述各种数字，不难看出无论直接与营养代谢疾病，还是发病和死亡靠前的疾病，如心脑血管疾病、肿瘤、糖尿病等与营养相关的疾病，触目惊心。

4、2018 年长春市青年社区老年居民样调查，显示重点人群营养缩影

表一、老年人关系营养疾病人数统计

（图表）略

结　论：加强营养质量管理是落实国民营养计划，实现健康中国的重要命题。要对当国民营养状况有清醒认识，增加紧迫感。在营养质量管理过程中，明确质量管理内涵，抓好重点行业、重点人群和关键环节。在大力普及营养健康知识、提高居民自我认识的基础上，采取政府领导、社会支持、大众参与、专业队伍指导等各种措施，把营养质量管理落到实处。

关键字 健康中国　国民营养　营养质量　加强管理。

分类：食物与营养

膳食限制改善高脂膳食诱导的小鼠肥胖有效性及机制研究

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肥胖已成为全球公共卫生问题，预计到 2035 年，全球将有 51%的人口达到超重或肥胖。高脂膳食导致的能量过剩是诱发肥胖的重要原因之一，减少摄食及能量摄入是减肥的常见方法之一。然而，大量的人群实验表明仅依靠膳食限制的减肥方式仅在短期内对于体重减轻有效，甚至会引起体重回升的副作用。这与肥胖过程中，脂肪组织过度扩张导致的脂肪细胞的数量和功能的改变，进而导致能量应答的变化密切相关。因此，课题针对高脂饮食诱导的肥胖小鼠，进行能量限制的膳食干预，研究逆转膳食对肥胖小鼠脂肪沉积、糖脂代谢应答功能的影响，为膳食限制在改善肥胖人群体重、代谢功能等方面的有效性提供科学依据，为解答膳食限制减肥的短时效性提供理论支撑。

本研究选择 4 周龄小鼠，利用高脂饮食（#D12492）进行 20 周的肥胖模型诱导，然后进行总能量减少近 30%的正常膳食（AIN-93G）进行膳食限制干预 12 周，模拟肥胖人群通过减少摄食进行体重控制的实际情况。通过评价干预后小鼠脂肪沉积部位、沉积量、脂肪组织中脂肪细胞数量及大小，结合小鼠能量代谢率、葡萄糖耐量、肝脏脂质沉积等的能量代谢功能的变化，评价膳食限制改善肥胖的效果；同时，测定脂质合成、分解和脂肪生成相关基因或蛋白的表达，利用流式细胞分型分析检测脂肪组织血管基质中增殖型、分化型干细胞的占比，阐明膳食限制改善肥胖生理生化的分子机制。本研究的主要结果如下：

1. 膳食中脂肪占比及总能量的限制，显著降低了肥胖小鼠的体重及皮下脂肪沉积量，并显著减轻了肥胖小鼠内脏及皮下脂肪组织中脂肪细胞的过度增大。

2. 膳食限制显著降低了内脏及皮下脂肪组织中脂质合成相关基因（内脏：C/EBPa，Pparg ；皮下：Dgat2），显著增加了脂质分解相关基因（内脏：Adrb3，Atgl，CPT1a，Hsl，Plin1；皮下：CPT1a）的表达。

3. 膳食限制显著降低了肥胖小鼠肝脏中甘油三酯和游离脂肪酸含量，改善了脂肪在肝脏的异位沉积。

4. 膳食限制重塑了脂肪组织中干细胞的分化轨迹，内脏脂肪中增殖型（DPP4/CD26+）脂肪干细胞占比显著升高，分化型（ICAM1/CD54+）脂肪干细胞占比显著降低，皮下脂肪中增殖型（DPP4/CD26+）脂肪干细胞占比显著降低。

膳食脂肪及能量限制能够显著减轻肥胖小鼠的体重、皮下脂肪以及肥胖引发的肝脏中异位脂肪的沉积，皮下和内脏脂肪中脂肪细胞中脂质含量减少，增殖型和分化型干细胞的比例亦发生显著变化，表明内脏脂肪与皮下脂肪应对能量的不同分子机制。然而，肥胖小鼠的能量代谢率的降低、糖耐量异常的现象并未得到改善，这表明仅靠减少能量或者脂肪的摄入并不能长期有效的减轻体重，对于肥胖引发的糖耐量异常等危害并无有效防控作用。

关键字 膳食限制，肥胖，脂肪沉积，脂肪干细胞，异位脂肪

分类：食物与营养

重庆市售 17 种羊奶粉营养成分现状的研究

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目的：乳品营养丰富，是不可或缺的营养来源。奶业是健康中国、强壮民族不可或缺的产业，分析市售羊奶粉的营养成分现状，为羊奶粉营养指标的国标修订和相关部门规范监管提供实验依据，为羊奶产业的发展提供理论基础，同时对国民的乳品消费观念进行科学引导。

方法：随机采购重庆市场上具有代表性的 17 种羊奶粉（纯羊奶粉*2，配方羊奶粉*15），参照国家标准方法对羊奶粉的水分、蛋白质、脂肪、可溶性糖、37 种脂肪酸、胆固醇、18 种氨基酸、4 种维生素、8 种矿物质进行检测，并对其营养成分进行了分析比较。

结果：结果表明，不同羊奶粉的水分含量为 2.6%~3.5%；蛋白质含量为 17.0%~25.0%；脂肪含量 10.2%~30.3%；均符合 GB19644 中理化指标的要求。棕榈酸为 18.2%~49.6%，油酸为 20.2%~33.9%，亚油酸最高有 29.8%，其中 4 种配方羊奶粉中检出了 DHA；灰分含量为 4.8%~7.0%；胆固醇含量为 7~17%；可溶性糖含量为 20.4%~62.8%；各矿物质含量分别为钙 782~1006mg/100g，磷 228~586mg/100g，铁 0.3~12.4mg/100g，锌 3.1~14.8mg/100g，钾 876~1690mg/100g，钠 206~371mg/100g，镁 74~122mg/100g，锰 0.01~0.21mg/100g，铜最高只有 0.5mg/100g；必需氨基酸占总氨基酸的比例在 44.3%~50.9%；各维生素的含量分别为 VA269~943μg/100g，VE2.09~16.51mg/100g，核黄素 0.08~0.88mg/100g，硫胺素 0.48~1.71mg/100g。

研究发现，17 种羊奶粉的水分、蛋白质、脂肪等理化指标均满足 GB19644 的要求。蛋白质含量丰富，氨基酸种类齐全，必需氨基酸占总氨基酸比例与人乳相近，但是氨基酸模式与人体氨基酸模式差异较大，可能会导致必需氨基酸在体内不能被充分利用，进而造成蛋白质营养价值的降低；羊奶粉中脂肪酸的组成及含量差异较大，其中棕榈酸（c16:0)含量最丰富，其次是油酸(c18:1n9c)，人体必需的脂肪酸亚油酸(c18:2n6c)的含量也很丰富，且在 4 种配方羊奶粉中还检出二十二碳六烯酸（DHA）；钙、铁、锌含量丰富，但有 1 种配羊方奶粉中磷含量是其他羊奶粉的 2 倍，可能存在干扰钙吸收的风险，纯羊奶粉中的钾、钠、镁含量均高于配方羊奶粉，而锰和铜却与之有相反的结果；配方羊奶粉中的脂溶性 VA、VE 的含量均高于纯羊奶粉。纯羊奶粉中的可溶性糖含量较配方羊奶粉偏低。纯羊奶粉中 VA 和 VE 的含量均比配方羊奶粉低。

结论：该研究通过营养知识和监测数据相结合阐释了羊奶粉的营养价值，实验所得的各项监测数据，基本反映了目前重庆市场上羊奶粉的产品质量现状。市场上现有的羊奶粉多属于调制乳粉，调制的水平参差不齐，科学强化羊奶粉和规范监管羊奶粉市场是未来羊奶产业发展的基础。本研究虽肯定了羊奶粉的营养优势，同时也暴露了羊奶粉市场上个别不规范的问题，相关部门需加强监管。

关键字 重庆市售、羊奶粉、营养成分、结果分析

分类：食物与营养

藜麦对大鼠非酒精性脂肪肝血脂代谢紊乱的作用效果

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目的：观察藜麦对大鼠非酒精性脂肪肝血脂代谢紊乱的作用效果，为食品防治非酒精性脂肪肝病提供理论依据。

方法：选取 8 周龄 SPF 级 SD 雄性大鼠 26 只，体重 200±20 克，按随机数字将大鼠随机分为基础饲料对照组（n=9 只）和高脂膳食组（n=17 只），连续造模 12 周，于 12 周处死正常对照组和高脂膳食组大鼠各 1 只，取肝脏组织进行苏木精-伊红染色、油红 O 脂肪染色，判断大鼠非酒精性脂肪肝模型是否建造成功。造模成功后，将 16 只高脂膳食组大鼠分为模型组（n=8 只）和藜麦高脂组（n=8 只）。实验期间，基础饲料对照组饲喂普通饲料；模型组饲喂 60%的高脂饲料；藜麦高脂组饲喂藜麦高脂饲料，三组大鼠均自由进食饮水，持续干预 11 周。干预结束后，所有大鼠均实施安乐死并取出肝脏和血液做后续分析，采用胆固醇氧化酶法和磷酸甘油氧化酶-过氧化物酶偶联法分别检测血浆总胆固醇、甘油三酯含量；采用生化法测定血浆谷草转氨酶、谷丙转氨酶含量；使用酶联免疫分析试剂盒检测血清瘦素、脂联素表达水平。留取大鼠肝脏组织进行苏木精-伊红染色、油红 O 脂肪染色，对比干预后各组肝脏组织病理变化情况。

结果：造模 12 周后，肝脏组织经苏木精-伊红染色、油红 O 脂肪染色结果显示高脂膳食组大鼠肝小叶结构和肝索结构紊乱，部分胞核被挤压于一侧，肝细胞内出现大小不等的脂滴。干预 11 周后，肝脏组织经苏木精-伊红染色显示藜麦高脂组的肝索排列较为整齐，肝细胞内的脂肪空泡与模型组相比明显减少。油红 O 脂肪染色结果显示藜麦高脂组肝细胞内脂肪堆积与模型组相比明显减轻。血脂指标检测结果显示，与对照组相比，模型组大鼠血浆总胆固醇、甘油三酯、谷草转氨酶、谷丙转氨酶水平显著升高，差异均有统计学意义（P 值＜0.05）；与模型组相比，藜麦高脂组血浆总胆固醇、甘油三酯、谷草转氨酶、谷丙转氨酶水平降低，差异均有统计学意义（P 值＜0.05）；肝脏瘦素水平降低、脂联素水平升高，差异有统计学意义（P 值＜0.05）。

结论：藜麦对改善大鼠非酒精性脂肪肝的血脂代谢紊乱具有一定作用效果。

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关键字 藜麦，非酒精性脂肪肝，血脂

分类：食物与营养

高脂高糖膳食添加甘蔗渣对糖耐量和脂肪组织的影响

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目的：探索高脂高糖膳食添加甘蔗渣对大鼠空腹血糖、口服糖耐量、胰岛素耐量、皮下脂肪组织、内脏脂肪组织和肝脏重量及器官指数的影响，为甘蔗渣深度开发利用提供理论依据。

方法：将 18 只 4-6 周龄 SPF 级雄性 Wistar 大鼠适应性喂养 1 周后采用随机数字随机分为 3 组，包括低脂对照组、高脂组和高脂+甘蔗渣组。低脂对照组采用普通饲料，高脂和甘蔗渣添加组采用脂肪提供 45%能量的高脂高糖饲料，添加 15%的蔗糖，甘蔗渣添加组用 10%的甘蔗渣粉替代相应的基础饲料重量。添加的甘蔗渣粉为新鲜甘蔗榨汁后的渣干燥后粉碎的粉末。大鼠两只一笼，每周更换垫料，实验环境每天昼夜循环光照 12h，环境温度为 22～24℃，相对湿度为 50%～55%。每周记录两次剩食量并测量一次体重，计算采食量和饲料利用效率。喂养 2 周后隔夜禁食，鼠尾采血测定空腹血糖并进行口服糖耐量试验。喂养 4 周后隔夜禁食，鼠尾采血测定空腹血糖并进行胰岛素耐量试验。喂养 5 周后禁食，第二日异氟烷麻醉后行腹主动脉取血留样，再放尽血后取肝脏准确称重记录，记录皮下和内脏脂肪组织重量，测定身长和尾长，计算肝脏指数、脂肪组织器官指数、BMI 和 Lee’s 指数。器官指数等于器官重量除以体重。采用 SPSS 20.0 进行数据处理。实验数据用 x±sem 表示，组间差异采用方差分析和事后检验，检验显著性水平取 α=0.05。

结果：高脂膳食喂养 3 周后，高脂组空腹血糖增加值比低脂对照组高 2.1mmol/L(P<0.05)。高脂膳食喂养 5 周后，高脂组空腹血糖增加值比低脂对照组高 3.3mmol/L(P<0.05)。各组口服糖耐量和胰岛素耐量试验各时间点血糖值之间没有显著差异，各组曲线下面积之间没有显著差异。低脂对照组头 4、11、13 天内体重增加值显著高于高脂组和甘蔗渣添加组，之后各组间体重增加值没有显著差异。高脂膳食喂养 5 周后，高脂组和甘蔗渣添加组附睾脂肪、腹膜后脂肪、腹股沟脂肪和臀脂重量和器官指数均显著高于低脂对照组。甘蔗渣添加组腹股沟脂肪指数显著低于高脂组。甘蔗渣添加组盲肠长度指数显著低于低脂对照组和高脂组。高脂膳食添甘蔗渣粉未显著改变身长、肠系膜脂肪重量及指数、BMI 和 Lee’s 指数。

结论：高脂高糖膳食添加甘蔗渣可以显著降低腹股沟脂肪器官指数和盲肠长度指数，但对空腹血糖、口服糖耐量及胰岛素耐量没有显著影响。膳食添加甘蔗渣对腹股沟脂肪的影响可能与其降低盲肠长度指数有关，相关机制有待进一步研究。

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关键字 甘蔗渣；高脂高糖膳食；糖耐量；脂肪组织；大鼠

分类：食物与营养

DHA 强化蛋中 DHA 占比及 n-6/n-3 PUFA 比值更符合中国居民膳食平衡要求

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目的　二十二碳六烯酸（DHA），是一种 n-3 系列的长链多不饱和脂肪酸（n-3 PUFA），对人类神经系统的发育以及心脑血管疾病的预防都有着重要作用。而鸡蛋作为 DHA 的良好载体，价廉易得，有潜力成为人体补充 DHA 的膳食来源。在我国，富含 DHA 等 n-3 PUFA 商品蛋的受众较少，相关研究尚不完善。本研究对国内不同品牌及产地鸡蛋中的 DHA 等多种脂肪酸进行测定分析，以期为居民选购普通商品蛋及功能性鸡蛋提供科学指导，为解决传统途径中 DHA 等 n-3 PUFA 摄入不足等问题提供可行方案，为制定我国相关膳食营养素参考摄入量（DRIs）提供参考依据。

方法 本研究选择了 4 个品类的 10 种鸡蛋（普通鸡蛋 1 种、品牌养殖蛋 3 种、地区散养蛋 3 种、DHA 强化蛋 3 种），进行脂肪酸的提取和甲酯化，使用气相色谱-火焰离子化检测器（GC-FID）进行分析，参考 37 种脂肪酸混合标品峰面积进行归一化法校正样品峰面积，使用 SPSS 21.0 建立数据库并进行统计分析。对各脂肪酸占比以 3 个平行样的均数±标准差表示，不同品类鸡蛋间的比较采用单因素方差分析及 LSD-t 检验。

结果 （1）本研究选用的 4 个品类 10 种鸡蛋中，3 种 DHA 强化蛋的 DHA 占比为 3.98±0.57% ~ 5.56±1.2%，其余 7 种鸡蛋的 DHA 占比为 1.36±0.14% ~ 2.45±0.46%。DHA 强化蛋中的 DHA 占比显著高于品牌养殖鸡蛋和地区散养蛋（$p<0.05$），其二十碳四烯酸（ARA）占比显著低于其它两种鸡蛋（$p<0.05$），而品牌养殖鸡蛋和地区散养蛋的 DHA、ARA 占比差异均不显著（$p>0.05$）。（2）对 3 种 DHA 强化蛋中 DHA 和 α-亚麻酸（ALA）占比的比较结果显示，宣称使用亚麻籽、螺旋藻饲料等母鸡饲养方式的鸡蛋 DHA 占比未见显著差异（$p>0.05$），而宣称使用亚麻籽饲料的“圣迪乐村 OMEGA-3 鲜鸡蛋”及“盒马 OMEGA-3 有机富硒宝宝蛋”ALA 占比均高于使用螺旋藻饲料的“农沃丰高 DHA 螺旋藻鲜鸡蛋”（$p<0.05$）。（3）10 种鸡蛋的 n-6/n-3 PUFA 比值的分析结果显示，“圣迪乐村 OMEGA-3 鲜鸡蛋”及“盒马 OMEGA-3 有机富硒宝宝蛋”2 种 DHA 强化蛋的 n-6/n-3 比值分别为 1.80±0.09 及 2.25±0.64，显著低于其它鸡蛋（$p<0.05$），而普通鸡蛋的 n-6/n-3 PUFA 比值（9.89±0.40）显著高于除 1 种品牌养殖蛋外的所有鸡蛋（$p<0.05$）。目前中国膳食指南推荐的 n-6/n-3 PUFA 比值为 4~6:1，美国膳食指南推荐的比例是 2.3:1，故 DHA 强化蛋相对于其他非 DHA 强化蛋，更符合中国居民膳食平衡的需求。

结论 DHA 强化蛋是居民摄入 DHA 等 n-3 PUFA 的良好来源，品牌和产地对鸡蛋中 DHA 占比的影响不大。我国居民膳食中的摄入的主要油脂为植物油，其含有丰富的 n-6 PUFA，而对于亚麻籽、海洋性食物等富含 n-3 PUFA 食物的摄入量相对较少，因此我国居民膳食中 n-6/n-3 PUFA 比值为 20~30:1，远不及居民膳食指南推荐值 4~6:1。本研究中的 10 种鸡蛋 n-6/n-3 PUFA 比值都能满足降低心脑血管疾病危险因素的要求，但 DHA 强化蛋更符合中国居民膳食平衡要求。

关键字 DHA 强化蛋，n-3/n-6 PUFA 比值，脂肪酸，膳食平衡

分类：食物与营养

健康饮食和体重变化与糖尿病患病风险的关系

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目的：随着社会经济的发展，糖尿病这种慢性非传染性疾病的发病率越来越高，发病年龄越来越低，已成为严重的公共卫生问题。饮食与糖尿病的发生、发展有着密切的联系，生命过程中的体重变化也会对糖尿病的发病风险产生深远的影响，探讨健康饮食模式及不同体重变化模式对糖尿病患病风险的影响，将有助于实施早期、持续和有针对性的干预措施，为预防糖尿病的发生和进展提供参考。

方法：本研究获取2005-2018年美国国家营养与健康调查（National Health and Nutrition Examination Survey,NHANCES）数据库中的40-74岁参与者的数据，收集参与者一般情况、体重问卷调查结果、24小时饮食回顾数据。参考既往研究，计算出HEI-2015评分，将HEI-2015评分的百分位数分为≥95%、75%-94%、50%-74%、25%-49%、<25%。BMI变化时间分为25岁时的BMI和10年前的BMI，将参与者25岁至中年时期的体重变化模式分为稳定正常、非肥胖到超重、非肥胖到肥胖、稳定肥胖、体重减轻。采用STATA 17.0软件进行统计分析，在数据分析开始时首先对数据库中的样本进行加权，计量资料用算数均数和标准差（正态性）进行统计描述，计数资料运用率或构成比表示，使用方差分析、卡方检验进行组间比较，通过多因素COX回归分析糖尿病的患病风险，研究健康饮食模式及成年早期至中期体重变化模式对糖尿病患病风险的影响。

结果：本研究共纳入了13077名40-74岁研究人群，25岁至中年时期的体重变化模式中稳定正常、非肥胖到超重、非肥胖到肥胖、稳定肥胖、体重减轻的样本量分别为4429（33.8%）、4764（36.4%）、2707（20.7%）、876（6.6%）、301（2.3%）。校正了性别、年龄、种族、教育程度、家庭贫困指数后，HEI-2015评分增加糖尿病患病风险降低（HR=0.9913，P=0.008，95%CI：0.9850-0.9977）；与HEI-2015评分≥95百分位的参与者比较，HEI-2015评分<25百分位的参与者糖尿病的患病风险增加（HR=1.7268，P=0.020，95%CI：1.0936-2.7267）；HEI-2015评分降低与成年早期至中期体重变化至肥胖或稳定肥胖的体重变化模式对糖尿病患病风险均有附加效应，HEI-2015评分越低影响越强：与HEI-2015评分≥95百分位且在成年早期至中期体重变化模式为正常到正常的参与者比较，HEI-2015评分<25百分位且在成年早期至中期体重变化模式为非肥胖到肥胖的参与者糖尿病的患病风险显著增加（HR=5.5967，P=0.012，95%CI：1.4720-21.2795），HEI-2015评分<25百分位且在成年早期至中期体重变化模式为稳定肥胖的参与者糖尿病的患病风险显著增加（HR=7.3203，P=0.002，95%CI:2.0673-25.9211）。

结论：不健康饮食模式及在成年早期至中期体重变化至肥胖或稳定肥胖的参与者糖尿病的患病风险显著增加，提示在生命早期控制体重的同时注重科学健康饮食在预防糖尿病发病中有重要的作用。

关键字 健康饮食;体重变化模式;超重;肥胖;糖尿病

分类：食物与营养

煮制升高红枣干的餐后血糖反应但提升餐前负荷效应

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全球有超 5 亿人处于糖尿病前期，其中很多人在空腹血糖超标之前，就已发生餐后血糖受损状况。餐后血糖失控既是血糖控制能力下降的表现，也会增加胰岛 β 细胞功能受损的风险。血糖和胰岛素稳态受损还与痤疮、多囊卵巢综合征、肥胖以及心血管疾病等多种疾病的风险密切相关。选择合适的食物、合理的烹调方法以及进餐模式均有助于管理餐后血糖反应。近年来，体外研究以及部分动物实验已初步证实红枣具有降血糖的潜力。在我国传统膳食中，常将红枣炖煮后单独或与主食一起食用。

为探索红枣制品有利平稳餐后血糖反应的合理摄入方式，本研究选择红枣干和煮红枣干为实验材料，分别招募 14 名健康受试者，进行以下 2 项实验：（1）摄入含 50 g 可利用碳水化合物的红枣干或煮红枣干，评估其餐后血糖和胰岛素反应；（2）摄入含 15 g 可利用碳水化合物的红枣干或煮红枣干作为餐前负荷，30 min 后摄入含 50 g 可利用碳水化合物的米饭正餐，评估其餐后血糖和胰岛素反应。

结果表明，单独摄入时，红枣干和煮红枣干的血糖指数分别为 68 和 83。与红枣干相比，煮红枣干的餐后血糖峰值增加了 34.5 %（P<0.001），血糖波动幅度增加了 57.1 %（P<0.001），血糖曲线下面积增加了 159.1 %（P<0.001）。这提示大量摄入炖煮到软烂的枣类产品不利于血糖稳定。胰岛素测定结果发现，红枣干和煮红枣干的胰岛素指数分别为 88 和 95。煮红枣干组 15 min 的胰岛素值显著高于红枣干组（P<0.05），30 min 胰岛素值有高于红枣干组的趋势（P=0.071），表明煮红枣干可更有效地诱导进食早期胰岛素分泌水平上升。

而作为餐前负荷食物使用时，与米饭餐前喝水的对照组相比，煮红枣干餐前负荷组餐后血糖峰值显著降低了 23.5 %（P<0.05），2 h 内最大血糖波动降低了 36.8 %，且有低于红枣干餐前负荷组的趋势（P=0.077）。红枣干餐前负荷组的最大血糖波动也比对照组降低了 21.1 %。煮红枣干餐前负荷组 15 min 时的胰岛素水平最高（P<0.05），而在进食米饭正餐后，煮红枣干餐前负荷组的 60 min 胰岛素水平最低（煮红枣干餐前负荷组 vs 对照组，P<0.05；煮红枣干餐前负荷组 vs 红枣干餐前负荷组+R，P=0.071），且并未增加餐后 4 h 内的胰岛素反应曲线下面积和峰值。

本研究证实，在餐前 30 min 摄入含 15 g 可利用碳水化合物的煮红枣干作为餐前负荷，可以在不增加胰岛素分泌总量的情况下，更有效地诱导米饭餐前的胰岛素分泌，从而抑制摄入米饭后的血糖快速上升态势，降低餐后血糖波动。高胰岛素指数食物可能更适合作为餐前负荷少量食用。

关键字 红枣，血糖反应，血糖指数，胰岛素指数，餐前负荷

分类：食物与营养

玉米肽对四氯化碳肝纤维化大鼠模型肌肉衰竭的影响及机制探索

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目的：肌肉衰减是慢性肝病患者最为常见的并发症之一，可导致预后不良。本研究拟探究玉米肽能否改善大鼠肝纤维化模型的肌肉衰减作用，并初步探讨其可能的影响机制。

方法：将 50 只 8 周龄健康雄性 SD 大鼠适应性喂养一周后，随机分为对照组、模型组、乳清蛋白组、玉米肽低剂量组和高剂量组。对照组动物接受腹腔注射橄榄油（1 mL/kg bw，2 次/w）外，其他各组大鼠均腹腔注射 50%CCl4-橄榄油溶液（1 mL/kg bw，2 次/w），诱导建立肝纤维化模型。同时乳清蛋白组大鼠按体重灌胃乳清蛋白 500 mg/kg/d，玉米肽低剂量组和高剂量组分别灌胃 250 mg/kg/d 和 500 mg/kg/d 的玉米肽，对照组和模型组大鼠灌胃等体积蒸馏水，共干预 8 w。干预结束前 2 日采用电子抓力计测量大鼠四肢抓力，采集标本，分析各组大鼠肝纤维化指标、称量腓肠肌重量，取肝脏组织、腓肠肌进行病理切片染色，分析肌肉组织形态结构，RT-PCR 实验分析肌肉组织中 IL-6、TNF-α、NF-κB 炎性因子基因表达水平，Western Blot 实验测定腓肠肌中肌球蛋白 Myosin、MYH2、MYL2 表达情况以及蛋白质合成相关信号分子 mTOR、p70S6K 蛋白及其磷酸化水平。

结果：干预 8w 后，各组大鼠间体重无显著差异（P>0.05），模型组、乳清蛋白组、玉米肽低剂量组和高剂量组大鼠体重略低于对照组。与对照组相比，模型组大鼠肝脏体积增大，肝指数升高，肝功能显著下降（P<0.05）。相比于模型组，玉米肽组大鼠肝功能略有好转，其中玉米肽高剂量组大鼠血清白蛋白水平显著高于模型组和乳清蛋白组（P<0.05）。各组大鼠间四肢抓力和腓肠肌指数尚未表现出显著差异（P>0.05），与对照组相比，模型组大鼠四肢抓力和腓肠肌指数呈现下降趋势。病理方面，肝脏：玉米肽组与模型组大鼠相比，肝细胞气球样变性减少，有少量炎性细胞浸润，肝纤维组织沉积面积显著低于模型组（P<0.05）。腓肠肌：对照组大鼠肌纤维组织排列整齐紧密，其他四组大鼠的肌纤维排列相对疏松。模型组大鼠肝组织中 IL-6、TNF-α、NF-κB 炎性因子基因表达水平略高于其他各组，玉米肽高剂量组显著低于模型组（P<0.05）。模型组大鼠骨骼肌中炎性因子（IL-6、TNF-α、NF-κB）的 mRNA 表达水平显著高于对照组（P<0.05），玉米肽高剂量组的炎性因子表达水平显著低于模型组（P<0.05）。相比于对照组，模型组大鼠骨骼肌中 Myosin、MYL2、MYH2 蛋白表达量均有下降的趋势，高剂量玉米肽组大鼠 Myosin 和 MYH2 的表达水平显著高于模型组（P<0.05）。模型组大鼠腓肠肌中 p-mTOR/ mTOR，p-p70S6K/ p70S6K 蛋白表达水平明显低于对照组（P<0.05），而玉米肽高剂量组蛋白磷酸化水平高于模型组（P<0.05）。

结论：玉米肽对于 CCl4 诱发的肝纤维化大鼠的肌肉功能方面未见明显改善，可能与造模时间短，长程保护作用尚未显示相关。而玉米肽组显现出明显的肝脏保护作用，抑制炎性状态，延缓肝纤维化的进展。玉米肽可以通过激活 mTOR 信号通路，促进 mTOR 和 p70S6K 蛋白磷酸化，提高蛋白质转录和翻译效率，对血清蛋白水平改善效果优于乳清蛋白。但玉米肽可抑制炎性因子表达和 mTOR 信号通路的激活，具有促进骨骼肌蛋白合成的潜力，需要进一步的研究。

关键字 玉米肽；肝纤维化；肌肉衰减；p-mTOR; mTOR

分类：食物与营养

发酵乳杆菌发酵参荷苓复方的抗肥胖机制及其在肥胖/超重人群中的减肥作用

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题目： 发酵乳杆菌发酵参荷苓复方的抗肥胖机制及其在肥胖/超重人群中的减肥作用

目的： 先前的研究表明，发酵乳杆菌（*Lactobacillus fermentum*）grx08 发酵的参荷苓复方（SHLF08）具有良好的风味，并对肥胖大鼠具有安全有效的减肥作用。本课题进一步探究 SHLF08 抗肥胖的机制，并在肥胖/超重人群中验证 SHLF08 的减肥作用。

方法：四周龄的 Wistar 大鼠，适应性喂养 1 周后随机分为三组（每组 10 只，雌雄各半，分开喂养）。实验共 8 周，除正常饮食组（ND）外，其余接受高脂饮食（HFD），肥胖模型建立后，从第 5 周开始，给予生理盐水（空白组、模型组）和 SHLF08 发酵液(SHLF08 组)灌胃处理。干预结束后，结合生化、免疫组化、基因转录水平以及肠道菌群等探究抗肥胖机制。然后通过随机、安慰剂对照试验在肥胖/超重的人群中验证 SHLF08 的减肥作用。

结果： 1.抗肥胖机制：（1）SHLF08 干预显著降低了大鼠下丘脑的神经肽 Y（NPY）和刺鼠相关肽（AGRP）mRNA 的表达（$p<0.01$）以及血清 NPY 的含量（$p<0.05$），显著升高了血清中胰高血糖素样肽-1（GLP-1）的含量（$p<0.001$），并使雌性和雄性大鼠的食量分别比 HFD 组减少了 19.58%和 9.74%（$p<0.01$）。（2）干预显著提高了大鼠肝脏法尼醇 X 受体（FXR）、AMP 依赖的蛋白激酶（AMPK）和肉毒碱棕榈酰基转移酶-1（CPT-1）mRNA 的表达（$p<0.05$），显著降低了固醇调节元件结合蛋白-1C（SREBP-1C）和硬脂酰辅酶 A 去饱和酶-1（SCD-1）mRNA 的表达（$p<0.05$）。（3）干预显著提高了棕色脂肪中过氧化物酶体增殖物激活受体 γ（PPARγ）和解偶联蛋白-1（UCP-1）mRNA 的表达（$p<0.05$），以及提高了 UCP-1 蛋白的含量（$p<0.0001$）和棕色脂肪指数（$p<0.01$）。（4）显著提高了大鼠肠道 Bifidobacterium 和 Akkermansia 的丰度、以及粪便中丁酸的含量（$p<0.05$），并显著降低了螺旋菌门的丰度、厚壁菌门/拟杆菌门比值（$p<0.05$）。2.肥胖/超重人群中的减肥作用：相对于安慰剂组，SHLF08 干预使男、女组体重分别减少了 2.59 kg、3.29 kg（$p<0.05$），体脂肪分别减少了 2.14 kg、1.85 kg（$p<0.05$），BMI 值分别减少了 0.87 kg/m^2、1.26 kg/m^2（$p<0.05$）。干预后显著降低了男性血清的 TG、LDL-C、尿酸含量（$p<0.05$），以及女性的 TC、LDL-C、尿酸含量（$p<0.05$）。此外，干预显著降低了女性的气虚、痰湿和湿热体质的分数（$p<0.05$）。

结论： 1.抗肥胖机制：SHLF08 通过多靶点、多途径发挥抗肥胖的作用，主要可能的机制包括：（1）SHLF08 可以通过调节食欲降低食量，从而降低能量摄入。（2）可能通过 FXR/SREBP-1C/SCD-1 途径抑制脂肪的合成，以及可能通过 AMPK/CPT-1 途径增加脂肪酸 β 氧化，进而恢复脂质代谢平衡。（3）可能通过增加棕色脂肪细胞产热而消耗能量。（4）可能通过改善肠道菌群和短链脂肪酸的失衡，平衡能量稳态。2.肥胖/超重人群中的减肥作用：SHLF08 可以降低肥胖/超重人群的血脂、体脂以及体重和 BMI 值，发挥了一定的补气、祛湿减肥的功效。

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关键字 参荷苓复方；发酵乳杆菌；食欲抑制；脂质代谢；棕色脂肪

分类：食物与营养

光催化-芬顿法降解硫酸软骨素及其铁复合物的生物利用度研究

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硫酸软骨素(Chondroitin sulfate，CS)是一种广泛存在于人和动物结缔组织中的天然糖胺聚糖，具有抗氧化、抗肿瘤、免疫调节、抗动脉粥样硬化等有益的健康促进作用。天然硫酸软骨素的高分子量（50～100kDa）使其溶解度较低，吸收性差，限制了其在体内的消化吸收及生物利用度。硫酸软骨素的分子量与其生物活性密切相关，低分子量硫酸软骨素（LWCS）被认为具有增强的功能活性和生物利用率等，具有开发为药物和膳食补充剂的更大潜力，但关于硫酸软骨素的高效降解方法及活性的研究较少。本课题创新性的利用光催化-芬顿体系降解硫酸软骨素，并采用高效凝胶渗透色谱法、化学法测定降解前后分子量及化学成分的变化，采用紫外光谱、傅里叶红外光谱、圆二色谱、扫描电镜&射线能谱、核磁共振波谱和 HPLC-ESI-MS^n技术对硫酸软骨素及其降解产物进行结构表征及结构鉴定，采用体外模拟消化模型对降解产物的铁释放特性进行研究。结果表明，催化条件为 2.5g/LTiO_2，400mM H_2O_2，10mM $FeSO_4$时，反应 0min、15min 和 60min 硫酸软骨素的分子量分别降低至 4.77kDa、2.47kDa 和 1.21kDa（依次命名为 LWCS0、LWCS15 和 LWCS60）。化学成分分析表明降解产物的硫酸多糖、还原糖、糖醛酸和硫酸基团含量随降解时间的增加显著降低，而铁含量呈现逐步增加（6.02±0.17～7.56±0.50%）的趋势。同时，氧化降解及铁的络合导致低分子量硫酸软骨素的官能团及构象发生改变，LWCS 中的羧基、硫酸基团等参与了与铁的络合。扫描电镜&射线能谱分析进一步表明 LWCS 中铁与多糖发生络合，加强了多糖分子之间的聚集，使得降解产物呈现紧密连接和表面光滑的微观形貌。核磁共振波谱 1H 谱及 HSQC 谱显示归属于 GlcA 的 H-5 信号及 C-5/H-5 信号随着降解时间的增加而消失，证明了光催化-芬顿反应的降解作用位点可能为 GlcA。HPLC-ESI-MS^n结果显示在 LWCS60 中共鉴定出 5 种寡糖片段，在二糖至四糖之间分布，其还原端多为阿拉伯糖醛酸，并提出了其解聚机理。体外模拟消化结果显示与 LWCS0 和 LWCS15 相比，LWCS60 在胃部环境中的铁释放率最高，消化终点时铁的释放率达到 18.56±1.76%，而在模拟肠消化环境中铁释放率几乎不发生改变。本研究通过光催化-芬顿法降解硫酸软骨素制备得到一种低分子量硫酸软骨素-铁复合物，降解主要通过作用于 GlcA 得到低分子量产物，其与铁络合后增加胃肠道消化过程中铁的释放率，是一种潜在的膳食铁补充剂。同时为今后研究光催化-芬顿氧化降解硫酸软骨素的机制提供了科学参考及理论依据。

关键字 硫酸软骨素；光催化-芬顿；低分子量；铁复合物；生物利用度

分类：食物与营养

核桃中具有潜在预防阿尔兹海默症植物化学成分的筛选与分析

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目的：

阿尔茨海默病（Alzheimer's disease，AD）是一种神经退行性疾病，作为痴呆的主要原因已严重威胁老年人的健康。本研究通过筛选并分析核桃可食部甲醇提取物不同萃取相中潜在预防 AD 的植物化学活性成分，旨在为核桃功能性产品的进一步研发以及预防 AD 活性成分的基础研究提供理论依据。

方法：

核桃可食部甲醇提取后，经正己烷、二氯甲烷、乙酸乙酯、正丁醇逐步萃取，分别得到核桃甲醇提取物的不同萃取相；通过乙酰胆碱酯酶抑制实验、β 分泌酶 1 抑制实验、铁还原能力（FRAP）和氧自由基吸收能力（ORAC）测定、DPPH 自由基及 NO 自由基清除能力实验筛选可能预防 AD 作用更强的萃取相；进一步利用超高效液相色谱-串联质谱法（UPLC-MS/MS）分析和鉴定其中的植物化学成分，并结合以往文献最终评价了核桃中 10 种酚类成分的预防 AD 效果以及在核桃不同部位的含量。

结果：

核桃可食部甲醇提取物的提取率为 25.5 %；甲醇提取物不同萃取相的得率分别为正己烷相 78.1 %、二氯甲烷相 2.3%、乙酸乙酯相 1.4 %、正丁醇相 4.9 %及水相 5.1%。乙酸乙酯萃取相表现出最强的乙酰胆碱酯酶抑制活性、稍逊于正丁醇相的 β 分泌酶 1 抑制活性；在 FRAP 和 ORAC 能力评价、DPPH 及 NO 自由基清除实验中，乙酸乙酯相的效果均最优。进一步将具有潜在预防 AD 综合能力较好的乙酸乙酯萃取相进行 UPLC-MS/MS 分析，发现其中包括酚类、脂肪酸类等 54 种植物化学成分。以酚类化合物为研究焦点，结合 UPLC-MS/MS 分析结果和以往文献报道，最终筛选出没食子酸、水杨酸、鞣花酸、槲皮素、儿茶素、表儿茶素、6-姜酚、邻苯三酚、圣草酚、阿魏酸甲酯等 10 种酚类成分。活性测定和含量分析结果显示，各酚类化合物均具有酶抑制及抗氧化活性。其中，没食子酸、邻苯三酚、鞣花酸、槲皮素和儿茶素的综合活性较强。利用超高效液相色谱分析测定核桃青皮、核桃壳、核桃分心木、核桃种皮及核桃仁中被筛选酚类化合物的含量结果表明，邻苯三酚在核桃种皮中的含量最高，其次是鞣花酸，核桃壳是鞣花酸、没食子酸、儿茶素、圣草酚、和阿魏酸甲酯的良好来源。

结论：

核桃可食部甲醇提取物的乙酸乙酯萃取相具有更强的预防 AD 潜力，酚类化合物可能是其中主要的贡献成分。核桃壳中存在着较高含量的酚类成分，提示着开发核桃壳中预防 AD 植物化学成分，具有提高核桃副产物资源利用率的可能。综合活性较强的邻苯三酚和鞣花酸在核桃种皮中的含量较高，也建议核桃仁与种皮同时食用，健康效果更佳。

关键字 核桃，阿尔兹海默症，植物化学成分，UPLC-MS/MS，筛选与分析

分类：食物与营养

安石榴苷通过 CX3CL1/CX3CR1 轴对糖尿病小鼠认知功能障碍的保护作用及机制研究

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目的：糖尿病认知功能障碍是糖尿病严重的并发症之一。研究表明，氧化应激、神经炎症与糖尿病认知功能障碍密切相关，而 CX3CL1/CX3CR1 轴与越来越多的神经退行性疾病密切相关，被认为是改善氧化应激及神经炎症进而预防或减缓糖尿病认知功能障碍发生发展的潜在靶点。安石榴苷是石榴中含量最丰富的多酚类化合物，具有抗氧化、抑菌、抗炎及调节脂质代谢等生物活性作用，最近发现安石榴苷具有潜在的神经保护作用。因此本研究通过观察安石榴苷对糖尿病小鼠认知功能障碍的影响，并探讨其可能机制，为安石榴苷的进一步开发利用奠定基础。

方法：30 只 C57BL/6J 雄性小鼠，适应性喂养 1 周，随机分为正常组和模型组。正常组喂以基础饲料，模型组喂以高脂饲料。高脂饮食 8 周后，模型组动物腹腔一次性注射 STZ100mg / kg，对照组动物注射等量溶剂，注射后 72h 测空腹血糖，血糖值≥11.1mmol/L 者为造模成功，作为糖尿病小鼠纳入实验。将糖尿病小鼠随机分为 2 组：模型组、安石榴苷干预组。安石榴苷干预组小鼠连续灌胃给药 10 周(20mg/kg)，干预结束前 7 天进行 Morris 水迷宫实验来评估糖尿病小鼠的认知功能。干预结束后，脑组织进行 HE 染色及 Nissl 染色观察脑组织的病理形态学改变；Western-blot 法检测海马 CX3CL1、CX3CR1 蛋白，氧化应激蛋白 Nrf2、SOD2，神经炎症相关蛋白 TXNIP、NLRP3、IL-1β、Caspase-1、TNF-α 表达水平。

结果：Morris 水迷宫行为学实验结果显示，与正常组相比，模型组小鼠逃避潜伏期显著延长，穿越平台次数显著减少（P＜0.01）。安石榴苷干预后，模型组小鼠出现潜伏期逐渐下降趋势，并且潜伏期显著缩短，穿越平台次数显著增加（P＜0.05），表明安石榴苷可以改善糖尿病小鼠的学习和记忆能力。HE 染色发现模型组小鼠海马神经元表现出排列不规则、细胞间隙变宽、细胞体积减小和核浓缩等病理特征，安石榴苷干预后小鼠海马神经元病理改变有明显改善。Nissl 染色发现模型组小鼠海马的尼氏小体染色较正常组浅，神经元中 Nissl 体消失，神经元细胞数量减少，安石榴苷干预后 Nissl 体数量有所增加，提示安石榴苷可以改善糖尿病小鼠海马神经元 Nissl 体数量及预防神经元丢失。Western Blot 结果显示，与正常组相比，模型组中 CX3CL1、CX3CR1 蛋白显著降低（P＜0.05），氧化应激相关蛋白 Nrf2、SOD2 显著降低（P＜0.01），神经炎症相关蛋白 TXNIP、NLRP3、IL-1β、Caspase-1、TNF-α 水平显著升高（P＜0.05）。与模型组相比，安石榴苷干预组中 CX3CL1、CX3CR1 蛋白显著升高（P＜0.05），Nrf2、SOD2 显著升高（P＜0.05），TXNIP、NLRP3、IL-1β、Caspase-1、TNF-α 蛋白表达显著降低（P＜0.05）。

结论：安石榴苷可能通过调节 CX3CL1/CX3CR1 信号通路发挥抗氧化及抗神经炎，调节神经元形态和功能，进而改善糖尿病认知功能障碍。

关键字 糖尿病认知功能障碍；安石榴苷；CX3CL1/CX3CR1；氧化应激；炎症

分类：食物与营养

线粒体动力学调控 NEK7/NLRP3 在安石榴苷改善糖尿病肝损伤中的机制研究

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目的：糖尿病肝损伤（Diabetic Liver Injury，DLI）是糖尿病严重并发症之一。研究表明，NLRP3 炎症小体在糖尿病肝损伤发生发展中起着关键作用，而线粒体动力学失衡在 NLRP3 炎症小体激活过程中扮演着重要角色。NIMA 相关蛋白激酶 7（NIMA-related protein kinase 7，NEK7）具有调控线粒体功能等作用，近年研究发现，NEK7 是活化 NLRP3 炎性小体的关键蛋白。目前，糖尿病肝损伤药物疗效不稳定、副作用大，天然来源、安全高效的植物活性成分成为研究热点。安石榴苷（Punicalagin, PU）是从石榴皮中提取的一种多酚类物质，具有抗炎、抗氧化等生理活性。本研究通过建立糖尿病肝损伤动物模型，明确线粒体动力学调控 NEK7/NLRP3 炎症小体通路在安石榴苷改善糖尿病肝损伤中的作用及可能机制，为安石榴苷的开发利用及糖尿病肝损伤防治提供新思路。

方法：雄性 C57BL/6 小鼠 30 只，适应性喂养 1 周，随机分为正常对照组、模型组和安石榴苷干预组。正常对照组给予基础饲料喂养。模型组和安石榴苷干预组给予高脂饲料喂养，8 周后，禁食不禁水 12 h，腹腔注射链脲佐菌素（100 mg/kg·BW），72h 后检测小鼠空腹血糖水平，空腹血糖≥11.1mmol/L 为造模成功。造模成功后，安石榴苷干预组小鼠连续灌胃给药 10 周（PU=20 mg/kg·BW），正常对照组和模型组灌胃给予等体积的蒸馏水。喂养期间自由摄食、饮水，明暗周期为 12h。采用生化试剂盒检测小鼠血清 ALT、AST、TNF-α、IL-6、IL-18、IL-1β 水平，HE 染色观察肝脏病理改变，Western Blot 法检测肝脏线粒体动力学、NEK7/NLRP3 通路相关蛋白表达水平。

结果：与正常对照组相比，模型组小鼠血清 ALT、AST、TNF-α、IL-6、IL-18、IL-1β 水平显著升高（$P<0.05$），肝脏出现脂肪病变、炎症细胞浸润等病理学改变，提示小鼠糖尿病肝损伤造模成功。与模型组相比，安石榴苷干预组小鼠血清 ALT、AST、TNF-α、IL-6、IL-18 水平显著降低（$P<0.05$），肝组织损伤程度减轻，提示安石榴苷对糖尿病肝损伤具有保护作用。进一步研究显示，与正常对照组相比，模型组小鼠肝脏 NEK7、NLRP3、Caspase-1、IL-1β、TNF-α 蛋白表达显著增加（$P<0.01$），线粒体融合相关蛋白 Mfn2、Opa1 表达显著降低（$P<0.01$），线粒体分裂相关蛋白 Drp1、p-Drp1（Ser616）表达显著增加（$P<0.01$）。与模型组相比，安石榴苷干预组小鼠肝脏 NEK7、NLRP3、Caspase-1、IL-1β、TNF-α 蛋白表达显著降低（$P<0.01$），线粒体融合相关蛋白 Mfn2、Opa1 表达显著增加（$P<0.05$），线粒体分裂相关蛋白 Drp1、p-Drp1（Ser616）表达显著降低（$P<0.01$），提示安石榴苷可能通过抑制线粒体分裂，上调线粒体融合，改善线粒体动力学稳态，从而抑制 NEK7 /NLRP3 通路激活，减轻肝脏炎症，发挥糖尿病肝损伤保护作用。

结论：安石榴苷可能通过抑制线粒体分裂，上调线粒体融合，改善线粒体动力学稳态，从而抑制 NEK7 /NLRP3 通路激活，减轻肝脏炎症，发挥糖尿病肝损伤保护作用。

关键字 安石榴苷；糖尿病肝损伤；线粒体动力学；NEK7；NLRP3

分类：食物与营养

蜂蜜对大鼠血尿酸水平及肝脏损伤研究

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蜂蜜对大鼠血尿酸水平及肝脏损伤研究
摘要：
题目　蜂蜜对大鼠血尿酸水平及肝脏损伤研究
目的　本研究主要观察氧嗪酸钾模型大鼠饮用洋槐蜂蜜（AH）水溶液后，对大鼠血尿酸、血生化水平及肝脏组织影响。
方法　试剂配制　取市售洋槐蜂蜜，参照《食品安全国家标准　食品中果糖、葡萄糖、蔗糖、麦芽糖、乳糖的测定》（GB5009.8-2016）测定果糖含量，确定本品每100g果糖含量约为40g。实验时，用双蒸水将AH配制成25%、12.5%及6.25%蜂蜜水溶液，其对应果糖含量分别为10%、5%及2.5%；用双蒸水将果糖配制成10%水溶液，供大鼠饮用。动物分组及给药　雄性SD大鼠60只，随机分为6组，每组10只，即空白对照组（CON对照组）、氧嗪酸钾模型组（OA模型组）、10%果糖组（10%F组）、25%蜂蜜组（25%AH组）、12.5%蜂蜜组（12.5%AH组）及6.25%蜂蜜组（6.25%AH组）。CON对照组每次皮下注射5%CNC-Na溶液，其余各组每天按100mg/kg皮下注射5%CMC-Na助悬的OA溶液。所有动物每日全价营养饲料喂养，CON对照组与OA组每日饮用无菌水，10%F组每日饮用足量10%果糖水溶液，其余3组每日饮用足量含不同浓度的AH水溶液。本试验为期4w。大鼠血清尿酸含量测定　所有大鼠试验前及试验期间每周剪尾采血一次，采血量0.4～0.5mL，4℃静置1h，3000rpm/min离心10min，取上清，按照尿酸检测试剂盒测定大鼠血尿酸水平。大鼠血清生化指标检测　试验结束后，大鼠腹腔麻醉，腹主动脉取血，4℃静置1h，3000rpm/min离心10min，取上清，按照试剂盒说明书要求测定大鼠血清甘油三酯、总胆固醇、游离脂肪酸、低密度脂蛋白胆固醇与高密度脂蛋白胆固醇含量，同时测定谷丙转氨酶活性、谷草转氨酶活性。大鼠肝脏重量及脏器系数测定　试验结束后，大鼠腹腔麻醉，取肝脏，吸干表面血迹后称重，并计算脏器系数，即（脏器重量/大鼠体重）′100%。
肝脏组织学观察　取肝脏，10%甲醛固定，石蜡包埋、切片、HE染色后，光镜下观察组织病变情况，并进行各组间病变情况比较。统计学处理　实验数据以均数±标准差（`c±SD）表示。采用SPSS软件包进行统计处理，多组间数据比较根据各组正态及方差齐性与否选择单因素方差分析或是Kruskal-Wallis秩和检验，组间比较采用最小显著差异法（LSD），以P<0.05表示差异有统计学意义。
结果　与空白对照组相比，蜂蜜可显著升高大鼠体内血尿酸水平，增加大鼠肝脏重量及脏器系数；高、中剂量蜂蜜组还可升高血清TG、游离脂肪酸、HDL-C，但对总胆固醇及LDL-C影响不大；低剂量蜂蜜组则对血清TG、游离脂肪酸、HDL-C、总胆固醇及LDL-C水平均有不同程度的升高。所有蜂蜜组别大鼠均呈现不同程度的肝脏脂肪病变，并具有剂量依赖性；中、高蜂蜜组脂肪病变程度大于果糖组。结论　在一定剂量范围内，蜂蜜能引起大鼠高尿酸血症、高TG血症及肝脏脂肪病变。

关键词：洋槐蜂蜜；氧嗪酸钾；果糖；尿酸；脂肪肝
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关键字 洋槐蜂蜜；氧嗪酸钾；果糖；尿酸；脂肪肝

分类：食物与营养

蜂蜜对大鼠血尿酸水平及肾损伤研究

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摘要：

题目蜂蜜对大鼠血尿酸水平及肾损伤研究。

目的随着人们生活水平的提高，饮食结构也发生极大变化，随之而来的是高尿酸血症发病率上升，并趋向低龄化。高尿酸血症与果糖摄入密切相关。果糖一方面在肝脏代谢促进尿酸生成，另一方面可通过多种途径引起血尿酸水平升高。天然果糖广泛存在于甘蔗、甜菜、蜂蜜和大多数水果中。蜂蜜作为功能性营养品或“保健品”，其果糖含量约占 38.5%，葡萄糖含量约占 31%，此外还含有蔗糖、麦芽糖以及海藻糖等。蜂蜜中如此高的果糖含量，是否会引起人体血尿酸水平升高同时导致肾脏组织损伤是我们此次研究的重点。本研究主要观察氧嗪酸钾模型大鼠饮用洋槐蜂蜜（AH）水溶液后，对大鼠血尿酸水平及肾功能的影响。

方法试剂配制取市售洋槐蜂蜜，参照《食品安全国家标准食品中果糖、葡萄糖、蔗糖、麦芽糖、乳糖的测定》（GB5009.8-2016）测定果糖含量，确定本品每 100g 果糖含量约为 40g。实验时，用双蒸水将果糖配制成 10%水溶液，将 AH 配制成 25%、12.5%及 6.25%蜂蜜水溶液，其对应果糖含量分别为 10%、5%及 2.5%，供试验期间大鼠饮用。 动物分组及给药雄性 SD 大鼠 60 只，随机分为 6 组，即空白对照组（CON 对照组）、氧嗪酸钾模型组（OA 模型组）、阳性对照 10%果糖组（10%F 组）、25%蜂蜜组（25%AH 组）、12.5%蜂蜜组（12.5%AH 组）及 6.25%蜂蜜组（6.25%AH 组），每组 10 只。CON 对照组每次皮下注射 5%CNC-Na 溶液，其余各组每天按 100mg/kg 皮下注射 5%CMC-Na 助悬的 OA 溶液。所有动物每日全价营养饲料喂养，CON 对照组与 OA 组每日饮用无菌水，10%F 组每日饮用足量 10%果糖水溶液，其余 3 组每日饮用足量含不同浓度的 AH 水溶液。本试验为期 4w。大鼠血清尿酸、肌酐及尿素氮含量测定所有大鼠试验前及试验期间每周剪尾采血一次，采血量 0.4～0.5mL，4℃静置 1h，3000rpm/min 离心 10min，取上清，按照尿酸检测试剂盒测定大鼠血尿酸水平。试验前及试验期间大鼠每周称重并取血一次，试验结束后取血、尿、粪便及肾脏组织，测定血、尿、粪便中尿酸含量、血清肌酐及尿素氮水平及肾脏组织炎症因子，并进行肾脏组织病理切片观察。

结果与空白对照组相比，蜂蜜可显著降低大鼠体重（P<0.05），增加大鼠肾脏脏器系数，升高大鼠血尿酸、尿尿酸（UUA）、血清肌酐及尿素氮水平，降低大鼠粪尿酸（FUA）水平；蜂蜜可下调大鼠肾脏组织肿瘤坏死因子 a（TNFa）水平（P<0.05）、上调单核细胞趋化蛋白 1（MCP-1）及转化生长因子 b1（TGF-b1）表达水平；蜂蜜能引起大鼠肾脏组织肾小管轻微到轻度扩张及轻到中度嗜碱性病变，并具有剂量依赖性。

结论蜂蜜能引起大鼠高尿酸血症、肾小管扩张及嗜碱性病变，导致肾功能损伤。

关键词：洋槐蜂蜜；氧嗪酸钾；果糖；尿酸

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关键字 洋槐蜂蜜；氧嗪酸钾；果糖；尿酸

分类：食物与营养

利用 3D 营养配餐系统对某高校学生进行的膳食诊断结果分析

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【目的】
交互体验式营养教育系统“3D 营养配餐和膳食行为训练系统”（简称 3D 配餐系统）是一种新型营养指导工具，它利用带有 IC 数据芯片的等比大小的食物模型为载体进行配餐，通过计算机的后台运算，能自动生成食物搭配合理度评价结果，记录菜肴搭配的种类、摄入量和营养分析数据。本研究是利用这套系统对在校大学生的饮食行为进行调查，对配餐中菜肴选择的数量和营养摄入值进行分析，并探讨 3D 系统在未来营养教学中如何发挥更大的作用。

【方法】
研究对象为某高校公共卫生专业一年级入学新生男女共 65 名。实验实施前专业指导教师就实验目的和操作方法进行了详细说明，学生们预先得到了“菜谱清单”（实训用 3D 食物模型 150 种），将晚饭时希望进食内容做了勾选。实验当天，参加者拿着已勾选内容的清单在陈列的食物模型中选择对应的食品，将托盘置于 3D 配餐系统信息读取装置上，完成数据采集。

【结果】
所有参与实验的学生都非常开心的完成了配餐活动，他们不但对食物组合的过程兴趣浓厚，对配餐结果和食物搭配合理度评价也表现出了关注。结果显示，男生选择“主菜/大荤”、女生选择“副菜/素菜”时，均有比较明显的复数（多选）选择倾向。女生中还存在不选择“主食”者。从营养素摄入量结果分析看，男生不论是中体力活动还是轻体力活动类型，获得高于 RNI 推荐量的是蛋白质和维生素 C，低于推荐量的是碳水化合物、膳食纤维、维生素 A、B1、B2、钙和铁。女生高于推荐值的摄入营养素为蛋白质、维生素 C、烟酸和钠，脂肪摄入基本在合理范围，其他营养素均显示不足的结果。从晚餐菜品组合的数量看，选择 3 种的人数最多。男生选择 5-6 种，女生选择 3 种的情况也属常见。

【结论】
本研究利用 3D 营养配餐系统，通过数据分析对在校大学生的配餐（选餐）状况和晚餐营养摄入水平有了一定的掌握，同时，也明确了该系统在教学环节存在的一些问题点。今后，我们将进一步研究 3D 营养配餐系统在教学和健康教育领域的新的应用方法，为高校学生饮食生活的改善，为居民健康素养的提升做出贡献。

【关键词】
营养诊断，膳食调查，3D 营养配餐，食物模型

关键字 营养诊断，膳食调查，3D 营养配餐，食物模型

分类：食物与营养

基于体外模拟消化探讨枸杞果渣蛋白酶解液对血管紧张素转换酶抑制活性的影响

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目的 枸杞果渣作为枸杞深加工的主要待利用产品是目前研究的热点之一，本研究探讨以“宁杞 1 号”头茬果和夏果、“宁杞 7 号”夏果及“宁杞 7 号”夏果果渣为原料制备的枸杞蛋白酶解液的血管紧张素转换酶（Angiotensin-converting enzyme, ACE）抑制效果，同时评价体外模拟胃肠消化对枸杞蛋白酶解液 ACE 抑制效果稳定性的影响，为宁夏枸杞及枸杞果渣的进一步开发和利用提供一定的理论依据。

方法 将“宁杞 1 号”头茬果和夏果、“宁杞 7 号”夏果及“宁杞 7 号”夏果果渣用粉碎机粉碎，过 80 目筛子，分别制成 4 种 80 目过筛粉，同时制备“宁杞 7 号”夏果果渣的超微粉。碱提酸沉法提取 5 种枸杞粉样本中的枸杞蛋白后用中性蛋白酶酶解，制备枸杞蛋白酶解液，并用冻干机将枸杞蛋白酶解液冻干，制备成酶解液冻干粉，将冻干粉分别配置成 5 种 10mg/ml 枸杞蛋白酶解物溶液，同时配置 10mg/ml 的卡托普利溶液作为对照。双缩脲法测定 5 种枸杞酶解物冻干粉溶液的多肽含量；FAPGG 法测定 ACE 抑制率；根据 INFOGEST 的静态体外模拟方案模拟胃肠道消化，分别测定胃、肠消化后的 ACE 抑制率，评估其抵抗胃肠道酶降解的能力。

结果 各组样品多肽含量为 3.94-6.08 mg/mL，“宁杞 1 号”夏果组多肽含量最高（6.08±0.03 mg/mL），“宁杞 7 号”夏果组（5.99±0.08 mg/mL）和“宁杞 1 号”夏果组（6.08±0.03 mg/mL）的多肽含量相近（$P>0.05$），但较“宁杞 1 号”头茬组（3.94±0.01 mg/mL）分别显著增加 2.05 mg/mL 和 2.14 mg/mL（$P<0.05$），“宁杞 7 号”夏果果渣组（4.48±0.01 mg/mL）蛋白酶解物多肽含量较“宁杞 1 号”头茬组高 0.54 mg/mL（$P<0.05$），但较“宁杞 7 号”夏果组减少 1.51 mg/mL（$P<0.05$），“宁杞 7 号”夏果果渣超微粉组（5.27±0.01 mg/mL）较“宁杞 7 号”夏果果渣组提高 0.79 mg/mL（$P<0.05$）；各组样品的平均 ACE 抑制率为 67.33±7.63%，均低于 10mg/mL 卡托普利的 ACE 抑制率（82.27±1.10%）（$P<0.05$），“宁杞 1 号”头茬组（55.81±1.93%）的 ACE 抑制率较“宁杞 1 号”夏果组（69.91±3.51%）低 14.10%（$P<0.05$），“宁杞 7 号”夏果组（71.37±1.21%）与“宁杞 1 号”夏果组的 ACE 抑制率无显著差异（$P>0.05$），进一步比较枸杞果渣的 ACE 抑制效果发现，“宁杞 7 号“夏果果渣组（64.08±1.56%）的 ACE 抑制率较“宁杞 7 号”夏果组降低 7.29%（$P<0.05$），但由“宁杞 7 号”夏果果渣超微粉制得的蛋白酶解液 ACE 抑制率显著高于其余各组（75.50±1.66%）（$P<0.05$）；与消化前相比，模拟胃消化后 ACE 抑制率降低，“宁杞 7 号”夏果果渣组、“宁杞 7 号”夏果果渣超微粉组、“宁杞 7 号”夏果组、“宁杞 1 号”头茬组、“宁杞 1 号”夏果组分别降低 6.80 %、3.80 %、2.06 %、1.88 %、2.92 %，继续进行模拟肠消化，其 ACE 抑制率均升高（较胃消化产物分别升高 9.37 %、5.94 %、5.93 %、2.29 %、5.12 %），且均高于消化前的 ACE 抑制率，表明枸杞蛋白酶解液对胃肠道酶的消化作用具有良好的稳定性。

结论 5 种枸杞蛋白酶解液均具有较高的 ACE 抑制活性，且酶解液中的多肽在模拟胃肠道消化过程中对胃蛋白酶和胰酶的降解具有良好的抗性。枸杞果渣超微粉制备的蛋白酶解液 ACE 抑制率最高。

关键字 枸杞蛋白；酶解液；血管紧张素转换酶抑制率；体外模拟；稳定性

分类：食物与营养

孕期膳食营养指导对母乳乳汁成分的影响

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孕期膳食营养指导对母乳乳汁成分的影响

目的：探究孕期膳食营养指导对母乳乳汁成分的影响，提出适合中国孕妇的合理营养指导建议，促进母婴健康。

方法：对 2021 年 01 月-2023 年 01 月期间在我院待产的 156 例孕妇的临床资料进行回顾 分析,依据护理方案的不同将孕妇分为对照组和实验组各 78 例,对照组孕妇待产期间进行常规健康教育指导,实验组孕妇在对照组患者的基础上进行个性化孕期膳食营养指导。具体方法为：（1）孕妇膳食调查：调查孕妇膳食营养摄取情况，要求孕妇如实详细记录自己饮食情况连续 3d，由进行过专业营养知识培训的营养师对收集到的孕妇的营养摄入情况进行分析，详细记录并建立孕妇个人健康档案。（2）保健知识宣讲：对孕妇及家属定期进行孕期保健知识宣讲，为每个待产家庭科普营养保健相关知识，并建议孕妇进行正确体重管理，告知其体重增长过快或体重过低的危害，提升孕妇的重视及配合度。（3）为孕妇制定健康管理方案，针对不同孕妇制定个性化膳食营养方案，并建立个人档案，随时记录孕妇身体健康及营养信息。根据孕周制定合理膳食指导；孕早期（孕 1-12 周）建议少食多餐，多吃富含维生素和微量元素的食物；孕中期（孕 13-27 周）需要摄入大量蛋白质维持胎儿的生长发育，同时还需要大量的钙、磷、碘、锌等微量元素促进骨骼和大脑发育；孕晚期（孕 28 周-分娩）：蛋白质仍是首要补充的营养，其次是钙、磷和维生素 D，为胎儿牙齿和骨骼生长所必须。由经过培训的专业营养师对孕妇进行膳食营养指导直至分娩，收集产后 40-45d 的母乳乳汁进行成分分析，采用乳汁分析仪测定乳汁宏量营养素水平。观察分析两组孕妇孕期营养状况及分娩之后的母乳成分。组间比较采用独立样本 t 检验进行统计学分析，以 P<0.05 为差异具有统计学意义。分析孕妇孕期膳食营养指导与乳汁成分之间的关系。

结果：实验组乳汁平均能量为（62.35±10.17）kcal.100g-1，蛋白质含量为（0.93±0.15）g.100-1，脂类含量为（3.32±1.14）g.100-1，乳糖含量为（6.15±.0.65）g.100-1，对照组乳汁平均能量为（59.46±8.35）kcal.100g-1，蛋白质含量为（0.78±0.25）g.100-1，脂类含量为（4.52±2.03）g.100-1，乳糖含量为（5.65±.0.82）g.100-1。结果显示实验组乳汁成分均衡，各成分比例均处于正常参考范围内，提示乳汁质量较好，且平均能量显著高于对照组（P<0.05）。对照组蛋白质含量低于对照组，脂类含量高于对照组，乳糖含量高于对照组，差异均具有统计学意义（P<0.05）。

结论：孕期膳食营养指导能够及时调整孕期营养摄入，达到孕期营养均衡，可以使孕妇在分娩后的乳汁营养成分更好，利于婴儿生长发育。

关键字 孕期营养；膳食指导；乳汁成分

分类：食物与营养

复配营养强化剂中铁含量的测定研究

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本文研究的是样品采用的是盐酸溶解法进行前处理，利用火焰原子吸收光谱法测定复配营养强化剂中铁的含量。结论：该方法检测效率高、准确，灵敏，可用于测定复配营养强化剂中铁的含量。

关键词：复配营养强化剂；原子吸收；前处理；铁。

前言

随着社会经济水平的提高，人们越来越注重自身健康问题，但由于缺乏正确的营养知识和认知，导致许多营养相关疾病的患病率不断攀升。据 2004 年 10 月 12 日卫生部发布的“中国居民营养与健康状况调查”显示，铁,维生素 A 等微量营养素缺乏是我国城乡居民普遍存在的问题。我国居民贫血患病率平均为 15.2%； 2 岁以内婴幼儿、60 岁以上老人、育龄妇女贫血患病率分别为 24.2%、21.5%和 20.6%,，微量元素对维护人体的健康很重要，如果摄取不当就会导致各种疾病的生成，严重时还会危及生命，例如微量元素铁具有造血功能，严重缺乏就有可能患有各种贫血症。目前，全世界大约有 20%~50%的人有不同程度的铁缺乏，尤其以发展中国家多见，发生率大约是发达国家的 4 倍。由此可见缺铁性贫血已成为仅次于结核病的全球患病率最高、耗资最大的公共卫生问题[1]。

1 实验部分

1.1 实验原理

试样消解后,经原子吸收火焰原子化,在 248.3nm 处测定吸光度值。在一定浓度范围内铁的吸光度值与铁含量成正比,与标准系列比较定量。

1.2 实验仪器

原子吸收分光光度计；通风橱；电炉；分析用钢瓶乙炔气和空气压缩机； 250ml 三角瓶；天平：感量为 0.1 mg

1.3 实验所需材料与试剂

洗瓶；移液枪；枪头；盐酸 1:1（优级纯）；铁标准溶液 100μg/mL（铁元素标准使用液须有标准物质证书）。

1.4 试剂的配制

盐酸（1+1）：50ml 盐酸溶于 50ml 水中。

铁标准系列溶液:分别准确吸取铁标准中间液(100mg/L)0mL、0.500mL、1.00mL、2.00mL、3.00mL、4.00mL 于 100mL 容量瓶中,加硝酸溶液(5+95)定容至刻度,混匀。此铁标准系列溶液中铁的质量浓度分别为 0mg/L、0.500mg/L、1.00mg/L、2.00mg/L、3.00mg/L、4.00mg/L。

1.5 实验步骤

1.5.1 样品前处理

称取混匀的试样约 0.2-0.25g 左右，置于 25ml 比色管中，后加入 2.5ml 盐酸（1+1）放置于水浴锅中加热溶解。等溶解完全后，拿下，放冷，定容，混匀，待稀释。根据铁元素标准曲线范围，对样品溶液进行稀释。该样品稀释液为上机待测液。

1.6 开机测试

以浓度为横坐标，对应的吸光度为纵坐标，得出溶液的标准曲线，如下图所示。再对样品稀释液中的铁元素进行测定，测得样液浓度。

1.6.3 结果与计算

铁元素含量按下式计算

式中

X——试样中铁元素的含量　　μg/ g
C——测定液中铁元素的浓度　μg/mL
——空白试样中铁元素的含量　μg/mL
V　——样液定容体积　　mL
f——样液稀释倍数
m——试样的质量　g
2 结论
计算结果如下图所示：
我们选取了一种复配营养强化剂取了 6 个样品用样品前处理盐酸溶解法进行铁元素的检测：

通过使用原子吸收光谱仪测定某一复配营养强化剂铁的含量，从计算结果可以看出，该样品铁的含量符合配方要求。说明该样品铁含量的测定可以使用盐酸溶解样品前处理。

关键字 复配营养强化剂；原子吸收；前处理；铁。

分类：食物与营养

上海 122 种市售现制奶茶营养特征

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［背景］随着世界范围内饮料的生产和消费不断增长，我国饮料的生产和消费量也逐年上升，市售现制奶茶行业处于快速发展期，其营养素含量研究甚少，制约了奶茶营养指导工作的开展。现制奶茶作为新型含糖饮料的代表，在制作过程中往往添加一定量添加糖。含糖饮料的过量摄入可能引起一些不良健康效应，如体重增加、肥胖、2 型糖尿病 、龋齿、代谢综合征等。

［目的］ 测定上海市部分市售现制奶茶的营养素含量，分析奶茶的营养特点。旨在为开展膳食调查及市售现制奶茶风险评估提供基础数据，为制定奶茶相关政策和营养指导提供科学依据。

［方法］ 2018 年和 2021 年，在“美团”和“饿了么”订餐平台上搜索“奶茶”，共选取在上海市有≥3 家分店的现制奶茶品牌共 13 个，采集其销量排名靠前的 3 类现制奶茶（奶茶（包含其销售的所有甜度等级）、奶盖茶、水果茶），共采集 122 种。样本交给具备 CMA 和 CNAS 资质的公司采用国标方法检测能量、蛋白质、脂肪、碳水化合物、糖（包括蔗糖、葡萄糖、果糖、乳糖、麦芽糖）。对样品采集和实验室检测过程均进行质控。

［结果］ 市售现制奶茶能量中位数奶盖茶＞奶茶＞水果茶，分别是 322 KJ·100g-1、315 KJ·100g-1 和 183 KJ·100g-1。能量的主要来源于碳水化合物和脂肪。奶盖茶、奶茶的能量、蛋白质、脂肪含量显著高于水果茶，三者的碳水化合物含量差异无统计学意义。从糖含量角度分析，奶茶的总糖及果糖、葡萄糖含量显著低于奶盖茶和果茶；水果茶的乳糖含量显著低于奶茶和奶盖茶。奶盖茶的反式脂肪酸含量中位数高于奶茶（p＜0.05）。三类现制奶茶咖啡因含量在 0-32.7mg·100g-1 之间，中位数为 12.5mg·100g-1；茶多酚含量在 5.4-270.0mg·100g-1 之间，中位数是 57.6mg·100g-1。咖啡因和茶多酚的含量中位数均表现为奶茶＞奶盖茶。奶茶能量、碳水化合物、蔗糖、总糖、钙含量与加料数量（0~3 种）呈正相关；能量、碳水化合物、总糖的含量随着甜度升高均呈显著上升趋势（p ＜ 0.05），且总糖主要是蔗糖，其次为果糖和葡萄糖。声称“不额外加糖”的样品糖含量中位数是 3.40g·100g-1，其中 93.3%总糖含量大于 0.5g·100g-1；声称“三分糖”的样品糖含量中位数是 4.97g·100g-1，其中 47.4%总糖含量大于 5g·100g-1；声称“五分糖”的样品糖含量中位数是 5.80g·100g-1；声称“七分糖”的样品糖含量中位数是 6.59g·100g-1；声称“全糖”的样品糖含量中位数是 7.96g·100g-1，94.0%总糖含量大于 5g·100g-1，大于 10g·100g-1 的比例是 18.0%。

［结论］ 市售现制奶茶营养素不均衡，具有能量高、添加糖含量高、脂肪含量高、蛋白质含量低的特点，需要规范糖添加量和甜度标注,制定奶茶不同甜度等级下糖添加量范围，同时加强奶茶营养特征宣传教育，引导居民适当限制其摄入量。

关键字 现制奶茶；能量；糖；蔗糖；蛋白质；脂肪

分类：食物与营养

调制乳粉贮存过程中维生素的衰减研究

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摘要:目的 对调制乳粉中的维生素衰减进行研究，分析加速试验周期内维生素的衰减情况。结果　经过 90d 的加速后，各个营养素均有不同程度的衰减，维生素 A 衰减率最高；维生素 D、维生素 B1、维生素 B2、烟酸衰减率较小。

关键词：调制乳粉；维生素；衰减

随着国家层面发布的“健康中国 2030”战略及目前所处的后疫情时期，人们越来越注重自身的健康，调制乳粉近年来的种类及销量都有较明显的增长。一般市面上的调制乳粉保质期为 12 或 18 个月，由于产品保质期较长，受新品上市时间限制，研发人员不可能对产品各个指标进行长达 12 或 18 个月的实际周期测定，常常采用短时间的加速试验，根据加速试验的检测数据推断产品保质期，产品上市后，通过货架期跟踪进一步验证[2]。本文章以市面上 2 种调制乳粉为研究对象，通过加速试验分析调制乳粉在贮存过程中维生素的衰减情况。

1 材料与方法

1.1 材料与设备

嘉仕吉优学生成长羊奶粉

高钙富硒羊奶粉

恒温恒湿培养箱

1.2 贮存方法

将样品放入恒温恒湿箱（温度：37℃±2℃，湿度：RH75±5%）内，样品分别贮存 0d,30d,60d 和 90d 进行检测。

2 结果与分析

按照加速时间定期进行检测，汇总衰减情况，具体见表 1 及表 2。

表 1 嘉仕吉优学生成长羊奶粉 维生素衰减率（%）

项目

加速 30d

加速 60d

加速 90d

检测方法

精密度/%

维生素 A

-1.47

0.74

21.27

GB 5009.82

10

维生素 D

1.27

12.1

GB 5009.82

15

维生素 E

1.78

1.96

3.15

GB 5009.82

10

维生素 B6

-1.39

1.39

-2.08

GB 5009.154

15

维生素 C

22.53

14.81

46.14

GB 5009.86

10

表 2 高钙富硒羊奶粉 维生素衰减率（%）

项目

加速 30d

加速 60d

加速 90d

检测方法

精密度/%

维生素 A

4.61

11.28

29.27

GB 5009.82

10

维生素 D

7.09

14.18

28.79

GB 5009.82

15

维生素 E

3.61

11.34

18.56

GB 5009.82

10

维生素 B6

5.65

16.13

25

GB 5009.154

15

维生素 C

18.25

28.71

42.01

GB 5009.86

10

从以上结果可以看出，经过 90d 的加速后上述两种调制乳粉中各个维生素均有不同程度的衰减，整体随着贮存时间的延长，维生素衰减率呈上升的趋势。其中维生素 C 衰减率最高，维生素 A、维生素 D 衰减率高于其对应的检测精密度，衰减较明显。两个产品中维生素 E 和维生素 B6 的衰减率偏差较大，在后续的稳定性研究过程中将持续关注维生素 E 和维生素 B6 的衰减及检测偏差。

3.结论

经过 90d 的加速后，各个营养素均有不同程度的衰减，维生素 C 衰减率最高， 维生素 A、维生素 D 衰减较明显，维生素 E、维生素 B6 衰减较小。

产品在贮存过程中会受到温度、水分、光照等各种因素的影响，另外产品的包装形式及配料组分也会对营养素的衰减有一定的影响。因此，在研发新产品之初，不仅要考虑营养素的指标、化合物来源、生产工艺损耗，同时也要考虑营养素在货架期内的衰减情况，为调制乳粉储存提供数据支撑。

关键字 调制乳粉；维生素；衰减

分类：食物与营养

碳酸钙对营养包产生哈喇味的应用研究

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为研究碳酸钙中杂质离子对营养包气味和稳定性的影响，选取不同含量杂质离子的碳酸钙以及本司高纯碳酸钙与其他原料混合进行营养包的 90 天加速氧化试验。试验结果显示，高含量杂质离子的碳酸钙会加快营养包产生哈喇味，而本司高纯碳酸钙杂质离子含量低，能够很好的解决营养包哈喇味产生，延长营养包的货架期。

关键字 金属离子，哈喇味，高纯碳酸钙

营养包的主要成分是豆粉和乳粉，且豆粉和乳粉的蛋白质和脂肪含量较高，在贮藏过程中容易氧化变质，产生哈喇味[1]。而金属离子是脂肪氧化良好的催化剂，与营养包的氧化哈败息息相关[2]。通过检测大量的碳酸钙样品，发现碳酸钙原料中常见的金属离子有铁、铜、锰、铬等，其中铁、铜、锰的含量较高，甚至有些碳酸钙中铁含量高达 96mg/kg，锰含量高达 80mg/kg，而这些高含量的变价金属离子，可以加速脂肪的氧化酸败，使营养包更快产生哈喇味。本试验进行营养包的 90 天加速氧化试验，分析不同含量的杂质离子对营养包哈喇味产生的时间和程度，提出了一种解决营养包产生哈喇味的方法。

1 试验目的

探究碳酸钙中杂质离子对营养包气味和稳定性的影响。

2 试验方法

1.检测大量的碳酸钙样品中的金属离子铁、铜、锰的含量。2.营养包模拟配方：碳酸钙 34.4g，营养素预混料 25.6g，豆粉 1140g；碳酸钙选取 8 组不同杂质离子含量的碳酸钙成品，分别标号 1，2，3，4，5，6，高纯碳酸钙标号 7，8。3.根据配方将碳酸钙，营养素预混料和豆粉进行干混，进行 8 组的加速氧化试验。将营养包置于 37℃、75%RH 的恒温恒湿箱中加速 90 d。加速期间利用人体感官评价样品气味的变化情况，并记录哈喇味出现的时间和程度。

3 试验结果与分析

表 1 碳酸钙原料铁、铜、锰的含量及营养包出现哈喇味的情况

序号	铁(mg/kg)	铜(mg/kg)	锰(mg/kg)	哈喇味程度	出现哈喇味时间/d
1	65.60	1.30	85.20		

轻度

21

2

96.90

1.30

21.40

轻度

21

3

75.80

0.33

39.30

轻度

28

4

55.65

0.71

35.25

轻度

35

5

26.90

0.40

79.20

轻度

35

6

28.39

2.57

24.95

轻度

63

7

16.90

3.60

7.20

无

90

8

19.50

未检出

6.40

无

90

通过表 1 数据可知，金属离子铁、锰的含量普遍偏高，而且通过营养包的加速试验可知，金属离子的含量越高营养包产生哈喇味的时间越快，高纯碳酸钙在加速的 90 天内并没有出现哈喇味，低杂质离子的高纯碳酸钙能够大幅延长营养包的货架期。

4 试验结论

通过进行营养包的加速氧化试验，得出碳酸钙杂质离子含量对营养包产生哈喇味影响很大，而多数的碳酸钙产品杂质离子又普遍偏高。高纯碳酸钙低杂质离子的优点，在营养包中使用可以明显改善营养包哈喇味的问题，大幅延长营养包的货架期。

关键字 金属离子，哈喇味，高纯碳酸钙

分类：食物与营养

麦角硫因对食品用益生菌防护作用的研究

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摘要：目的：益生菌是指能够有明确健康作用，改善维持微生态平衡和发挥益生功效的活性微生物，在食品药品保健品等领域应用众多。益生菌菌种保存方法多样，其中甘油冷冻管保存法具有适用范围广、操作简便等优点，但是应用过程中发现菌种在低温保存一段时间后，存在活力减弱现象。为了提高菌种复苏生长活力，需要不断开发新的菌种保护剂。麦角硫因(ergothioneine，EGT)具有清除自由基、抗炎、维持 DNA 的生物合成、细胞正常生长以及细胞免疫等多种生理功能，广泛应用于化妆品和医药食品保健品等领域，但尚未有报道 EGT 作为菌种保护剂的应用。本文就 EGT 对食品用益生菌保存防护作用进行研究。方法：采用甘油冷冻管法，以植物乳杆菌、干酪乳杆菌、动物双岐杆菌为研究对象，探究 20%甘油和 EGT（0.1%,0.5%,1%,2%）分别作为单一保护剂，20%甘油与 EGT（0.1%,0.5%,1%,2%）复配作为复合保护剂对益生菌保存后菌种活力的影响。菌种于-20℃条件下存放 6 个月后进行活化，比较不同保存配方下各个菌种的活力差异情况，对比液体培养后菌体细胞浓度，菌液 pH 变化，以及平板计数法测定三种益生菌存活率变化，来研究 EGT 对益生菌保存的防护作用。存活率计算公式如下：

存活率（%）=保存后益生菌活菌数/保存前益生菌活菌数*100%

结果：对于单一保护剂来说，20%甘油作为对照组，干酪乳杆菌、植物乳杆菌、动物双歧杆菌分别在 1%ETG，0.5%ETG，0.1%ETG 浓度下活化后活力最高，液体培养 18h OD600 较对照组分别提高了 47.5%，22.7%，400%；pH 变化率提高了 33.7%，25.0%，4.9%；存活率提高了 7.5%，3.1%，7.8%。对于复合保护剂来说，20%甘油作为对照组，干酪乳杆菌、植物乳杆菌、动物双歧杆菌分别在 20%甘油复配 1%EGT，0.5%ETG，0.1%ETG 浓度下活化后活力最高，液体培养 18h OD600 较对照组分别提高了 486.0%，541.0%，465.0%；pH 变化率提高了 104.0%，85.0%，4.9%；存活率提高了 76.5%，75.8%，90.2%。由数据可知无论是单独 EGT 还是与甘油两者复配后作为保护剂均对菌种保存都有显著效果，菌种活力好产酸能力强，存活率高，对于长时间保存益生菌菌株具有良好的效果。这些结果证明了 EGT 在菌种保存领域中具有广泛的应用前景。综上所述，麦角硫因作为菌种保存保护剂可以提高益生菌菌种的存活率和代谢活性，从而可以高效获得大量高活性菌体细胞，最终有利于改善益生菌产品品质。另一方面对于延长食品配方中益生菌存活周期提高产品货架期具有潜在可能，未来需要进一步加强应用研究，以促进麦角硫因在益生菌发酵制剂领域的发展和推广。

关键字 麦角硫因；益生菌；菌种保存；菌种活力；益生菌发酵

分类：食物与营养

森态长白山药食两用物产的资源优势与研发价值

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[目的]探讨长白山因由长期的自然蕴化和保护，其“森态”环境已成为生态理念的创新、延伸和升级版，对长白山药食两用物产特产的生物效价、资源品质和时空存续具有积极而优异的影响。[方法] 通过认识“森态”、长白山和药食两用的概念和交集，分析“森态”长白山优异的药食两用特产食材做为资源物产的重要载体，其涵养能力、营养品质和安全质量的区域优势和物源优势。[结果]森态长白山药食两用物产作为资源稀缺的品质特产，其营养构成、安全系数以及功效优势，亟需社会面充分认知、科学研发和规范应用，需要不同学科的跨界合作、团队协作和系统标准。[结论]充分认识长白山特色物产的资源品质，建立药食两用物产科学研发和规范应用的运行体系，将推动和带动资源赋能与生态反哺的良性对接，形成生态效益、社会效益和经济效益的良性循环。森态长白山是动态变化与相对稳定的有机整体，需要通过规范管理平衡资源和效益的需求关系。药食物产的研发应用是半径宽广的系统工程，需要政策设计、生态评价、认证标准以及技术研发、市场规划、产能控制等广泛对接，需要开放性、兼容性、成长性的运行规范、标准和专业协作团队，以提高资源认知、品质认知、价值认知。森态药食物产既是健康生活高标选品的优质标的，也是产业转化升级的效率载体，为区域特色经济增值提供支撑。在规范药食物产研发应用的过程中，需同时规范人与自然的协作流程、量效约束和长期共赢，升级特产深加工模式和标准，区分药食物产应用的特殊与常规，理顺产学研对接秩序，形成持续改进和可持续发展，为生态开发与保护提供建设依据、方向引导和行动坐标。森态长白山药食物产兼具绿色、有机双品认证标准的体系优势和国家地理标志识别价值。森态长白山药食物产的规范研发与应用，是对环森林资源的高标赋能和价值提升，对于优化区域长期、远期的生态效益、社会效益、经济效益意义显著。作为陆地生态系统可再生的食药物源和特产资源,推进森态长白山药食物产生态资源、物产品质、产业结构等方面的体系建设、责权划分和标准制定，有助于形成人文、环境、时空的持续改进和良性循环，为人类社会整体环境的健康发展筑基建模。森态长白山药食两用物产的深度研发与应用，需区分功效性和普适性，在提升加工科技和品牌打造能力的同时，落实种源适应、地力益复、环境反哺等生态持续。相关标准和运行流程的规范，有助于创新、迭代和国际化中国食品认证体系，建立物产准入、生态、生产、流通、服务等流程标准的全产品线科学管理和无缝对接，以稀有药食物产和高端土特产品的资源品质重新诠释森态长白山的价值和未来。

关键字 森态　长白山　药食两用　研发　应用

分类：食物与营养

膳食模式对社区管理 2 型糖尿病患者血糖控制影响的研究

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【摘要】 **目的** 了解膳食对社区卫生服务中心糖尿病慢病管理（以下简称社区管理）2 型糖尿病（T2DM）患者血糖控制的影响，为实施针对糖尿病患者血糖控制的策略和措施提供依据。**方法** 本研究基于“中国糖尿病足预防模式项目”基线数据，选取社区管理的 1825 名 T2DM 患者。采用食物频率法收集研究对象过去 12 个月的食物摄入情况，并进行身体测量和血糖检测。利用主成分分析提取膳食模式，并按因子得分四分位间距由低到高划分为 T1-T4 组；以空腹血糖（FBG）控制是否达标为因变量，进行非条件多因素 logistic 回归分析影响因素。 **结果** 本研究中 FBG 控制率为 57.59%，女性 FBG 达标率略高于男性（59.73%>54.39%，P<0.05）。研究通过因子分析获得社区管理 T2DM 患者主要的 5 种膳食模式：动物性食物模式、水果-水产-薯类模式、蔬菜-谷物模式、蛋-奶-豆模式和油盐模式。动物性食物模式 T3、T4 组动物内脏、油炸食物、腌制肉食和畜禽肉的日均摄入量均超过中国居民膳食指南推荐摄入量（RNI），其中畜禽肉 RNI 超标率达 31.7%、44.8%；水果-水产-薯类模式随因子得分等级增加，水果、水产品和薯类日均摄入量增加，但整体摄入水平和 RNI 摄入达标率较低（T4 组水果和薯类日均摄入量分别为 100.0g、21.4g）；蔬菜-谷物模式因子得分等级越高，蔬菜和谷类日均摄入量与 RNI 摄入超标率越高（T4 组蔬菜和谷类 RNI 摄入超标率分别为 84.7%、71.3%）；蛋-奶-豆模式各成分整体摄入水平较低，仅 T4 组蛋类和豆制品日均摄入量达到 RNI，RNI 摄入达标率分别为 73.74%、11.82%。动物性食物模式 T1、T2 组 FBG 达标率高于 T3、T4 组（63.16%、60.22%>52.54%、54.41%，P<0.05）；水果-水产-薯类模式 T4 组 FBG 达标率最高，为 61.93%（P<0.05）；蔬菜-谷物模式因子得分等级越高，FBG 达标率越高（T1、T4 组分别为 52.99%、60.18%，P>0.05）;蛋-奶-豆模式因子得分等级越高 FBG 达标率越高（T1、T4 组分别为 49.45%、63.16%，$P_{for\ trend}$<0.05）；油盐模式 T3 组 FBG 达标率最高，为 61.18%（P<0.05）。非条件多因素 logistic 回归分析结果显示，调整 BMI、身体活动、药物治疗、糖尿病病程、糖尿病家族史和糖尿病并发症等强影响因素后，动物性食物模式与社区管理 T2DM 患者 FBG 达标率呈负相关（与 T1 组相比，T4 组的 *OR*=0.733，*95%CI*：0.540~0.994）；蛋-奶-豆模式与社区管理 T2DM 患者 FBG 达标率显著正相关（与 T1 组相比，T4 组的 *OR*=1.987，*95%CI*：1.467~2.689）。未发现水果-水产-薯类模式、蔬菜-谷物模式和油盐模式与社区管理 T2DM 患者 FBG 达标率的相关性。 **结论** 社区管理 T2DM 患者各类食物摄入情况整体呈现一种不均衡的摄入状态，如动物性食物和蔬菜 RNI 摄入超标率高，而水果、薯类、奶类和豆类摄入量多未达到 RNI。摄入足量蛋奶豆等优质蛋白质，减少摄入红肉和加工肉类对社区管理 T2DM 患者 FBG 控制有重要作用。

关键字 糖尿病；空腹血糖；膳食模式；因子分析

分类：食物与营养

间歇进食策略影响餐后糖脂应答的交叉试验研究

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题目：间歇进食策略影响餐后糖脂应答的交叉试验研究

目的：研究不同间歇进食策略对健康成年人餐后糖脂应答的影响，为预防糖脂代谢紊乱提供饮食行为指导，为我国慢性代谢性疾病防治策略的制定提示新科学方向。

方法：采用交叉设计随机对照试验，对上海健康成年人依次进行两个禁食日的干预，分别是晚餐禁食日（进餐时间：7:30、13:00），早餐禁食日（进餐时间：13:00、20:00），两个禁食日之间的洗脱期为一周。在试验开始前，问卷调查人口学基本信息以及近一年食物消费频率信息（FFQ），进行血液糖脂相关生化检查，确定入组对象；从试验开始前 2 天佩戴动态葡萄糖检测系统（CGM）监测整个试验期间（12 天）的连续血糖变化；干预日前后三天研究对象采用标准化饮食，每日能量供给量分别为女性 1600 kcal、男性 2000 kcal，三餐供能比为 1:1:1，食物 GI 无差异。晚餐禁食日抽取第二天早餐餐前空腹及餐后 2 小时后静脉血；早餐禁食日抽取当日午餐餐前空腹及餐后 2 小时静脉血，检测餐前餐后血浆葡萄糖、胰岛素、甘油三脂、总胆固醇、低密度脂蛋白胆固醇、高密度脂蛋白胆固醇等生化指标；绘制餐后血糖变化曲线，计算曲线下面积（AUC）。所得数据采用 R 软件进行统计分析。

结果：试验共纳入 37 名健康成年人，男性 14 人，女性 23 人，年龄为 23.5±1.76 岁，BMI 为 20.9±2.3，无糖脂相关慢性代谢性疾病或睡眠障碍。餐后血糖应答：（1）与正常进餐比较，研究对象早餐禁食显著升高午餐后 150 分钟血糖 AUC（P<0.001），而晚餐禁食后早餐 AUC 与未禁食早餐后 AUC 相比未见明显差别。（2）研究对象晚餐禁食后早餐空腹血糖显著低于早餐禁食后午餐空腹血糖（P<0.01）；各组餐后 150 分钟血糖 AUC 比较，早餐后 AUC 显著低于午餐后 AUC（P<0.001）。（3）与早餐禁食后午餐后 2 小时血浆胰岛素水平相比，研究对象在晚餐禁食后早餐后 2 小时的胰岛素水平更高（P<0.001）。餐后血脂应答：与晚餐禁食早餐前后血浆甘油三脂变化比较，早餐禁食显著改变了午餐前后甘油三酯的升高幅度（P<0.05）,而各组总胆固醇、高密度脂蛋白胆固醇、低密度脂蛋白胆固醇水平没有显著差别。

结论：与早餐禁食策略比较，晚餐禁食显著升高了健康成年人早餐后胰岛素水平，呈现较低餐后血糖反应，可更好维持餐后糖脂代谢的稳态。

关键词：间歇进食；餐后血糖；连续葡萄糖监测；交叉试验

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关键字 间歇进食；餐后血糖；连续葡萄糖监测；交叉试验

分类：食物与营养

药食两用物质罗汉果活性成分及其功效研究进展

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目的：2021 年国家卫生健康委发布关于印发《按照传统既是食品又是中药材的物质目录管理规定》的通知，药食两用物质逐渐进入人们的视野。药食两用物质罗汉果不仅具有丰富的药理活性，其食用价值也不可忽视，目前市面上以罗汉果为原料的食物也逐渐增多。同时，罗汉果苷也是天然甜味剂，可以作为食品添加剂使用。罗汉果干果作为中药材使用的功效已经为大众所熟知，但是罗汉果鲜果作为食物的功效研究还较少，且缺乏系统总结。本文旨在研究罗汉果鲜果的营养功效的最新进展，并以此展开综述。

方法：以罗汉果为关键词，在知网、PubMed、Web of Science 等数据库查阅罗汉果成分功效的相关研究，对相关的研究进展做一综述。

结果：罗汉果鲜果中蛋白质和糖类含量丰富，生物活性成分主要有黄酮类物质、葫芦烷三萜类化合物、多糖类物质等，发挥重要生理功效。邵佩等人通过对罗汉果黄酮的提取和纯化，发现罗汉果黄酮中含有大量的酚羟基基团，这些基团通过清除活性氧和自由基来实现抗氧化能力。郑楚等人的动物实验结果表明罗汉果总黄酮对 STZ 糖尿病鼠具有明显的降血糖作用，能明显回复 STZ 引起的胰岛素减少。葫芦烷型四环三萜类化合物对多种肿瘤细胞的抑制作用在多项研究中被证明，同时它也可以通过调节多种细胞行为和信号通路，表现出抗炎活性。此外葫芦烷型四环三萜类化合物还具有抗氧化应激功能。罗汉果三萜类化合物中含量最高的是罗汉果甜苷 V，国内外多项动物研究表明罗汉果甜苷 V 具有血糖调节作用，这可能与其增加餐后胰岛素的分泌，抑制参与淀粉和糖原代谢的 α-葡萄糖苷酶活性的机制有关。此外，罗汉果甜苷还具有调节脂肪沉积作用。植物多糖的生物相容性使其具有广泛的应用前景，张海全等人的小鼠实验表明罗汉果多糖能显著促进环磷腺苷免疫抑制小鼠 T 细胞的增殖，修复小鼠免疫系统。另外，罗汉果多糖的抗氧化活性也在一些动物实验和体外抗氧化研究中得到证实。

结论：罗汉果鲜果具有多种活性成分，其中三萜类化合物具有一定的抗肿瘤、抗炎、抗氧化活性、降血糖、脂质调节作用，罗汉果黄酮具有抗氧化和降血糖等的生物活性，罗汉果多糖也具有抗氧化和调节机体免疫力的功效。由此可见，罗汉果作为特色经济产物，其活性成分功效丰富，以罗汉果为原料的产品应用前景广泛。

关键字 罗汉果甜苷；三萜类化合物；黄酮；生物活性；功效研究

分类：食物与营养

基于人工智能开发设计的适应“四高环境”下一线医务人员的个体化营养食谱研究

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目的 为支持和保障一线医务人员在传染病防控工作与突发性公共卫生事件下的机体健康，本课题研究一线医务人员在高温度、高湿度、高强度和高感染风险的工作环境（以下简称“四高环境”）下的营养流失情况，给出相应营养补充对策与个体化食谱软件。方法 评估一线医务人员的营养风险，制做营养流失模型。利用便利抽样法，对 115 位“四高环境”下工作的医务人员进行营养 KAP 调查。模拟“四高环境”工作生态，应用逐口气式间接测热法，测量 31 名健康受试者能量消耗。根据性别、年龄、防护级别、身高、去脂体重、时间、温度、湿度等相关因素，通过多元线性回归拟合方程形成基于个体化参数的能量消耗模型公式，并使用机器学习技术和营养计算分析形成一个数据驱动的食谱软件。基于调研、实验、搜集过程所得资料，优化个体化营养交互算法。基于各类食谱编制原则与营养的计算方法，参考《高温作业人群膳食指南》、《中国居民膳食营养素参考摄入量》等具有高度参考价值的文献，确定食物提供的能量和主要营养素，建立一个含有 200 种以上的食物配餐数据库将食物交换份法应用于运算上步建立好的个体化营养交互算法模型。结果 营养风险评估显示大部分“四高环境”下一线医务人员饮食不规律，缺少水分补给，营养素补充不足，并处于轻度抑郁与神经衰弱之中。营养 KAP 调查发现，大部分一线医务人员对营养与食品健康领域的认知认可度较为乐观，营养知识较为充足，营养态度积极。不同性别在“四高环境”的能量消耗与防护级别、去脂体重、工作时长、温度均呈显著正相关(P 均＜0.05)，与湿度无显著相关性。以能量消耗为应变量，可得多元线性回归方程，Y=9.86t+4.88a(1-(1.2a/c2+0.23×d-5.4-10.8e))+47.082b-0.03f2+3.44f+35.02，t 为时间，a 为体重，b 为防护级别，c 为身高，d 表示年龄，e 为性别，男性为 1，女性为 0，回归模型具有统计学显著性。结合一线疫情防控工作人员的性别、年龄、工作时长、个体 BMI 、个人喜好、南北方饮食差异等因素，设计系列个体化营养食谱，给出多项营养食材供一线防疫人员个体化选择。结论 根据营养风险评估结果，构建了一线医务人员的营养变化模型，模拟分析机体营养流失、营养缺乏以及营养补充过程和剂量，为一线医务人员设计开发了用于“四高环境”环境下的个体化营养食谱，确保医务人员能够实现营养的合理补充。此外，相关研究成果仍然适用于其他在“四高”工作环境相关的行业从业人员。

关键字 高温高湿环境；间接测热法；营养食谱

分类：食物与营养

便秘者蘑菇摄入水平和肠道菌群多样性与血压的关联

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目的：便秘是血压升高的危险因素之一，然而针对便秘人群的血压与膳食之间的关系的研究却鲜有报道。蘑菇作为一种广泛食用的食品，富含有多种蛋白质、必需氨基酸、膳食纤维、维生素及矿物质，其中大量的 β-葡聚糖、洛伐他汀和 L-麦角硫因等物质对人类的心血管健康有着潜在的有益影响。既往有的实验和观察性研究显示，食用蘑菇对人的收缩压和舒张压有着中性或积极影响，但是研究的数量较少，结果存在一定的异质性且促进心脏代谢健康的机理目前尚不清楚。本研究在功能性便秘患者中，分析干蘑菇和鲜蘑菇的摄入水平与血压之间的关系，探讨肠道菌群多样性指数在蘑菇摄入水平和血压之间关系发挥的作用，为该人群高血压防治提供数据支持。

方法：本研究纳入 249 名 18-70 岁功能性便秘患者（符合罗马Ⅳ诊断标准）。研究使用膳食频率问卷调查干蘑菇和鲜蘑菇的摄入情况。采用欧姆龙袖带式电子血压计对志愿者进行三次血压测量，取平均值作为其血压值。在进行协变量调整后，使用 Spearman 偏相关分析探究蘑菇的摄入频率和血压之间的关联。收集粪便样本，采用 16S rRNA 测序获得肠道菌群相对丰度数据。使用中介分析探讨肠道菌群 α 多样性指数对蘑菇摄入频率与血压关联的中介潜在效应。模型 1 调整了年龄、性别、吸烟和饮酒，模型 2 在模型 1 的基础上加入了体力活动当量、教育程度和婚姻状况，模型 3 在模型 2 的基础上进一步加入了是否服用降压药。

结果：在 249 名志愿者中，有 124 名（49.7%）志愿者几乎不吃干蘑菇、69 名（27.7%）志愿者每周摄入干蘑菇的频率＜1 次、25 名（10.0%）志愿者每周摄入 1 次干蘑菇、27 名（10.8%）志愿者每周摄入 2-3 次干蘑菇、4 名（1.6%）志愿者每周摄入干蘑菇＞3 次。在三个模型中，干蘑菇的摄入频率与收缩压和舒张压均呈显著负相关（模型 1：r-SBP=-0.213，P-SBP<0.001，r-DBP=-0.156，P-DBP=0.015；模型 2：r-SBP=-0.207，P-SBP=0.001，r-DBP=-0.153，P-DBP=0.017；模型 3：r-SBP=-0.197，P-SBP=0.002，r-DBP=-0.154，P-DBP=0.016），鲜蘑菇的摄入频率与血压间未发现这种关联（模型 1：r-SBP=0.103，P-SBP=0.108，r-DBP=0.113，P-DBP=0.077；模型 2：r-SBP=-0.015，P-SBP=0.216，r-DBP=0.073，P-DBP=0.124；模型 3：r-SBP=0.089，P-SBP=0.167，r-DBP=0.112，P-DBP=0.081）。通过筛选得到 118 种肠道菌属，对志愿者的肠道菌群 α 多样性指数进行干蘑菇和血压的中介分析研究结果显示，志愿者肠道菌属的 α 多样性指数（Shannon 指数、Simpson 指数等）没有介导干蘑菇的摄入频率与收缩压和舒张压之间的关联（P-indirect>0.05，P-direct<0.001，P-total<0.001）。

结论：在功能性便秘患者中，干蘑菇的摄入频率与收缩压和舒张压呈显著负相关。

关键词：干蘑菇 血压 肠道菌群多样性 功能性便秘

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关键字 干蘑菇 血压 肠道菌群多样性 功能性便秘

分类：食物与营养

中药对肥胖患者干预有效性和安全性的系统评价再评价

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目的：目前，肥胖的发病机制尚不完全明确，有中医学者认为其主要的病理机制为痰湿、湿热，多见于慢性低度全身炎症，容易发生胰岛素抵抗，进而导致代谢发生紊乱，肥胖患者通常存在低度、慢性、全身性炎症，同时肥胖的病理路径是:脂毒性-缺氧或慢性低度炎症-胰岛素抵抗-代谢紊乱。本研究对中药干预肥胖患者的有效性和安全性系统评价/Meta 分析进行再评价，并分析中药对肥胖的作用机制与现代医学之间的联系，基于中西医结合理论指导防治肥胖，为临床护士应用“家庭护士食疗理论”给肥胖患者提供饮食干预方案提供指导和依据。

方法：本研究共检索了中国知网、万方数据库、维普数据库、中国生物医学文献数据库（CBM）、PubMed、Scopus、Web of Science7 个数据库中关于中药干预肥胖患者的文献，检索的时限是建库到 2023 年 3 月 29 日。由两名研究者独立进行文献检索、资料提取，并采用 AMSTAR 2 量表对所纳入的研究进行方法学质量评价。

结果：最终共纳入 11 篇系统评价，均为基于随机对照试验的系统评价，包括中文文献 6 篇，英文文献 5 篇。 通过 AMSTAR 评价显示：3 项的方法学质量评为低质量，8 项为极低质量。其中仅 4 项研究声明在研究实施前就已确定系统评价研究方法，11 项研究均未使用全面的检索策略，4 项研究提供了完整的排除文献的清单及排除理由，11 项研究均使用了合适的工具来评估纳入研究的偏倚风险，并使用了合适的统计方法进行合并结果，也充分分析了发表偏移，并讨论了发表偏移对研究结果的可能影响。中医对于肥胖患者的干预具有一定的疗效，对体重、BMI、腰围、血脂都有一定的改善作用，且安全性良好，不良反应较少。

结论：中药对肥胖患者的干预具有一定的疗效，能够降低肥胖患者的体重、BMI、腰围，同时可以改善血脂，调节脂质代谢，并且安全性较高，出现的不良反应较少，出现的症状较轻，临床应用比较安全可靠。中药主要是通过抗炎、抗氧化、改善脂质代谢这三个方面来防治肥胖疾病的，这与“家庭护士食疗理论”模型有着相似的结构，护士可制定饮食处方或农产品处方运用非营养素通过抗氧化、抗炎症、调节代谢三条主要通路来辅助治疗肥胖等慢性疾病，该理论模型可用于指导临床上肥胖患者的饮食护理工作。但由于本研究纳入的系统评价方法学质量均较低，结论仍需大样本、高质量的研究进行进一步论证。

关键字 中医，肥胖，“家庭护士食疗理论”

分类：食物与营养

一例血脂异常患者的营养管理报告

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无锡安国中西医结合医院

一例血脂异常患者的营养管理报告
目的：总结血脂异常患者的营养治疗体会
关键词：

一例血脂异常患者的营养管理报告
目的：总结血脂异常患者的营养治疗体会
关键词：血脂异常　　植物生化素　　膳食治疗
病例资料

患者：男性，58 岁，身高 178cm,体重 75kg,BMI:23.7kg/m2,无高血压、糖尿病、冠心病等慢性病；2 个月前体检发现血脂异常：总胆固醇（TC）：6.51mmol/L、低密度脂蛋白（LDL-C）：4.36mmol/L、甘油三酯（TG）：3.16 mmol/L、高密度脂蛋白胆固醇（HDL-C）：0.83 mmol/L；目前没有采用药物治疗。医院通过对患者进行营养风险筛查（NRS　2002）、体格检查、血液生化检查、人体成分分析等进行综合营养评定及营养诊断，给予膳食指导和膳食治疗。

方法：

（1）　　工具：体脂秤、破壁机、家用电子秤

（2）　　管理时间：2 个月

（3）团队成员组成：健康管理师、营养师

（4）食谱编制：每日能量 1900kcal/d　、每日蛋白质 75g/d

（5）饮食方案：饮食结构、营养均衡搭配、饮食顺序（先吃蔬菜、再吃肉类、最后食用主食类）、个体化植化素配方。每周更新食谱。

（6）营养方案：混合益生菌、红曲胶囊（1000mg/日）、复合维生素 B 族（维生素 B1 50mg、维生素 B2 50mg 等）、α-亚麻酸等。

（7）每日早晚各喝 1 次苦荞麦茶（苦荞麦 10 克）

（8）调血脂植物生化素：一种天然的化合物质，属于天然食物的色素，人体无法制造它们，必须从食物中获取；

早晨配方：干木耳 10 克（泡发后煮熟）＋带皮的柠檬 30 克（用淘米水浸泡 15 分钟后切片备用）＋“黄金三宝粉”10 克（大豆卵磷脂、啤酒酵母、小麦胚芽）+水 200ml，利用破壁机打至 40℃口服；

晚上配方：西芹叶 10 克（切成小段）＋洋葱 10 克（切成小片）＋带皮的柠檬 20 克（用淘米水浸泡 15 分钟后切片备用）＋苦瓜 10 克（去瓤切成小片）＋胡萝卜 30 克（切成小片）＋“黄金三宝粉”10 克（大豆卵磷脂、啤酒酵母、小麦胚芽）+水 200ml，利用破壁机打至 40℃口服；

（9）教育：每周健康饮食科普宣教（一日三餐的搭配、饮食的顺序、植物生化素配方的制作）；

（10）运动：患者每天饭后快走 30-60 分钟；

结果：2 个月后复查结果总胆固醇（TC）：5.08mmol/L、低密度脂蛋白（LDL-C）：3.14mmol/L、甘油三酯（TG）：2.2 mmol/L、高密度脂蛋白胆固醇（HDL-C）：1.8mmol/L。与两个月之前的检查结果相比，取得了明显的调理结果。

结论：营养治疗是改善慢性病的重要方法之一，血脂异常是指体内脂质代谢紊乱，血液中有益的脂质成分减少，有害的脂质成分增多。通过植物生化素在食疗领域的理论创新与发展应用，并配合饮食方案、营养方案，不但能够消除或减少细胞内的自由基，增加人体氧化耐受性，而且能够调节血脂，降低胆固醇、甘油三酯的含量，提高高密度脂蛋白的含量，抑制动脉粥样硬化的

作用。通过 2 个月的营养管理，患者血脂达标。我科将继续总结探索，为广大临床营养师治疗血脂异常患者提供参考。

关键字 血脂异常　植物生化素　膳食治疗

分类：食物与营养

莲藕提取物的抗疲劳作用及机制研究

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目的：疲劳是人体体力和脑力维持活动到一定阶段时出现的一种生理现象，表现为机体生理过程不能维续其机能在特定水平和（或）不能维持预定的运动强度。疲劳的发生机制包括能量物质耗竭、氧化应激、内环境稳态失调、生理指标的异常和自由基的大量累积。莲藕是水生植物莲（Nelumbo nucifera Gaertn.）的根茎，是我国栽培面积最大的水生蔬菜，也是中国人喜欢的水生蔬菜之一。本课题组前期的研究发现，在中国居民经常食用的 36 种蔬菜中，莲藕可食部的体外抗氧化作用最强，类黄酮等食物活性成分含量也较为丰富。本研究根据中国人对藕的食用习惯，在前期工作的基础上，以莲藕可食部为原料，采用乙醇浸提结合超声的方法制备莲藕提取物。接着探讨该提取物的抗疲劳作用，并探讨其发挥抗疲劳作用的相关机制，重点研究的机制包括能量代谢机制、氧化应激机制等。

方法：1.力竭游泳实验。将 48 只健康雄性 Balb/c 小鼠随机分为对照组、莲藕提取物低、中、高剂量组。每组 12 只，对照组灌胃蒸馏水，莲藕提取物低、中、高剂量组分别灌胃 500 mg/(kg bw)、1000 mg/(kg bw)与 2000 mg/(kg bw)剂量的 LRE 溶液，1 次/天，灌胃 24d。第 25d，采用力竭游泳实验评价 LRE 的抗疲劳效果，并确定最佳实验剂量。2.非负重游泳实验。将 60 只 Balb/c 小鼠适应性喂养 5d 后随机分为正常对照组、游泳对照组和莲藕提取物组 3 组，每组 20 只。正常对照组和游泳对照组灌胃蒸馏水，莲藕提取物组 LRE 组灌胃莲藕提取物，剂量为[2000mg/(kg bw)]，1 次/天，灌胃 24d。第 25d，在 90min 自由游泳实验结束后取外周血、肝脏与肌肉组织，采用试剂盒检测代谢相关指标：游离脂肪酸、乳酸、尿素氮、糖原、ATP 酶、乳酸脱氢酶、糖原合酶、琥珀酸脱氢酶；抗氧化剂谷胱甘肽；抗氧化酶谷胱甘肽过氧化物酶、超氧化物歧化酶、过氧化氢酶；脂质过氧化产物丙二醛等生化指标。

结果：2000 mg/(kg bw)剂量的莲藕提取物可以显著延长健康雄性 Balb/c 小鼠的力竭游泳时间，升高游泳后小鼠血糖与游离脂肪酸水平，降低血清乳酸、尿素氮、乳酸脱氢酶水平，升高肌肉与肝脏糖原水平，增强组织中 ATP 酶、糖原合酶与琥珀酸脱氢酶活性，提高血清和组织中抗氧化酶活性，如谷胱甘肽过氧化物酶、超氧化物歧化酶活性，还可降低血清和组织脂质过氧化产物丙二醛的水平。

结论：莲藕提取物具有显著的抗疲劳作用；该提取物通过增强血清和组织的抗氧化剂活性、提高抗氧化剂水平、降低脂质过氧化水平，调节糖代谢和脂代谢等机制发挥其抗疲劳作用。

关键字 莲藕提取物；抗疲劳；抗氧化；能量代谢

分类：食物与营养

盐地碱蓬多糖对高脂诱导 H9C2 细胞炎症、氧化应激及细胞凋亡的影响

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【摘　要】 目的 中国已成为世界上超重或肥胖人数最多的国家，肥胖患者平均预期寿命减少，心血管疾病患病风险增加。高脂饮食诱导心肌的炎症反应，可使白细胞介素-1β（Interleukin-1β，IL-1β）、白细胞介素-6（Interlukin-6，IL-6）、肿瘤坏死因子-α(Tumour necrosis factor-α，TNF-α）表达升高。高脂饮食同样可使心肌细胞发生氧化应激反应从而引起细胞凋亡。植物多糖具有抗氧化、抗炎、降血糖等多种生物学活性作用。盐地碱蓬系藜科碱蓬属一年生草本真盐生植物，富含蛋白质、膳食纤维、多糖、色素、黄酮类化合物等，具有较高的食用价值和药用价值。盐地碱蓬多糖具有体外抗氧化活性，对自由基有清除作用。本研究建立高脂暴露 H9C2 细胞模型，检测细胞炎症、氧化应激及细胞凋亡情况，明确高脂饮食对心肌的影响，初步阐明盐地碱蓬多糖对高脂诱导心肌细胞损伤的保护作用及其可能机制，为盐地碱蓬多糖应用于高脂饮食引起的心血管疾病防治提供科学依据。方法 体外培养心肌细胞 H9C2，分为对照组、棕榈酸（100μM）+油酸（200μM）组（高脂组）、棕榈酸（100μM）+油酸（200μM）+盐地碱蓬多糖（50μg/ml、100μg/ml 及 200μg/ml）组（高、中、低浓度多糖干预组）。利用 CCK8 方法检测细胞增殖水平，利用试剂盒检测细胞中 MDA 及 SOD 含量，应用流式细胞术检测细胞凋亡水平及 ROS 含量，应用 ELISA 试剂盒检测细胞上清中炎症因子 IL-1β、IL-6、TNF-α 水平。结果 利用 CCK8 方法分别检测不同浓度棕榈酸、油酸与盐地碱蓬多糖对 H9C2 细胞增殖水平，结果显示棕榈酸染毒浓度低于 400μM、油酸染毒浓度低于 600μM、盐地碱蓬多糖干预浓度低于 800μg/ml 对 H9C2 细胞增殖无显著性影响（P＞0.05）。通过对细胞 MDA、SOD 及 ROS 水平进行检测结果显示，与对照组比较，高脂组 H9C2 细胞 MDA、ROS 含量升高，SOD 活性降低（P<0.05）；与高脂组比较，不同浓度多糖干预组细胞 MDA、ROS 含量均降低（P<0.05），SOD 活性均升高（P<0.05）；与低浓度多糖干预组比较，中、高浓度干预组细胞 MDA、ROS 含量降低，SOD 活性升高（P<0.05）。通过对细胞上清中 TNF-α、IL-1β 和 IL-6 水平进行检测结果显示，与对照组比较，高脂组 H9C2 细胞上清中 TNF-α、IL-1β 和 IL-6 水平升高（P<0.05）；与高脂组比较，不同浓度多糖干预组细胞上清中 TNF-α、IL-1β 和 IL-6 水平均降低（P<0.05）；与低浓度多糖干预组比较，中、高浓度干预组细胞上清中 TNF-α、IL-1β 和 IL-6 水平均降低（P<0.05）；与中浓度多糖干预组比较，高浓度多糖干预组细胞上清中 TNF-α、IL-1β 水平降低（P<0.05）。应用流式细胞术检测细胞凋亡水平结果显示，与对照组比较，高脂组 H9C2 细胞凋亡率升高（P<0.05）；与高脂组比较，不同浓度多糖干预组细胞凋亡率均降低（P<0.05）；与低浓度多糖干预组比较，中、高浓度干预组细胞凋亡率均降低（P<0.05）。结论：盐地碱蓬多糖能够降低 H9C2 细胞炎症、抑制氧化应激及细胞凋亡，减轻高脂诱导的 H9C2 细胞损伤，提示盐地碱蓬多糖在治疗心肌疾病方面具有显著的潜力。

关键字 盐地碱蓬多糖；高脂；H9C2 细胞；炎症因子；氧化应激；细胞凋亡

分类：食物与营养

贝壳类水产品中的微生物成分对于食物营养素的影响和效果

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目的：本研究选取海蛎这种特殊贝壳类水产品（因其海域分布、存活时间而有普遍的代表意义），对于海蛎在常温环境和蒸煮环境中的微生物种类含量与食物营养成分建立对比参照研究，研究海蛎中的微生物种类含量改变如何影响食物营养成分，进一步对于海蛎在海洋环境中的营养影响的作用、性质和前景进行认识。

方法：首先，运用 16S rRNA 蛋白质基因测序法检测出水产品中的微生物菌种，选取饮食中 23 份同样的海蛎样品进行滴定，测定 23 组海蛎中维生素 B12、牛磺酸、叶酸、钙含量等营养素随着氧气、日照等环境因素改变，与菌落总数 CFU 的变化关系、与 pH 值的变化关系，同时与海蛎中的盐度变化做出关联性评估，最后将温度升高到 120 摄氏度，对温度影响指标进行进一步的衡量评估。

结果：经过测序，在海蛎中含量居多的原本是大肠杆菌、蓝藻菌、溶血弧菌，在常温和普通日照环境下（恒定）放置之后，通过碳酸盐、碳酸氢盐和磷酸盐含量对比，探测到嗜酸性和嗜盐性菌种（CFU）大量减少，pH 值显著上升，平均从 4.13 上升到 6.05 左右，通过统计学测定表明 23 组样本维生素含量和营养素含量都与盐度的变化呈正比，与微生物含量的变化呈正比。而在升温过程中，pH 值先升高至 7.22 后保持不变，在这个阶段，营养素随着微生物含量开始降低而降低，但是经过盐度几乎随水分挥发完全后，达到了海蛎中可食用的微生物状态却未见有维生素和营养素含量的变化，其加强的证据在于，用食物金属仪器来测定维生素和营养素在温度升高后期（在达到微生物可食用标准温度之后）几乎未有明显变化。

结论：在常温和普通日照环境（排除在某些实验中的特殊环境）下，新鲜海蛎通过维持其尚未挥发的盐度，调节 pH 值来平衡营养素含量与微生物的关系比例，而在盐度挥发之后，微生物含量尽管显著下降，pH 值下降幅度减小，营养素含量几乎不变，表明在蒸煮中微生物含量尽管本身下降，但在盐度保持不变或蒸发后未见明显变化，营养素含量实际上与温度对影响盐度变化的幅度存在显著性关联，温度升高，盐度下降，营养素下降，直至不变，而如果排除盐度因素，温度对微生物的影响在同等环境体系下已经非常小了。在新鲜海蛎中形成一层肉眼可以观察的微生物膜，可以保持基本盐度的稳定性，调节 pH 值。实验结论在 23 组样品中都是反复可再现的。

关键字 贝壳类，微生物，食物营养

分类：食物与营养

代谢组学在食物活性成分分子机制研究中的应用

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目的：了解代谢组学在分析食物成分生物活性方面的应用现状，探讨生物活性成分在疾病防治、调节人类健康等方面的发展前景，为特殊食品的研发和利用提供思路和依据。

方法：通过 Web of Science、PubMed、CNKI 等数据库收集相关文献，采用文献研究和前瞻性分析相结合的方法，对代谢组学技术用于研究生物活性成分的作用靶点、代谢通路的潜力和优势进行整理、归纳和总结，并展望其应用前景。

结果：1、生物活性成分在食物中广泛分布，部分成分具有抗氧化、抗炎、免疫调节、改善糖脂代谢等健康促进作用，增加这类生物活性物质的摄入有助于降低肥胖、2 型糖尿病、心血管疾病、癌症等慢性非传染疾病的发病风险，能够发挥调节生理功能、预防疾病和维护人体健康的作用。研究食物活性物质的作用机制与相关靶点有利于促进其向特殊食品的转化，从而促进健康。2、传统的营养调查方法以及流行病学研究能够揭示食物活性成分与健康在宏观上的潜在的关联，但食物代谢是个复杂的过程，微观上这些活性成分在人体内具体的代谢通路、相关的作用靶点以及影响健康的机制尚不清楚，进一步探索食物活性成分的作用机制需要更为精确、系统、全面的研究方法。3、代谢组学以核磁共振、质谱和色谱等技术为检测平台，以复杂的生物体系中小分子代谢产物为研究对象，检测相关因素改变后生物系统整体、动态代谢变化，可以考虑和解决食物整体代谢的复杂性，高效检测食物活性成分的作用靶点，了解具体影响人体健康的作用机制，实现精准探索食物活性成分对机体代谢产生的影响，为食物活性成分在疾病的防治领域提供一定的理论依据。4、目前代谢组学技术如超高效液相色谱-质谱联用技术（UPLC-MS/MS）、核磁共振技术（NMR）以及色谱-质谱联用技术（LC-MS）等被广泛运用于营养学研究的各个领域，越来越多食物活性成分的代谢靶点被发现，其相关的代谢通路也逐渐明朗，并与基因组学、转录组学、蛋白组学等生物学研究方法一起为食品行业将食物活性成分的营养价值及生物学作用开发利用提供了强有力支持。

结论：代谢组学为食物活性成分作用靶点的发现、代谢通路的构建、作用机制的了解提供了更加全面、系统的研究方法，促进其向细胞分子层面发展，提高了食物营养研究的精确性。

关键字 代谢组学；食物营养；生物活性成分；

分类：食物与营养

不同焙烤水平大麦茶的营养成分和香气成分比较分析

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目的 大麦茶由大麦的籽粒加工制成，是一种公认的健康食品。随着人们生活水平日益提高以及对代用茶研究的逐渐增多，大麦茶的饮用价值逐渐凸显。大麦茶具有防暑止渴、助消化、降血糖和缓解疲劳的作用，大麦茶以其独特的香气和有益的功效越来越受欢迎。焙烤温度是影响大麦茶风味和营养成分的重要因素。因此，本研究旨在通过运用顶空固相微萃取-气相-质谱联用（HS-SPME-GC-MS）、电子鼻和电子舌技术，综合分析不同焙烤水平下大麦茶的挥发性风味成分和感官品质，同时对其营养和功能成分进行测定。为优质大麦茶焙烤水平的选择提供理论依据。

方法 采用不同的焙烤温度制备 3 种不同焙烤水平的大麦茶，分别为轻度、中度和重度焙烤大麦茶（LRBT、MRBT 和 HRBT）。采用理化检验的方法测定大麦茶中可溶性糖、氨基酸、蛋白质、多酚、β-葡聚糖和总黄酮的含量；利用 HS-SPME-GC-MS 和电子鼻对大麦茶中的挥发性特征成分进行分析比较；利用电子舌技术对大麦茶的口感进行评价。

结果 随着大麦茶焙烤水平的提高，可溶性糖和多酚含量增加，总游离氨基酸、蛋白质和 β-葡聚糖含量降低，中度焙烤的大麦茶中总黄酮含量最高。HS-SPME-GC-MS 分析从大麦茶中共检出 93 种挥发性化合物，其中，烷烃类 35 种、烯烃类 7 种、芳烃类 6 种、酯类 18 种、吡嗪类 8 种、醛类 6 种、醇类 5 种和其他类 8 种。电子鼻测试的主成分分析（PCA）和线性判别分析（LDA）能够明显看出不同温度焙烤的大麦茶风味特征存在差异。电子舌测试对大麦茶的口感进行评价，可以看出 3 种大麦茶样品的味觉趋势基本相同，但苦味、苦味余味、鲜味等指标存在显著差异，重度焙烤大麦茶的苦味和苦味余味最高，而轻度焙烤大麦茶的苦味和苦味余味最低。鲜味由高到低依次为中度焙烤大麦茶、重度焙烤大麦茶和轻度焙烤大麦茶。

结论 HS-SPME-GC-MS 分析可以看出，轻度和中度焙烤大麦茶的主要香气成分为烷烃类和芳烃类，重度焙烤大麦茶的主要香气成分为芳烃类和醛类。基于电子鼻数据的 PCA 和 LDA 分析能很好地区分不同大麦茶的香气特征；焙烤温度的升高会导致吡嗪和呋喃类化合物的大量形成，使大麦茶具有更丰富的花香、烘烤和坚果香气。但温度过高也会使挥发性成分含量降低，产生苦味和焦味。此外，根据电子舌的数据分析，中度焙烤大麦茶苦味适中，鲜味丰富。综合结果表明，中度焙烤大麦茶的风味最佳。本研究能够为大麦茶中的香气成分鉴定和大麦茶的感官品质评价提供一定的研究基础。

关键字 大麦茶；HS-SPME-GC-MS；电子鼻；电子舌；香气成分

分类：食物与营养

基于网络药理学和体内外实验研究黑茶辅助降血糖的作用机制

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目的 通过体内外实验验证黑茶的辅助降血糖功能，采用网络药理学分析黑茶辅助降血糖的成分、靶点、通路，运用分子对接验证黑茶功能成分与通路相关蛋白的结合能力。方法 雄性 SD 大鼠按血糖随机分为空白对照组、高脂模型组、低、中、高剂量藏茶组，每组 10 只；空白对照组动物喂饲基础饲料，模型对照组和三个实验组动物喂饲高脂饲料（80%基础饲料+8%猪油+12%蔗糖），控制各组动物进食量及饮水量基本一致，空白对照组和模型对照组动物饮用蒸馏水，实验组动物饮用相应剂量的藏茶水；实验第 31 天处死大鼠，测定或计算空腹血糖、0.5h 血糖、2h 血糖和血糖反应曲线下面积等指标。制备藏茶水提醇沉物，用胰岛素体外诱导胰岛素抵抗 HepG2 细胞模型，将正常 HepG2 细胞分为正常组、阳性组（二甲双胍组，下同）、藏茶水提醇沉物低剂量、中剂量、高剂量组，胰岛素抵抗 HepG2 细胞分为正常组、模型组、阳性组、藏茶水提醇沉物低剂量、中剂量、高剂量组，分别测定正常 HepG2 细胞和胰岛素抵抗 HepG2 细胞的葡萄糖消耗量和糖原合成量。利用 PharmMapper 和 Swiss Target Prediction 数据库获得有效功能成分的作用靶点蛋白，检索 DrugBank、OMIM 及 GeneCards 数据库获取 2 型糖尿病相关的疾病靶点，再通过绘制韦恩图取黑茶活性成分靶点和 2 型糖尿病疾病靶点的交集，将交集靶点输入到 STRING 数据库分析获得蛋白互作网络，然后导入 Cytoscape 3.8.0 软件进行可视化处理。使用 Metascape 对交集靶点进行基因本体（GO）和京都基因与基因组百科全书（KEGG）富集分析，然后使用微生信平台进行富集分析可视化，选取前 20 个 KEGG 信号通路构建 KEGG 关系网络图。最后，使用分子对接对分析结果进行验证。结果 体内实验表明，低和高剂量藏茶组大鼠空腹血糖低于模型对照组（P＜0.05）；中剂量藏茶组大鼠给予葡萄糖后 0.5h 后血糖低于模型对照组（P＜0.05），中和高剂量藏茶组大鼠血糖反应曲线下面积低于模型对照组（P＜0.05）。体外实验表明，与正常组相比，藏茶水提醇沉物中、高剂量组显著增加 HepG2 细胞对葡萄糖的消耗和 HepG2 细胞中的糖原含量（P＜0.05）。网络药理学共筛选到 9 个化学成分，其中槲皮素、山奈酚和表儿茶素发挥主要作用；获得 38 个核心靶点，包括白细胞介素-6（IL-6）、白蛋白（ALB）、丝氨酸/苏氨酸蛋白激酶 1（AKT1）、胰岛素（INS）和肿瘤坏死因子（TNF）等；基因靶点富集较多的通路包括 PI3K/AKT、TNF 和 IL-17 等。结论 黑茶可下调高脂饮食和胰岛素抵抗导致的血糖升高，其功能成分可能通过抗氧化、抗炎、降脂、调节糖代谢等途径发挥调控血糖的作用，具有多成分、多靶点、多通路的特征。

关键字 网络药理学； 分子对接； 体内外实验

分类：食物与营养

羊肚菌紫米面包的特性和体外消化率影响研究

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高血糖指数食品会导致人体血糖水平迅速升高且导致肥胖等慢性疾病。羊肚菌和紫米含有丰富的营养成分，该研究小麦面包为对照，实验组以羊肚菌粉（3%）和紫米粉（3%、6%、9%、12%）代替部分小麦粉，研究两者协同添加对小麦面包的营养品质和血糖指数的影响。采用流变仪分析面团的动态流变特性；采用色差仪测定了面包的颜色，采用质构仪测定了面包的质构指标，包括硬度、弹性、咀嚼性和内聚性；采用菜籽油置换法测定了面包的比容；根据 AOAO（2000）分析方法测定面包中的水分、灰分、蛋白质含量、总膳食纤维、不溶性膳食纤维含量和可溶性膳食纤维含量，使用 Megazyme 淀粉分析试剂盒测定总淀粉含量，采用评分法对面包的色泽、形态、面包芯质地、面包纹理结构及口感进行感官评定；采用氨基酸分析仪测定面包的蛋白氨基酸含量，对面包蛋白组分营养指标进行评估；通过测定面包蛋白质体外消化率来评估面包中蛋白质的营养指标，通过测定面包淀粉体外消化率从而评估面包的还原糖含量，氢化指数和预期血糖生成指数。结果如下：所有面包面团组的弹性模量 G'值都大于粘性模量 G''值，表明弹性性能优于粘性性能，随着羊肚菌粉与紫米粉的增加，面包的颜色由白色（面包皮 L*值为 43.1，面包芯 L*值为 61.8）转为棕色（面包皮 L*值为 32.2，面包芯 L*值为 34.1），面包的 G'，G''模量，硬度，咀嚼度均显著增加，而面包弹性，凝聚力，比容显著降低；此外，羊肚菌粉（8.87 g/100g）和紫米粉（6.18 g/100g）的含水量均显著低于小麦粉（12.6 g/100g），与小麦粉相比，羊肚菌粉和紫米粉中的灰分含量，蛋白质含量和膳食纤维含量更高；随着羊肚菌粉和紫米粉的添加，面包中的灰分含量，蛋白质含量和膳食纤维含量显著增加，而面包的中的淀粉含量和水分含量显著降低；游离氨基酸对面包的滋味形成有重要影响，随着羊肚菌粉和紫米粉的增加，面包总游离氨基酸含量都显著增加；感官评价实验表明，添加羊肚菌粉（3%）和紫米粉（6%）的面包显著增强了面包色泽和口感，其评价总分最高。最后，随着羊肚菌粉和紫米粉的加入，提高了面包蛋白质消化率同时优化面包的氨基酸模式，更有利于人体消化吸收，且面包中还原糖，氢化指数和预期血糖生成指数逐渐降低。结果表明，羊肚菌粉和紫米粉可以作为天然高价值成分，以改善面包中的营养成分，增加面包风味，降低面包的血糖指数，具有广阔的市场前景。

关键字 羊肚菌；紫米；小麦面包；血糖生成指数；体外消化率

分类：食物与营养

冻干桑叶粉及其乙醇提取物的抗衰老作用研究

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目的：衰老是一种难以避免的生物进程，生物体随着自身年龄的增长出现各种组织和器官功能的退行性改变，目前有关衰老的机制研究中，自由基理论被广为接受和认可，而天然植物被认为是清除自由基的物质来源，从天然植物中寻找延缓衰老的活性成分，对提高人类生存质量有很重要的现实和社会意义。桑叶为桑科（Moraceae）桑属（Morus）植物桑树的叶片，富含酚类、生物碱类、多糖等多种植物化学成分，具有强大的清除自由基能力。目前对于桑叶的开发利用集中在提取物和特定化合物上，而传统的提取工艺会造成桑叶营养素的大量损失，故使用全桑叶作为原料进行生产加工可能比其提取物更具有价值。本研究通过评价冻干桑叶粉和冻干桑叶粉乙醇提取物的抗衰老活性，为全桑叶抗衰老功能食品的开发提供实验数据。方法：将 70 只小鼠随机分为正常组、衰老模型组、抗坏血酸对照组(100mg/kg)及冻干桑叶粉组、桑叶粉乙醇提取物组、桑叶粉乙醇提取渣组以及桑叶粉乙醇提取物提取渣混合组 7 组。通过腹腔注射 200mg/(kg·d)的 D-半乳糖建立衰老小鼠模型，同时每天灌胃相应药物。给药 8 周后对小鼠进行行为学试验，收集小鼠粪便进行 16s rRNA 基因扩增和高通量测序以检测肠道菌群，并测定各组小鼠血清中丙二醛(MDA)、谷胱甘肽过氧化物酶(GSH-PX)、总抗氧化能力(T-AOC)水平。结果：旷场试验中冻干桑叶粉及其乙醇提取物均能显著提高小鼠 5 分钟内的运动总路程、平均速度和直立次数，水迷宫试验中冻干桑叶粉及其乙醇提取物均能减少小鼠的逃避潜伏期，提高原平台所在象限停留时间与穿越次数；肠道菌群结果显示冻干桑叶粉组小鼠肠道菌群 α 指数显著提高，冻干桑叶粉组及其乙醇提取物组厚壁菌门与拟杆菌门的比例显著降低，冻干桑叶粉组显著提高了几种益生菌的相对丰度；血清抗氧化结果显示冻干桑叶粉及其乙醇提取物均能显著提高 T-AOC 水平并显著降低小鼠机体 MDA 含量，冻干桑叶粉能显著提高 GSH-PX 活性。结论：冻干桑叶粉和桑叶乙醇提取物均能改善衰老小鼠肠道菌群，增加衰老小鼠肠道菌群总体多样性、丰富度并提高肠道优势菌群的相对丰度，提高衰老小鼠血液总抗氧化能力，提高抗氧化酶 GSH-PX 的水平，降低 MDA 的水平，提高小鼠的运动、空间探索以及学习记忆能力，冻干桑叶粉的综合抗衰老效果要优于其乙醇提取物。

关键字 桑叶；抗衰老；肠道菌群；行为学试验

分类：食物与营养

美国成年人非酒精性脂肪性肝病与膳食叶酸和血清叶酸的相关性：来自 NHANES 2009-2018 的横断面分析

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背景与目的:非酒精性脂肪性肝病(NAFLD)是一个全球性的健康问题，减重和营养管理仍然是预防 NAFLD 发展的主要方式。但在 NAFLD 患者中，营养需求与机体代谢的相互作用非常复杂。根据具体需求制定个性化的营养计划是一种很有前途的营养治疗方式。本研究旨在探究饮食中叶酸和血清叶酸水平与 NAFLD 之间的横断面关联。

方法:我们对参加 2009-2018 年国家健康与营养调查(NHANES)的 7543 名成年人进行了研究。NHANES 参与者提供了两次 24 小时内饮食摄入的信息，总叶酸摄入量和食物叶酸摄入量取两次平均值。参与者还提供了在过去 30 天内的膳食补充剂的使用情况，由此分析叶酸补充剂的摄入数据。血清叶酸（Serum folate）是短期状态的指标，血清总叶酸（Serum total folate）是个体叶酸形式的总和。而血清中主要的循环叶酸维生素是 5-甲基四氢叶酸(5-甲基 THF)，这是叶酸的实际生物活性形式。红细胞(RBC)叶酸是一种非常有价值的生物标志物，不受短期饮食的干扰。脂肪肝指数(FLI)已被证明与腹部超声诊断的肝脂肪变性密切相关，FLI≥60 判断为 NAFLD 状态。数据基于 R 软件 3.4.3 和 Empower Stats 软件进行分析。所有统计分析都对加权变量进行了调整，我们使用多变量调整 logistic 回归模型，将与目标结果的关联或者效应估计变化超过 10%的变量纳为协变量进行校正。我们使用比值比(ORs)和 95%置信区间(95% CI)确定膳食叶酸摄入量、血清叶酸和 NAFLD 之间的关系。此外，按性别进行交互作用和分层分析。

结果:近一半(45%)的患者根据 FLI 被归为 NAFLD 组。NAFLD 组的收缩压、舒张压、体重指数、腰围均高于非 NAFLD 组(p <0.001)。与非 NAFLD 组相比，NAFLD 组中老年人(45 岁以下)、男性、非西班牙裔白人和吸烟者的比例更高，NAFLD 组的甘油三酯（TGs）、低密度脂蛋白(LDL-C)、天冬氨酸转氨酶(AST)和丙氨酸转氨酶(ALT)水平更高。NAFLD 组的总膳食能量摄入显著高于非 NAFLD 组;然而，NAFLD 组的平均总叶酸摄入量和天然叶酸摄入量明显低于非 NAFLD 组。在校正的模型中，饮食中总叶酸和食物中叶酸含量最高的四分位组的参与者 NAFLD 患病率低于最低四分位数的参与者(OR:0.582；95%置信区间(CI): 0.350, 0.968；OR:0.737；95% CI: 0.611, 0.888)，血清总叶酸和 5-甲基-四氢叶酸的第四分位组与 NAFLD 患病率呈显著负相关(OR:0.664;95% CI: 0.495, 0.891;OR:0.712;95% CI: 0.532, 0.954)。然而，红细胞叶酸与 NAFLD 之间没有显著相关性。亚组分析显示，这种有益的关联在女性中更为显著，女性(OR:0.526;95% CI: 0.329, 0.843;相互作用 p<0.001)高于男性(OR:0.805;95% CI: 0.546, 1.186)。

结论:在美国成年人中，较高的膳食叶酸摄入量和血清叶酸水平与较低的 NAFLD 患病率相关，这一趋势在女性中更为明显，为营养干预 NAFLD 提供了新的思路。由于本研究是横断面研究，未来还需要进行大规模的队列研究来确定因果关系。

关键字 Nutrition; Non-alcoholic fatty liver disease; folate; folic acid

分类：食物与营养

冻干桑叶粉和桑叶乙醇提取物的体内代谢及抗衰老活性研究

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目的：

桑叶为桑科（Moraceae）桑属（Morus）植物桑树的叶片，富含酚类、生物碱类、多糖等多种植物化学成分，具有强大的清除自由基能力。传统的提取工艺会造成桑叶营养成分的大量损失，故可能使用全桑叶作为原料进行生产加工可能比其提取物更具有价值。因此本研究通过探究冻干桑叶粉和桑叶乙醇提取物的酚类化合物体内代谢情况和抗衰老活性差别，为将全桑叶开发成抗衰老功能食品提供实验数据。

方法：

本研究通过 UPLC-Q-Exactive Focus 技术对冻干桑叶粉及其乙醇提取物的酚类物质的入血活性成分进行初步鉴定，并基于入血活性成分进行抗衰老网络药理学研究；使用 D-半乳糖构建小鼠加速衰老模型，并对冻干桑叶粉及其乙醇提取物的抗衰老功能进行研究。

结果：

1. 通过 UPLC-Q-Exactive-MS /MS 技术，对冻干桑叶粉及其乙醇提取物中的酚类物质的体内代谢产物进行初步鉴定，共鉴定出 18 个相关代谢产物，主要为酚类物质的Ⅰ、Ⅱ相反应产物，包括还原、脱羧、水解、羟基化、脱氧和去糖基化等Ⅰ相反应，Ⅱ相反应如甲基化、葡萄糖醛酸化和硫酸化等。冻干桑叶粉酚类物质在体内释放代谢产物的持续时间比乙醇提取物更长。

3. 动物实验研究表明，冻干桑叶粉及其乙醇提取物对衰老小鼠均具有一定的抗衰老作用，二者能不同程度的改善衰老小鼠的体重减轻现象，缓解肝脏病理损伤，提高血液抗氧化能力，提升学习记忆和运动能力，冻干桑叶粉的综合抗衰老效果要优于桑叶乙醇提取物。

4. 动物实验研究表明，冻干桑叶粉及其乙醇提取物对衰老小鼠肠道菌群具有一定的改善作用，能够提高衰老小鼠肠道菌群总体的多样性与丰富度，提高拟杆菌门等肠道优势菌群的相对丰度，其中冻干桑叶粉和桑叶乙醇提取物提取渣混合物对肠道菌群的改善作用优于桑叶乙醇提取物。

5. 网络药理学方法构建“功能成分-靶点-通路”可视化网络系统，并对 KEGG 富集的相关通路蛋白表达进行实验验证，结果发现冻干桑叶粉及其乙醇提取物均可能通过调控 MAPK 信号通路部分蛋白的磷酸化水平，达到抗衰老的效果。

结论：

本文比较了冻干桑叶粉及其乙醇提取物酚类物质在小鼠体内代谢的异同，冻干桑叶粉在体内释放代谢产物的持续时间比桑叶乙醇提取物更长，动物实验表明冻干桑叶粉及其乙醇提取物对衰老小鼠都具有一定的抗衰老作用，在提高血液抗氧化能力及调节肠道菌群等方面冻干桑叶粉抗衰老功效优于桑叶乙醇提取物。

关键字 桑叶；乙醇提取物；体内代谢；抗衰老 ；行为学试验；肠道菌群

分类：食物与营养

基于 citespace 对健康膳食模式研究进展的知识图谱分析

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目的：中国从 1982 年开始进行国民营养与健康情况监测，40 年来的监测表明，国民摄入的食物日趋充足和多样化，膳食营养状况明显改善。本文围绕健康膳食模式进行系统的文献计量和可视化分析，了解健康膳食模式研究较活跃的作者和单位、健康膳食模式研究的关键词，探索健康膳食模式的发展状况、研究热点、研究趋势以及研究前沿动态，为健康膳食模式提供数据情报支持和发展参考。

方法：以“健康膳食模式”为主题词，以 2000 年 1 月 1 日—2022 年 10 月 1 日为时间段，检索中国知网数据库所收录的相关文献，运用 CiteSpace 6.1.R6 可视化分析工具,从文献发文量、高频关键词、突现词、发展趋势方面进行解析。

结果：本研究共纳 3641 篇文献，发文量呈现逐年上升趋势；作者合作分析结果显示中文文献发文量最多的是丁钢强、肖辉团队，英文文献发文量最多的是 Eun, Kim Jung,Hu Frank, T Clark Cain C 团队；中文文献发文量最多的机构有北京大学公共卫生学院、天津医科大学公共卫生学院，英文文献发文量最多的机构有、Dpartment of Nutrition、Department ofEpidemiology、Harvard T.H.Chan School of Public Health；发表单位统计分析显示机构之间的合作关系离散，表明有关膳食健康研究面广，机构合作在英文文献中较中文文献更加紧密，存在一定跨区域合作；关键词分析结果表明中文文献侧重于慢性病、摄入量、橄榄油和居民膳食等，而英文文献更侧重于地中海饮食、健康饮食指数、心血管疾病和乳腺癌等；研究聚类图谱可见所有关键词被聚类成 20 类，有地中海饮食、得舒饮食、植物性饮食、糖尿病饮食、慢性肾病饮食、心血管疾病饮食等；突现词分析结果表明近年来侧重于研究心血管疾病和慢性病，呈现出持续深入研究特点;对于不同慢性疾病而言，推荐素食模式（以果蔬类、豆制品和蛋类为主）或均衡膳食模式（以粗杂粮、蔬菜、蛋类、豆制品、海产品为主）能够显著降低高血压、肥胖病、肾病、阿尔兹海默症等患病风险并能改善患者病情。

结论：近年来国内外学者对健康膳食模式的研究热度持续上升,热点问题在不断更新、涉及的疾病范围也在不断扩大,尤其在慢性肾病、糖尿病和心血管疾病方面。健康膳食模式在延缓慢性病发生发展方面疗效明显，是本领域研究热点和主流研究趋势，居民膳食营养仍是健康膳食模式的重点研究方向；东方健康膳食模式为我国的研究前沿热点。作者及机构之间的合作存在不足，交流有待进一步加强。未来国内健康膳食模式可以深入持久关注重点领域、加强慢性病食疗研究、全面提升研究质量。

关键字 citespace；健康膳食模式；知识图谱；可视化分析

分类：食物与营养

鸡蛋清多肽对肝脏糖稳态的调节作用与机理研究

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目的：鸡蛋清蛋白被认为是一种优质的膳食蛋白质来源，也是一种理想的蛋白质来源，是生产生物活性肽的原料。虽然围绕鸡蛋清多肽（EWP）干预慢性代谢性疾病的研究先前已被报道，但是其潜在的机制，尤其对肝脏糖异生的影响仍有待阐明。

方法：在本研究中，我们通过对高脂饲料和链脲佐菌素 (Streptozotocin，STZ)诱导的二型糖尿病 C57 小鼠进行干预 7 周后，发现空腹血糖有明显降低。随后进一步通过商业化酶联免疫吸附测定（ELISA）试剂盒测定试验小鼠血清中胰岛素、胰高血糖素、血脂四项等含量。随后制作小鼠肝脏石蜡切片，经苏木精/伊红（H&E）染色、糖原染色（PAS）和油红染色后在显微镜下观察肝脏组织病理变化；通过 Western blot 检测 NF-κB 通路中关键分子 Iκkβ -Ser177/S181 及 p65-Ser536 磷酸化水平磷酸化特异性抗体；检测 PKA 底物反应结合蛋白 CREB-Ser133 丝氨酸残基 133 及 Foxo1-Ser273 转录因子试剂盒（等同于人源 Foxo1-Ser276）磷酸化水平；提取肝脏组织总 RNA，通过 qRT-PCR 检测糖异生基因 G6pc、Pck 表达水平，同时测定炎症相关基因 TNFα、IL-1β、MCP1 和 IL-6 表达水平。最后通过肝脏的代谢组学分析，从糖代谢和脂质代谢两方面进一步探讨 EWP 对肝脏糖代谢影响及可能机制。

结论：本研究的发现揭示了 EWP 在其发病机制中的新作用，具有抗糖尿病活性，有助于促进功能食品的开发以 EWP 为原料的保健品。

关键字 肉苁蓉多糖；营养功效；研究进展

分类：食物与营养

全脂山羊乳粉体外消化产物肽段功能性分析

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1 目的：

生物活性肽是一类对生命有机体具有重要生理功能的肽类分子。山羊乳源生物活性肽极其丰富，研究表明山羊乳清蛋白经体外静态消化后可释放 3698 种多肽。本研究通过体外动态模拟消化全脂山羊乳粉，并对消化产物进行肽序测定；利用生物信息学技术，借助生物活性肽数据库及计算模拟，筛选出潜在生物活性肽；将筛选所得的潜在生物活性肽与其相应的受体进行分子对接，最终从全脂山羊乳粉消化产物中挖掘出特定生物活性肽。本研究为实现高效分离羊乳中特定生物活性肽提供参考，并为提高山羊乳蛋白的深度利用提供理论依据。

2 方法：

2.1 全脂山羊乳粉体外动态消化：将全脂山羊乳粉按照粉：水=1: 6 比例溶解。利用动态人胃肠体外消化设备对溶液进行模拟连续的胃肠消化 180min，收集小肠排除物用于后续检测分析。

2.2 肽段鉴定：采用 Shotgun 蛋白质组学技术，对消化后产物进行肽段鉴定和定量分析。

2.3 功能肽筛选与验证：

2.3.1 利用 PeptideRanker 在线预测工具，筛选 Ranker 值>0.8 的生物活性肽。

2.3.2 使用 ToxinPred 预测肽段毒性。

2.3.3 降血糖肽、降血压肽初步筛选：利用 BIOPEP 数据库从 Ranker 值>0.8 的肽段中，检索与降血糖或降血压相关的关键词，筛选得到全脂山羊乳粉体外消化产物中具有降血糖或降血压活性和氨基酸序列中存在活性部位的肽段。

2.3.4 降尿酸肽、降血脂肽筛选及降血糖肽、降血压肽活性验证：通过 ChemDraw 20.0 软件绘制 2.3.1 中生物活性肽的二维分子结构式，使用 Chem3D 20.0 软件转化为后缀为*pdb.的三维结构作为分子对接的配体，从 Protein Data Bank 下载降尿酸肽受体黄嘌呤氧化酶、抗血脂肽受体 3-羟基-3-甲基戊二酰辅酶 A 还原酶、抗血压肽受体血管紧张素转换酶、抗血糖肽受体二肽基肽酶 IV 的晶体结构，用 AutoDock Vina 分子模拟软件将肽段分别与目标受体蛋白进行柔性对接，根据默认的打分函数挑选出亲和性最高（结合能最小）的复合物结构进行分析，筛选出结合能≤-6kcal/mol 山羊乳生物活性肽。

3 结果：

3.1 全脂山羊乳粉经体外动态模拟消化后，共得到 663 条序列不同的肽段，其中寡肽 169 条，多肽 494 条。

3.2 利用 PeptideRanker 从上述 663 条肽中筛选得到 15 条 Ranker 值>0.8 具有生物活性的肽段，其中寡肽 5 条，多肽 10 条。经 ToxinPred 预测分析发现 15 条肽段均无毒性。

3.2 通过采用 BIOPEP 数据库进一步筛选，发现该 15 条段肽兼具潜在降血糖和降血压功能。

3.4 采用分子对接技术，从上述 15 条肽段中筛选出 14 条结合能≤-6 kcal/mol 的肽段，这 14 条肽段均具有降尿酸和降血糖功能，其中 8 条肽段同时具有降尿酸、降血脂、降血糖、降血压 4 种功能（见附件表 1 和图 1）。

3.5 依据定量分析结果，上述 14 条肽段中 2 条肽段具有较高丰度，分别是 DRPIEPLDLAVFWVEFVMR（具有降尿酸、降血脂、降血糖功能）和 GPAGPQGPR（具有降尿酸、降血脂、降血糖、降血压功能）。

4 结论：

全脂山羊乳粉经体外动态消化后可获得生物活性肽，通过数据库筛选和分子对接技术证明这些生物活性肽具有降尿酸、降血脂、降血糖和降血压中的一种或多种功能。本研究通过快速筛选特定生物活性肽，为肽段的定向功效验证打下基础，有助于提高山羊乳蛋白的利用价值。

关键字 山羊乳；生物活性肽；体外动态消化；分子对接

分类：食物与营养

甜菊糖苷安全性的研究进展

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背景：甜菊糖苷是中国传统药食同源植物甜叶菊的主要成分之一，随着近年研究的深入，研究者们发现它具有无热量、高甜度等食品特点，并且有利尿、降血压、不致龋齿等保健功能，已在美国、欧盟、日本、中国等国作为食品添加剂批准使用。除了这些功能性的保健功能，作为药食同源植物，安全性也是必须考察的重要因素，但目前国内外关于甜菊糖苷的功能性研究较多，安全性研究却较少。

目的：阐述国内外关于甜菊糖苷安全性实验的研究进展，为研究者们的深入研究提供现实依据。

方法：以“甜菊糖苷”“安全性”“毒理”等为中文检索词；以“steviol Glycosides”“safety”“toxicity”等为英文检索词，计算机及手工检索中文数据库：中国期刊全文数据库（CNKI）、中国生物医学文献数据库（CBM）、中国科技期刊全文数据库（VIP）和万方数据库；英文数据库：PubMed/MEDLINE、Embase、Cochrane Librar、Web of science 等。筛选 1990 年 3 月 1 日-2023 年 3 月 1 日，公开发表的国内外相关动物及人体研究文献。

结果：通过研究方法文献检索初筛选出 104 篇文献，按照纳入标准最终筛选出 20 篇满足条件的相关文献。可以检索到的研究表明，甜菊糖苷是一种非常安全的植物活性成分，在动物模型中，绝大部分研究表明并不会对动物的生育造成不良影响，也不会导致胚胎死亡或畸形的等情况发生；在人体实验当中，甜菊糖苷并未发现有致癌活性，无中枢神经毒性，对人体的生长发育也不会造成影响。从药代动力学来看，研究表明在正常人体中，甜菊糖苷不会被上消化道的消化酶水解，也不会通过胃肠道的上部吸收，会通过结肠细菌活性转化为甜菊醇，但随后迅速转化为甜菊醇葡萄糖醛酸酯的无毒代谢物通过尿液排泄。

结论：虽然目前多数证据证明甜菊糖苷是无毒物，但值得注意的是 FDA 要求甜菊糖苷作为食品添加剂纯度需要在 95%以上，说明未经高度提纯的甜菊糖苷制品当中的杂质可能会存在潜在的不良反应，而中国在 2022 年最新颁布的《食品安全国家标准 食品添加剂 甜菊糖苷》中对甜菊糖苷的纯度要求是 90%以上即可。但目前在国内，甜菊糖苷并无加工提取国家标准，是否可以将对甜菊糖苷的安全性研究重心转移到甜叶菊的原料加工质量控制上。国内已有用“甜叶菊渣”作为混合饲料做的动物实验，结果表明在饲料中过量添加会导致鸡、妊娠母猪、家兔、鸡等动物的器官损害。最后，甜菊糖苷已成为多国的食品添加剂和传统的“食物”，关于其安全性的研究可能会渐渐被忽视，笔者在此希望业内研究人员可以秉持科学的研究方法，穷理尽性，造福人类。

关键字 甜菊糖苷；安全性；毒理；药食同源

分类：食物与营养

基于校园 “智慧点餐”系统的膳食大数据准确性评价

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目的：验证校园“智慧点餐”系统膳食大数据的准确性，以确定其能否用于评价学生的在校膳食摄入情况。

方法：遵循调查对象性别、学院、教育阶段等相对均衡的原则，招募复旦大学枫林校区在校大学生共221名，完成连续7天24小时膳食记录（7-day food diary , 7DFD）及补充膳食频率问卷（food frequency questionnaire，FFQ），补充FFQ内容主要包含乳制品、水果、坚果、含糖饮料和糖果巧克力的食用频率及摄入量；经过调查对象授权，获取同一时间段的“智慧点餐”系统膳食数据共9385条。以7DFD为“金标准”，通过计算“智慧点餐”系统膳食数据 vs. 7DFD及“智慧点餐”系统数据+补充FFQ vs. 7DFD膳食摄入的Mann-Whitney U检验、Spearman相关系数、交叉表一致性检验、Bland-Altman检验、建立不同性别的分层线性回归等方法，评价两种方法之间膳食能量、宏量营养素（蛋白质、脂肪、碳水化合物）及10个食物组（谷类、薯类、蔬菜类、水果类、动物性食物、奶及奶制品、大豆及坚果、盐、油、添加糖）摄入量的相关性和一致性。

结果：221名研究对象平均年龄22.23 ± 2.44岁，其中男生85人（38.46%），女生136人（61.54%）；本科生118人（53.39%），研究生103人（46.61%）。“智慧点餐”系统获得的膳食能量、宏量营养素及食物组摄入量均低于7DFD(P<0.05)；除奶及奶制品（rs=0.267）、水果类（rs=0.336）外，其余营养素和食物摄入量间的Spearman相关系数rs在0.500～0.883之间（P<0.001）；两方法间膳食能量、营养素和食物摄入被分类到相同或相邻的四分位数组的比例为64.25%（奶及奶制品）至98.19%（大豆及坚果）。“智慧点餐”系统+补充FFQ获得的膳食能量及宏量营养素摄入量低于7DFD(P<0.05)；食物组中“智慧点餐”系统+补充FFQ的水果摄入量被低估，奶及奶制品、大豆及坚果、添加糖摄入量略高于 7DFD，但差异均不具有统计学意义(P>0.05)；除添加糖（rs=0.397）外，rs在0.519～0.863之间（P<0.001）；两方法间膳食能量、营养素和食物摄入被分类到相同或相邻的四分位数组的比例为78.73%（添加糖）至96.38%（蔬菜类）。Bland-Altman图表明“智慧点餐”系统vs. 7DFD和“智慧点餐”系统+补充FFQ vs. 7DFD测得的膳食能量及宏量营养素摄入均呈现良好的一致性。利用“智慧点餐”系统膳食数据建立对不同性别学生膳食能量和宏量营养素摄入量的预测模型，决定系数R2范围0.11～0.74；“智慧点餐”系统膳食数据+补充FFQ模型R2范围0.07～0.55；对同一营养素，“智慧点餐” 膳食系统的预测能力高于“智慧点餐”系统膳食数据+补充 FFQ；除蛋白质外，无论是否合并补充 FFQ，“智慧点餐”系统对男生的膳食摄入量的评估更为准确。

结论：“智慧点餐”系统的膳食大数据在评估大学生在校膳食摄入时有良好的准确性；膳食频率问卷作为一种有效的补充方式，适用于调查学校食堂提供较少或不提供的食物组。

关键字 “智慧点餐”系统；膳食大数据；准确性评价；大学生

分类：食物与营养

鱼油补充对中老年人血清 ICAM-1 水平及抗氧化能力影响的随机对照研究

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目的：探究不同剂量鱼油补充对中老年人群血清细胞间黏附分子-1（ICAM-1）水平及丙二醛（MDA）、超氧化物歧化酶（SOD）、谷胱甘肽过氧化物酶（GSH-Px）水平的影响。

方法：开展为期 12 周的随机、对照、鱼油补充试验。选取广州市荔湾区某社区卫生服务中心作为研究现场，在来该社区卫生服务中心进行健康体检的中老年人中招募 240 名志愿者作为研究对象（纳入标准：在该社区居住 1 年以上，年龄＞40 岁， BMI＜28kg/m²，调查前 1 年内未服用过鱼油等相关药品或保健品，无心脏疾病、糖尿病，无严重肺、肾等器质性损伤，无急、慢性炎性疾病，无听力、语言表达障碍及智力缺陷，愿意合作并自愿签署知情同意书）。采用随机数字法将研究对象随机分为四组，每组 60 人。对照组不服用任何鱼油干预剂；低剂量组每日 1 粒鱼油胶囊（含 182mgEPA+129mgDHA），随午餐服用；中剂量组每日 2 粒鱼油胶囊（含 364mgEPA+258mgDHA），随餐服用，中晚餐各 1 粒；高剂量组每日 4 粒鱼油胶囊（含 728mgEPA+516mgDHA），随餐服用，中晚餐各 2 粒。鱼油胶囊由汤臣倍健公司提供，1000mg/粒。干预前后进行问卷调查和体格检查，并采集空腹静脉血以测量血清 ICAM-1、MDA、SOD、GSH-Px 水平。采用酶联免疫吸附法（ELISA）测量血清 ICAM-1 水平；硫代巴比妥酸法（TBA）测量血清 MDA 水平；羟胺法测量血清 SOD 水平以及血清 GSH-Px 水平。问卷资料统一编码，用 EpiData3.1 录入问卷并建立数据库。采用 SPSS25.0 进行统计分析。Shapiro-Wilk 法检验变量正态性。组间比较采用方差分析或非参数方法。两两比较采用 Least—SignificantDifference 法。

结果：研究对象平均年龄为 60.62±7.66 岁。各组研究对象一般人口学特征变量无组间差异（P＞0.05），具有可比性。干预前，各组研究对象血清 EPA 和 DHA 百分含量无组间差异（P＞0.05），具有可比性。干预后，对照组血清 EPA 和 DHA 百分含量相较于干预前无明显变化（P＞0.05），而各鱼油干预组 EPA 和 DHA 百分含量均较干预前明显上升（P<0.05）。干预后，各鱼油干预组血清 EPA 和 DHA 百分含量均高于对照组，差异有统计学意义（P＜0.05）。干预前，各组研究对象的血清 ICAM-1、MDA、SOD、GSH-Px 水平差异无统计学意义（P>0.05）。干预 12 周后，各组间 GSH-Px 水平存在差异（P<0.05），两两比较显示中、高剂量组的 GSH-Px 水平均高于对照组和低剂量组（P<0.05），高剂量组的 GSH-Px 水平高于中剂量组（P<0.05）。干预 12 周后，各组 ICAM-1、MDA、SOD 水平差异无统计学意义（P>0.05）。但干预 12 周后，高剂量组 GSH-Px 水平的相对增幅高于其余三组（P<0.05）；低剂量组 ICAM-1 水平的相对降幅高于其余三组（P<0.05）；各组 MDA 水平的相对降幅及各组 SOD 水平的相对增幅差异无统计学意义（P>0.05）。

结论：鱼油补充可降低中老年人群血清 ICAM-1 水平以及提高中老年人群血清 GSH-Px 水平，有助于提高机体抗氧化能力。

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关键字 鱼油，健康中老年人，ICAM-1，抗氧化

分类：食物与营养

鱼油补充对中老年人血脂及血浆致动脉粥样硬化指数影响的随机对照研究

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目的：探究不同剂量鱼油补充对中老年人群血脂及血浆致动脉粥样硬化指数（AIP）的影响，为中老年人合理补充鱼油预防、改善心血管疾病提供参考和依据。

方法：开展为期 12 周的随机对照鱼油干预研究。选取广州市荔湾区某社区卫生服务中心作为研究现场，在来该中心进行健康体检的中老年人中招募 240 名志愿者（纳入标准:在该社区居住 1 年以上,年龄＞40 岁， BMI＜28kg/m2，调查前 1 年内未服用过鱼油等相关药品或保健品,无心脏疾病、糖尿病,无严重肺、肾等器质性损伤， 无急、慢性炎性疾病，无听力、语言表达障碍及智力缺陷,愿意合作并自愿签署知情同意书）。采用随机数字法将研究对象随机均分为 4 组，每组 60 人。对照组不服用任何鱼油干预剂，低剂量组每天服用 1 粒鱼油胶囊（含 129mgDHA+182mgEPA）、中剂量组每天服用 2 粒鱼油胶囊（含 258mgDHA+364mgEPA）、高剂量组每天服用 4 粒鱼油胶囊（含 516mgDHA+728mgEPA），鱼油胶囊由汤臣倍健公司提供。在干预前和干预后分别对研究对象进行问卷调查和体格测量，采集空腹静脉血；干预过程中，向研究对象发放补充记录表，通过电话随访记录补充剂服用情况，了解研究对象的饮食、药物使用和身体状况等基本情况，并督促研究对象按要求服用。检测血脂水平总胆固醇(TC)、甘油三酯(TG)、低密度脂蛋白胆固醇(LDL-c)、高密度脂蛋白胆固醇(HDL-c)。计算 TG 与 HDL-c 比值的对数[Log(TG/HDL-c)]得出血浆致动脉粥样硬化指数（AIP）。将资料统一编码，用 EpiData3.1 建立数据库对回收问卷进行录入，采用 SPSS 25.0 进行统计分析。Shapiro-Wilk 法检验变量正态性，配对 t 检验对干预前后血脂、AIP 进行检验,组间比较采用方差分析或非参数方法，两两比较采用 Least—SignificantDifference 法，检验水准 α=0.05。

结果：各组研究对象一般人口学特征变量无统计学差异（P＞0.05），具有可比性。鱼油干预对血脂水平的影响：干预前，各鱼油组 TG、TC、LDL-c、HDL-c 及 AIP 水平与对照组无显著性差异。干预后，对照组 TG、TC、HDL-c 水平及 AIP 较干预前无统计学差异，对照组 LDL-c 较干预前呈现下降趋势（P<0.05）；而不同剂量鱼油补充组 TG、TC、LDL-c、AIP 均呈现下降趋势，其中 TG、LDL-c、AIP 水平较干预前有显著性差异（低、中剂量组 P<0.05，高剂量组 P＜0.001）；各鱼油干预组 TC 水平干预后也较干预前降低，但无统计学差异（P＞0.05）；各鱼油干预组 HDL-c 水平均较干预前上升，仅高剂量补充组较干预前有统计学差异（P＜0.05）。

结论：适量补充鱼油可降低中老年人群血清 TG、AIP 指数，升高 HDL-c 水平，对中老年人预防、改善心脑血管疾病具有积极意义。

关键字 中老年人；鱼油；DHA；EPA；血脂；AIP

分类：食物与营养

海藻膳食纤维在减脂减盐脆皮蒜肠产品中的应用效果评价

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目的　我国是全球肉类消耗和生产最大的国家，肉类制品含有丰富的蛋白质、维生素、矿物质等，富含丰富的营养价值，但肉制品中过多的脂肪会增加肥胖和心脑血管疾病的风险，同时，在肉类加工过程中过多的盐含量会增加高血压、心脏病、癌症等多重疾病的风险，对人体健康造成威胁。但脂肪和食盐在肉制品加工中具有非常重要的作用，可以改善肉质，增加保水，减少蒸煮损失等，所以单纯减少脂肪、盐含量会使肉制品发干、发柴、汁水感不足，且风味降低，结构变差。海藻膳食纤维是从海藻中提取的以多糖类为主的大分子物质，且不易被人体消化吸收，研究表面，富含膳食纤维食品可有效促进消化系统健康、改善心血管系统、预防糖尿病、减少肥胖。研究利用海藻膳食纤维热不可逆凝胶机理，将海藻膳食纤维、水、肥膘制成类似脂肪口感的替代物，加入配方中，维持脂肪香气的同时，降低配方中脂肪用量，起到减脂功效，同时可以提升产品硬度、弹性、咀嚼性、爽滑度，再结合减盐配方，形成减脂减盐新方案。

方法　通过市场调研，选取市场畅销低温肉制品，低温肉制品因其杀菌温度较温和，较好的保留了营养成分，受到消费者欢迎，因此选定一款脆皮蒜肠产品，并设计实验方案。实验设计为2组，分别为，对照组：非减脂减盐组（未添加海藻膳食纤维），实验组：减脂减盐组（添加海藻膳食纤维）。原料肉经解冻、绞制、料馅拌和、滚揉腌渍、灌装、熟制、杀菌冷却后，由肉制品专业评价小组分别对产品硬度、弹性、咀嚼性、爽滑度、风味进行评价，同时分析脂肪及钠含量。

结果　经分析，脂肪含量(/100g产品)分别为：对照组11.2g，实验组6.5g，实验组较对照组减少4.7g；钠含量（/100g产品）分别为：对照组606mg，实验组390mg，实验组较对照组较少216mg。结构上，与对照组相比，添加海藻膳食纤维组硬度大，有咀嚼性，且弹性较好，爽滑度高，整体结构有很大提升；风味上，肉香浓郁，咸淡适中，但较对照组，脂肪香气稍弱，但整体风味协调，可接受程度高。

结论　较对照组相比，实验组脂肪含量降低42%，钠含量降低35.6%，添加海藻膳食纤维减脂减盐方案，可明显降低脂肪、盐含量，且脂肪风味佳，可接受程度高。同时，添加海藻膳食纤维可提高产品硬度、弹性、咀嚼性、爽滑度，使产品在结构上有明显提升。

关键字 海藻膳食纤维　减脂减盐　脆皮蒜肠

分类：食物与营养

HS-GC-IMS 研究不同贮藏条件下橄榄菜的挥发性化合物特征图谱

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HS-GC-IMS 研究不同贮藏条件下橄榄菜的挥发性化合物特征图谱

Characteristic Volatiles Fingerprints in Olive Vegetable Stored at Different Conditions by HS-GC-IMS

目的:

橄榄菜是中国潮汕的一种特殊泡菜，吸引了很多消费者。它是一种以橄榄、芥末为主要原料添加其他辅助成分的独特风味食品。它富含多种营养物质，如叶绿素、钙、碘和许多维生素。近年来，关于泡菜的研究报道较多，主要包括酸洗机理分析、工艺改进、功能和成分分析。然而，泡菜缺乏集约化加工，通常在小车间加工，泡菜的基本成分的组成和风味特征尚未完全了解。本研究旨在研究橄榄菜的理化性质以及不同贮藏条件下橄榄菜的挥发性化合物特征。

方法:

本文选用广州的食品有限公司生产的橄榄菜，创新性地采用顶空-气相色谱-离子迁移光谱法测定了在不同贮藏条件下的橄榄菜的挥发性化合物特征。

结果:

橄榄菜的含水量为 22.70%，含盐量为 3.10%，属于腌制食品。橄榄菜的脂肪含量为 45.4 g/100g，橄榄菜的含糖量较低，仅为 0.167 g/100g。橄榄菜中未检测到亚硝酸盐和丙烯酰胺。检测到挥发性化合物 57 种，其中醛类 30 种，酮类 8 种，醇类 5 种，酯类 2 种，烷烃类化合物 8 种，呋喃类 1 种，含硫化合物 3 种。4℃条件下储存 21 天的橄榄菜产生了更多的烯烃，其中柠檬烯会产生一种令人愉快的柠檬香气，因此在 4℃储存的橄榄菜中可产生一种理想的气味。新鲜的橄榄菜中部分挥发性化合物含量较低，包括（E，E）-2，4-庚二烯醛、5-甲基糠醛、(E)-2-辛烯醛、(E)-2-戊烯醛和庚烯醛，但它们会随贮藏时间的增加而增加。橄榄菜中的挥发性化合物浓度随储存时间的变化而变化，但在 0℃贮藏条件下变化最小。

结论:

该橄榄菜符合中国食品安全管理规定。风味化合物可以区分不同保存条件下的橄榄菜样品。评价不同贮藏条件对橄榄菜风味成分的影响，还可为提高橄榄菜风味品质提供理论依据。此外，本研究还可为发展传统食品和标准化工业生产提供依据。

关键字 橄榄菜；贮藏条件；挥发性化合物；HS-GC-IMS

分类：食物与营养

甘肃省松针绿壳鸡蛋营养成分分析及安全评价

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目的　为了探讨喂养松针和黄连粉的黑羽乌鸡所产绿壳蛋的营养成分和安全性，做出松针绿壳鸡蛋的营养价值及安全性评价。方法　本项目是甘肃省营养学会立项课题 GSYYXH:2022003。随机抽取甘肃省新鲜松针绿壳鸡蛋 20 枚，测定其营养成分及安全性指标。结果　松针绿壳鸡蛋的蛋白质含量为 10.80g/100g，维生素 D 的含量 2.22mg/100g,维生素 A 的含量为 88.6mg/100g。松针绿壳鸡蛋的总氨基酸含量为 13.70g/100g,高于市售其它品种的鸡蛋。必需氨基酸的总含量为 5.70g/100g,其中，苏氨酸含量为 0.62g/100 g，缬氨酸含量为 0.93 g/100 g，蛋氨酸含量为 0.47g/100 g，异亮氨酸含量为 0.73g/100 g，亮氨酸含量为 1.16g/100g，苯丙氨酸含量为 0.71g/100 g，赖氨酸含量为 1.08g/100 g，占总氨基酸含量的 41.60%。值得关注的是，婴幼儿生长发育必须的组氨酸含量较高为 0.42g/100 g。松针绿壳鸡蛋的鲜味氨基酸（天冬氨酸、谷氨酸、甘氨酸、丙氨酸、精氨酸）的含量为 5.37g/100g，显著高于市售其它品种的鸡蛋，占总氨基酸含量的 39.19%。针绿壳鸡蛋中硒、锌、铁、钙的　含 量 分 别 为 0.032mg/kg、18.40mg/kg、26.40mg/kg、59.00mg/kg，其中钙的含量最高，铁、锌的含量明显高于市售其他品种鸡蛋。依据国家标准，未检出铅等重金属、氟喹诺酮类药物、氯霉素等抗生素的残留，大肠杆菌在国家标准允许范围内，说松针绿壳鸡蛋是安全放心的蛋。结论　以松针粉及黄连等中药复配饲料喂养的乌鸡所产的松针绿壳鸡蛋中：蛋白质含量处于中等偏上水平，氨基酸含量较高，其中必需氨基酸占比较高，亮氨酸、蛋氨酸、赖氨酸相比其他蛋类含量更为丰富；鲜味氨基酸含量在蛋类中处于上等水平，表明松针绿壳鸡蛋的口感更鲜美；就矿物元素而言，钙含量最高，铁、锌的含量比市面上其它普通土鸡蛋更高。未检出铅等重金属、氟喹诺酮类药物、氯霉素等抗生素的残留，大肠杆菌在国家标准允许范围内，说明松针绿壳鸡蛋营养价值高，安全性有保证，在市场上有较好的前景。应该加大对甘肃黑羽乌鸡的品种培育力度，开发特色喂养饲料，为日后蛋品的加工利用以及进一步开展禽类品种改良、提高蛋品质等方面提供帮助。

关键字　松针粉；绿壳鸡蛋；营养价值；安全性

分类：食物与营养

焉支野黑麦营养成分分析与评价

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目的：分析评价甘肃山丹县种植的焉支野黑麦的营养成分，为其开发利用提供参考。 **方法：**采用国家标准分析方法测定焉支野黑麦的营养成分，以普通小麦、河东乌麦为对照，对其营养价值进行综合比较和评价。 **结果：**焉支野黑麦中蛋白质含量为20.5%，粗脂肪为7.2%，碳水化合物为49.6%，粗纤维为11.3%。焉支野黑麦含有17种氨基酸，氨基酸总量达到18.126%，较普通小麦高出45.24%，较河东乌麦高出13.93%，其中7种必需氨基酸占氨基酸总量的5.358%，非必需氨基酸占 9.032%。焉支野黑麦含有 14 种脂肪酸，不饱和脂肪酸含量丰富，占脂肪酸总量的 83.24%，其中亚油酸含量最高(49.99%)，油酸含量次之(30.00%)。饱和脂肪酸占16.76% ，其中棕榈酸酸含量最高(14.58%)。必需脂肪酸含量占脂肪酸总量的52.30%，饱和脂肪酸：单不饱和脂肪酸：多不饱和脂肪酸为1:2:3.25。未检出反式脂肪酸。焉支野黑麦的维生素B_1、维生素B_2、钙含量较低，铁、锌、硒含量较高，分别为4.47mg/100g、2.98mg/100g、0.0593mg/100g。与普通小麦相比，焉支野黑麦的蛋白质含量高出51.85%，脂肪含量高出380.0%，粗纤维含量高出253.13%，碳水化合物含量低于普通小麦32.43%，锌元素高出33.63%，铁元素高出104.11%，硒元素高出530.85%；与河东乌麦相比，其蛋白质含量高出27.33%，脂肪含量高出323.53%，粗纤维含量高出145.65%，碳水化合物含量低于河东乌麦34.01%，锌元素高出30.70%，铁元素高出53.08%，硒元素高出196.50%。根据氨基酸评分和化学评分，焉支野黑麦中富含蛋氨酸+胱氨酸和苯丙氨酸+酪氨酸，其第一限制性氨基酸为赖氨酸，含量为0.433%，是普通小麦的1.5倍。焉支野黑麦的必需氨基酸指数为62.32，高于普通小麦，低于青稞、藜麦等。此外，焉支野黑麦中含有大量的黄酮类化合物，含量为0.12mg/100g，是黄酮小麦山农101号的1.2倍左右，是普通小麦的5倍左右。 **结论：**焉支野黑麦是一种粗蛋白含量高，粗纤维含量高，低碳水化合物，必需氨基酸种类齐全，富含不饱和脂肪酸，富铁、富硒，营养价值较高的新黑色食品资源，有很好的开发应用前景。

关键字 焉支野黑麦；营养成分；营养评价

分类：食物与营养

Cy3G 对 APP/PS1 小鼠炎症与肠道菌群的影响

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目的 阿尔茨海默病（Alzheimer’s disease，AD）是痴呆最常见的致病原因，主要表现为进行性认知功能损伤以及精神和行为失调等，但 AD 的发病机制至今还未研究清楚。APP/PS1 双转基因小鼠是研究阿尔茨海默病的一种常见动物模型。近年来，越来越多的研究表明 AD 的发生发展与肠道菌群失调密切相关。生理状态下，肠道菌群种类、数量和比例相对稳定，且与宿主保持动态平衡，调节宿主大脑功能、影响宿主认知行为，被称为“第二大脑”，健康的肠道菌群有利于维护大脑的认知功能。花色苷具有多种生物活性，可以降低 AD 的发病风险。矢车菊素-3-O-葡萄糖苷（Cy3G）是一种常见花色苷。本研究探讨 Cy3G 对阿尔茨海默病动物模型 APP/PS1 双转基因小鼠的炎症及肠道菌群组成的影响。

方法 32 只 6 月龄雄性 APP/PS1 小鼠随机分为 2 组，每组 16 只。Cy3G 干预组小鼠灌胃 Cy3G 50 mg/（kg·bw·d）。模型组小鼠灌胃等量生理盐水。同窝野生基因型小鼠 16 只作为阴性对照组灌胃等量生理盐水。干预周期为 8 周，实验结束后采集小鼠血清、结肠、脑组织和粪便，ELISA 试剂盒测定小鼠血清神经递质的水平、脑组织炎症因子水平、Western blot 检测结肠紧密连接蛋白的表达、对结肠内容物进行高通量 16s RNA 测序分析肠道菌群多样性和群落结构。

结果 与模型组相比，Cy3G 干预可以显著提高 APP/PS1 小鼠血清 BDNF、GABA 水平（$P<0.01$），增加结肠组织紧密连接蛋白 Occludin、ZO-1 的表达（$P<0.01$）。APP/PS1 小鼠在 Cy3G 干预后脑组织炎症因子 COX-2、IL-6、iNOS、TNF-α 和 IL-1β 的水平有下降趋势。16S rRNA 高通量测序结果显示，Cy3G 干预 APP/PS1 小鼠肠道菌群的 β-多样性上升。在门水平的物种相对丰度分布上，Cy3G 干预后厚壁菌门丰度显著下降，拟杆菌门丰度显著增加（$P<0.05$），干预组降低了厚壁菌门/拟杆菌门的比值。主坐标分析显示，Cy3G 干预后，模型小鼠肠道菌群物种组成接近正常对照组。

结论 饮食干预来预防神经退行性疾病的发生是一种安全有效的方式，在 Cy3G 干预后 APP/PS1 小鼠的炎症反应、结肠屏障功能、肠道菌群结构与组成得到改善。初步揭示了肠道菌群可能是防治阿尔茨海默病的新靶点。由于肠道菌群结构与组成也相对复杂，其作用机制仍需深入探讨。

关键字 矢车菊素-3-O-葡萄糖苷；阿尔茨海默病；肠道菌群

分类：食物与营养

重庆市售乳品中脂肪酸组成及含量分析

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目的：乳品中的脂肪酸是一种促进机体生长发育的重要营养物质，不仅能够作为主要的能量和必需脂肪酸来源，还对大脑、神经系统、视觉系统等发育具有重要促进作用。在营养缺乏的情况下，乳品是主要的营养补充剂，这就要求乳品的调配必须考虑优化各种脂肪酸及其他营养素的组成和含量，确保能够满足机体营养所需。通过对重庆地区市售的不同品牌的乳品中脂肪酸组成及含量进行检测分析，为研究开发营养全面的乳品提供依据，为国内乳品营养成分现状研究提供基础数据，也为中国食物营养信息系统建设提供数据支撑。方法：随机购买重庆地区市场上具有代表性的33种乳品，称取试样0.1 g~10 g（精确至0.1 mg）于250 mL平底烧瓶中，先加入100 mg焦性没食子酸、2 mL 95%乙醇和4 mL纯水，混匀。再加5 mL氨水，混匀后80℃水浴20 min。结束后冷却至室温，加入10 mL 95%乙醇，混匀。水解液移至分液漏斗中，加入50 mL乙醚/石油醚混合液，振摇5 min，静置10 min。将醚层提取液收集到烧瓶中，重复提取3次，合并提取液。提取液浓缩至干，残留物为脂肪提取物，向其中加入8 mL，2%氢氧化钠甲醇溶液，80℃水浴回流至油滴消失。从回流冷凝器上端加入 7 mL 15%三氟化硼甲醇溶液，80℃水浴继续回流 2 min。完成后迅速冷却至室温，准确加入20 mL正庚烷、饱和氯化钠水溶液，混匀后静置分层。吸取上层溶液于试管中，加入3 g无水硫酸钠，振摇1 min，静置5 min，取上清液进行气相色谱分析。结果：本研究一共检出26种脂肪酸，各样品中脂肪酸的组成及含量差异较大，棕榈酸含量最高（17.89%~49.01%），其次是油酸（18.52%~33.72%），而亚油酸含量最高可达29.54%，最低仅为1.01%；4款乳品中检出了DHA（C22 : 6n3），所有乳粉中均未检出EPA（C20:5n3）；10款乳品中亚油酸与α-亚麻酸比值（1.40~4.00）低于以往研究报道的其他乳品，如人乳（8.92）、牛乳（2.78）和山羊乳（3.10）等，其余脂肪酸含量均与以往研究结果类似。结论：不同品牌的乳品的脂肪酸组成及含量需要进行不断优化、合理配比，以满足机体的营养需求。该研究也提示重庆居民，在摄入乳品的同时，可能要从其他饮食中适当增加多不饱和脂肪酸的摄入，来保持膳食中各种脂肪酸的平衡。

关键字 乳品；营养成分；脂肪酸

分类：食物与营养

基于 CiteSpace 的柚皮苷研究现状可视化分析

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研究目的：柚皮苷是一种药食同源的天然植物化合物，主要存在于芸香科植物柚果实，如葡萄柚 、橘、橙的果皮和果肉中，同时它也是中国传统中药骨碎补、化橘红、枳实、枳壳的主要活性成分。为掌握柚皮苷的研究进展及研究热点，了解该研究领域的国家、作者、机构和期刊的研究现状。本研究运用文献计量学和 CiteSpace 可视化分析软件对收录于 CNKI（中国知网）数据库和 WOS（Web of Science）数据库的与柚皮苷相关研究文章进行分析。

研究方法：使用 CiteSpace 可视化分析软件对 1936-2022 年间被 WOS（Web of Science）数据库收录的 2781 篇英文文献和 1982-2022 年间被 CNKI（中国知网）数据库收录的 2386 篇中文文献进行分析。分别从国家、机构、作者合作情况角度进行网络图谱分析柚皮苷研究领域的活跃程度，并通过关键词聚类图谱、关键词时间域和突现检测角度分析柚皮苷研究的热点方向发展趋势。

研究结果:国家合作网络图谱分析结果表明，研究报道柚皮苷最多的国家依次为中国、印度和美国；对柚皮苷研究贡献最大的国家依次是美国、印度和中国；综合中国和国际作者发文情况的分析，林励、陈丹、苏薇薇、倪辉等是国内柚皮苷研究的引领者；《中草药》和《Food Chemistry》是柚皮苷发文量最高的期刊；机构合作网络图谱分析结果表明，中文文献中广州中医药大学对柚皮苷的报道最多，英文文献中中山大学发文量最多；关键词聚类分析显示中文文献研究侧重于柚皮苷的提取工艺和含量测定，英文文献侧重于柚皮苷的生物机制研究；关键词时间域和关键词突现分析结果显示柚皮苷的提取、含量测定及其相关的生物机制仍为未来研究的热点。

研究结论：柚皮苷在自然界中广泛存在，生产工艺稳定，廉价易得。已有大量的研究报道表明柚皮苷生物活性较强，作用靶点较多，具有抗炎、抗过敏、抗氧化、抗凋亡、保护神经细胞等药理学作用。但中国目前与柚皮苷相关的研究方向主要为提取工艺、生物活性、药理作用和制剂制备，与茶黄素、槲皮素、原花青素等已经有大量研究报道的多靶点植物化合物相比，科研人员对柚皮苷机制相关研究的关注度稍显不足。因此在植物化合物相关营养机制研究方面，柚皮苷具有较为较为广阔的研究前景。

关键词：柚皮苷；CiteSpace；可视化分析

关键字 柚皮苷；CiteSpace；可视化分析

分类：食物与营养

葡萄籽原花青素对人工反式脂肪酸诱导肥胖大鼠血脂代谢的影响及其机制研究

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目的 探讨葡萄籽原花青素(grape seed proanthocyanin extract, GSPE)对人工反式脂肪酸（industrial trans fatty acids，ITFAs）诱导肥胖大鼠血脂的影响及其可能机制。**方法** 将初断乳的 SD 雄鼠 45 只随机分为对照组（饲以基础饲料）、ITFAs 组（饲以 ITFAs 饲料）、ITFAs+GSPE 组（饲以 ITFAs 饲料）3 组，每组 15 只，每日灌胃 GSPE 100 mg /（kg·d）1ml，其他两组给予相应体积的生理盐水。每周监测体重，干预 10w 后，腹主动脉取血，计算脂肪系数，检测血脂、内脏脂肪组织中脂肪甘油三酯脂酶、激素敏感性脂肪酶、脂蛋白脂肪酶 mRNA 及其蛋白表达水平。**结果** 与对照组相比，ITFAs 组大鼠体重在干预 2w 后开始有明显增加，从第 5w 开始 ITFAs+GSPE 组大鼠体重明显增加。在干预 10w 时两组大鼠内脏脂肪系数明显增加，且 ITFAs 组高于 ITFAs+GSPE 组，并且出现不同程度的血脂紊乱现象；内脏脂肪组织中脂肪甘油三酯脂酶、激素敏感性脂肪酶 mRNA 表达水平明显减少，脂蛋白脂肪酶 mRNA 表达水平增加；ITFAs 组酶激素敏感性脂肪酶蛋白表达水平明显降低，脂蛋白脂肪酶蛋白表达水平明显升高；ITFAs+G 组脂肪甘油三酯脂酶、激素敏感性脂肪酶 mRNA 表达水平高于 ITFAs 组，脂蛋白脂肪酶 mRNA 表达水平低于 ITFAs 组，以上差异均具有统计学意义（P<0.05 或 0.01）。**结论** ITFAs 可能够通过作用于内脏脂肪代谢关键酶的表达，诱导大鼠肥胖及血脂水平改变，而葡萄籽原花青素对 ITFAs 诱导肥胖大鼠的血脂代谢紊乱具有一定的防护作用。

关键词： 葡萄籽原花青素；肥胖；人工反式脂肪酸；脂代谢；内脏脂肪

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关键字 葡萄籽原花青素；肥胖；人工反式脂肪酸；脂代谢；内脏脂肪

分类：食物与营养

槲皮素抑制 G6PD 促进肺癌 EGFR T790M 突变蛋白降解

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研究背景：$EGFR^{T790M}$突变是导致非小细胞肺癌（non-small cell lung cancer, NSCLC）患者对第一代酪氨酸激酶抑制剂（tyrosine kinase inhibitors, TKIs）耐药的主要原因。然而，对于第一代 TKIs 的增敏和延缓 $EGFR^{T790M}$突变的出现，可选择的治疗方案有限。

研究方法：利用槲皮素的糖基化酶促反应并联合点击化学反应富集槲皮素相关的结合蛋白，并进行质谱鉴定。采用表面等离子共振（SPR）、微尺度热泳动（MST）、蛋白下拉实验和稳定同位素示踪实验验证槲皮素对其靶向蛋白的抑制作用。利用合成的氧杂吖丙啶基（oxaziridine-based）探针结合质谱检测 $EGFR^{T790M}$蛋白的 M790 氧化。在细胞系和临床前动物模型中检测槲皮素联合吉非替尼的治疗效果。通过公共数据库和 NSCLC 临床样本分析探讨槲皮素靶向蛋白与 $EGFR^{T790M}$突变发生的关联性。

研究结果：我们证明了槲皮素作为一种具有广泛健康促进作用的植物化学物质，它可以直接与葡萄糖-6-磷酸脱氢酶（glucose-6-phosphate dehydrogenase, G6PD）结合，并通过竞争性地抑制 NADP+在催化域的结合来降低 G6PD 的酶活性。该抑制作用引发细胞内 NADPH 水平降低，导致甲硫氨酸还原酶 A（methionine reductase A, MsrA）底物不足，从而致 $EGFR^{T790M}$的 M790 氧化累积最终诱导 $EGFR^{T790M}$降解。在体外和体内模型中，槲皮素协同增强吉非替尼对 $EGFR^{T790M}$阳性 NSCLC 的治疗作用，并延迟 EGFRT790M 突变的产生。G6PD 高表达与 NSCLC 患者不良预后及 $EGFR^{T790M}$突变出现时间呈现出相关性。

研究结论：这些发现证实了槲皮素通过直接靶向 G6PD 在 NSCLC 患者中克服 $EGFR^{T790M}$突变驱动的 TKI 耐药的潜在意义和临床价值。

关键字 葡萄糖-6-磷酸脱氢酶，槲皮素，非小细胞肺癌，EGFR T790M，蛋氨酸氧化

分类：食物与营养

内皮祖细胞作为食品营养研究领域新兴的心血管风险因素：进展与挑战

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背景：心血管疾病（Cardiovascular diseases，CVDs）是全球疾病和死亡的首要原因。饮食是 CVDs 发生和发展的促成因素，而合理膳食可预防和降低 CVDs 多重危险。内皮祖细胞（Endothelial progenitor cells，EPCs）是一类来源于骨髓，在成人血液中循环，可分化为成熟内皮细胞的祖细胞，在维持心血管健康中发挥着关键作用。研究表明 EPCs 有望成为评估营养干预改善心血管健康的生物标志物。目的和方法：本文梳理了 EPCs 的定义、细胞种类和特征，系统回顾和总结了有关食品营养对 EPCs 数量和功能影响的研究。同时为规避 EPCs 词汇的不规范使用，采用统一的分类方法对文献中的 EPCs 进行重新定义。最后指明了目前该领域所面临的挑战并提出相应的应对措施。结果：EPCs 广义上可分为 circulating EPCs、colony-forming unit-endothelial cells、circulating angiogenic cells（CACs）、blood outgrowth endothelial cells（BOECs）四种类型。狭义上认为 BOECs 才是真正的 EPCs，因其具有克隆性增殖能力和体外管形成能力，并可归巢于体内血管受损部位，促进血管新生并修复血管壁。检索结果表明营养研究多关注于 circulating EPCs，其次是 CACs，仅少数研究采用了 BOECs。研究较一致地表明健康饮食（如地中海饮食、超重人群的限制饮食）、特定食物（如水果蔬菜、橄榄油、红酒、茶、奇亚籽）和营养素（如多酚、不饱和脂肪酸、无机硝酸盐、维生素）会增加 EPCs 的数量、增强 EPCs 的功能。相反，高剂量糖、代糖、盐或果糖等会损害 EPCs 的功能。但相同饮食、食物或营养素的不一致结果也同时存在于所有类型 EPCs 中。结论：EPCs 在营养干预影响心血管健康中发挥紧要作用，具有良好的应用前景。建议未来的研究应着眼于 BOECs，探讨营养干预对 BOECs 的影响机理。但由于 circulating EPCs 分析方法相对简单，可预测未来更多的研究仍将采用该指标。目前仍缺乏 EPCs 的精确定义和表征方法。一旦明确了 EPCs 的定义和特征，它们将成为评估心血管疾病营养预防有效性的重要标志物。

关键字 心血管疾病，内皮祖细胞，食物，营养，Blood outgrowth endothelial cells

分类：食物与营养

市售包装矿泉水冲泡茶叶特性分析

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目的：

伴随经济增长与消费行为的改变，包装饮用水已经成为居民饮用水的重要来源。调研显示我国16省（市）3岁及以上人群中，包装饮用水总消费量占每日推荐摄入量的20%。茶叶中含量大量的功能成分，冲泡茶叶的水与其茶汤酚类物质含量及抗氧化性具有一定关系。本研究通过探究不同包装矿泉水冲泡茶叶后颜色、酚类物质含量及抗氧化性变化，为指导健康饮茶提供基础数据。

方法：

根据电商销量选取市售10款常见矿泉水，测定其pH值、钙、镁、偏硅酸、溶解性固体等指标，并按照料液比1:50冲泡龙井绿茶、海堤红茶、普洱生茶3种茶叶5min，将冲泡后的茶汤用定量滤纸过滤，取澄清液体测定色差值（L、a、b值）、多酚含量、总黄酮含量、DPPH清除率及ORAC值，并进行相关性分析。

结果：

1、龙井绿茶茶汤亮度及多酚含量、黄酮含量与溶解性总固体成负相关，亮度与钙离子浓度呈极显著负相关。说明矿泉水中溶解性总固体、特别是钙含量较高时，会降低绿茶茶汤中有效成分含量，并降低感官品质。

2、海堤红茶茶汤亮度、DPPH清除率与钙离子浓度呈极显著负相关，同时茶汤红色值随偏硅酸浓度上升而增加。说明钙含量较低的矿泉水更有助于保持红茶感官品质和抗氧化性，而适宜的偏硅酸能够让红茶呈现偏红的颜色。

3、普洱生茶在不同水中黄酮浸出量差别较大，钙离子浓度较低的矿泉水冲泡后，普洱茶汤具有较强的ORAC抗氧化能力。

4、相关性分析显示：茶汤中ORAC抗氧化能力和多酚含量以及茶汤的亮度呈极显著正相关，和可溶性糖含量以及茶汤的色度呈显著负相关。茶汤中DPPH自由基清除能力和黄酮含量呈极显著正相关，和茶汤pH呈极显著负相关。

结论：

市售包装矿泉水的成分有较大差异，不同矿泉水冲泡茶叶后，对茶汤颜色、酚类物质含量及抗氧化性均有不同的影响，且与茶叶品种相关。偏硅酸含量适中，钙离子浓度较低的矿泉水适合冲泡红茶；钙离子含量低、偏硅酸含量高的矿泉水更适宜冲泡普洱生茶；总离子含量较低的矿泉水水适合泡龙井绿茶。

关键字 矿泉水、茶汤、多酚、颜色、抗氧化性

分类：食物与营养

6-姜酚生理功能及其作用机制的研究进展

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目的 目前，开发天然药物已经成为热点。生姜(Ginger)，是姜科(Zingiberaceae)姜属植物(Zingiber officinale Rosc)的根茎部分，是生活中常用的调味料，并且在我国传统中医药领域占据重要地位。姜酚类化合物包括6-姜酚、8-姜酚、10-姜酚，其中6-姜酚(6-gingerol, (5S)-5-羟基-1-(4-羟基-3-甲氧基苯基)癸-3-酮)含量最高，是生姜中生物活性物质的代表性成分。6-姜酚具有多种生物活性，如抗氧化、抗肿瘤、抗炎、强心、降压、降血脂、降血糖、抗凝等，并且具有抑制血管生成，改善肠道消化功能，抑制脂肪形成，预防营养性脂肪性肝炎等多种药理学活性。本文就6-姜酚的生理功能和作用机制进行综合论述，以便为开发新的疾病预防和治疗药物提供理论依据。

方法 计算机检索近几年PubMed、中国知网等数据库中有关6-姜酚的文献，分别从6-姜酚降脂功能、预防糖尿病功能、抗氧化功能、抗肿瘤功能和其他功能五个方面进行归纳分析，探讨姜黄素的生理功能及其作用机制。

结果 研究表明，6-姜酚可使喂食HFD的大鼠的FFA，胆固醇，磷脂和高密度脂蛋白（HDL）减少，另一方面6-姜酚会抑制 α-淀粉酶活性，它有助于减少碳水化合物的肠吸收，增强胰岛素敏感性并有助于发挥其自身的抗高血糖和抗肥胖作用。6-姜酚还在链脲佐菌素诱导的糖尿病大鼠与高脂膳食的大鼠中起到了抗糖尿病与降血脂的功效。不仅如此，6-姜酚抗氧化效果强于维生素E和丁基羟基茴香醚，能明显地清除生物体中羟基自由基和超氧自由基及降低肝脑组织中的脂质过氧化物。它还有明显的抗肿瘤功能，6-姜酚的抗肿瘤机制主要包括对肿瘤相关基因蛋白的调控，对肿瘤细胞生长增殖的抑制、诱导肿瘤细胞凋亡以及影响肿瘤细胞周期等方面。除此以外，6-姜酚可显著改善接受辅助化疗的癌症患者中的化疗相关性呕吐(chemotherapy-induced nausea and vomiting，CINV)、食欲与生活质量。

结论 植物来源的天然化合物具有安全性高、来源广泛等特点，因此从植物中筛选新的、副作用更小的生理活性成分已成为现代预防医学的研究热点之一。6-姜酚具有较好的降脂、抗糖尿病、抗氧化和抗肿瘤等生理功能，值得进一步深入研究其分子作用机制和药物机制。

关键字 6-姜酚；生理功能；作用机制

分类：食物与营养

草果乙醇提取物生物对体外代谢酶活性及其生物活性成分的研究

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目的 本文研究草果乙醇提取物模拟消化前后对体外糖脂代谢关键酶的抑制作用与其生物活性成分，为 2 型糖尿病的防治提供科学依据。方法 选取糖脂代谢关键酶 α-淀粉酶、α-葡萄糖苷酶、胰脂肪酶和乙酰胆碱酯酶进行草果乙醇提取物的体外酶抑制实验，评估草果乙醇提取物的降糖降脂作用。采用静态体外消化法模拟草果乙醇提取物在不同时间经口腔、胃和肠道的消化，评价糖脂代谢关键酶抑制活性。利用 HPLC 技术分析草果乙醇提取物中的生物活性成分，通过改进的 Dowd 法测定总黄酮含量，并用 UPLC-MS/MS 技术对黄酮类化合物进行分析鉴定。将获得的黄酮类化合物的保留时间、质荷比、碎片离子峰、分子式等信息，与相应数据库（PlantMAT、BioDeepDB 和 KEGG）进行匹配，得到黄酮类化合物的成分信息。结果 草果乙醇提取物对糖代谢相关的 α-淀粉酶和 α-葡萄糖苷酶有强抑制作用，IC50 分别为 33.85 mg/mL 和 3.64 mg/mL，对脂代谢相关的胰脂肪酶和乙酰胆碱酯酶也呈抑制作用，IC50 分别为 118.05 mg/mL 和 110.27 mg/mL。模拟消化后，草果乙醇提取物对 α-淀粉酶和胰脂肪酶抑制作用减弱，对乙酰胆碱酯酶的抑制作用增强，对 α-葡萄糖苷酶的抑制没有较大改变。模拟消化时间影响草果乙醇提取物的酶抑制功能，对乙酰胆碱酯酶抑制功能的影响最小。通过 HPLC 方法从草果乙醇提取物中分析得出 10 种活性成分，其中 3 种为酚酸类，6 种为黄酮类，1 种为二苯基庚烷类。草果乙醇提取物中总黄酮含量为 0.73 mg QE/g DW，利用 UPLC-MS/MS 技术进一步从中鉴定出 25 种黄酮类成分，其中相对丰度较高的主要有 2″-O-没食子酰基金丝桃苷、日当药黄素、槲皮素-7-O-鼠李糖苷、(+)-儿茶素、槲皮素、Epsilon-白藜芦醇脱氢二聚体和原花青素 B1。结论 草果乙醇提取物模拟消化前后均有较强的体外 α-淀粉酶、α-葡萄糖苷酶、胰脂肪酶和乙酰胆碱酯酶抑制活性，表明草果具有良好且稳定的降糖降脂作用。草果乙醇提取物中含有酚酸、黄酮和二苯基庚烷类化合物，其中黄酮类化合物成分丰富，可进行更深入的研发和利用。

关键字 草果；乙醇提取物；代谢酶；降糖降脂

分类：食物与营养

番茄和番茄红素与紫外线诱导皮肤恶化的相关性研究

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目的：番茄红素作为一种天然抗氧化剂，被研究用于紫外线辐射(UVR)的光保护，是类胡萝卜素中最有效的清除活性氧(ROS)的一种，因此它已被用作多种疾病的营养药物，如光保护和心血管疾病。本文旨在通过对现有人群干预实验的回顾，总结番茄和番茄红素对健康人群皮肤光损伤和皮肤光老化的保护作用。方法：从开始到 2021 年 1 月，不受限制地检索了 PubMed、Scopus、EBSCO、Web of Science 和 Cochrane Library 等 5 个电子数据库。感兴趣的结局指标是最小红斑剂量(MED)，补充后和补充前紫外线照射后 24 小时红斑发展水平的差异(Δa*)，基质金属蛋白酶 1(MMP-1)，细胞间粘附分子 1(ICAM-1)，皮肤厚度，皮肤密度，皮肤弹性和皮肤色素沉着。采用 Cochrane 协作工具和 ROBINS-I 偏倚风险评估工具评估潜在偏倚，采用 GRADE pro GDT 软件在线版的推荐、评估、发展和评价分级(GRADE)方法对证据的确定性进行评估。结果：在初步检索出的 19336 份文献中，21 篇研究符合纳入标准并进行了 Meta 分析。最终分析结果为：补充番茄和番茄红素与 Δa* （SMD = -0.770； 95% CI：-1.340, -0.190； P =0.009），MMP-1 （SMD = -0.660；95% CI：-0.969, -0.350； P <0.001），ICAM-1 （SMD = -1.003； 95% CI：-1.312, -0.693；P <0.001）和皮肤色素沉着（SMD = -0.622； 95% CI：-1.113, -0.131； P =0.013）的显著降低相关；而补充番茄和番茄红素与 MED （SMD = 0.540； 95% CI：0.200, 0.870； P =0.002）、皮肤厚度（SMD = 0.755； 95% CI：0.340, 1.171；P <0.001）和皮肤密度（SMD = 0.998； 95% CI：0.234, 1.761；P =0.010）的显著增加相关。结论：这项系统综述和荟萃分析表明，番茄和番茄红素的皮肤保护可能通过促进抗氧化、抗炎和免疫调节作用的不同机制来实现，防止光诱导的皮肤光损伤和皮肤光老化，改善皮肤外观和色素沉着。富含番茄红素的产品可以作为内源性防晒产品，也有很大的开发潜力作为防晒营养药物。

关键字 番茄红素；皮肤光损伤；皮肤光老化；Meta 分析

分类：食物与营养

草果醇提物对 2 型糖尿病大鼠肝损伤的保护作用研究

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目的 探讨草果对 2 型糖尿病大鼠肝损伤的影响。方法 42 只 6 周龄的 SD 雄性大鼠适应性喂养 1 周后，随机分成正常对照组（NC 组，8 只）和模型组（Mod 组，34 只），两组大鼠分别给予普通饲料和高脂高糖饲料喂养。第 6 周，Mod 组大鼠按 35 mg/kg 体重注射 STZ 溶液，构建 T2DM 模型。将造模成功的 T2DM 大鼠随机分为模型对照组（MC 组）、草果组（AT 组）和二甲双胍组（Met 组）。AT 组和 Met 组大鼠分别使用草果醇提物和二甲双胍灌胃干预，干预时间为 6 周。期间记录大鼠体重变化，实验结束后对腹主动脉进行采血，收集肝组织。计算肝脏系数，检测血清中谷丙转氨酶（Alanine transaminase，ALT）和谷草转氨酶（Aspartate aminotransferase，AST）含量，检测肝组织中肝糖原含量、己糖激酶（Hexokinase，HK）和丙酮酸激酶（Pyruvate kinase，PK）活力，PAS 染色观察肝脏糖原情况；检测肝组织氧化损伤指标总抗氧化能力（Total antioxidant capacity，T-AOC）、超氧化物歧化酶（Superoxide dismutase，SOD）、谷胱甘肽过氧化物酶（Glutathione peroxidase，GSH-Px）、过氧化氢酶（Catalase，CAT）和丙二醛（Malondialdehvde，MDA）水平，对肝脏组织行 HE 染色、油红 O 染色和 Masson 染色观察其病理变化。结果 与 NC 组相比，T2DM 组肝脏系数明显增大（P ＜0.05）；血清 ALT、AST 水平明显升高（P ＜0.05）；肝脏糖原含量、PK 和 HK 活力明显降低（P ＜0.05）；肝脏 T-AOC、SOD、GSH-Px 和 CAT 含量明显降低（P ＜0.05），MDA 水平明显升高（P ＜0.05）。与 T2DM 组比较，AT 组能显著改善肝功能指标（P ＜0.05），肝糖原指标（P ＜0.05）和肝脏氧化损伤指标（P ＜0.05）。HE 染色、油红 O 染色和 Masson 染色结果显示，MC 组大鼠肝组织结构紊乱、肝细胞内可见大量脂滴、肝组织中央静脉及汇管区可见大量蓝染的胶原纤维。而草果醇提物干预 6 周后，AT 组大鼠肝组织结构紊乱程度减轻、肝组织中脂滴聚集明显减少、胶原纤维沉积程度减轻。结论 草果醇提物能够改善 T2DM 大鼠肝功能损伤，增加糖原含量，促进糖原合成，减轻肝脏氧化损伤。

关键字 草果；醇提物；2 型糖尿病；肝脏；氧化损伤

分类：食物与营养

园蓝蓝莓汁对四氯化碳致小鼠急性肝损伤的保护机制研究

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目的：研究在鲜榨园蓝蓝莓汁干预下，急性肝损伤小鼠肝脏的损伤和修复程度及其机制。方法：50 只雄性 ICR 小鼠随机分为 5 组：正常对照组（NC）、蓝莓汁对照组（BC）、模型组（MC）、阳性对照组（PC）、蓝莓汁干预组（BI），每组 10 只。BI 和 BC 组灌胃蓝莓汁，灌胃剂量根据《中国居民膳食指南 2022》推荐的水果摄入量及体表面积法，折算成小鼠每日摄入量为 20 ml/kg。PC 组灌胃等体积的联苯双酯水溶液，其余组灌胃等体积的生理盐水。干预 4 周后，腹腔注射 CCl4 花生油溶液建立急性肝损伤模型。检测空腹血糖（FBG）、甘油三酯（TG）、总胆固醇（TC）、谷丙转氨酶（ALT）、谷草转氨酶（AST）含量；检测超氧化物歧化酶（SOD）、谷胱甘肽过氧化物酶（GSH-Px）活性及丙二醛（MDA）含量；检测肝组织炎症因子、肝细胞凋亡相关指标、肝纤维化相关标志物含量。结果：BI 和 PC 组 ALT 和 AST 含量均低于 MC 组（P＜0.05）；各组间 FBG、TC、TG 含量的差异相同，MC＞BI＞PC（P＜0.05）。BC、PC 和 BI 组 SOD 活性显著高于 MC 组（P＜0.05），且 PC 和 BI 组无显著性差异（P＞0.05）；GSH-Px 活性和 SOD 一致；PC、BI 组 MDA 含量低于 MC 组（P＜0.05）。 肝组织炎症因子中，磷酸化的核因子 κB（p-NF-κB）含量 MC>BI＞PC＞BC＞NC（P＜0.05）；肝细胞凋亡相关指标中，BI 组葡萄糖调节蛋白 78（GRP78）、转录因子 C/EBP 同源蛋白（CHOP）、半胱氨酸蛋白酶-3（caspase-3）含量均显著低于 MC 组（P＜0.05）。肝纤维化标志物中，BI 组的 α-平滑肌肌动蛋白（α-SMA）、金属蛋白酶组织抑制因子-1 含量均显著低于 MC 组（P＜0.05）。结论：鲜榨园蓝蓝莓汁可显著减轻急性肝损伤小鼠肝细胞膜脂质过氧化，对于肝组织炎症因子、肝细胞凋亡、肝纤维化等相关指标都有不同程度的抑制作用。

关键字 园蓝蓝莓；急性肝损伤；炎症；凋亡；肝纤维化

分类：食物与营养

静脉血与指尖血两种采血方式在食物血糖生成指数测试中的应用分析

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目的：当前，有些试验研究证实了食物 GI 值的影响因素主要分为测定 GI 值的检测方法和食物本身两个方面。其中在行业标准 WS/T 652-2019 《食物血糖生成指数测定方法》中规定了 GI 值的检测方法，在这一检测过程中使用的是人体试验的方法，所以待测人员的人数、身体素质、参考食物、采血方式等都可能对 GI 值的最终检测结果产生影响。现阶段行标规定 GI 的血样采集要求为指尖毛细血管血（全血）或手背/肘静脉血采血两种采血方式，指尖血检测使用的快速血糖仪是糖尿病患者必备的日常血糖监测仪器之一，在临床上也被广泛接受和使用，具有携带方便，操作简单的优势，但是是否适合应用于专业的食物 GI 值检测试验，还未有相关文献支撑。本研究对两种不同的采血方式进行对比研究，观察两种采血方式对 GI 结果的影响，为食物 GI 值检测的应用提供指导。

方法：严格依据 WS/T 652-2019 《食物血糖生成指数测定方法》操作执行，对 15 名健康志愿者食用两款相同碳水化合物的伊利酸奶，分别使用留置针采集静脉血，生化分析仪葡萄糖氧化酶法检测血糖，与指尖血采集使用快速血糖仪检测血糖，比较餐后 2 h 内不同时间点的血糖值变化，得到其两款酸奶的 GI 值，分析两种采血方式对 GI 结果的影响因素。

结论：两种不同采血方式的血糖曲线整体趋势相似，且所有餐后血糖曲线中指尖血血糖值均高于静脉血血糖值，对照样品葡萄糖的两种采血方式检测所得血糖水平在各个时间点均无统计学差异（$p>0.05$），但食用两种发酵乳的受试样品后 15、30、45 min 三个时间点，静脉血糖值显著低于指尖血糖值（$p<0.05$），最终得出的两款发酵乳 GI 值有明显差异。原因可能是用快速血糖仪检测指尖血血糖值的准确性受血糖仪的试纸、采血环境、采血方法、采血部位等多种因素的影响。对比指尖血，静脉血采集更能够比较准确的反映出待检测者的真实血糖情况。食物的 GI 值检测不同于临床或日常普通的血糖监测，食物 GI 值的检测是要求在 2h 内精准、固定时间的血液采集，且要求结果较为精确。虽然本研究结果显示指尖血与静脉血血糖检测结果存在差异，但快速血糖仪更多的是适用于定性待测者的血糖是否在正常范围，并不会对血糖有非常精确的数值要求，更适合应用于临床中对医护对患者或日常家庭需要监测血糖的人群进行血糖范围的监测。

关键字 静脉血，指尖血，食物血糖生成指数（Glycemic Index），快速血糖仪，II 型糖尿病

分类：食物与营养

基于社交大数据方法探索儿童健康食品创新方向

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目的：通过社交大数据分析，挖掘父母对儿童营养健康方面的诉求，为儿童健康食品创新提供参考方向。传统的消费者调研存在样本量小、代表性不足、具有引导性等问题，社交大数据方法可以对消费者的线上行为及发声进行分析,在不造成干扰的情况下实时、大规模地了解消费者客观行为和主观感受，为创新方向探索提供更多可能。

方法：数据爬取：通过网络爬虫及 API 接口获取主流社交平台上的消费者声量数据，时间段：2020.12- 2021.11；设定儿童年龄（2-10 岁）及关键词（营养、健康等），命中关键词的内容收集为原始数据。 数据清洗：通过 training set plus 机器学习识别水军、僵尸粉等账号，去除其内容。数据语义分析：采用 Biterm Topic Model (BTM)模型，将关键词相关的大量文本聚类获取话题分组，通过自然语言处理技术，进行语料的实体识别和情感关系识别，输出大数据分析结果。

结果：2-3 岁儿童生长发育常见问题总声量为 712,502，声量占比中免疫力位于第一位（52.1%），排名第二、三位的分别是肠胃问题和缺钙；家长关注的营养成分总声量为 291,371，排名第一名的是矿物质（45.8%），第二、三位分别是益生菌及维生素。4-6 岁儿童生长发育常见问题总声量为 629,162，免疫力（54.8%）及肠胃问题（15.4%）同样位于一、二位，视力问题位于第三位；家长关注的营养成分总声量为 188,703，益生菌占比 25.7%，次于矿物质及维生素位于第三位。7-10 岁儿童常见生长发育问题总声量为 256,402，免疫力仍位于第一位（28.1%），但与 2-6 岁相比视力问题较为突出；家长关注的营养成分总声量为 85,453，矿物质及维生素仍位居一、二位，叶黄素占比 2.1%位于第五位。

结论：基于儿童营养健康领域消费者社交大数据分析结果，可为儿童健康食品创新提供如下参考方向：整体来说，2-10 岁儿童都需要关注的功能机会点为提高免疫力、改善肠胃、补钙；营养成分机会点为矿物质（钙）、维生素（维生素 D）、蛋白质（泛蛋白质）、益生菌。针对 2-3 岁幼儿期儿童，需要重点关注的功能机会点为改善肠胃，营养成分机会点为益生菌；针对 4-6 岁学龄前期儿童，需要重点关注的功能机会点为改善肠胃、预防视力问题；营养成分机会点为益生菌、叶黄素；针对 7-10 岁学龄期儿童，需要重点关注的功能点是预防视力问题，营养成分机会点为叶黄素。

关键字 社交大数据、儿童，营养健康，食品，创新，2-10 岁

分类：食物与营养

代谢组学和网络药理学综合分析 EGCG 预防肥胖相关性早熟的分子机制

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目的：(-)-表没食子儿茶素没食子酸酯(EGCG)对肥胖相关的性早熟有预防作用，但其机制仍不清楚。本研究通过血清代谢组学和网络药理学相结合的分析，以揭示 EGCG 在预防肥胖相关性早熟中的机制。

方法：采用高效液相色谱-电喷雾串联质谱法分析 EGCG 对随机对照试验中肥胖女童血清代谢物和相关代谢通路的影响。利用网络药理学预测 EGCG 在预防肥胖相关性早熟的靶点和信号通路。EGCG 靶点是从 PharmMapper、SwissTargetPrediction 和 DrugBank 数据库中获得的，而性早熟和肥胖的靶点是在 GeneCards、DrugBank 和 CTD 数据库中筛选的。蛋白质-蛋白质相互作用（PPI）关系从 STRING 数据库中获得，并使用 Cytoscape 3.7.2 构建 PPI 网络并分析核心靶基因。R 4.0.3 的 ClusterProfiler 软件包被用来进行基因本体论（GO）和京都基因和基因组百科全书（KEGG）的途径富集分析。使用 AutoDock Vina 1.1.2 软件进行分子对接验证。

结果：在 357 个 EGCG 靶点、3447 个肥胖靶点和 3994 个性早熟靶点的交集中，共发现了 153 个共同靶点。通过 GO 富集分析，共发现 2289 条生物过程，51 条细胞成分和 163 条分子功能（$P<0.05$）。富集的基因与内分泌相关的途径和过程有关，如雌激素信号通路、孕激素介导的卵母细胞成熟、胰岛素抵抗和催乳素信号通路，以及与信号转导相关的几个信号通路，包括 FoxO 信号通路、MAPK 信号通路、PI3K-Akt 信号通路和 Jak-STAT 信号通路。分子对接分析显示，大多数靶点与 EGCG 有很强的结合亲和力。此外，血清代谢组学筛选出 234 个内源性差异代谢物，网络药理学共确定 153 个共同靶点。这些代谢物和靶点主要涉及内分泌相关途径（雌激素信号通路、胰岛素抵抗和胰岛素分泌）和信号转导（PI3K-Akt、MAPK 和 Jak-STAT 信号通路）的富集途径。综合代谢组学和网络药理学表明，AKT1、EGFR、ESR1、STAT3、IGF1 和 MAPK1 可能是 EGCG 预防肥胖相关性早熟的关键靶点。

结论：EGCG 可能通过 AKT1、EGFR、ESR1、STAT3、IGF1 和 MAPK1 等靶点和多种信号通路，包括雌激素、PI3K-Akt、MAPK 和 Jak-STAT 通路，有助于预防肥胖相关的性早熟。

关键字 (-)-表没食子儿茶素没食子酸酯，肥胖，性早熟，代谢组学，网络药理学

分类：食物与营养

L-茶氨酸对 H2O2 诱导的小鼠 C2C12 细胞氧化损伤的影响及机制研究

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目的：

L-Theanine 作为天然活性产物，近年来在细胞水平上具有抗氧化应激作用逐渐被发现，而骨骼肌运动性氧化应激损伤是氧化应激的重要应激源，但目前关于对骨骼肌氧化应激作用的相关研究报导较少。因此，本研究将建立 H2O2 诱导的小鼠 C2C12 细胞氧化损伤的基础上，探讨 L-Theanine 对 C2C12 细胞氧化损伤的作用机制，在细胞水平上为 L-Theanine 治疗骨骼肌损伤提供理论依据，也为日常正确服用 L-Theanine 提供理论指导。

方法：

本研究通过细胞实验，采用 MTT、抗氧化试剂盒、HE 染色、Hoechest 荧光染色、Western blot 等方法探讨 L-Theanine 对 H2O2 诱导的小鼠 C2C12 细胞氧化损伤的影响和机制。

结果：（1）H2O2 组（H 组）显著增加 LDH 活性（P<0.01）、治疗组（HL 组）活性极显著增加（P<0.001）。

（2）L-TN 组（L 组）极显著增加 SOD 活性（P<0.001），H2O2 组（H 组）极显著降低 SOD 活性（P<0.001）；与 H 组相比，L-TN 治疗组（HL 组）极显著降低细胞内 SOD 抗氧化酶活性（P<0.001）。

（3）H 组（1mM H2O2）中，细胞形态由梭状变为纤维状；在 HL1、2、3 组中，细胞形态由梭状变为纤维状逐渐明显。

（4）H 组中，可观察到细胞核与细胞质之间的边缘界限模糊；在三个治疗组 HL1、HL2、HL3 中，细胞核、细胞质边缘模糊程度逐渐明显，HL3 组的核质边缘界限模糊程度高于 H 组，细胞核明显变大，细胞质明显浓缩。

（5）与对照组相比，H 组出现较多、较强的浓染致密的颗粒块状荧光，L 组无该明显现象；在治疗组 HL2、HL3 组中可观察到浓染致密的块状蓝色荧光，且分布均匀；与 H 组相比，HL2、HL3 两组的较强蓝色荧光分布较广，细胞凋亡数量增多。

（6）L-Theanine 通过激活 p38 MAPK、促进 GSK-3β 蛋白表达、活化 caspase3 等调节小鼠 C2C12 细胞氧化损伤反应。

结论：

L-Theanine 提高小鼠骨骼肌细胞抗氧化活性且不会对细胞形态造成影响，但未能提高 H2O2 诱导的小鼠骨骼肌细胞内的抗氧化活性、降低细胞毒性，且使得氧化应激模型细胞空泡化、凋亡数量增加，并通过 p38 MAPK/GSK-3β 信号通路加重了 C2C12 细胞氧化损伤反应。

关键字 L-Theanine；C2C12 细胞；氧化损伤

Category: Nutrition Across Lifespan

Dietary Provision for Grandchildren Among Grandparents in Kuantan, Pahang, Malaysia

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Background and objectives:

Grandparents who are involved as caregivers can influence the development of grandchildren's eating habits and preferences. The food environment at an earlier age can impact the nutritional status and health outcome of the children. This study aims to explore the dietary provision among grandparents with at least a grandchild aged 3 to 12 years in Kuantan, Pahang, Malaysia.

Methods:

This qualitative study involved 30 grandparents with an average age of 61.9±5.2 years old. A semi-structured, in-depth interview was conducted using Whatsapp or FaceTime video call and was audio-recorded. Information obtained from the grandparents includes types, quantities, and frequency of foods provided to the grandchildren.

Results:

The results of the study show that all grandparents provide carbohydrate-type foods for their grandchildren. The most common types of foods provided by grandparents include rice, chicken dishes, biscuits, fresh milk, carrot, apple, and banana. Most grandparents provide plain water or sugary drinks for their grandchildren. Only 13.3 % of the respondents prepared food from all the food groups stated in the Malaysian Food Pyramid 2020. A total of 73.3% of respondents prepared two to six times of main meals and snacks a day for their grandchildren.

Conclusions:

These findings support the need for further improvement of grandparents' feeding knowledge to ensure grandparents are engaged in optimum dietary provision for their grandchildren. Future interventions targeting grandparents are essential to improve dietary-related health outcomes in grandchildren.

Key words dietary provision, grandparents, grandchildren, nutrition knowledge

Category: Nutrition Across Lifespan

Which factors are associated with breastfeeding attitudes among NICU mothers?

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Background and objectives: Breastfeeding provides the ultimate nutrition for premature infants. However, the practice was questionable due to the separation of mothers and infants in the Neonatal Intensive Care Unit (NICU), which may cause emotional stress among the mothers. Thus, we aim to identify factors related to breastfeeding attitudes among NICU mothers. Results from this study may enlighten practitioners to specifically enhance breastfeeding in premature infants. Methods: A total of 291 mothers with premature infants in selected NICUs of hospitals in Selangor, Malaysia participated in this cross-sectional study. The Parental Stress Scale: NICU was used to evaluate stress levels, alongside demographic and Body Mass Index information. The Iowa Infant Feeding Attitude Scale (IIFAS) was administered to measure the attitude of mothers towards infant feeding. Binary logistic regression was applied in the statistical analyses using SPSS software to determine factors related to breastfeeding attitudes. Results: Overall, we found that 36.8% of mothers have negative attitudes towards breastfeeding. Of that, 16.5% of mothers indicated high parental stress. Further analyses revealed that mothers who have high perceived stress in terms of their role alteration (adjusted OR 0.535, 95% CI 0.286, 0.998) and those who are underweight (adjusted OR 0.315, 95% CI 0.104, 0.955) were less likely to have positive attitudes towards breastfeeding. Interestingly, we identified that mothers who were working in the government sector had a threefold increase in the positive attitude towards breastfeeding compared to the non-government sector (adjusted OR 3.695, 95% CI 1.448, 9.432). Conclusions: In summary, we ought that increase the willingness of breastfeeding among mothers should emphasize the factors related to their attitude. Maternal stress in NICU is alarming, therefore tackling mental health issues in NICU mothers is essential. Improving the nutritional status of post-natal mothers should also be a priority.

Key words Breastfeeding, breastfeeding attitude, NICU mother, underweight

Category: Nutrition Across Lifespan

Do maternal nutritional status and dietary habits associate with their emotional well-being?

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Background and objectives: Postpartum mothers in Malaysia typically followed their traditional postpartum diet. However, these practices might interfere with their macro- or micronutrient intake, hence the effect on their mental and physical health is doubtful. This study is aimed to identify whether there is an association between nutritional status and dietary habits with emotional well-being among mothers with preterm infants in Neonatal Intensive Care Unit (NICU).

Methods: A cross-sectional study was carried out on 351 postpartum mothers with preterm infants. Participants were recruited through purposive sampling from government hospitals with NICU in Selangor, Malaysia. A demographic factor, anthropometric measurement, and validated Malay version of both; Parental Stress Scale: Neonatal Intensive Care Unit (NICU), and Confinement Practice Questionnaires were administered.

Results: The results demonstrate that mothers with obesity were 6 times more likely to have greater stress levels (Adjusted OR 6.651; 95% CI 1.428, 30.986) compared to mothers with normal body mass index (BMI). According to their postpartum dietary habits, mothers who consume fewer leafy vegetables (Adjusted OR 5.523; 95% CI 1.713, 17.802), ginger (Adjusted OR 4.071; 95% CI 1.023, 16.200) and plain water (Adjusted OR 4.735; 95% CI 1.376, 16.290) have a higher risk of experiencing stress than those who consume more of these foods. However, mothers who consumed more seafood (Adjusted OR 27.351; 95% CI 1.090, 686.499) and herbal tea (Adjusted OR 8.502; 95% CI 1.865, 38.753) were positively associated with higher stress levels than mothers who consumed less of these foods.

Conclusion: In conclusion, higher BMI and certain trends in postpartum dietary intake (such as consuming less vegetables/ plain water, and consuming more herbal tea) had substantially associated with mothers' emotional well-being. This study revealed that good nutritional intake and status are essential to improve emotional well-being among mothers with preterm infants in the NICU.

Key words Postpartum mothers, maternal stress, dietary habits, obesity, traditional postpartum diet

Category: Nutrition Across Lifespan

Assessment of the effect of Low-FODMAP recipes based on the Korean diet

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The diagnosis rate of Irritable Bowel Syndrome (IBS) has been continuously increasing over the past five years in Korea. To alleviate IBS symptoms, our research team has developed 83 types of low-FODMAP recipes based on the Korean diet. The assessment of these recipes is scheduled to take place in June 2023 in Seoul, Korea. The study will recruit 40 adult Koreans with IBS, who will answer a questionnaire to determine the status of their symptoms. Based on the questionnaire, the research team will assess whether the participants meet the criteria to be considered IBS patients. Eligible participants will receive low-FODMAP meals cooked with the developed recipes twice a week. Participants will be required to consume all delivered meals and record any other food intake to track their diet. After six weeks of consuming the low-FODMAP meals, participants will again complete the questionnaire. By comparing the questionnaire results from baseline to endpoint, the study aims to determine the effect of the newly developed low-FODMAP recipes on IBS. This study is expected to provide evidence that Korean low-FODMAP recipes can help alleviate IBS symptoms among Koreans.

Key words Irritable bowel syndrome, Low-FODMAP

Category: Nutrition Across Lifespan

Effects of dietary intake on the nutritional status of pregnant women

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Background and objectives

During pregnancy, proper nutrition is important because it affects the nutritional status of both the mother and the fetus. The objective of this study was to assess the effects of dietary intake on the nutritional status of pregnant women.

Methods

A total of 150 second-trimester pregnant women, who attended the maternal clinics in the Pannala and Kuliyapitiya areas in Sri Lanka, were recruited. An interviewer-administered questionnaire, anthropometric measurements, information in pregnancy records; Mid-Upper-Arm-Circumference (MUAC), pre-pregnancy height and weight, biochemical parameters; hemoglobin levels by using hemocue meter, serum total protein by biuret test, serum albumin by bromo cresol green test, and a three-day diet diary were used to collect information. Nutritional status was determined using pre-pregnancy Body-Mass-Index (BMI), MUAC, and nutrient intake. Nutrient intake was analyzed by Foodbase 2000 software and compared with RDA for pregnancy.

Results

The mean age of the sample was 26 (SD 4.58) years. Based on MUAC, 89% had normal nutritional status (≥23 cm). The mean daily intake of energy, carbohydrates, and protein was 2383 (SD 556.6) kcal, 380 (SD 89.7) g, and 63.7 (SD 23.3) g, respectively, and they were higher than RDA for pregnancy. Their dietary intake of iron, calcium, iodine, folic acid, vitamin C, and vitamin A was 15.5 (SD 5.1) mg, 632.3 (SD 228.6) mg, 62.5 (SD 18.4) μg, 226.5 (SD 85.7) μg, 47.8 (SD 32.9) mg and 439.7 (SD 214.5) μg, respectively, and they were lower than RDA. Results revealed that dietary intake of carbohydrates positively affects ($p<0.05$) MUAC and protein intake positively affects hemoglobin level ($r=0.305$), serum total protein ($r=0.348$), and albumin status ($r=0.310$). Further, dietary intake of iron positively affects hemoglobin levels ($r=0.270$).

Conclusions

The study concluded that dietary intake of carbohydrates, protein, and iron positively affects the nutrition status-related indices of MUAC, serum total protein, albumin status, and hemoglobin level.

Key words Anthropometry, Biochemical parameters, Dietary intake, Nutritional status, pregnant women

Category: Nutrition Across Lifespan

Nutrient Intake of Indonesian Workers in Gold Mining Industry: A Case-Study of A Gold Mines Site in Luwu, South Sulawesi.

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Background and Objective: Workers who are required to live in the site area are prone to various nutritional problems. This study aims to determine the nutritional intake of workers who lived in a gold mines site area.

Methods: A cross sectional study was conducted in a site office of the gold mining industry in Luwu, South Sulawesi. A total of 100 workers with various positions participated in this study. Two days non-consecutive 24 hour food recalls were conducted to identify nutritional intake of the workers. In addition, secondary data of nutritional status as well as non-communicable disease (NCD) history were collected from the clinic in the site area.

Results: In the site, the main meal is served three times a day which consists of white rice, two types of protein resources, and one type of vegetable. Snacks are also served three times a day, including at brunch time, at afternoon, and at night. Meals and snacks are served at a buffet in the cafeteria. Majority of the sample in this study are male (91%) and aged 30-49 years-old (65%). The mean of energy consumption was 2,346.98 kcal, carbohydrate 326.81 gr, protein 75.96 gr, fat 74.64 gr, vitamin C 62.46 mg, iron 8.08 mg, and zinc 5.98 mg. In addition, a total of 99% of workers have inadequate consumption of dietary fiber (< 25 gr per day) while 86% of workers have excess natrium consumption (> 2 gr per day). Nutritional status data indicate that 44% of workers are overweight and 39% are diagnosed with NCD.

Conclusions: Despite the provision of meal in the site area, workers in the gold mining area are having imbalanced nutrition. More nutrition promotion should be provided in the site area to encourage consumption of fruits and vegetables and reduce consumption of ultra-processed foods.

Key words adult, worker, nutritional intake, gold mine, nutrition at work

Category: Nutrition Across Lifespan

Transepidermal Water Loss to Assess Skin Barrier Function in Healthy Chinese Formula-Fed Infants: Anatomical Insights and Preliminary Descriptive Results

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Background and Objectives: Specific partially hydrolyzed whey-based infant formulas (pHF-W) have been associated with reduced risk of atopic dermatitis (AD) in certain infant populations. Increased transepidermal water loss (TEWL) can indicate disrupted skin barrier function and may be associated with higher risk of AD development. The study purpose is to determine whether healthy infants consuming pHF-W until age 6mo have lower TEWL compared to infants consuming intact cow's milk protein formula (CMF). Here, we present descriptive TEWL results from this ongoing study to establish a broader understanding of TEWL assessment and measurement patterns.

Methods: Healthy infants aged 35-56 days (n=169 enrolled; target n=200) who had no previous exposure to pHF-W and no diagnosed cow's milk protein intolerance were randomized to receive pHF-W or CMF until age 6mo. Primary outcome of this randomized, controlled, open-label study is the cumulative change from baseline to age 6mo in TEWL of the volar forearm measured by a closed-chambered vapometer. This validated technique measures water transpiration from the skin. In this descriptive report, we present TEWL results at 4 anatomical locations for all infants (both groups combined, FAS) who completed the baseline (n=160) and/or 6mo visit (n=76).

Results: Mean±SD volar forearm TEWL values were similar at baseline (15.4±5.6 g/m^2/h) and 6mo (15.4±6.4 g/m^2/h). Compared to volar forearm, forehead TEWL values were slightly lower (12.1±6.0 and 13.1±5.6 g/m^2/h at baseline and 6mo, respectively) while results in flexural anatomical locations were slightly higher at both timepoints: cubital fossa (19.3±7.9 and 18.7±9.8 g/m^2/h) and thigh fossa (19.8±9.3 and 20.0±10.3 g/m^2/h).

Conclusions: Mean TEWL values varied slightly among anatomical locations, likely due to differences in habitual environmental exposure (forearm vs. forehead) and flexural (fossae) vs. non-flexural skin. These preliminary results demonstrate the feasibility of measuring TEWL in healthy Chinese infants, which may potentially serve as a non-invasive risk indicator of developing AD.

Key words infant formula, atopic dermatitis, skin barrier function, transepidermal water loss, partially hydrolyzed whey formula

Category: Nutrition Across Lifespan

Is Quality of Life related to Muscle Mass, Muscle Strength and Physical Performance of Community-Dwelling Older Filipinos?

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Background and Objectives:

In the Philippines, the older population group is projected to steadily increase in the next 10 years. The ageing process is inevitable and is accompanied by physiologic changes such as loss of muscle mass and strength (Sarcopenia) which may affect the functional status, and ultimately, the overall quality of life. This study was conducted to determine the association of muscle mass, strength and physical performance with the quality of life of community-dwelling older Filipinos aged 60 years and older.

Methods:

From November 2021 to June 2022, a total of 536 older adults coming from the cities of Tarlac, Tacloban and Davao participated in this cross-sectional study. Muscle Mass was measured using a body impedance analyzer. Handgrip strength was assessed using a hand dynamometer while physical performance was evaluated through a short physical performance test battery and the chair stand test. Quality of life was determined using a culturally-validated questionnaire. Prevalence of Sarcopenia was determined using the 2019 Asian Working Group for Sarcopenia criteria which is the presence of loss of muscle mass, plus low muscle strength, and/or low physical performance. Binary logistic regression was used to determine the association between quality of life and Sarcopenia (criteria).

Results:

Nearly 25% of the respondents (n= 130) were Sarcopenic. After adjusting for age, The increased odds to attain higher overall quality of life score was associated with normal muscle mass (OR = 1.68; 95%CI 1.12-2.51), normal muscle strength (OR= 1.50; 95% 1.03-2.17) and absence of sarcopenia (OR= 1.81; 95%CI 1.19-2.78).

Conclusion

Increased overall quality of life score among older Filipinos was associated with normal muscle mass, normal muscle strength and absence of Sarcopenia but not with physical performance. The findings provide valuable and relevant input in crafting nutrition and lifestyle intervention for older Filipinos before the country transitions into an ageing society.

Key words Ageing, Nutrition, Sarcopenia, Quality of Life, Philippines

Category: Nutrition Across Lifespan

特殊职业人群营养状况研究进展

Research progress on nutritional status of special occupational populations

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With the development of China's economy and the improvement of people's living standards, China's nutrition scientific research has made great progress, a lot of research has been carried out on the nutritional status of different specific population in the whole life cycle. The nutritional needs and dietary guidelines of different population of infants and children, the elderly, and pregnant women in the whole life cycle have been formulated/revised, which plays an important role in guiding all kinds of people in the whole life cycle and improving the overall health quality of Chinese residents.

Occupational population, especially special occupational population, such as those engaged in navigation, aerospace, construction, mining, long-distance freight, and internet workers, etc., have different needs for certain nutrients because of the particularity of their working environment and conditions. On the other hand, some special occupation exposure can cause damage to the body due to harmful factors in the working environment, and reasonable nutrition maybe reduce or eliminate the damage caused by special occupation exposure.

The nutritional needs and intervention research of special occupational population are weak point in nutrition research. Understanding the nutritional and health status and the nutritional needs of different special occupational population, further studying the protective effect of nutrients on the body caused by harmful factors in special occupations, and providing reasonable health guidance for special occupational population is an important part of comprehensively improving people's health level. Therefore, this article systematic reviewed the nutritional and health status of different special occupational population at home and abroad.

Key words occupational populations; nutritional status; diet; health

Category: Nutrition Across Lifespan

凉山地区学龄儿童家庭功能与超重肥胖相关行为的关联性研究

Study on the Relationship between Family Functioning and Overweight/obesity-related Behaviors among School-aged Children in Liangshan Area

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Abstract: Objective To explore the relationship between family functioning and overweight/obesity-related behaviors among school-aged children in Liangshan area, and provide scientific basis for intervention of overweight and obesity in school-aged children. **Methods** 1 890 school children were recruited in Liangshan area in March 2021. Information on overweight/obesity-related behaviors and General demographic information were collected through questionnaires, and family functioning was measured using the Chinese Family Assessment Instrument (C-FAI). The multivariate logistic regression analysis was used to analyze the relationship between family functioning and overweight/obesity-related behaviors. **Results** After adjusting for gender, age, and ethnicity, school-aged children with good family functioning were less likely to have low frequency of breakfast (OR=0.327, 95%CI=0.220-0.486) and exercise (OR=0.303, 95%CI=0.215-0.427), but more likely to have low frequency of late night snacks (OR=1.469, 95%CI=1.023-2.112), low intake of Sugar-sweetened beverages (OR=2.551, 95%CI=1.567-4.152) and fried foods (OR=2.533, 95%CI=1.614-3.975), and less time using electronic devices (OR=6.273, 95%CI=2.405-16.360), and were less likely to mock their obese classmates (OR=9.228, 95%CI=3.903-21.819). **Conclusion** There is a certain correlation between family functioning and overweight/obesity-related behaviors in school-aged children. Good family functioning is of great significance for forming good dietary and lifestyle habits and controlling weight. Therefore, a family-functioning-centered intervention strategy for overweight and obesity in school-aged children can be explored.

Key words School-aged children; Overweight/obesity; Family functioning; Related behaviors; Intervention

Category: Nutrition Across Lifespan

Chrono-eating habits of pregnant women: The impact of pregnancy-related symptoms on sleep-wake schedules and meal time

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Pregnant women are often challenged by pregnancy-related symptoms such as morning sickness, insomnia, and backaches which alter their sleep-wake patterns and meal schedules. The change in meal and sleep-wake time may lead to changes in chrono-eating habits. This study aims to determine the influence of pregnancy symptoms on sleep, wake, and mealtimes and their influence on chrono-eating habits.This was a cross-sectional study conducted in ten randomly selected government maternity clinics in Kuala Lumpur, Malaysia. Pregnant women in their second trimester completed the Chrononutrition Profile Questionnaire-Pregnancy (CPQ-P) to determine their weekly frequency of pregnancy-related symptoms affecting their sleep time, wake time, and mealtime and chrono-eating habits. 399 pregnant women with a mean age of 31.7 (4.6) years participated. Mean gestational age of the pregnant women was 25.5 (8.4) weeks, with majority of them being Malay (47.3%), having tertiary educational level (79.5%), and from middle household income (58.5%). The average weekly frequency of pregnancy symptoms affecting their sleep, wake up and mealtime was 3.67 (2.51) days, 3.03 (2.53) days, and 2.38 (2.65) days, respectively. On a weekly average, pregnant women skipped breakfast for 0.97 (1.83) day, snack after dinner for 3.44 (2.07) days, and had an eating window of 12.08 (1.47) hours. Night snacking was increased when the frequency of pregnancy symptoms affecting sleep time increased ($r=0.150$, $p=0.003$). Night eating was found to increase as the frequency of pregnancy symptoms affecting wake time ($\beta=0.116$, $p<0.001$), sleep time ($\beta=0.117$, $p<0.001$), and mealtime ($\beta=0.102$, $p=0.001$) increased. Pregnancy-related symptoms have a significant influence on the sleep-wake patterns and meal schedules of pregnant women. This disruption in sleep and mealtimes can lead to changes in their chrono-eating habits, particularly an increase in night snacking and night eating. Future studies should focus on the management of pregnancy symptoms to promote healthier eating behaviours and improve maternal outcomes.

Key words Circadian rhythm, chrononutrition, night snacking, pregnancy symptoms, maternal health.

Category: Nutrition Across Lifespan

Longitudinal trajectories of dietary sugar intakes and their determinants in early childhood

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Background and Objectives: High intake of dietary sugar is a well-recognised contributor to childhood obesity. Research into dietary sugar intakes in early childhood, a critical window underpinning the development of obesity and dietary habits, remains scarce. This study described the longitudinal trajectories of total and free sugar intakes and examined their determinants in early childhood.

Methods and Study Design: Data (n=445) from the Melbourne INFANT program were used. Dietary intake was assessed by three 24-hour recalls at ages 1.5, 3.5 and 5 years. Group-based trajectory modelling was conducted to identify trajectories of total and free sugar intakes (grams/day) from ages 1.5 to 5 years. Multinomial logistic regression examined the association of child sex, maternal age, pre-pregnancy BMI, country of birth, and education level with sugar intake trajectories.

Results: Three trajectory groups were identified for total sugar intake: “Low-stable” (27%; 52 to 56 grams), “Mid-rising” (60%; 72 to 85 grams) and “High-rising” (13%; 83 to 129 grams). In contrast, two free sugar intake trajectory groups were identified: “Low-rising” (88%; 11 to 24 grams) and “High-rising” (12%; 23 to 66 grams). Relative to the “Low-stable” total sugar trajectory group, boys versus girls and children of Australian versus overseas born mothers had higher odds of following the “Mid-rising” and “High-rising” total sugar trajectory groups. For free sugar intake, boys and children of mothers with no tertiary education appeared to have higher odds of following the “High-rising” versus “Low-rising” trajectory groups. Maternal age and pre-pregnancy body mass index were associated with neither total sugar nor free sugar trajectory groups.

Conclusions: Children exhibited heterogeneous trajectories of total and free sugar intakes in early childhood, with most children showing a rising trajectory. Interventions to reduce sugar intake should start in early childhood and target boys and children whose mothers are Australian-born and without tertiary education.

Key words Dietary sugar, free sugar, early childhood, trajectory modelling, longitudinal

Category: Nutrition Across Lifespan

Maternal Vitamin D Levels During Pregnancy, Infant Feeding Practices, and Growth in Infants During the First Year of Life

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Background and objectives: Adequate nutrition during early life is crucial for proper growth and development. Few studies have investigated the role of maternal vitamin D levels and feeding practices on postnatal growth of infants in developing countries. This study aims to determine the associations between maternal vitamin D levels during pregnancy, infant feeding practices, and growth in infants during the first year of life.

Methods: In this prospective cohort study, serum 25(OH)D concentrations of 379 third-trimester pregnant women were measured using a chemiluminescent immunoassay. Infant feeding practices including duration of exclusive breastfeeding (EBF), timely initiation of complementary feeding, and minimum dietary diversity (MDD) were assessed using parental reports. Infant length-for-age (LAZ), weight-for-age (WAZ), and weight-for-length (WLZ) Z-scores were assessed at birth, three, six, and 12 months.

Results: Vitamin D deficiency (<30nmol/L) was observed in 43.3% of women during late pregnancy. Nearly half of the mothers complied with the infant feeding recommendations to exclusively breastfeed their child for at least 6 months (46.6%) and 97.1% introduced complementary foods at 6 months. Only 10.6% of infants met MDD at 6 months and the proportion increased to 54.6% at 12 months. After adjusting for potential confounders, results of the multivariable linear mixed models showed that higher maternal vitamin D levels during late pregnancy was associated with lower infant LAZ ($p<0.01$) and WAZ ($p<0.01$) at birth. EBF until 6 months was associated with lower WAZ ($p<0.05$) at 12 months. Compliance with MDD was associated with higher infant LAZ ($p<0.05$) and WAZ ($p<0.05$) at 12 months.

Conclusions: The present study suggests that maternal vitamin D levels, EBF, and compliance with MDD are critical factors that can impact infant growth, highlighting the importance of proper nutrition during pregnancy and infancy. Further research is necessary to examine whether these associations persist throughout the course of life.

Key words Vitamin D; pregnancy; feeding practices; growth; infant

Category: Nutrition Across Lifespan

Sleeping habits, social jetlag, and its association with chrono-eating habits during pregnancy

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Background and objectives

Social jetlag has been found to be associated with poor dietary behaviour and weight gain. It is plausible that the overall relationship between social jetlag, eating habits, and weight gain could extend to gestational weight gain as well. Hence, the current study aims to determine the association between sleeping habits and social jetlag with chrono-eating habits during pregnancy.

Methods

This was a cross-sectional study conducted in 10 government maternity clinics in Kuala Lumpur, Malaysia. Pregnant women in their second trimester were recruited and completed the Chrononutrition Profile Questionnaire-Pregnancy (CPQ-P) to determine their sleep timing and eating habits. Social jetlag was calculated as the difference between workdays and freedays sleep midpoint.

Results

A total of 399 pregnant women with a mean age of 31.7 (4.6) years were recruited. The average workdays sleep time was 22:53 (0:56) while the freedays sleep time was 23:06 (0:59). The average naps taken was once a week and the average duration of their naps was 68.29 (55.08) mins. The median social jetlag duration was 15.00 (45.00) mins. Sleeping later was associated with consuming a larger meal later in the day for both workdays ($r=0.186$, $p<0.001$) and freedays ($r=0.137$, $p=0.007$). Increased daytime napping frequency was associated with increased night snacking ($\beta=0.218$, $p=0.029$). Greater social jetlag was associated with increased breakfast skipping frequency ($\beta=0.206$, $p=0.034$).

Conclusions

This study revealed that sleeping later is associated with a later largest meal, napping in the day could increase night snacking, and greater social jetlag could lead to greater breakfast skipping habits, which is not favourable for maternal health. More studies are warranted to strengthen the findings and support policymakers in establishing recommendations for pregnancy sleep habits for optimum maternal and infant health outcomes.

Key words Circadian rhythm, chrononutrition, daytime napping, social jetlag, maternal health

Category: Nutrition Across Lifespan

Interactions between maternal vitamin D binding protein level and maternal vitamin D status on intrauterine transfer and umbilical cord 25-hydroxyvitamin concentration

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Background and objectives: Vitamin D has autocrine effects in the developing fetus, and intrauterine transfer of 25-hydroxyvitamin D (25OHD) is the only supply of vitamin D to the fetus. Previous studies have suggested that transplacental transfer of 25OHD is driven primarily by receptor-mediated endocytosis and the placenta uptake is increased by the presence of binding proteins, suggesting the role of vitamin D binding protein (VDBP) in the intrauterine transfer of 25OHD. However, little is known about the influence of maternal VDBP level on intrauterine transfer and umbilical cord 25OHD concentrations. The present study aims to explore the associations and interactions between maternal VDBP level and maternal vitamin D status on intrauterine transfer and cord 25OHD concentrations.

Method: This paper included the analysis of data from 216 mother-neonatal dyads at birth. Maternal and umbilical cord blood 25OHD concentrations were assessed using ultra-high-performance liquid chromatography (UHPLC). VDBP concentrations were measured using a commercial enzyme-linked immunoassay (ELISA) kit. The intrauterine transfer percentages for 25OHD were calculated: (umbilical cord blood 25OHD concentration/ maternal 25OHD concentration) x 100.

Results: There was a significant interaction between maternal VDBP level and maternal vitamin D status on umbilical cord 25OHD concentration ($P_{interaction}<0.001$). The magnitude of association between maternal 25OHD and cord 25OHD was almost twice as much ($\beta=0.57$, 95%CI: 0.44, 0.69) in mothers in the highest tertile of VDBP concentrations compared to those with middle tertile ($\beta=0.37$, 95%CI: 0.26, 0.47) and triple compared to those with lowest tertile ($\beta=0.18$, 95%CI: 0.07, 0.28). There was no statistically significant difference in the intrauterine transfer percentage of 25OHD between maternal VDBP tertiles. However, intrauterine transfer increased in vitamin deficient (defined as 25OHD<30 nmol/L) compared to non-deficient mothers (106% versus 64%, $p<0.001$).

Conclusions: Results suggest that the intrauterine transfer of 25OHD is prioritized in case of maternal deficiency.

Key words vitamin D, vitamin D binding protein, intrauterine transfer

Category: Nutrition Across Lifespan

Insufficient gestational weight gain and dietary intake were associated with low infant birth weight: A prospective clinic-based study in Malaysia

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Background and objective: Low birth weight (LBW) is a crucial health issue related to under-five mortality. Findings from the developed countries reported associations between maternal nutritional status prior to conception and during pregnancy with fetal growth and development. This study aimed to determine the contribution of maternal nutritional status on infant birth weight in selected health clinics within Malaysia. **Methods:** There were 467 pregnant women interviewed for their socio-demographic information, obstetrical history, and dietary intake in the third trimester of their pregnancy. The pregnant women were followed up prospectively until childbirth, and their childbirth weight was obtained when the infants were one-month-old. **Results:** The study showed that nearly half (45.8%) of pregnant women were malnourished before pregnancy (underweight: 9.6%; overweight; obese: 36.2%) and had undesirable gestational weight gain during pregnancy (insufficient: 32.5%; excessive: 28.1%). There were more than half of pregnant women consumed inadequate energy, protein, fat, and essential nutrients during pregnancy (vitamin A, vitamin B, vitamin D, calcium, iron, and iodine). The mean infant birth weight was 3.0 ± 0.4 kg, in which 9.2% of the infants had LBW (born less than 2.5kg). Based on the multivariate logistic regression analysis, insufficient maternal GWG (OR: 2.726), energy (OR: 8.888), iron (OR: 1.014), and vitamin D intake (OR: 7.553) less than the Malaysian recommended nutrient intake (RNI) contributed towards the LBW of infants ($p < 0.001$). **Conclusion:** In short, one out of ten Malaysian infants were born with LBW. Hence, women need to gain optimal weight during gestation and consume adequate energy and micronutrients, especially iron and vitamin D throughout the pregnancy to improve infant birth weight.

Key words Gestational weight gain, low birth weight, dietary intake, infant, Malaysia

Category: Nutrition Across Lifespan

Towards Healthy and Active Ageing: Physical Activity and Eating Behaviours of Community-Dwelling Older Adults in Klang Valley, Malaysia

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Background and objectives: Malaysia is rapidly becoming an ageing nation. Regular physical activity is not only important for physical health but also for mental health and well-being. The present study aimed to determine the physical activity behaviours, eating behaviours and nutritional status among community-dwelling older adults in Klang Valley, Malaysia.

Methods: This cross-sectional study was conducted among more than 200 community-dwelling older adults aged ⩾60 years old residing in neighbourhoods across urban Kuala Lumpur and Klang Valley (Malaysia). The older adults were recruited by purposive sampling. Weight, height, BMI, body fat percentage and muscle mass percentage were measured using standard protocols. Self-reported physical activity was assessed using the International Physical Activity Questionnaire (short, last 7 days version) adapted for the elderly. Eating behaviours traits were assessed with the Adult Eating Behaviour Questionnaire (AEBQ).

Results: About 62.4% of the older adults had low muscle mass for their age. Only 12.9% of the older adults had high physical activity level, while 23.8% were categorised into the low physical activity level category. Older adults of Chinese ethnicity showed higher physical activity levels ($p<0.05$). Results showed weak, negative correlations between physical activity using total MET-mins/week and BMI ($r= -0.269$, $p < 0.001$) as well as body fat percentage ($r= -0.271$; $p < 0.001$). Muscle mass percentage had a weak, positive correlation with physical activity level ($r= 0.222$, $p < 0.01$). Several significant relationships were found between nutritional status indicators with 'food approach' appetitive trait and 'food avoidance' appetitive traits.

Conclusions: A large proportion of older adults had low physical activity levels and low muscle mass. With the benefits of physical activity to the health and fitness of older adults well-established, regular moderate-to-vigorous intensity physical activity and nutrition are important components of lifestyle management to promote healthy and active ageing.

Key words Physical activity, older adults, eating behaviour, active ageing, ageing

Category: Nutrition Across Lifespan

Nausea and Vomiting in the First Trimester of Pregnancy and Its Association With Dietary Intake and Constipation: A Preliminary Finding

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Background and objectives:

Nausea and vomiting in pregnancy (NVP) is a common symptom experienced by pregnant women in early pregnancy. Its occurrence may alter nutritional status of mothers during pregnancy and subsequently affect optimal growth of infants. However, the relationship between constipation and dietary intake with NVP among Malaysian pregnant women in their first trimester remained underexplored. These are preliminary findings of an on-going cohort study of pregnant mothers from first trimester to infants age 12 months old in Malaysia. The present analysis determined the NVP in the first trimester of pregnancy and its association with constipation and dietary intake.

Methods:

34 pregnant women were included in the present analysis, in which sociodemographic background, constipation, and NVP were assessed using questionnaires. A 3-day 24-h dietary recall was used to assess their dietary intake.

Results:

Findings showed that as many as 97.1% of the pregnant women had NVP, with 26.5%, 64.7%, and 5.9% of them developing mild, moderate, and severe NVP, respectively. More than two-third of them did not achieve dietary adequacy for energy, total fiber, vitamin A, thiamin, riboflavin, niacin, vitamin C, and calcium. There were no significant differences in constipation and dietary intake between pregnant women with no or mild NVP and pregnant women with moderate or severe NVP.

Conclusion:

Pregnant women were prone to developing NVP in early pregnancy. More studies should be conducted to identify modifiable lifestyle and nutritional factors affecting NVP among pregnant women.

Key words Nausea, vomiting, dietary intake, constipation, pregnant women

Category: Nutrition Across Lifespan

A Moderated and Mediation Lifestyle Factorial Model for Excessive Body Fat among Malaysian Children from Urban-poor Background

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Background and Objectives: Obesity is a significant public health concern among urban-poor children, who are at risk of unhealthy diets and sedentary lifestyles. This study aimed to investigate the inter-relationships between dietary intake, physical activity level, physical fitness, and body fat percentage in urban-poor children. Additionally, the potential mediating effect of physical fitness on the relationships between physical activity level and body fat percentage, as well as the potential moderating effect of macronutrients' intake, were examined.

Methods: A cross-sectional study was conducted among 408 urban-poor who lived at low-cost flats in Kuala Lumpur using cluster sampling. Physical activity level, body fat percentage, macronutrient intake and physical fitness components such as cardiorespiratory fitness, muscular strength, muscular endurance, and flexibility, were assessed. Multiple linear regression and moderated mediation analysis was performed to determine the inter-relationships of physical activity level, physical fitness, and macronutrient intake with body fat percentage.

Results: About one in three (31.9%) of the children were classified as having excessive body fat, with mean body fat percentage of 21.7±10.1%. Multiple linear regression analysis revealed that high physical activity level, low fat intake, high cardiorespiratory fitness, high muscular strength, and high muscular endurance were predictors of low body fat percentage ($R2=0.24$, $F(7,400)=17.97$, $p<0.001$). Mediation analysis showed that cardiorespiratory fitness ($B=-0.650$, $p=0.028$) and muscular strength ($B=-0.746$, $p=0.012$) mediated the relationship between physical activity level and body fat percentage. Fat intake was found to moderate the relationships between physical activity level and muscular strength ($B=0.075$, $p<0.05$), as well as muscular endurance ($B=0.098$, $p<0.05$).

Conclusions: The present study proposed a moderated mediation lifestyle factorial model based on cardiorespiratory fitness, muscular strength and fat intake for excessive body fat among urban-poor Malaysian children. These findings have important implications for the future development of effective lifestyle interventions to improve body composition among children's populations.

Key words Children, physical fitness, body composition, macronutrient

Category: Nutrition Across Lifespan

Uncovering Positive Deviance in Child Feeding Practices: Insights from Urban Poor Caregivers in Kuala Lumpur, Malaysia

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Background and objectives:

Children in their young age rely primarily on adults for their daily diet. Inappropriate food and feeding practices may lead to poor diets and undernutrition. It is challenging for urban poor caregivers who face resource constraint that limit their ability and affordability to provide adequate diets for their children. However, some urban poor caregivers are able to raise their children healthily despite these challenges and are referred to as positive deviants. This qualitative study aimed to explore the positive deviance related to foods fed to children and feeding practices among urban poor caregivers.

Methods:

Caregivers together with their under-five children were recruited from eight public low-cost flats in Kuala Lumpur. Caregivers were divided into two groups based on their children's anthropometric measurements: positive deviance (PD) group with well-nourished children (n=12) and non-positive deviance (NPD) group with undernourished children (n=15). Semi-structured face-to-face in-depth interviews were conducted, transcribed and analysed using thematic analysis.

Results:

The PD caregivers fed their children with local foods such as anchovies, tempeh, curry flavoured foods and watermelon and used high responsiveness and demandingness techniques when feeding their children. Moreover, they often used positive rewards, such as healthy snacks and commitments to take them on outdoor outings, to encourage their children to eat more and involved their children in home-cooked meal preparation. These foods and practices were the positive deviance that were beneficiary, but not commonly practised by the NPD caregivers.

Conclusions:

These findings highlight the PD related to food and feeding practices among urban poor caregivers in Kuala Lumpur. Findings could be used in developing appropriate interventions to disseminate and promote PD as an initiative to reduce child undernutrition in the urban poor community.

Key words Child undernutrition, positive deviance, urban poor, child feeding practices

Category: Nutrition Across Lifespan

Relationship between nutrition status and cognitive performance in Thai school -age children

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Background Malnutrition in Thailand has been successfully controlled since 1980s. Data from Nutritional status and dietary intakes of 0.5-12-year-old Thai children in 2012 indicated that Thailand is faced with double-burden malnutrition problem where under and over nutrition coexist.There are some malnutrition , such as stunting and iron deficiencies anemia , they are important factors in cognitive development.

Objectives To study the association between nutritional status and cognitive performance among school-age children.

Methods The cross-sectional study was conducted in 1899 school-age children (aged 7.3 years) from October 2021 to September 2022. A multistage cluster sampling method was used to selected participants from five regions ,i.e. central,north,northeast,east,and south of Thailand (ten provinces) ,except Bangkok. Body weight was measured with digital weighing scale to the nearest 0.1 kg and height was measured in the standing position to the nearest 0.1 cm. Hb concentration was measured using the HemoCue instrument. Non-verbal IQ was measured using Standard Progressive Matrices(SPM) parallel version 1998 update 2013 by clinical psychologist.

Results A total of 1899 children were included in the study. From this,101 children (5.3%) were stunted,27 children (1.4%) were thinness,166 children (8.7%), were overweight and 139 children (7.3%) were obesity. The prevalence of anemia was 12.1% (229 children) and mean Hb levels were 12.7 ±1.3 g/dL.Almost 23.2 %(443 children) of children had poor IQ levels (low average, borderline and mental retardation) and mean IQ levels were 101.8±18.0. Height-for-age and non-verbal IQ were significant association in school-age children (p 〈 0.05),whereas there were no difference the relationship between weight-for-height and non-verbal IQ (p=0.477) as well as hemoglobin and non-verbal IQ (p=0.98)

Conclusion Malnutrition and non-verbal IQ were significantly association in school-age children consequently effective to improve nutrition in preschool and school-aged children promote cognitive performance.

Key words Height-for-age:Weight-for height:Non-verbal intelligence quotient:School-age chldren:Malnutrition

Category: Nutrition Across Lifespan

生命早期饥荒暴露与成年期癌症风险:一项系统综述和荟萃分析
Famine exposure during early life and risk of cancer in adulthood: A systematic review and meta-analysis

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Objective: Emerging evidences have explored the association between famine exposure during early life and cancer risk in adulthood, but the results remain controversial and inconsistent. This study aimed to provide a comprehensive evidence on the relation of famine exposure to later cancer risk.

Methods: Relevant reports published up to March, 2022 were identified by searching PubMed, Embase, Web of sciences and Medline databases. English-language observation study on famine exposure during early life were included that provided outcomes on risk of cancer. Data were extracted from each study by two authors independently. Discrepant data were then resolved through consensus. Pooled relative ratios (RRs) with 95% confidence intervals (CIs) were used to evaluate the effect famine exposure on cancer risk.

Results: Totally, 18 published articles with 6,061,147 subjects were included in this study. Compared with unexposed group, early life famine exposure dramatically increased the risk of cancer in adulthood (RR=1.13, 95% CI: 1.04-1.22). The pooled RRs were different in terms of sex, exposure severity, exposure period, famine type, study design type and cancer location. A remarkably elevated risk for cancer was discerned in women exposed to famine (RR=1.09, 95% CI: 1.00-1.18), severe exposure (RR=1.12, 95% CI: 1.02-1.22) and adolescence exposure (RR=1.76, 95% CI: 1.02-2.50), Chinese famine exposure (RR=1.55, 95% CI: 1.29-1.82) and cohort studies (RR=1.28, 95% CI: 1.13-1.42). Moreover, a significant association of early life famine exposure with increased risk of breast (RR=1.16, 95% CI: 1.05-1.27) and stomach cancers (RR=1.89, 95% CI: 1.24-2.54) was observed.

Conclusions: This meta-analysis suggests that exposure to famine during early life may increase the risk of cancer in adulthood. The above-mentioned association is pronounced in women exposed to famine, severe exposure, adolescence exposure, Chinese famine, cohort studies, breast and stomach cancers.

Key words famine exposure, early life, cancer, systematic review, meta-analysis

Category: Nutrition Across Lifespan

孕期叶酸、维生素 B12 及二者不平衡对妊娠期糖尿病的影响及机制研究：在中国开展的巢式病例对照研究

The impact of maternal serum folate, vitamin B12 and their imbalance during pregnancy on the occurrence of gestational diabetes mellitus and related mechanism: a nested case-control study in China

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Background and Objective: Gestational Diabetes Mellitus (GDM) causes serious harm to the health status of mother and child. The prevalence of GDM is high and is on the rise. Nutrition during pregnancy is one of the important modifiable factors of GDM. This study aims to explore the associations of maternal serum folate, vitamin B12 and their imbalance in early pregnancy with GDM, and the mediation effects of the methionine cycle related metabolites.

Methods: This nested case-control study was conducted based on a prospective birth cohort in Beijing, China. A total of 172 GDM case-control pairs were included in the analysis. Maternal serum concentrations of total folate, 5-methyltetrahydrofolate (5-MTHF), vitamin B12, S-adenosylmethionine (SAM), S-adenosylhomocysteine (SAH) and Homocystine (Hcy) in early pregnancy were measured.

Results: The level of 5-MTHF and its ratio to vitamin B12 in early pregnancy were significantly higher in the case group than that in the control group ($P<0.05$). Conditional logistic regression analysis showed that the risk of GDM was higher in the group with high total folate (OR = 1.98, 95%CI: 1.07-3.66). High serum levels of 5-MTHF during early pregnancy may cause higher risk of GDM (OR = 1.58, 95%CI: 1.12-2.22). Compared with the group of the lowest tertile concentration of vitamin B12, the group of the highest concentration had a lower risk of GDM (OR = 0.46, 95%CI: 0.22-0.97, Ptrend < 0.05). Compared with the group with the lowest tertile ratio of 5-MTHF/vitamin B12, the group with the highest tertile ratio had a higher risk of GDM (OR = 2.09, 95%CI: 1.08-4.02, Ptrend < 0.05). Besides, no significant mediation effect of SAM, SAH, SAM/SAH or Hcy was found.

Conclusions: High serum folate level, low vitamin B12 level and the resulting imbalance in early pregnancy may increase the risk of GDM. Further study on the mechanism is warranted.

Key words Gestational diabetes mellitus, Folate, Vitamin B12, Methionine cycle, Nested case-control study

Category: Nutrition Across Lifespan

人乳低聚糖和儿童期肥胖关系的研究进展

Research progress on the relationship between human milk oligosaccharides and childhood obesity

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Childhood obesity has become a major global public health problem. Human milk oligosaccharides (HMOs) may be one of the reasons for breastfeeding to prevent childhood obesity. By searching the following keywords from 4 electronic databases (PubMed, Medalink, CNKI, and Wanfang): human milk oligosaccharide, Bifidobacterium, gut microbiome, infant obesity, weight gain, and adiposity, we review the potential role of HMOs in preventing the risk of obesity in infancy and childhood and the possible pathways. HMO diversity (associated with weight z-score, β=-0.048, 95%CI:-0.087,-0.009)and Lacto-N-neotetraose (LNnT) (associated with weight z-score, β=- 0.225 nmol/mL,95%CI:-0.389,-0.061)may reduce weight gain in infancy and the risk of childhood obesity by modulating the gut microbiome profile and reducing appetite; Other HMOs such as 6'-Sialyllactose (6'-SL), 3'-Sialyllactose (3'-SL) and Lacto-N-fucopentaose I (LNFPI) may also reduce the risk of obesity in infants and children by several ways, including promoting the growth of bifidobacteria, affecting intestinal epithelial cell responses, and reducing food intake. As most studies have focused on the relationship between HMOs and obesity in early infancy, more studies with follow-up into childhood are needed to confirm these hypotheses and to determine the mechanisms of action of different HMOs on childhood obesity, to obtain more evidence on the relationship between HMOs and childhood obesity.

Key words human milk oligosaccharides; childhood obesity; gut microbiota; infant obesity

Category: Nutrition Across Lifespan

中国母亲感知无母乳状况及危险因素分析

Risk factors for perceived absence of breast milk supply among Chinese mothers

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Objective:To estimate the prevalence of perceived absence of breast milk supply among Chinese mothers and to identify associated factors.

Methods: The data were extracted from Chinese National Nutrition and Health Status Surveillance in 2013, which was a cross-sectional study on children aged 0-5 years and their mothers. We defined perceived absence of breast milk supply as failure to breastfeed due to lack of breast milk supply. Breastfeeding information, maternal breastfeeding knowledge, and general characteristics were collected via a structured questionnaire. Univariate analysis and logistic regression were used to analyze the factors associated with perceived absence of breast milk.

Results: The study subjects included 12,091 women from 55 monitoring sites in 30 provinces across China, with 419 cases in the no-breastfeeding group and 11,672 cases in the control group. The prevalence of perceived absence of breast milk among mothers in China was 3.5% in 2013.

Maternal age（OR=1.055，95%CI：1.034~1.076）， postpartum hemorrhage（OR=2.062，95%CI：1.323~3.215）， unclear how to breastfeed（OR=3.428，95%CI：2.403~4.891）, and belief that breastfeeding should continue≤6 months（OR=1.504，95%CI：1.006~2.248）are risk factors for perceived absence of breast milk supply ($p<0.05$). Multiparity（OR=0.606，95%CI：0.475~0.774）is a protective factor for perceived absence of breast milk supply($p<0.05$).

Conclusion: Primiparity, postpartum hemorrhage and lower level of breastfeeding konwledge were the primary risk factors for perceived absence of breast milk. Based on our findings, breastfeeding education during pregnancy is recommended to lower the risk of perceived lack of breast milk.

Key words Breastfeeding; Perceived absence of breast milk supply; Cross-sectional studies; Lactating women; Influence factors

Category: Nutrition Across Lifespan

咖啡因干预吸气肌训练对青年男性自主神经与心血管的急性影响

Acute autonomic and cardiovascular effects of caffeine intervention on inspiratory muscle training in young men

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Objective: Caffeine is one of the most popular sports nutrition supplements. Inspiratory muscle training (IMT) can improve lung function and increase respiratory muscle strength, thereby weakening the metabolic reflex of respiratory muscles, promoting recovery from respiratory muscle fatigue. However, research on the effects of caffeine on IMT is limited. To investigate the acute effects of caffeine intervention in inspiratory muscle training on lung function and cardiovascular system in young men.

Methods: In this study, 12 healthy male college students aged 18 to 25 years with no training history were selected for two tests at a sports college in Beijing. Subjects underwent medium-intensity inspiratory muscle training (60% MIP) in both tests, and lung function parameters were measured before and after training, including: spirometry, one-second rate, maximum inspiratory pressure; cardiovascular system, including heart rate variability, blood pressure. The study was reviewed and approved by the Ethics Committee of the Capital Institute of Physical Education (approval number 2022A57).

Results: There were no significant differences between the pre-training caffeine and placebo groups at baseline levels in terms of basal information, lung function and cardiovascular system ($p>0.05$). Compared to the placebo group, there were significant differences in heart rate variability, heart rate, systolic blood pressure and maximum inspiratory pressure in the caffeine group after the intervention ($P<0.05$), and no significant differences in spirometry, one second rate, diastolic blood pressure or blood flow irrigation values ($P>0.05$). Further studies are needed to confirm the effects and safety of caffeine on the acute effects of inspiratory muscle training.

Conclusion: caffeine intervention enhances training status in inspiratory muscle training and has a positive acute effect on lung function and the cardiovascular system in healthy male university students.

Key words caffeine; inspiratory muscle training; lung function; cardiovascular system

Category: Nutrition Across Lifespan

基于自我决定理论的回应性喂养干预对母乳喂养和婴儿生长发育的影响：一项随机对照试验

Effects of responsive feeding intervention based on self-determination theory on breastfeeding and infant growth ：A Randomized Controlled Trial

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Weifang Medical University

Objective：This study was to evaluate the effects of a responsive feeding (RF) intervention program on maternal breastfeeding and infant growth and development, based on self-determination theory (SDT).

Methods：This study was a randomized controlled trial. A total of 110 mother-infant pairs were recruited and randomly divided into intervention group (n=55) and control group (n=55). The RF intervention program was divided into three parts: before delivery, during postpartum discharge, and post-discharge follow-up. The primary outcomes were breastfeeding motivation score (BMS), breastfeeding self-efficacy (BSE) and exclusive breastfeeding rate, and the secondary outcomes were infant physical development at 6 weeks and 3 months.

Results：Repeated measures variance results showed that at different time points after the intervention, the intervention group scored higher than the control group on the "enjoyment," "self-perception of connectedness and motherhood," and "actual need" dimensions of BMS (all $p<0.05$), while the "stress from significant others" score was lower than the control group (all $p<0.05$). The intervention group had higher breastfeeding efficacy scores and higher rates of exclusive breastfeeding at different time points postpartum compared to the control group (all $p<0.05$). There was no significant effect of the RF intervention program on the physical development of infants at 6 weeks postpartum ($P>0.05$), and the weight and length of 3-month-old infants was significantly lower in the intervention group than in the control group ($p<0.05$). Infants in the RF group grew at a smoother rate, with no excessive growth of infants over a short period of time.

Conclusion：Our RF intervention program based on SDT showed good results in improving mothers' motivation to breastfeed, building breastfeeding self-confidence and increasing the rate of exclusive breastfeeding, and the effects on infant physical development will need to be verified with longer follow-up in the future.

Key words responsive feeding; self-determination theory; exclusive breastfeeding; infant physical development; breastfeeding motivation; breastfeeding self-efficacy

Category: Nutrition Across Lifespan

中国 TAWS 队列中自我报告的孕前体重与孕早期测量体重的一致性分析

Agreement between self-reported pre-pregnancy weight and measured first trimester weight in Chinese TAWS cohort study

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Background Pre-pregnancy BMI is critical to pregnancy-induced symptoms and birth outcomes. However, it is not easy to measure pre-pregnant weight due to the high percentage of unplanned pregnancies. **Objective** This study aimed to evaluate the agreement between self-reported pre-pregnancy weight (SRW) and first-trimester measured weight (FMW). **Methods and Study Design** Pregnant women before 14 weeks of gestation were enrolled in Taicang and Wuqiang mother-child cohort study (TAWS) in China. Well-trained nurses queried SRW at enrollment and measured FMW and height at their first clinical care. We used the Spearman correlation, intraclass correlation coefficient, and Bland and Altman plot to assess the agreement between SRW and FMW. We estimated the agreement of BMI categories based on SRW and FMW using the Kappa coefficient. **Results** Medians ($P25$, $P75$) of SRW and FMW in our participants (n=1579) were 52.5 (48.0, 57.5) kg and 53.0 (48.3, 58.4) kg, and their median difference was 0.4 (-1.0, 2.0) kg. Higher weight differences were found among overweight and obese women than normal-weight women (2.0 kg vs 0.5 kg, P<0.05), when FMW measured in 13 weeks of gestation than in 12 weeks of gestation and earlier (1.0 kg vs 0.0 kg, P<0.05), and when FMW measured in November to April than in May to October (1.0 kg vs 0.0 kg, P<0.05). SRW and FMW had a high correlation (r=0.925, P<0.001) and consistency (ICC=0.936; 95%CI:0.924-0.945). There were 84.2% of participants classified into the same BMI categories based on SRW and FMW (κ=0.728; 95%CI:0.696-0.760). **Conclusion** SRW has good agreement with FMW, and BMI based on SRW can be used for clinical gestational weight gain consultation and weight-related research.

Key words self-reported, pre-pregnancy weight, body weight, first trimester, birthweight

Category: Nutrition Across Lifespan

部分水解配方对幼儿生长发育和健康效益的前瞻性对比研究

Growth and Sensitivity Conditions of Feeding a Partially Hydrolyzed Formula in Healthy Chinese Toddlers: A Prospective Comparative Study

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Background and Objectives: “Minor sensitivity” describes a series of well-understood symptoms related to gastrointestinal comfort, skin, sleep and respiratory conditions in children 12-36 months old. While partially hydrolyzed proteins have in infant formulas shown benefits of preventing atopic dermatitis and improving digestive comfort (Wen 2015, Huang 2021), current research lacks data in children aged 12 months onwards. This is the first study to generate growth and health effect data of a partially hydrolyzed formula (pHF) in this population.

Methods: Healthy children aged 48-72 weeks (n=256) regardless of previous feeding type were partially randomized to receive either pHF or intact protein formula (CMF) for 4 months. Primary outcome is the change in weight-for-age z-scores (WAZ) compared between pHF and CMF groups. Anthropometrics and sensitivity symptoms were collected every 4 weeks using standardized techniques and questionnaires.

Results: The two groups were similar at baseline in age, birthweight, family history of allergy and timing of complementary feeding. Compared to CMF, pHF group had significantly more children with previously diagnosed food allergy or intolerance (6.3% vs. 20%, P=0.0015) and food-related sensitization or discomfort (16% vs. 39%, P<0.0001), which was expected as previous knowledge showed that pHF can be used in the management of cow’s milk allergy and the partially randomized design allowed parents to self-elect their child to continue with pHF when enrolled in the study. Despite differences at baseline, after 4 months of feeding, pHF demonstrated non-inferiority (margin = -0.5 z score) in supporting age-appropriate growth comparable to CMF, and anthropometric z scores of both groups tracked closely against the WHO standards. pHF group also showed decreasing sensitivity over the 4 months of feeding.

Conclusions: These preliminary results demonstrated that pHF can support healthy growth after the first year of life and may provide added benefits in improving signs of “minor sensitivity”.

Key words growing-up formula, partially hydrolyzed whey formula, sensitivity, age-appropriate growth

Category: Nutrition Across Lifespan

中国孕妇血糖水平与维生素 B12、叶酸、同型半胱氨酸状况的关联性

The correlation between blood glucose and vitamin B12, folic acid, and homocysteine status in Chinese pregnant women

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Objective: To explore the relationship between blood glucose and serum vitamin B12, folate, and homocysteine status in pregnant women in China.

Method: A cross-sectional survey was used to explore the relationship between vegetarian diets and vitamin B12 levels in Chinese pregnant women based on the data from the Chinese National Nutrition and Health Surveillance (2015-2017). Background information and diets of the subjects were collected using a questionnaire and a food frequency questionnaire. The fasting blood glucose concentration was detected by hexokinase method. The serum vitamin B12 and serum folate concentration were detected by electrochemiluminescence, and the serum homocysteine concentration was detected by circulating enzyme method. Univariate regression and multivariate regression were used to analyze the relationship between maternal blood glucose and vitamin B12, folate, and homocysteine status.

Results: A total of 6967 pregnant women were included in the analysis. The average fasting blood glucose is 4.19 (3.78,4.60) mmol/l. The average concentrations of serum vitamin B12, folic acid, and homocysteine were 262.10 (178.90372.00) pg/mL, 5.52 (2.90,10.24) ng/mL, and 6.81 (5.17,9.73), respectively μ mol/L. The results of multivariate regression analysis showed that fasting blood glucose in pregnant women positively correlated with serum vitamin B12 concentration（ β= 0.135，t=8.36，P＜0.001）, not correlated with serum folic acid and homocysteine concentrations after adjusting for confounding factors such as maternal age, education level, gestational week, and pre pregnancy weight,

Conclusion: There is a positive correlation between fasting blood glucose during pregnancy and serum vitamin B12; And it may not be related to serum folic acid and homocysteine.

Key words pregnant; glucose; vitamin B12; folic acid; homocysteine

Category: Nutrition Across Lifespan

父母生活方式与后代抑郁症状之间的关系:中国一项基于人群的研究

Associations between parental lifestyles and depressive symptoms in offspring: A population-based study in China

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Background Adherence to healthy lifestyles has been associated with a lower risk of depression among adults, but little is known about the potential impact of parental healthy lifestyle on offspring depressive symptoms.

Objective To explore the cross-sectional and prospective associations between overall parental healthy lifestyles and depressive symptoms in offspring.

Methods We included 2,398 children and adolescents aged 10-15 years at baseline, drawn from the China Family Panel Studies (CFPS) in 2012. The overall parental lifestyle scores were defined as a composite score including smoking, drinking, exercise, napping, and diet. Offspring depressive symptoms were measured in 2012, 2016, 2018, and 2020 using the Center for Epidemiological Studies Depression Scale (CES-D20). Offspring with CES-D scores of 16 or above were considered to have depressive symptoms. Among them, 1,119 children and adolescents without depressive symptoms were included in subsequent follow-ups. Logistic regression models were used to examine the cross-sectional and prospective associations between parental healthy lifestyle and offspring depressive symptoms.

Results In the cross-sectional analysis, each 1-unit increment in overall parental healthy lifestyle score was associated with lower odds of offspring's depressive symptoms (OR=0.83, 95% CI: 0.73-0.94, p-trend=0.003). The association was similar for paternal and maternal lifestyle scores and across most subgroups but varied by residential area and household income level, with significant associations only observed among individuals in rural areas and those with lower household income level (P for interaction<0.05). In the prospective analysis, we did not observe a significant association between overall parental healthy lifestyle and offspring depressive symptoms (OR=0.91, 95% CI: 0.76-1.10, p-trend=0.331). However, paternal adherence to the highest lifestyle score was associated with lower risks of developing depressive symptoms in offspring (ORT3 vs T1=0.67, 95% CI: 0.44-1.00).

Conclusion Our findings suggest that the adoption of healthy lifestyles by parents, particularly by fathers, may contribute to the primary prevention of offspring depressive symptoms.

Key words Parental healthy lifestyle, offspring, depressive symptoms, maternal paternal lifestyle

Category: Nutrition Across Lifespan

孕期血浆氨基酸水平与婴儿生长的关系

Association between plasma amino acid during pregnancy and infant growth

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Objectives: This study examined the association between plasma amino acid levels during pregnancy and infant growth, and whether these associations were influenced by infant gender.

Methods and study design: A prospective cohort study was used to recruit 1158 pregnant women from Huazhong University of Science and Technology Union Shenzhen Hospital. Maternal plasma sample were collected during the second-trimester and analyzed for amino acid using liquid chromatography tandem mass spectrometry. General demographic data were obtained from hospital records. Sorting based on the gender of the infants, analyses were performed using linear mixed models.

Results: For males, after adjusting for confounding factors, maternal plasma levels of Alanine, Proline, 3-Hydroxyproline, and Homoarginine are positively correlated with infant weight (β : 1.355×10^{-3}-1.134, p : 0.027-0.049); Citrulline, Proline, Glutamine, Kynurenine, Ornithine, Asparagine are positively correlated with infant height (β : 2.694×10^{-3}-0.608, p : 0.004- 0.048); and there was no correlation between amino acids and infant head circumference. For females, maternal plasma levels of methionine, citrulline, asparagine were positively associated with infant weight after adjusting for confounders (β : 8.550×10^{-3}-1.811×10^{-2}, p : 0.015-0.045), while ornithine was found to be negatively associated with infant head circumference growth(β = -0.020, p = 0.037). No correlation was observed between amino acids and infant height for females.

Conclusions: The plasma levels of certain amino acids during pregnancy are related to the growth of infants, and the effects of these amino acids differ between male and female infants.

Key words Maternal plasma; Amino acid; Infant; Growth; Gender

Category: Nutrition Across Lifespan

中国老年人营养指数的构建与研究

Construction and study of nutrition index for the elderly in China

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OBJECTIVE: To investigate the relationship between exercise and nutrition in Chinese elderly people, construct a nutrition index, find the main influencing factors affecting the nutrition index, and personalize the improvement of the nutritional status of Chinese elderly people by adjusting the influencing factors.

METHODS: A cross-sectional study was conducted on 136 elderly people in Beijing, excluding subjects with special safety risks. The included subjects were asked for basic information (medical history), morphological and body composition tests (16 items), exercise capacity tests (10 items) and nutritional assessment (Simple Nutritional Assessment Scale MNA). After cleaning the data, logistic regression was performed and the main factors influencing nutritional status were screened by stepwise regression of variables using the stepAIC function in the MASS package.

RESULTS: The main factors affecting nutritional status were waist circumference, skinfold thickness, presence of gastric disease, and SPPB. the nutritional index was Y= -0.1 waist circumference - 0.1 skinfold thickness + 1.4 presence of gastric disease - 0.1 SPPB. where Y is the nutritional index, the closer to 1 the better the nutritional status; SPPB is the summary physical status.

Conclusion: Nutritional index is not a nutritional supplement, but the nutritional status of the organism. This study found that the waist circumference and skin fold thickness reflect the body fat content will affect the nutritional status of the body, and controlling the fat content is one of the main factors to improve the nutritional status of the body; stomach disease also affects the nutritional status of the body, and the digestion and absorption of food has a close practice with whether the stomach can work normally; interestingly, the physical fitness status is also the main factor to affect the nutritional status, so maintaining a good physical fitness level is also It is important to maintain a good level of fitness.

Key words Exercise; Nutrition; Elderly

Category: Nutrition Across Lifespan

产后早期危险因素与儿童中期超重/肥胖的纵向关联研究

Longitudinal associations of postnatal early risk factors with overweight/obesity in mid-childhood

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Objectives: Many studies have identified the association between exposure to a single prenatal risk factor and childhood obesity. We examined the association of postnatal early risk factors, individually or in combination, with late childhood risk of overweight/obesity in an Australian cohort.

Methods: We studied 945 mother-child pairs in the Longitudinal Study of Australian Children (LSAC). Six common postnatal early risk factors were included: maternal, paternal overweight/obesity at 24 months post-delivery, smoking exposure, low family socioeconomic score, short breastfeeding duration, and rapid weight gain in the first 2 years. Overweight/obesity outcomes are defined as body mass index ≥ 85th percentile according to the Centers for Disease Control and Prevention reference. The cumulative number of risk factors was summed to obtain each child's risk score, and the association between risk scores and overweight/obesity outcomes was assessed using multivariable logistic regression model.

Results: Among 945 children, 593 (73%) had >1 postnatal early risk factors. While individual postnatal early risk factor was significantly associated with childhood risk of overweight/obesity, the more risk factor scores exposed, the higher risks of childhood overweight/obesity (p-for-trends <0.001). Compared with those with 0-1 risk factor, the risk of being overweight/obesity for children with 4-6 risk factors was 6.22 (95%CI: 3.64, 10.62). The probability of being overweight/obesity at 11-12 years ranged from 6.7 (2.9, 10.7)% (with no risk factors) to 61.8 (41.8, 81.7)% (with all six risk scores). It is worth noting that children exposed to maternal 20.1 (10.2, 30.1)% or paternal overweight/obesity status 12.6 (6.7, 18.5)% had the largest predicted probability of overweight/obesity.

Conclusions: We found that multiple risk factor exposures from birth to age two were associated with a cumulative increased risk of overweight/obesity in late childhood. Therefore, interventions to prevent obesity may be more effective if targeting multiple modifiable factors early in life than a single one.

Key words the developmental origin of health and diseases, obesity, body mass index, postnatal risk factors, children

Category: Nutrition Across Lifespan

同型半胱氨酸水平与心血管疾病风险：一项剂量反应 meta 分析
Homocysteine levels and risk of cardiovascular disease: a dose-response meta-analysis

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Background: Whether elevated homocysteine (Hcy) levels prior to the development of hyperhomocysteinemia increase the risk of cardiovascular disease (CVD) remains controversial. This study aimed to explore the dose-response relationship between Hcy and CVD risk, and to provide scientific basis for primary prevention of CVD.

Methods: Searches were conducted in PubMed, Embase, and Web of Science from inception to 23 April 2022 to obtain observational literatures examining the association between Hcy and CVD. The proportion of cumulative CVD cases relative to total CVD cases at each Hcy level was calculated. Summary results were received through random effects model. Linear and nonlinear association were constructed through generalized least squares method and restricted cubic spline with three knots, respectively.

Results: A total of 94 original studies on 193,234 participants were included. The proportion of cumulative CVD cases relative to total CVD cases increased rapidly when the Hcy level rose from 8 to 12 μmol/L. The increase of blood Hcy level was associated with higher CVD risk (relative risk (RR): 1.79, 95% confidence interval (CI): 1.65-1.94). Nonlinear dose-response relationship between Hcy and CVD risk was shown, with significantly elevated risk when Hcy ≥ 10 μmol/L. Similar results were found in separate analyses of cohort studies, case control studies and cross-sectional studies (RR: 1.57, 95%CI: 1.37-1.80; RR: 2.12, 95%CI: 1.82-2.46; RR: 1.62, 95%CI: 1.45-1.81, respectively). In addition, the risk of CVD also increased significantly when blood Hcy ≥ 11 umol / L and ≥ 9 umol / L in cohort studies and case control studies, respectively.

Conclusions: Elevated Hcy significantly increased the risk of CVD when blood Hcy ≥ 10 μmol/L. Earlier nutritional intervention to reduce blood Hcy level may be an effective strategy for primary prevention of CVD.

Key words homocysteine, cardiovascular disease, meta-analysis, dose-response relationship

Category: Nutrition Across Lifespan

四川偏远农村地区婴幼儿看护人营养包认知-采用过程的作用机制及关联动态研究

Study on the influence mechanism and association dynamics of the cognitive-adoption process of Ying Yang Bao for children's caregivers in remote rural areas of Sichuan Province

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Background

Child nutrition improvement interventions with Ying Yang Bao as the main tool have been widely used in remote rural areas of China.

Objectives

This study aimed to investigate the factors influencing the adoption behaviors of Ying Yang Bao based on the innovation-decision making process of innovation diffusion theory. In addition, this study aimed to explore the dynamic association between information perception and adoption behaviors using three-period panel data.

Study Design

This study was a three-phase longitudinal study from 2019-2020. Data were collected using face-to-face household questionnaire interviews.

Methods

A multi-stage whole-group random sampling method was used to select infant and toddler caregivers among the 32 project counties in Sichuan Province. Multi-layer structural equation modeling was used to investigate the factors influencing Ying Yang Bao adoption behaviors. In addition, cross-lagged panel models with random intercepts were constructed to verify the dynamic association between information perceptions and adoption behaviors over time.

Results

A total of 1556 pairs of infants and toddlers aged 2-24 months and their caregivers were included in this study. The results of the multilayer structural equation modeling showed that information perceptions directly influenced their Ying Yang Bao adoption behaviors and indirectly influenced adoption behaviors through health beliefs. The results of the three-period random intercept cross-lagged panel model showed that information perceptions positively predicted the caregivers' subsequent Ying Yang Bao adoption behaviors (period 2 to 1: β = 0.439, 95% CI = 0.016-0.825; period 3 to 2: β = 0.328; 95% CI = 0.086- 0.532).

Conclusions

In the next step of Ying Yang Bao promotion process, there should be a focus on the promotion and explanation of the core information of the Ying Yang Bao to strengthen the infant and toddler caregivers' understanding and knowledge so as to promote their Ying Yang Bao adoption behaviors.

Key words Early life nutrition; Ying Yang Bao; Diffusion of innovation; Child caregivers; Random-intercepts cross-lagged panel model

Category: Nutrition Across Lifespan

过敏及健康儿童肠道菌群和短链脂肪酸的差异：一项横断面研究

Differences in gut microbiota and SCFAs between allergic and healthy children: a case-control study

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The hygiene hypothesis suggests that gut microbiota may influence the development of allergy directly or through its metabolites. The present study was conducted to compare the differences in gut microbiota and its metabolites between allergic and healthy children. 95 school-age children (6~8 years old) were included from our birth cohort. Allergy data and demographic characteristics were derived from parental self-report. Serum immunoglobulin E (IgE), blood routine, and blood biochemical parameters were detected. A total of 91 stool samples from subjects were obtained. Gut microbiota were profiled by 16s rRNA gene sequencing. Short-chain fatty acids were extracted from stool and detected by Gaschromatography-mass spectrometry. 36 allergic children and 59 healthy children completed the survey. At the phylum level, Firmicutes, Bacteroidota, and Actinobacteriota were the top 3 dominant bacteria with no significant difference between groups. The relative abundance of Verrucomicrobiota and Cyanobacteria in the allergic children were significantly lower than that in the healthy children. At the genus level, Akkermansia in the allergic children were significantly lower than that in the healthy children, and the reverse was found in Subdoligranulum. There were no significant differences in alpha and beta diversity between groups. The content of acetic, propionic, butyric, isobutyric acid, valeric, isovaleric acids, serum IgE, and blood indexes showed no significant differences between groups. We observed that the relative abundance of certain gut microbiota might be associated with allergic diseases although the SCFAs on allergy were not found. The results also suggested that serum IgE might not be the main feature of allergy. Combined with our previous researches, the gut microbiota in the early life were more important than that in the childhood.

Key words allergy, gut microbiota, short-chain fatty acids, serum immunoglobulin E, blood indexes

Category: Nutrition Across Lifespan

全营养配方粉与乳清蛋白粉改善老年人群营养状况及体成分的随机对照干预研究

Impact of standard enteral nutrition formula and whey protein powder in improving nutritional status and body composition of elderly subjects: a randomized controlled trial

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Objectives: We examined whether the standard enteral nutrition (EN) formula or the whey protein powder improves the nutritional status and body composition among elderly people.

Methods: In an 8-wk, randomized, controlled, open-label trial, 37 individuals were randomized to receive an oral nutritional supplementation either standard EN formula (N=18, 96g/d) or whey protein powder (N=19, 20g/d) twice a day(10 a.m. and 3 p.m.). Nutritional status was determined through Minimum Nutritional Consulting (MNA). Subjects who were over the age of 60 years old and scores of MNA below 23.5 were conducted. MNA and body composition were carried out at baseline, then after 8 weeks of supplementation.

Outcomes: Compaed with baseline, there were statistically significant increase in scores of MNA and body composition [body weight, BMI (body mass index), body lean mass, body fat mass] in both "standard EN formula group" and "whey protein powder group". However, the results showed no statistically significant differences in body composition (body weight, BMI, body lean mass, body fat mass) and scores of MNA between the two groups at the end of the clinical trial

Conclusions: Both supplementations of standard EN formula and whey protein powder can improve the nutritional status and body composition in elderly people who are in nutritional risk or in malnutrition.

Key words elderly people; standard enteral nutrition formula; whey protein powder; body composition; nutritional status

Category: Nutrition Across Lifespan

中国3～5岁儿童膳食维生素D摄入量

Dietary vitamin D intake of children aged 3 to 5 years in China

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Objectives:

To analyze dietary vitamin D intake among preschool children aged 3~5 years based on a national representative cross-sectional study in China.

Methods:

In a national representative cross-sectional study, children were randomly sampled by using a multi-stage stratified cluster sampling method in China, and dietary intake of preschool children aged 3~5 years was collected using the 3-day 24-hour weighted food records method. Demographic characteristics and socio-economic status of children were collected by using a structured questionnaire. The dataset for vitamin D contents in foods was established by using FoodEXplorer™ platform and the food composition data from the United States and India. Total energy intake abnormally (less than 300 kcal/day or more than 2000 kcal/day) and dietary weighing record < 3 days were excluded. We calculated the mean daily vitamin D intake by averaging the 3-day dietary intake data (not included the vitamin D supplements doses), as well as calculated the percentage of vitamin D intake from each food group for each child.

Results:

Totally 559 children aged 3~5 years were included. Dietary vitamin D intake was 1.85 (0.97, 4.40) μg/d, and the proportion of dietary vitamin D intake below the Estimated Average Requirement was 98.9%. The main food source of vitamin D was egg. The dietary vitamin D intake of north children was higher than south children (2.13 μg/d vs 1.74 μg/d, P=0.0007), and there were differences in the dietary vitamin D intake among children in eastern, central and western regions (3.01 μg/d, 1.61 μg/d and 1.20 μg/d, respectively) (P<0.01). There was no significant difference in dietary vitamin D intake between urban and rural areas or other population characteristics.

Conclusion:

The dietary vitamin D intake was very low among children aged 3~5 in China and great attention needs to be paid to improve dietary vitamin D intake.

Key words Food composition database; Preschool children; Vitamin D; Dietary intake; China

Category: Nutrition Across Lifespan

一项用于中国老年人肌少症诊断的低肌肉质量快速筛查方法的开发

Development of a Quick Screening Tool to Predict Low Muscle Mass for Sarcopenia Diagnose in Chinese Older Adults

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Background: The feasibility of performing muscle mass measurement remains limited due to the high cost and technique limitation. Our study aim is to develop a quick screening tool to predict muscle mass and sarcopenia status in Chinese older adults.

Methods: Two thousand eight hundred and twenty-three community-dwelling older adults (≥ 60 years old) were recruited from Beijing, Shanghai and Chengdu in China. Appendicular muscle mass (ASMI) was assessed through bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DXA). Body mass index (BMI), upper arm circumference (UAC), calf circumference (CC) and handgrip strength were measured. Linear regression models were applied to predict the ASMI through the anthropometric parameters (BMI, UAC and CC) and handgrip strength. The optimal cut-off in Chinese population was used (7.05 kg/m^2 for men and 5.85 kg/m^2 for women) to define low ASMI.

Results: ASMI was positively correlated with handgrip strength, UAC and CC in both men ($r = 0.39$, $p < 0.001$; $r = 0.54$, $p < 0.001$; and $r = 0.67$, $p < 0.001$, respectively) and women ($r = 0.38$, $p < 0.001$; $r = 0.57$, $p < 0.001$; and $r = 0.67$, $p < 0.001$, respectively). A final model has been identified for ASMI prediction through the combination of handgrip strength and CC in men ($R^2 = 0.66$, $p < 0.0001$) and women ($R^2 = 0.66$, $p < 0.0001$), after adjusting for age, BMI and living location in Chinese older adults. The area under the receiver operating characteristic curve (AUC) was 0.89 (95% confidence interval [CI]: 0.88-0.91) for men and 0.90 (95% CI: 0.89-0.92) for women.

Conclusion: The model using the combination of handgrip strength and CC can be used as an alternative tool to identify low muscle mass for sarcopenia screening in community settings with high accuracy.

Key words Sarcopenia, Low Muscle Mass, Handgrip Strength, Calf Circumference, Chinese, Older Adults

Category: Nutrition Across Lifespan

基于上海队列研究的母亲妊娠期鱼类摄入量和血液 ω-3 脂肪酸水平对 18 个月龄儿童神经发育的影响

Maternal Fish Intake during Pregnancy, Blood Omega-3 Fatty Acids Levels, and Child Neurodevelopment at Age 18 Months in a Shanghai Cohort

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Background: Fish are the primary source of protein, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) for pregnant women and children, but harmful contaminants such as methylmercury (MeHg) are the potential hazard of fish consumption. This study aimed to study the balance of contaminant risk and nutritional benefit from maternal prenatal fish consumption for child neurodevelopment.

Methods: Using data from a prospective cohort study of 397 Chinese mother-child pairs in Shanghai enrolled in 2018, the authors studied associations of maternal prenatal fish intake and plasma DHA+EPA levels with children's suboptimal development on the Ages & Stages Questionnaire (ASQ) at age 18 months. Dietary intakes of MeHg and DHA+EPA were calculated, and then net IQ points gain was used to evaluate the health risk and benefit at a population level by FAO/WHO model.

Results: The average consumption of total fish was 87.47g/d. Mean maternal MeHg and DHA+EPA intakes were 0.035μg/kg·bw/d and 345mg/d, respectively. Geometric mean maternal DHA+EPA level was 71.52 (geometrics standard deviation, 1.92) μg/mL. After adjustment using Poisson regression model, higher fish intake was associated with better performance of problem solving among baby boys, but higher maternal DHA+EPA level was not associated with a benefit. 62.8% of the population met the recommended daily intakes of 250 mg DHA+EPA meanwhile not exceeded the MeHg reference dose of 0.1μg/kg·bw/d. In FAO/WHO model, the proportion of 69.7% reached the maximum IQ points gain.

Conclusions: The pregnant women in Shanghai have an adequate fish consumption, but balancing the benefits of fish intake and risk of potential MeHg exposure is still a challenge. It is necessary to develop local dietary recommendations for pregnant women that incorporate the nutritional benefits as well as the risks of fish intake.

Key words fishes; child development; pregnancy; omega-3 fatty acids; methylmercury

Category: Nutrition Across Lifespan

孕前膳食模式对孕期体重增重轨迹的影响：一项前瞻性队列研究

Dietary Patterns Prior to Pregnancy Are Associated with Gestational Weight Gain Trajectory: A Prospective Cohort Study (TAWS)

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Objective: To explore the association between pre-pregnancy diet pattern and gestational weight gain (GWG) trajectory.

Methods: Data were extracted from the Taicang and Wuqiang cohort study (TAWS), a maternal and child nutrition and health cohort study in China. ALL participants entered the TAWS at early-pregnancy and completed the baseline questionnaire and food frequency questionnaire at their first visit. Totally, 1080 eligible women, living in Wuqiang, were included in the current analysis. Dietary intake was assessed by a validated 57-item food frequency questionnaire recording food consumed “in the one month prior to pregnancy”. Weight was repeatedly measured at 12-16, 24–28, 32-36 weeks of pregnancy and before delivery; pre-pregnancy was self-reported.

Dietary patterns were derived by using principal component analysis. The latent class mixed model was conducted to identify distinct weight gain trajectories. Multinomial logistic regression model was conducted to study the association between dietary patterns prior to pregnancy and GWG trajectory.

Results: Four dietary patterns were retained, accounting for 48.7% of the overall diet. Dietary patterns were named the “cereals, vegetables and fruits” pattern, “meats” pattern, “fishes and eggs” pattern and “dessert and nuts” pattern. Three GWG trajectories were identified: ‘normal growth trajectory(n=783)’, ‘fast growth trajectory(n=157)’ and ‘slow growth trajectory(n=140)’. Compared with GWG normal growth trajectory, higher “fishes and eggs,” pattern scores prior to pregnancy were associated with lower odds of GWG fast growth trajectory during pregnancy (adjusted Odds Ratio (OR): 0.755, 95% Confidence Intervals(CI): 0.615, 0.926).

Conclusion: Diet prior to pregnancy is an important target for interventions and may be important for weight control during pregnancy, especially for those who are overweight or obese pre-pregnancy.

Key words pre-pregnancy diet pattern; gestational weight gain; trajectory pattern; pregnant cohort study

Category: Nutrition Across Lifespan

富含 α-乳清蛋白、骨桥蛋白和神经节苷脂的婴儿配方奶粉调节肠道微生物组成和促进双歧杆菌的生长

Infant formula enriched with alpha-lactalbumin, osteopontin and gangliosides modulates gut microbiome and promotes growth of Bifidobacteria similar to breastfed infants

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Background and objectives

Breastfeeding, the gold standard for infant nutrition, results in a higher abundance of Bifidobacteria. In a prospective, open label study of an infant formula with unique whey protein concentrate enriched in α-lactalbumin, osteopontin and gangliosides, after 6 weeks of intervention, we explored the bifidogenic effect and changes in the microbial-derived metabolites, compared to a breastfed reference group.

Methods

Chinese infants were enrolled between 3 and 28 days and assigned to predominantly formula-fed (FF) (N= 60) or breastfed (BF) group (N=60) per their feeding practice, for 6 weeks. Fecal samples were collected at baseline and after week 6. Fecal metagenomic data was processed using MetaPhlAn3. Bacteria relative abundances was analyzed with a zero-inflated negative binomial (ZINB) model. Bacteria genus and species were compared for FF versus BF group at week 6. Short chain fatty acids (SCFAs) and branched-chain fatty acids (BCFAs) were analyzed by ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MSMS) and results expressed as μmol/g of dry feces. Both microbiota and SCFAs analyses were adjusted for covariates including baseline age, sex, delivery mode, site and baseline measures.

Results

Bifidobacterium genus relative abundance was not significantly different ($p=0.686$) between the FF and BF groups at end of trial.
Bifidobacterium bifidum species increased over time with intervention formula ($p=0.0105$). After 6 weeks, total SCFAs were significantly higher ($p=0.048$) in the FF versus BF group. The increase in SCFAs level was mainly driven by the increased levels of, valeric and propanoic acids ($p<0.05$ for both). Also, after 6 weeks, total BCFAs, isobutyric and isovaleric acids were significantly higher in FF vs BF ($p<0.05$ for all).

Conclusions

Our study provides evidence on the effectiveness of a unique infant formula in modulating the gut microbiome and promoting Bifidobacteria abundance similar to that of the BF group.

Key words Osteopontin, Gangliosides, Oligofructose, Gut Microbiome, Short Chain Fatty Acids (SCFAs)

Category: Nutrition Across Lifespan

富含 α-乳清蛋白、骨桥蛋白和神经节苷脂的婴儿配方粉支持健康足月儿的生长、肠道健康和免疫反应

Infant formula enriched with alpha-lactalbumin, osteopontin and gangliosides supports growth, gut health and immune response

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Background and objectives

Bioactive proteins and lipids found in human milk such as osteopontin and gangliosides have immune modulatory functions, improve gastrointestinal (GI) tolerance, and may result in functional benefits when added to infant formula. In this prospective, intervention study we tested the feeding tolerance, gut and immune health of Chinese infants fed on an infant formula with unique whey protein concentrate enriched in α-lactalbumin, osteopontin and gangliosides.

Methods

Predominantly formula-fed (FF) and breastfed (BF) infants were enrolled between 3 and 28 days and assigned to the FF (N= 60) or BF group (N=60), per their feeding practice, for 6 weeks. The primary endpoint was Infant GI Symptom Questionnaire (IGSQ) index score assessed using a validated IGSQ-13 questionnaire after 6 weeks of intervention; non-inferiority of FF vs BF was tested. Secondary endpoints included fecal markers of immune response, inflammation and gut barrier integrity (sIgA, cytokines, calprotectin, α-1-antitrypsin) assessed using ELISA, stool consistency assessed using GI diary, anthropometric assessments, physician reported adverse events (AE), and use of medications.

Results

Baseline infant characteristics (age, sex, gestational age at birth) were not significantly different between groups. More infants were born by cesarean section in the FF vs. BF group (55% vs. 30%, $P<0.05$). IGSQ index score demonstrated good GI tolerance in both groups at week 6 (Mean (SD); FF: 19.9 (7.4) BF: 16.8 (4.2); difference of means 1.35 [-1.312, 4.012]. The IGSQ domain scores (spitting up/vomiting, flatulence, crying, fussiness and stooling), mean stool consistency, fecal marker levels, anthropometric Z-scores and AE were not significantly different between groups at week 6. Incidence of diarrhea, respiratory tract infections and antibiotic usage were low overall and not significantly different between groups.

Conclusions

Our data provides evidence on the safety and effectiveness of the unique infant formula in supporting growth, gut barrier integrity and immune response.

Key words Osteopontin, Gangliosides, Gastro-intestinal tolerance, immune response, gut health

Category: Nutrition Across Lifespan

基于营养充足评价和不良妊娠结局风险预测的中国孕妇健康膳食指数的建立和验证

Development and validation of the Chinese Healthy Diet Index for Pregnancy for the nutrition adequacy assessment and risk prediction of adverse pregnancy outcomes.

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Background and objectives: In China, few diet quality index was designed for pregnant women to assess their diet simply and intuitively. We aimed to develop and validate a food-based index to assess Chinese pregnant women's diet quality, the Chinese Healthy Diet Index for Pregnancy (CHDI-P).

Methods and study design: A prospective cohort study was conducted in southwest China to collect pregnant women's food intake through 24h recalls for three consecutive days. The CHDI-P was developed on dietary guidelines and food and health outcomes studies. The CHDI-P has three dimensions comprising 26 components and a total score of 100 points. Reliability was assessed by Cronbach's alpha coefficient and item-item correlation between components. Validity was assessed, including Spearman correlation analysis for the relationships between CHDI-P with nutrients and energy intake, multiple logistic regression for the association between the CHDI-P and anemia-in-pregnancy (AIP), differences comparing in the median between groups categorized by the known factors that influenced diet quality.

Results: 1663, 1036, and 1045 participants in early, middle, and late pregnancy were included. The median score in early, middle, and late pregnancy were 55.50, 56.00, and 56.25. Cronbach's alpha for CHDI-P in early, middle, and late pregnancy was 0.709, 0.738, and 0.743. Most of the correlations between components were low. The CHDI-P score was significantly positively associated with selected nutrient intake. Pregnant women with the highest level of CHDI-P score in middle [*OR (95%CI)*: 0.595 (0.408, 0.869)] and late pregnancy [*OR (95%CI)*: 0.668 (0.465, 0.960)] had a lower risk of AIP compared with the lowest level. The elderly, who were highly educated and had pre-pregnancy exercise habits, had higher CHDI-P scores.

Conclusion: The CHDI-P can easily and precisely assess the diet quality of Chinese pregnant women and predict nutritional adequacy and the risk of adverse pregnancy outcomes.

Key words diet quality, pregnancy, diet indexes, healthy diet, diet assessment

Category: Nutrition Across Lifespan

无锡市巨大儿发生现况及其影响因素分析

Analysis of the Current Situation and Influencing Factors of Macrosomia in Wuxi, China

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Objective: To investigate the occurrence of macrosomia in Wuxi City and analyze its influencing factors.

Methods: A total of 403 pregnant women who were hospitalized for childbirth in Wuxi Maternal and Child Health Hospital from January 2016 to December 2017 were selected as the study subjects. A questionnaire survey was used to collect data on the pregnant women's pre-pregnancy and pregnancy-related information. The information of infants at birth was collected through the maternal and child health system and hospital medical records.

Results: The incidence of macrosomia in this survey was 13.90%. Univariate analysis found that there were statistically significant differences in maternal age, pre-pregnancy BMI, paternal BMI, family economic status, number of pregnancies, history of diabetes, and maternal serum 25-hydroxy D concentration (P<0.05). Multivariate logistic regression analysis revealed that maternal age ≥35 years (OR=2.624, 95% CI: 1.642~3.751), pre-pregnancy BMI ≥28 (OR=2.161, 95% CI: 1.5562.346), history of diabetes (OR=6.653, 95% CI: 3.152~8.658), and insufficient maternal serum 25-hydroxy D concentration during pregnancy (OR=1.653, 95% CI: 1.115~2.778) and lack (OR=3.652, 95% CI: 2.052~5.154) were risk factors for macrosomia.

Conclusion: In future clinical work, attention should be paid to pregnant women with advanced age, pre-pregnancy obesity, multiple pregnancies, a history of diabetes, and low serum 25-hydroxy D concentrations to prevent the occurrence of macrosomia and take intervention measures.

Key words Pregnant women; Macrosomia; Influencing factors; Logistic analysis

Category: Nutrition Across Lifespan

孕期碘过量和甲状腺功能与18-24个月婴儿神经发育的关系
The relationship between iodine excess and thyroid function during pregnancy and infantile neurodevelopment at 18-24 months

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Background and Objectives: Thyroid disease is a prevalent condition during pregnancy, and excessive iodine intake can lead to changes in thyroid function. However, research on the relationship between maternal iodine excess, thyroid hormones during pregnancy, and infantile neurodevelopment is limited. This study aimed to explore the relationship between maternal iodine excess and thyroid hormones during pregnancy and infantile neurodevelopment. The objective is to provide evidence to support and enhance the prevention of infant neurodevelopmental retardation.

Methods and Study Design: From 2016 to 2018, a prospective study was conducted from pregnancy to 18-24 months postpartum. Maternal urinary iodine concentration (UIC), thyroid stimulating hormone (TSH), total serum iodine (TSI) and non-protein bound serum iodine (nbSI) during pregnancy were determined. The Gesell Development Scale (GDS) was used to assess neurodevelopment of infant at 18-24 months. The iodine status of pregnant women was divided into four groups based on the distribution of maternal UIC: <100μg/L (moderate deficiency), 100-149μg/L (mild deficiency), 150-249μg/L (sufficiency) and >250μg/L (above requirement).

Results: 469 mother-infant pairs participated in our study. Compared with the maternal UIC of 150-249μg/L during pregnancy, the risk of adaptive developmental delay was increased in infants with maternal UIC≥250μg/L (OR=2.38, 95%CI: 1.06, 5.35). Pregnant women with TSI>90th quantiles were more likely to have offspring with language developmental delay than those with lower TSI in 10-90th quantiles (OR=3.06, 95%CI: 1.09, 8.58). The risk of fine motor developmental delay was increased in infants with maternal TSH≥2.5mIU/L during pregnancy (OR=4.32, 95%CI: 1.43, 13.0).

Conclusions: Maternal iodine nutritional status above requirement (UIC≥250μg/L or TSI>90th quantiles) during pregnancy negatively affects infantile neurodevelopment. Maternal TSH≥2.5mIU/L during pregnancy was an independent risk factor for infantile neurodevelopment.

Key words Pregnancy; Infant; Iodine excess; Thyroid function; Neurodevelopment.

Category: Nutrition Across Lifespan

中国65岁及以上老年人食物多样性与其跌倒风险的关联研究

Association of dietary diversity and falls in Chinese people aged 65 years and older

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Background: Dietary diversity is widely recommended as a means of promoting health. However, there is little evidence supporting the relationship between dietary diversity and falls in older adults.

Objective: To estimate the prevalence of falls and examine the association between the dietary diversity score (DDS) and falls among older Chinese adults.

Methods: We used data from the Chinese Longitudinal Healthy Longevity Survey (CLHLS), a nationwide longitudinal survey that aimed to investigate the determinants of health and longevity among older adults in China. The outcome observed was the incidence of falls in the past year, as self-reported by the participants. The DDS was constructed based on 12 items from a food frequency questionnaire. DDS was categorized into quartiles, and the lowest quartile was used as the reference group. Logistic regression was used to examine the association between DDS and the risk of falls in the elderly.

Results: Fall was reported by 22.9% of the 11208 participants. Each 1-unit increase in DDS corresponded to a 5% lower risk of falls (adjusted odds ratio [aOR]; 0.95; 95% CI: 0.93, 0.97]. After adjustment for demographic and lifestyle characteristics, compared to the lowest quartile of DDS, ORs (95% CIs) were 0.82 (0.73, 0.94) for quartile 2, 0.80 (0.70, 0.91) for quartile 3, and 0.74 (0.65, 0.85) for quartile 4 (P for trend<0.001). Protein-rich food items, including meat, fish, and beans were associated with protective effects against falls. In addition, a significant association was observed between higher consumption of fresh vegetables and fruits, and lower risk of frailty.

Conclusions: A higher DDS was associated with a lower risk of falls in Chinese individuals aged 65 years and older. This study highlights the importance of a diverse diet as a potential modifiable behavioral factor for preventing falls in older Chinese adults.

Key words dietary diversity; falls; older Chinese adult

Category: Nutrition Across Lifespan

母亲妊娠期饮食模式对低出生体重和小于胎龄儿发生的影响：中国的前瞻性出生队列

The influence of maternal dietary pattern during pregnancy on the occurrence of low birth weight and small for gestational age: a prospective birth cohort in China

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Background: To investigate the dietary pattern of pregnant women in Tongzhou District of Beijing, China, and to explore the association between maternal dietary pattern during pregnancy and low birth weight (LBW) and small for gestational age (SGA).

Methods: A prospective cohort study was conducted in the Tongzhou Maternal and Child Health Care Hospital of Beijing from July 2018 to February 2019. Maternal socio-demographic and lifestyle information was obtained from questionnaires in three different trimesters, and pregnancy outcomes were obtained from the hospital information system. Inconsecutive 2-day 24-hour dietary surveys were conducted to assess maternal diet in both the 1st and 2nd trimesters. Principal component analysis was performed to extract dietary patterns during pregnancy. Multivariate logistic regression analysis was performed to explore the independent effect of maternal dietary patterns during pregnancy and the occurrences of LBW and SGA.

Results: A total of 3856 pregnant women were included. The prevalence of LBW and SGA was 3.8% and 6.0%, respectively. Six dietary patterns were extracted in the 1st trimester, including the “milk-fast food” pattern, “eggs-fish-shrimp” pattern, “vegetables-mushrooms and algae-poultry meat” pattern, “potatoes-fruit-nuts” pattern, “dry beans-snacks” pattern and “livestock meat” pattern. In the 2nd trimester, five dietary patterns were extracted, including the “eggs-vegetables-mushrooms and algae” pattern, “milk-snacks-fast food” pattern, “fruit-potatoes-nuts” pattern, “poultry meat-livestock meat-beans” pattern and “fish and shrimp” pattern. Pregnant women adhering to the “milk-snack-fast food” pattern (OR=0.525, 95% CI: 0.282-0.977) and “poultry meat-livestock-beans” pattern (OR=0.579, 95% CI: 0.359-0.933) in the 2nd trimester had a lower risk of SGA. Pregnant women adhering to the “fruit-potatoes-nuts” pattern in the 2nd trimester had a lower risk of LBW (OR=0.433, 95% CI: 0.199-0.940).

Conclusion: Pregnant women should consume sufficient fruits, milk and meat in the 2nd trimester to prevent adverse pregnancy outcomes caused by relatively low birth weight.

Key words dietary pattern, low birth weight, small for gestational age, early pregnancy, mid-pregnancy, China

Category: Nutrition Across Lifespan

短期营养干预对专业运动员体能测试指标的影响

Influence of short-term nutrition intervention on physical fitness test indexes of professional athletes

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Objective: Physical fitness test plays an important role in evaluating the training level and physical quality of athletes. Periodic physical fitness test is a powerful index to examine the basic physical fitness of professional athletes and the effect of winter training.This study provides data support for scientific diet and nutritional supplement to improve physical performance of male Wushu routine athletes through nutritional intervention.

Methods: experimental group: wushu (15), control group: diving (15), age 19.67 + / - 2.91, are men, 14 days experimental period, experimental dietary nutrition and nutrition supplement nutrition points: dietary nutrition ratio of relying on the scientific wisdom restaurant dining, and more nutritional supplement to energy, electrolyte, glycogen reserve supplies, fitness test on that day, dynamic resistance accelerate jelly (38 g) exercise 30 minutes before eating 1 bag, Odyssey, glycogen from powder (80 grams), eat before breakfast.The events tested were 30 meters (explosive power), 1,500 meters (aerobic endurance), one-minute double swing rope jump (flexibility and agility), and planking (core strength).

Results: One-minute double rope skipping: experimental group 87.85 + / -22.98, control group 48.87 + / -25.84 ($P < 0.05$).30 m: 4.80 + / -0.25 in the experimental group and 5.18 + / -0.28 in the control group ($P < 0.05$).There was no difference in the test results of 1500m and plank support between the two groups.

Conclusion: Short-term nutrition intervention has significant effect on the performance of explosive power events, but has no significant effect on the performance of endurance events.

Key words short-term nutrition; physical fitness test; professional athletes

Category: Nutrition Across Lifespan

补充白藜芦醇通过调节 NF-κB/SIRT1/NLRP3 抑制力竭运动中的肾脏炎症反应

Resveratrol supplementation inhibits kidney inflammation during exhaustion exercise by regulating NF-κB/SIRT1/NLRP3

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Objective. Exhaustive exercise can lead to renal inflammatory response and subsequent kidney injury, while resveratrol has been shown to possess anti-inflammatory properties. The aim of this study is to investigate whether resveratrol supplementation can alleviate kidney injury induced by exhaustive exercise and explore its possible mechanisms of action. This study has the potential to provide new therapeutic strategies for the prevention and treatment of exercise-related kidney injury.

Methods. 30 SD rats were divided into four groups: control (CON, n=8), resveratrol (RSV, n=8), exhaustion exercise (EE, n=7), and exhaustion exercise with resveratrol (RSV+EE, n=7). EE and RSV+EE groups underwent 6 weeks of exhaustion exercise, while RSV and RSV+EE groups were given resveratrol. Kidney tissue was collected for analysis 24 hours after the last exercise. Hematoxylin-eosin staining (HE) was used to observe morphological changes in kidney tissue. Enzyme-linked immunosorbent assay (ELISA) was used to measure interleukin (IL)-1β, tumor necrosis factor (TNF)-α, IL-6, and IL-10 levels in kidney tissue. Western blot was used to measure the expression of SIRT1, nuclear factor (NF)-κB p65, NLRP3, apoptosis-associated speck-like protein (ASC), and IL-1β in kidney tissue.

Results. EE group showed kidney damage, while RSV+EE group had some improvement. Compared with CON, RSV and RSV+EE groups had significantly increased SIRT1 expression ($P<0.05$), and RSV and RSV+EE groups had significantly decreased NLRP3 and ASC expression compared to EE group ($P<0.05$). The expression of NF-κB p65 protein was significantly higher in the EE group than in the control ($P<0.01$), while it was significantly lower in RSV+EE group than in EE group ($P<0.05$). EE group had significantly higher levels of IL-1β and IL-10 protein expression than CON($P<0.01$), while RSV+EE group had significantly lower levels than EE group ($P<0.01$).

Conclusion. Resveratrol can alleviate kidney injury induced by exhaustive exercise through regulation of the SIRT1/NF-κB/NLRP3 pathway.

Key words Resveratrol; Exhausted exercise; Kidney inflammation; NF-κB; SIRT1; NLRP3.

Category: Nutrition Across Lifespan

产后第一年母乳乳铁蛋白浓度的变化- TAWS 队列研究

Longitudinal changes of human milk lactoferrin concentration during the first year postpartum- a TAWS cohort study

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Objectives: To explore longitudinal changes of human milk lactoferrin (hLF) concentrations during the first year postpartum and associated factors.

Methods: This was a prospective cohort study, in which 160 dyads of newly delivered healthy mothers and full-term newborns were recruited in Wuqiang, Hebei, China. Milk samples were collected at 0-7 days, 30±3 days, 3 months±1 week, 6 months ±1 week, and 12 months±1 week postpartum. Infant feeding practice was evaluated with World Health Organization infant and young child feeding indicators. Characteristics of mothers and infants were collected by using a structured questionnaire. Complete blood count was tested before delivery. Concentrations of hLF was measured using an Enzyme-linked Immunosorbent Assay (ELISA). Linear mixed model was used to examine its longitudinal changes and associated factors.

Results: The concentrations of hLF were 7.17±2.38 g/L, 4.02±1.79 g/L, 2.95±1.54 g/L, 2.19±1.56 g/L, and 2.43±1.65 g/L at 0-7 days, 30 days, 3 months, 6 months, and 12 months postpartum, respectively. LF concentrations decreased during the first six months postpartum (time 0 vs 1: β=3.17, P＜0.001; time1 vs 3: β=1.11, P＜0.001; time 3 vs 6: β=0.70, P＜0.001). However, it increased between 6 month and 12 month postpartum (time 6 vs 12: β=-0.63, P=0.004). The frequency of breastfeeding in the past 24 hours was negatively associated with LF concentrations (β=-0.08, P=0.031). Prenatal mean corpuscular volume(MCV) and red blood cell volume distribution width(RDW) status may influence the longitudinal changes of human milk LF (PMCV*time=0.006, PRDW*time=0.049).

Conclusions: The concentrations of hLf decrease during the first 6 months and may increase from 6 months to 12 months. Its change may be associated with the frequency of breastfeeding in the past 24 hours and prenatal MCV and RDW status.

Key words human milk ; lactoferrin; cohort

Category: Nutrition Across Lifespan

维生素 D 干预对中国北方社区老年人肌肉衰减综合征患者骨骼肌质量和功能的积极影响

The Positive Effect of Vitamin D Supplementation on Skeletal Muscle Mass and Physical Function among Community-dwelling Elderly individuals with Sarcopenia in Northern China

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Background and Objectives: Sarcopenia is defined as a syndrome characterized by declines in skeletal muscle mass and strength or an alteration in physical function. The purpose of this study was to evaluate the improvement of skeletal muscle mass and physical function after one year vitamin D supplementation in elderly with sarcopenia and vitamin D deficiency. Methods and Study Design: This study was a one year randomized controlled trial. After screening, 68 elderly patients with sarcopenia were randomly divided into intervention group (n= 36) and control group (n=32). The intervention group was given vitamin D capsules (800IU/d) and the control group was given vitamin E capsules (100mg/d) with similar appearance. Skeletal muscle mass (Dual-energy x-ray), handgrip strength and physical function were evaluated at 0 and 12 months respectively. Results: There were no significant differences in sun exposure, energy intake, protein intake, quality protein intake and amount of exercise between the two groups at 0, 6 and 12 months ($p>0.05$). The increase of serum 25 (OH) D level in the intervention group (8.17 ± 7.34ng/ml) was significantly higher than that in the control group (2.92 ± 6.20ng/ml) ($p=0.002$). The intervention group compared to the control group, skeletal muscle mass increased by 0.90kg ($p<0.01$), relative skeletal muscle mass index increased by 0.41kg/m2 ($p<0.01$), 4-meter gait speed increased by 0.28m/s ($p<0.01$), single feet balance time adding 2.90 seconds ($p=0.02$), five chair stand time decreased by 2.60 seconds ($p<0.01$). Conclusion: Vitamin D intervention can effectively increase skeletal muscle mass and physical function in the elderly.

Key words elderly, sarcopenia, vitamin D, intervention, randomized controlled trial

Category: Nutrition Across Lifespan

妊娠期糖尿病女性不同泌乳阶段 母乳蛋白组学研究

Proteomics study of breast milk at different lactation stages in women with gestational diabetes mellitus

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Objectives: This study aims to compare the differences in protein composition and function of breast milk proteome between gestational diabetes mellitus (GDM) and healthy women (H) at different lactation stages and its possible impact on offspring growth and development.

Methods: Twenty healthy mothers and twenty GDM mothers were enrolled and human milk samples were collected at four-time points covering colostrum (postpartum 4-6 days), transitional milk (postpartum 12-14 days), early mature milk (postpartum 42 days) and mature milk (postpartum 4 months). The milk proteome was analyzed by a shotgun proteomics approach using nano LC-Orbitrap-MS/MS. The function of the differently expressed proteins was analyzed by gene ontology (GO) enrichment.

Results: A total of 1652 proteins were detected, 1223 of which were shared in GDM and H groups. The PCoA analysis showed that the milk proteome of earlier lactational periods was clearly separated between GDM and H groups, but the distance gradually decreased as the lactation period extended. Furthermore, 33, 42, 47, and 9 proteins were differentially expressed in colostrum, transitional milk, early mature milk, and mature milk, respectively. For all the differently expressed proteins, 34 of them showed the same direction of change in at least two lactation stages. Based on the GO enrichment analysis, up-regulated proteins in GDM were involved in the innate immune system, complement and coagulation cascades, cell secretion, enzymatic and binding activity, and platelet activation.

Conclusions: The milk proteome is altered by GDM and the degree of alternation was decreased in mature milk.

Key words gestational diabetes mellitus, proteomics, breast milk, immunity, lactational period

Category: Nutrition Across Lifespan

重庆市青少年体重误解与零食模式的关系:一项基于中国重庆市人群的横断面研究

Association Between Body Weight Misperception and Snacking Patterns Among Adolescents: A Population-Based Cross-Sectional Study in Chongqing, China

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Objectives: Our study aimed to examine the relationship between body weight misperception and snacking pattern choice among school adolescents.

Methods: A cross-sectional study was conducted using an online survey platform. Body weight misperception was defined based on perceived body weight and true weight. Snack intake was measured using a qualitative food-frequency questionnaire. Factor analysis was used to identify snacking patterns, and multiple linear regression was employed to examine the association between body weight misperception and snacking patterns.

Results: 190,296 students with the average age of 13.3 ± 1.0 years were included, and 44.5% of students misperceived their weight. Overestimation was more prevalent than underestimation. Two snacking patterns, namely a high-calorie snacking pattern and a healthy snacking pattern, were identified with eigenvalues > 1. Weight underestimation was positively linked to high-calorie snacking pattern scores for both normal weight students (β: 0.16, 95% CI: 0.11, 0.21) and students with overweight/obesity (β: 0.44, 95% CI: 0.35, 0.52), and to healthy snacking scores for students with overweight/obesity (β: 0.28, 95% CI: 0.22, 0.33), but negatively linked to healthy snacking pattern scores for normal weight students (β: -0.12, 95% CI: -0.15, -0.09). Conversely, weight overestimation was negatively linked to both high-calorie and healthy snacking pattern scores for normal weight students (β: -0.07, 95% CI: -0.11, -0.04 and β: -0.13, 95% CI: -0.15, -0.10), but positively linked to healthy snacking scores for underweight students (β: 0.15, 95% CI: 0.08, 0.21). Interactions were found between sex, grade, accommodation, only child, primary guardians, parental education level and weight misperception to snacking patterns.

Conclusions: Adolescents with normal weight and overweight/obesity who misperceived their weight exhibited less healthy snacking patterns, whereas underweight students who misperceived their weight displayed healthier snacking patterns. Comprehensive programs are crucial to educate and guide adolescents in understanding their weight status and making healthier snack choices.

Key words body weight misperception, snacking patterns, adolescents, healthy eating, nutrition survey

Category: Nutrition Across Lifespan

新生儿胎便能否通过16s rDNA测序检测到微生物？
Does neonatal first-pass meconium have a detectable microbiota by 16s rDNA sequencing?

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Background: A growing body of evidence supports that the gut microbiome is not established prior to birth. It remains no conclusion whether the first-pass meconium has a detectable microbiota. **Objectives:** To examine whether the first-pass meconium has a detectable microbiota and associated factors with the detection. **Methods:** This is a cross-sectional study conducted from April to September in 2021 in a rural area of Hebei province in China. First-pass meconium samples (n=144) were collected from the healthy full-term singleton neonates within 24 hours after birth at hospital. We used 16s rDNA sequencing to examine microbiota, and the microbiota composition was described using α and β diversity measures. We used the multinomial logistic regression to explore the characteristics between the samples with/without a detectable microbiota. **Results:** Approximately 72.2% (104/144) of the first-pass meconium samples had a detectable microbiota by 16s rDNA sequencing. The likelihood of detection was much higher if the meconium were collected in April, May and June than that were collected in July, August and September (AOR: 17.70, 95%CI: 4.37-71.68). Samples that were transferred to -80 ° cryogenic freezer less than 2 hours after collection were more likely to be detected than those time intervals of transferring were longer than 2 hours (AOR: 5.56, 95%CI: 1.43-21.57). The newborns whose airway were cleared after birth immediately had 5.39 times of microbiota detection in their first-pass meconium higher than those without airway clearance (95%CI: 1.69-17.26). **Conclusions:** Nearly thirty percent of the neonatal first-pass meconium does not have a detectable microbiota by 16s rDNA sequencing. Month of sampling, the time interval of transferring to -80° cryogenic freezer and the airway clearance might influence the likelihood of the microbiota detection. More sensitive technique method and robust controls should be used to study bacteria present at very low abundances in the future.

Key words Meconium, Microbiota, 16s rDNA sequencing, Determinants, Composition

Category: Nutrition Across Lifespan

分析中国 32,217 名 0-36 月龄婴儿辅食喂养与发育之间的相关性

ANALYSIS OF THE CORRELATION BETWEEN COMPLEMENTARY FEEDING AND THE DEVELOPMENT OF 32,217 BABIES AGED FROM 0-36 MONTHS IN CHINA

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Background and Objectives To investigate the current situation of complementary feeding in China and the correlation between complementary feeding and the development of babies.

Methods and Study Design A total of 32,217 subjects were enrolled and separated into four groups depending on their age. The complementary feeding data were collected from media from 33 provinces in China. Data analysis was conducted by IBM SPSS Statistics version 25 and SAS version 9.4.

Results The proportion of starchy food contributed to the largest on feeding, followed by fruits and vegetables. Feeding with teething rusks is the most common at 0-12 months of age. Moreover, the proportion of wheat products is the highest at 13-36 months of age. The walnut oil intake dominated the largest area compared with other kinds of oil at all month-age periods. Vitamin A & A&D dominated the largest proportion compared with other supplements at 0-12 months of age. Additionally, the DHA was the most prevalent nutrient during the whole period. Only vegetables and fish and shrimp feeding at 13-18 months of age, and only meat, fish and shrimp, beans and eggs feeding at 19-36 months of age statistically significantly benefit subjects on reaching p25 and above on length. Feeding babies with fruits and fish and shrimp at 7-18 months of age, and beans, egg, and liver and blood-feeding at 19- 36 months of age statistically benefit subjects on reaching p25 and above weight. Only starchy food feeding could help subjects achieve p25-75 on weight/length. Finally, the variety of complementary feeding was positively associated with the length and negatively associated with weight/length.

Conclusions Currently, the situation of complementary feeding in China is unsatisfactory. The variety, type, and time of complementary feeding were associated with the development and growth of babies. It is necessary to promote scientific complementary feeding in China.

Key words Complementary feeding, Baby, Development, Growth, Children

Category: Nutrition Across Lifespan

孕期膳食炎症指数与先天性心脏病的关系

Dietary inflammatory index during pregnancy and congenital heart defects

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Background and Objectives: Congenital heart defects (CHD) is the most common birth defects worldwide, and has become a great public health issue. Maternal inflammatory condition is important in fetal cardiovascular development, and diet is a major modifiable factor for systemic inflammation. However, to our knowledge, it remains unknown on the relationship between diet-related inflammation during pregnancy and CHD. The present study aimed to investigate the association between dietary inflammatory index (DII) during pregnancy, reflecting the overall inflammatory potential of maternal diet, and the risk of CHD, and assess the prediction value of DII on CHD.

Methods and Study Design: A hospital-based case-control study including 474 cases and 948 controls was performed in Northwest China. Eligible women waiting for delivery were recruited. Maternal diets in pregnancy were collected by a validated food frequency questionnaire and other information was gathered by a standard questionnaire. Logistic regression models were used to estimate the relationship between DII and CHD, and operating characteristic curves were constructed to evaluate the prediction value of DII on CHD.

Results: The maternal DII ranged from -1.36 to 5.73 in cases, and 0.43 to 5.63 in controls. Pregnant women with per 1 higher DII score were at 31% higher risk of fetal CHD (OR=1.31, 95%CI=1.14-1.51), and the adjusted OR (95%CI) comparing the pro-inflammatory diet group with the anti-inflammatory diet group was 2.04 (1.42-2.92). The inverse association of DII score with CHD risk was consistent across various subgroups of baseline characteristics. Maternal DII in pregnancy had good predictive value for fetal CHD, with the area under the receiver operating characteristic curve higher than 0.7.

Conclusions: Maternal higher DII score during pregnancy, indicating a more pro-inflammatory diet, was associated with higher risk of CHD. These findings suggested that avoiding a pro-inflammatory diet during pregnancy should be emphasized in the prevention of CHD.

Key words dietary inflammatory index; congenital heart defects; pregnancy; case-control study; Chinese

Category: Nutrition Across Lifespan

中国老年人的饮食和血液炎症对糖尿病与认知间关系的影响
The effects of dietary and blood inflammation among Chinese elderly people on the relationship between diabetes and cognition

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Objective: This study aimed to evaluate the associations between dietary inflammatory index (DII), systemic immune inflammation index (SII) and system inflammation response index (SIRI), diabetes and mild cognitive impairment (MCI). The different synergistic effects of DII, SII and SIRI on blood glucose and cognition were also explored based on diabetes status.

Method: Study included 1050 participants from Beijing. Food frequency questionnaire was used to calculate energy-adjusted DII scores. Cognitive function was evaluated by neuropsychological tests. Fasting plasma glucose (FPG) were obtained by blood samples, to calculate SII, SIRI. The log regression and generalized linear regression models were built to investigate the potential associations.

Results: The diabetes patients with MCI consumed less Mg, niacin and thiamin than others ($p<0.001$). Lower levels of DII, SIRI and SII might increase the risk of diabetes, MCI and co-morbidity of diabetes with MCI ($p<0.05$). The synergistic effects of DII and SII or SIRI on MCI were enhanced by higher FPG. Among diabetes patients, the lower levels of DII, SIRI and SII were significantly correlated with higher MoCA scores and lower FPG ($p<0.05$). However, these relationships were significantly diminished or even disappeared in non-diabetes population.

Conclusion: Lower levels of DII, SIRI and SII might play protective roles in reducing the risks of diabetes and/or MCI. The benefits of anti-inflammatory diets on cognitive protection and FPG control were more sensitive in elderly people with diabetes.

Key words Diabetes; Dietary inflammatory index; System inflammation response index; Systemic immune inflammation index; Mild cognitive impairment; Elderly.

Category: Nutrition Across Lifespan

四周肌酸补充和吸气肌训练对心肺健康的影响:一项随机对照试验

The effects of four weeks of creatine supplementation and Inspiratory muscle training on cardiorespiratory fitness: a randomized controlled trial

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Background: Inspiratory muscle training(IMT) improves lung function and increases respiratory muscle strength, thereby weakening the metabolic reflex of the respiratory muscles, promoting recovery from respiratory muscle fatigue . Creatine supplementation may enhance strength , leading to even greater physiological adaptations. The purpose of this study was to determine the effects of Inspiratory muscle training and creatine supplementation on cardiorespiratory fitness and endurance performance in college-aged men.

Methods: participants were randomly assigned to one of two groups: creatine (creatine citrate) (Cr; n = 12),or control (Con;n = 11) groups. The Cr and Con groups completed four weeks of IMT prior to post-testing. Test their lung function, respiratory muscle strength and maximum oxygen uptake.

Results: Pulmonary function, respiratory muscle strength and aerobic endurance indexes improved in both groups before and after training.There was a significant difference in the elevation of FVC and FIVC in the Cr group ($P<0.05$) and an extremely significant difference in the increase in FEV1/FVC and FEV1 ($P<0.01$). There was a highly significant difference between the Cr and IMT groups in the increase in MIP and MEP before and after training ($P<0.01$).There was no significant difference between the two groups before and after training in VO_2max ($P>0.05$), but there was a highly significant difference in the increase in exercise duration in the IMT(Cre) group ($P<0.01$).

Conclusion: Both Cr and Con can improve lung function, respiratory muscle strength and endurance performance. Compared to IMT, IMT (Cre) had a more significant effect on their lung function, respiratory muscle strength levels and duration during endurance exercise.

Key words Creatine; Inspiratory muscle training; Lung function; Respiratory muscle strength;

Category: Nutrition Across Lifespan

长期高碘暴露对中国孕妇甲状腺不良影响

Adverse effects on thyroid of Chinese pregnant women exposed to long-term iodine excess

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Background and Objectives: Ensuring optimal iodine nutrition in pregnant women is a global public health concern. However, there is no direct data on safe tolerable upper intake levels (UL) for pregnant women. A cross-sectional study was performed in an area with large variability of water iodine concentration in the natural environment and restricted iodized salt supply to determine the UL of pregnant women.

Methods and Study Design: We measured 24-h urinary iodine excretion (UIE) and thyroid function for pregnant women across a range of iodine intakes. Logistic regression was used to assess the relationship between UIE and thyroid dysfunction, thyroid nodules, and thyroid volume.

Results: 744 pregnant women were enrolled in this study. The median (IQR) UIC in pregnant women was 150.2(87.6, 268.0) μg/L, and the 24h-UIE was 204.2 (116.0, 387.0) μg/day. Compared with UIE 150-250μg/day, the reference group, the prevalence of thyroid dysfunction was 5.7 times higher (95%CI: 1.7, 19.2) in pregnant women with UIE 450-550 μg/day, and 3.9 times higher (95%CI: 1.5, 10.3) in pregnant women with UIE ≥550 μg/day. Compared with EII 100-200μg/day, the reference group, the prevalence of thyroid dysfunction was 4.3 times higher (95%CI: 1.3, 14.4) in pregnant women with UIE 500-600 μg/day, and 3.6 times higher (95%CI: 1.5, 8.9) in pregnant women with UIE ≥600 μg/day.

Conclusions: Excessive iodine intake during pregnancy increases the risk of thyroid dysfunction. Avoiding chronic iodine intakes of 500 μg/day or higher, or UIE ≥450μg/day is recommended for pregnant women.

Key words Pregnant women; Tolerable upper intake levels; Urinary iodine excretion; Thyroid dysfunction; Iodine.

Category: Nutrition Across Lifespan

基于宿主-微生物交互作用对羊乳和牛乳蛋白在改善肌肉衰减综合征中的比较分析

Comparative analysis of goat and bovine milk proteins in the improvement of sarcopenia based on host-microbial interactions

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Background and Objectives Diet intervention, especially supplementation with high-quality protein, is considered to be a critical strategy in sarcopenia. However, different sources and types of protein have different health impacts. The aim of this study is to explore the differences in the ameliorative effects and mechanisms of different sources and types of proteins on sarcopenia, providing an optimal path for the prevention and treatment of sarcopenia.

Methods and Study Design A sarcopenia model was established by intraperitoneal injection of dexamethasone (5 mg/kg). Sixty male C57BL/6 mice (8 months old) were randomly divided into the normal control, sarcopenia, goat whey protein, goat milk casein, bovine whey protein, and bovine milk casein groups. Animals were treated for eight consecutive weeks. Organism-level and molecular phenotypes, 16S rRNA gene sequencing, and untargeted metabolomics profiling based on GC-TOF/MS were employed to investigate the correlation between host metabolism, microbial metabolism, autophagy and inflammation and their influence on sarcopenia in C57BL/6 male mice.

Results All four proteins increased muscle mass, and goat whey protein improved muscle strength in sarcopenic mice. Goat and bovine milk proteins promoted muscle regeneration by increasing MyoD1 and MyoG expression, and the former had a more distinct effect in inducing autophagy and decreasing inflammation than the latter. In addition, goat whey protein and casein could modulate host-microbial arginine co-metabolism. Notably, goat milk proteins responded well to sarcopenia comorbidities, including sarcopenic obesity, osteosarcopenia, and osteoarthritis.

Conclusions The study confirmed that goat milk proteins were more effective than bovine milk proteins for the control of sarcopenia. Moreover, we found that whey protein and casein could modulate host-microbial arginine co-metabolism, which shows their potential as precision nutritional supplements for the management of sarcopenia. Our study provides theoretical support for the prevention and control of sarcopenia.

Key words sarcopenia; whey protein; casein; comorbidity; host-microbe co-metabolism

Category: Nutrition Across Lifespan

多种心脏代谢疾病加重低白蛋白血症对中国百岁老人死亡率的不良影响

Multiple Cardiometabolic Diseases Enhance the Adverse Effects of Hypoalbuminemia on Mortality among Centenarians in China

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Background Although hypoalbuminemia was associated with high risk of mortality in community-dwelling older adults, as well as in the hospitalized older adults, little is known among centenarians. And there are limited data on whether having cardiometabolic diseases (CMDs) is associated with additive effects.

Methods Baseline examinations including a determination of albumin levels were performed in 1002 Chinese centenarians from January 2014 through to December 2016, and the survival status was subsequently ascertained until 31 May 2021. Cox proportional risk model was performed to assess the risk of all-cause mortality associated with albumin levels and hypoalbuminemia combined with CMDs.

Results Of 1002 participants included in the analysis, the mean level of albumin was 38.5 g/L (±standard deviation, 4.0 g/L), and 174 (17.4%) had hypoalbuminemia (albumin <35 g/L). The multivariable analyses showed that albumin level was negatively associated with all-cause mortality (Ptrend<0.05). Compared to normoalbuminemia, hypoalbuminemia was associated with an increased mortality risk in the overall participants (hazard ratio [HR]: 1.55, 95% confidence interval [CI]: 1.22–1.97). Furthermore, the HR (95% CI) of hypoalbuminemia combined with multiple CMDs was 2.20 (1.16-4.17). There was evidence of an additive deleterious dose effect of an increasing number of CMDs (Ptrend=0.001).

Conclusions Hypoalbuminemia is associated with an increased risk of all-cause mortality in Chinese centenarians, and this risk is more pronounced among older adults with multiple cardiometabolic diseases. Our findings suggest that older adults with hypoalbuminemia, especially comorbid multiple CMDs warrant early identification and management.

Key words Serum Albumin; Cardiometabolic Diseases; All-cause Mortality; Centenarians; Cohort study

Category: Nutrition Across Lifespan

中国家庭6-10个月婴儿喂养行为研究

Feeding practices demonstrated by Chinese caregivers of 6-10-month-old infants: A behavioral observation study in Shaanxi province

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Caregiver feeding practices in early childhood are important for the development of children's eating habits. All infant feeding occasions were recorded during one day by 28 families in Shaanxi, China with infants (age 6-10 months) who have started a complementary feeding. Videos were coded for feeding practices, feeding environment, and responsive feeding. The most common feeding practices of Chinese caregivers were opening mouth, instruction, and interference. Most prompts to eat were effective at this age. Overweight infants' caregivers used more coercive prompts to eat ($p < .05$). Mothers used more autonomy-supportive prompts to eat than did fathers ($p < .05$). Early, active, and late infant fullness cues were captured in 25.6%, 34.8% and 8.5% of videos, respectively. 53.6% of caregivers fed at the right pace while 14.5% and 31.9% fed too slow or too fast, respectively. Only 5.5% videos had a screen on, but 33.5% videos included at least one other distraction during the meal. The types of feeding practices observed being used by Chinese caregivers of infants in this age are largely positive. Differences in feeding practices among caregivers suggest that targeted advice may further improve feeding practices. Caregiver awareness in identifying satiety cues and responsiveness to infant eating rate may also help to avoid potential risk of overfeeding.

Key words Infant feeding practices; Behavioral observation; Responsive feeding; Infant obesity

Category: Nutrition Across Lifespan

根据 IOM 指南，中国双胎妊娠妊娠期体重增加与围产期不良结局的关系

Association of Gestational Weight Gain with Adverse Perinatal Outcomes in Chinese Twin Pregnancies According to the Institute of Medicine Guidelines

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Objectives: To explore the association between gestational weight gain (GWG) and adverse perinatal outcomes in Chinese twin pregnancies according to the 2009 Institute of Medicine (IOM) recommendations.Methods: This birth-based retrospective study was conducted in a tertiary hospital in Beijing, China, between January 2012 and October 2022. A total of 794 women with twin pregnancies and 1,588 viable infants were included in our study. Univariate analysis and multivariable logistic regression models were used to estimate the independent influence of GWG on perinatal outcomes.Results: In total, 360 (45.3%), 356 (44.8%), and 78 (9.8%) twin-pregnant women with GWG were defined as within, below, and above the IOM guidelines, respectively. Both the below and above IOM guideline groups were associated with an increased risk of preterm birth (gestational age < 37 weeks) (adjusted OR: 1.39 [95% CI: 1.03–1.87] and adjusted OR: 1.74 [95% CI: 1.07–2.83], respectively). GWG below IOM guidelines was also associated with an increased risk of gestational diabetes (adjusted OR: 1.42 [95% CI: 1.01–2.01]) and low-birth-weight infants (BW＜2500 g) (adjusted OR: 1.89 [95% CI: 1.48–2.4]) and a decreased risk of gestational hypertensive disorder (adjusted OR: 0.49 [95% CI: 0.34–0.71]), cesarean delivery (adjusted OR: 0.49 [95% CI: 0.31–0.79]), and twin growth discordance (adjusted OR: 0.56 [95% CI: 0.37–0.85]). Meanwhile, GWG above IOM guidelines was associated with an increased risk of gestational hypertensive disorder (adjusted OR: 2.7 [95% CI: 1.61–4.53]), large size for gestational age (adjusted OR: 3.9 [95% CI: 1.54–9.89]), and a reduction in the risk of low-birth-weight infants (BW＜2500 g) (adjusted OR: 0.45 [95% CI: 0.3–0.68]).

Conclusion: In this study, the GWG of approximately half of Chinese twin-pregnant women was below the IOM guidelines. We found that GWG below or above IOM guidelines was associated with less favorable perinatal outcomes, especially with an increased risk of preterm birth.

Key words gestational weight gain; twin pregnancy; preterm birth; gestational diabetes; gestational hypertensive disorder

Category: Nutrition Across Lifespan

母亲孕期红细胞多不饱和脂肪酸与子代2岁时神经发育的关联

Association between maternal erythrocyte PUFAs during pregnancy and neurodevelopment of offspring at 2 years of age

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Background and Objectives: Polyunsaturated fatty acids play an important role in brain structure and function. However, previous studies on prenatal polyunsaturated fatty acids and neurodevelopment of offspring obtained inconsistent results with limited types of fatty acids and using dietary intake or concentrations in serum/plasma as biomarkers. In this study, we aimed to investigate the association between maternal erythrocyte polyunsaturated fatty acids during pregnancy and children neurodevelopment at 2 years of age in the Chinese population.

Methods and Study Design: We included 242 mother-child pairs from the Yuexiu birth cohort. Maternal blood samples were obtained during the 20-28 gestational weeks, and the composition of erythrocyte fatty acids was measured using gas chromatography. Neurodevelopment of children was assessed with the Ages and Stages Questionnaire.

Results: We found that maternal eicosapentaenoic acid [OR (95% CI): 0.36 (0.16, 0.77) for second tertile, 0.34 (0.15, 0.75) for highest tertile, and P for trend = 0.032] was associated with a reduced risk of potential developmental delay in gross motor skill. Contrarily, total n-6 polyunsaturated fatty acids [OR (95% CI): 2.89 (1.09, 8.21) for second tertile, 2.74 (1.08, 7.48) for highest tertile, and P for trend = 0.034] and arachidonic acid [OR (95% CI): 4.54 (1.66, 13.76) for highest tertile, and P for trend = 0.005] were associated with an increased risk of potential developmental delay in personal-social skill. Furthermore, the ratio of eicosapentaenoic acid/arachidonic acid [OR (95% CI): 2.56 (1.15, 5.89) for highest tertile, and P for trend = 0.019] was associated with an increased risk of potential developmental delay in gross motor skill. Non-significant associations were observed in other PUFAs.

Conclusions: Prenatal erythrocyte polyunsaturated fatty acids are associated with children’s neurodevelopment, emphasizing the importance of appropriate amounts and ratios of polyunsaturated fatty acids in pregnant women.

Key words neurodevelopment; polyunsaturated fatty acids; pregnancy, children, birth cohort

Category: Nutrition Across Lifespan

红细胞多不饱和脂肪酸与妊娠期糖尿病的关联

Association between erythrocyte polyunsaturated fatty acids and gestational diabetes mellitus in Chinese pregnant women

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Background and Objectives: We aimed to explore the associations of erythrocyte polyunsaturated fatty acids (PUFAs) with risk of gestational diabetes mellitus (GDM) in Chinese pregnant women.

Methods and Study Design: A total of 951 Chinese women in mid-pregnancy were recruited during 2017-2018. Erythrocyte polyunsaturated fatty acids were measured by gas chromatography and expressed as a percentage of total fatty acids. Women underwent a 75g oral glucose tolerance test for GDM diagnosis. Logistic regression and restricted cubic spline models were conducted.

Results: Of the 951 participants, 180 were diagnosed as GDM (18.93%). For n-3 PUFAs, for per standard deviation (SD) increase, the multivariable-adjusted ORs (95%CI) of GDM were 0.789 (0.649, 0.961, P=0.018) for α-linolenic acid (ALA) and 0.782 (0.638, 0.957, P=0.017) for docosapentaenoic acid (DPA), whereas the associations became marginally significant after post hoc false-discovery rate (FDR) correction (both PFDR=0.065). A nonlinear association was observed for ALA and GDM risk (P-nonlinearity=0.001). For n-6 PUFAs, γ-linolenic acid (GLA) was significantly associated with a 46.0% higher risk of GDM [OR (95%CI): 1.460 (1.195, 1.785), PFDR=0.003) for per SD increase, and the non-linear relationship was also significant (P-nonlinearity=0.031). Arachidonic acid (AA) was borderline significantly associated with a lower risk of GDM after FDR correction [OR (95%CI): 0.736 (0.568, 0.953), P=0.020, PFDR=0.065]. No associations were found for other PUFAs and risk of GDM.

Conclusions: We documented that GLA was significantly associated with an increased risk of GDM in Chinese pregnant women. We firstly showed significant non-linear associations of ALA and GLA with GDM risk.

Key words Gestational diabetes mellitus; Erythrocyte; Polyunsaturated fatty acids

Category: Nutrition Across Lifespan

补充蛋白质的时间和类型对接受阻力训练的成年人肌肉质量、力量和功能改善的比较效果：随机对照试验的系统回顾和网络荟萃分析

Comparative effects of timing and types of protein supplementation on improving muscle mass, strength and function in adults undergoing resistance training: a systematic review and network meta-analysis of randomized controlled trials

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Background and Objectives

The timing or specific type of protein supplementation has been debated as a potential “anabolic window” to improve muscle mass, strength and function of adults undergoing resistance training.

Methods and Study Design

We carried out a systematic review and network meta-analysis of randomized controlled trials with protein supplement and resistance training ≥ 2 weeks within a frequentist framework. PubMed, Web of Science, Cochrane Library and SPORTDiscus databases were searched until 1st December 2022. Outcomes included fat-free mass, skeletal muscle mass, appendicular lean mass, handgrip strength, squat strength, gait speed, etc.

Results

We included 116 eligible trials with 4711 participants that reported on 11 timing and 14 types of protein supplementation. Compared with placebo, after exercise (0.54 kg, 95% CIs): 0.10-0.99 for fat-free mass and 0.34 kg, 95% CIs: 0.10-0.58 for skeletal muscle mass) and at night (2.85 kg, 95% CIs: 0.49-5.22 for handgrip strength and 12.12 kg, 95% CIs: 3.26-20.99 for leg press strength) were found the most consistent effective protein intake timing for gains in muscle mass and muscle strength, respectively. Milk proteins (milk, whey, yogurt, casein and bovine colostrum), red meat and mixed protein were proved to be effective proteins for gains in both muscle mass and strength. No timing or type of protein supplementation showed a significant enhancement in muscle function.

Conclusions

Overall, after exercise and at night are key recommendation timing for protein intake to increase muscle mass and strength, respectively. Milk proteins are the preferred type of protein supplement for improvements of muscle mass and strength. Future studies that directly compare the effects of those effective timing or types of protein supplementation on muscle mass and strength are of great significance.

Key words Muscle; Network meta-analysis; Protein supplementation; Protein type; Timing

分类：全生命周期营养

顺应喂养相关行为与婴幼儿体格生长的关系及相关机制探索

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目的：顺应喂养是儿童早期发展中养育照护的重要环节，被世界卫生组织及我国营养学会纳入喂养指南中。然而，作为一个新兴概念，顺应喂养与婴幼儿体格生长的关系尚不清晰。本研究的目的是了解我国 6-35 月龄婴幼儿照养人顺应喂养相关行为现况，分析照养人顺应喂养相关行为与婴幼儿体格生长的关系，并探索婴幼儿饮食行为在此关系中是否发挥中介作用。

方法：采用横断面研究设计，于 2020 年 8-10 月在河北省部分地区开展问卷调查。采用方便抽样纳入 409 对照养人-婴幼儿。主要采用《婴幼儿家长喂养行为量表》评估照养人顺应喂养相关行为并计算平均的总顺应喂养得分；采用《儿童饮食行为问卷》评估婴幼儿饮食行为。顺应喂养和饮食行为的评估均采用 5 级 Likert 评分。采用食物频率表调查婴幼儿过去 7 天的膳食，提取水果、蔬菜、超加工食品摄入情况并计算摄入率和日摄入量；测量婴幼儿身长/身高和体重并将其转换为 4 个体格生长指标：年龄别身高/身长、年龄别体重、身高/身长别体重、年龄别体质指数 Z 评分。采用多重线性回归分析顺应喂养相关行为与婴幼儿体格生长的关系；采用中介模型检验婴幼儿饮食行为、膳食摄入是否在顺应喂养相关行为与婴幼儿体格生长的关系中起中介作用。

结果：照养人总顺应喂养得分为 3.6±0.3 分。将顺应喂养相关行为分成非顺应喂养行为（含控制性喂养、强迫进食、食物奖励、情绪性喂养）和顺应喂养行为（含回应饮食信号、模范饮食行为、积极交流互动、营造良好就餐环境），照养人顺应喂养行为次数或得分高于非顺应喂养行为。婴幼儿 4 个体格生长指标大多处于正常水平（93.2%-99.5%）。婴幼儿较低的年龄别体重 Z 评分与照养人强迫进食（ β = -0.14, 95%CI: -0.27, -0.01）有关。中介分析显示，照养人强迫进食可能增加婴幼儿挑食偏食（ab = -0.033, 95%CI: -0.072, -0.005）、吃得慢（ab = -0.030, 95%CI: -0.066, -0.007）行为频率进而降低其年龄别体重 Z 评分。未发现总顺应喂养得分、其他顺应喂养相关行为与婴幼儿体格生长指标的相关性。

结论：照养人采用顺应喂养行为的频率高于非顺应喂养行为。照养人强迫进食可能通过增加婴幼儿挑食偏食、吃得慢饮食行为进而降低婴幼儿年龄别体重。应教育照养人在喂养过程中避免采用强迫进食喂养行为，促进婴幼儿养成健康饮食习惯，获得更佳的体格生长。未发现其他顺应喂养相关行为与 6-35 月龄婴幼儿体格生长指标的相关关系，未来需开展纵向研究探索照养人的顺应喂养相关行为是否会对婴幼儿体格生长带来长期影响。

关键字 婴幼儿，顺应喂养，饮食行为，体格生长，中介分析

分类：全生命周期营养

妊娠期糖尿病对大鼠子代社交行为的影响

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【目的】探究妊娠期糖尿病（gestational diabetes mellitus，GDM）对大鼠子代社交行为的影响

【方法】4 周龄雌性 SD 大鼠，根据体重随机分为空白对照组（CON）和妊娠期糖尿病组（GDM），各组孕鼠受孕后，GDM 组采用高脂膳食（high fat diet，HFD）辅以小剂量链脲佐菌素（streptozotocin，STZ，30 mg/kg·bw）注射的方法建立疾病模型。各组孕鼠自然分娩，子代分别在分娩后第 21 天（断乳）、分娩后第 56 天（性成熟期）、分娩后第 98 天（成年期）三个时期开展旷场实验（open field test，OFT）、高架十字迷宫实验（elevated plus maze test，EPM）、新物体识别实验（novel object recognition，NOR）和三箱社交实验（3-Chambered Social Test，3-CST）来评估大鼠的社交行为；在各个时期测定子代血清及海马组织中的 C 反应蛋白（C-reactive protein，CRP）、白细胞介素-1β（interleukin-1β，IL-1β）、IL-4、IL-6、IL-10、肿瘤坏死因子-α（tumor necrosis factor，TNF-α）浓度；并对子代结肠内容物进行 16S rDNA 测序以确定菌群的相对丰度。

【结果】与 CON 子代相比：GDM 雌性子代在分娩后第 98 天的旷场实验自主活动得分显著降低（P<0.05）；GDM 雄性子代在分娩后第 98 天的高架十字迷宫实验中，开放臂停留时间百分比显著降低（P<0.05），GDM 雌雄子代在分娩后第 56 天、分娩后第 98 天的自主活动得分和开放比停留时间百分比无显著改变。旷场实验和高架十字迷宫实验结果表明 GDM 子代在成年期的焦虑程度增加。新物体识别实验中 GDM 雌性子代在分娩后第 21 天的新物体偏爱指数显著降低（P<0.05），GDM 雌雄子代在分娩后第 56 天、分娩后第 98 天的新物体偏爱指数无明显改变；三箱社交实验中，GDM 雌性子代在分娩后第 21 天和 GDM 雄性子代在分娩后第 98 天的社交倾向指数显著降低（P<0.05）；GDM 雌雄子代在分娩后第 98 天的社交新奇偏好指数也显著降低（P<0.05），在分娩后第 56 天的社交倾向指数和社交新奇偏好指数无明显改变。新物体识别实验和三项社交实验结果提示 GDM 子代在成年期社交障碍程度提高。GDM 雌性子代分娩后第 56 天的血清 IL-1β、IL-4 浓度显著降低（P<0.05），GDM 雄性子代分娩后第 98 天的血清 TNF-α 浓度显著升高（P<0.05）。GDM 雌性子代分娩后第 21 天的海马 IL-4 浓度显著降低（P<0.05）；GDM 雄性子代分娩后第 21 天的海马 IL-1β 和 IL-6 浓度、分娩后第 56 天的海马 CRP 浓度显著降低（P<0.05），分娩后第 56 天的海马 IL-10 浓度显著升高（P<0.05）。GDM 雌性子代厚壁菌门在分娩后第 21 天和分娩后第 98 天时相对丰度显著增加（P<0.05），变形菌门在分娩后第 21 天和分娩后第 56 天的相对丰度显著下降（P<0.05）；GDM 雄性子代变形菌门在分娩后第 21 天和分娩后第 56 天的相对丰度、热脱硫杆菌门在分娩后第 56 天的相对丰度和弯曲杆菌门在分娩后第 98 天的相对丰度均显著下降（P<0.05）。

【结论】GDM 子代的社交行为在生命早期无明显改变，主要在成年期出现明显的社交障碍，且该种作用不具有明显的性别特异性，其作用机制可能与肠道菌群的改变有关。

关键字 妊娠期糖尿病；社交行为；肠道菌群；细胞因子

分类：全生命周期营养

强化 OPO、LTF 和 CPP 对婴配粉蛋白和脂肪消化特性的影响

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研究目的：婴幼儿配方乳粉中的营养物质，包括蛋白和脂质，必须在体内经过消化变成小分子物质后，才能被机体吸收利用，为机体补充营养。前人研究表明除了个别营养成分外，食物基质的成分、物理和结构特性也会影响其消化动力学和生理特性，比如消化过程中的蛋白质和脂质降解动力学以及肽、氨基酸和脂肪酸的释放。虽然婴幼儿配方乳粉基于母乳为标准，对其蛋白组成和脂质的组成进行了比例的调整，但是这些调整对于蛋白和脂质的消化吸收情况，以及强化的蛋白和脂质组分对于蛋白和脂质的影响还尚不清楚。因此本研究旨在首先探索 1,3-二油酸-2-棕榈酸甘油三酯（OPO）、乳铁蛋白（LTF）、酪蛋白磷酸肽（CPP）强化对婴幼儿配方奶粉蛋白和脂质消化特性的影响

研究方法：基于体外婴幼儿动态消化模型模拟不同婴配粉在胃肠过程中的消化，并基于蛋白含量、电泳、游离氨基酸、水解氨基酸、水解度、多肽组以及脂解程度表征婴配粉中蛋白和脂质的消化特性。

研究结果：基于蛋白和脂肪含量可以明显看出随着消化的进行蛋白和脂肪含量均逐渐降低。电泳结果显示强化乳铁样品其电泳条带明显深于未强化样品，在胃肠消化 30min 后母乳和荷致升级后中的酪蛋白和 α-乳白蛋白几乎完全消化，而荷致升级前和对照组中仍有部分的酪蛋白未消化，且所有婴配粉中仍然有大量的 β-乳球蛋白保留，并持续到胃肠消化 120min 甚至 180min，说明 β-乳球蛋白相比酪蛋白和 α-乳白蛋白难消化。蛋白消化后会产生多肽和游离氨基酸，荷致升级后 3 段的水解度达到了母乳的 96.8%，且都高于升级前和对照组；基于游离氨基酸，我们发现婴配粉胃肠消化 120min 产生的游离氨基酸组成以及必需氨基酸占比与母乳较接近，尤其是荷致升级后 3 段与母乳接近度最高。基于多肽组结果，发现母乳消化后产生的多肽数目（10435）高于婴配粉，其中荷致升级后 3 段消化后产生的多肽数目在婴配粉中最高（6545）且与母乳中共有肽段的数目也最高；基于 PCA 聚类分析发现荷致升级后样品消化过程中产生的多肽种类及含量与对照组差异较大。在消化过程中婴配粉中甘油三酯和甘油二酯所占比例逐渐下降，游离脂肪酸所占含量逐渐升高，脂解度显著升高。在胃肠消化 120min，荷致升级后样品脂解度（52.45）显著高于对照组（32.72）。对照组与荷致升级后样品蛋白与脂质消化特性的差异可能与荷致升级后样品强化 OPO、LTF 和 CPP 有关，也可能与升级后蛋白与脂肪比例的调整有关，这些成分如何影响蛋白和脂质的消化特性仍需进一步的探讨。

研究结论：强化 OPO、LTF 和 CPP 婴配粉中蛋白和脂肪的消化速率均高于未强化样品。

关键字 婴配粉、蛋白、脂肪、消化特性、OPO、LTF、CPP

分类：全生命周期营养

孕期一碳单位代谢水平及其相互作用

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摘要

目的:评价孕妇妊娠期血液一碳单位代谢情况，探讨其相互作用及影响因素。

方法:在北京市和山东省招募共 366 名孕妇，通过问卷调查收集研究对象的基本信息和社会人口学特征，由医院护士采集血样进行血液一碳单位代谢相关指标检测，研究者采用 SPSS 21.0 进行统计学分析。计量资料用均数和中位数表示集中趋势，用标准差或四分位数表示离散趋势，组间资料比较用卡方检验、t 检验、LSD 检验，相关性分析用 Pearson 或 Spearman 相关性分析；计数资料和非正态分布计量资料用频数（频率）表示，组间资料比较采用非参数检验、Spearman 秩相关分析等。多因素分析采用多元线性回归，通过 K-S 检验分析是否服从正态分布。

结果:366 名调查对象中，年龄≥35 岁者 129 例(35.2%)，妊娠中期 317 例(86.6%)，妊娠晚期 49 例(13.4%)，首次妊娠 140 例（40.5%），首次分娩 192 例（55.5%）；本科及以上学历 153 例（43.7%）,居家者 98 例（28.2%），家庭人均月收入>6000 者 286 例（83.9%），营养素养得分较高者 226 例（65.5%），207 例（59.7%）在妊娠期间接受营养健康教育。红细胞叶酸平均水平为 968.39±287.94 ng/mL。7 例（1.8%）患高同型半胱氨酸血症(≥10μmol/L)，33 例(8.3%)缺乏维生素 B12 (<148pmol/L)，5 例（1.3%）缺乏维生素 B6，10 例（2.6%）红细胞叶酸水平较低，9 例（2.3%）血清叶酸水平较低。调查对象为研究生学历的血清维生素 B12 水平和红细胞叶酸水平高于高中生和大学生(P<0.05)。商业服务业管理人员的红细胞叶酸水平低于企业员工和专业技术人员(P<0.05)。家庭人均月收入>6000 者的红细胞叶酸水平高于家庭人均月收入 3001 ~ 6000 者(P<0.05)。首次怀孕和首次分娩者的红细胞叶酸水平较高(P<0.05)。营养素养得分较高者的血清叶酸和维生素 B12 水平较高(P<0.05)。相关性分析中，调查对象血浆 SAM 水平与血清叶酸水平(r=0.187, P<0.05)、血清甜菜碱水平(r=0.566, P<0.001) 、血清 thcy 水平（r=0.299, P<0.001）正相关，与血清维生素 B6 水平（r=-0.265, P<0.001）负相关。血清 tHcy 水平与血清甜菜碱水平（r=0.213, P<0.05）正相关，与红细胞叶酸水平（r=-0.104, P<0.05）、血清叶酸水平（r=-0.237, P<0.05）负相关。血清叶酸水平与红细胞叶酸水平正相关（r=0.382, P<0.001）。血清维生素 B2 水平与血清叶酸水平（r=0.184, P<0.05）、血清胆碱水平（r=0.275, P<0.001）、血清甜菜碱水平（r=0.230, P<0.001）、血清叶酸水平（r=0.217, P<0.05）、血清 thcy 水平（r=0.251, P<0.05）均正相关。血清维生素 B6 水平与血清叶酸水平（r=0.224, P<0.001）、血清维生素 B2 水平（r=0.217, P<0.001）正相关，与血清甜菜碱水平（r=-0.200, P<0.001）负相关。血清维生素 B12 水平与血清叶酸水平（r=0.158, P<0.001）、红细胞叶酸水平（r=0.246, P<0.001）正相关。血清胆碱水平与血清叶酸水平（r=0.144, P<0.05）、血清甜菜碱水平（r=0.100, P<0.05）正相关；血清蛋氨酸水平与血清甜菜碱水平正相关（r=0.195, P<0.05）。多元线性回归分析显示，血清 tHcy 水平与年龄显著相关(β=0.202, P<0.05)，且与家庭人均月收入呈负相关(β=-0.471, P<0.05)。

结论:研究对象存在血清叶酸、红细胞叶酸、维生素 B6、维生素 B12 缺乏和血 tHcy 过量。血一碳单位代谢各指标间存在相互作用。研究对象一碳单位代谢水平可能与受教育水平、职业、家庭人均月收入、怀孕次数、分娩次数、营养素养及怀孕期间的营养健康教育有关。

关键字 妊娠期；一碳单位；代谢

分类：全生命周期营养

2’-岩藻糖基乳糖对妊娠期糖尿病大鼠后代糖代谢的影响

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【目的】探索2’-岩藻糖基乳糖（2’-fucosyllactose，2’-FL）生命早期干预对妊娠期糖尿病（gestational diabetes mellitus，GDM）大鼠后代糖代谢异常的影响。

【方法】本研究采用采用高脂膳食（high fat diet，HFD）结合小剂量（30 mg/kg）链脲佐菌素（streptozotocin，STZ）注射诱导SD大鼠，建立GDM实验大鼠模型。空白对照组子代为CON组，GDM组子代随机分为GDM子代低剂量2’-FL干预组（0.2 g/kg 2’-FL，GLF）、GDM子代中剂量2’-FL干预组（0.6 g/kg 2’-FL，GMF）和GDM子代高剂量2’-FL干预组（1.8 g/kg 2’-FL，GHF），每组8窝。于产后3天（postnatal day 3，PND 3）至PND 21对仔鼠实施灌胃干预，CON组灌蒸馏水。分别于PND 21、PND 56、PND 98使用快速血糖试纸检测子代空腹血糖水平。于PND 49和PND 91进行胰岛素耐量试验（insulin tolerance test，ITT），在断食4小时后，按0.5 U/kg剂量注射胰岛素，在注射胰岛素后的第0min、第30min、第60min、120min经尾静脉取血测量血糖浓度。于PND 56和PND 98进行口服葡萄糖耐量实试验（oral glucose tolerance test，OGTT），断食过夜后按2 g/kg灌喂葡萄糖，在第0min、第30min、第60min、第120min经尾静脉取血测量血糖浓度。于PND 57和PND 99经内眦取血检测血清胰岛素浓度。

【结果】

与CON组子代相比，GDM组雌性子代断乳时（PND21）空腹血糖、青春期（PND 49）ITT曲线下面积、成年期（PND 98）OGTT曲线下面积显著升高（$P<0.05$）；GDM组雄性子代断乳时空腹血糖、成年期OGTT曲线下面积显著升高（$P<0.05$）。GDM组青春期以及成年期空腹血糖和血清胰岛素水平无明显异常，青春期葡萄糖耐量无明显异常。

与GDM组相比，GLF组雌性青春期ITT曲线下面积、成年期OGTT曲线下面积显著降低（$P<0.05$）；GLF组雄性断乳时空腹血糖、青春期ITT曲线下面积、成年期OGTT结果显著降低（$P<0.05$）。GMF组雌性青春期ITT曲线下面积、成年期OGTT曲线下面积显著降低（$P<0.05$）；GMF组雄性断乳时空腹血糖、青春期 ITT 曲线下面积、成年期 OGTT 曲线下面积显著降低（$P<0.05$）。GHF组雌性青春期ITT曲线下面积、成年期ITT以及OGTT曲线下面积显著降低（$P<0.05$）；GHF组雄性断乳时空腹血糖、青春期ITT曲线下面积、成年期ITT以及OGTT曲线下面积显著降低（$P<0.05$）。CON组与2'-FL各剂量干预组间血清胰岛素水平未观察到明显差别。

【结论】GDM引起子代糖代谢异常，从生命早期延续至成年期观察到空腹血糖异常、胰岛素耐量异常以及葡萄糖耐量异常。在生命早期给予GDM子代2’-FL干预能够改善其糖代谢异常，高剂量干预组于雌雄各时期产生最广泛的显著效果。干预存在性别差异，对于雌性子代可改善其青春期胰岛素敏感性以及从青春期到成年的葡萄糖耐量；对于雄性子代可改善其断乳时的空腹血糖、青春期胰岛素敏感性以及从青春期到成年的葡萄糖耐量。本研究中雄性子代对于2’-FL干预更为敏感，表现为生命早期即对2'-FL干预产生反应，且各剂量均能产生有效干预。染色体组成以及性激素可能在雌雄子代差异中扮演一定作用，具体机制有待进一步研究。

关键字 妊娠期糖尿病；2’-岩藻糖基乳糖；生命早期营养；胰岛素耐受试验；口服葡萄糖耐量试验

分类：全生命周期营养

孕期维生素 D 摄入与小于胎龄儿发生风险的关联研究

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目的：孕期维生素 D 缺乏十分常见。研究表明孕期维生素 D 摄入与胎儿生长发育密切相关，但不同孕期及不同来源的维生素 D 摄入与小于胎龄儿（SGA）的关联研究有限且结论不一致。本研究旨在前瞻性探讨武汉市孕妇孕早、中期维生素 D 摄入（膳食+营养补充剂）与 SGA 发生风险的关系。

方法：选取 2018－2022 年纳入同济出生队列的研究对象。通过面对面调查收集孕妇的基本情况、生活方式及维生素 D 等补充剂服用情况，采用半定量食物频率调查表评估膳食维生素 D 摄入量。新生儿信息包括胎龄、性别、出生身长及体重从医院产科记录中获得。采用多因素 Logistic 回归模型和限制性立方样条函数评估孕早期（6－16 周）、中期（17－28 周）维生素 D 摄入与 SGA 风险的相关性。

结果：本研究共纳入 2736 名孕妇（孕早期 1818 名，孕中期 1373 名）。维生素 D 总摄入量、补充剂和膳食摄入量的中位数在孕早期分别为 537.64 IU/d、500.00 IU/d 和 85.83 IU/d，在孕中期分别为 519.29 IU/d、381.72 IU/d 和 133.57 IU/d。与维生素 D 总摄入量的最低四分位数（Q1）相比，无论是在孕早期还是孕中期，维生素 D 总摄入量较高者更有可能是经产妇、文化程度更高、防晒霜、DHA 及维生素 D 补充剂的使用频率更高。未调整任何混杂因素下的多因素 Logistic 回归分析结果显示，孕早期维生素 D 总摄入量从 Q1 到最高四分位数组（Q4），SGA 的 ORs 值（95%CIs）分别为 1.00（参考）、0.95（0.59, 1.52）、0.61（0.36, 1.04）和 0.53（0.31, 0.92）（P 趋势=0.005）；控制孕妇年龄、民族、文化程度、家庭人均月收入、孕前体质指数、孕期增重、初产、孕前吸烟习惯、孕前饮酒习惯、纳入时季节、锻炼习惯、户外活动、防晒霜使用、DHA 补充剂使用、膳食总能量、叶酸、铁及多不饱和脂肪酸摄入和新生儿性别后，孕早期总维生素 D 摄入量从 Q1 到 Q4 组，SGA 的 ORs 值（95%CIs）分别为 1.00（参考）、0.94（0.57, 1.54）、0.55（0.32, 0.95）和 0.51（0.29, 0.91）（P 趋势=0.005）。将孕妇按照年龄（<30 岁/≥30 岁）、孕前体质指数（<24 kg/m2 /≥24 kg/m2）、孕期增重（<15 kg/≥15 kg）、新生儿性别（男/女）、纳入时季节（冬春季/夏秋季）及 DHA 补充（是/否）进行分层分析，未发现孕早期维生素 D 总摄入量与分层变量之间的显著交互作用（所有 P 交互> 0.05）。与不补充组相比，孕早期维生素 D 补充使 SGA 发生风险降低了 43%（OR=0.57，95%CI: 0.38, 0.87），当维生素 D 补充≥ 400 IU/d 时，SGA 风险降低了 47%（OR=0.53, 95%CI: 0.34, 0.83）。限制性立方样条分析进一步表明孕早期维生素 D 总摄入量及补充剂量与 SGA 风险之间存在 L 型非线性剂量-反应关系（P 非线性< 0.05），即随着维生素 D 总摄入量或补充剂量增加，SGA 发生风险降低，当维生素 D 总摄入量达到 670 IU/d 或补充剂量达到 550 IU/d 时，SGA 发生风险不再降低。然而，本研究未观察到孕早期维生素 D 膳食摄入量和孕中期维生素 D 总摄入量、膳食及补充剂摄入与 SGA 风险之间的显著关联。

结论：孕早期维生素 D 总摄入量及补充与 SGA 风险降低有关，且存在 L 型非线性剂量-反应关系。此外，未发现孕中期维生素 D 摄入与 SGA 风险有关。

关键字 维生素 D；膳食；维生素 D 补充；小于胎龄儿；孕期

分类：全生命周期营养

人乳寡糖对新生小鼠肠粘膜免疫构建的影响

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新生儿出生后肠粘膜免疫系统尚未成熟，随着微生物及抗原暴露的增加，新生儿感染、患病的风险增加。流行病学和动物模型研究发现，相比于婴儿配方粉，母乳喂养可降低新生儿感染性疾病的发病率和死亡率，尤其胃肠道感染。母乳低聚糖（human milk oligosaccharides，HMOs）是母乳中的第三大固体成分，是母乳中重要的生物活性组分，对新生儿肠粘膜免疫系统的健全发挥了重要作用。然而，目前关于 HMOs 的研究集中于肠道菌群和上皮屏障，缺少其对于肠道粘膜免疫系统核心组成——固有层免疫细胞和派伊尔结的影响研究；此外，目前婴儿配方粉中主要　添加的是 2’- 岩藻糖基乳糖（2’-FL）或 3’- 岩藻糖基乳糖（3’-FL），仍有待开展其量效关系研究。因此，本研究聚焦 2’-FL 及 3’-FL 对新生小鼠肠粘膜免疫系统结构和功能的影响，明确其构效及量效关系，为婴配粉中 HMOs 的添加提供理论依据。

本研究基于目前婴配粉中添加剂量及法规中剂量规定，对新生小鼠进行高、低剂量的 2’-FL，3’-FL 灌胃干预，测定其对黏液层（菌群及活性组分）、肠上皮细胞层、固有层等肠粘膜免疫系统结构成熟的影响；同时构建大肠杆菌肠道感染模型，评估有无 HMOs 干预对肠粘膜免疫系统功能抵抗大肠杆菌感染的抵抗作用。本研究利用流式细胞术检测固有层各类免疫细胞亚型及占比变化，利用免疫组化技术测定肠道结构、上皮层各类型分化细胞占比，利用 RT-PCR 等分子生物学手段，检测上皮层紧密连接蛋白的表达，结合肠道黏液层中关键抑菌物质和炎症因子含量，及粪便中短链脂肪酸组成，阐明 HMOs 促进新生小鼠肠粘膜免疫成熟的量效关系和分子机制。本研究的主要结果如下：

（1）2’-FL 和 3’-SL 的哺育期干预均能剂量依赖的增加小鼠肠道的绒毛长度及隐窝深度，促进新生小鼠的肠道生长，尤其是 2’-FL 高剂量组（$p<0.05$），并能够显著增加上皮细胞层中潘氏细胞和杯状细胞数量。

（2）高剂量 2’-FL 和 3’-SL 能够显著增加断乳小鼠小肠固有层中 Th2 型细胞的占比，促进新生小鼠肠道 T 淋巴细胞中 Th1/Th2 及 Th17/Treg 的平衡，提高血清中 IgA 抗体水平。

（3）2’-FL 和 3’-SL 干预提高了粘蛋白、抗菌肽、紧密连接蛋白 Occludin，Claudin-1 表达，同时增加丁酸等短链脂肪酸的含量，并呈现出量效关系。

（4）在肠聚集性大肠杆菌（EAEC）感染断乳小鼠腹泻模型中，2’-FL 和 3’-SL 干预组小鼠死亡率低于对照组，肠道感染后的组织病理学损伤也显著减轻。

本研究发现 2’-FL 和 3’-FL 能够促进新生小鼠肠粘膜免疫系统的构建，通过促进上皮层细胞增殖分化，增加黏液层中抗菌组分及丁酸等菌群代谢产物，促进固有层淋巴细胞的分化平衡等机制促进肠道粘膜免疫系统结构及功能的成熟，进而抵御致病菌的感染。

关键字 母乳寡糖；新生肠粘膜免疫；大肠杆菌感染

分类：全生命周期营养

主成分分析法分析妊娠期糖尿病孕妇膳食模式与其糖脂代谢的关系

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目的 采用主成分分析法（PCA）调查妊娠期糖尿病(GDM)孕妇膳食模式，并分析其与孕妇糖脂代谢的关系。方法 选取2022年7月至2023年3月在新疆医科大学第一附属医院进行常规产检，且在孕24-28周时进行口服葡萄糖耐量试验（oral glucose tolerance test, OGTT），确诊为妊娠期糖尿病(GDM)的170例孕妇作为研究对象，在调查对象确诊为妊娠期糖尿病（GDM）时,进行一对一、面对面的交流，同时帮助妊娠期糖尿病（GDM）孕妇回忆其近一个月的饮食情况，采用食物频率问卷调查（FFQ）的方法，调查其近一个月的饮食情况，同时进行其空腹血液样本的采集，目的在于调查妊娠期糖尿病（GDM）孕妇其饮食习惯和膳食摄入的情况，检测其血常规、血脂和血糖等实验室指标，再应用主成分分析法（PCA）提取其膳食模式，分析妊娠期糖尿病（GDM）孕妇膳食模式与其糖脂代谢的关系。 结果 本研究纳入妊娠期糖尿病（GDM）孕妇170例，分为妊娠期糖尿病（GDM）合并脂代谢异常组（病例组）和妊娠期糖尿病（GDM）脂代谢正常组（对照组）两组，年龄 M（Q_R）为 33.00（4.24）岁，孕周 M（Q_R）为 27.09（1.84）周，孕前体质指数（BMI）M（Q_R）为23.66（3.69）kg/m^2，孕中期110人，占64.71%。纳入对象的年龄、孕产阶段、文化程度、有无不良孕产史、孕前BMI、民族以及孕产次在两组之间差异没有统计学意义。根据因子载荷较高食物种类将提取出的膳食模式分别命名为主食-蔬菜模式及、粗粮-水产品模式、优质蛋白-加工肉模式、畜肉-内脏-甜品模式、薯类-水果模式和大米-油炸食品-禽肉模式。本研究参考《威廉姆斯产科学（第24版）》的孕期血脂标准，研究中诊断为妊娠期糖尿病（GDM）合并脂代谢异常（即病例组）的孕妇有59例，患病率为34.71% ，妊娠期糖尿病（GDM）孕妇合并脂代谢异常患病率由高到低的膳食模式分别为大米-油炸食品-禽肉模式、薯类-水果模式、优质蛋白-加工肉模式、粗粮-水产品模式、畜肉-内脏-甜品模式、主食-蔬菜模式。将膳食模式以及其他因素通过Passion回归分析显示，以主食-蔬菜模式作为参考，大米-油炸食品-禽肉膳食模式（RR=4.257,95% CI:1.141~15.891）与妊娠期糖尿病（GDM）合并血脂代谢异常（病例组）的发病风险存在统计学关联，发病率提高3.257倍；以近一个月不运动为参考，近一个月运动的妊娠期糖尿病（GDM）孕妇与妊娠期糖尿病（GDM）合并脂代谢异常（病例组）存在统计学关联（RR=2.261,95% CI:1.369~3.733），近一个月不运动的妊娠期糖尿病孕妇是近一个月运动妊娠期糖尿病孕妇发病率的1.261倍。结论 相比于主食-蔬菜模式，大米-油炸食品-禽肉模式和薯类-水果模式可增加孕妇患妊娠期糖尿病合并脂代谢异常的发生风险，为减少不良妊娠结局的发生，我们应该重视对孕妇孕期血糖及血脂的控制。

关键字 主成分分析、膳食模式、妊娠期糖尿病、脂代谢异常、COX回归

分类：全生命周期营养

烟酰胺单核苷酸对雄性昆明小鼠小腿肌肉萎缩的影响

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目的：研究在高脂膳食中添加烟酰胺单核苷酸对雄性昆明小鼠小腿肌肉萎缩的影响，为开发老年肌肉减少症营养干预措施提供理论支持。

方法：将 27 只 9 月龄雄性昆明小鼠的左腿踝关节钉住固定于背屈位以引起小腿前部肌肉萎缩。异氟烷麻醉小鼠后，将小鼠左侧脚掌前部钉到小腿前部，确保踝关节固定于背屈位。采用随机数字将小鼠随机分为低脂膳食对照组、高脂膳食组和高脂膳食加烟酰胺单核苷酸组。高脂膳食中脂肪提供 45%的能量，烟酰胺单核苷酸组烟酰胺单核苷酸添加量相当于体重 70kg 成人每天摄入 250mg。小鼠三只一笼，每周更换垫料，实验室昼夜循环光照 12h，温度为 22～24℃，相对湿度为 50%～55%。头 3 天每天称体重和剩余饲料量，并检查左足钉是否正常，如有松动或脱落，重新钉上。随后每 2-3 天检查小鼠状况并记录体重和采食量。喂养两周后隔夜禁食，第二日异氟烷麻醉后行摘眼球取血留样，再放尽血后取肝脏准确称重记录，分离双侧胫骨前肌、趾长伸肌、比目鱼肌和腓肠肌，用万分之一天平称重记录肌肉重量。测定身长和尾长，计算肝脏指数、肌肉器官指数、BMI 和 Lee’s 指数。器官指数等于器官重量除以体重。组间差异采用单因素方差分析和事后多重比较，检验显著性水平取 α=0.05。

结果：有 3 只小鼠在实验过程中死亡，剩下的 24 只小鼠数据用于统计分析。单因素方差分析结果显示各组体重、肌肉重量、肝脏重量、肝脏器官指数、肌肉器官指数、BMI 和 Lee’s 指数之间均没有显著差异。24 只小鼠左侧胫骨前肌平均值 62.88±15.44mg、右侧胫骨前肌平均值 65.91±17.32mg、左侧趾长伸肌平均值 13.56±4.76mg、右侧趾长伸肌平均值 14.65±3.77mg、左侧比目鱼肌平均值 10.30±4.05mg、右侧比目鱼肌平均值 9.13±2.07mg、左侧腓肠肌平均值 185.88±38.14mg、右侧腓肠肌平均值 189.39±38.07。24 只小鼠中有 10 只左侧胫骨前肌重量大于右侧，被认定为造模不成功。剔除 10 只造模不成功小鼠后剩余 14 只小鼠左右侧肌肉重量采用 t 检验进行比较，左侧胫骨前肌重量小于右侧胫骨前肌重量（61.17±16.21 vs 72.54±15.74，P=0.07）。其他三种肌肉左右侧差异不显著。

结论：钉住左腿踝关节固定于背屈位可引起左侧胫骨前肌肉、左侧趾长伸肌、左侧腓肠肌、左侧比目鱼肌均与右侧对比成萎缩状态，但肌肉重量减少程度不够显著。高脂膳食中添加烟酰胺单核苷酸对雄性昆明小鼠小腿肌肉萎缩没有显著影响。

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关键字 烟酰胺单核苷酸；肌肉萎缩；肌肉减少症；高脂膳食；小鼠

分类：全生命周期营养

营养门诊中孕期相关人员普遍关注的营养问题及接受的信息传播方式

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营养门诊中孕期相关人员普遍关注的营养问题及接受的信息传播方式

目的 孕期营养是社会普遍关注的营养问题。有充分的科学证据表明，孕期适宜的营养对母子双方健康具有近期及远期重要的影响。生命早期的营养与孩子一生的健康息息相关，也关乎整个家庭的健康幸福以及国家整体国民的健康素质。但是，孕妇日益增长的营养健康知识需求，与家庭长辈们传统观念的冲突以及过量信息的混淆，带给孕妇诸多困扰，为了研究孕产相关人员最关注的营养问题及最能接受的信息方式，以期为他们提供便捷、科学的营养健康知识。方法 回顾2022 年 7 月-2023 年 4 月营养门诊中 96 位孕妇主要关注的营养问题以及希望获得此类信息的途径。结果 超过 85%的孕妇及家属关注孕期体重增加，希望长胎不长肉，但同时 65%的孕妇对于孕期合理的体重增长范围没有认知或有错误的认知。48%的孕产妇不认为孕期体重增长与妊娠期并发症以及妊娠结局有关。45%的患者由于孕期合并症就诊，其中以妊娠期高血糖以及妊娠期贫血为主。87%的妊娠期高血糖患者能过通过饮食控制治疗妊娠期高血糖，但同时绝大多数患者及家属对于粮食摄入普遍存在误区，摄入量不足大于摄入量过多，由此增加酮症及胎儿生长发育受限等系列问题。因妊娠期贫血就诊营养门诊的比例为 30%，其中大家对于食物中铁的来源认知有所提高，与产科医生及大众媒体的宣传密不可分。部分贫血患者同时存在体重增加过多或高血糖情况，由此可见，孕前体重增加多不等于营养充足。此外，营养补充剂的使用也是他们关注的重点。在获得相关知识的途径方面，大家对医院医护人员信赖度高，尤其是自己接触过的医护人员。乐意接收营养信息的形式方面，以小视频、直播问答、科普文的方式接受度最高。

结论 孕前体重增长、营养不足、孕期并发症、营养补充剂的使用是孕妇普遍关注的问题。孕前体重增加多不等于营养充足，孕期体重增加过多与营养不足同时存在。大家认知有所提高，与产科医生及大众媒体的宣传密不可分。在获得相关知识的途径方面，大家对医院医护人员信赖度高，尤其是自己接触过的医护人员。小视频、直播问答、科普文的方式是孕妇及家属接受度最高的信息传播方式。

关键词 孕期 营养门诊 营养信息 传播方式

关键字 孕期 营养门诊 营养信息 传播方式

分类：全生命周期营养

维生素 D、TNF-α 和 IL-6 水平与肌少症的相关性研究

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摘要:目的 肌少症（Sarcopenia，SA）是一种增龄相关的肌肉量减少、肌肉力量下降和/或躯体功能减退的老年综合征。SA 增加老年人跌倒和骨折的风险、损害日常生活能力、增加心脏病、呼吸系统等疾病的患病风险。目前，SA 发病机制尚未明确，近年来研究认为炎症反应和营养缺乏可能是最主要的发病机制。维生素 D 是一种脂溶性维生素,不仅可通过增加钙吸收调节骨代谢,也可调节肌肉系统的病理生理过程。肿瘤坏死因子(TNF)-a 和白细胞介素(IL)-6 是常见的炎症因子指标,临床获取便捷，已被证实可通过多种途径导致肌肉萎缩。本研究探讨老年人群维生素 D、TNF-a、IL-6 水平与 SA 的关系。方法 选取 158 例 2021 年 3 月-6 月参加体检的≧60 岁人群为研究对象，根据 2019 年亚洲肌少症工作组（Asian Working Group for Sarcopenia，AWGS）诊断标准为 SA 诊断依据分为肌少组和（n=51）非肌少组（n=107）。收集患者的基本资料和生化指标以及血清维生素 D、IL-6 和 TNF-α 水平。采用 Spearman 相关性分析血清维生素 D、IL-6 和 TNF-α 水平与 SA 指标间的关系，多因素 Logistics 回归分析老年 SA 患者的影响因素，ROC 曲线分析维生素 D、IL-6 和 TNF-α 对老年 SA 患者的评估价值。结果 （1）SA 组维生素 D 水平低于非 SA 组（19.62±3.99 ng/mL vs 23.88±4.72ng/mL，t=-4.63）；TNF-α 和 IL-6 水平显著高于非 SA 组（58.26±46.17 ng/L vs 24.17±29.83 ng/L ,t=-7.02；24.01±23.25 ng/L vs 9.88±23.43 ng/L，t=-6.68），差异均具有统计学意义（P＜0.05）。（2）SA 组年龄和血小板计数显著高于非 SA 组（t=-3.15，-2.71，P 均小于 0.05），腰围、颈围、小腿围、BMI 和血清肌酐水平显著低于非 SA 组（t 分别为-4.80、-4.88、-6.50、-11.17 和-2.13，P 均＜0.05）。（3）维生素 D 水平与四肢骨骼肌含量呈正相关（r 男性=0.342，P=0.011，r 女性=0.315,P=0.001）;IL-6 水平与四肢骨骼肌含量、最大握力及六米步速间均呈负相关（r 男性=-0.481、-0.494、-0.444，r 女性=--0.389、-0.649、-0.512；P 均＜0.05）；TNF-α 水平与四肢骨骼肌含量、最大握力以及六米步速间呈负相关（r 男性=-0.597、-0.600、-0.544，r 女性=--0.285、-0.717、-0.566；P 均＜0.05）；（4）多因素 Logistics 回归分析显示维生素 D（OR=0.818，95%CI：0.707～0.946）和 BMI(OR=0.599，95%CI：0.452～0.795)为 SA 的独立保护因素(P 均<0.05),年龄（OR=1.210，95%CI：1.073～1.365）、IL-6(OR=1.027，95%CI：1.003～1.051)和 TNF-α (OR=1.021，95%CI：1.004～1.038)为独立危险因素(P 均<0.05)。（5）ROC 曲线分析结果显示，以 22.5ng/ml 为最佳截断值维生素 D 水平预测老年人群发生 SA 的曲线下面积为 0.867，敏感度 8242%，特异度 73.8%。以 7.35ng/ml 为最佳截断值，IL-6 水平预测老年人群发生 SA 的曲线下面积为 0.829，敏感度 84.3%，特异度 69.2%。以 19.4ng/ml 为最佳截断值，TNF-α 水平预测老年人群发生 SA 的曲线下面积为 0.846，敏感度 92.2%，特异度 68.2%。维生素 D 联合 IL-6 和 TNF-α 水平的曲线下面积最大（0.904），敏感度和特异度分别为 80.4%和 81.3%。结论 SA 患者维生素 D 水平较低，维生素 D、TNF-α、和 IL-6 水平与老年 SA 发生和发展关系密切,可作为评估老年人群发生 SA 的指标,且三者联合检测可进一步提高判断价值。应多关注老年人群营养状况，进行早期营养教育以及干预，评估维生素 D 营养状况，足量补充维生素 D，提高血清维生素 D 水平，以保护老年人群骨骼健康、免疫功能正常等，从而预防 SA 的发生以及发展。

关键字 肌少症；维生素 D；IL-6；TNF-α

分类：全生命周期营养

孕期高剂量叶酸暴露对子代焦虑、抑郁行为及炎症反应性的影响

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目的：叶酸是天然存在于绿叶蔬菜中的水溶性维生素，在人体多个关键生物学过程中起辅助因子和调节分子的作用。叶酸补充剂和强化食品的应用使一部分人群包括孕妇处于过量摄入叶酸、机体高叶酸水平所带来潜在不利影响的风险中。本课题组前期对江苏出生队列的数据进行分析，结果显示孕晚期叶酸补充剂摄入量≥1000μg/d 与子代认知发育得分降低相关。本研究通过动物实验观察孕期高剂量叶酸暴露对子代神经行为发育的影响，并从子代炎症反应性方面对机制进行探索性研究，旨在为叶酸在孕期的合理补充提供理论依据。

方法：雌性 C57BL/6J 小鼠在整个妊娠期以正常饮食或高叶酸饮食喂养，分娩后恢复正常饮食。观测并记录子鼠早期生命体征和神经反射发育等情况，于出生后第 4 周采用旷场实验、明暗穿梭、避暗实验、悬尾和强迫游泳实验评估子鼠的空间学习和记忆能力及焦虑抑郁样行为。取子鼠脑组织，ELISA 检测脑组织中炎症因子的表达水平，Western Blot 检测脑组织中磷酸化 p38（p-p38）和 il-6；取海马组织，戊二醛固定后透射电镜观察海马星形胶质细胞超微结构的改变。

结果:与孕期正常饮食组的子代相比，孕期高剂量叶酸饮食组子代存活率显著降低，耳廓分离、出毛和牙齿萌出时间显著推迟，断壁回崖的阳性时间推迟，前肢握力悬挂时间显著减少。在旷场实验中，与对照组相比，高叶酸组子代的中央区运动时间较短、中央区运动时间百分比较低、中央区运动距离较短、穿梭次数较少，差异有统计学意义；在明暗穿梭实验中，与对照组相比，高叶酸组子代的明箱停留时间、穿梭次数较少，差异有统计学意义；在悬尾和强迫游泳实验中，高叶酸组子代的不动时间显著增加；在避暗实验中，三组子代间潜伏期和错误次数无显著差异。与雄性子代相比，高叶酸组雌性子代在旷场实验中的中央区运动时间较短、穿梭次数较少；在明暗箱实验中，与雄性子代相比，高叶酸组雌性子代的穿梭次数较少。ELISA 结果表明，孕期高叶酸暴露组雌性子代的脑组织中 TNF-alpha 和 IL-水平显著高于对照组雌性子代，WB 结果显示高叶酸暴露提高雌性子代的脑组织中 p-p38 和 IL-6 蛋白表达水平，透射电镜下可见高叶酸组子代海马星形胶质细胞内出现大面积空旷区，胞内细胞器减少、消失。

结论：孕期高剂量叶酸暴露影响子代早期生理发育、神经反射和运动协调能力，并引起子鼠焦虑抑郁行为，且雌性子代在焦虑抑郁行为方面所受影响较雄性子代更为明显。孕期高剂量叶酸暴露使子鼠脑部的炎症反应处于高敏状态，可能与子代的焦虑抑郁行为相关。

关键字 高剂量，叶酸，孕期，焦虑、抑郁行为，炎症

分类：全生命周期营养

运动员维生素 D 营养状况及维生素 D 补充获益情况的相关研究进展

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【目的】维生素 D 是人体必需的脂溶性维生素，可促进肠道对钙的吸收、动员骨钙、增强肾脏对钙、磷的重吸收，维持血钙在正常水平，以保证机体生理活动的正常运行。机体维生素 D 不足和缺乏，会导致弱骨骼稳定性降低、增加骨折风险，还会让肌肉的收缩功能受阻，因此机体维生素 D 是否充足与骨骼和肌肉的健康密切相关。对于运动员而言，骨骼和肌肉健康是保障运动能力的基本条件，因此其维生素 D 营养状况可能直接影响运动功能及竞技状态，值得关注。因此本研究在查阅相关文献的基础上，就运动员维生素 D 营养状况及维生素 D 补充与运动员获益的相关研究进展进行综述，以期为改善我国运动员营养健康状况及提高运动竞技表现提供理论依据。

【方法】通过 PubMed、MEDLINE、中国知网数据库、维普、万方等数据库，以 “运动员”、“训练”、“维生素 D”、“营养状况”、“肌肉力量”“骨骼健康”、“运动能力”等为关键词进行系统文献检索，检索时限为 2015 年 1 月至 2022 年 12 月，并按照纳入和排除标准对查阅的文献进行筛选和资料提取，分析运动员维生素 D 营养状况及维生素 D 补充与运动员获益的相关性。

【结果】针对运动员维生素 D 营养状况的相关研究集中在国外，各地运动员均普遍存在维生素 D 水平低下或不足的情况，但仍存在较大差别，中东地区和英国爱尔兰地区运动员维生素不足的比例超过 70%以上，美国、西班牙、澳大利亚等地运动员维生素 D 缺乏的比例约 30%～40%。国内尚缺乏关于运动员维生素 D 营养状况的大型研究，近几年有多项小样本的研究显示游泳、射击等项目运动员均存在维生素 D 水平低下的情况。当维生素 D 不足或者缺乏时，骨折风险明显增加，长期高负荷训练的运动员更易引发应力性骨折。多项研究表明，补充维生素 D 与体内维生素 D 水平密切相关，有利于促进运动员骨骼和肌肉健康，降低骨折的发生风险，加速修复运动导致的组织损伤，提高肌细胞的收缩能力，改善肌肉蛋白质的合成代谢从而增加肌肉质量。同时，补充维生素 D 改善肌体 1，25-(OH) 2-D3 浓度水平，有效降低了运动员训练后的炎症反应，有助于运动员改善免疫功能的状态，训练周期感染疾病的风险明显下降。

【结论】运动员普遍存在维生素 D 水平不足或缺乏，可能由此影响其营养健康状况及运动表现能力。补充维生素 D 对于骨骼健康和肌肉质量有促进作用，且有助于改善运动员的免疫功能。但目前维持运动员维生素 D 水平充足的营养补充量尚不一致，对于不同项目运动员改善维生素 D 营养状况和提高运动表现的适宜补充剂量仍需进一步研究。

关键字 维生素 D、营养状况、肌肉力量、运动能力

分类：全生命周期营养

妊娠期糖尿病对胎儿铁营养状况影响的队列研究

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妊娠期糖尿病对胎儿铁营养状况影响的队列研究
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目的：探讨妊娠期糖尿病（gestational diabetes mellitus，GDM）对胎儿铁营养状况的影响。

方法：研究对象来自同济母婴健康队列（Tongji Maternal and Child Health Cohort，TMCHC）。孕妇经知情同意后纳入。纳入时完成面对面的问卷调查，收集年龄、孕前体重、民族、文化程度、家庭人均月收入、生活方式、既往孕产史和疾病史、家族病史等基本信息，孕 24-28 周进行 75g 口服葡萄糖耐量试验筛查 GDM，住院待产时取母亲晨起空腹静脉血，分娩时取胎儿脐静脉血，分离血浆及红细胞于无菌无酶 EP 管中，于-80° C 冰箱冻存，分娩后通过住院记录收集分娩孕周、出生体重等出生结局信息。采用酶联免疫吸附法测定血浆铁蛋白，采用高效液相色谱法测定 GDM 孕妇红细胞糖化血红蛋白（HbA1c）。根据产前 HbA1c 是否<5.8%判定 GDM 血糖控制情况，分为控制较好（GDM-good）和较差（GDM-poor）组。采用秩和检验比较 non-GDM、GDM-good 和 GDM-poor 各组母血及脐血铁蛋白水平，采用广义线性模型对 GDM 孕妇 HbA1c 水平与自然对数转换后的脐血铁蛋白水平进行关联分析，调整年龄、孕前体重指数（BMI）、产次、糖尿病家族史及母体铁蛋白水平等混杂因素，计算偏回归系数（β）和 95%置信区间（confidence interval，CI）。

结果：本研究共纳入 184 对母婴，其中 132 对为 non-GDM，52 对为 GDM 母婴（22 对 GDM-good 和 30 对 GDM-poor）。孕妇平均年龄 29.2±4.0 岁，平均孕前 BMI 为 21.3±2.6kg/m2，75.0%为初产妇，4.9%有糖尿病家族史，平均分娩孕周为 39.4±1.4 周。与 non-GDM 组相比，GDM 孕妇年龄较大、孕前超重和有糖尿病家族史比例更高，初产妇比例更低，其余方面无显著差异。non-GDM、GDM-good 和 GDM-poor 三组母血铁蛋白水平无显著差异（21.4（12.6-33.6）vs 23.3（12.3-46.5）vs 19.9（10.3-31.0）μg/L，P=0.48）；与 non-GDM 组脐血铁蛋白（64.1（34.2-97.6）μg/L）相比，GDM-good 组无显著差异（65.0（34.2-115.1）μg/L，P=0.70），GDM-poor 组显著降低（34.7（15.7-56.2）μg/L，P<0.001）。调整混杂因素后，GDM 孕妇产前 HbA1c 水平每增加一个标准差，自然对数转换后的脐血铁蛋白水平降低 0.90（β：-0.90；95% CI：-1.57，-0.23）。

结论：GDM 影响胎儿铁营养，GDM-poor 组胎儿脐血铁蛋白水平显著低于 non-GDM 和 GDM-good 组胎儿。提示早期筛查 GDM 并有效控制血糖，有助于降低 GDM 胎儿铁营养不良的风险。血糖控制不佳的 GDM 孕妇胎儿，出生时铁贮备不足，应及时补充。

关键词：妊娠期糖尿病；孕妇；胎儿；铁蛋白；糖化血红蛋白

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关键字 妊娠期糖尿病；孕妇；胎儿；铁蛋白；糖化血红蛋白

分类：全生命周期营养

基于 CiteSpace 对近十年衰弱人群营养状况的文献计量研究与热点分析

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目的：剖析近十年来国内外对于衰弱人群及其营养状况相关文献，探讨研究的前沿热点。对未来发展进行预测，为后续研究提供参考依据。

方法：采用文献分析法，使用由陈超美教授设计的 CiteSpace（6.2.2）可视化软件进行科学知识图谱的绘制。文献来源为“Web of Science 核心合集”，检索词：TS=“frailty or frailty syndrome or frail ”AND“nutrition or nourishment”，时间跨度为 2012-01-01 至 2022-12-31，共得 1743 篇文献，文献纳入标准：与衰弱人群营养相关的文献，排除标准：会议、报刊文章、图书、重复发表的文献，余 1688 篇。参数：时间分区设置为 2012.1-2022.12，切片默认“1”，节点类型依次选择作者、机构、国家、关键词、共被引文献，阈值为预定参数。对以上节点绘制网络图谱，探析衰弱人群营养研究的热点及发展趋势。

结果：1）发文情况：近十年，国内外有关衰弱人群营养状况的发文量与研究热度呈不断上升的趋势。发文量从 2012 年 28 篇增长到 2017 年 127 篇；2018 年增长幅度最大（174 篇）；2019-2022 年从 210 到 306 篇；整体发展较稳定，趋势较好，预计 2023 年发文量将继续升高；作者发文量前三名为 Cesari,Matteo（18 篇）、Rodriguez-artalejo,Fernando（17 篇）、Rockwood,Kenneth（16 篇）；2）2012-2022 年共有 378 个国家的研究机构涉及衰弱人群的营养状况的研究，主要机构为法国国家健康与医学研究院、伦敦大学、UDICE-法国研究型大学、哈佛大学等，主要集中在欧美地区；3）研究最多的前三个国家分别为美国、英国及日本，其次是意大利、加拿大等，每个国家之间的联系都十分紧密。美国以 353 篇列首位，占总发文量的 20.9%，中国发文 119 篇，占总发文量 7.0%。可见美国在衰弱人群的营养状况方面有显著的学术地位，我国还有一定挖掘空间；4）利用 CiteSpace 软件绘制近十年关键词共现知识图谱，排除衰弱人群与营养的基础词汇，对前十的关键词进行统计可分为三个主题：第一：表明循证医学研究：危险因素（risk）、发病率（prevalence）、相关性（association）；第二：揭示干预模式及效果：死亡率（mortality）、健康状况（health）、身体活动（physical activity）、结局（outcome）、身体成分（body composition）；第三：与其他疾病相关：肌少症（sarcopenia）、营养不良（malnutrition）；5）用 CiteSpace 对 1688 篇文献进行突现词分析。2012-2016 年研究主要针对老年人衰弱、身体表型、瘦体重等方面；2017 开始逐渐转向女性健康、炎症标志物、氨基酸、膳食营养等方向；6）对关键词进行聚类分析发现，有 systematic review、chronic kidney disease、cognitive frailty、colorectal cancer、nutrition risk、oral health；涉及慢性病、癌症、口腔健康、风险等多个方面；7）共被引文献分析：Cruz-Jentoft AJ 在 2018 年发表在《Age and Ageing》上的《Sarcopenia: revised European consensus on definition and diagnosis》被引次数最多（152 次）；

结论：1）对近十年的发文量分析，有关衰弱人群的营养状况的研究呈现逐年上升的趋势；2）研究机构主要分布在各高校及政府机构，整体通过多领域、多方面、多学科来进行交叉分析；3）研究力量集中于欧美发达国家，亚洲地区的研究潜力较大；4）相关热点集中于对衰弱人群的总体健康状况及与营养相关的疾病研究；5）近十年热点不断变换，逐渐从广泛的身体机能及表型方面，转向细致的分子生物学方向与女性健康，体现了体医融合与医工融合的思想；6）研究显示，肌少症是近十年国内外衰弱人群营养相关研究的热点；7）本研究仅对 Web of Science 核心合集收录的文献进行研究，不能完全代表研究情况；由于 CiteSpace 分析的是文献计量的特定信息，可能会遗漏一些关键细节，对该领域的最新研究进展及内容仍需进一步探讨。

关键字 衰弱；营养；CiteSpace；可视化分析；

分类：全生命周期营养

白藜芦醇对力竭运动大鼠肾组织闭锁小带蛋白 ZO-1 的影响

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研究目的：白藜芦醇是多酚类植物抗毒素，其在肾小球系膜细胞、肾足细胞和肾小管上皮细胞等各种损伤模型中的作用已得到证实。肾小管上皮细胞之间的紧密连接(tight junctions，TJs)位于肾小管上皮细胞的顶端膜，调节细胞的通透性和细胞的极性，维持细胞屏障的完整性。它将两个细胞紧密连接在一起，阻止细菌、大分子物质通过细胞间隙进入结缔组织，同时阻止组织液外渗。TJs 在维持肾小管完整性和功能方面具有关键作用，TJs 损伤是上皮损伤的最早标志之一。闭锁小带蛋白-1(zonula occluden-1,ZO-1)是肾小管上皮细胞之间 TJs 的经典蛋白。本研究的目的是探讨白藜芦醇对力竭运动大鼠肾小管紧密连接蛋白 ZO-1 的影响，为运动性肾功能紊乱的防治奠定基础。

研究方法：32 只雄性 SD 大鼠，8 周龄，体重 345.5±13.5 g，SPF 级动物实验室饲养，国家标准固体饲料喂养。将大鼠随机分为 4 组，分别为安静对照组（Con 组，8 只）、力竭运动组（Ex 组，8 只）、白藜芦醇组（RSV 组，8 只）、力竭运动+白藜芦醇组（Ex+Rsv 组，8 只）。Con 组和 Ex 组普通饲养，Ex 组和 Ex+Rsv 组进行四周力竭跑台训练。正式训练前进行 3 天运动预适应，每天以 10 m/min 的速度进行跑台训练 30 min。正式训练方案为四周大强度力竭训练，速度从 10 m/min，每 5 min 速度增加 5 m/min，直至 35 m/min，直至大鼠运动力竭。跑台坡度为 10 度，运动频率为 1 次/天，5 天/周，共进行 4 周。第 4 周最后一次力竭跑台运动后 24 h 取材，酶联免疫吸附法检测大鼠尿肾损伤分子 KIM-1 含量，免疫组织化学法检测大鼠肾组织 ZO-1 的表达。

研究结果：与安静对照组（7.48±0.31 pg/ml）相比，力竭运动组大鼠尿 KIM-1 水平（11.01±1.18 pg/ml）显著升高（P＜0.01 pg/ml），而白藜芦醇+力竭运动组（9.10±0.77 pg/ml）显著低于力竭运动组（P＜0.01）；免疫组织化学检测显示，ZO-1 蛋白主要表达于肾间质及肾小管中，胞质可见成棕黄色染色颗粒。安静对照组可见大量棕黄色的颗粒表达，染色较强，力竭运动组 ZO-1 蛋白表达均较少，大鼠免疫染色面积和强度均明显减弱，力竭运动+白藜芦醇组染色面积和强度均比力竭组增强，ZO-1 蛋白表达组间 OD 值比较结果显示，与安静对照组（0.59±0.08）相比，力竭运动组（0.36±0.06）显著降低（P＜0.01），与力竭运动组相比，力竭+白藜芦醇组（0.47±0.22）则有所升高（P＜0.05）。

研究结论：4 周力竭运动可导致大鼠出现肾功能紊乱，并可能导致大鼠肾小管紧密连接结构破坏，影响了肾小管离子运输和代谢废物的排泄，超滤液通过细胞旁渗漏进入间质，加重肾灌注不足，影响肾的正常功能。而补充白藜芦醇则可通过调节 ZO-1 蛋白的表达改善力竭运动大鼠肾组织的紧密连接结构，从而发挥肾脏保护作用，这可能为运动性肾功能紊乱的防治提供新的作用机制依据和基础。

关键字 白藜芦醇；力竭运动；肾功能

分类：全生命周期营养

胆碱对睡眠剥夺所致认知功能受损幼鼠 认知功能的影响及潜在机制初探

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【摘 要】目的 儿童长期睡眠不足会引起认知功能受损。胆碱不仅是磷脂酰胆碱（卵磷脂）的重要组成成分，同时也是神经递质乙酰胆碱的前体，我们前期的研究发现，胆碱可以改善认知功能受损，但其是否可改善睡眠不足所致的认知功能损伤尚不明确。因此，本研究拟采用动物试验，研究胆碱补充对长期部分睡眠剥夺（Partial Sleep Deprivation, PSD）幼鼠认知功能损伤的影响，以及基于静息态功能磁共振成像探讨胆碱补充改善 PSD 幼鼠脑功能连接，并进一步探讨胆碱补充激活 PSD 幼鼠海马 α7 烟碱型乙酰胆碱受体发挥胆碱能抗炎通路的潜在机制。方法 36 只 3 周龄 C57BL/6 雄性小鼠随机分为 3 组，分别进行以下干预，为期 21 天：①空白对照（CC）组：饲以 AIN-93G 饲料（含 1.1g/kg 氯化胆碱）；②睡眠剥夺模型组（PSD）：饲以 AIN-93G 饲料，同时进行睡眠剥夺，剥夺强度为 20h/d；③胆碱补充组（CS-PSD）：在睡眠剥夺的同时饲以高胆碱饲料（含 4.5g/kg 氯化胆碱），睡眠剥夺强度同 PSD 组。实验结束后采用 Y 迷宫实验测定各组小鼠空间学习能力；然后采用 9.4T 小动物磁共振成像扫描仪（MRI, Biospec94/30USR, Bruker）进行静息态功能磁共振成像，统计其低频振幅（amplitude of low frequency fluctuation，ALFF），之后以小鼠海马区为模板（mask）分析 ALFF、低频振荡分数(fractional amplitude of low frequency fluctuation, fALFF)以及种子点前额叶皮层到全脑的功能连接变化；最后采用 Western-blot 检测各组小鼠海马组织 α7 烟碱型乙酰胆碱受体蛋白表达变化。结果 PSD 三周后，Y 迷宫实验结果显示 PSD 组小鼠在新臂停留的时间显著低于 CC 组，而 CS-PSD 组小鼠的新臂停留时间相较于 PSD 组得到显著改善（均 P＜0.05）；静息态功能磁共振成像结果显示 PSD 组小鼠在下丘/背核右区的 ALFF 值显著低于 CC 组（P＜0.05），而 CS-PSD 组小鼠在下丘/背核右区的 ALFF 值相较于 PSD 组得到显著改善（P＜0.05）；以海马区为 mask，三组小鼠 ALFF 值无统计学差异（P＞0.05），PSD 组小鼠在左脑海马 CA3 区的 fALFF 值显著低于 CC 组（P＜0.05），而 CS-PSD 组小鼠 fALFF 值相较于 PSD 组得到改善但并未观察到统计学差异（P=0.11），PSD 组小鼠前额叶皮层与右脑海马内嗅区外侧功能连接强度相较 CC 组增加（P＜0.05），而 CS-PSD 组小鼠前额叶皮层与右脑海马内嗅区外侧功能连接强度相较 PSD 组得到显著恢复（P＜0.05）；Western-blot 结果显示 PSD 组小鼠海马组织 α7 烟碱型乙酰胆碱受体蛋白表达水平显著低于 CC 组（P＜0.05），而 CS-PSD 组小鼠海马组织 α7 烟碱型乙酰胆碱受体蛋白表达水平相较于 PSD 组得到显著改善（P＜0.05）。结论 胆碱补充可以缓解睡眠剥夺所致幼鼠的认知功能损伤，其机制可能与胆碱改善脑功能连接、增加海马区域 α7 烟碱型乙酰胆碱受体的表达有关。我们实验将进一步探索胆碱补充是否增加胆碱能神经元标志物，以及论证胆碱补充是否通过 α7 烟碱型乙酰胆碱受体激活下游通路并改善神经炎症。

关键字 胆碱；海马；α7nAChR；rs-fMRI；FC

分类：全生命周期营养

成都市社区老年人营养及膳食状况与肌少症风险相关性分析

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目的：通过调查成都市社区 60 岁及以上老年人的营养膳食情况以及肌肉减少症（简称肌少症）相关情况，评价成都市社区老年人营养状况，发现该人群的膳食营养问题，同时探讨该人群营养与肌少症风险的相关性，并分析肌少症发生的可能影响因素，为成都市开展老年人营养干预措施及防治老年人群肌少症提供理论依据，提高成都市老年人群营养健康水平，降低老年人肌少症发生率。

方法：在 2022 年 3-12 月期间，采用整群随机抽样法，抽取四川省成都市郫都区 60 岁及以上老年人约 600 名，对其进行问卷调查及体格测量，获取老年人社会人口学特征、营养及膳食摄入情况、肌少症筛查指标等信息。根据亚洲肌少症工作组（AWGS）推荐的社区老年人肌少症筛查“两步法”，确定有肌少症风险的对象，将其纳入“肌少症风险组”，其余未确诊肌少症且无肌少症风险的研究对象被纳入“非肌少症风险组”。采用微型营养评估-简表（MNA-SF）和短版食物频率问卷（Food Frequency Questionnaire, FFQ）对社区老年人进行营养评价和膳食调查。根据 MNA-SF 得分将研究对象分为“营养不良组”、“存在营养不良风险组”以及“营养状况正常组”；分析研究对象每天、每周摄入的膳食种类数量是否符合《中国居民膳食指南 2022》推荐标准。采用两独立样本 t 检验比较肌少症风险组和非肌少症组摄入膳食情况以及 MNA-SF 得分的差异。用卡方检验比较不同营养状况和膳食种类达标情况下，社区老年人肌少症风险检出率构成比的差异。将社会人口学特征、体格测量、MNA-SF 得分以及摄入膳食种类数与肌少症进行相关性分析，最终采用多元 logistic 回归分析肌少症发生的可能影响因素。

结果：共调查社区老年人 592 人。其中确诊肌少症的人数为 0，166 人（28.0%）存在肌少症风险，24 人营养不良（4.1%），289 人（48.8%）存在营养不良风险；仅 87 人（14.7%）每天及每周摄入膳食种类数均达标。肌少症风险组每天摄入膳食种类数、MNA-SF 得分与非肌少症组之间存在统计学差异（$P<0.05$）。每天摄入膳食种类数与肌少症风险呈负相关，而 MNA-SF 得分与肌少症风险呈正相关。女性、MNA-SF 得分高和每天摄入膳食种类数达标是肌少症发生发展的保护因素。

结论：成都市社区老年人群普遍存在肌少症风险，营养不良和膳食种类摄入较少的情况较多；营养状况、每天及每周摄入膳食种类数与肌少症风险均具有相关性。营养状况良好、每天膳食种类丰富可以预防肌少症及降低肌少症发生风险。

关键字 肌肉减少症；膳食种类；营养状况；老年人

分类：全生命周期营养

孕晚期膳食模式与妊娠结局的关联性分析

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目的　了解孕妇孕晚期的膳食模式的现状及其影响因素，分析孕妇在孕晚期的膳食模式与妊娠结局的关联性，为指导孕妇合理膳食、预防不良妊娠结局提供相关的理论依据。方法　选取2021年12月至2022年8月在乌鲁木某三甲医院产科门诊定期做孕期检查，并且孕周在28周以后自愿参与本课题的505例孕妇作为研究对象，并追踪进入队列的研究对象至分娩430例，记录妊娠结局。问卷采用“中国孕产妇营养与健康科学调查”项目的调查问卷收集基本情况、孕期生活方式和健康状况调查表、食物频率调查问卷，使用食物频率调查问卷过程中，结合三维食物模型和回顾性膳食调查辅助参照食谱对孕妇进行膳食回顾及食物摄入频率调查，回顾近一个月的膳食摄入情况。采用因子分析法确定膳食模式；采用多因素logistic回归模型进行膳食模式与妊娠结局的关联性分析。结果　纳入505名孕妇，平均年龄为31.28岁。在本研究中追踪至分娩结局的430例孕妇中，孕妇平均分娩孕周为（38.84±1.36）周，孕妇平均孕期增重为（14.27±6.99）kg，新生儿平均出生身长为（49.74±2.12）cm，平均出生体重为（311.81±423.82）g。在新生儿中，低出生体重儿、巨大儿、SGA、LGA、早产儿的发生率分别为2.09%、6.74%、3.26%、7.67%和4.19%。发现4种膳食模式，根据因子载荷较高的食物种类分别命名为“蛋奶-畜禽肉”模式（以奶类及制品、蛋类和禽畜肉类为主）、“谷薯-水果”模式（以谷薯类、水果和甜点为主）、“加工制品”模式（以加工制品类、大豆及制品类和禽畜肉类为主）、“蔬菜-谷薯-水产品”模式（以蔬菜类、谷薯类和水产品类为主）。与2022年中国居民膳食宝塔的推荐摄入量进行比较，“奶蛋-畜禽肉”模式下谷薯类、蔬菜类、水产类和大豆类的摄入量未达到推荐摄入量中值；“谷薯-水果”模式下蔬菜类、水产类、大豆类、坚果类和奶类及奶制品的摄入量均未达到推荐摄入量中值；“加工制品”模式下谷薯类、蔬菜类、水产类、蛋类、坚果类和奶类及奶制品的摄入量均未达到推荐摄入量中值；“蔬菜-谷薯-水产品”模式下水产类、坚果和奶类及奶制品的摄入量未达到推荐摄入量中值。在“蛋奶-畜禽肉”模式中，丈夫的文化程度水平影响孕妇“蛋奶-畜禽肉”模式的平均得分，模式得分随着文化程度的提升而提升（P＜0.05）。在“蔬菜-谷薯-水产品”模式中，孕妇近一个月锻炼与否和产次影响其模式得分，近一个月锻炼的孕妇在该模式下得分高于近一个月没有锻炼的孕妇（P＜0.05），初产妇在该模式下得分高于经产妇（P＜0.05）。在经过调整混杂因素后，“蛋奶-畜禽肉”模式是孕妇早产的危险因素（OR=7.415，95%CI：1.184-46.440），“蛋奶-畜禽肉”模式是大于胎龄儿（LGA）的危险因素（OR=4.598，95%CI：1.033-20.347）；“蛋奶-畜禽肉”模式是GWG过多的危险因素（OR=1.961，95%CI：1.069-3.599）。结论　孕妇孕晚期的饮食存在不合理现状。孕期坚持“蛋奶-畜禽肉”模式会增加早产和LGA发生的风险，“蛋奶-畜禽肉”模式还会增加GWG过多发生的风险。

关键字 膳食模式；孕妇；妊娠结局

分类：全生命周期营养

短时有氧运动或功能饮料对脑疲劳后认知表现的影响研究

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研究目的：

功能饮料通常含有咖啡因等功能成分，研究证实，咖啡因对于改善认知功能有积极作用，主要表现在提高注意力、缩短反应时间等方面，在快节奏的工作和生活中很多青年人群青睐通过功能饮料达到“提神醒脑”的目的。近年来，短时有氧运动因其节省时间、有益身心而受到关注，有研究指出其能够正向调节认知功能，但不同研究仍存在一些争议。因此，本研究通过建立脑疲劳模型，在分别进行短时有氧运动或饮用功能饮料后观察不同干预方式对认知表现的影响，为大众科学应对脑疲劳提供理论参考。

研究方法：

本研究共招募 18 名青年受试者，均无饮用咖啡或咖啡类饮料习惯，在签订知情同意书后参加实验测试。采用双盲、交叉的实验设计，每名受试者需完成 3 次独立的实验测试，在每次测试中施加不同的干预措施，任意两次测试间均有不少于 3 天的洗脱期。每次测试中，首先通过 2 小时的标准化考试制造脑疲劳模型，然后受试者会被安排饮用咖啡因功能饮料（饮料组）或安慰剂饮料（安慰剂组）或完成一次短时有氧运动（运动组），饮用饮料及完成运动时间均为 20 min；功能饮料中的咖啡因含量为 100 mg，安慰剂饮料口味与功能饮料相似，但不含任何功能成分，有氧运动在功率自行车上完成，通过心率监测控制运动强度为最大心率的 65±5%；完成上述干预措施后，受试者有 120 min 的休息时间。在脑疲劳后即刻、休息阶段的 60 min 及 120 min 分别测试并记录受试者的心率和血压，通过简单反应时测试、字母划消测试（LCT）和连续相加测试（CCT）用来评估受试者认知表现。实验数据采用多因素重复测量的方差分析进行统计，以 $p<0.05$ 为具有显著的统计学差异。

研究结果：

在完成脑疲劳造模后，各组受试者的认知表现数据均无显著性差异。在恢复阶段第 60 min 时，运动组受试者的心率显著高于饮料组和安慰剂组（71±1 vs. 63±2 and 63±2 b/min, $p<0.01$），但运动组的收缩压显著低于另外两组（112±11 vs. 119±11 and 117±14 mmHg, $p<0.05$）。在 120 min 休息结束时，咖啡因组受试者的简单反应时表现显著优于安慰剂组（360±56 vs. 386±76 ms, $p<0.05$），但与运动组无显著差异。在 3 次测试的不同时间点，受试者完成 LCT 和 CCT 测试的时间无显著差异，但在 120 min 休息结束时，运动组和咖啡因组受试者的 CCT 正确率显著高于安慰剂组（63±32% and 60±24% vs. 44±21%, $p<0.05$）。

研究结论：

在本研究的实验条件下，短时有氧运动和咖啡因功能饮料改善脑疲劳后认知表现的作用相近。相对于安慰剂饮料，短时有氧运动和咖啡因功能饮料均提高了认知表现，但这种积极作用较为有限。

关键字 有氧运动；咖啡因；功能饮料；认知表现

分类：全生命周期营养

同型半胱氨酸与老年肌少症关系的病例对照研究

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摘要 目的 随着人口老龄化的加速进展，老年人健康相关问题已经成为全世界的主要问题之一。肌少症（Sarcopenia，SA）被认为是随着年龄的增长出现以进行性和全面性骨骼肌质量和力量丧失为特征的一种老年综合征。SA 给患者带来一系列的危害，如：增加老年人跌倒和骨折的风险、损害日常生活能力导致患者行动不便、生活质量下降、丧失独立性、增加心脏病、呼吸系统等疾病的患病风险。越来越多的证据表明营养物质与肌肉质量、力量和躯体功能之间存在关系，而同型半胱氨酸（homocysteine，Hcy）是人体中蛋氨酸的中间代谢产物之一，但当体内 Hcy 浓度过高会影响蛋白质的合成与调控，进而导致组织和器官的病理变化。本研究探讨 tHcy（total homocysteine，tHcy）水平与老年肌少症的相关性，为肌少症防治提供理论支持和实用措施。方法 采用病例对照研究设计，以 2021 年 3 月-6 月参加体检的≧60 岁人群为研究对象，根据 2019 年亚洲肌少症工作组（Asian Working Group for Sarcopenia，AWGS）诊断标准为肌少症诊断依据，按照同性别、年龄（±2 岁）进行 1：1 匹配得到病例组对照组各 160 名。采用面对面访谈的方法收集研究对象的人口学特征：性别、年龄；生活方式：饮酒、吸烟以及锻炼。采集空腹静脉血，用酶循环法测定 tHcy。采用 Spearman 相关性分析 tHcy 水平与肌少症指标间的关系，条件 Logistics 回归分析探讨肌少症的影响因素。结果（1）病例组 tHcy 浓度高于对照组，（15.38±5.01 mmol/L vs 14.34±6.20 mmol/L，t =-3.19，P = 0.001），高同型半胱氨酸血症（hyperhomocysteine，HHcy）检出率高于对照组（47.5%vs 30%，t =10.32，P = 0.001）（2）病例组的腰围、颈围、小腿围以及 BMI 值均低于对照组（t 分别为-8.88，-7.64，-10.36 和-11.17；P 均＜0.05），具有吸烟史、饮酒史及高血压病史的比例高于对照组（32.3% vs 16.8%；62.1% vs 46.0%；24.8% vs 11.8%；P 均＜0.05），血小板计数、高密度脂蛋白胆固醇（High density lipoprotein cholesterol，HDL-C）浓度均高于对照组（t=-2.31、-4.50；P 均＜0.05）。（3）tHcy 水平与最大握力（r 男性 = -0.24；r 女性 =-0.29 ，P 均=0.001）、步速（r 男性 = -0.16，P = 0.03；r 女性= -0.25，P = 0.005）间均呈负相关，女性人群中 tHcy 水平还与四肢骨骼肌质量指数呈负相关（r = -0.29， P = 0.001）。（4）多因素条件 Logistics 回归分析显示 HHcy（OR =3.692，95%CI：1.675～8.136）、高血压（OR =3.014，95%CI：1.482～6.126）饮酒（OR =3.058，95%CI：1.080～8.655）和血小板计数（OR =1.010，95%CI：1.004～1.017）是肌少症的独立危险因素，小腿围（OR =0.605，95%CI：0.490～0.749）和 BMI（OR =0.666，95%CI：0.548～0.810）是肌少症的保护因素，差异均具有统计学意义（P＜0.05）。结论 肌少症患者的 tHcy 水平显著升高，HHcy 是肌少症发病的独立危险因素之一。老年人因生活习惯、消化吸收功能等原因易出现 B 族维生素缺乏，tHcy 水平普遍偏高，HHcy 患病率高。应重视老年人群的营养状况，并对其进行营养宣教以及干预，补充 B 族维生素中 B6、B12 以及叶酸以预防 SA 的发生发展。临床上应多关注 SA 患者的 B 族维生素营养状况，对危险因素进行早期干预，以保护患者的骨骼肌健康，免疫功能正常等，促进疾病恢复。

关键字 同型半胱氨酸；肌少症；病例对照；老年人

分类：全生命周期营养

蛋白质摄入和老年人肌肉减少

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随着全球人口老龄化的加速，老年人的健康问题越来越受到关注。肌肉减少作为老年人常见的健康问题之一，严重影响着老年人的生活质量和健康状况，使日常活动收到限制，并增加患病和死亡的风险。蛋白质是人体生命活动的基础物质，对于维持正常生理功能和肌肉健康至关重要。因此，研究蛋白质摄入与老年人肌肉减少之间的关系具有重要的现实意义。早在 20 世纪 80 年代，研究者们就开始关注蛋白质摄入对肌肉健康的影响。随着研究的深入，越来越多的证据表明，蛋白质摄入与肌肉健康密切相关。进一步研究发现，老年人由于生理功能退化，更容易出现蛋白质摄入不足的现象，长期蛋白质摄入不足可能导致肌肉减少，从而影响老年人的生活质量。老年人肌肉减少的病理生理学机制非常复杂，主要涉及：老年人的神经系统功能下降，导致肌肉神经递质的减少，这会导致肌肉的萎缩和无力；老年人的内分泌功能下降，导致激素水平的变化，这会影响肌肉的合成和分解过程；老年人的免疫系统功能下降，导致炎症因子的增加，这会导致肌肉的破坏和萎缩；老年人的营养状态普遍较差，特别是蛋白质摄入不足，这会导致肌肉合成的能力下降。 当前研究的前沿主要集中在以下几个方面：寻找更为精准的蛋白质摄入推荐值；探讨不同类型蛋白质的优劣；研究个体差异对蛋白质需求的影响；以及探索新型肌肉减少的诊断和评估方法。这些研究为进一步了解蛋白质摄入与老年人肌肉减少之间的关系提供了有力支持。然而，在当前研究中仍然存在一些问题。首先，关于蛋白质摄入量的推荐值尚无统一标准，这可能导致在实际应用中出现误导。其次，虽然已有研究探讨了不同类型蛋白质的优劣，但关于哪种蛋白质来源更适合老年人的问题尚未得到明确答案。此外，尽管个体差异对蛋白质需求的影响得到了广泛关注，但目前的研究尚不足以为精准营养提供充分的数据支持。最后，尽管已有一些肌肉减少的诊断和评估方法，但在实际应用中仍存在一定的局限性，需要进一步优化和完善。本文旨在综述蛋白质摄入和老年人肌肉减少的研究现状、挑战与前景，既回顾了该领域的研究历史，又展示了当前的前沿成果。我们将分析老年人生理功能退化导致的蛋白质摄入不足问题，探讨老年人肌肉减少的原因及影响，并讨论二者之间的相关性。此外，本文还将提出可能的应对措施和解决方案，概述相关问题的当前研究前沿，并预测研究的未来发展方向。我们希望通过本文的讨论，为老年人肌肉减少问题的防治提供有益的启示，从而提高老年人的生活质量和健康水平。

关键字 老年人；肌肉减少；蛋白质摄入；病理生理学机制

分类：全生命周期营养

孕期肥胖影响子代认知发育及营养干预研究进展

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目的

孕期肥胖发病率呈逐年上升趋势，孕期体重过度增长会增加不良围产结局的风险。除了对母体造成直接影响，也与子代的远期肥胖症、冠心病、2 型糖尿病及哮喘等发病风险增加有关。近年研究显示，孕期肥胖与子代的神经发育障碍密切相关，然而其根本机制和有效干预措施仍不明确。本文就孕期肥胖影响子代认知发育以及潜在机制进行讨论，为探讨可实施的孕期营养干预方案，优化子代认知发育提供参考依据。

方法

利用 PubMed、MEDLINE、知网、万方等文献网络检阅工具查阅国内外孕期肥胖的现状，孕期肥胖对子代认知发育的影响以及其可能潜在机制，搜寻孕期饮食干预对子代认知发育影响的证据，为进一步探讨有效的孕期营养干预措施提供理论依据。

结果

文献显示，由于不良膳食结构及生活方式的改变，全球育龄妇女肥胖率逐步上升。孕期肥胖会增加子代发育性疾病和精神疾病的风险，如认知功能障碍、智力障碍、社交能力下降等。孕期肥胖与复杂的神经内分泌、代谢、免疫及炎性改变均有关，可能影响胎儿胎盘功能和能量代谢。其潜在机制可能是孕期摄入高浓度的葡萄糖、脂肪以及肥胖产生的炎性介质，可穿过胎盘并可破坏胎儿神经内分泌发育、神经元增殖和大脑的发育。同时，孕期肥胖通过 “肠道微生态-代谢物-脑”轴可能破坏子代肠道微生物组成，扰乱自身及子代肠道菌群的稳定状态，与子代学习记忆及社交能力的降低有一定关系。通过孕期高纤维饮食干预可改善子代肠道菌群，减轻神经细胞突触损伤和小胶质细胞缺陷。孕期体重的合理管理可能会改善孕妇超重和肥胖对子代神经系统的不良影响，孕期限制脂肪、添加糖，增加富含膳食纤维的蔬菜、粗粮等食物有利于孕期体重控制，降低子代认知发育障碍风险。

结论

孕期肥胖增加子代认知发育障碍风险，孕期的体重管理和营养均衡对于子代认知发育，尤其是神经系统发育的健康关系密切，其因果关系、潜在生理机制仍需进一步研究。以营养为基础的干预策略，在预防孕期增重过高方面效果显著。合理的营养干预措施如限制脂肪、限制添加糖、增加膳食纤维等对于孕期体重的监测与控制、减低子代认知发育障碍风险有重要意义，对于改善全球肥胖流行下育龄期妇女及其子代的健康状况具有深远影响。

关键字 孕期肥胖　认知发育 营养干预 肠道菌群

分类：全生命周期营养

中学生运动习惯、膳食摄入习惯与体成分的相关性研究

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目的：肥胖是我国暨全球严重威胁青少年身心健康的重大公共卫生问题之一，会对身体各项指标产生负面影响。基于此，本研究尝试对青少年中学生的运动习惯、膳食摄入状况、体成分状况及其相关性进行调查和分析，旨在更为全面地了解青少年的健康水平以及运动习惯、膳食摄入习惯是否与体成分之间存在相关性，为了解及改善学生运动营养现状提供新的方向和指导。

方法：2022 年 12 月调查了陕西省某中学七、八年级学生共 301 人为研究对象，运用了问卷调查法、测量法、数理统计法。现场发放回收《西安市儿童健康发展问卷》了解中学生的运动和膳食摄入现状，采用人体成分仪对中学生的体成分数据进行收集。采用均数（X±SD）、独立样本 T 检验以及单因素方差分析、卡方检验、独立样本非参数检验、皮尔逊双变量相关性分析等数统计法进行数据的分析，所有统计过程由 SPSS26.0 完成。

结果：（1）男女中学生在体成分指标上具有显著性差异，男生优于女生(P＜0.01)。运动习惯不同的中学生之间体成分各项指标有显著性差异（P＜0.01），运动习惯好的学生，体成分指标优于运动习惯不好的。不同膳食摄入习惯的同性别的中学生中，膳食习惯越好，体成分分布呈现越合理的趋势。

（2）年纪大的中学生运动习惯优于年龄小的中学生，且具有显著性差异(P＜0.05)。运动习惯好的男中学生比例大于女中学生，运动习惯得分最高和最低的中学生，男生分别为 51 人、37 人，占男生总人数分别为 32.2%、23.4%；女生分别为 32 人、66 人，占女生总人数分别为 22.3%、46.2%。膳食摄入习惯好的女中学生比例大于男中学生，膳食摄入习惯得分最高和最低的中学生中，女生分别为 47 人、42 人，占女生总人数分别为 32.9%、29.4%；男生分别为 37 人、67 人，占男生比例分别为 23.4%、42.4%。

（3）运动习惯与身高、体重、蛋白质、骨骼肌、BMI 具有显著正相关性，与体脂肪、体脂率有显著负相关性；膳食摄入习惯与身高、体重、蛋白质、骨骼肌、BMI 具有显著正相关性，与体脂肪、体脂率有显著负相关性。

结论：（1）运动习惯和体成分情况，男生优于女生。

（2）中学生的运动习惯、膳食摄入习惯得分与体成分具有正相关性，运动习惯、膳食摄入习惯好的中学生，体成分情况更好，良好的运动习惯、膳食摄入习惯对体成分的合理分布具有促进作用，表明膳食摄入习惯、运动习惯能影响体质健康情况。

（3）提示培养中学生良好的运动习惯和膳食摄入习惯有利于学生身体素质和营养状况水平。

关键字 中学生、体成分、膳食摄入、运动习惯

分类：全生命周期营养

孕中期多株益生菌的应用对妊娠糖尿病发病风险、妊娠结局及孕期体成分的影响

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目的 观察孕中期多株益生菌的补充是否能够影响妊娠期孕妇体成分变化以及妊娠糖尿病的发病风险，改善母婴结局。

方法 选择在北京积水潭医院产科正式建档的孕妇，采用随机双盲的方法，将签署知情同意书后入组的受试孕妇随机分为益生菌组和安慰剂组，同时期入组未参与受试的阴性对照组孕妇。三组孕妇入组后孕期全程均给与饮食及运动指导，记录饮食日记。益生菌组孕妇从妊娠 16 周开始服用糖稳态益生菌（益生菌包含嗜酸乳杆菌、乳双歧杆菌、植物乳杆菌；每日 2 次，每次 4g，400 CFU）至 23 周，共服用 8 周试剂。安慰剂组孕妇在相同时间服用外观相同、口味相同的安慰剂麦芽糊精（每日 2 次，每次 4g）。益生菌组及安慰剂组孕妇在服用前后进行 qPCR 便肠道菌群检测（包括总菌量、总双歧杆菌、总乳杆菌、akk 菌、柔嫩梭菌、多形拟杆菌、厚壁菌类、拟杆菌门、普雷沃氏菌、大肠杆菌粪、肠球菌及丁酸梭菌 11 种菌群菌量的检测）。研究观察受试者妊娠 16 周及 24 周体重变化、人体成分分析检测（包括基础代谢、总体水、细胞外液、BMI、肌肉重、脂肪重、去脂体重及体脂百分比）、24 周糖耐量检查结果以及产后母婴结局。结果（1）研究共招募孕妇 220 人，其中 11 人提前诊断 GDM，5 人因流产、胎停育等原因提前终止妊娠，9 人因双胎、人工体外受精、孕期服用抗生素及患有系统性红斑狼疮等排除标准未纳入研究。最终入组益生菌组孕妇 72 人，安慰剂组 64 人，阴性对照组 59 人。各组受试者的年龄、身高、体重及孕前 BMI 差异均无统计学意义（P>0.05）。（2）各组孕妇妊娠糖尿病发病率差异无统计学意义（ x^2=0.197，P=0.906），各组 OGTT 空腹、1 小时及 2 小时血糖水平、新生儿体重和分娩方式差异均无统计学意义（P>0.05）。（3）各组孕妇妊娠 16 周各体成分数据差异无统计学意义（P>0.05）。妊娠 24 周益生菌组孕妇其 BMI、脂肪重及体脂百分比显著低于其余两组，差异有统计学意义（P<0.05）。将受试者孕 24 周与孕 16 周体成分分析各项数据做差值，其差值各组间差异无统计学意义（P>0.05）。（4）便肠道菌群检测结果发现益生菌组的孕 24 周总菌量更高（P<0.05），其余组差异无统计学意义。按照是否患有妊娠糖尿病情况分组，发现患有妊娠糖尿病的孕妇在孕 16 周总双歧杆菌比例更低，AKK 菌数量更低、丁酸梭菌比例更高（P<0.05），其余指标差异无统计学意义（P>0.05）。

结论 给予妊娠 16 至 23 周孕妇糖稳态多株益生菌的干预，未观察到显著降低妊娠糖尿病发病风险的作用，但是多株益生菌的补充可能对孕妇孕中期体重尤其是体脂肪的增长有影响作用。

关键字 益生菌；妊娠期糖尿病；体脂率；妊娠结局

分类：全生命周期营养

燕麦 β-葡聚糖对妊娠期糖尿病致胎鼠肠道粘膜屏障发育异常的改善作用

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目的：探讨在孕前 1 周和孕期给予妊娠期糖尿病（Gestational diabetes mellitus, GDM）大鼠燕麦 β-葡聚糖（Oat β-glucan, OG）对胎鼠肠道粘膜屏障发育（物理屏障、化学屏障和免疫屏障）异常的改善作用，为生命早期预防和改善子代肠道健康提供可行的措施和实验室数据。

方法：将 27 只 SD 雌性大鼠分为正常组、GDM 组和 GDM+OG 组，每组 9 只。采用 8 周高脂饮食和孕（Gestational day, GD）3.5 时腹腔注射 27 mg/Kg 链脲佐菌素构建 GDM 模型，当空腹血糖值为 10 mmol/L 为模型成功，GDM+OG 组为在 GDM 模型的基础上，在孕前 1 周和整个孕期给予 1.1 g/Kg OG，于 GD 19.5 时麻醉孕鼠取出胎鼠并分离其肠道，观察肠道细胞形态-回肠绒毛长度和结肠隐窝深度（HE 染色）、回肠和结肠杯状细胞（AB-PAS 染色）和回肠潘氏细胞（荧光桃红染色）的数量，紧密连接蛋白（Claudin1、Claudin1 和 Occludin）、黏蛋白（Muc2）和抗菌肽（defa6 和 hamp）的表达，免疫细胞标志物转录水平（树突状细胞、巨噬细胞和 T 细胞）和相应细胞因子的表达水平。

结果：与正常组相比，GDM 组 GD19.5 时胎鼠肠道形态损伤，表现为回肠绒毛、结肠隐窝深度明显缩短，但是物理屏障中未见显著差异，化学屏障的异常包括回肠和结肠中杯状细胞数量的显著减少及 Muc2 分泌降低，回肠潘氏细胞数量的增加、抗菌肽 defa6 和 hamp 的转录水平显著升高，免疫屏障中树突状细胞标记物 cd83 与 T 细胞标记物 cd3 和 cd4 转录水平显著降低，巨噬细胞标记物 cd68 的转录水平显著升高，细胞因子单核细胞趋化蛋白-1（monocyte chemoattratctant protein-1, MCP-1）和巨噬细胞炎症蛋白 1-α（Macrophage Inflammatory Protein 1α, MIP-1α）的浓度升高，调节激活正常 T 细胞表达分泌因子（Reduced upon activation nornal T cell expressed andsecreted, RANTES）和嗜酸粒细胞趋化因子（eotaxin）浓度降低，结果提示 GDM 对宫内胎鼠肠道屏障功能造成损伤，孕期宫内环境的变化对子代肠道健康发育造成重要不利影响，孕前和孕期的预防措施至关重要。GDM 孕鼠在孕前和孕期补充 OG 后，显著改善了胎鼠肠道的形态，包括增加回肠绒毛深度、回肠和结肠中杯状细胞的数量、降低回肠中潘氏细胞数量，促进紧密连接蛋白 Claudin5、粘蛋白 Muc2 表达，降低抗菌肽 defa6 和 hamp 的转录水平，促进树突状细胞标记物 cd83、T 细胞标记物 cd3 和 cd4 转录水平，降低巨噬细胞标记物 cd68 的转录水平，显著减少细胞因子 MCP-1 和 MIP-1α 的表达，并促进了 RANTES 和 eotaxin 的表达，结果提示孕鼠 OG 的补充能显著改善异常的 GDM 胎鼠肠道物理、化学和免疫屏障功能，OG 补充的剂量根据中国居民膳食营养素纤维素的推荐摄入量换算所得，即补充到推荐摄入量就可有显著促进子代肠道健康的作用。

结论：研究发现孕前一周和整个孕期补充 OG，能改善胎鼠肠道形态、物理屏障、化学屏障、免疫细胞、细胞因子表达，以保护胎鼠肠道屏障功能。上述结果为孕前和孕期补充 OG 促进子代肠道健康提供了一定的研究基础。

关键字 妊娠期糖尿病；肠道粘膜免疫；物理屏障；化学屏障；燕麦 β-葡聚糖

分类：全生命周期营养

“老年人群营养改善行动”助力老年友好型社会建设

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“十四五”时期是我国全面建设社会主义现代化国家新征程的第一个五年，也是积极应对人口老龄化的重要窗口期。《“十四五”健康老龄化规划》提出了“完善身心健康并重的预防保健服务体系”的重要举措，“实施老年营养改善行动，制定老年人营养健康状况评价指南，指导各地制定为老助餐机构营养健康相关标准，启动老年人营养风险筛查试点”。全国老龄办决定2022-2025年在全国组织开展老年营养改善行动。老年健康服务是重大公共卫生问题，提升老年人群多层次、多样化健康服务能力，探索健康服务新路径,建立健全老年营养与健康服务体系，是积极应对老龄化国家战略的重要举措。

2020年12月，国家卫生健康委 全国老龄办发布了《关于开展示范性全国老年友好型社区创建工作的通知》(国卫老龄发〔2020〕23号，以下简称《通知》)，示范性全国老年友好型社区创建工作启动，2021年6月进一步出台了《国家卫生健康委办公厅关于印发全国示范性老年友好型社区评分细则（试行）的通知》（国卫办老龄函〔2021〕303号，（以下简称《评分细则》）。《通知》虽然提出了“开展老年人群营养状况监测和评价，制定满足不同老年人群营养需求的改善措施”并成为“提升为老年人服务质量”的重要举措，设置了“全国示范性城乡老年友好型社区标准（试行）”（城镇和农村），《评分细则》分别设置了城镇和农村社区评分标准，唯独没有老年营养改善工作具体条目。

在老年健康服务多元化发展的过程中，老年人群营养改善工作是老年健康服务的重要抓手，建议设立老年营养相关工作评价指标和分值并纳入“全国示范性老年友好型社区标准”中。到2030年，建立我国老年人群普惠性的营养指导制度是《国民营养计划（2017-2030年》--“老年人群营养改善行动”的第二阶段目标。郑玉梅等在针对北京地区老年人群生命质量评价过程中，有61.15%的老年人表示常常感到孤独，而快乐的积极情绪只占14.58%。老年人营养不良影响健康预期寿命，而孤独是老年人营养不良的独立因素。老年健康促进与营养教育可降低疾病负担，老年营养监测与评价工作在老年友好型社会建设中至关重要。

积极应对人口老龄化，要把打造老年友好型社会和实施健康中国行动有机结合起来，老年营养学科在“十四五”时期应是优先发展的领域。积极推进“老年人群营养改善行动”真正成为老年健康服务体系“四梁八柱”中可依托的支柱之一，深度融入医养结合工作，切实增强老年人的获得感、幸福感、安全感。

关键字 老年人群营养改善行动；老年友好型社会；全国示范性城乡老年友好型社区标准；积极应对人口老龄化；老年人群生命质量

分类：全生命周期营养

南京市农村中老年人肌力减少症患病率及其影响因素研究

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目的：肌少症是与年龄相关的肌肉质量减少，同时存在肌肉力量和（或）躯体功能下降的综合征，其可能导致跌倒、骨质疏松、心肺功能受损等不良事件发生。肌力减少症（dynapenia）指由非神经学或肌肉疾病引起的与增龄相关的肌肉力量的丧失。研究发现肌肉力量的下降远快于肌肉质量的减少。在对许多不良健康结局（如失能、抑郁、住院）的预测上，肌肉力量比肌肉质量具有更好的预测性。有研究表明，农村居民肌肉力量比城市居民较弱，农村老年人比城市老年人更容易发生肌肉减少症。然而，对中国中老年人肌力减少症患病率的研究较少，并且大多数集中在城市中老年人。本研究旨在了解农村中老年人肌少症、肌力减少症的患病率，明晰其影响因素，以便为当地居民制定可行的针对性干预方案。

方法：2022 年 7 月通过招募志愿者的方式，对南京市江宁区 6 个村镇进行调查。通过问卷收集研究对象的人口学资料，包括性别、年龄、最高学历、婚姻状况、居住情况、吸烟史、饮酒史；测量身高、体重、握力、腰围、小腿围、体脂率、六米步行时间各项指标，计算得到 BMI 和六米步速。根据公式计算四肢肌肉量 ASM (appendicular skeletal muscle mass) =0.193*体重 +0.107*身高－4.157*性别－0.037 年龄－2.631。计算肌肉质量指数 SMI (muscle mass index)= ASM/身高 2。肌少症诊断标准为肌肉量下降合并有步速或握力下降，肌力减少症为肌肉量正常但握力和/或步速下降。采用　　检验比较组间分布差异，不符合检验条件的计数资料的组间比较采用 Fisher 确切概率法。运用二分类　Logistic 回归进行肌力减少症影响因素的多因素分析。

结果：253 例研究对象的平均年龄为多在 70 岁及以上（49%），男性占 30.4%。正常体重者最多，占 51.8%，其次为超重（36.8%）。学历以未上过学和小学为主，均占 35.2%。多数为在婚（69.6%）、非独居（74.3%）、不吸烟（81.8%）、不饮酒（78.7%）。43.5%的人睡眠时间在 6~8 小时。

肌少症患者共 14 人，患病率 5.5%，其中男性 7 人（9.1%），女性 7 人（4.0%）。肌力减少症 176 人（69.9%），其中男性 48 人（62.3%），女性 128 人（72.7%。）肌力减少症组与非肌力减少症组间年龄、学历、婚姻状况、饮酒状况不同。以肌力减少症患病与否作为应变量，p<0.1 的变量（年龄、学历、婚姻、吸烟、饮酒状况）作为自变量，进行多因素 logistic 回归分析，年龄为危险因素（OR= 2.59; 95% CI　1.63, 4.12; p < 0.001），学历为保护性因素（OR = 0.55; 95% CI 0.38, 0.80; p = 0.002）。

结论：南京市农村中老年男性肌少症患病率较高，女性患病率较低，男女性肌力减少症患病率均较高。其可能与年龄、学历有关。应加强健康知识科普宣传，建造开放健身锻炼设施，倡导农村中老年人坚持适当运动健身，合理膳食。

关键字 农村；肌力减少症；中老年人；肌肉力量

分类：全生命周期营养

中文版直觉饮食量表-2 在中国孕妇群体的信效度研究

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目的 直觉饮食（IntuitiveEating，IE）是一种适应性和调节的饮食行为，可控制情绪饮食和饮食限制。这是一种非节食性饮食测量方法，可以用于测量人群对食物摄入的本能选择情况。相比于普通人群，孕妇群体的情绪化水平更高，受孕早期孕吐等生理性影响更大，自主进食行为将受更多因素的影响。而此前国内并未有针对孕妇群体的直觉饮食程度的测量研究。因此，本文拟了解国内孕妇直觉饮食量表的得分现状，探索影响孕妇直觉饮食得分的主要因素，并评价第 2 版中文版直觉饮食量表(IntuitiveEatingScale-2-Chinese，IES-2-CHI)在早中期孕妇群体中的信效程度，为更有针对性地改善孕期健康水平提供科学建议。

方法 本研究通过将英文版 IES-2 翻译、回译、文化适应、专家咨询并结合此前应用于非孕妇群体的中文版 IES-2 量表进行修改后形成该量表。先通过预调查了解受试孕妇的理解度后，于 2022 年 9 月至 2023 年 3 月采用简单随机抽样方法抽取江苏省镇江市丹阳市妇幼保健医院符合标准的早中期 345 名孕妇，并对其进行经过跨文化调适的中文版 IES-2-CHI 问卷调查。所有孕早期孕吐反应严重、具有进食障碍、已经诊断出糖尿病及其他代谢性疾病的孕妇均被排除在外。数据采用 SPSS 20. 0 和 AMOS 21. 0 软件进行分析，通过项目分析、Cronbach’s α 系数评定、Pearson 相关分析、内容效度评定、探索性因子分析和验证性因子分析，评价中文版 IES-2 应用于国内孕妇直觉饮食水平调查的可靠性和有效性。

结果 本研究共发放问卷 345 份，回收 306 份，有效回收率为 88.69%。中文版直觉饮食量表(IES-2-CHI)各条目与总分的 Pearson 相关系数在 0. 281~ 0. 631 之间，差异有统计学意义(P<0. 01)。IES-2-CHI 的 Cronbach's α 系数为 0.738，折半信度为 0.615。问卷经调整后，探索性因子分析结果：共提取自我意识性进食、情绪选择性进食和身体选择性进食三个公因子，累计方差贡献率为 51. 892%。验证性因子分析结果：卡方自由度比(χ2/df)为 8.32，近似误差均方根为（RMSEA）0.092，均方根残余指数(RMR)为 0.054，拟合优度指数(GFI)为 0848，相对适合度(CFI)指标为 0.821，非规范拟合指数(TLI)为 0.784，递增拟合指数(IFI)为 0.823，规范拟合指数(NFI)为 0.781，此模型基本适配。

结论 中文版 IES-2-CHI 在中国孕妇群体中具有良好的信度和效度， 易于接受，为评估孕妇早中期直觉饮食行为建立良好的饮食习惯及提供工具及参考依据，可以进一步优化以用于测量中国孕妇的直觉饮食现状。本次研究是第一次在孕妇群体中引进该量表以检验其在孕妇中的信效度，今后可探讨该量表在中国妇女在怀孕不同时期中的适用性。

关键字 直觉饮食;量表;饮食行为;妊娠期;信度;效度

分类：全生命周期营养

花样滑冰运动员术后康复营养支持和管理方法：个案报道

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研究目的

参照加速康复外科与围术期管理模式，对我国某男性花样滑冰运动员进行术后系统的跟踪监测，分阶段给予不同的营养指导和管理，使得该运动员在康复期保持肌肉功能和力量的同时体重维持在一个合理范围。通过研究和制定花滑运动员术后个性化的营养支持方案，探究普适性的运动员术后康复营养恢复措施，为建立系统的科学营养恢复方案提供了数据支持。

研究方法

某男子花样滑冰运动员入院对实施外科手术后，营养师为配合术后康复训练提供全面的系统营养支持和管理。把术后康复阶段分为手术应激期、手术恢复期、体重管理期和自我管理期四个阶段。依据不同阶段营养目标以及相关营养监测结果进行评估和调整膳食营养方案。

营养支持原则是：1）每日膳食摄入满足日常活动和康复训练所需能量；2）使其膳食结构更加科学、合理；3）应用运动营养食品补充膳食中缺乏的营养素。

营养监测包括：体成分测定（Inbody 3.0）、膳食营养记录与评估、能量消耗测定（SenseWear Armband 2.0）。

研究结果

1.体成分测定结果显示，体脂率从 16.4%降低至 14.2%，体重由 65.6kg 缓慢降低至 63.7，肌肉量基本保持恒定，各项指标已恢复到入院前水平。

2. 入院康复期间，记录每日膳食摄入并计算其能量和营养素配比，随着康复进程每日摄入能量每周逐渐递减，从 2800kcal（术后 1 周）—2400kcal（术后 2 周）—2000kcal（术后 3-4 周）—1900kcal（术后 5-6 周）—1800kcal（术后 7-8 周）。

3.在术后恢复期和体重控制期测定计算平均每日能量消耗和同期膳食能量摄入，术后恢复期是正能量平衡，体重控制期是负能量平衡，符合各自的营养目标。该运动员睡眠效率低于 80%，需要调整活动和作息，保证良好的睡眠质量，使机体得到充分的恢复。

4. 效果评估与营养支持策略

术前检查结果显示，营养状况良好符合外科手术要求。术前根据情况适当给予加餐。术后各阶段营养目标均已实现。术后早期主要采用流质食物，然后逐渐从半流质过渡到正常膳食。以清淡饮食为主，进食种类根据手术后恢复和运动员的耐受情况而定，少食多餐、摄入总能量满足基础代谢以及功能训练的需求。提供充足的蛋白质摄入，在此基础上适当增加维生素和矿物质营养品的使用。后期膳食需控制能量摄入并调整食物结构以增肌、减脂为目标。三餐以运动员个人意愿为主，膳食多样化，重视蛋白质摄入，多选取优质蛋白并补充充足的水分，运动员逐步调整作息以适应运动队的日常训练和安排，同时关注其睡眠状况。出院归队后需继续对运动员进行营养追踪管理。

研究结论

花滑运动员骨科手术后尽早接受营养支持和管理，针对不同阶段的营养目标采取相应的营养干预措施，有利于降低运动员围术期营养不良的发生率，控制合理体重，促进运动员伤病后的身体运动功能的恢复，并提高其归队后对训练和比赛的适应能力。

关键字 花样滑冰，术后康复，营养支持与管理

分类：全生命周期营养

北京冬奥会冠军隋文静韩聪备战期间的体成分控制策略分析

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冬奥会花样滑冰双人滑金牌时隔 12 年再次花落中国。中国代表团在北京冬奥会上赢得刷新纪录的第九金。三对俄罗斯奥委会队选手只能甘拜下风。0.63 分，临时在自由滑中祭出的高难度“捻转四周”动作成为隋文静/韩聪的制胜关键，弥补了平昌冬奥会以 0.43 分之差与金牌失之交臂的遗憾，把同样发挥出色的塔拉索娃/莫洛佐夫挤到第二名。《忧愁河上的金桥》是隋文静/韩聪 2017 年获得世锦赛金牌时的自由滑曲目，两人在熟悉的音乐声中出色完成捻转四周的高难度动作，尽管单跳被降级，但连跳、抛跳等动作均完成出色，艺术表现力也被高度认可。他们的自由滑得到 155.47 分，以总分 239.88 分获得冠军。中国花样滑冰队双人滑主教练赵宏博说，“隋文静/韩聪获胜的关键在于高难度的捻转四周和动作完成质量。”

对于花样滑冰双人滑项目来说，冠军组合的体重比一般在 1:2（女性体重：男伴体重），然而隋文静韩聪组合体重比远小于这一数值，因此一直以来并不被外界看好。从生物力学角度分析，为完成捻转四周动作，隋文静需要减去体重、体脂但是同时需要保持充足的体能来完成跳跃、旋转等动作，韩聪需要增长体重和足够力量来完成捻转和抛跳等动作。整个北京冬奥会的备战周期期间，韩聪体重、体脂率、体成分按照周期化营养计划进行变化。根据训练安排和比赛计划，团队营养师为隋文静韩聪制定了个性化的营养方案，体脂率由 15.3%降低至 14%。在整个北京冬奥会备战期间，经过准备期、赛前期、比赛期等几个关键阶段，营养计划同样依据准备期、赛前期、比赛期产生的不同营养需求制定。经过三个不同时期的营养计划，最终在赛前，隋文静韩聪体成分得到了优化。北京冬奥会前隋文静体脂体重达职业生涯最低值（每两周进行皮脂钳监控、生物电阻监控）。合理的、根据备战训练周期安排的营养计划使得隋文静即使体重体脂降到最低值，依然在赛前保持充沛的体能，出色的完成了既定的目标动作。通过体能储备期的增肌计划，韩聪体重稳定上升，达到阶段目标，体重由非赛期的 64kg 提高至理想体重 65kg，同时体脂维持稳定。通过营养计划韩聪实现了最大化的训练后恢复以及力量的提升。这一以训练备战周期需求为主导的体成分控制策略为韩聪隋文静组合在北京冬奥会上完美地完成捻转四周动作提供了生物力学上的优势。助力北京冬奥会第九枚奥运金牌。

关键字 北京冬奥会；奥运冠军；隋文静韩聪；体成分；营养策略

分类：全生命周期营养

苏炳添东京奥运会备战期间的体成分管理策略

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目的：探究世界级短跑运动员备战周期的体成分管理策略。

方法：本案例研究，于2020年东京奥运会备战期间对世界级短跑运动员苏炳添进行了长达一年的跟踪营养干预。基于周期化训练需求、生物力学分析、营养需求设计了个性化的周期化营养方案。运用体重计、DEXA、皮褶厚度计等方法对体成分进行定期监测。应用血液生化测试和尿比重等手段对身体机能进行定期监测。

结果：将整个备战周期划分为过渡期、准备期、比赛前期、比赛期四个时期，体脂变化趋势依次为下降至职业生涯最低值5.9%、保持8%左右、保持8%左右、略微降低。体重变化趋势依次为下降至最低值68.3kg、增加至最高值75.4kg、保持75kg左右、减重至73kg。生物力学分析显示减重带来的收益为垂直力需求减少162%。整个备战周期运动员恢复良好，肌酸激酶、尿素氮、血红蛋白、皮质醇、睾酮等生理生化指标保持在适宜区间。个性化的营养方案证实有效。

结论：在过渡期、准备期、比赛前期、比赛期分别按照减脂-增肌-保持-减重的目标对苏炳添的体成分进行调控和管理，使苏炳添在东京奥运会前获得了极佳的机能状态，为其创造优异成绩奠定了基础。

背景：苏炳添优异成绩的取得是中国田径协会整合各方面资源综合攻关的成果。短跑运动员在冲刺时，肌肉需要承受超过自重力5倍的力量(Weyand and Davis 2005)(Wright and Weyand 2001)(Weyand, Sternlight et al. 2000)，因此为了跑的更快需要有足够强壮的肌肉、韧带、骨骼用以承受和产生力量(Nelson, Gabaldón et al. 2004)(Weyand and Davis 2005)。备战前期苏炳添身高173cm、体重72kg，体重指数（BMI）为 24，高于我国其他短跑运动员，然而，纵观历届奥运会冠军短跑运动员，BMI 均高于 24，2008-2016 三届奥运会冠军博尔特（最好成绩 9.58 秒）身高1.95m、体重94kg、BMI：24.7、2004年奥运会冠军加特林身高1.85m、体重83kgBMI24.3，2000年奥运会冠军莫里斯.格林身高1.76m、75kg、BMI：24.2，1996年奥运会冠军多诺万贝利身高1.85、体重91kg，BMI更是达到26.2。分析历届参与奥运会的短跑运动员的体成分也显示：在一定BMI范围区间内，更大BMI的选手成绩往往更好(Nevill, Winter et al. 2010)(Watts, Coleman et al. 2012)。100m奥运冠军的BMI通常高于参与决赛的奥运会选手，决赛选手BMI高于其他仅进入半决赛的选手(Nevill, Winter et al. 2010)(Watts, Coleman et al. 2012)。可能对于奥运会选手水平短跑运动员来说，更高的BMI意味着有更多的肌肉储存ATP和肌糖原，也意味着有更强大的爆发力。但缺乏对精英优秀运动员的体成分的研究。在苏炳添东京奥运会备战期间，通过与生物力学的专家跨学科交流分析，制定了赛前4周的减体重减去肌肉营养方案。为苏炳添东京赛场上的历史性突破提供了生物力学优势。

关键字 苏炳添；东京奥运会；体成分；精英运动员；BMI；体脂率

分类：全生命周期营养

妊娠期过量果糖摄入对子代大鼠骨骼发育的影响及机制探讨

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目的

通过比较孕期不同果糖干预组子鼠股骨结构、病理及血清学骨代谢指标，研究妊娠期过量果糖摄入对青春期子代大鼠骨骼生长发育的影响，并初步探讨其可能机制。

方法

将48只雌性Sprague Dawley大鼠随机分为：对照组（CON，n=12）、GLU组（GLU，n=12）、低剂量果糖干预组（LFRU，n=12）、高剂量果糖干预组（HFRU，n=12）。孕期对照组孕鼠接受等体积自来水灌胃，葡萄糖对照组接受20 g/kg葡萄溶液灌胃，低果糖组和高果糖组接受10 g/kg或20 g/kg果糖溶液灌胃，取21d胎鼠及自然分娩自然生长7周龄子鼠。记录各组孕鼠及子代大鼠每周摄食量，称重孕21d胎鼠及分娩后子代股骨重量。对孕鼠（妊娠第21天）和子代大鼠（7周龄）进行口服糖耐量试验，计算曲线下面积（Area under The curve，AUC）及胰岛素抵抗指数（Insulin resistance index，HOMA-IR）。ELISA法检测孕鼠及子代大鼠血清果糖及尿酸水平、子代I型前胶原蛋白n端前肽（N-terminal propeptide of type I procollagen，PINP）和I型胶原蛋白c端肽（C-telopeptide of type I collagen，CTX）水平。利用Western blot测定子代大鼠股骨中骨保护素（Osteoprotegerin，OPG）及核因子-κB受体激活因子配体（Receptor Activator of Nuclear Factor-κB Ligand，RANKL）蛋白表达水平。使用Micro-CT扫描仪对子代大鼠股骨微观结构进行重建测量并定量分析。对子鼠股骨行苏木精-伊红（Hematoxylin and eosin，H.E）染色、抗酒石酸酸性磷酸酶（Tartrate resistant acid phosphatase，Trap）染色观察子代大鼠骨组织病理学改变。

结果

四组孕鼠在整个孕期的能量摄入及体重无统计学差异。与对照组和GLU组相比，HFRU组胎鼠重量显著降低，子代大鼠腓肠肌及股骨骨重显著降低（P＜0.05）。HFRU组较对照组子代大鼠空腹血糖浓度降低（P＜0.05），同时HFRU组血清尿酸、空腹血清胰岛素浓度和胰岛素抵抗指数增加（P＜0.05）。Micro-CT结果显示，与对照组和GLU组相比，HFRU组子代大鼠骨密度、皮质平均骨密度和松质骨骨密度显著降低（P＜0.05）。此外，与对照组相比，HFRU组子代大鼠骨膜包膜内总横截面积、皮质骨截面面积、皮质骨厚度、骨膜周长、内膜周长均降低（P＜0.05）；骨小梁数目、骨小梁厚度和连接度均降低（P＜0.05），而平均截距长度显著增加（P＜0.05）。骨代谢指标分析显示，与对照组与GLU组相比，HFRU组与LFRU组PINP及CTX水平显著增加（P＜0.05）。LFRU组与HFRU组骨组织OPG、RANKL蛋白表达水平较对照组显著降低（P＜0.05）。子代大鼠股骨HE染色显示：HFRU组子代大鼠干骺端生长板异常，软骨细胞增殖带减少。子代大鼠股骨Trap染色显示：HFRU组子代大鼠可见大量巨形和多核破骨细胞，细胞质染色呈砖红色，分布紧密，形状不规则。

结论

妊娠期过量果糖摄入会增加子鼠血尿酸水平及胰岛素抵抗水平，损害子代大鼠股骨皮质骨及松质骨结构，通过干扰骨吸收-骨形成稳态抑制子鼠骨骼生长发育。控制孕期果糖摄入对于维护子代骨骼健康有重要意义。

关键字 孕期果糖，高尿酸血症，骨发育，骨稳态，胎儿编程

分类：全生命周期营养

非靶向代谢组学方法探讨 6-12 岁正常体重学龄儿童含糖饮料高频/低频摄入的血清代谢特征

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背景：含糖饮料（sugar-sweetened beverages，SSBs）是指所有含游离糖的饮料，其具有能量密度过高、饱腹感低、易成瘾等特点，是人群添加糖摄入的主要来源之一，SSBs 可通过改变多巴胺能奖赏系统、增加尿酸、促进新生脂肪生成等途径对糖脂代谢和多种代谢性疾病产生不利影响，增加儿童青春期超重、肥胖及成年期癌症、心血管疾病、早死等风险，长期、过量摄入 SSB 的健康风险受到广泛关注。基于正常体重儿童开展的 SSBs 研究甚少，对 SSBs 造成的亚临床改变及早期危害关注不足，缺乏明确、有效的早期生物标记物。既往研究着重于儿童摄入 SSBs 的尿代谢标志物，但尚未对血清代谢标志物进行研究。

目的：探究正常体重 6-12 岁学龄儿童中，SSBs 高摄入与低摄入组的血清代谢轮廓差异，探索长期、过量摄入 SSBs 调控差异代谢物和可能涉及的代谢通路。

方法：通过 2015 年-2017 年上海饮食与健康调查（SDHS）两阶段分层整群抽样，抽取上海市 16 区 20 所小学 6-12 岁的 180 名 SSB 高频摄入的学生（>1 次/天），并 1:1 匹配 180 名性别、年龄相仿的 SSBs 低频饮食者（<1 次/周）作为对照。采用食物频率问卷调查学生 SSBs 消费频率，并收集调查对象空腹血清样本。采用超高效液相色谱-四极杆-飞行时间串联质谱（UPLC-Q-TOF-MS）测定非靶向代谢组，通过 HMDB 数据库对代谢物进行鉴定，并采用主成分分析（PCA）及正交偏最小二乘判别分析（OPLS-DA）提取代谢物特征，并使用七倍交叉验证和 200 次置换测试进行验证。以变量投影重要性（VIP）>1，t 检验 p＜0.05 为初步条件筛选差异代谢物。

结果：在 PCA 模型中，两组儿童代谢特征无法分离。在 OPLS-DA 中，男孩 SSBs 高频摄入与低频摄入两组的代谢特征分离较好，女孩两组代谢特征不能完全分离。男孩血清样本中，668 种代谢物具显著差异（p<0.05），其中，脂质和类脂分子占 37.9%，有机酸及其衍生物占 13.5%，有机杂环化合物占 12.1%，苯丙烷类和聚酮化合物占 11.1%。经多重检验，生物素-5'-AMP、1-（2-噻吩基）-1-庚酮、三己酸甘油酯等 5 个代谢物具有显著差异（多重检验错误发现率 FDR 值<0.05）。对男孩样本代谢物的富集分析发现，生物素代谢、三羧酸循环、亚油酸代谢、磷酸戊糖途径等 19 个代谢通路有显著差异（p<0.05），经多重检验，仅生物素代谢通路有显著差异（FDR=0.005）。女孩血清样本中，66 种代谢物具显著差异（p<0.05），但所有代谢物的 FDR 值均大于 0.05；富集分析显示，所有涉及通路均无显著差异。

结论：SSBs 可能通过生物素代谢、三羧酸循环、亚油酸代谢等通路改变 SSBs 高频摄入的正常体重 6-12 岁学龄男孩的血清代谢轮廓，而对同龄女生的血清代谢改变不显著。

关键字 代谢组学，学龄儿童，含糖饮料摄入，血清代谢特征，儿童营养

分类：全生命周期营养

温州市养老机构老年人群营养水平与膳食习惯现况调查与分析

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【目的】本研究旨在了解被调查养老机构在住“康养”老人的营养水平与膳食状况以期提出营养建议并加以改善。【方法】对2022年全市注册在案的253家养老机构按养老类型，采用随机抽样方法抽取被调查养老机构。对被抽中的养老机构采用食物频数表法结合记账法获取被调查机构一月内消耗食物种类及数量。经营养软件（NCCW2009）分析处理后，计算被调查养老机构“康养”老人日均膳食中能量、三大营养素、维生素及矿物质摄入量状况；微量营养素食物来源及营养素间相互比例等，并与中国居民平衡膳食宝塔（2022）及《中国居民膳食营养素参考摄入量（2013版）》（DRIs）中65岁及以上/轻体力活动推荐量进行比对分析。【结果】调查显示被调查老年人群谷类、畜禽类、蛋类和油脂的摄入量超过推荐摄入量，乳类、水果摄入量偏低（P＜0.05）；钠、胆固醇摄入量偏高（P＜0.05）；钙摄入量显著低于1000mg/日。被调查老人日常膳食中粮谷类供能比占48%，蛋白质（18%）、脂肪（34%）供能比偏高；优质蛋白占比较合理（51.7%）；动物源性脂肪占总脂肪55%；植物源性铁占比为60%；来源于豆类及其制品的钙占总钙量仅为5.3%；大豆及制品摄入量偏少；饱和脂肪酸:单不饱和脂肪酸:多不饱和脂肪酸比值为0.87:1.13:1。【结论】随着我国人口老龄化趋势加剧、家庭结构变迁，选择养老机构养老（康养、医养）的比例逐年增加。在此背景下，“成功老龄化”被提出，而合理营养是成功老龄化要素之一。此次被调查养老机构中在住“康养”老年人群的膳食结构以粮谷类为主，蔬菜、蛋类、水产品摄入充分，属“东方膳食模式”，但仍存在部分营养素摄入不足的现象。日均食物摄入中乳类、水果类不足；谷类、蛋类、畜肉类与油脂等摄入偏高；宏量营养素中蛋白质、脂肪和胆固醇摄入占比偏高，且蛋白质的食物来源中豆类食物来源偏低；微量营养素中钠摄入过多；总钙摄入量低于1000mg。因此，建议控制盐的摄入、增加豆类、乳类及其制品的摄入。调查显示：植物源性食物铁来源占比较高，为提高铁的吸收率建议增加含铁丰富的动物性食物摄入。此外，还需增加老人日均水果的消耗量，减少烹调用油；干预在住“康养”老人食用腌制海产品的食用习惯，减少钠盐摄入以降低心脑血管疾病的发生风险。本次被调查养老机构膳食中胆固醇、碳水化合物摄入偏高，建议适量减少主食、无鳞鱼以及蛋类的摄入量，并适度开展适合老年人群的场所户外运动。

关键字 养老机构；老年人群；膳食调查；膳食营养素参考摄入量

分类：全生命周期营养

生命早期营养不良对衰老影响及成年后衰老相关膳食模式的构建

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背景及目的：衰老是一种高度个性化、多因素共同发展的过程。膳食营养作为一个关键的、可塑性的环境因素，在各个生命阶段中具有重要作用。目前尚无法确定产前胎儿期的营养状况，是否会影响成年后的衰老速率，且此影响是否会传递给子代。此外，成年阶段的膳食营养状况是影响衰老进程的另一关键环节，而目前尚无能针对性反应衰老相关生物学过程的膳食模式。因此，本研究从胎儿期、成年期两阶段出发，系统性地分析膳食营养与衰老的关系，依照衰老相关机制针对性地构建与衰老相关的膳食模式，探究膳食模式与死亡风险间的关系。

方法：本研究分为二部分，第一部分选取饥荒人群，以家庭为单位，纳入胎儿期暴露营养不良的参与者及其子代，采用 DNA 印记法、850K 甲基化芯片法等检测并计算端粒长度、甲基化时钟、生物学年龄、炎症及氧化应激水平，以分析胎儿期营养不良对亲代及子代衰老的影响。第二部分基于两项人群研究，分别为 MCNDS 及 NHANES。在 MCNDS 中，应用降秩回归构建衰老相关膳食模式，并分析膳食模式与端粒长度及生物学年龄的关系。同时，将 NHANES 作为外部人群，验证此种膳食模式与端粒长度间的关系。另基于 2003-2014 年 NHANES 的纵向数据，分析膳食模式与全因死亡及死因别死亡间关系。

结果：第一部分研究中，发现胎儿期营养不良暴露组中，端粒长度显著低于非暴露组（P<0.001），生物学年龄的增加速率、血清 IL-1β、IL-6、SOD、ROS 水平及甲基化时钟显著高于非暴露组。第二部分中，利用降秩回归方法，得到了一种衰老相关膳食模式，此膳食模式特征为红肉、动物内脏及薯类的摄入量较多，而乳制品、姜及蔬菜的摄入量较少。横断面的研究中，校正协变量后发现，此种膳食模式与外周血端粒长度呈负相关（β=-0.025，P=0.045），与生物学年龄呈正相关（β=1.159，P=0.003），与血清衰老相关标志物评分呈正相关（β=0.569，P=0.003）。同时，在外部数据中观察到了相似的结果，此膳食模式评分每增加 1 个标准差，对应男性和女性分别额外衰老 2.9 岁及 3.1 岁。经过平均 6.58 年的随访，校正了混杂因素后发现，此种膳食模式显著的增加了全死因死亡及癌症特异性死亡风险（HRs=1.23，95% CI：1.08,1.39；HRs=1.35，95% CI：1.05,1.75）。

结论：胎儿期营养不良可能通过影响表观遗传修饰、炎症氧化应激的生物学过程，加速衰老。同时此影响会传递给其子代，以加速成年后的衰老速率。成年阶段，以多肉薯类，少蔬菜类为特征的衰老相关膳食模式与端粒长度、生物学年龄等衰老评价指标密切相关。同时，长期遵循此种膳食模式，将增加全死因死亡及癌症特异性死亡的发生风险。

关键字 衰老；生命早期营养；膳食模式

分类：全生命周期营养

营养包对我国农村欠发达地区 6~60 月龄儿童营养状况的干预效果评价

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目的：了解我国农村欠发达地区 6~60 月龄儿童营养状况；评价婴幼儿辅食营养包（以下简称营养包）对农村欠发达地区 6~60 月龄儿童营养状况的改善效果；为儿童营养改善政策的实施提供科学数据支撑。

方法：研究对象来自于“早期儿童营养包干预长期营养健康作用评估项目（LHEAITNP）”，该项目为一项前瞻性随机对照研究，监测地区涉及 10 省 15 县，旨在探讨营养包干预对儿童营养状况的近期和远期影响。本研究基于 LHEAITNP 项目 2018-2021 年调查数据，并依据是否服用营养包，将研究对象分为干预组和对照组两组，其中干预组 3034 人，对照组 1632 人。首先对营养包干预效果进行单因素分析，采用 t 检验比较各年份干预组与对照组间血红蛋白水平（Hemoglobin, Hb）、体重、身长或身高、年龄别体重 Z 评分(WAZ)、年龄别身长或身高 Z 评分(LAZ/HAZ)、身长或身高别体重 Z 评分(WLZ/WHZ)等连续变量的差异，采用卡方检验分析贫血率、低体重率、生长迟缓率、消瘦率等分类变量的组间差异。其次采用 Spearman 相关性检验，分析各营养健康结局指标与年份之间的线性关系。然后对营养包干预的长期效果进行评价，采用两水平回归对重复测量数据进行分析，以个体水平为水平 2，不同年份为水平 1，对连续变量和分类变量分别构建两水平线性回归模型和两水平 Logistic 回归模型，评价营养包对 6~60 月龄儿童 Hb 水平和贫血状况、体格发育（体重、身长/身高、WAZ、LAZ/HAZ 和 WLZ/WHZ）、营养不足（低体重率、生长迟缓率和消瘦率）等结局变量的干预效果。

结果：整体而言，2018-2021 年，儿童 Hb 水平由 118.8 g/L 升至 129.2 g/L，贫血率由 23.6%降至 2.4%；儿童体重约增加了 6 kg，身长/身高约增加了 25 cm，三项 Z 评分约下降了 0.1~0.3，各年份间儿童营养不足发生率无明显变化趋势。2018-2021 年，对照组儿童生长迟缓率显著下降，消瘦率略有上升，干预组儿童营养不足发生率一直处于较低的水平。干预组儿童营养状况明显优于对照组，干预组儿童 Hb 水平、体重、身长/身高和三项 Z 评分均高于对照组，贫血率和生长迟缓率低于对照组（P < 0.05）。6 月龄开始为期 18 个月的营养包干预能使 6~60 月龄儿童贫血、低体重和生长迟缓的发生风险分别降低 32% (OR: 0.68, 95% CI: 0.57 ~0.83)、31% (OR: 0.69, 95% CI: 0.50 ~0.97)和 40% (OR: 0.60, 95% CI: 0.45 ~0.81)；相比于对照组，干预组儿童 Hb 水平平均高 0.71 g/L，WAZ、LAZ/HAZ 和 WLZ/WHZ 分别高 0.20、0.14 和 0.17，尚未观察到营养包干预与 6~60 月龄儿童消瘦率之间的关联。

结论：营养包干预政策是提升我国农村欠发达地区儿童营养健康的重要措施。营养包能够明显改善我国农村欠发达地区 6~60 月龄儿童营养状况，显著降低贫血率、低体重率和生长迟缓率，但其改善消瘦状况的效果还有待探索。

关键字 营养包；6~60 月龄儿童；营养状况；两水平回归模型

分类：全生命周期营养

南京市居家养老高龄老年人营养相关疾病特点分析

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目的：了解南京市居家养老高龄老年人营养相关疾病的患病特点，为开展相应健康促进工作、推进健康老龄化提供依据。方法：于 2022 年 5 月至 8 月采用随机抽样的方法，选取南京市主城区居家养老的非卧床老年人，获得其知情同意后，采用在社区集中座谈与服务的方法，摘抄老年人近一年内体检报告中营养相关疾病的内容，包括身高、体重，并计算 BMI；收缩压、舒张压、血红蛋白、空腹血糖、甘油三酯、胆固醇、尿酸水平、B 超检测的脂肪肝状况，参照相关标准进行评判。认真反复核对摘抄内容后，采用双录入方法建立数据库，数据比对正确后，以年龄≥80 岁为高龄老年人，用卡方检验比较其与低龄老年人相关疾病的构成差异，了解其患病特点。结果：（1）本次共调查了 5310 名老年人，其中，60~79 岁者 4979 人，80 岁及以上者 331 人，男性 2127 人，女性 3183 人。高龄老年人消瘦（12.4%　vs 6.1%）、贫血（7.3% vs 2.8%）、高血压（65.0% vs 56.6%）的患病率高于低龄老年人；但超重/肥胖（17.5% vs 26.6%）、糖尿病（24.8% vs 33.4%）、高甘油三酯血症（6.0% vs 12.1%）、高胆固醇血症（45.9% vs 54.5%）、脂肪肝（21.8% vs 40.1%）的患病率低于低龄老年人；且高龄老年人与低龄老年人高尿酸血症患病率（1.5% vs 2.8%）的差异无统计学意义。（2）男性高龄老年人消瘦（10.6% vs 6.3%）和贫血（6.4% vs 2.3%）的患病率均高于低龄老年人，但超重/肥胖（12.8% vs 25.1%）、糖尿病（22.0% vs 30.5%）、高甘油三酯血症（2.8% vs 8.5%）、脂肪肝（21.3% vs 36.8%）的患病率低于低龄老年人，而高血压（63.8% vs 59.9%）、高尿酸血症（2.8% vs 4.2%）、高胆固醇血症（35.5% vs 42.8%）的患病率与低龄老年人的差异无统计学意义。（3）女性高龄老年人消瘦（13.7% vs 6.0%）、贫血（7.9% vs 3.2%）、高血压（65.8% vs 54.5%）的比例高于低龄老年人，但超重/肥胖（21.1% vs 27.5%）、糖尿病（26.8% vs 35.2%）、高甘油三酯血症（8.4% vs 14.5%）、高胆固醇血症（53.7% vs 62.2%）、脂肪肝（22.1% vs 42.4%）的比例低于低龄老年人，而高尿酸血症的比例与低龄老年人的差异（0.5% vs 1.8%）无统计学意义。结论：高龄老年人营养相关疾病同时存有营养缺乏与营养过剩性疾病，以营养过剩病为主，尤以高血压为著，消瘦、贫血的患病率高于低龄老年人，但糖尿病、高甘油三酯血症、高胆固醇血症、脂肪肝的患病率明显降低，而高尿酸血症的患病率变化不大。男、女性高龄老年人消瘦和贫血的患病率均高于低龄老年人，但超重/肥胖、糖尿病、高甘油三酯血症、脂肪肝的患病率低于低龄老年人，而高尿酸血症患病率与低龄老年人的差异无统计学意义。但有所不同的是，女性高血压的患病率高于低龄老年人，高胆固醇血症患病率低于低龄老年人，而男性高龄老年人与低龄老年人两者间的差异无统计学意义。这些差异的出现可能与高龄老年人的生理特点与饮食方式有关。

关键字 高龄老人；营养相关疾病；患病；特点

分类：全生命周期营养

高龄老人营养特点及对策

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目的：了解高龄老年人的营养特点，为制定相关政策措施提供依据。方法：查阅、汇总中外有关 75 岁以上高龄老年人营养特点的文献，分析高龄老年人的营养特点。结果：（1）高龄老年人的食物摄入量低于年轻的老年人。（2）根据中国居民平衡膳食指数对老年人的膳食结构进行分析可见，80 岁年龄组老年人的膳食类型以 B 型为主（膳食中摄入过量问题较少，但存在一定程度的摄入不足，76.9%），其次为 C 型（膳食中的主要问题是严重的摄入不足，15.4%），无 1 人的膳食类型属于 A 型（膳食中摄入不足与摄入过量的问题均较少），提示高龄老年人更易出现食物摄取不足及失衡的倾向。（3）有关能量与营养素摄入状况，无论是国内还是国外，高龄老年人（尤其是高龄独居老年人）大部分营养素的摄入量减少，摄入量达到推荐供给量标准的比例也低于年轻的老年人。此外，国外高龄女性老年人叶酸摄入不足的比例更高。可能与其消化功能进一步减退、缺乏必要的营养配餐、食物选择不当有关。（4）高龄老年人具有营养风险的比例为 46.8%，农村高龄老人具有营养不良风险率的比例 51.2%，营养不良率为 20.4%。独居老年人营养不良的比例 92.3%，具有营养风险的比例为 7.7%，无 1 人为营养正常。（5）高龄老年人贫血的患病率高于低龄老年人，低蛋白血症患病率为 18.4%，高血压的患病率高于低龄老年人，而糖尿病、高甘油三酯血症、高胆固醇血症、脂肪肝的患病率低于低龄老年人，高尿酸血症患病率与低龄老年人的差异无统计学意义。（6）上述结果的出现可能是因为有 80%的 80 岁以上的老年人有感觉的缺失（尤其是嗅觉，咀嚼力仅为青年人的 10%，吞咽障碍的发生率达 33%~48.67%，胃肠道血液量较青年人减少 60%，胰液的分泌量也减少，以上的综合因素使得老年人食物和营养素的摄入减少；高龄老年人不出门的比例高于年轻老年人，家务劳动时间也短；且大部分老年人患有疾病，影响了进食；由于疾病的治疗而服用的药物可影响食欲、营养素的吸收，甚至导致营养素的消耗增多，上述综合因素导致其易发生营养相关性疾病。结论：高龄老年人的营养状况不容乐观，与其摄 食功能减退有关。应实践高龄老年人的膳食指南、以多种形式供餐，努力提高老年人的食欲；并适时进行咀嚼吞咽消化功能评估，以提供适宜的膳食；鼓励其少量多餐，进行必要的营养补充或营养支持、提供适宜的用餐器具，以保证充足食物的摄入，同时合理用药、治疗基础疾病。

关键字 高龄老人；营养；特点

分类：全生命周期营养

合理营养补充对 6 周高原训练期间赛艇运动员机能状态和专项能力的影响

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目的

高原训练可诱发机体的抗缺氧效应，对运动机体摄取、运输、利用氧的能力产生良好的作用，提高机体对低氧的适应和耐受能力。本项目主要研究在给予合理营养补充干预的情况下，6 周高原训练对女子赛艇运动员身体机能监控指标及转项能力的影响，对高原训练效果进行客观评价。

方法

以广东赛艇队 13 名女子轻量级运动员为研究对象，高原训练地点云南会泽（海拔 2100 米），高原训练期间合理膳食，运动员日常规律补充糖电解质饮料、蛋白粉、多元维生素片、维铁泡腾片等运动营养品。通过监控高原训练前后血红蛋白、血尿素、肌酸激酶及专项能力和心率的变化，对高原训练前后运动员的机能指标和训练效果进行分析。

结果

1.高原训练初期与平原相比，血红蛋白有下降趋势，经过两到三周适应训练血红蛋白浓度有了反应性提高，与上高原前相比，升高显著（$p<0.01$），部分运动员达到 140-150g/L 左右（排除了脱水性升高的情况）。至第 6 周达到最高，升高的情况维持至下高原后 1 个月（143g/L）,与高原前相比升高显著（$p<0.05$），上升了 3.8%。

2. 高原训练期间，运动员血尿素值基本较为稳定，从第 1 周开始血尿素有升高趋势，但是大部分运动员基本在 4-7mmol/L 范围内波动，部分运动员在大强度训练后会出现一过性升高的情况，经过休息后很快又恢复正常值和生理值范围，蛋白质分解代谢正常，没有出现明显疲劳堆积的现象，与高原前及高原后相比，没有显著性差异（$p>0.05$）。

3.高原训练期间，血清肌酸激酶整体出现先升高后下降的现象，在高原环境和训练的双重刺激下，在高原训练第 2 到 3 周时 CK 值均值达到最高（377U/L），与高原前后相比均有非常显著性差异（$p<0.01$）。

4.高原训练期间，测功仪专项能力有一定提高。以测功仪 30 分钟 16 桨为例，上高原后前两周测功仪 500 米用时增加了 2 秒，同时平均心率也有所增加；经过高原训练适应后，500m 平均功率变化不大，但是心脏适应能力增强，平均心率下降；下高原后测功仪 30 分钟 16 桨有氧耐力得到一定程度提升，与高原前相比，平均成绩提高 1.2 秒，心率与高原前相比平均下降了 3 次/分。

结论

由于高原环境的特殊性及大负荷训练的影响，合理规律的营养补充对于运动员保持良好的身体机能状态非常重要。赛艇运动员 6 周高原训练后，身体机能状态和测功仪 30 分钟 16 桨的功率得到提升，平均心率有一定程度的下降，说明高原环境所致的低氧和运动缺氧的双重刺激对提升运动员的有氧耐力产生了一定的作用，同时也提示了在加强高原训练监控的同时，需重视运动员的营养补充。

关键字 赛艇；高原训练；营养补充；机能指标；有氧能力

分类：全生命周期营养

妊娠期血清胆固醇变化与产后高胆固醇血症的关系及孕期胆固醇参考值范围：一项动态前瞻性队列研究

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目的：探讨孕妇妊娠期至产后 42 天血清总胆固醇（TC）、低密度脂蛋白胆固醇（LDL-C）及高密度脂蛋白胆固醇（HDL-C）水平及其比值的变化特点，探究孕期胆固醇及其变化与产后高胆固醇血症风险之间的关联，并建立各孕期血胆固醇参考值范围，为科学指导孕妇妊娠期血脂控制提供参考依据。

方法：以 2018 年 11 月至 2020 年 1 月在首都医科大学附属复兴医院定期产检并分娩的孕产妇共 905 例为研究对象，收集孕 6-8 周、孕 16 周、孕 24 周、孕 36 周及产后 42 天血清甘油三酯（TG）、TC、LDL-C、HDL-C 水平。采用逐步多元线性回归分析孕期胆固醇水平与产后胆固醇水平的关联，采用 Logistic 回归和限制性立方样条（RCS）回归分析孕期胆固醇水平与产后高胆固醇血症的关联，并计算优势比和 95%置信区间；采用线性混合效应模型（LME）探讨孕期血胆固醇随时间变化的趋势与产后高胆固醇血症的关联；采用受试者工作特征（ROC）曲线计算各孕期 TC、LDL-C、HDL-C 的参考截断值。

结果：孕期血清 TC、LDL-C 水平及 TC/HDL-C 和 LDL-C/HDL-C 比值均随孕周增加而逐渐升高，至产后 42 天有所下降；孕早期血清 HDL-C 水平逐渐升高，至孕中期开始下降。孕前超重肥胖和 GDM 孕妇的 TC、LDL-C 水平在整个孕期的升高速率相较正常孕妇缓慢，达到的峰值较低，且在产后更难以恢复至正常水平，其孕期及产后的 HDL-C 水平均显著低于正常孕妇。Logistic 回归分析显示，孕 6-8、16、24、36 周 TC 水平均为产后高 TC 血症的危险因素，且风险随孕周增加而降低；各孕周 LDL-C 水平均为产后高 LDL-C 血症的危险因素；各孕周 HDL-C 水平均为产后低 HDL-C 血症的保护因素。线性混合效应模型分析显示，孕期 TC 和 LDL-C 水平随时间变化趋势分别与产后 TC、LDL-C 水平呈正相关，且分别为产后高 TC、LDL-C 血症的危险因素；孕期 HDL-C 水平随时间变化趋势与产后 HDL-C 水平呈正相关，并为产后低 HDL-C 血症的保护因素。基于 ROC 曲线，孕 6-8、16、24、36 周血 TC 水平应不高于 4.64, 5.47, 6.35 和 7.22 mmol/L；LDL-C 水平应不高于 2.50, 2.83, 3.82 和 4.21 mmol/L；HDL-C 水平应不低于 1.22, 1.50, 1.54 和 1.50 mmol/L。

结论：孕妇血清胆固醇水平及其比值在孕期逐渐升高，至产后有所下降。孕期胆固醇水平及其随孕周的变化率可作为产后高胆固醇血症的预测因子。在孕 6-8、16、24、36 周，血清 TC 水平应控制在 4.64, 5.47, 6.35 和 7.22 mmol/L 以下，LDL-C 水平应控制在 2.50, 2.83, 3.82 和 4.21mmol/L 以下，HDL-C 水平应控制不低于 1.22, 1.50, 1.54 和 1.50 mmol/L。孕妇应定期监测血脂水平，及早识别孕期发生的血脂异常，以及时采取治疗措施和营养干预。

关键词：妊娠；总胆固醇；LDL-C；HDL-C；高胆固醇血症；孕期血脂；参考值

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关键字 妊娠；总胆固醇；LDL-C；HDL-C；高胆固醇血症；孕期血脂；参考值

分类：全生命周期营养

2017—2022 年中国市售婴幼儿配方乳粉可食用菌添加情况

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目的:随着人体微生态研究的深入,母乳喂养儿肠道益生菌的健康效应及母乳喂养儿的健康,特别是免疫获益已凸显。实验研究证实,益生菌可以改善婴幼儿急性腹泻、呼吸道感染的风险,对婴幼儿肥胖以及远期代谢紊乱等相关疾病也有很好的预防和治疗作用。尤其是动物双歧杆菌 Bb-12 对提高婴儿抵抗力、改善婴儿健康有很重要的作用,其中部分产品的临床喂养效果得以肯定。但目前我国还未出台任何关于婴幼儿配方食品中可添加的益生菌名单,为适应市场现状, 2022 年 6 月国家卫生健康委发布《可用于婴幼儿食品的菌种名单》和历年来我国新食品原料审批通过的菌株,共 14 种可用于婴幼儿食品。2022 年 8 月,国家卫生健康委发布关于《 可用于食品的菌种名单》和《可用于婴幼儿食品的菌种名单》更新的公告,重新梳理更新了已经批准的这 14 种菌株的菌株名和拉丁名称等,并设置 2 年过渡期来解决新旧名单的衔接事宜。值得注意的是,以上允许在婴幼儿配方乳粉中添加的仅是可食用菌名单,并不是益生菌名单, 也就是说,目前市售婴幼儿配方粉中并没有使用益生菌的相关法规支撑,这些可食用菌是否可以称为益生菌还需要相关科学证据来确定。因此,本研究调查了 2017-2022 年我国已批准的婴幼儿配方乳粉产品中菌株添加情况,对菌株添加种类、添加量等进行统计分析,以期为今后产品生产和法规制定提供基础数据支撑。方法:调查 2017 年 1 月-2022 年 6 月我国已注册批准的婴幼儿配方乳粉产品信息,包括查询平台和包装标签信息,统计分析可食用菌菌株添加种类、添加率和添加量等。结果: 2017-2022 年我国共批准婴幼儿配方乳粉产品 1438 个,其中 434 个(30.18%) 添加可食用菌株。添加菌株 6 个:动物双歧杆菌 Bb-12、乳双歧杆菌 HN019、乳双歧杆菌 Bi-07、发酵乳杆菌 CECT5716、鼠李糖乳杆菌 HN001 和嗜酸乳杆菌 NCFM。添加率占前三位的是动物双歧杆菌 Bb-12、乳双歧杆菌 HN019 和乳双歧杆菌 Bi-07,添加率分别是 79. 72%、18. 43%和 12. 67%。菌株的添加量为 1×106 ~ 6×107 CFU/g, 中位数是 1×106CFU/g。结论：尽管这个添加剂量可满足现行的婴幼儿食品标准中对菌株添加量的规定为不低于 1×106 CFU / g 的要求,但与多个婴幼儿人群动物双歧杆菌 Bb-12 的随机对照实验添加剂量(1×109 CFU/d~1×1010 CFU / d)比较,经不同剂量单位的估算,最低相差 10 倍,最高相差 100 倍。提示我国市售婴幼儿配方乳粉可食用菌添加剂量有待提高,在剂量提高之前,更不应该有任何健康功能宣称。至于提高的具体剂量需要依据循证原则,开展对婴幼儿配方产品中菌株添加量的相关研究,以高质量的随机临床对照研究为基础,推动完善现有的婴幼儿食用菌法规标准, 使得法规更具科学性。

关键字 婴幼儿配方乳粉 菌株 添加率 添加量

分类：全生命周期营养

补充咖啡因对运动表现研究的进展与热点可视化分析

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目的 咖啡因是一种黄嘌呤生物碱化合物，存在于茶、咖啡、苏打饮料和一些药物中。它可以改善情绪、提高认知，并导致儿茶酚胺的释放，从而对运动表现产生积极的影响。本研究旨在运用可视化工具 CiteSpace 了解运动中使用咖啡因的研究进展与新兴热点，为该领域未来的研究提供参考和依据。

方法 基于 2014~2023 十年 Web of Science 核心数据库中，语种为英文的综述和研究论文，进行高级检索，检索式为：TS=(caffeine) AND TS=(exercise)。借助可视化工具 CiteSpace，对相关文献从年度发文量、国家、机构、作者、关键词等方面进行文献计量及可视化分析，对关键词进行聚类，并绘制知识图谱。

结果 （1）最终检索纳入 1121 篇文献，2014~2023 十年期间补充咖啡因对运动表现研究的发文量呈现逐年平稳上升的趋势。发文量最高的国家为美国，机构为圣保罗大学，发文最高的作者为西班牙胡安卡洛斯国王大学的 Juan Del Coso 教授。中国发文量排在全球第 7 名，但发文中心性较低，应与各国机构开展更紧密的合作。（2）除与主题词相关以及意思相近的关键词外，频次前 5 位的关键词依次为“运动表现”、“新陈代谢”、“耐力”、“力量”和“骨骼肌”。（3）研究热点集中于：①含有咖啡因的能量饮料。探究了含有咖啡因的能量饮料安全性与剂量范围。在许多但不是所有研究中，补充咖啡因可以极大地增强各个方面的运动表现，益处包括但不限于肌肉耐力、运动速度、肌肉力量、爆发力、跳跃和投掷表现。②咖啡因提升认知功能和运动表现。咖啡因单独或联合使用对认知功能和身体机能具有促进作用。300 mg（4 mg/kg）的咖啡因通过提升警觉性和注意力，增强一系列基本认知功能。咖啡因增强运动表现的能力是剂量依赖性的，在运动前 1 小时摄入 200~500 mg（3~7 mg/kg）的咖啡因可以提高体能，然而个体间差异很大。③咖啡因改善氧化应激。饮用咖啡可以提升谷胱甘肽水平并改善对 DNA 损伤的保护。然而咖啡类型、剂量和研究持续时间方面高度异质，缺乏相关氧化应激标志物的选择和用于评估的方法，需要进行更良好控制的干预研究。

结论 众多国家、机构和学者对咖啡因在提升运动表现领域开展研究，并深入交流。大部分研究表明，咖啡因通过中枢神经系统和外周组织对认知和运动表现产生积极的影响。在未来的研究中，还需要在咖啡因的有效性、个体差异和氧化应激方面深入研究，进一步探讨咖啡因最佳摄取剂量与时间以及特殊环境下对运动能力的提升作用。

关键字 咖啡因；运动表现；可视化分析；CiteSpace

分类：全生命周期营养

术前预后营养指数与老年患者粗隆间骨折术后谵妄相关性的研究

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目的：术后谵妄是一种常见的术后并发症，并且与发病率和死亡率的增加密切相关，特别是在老年髋部骨折患者中有较高发病率。有研究指出营养不良既是谵妄发生的危险因素，也是谵妄的不良预后。预后营养指数是一种用于评估营养状况的简便工具。然而，关于研究讨论预后营养指数作为营养评估在预测粗隆间骨折术后发生谵妄方面的有效性较少。本研究的目的旨在探讨术前预后营养指数与粗隆间骨折老年患者术后谵妄发生之间的关系。

方法：回顾性分析 2021 年 3 月至 2023 年 3 月北京某三甲医院收治的 267 例接受粗隆间骨折手术的老年患者（年龄≥65 岁）的临床资料。使用谵妄评估量表（CAM）从手术结束后 2 小时开始，至少间隔 6 小时，每日两次对患者进行评估，研究者从护理和医疗记录中收集谵妄的证据（包括幻觉、妄想、躁动、用药等）。主要结局是在术后 3 天出现 POD。根据术前预后营养指数的评估结果，分析术前预后营养指数与发生术后谵妄的相关性。本项使用单变量和多变量逻辑回归分析确定与术后谵妄相关性，并评估预后营养指数与术后谵妄发生之间的关系。使用 ROC 曲线分析评估预后营养指数对术后谵妄的预测价值。

结果：研究期间，267 例老年粗隆间骨折患者中，共有 53 人在手术后 3 天内发生术后谵妄，发生率为 20.0 % 。单变量分析表明，手术时间、麻醉持续时间、高血压、血清白蛋白和预后营养指数在谵妄组和非谵妄组中存在差异（ P < 0.05 ）。多变量逻辑回归分析显示，与营养状况正常（预后营养指数≥50）的老年粗隆间骨折患者相比，轻度营养不良（预后营养指数 45-50）不会增加术后谵妄的风险，而中度至重度营养不良（预后营养指数<45， OR ： 2.65 ; 95 % CI ， 1.22 - 7.53 ）的患者更容易发生术后谵妄。根据 ROC 曲线分析，术前预后营养指数是术后谵妄的预测因子，其截止值为 45.35，曲线下面积为 0.513 （ 95 % CI 0.44 -0.59，P < 0.05 ）。

结论：较低的术前预后营养指数水平与粗隆间骨折手术后老年患者术后谵妄有关。

关键字 老年患者；粗隆间骨折；术后谵妄；营养状况；预后营养指数

分类：全生命周期营养

硝酸盐补充对耐力运动表现的影响研究

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研究目的：人们对健康的重视和需求也不断提高，越来越多的人开始意识到耐力运动对身体健康和心理健康的重要性。虽然硝酸盐是有效的耐力运动营养补剂，但参与运动的人群对硝酸盐的认知不足也不够重视，本研究旨在探讨硝酸盐在耐力运动中的应用。

研究方法：在中国知网、万方、维普等中文数据库,以“运动表现”、“耐力运动”、“硝酸盐”等作为关键词进行检索。在 PubMed、Web of Science 等英文数据库,以 Sports performance、Endurance Sports、Nitrate 等作为关键词进行检索,检索语言不限,检索日期截止到 2023 年 3 月。筛选后获得 9 篇，进行 Cochrane 偏倚风险评估，最终纳入 4 篇文献，采用系统评价的方式对纳入文献进行系统分析。

研究结果：多年来，饮食中的硝酸盐一直被用于心血管疾病和高血压等疾病。国际奥委会 2018 年共识声明认可含有硝酸盐的食物或果汁(包括甜菜根、菠菜和芹菜等)为营养补剂。研究表明，摄入量通常为 300-600 mg。到目前为止，甜菜根汁是最广泛使用的膳食硝酸盐来源。甜菜根汁中含有大量的多酚和抗坏血酸，这两种物质被认为在硝酸盐的还原和一氧化氮的代谢中起一定作用。一氧化氮是一种信号分子，被认为有助于许多对运动代谢很重要的生理功能，包括增强 II 型肌肉纤维的功能;肌肉力量产生的三磷酸腺苷成本降低;线粒体呼吸效率提高;血管扩张，增加肌肉的血液流动。含有大量的无机硝酸盐(NO3-)。消耗转化为 NO2-，然后在肠道中转化为一氧化氮(NO)。NO 对耐力运动员身体机能的影响，包括血管舒张、促进运动肌肉中的血液流动和 O2 调节、线粒体呼吸、摄取葡萄糖能力和整体肌肉收缩与放松能力。这些效果可以提高肌肉运动中的经济性并且可以缓解疲劳，来影响心肺功能，并在一些研究中发现可以提高耐力项目的运动表现。在 2007 年 Larsen 的一项关键研究后，它在耐力运动员人群中引起了极大的关注，补充硝酸盐可以通过减少运动中的氧气消耗来提高耐力表现。需要注意的是，过量的硝酸盐摄入可能会导致不良反应，如头痛、恶心和呕吐等。因此，应该在合适的剂量下使用硝酸盐，并且最好在医生或专业的教练的指导下进行。日后可以探索关于硝酸盐不同剂量或不同人群的干预影响研究。

研究结论：本研究分析有关硝酸盐在耐力运动中应用的相关研究，为参与耐力运动人群提供科学的运动营养指导和建议，以提高身体健康水平。

关键字 运动表现;耐力运动;硝酸盐

分类：全生命周期营养

肌酸补充时机对运动员力量素质影响的研究进展

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目的：肌酸补充作为一种增加肌肉肌酸含量、提高运动表现和促进肌肉力量增长的有效策略已得到广泛应用。然而，关于肌酸补充的最佳时机仍存在争议。本文通过综述和分析相关研究，总结运动前后肌酸补充对运动员力量素质的影响差异，为制定科学、有效的肌酸补充方案提供理论依据。

方法：以“肌酸、补充”为关键词在知网、万方及维普数据库中检索；以“creatine、exercise、performance，strength fitness”为关键词在 PubMed、Web of Science 数据库中检索。排除与研究主题无关或不相关的文献后，对符合需求的文献进行全文阅读和综合分析，提取关键信息并对不同文献间的研究方法、结果和结论进行对比和分析，以确定肌酸补充时机对力量素质的影响。

结果：运动诱导的肌肉血流量增加有助于肌肉对血液中肌酸的吸收和积累。摄入 2g 肌酸可在约 1 小时内达到峰值血浆浓度，而摄入 10g 肌酸可在约 2 小时内达到峰值，并在接下来的 4 小时内保持峰值。根据运动方式、强度和持续时间，血管舒张可能在运动后持续 120 分钟。因此，运动前补充肌酸可从运动诱导的肌肉血流量增加及肌酸达到峰值浓度的较长重叠窗口获益。而一项研究对比了运动前后肌酸补充对健康休闲健美运动员肌肉肥大和力量增加的影响，结果表明，与运动前摄入相比，运动后摄入肌酸可更有效地增加肌肉质量和 1RM 卧推能力，因此提出运动后立即摄入肌酸可能对身体成分和力量更有益。另一项研究对比了运动前后肌酸补充对健康老年人肌肉力量、厚度和身体成分的影响，结果显示运动前后接受肌酸补充的组别之间，指标间无显著差异。迄今为止，关于肌酸补充时机有效性周期最长的一项研究对比了为期 32 周的阻力运动训练前后，健康老年人补充肌酸对肌肉力量和肌肉质量的影响。结果显示，运动前摄入肌酸组与运动后摄入肌酸组均表现出相似的力量增强，且变化大于安慰剂对照组。然而与对照组相比，运动后立即摄入肌酸的受试者肌肉质量增加更显著。

结论：综合各项研究结果，可得出结论，运动前后肌酸补充对运动员力量素质均有显著积极影响，但最佳的肌酸补充时机应为运动前或运动后短时间内。此外，肌酸补充剂的类型、剂量和个体差异等因素也需考虑。未来研究需进一步探讨肌酸补充与不同运动项目、不同运动强度和持续时间之间的关系，以及如何更加科学地进行肌酸补充。

关键字 肌酸、补充时机、力量素质

分类：全生命周期营养

咖啡因补充对耐力运动表现的影响

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研究目的：随着经济水平的持续发展，人们的生活水平有了显著提高，耐力性运动已成为当前体育全球化的热潮。运动营养补剂在耐力性训练中起到了一定的辅助作用，也在一定程度上改善了普通人群的身体素质，从而促进了全民健身的发展。其中，咖啡因作为最受欢迎的运动营养补剂，它能够有效的提高运动员的身体素质水平，同时延缓疲劳。运动爱好人群对于咖啡因在各项运动表现中产生的影响的关注度较高。然而大多数人群对于咖啡因在耐力性运动中应用的认知不够全面，本综述为咖啡因对运动员提高耐力运动表现提供参考与建议。

研究方法：本文采用文献资料法，在中国知网、万方、维普等中文数据库，以“咖啡因”“运动表现”“耐力运动”等作为关键词进行检索。在 PubMed、Web of Science 等英文数据库，以 Caffeine、Sports performance、Endurance Sports 等作为关键词进行检索，检索语言不限，检索日期截止到 2023 年 4 月。

研究结果：咖啡因，是很受欢迎的一种补充剂，在运动中有促进人体机能的作用。咖啡因是一种三甲基黄嘌呤，化学结构类似于腺苷。它增加神经递质释放，提高认知能力，并通过增加 β-内啡肽来抑制疼痛；从能量代谢角度来看，咖啡因有助于运动员脂肪酸并升高体温；众研究建议在运动前 30-90 分钟服用 3-6mg/kg 的适度咖啡因剂量，增益效果可达最大化，这种剂量可以提高耐力运动的运动表现，且服用咖啡因的起始剂量达 3mg/kg 是安全的。研究表明，服用高剂量 9mg/kg 咖啡因并不能进一步提高表现，会引起身体不适的感觉，包括肠胃不适、紧张焦虑、睡眠紊乱。不过最近的一项综述研究提出，咖啡因不会引起更严重的病发症，如水电解质平衡失调、脱水以及运动中耐热水平降低。在一项研究实验中，运动员 60%VO2max 骑行 2 小时后，进行高强度(80%VO2max)运动，然后再进行自行车比赛，在比赛的 80 分钟内，运动员分别被给予低剂量(1.5 mg/kg)或中等剂量(2.9 mg/kg)的咖啡因。与不服用咖啡因组相比，两组咖啡因都能更快地完成耐力训练，而且中剂量组比低剂量组更大程度上改善运动表现。

研究结论：咖啡因在耐力运动中的应用具有一定的瞻远性。在耐力运动前 30-60 分钟摄入 3-6mg/kg 的咖啡因剂量时，运动表现效益达到最大化。而摄入高剂量 9mg/kg 咖啡因并不能发挥更好的作用，可能会产生睡眠障碍和焦虑等副作用。

关键字 咖啡因；耐力运动；运动表现

分类：全生命周期营养

宏量营养素干预肥胖儿童青少年的系统综述

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研究目的：儿童青少年肥胖症的高发病率导致生命早期和成年期代谢并发症的增加，与一般人群中肥胖的患病率一致，参加体育运动的儿童肥胖患病率也很高。适当的营养干预肥胖青少年对于其提升健康和运动能力都很重要。青少年儿童正处于生长发育阶段，应当通过纠正肥胖青少年儿童的饮食和运动行为、平衡膳食、加强运动、改变不良的生活方式，使肥胖儿童青少年能量代谢达到平衡。本综述侧重于宏量营养素对体重管理和 5-18 岁儿童青少年的运动训练益处。

研究方法：本文采用文献资料法,在中国知网、万方、维普等中文数据库,以、“肥胖儿童”、“体力活动”、“宏量营养素”、“运动营养”等作为关键词进行检索。在 PubMed、Web of Science 等英文数据库,以 Obese children、Physical activity、Macronutrients、 Sports nutrition 等作为关键词进行检索,检索语言不限,检索日期截止到 2023 年 3 月。

研究结果：尽可能保持蛋白质平衡被认为是生长的最佳选择。根据成人的研究成果，为了尽可能争取积极的蛋白质平衡，常见的建议是在每餐和运动训练后的恢复期间平均分配蛋白质摄入量。对非超重儿童的研究支持运动后蛋白质摄入的益处；然而，未来需要对儿童全天蛋白质摄入时间进行研究。运动后对蛋白质（0.3g/kg）和碳水化合物（1.0-1.2g/kg/h）的摄入量需要进一步验证。对个体碳水化合物需求要根据儿童青少年的运动参与和竞技水平，可能需要每天 200 至 500g 碳水化合物。在考虑碳水化合物摄入如何帮助提升肌肉的训练适应时，主要关注的是补充糖原储存，以便能量可用于维持训练量并延缓疲劳。碳水化合物的利用可能会随着肥胖和运动训练而变化。脂肪摄入量应遵循一般建议，以满足儿童青少年公认的常量营养素分布范围（25%-35%）并减少饱和脂肪摄入量。没有证据表明额外的饮食脂肪改变会改善儿童的训练适应性。对于儿童青少年肥胖症的治疗，参与运动的肥胖儿童的营养考虑也应该转向个性化。根据性别、年龄和身体活动水平为儿童确定的一般能量需求是比较科学的做法。

研究结论：蛋白质摄入似乎是对健康、体重维持和训练适应性影响最大的常量营养素。碳水化合物的最低需求量约为 130 克/天。关于脂肪摄入，没有令人信服的研究对脂肪摄入进行验证。

关键字 肥胖儿童;体力活动;运动营养;宏量营养素

分类：全生命周期营养

彝族妇女两胎间体重变化对妊娠结局影响的纵向研究

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彝族妇女两胎间体重变化对妊娠结局影响的纵向研究
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目的 探索彝族妇女两次妊娠前体质指数（BMI）变化对本次妊娠结局的影响。**方法** 采用前瞻性队列研究方法，以四川省凉山州 584 名彝族二胎孕妇作为研究对象，在孕早期建卡时测量其身高，通过医院病历系统获得其孕前体重和第一胎妊娠相关信息，并通过问卷调查和孕早期实测体重进行核实，追踪孕妇直至分娩，于分娩后收集分娩方式、分娩孕周、新生儿出生体重及身长等信息。在控制母亲年龄、文化程度、孕前 BMI、孕期增重、妊娠间隔、一胎不良妊娠结局等相关混杂因素后，建立多个 logistic 回归模型分析两胎间 BMI 变化对妊娠结局的影响。**结果** 本次调查对象平均年龄（28.9±5.1）岁，文化程度本科以下比例为 94.2%，孕期未就业比例为 70.2%，家庭人均月收入＜5000 元比例为 83.9%，妊娠间隔（月）0-11、12-23、24-35、≥36 比例分别为 12.3%、19.5%、17.3%、50.9%；调查对象一胎妊娠前 BMI 分布情况：消瘦 12.3%、正常 70.4%、超重 14.0%、肥胖 3.0%（按照中国卫生健康委员会标准划分）；孕期增重分布情况：增重不足 7.7%、增重适宜 54.5%、增重过多 37.8%（按照中国妇女妊娠期体重监测与评价团体标准划分）；调查对象二胎妊娠前 BMI 分布情况：消瘦 8.6%、正常 60.8%、超重 23.6%、肥胖 7.0%；孕期增重分布情况：增重不足 9.1%、增重适宜 43.8%、增重过多 47.1%；调查对象两胎间 BMI 变化（二胎妊娠前 BMI - 一胎妊娠前 BMI）<-1、-1≤BMI 变化≤1、1<BMI 变化≤3、BMI 变化>3 分别为 9.3%、47.6%、27.2%、15.9%；在控制相关混杂因素后，logistic 回归显示：BMI 变化<-1 是小于胎龄儿的危险因素，OR 值（95%CI）为 2.27（1.06~4.84）；1<BMI 变化≤3 是大于胎龄儿和剖宫产的危险因素，OR 值（95%CI）分别为 1.82（1.02~3.23）和 1.52（1.01~2.31）；BMI 变化>3 是妊娠期糖尿病、大于胎龄儿和剖宫产的危险因素，OR 值（95%CI）分别为 2.04（1.03~4.03）、2.29（1.16~4.53）和 1.80（1.04~3.04）。**结论** 相比一胎妊娠，彝族妇女二胎妊娠前 BMI 正常和孕期增重适宜比例均明显减少，孕前超重、肥胖及孕期增重过多问题突出，两胎间 BMI 变化与妊娠期糖尿病、小于/大于胎龄儿、剖宫产密切相关，相关医疗保健人员应关注彝族孕妇两次妊娠前体重变化水平，对产后体重进行定期评估并纳入保健规范，并建议妇女将产后体重控制在理想水平再准备下一次妊娠，以减少不良母婴妊娠结局的发生。
关键词: 彝族妇女，BMI，体重变化，再次妊娠，妊娠结局

关键字 彝族妇女，BMI，体重变化，再次妊娠，妊娠结局

分类：全生命周期营养

茶油的抗运动性疲劳作用及其机制研究

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目的：探究茶油缓解运动性疲劳的作用和相关分子机制及其与肠道菌群的关系。

方法：将 50 只雄性 C57BL/6J 小鼠随机分为空白对照组（NC）、模型对照组（ND）、低剂量茶油组（LCO）、中剂量茶油组（MCO）和高剂量茶油组（HCO）。NC 组与 ND 组小鼠灌胃等体积棕榈油，LCO 组、MCO 组和 HCO 组小鼠分别灌胃茶油 2mL/kg·BW、4mL/kg·BW、6mL/kg·BW，每日 1 次，连续灌胃 28 d。从第 3 周开始，除 NC 组外，其余四组小鼠在灌胃后 60 min 进行跑台运动试验，构建小鼠运动性疲劳模型。第 28 日力竭运动后检测小鼠血清中尿素氮（BUN）、乳酸（LD）含量、肝脏组织肝糖原、抗氧化酶水平等疲劳生化指标。通过 qPCR 检测能量代谢、氧化应激、肌纤维转变和肠道屏障功能等相关基因表达水平。16s rRNA 微生物测序检测 C57BL/6J 小鼠肠道菌群群落结构的变化情况。

结果：1、与 ND 组相比，不同剂量的 CO 干预均可显著延长小鼠跑步时间，并显著降低高强度运动小鼠的 LD 和 BUN 水平，增加糖原储备，提高小鼠体内抗氧化酶水平（$P < 0.05$）。

2、CO 干预能显著增强运动性疲劳小鼠的能量代谢，减轻氧化应激反应（$P < 0.05$）。在肌肉组织中，CO 干预能显著降低 Myostain 和快纤维特异性基因的 mRNA 表达水平，同时显著上调 FNDC5 和慢纤维特异性基因的 mRNA 表达水平（$P < 0.05$）。此外，ND 组小鼠的肠道屏障相关基因的 mRNA 表达水平显著低于 NC 组，经 CO 干预可逆转运动性疲劳诱发的肠道屏障功能紊乱（$P < 0.05$）。

3、16S rRNA 高通量测序结果表明，与 NC 组相比，ND 组中 Allobaculum 相对丰度显著减少，而 Ileibacterium 和 Dubosiella 明显升高（$P < 0.05$）；与 ND 组相比，不同剂量 CO 干预后，Muribaculaceae 和 Alloprevotella 相对丰度均显著增加（$P < 0.05$），其中高剂量 CO 干预后 Allobaculum 的相对丰度显著升高（$P < 0.05$），中剂量 CO 干预后 Ileibacterium 和 Dubosiella 的相对丰度显著减少（$P < 0.05$）。

结论：茶油具有良好的抗疲劳作用，其机制可能与能量代谢、氧化应激、肌纤维转变及肠道屏障功能有关。同时，茶油可有效地改善肠道菌群结构，逆转了高强度运动导致的菌群失调。

关键字 山茶油，抗疲劳，能量代谢，抗氧化，肠道菌群

分类：全生命周期营养

女足运动员跑台力竭运动后补充植物性豆奶和低聚糖有效稳定血糖和血脂

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目的：研究证明运动后补充糖和蛋白质可有效促进糖原和肌蛋白合成。目前国内外最常见的蛋白质补充种类是从牛奶分离提取的乳清蛋白，但其中所含有的乳糖成分会让体内没有足够乳糖酶的人群摄入后容易发生乳糖不耐受症状。另一方面，越来越多崇尚素食的运动员或运动爱好者也在寻求动物蛋白补充的替代品。因此，与乳清蛋白营养成分接近的植物性蛋白成为这些人群的首选。然而目前大多数研究结果基于动物性蛋白的功效评定实验，植物性蛋白是否可以同样有效促进运动后的疲劳恢复相关研究报道非常有限。因此，本研究旨在评估单次有氧耐力力竭运动后补充大豆蛋白对于疲劳、代谢、炎症、肌肉损伤和运动能力的影响，为乳糖不耐受或全素食运动人群提供摄入豆奶替代乳清蛋白有效性的科学依据。方法：招募上海二级运动员 10 名进行实验。空腹状态下进行跑台运动到力竭(P1)，完成即刻和 2 小时分别摄入 450ml 豆奶添加适量低聚糖或等量水添加等热量低聚糖（随机交叉），4 小时休息结束后进行再一次的跑台运动到力竭(P2)，休息开始后每 30 分钟测指血血糖和乳酸（R30，R60，R90，R120，R150，R180，R210，R240），其中 R60、R120 和 R240 三个时间点取静脉血样进行疲劳、血脂反应、炎症反应和肌肉损伤各指标检测。结果：相对于对照组，豆奶组的血糖变化显著较低（R30 p=0.002；R60 p=0.001；R90 p=0.043），胰岛素变化 R60 显著较低（p=0.027）,甘油三酯变化值 R120，R240 和 P2 显著较高（p=0.022；p=0.000；p=0.003）。豆奶组白介素 8(IL-8)在 R120 显著降低（p=0.027），白介素(IL-1)在 R60 显著增加（p=0.019），白介素 1 受体拮抗剂(IL-1Ra)在 R240 显著增加（p=0.011），对照组均无显著变化。豆奶组 P1 和 R60 肌红蛋白变化显著较低（p=0.047；p=0.033）,第二次跑台力竭运动时间两组均显著少于第一次力竭运动时间，但组间无显著差异性。结论：与补充同等热量的低聚糖饮料相比，耐力运动训练后补充植物性豆奶和糖可以帮助维持血糖稳定和正常的血脂水平，有利于后续的耐力运动中机体使用脂肪供能，从而节省糖原便于延长运动时间。同时可缓解力竭运动引起的肌肉损伤和炎症反应，有利于更快的恢复。植物性豆奶可以作为乳糖不耐受人群和全素食运动人群蛋白质补充的有效方法。

关键字 豆奶 植物性蛋白质 血脂 肌肉损伤

分类：全生命周期营养

婴幼儿缺铁性贫血的现状与预防措施

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【目的】 6~24 月龄的婴幼儿是贫血的高危人群，我国 6~11 月龄儿童贫血发生率约为 36.6%，12~23 月龄儿童贫血发生率为 28%而其中缺铁性贫血是最常见的贫血类型，直接影响儿童的生长和智力发育。它是由于铁摄入不足、吸收量减少、需要量增加、利用障碍或丢失过多等原因，引起人体贮存铁缺乏导致血红蛋白合成量减少而发生的一种贫血。重视婴幼儿铁的摄入，预防缺铁和缺铁性贫血的发生对婴幼儿的健康至关重要。

【方法】 通过查阅国内外相关文献和指南，汇总不同年龄婴幼儿铁缺乏的风险因素和预防措施。

【结果】0~24 月龄时婴幼儿贫血的高危人群，① 孕期贫血是婴儿 6 月龄贫血的危险因素，孕期注意营养均衡，孕中晚期每日应增加 20~50g 红肉，每周吃 1~2 次动物肝脏或动物血。根据产检的铁营养状况，使用铁剂进行治疗。② 足月健康的婴儿体内储存有足够的铁，能够维持出生后 4 个月的生长需要。③ 婴儿体内的铁储备在 4 月龄左右逐渐耗尽，纯母乳可能不足以满足出生后 4~6 个月的铁需要，美国儿科学会（AAP）建议，纯母乳喂养的足月儿出生 4 个月后，应给予含铁滴剂或含铁的复合维生素（同时含有维生素 D）强化补充元素铁 1mg/（kg.d）直到饮食中含有足够的含铁食物。对于混合喂养的婴儿来说，母乳喂养的比例占 50%以上的婴儿，也建议 4 个月后给予 1mg/（kg.d）铁剂口服，直至可以引入足够含铁食物。④ 6~12 月龄每天的铁推荐量为 10mg，辅食的质量可能对贫血的预防起到决定性的作用。满 4~6 月龄后添加辅食，首先添加肉泥、肝泥、强化铁的婴儿谷粉等富铁的泥糊状食物。6 月龄标准配方的配方奶可以满足机体对铁的需要。4~6 个月后科学合理地引入含铁辅食，基本可以满足铁的需要。⑤ 1~3 岁幼儿每天铁的推荐量是 9mg，注意红肉、富含维生素 C 的水果蔬菜，促进铁的吸收。避免摄入过量牛奶，增加缺铁性贫血的风险，每天奶量约 500ml。

【结论】铁的充足摄入对婴幼儿时期的智力和体格发育至关重要，需要多方面共同努力，保证婴幼儿阶段铁的摄入，预防和降低缺铁性贫血的发生率。

关键字 婴幼儿;缺铁;贫血

分类：全生命周期营养

咖啡因影响运动表现的潜在机制及其研究进展

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咖啡因，是一种天然黄嘌呤生物碱化合物，也被作为能量饮料的活性化合物，被添加到水、口香糖、薄荷糖和糖果等产品中，可帮助提神醒脑，是世界上广泛摄入的化学物质之一。根据国际食品信息理事会基金会的报告，在 COVID-19 流行期间，美国成年人的咖啡因摄入量高达 96%。目的：2004 年世界反兴奋剂机构禁止名单中删除咖啡因后，精英运动员使用咖啡因的比例也逐渐提高。据报道，2004~2015 年间，监测运动员尿液中含咖啡因浓度从 70%增加到 75%。此外，国际奥委会在膳食补剂中指出，运动前摄入咖啡因可以提高运动成绩，缓解疲劳,提高运动表现。本文系统的综述了咖啡因作为营养补剂，对运动表现的影响及潜在机制，为科学训练、疲劳恢复和新型营养补剂研究提供了强有力的科学理论支持。方法：采用文献资料法，在中国知网、维普等数据库搜索咖啡因、运动表现、作用机制等关键词搜索，在 PubMed、Elsevier、Web of science 在对运动表现多方面影响以及增能作用的研究进展。研究结果：（1）在运动表现方面，对于有氧耐力、肌肉力量、肌肉耐力、跳跃表现和冲刺速度都有不同程度的促进作用。（2）大量文献表明，3~6mg/kg 的咖啡因增能效果最佳，而高剂量的咖啡因摄入过多会产生不良反应，常见的副作用有心动过速、心悸、焦虑、头痛以及失眠和睡眠质量障碍。（3）在作用机制方面，咖啡因抑制腺苷与受体结合是提升运动表现的重要潜在机制，在中枢神经方面，咖啡因通过抑制腺苷与受体结合从而调节多巴胺信号通路，激活运动神经元，促进运动表现；在外周方面，咖啡因摄入可减小脂肪细胞，促进脂肪酸氧化并节省糖原，缓解疲劳，此外还可以促进骨骼肌 Ca2+浓度升高，激活了 cAMP 通路并刺激钙调蛋白依赖性蛋白肌酶 II（CaMKII）、过氧化物酶体增殖受体（PPARβ/δ）、蛋白激酶（AMPK）和 PGC-1α(过氧化物酶体增殖激活受体-γ)来增强骨骼肌中线粒体的生物发生，促进运动表现。结论：咖啡因可以有效改善运动能力，此外，未来还需探究咖啡因在不同情况下提高运动表现的最佳摄取剂量及时间,对今后运动员使用咖啡因提升运动成绩等至关重要。

关键字 咖啡因；运动表现；作用机制

分类：全生命周期营养

中小学生体质与营养状况和生活方式的相关性研究

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目的 儿童青少年是最具可塑性的人群，在此阶段形成良好的生活方式，将对其一生产生深远影响。本文以成都市中小学生体质和生活方式数据为基础，探究体质与营养状况、生活方式之间的内在关系，为学生体质改善措施和学校体育健康课程改革提供依据。

方法 采用分层随机整群抽样。在成都市 20 个区县随机抽出小学、初中、高中各一所，再按年级分层，以教学班为单位进行整群抽样，最终抽取 23191 名学生进行体质测试，其中男生 11559 人，女生 11632 人。体质测试项目包括身高、体重、肺活量、握力、耐力跑（男生 1000m，女生 800m）、立定跳远、视力。以各项体测项目的年级性别组均数和标准差计算 Z 值，作为体质综合评分。另在初一、初二、高一、高二四个年级随机整群抽取 1024 名学生（男生 514 人，女生 510 人）进行生活方式问卷调查。按百分位数将体质指数（BMI）划分为极低、低、正常、高、极高五个等级，比较不同 BMI 等级学生身体素质的差异。同时分析体质状况与饮食、锻炼、睡眠等生活方式的相关性。

结果 （1）调查对象坐位体前屈成绩随 BMI 等级递增，肺活量体重指数和握力体重指数随 BMI 等级递减，正常 BMI 组 50 米跑、耐力跑和立定跳远成绩显著高于其他组（$P<0.05$）。

（2）随着 BMI 等级增加，调查对象的体质综合评分基本呈先升后降的趋势。以 BMI 为自变量，体质综合评分为因变量，共得出 8 个回归方程：

小学 3-4 年级：男：$y=-0.016X^2+0.423X-2.532$，女：$y=-0.005X^2+0.123X-0.588$；

小学 5-6 年级：男：$y=-0.027X^2+0.841X-6.214$，女：$y=-0.012X^2+0.314X-1.741$；

初中各年级：男：$y=-0.038X^2+1.521X-14.666$，女：$y=-0.008X^2+0.163X-0.132$；

高中各年级：男：$y=-0.035X^2+1.428X-14.233$，女：$y=0.007X^2-0.390X+5.160$。

一般 BMI 在正常范围时身体素质最好。

（3）调查对象的肺活量体重指数、立定跳远、视力等项体测指标合格率与锻炼呈正相关（$P<0.05$）；女生 BMI 合格率与饮食、锻炼均呈正相关（$P<0.05$）。

结论 中学生肺活量体重指数、立定跳远、视力状况均与锻炼有关。女生 BMI 与饮食有关。中小学生的体质、营养状况、生活方式相互影响，互为因果。

关键字 中小学生；体质；营养状况；生活方式；相关性

分类：全生命周期营养

我国不同地域老年人群膳食营养摄入与代谢综合征状况

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目的：分析我国不同地域老年人膳食营养摄入与代谢综合征状况。方法：数据来源于 2015 年中国成人慢性病与营养状况监测。按照地理区划和居民膳食特征，将全国 31 省/直辖市/自治区划分为环京津冀地区、东南地区、西南地区和西北地区四大区域。对四大区域共 20193 名 60 岁及以上居民一般情况、生活方式、健康状况等进行面对面询问调查。采用 3 天 24 小时膳食回顾法和家庭食用油调味品称重法进行膳食调查，采用标准方法进行身高、体重、腰围和血压测量。采集空腹静脉血测量血糖和血脂水平。代谢综合征按《中国 2 型糖尿病防治指南(2020 年版)》标准诊断。结果：环京津冀地区老年居民以小麦及其制品、杂粮、蛋类、浅色蔬菜摄入水平较高，大米及其制品、深色蔬菜、猪肉摄入水平低为主要膳食特点；东南地区老年居民摄入较高的大米及其制品、大豆类、深色蔬菜、菌藻类、坚果、猪肉、禽类和水产类，杂粮和薯类摄入低；西南地区老年居民大米及其制品、干豆类、浅色蔬菜、猪肉、食用油和食盐摄入高，杂粮、水果和奶类摄入低；西北地区小麦及其制品、薯类、牛羊肉、奶类、食盐摄入水平高，而水产品摄入水平低。能量和宏量营养素方面，东南地区老年居民每日能量摄入为 1752kcal/d，显著高于其他三地区，西北地区能量摄入最低为 1584kcal/d。四个区域碳水化合物、脂肪和蛋白质的供能比分别为：环京津冀地区（54.9%、32.9%、12.2%），东南地区（46.7%、38.2%、15.1%），西南地区（44.3%、44.9%、10.7%），西北地区（57.1%、31.6%、11.3%）；膳食钠和钾摄入水平分别为：4798mg/d:1538mg/d（3.1:1）、4886mg/d:1829 mg/d（2.7:1）、5021mg/d:1394mg/d（3.6:1）、4735 mg/d:1394 mg/d（3.4:1）。环京津冀、东南、西南、西北地区老年人的代谢综合征患病率分别为 27.7%、19.1%、16.7%、21.8%。代谢综合征各组分中，中心性肥胖、TG 升高、血压升高和血糖升高率在环京津冀地区均为最高，分别为 45.5%、30.7%、82.6%和 24.9%，HDL-C 降低率西北地区最高，为 25.6%。结论：我国四大区域老年人的膳食营养和代谢综合征状况存在显著性差异，需要根据区域特征进行有针对性的健康教育和营养改善。

关键字 老年人；膳食；营养；代谢综合征；横断面研究；

分类：全生命周期营养

基于自我决定理论的母乳喂养动机现状及影响因素研究

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摘要：目的 自我决定理论（SDT）是一种广泛动机和人格社会理论，涉及到健康行为的选择动机。有内在动机的产妇，在母乳喂养过程中会体验到幸福与快乐，并愿意主动进行母乳喂养；与之相反，拥有外在动机的产妇在选择母乳喂养过程中积极性不高，仅仅是为了不让自己感到内疚并获得亲人的认可，才选择母乳喂养。本文基于自我决定理论对初产妇母乳喂养动机现状进行调查，分析其影响因素，并探讨母乳喂养动机与产后母乳喂养时间和纯母乳喂养率之间的关系，为评估产妇母乳喂养动机水平和实施干预提供借鉴。方法 2022 年 11 月~2023 年 4 月，采用便利抽样的方法，选取在潍坊市某三甲医院产科住院分娩的 240 例初产妇作为研究对象，采用一般资料调查表、母乳喂养动机量表（BMS）对出院之前的产妇进行问卷调查，分析母乳喂养动机现状及主要影响因素。在出院当天通知产妇会在产后 1 周、产后 6 周及 12 周通过电话随访评估其母乳喂养情况。将单因素分析中有统计学意义的变量纳入多元 Logistic 回归方程中，分析产妇母乳喂养动机的主要影响因素，以及母乳喂养动机量表与产后随访母乳喂养状况之间的关系。结果 共回收 240 例产妇的问卷资料，回收率为 100%，但在出院后的电话随访中 5 名产妇未接听，予以排除。多元线性回归分析结果显示：年龄、受教育程度、孕期是否接受母乳喂养指导以及家庭支持度是影响初产妇母乳喂养动机的主要因素（P＜0.05）；在产后 1 周、6 周和 12 周电话随访中，母乳喂养动机得分高的产妇，其纯母乳喂养率更高，母乳喂养坚持的时间越久。结论 母乳喂养动机是孕产妇决定开始母乳喂养的重要因素。年龄偏大、受教育水平较高、孕期学习过母乳喂养知识指导以及家庭支持度高的产妇，其母乳喂养的内在动机强烈，愿意进行母乳喂养。母乳喂养动机与母乳喂养时间和纯母乳喂养率呈正相关，医护工作者应早期评估孕产妇母乳喂养的自主动机水平，及时关注母亲的喂养感受，确定对其母乳喂养自主动机有积极影响的关键因素，以实施相应的干预措施，提高纯母乳喂养率，延长母乳喂养的持续时间。

关键字 自我决定理论；母乳喂养；动机；自主动机水平；产妇；母亲；影响因素

分类：全生命周期营养

2016-2017 年中国 6～17 岁寄宿生烹调油和烹调盐摄入状况

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摘　要：目的　分析 2016-2017 年我国 6～17 岁寄宿生烹调油和烹调盐的摄入状况，为我国学校食堂制定减油减盐政策提供科学依据。 方法 数据来源于 2016—2017 年中国学龄儿童与乳母营养健康监测，采用多阶段分层随机抽样方法，在全国 31 省抽取 275 个监测点开展营养健康监测，5177 名 6～17 岁寄宿生为研究对象。采用食物秤称重记录学校食堂连续 3 天烹调油和烹调盐的摄入量，同时记录用餐人次数，依据用餐人员的膳食能量比计算个体烹调油和烹调盐的摄入量。结果　6～17 岁寄宿生烹调油日均摄入量中位数为 29.4g/d，其中 6～8 岁、9～11 岁、12～14 岁和 15～17 岁分别为 24.6g/d、24.0g/d、29.1g/d 和 32.8g/d；男生和女生分别为 31.8g/d 和 26.9g/d；城市和农村分别为 27.8g/d 和 29.4g/d；且在年龄、性别及城乡方面的差异具有统计学意义（$p<0.01$）。烹调盐的日均摄入量中位数为 6.6g/d，其中 6～8 岁、9～11 岁、12～14 岁和 15～17 岁分别为 6.2g/d、7.0g/d、6.8g/d 和 6.6g/d；男生和女生分别为 7.2g/d 和 6.2g/d；城市和农村分别为 6.3g/d 和 6.8g/d；且在年龄及性别方面的差异具有统计学意义（$p<0.01$）。与《中国居民膳食指南（2022》》烹调油和烹调盐推荐摄入量相比,50.7%的寄宿生烹调油日均摄入量高于推荐值，其中 6～8 岁、9～11 岁、12～14 岁和 15～17 岁高于推荐值的比例分别为 48.8%、47.1%、48.5%和 54.3%；男生和女生分别为 55.9%和 45.6%；城市和农村分别为 50.0%和 51.0%；且在年龄、性别及城乡方面的差异具有统计学意义（$p<0.01$）。70.1%的寄宿生烹调盐日均摄入量高于推荐值，其中 6～8 岁、9～11 岁、12～14 岁和 15～17 岁高于推荐值的比例分别为 72.2%、81.4%、70.0%和 65.0%；男生和女生分别为 74.1%和 66.1%；城市和农村分别为 62.7%和 72.9%；且在年龄、性别及城乡方面的差异具有统计学意义（$p<0.01$）。结论　我国 6～17 岁大部分寄宿生烹调油和烹调盐摄入过多。

关键字 营养与健康监测；烹调油；烹调盐；寄宿生

分类：全生命周期营养

生命早期和儿童期的营养状况与成年期糖尿病的关系研究

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糖尿病患病率逐年升高，已成为严重影响健康的慢性病之一。本文拟通过对生命早期和儿童期的营养状况与成年期糖尿病的关系进行研究，以期为糖尿病的早期预防提供科学依据。以生命早期/early life nutrition、儿童期/childhood nutrition 和糖尿病/diabetes 为关键词进行检索，在知网、万方、Pubmed 等数据库中共检索到 376 条结果。后以发表时间（2000-2022）及内容关联度为标准，筛选出 15 条结果并对其进行了综合分析。其中，8 篇队列研究结果显示生命早期和儿童期暴露饥荒，会增加成年后患糖尿病风险，相关系数 OR 值为 1.218-6.20。Wang N 等人对 6897 人的横断面调查显示，与未暴露于饥荒的相比，胎儿期（OR=1.53）和儿童期（OR=1.82）的饥荒暴露与糖尿病发生风险相关。Li YP 等人的研究结论与上述一致，并提出生命早期经历过饥荒，而成年后遵循富裕饮食模式（OR=7.63; P=0.0005）或生活水平高（OR=6.20; P=0.001)会使高血糖风险进一步升高。该结论与张豪杰等提出的生命周期营养失衡的*二次打击学说*一致。这提示早期经历饥荒的个体，成年后健康生活方式对防治糖尿病是必要的。另 7 篇文献提出生命早期营养不良会使糖尿病风险增加，成年后糖尿病患病率为 27%-46%。Rosen AL 等的研究指出，出生时体重<2.5kg 的人，成年期糖耐量受损率为 27%；出生时体重>3.41kg 的人，糖耐量受损率为 6%（p<0.002）。且出生时较瘦的婴儿更易产生胰岛素抵抗（p=0.01）。Santosh 等人的研究也证明婴儿期消瘦与成年期糖尿病之间存在关联（OR=1.36,P<0.001）。王超的研究进一步细分了营养不良暴露时期，发现孕期（OR=6.820,95%CI＝2.568-18.113,P<0.01）、儿童早期（OR=5.275,95%CI＝2.645-10.519,P<0.01）和儿童中期暴露组（OR=2.054,95%CI＝1.228-3.435,P<0.05）糖尿病风险增高。有研究提出其机制与节约基因表型、代谢酶障碍等有关，这与 DOHaD 理论保持一致，即生命早期的环境因素会影响成年后代谢疾病的发生风险。总之，生命早期暴露于饥荒或营养不良会导致成年后糖耐量受损与胰岛素抵抗，增加患糖尿病的风险。因此将糖尿病防治窗口前移具有重要意义。

关键字 生命早期；儿童期；饥荒；营养不良；糖尿病

分类：全生命周期营养

常见营养补剂对运动能力的影响

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目的：近年来我国体育事业蓬勃发展，运动健儿们取得的优异成绩不仅依赖于日常的努力训练，营养补剂对运动员运动能力的提升也至关重要，同时越来越多的的健身健美爱好者也对营养补剂产生了极大的兴趣，因此了解各类营养补剂对运动能力的影响显得尤为重要。

方法：通过检索知网、PubMed、百度学术相关文献进行归纳总结。

结果：1.氨基酸类运动营养补剂具有加速糖酵解，提高糖代谢效率，加速运动时血液的输出，增强心肌收缩力，从而能够更好地维持运动能力的作用。例如，长时间运动会使体内牛磺酸的消耗增多，而牛磺酸补剂能够改善运动员耐力并维持骨骼肌正常收缩能力。同时，运动员在运动过程中会产生大量的自由基，牛磺酸补剂可以减少自由基的产生，同时也加速了机体清除自由基的速度，减少了其对机体组织细胞的侵害,抵抗疲劳，提高运动能力。2.左旋肉碱是人体组织中的一种特殊支链氨基酸。左旋肉碱提高机体运动能力的方式之一是增加 ATP 的含量。左旋肉碱补剂还能改善机体血液循环，提高机体蛋白质的吸收速率，从而对运动损伤的恢复带来积极的影响。3.电解质类营养补剂能够补充运动时大量消耗的钠、钾、钙、镁等电解质，维持机体正常的生理机能。电解质营养补剂补充后，可以降低运动员体内的血乳酸浓度，长时间运动后有利于加速血乳酸恢复速率，这对提高有氧运动能力有重要意义，同时电解质补充还可以缓解运动次日的机体疲劳。4.糖类是人体主要的供能物质，在运动中被大量消耗，因此糖类营养补剂显得尤为重要。运动前和运动中合理的补糖可以减少糖原消耗,提高血糖水平，有利于提高运动能力。运动后尽快恢复体内糖储备有助于恢复运动能力。5.肌酸类运动营养补剂可以补充脑、骨骼肌、神经系统所需要的能量，也可以增加肌肉的爆发力、耐力、肌力、最大输出功率，进而改善运动能力。长期补充肌酸可抵消肌肉中 GLUT-4 蛋白含量的下降，这有助于机体对葡萄糖的摄取和利用，调节糖酵解过程，从而提高机体运动能力。

结论：目前，运动营养补剂成为许多运动领域人士的选择，可以利用其快速补充体能、消除疲劳、降低运动损伤风险、提高运动能力，但在选择运动营养补剂时，一定要做好质量把控，依据自身情况进行选择，以免造成不利的后果。

关键字 营养补剂；运动能力；氨基酸；左旋肉碱；电解质；糖；肌酸

分类：全生命周期营养

大学生抑郁现状及影响因素分析

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了解大学生抑郁流行现状及其影响因素，为干预和防治大学生心理健康提供科学依据。采用自填式网络在线调查问卷，调查问卷内容包括大学生基本信息、健康相关行为和流调中心抑郁量表9题简版量表（The Center for Epidemiologic Studies Depression Scale，CES-D9 Scale）。基本信息包括性别、年龄、月生活费等，健康相关行为包括身体活动、静态行为、睡眠行为、体重控制、吸烟饮酒行为等。流调中心抑郁量表9题简版量表（CES-D9）验证了三个维度的因素结构，即积极症状、消极症状和躯体与活动迟滞状态，用于测量抑郁状态的水平，CES-D9简表共9题，包含了4个抑郁情绪，2个积极情绪和3个躯体与活动迟滞状态的项目，该量表为4级评分法，所有题分数相加为抑郁风险总分，总分范围为0~27，分数越高，代表被试抑郁风险越高，以10分和17分为抑郁倾向和抑郁高风险的划界分。该抑郁量表的测量内容包含了国际上关于抑郁症认定的大部分症状，包括抑郁心境、精力减退、注意力差以及睡眠困扰等，但是不包括精神运动性改变以及存在自杀观念等。该量表作为抑郁症状筛查量表，具有很好的信效度和灵敏度。本文采用随机整群抽样方法选取565名大学生进行流调中心抑郁9题简版量表（The Center for Epidemiologic Studies Depression Scale, CES-D9 Scale）筛查，采用卡方检验、多因素logistic回归方法筛选出大学生抑郁的可疑危险因素。被调查的565名大学生中，抑郁检出率为31.7%，Logistic多因素分析结果表明存在睡眠问题与大学生抑郁情绪有关（OR=2.800，95%CI=1.920~4.083）。综上，大学生的心理健康状况不容乐观，大学生抑郁情绪检出率较高，尤其是存在睡眠问题的学生的抑郁率更高，应该高度重视大学生心理健康问题，建议将大学生作为心理卫生教育和抑郁干预研究的重点对象，加强有关抑郁症方面的健康教育，为大学生提供心理疏导与咨询服务，预防大学生抑郁。

关键字 抑郁情绪，大学生，睡眠

Category: The thematic areas

关于哪种饮食更好的争论，素食主义者，还是弹性素食主义者？
The debate of which diet is better, vegetarian, or flexitarian?

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Background: A flexitarian diet is a plant-based diet that allows for occasional consumption of meat or animal products. This diet emphasises whole, minimally processed plant-based foods, such as fruits, vegetables, whole grains, legumes, nuts, and seeds, but also includes lean meat, fish, and dairy in moderation. A vegetarian diet, on the other hand, eliminates all meat and fish, but may still include dairy and eggs. Both diets have been associated with health benefits, such as reduced risk of heart disease, type 2 diabetes, and mental health improvements. Braakhuis and colleagues have investigated the effects of various dietary patterns on health and how research participants can be supported to make dietary behaviour change.

Methods: The methodology covers two key randomised controlled trials and details can be sourced via clinical trial registrations: 1) red meat versus vegetarian diet intervention in young adults: https://clinicaltrials.gov/ct2/show/NCT04869163; 2) Flexitarian diet intervention in participants with metabolic dysfunction: www.anzctr.org.au Trial details: ACTRN12622000906752

Results: Our findings suggest neither the vegetarian or flexitarian are superior to each other regarding blood lipids, glucose control, body weight and other biomarkers of health. However, participants did struggle to adhere to the vegetarian diet, when compared to the flexitarian diet, despite an interest in following a vegetarian diet. Nutrition education and support underpins successful nutrition interventions.

Conclusions: Ultimately, the decision to follow a flexitarian or vegetarian diet come down to personal preferences and dietary needs. Both dietary patterns can be nutritionally balanced and meet daily nutrient requirements. Research using nutrition and social science frameworks to support nutrition education and behaviour change is recommended.

Key words metabolic health, red meat, young adults, nutrition behaviour

Category: The thematic areas

使用中国版营养环境测量工具（NEMS）对中国大学校园饮食环境进行评估

Assessment of Chinese university campus food environment using the Chinese Version of the Nutrition Environment Measurement Tool for Stores

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Background and Objectives: Despite widespread education and healthy eating campaigns, the prevalence of excessive body weight remains stubbornly high in many countries. Particularly, young adults (18-24 years) in universities are frequently exposed to an environment that promotes unhealthy eating behaviors. Hence, this study aims to assess on-campus food environment in a Chinese university by using a validated tool, the Chinese Nutrition Environment Measurement Survey for Stores (C-NEMS-S).

Methods and Study Design: The food outlets assessed in this investigation were located within two campuses in an urban university in Shijiazhuang City, China. We employed a modified version of the validated C-NEMS-S tool. The advantage of using the C-NEMS-S included adjustments to food categories that reflect the actual food composition, to definitions of foods that belong to each category, and to scoring criteria and weighting.

Results: A total of 52 on-campus food outlets were categorized into general canteen outlets (n 43), self-served outlets (n 7), or beverage outlets (n 2). General canteen outlets and self-served outlets were further categorized into subtypes. C-NEMS-S scores were significantly different across food outlet types (P = 0.0024) where the difference between noodle and rice outlets were the most prominent (P = 0.0415). The scores for starchy tubers (P < 0.001), dry beans (P < 0.001), vegetables (P = 0.0225), and fruits (P < 0.001) were significantly different across food outlet subtypes. Vegetables and meat & poultry availability scores were significantly higher than fruits, seafoods, and dry beans. Outlets selling healthier options were scarce and only appeared in “grains” (n 2) and “meat and poultry” (n 2) categories.

Conclusions: C-NEMS-S highlighted the types of food outlets located in a Chinese university as well as assessing their food availability. However, it needs to be extensively accustomed to the Chinese university food environments for generalization in Chinese universities.

Key words university; food environment; food availability; healthier options; dietary behaviour

Category: The thematic areas

120 例结核性脑膜炎临床特征分析
Clinical analysis of 120 tuberculous meningitis

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Objective This study investigated the early clinical features, cerebrospinal fluid changes, laboratory tests, imaging features and regression of tuberculous meningitis, aiming to improve the clinicians' ability to diagnose and treat the disease.Methods The clinical data of 120 cases, which were diagnosed as tuberculous meningitis in Qingdao Chest Hospital from October 2013 to February 2022 and had complete medical history, physical examination, cerebrospinal fluid and CT or MRI examination, were retrospectively analyzed. Results The 120 patients in this group were aged 15-85 years and the ratio of male to female was 1.26:1. The main clinical symptoms contained fever, headache, nausea with vomiting, meningeal irritation and neurobehavioral abnormalities. Atypical symptoms include dizziness, cough, obstruction, weight loss, fatigue, night sweats, and mental and behavioral disorders. The hospital admissions in stage Ⅰ (32.5%), stage Ⅱ (36.7%) and stage Ⅲ (30.8%) were similar. The number of protein was increased in 1000-4000 mg/L (60.8%), as well as sugar and chloride reduction ratios were 45.8% and 70.8% respectively. The positive rate of mycobacterium tuberculosis culture was only 10%. The positive rate of MRI in cranial imaging examination (80.3%) was higher than that in CT (31.7%). In all cases, 94 patients were improved, 24 patients were deteriorated and 2 patient were died.Conclusion In this study, the tuberculous meningitis was mainly middle-aged and elderly, and the staging of the disease at admission was helpful to judge the prognosis. The clinical symptoms and imaging changes were diverse, the early stage of CSF changes was atypical, and the etiological detection rate was low. Patients suspected of TBM should have detailed medical history, complete cerebrospinal fluid examination and imaging for comprehensive diagnosis. As long as TBM diagnosis is not excluded, experimental anti-tuberculosis therapy should be given.

Key words Tuberculous meningitis; Clinical analysis; Diagnosis; Cerebrospinal Fluid

Category: The thematic areas

Factors Affecting Malaysian Consumers to Use Diet-Related Health Apps to Support Healthy Food Purchase

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Background and objective: Unhealthy dietary patterns are the major risk factor for chronic non-communicable diseases (NCDs). However, the evidence for using health apps to support healthier food purchasing is more limited. The aim of this study was to explore the factors that affect consumers to use health apps to support healthy food purchases.

Method: A total of 269 Malaysians aged between 18 to 59 years old were recruited in Kuala Lumpur. A questionnaire comprising socio-demographic characteristics, usage of health applications and factors of using health apps to monitor healthy food purchases was used to collect data. All data were analysed using SPSS version 21.

Results: Approximately half of the participants (52%) had at least one health application on their mobile phone but 77% of them reported they downloaded health apps but no longer used them. Logistic regression analysis showed that there is significant relationship between education level (OR = 1.603, 95% CI: 1.150 - 2.234) and gender (OR = 1.926, 95% CI: 1.022 - 3.629) with the use of health apps. There was no statistically significant for age, ethnicity, marital status and income level ($p > 0.05$). Participants emphasized the functionality such as ease of use, information that provided and the setting in the app can be customized, were the priority consideration before using the apps. In addition, the personal data is safely guarded, easy and free to use, educational content and the interaction platform to communicate with health professionals are provided, which were the factors to affect the participants using health apps.

Conclusion: The current findings provide further guidance to app developers as well as researchers on future studies regarding mobile health app implementation.

Key words Health Apps, Malaysian, Healthy Food Purchase, Consumers, digital health

Category: The thematic areas

Prevention of diabetic nephropathy

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Background and Objectives:

In Japan, about 40,000 patients each year enter the new hemodyalisis in which 40% comes from diabetes mellitus.

Methods and Study Design,

Recently, the negative spiral of the uremic toxin through gut-kidney axis has been found under the condition of chronic kidney disease (CKD). Uremic dysbiosis is associated with endotoxemia and chronic inflammation, disrupting the intestinal barrier and depletion of beneficial bacteria producing short-chain fatty acids.

We deleted rice protein from the brown rice bran layer by a special combination of enzyme solution and Lactobacillus plantaris. This fermented low protein genmai (FLPG) is approved for the product and process JAS.

Results, and Conclusions

FLPG is characterized by (1) energy as same as white rice, (2) protein content is less than 0.2 g/ 100g boiled rice, (3) potassium being almost zero, (4) phosphorus being less than a quarter, (5) presence of dietary fiber, (6) g-oryzanol, and (7) antioxidant ability. These improved the negative spiral of the gut-kidney axis caused by uremic dysbiosis and leaky gut.

Dietary therapy for CKD patients is challenging to control both energy source intake and protein restriction simultaneously. We asked the patients to replace their staple foods with a FLPG package without restricting side dishes. A preliminary intervention study of 3 months of FLPG improved constipation by increasing Blautia wexlerae, Bifidobacteria, acetic acid, and decreasing harmful bacteria.

As expected, the protein intake decreased from 60 g to 50 g a day. So, people can easily practice a low protein diet to decrease protein intake.

Comparing pre-and post-assessment is a more straightforward and practical method under the solution-oriented strategy.

Key words diabetes, chronic kidney disease, prevention, gut-kidney axis, low protein fermented genmai

Category: The thematic areas

代谢组学角度揭示4种多环芳烃联合暴露致大鼠脂代谢紊乱
Disturbed lipid metabolism induced by PAH4 combined exposure in rats: from metabolomics perspective

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Background and Objective: While PAH4 (sum of benzopyrene, chrysene, benz[a]anthracene, benzo[b]fluoranthene) has been proposed as better marker than benzopyrene for assessing overall PAHs exposure in foodstuff, the toxicological information about PAH4 remains exactly rare. This study aims to investigate PAH4 induced toxicity profiles in rats by using UPLC-MS/MS metabolomics approach and evaluate the toxicity dose effect based on benchmark dose (BMD) method.

Methods: Male rats were daily exposed by gavage to 0, 10, 50, 250, 1000 μg/kg·bw PAH4 for consecutive 30 days. After final exposure, rats were sacrificed and blood and organs were collected. Serum liver function indexes (ALT, AST) and oxidative stress indexes (CAT, GSH-Px, SOD and MDA) were detected. Lipid indexes (TG, TC, HDL-C, LDL-C) were measured in serum and liver. Hematoxylin-eosin (H&E) staining were used to identify pathological alterations of liver. Serum metabolomics were conducted and the BMD analysis was based on sensitive toxicity endpoints with dose-effect relationships.

Results: PAH4 exposure induced hepatotoxicity including increased relative liver weight, hepatocyte swelling and degeneration, elevated serum AST and GSH-Px level. Serum metabolomics revealed lipid metabolites were significantly upregulated in dose groups, suggesting PAH4 exposure may perturb lipid metabolism. Increasement of hepatic TG further evidenced PAH4 induced lipid metabolism disorder in liver. Based on elevated hepatic TG content, the 95% lower confidence value of BMD (BMDL) was estimated as 4.28 μg/kg·bw, providing a more protective reference dose than the known BMDL (340 μg/kg·bw) derived from cancer endpoint.

Conclusions: PAH4 exposure induced disturbed hepatic lipid metabolism and this toxicity effect should be further concerned when conducting risk assessment of PAH4 since it is more sensitive than carcinogenicity.

Key words Polycyclic aromatic hydrocarbons; Hepatotoxicity; Lipid metabolism; Metabolomics; Benchmark dose

Category: The thematic areas

MALT1 蛋白酶活性在 TLR 介导的 IRF 信号通路中的作用
The role of MALT1 protease activity in TLR mediated IRF signaling pathway

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Mucosal associated lymphoid tissue lymphoma translocation protein1 (MALT1) plays a key role in both innate and adaptive immunity. As the only known human paracaspase, MALT1 can cleave 12 different substrates to regulate multiple signaling pathways. Since MALT1 activation has been found to be closely related to certain malignant B-cell lymphoma (e.g., ABC-DLBCL) and some autoimmune diseases, inhibition of MALT1 protease activity may become an attractive strategy to treat these diseases. However, due to the complex signaling network regulated by various MALT1 substrates (including unknown ones), it still remains unclear how the inhibition of MALT1 paracaspase activity impacts on the immune signaling of inflammatory responses. In this study, we aimed to investigate the role of MALT1 protease activity in regulating innate immune signaling in inflammatory responses. Three different MALT1 inhibitors were employed: MI-2 (catalytic site), mepazine and MLT-748 (both act at allosteric site). We first used reporter cells of NF-kB and IRF activation to screen a variety of inflammatory signaling pathways including Toll-like receptors (TLR), TNF-a, IL-1b and IFN-β. We found that all inhibitors were able to significantly down-regulate TLR4 induced IRF activation. Such inhibition was confirmed by immunoblotting of TBK1 and IRF3 activation. Interestingly, the inhibition of IRF signaling was pronounced by MI-2 than the other two inhibitors. The expression of downstream genes controlled by IRF pathways, such as IFN-β, CCL5, CXCL10, ISG15 and ISG16, were all reduced by the MALT1 inhibitors. Our findings suggested that MALT1 may participate in regulating the LPS-TBK1-IRF3 signaling pathway; and we will further investigate which substrate of MALT1 primarily governs this signal transduction. This work demonstrated a new role of MALT1 protease function in innate immune signaling, which may provide new therapeutic potentials of MALT1 inhibitors in treating inflammatory diseases.

Key words MALT1, Innate immunity, IRF, TLR4

Category: The thematic areas

藏族成人双能x线吸收法和生物电阻抗分析评估的一致性验证

Validation of assessment with the use of dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) in Tibetan adults

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Background: Body composition (BC) may help predict health outcomes, and different devices can measure and estimate it. Bioelectrical impedance analysis (BIA) is a simple, non-invasive, low-cost device which broadly applied for BC measurement but needs to be validated agreement with Dual-energy X-ray absorptiometry (DXA), which is a reliable method for assessing BC.

Objectives: We aimed to evaluate the validation of BIA measures with DXA as reference in Tibetan adults residing in Qinghai, China.

Methods and Study Design: In this cross-sectional observational study conducted in 2022 among Tibetan adults (n=901) in Qinghai province, BC was estimated using BIA and was compared with that accessed by DXA. Correlation and Bland and Altman analysis were performed to investigate methods agreement.

Results: A total of 855 participants were included in the analysis. Concordance correlation coefficient for total fat mass (FM) and total lean mass (LM) between BIA and DXA were 0.91 and 0.89 for the whole sample, indicating fairly good relative agreement. The bias of BIA for total FM and total LM was -0.15 kg (-0.58%) and -1.49 kg (-3.51%) compared with DXA, respectively, whereas the bias for percentages of total FM and total LM was 0.91% (2.46%) and -1.74% (-2.80%), respectively. Absolute limits of agreement of DXA with BIA were wide, particularly for total FM in obese men and women and for total LM in overweight men.

Conclusions: BC assessed using BIA and DXA had good agreement at group level, but was not ideal at individual level.

Key words body composition, DXA, bioelectrical impedance, ethnic minority

Category: The thematic areas

认知训练和有氧锻炼对社区健康老人大脑灰质体积的影响

The effects of cognitive training versus aerobic exercise on gray matter volume in the community-dwelling elderly

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Objective: Aging is associated with gray matter volume (GMV) reduction and cognitive decline. The impact of cognitive training and aerobic exercise on brain structural volume remains unclear. The aim of this study was to investigate the unique contributions of cognitive training and aerobic exercise to GMV in community-dwelling older adults.

Methods: 100 healthy community elderly were randomly assigned to the cognitive training or aerobic exercise groups to receive 24 sessions over 3 months, or to a healthy control group. At baseline and 12-month follow-up, structural magnetic resonance imaging was obtained to detect ROI-based gray matter volumes, and cognitive function was evaluated by the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). We used the repetitive measure analysis of variance (ANOVA) to evaluate the training effect on ROI-based GMV, and structural difference co-variance analysis to investigate inter-regional difference coordination patterns.

Results: There were significant time × group interactions effect on the four ROI gray matter volumes, including the left posterior orbital gyrus (POrG) (only this ROI survived after FDR correction), left posterior insula (PIns), left subcallosal area (SCA), and left transverse temporal gyrus (TTG). Compared with baseline, the left POrG volume was only significantly increased in the aerobic exercise group at the 12-month follow-up, while it was significantly decreased in the healthy control group, and was not change in the cognitive training group. Furthermore, compared with cognitive training group, structural difference co-variance between the left POrG and left TTG was increased in the aerobic exercise group; and compared with aerobic exercise group, structural difference co-variance between the left SCA and left TTG was decreased in the healthy control group.

Conclusion: Collectively, these findings suggest that both cognitive training and aerobic exercise can delay GMV reduction in aging populations, and aerobic exercise shows better benefits when compared to cognitive training.

Key words Cognitive training; Aerobic exercise; Gray matter volume; Aging; Structural difference co-variance

Category: The thematic areas

川贝流浸膏对 PM2.5 所致肺损伤大鼠的可能机制

The Possible Mechanisms of Fritillaria cirrhosa D.Don Fluid Extract on PM2.5 Matter-Induced Lung Injury in Rats

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Background PM2.5 can cause lung damage when inhaled into the body, causing inflammatory dysregulation and damage to the organism. *Fritillaria cirrhosa D.Don* is commonly used in the treatment of lung diseases.

Objective This study aimed to investigate the mechanism related to the effect of *Fritillaria cirrhosa D.Don* fluid extract on PM2.5-induced lung injury in rats.

Methods SD rats were randomly divided into blank group, model group, and low, medium, and high dose group, 10 rats in each group. The model group, and low, medium, and high dose groups were treated with PM2.5 (12mg/kg/bw, 2ml/kg/bw) by tracheal drip every other day for three times, and the blank group was treated with an equal dose of saline every other day three times to establish the lung injury model. 48h later, the low, medium, and high dose groups (262.71, 525.42, 1050.84mg/kg/bw) were gavaged with *Fritillaria cirrhosa D.Don* fluid extract solution, and the blank and model group were gavaged with equal doses of pure water (10ml/kg/bw) for 28 days. After the test, the expression levels of miRNA-21, PI3K/PI3K, AKT/AKT, mTOR/mTOR, and autophagy marker protein LC3-II/LC3-I were measured in lung tissues.

Results The results showed that miRNA-21 expression and LC3-II/LC3-I ratio were increased in the low, medium, and high dose groups compared with the model group, while the positive expression rates of P-AKT and P-mTOR were decreased, but none of them were statistically different ($P > 0.05$). In addition, the positive expression rate of P-PI3K was significantly lower in the high-dose group compared with the model group ($P < 0.05$).

Conclusion *Fritillaria cirrhosa D.Don* fluid extract may antagonize the effect of PM2.5-induced lung injury by inhibiting the PI3K-AKT-mTOR pathway in rats.

Key words Lung injury; Rats; Fritillaria cirrhosa D.Don; PM2.5; Autophagy

Category: The thematic areas

个性化营养干预改善超重肥胖中国成年人健康状况的随机对照临床试验

Personalized nutrition intervention improves health status in overweight/obese Chinese adults: a randomized controlled trial

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Background: Overweight and obesity increase the risk of noncommunicable diseases (NCDs). Personalized nutrition (PN) approaches may provide tailored nutritional advice/service by focusing on individual's unique characteristics to prevent against NCDs.

Objective: We aimed to compare the effect of PN intervention with the traditional "one size fits all" intervention on health status in overweight/obese Chinese adults.

Methods: In this 12-week randomized controlled trial, 400 adults with BMI ≥ 24 kg/m2 were randomized to control group (CG, n=200) and PN group (PNG, n=200). The CG received conventional health guidance according to the Dietary Guidelines for Chinese Residents and Chinese DRIs Handbook, whereas the PNG experienced PN intervention that was developed by using decision trees based on the subjects' anthropometric measurements, blood samples (phenotype), buccal cells (genotype), and dietary and physical activity (PA) assessments (baseline and updated).

Results: Compared with the conventional intervention, PN intervention significantly improved clinical outcomes of anthropometric (e.g., body mass index (BMI), body fat percentage, waist circumference) and blood biomarkers (e.g., blood lipids, uric acid, homocysteine). The improvement in clinical outcomes was achieved through behavior change in diet and PA. The subjects in the PNG had higher China dietary guidelines index values and PA levels. Personalized recommendations of "lose weight", "increase fiber" and "take multivitamin/mineral supplements" were the major contributors to the decrease of BMI and improvement of lipid profile.

Conclusion: We provided the first evidence that PN intervention was more beneficial than conventional nutrition intervention to improve health status in overweight/obese Chinese adults. This study provides a model of framework for developing personalized advice in Chinese population.

Key words personalized nutrition, diet, physical activity, genotype, phenotype, clinical trial

Category: The thematic areas

高原低氧暴露人群高尿酸血症患病特点及不同暴露时间与血尿酸的相关性分析

Characteristics of hyperuricemia in plateau hypoxia exposed population and association between different hypoxia exposure time and blood uric acid

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Objective:To analyze the characteristics of hyperuricemia in people exposed to plateau hypoxia, and to explore the effect of plateau hypoxia exposure time on the level of serum uric acid. Methods: A total of 192 serum samples from people exposed to hypoxia at high altitude (4000 meters above sea level) at different times were collected, and the blood serum uric acid was detected by automatic biochemical analyzer. The plain age-matched population was used as control. Independent sample t-test was used to compare the mean values between groups, and the counting data were tested by chi square test, Spearman correlation analysis was used to explore the association between plateau hypoxia exposure time and level of serum uric acid. Results:The prevalence of hyperuricemia and the level of blood serum uric acid in plateau hypoxia exposed population were significantly higher than those in plain living population ($p<0.001$). The prevalence of hyperuricemia in Han and Tibetan men was significantly higher than that in Han and Tibetan women ($p<0.01$; $p<0.05$). There was no significant difference between Han men and Tibetan men, Han women and Tibetan women. The level of blood serum uric acid in Han men was significantly higher than that in Tibetan men ($p<0.001$) and Han women ($p<0.01$). Han women were significantly higher than Tibetan women ($p<0.001$). There was no association between plateau hypoxia exposure time and serum uric acid levels. Conclusion:The prevalence of hyperuricemia in people exposed to plateau hypoxia was significantly increased. There was no statistically difference between nationalities, but in gender. High altitude can cause a significant increase in blood uric acid concentration, especially in Han men. There was no association between the increased level of serum uric acid and the exposure time of plateau.The monitoring of blood uric acid levels in people at high altitude should be strengthened in the future.

Key words plateau hypoxia; hyperuricemia; characteristics; correlation analysis

Category: The thematic areas

患者报告结局在我国心理健康领域应用研究

Application of patient-reported outcome measurements in mental health-related clinical trials in mainland China

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Objectives: International health policy and researchers have emphasized the value of evaluating patient-reported outcomes (PROs) in clinical studies, while the characteristics of patient-reported outcomes in mental health in China are not well established.

Methods: A cross-sectional study of interventional clinical trials of mental health conducted in mainland China from January 1, 2010, to June 30, 2022, Trials data were retrieved from the Chinese Clinical Trial Registry and ClinicalTrials.gov. The trials were divided into the following three groups: (1) explicitly specified PROs (registration mentioned the use of PRO instruments precisely), (2) implicitly specified PROs (registration mentioned the use of PRO instruments, which were not clarified), or (3) PROs not mentioned (registration did not mention the use of PRO instruments).

Results: Of 1683 eligible trials in total, 1 224 (73.9%) used the explicit PRO instruments and 202 (12.0%) mentioned the use of PROs but did not include the names of the assessment instruments. From more than 265 thousand participants included in the registered trials, data on 22 thousand (85.4%) patients were scientifically collected by PRO instruments. Depressive disorders (36.9%), insomnia disorders (18.7%), and neurocognitive disorders (16.3%) were the most common conditions listing explicitly PRO instruments. The most common instruments for PRO measurements were the Hamilton Depression Scale, Pittsburgh Sleep Quality Index, and Hamilton Depression Anxiety Scale.

Conclusions: The major increase from 2010 to 2022 in the number of clinical trials of mental trials originating in mainland China. While PRO instruments as primary and secondary outcomes were still not widely used in clinical trials. Future studies should fully consider patients' feelings and standardize the use of PRO tools, which is conducive to the construction of mainland China's mental health cause.

Key words Patient-reported outcomes; Randomized Clinical trials; Primary outcomes; Secondary outcomes; Mental health

分类：其他方向与主题

药食同源的植物寡糖对睡眠的调节作用

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目的：失眠是最为常见的睡眠问题，中国成年人失眠发生率达 38.2%，高于全球失眠发生率（27%），超过 3 亿中国人有睡眠障碍。长期失眠影响个体的正常生活和工作，增加患心脑血管疾病等多种疾病的风险，并易产生抑郁、焦虑等精神症状。而安眠药等药物治疗具有一定的副作用，不适于长期服用。因此，开发药食同源的纯天然功能食品，以食疗的形式改善睡眠，安全性好，具有巨大的应用空间。本研究从经典名方药食同源的食材中获得植物寡糖（为益生元类物质），评估其对睡眠的调节作用，并探讨其可能的机制。

方法：利用脑电肌电采集分析系统和无创睡眠监测系统等睡眠监测设备监测正常小鼠和模型小鼠的自主活动情况和睡眠状况；采用行为学相关实验仪器同步观测模型小鼠的精神症状变化；利用 16s 菌群测序观察小鼠的肠道菌群丰度及多样性的变化；利用 RNAseq 技术评估肠道组织昼夜节律相关的基因表达状况；同时采用微透析技术分析小鼠脑内血清素的变化。

结果：在生理条件下，该植物寡糖可明显减少小鼠的自主活动量，降低中枢神经兴奋性，但对小鼠睡眠/觉醒量无明显改变；在病理条件下，该植物寡糖可增加模型小鼠总睡眠时间和日间睡眠时间，并减少觉醒次数，同时改善小鼠的抑郁、焦虑等精神症状。相关机制研究中，菌群测序结果显示，该植物寡糖能明显增加微生物组丰度（richness）和逆辛普森多样性（inverse Simpson diversity），改善香农多样性（Shannon diversity），上述指标与睡眠总时间呈正相关，与睡眠碎片化呈负相关。肠道菌群可通过参与生物钟基因的表达及参与调控肠道昼夜节律影响睡眠，包括参与基因表达（脂质代谢、营养物运输相关）的同步振荡及血清素及其代谢产物的同步振荡等。而血清素是调节睡眠和情绪的关键神经递质：缺乏血清素会导致入睡困难、早醒、多梦、醒后没有恢复感，同时也与痛觉和睡眠体温调节有关。RNAseq 结果显示，该植物寡糖明显改善小鼠肠道 shank3、Npas2、Per2 以及 Nalcn 等昼夜节律相关基因表达；微透析结果显示该植物寡糖能明显增加脑内血清素含量。

结论：该植物寡糖可通过增加微生物组丰度和逆辛普森多样性，改善香农多样性，调节昼夜节律基因表达和血清素，从而对睡眠产生积极影响。这些结果表明，该植物寡糖可作为一种安全有效的功能食品或食品补充剂，用于改善睡眠质量和调节睡眠周期。

关键字 植物寡糖，益生元，睡眠，肠道菌群，昼夜节律，血清素

分类：其他方向与主题

大学生正确使用营养素补充剂的影响因素

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大学生正确使用营养素补充剂的影响因素
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摘要：目的 了解大学生正确使用营养素补充剂的影响因素，为制定相应的干预措施提供依据。 方法 采用随机整群抽样的方法抽取南京市 2 所高校共 3033 名大学生，经过其知情同意后采用匿名问卷调查的方法以了解其基本信息、营养素补充剂知识的知晓状况、营养素补充剂知识的来源、使用营养素补充剂的动机、使用营养素补充剂的目的、营养素补充剂的来源、使用的营养素补充剂的种类和使用营养素补充剂的频率。在使用过营养素补充剂的大学生中，将使用营养素补充剂以弥补膳食不足者作为正确使用组（86 名），其余作为对照组（1019 名），比较两组之间各相关因素的差异，再对差异有统计学意义的因素进一步做 Logistic 回归分析，根据 OR 值将其区分为大学生正确使用营养素补充剂的促进因素和妨碍因素。结果 与对照组相比，正确使用组中男生（50% vs 34%）、医学院校（94.2% vs 70.9%）、毕业于非城市中学（36.0% vs 24.5%）、营养素补充剂知识得分合格（72.0% vs 54.5%）、主动使用营养素补充剂（45.3% vs 34.4%）、听讲座受启发后使用营养素补充剂（15.1% vs 7.0%）、以弥补膳食不足为目的使用营养素补充剂（66.3% vs 40.2%）的大学生的比例较高，而从网络媒体途径获取营养素补充剂知识（43.0% vs 62.6%）、受他人嘱咐后使用营养素补充剂（23.3% vs 42.4%）、以全面加强营养为目的使用营养素补充剂（21.0% vs 38.7%）或以其他目的使用营养素补充剂（12.7% vs 21.1%）的大学生的比例较低。正确使用组中年级、专业、月消费水平以及是否学习过营养知识、是否听说过营养素补充剂、从父母朋友、课堂书本、报刊杂志及其他途径获取营养素补充剂知识、经同学朋友介绍使用营养素补充剂、自己购买或父母朋友等赠送获得营养素补充剂的大学生的比例与对照组的差异未见有统计学意义。二分类非条件 Logistic 回归分析结果显示，男生（OR=1.658，95%CI：1.047～2.628）、营养素补充剂知识得分合格（OR=1.964，95%CI：1.191～3.240）、以弥补膳食不足为目的使用营养素补充剂（OR=1.789，95%CI：1.258～2.543）为大学生正确使用营养素补充剂的促进因素，而非医学院校（OR=0.207，95%CI：0.082～0.525）、毕业于城市中学（OR=0.564，95%CI：0.348～0.914）、从网络媒体途经获取营养素补充剂知识（OR=0.499，95%CI：0.315～0.792）为大学生正确使用营养素补充剂的妨碍因素。结论 学生类型、营养素补充剂知识知晓状况与获得途径、使用目的为影响大学生正确使用营养素补充剂的因素。

关键词：大学生；营养素补充剂；正确使用；影响因素

关键字 大学生；营养素补充剂；正确使用；影响因素

分类：其他方向与主题

体质指数正常人群血清铁蛋白、血尿酸水平与代谢相关脂肪性肝病的关系研究

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【摘要】 目的 代谢相关脂肪性肝病（metabolic associated fatty liver disease，MAFLD）目前已成为全球患病率最高的慢性肝病。肥胖、2 型糖尿病、代谢障碍是 MAFLD 相关进展期纤维化的高危因素。但是体质指数（body mass index，BMI）正常的中国人群 MAFLD 代谢特点尚无定论。本研究以 BMI 中国正常参考值为标准确定纳入人群，尝试了解体重正常的 MAFLD 人群血糖、血脂、血压的代谢特点，分析血清铁蛋白、血尿酸水平与 MAFLD 的相关性，旨在探索中国体重正常人群 MAFLD 的铁蛋白、尿酸等代谢特征。 方法 选取 2022 年 3 月至 12 月在浙江省余姚市人民医院和余姚市中一健康管理中心接受健康体检的 BMI 在正常值范围的（18.5kg/m^2≤BMI＜24.0kg/m^2）受试者为研究人群。收集研究对象的性别、年龄等人口学基本特征，身高、体重等人体测量结果，血压值，空腹血糖、糖化血红蛋白、总胆固醇、甘油三酯、高密度脂蛋白胆固醇、低密度脂蛋白胆固醇、丙氨酸氨基转移酶、天门冬丙氨酸氨基转移酶、血红蛋白、血清铁蛋白、尿酸等实验室检测结果，以及腹部 B 超检查结果。根据 MAFLD 诊断标准，结合肝脏 B 超和 2 项以上代谢异常结果，将研究对象分为 MAFLD 组（n=290）和对照组(n=1522)。采用统计软件包 R (The R Foundation; http://www.r-project.org; 版本 3.6.3)和易侕统计(http://www.empowerstats.com,X&Y Solutions, Inc., Boston, MA)进行统计学分析。正态分布计量资料以均数±标准差表示，非正态分布计量资料以中位数和四分位间距[M(QL,QU)]表示。计数资料以 n（%）表示。以 P<0.05 认为差异有统计学意义。比较两组研究对象的基本人口特征、糖代谢指标、脂代谢指标、肝功、以及血尿酸、血清铁蛋白的差异情况，分析 BMI 正常人群 MAFLD 的代谢特征。 结果 与对照组相比，MAFLD 组男性比例更高（占 70.34%），并且年龄更大（50.46 ± 10.31 岁）（p<0.05）。与对照组相比，MAFLD 组研究对象的糖化血红蛋白、空腹血糖更高（p<0.001）；与对照组相比，MAFLD 组研究对象的收缩压、舒张压均更高（p<0.05）；与对照组相比，MAFLD 组研究对象的总胆固醇、甘油三酯均更高（p<0.05），而高密度脂蛋白胆固醇更低（p<0.05）。与对照组相比，MAFLD 组研究对象的丙氨酸氨基转移酶、天门冬丙氨酸氨基转移酶更高（p<0.05）。与对照组相比，MAFLD 组研究对象的血红蛋白、血清铁蛋白水平均更高（p<0.001）；与对照组相比，MAFLD 组研究对象的血尿酸水平更高（p<0.001）。 结论 体重正常的 MAFLD 人群仍有男性比例较大、年龄较大的特点。体重正常的 MAFLD 人群仍可能存在血糖代谢异常、高血压风险增加、血脂代谢异常和肝功能受损的问题。尿酸和血清铁蛋白的增加提示其可能与 MAFLD 发生或者疾病进展有关，具体作用机制尚需进一步验证。体重正常的 MAFLD 人群中血糖、血脂、血压的代谢机制是否与肥胖 MAFLD 人群一致尚需进一步验证。

关键字 关键词：代谢相关性脂肪肝病 体质指数　铁蛋白　尿酸

分类：其他方向与主题

孕妇血清维生素 D、钙离子及血脂水平与子痫前期及妊娠结局的影响研究

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【摘要】 子痫前期（preeclampasia,PE）是妊娠期特有的疾病，也是妊娠期高血压疾病中最严重的一种，其严重程度可持续进展；该疾病的临床表现一般为妊娠 20 周后，以高血压、蛋白尿等为主要表现，也可伴有其他器官功能的损害，对母体及胎儿均有不利影响，严重威胁母儿健康，易引起多种并发症和不良妊娠结局，发现或治疗不及时可导致母体出现高血压和其他器官功能的损害，如肝功能、肾功能异常及子宫胎盘功能障碍；且近年来发病率呈上升趋势。但子痫前期的病因和发病机制尚未完全阐明，且疾病过程较为复杂。故本研究的目的是探究孕妇血清维生素 D、钙离子、血脂水平检测指标与子痫前期（preeclampasia,PE）及妊娠结局的影响因素。方法 选择 2021 年 1 月 1 日至 2023 年 1 月 1 日，于乌鲁木齐市妇幼保健院进行产前检查，并分娩的 166 例子痫前期孕妇作为观察组，另随机选同期 200 例正常孕妇作为对照组；按照子痫前期的诊断分级标准，分别将其纳入非重度子痫前期组和重度子痫前期组，检测三组孕妇血清维生素 D、钙离子、血脂水平及妊娠结局指标。结果 单因素分析结果显示非重度子痫前期组、重度子痫前期组孕妇血清维生素 D、钙离子及高密度脂蛋白水平，显著低于对照组，差异具有统计学意义（P<0.05）；而重度子痫前期组和轻度子痫前期组孕妇血清肌酐、尿酸水平显著高于对照组，差异具有统计学意义（P<0.05）。重度 PE 组孕妇血清总胆固醇及甘油三酯水平显著高于非重度 PE 组和对照组，差异具有统计学意义（P<0.05）；非重度子痫前期组和重度子痫前期组产妇不良妊娠结局早产、孕晚期流产、胎盘早剥发生率均明显高于对照组，且重度子痫前期组产妇不良妊娠结局高于非重度子痫前期组和对照组，差异具有统计学意义（P<0.05）；非重度子痫前期组和重度子痫前期组新生儿并发症胎死宫内、胎儿生长发育迟缓、低出生体新生儿窒息发生率均明显高于对照组，且重度子痫前期组新生儿并发症高于非重度子痫前期组和对照组差异具有统计学意义（P<0.05）；多因素 logistic 回归分析的结果显示，血清维生素 D、钙离子、高密度脂蛋白、尿酸、肌酐水平，均为孕妇发生子痫前期的独立影响因素（OR=15.078、4.631、0.358、1.007、1.035,95%CI：1.819～124.979、2.638～8.129、0.214～0.696、1.003～1.010、1.007～1.065，P<0.05）。结论 与同期正常孕妇相比，子痫前期孕妇血清维生素 D、钙离子、血脂、尿酸及肌酐水平发生明显变化，应及时检测子痫前期患者以上指标，并给予有效处理与治疗，从而降低孕妇发生子痫前期的风险，对改善孕产妇的妊娠结局具有重要意义。

关键字 子痫前期；维生素 D；钙离子；血脂；妊娠结局

分类：其他方向与主题

低碳饮食是返璞归真的饮食结构能有效纠正内分泌紊乱

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低碳饮食是指三大供能营养素占比中，碳水化合物所占比例低于 26%的一种饮食营养结构。恰巧与哺乳纲动物的母乳营养配比想接近，而母乳是自古以来所有哺乳动物沿袭至今亿万年之久，始终如一为了哺育下一代的标志性饮食结构，无论是物种间的差异并不大，乃至是不同区域人类饮食结构变化，也会表现出接近的母乳三大营养素结构相近的结果。并且无论是食肉动物、食草动物、还是杂食性动物的母乳都毫无例外的表现出低碳水高脂肪特点，这正是大自然的神奇之处，引用达尔文的进化论也不难推断，物竞天择，适者生存的理论下，所有哺乳动物唯有保留母乳营养结构的合理性，营养均衡的特性，才能够适应幼崽在获取最佳营养结构下，健康茁壮的成长，尽早实现抵御外敌和适应恶劣的自然环境的要求，

中国低碳医学联盟专家共识中也强调，低碳饮食是治疗多种慢性代谢性疾病的一种营养治疗方案，据中国居民膳食指南推荐摄入 55%-60%碳水化合物供能比的建议，和三大产能营养素在体内代谢的特点分析，当人们进食后，由于碳水化合物供能快，且主要以葡萄糖的形式由肝脏门静脉进入体液循环，并激发连锁反应，首先是肠促胰素的释放，接下来是大量胰岛素被释放进入肝脏门静脉，将葡萄糖转化为糖原储备，食物中摄入的碳水比例越高，总量越多，体内葡萄糖代谢所需的胰岛素就相应也越多，并且长期采取高碳饮食将势必造成身体长期处于需要释放大量胰岛素转运葡萄糖的状况，由于胰岛素属于体内唯一具有降低血糖作用的内分泌激素，与身体其它内分泌激素具有不同程度的拮抗作用，过多的胰岛素释放，势必造成体内其它内分泌激素被迫增加释放量的结果，由此拉开了内分泌激素的紊乱的对抗。

而低碳饮食恰恰是通过减少了碳水化合物的摄入量，降低了碳水化合物的供能比，从而对胰岛素的需求量降低，持续的低碳水饮食能逐渐降低胰岛素的整体水平，有效纠正高胰岛素血症。通过缓解了内分泌激素的拮抗作用。实现纠正整体内分泌激素紊乱的收效。从而缓解各种由于内分泌激素紊乱所造成的慢性代谢性疾病。正因为内分泌激素紊乱的状况被低碳饮食所纠正，因此由于内分泌紊乱导致的相关疾病也因此得到缓解。这就是低碳饮食通过简单的改变饮食营养结构，轻松调节整体内分泌激素紊乱的奥妙之所在。

关键字 低碳饮食　　内分泌紊乱　　高胰岛素血症

分类：其他方向与主题

中国四省 55 岁及以上人群水产品消费与帕金森病前驱期的关联

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背景 随着我国进入深度老龄社会，帕金森病（Parkinson's disease, PD）患病形势持续加重，严重威胁着我国中老年居民的身心健康和生活质量。帕金森病前驱期（Prodromal Parkinson's disease, pPD）是延缓或阻止 PD 进展的关键阶段，膳食营养作为调节神经系统氧化平衡的重要因素日益受到关注。

目的 分析中国四省 55 岁及以上人群水产品消费与 pPD 相关结局的纵向关联。

方法 研究资料来自“神经系统疾病专病社区队列研究”2018-2019 年基线和 2020-2021 年随访调查数据，选择具有完整的基线人口学信息、生活方式、体格测量、膳食调查以及两轮 PD 风险因素筛查数据的 55 岁及以上人群，并排除能量摄入异常、患有严重精神疾病或服用精神药物、基线为可能或极可能 pPD 者，最终纳入 8836 名研究对象。基于国际帕金森和运动障碍病协会的研究标准评估研究对象的 pPD 相关结局情况：pPD 后验概率（连续型变量）、风险/前驱标志数（计数资料）、可能或极可能的 pPD（二分变量）；应用食物频率问卷调查法获得过去 12 个月的膳食数据，计算水产品消费量并分为未消费组和消费者消费量三等分组。采用秩和检验比较不同特征研究对象 pPD 后验概率的差异；采用 t 检验或方差分析比较不同特征研究对象风险/前驱标志数的差异；采用卡方检验比较不同特征研究对象可能或极可能 pPD 检出率的差异。采用广义估计方程模型（Generalized Estimating Equation, GEE）分析基线水产品消费与 pPD 相关结局的纵向关联。

结果 2018-2019 年过去一年中未消费水产品的人群比例为 21%；水产品消费量最高三分位组的消费量中位数是 43.51 g/d；2020-2021 年研究对象 pPD 后验概率的均值为 1.59%，中位数为 0.78%，女性、有工作、睡眠时间合理、无相关药物使用史者的 pPD 后验概率低于相应特征组的其他人群；年龄越低、文化程度越高、家庭人均月收入水平越高的人群，pPD 后验概率越低（p<0.05）；风险/前驱标志数的平均值为 3.52，中位数为 3.00，男性、75 岁及以上、初中及以上文化程度、家庭人均月收入＜1000 元、饮酒、睡眠时间较多、有相关药物使用史、有重金属暴露史的人群风险/前驱标志数高于同组其他人群（p<0.05）；可能或极可能 pPD 的检出率为 0.32%（28 名），男性检出率（0.53%）高于女性（0.16%），75 岁及以上年龄组检出率（1.06%）高于 55~64 岁（0.13%）和 65~74 岁年龄组（0.22%）（p<0.05）。GEE 回归分析结果显示：与水产品未消费组相比，水产品消费量 T3 组在调整人口学、生活方式和健康相关协变量的模型中与 pPD 后验概率呈负向关联（p-trend<0.05）；水产品消费量 T1-T3 组的风险/前驱标志数存在线性下降的趋势（p-trend<0.05）；且水产品消费量 T2 组检出可能或极可能的 pPD 的可能性降低了 72.2%（95%*CI* 0.081~0.961, p-trend>0.05）。

结论 水产品适量消费人群的 pPD 后验概率、存在风险/前驱标志的数量、检出可能或极可能 pPD 的风险较低。

关键字 帕金森病前驱期；水产品；55 岁及以上人群

分类：其他方向与主题

益生菌通过肠道菌群控制 2 型糖尿病的机制研究进展

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【研究目的】随着人们生活条件的提高，2 型糖尿病（Type2 diabetes, T2DM）的发病率越来越高，预计到 2045 年将有 7.83 亿人患糖尿病。近年来，肠道菌群与 T2DM 的关系逐渐收到重视。肠道菌群可分为有益菌、有害菌和共生菌,益生菌是具生物活性的微生物，通常通过宿主摄食过程进入体内并在肠道定殖，调节了肠道内环境菌群结构的平衡，打造优良的肠道微生态，对人及动物产生有益影响，益生菌现已被广泛应用于临床实践中。本综述的主要目的是概述益生菌如何调节肠道菌群来预防或治疗 T2DM 的机制，为益生菌更广泛的应用到预防和治疗 T2DM 及其相关疾病中提供参考。

【研究方法】运用文献资料法，以“2 型糖尿病”、“益生菌”、“肠道菌群”及“Type2 diabetes”、“Probiotics”、“Gut microbiota”等为关键词，通过查阅中国知网、PubMed、万方等数据库，对相关文献进行分析与总结。

【研究结果】肠道微生物群被广泛认为是维持体内平衡最重要的组成部分之一，与人类及其他哺乳动物的健康和疾病密切相关，许多疾病的发生都伴随着肠道微生物的紊乱。研究显示，饲喂益生菌饲料后，高脂肪饮食喂养的小鼠显示出肠道微生物群组成的变化，小鼠体内革兰氏阳性细菌和放线菌(Actinomycetes)数量减少。目前，大量的动物试验结果表明，一些种类的双歧杆菌、植物乳杆菌、干酪乳杆菌和鼠李糖乳杆菌等益生菌通过增加肠道有益菌比例及改善肠道菌群失调，从而缓解体内代谢紊乱和平衡能量消耗，进而表现出显著的降血糖作用。一些益生菌常常被用来改善微生物群、调控机体免疫、缓解机体疾病并维持机体健康，益生菌能够调节肠道微生物群，从而缓解疾病，促进机体健康。。

【研究结论】益生菌可以在人体肠道定植，改善人体肠道菌群，调节代谢，维护肠道系统平衡。益生菌缓解及治疗糖尿病主要作用机制包括调节免疫反应和改善肠屏障，改变肠道菌群，增加短链脂肪酸含量，降低氧化应激及抗氧化作用，抑制与葡萄糖吸收相关的酶的活力，增加胆盐水解酶活性和吸收或吸附胆固醇，并且各个机制是相互关联作用共同达到抗糖尿病的功效。在体外寻找更多筛选降糖菌株的方法，为具有缓解糖尿病作用的益生菌产品的研发奠定一定的基础。但是糖尿病机制复杂多样，个体之间存在着特异性，加之不同益生菌的作用机制及其效果也有所不同。因此，未来应在综合考虑以上各因素的基础上探寻更多的降糖靶点，做到“对症下药”来更好的缓解糖尿病。

关键字 益生菌；2 型糖尿病；肠道菌群

分类：其他方向与主题

一种控量控速控温的鼻饲辅助装置

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题目：一种控量控速控温的鼻饲辅助装置**目的**：鼻饲技术是一种营养支持治疗的方法，通过将特殊营养液通过鼻子插入胃部，为需要营养支持的病患提供必需的营养成分。然而无论是通过文献查阅还是临床调研，本团队发现现有鼻饲装置存在鼻饲液温度、鼻饲液的流速和流量控制、成本、装置繁琐程度等方面的问题，这些问题都会给护士和患者带来或多或少的不良影响。基于此，本团队在对已有专利的特点和技术创新热点进行分析后，设计了一种控量控速控温的鼻饲辅助装置，引入了自动化控制，实现了“控量”“控速”“控温”三个特点，取代现有一次性产品，并减轻医护人员的工作负担。研发设计中，考虑到作为一款医疗器械，选用医用级 PP 材质、不锈钢等材料制作，为鼻饲辅助装置的实现起到了重要的保障作用。为了实现本产品的推广，本团队进行了市场前景分析，通过行业政策法规和同类产品比较，制定了营销策略和可持续发展规划等，助力于本产品的可行性。**方法**：现有文献与专利调研、前往北京大学第一医院进行临床调研，发现现有装置存在的缺陷后进行发明设计**结果**：调研部分：鼻饲技术仍存在技术缺陷,包括鼻饲液温度、饲液的流速和流量控制、成本、装置繁琐程度等方面的问题。主要问题有：①鼻饲液温度：一些研究指出，鼻饲液温度过高可能会引起黏膜损伤、喉部疼痛等问题。然而，目前很少有鼻饲装置能够对饲液温度进行控制。因此，需要开发出能够实现饲液温度控制的鼻饲装置。②饲液的流速和流量控制 饲液的流速和流量控制是鼻饲技术中非常关键的一环，但现有装置在这方面存在多种问题。例如，一些装置只能实现简单的流速控制，而不能对流量进行精确的调节；另外一些装置则存在流速波动大、调节不精确等问题。这些问题会导致患者的饲喂过程不稳定，可能会对患者的健康造成风险。③成本问题：现有的鼻饲装置成本较高，这也是制约其推广的一个因素。④繁琐的安装过程：现有的鼻饲装置通常需要在患者的鼻腔内放置一根饲管，并通过该管向胃肠道输送营养物质。然而，安装过程繁琐，需要严格掌握技巧。

成功设计出一种控量控速控温的鼻饲辅助装置**结论**：基于上述，笔者在对已有专利的特点和技术创新热点进行分析后，设计了一种控量控速控温的鼻饲辅助装置，引入了自动化控制，实现了“控量”“控速”“控温”三个特点，取代现有一次性产品，并减轻医护人员的工作负担。**关键词**：鼻饲，控量，控速，控温，发明设计

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关键字 鼻饲，控量，控速，控温，发明设计

分类：其他方向与主题

孕前营养是否均衡对围产期孕妇体质指数（BMI）轨迹变化的影响

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目的：孕前及围产期饮食营养对成功妊娠和对胎儿及孕妇本身健康发育具有极其重要的影响。围产期膳食结构失衡或缺乏关键的营养物质会导致孕妇和胎儿健康状况不良，而营养结构的失衡体现在“营养过剩”和“营养不良”并存。营养过剩会导致孕妇血糖升高、体质指数（BMI）过高及肥胖等问题。而围产期孕妇 BMI 是影响母婴健康的重要因素，但目前关于不同孕产期 BMI 的发展轨迹及影响因素的证据十分有限，故本研究的目的在于探索孕妇在围产期 BMI 的发展轨迹及孕前是否营养均衡对其影响，旨在为本地区孕妇合理增长 BMI 提供参考依据。 方法：采用方便抽样法。在宁夏某妇幼保健院开展的一项妊娠纵向随访研究，研究对象为 2022 年 8 月-2023 年 4 月以怀孕 12 周至产后 42 天以内的完整完成孕 早期、孕中期、孕晚期及产后问卷评估的 418 名女性。所有调查者自愿参加，签署知情同意书。本研究经过学校伦理委员会伦理学批准。调查内容包括人口学特征、 产检信息及社会心理因素等。采用 Mplus8.0 软件构建潜变量增长模型（LCGM）， 探究孕妇围产期 BMI 变化趋势是否存在异质性,探索并确定总体中各亚组的发展轨迹及其轨迹特征；利用 Wald 检验和 x 2 检验探究轨迹亚组影响因素分析。 结果：在不分组的模型拟合中，根据 418 名孕妇围产期的体重变化，确定了 4 条 不同的围产期 BMI 增长轨迹（人数比例分别为：A 组（最低组）89 人，B 组 156 人，C 组 124 人，D 组（最高组）49 人），各组均在孕 14 周出现速率转折点，转 折点后 BMI 增长速度明显加快。孕前营养越不均衡的孕妇，初次妊娠、多次怀 孕、年龄越小、城市居住、婚姻状况良好、学历越低和家庭年收入越低的比例越 高。在按孕妇孕前是否营养均衡分组的模型拟合中，均可分别拟合多个亚族，曲 线截距差异与斜率差异均有统计学意义（P<0.05），孕前营养不均衡的孕妇，围 产期 BMI 增速越快。结论：宁夏地区孕妇孕 14 周后体重增长速度加快，孕前营养不均衡的孕妇，围 产期 BMI 增速越快。提示，孕前营养不均衡对孕妇围产期 BMI 有很大影响，因 此建议各大媒体要对女性进行孕前合理饮食的广泛宣传，使女性孕前摄入充足的 营养，保持好营养均衡；对已经存在孕前营养不均衡的孕妇而言，在孕期产检时 应对孕妇进行营养状况和健康状况的评估，积极给出相应的调整措施，使孕妇在围产期各阶段的营养摄入保持均衡，进而使得围产期 BMI 在合理范围内增长。

关键字 营养均衡；围产期体质指数（BMI）；潜变量增长模型；纵向发展轨迹

分类：其他方向与主题

北京社区老年人中主要食物组摄入与衰弱和衰弱前期风险的关联

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目的：研究北京市社区老年人衰弱和衰弱前期的流行状况及其危险因素，为延缓衰弱和衰弱前期的发生发展提供科学依据。

方法：于2020年8月-2021年9月，在北京市五个区采用分层抽样，使用“城市社区老年人综合评估量表”和简易食物频率问卷对北京市5264位老年人进行面对面调查。纳入标准：①年龄65岁及以上，②来社区医院就诊或体检，③社区居住6个月及以上；排除标准：沟通障碍，有严重认知或听力障碍。构建基于老年综合评估、共纳入34个变量的衰弱指数（Frailty Index, FI），包括13个共病变量（高血压、糖尿病、血脂异常、脑卒中等），11个老年综合征变量（疼痛、视力、听力减退、吞咽障碍、胃肠功能减退、便秘、跌倒、睡眠障碍等），1个体能变量（SF-36 体能部分），1 个认知变量（MMSE），1 个抑郁变量（GDS-5），3 个营养不良变量（BMI、腰围、近三个月体重下降等），4个肌肉衰减变量（5次起坐、6米步速、小腿围、握力等）。衰弱指数构建遵从5个原则：①后天获得，②与年龄相关，③具有生物学合理性，④给健康带来不良后果，⑤不会过早饱和。判定界值：衰弱（FI≥0.35），衰弱前期（FI 0.20 ~0.35），非衰弱（FI <0.20）。食物组包括奶及奶制品，豆制品，鱼、禽、畜肉、蛋类，新鲜蔬菜，新鲜水果5类，摄入频率分为≤1次/周，2-6次/周，≥1次/天三组。使用单因素分析衰弱和衰弱指数的危险因素（卡方检验，两两比较使用Bonferroni 调整法）；使用累计logistic回归，构建衰弱和衰弱前期的危险因素预测模型，及其与各类食物摄入频率的关联。P值<0.05被认为是显著的。

结果：4973位老年人纳入分析，221人关键变量缺失予以剔除。调查对象平均FI=0.243，19.9%（n=1046）为衰弱，35.9%（n=1892）为衰弱前期，44.2%（n=2326）为非衰弱。衰弱率随年龄增加而增加，女性衰弱率高于男性，受教育程度低、丧偶、独居、有疾病史、体重不足或超重、吸烟、不运动是衰弱的危险因素。调整性别、年龄、受教育程度、婚姻状况、居住状况、职业状况、饮酒、吸烟等协变量后，高豆制品摄入频率（≥1次/天）与衰弱的发生呈负相关（OR=0.64, 95%CI=0.52, 0.78），较高豆制品摄入频率（2-6次/周）与衰弱的发生呈负相关（OR=0.79, 95%CI=0.68, 0.92）；高鱼、禽、畜肉、蛋类摄入频率（≥1次/天）与衰弱（OR=0.62, 95%CI=0.46, 0.83）和衰弱前期的发生呈负相关（OR=0.59, 95%CI=0.43, 0.82），较高鱼、禽、畜肉、蛋类摄入频率（2-6次/周）与衰弱（OR=0.65, 95%CI=0.49, 0.86）和衰弱前期的发生呈负相关（OR=0.70, 95%CI=0.50, 0.96）；高水果摄入频率（≥1次/天）与衰弱（OR=0.59, 95%CI=0.43, 0.82）和衰弱前期（OR=0.61, 95%CI=0.47, 0.80）呈负相关。奶及奶制品和蔬菜的摄入频率与衰弱和衰弱前期的关联无统计学意义。

结论：社区老年人的衰弱和衰弱前期状况不容忽视，建议老年人提高蛋白质（包括动物蛋白和植物蛋白）的摄入，并每天摄取适量水果，以延缓衰弱和衰弱前期的发生发展。

关键字 社区老年人、衰弱、衰弱前期、食物摄入频率

分类：其他方向与主题

猪牛羊肉生产和消费统计关系探究

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目的:

通过对近几年中国猪牛羊肉的生产与消费的描述、相关、回归、因子和聚类等统计分析分析，探索出它们各自特征以及互相之间的复杂关系。从而可以进一步了解猪牛羊存栏变化、销售变化、肉类市场供应情况、进出品调节、稳定猪牛羊生产和消费。以期为政府制定相关政策提供依据和参考，为企业、行业未来发展方向提供参考，同时促进各地区人民生活的提高和整体经济水平的增长。

方法:

描述、相关、回归、因子和聚类等统计分析方法。

结果：

1. 猪牛羊肉消费稳步增加，淡旺季特征减弱

猪肉和牛肉每年人均消费量都在不断增加，而且稳步增加的幅度比较大。除了猪牛羊肉消费量不断增加以外，大众对猪牛羊肉品质也提出了更新更高的要求。传统的猪牛羊肉消费具有显著的季节性特征，但随着火锅、撸串、烧烤等旅游休闲消费的常态化，牛羊肉淡旺季消费界限变得越来越模糊。2. 相关分析牛肉地区产量和地区其它肉类消费量不相关，说明养牛大的地区主要向外地销售，而且有些地区靠进口才行，所以政府要加强肉牛的运输管理和牛肉的进口管理。羊肉产量大的地区有比较大一部分在本地消费掉了，其它人均羊肉消费量大的地区羊肉消费主要要靠其它地区输入或从国外进口，政府要加强羊肉进口方面的管理。猪肉的人均消费量和牛、羊肉人均消费量负相关，说明在猪肉人均消费和牛、羊肉人均消费具有替代关系。牛肉人均消费对禽类消费具有互补关系，牛肉消费对禽类消费具有促进关系。3. 回归分析由于国内羊牛在短期内不能大量增加，相关部门就应该做好羊肉进口计划，以便更好的稳定物价，促进社会稳定和谐发展。4. 聚类分析如果对牛羊肉消费量的大规模调研，地区应该选择：甘肃、北京、宁夏、青海、西藏、内蒙古、新疆、河南、四川、河北、山东这 10 个地区进行实地调研。

结论：

国内产能不足，短时期难以改变，猪牛羊肉市场长期存在供需缺口，并有进一步扩大的态势，而且随着进口目的地不断扩展以及进口关税逐渐降低，进口猪牛羊肉价格优势会更加显现，未来进口仍有一定拓展的空间。此外，5G 时代到来，加快了冷链物流和物联网落地肯定会打破牛羊肉进口在时间与空间上的制约，也将进一步激发国内的消费潜力，推动进口量持续增长。

关键词 ：猪牛羊；生产与消费；统计分析；肉类

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关键字 猪牛羊；生产与消费；统计分析；肉类

分类：其他方向与主题

Hepa1-6 所致肝癌相关肌肉减少症小鼠模型建立

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题目：Hepa1-6 所致肝癌相关肌肉减少症小鼠模型建立

目的：研究 Hepa1-6 所致肝癌相关肌肉减少症小鼠模型建立的方法。

方法：8 周龄 SPF 级 C57BL/6j 雄性小鼠 28 只，适应性喂养 1 周后，随机分为肿瘤组 16 只、假手术组 12 只，肿瘤组小鼠处理方法：用 Hepa1-6 小鼠肝癌细胞接种小鼠皮下制成荷瘤小鼠，3 周后其皮下肿瘤长成约 1x1x0.5cm3，取皮下肿瘤切成 1x1x2mm3 肿瘤组织块，种植于实验小鼠左半肝。实验期间观察小鼠的一般情况，每周测量小鼠体重、四肢抓力、EchoMRI 测瘦体重。实验第 6 周取小鼠血清、肝脏、腓肠肌组织，电子秤测量小鼠双侧腓肠肌湿重；全自动生化分析仪测量各组小鼠血清 ALT、AST、DBIL、ALB；ELISA 法测小鼠血清 TNF-a、IL-6 水平；HE 染色观察各组小鼠肝脏、肌肉病理结构变化；免疫组化和 Western blotting 测小鼠腓肠肌组织中 MuRF1、Atrogin-1 蛋白表达水平。

结果：1.肿瘤组小鼠肝脏种植肿瘤组织后，出现活动、进食量减少、反应迟钝、毛发干枯不顺、精神不佳、体重增加缓慢等情况。2.体重变化：术前两组小鼠体重无明显差异（P＞0.05），术后 3 周开始，肿瘤组小鼠体重较假手术组体重低（P＜0.05）。3.抓力变化：术前两组小鼠抓力比较无明显差异（P＞0.05），术后 3 周开始，肿瘤组小鼠抓力较假手术组体重低（P＜0.05）。4.瘦体重变化：术前两组小鼠瘦体重无明显差异（P＞0.05），术后 3 周开始，肿瘤组小鼠瘦体重较假手术组体重低（P＜0.05）。5.小鼠腓肠肌湿重：肿瘤组小鼠腓肠肌湿重较假手术组低（P＜0.05）。6.血清生化指标分析：肿瘤组 ALT、AST、DBIL 值高于假手术组（P＜0.05），ALB 值低于假手术组（P＜0.05）。7.ELISA 法测小鼠血清 IL-6、TNF-α 水平：肿瘤组小鼠血清 IL-6、TNF-α 水平较假手术组高（P＜0.05）。8.HE 染色观察小鼠腓肠肌结构变化：肿瘤组小鼠腓肠肌肌细胞之间连接稀疏、排列不规则，肌细胞大小差异较大，而假手术组小鼠肌细胞连接较为紧密、排列规则；HE 染色观察小鼠肝脏结构变化：与假手术组小鼠肝脏组织相比，肿瘤组小鼠肝脏组织结构紊乱，胞质肿胀，汇管区出现大量炎性细胞。9.免疫组化测小鼠腓肠肌组织中 MuRF1、Atrogin-1 蛋白表达水平：肿瘤组小鼠腓肠肌组织中 MuRF1、Atrogin-1 蛋白表达水平明显高于假手术组（P＜0.05）。10：Western blotting 测小鼠腓肠肌组织中 MuRF1、Atrogin-1 蛋白表达水平：肿瘤组小鼠腓肠肌组织中 MuRF1、Atrogin-1 蛋白表达水平明显高于假手术组（P＜0.05）。

结论：1.通过肝脏种植肿瘤组织，3 周即可建成肝癌相关肌肉减少症的小鼠模型；2.肝癌发展过程中的慢性炎症状态、肝功能障碍、蛋白质分解代谢增加等，可能是导致肝癌相关肌肉减少症发生的重要因素。

关键词：Hepa1-6；肝癌；肌肉减少症

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关键字 Hepa1-6；肝癌；肌肉减少症

分类：其他方向与主题

早产极低出生体重儿肠道菌群变化与早产儿脑损伤的相关研究

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摘要：目的：探讨早产极低出生体重儿（Very low birth weight infants, VLBWI）肠道菌群变化对早产儿脑损伤（Brain injury in premature infants,BIPI）发生发展的影响。

方法：将2018年05月30日至2019年09月30期间于生后24小时内收住苏州大学附属儿童医院新生儿重症监护病房、出生体重<1500g且住院时间≥28天的早产儿作为研究对象，采集并记录所有早产儿出生时情况、入院时情况、母亲一般情况、早产儿原发基础疾病及合并症、早产儿住院期间治疗情况等临床资料，分别于生后第4、7、14、21、28天留取粪便标本。根据BIPI诊断标准，将发生BIPI的早产VLBWI作为BIPI组，未发生BIPI的早产VLBWI作为非BIPI组，采用16S rDNA高通量测序技术检测4、7、14、21、28日龄粪便样本菌群。分析比较两组早产VLBWI生后肠道菌群定植情况及其在BIPI发生过程中的变化差异。

结果：一、临床基本资料信息：研究期间共观察到发生BIPI的有46例为BIPI组，未发生BIPI的72例早产VLBWI作为非BIPI组，两组共118例；男58例（49.2%），女（50.8%），出生体重 800~1500g，平均出生体重（1247.6±199.7）g，胎龄 27~32+2 周，平均胎龄（30.17±1.28）周。BIPI组与非BIPI组临床资料比较显示：（1）两组早产VLBWI性别、出生体重、胎龄、分娩方式、是否自然受孕、是否双胎或多胎、是否小于胎龄儿、1min Apgar评分、5min Apgar评分、母亲孕期一般情况、败血症、感染性肺炎、支气管肺发育不良、早产儿视网膜病、血小板总数<100x109/L、坏死性小肠结肠炎、开奶日龄、首次抗生素为非限制级、首次抗生素为限制级、首次抗生素为非限制级与限制级联用、首次抗生素为限制级与特殊级联用、脐静脉置管、PICC 置管、氧疗时间、无创机械通气、无创机械通气时间比较无明显差异（P>0.05）；（2）BIPI组新生儿呼吸衰竭、新生儿呼吸窘迫综合征、频发呼吸暂停、血红蛋白浓度<90g/L、酸中毒、肠外营养相关性胆汁淤积症、动脉导管未闭、宫外生长迟缓发生率明显高于非BIPI组（P<0.05）；肠外营养时间、抗生素使用时间、PICC置管时间、输血≥3次、有创机械通气、有创机械通气时间明显多于非BIPI组（P<0.05）。Logistic多因素回归分析显示：频发呼吸暂停（OR=4.031, 95% CI: 1.355~11.995）、有创通气时间（OR=1.273, 95% CI: 1.056~1.534）、PN时间（OR=1.035, 95% CI: 1.002~1.068）、EUGR（OR=5.883, 95% CI: 1.984~17.443）为早产VLBWI生后发生BIPI的独立危险因素。

二、粪便16S rDNA高通量测序结果：（1）发展为BIPI的早产VLBWI生后4~28天厚壁菌门相对丰度均高于非BIPI组（U=160，425，443，310，254，P＜0.05），而变形菌门相对丰度均低于非BIPI组（U=173，277，484，247，128，P＜0.05）。（2）Alpha多样性分析结果：BIPI组chao1指数、Shannon指数、Simpson指数在生后第7~28天均高于非BIPI，且在生后21、28天时差异有统计学意义[(305±132.9）比（180.7±142.9），（266.6±151.4）比（167.5±127.4），（3.15±1.29）比（2.14±1.15），（2.78±1.13）比（2.12±1.10），（0.78±0.25）比（0.69±0.22），（0.80±0.17）比（0.67±0.25），P=0.006，0.01，0.002，0.02，0.025，0.008]。（3）Beta多样性分析结果：在第21天（AdonisR2=0.095，P=0.001）、第28天（AdonisR2=0.163，P=0.001）时BIPI组与非BIPI组间菌群差异明显。（4）菌群群落结构差异显著性分析：与非BIPI组比较，生后21天， BIPI组变形菌门（P=0.001）、g-变形菌纲（P=0.001）、梭菌纲（P=0.021）、肠杆菌（P<0.001）、梭菌（P=0.002）、双歧杆菌（P=0.021）显著减少，肠球菌（P=0.003）、拟杆菌（P=0.001）明显增多；生后第28天变形菌门（P=0.001）、梭菌纲（P=0.012）、肠杆菌（P<0.001）、梭菌（P=0.001）、双歧杆菌（P=0.010）显著减少，而拟杆菌门（P=0.001）、肠球菌属（P=0.003）、拟杆菌属（P0.001）、肠球菌（P=0.001）、拟杆菌（P=0.001）明显增多。

结论：

（1）频发呼吸暂停、有创通气时间、PN时间、EUGR为早产VLBWI生后发生BIPI的独立危险因素。

（2）发展为BIPI的早产VLBWI生后4~28天物种丰度及多样性高于非BIPI组，且于第21、28天差异显著。

（3）发展为BIPI的早产VLBWI肠道菌群中梭菌、双歧杆菌减少，而肠球菌、拟杆菌增多。

关键字 早产极低出生体重儿；早产儿脑损伤；肠道菌群；菌群-肠-脑轴；高通量测序

分类：其他方向与主题

植物乳杆菌发酵猕猴桃果浆对肠黏膜屏障损伤的预防作用及机制研究

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植物乳杆菌发酵猕猴桃果浆对肠黏膜屏障损伤的预防作用及机制研究
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目的：

近年来，关于乳酸菌发酵提高果蔬的抗氧化活性受到广泛关注，但动物水平能否缓解肠道损伤并不清楚。课题组前期研究显示在模拟胃肠道消化过程中植物乳杆菌发酵猕猴桃果浆总酚酸、总黄酮较多，自由基清除活性较强且活菌数较多。本研究欲通过非靶向代谢组学技术探讨发酵前后物质组成差异，实验对象为急性脂多糖应激动物，并从线粒体损伤角度研究其作用机理。该研究将为阐明乳酸菌发酵果蔬制品对机体健康效应提供理论支撑。

方法：

运用非靶向代谢组学技术联合多变量统计分析，明确乳杆菌对猕猴桃果浆物质组成的影响。将 32 只 SD 雄性大鼠随机分为正常组（Control）、脂多糖组(LPS)、猕猴桃果浆与植物乳杆菌组(KP+LP)、植物乳杆菌发酵猕猴桃果浆组(FKP-LP)。其中 KP+LP（1010CFU 植物乳杆菌/g 果浆）持续灌胃 4 周，于宰杀前 48 h，按照 3 mg/kg 腹腔注射 LPS，造成肠道急性应激。

结果：

1）非靶向代谢组显示植物乳杆菌发酵猕猴桃果浆中肽、激素和微生物类物质有所上升，而核酸、碳水化合物和有机酸的含量下降。正离子模式下，青蒿素、乙酰胆碱、10-羟基癸酸等 19 种物质上升，皮质醇、尿嘧啶 1-β-D-阿拉伯呋喃糖苷、5-甲基胞嘧啶等 6 种物质的含量下降。负离子模式下，羟基癸烯酸、2,6-二羟基苯甲酸、2-羟基十二酸 N2-甲基鸟苷等 17 种物质含量上升，尿苷、泛酸、LPC.182 等 8 种物质含量下降。

2）与 Control 组相比，LPS 应激造成了肠道黏膜形态的变化，腺体排列紊乱，同时伴有炎性细胞浸润，肠上皮细胞紧密连接不清晰，线粒体边界模糊、肿胀。血浆 DAO 活性上升至 11.7 mU/mL，紧密连接蛋白（Clauding-1、ZO-1 及 Occludin）mRNA 的表达降低。发酵猕猴桃果浆干预后，肠黏膜形态趋于正常，紧密连接清晰可见，跟 LPS 比，血浆 DAO 活性下降至 6.99 mU/mL，与 Control 组相比无显著差异性，紧密连接蛋白 mRNA 表达水平升高。

3）与 Control 组相比，LPS 急性应激造成了肠道组织和线粒体的氧化损伤，表现为 MDA 含量的上升，SOD、GSH-PX 和 CAT 活性的下降；ATP、ADP 及 AMP 含量上升，呼吸链复合酶 I 活性下降，复合酶 III、V 活性升高，线粒体稳态调节蛋白相关(AMPK、PGC-1α、NRF1、NRF2、ULK1、ULK2 及 TFAM) mRNA 表达水平升高。与 LPS 组相比，FKP-LP 组肠道组织和线粒体氧化损伤得到缓解，能荷水平下降，呼吸链复合酶 III、V 活性，以及线粒体稳态调节线粒体稳态相关基因表达下降，且差异有统计学意义。与 KP+LP 组相比，FKP-LP 在缓解氧化损伤，维持能荷水平等效果稍优于 KP+LP。

结论：

综上，相较未发酵猕猴桃果浆，植物乳杆菌发酵造成了猕猴桃果浆物质组成的变化。植物乳杆菌发酵猕猴桃果浆对预防急性 LPS 应激造成线粒体应激起到了缓解作用，从而减轻肠道损伤。

关键字 植物乳杆菌；发酵；猕猴桃；肠道损伤；脂多糖

分类：其他方向与主题

宿迁市低出生体重儿 12 个月内追赶生长特点分析

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目的：了解宿迁市低出生体重儿 12 个月内的追赶生长及出生后不同特征婴儿的追赶生长特点；

方法：在授权使用的数据库中，整群选取 2020 年 1 月～2021 年 5 月在宿迁市宿豫区豫新医院定期参加体检和随访至 12 个月的全部 286 例低出生体重儿为研究对象，同时随机选取正常对照组 286 例；收集儿童基本信息、婴儿出生情况、出生、1 月、3 月、6 月、8 月、12 月的体重、身高测量值，同时用调查问卷收集母亲孕期情况、出生时健康状况、婴儿出生后喂养与疾病情况、社会环境情况等；计算 Z 评分；以 12 月龄时体重△Z≥0.67 将低出生体重儿分为追赶生长组（272 例）和未达追赶生长组（14 例），分析宿迁市低出生体重儿追赶生长的特点。

结果：

12 个月内追赶生长情况：（1）低出生体重儿出现追赶生长 272 例，未达追赶生长 14 例，低出生体重儿追赶生长发生率 95.10%。（2）追赶组与对照组体重的差异在各月龄均有统计学意义，身长除 12 月龄外各月龄的差异均有统计学意义。追赶生长组与未达追赶生长组体重在 1 月（3.79kg vs 3.80kg）、3 月（5.91kg vs 5.56kg）差别无统计学意义，其余月龄期两组间的差异具有统计学意义；身长在 1 月（51.57cm vs 51.99cm）、3 月（59.01cm vs 58.40cm）差别无统计学意义，其余月龄期两组的差异具有统计学意义。追赶组的体重、身长从 6 个月就超过了未达组，其身高则在 12 月达到了接近正常的水平。（3）追赶组与对照组体重△Z 值、身长△Z 值各月龄的差异均有统计学意义；追赶组与未达组体重△Z 值、身长△Z 值各月龄差异均有统计学意义；未达组与对照组体重△Z 值在各月龄的差异均有统计学意义；身长△Z 值在 1 月龄、6 月龄差异有统计学意义。（4）追赶组的体重主要从 1 月龄就出现了追赶，身长则主要从 6 月龄才出现了追赶，未达组虽第 3 个月体重、第 6 个月身长出现了追赶，但很快就结束了追赶。（5）出生后接受营养强化（98.24% vs 90.52%）、出生时为早产（98.76% vs 90.40%）的低出生体重儿出现追赶生长的比例较高；出生时为小于胎龄儿（10.62% vs 1.16%）和存在宫内发育迟缓（14.30% vs 1.00%）者出现未达追赶生长的比例较高。

结论：

1. 95.10%的低出生体重儿出生后会发生 12 月内的追赶生长，其中体重追赶生长早于身长，追赶组体重从 1 个月就开始追赶，身长则从 6 个月开始追赶。未达组从出生后第 3 个月出现体重、第 6 个月出现身长的追赶生长，此后追赶生长消失。

2.出生时为早产及出生后接受营养强化的低出生体重儿更容易发生 12 月内的追赶生长；出生时存在宫内发育迟缓及为小于胎龄儿的低出生体重儿不易出现 12 月内的追赶生长

关键字 低出生体重儿；追赶生长；特征

分类：其他方向与主题

基于能量代谢探索猕猴桃多酚对脂多糖应激大鼠肠道损伤的缓解作用

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目的：

肠道是一个高能耗组织，其能量消耗占机体总能耗的20%-30%。近年，能量代谢紊乱被认为是引起肠道损伤的重要因素，能量代谢不仅为肠上皮细胞增殖、迁移以及细胞骨架的维持提供能量支撑，同时能量代谢途径的变化还影响了肠上皮细胞的分化、肠道菌群的组成和肠道免疫。因此，维持肠道的能量代谢是保持肠道稳态的重要途径。研究显示膳食多酚类化合物能调节肠道微生物的组成，并促进丁酸的产生，而肠上皮细胞的能量60-70%由丁酸提供。鉴于此，本研究拟从肠道微生物—能量代谢角度探讨猕猴桃多酚对内毒素应激大鼠肠道损伤的缓解作用。

方法：

32只雄性SD大鼠随机分为4组：正常组（Control）、猕猴桃多酚组（KPE）、脂多糖组（LPS），猕猴桃多酚干预组（KPE-LPS）。Control组和LPS组灌胃蒸馏水，KPE和KPE-LPS组按照80 mg/kg灌胃猕猴桃多酚，实验2周后，LPS组和KPE-LPS组以100 ug/kg腹腔注射LPS，Control和KPE组腹腔注射等体积生理盐水。实验周期为4周通过H&E染色、杯状细胞染色及透射电镜观察肠道的组织形态；通过微生物组学技术测定肠道微生物的组成；采用气相色谱测定食糜中短链脂肪酸的水平；通过高效液相色谱法测定肠道能荷物质、三羧酸循环相关物质的含量，并测定能量代谢关键酶的活性。

结果：

1）Control组与KPE组肠黏膜形态相当，而LPS组肠黏膜结构排列紊乱，炎性细胞大量浸润，杯状细胞数量较少，肠道上皮细胞紧密连接结构模糊，线粒体肿胀，血浆DAO活性上升至16.5 mU/mL，粘蛋白（Muc1、Muc5ac）及紧密连接蛋白（Clauding-1、Clauding-2及ZO-1）mRNA的表达降低，而KPE-LPS组偶有肠黏膜排列紊乱，杯状细胞数量明显增多，紧密连接结构清晰，线粒体呈椭圆形。说明KPE能够缓解LPS造成的肠道形态的损伤。

2）较LPS组，KPE-LPS组丁酸、丙酸、乙酸的含量较高,且shannon指数较低（$P<0.01$），KPE干预一定程度上降低了内毒素应激大鼠肠道微生物物种多样性并调整肠道菌群结构，提高了部分有益菌（*Gammaproteobacteria*、*Prevotellaceae*、*Enterobacteriaceae*等）的相对丰度，降低部分有害菌（*Clostridia*、*Ruminococcaceae*等）的相对丰度。

3）较KPE-LPS组，LPS组己糖激酶、乳酸脱氢酶活性及乳酸含量显著升高（$P<0.05$），说明LPS刺激机体主要通过糖酵解方式供能并造成乳酸堆积；而苹果酸及柠檬酸含量较低（$P<0.05$），线粒体呼吸链复合酶（Ⅰ、Ⅲ、Ⅳ）活性较低（$P<0.05$），能量代谢关键调控因子AMPK mRNA表达显著上升（$P<0.05$），综上，KPE能增强三羧酸循环和氧化磷酸化过程，抑制糖酵解的发生，抵抗LPS对大鼠肠道的损伤。

结论：

KPE能够重塑肠道菌群结构，促进肠道有益菌生长，增强三羧酸循环和氧化磷酸化过程，从而预防内毒素应激对肠道造成的损伤。

关键字 猕猴桃；肠道微生物；能量代谢

分类：其他方向与主题

干酪乳杆菌和菊粉基于肠道微生态对抗结核药物所导致肠道屏障功能障碍的保护作用研究

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目的：建立利福平联用异烟肼所致肠道屏障功能障碍动物模型，分析干酪乳杆菌和菊粉是否能通过修复肠道屏障及调节肠道微环境从而改善利福平联用异烟肼等抗结核药物所致的肠道屏障功能障碍。

方法：36 只雄性 C57BL/6J 小鼠，适应性喂养一周后随机分为 6 个组（6 只/组）：正常对照组（NC）、异烟肼+利福平模型组（MOD）、干酪乳杆菌干预组（Lc）、菊粉干预组（INU）、干酪乳杆菌和菊粉联合干预组（LI）、阳性对照组（鼠李糖乳杆菌干预组，LGG）。每组每日给予 2 次灌胃，第一次灌胃 NC、MOD 组给予 0.9%的生理盐水，Lc、INU、LI 组和 LGG 组分别给予 5×10^9CFU/只干酪乳杆菌、600mg/kg•bw 菊粉、干酪乳杆菌和菊粉的同剂量混合溶液和 1×10^9CFU/kg•bw 鼠李糖乳杆菌。两小时后，NC 组灌胃 0.5%羧甲基纤维素钠溶液，其余组给予 150mg/kg•bw 异烟肼与 300mg/kg•bw 利福平混悬液，每次灌胃剂量 10mL/kg•bw。连续干预 8 周，每周固定时间记录各组小鼠体重和摄食量；最后一次灌胃结束后禁食不禁水 10 小时，麻醉小鼠后眼球取血，分离血清，留取回肠及结肠组织，收集盲肠内容物并保存于-80℃冰箱中以待下一步检测。对结肠和回肠进行 HE 染色观察组织形态结构，采用免疫蛋白印记法（Western blot）、酶联免疫吸附法（ELISA）和高通量测序检测肠道机械、免疫、化学和生物屏障的指标及血清和结肠中的内毒素（LPS）水平。

结果：HE 染色结果显示，MOD 组结肠肠道细胞轻微受损，隐窝变浅，细胞排列不规则，回肠组织中正常小肠绒毛较少，上皮和固有层分离；与 MOD 组相比，Lc、INU、LI 和 LGG 组结肠和回肠组织病变均有一定的恢复，但各干预组结肠组织仍有程度不等的炎症表现，回肠组织仍能观察到轻度的绒毛顶端脱落和固有层水肿。干预 8 周后，与 NC 组相比，MOD 组结肠分泌型免疫球蛋白（sIg）A、OTU 数目和 Chao1 指数显著降低（P<0.05），肿瘤坏死因子-α（TNF-α）、β 防御素-2（HβD-2）、白介素（IL）-6 水平和 *Akkermansia*、*uncultured_Bacteroidales*、*unclassified_Oscillospiraceae* 和 *Desulfovibrio* 丰度显著升高（P<0.05）。与 MOD 组相比，Lc 组 Occludin、结肠 sIgA 水平和 OTU 数目显著升高（P<0.05），TNF-α、血清 LPS 水平和 *Desulfovibrio*、*unclassified_Oscillospiraceae* 丰度显著降低（P<0.05）；INU 组 Claudin-1 和 sIgA 水平显著升高（P<0.05），TNF-α、血清 LPS 水平和 *Akkermansia* 丰度显著升高（P<0.05）；LI 组 Occludin 和结肠 sIgA 水平显著升高（P<0.05），IL-6、HβD-2、TNF-α 水平和 *unclassified_Oscillospiraceae* 丰度显著降低（P<0.05）。结肠 sIgA 水平与 *Akkermansia*（r=-0.45，P=0.006）、*Faecalibaculum* 显著负相关（r=-0.38，P=0.03），与 *unclassified_Oscillospiraceae*（r=0.39，P=0.02）和 *Lachnospiraceae_NK4A136_group* 显著正相关（r=0.39，P=0.02）；IL-6 与 *Oscillibacter* 显著正相关（r=0.46，P=0.006），与 *Desulfovibrio* 显著负相关（r=-0.37，P=0.03）；结肠内 LPS 水平与 *unclassified_Oscillospiraceae* 显著负相关（r=-0.41，P=0.01）；HβD-2 水平与 *Bacteroides* 显著负相关（r=-0.39，P=0.02）。

结论：异烟肼和利福平联合应用可对小鼠肠道屏障功能造成损伤，干酪乳杆菌、菊粉及二者联合补充可以改善小鼠肠道的机械、免疫、化学和生物屏障功能，进而预防抗结核药物所造成的肠道损伤。这为预防和改善抗结核药物所造成的肠道不良反应提供了新的思路。

关键字 抗结核药物，干酪乳杆菌，菊粉，肠道微生态

分类：其他方向与主题

Fruitflow 可有效改善高胆固醇血症人群的血压水平

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目的：Fruitflow 是一种番茄水溶性提取物（WSTC），研究证明 Fruitflow 有益于健康人群的血流，具有减少血小板聚集的作用。本研究拟探讨 Fruitflow 对胆固醇升高的中老年人群的血压及风险因素的影响。

方法：本研究共纳入 60 名 35～65 岁血清胆固醇升高的受试者（总胆固醇 TC≥5.2 且＜7.2 mmol/L，和/或低密度脂蛋白胆固醇 LDL-C≥3.4 且＜4.9 mmol/L；初次发现，未使用降脂药；或曾服用降脂药，但已停降脂药 3 个月以上）。本研究为随机双盲安慰剂平行对照试验，受试者被随机分配到试验组和对照组，每组 30 人。试验组服用新络素片，300 mg/片，其中含 150 mg Fruitflow（包括黄酮、腺苷和绿原酸），辅料 150 mg；对照组为安慰剂（外观、味道等与新络素片一致）。试验为期 60 天（干预期 45 天；干预后随访期 15 天）。干预期受试者服用受试品 2 次/日，1 片/次，随早、晚饭服用。本研究已通过北京大学第三医院医学伦理委员会批准（[2017]医论审第(325-03)号）并在中国临床试验注册中心注册，注册号：ChiCTR1800015904。所有受试者均签署知情同意书。

结果：完成干预研究的受试者共 60 人，完成干预后随访者 59 人。基线时受试组和对照组的收缩压（SBP）分别为 128.1±11.8、125.9±14.7 mmHg，舒张压（DBP）为 76.4±10.2、78.5±9.1 mmHg，SBP、DBP 两组间无显著差异（P＞0.05），基线时其余指标均无组间显著差异。干预 45 天后，受试组的 SBP 和 DBP 均显著下降，分别降低 4.2%（P＜0.001）和 3.8%（P=0.015），而随访期的 SPB 有明显升高（1.5%，P=0.032），DBP 无显著变化。对照组的 SBP、DBP 在干预期及随访期均无显著变化（P＞0.05）。按是否患有高血压进一步分析，干预期，受试组的高血压和非高血压者的 SBP 均显著下降（P＜0.05），DBP 有所下降但变化不显著（P＞0.05）；而对照组的 SBP 和 DBP 均无显著变化。干预期受试组的高密度脂蛋白胆固醇（HDL-C）明显升高（增加 6.5%，P=0.018），随访期的 HDL-C 略有升高，但变化不显著。试验组的甘油三酯（TG）、TC 和 LDL-C 和对照组的血脂质指标干预期及随访期均无明显变化。干预期，试验组和对照组的同型半胱氨酸均显著下降（试验组下降 5.4%，P=0.028，对照组下降 13.4%，P=0.006），两组无显著差异（P＞0.05）；随访期试验组 HCY 进一步降低，而对照组较干预结束时升高，但变化均不显著。干预期受试组平均 BMI 显著下降（1.1%，P = 0.001），对照组的 BMI 无显著变化，两组 BMI 改变量有显著差异（P = 0.024）；两组的体脂率均无明显变化。试验期间受试者均未报告不良事件，且干预前后的凝血功能、肝肾功能等指标均在正常范围。

结论：Fruitflow 对胆固醇升高人群是安全可靠的。Fruitflow 可有效降低胆固醇升高人群的血压水平，并对血压相关风险因素有一定的改善作用；其可提高 HDL-C 水平及降低 HCY 水平，且有一定的改善作用，且对 HCY 的改善作用有一定的持续性。Fruitflow 可能有减轻体重的作用，需进一步研究证明。

关键字 Fruitflow；血压；高胆固醇血症；高血压；番茄水溶性提取物

分类：其他方向与主题

联合补充植物甾醇和卵磷脂对高胆固醇血症大鼠血脂和红细胞膜流动性的影响及红细胞脂质组学研究

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目的：建立高胆固醇饮食诱导的大鼠高胆固醇血症模型，采用植物甾醇（PS）和卵磷脂（PC）联合干预，研究 PS 与 PC 联合补充对高胆固醇血症大鼠的改善效果及其红细胞膜流动性的影响，以及通过红细胞脂质组学研究相关代谢通路的变化。

方法：雄性 SD 大鼠适应性喂养 1 周后，按体重和胆固醇水平随机分为 8 组（12 只/组），空白对照组给予对照饲料（D12102C），其余组均给予高胆固醇饲料（D12109T）。对照组 CON、模型组 HCD、阳性对照组 SIM（4mg/kg 辛伐他汀）、植物甾醇组 PS（0.3g/kg PS）、卵磷脂组 PC（1g/kg PC）、植物甾醇+低剂量卵磷脂组 LPC-PS（0.3g/kg PS + 0.5g/kg PC）、植物甾醇+中剂量卵磷脂组 PC-PS（0.3g/kg PS + 1g/kg PC）、植物甾醇+高剂量卵磷脂组 HPC-PS（0.3g/kg PS + 1.5g/kg PC）。干预 10 周后，大鼠腹主动脉取血，分别采用非抗凝管和抗凝管收集血液，离心后获得血清和红细胞。采用全自动生化分析仪检测血清脂质水平和肝功能指标。低渗一步溶血法获得红细胞膜，并采用荧光偏振法以 TMA-DPH 为探针，检测细胞膜的流动性。采用 UPLC-MS/MS（QE Plus™）液相色谱质谱系统进行红细胞非靶向脂质组学检测，并结合 MSDAIL 软件进行脂质鉴定与数据处理。电喷雾离子源（ESI）正负离子模式下检测，并用主成分分析（PCA）、偏最小二乘判别分析（PLS-DA）和正交偏最小二乘判别分析（OPLS-DA）进行差异研究，结合单变量分析计算的变异倍数（FC）、P 值和多维统计分析计算的变量投影重要度（VIP）来筛选显著差异脂质，并通过 KEGG 通路富集来研究差异脂质参与的代谢通路。

结果：给予高胆固醇饮食后，与 CON 组相比，HCD 组的大鼠血清总胆固醇（TC）、低密度脂蛋白胆固醇（LDL-C）、谷丙转氨酶（ALT）和谷草转氨酶（AST）水平显著上升（P＜0.05）；经过 10 周 PS 和（或）PC 的干预后，与 HCD 组相比，LPC-PS、PC-PS、HPC-PS 组的 TC、LDL-C、ALT 和 AST 水平均显著降低（P＜0.05）。与 CON 组相比，HCD 组的红细胞膜偏振度（P）和微粘度（η）显著升高（P＜0.05），表明高胆固醇血症大鼠红细胞膜流动性降低；PC 组和 PC-PS 组的 P 和 η 显著降低（P＜0.05），表明 PC 或 PC-PS 联合干预可以增加红细胞膜流动性。采用 Person 相关分析评估脂质水平与膜流动性的相关性，结果表明 TC 与 P、η 成正相关（相关系数 r=0.32，P＜0.05）；LDL-C 与 P、η 成正相关（r=0.26，P＜0.05）。参考 LIPID MAPS 对检测到的脂质进行了分类，共检测出 5 大类脂质，即脂肪酰类、甘油酯类、甘油磷脂类、鞘脂类和固醇脂类，包括 66 种脂质亚类（1758 个脂质代谢分子）；总体样本的 PCA 分析表明质控样本紧密聚集在一起，不同组别之间出现明显分离趋势，表明本次实验重复性好，仪器分析系统稳定，实验数据可靠。PLS-DA、OPLS-DA 模型建立成功且稳定可靠，按照 VIP＞1.5、P＜0.05、FC＞2 或 FC＜0.5 筛选差异脂质，组间比较后发生变化的脂质主要集中在神经酰胺、磷脂酰胆碱、醚联磷脂酰胆碱、磷脂酰乙醇胺、鞘磷脂和甘油三酯等脂类；经 KEGG 通路富集分析发现上述差异脂质参与的主要通路是鞘脂信号通路、鞘脂代谢、甘油磷脂代谢、醚脂质代谢、脂肪消化吸收、胆固醇代谢等。

结论：PS 与 PC 联合补充可以改善高胆固醇血症大鼠的血清脂质水平及高胆固醇饮食引起的肝损伤；经 PC 或者 PC-PS 联合干预可以增加高胆固醇血症大鼠的红细胞膜流动性；PS 和（或）PC 干预，可以调节鞘脂代谢、甘油磷脂代谢、胆固醇代谢等与高胆固醇血症密切相关的代谢通路，从而改善因高胆固醇饮食引起的大鼠脂代谢紊乱。

关键字 高胆固醇血症；植物甾醇；卵磷脂；红细胞膜流动性；脂质组学

分类：其他方向与主题

基于云平台和物联网技术的国民营养与健康评估系统

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目的 “健康中国 2030 规划纲要”、“国民营养计划（2017-2030）”相继提出了，利用“互联网+”、大数据、智能可穿戴设备等技术与营养健康融合发展。营养调查和膳食评估是营养工作领域的关键技术，传统的膳食调查从入户调查、数据统计到结果公布耗费大量的人力、物力、财力和时间，缺少对调查对象的个体膳食营养健康状况评估。随着互联网、大数据、物联网、云计算等技术的发展，为方便快捷的收集数据、提高调查速度、提高调查数据的质量，亟需建立融合云平台和物联网技术的营养与健康平台，为营养调查和营养指导管理提供工具。

方法 融合“互联网+”和云平台技术、手机/PAD 智能移动终端、小程序、辅助测量和穿戴设备，构建国民营养与健康评估系统。该系统包含管理平台、专业版膳食调查 APP、膳食调查辅助小程序和家庭用营养监测 APP。其中管理平台包括系统管理、项目管理、膳食调查、体格检查、身体活动调查、数据质控、统计分析、个体评估和系统教学等。膳食辅助调查小程序、专业版膳食调查 APP 和家庭用营养健康监测 APP 通过蓝牙连接厨房秤，专业版膳食调查 APP 和家庭用营养健康监测 APP 还通过蓝牙连接了血压计、血糖仪、手环、体脂秤等可穿戴设备。

结果 国民营养与健康评估系统实现了国家、省、市、县四级联动管理，形成数据收集、质控、统计分析和个体评估反馈闭环机制。被调查对象可通过膳食调查辅助小程序以语音、图片等多形式实时记录个体用餐信息并同步至专业版膳食调查 APP，减少回忆误差。专业调查员可通过膳食辅助小程序同步的膳食图片和系统预存的多种重量图片辅助估重，提高估重的准确率；可食部比例、生熟比等信息自动通过系统调出和计算。通过扫描二维码快速匹配被调查对象相关信息，减少录入姓名等信息查找的时间。通过厨房秤、血压计、血糖仪、运动手环等测量和穿戴设备自动传输食物重量、血压、血糖和运动等相关数据，减少人工录入和误差。评估个体的膳食摄入、运动、血压等健康状况，给出健康建议，并实时将个体评价结果和健康建议反馈至被调查对象移动终端。

结论 国民营养与健康评估系统在计算机辅助面访系统优点的基础上，增加了被调查对象通过膳食调查辅助小程序实时录入、语音和图片识别、测量和穿戴设备连接、个体评估和反馈等功能，从多方面提高调查问卷的质量及真实性，降低回忆误差，提高估重准确率。个体评估结果的反馈可提高被调查对象依从性和应答率，进而实现调查结束即营养宣教，提高居民合理膳食的能力。国民营养与健康系统为开展营养健康调查高质量精细化实施提供了工具，促进信息技术与公共卫生的融合发展。

关键字 互联网+；物联网；膳食调查；营养调查；可穿戴设备

分类：其他方向与主题

中微量元素对植物生长的作用

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一、植物生长所必需的 17 种大中微量元素

目前所知的植物生长所需的大中微量元素共有 17 种，其中大量元素 6 种：碳、氢、氧、氮、磷、钾；中量元素 4 种：钙、镁、硅、硫；微量元素 7 种：铁、锰、硼、锌、铜、钼、氯。

大量元素碳、氢、氧，氮、磷、钾在植物体内占比 95%，是植物体中各种物质的基本组成成分，构成植物生长代谢活动的基础。

相对于大量元素，钙镁硅硫等 4 种被列为中量元素（植物中含量 0.1%-0.5%），锌、硼、锰、钼、铜、铁、氯等 7 中被列为微量元素（植物中含量 0.2×10-6-200×10-6），在农业生产上述 11 中元素通常被称为中微量元素。

中微量元素在作物体内含量虽少，但它对植物的生长发育起着至关重要的作用，是植物体内酶或辅酶的组成部分，具有很强的专一性，是作物生长发育不可缺少的和不可相互代替的。因此当植物缺乏任何一种中微量元素的时候，生长发育都会受到抑制，导致减产和品质下降。当植物在中微量元素充足的情况下，生理机能就会十分旺盛，这有利于作物对大量元素的吸收利用，还可改善细胞原生质的胶体化学性质，从而使原生质的浓度增加，增强作物对不良环境的抗逆性。

二、中微量元素对植物生长的作用

1. 硅元素对植物生长的作用

硅元素是植物体组成的重要营养元素，大部分植物体都含有大量硅。作物吸收硅后，形成硅化细胞，提高植物细胞壁强度，株型挺拔茎叶直立，利于密植，提高叶面的光合作用，有利于通风透光和有机物的积累；硅元素能提高植株叶绿素含量，延长生育期，促进植物生长；硅元素能增强植株基部秸秆强度，使作物导管的刚性增强，增强植物内部通气性，从而增强根系的氧化能力，防止根系早衰与腐烂，增强抗倒伏能力；作物中的硅化细胞能够有效地调节叶面气孔开闭及水分蒸腾。硅元素能减少磷肥在土壤中的固定，同时有活化土壤中的磷及促进磷在植物体内运转作用，从而提高磷肥的利用率和作物的结实率；硅元素素能增强花粉活力，增加瓜果类作物的成果率。

2. 钙元素对植物生长的作用

钙是作物细胞壁的重要组成元素，可以促进表皮细胞的分裂，提高果实表皮的韧性和厚度，从而加快果实表皮的生长，避免果皮生长速度跟不上果肉生长的速度出现裂果的问题。同时钙元素可以调节植物细胞膜的渗透性，减少作物体内乙烯的合成，从而延缓作物的衰弱速度，提高作物的挂果期。

3. 镁元素对植物生长的作用

镁元素是聚核糖体的重要成分，能促进作物体维生素的形成。因此，施用镁肥能增强农作物的光合作用，提高产量并改善品质。镁还能促进植物对硅的吸收

关键字 植物营养，中微量元素，快速吸收

分类：其他方向与主题

某铁路局食品快检技术应用现状浅析

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某铁路局食品快检技术应用现状浅析
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【摘要】　目前，食品快检技术已广泛应用于食品安全监管工作，为现场科学、精准、高效监管提供了强大技术支撑。本研究旨在了解食品快检技术在某铁路局食品安全监管工作中的应用现状及存在的问题，并提出相应对策，为铁路相关部门提供参考。
【关键词】　食品快检技术；食品安全监管；应用

Brief analysis on the application status of food fast inspection technology in a railway Bureau
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【 Abstract 】 At present, fast food inspection technology has been widely used in food safety supervision, providing strong technical support for scientific, accurate and efficient supervision on site. This study aims to understand the application status and existing problems of fast food inspection technology in food safety supervision work of a railway bureau, and put forward corresponding countermeasures to provide reference for railway related departments.
【 Key words 】 Fast food inspection technology; Food safety supervision; application

食品安全大于天，是关系国民生计的大事[1]。食品安全是“产”出来的，也是“管”出来的，食品安全监管部门要多在“管”字上下功夫。近年来，随着社会经济和食品科技的发展，食品种类不断丰富，新业态、新商业模式层出不穷，极易产生新的食品安全风险隐患。这一现状给食品安全监管带来前所未有的压力和挑战。若仅靠传统实验室检测方式，则远远不能满足公众对于快速排查食品安全风险隐患的需求。在食品安全监督检测体系中，食品快检技术不仅可以实现食品安全预警时间点前移，还可以扩大食品安全控制范围，减轻了实验室检测的压力。目前，食品快检技术已广泛应用于食品安全监管工作，为现场科学、精准、高效监管提供了强大技术支撑。本研究旨在了解食品快检技术在某铁路局食品安全监管工作中的应用现状及存在的问题，并提出相应对策，为铁路相关部门提供参考。

1　近年来食品快检技术在某铁路局食品安全监管中的应用现状

1.1　某铁路局食品安全监管中应用食品快检技术抽检样品情况

2020 年—2022 年，某铁路卫生监督所应用食品快检技术开展现场快速检测，检测项目有餐（饮）具洁净度等 11 项，共计快速检测样品 1535 件，检测合格率 93.42%，果蔬农药残留、食品中心温度、餐（饮）具洁净度等 3 个项目开展的比较多。见表 1。

表 1　2020 年—2022 年开展食品快检情况

序号

检测项目

检测数

不合格数

合格
率/(%)

占总检测样品比/(%)

1

餐（饮）具洁净度

205

17

91.71

13.36

2

容器工具洁净度

68

10

85.29

4.43

3

食品中心温度

405

8

98.02

26.38

4

果蔬农药残留

465

38

91.83

30.29

5

容器消毒余氯

74

13

82.43

4.82

6

食品中亚硝酸盐含量

26

100.00

1.69

7

食品中硝酸盐含量

29

100.00

1.89

8

食品中甲醛含量

55

4

92.73

3.58

9

食品中吊白块含量

38

3

92.11

2.48

10

食品中二氧化硫盐含量

46

4

91.30

3.00

11

食用油酸价及过氧化值

124

4

96.77

8.08

合计

—

1535

101

93.42

—

1.2　食品快检技术在某铁路局重大活动食品安全保障工作中的应用情况

在某铁路局召开职代会、党代会及举办其它重大活动时，某铁路卫生监督所在食品安全保障工作中应用食品快速检测技术对一些重点环节进行卡控。例如在原料采购环节使用农残速测卡（检测果蔬农药残留），在加工制作环节使用 ATP 荧光检测仪（检测餐用具的洁净度），在成品热链贮存环节使用中心温度计（实时检测食品的中心温度），等等。这些高新技术食品快检手段的应用，使食品源头到餐桌的全过程盯控更加数字化、可视化，让食品安全保障工作更加科学、精准、高效。

关键字 食品快检技术；食品安全监管；应用

分类：其他方向与主题

精神病性障碍早期视空间认知缺陷特征及皮层干预靶点

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【目的】

精神分裂症是重性精神病性障碍，认知功能缺陷独立于临床症状、在症状缓解后依然稳定存在，且不受药物影响，是更接近核心病因的疾病内表型。针对认知功能缺陷的难治性现状，课题组策略：一是前移治疗窗口早干预，选择早期患者为干预对象，包括精神病临床高危综合征（clinical high risk for psychosis, CHR）和首发精神分裂症（first episode schizophrenia, FES）；二是针对性选择与精神病发作密切关联的特定认知领域，基于相关病理性脑神经环路进行精准干预。本研究选择与精神病发作密切相关的视空间认知功能，基于其病理性神经环路、采用重复经颅磁刺激（repetitive transcranial magnetic stimulation, rTMS）进行个体化精准干预研究。

【方法】

使用随机双盲安慰剂对照的研究设计，纳入 CHR 和 FES 患者作为干预对象，随机分为 rTMS 真刺激组和伪刺激组。基于视空间认知功能缺陷的病理性神经环路“顶叶-海马回路”，根据每个被试的海马-下顶叶的局部最大功能连接确定皮层干预靶点，采用 20Hz 高频 rTMS 干预左下顶叶、进行个体化精准干预 2 天 10 个疗程，并在干预前后采集神经影像学数据，明确 rTMS 对视空间认知功能的干预疗效、探索 rTMS 疗效的生物学机制。

【结果】

110 例患者随机分为 rTMS 真刺激组 55 例、rTMS 伪刺激组 55 例，两组患者在人口学及临床学特征方面匹配；真刺激组 52 例和伪刺激组 47 例患者完成了 rTMS 干预及干预前后的认知功能评估，结果显示 rTMS 精准干预左下顶叶对视空间认知功能的效应优于伪刺激对照组，时间和组别交互作用显著（$F = 6.873$，$p = 0.01$）；真刺激组 48 例和伪刺激组 38 例患者完成了 rTMS 干预、干预前后的认知功能评估及干预前后的神经影像扫描，使用多变量距离矩阵回归（Multivariate Distance Matrix Regression, MDMR）算法分析发现视空间认知功能与双侧角回脑区活动显著相关；分别以双侧角回为感兴趣种子点，进行与全脑体素的功能连接分析：右侧角回与左侧枕叶、右侧眶额、右侧额下回、右侧额上回之间的功能连接与认知分数存在显著负向关联；对上述四组功能连接在干预前后的变化值与认知变化值进行相关分析，真刺激组存在右侧角回与左侧枕叶的功能连接变化与认知变化之间存在显著负相关（$r = -0.31$, $p = 0.04$），提示 rTMS 干预机制与降低右侧角回与左侧枕叶的功能连接有关。

【结论】

精准 rTMS 高频干预早期精神病患者的左侧角回可以显著提升视觉学习记忆，该疗效可能与调节海马-中央后回的功能连接有关。本研究为精神病认知缺陷的早期干预提供了科学线索。

关键字 精神病性障碍早期，精神病临床高危综合征，首发精神分裂症，视空间认知功能，重复经颅磁刺激

分类：其他方向与主题

基于低场核磁共振方法快速评价食用油脂氧化的研究

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目的　从脂肪酸和甘三酯组成角度，应用多元线性逐步回归方法建立弛豫信号对理化指标的预测模型，讨论基于低场核磁共振技术（LF-NMR）快速评价食用油脂氧化的可行性，探索其快速检测的内在机理。

方法　制备不同氧化程度的食用油脂样品，测定其理化指标包括动力粘度，脂肪酸组成和极性物质组成，测定 LF-NMR 参数包括多变量数据处理方法所得峰 21 和峰 22 的弛豫时间（T）、高度（H）、面积（S）、相对面积（RS）及单变量数据处理方法所得整体的弛豫时间（T2w）和峰面积（S2w）。应用多元线性逐步回归方法，建立 LF-NMR 参数对理化指标的预测模型，通过标准差（SD）和平均相对误差（MRE）指标评价模型性能，并与传统分析方法对比。应用 Pearson 相关性分析和多元线性回归分析方法，结合纯物质的 LF-NMR 弛豫谱图，阐述 LF-NMR 参数、化学组成和物理性质的三角关系，探索 LF-NMR 弛豫谱图未知峰的内在涵义，归纳 LF-NMR 快速评价食用油脂氧化的内在机理。

结果

1、LF-NMR 检测所得弛豫谱图特性：多变量数据处理方法所得弛豫谱图，所有曲线呈现相似的两个峰分布，分别表示为峰 21 和峰 22，随油脂的氧化程度提高，两峰逐渐靠近并最终合并为同一个峰。单变量数据处理方法所得 T2w 和 S2w 参数，其数值均随油脂氧化程度的提高而降低，T2w 相比 S2w 的下降速率更快。

2、LF-NMR 法预测油脂理化指标的性能分析结果：基于 LF-NMR 可快速评价食用油脂氧化，但对各指标的预测性能不同，从高到低的排序为：脂肪酸不饱和度>极性物质>动力粘度。结果也证明 LF-NMR 在快速评价油脂氧化时，弛豫信号反馈的信息更偏向脂肪酸，而非甘三酯。

3、LF-NMR 参数和理化指标的初步相关性分析：对比多变量和单变量数据处理方法所得 LF-NMR 参数，发现 T2w 几乎与峰 21 的所有参数负相关，差异具有统计学意义（$P<0.01$），而与峰 22 的所有参数呈正相关，差异具有统计学意义（$P<0.01$），即 T2w 是油脂 LF-NMR 信号的代表性指标。从脂肪酸组成角度，T22 和 H22 与油脂饱和脂肪酸（SFA）、单不饱和脂肪酸（MUFA）、多不饱和脂肪酸（PUFA）和不饱和脂肪酸（UFA）含量的相关性最强，r 分别为-0.967~-0.932 和 0.932~0.967（$P<0.01$）。

4、LF-NMR 快速检测的内在机理探讨： 提出 LF-NMR 弛豫谱图与特定化学物质相关，应用多元线性逐步回归方法结合二聚甘油二油酸酯、三油酸甘油酯和油酸弛豫谱图，发现 oxTGM= 48.438+0.896*H21-0.531*T22，FFA= 0.184*T21+0.000294*S22，表明 LF-NMR 弛豫谱图中峰 21 仅提供有关极性和低分子量氧化产物的独特信息，而与其他研究者所提出的聚合物无关。

结论　证实基于 LF-NMR 方法可快速评价食用油脂氧化，各指标的预测性能从高到低为：脂肪酸不饱和度>极性物质>动力粘度。表明 LF-NMR 快速评价油脂氧化时，弛豫信号反馈的信息更偏向脂肪酸，而非甘三酯。LF-NMR 快速检测的内在机理：LF-NMR 弛豫谱图与特定化学物质相关，弛豫谱图中峰 21 仅提供有关极性和低分子量氧化产物的独特信息，而与其他研究者所提出的聚合物无关。

关键字 低场核磁共振，食用油脂氧化，脂肪酸，极性物质，动力粘度

分类：其他方向与主题

食品超市中的营养学服务：现状、分析与建议

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食品超市中的营养学服务：现状、分析与建议

目的：调研食品超市中营养学服务现状，分析原因并提出对策建议。

方法：调研访谈法、实地走访、需求分析

人们生活必需品之食物，居民采买渠道主要是农贸市场、食品超市、便利店等。

信息收集一：询问超市工作人员，顾客会问这三个方面的内容吗？1、问这种食材如何做菜好吃？ 2、问食材有什么食用好处吗？ 3、问哪些食品是低 GI、低热量的？超市人员回答，顾客很少问。

信息收集二：顾客问超市工作人员最多的是，问商品摆放的位置。

信息收集三：顾客想问超市工作人员关于所售商品的营养、食用方法，但常得不到满意的答复。顾客希望有相关的服务。有食品营养方面的普及那更好。

结果：

对标准食品，在食品外包装袋或盒、或箱子的外部标注食品的配料表和食品营养成份表。

对食用初级农产品的营养成份，超市或便利店并没有标示出来。一方面是有难度，食用农产品营养成份的测定结果受外因的影响，准确度难以维系的。

另一方面经营者对此也没有去深究是否设立这样的服务。

第三，如果没有国家专业机构的引导和要求，没有营养专业人员的加入，超市就不能实现食品营养推荐服务的科学性、专业性、持续性。

第四，目前搜索零售官网 如联商网，关于超市里的营养师方面的信息很少。

结论：

通过以上信息收集，对于超市为顾客提供食品的重要场所，食品营养方面的服务是未来蓝海的地方。

由此，进一步分析现状并提出建议。

其一，超市作为老百姓购物的重要场所，“一果一蔬、一禽一蛋、一鱼一肉”都是老百姓的一日三餐需求。（引用《生鲜高效运营》一书）。人们对食物食品营养知识、营养三餐的配餐需求是存在的。

其二，据了解，超市在经营过程中，也面临着为顾客提供庞大食品种类，初级农产品、加工品，熟食制品，标准化食品的营养知识的服务需求。

其三，超市的食品采购业务人员、各级管理人员，需要掌握基础的营养知识。

其四，超市食品经营过程中，面临打假、出现异常状况，需要提供专业的判断和后续的改进。

超市的食品销售工作，从采购到销售，从顾客角度、从经营的角度去特别关注趋势，老百姓从以前对食品安全的关心、到现在对食品如何组合搭配的需求。

综上所述，从老百姓的饮食营养出发，从国家 2030 的大健康目标出发，建议食品超市的经营中，倡导建立营养科普宣传点或根据经营规模配备兼职营养师。鼓励在大型商超里设置专职或兼职营养师。

关键词：食品超市、营养师、营养学服务

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关键字 关键词：食品超市、营养师、营养学服务

分类：其他方向与主题

基于代谢组学分析迟发型母乳性黄疸与粪便代谢物相关性的病例对照研究

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新生儿黄疸可分为生理性黄疸和病理性黄疸。生理性黄疸是指在新生儿早期，血液中的非结合胆红素增加到一定程度的新生儿黄疸，是新生儿正常发育过程中出现的一过性胆红素血症。其中有一种特殊类型的黄疸—母乳性黄疸(Breast milk jaundice, BMJ)是新生儿生理性黄疸的延续。母乳是新生儿的最佳食物选择，世界卫生组织建议在婴儿出生后的 6 个月内采用纯母乳喂养。迟发型母乳性黄疸是造成母乳喂养中止甚至中断的常见原因，但其发病机制目前还不明确，母乳生物活性因子、产妇哺乳期膳食均可能干扰新生儿肠道菌群定植和粪便代谢物从而影响黄疸的发生。

【目的】利用代谢组学方法分析婴儿粪便中的代谢物，筛选与迟发型母乳性黄疸相关的生物标记物。

【方法】依托本课题组建立的母乳库随访队列，采用前瞻性巢式病例对照研究，选择 29 例随访过程中诊断为迟发型母乳性黄疸的足月患儿作为黄疸组，依据黄疸组新生儿的胎龄、性别，按 1：2 的比例匹配，入组 65 例健康无黄疸足月儿作为对照组。 为进一步探讨母乳性黄疸婴幼儿粪便代谢物的特征，从诊断为母乳性黄疸的婴儿中选择 12 例典型病例作为黄疸组，依据黄疸组新生儿的胎龄、性别，按 1：1 的比例匹配，入组 12 例健康无黄疸足月儿作为对照组。产后 42 天收集两组婴儿粪便，利用超高效液相色谱-四级杆-飞行时间串联质谱(Ultra-high performance liquid chromatography quadrupole time-of-flight tandem mass spectrometry, UHPLC-Q-TOF/MS)对粪便代谢产物进行非靶向代谢组学分析，探究母乳性黄疸代谢特点，分析其与母乳成分、肠道菌群的关系。

【结果】 由 Venn 图分析可得正离子模式下，黄疸组和对照组共有的代谢物有 2056 个，黄疸组有 1376 个特有的代谢物，对照组有 598 个特有的代谢物；负离子模式下，黄疸组和对照组共有的代谢物有 796 个，黄疸组有 568 个特有的代谢物，对照组有 455 个特有的代谢物。正离子模式下，黄疸组和对照组中，一共有 10572 种差异代谢物，其中有 2 种代谢物上调表达，10570 种代谢物下调表达；在负离子模式下，黄疸组和对照组中，一共有 2341 种差异代谢物，其中有 997 种代谢物上调表达，1344 种代谢物下调表达。下调代谢物以柠檬酸、甲硫氨酸、天冬氨酸、腐胺、亚精胺、尿胆素原、丁酸为代表。利用 KEGG 数据库提供的 pathway 信息综合分析，共涉及 159 条通路。

【结论】柠檬酸、甲硫氨酸、天冬氨酸、腐胺、亚精胺、丁酸等作为代表性差异代谢物，可能通过影响肠道发育、能量合成、胆红素代谢等方式影响黄疸的发生。

关键字 母乳性黄疸，乳母膳食，代谢组学

分类：其他方向与主题

β-羟基-β-甲基丁酸（HMB）对老年肌少症作用的meta分析

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目的 肌少症是一种常见的老年疾病，会增加老年人衰弱和跌倒的发生风险，增加全因死亡率。β-羟基-β-甲基丁酸（HMB）是必需支链氨基酸亮氨酸的活性代谢产物，通过刺激肌肉合成代谢信号通路和抑制肌肉蛋白分解来维持骨骼肌质量和瘦体重。既往研究证实，补充HMB对肌少症可能存在治疗效果，但单一补充HMB对肌少症的干预缺乏多中心大样本人群的研究，而无法进行抗阻训练的老年人需要这样的证据。因此，本研究通过Meta分析，探寻单一补充HMB对老年肌少症患者的肌肉质量、力量及躯体功能的干预作用。方法 检索PubMed、Medline、Embase、CNKI、Sinomed及万方数据库，文献报道的时间从最早的一年至2022年10月。中文检索词包括“肌肉减少”、“肌肉减少症”、“肌少症”、“少肌症”、“肌衰症”、“HMB”、“β-羟基-β-甲基丁酸”、或“β-羟基-β-甲基丁酸钙”、“肌肉量”、“握力”等；英文检索词包括“Sarcopenia”、“Muscle mass”、“Grip”、“Muscle loss”、“CaHMB”、“HMB”、“β- hydroxy -β- methyl butyrate”等，通过计算机与人工溯源相结合，扩大搜索范围。纳入的研究需符合以下标准：（1）研究对象年龄≥60岁；（2）采用随机对照双盲设计；（3）补充 HMB 营养剂；（4）结局指标有肌肉质量，和/或肌肉力量，和/或躯体功能。排除标准为：（1）严重疾病导致的肌少症，如晚期器官疾病(心、肺、肝、肾、脑)、炎症性疾病、肿瘤、恶病质等；（2）增加了运动干预；（3）无对照；（4）无盲法；（5）重复发表。由两名研究员独立阅读题目、摘要，纳入符合纳排标准的文献并提取文章基本信息、受试者信息、营养干预信息（方式、时间及频率）及研究指标效应值，采用Cochrane风险评估工具进行研究质量评价，通过Stata16.0与RevMan5.3软件联合进行meta分析，应用标准化均数差(SMD)及95%可信区间(CI)评估干预效果。结果 通过数据库识别88篇,剔除重复文献23篇，阅读题目和摘要剔除不相关文献48篇，阅读全文并复筛17篇文章，最终纳入5篇符合标准的随机对照双盲试验进行Meta分析。纳入研究的总样本量为400例，HMB治疗组包括197例，安慰剂对照组包括203例。干预持续时间多为3-6个月，HMB总摄入量范围为2-3g，除了一项研究依据体重给相应剂量的HMB，其余均为固定剂量，大多以粉末冲剂或者橙汁饮料的形式给药，频率1-2次/天，安慰剂多为口感、气味、颜色相似的无效粉末。Meta分析结果显示，与对照组相比，HMB营养剂对肌肉质量（瘦体重）、肌肉力量（握力）和躯体功能（起立行走试验）的效应值 SMD （95CI%）分别为 2.08（1.00，3.16）kg（P=0.0002，I2=92%）、1.31（-1.54，4.16）kg （P=0.37，I2=98%）和-0.73（-3.85，2.40）秒（P=0.65，I2=96%）。结论 HMB营养补充剂可以有效改善老年肌少症患者的肌肉质量，HMB对肌肉力量和身体功能均有积极的影响，但未达到统计学显著性，提示，在不进行抗阻训练的情况下，HMB可以改善老年人的肌肉质量，若要改善肌肉力量和躯体功能，应该结合抗阻训练。

关键字 肌少症；β-羟基-β-甲基丁酸；Meta分析；营养联合

分类：其他方向与主题

基于图像识别的膳食调查系统开发

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目的：膳食调查是进行营养干预及营养指导工作的重要依据，也是人们了解自身营养摄入情况的重要数据来源。近年来，大数据、人工智能及可穿戴设备等技术的发展，为传统膳食调查方法的改进提供了空间，为膳食调查新方法的发展奠定了基础。这些方法提高了膳食调查和评估的准确性，对人们饮食习惯研究及健康管理具有重要的推进意义。但这些新方法的应用还在探索中，需要进一步的完善。针对传统膳食调查方法使用过程繁琐、耗时长的问题，将食品图像识别技术应用于膳食调查，为膳食调查新方法的研究奠定基础。

方法：将图像识别技术应用于膳食调查，采用食品图像识别引擎，识别用户上传的食材图片名称，同时采用图像分割模型、边缘检测等计算机技术，获取上传食物面积；并通过拍照、称重等建立常见食材面积与重量关系表，从而完善食物重量估算算法，实现食材重量的自动估算。通过竞品分析、用户画像分析等，确定系统的产品定位、功能模块及页面交互等。将图像识别与重量估算引擎植入前端小程序，设置用户信息管理、饮食记录、膳食评估及营养师远程管理功能模块。邀请 10 位资深营养师对小程序进行内部测试。

结果：本研究实现了拍照识别食材名称以及食材重量的自动估算，600 种常见食材图像识别 top1 准确率为 84.23%、top5 准确率为 96.22%。建立 600 种常见食材面积与重量关系表，食材图像面积识别平均相对误差为 8%。开发完成了方便快捷的饮食记录小程序以及一个基于 web 端的营养师工作台。目前饮食记录小程序已经实现用户健康档案建立，多种饮食记录方式（语音录入、文字输入及拍照识别），膳食营养评估，饮食记录分享及指导意见的获取等功能。营养师工作平台支持营养师查看远程录入的饮食记录，并结合系统生成的膳食评价报告，提供专业的评价及建议反馈给用户。营养师内测结果显示，使用饮食记录小程序与营养师工作平台，可有效解决远程管理问题，工作效率提升 50%以上。

结论：本研究探究了一种基于食品图像识别技术的膳食调查新方法，创新性的提出了食物重量估算的新思路，实现了拍照识别食材名称以及食材重量的自动估算。在软件应用方面，打造用户端与营养师端联动系统，提高了膳食调查的便捷性和自动化程度，可以为营养干预提供依据和参考。

关键字 膳食调查，图像分割，图像识别，重量估算，营养软件

分类：其他方向与主题

糖酵解代谢中重要代谢物的检测与分析

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目的：本研究旨在建立一种基于气相色谱-串联质谱的糖酵解代谢途径中重要代谢产物的定量检测方法，为糖酵解相关代谢物的定量检测提供更加精确的检测方法，有助于分析其代谢物变化与相关疾病之间的关系。

方法：采用气相色谱-串联质谱测定血清中 10 种糖酵解途径中代谢物的测定方法。对标准品与牛血清白蛋白的混合溶液样本和血清样本进行了硅烷化前处理条件的优化。采用单因素试验对衍生剂种类、提取溶剂种类、提取溶剂体积、衍生化时间、衍生化温度等参数进行了优化。根据 4 因素 4 水平的响应面优化设计，对衍生化温度、衍生化时间、萃取溶剂种类和衍生剂体积等因素进行综合统计分析，以确定最佳的提取条件，以实现最优的衍生化效率。利用标准曲线、基质效应、精密度、检出限和定量限等指标，对建立的检测方法进行方法学评价。

结果：对牛血清白蛋白加入标准品样本和血清样本两种样本前处理条件进行单因素结果与响应面结果综合分析，根据响应面实验结果，人工神经网络建模得出衍生化效率最大值对应的硅烷化实验条件为：N,O-双(三甲基硅基)三氟乙酰胺+1%三甲基氯硅烷(N,O-Bis(trimethylsilyl)trifluoroacetamide+1%Trimethy- lchlorosilane，BSTFA+ 1%TMCS)作为衍生剂，衍生剂体积 100μL,提取试剂为 80%甲醇，反应温度为 80℃,反应时间为 60 分钟。实验结果显示线性方程的相关系数范围在 0.9872-0.9927 之间；检出限在 0.0002-0.2382 μg/mL 之间；定量限在 0.0007-0.7940 μg/mL 之间，回收率范围在 80.10%-113.60%之间，日内精密度在 0.87%-13.67%之间，日间精密度在 2.03%-12.01%，整体基质效应在可接受范围内。衍生代谢物在-20℃和-40℃下具有较好稳定性（RSD%<20.00%）。血清中糖酵解代谢产物的稳定性：在-20℃下 9 种代谢物无法保持稳定（RSD%>20.00%）。在-40℃下 4 种代谢物（丙酮酸、草酰乙酸、3-磷酸甘油酸和α-D-6-磷酸葡萄糖）的稳定性较差（RSD%>20.00%），在-80℃下 10 种代谢物具有较好稳定性（RSD%<20.00%）。血清样本在 6 次冻融循环中，三种代谢产物（草酰乙酸、β-D-葡萄糖和 3-磷酸甘油酸）的 RSD%>20.00%，在经历 4 次冻融循环稳定性较好（RSD%<20.00%），因此需要在较少冻融循环次数内完成测定。

结论：本研究优化了一种基于气相色谱-三重四级杆串联质谱检测血清中 10 种糖酵解代谢物的方法。依据单因素结果与响应面结果综合分析确定提取最佳条件为：衍生剂体积 100μL，提取试剂为 80%甲醇，反应温度为 80℃，反应时间为 60 分钟。该方法在线性范围、检出限、稳定性、回收率和灵敏度方面显示出了良好的分析性能。本研究为血清糖酵解代谢物的定量分析提供技术支持，为糖酵解相关疾病的发病机制研究提供新思路。

关键字 糖酵解；硅烷化衍生；血清；气相色谱-质谱联用；响应面法

分类：其他方向与主题

社交媒体环境下食品安全危机信息传播机制研究

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目的　选择研究社交媒体环境下食品安全危机信息传播机制，通过分析社交媒体环境下食品安全危机信息传播的影响因素和机制，提出关于社交媒体环境下食品安全危机信息传播的建议。**方法**　主要采用文献研究法、案例分析法进行研究。使用文献研究法通过对国内外有关食品安全、社交媒体、危机信息传播相关理论资料进行搜集和整理，作为立论的理论基础。同时使用案例分析法，以沃尔玛狐狸肉事件为例分析了社交媒体环境下食品安全信息传播规律。**结果**　通过研究发现，社交媒体环境下食品安全危机信息传播的影响因素主要有政府、社交媒体、食品企业、网民。在社交媒体环境下食品安全危机信息传播的管理，必须做好关键环节的控制，建立网络监测小组，加强社交媒体舆论监管；引导网民积极参与媒体监督，根据公共治理理论，在食品安全危机治理时，需要协调各主体的力量共同治理危机，形成危机治理网络，做到快速高效地应对危机；加强政府对社交媒体的引导，政府有关部门在企业食品安全危机事件过程中应当做好对社交媒体舆论的引导；政府要善于利用社交媒体发声，政府食品安全政府监管部门应该在借助于传统媒体进行议程设置的同时，还应当充分发挥社交媒体在传播渠道中本应该发挥的重要作用；食品企业要积极与媒体沟通，企业应该在危机发生后尽快和受伤害网民、媒体、公众、政府部门、行业组织等积极沟通；加强政府对企业监管力度。以期为政府加强对食品安全舆情的监测和引导提供相关参考依据。**结论**　运用公共治理理论和危机信息传播理论研究社交媒体环境下食品安全危机信息传播机制。通过分析社交媒体环境下食品安全危机信息传播的影响因素和机制，探讨了社会媒体环境下食品安全危机管理的建议。通过本文的研究发现，社交媒体环境下食品安全危机信息传播的影响因素主要有：政府、社交媒体、食品企业、网民。在社交媒体环境下食品安全危机信息的传播生命周期分为四个阶段：食品安全危机信息的潜伏期、食品安全危机信息的蔓延期、食品安全危机信息的控制期、食品安全危机信息的稳定期。本文认为社交媒体环境下食品安全危机信息传播管理，应该做好关键环节的控制、引导网民积极参与媒体监督、加强政府对社交媒体的引导、政府要善于利用社交媒体发声、食品企业要积极与媒体沟通、加强政府对企业监管力度。

关键字　社交媒体；食品安全；危机；信息传播

分类：其他方向与主题

鱼腥草中黄酮类化合物检测方法的建立

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目的：本研究旨在依据超声辅助萃取技术并结合超高效液相色谱-质谱联用技术，建立检测鱼腥草中黄酮类化合物含量的方法，并探究黄酮类化合物在不同产地鱼腥草的不同部位（根、茎、花、叶）的富集情况，有助于鱼腥草的品质评估鉴定和定向种植，促进了鱼腥草资源的综合利用和功能性食品药品的开发。

方法：采用超声辅助萃取技术结合超高效液相色谱-串联质谱法测定鱼腥草中 11 种黄酮类化合物。采用单因素实验对鱼腥草样本进行了前处理条件的优化，如提取溶剂的种类与质量分数、固液比、超声时间和超声温度等参数进行了优化。根据响应面优化设计，对上述因素进行综合统计分析，以确定最佳提取条件，以实现最优的提取效率。利用标准曲线、基质效应、精密度、回收率、检出限、定量限和稳定性等指标，对建立的检测方法进行方法学评价。

结果：经综合分析样本前处理条件的单因素实验结果和响应面实验优化结果，得最佳提取工艺条件为提取试剂为 40%质量分数的乙醇，固液比为 1:30，在室温（25℃）下超声，超声时间为 5 分钟。该方法验证的结果为：11 个目标化合物在浓度范围内均呈良好的线性关系（R2＞0.9855），检出限和定量限分别在 0.0025-0.1μg/mL 和 0.005-0.1μg/mL 范围内，11 种分析物的日内精密度为 4.61%-10.94%，日间精密度为 5.06%-11.62%，回收率范围在 80.12 %-119.48%之间，基质效应的结果为：斜率比在 0.882-1.097 之间，在可接受范围内。在三个不同温度储存条件下（室温、4℃和-20℃）保存七天的稳定性结果如下：在 4℃时 11 种化合物的稳定性都比较好（RSD：3.42%-9.23%），橙皮苷在-20℃下的稳定性最差（RSD＞20.00%），其余物质稳定性的 RSD 为 2.98%-10.80%，11 种化合物在室温时的 RSD 为 5.06%-11.62%。将该方法成功应用于不同地区鱼腥草不同部位的黄酮类化合物的测定及其比较分析，11 种化合物在 8 个省份的鱼腥草的不同器官间的分布和含量存在明显差异，其中叶和花中黄酮含量呈高聚集，根和茎中含量较低。

结论：本文采取超声辅助提取与超高效液相色谱-质谱分析相结合的技术，系统地建立了检测鱼腥草中 11 种黄酮类化合物的方法，优化出了最佳提取工艺条件：提取试剂为 40%乙醇，固液比 1:30，室温（25℃）下超声，超声时间 5 分钟），方法验证结果证明了该方法的简单、灵敏和高效。方法应用得到 11 种化合物在鱼腥草叶和花中含量高，根和茎中含量较低。因此，本文对鱼腥草在食品、药品以及化妆品领域中的开发和利用提供了良好的理论支持和科学依据，对促进中国中药的发展具有深远的意义。

关键字 鱼腥草；类黄酮；液相色谱-质谱联用；响应面

分类：其他方向与主题

烟台市主要膳食食品中重金属污染水平与概率健康风险评估

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目的： 了解烟台市主要膳食食品中重金属污染情况并评估其潜在的健康风险。方法：采用多阶段分层抽样确定调查人群，采用 3 天 24 小时调查问卷调查当地居民膳食摄入情况。于 2012-2022 年共采集食品样本 2825 份，采用电感耦合等离子体质谱法检测食品中铅、镉、汞、砷 4 种重金属元素的含量。采用单因子污染指数法、内梅罗综合污染指数法评价食品中重金属污染状况。基于居民膳食摄入量的调查结果，采用目标危害系数（THQ）、总目标危害系数（TTHQ）、终生癌症风险增量（ILCR）、总终生癌症风险增量（TILCR）等指标，使用蒙特卡罗模拟方法，定量评估食品中重金属对人体的概率健康风险。结果：膳食调查结果显示，当地居民蔬菜及谷类消费量最高，分别为 271.74、266.16 g/d。食品中重金属污染评价结果显示，水产品中铅、镉、砷含量均超标，超标率分别为 0.8%、4.7%、27.3%，其中砷的检测浓度最高达 1.57 mg/kg；豆类、肉类、乳类中均出现汞超标情况，超标率分别为 0.58%、3.45%、2.16%；其他食品中铅、镉、砷的检测浓度均在国家食品安全标准(GB 2762-2017)的规定范围内。水产品中砷的单因子污染指数为 2.45，处于中度污染水平，水产品中重金属综合污染指数为 1.81，处于轻度污染水平；其他食品中重金属单因子污染指数、综合污染指数均小于 0.7，处于优良水平。概率健康风险评估结果显示，食品中 THQ 平均值为砷（2.83）>镉（0.16）>汞（0.09）>铅（0.05），食品中砷的 THQ 平均值大于可接受限度（HQ=1），表明通过食物摄入砷的潜在风险是不可接受的，THQ 值大概在第 80 百分位小于 1；食品中铅、镉、汞的 THQ 的平均值及第 95 百分位值均小于 1，表明其摄入对人体健康无明显危害；TTHQ 的平均值为 3.13，第 95 百分位为 8.63，二者均小于 10，表明长期摄入这些食物不会对人体产生慢性毒性。食品中 ILCR 平均值为砷（1.3×10^{-3}）>镉（9.7×10^{-5}），砷的 ILCR 值大于可接受限度（ILCR=1×10^{-4}），表明其对人体有潜在的致癌风险，而镉的 ILCR 值大于 1×10^{-6} 但小于 1×10^{-4}，其对人体潜在的致癌风险在可接受范围内；TILCR 值在第 40~45 百分位则超过 1×10^{-4}，表明通过膳食摄入的重金属对人体有潜在的致癌风险。根据不同食品对 THQ 和 ILCR 的贡献分析发现谷类是铅的主要来源，谷类和水产品是镉的主要来源，水产品是汞和砷的主要来源。经谷类和水产品摄入的重金属构成了对人体主要的健康风险，其中砷是最主要的重金属。结论：各类食品中水产品的污染程度最高，居民通过食物消费摄入的重金属砷对人体具有潜在的健康风险，较高的摄入水平和重金属污染水平使谷物和水产品成为膳食重金属暴露的主要来源。

关键字 食品；重金属；污染指数；概率风险评估；

分类：其他方向与主题

饮食温度对大鼠生理功能的影响

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目的：饮食与健康的关系越来越受到重视，中医理论认为食物寒温失宜,会损伤人体阴阳之气。有学者研究发现饮食的温度对人体的体质有明显影响。为了探讨饮食温度对机体生理机能的全面影响,找出最适合的饮食温度，本实验通过观察不同温度的饮食对大鼠的多项生理功能包括一般状况、体重、血糖、血脂、抗氧化作用、自主活动和免疫能力的影响；及对雌性大鼠性激素及血液流变学的影响等。为指导健康饮食提供实验依据。方法:将 40 只 Wistar 大鼠（雌雄混搭）随机分为 4 组(n= 10)(A 组、B 组、C 组、D 组)，分别喂饲不同温度(10～ 15℃、22～ 32℃、42～ 52℃、52～ 62℃)的食物和饮水，在饲养过程中观察大鼠的一般状况，35d 后对大鼠进行体重测量，测定血糖(G)、总胆固醇(TC)、甘油三脂(TG)，测定血清中超氧化物歧化酶(SOD)活性、谷光甘肽过氧化物酶(GSH-Px)活力及丙二醛(MDA)和蛋白含量；进行大鼠自主活动测试、血浆免疫球蛋白和补体的测定、计算胸腺及脾脏系数；对雌性大鼠进行性激素和血液流变学等参数测定。结果：采用不同温度的饮食喂养 35 d 后，各组大鼠的体重、血糖、血脂无显著差异(P> 0.05)，C 组大鼠的血浆 SOD 和 GSH-Px 活性明显高于 A 组(P< 0.05)，MDA 和蛋白含量显著低于 A 组(P< 0.05)；C、 D 两组大鼠的自主活动距离明显大于 A、B 两组 (P<0.05) ；B、C、D 组血浆补体 C3 含量低于 A 组 (P<0.05) ，C4 含量显著低于 A 组(P<0.01) ， D 组 C4 含量低于 B、C 组 (P<0.05) ；免疫球蛋白 4 组间差异无统计学意义 (P>0.05)；A、C 两组胸腺及脾脏系数均明显高于 D 组 (P<0.05) ；在饲养过程中 C 组大鼠的一般情况最好，活泼好动，毛发浓密顺滑。C 组雌性大鼠的胰岛素(INS)和载脂蛋白 apoA 水平，卵泡刺激素(FSH)、黄体生成素(LH)、孕酮(P)含量明显升高，产仔最多，总胆固醇(TC)、甘油三酯(TG)、低密度脂蛋白(LDL)水平和 apoB/apoA 比值均明显降低，血流状态稳定。结论:42～52℃饮食组大鼠一般情况最好，生化指标较为稳定，有较强的抗氧化作用；有较好的自主活动能力及免疫能力；该饮食组雌性大鼠生产的次数及每次生产的数量最多；但不同温度的饮食对糖代谢无明显影响。综上 42～52℃是实验大鼠较为适宜的饮食温度。大鼠正常体温在 38℃左右，比人体高 1℃左右，由此推荐人们的最适饮食温度大致在 40～50℃附近，或稍高于体温的温热饮食。此实验证实了饮食温度与健康的关系。有学者曾对大量 50～ 70 岁中老年人进行流质饮食适宜温度的测试,发现适宜的温度分布在 40.92～ 50.84℃ ,这与本实验结果比较一致。大鼠体温与人体接近,较适宜的饮食温度也是相近的。但是适宜的饮食温度即使对每一个个体而言也不是一成不变的,一定要全面权衡,找出体现个性化的最适宜饮食温度。

关键字 关键词：饮食温度；大鼠；糖脂代谢；自主活动；免疫能力、血液流变学

分类：其他方向与主题

中国北方某农村地区老年人吞咽功能对骨骼肌质量与功能的影响及差异分析

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目的：分析了解吞咽功能对中国北方某农村地区老年人骨骼肌质量与功能的影响及差异。

方法：2020 年 8 月在内蒙古自治区巴彦淖尔市五原县对 65 岁及以上常住老年居民进行调查，测量身高、体重，计算体重指数（BMI），应用生物电阻抗法测定去脂体重（FFM）、骨骼肌总量（SMM），体脂率（PBF），计算四肢骨骼肌指数（SMI）。采用电子握力计测量双手握力各 2 次，取最大值记为握力值。记录老年人以日常行走速度步行完成 6 米直线距离的时间，计算步行速度，取 2 次测量平均值记为 6 米步速。记录老年人重复从椅子上站起 5 次所用时间，记为重复站起用时。应用 30mL 温水吞咽测试，评估老年人吞咽功能，1 级正常，2-5 级（可疑）下降，应用 t 检验或 Wilcoxon 秩和检验比较正常组和（可疑）下降组差异。

结果：纳入完成体成分测定、身体测量和评估的 138 名老年男性和 169 名老年女性进行分析。老年男性吞咽功能正常 75 人，占比 54.3%，老年女性吞咽功能正常 62 人，占比 36.7%。与老年男性中，吞咽功能（可疑）下降组的 FFM 和 SMM 分别为 48.0±5.7kg 和 26.2±3.4kg，均显著低于正常组（FMM:50.1±5.8kg，SMM: 27.4±3.6kg，P<0.05）；但握力、6 米步速、重复站起时间等骨骼肌功能评价指标，和 BMI、PBF、四肢骨骼肌指数等身体测量指标在两组间均无显著差异（P>0.05）。老年女性中，吞咽功能（可疑）下降组的握力、6 米步速和重复站起时间分别为 20.6±5.6kg，0.9±0.2m/s 和 18.6±5.3s，其中握力和步速均显著低于正常组（握力：23.8±7.9kg，6 米步速：1.0±0.2m/s，P<0.05），重复站起时间显著高于正常组（16.3±4.0s，P<0.01）。此外，吞咽功能（可疑）下降组的 FFM、SMM 和 SMI 分别为 37.6±4.9kg，20.0±2.9kg，6.2±0.8kg/m2，均显著低于正常组（FMM:39.7±4.8，SMM: 21.3±2.9kg，6.5±0.8kg/m2，P<0.05）；BMI 和 PBF 则无显著差异（P>0.05）。

结论：在北方某农村地区，与正常老年人相比，吞咽功能衰退老年男性的骨骼肌质量呈现显著下降，老年女性的骨骼肌质量与功能均呈显著下降。提示老年人的吞咽功能衰退可能是导致肌肉衰减症发生发展的重要诱因。

关键字 老年人；吞咽功能；骨骼肌质量；骨骼肌功能；肌肉衰减症

分类：其他方向与主题

Research on Grassland Mongolian Sheep Tail Oil Targeted to Increase Testosterone

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Purpose

Sheep tail fat (STF) is a valuable nutritional reserve for sheep under harsh living conditions. According to traditional Mongolian medicine, STF has the functions of tonifying deficiency and moistening dryness, warming and eliminating pathogenic factors, and nourishing kidney and yang. The team’s previous research found that the grassland Mongolian sheep STF has the characteristics of ruminant-specific odd-chain saturated fatty acids, high content of oleic acid (OA) in the sn-2 position, n-6/n-3 values that meet health needs, and has the ability to increase testosterone secretion role. Now, the fertility and overall health problems caused by male oligospermia have become a major issue that threatens human survival. This experiment aims to solve the problem of low testosterone secretion caused oligospermia in men by studying the targeted effect of STF-specific fatty acid profile on testosterone.

Method

SHR rats were fed with STF in the experimental group and lard (PF), soybean oil (SO) and rapeseed oil (RO) in the control group for three months. Rats in the experimental group and the control group were fed with fat and oil-free standard food at a ratio of 1:9, and the rats in the blank group were given standard feed and drank 1% saline freely. Determination of fatty acid composition in oil, liver kinase, blood lipid, gonadotropin-releasing hormone (GnRH), luteinizing hormone (LH), estradiol (E2) and follicle-stimulating hormone (FSH), testosterone (TT) concentration in testicular tissue and StAR, CYP11A1,CYP17A1 gen protein and mRNA expression.

Result

The content of palmitic acid (PA) and stearic acid (SA) in STF was higher than that in vegetable oil, but significantly lower than that in PF. The content of OA is lower than that of RO, but extremely higher than that of PF. The n-6/n-3 ratio of STF was similar to that of RO. Compared with PF (13.48%), STF (43.27%) has high OA at the sn-2 position, low PA and SA content, accompanied by the characteristics of conjugated linoleic acid (CLA) and fat-soluble vitamins E,A,D and K2. The blood pressure of the rats ingesting STF for three months was significantly lower than that

of other oil groups, and the rise of blood pressure was relatively gentle. The γ-GT value (2.23 U/L) and AST and ALT (16.6 and 37.36.32 U/L) were significantly lower than those of the control group, there was no difference with the blank group. The serum γ-GT value of rats in RO group of rats in RO group was 10.53U/L, AST and ALT were 37.9 and 61.84 U/L, respectively, and liver kinase in PF group were 4.82, 27.84 and 42.83 U/L, respectively. The blood fat of the rats ingesting STF was significantly lower than of the PF group, and there was no significant difference with other vegetable oil groups.

The expression of TT in testis of rats ingesting STF for three months was higher than that of RO group, and had no distinct difference with other groups. There was no discrepancy in the expression of FSH and GnRH in different experimental oils, and the expression of LH and E2 in STF group was lower than that in PF group. Combined with the results of previous experiments, it can be seen that STF has no obvious effect on hormones on the hypothalamus-pituitary-gonad axis. Rats in the STF group had gene expressions of StAR, CYP11A1 and CYP17A1 similar to those in the blank group, which were significantly higher than those in the RO group. Compared with the PF group, the expression of StAR in the rat ingesting STF was higher (0.82 and 0.64 for STF and PF, resprectively), and there was no huge diference in the gene expression of CYP11A1 and CYP17A1.

Conclusion

STF has a specific fatty acid composition, low total SFA and SA content, high sn-2 OA content that is easy for the body to digest and absorb, n-6/n-3 ration is 3:1 suitable for human needs, accompanied by CLA and other active ingredients. STF lowers LDL-C in blood, increases HDL-C, significantly improves liver function in SHR rats, and increases blood pressure gently. STF has no obvious effect on FSH, GnRH, LH and E2 on the hypothalamus-pituitary-gonad axis, but targets the secretion of androgen TT by testis. STF improves the body’s functional metabolism through the unique sn-2 OA and its accompanying active ingredients, regulates the expression of related genes on the steroid metabolism pathway, improves the decrease in sex hormone secretion caused by hypertension, and targets the promotion of testicular secretion of TT.

关键字 sheep tail fat, testosterone, SHR rats, targeted, liver function

分类：其他方向与主题

早产儿支气管肺发育不良与肠道菌群变化的相关性研究

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目的　初步探讨胎龄≤32 周早产儿发生支气管肺发育不良（bronchopulmonary dysplasia,　BPD）危险因素，并对其肠道菌群结构特征变化进行分析。

方法　采用前瞻性的巢式病例对照研究。将 2018 年 04 月 20 日至 2019 年 09 月 20 日期间于生后 24 小时内收住苏州大学附属儿童医院和/或苏州市立医院本部母子中心 NICU、胎龄≤32 周且住院时间≥28 天的早产儿作为研究对象，采集所有早产儿基本临床资料及粪便样本，粪便留取截点为生后 1、4、7 日龄，之后每周留取 1 次，留取终点为 BPD 发生或出院或生后第 8 周（以先到者为终点）根据有无 BPD 发生分为 BPD 组和对照组，对照组按 1∶1 的比例匹配，并将 BPD 组分为轻度和中/重度两亚组。对 BPD 组和对照组临床资料进行比较，并采用 16 S rDNA 测序方法分析并比较两组和 BPD 两亚组间的粪便标本菌群组成的差异。

结果　BPD 组和对照组各 58 例，其中轻度 BPD 26 例，中/重度 BPD 32 例。BPD 组菌群丰富度在第 7 天时最高，后随日龄的增长逐渐减少，其菌群多样性随着日龄的增加而减少；非 BPD 组菌群丰富度在第 7 天时最低，14 天后基本稳定，其菌群多样性在第 7 天时最少，后逐渐增加。BPD 组生后第 4、7 天的菌群丰富度较非 BPD 组显著增高。BPD 组克雷伯菌属、肠杆菌属、双歧杆菌属、乳杆菌属水平均明显低于非 BPD 组，而葡萄球菌属、棒杆菌属水平高于非 BPD 组。与轻度 BPD 相比，中/重度 BPD 的早产儿在生后第 4 天肠道菌群多样性显著减少，双歧杆菌、链球菌减少与中/重度 BPD 的发生相关。BPD 组早产儿输注红细胞≥3 次、有创通气、无创通气、单联特殊级抗生素使用率、输注红细胞量（ml/kg）、入院当天 FiO2 明显高于非 BPD 组，其 PICC 置管时长、有创通气天数、无创通气天数、总吸氧天数、抗生素使用时长、肠外营养天数、住院时长显著较非 BPD 组多；相比于非 BPD 组，BPD 组 PDA、频发呼吸暂停、ROP、PNAC、EUGR 的发生率明显较高。

结论　红细胞输注≥3 次、红细胞输注量（ml/kg）、无创通气天数是本研究中早产儿 BPD 发生的独立危险因素。早产儿在发展为 BPD 之前肠道菌群定植模式已发生改变，肠杆菌属、差异菌群的出现可能和 BPD 发生相关，肠道菌群的多样性降低以及双歧杆菌、链球菌减少和 BPD 严重程度相关。

关键字 早产儿；支气管肺发育不良；危险因素；肠道菌群；高通量测序

分类：其他方向与主题

可吸附微塑料益生菌的高通量筛选

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目的：

塑料制品给人们带来了很多便利，但是由于塑料磨损或分解而产生的微塑料会进入人体，通过食物和饮用水等途径积累在各种器官中，对健康造成多种不良影响，如生长发育受阻、胃肠道损伤、脏器炎症和免疫功能失调等。近年来，微塑料对人体健康的影响引起了广泛关注。然而，由于微塑料是一种高分子物质，无法被包括人体在内的生物体系降解，因此会不断积累，造成持续伤害。当前，有效缓解微塑料伤害的方法仍然很少。

本研究旨在开发能够吸附微塑料的益生菌，通过吸附作用形成菌-微塑料聚合体的方式减少微塑料被人体吸收。本研究提出了一种创新的解决方案，可以缓解微塑料对人体的伤害，同时也为开发相关益生菌产品奠定了基础。

方法：

聚苯乙烯（PS）是快餐盒等食品包装的常用材料，也是食品中微塑料主要来源之一。本研究选用聚苯乙烯（PS）微球作为微塑料的代表，并开发和应用了一种利用 PS 荧光微球高通量筛选对微塑料有强吸附能力的菌株的方法。菌体与 PS 荧光微球共同培养后会发生吸附聚集作用，吸附在一起的菌体-微球复合物沉降系数显著增加，并且可以通过控制离心转速和时间与未吸附的微球分离。通过检测上清液中未吸附的 PS 荧光微球的荧光强度，可以确定未吸附微球的含量，并计算出菌体吸附率。整个操作可以在 96 孔板中进行，并通过酶标仪检测荧光强度，实现了对具有吸附微塑能力的菌株的高通量筛选。

结果：

本研究从发酵食品和粪便样品中分离出 18 株候选菌株，经荧光微球吸附法测得不同菌株对 PS 微球的吸附率差异非常大，从约 0%~90%不等。通过筛选，本研究成功地分离出了两株对微塑料具有强吸附能力的菌株，分别为副干酪乳杆菌（ATM-7）和干酪乳杆菌（ATM-107）。

结论：

综上所述，本研究开发了一种适用于高通量筛选可吸附微塑料的菌株的方法，并成功地从发酵食品和粪便样品中分离和筛选出了两株对微塑料具有强吸附能力的菌株。这些结果初步证明了菌株吸附微塑料的可行性和基于 PS 荧光微球筛选方法的有效性，为大规模筛选缓解微塑料伤害的益生菌及开发新一代的益生菌产品奠定了基础。

关键字 微塑料，益生菌，高通量筛选

分类：其他方向与主题

不同来源生物活性多肽抗衰老作用的研究进展

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目前，中国不仅是世界上人口最多的国家，也是老年人口最多的国家。如何加强老年保健延缓衰老进程、防治各种老年常见病,达到健康长寿和提高生命质量，已成为医学界注重的研究课题。许多研究表明，生物活性多肽具有抗氧化、清除自由基、抗衰老等多种生理功能，且易吸收、生物利用率高、毒性低,是极具发展前景的抗衰老功能性因子。本文主要介绍了衰老的原因，衰老与抗氧化之间的关系，近几年来不同来源的生物活性多肽抗衰老作用的主要研究进展和生物活性多肽可能的抗衰老作用机制，以期为生物活性多肽抗衰老作用的研究提供参考。

衰老一直以来都是一个吸引着科学家和哲学家的话题，机体所有的器官系统随着衰老都会发生生理变化，主要表现在①身体成分：脂肪组织增加，细胞数量下降，身体水分减少和骨组织矿物质减少；②代谢功能：基础代谢降低，合成代谢降低及分解代谢增高；③器官功能：消化功能，心血管功能，脑、肾和肝脏等器官的功能及代谢能力均会随衰老的发生而有不同程度的功能下降。体内产生的过量自由基引起的氧化胁迫是导致机体衰老的重要原因，以该学说为理论依据，认为补充抗氧化剂可以清除机体内多余的自由基，是延缓衰老的重要手段。多肽是多个氨基酸以肽键相连的化合物，通常由 10～100 个氨基酸分子组成，其连接方式与蛋白质相同，相对分子质量低于 10kDa，一般没有复杂的空间结构，能够调节生物机体的生命活动或具有某些生理活性作用的多肽称为活性多肽，又称生物活性多肽。生物活性多肽发挥着多种生物学作用，其中最重要的作用之一是抗氧化活性。生物活性多肽的抗氧化活性可能与其氨基酸组成、氨基酸序列、肽链的分子量、抑制脂质过氧化和多肽的金属离子螯合等性质有关。

具有抗衰老作用的内源性生物活性多肽，如胸腺肽 β-4（Thymosin beta-4，Tβ4）、线粒体衍生肽(mitochondrial derived peptide, MDP)；植物来源生物活性多肽，如大豆多肽、大米多肽；动物来源生物活性多肽，如糖巨肽（Glycomacropeptide，GMP）、卵白蛋白多肽（ovalbumin peptides）；微生物来源生物活性多肽，如菌丝多肽、螺旋藻小分子多肽和聚海藻酸多肽等；海洋来源生物活性多肽，如海参多肽、生蚝多肽等。

关键字 生物活性多肽；衰老；抗衰老；自由基；抗氧化

分类：其他方向与主题

武汉市地铁职工膳食模式与超重肥胖的关系研究

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[目的]分析武汉市地铁职工膳食模式,并探讨其与超重/肥胖的关系。**[方法]**研究基于 2018 年 5 月-2019 年 10 月开展的地铁职工健康调查项目，选取完成问卷调查及健康体检的 5650 名地铁职工作为研究对象，通过问卷调查收集研究对象的基本情况、膳食习惯等信息。采用 SAS9.4 软件对数据进行数据处理和分析，利用因子分析法对地铁职工膳食模式进行分析；将膳食模式因子得分按四分位数由低到高依次分为 T1、T2、T3、T4 四个水平，并通过多因素 Logistic 回归分析模型探讨膳食模式与超重/肥胖发生风险的相关性。**[结果]**本次调查武汉市地铁职工超重/肥胖检出率为 39.13%，男性、居住地为中心城区、40 岁及以上、现在吸烟、现在饮酒、饮食偏咸和饮食高油等人群超重/肥胖检出率较高,分别为 44.95%、39.96%、51.88%、52.85%、49.56%、43.49%和 52.01%，差异有统计学意义（均 $P<0.05$）。因子分析法提取 3 种膳食模式,其累计贡献率为 55.94%,分别为肉蛋奶模式、杂粮蔬菜模式和豆类模式。调整混杂因素后，logistic 回归分析结果显示:肉蛋奶模式与武汉市地铁职工超重/肥胖高风险相关(*OR*=1.1.25，95%*CI*:1.06～1.46)，超重肥胖风险随年龄增加而上升（OR=3.11,95%CI：2.35~4.11），居住地为中心城区（OR=1.22,95%CI:1.07~1.38）、现在吸烟(OR=1.38,95%CI:1.20~1.59)、饮食高油(OR=1.38,95%CI:1.10~1.72)、吃饭过快(OR=1.73,95%CI:1.54~1.94)、吃得过饱(OR=1.37,95%CI:1.19~1.58)也均与超重/肥胖高风险相关；而女性、饮食清淡与超重/肥胖低风险相关。**[结论]**武汉市地铁职工超重/肥胖检出率较高，其膳食模式和超重肥胖之间有相关性。对该群体应加强健康教育、优化膳食模式，督促采取健康生活方式，以降低超重肥胖等健康风险。

关键字 地铁职工 超重肥胖 膳食模式

分类：其他方向与主题

上海市优秀运动员蛋白质营养的 KAP 状况调查及其与膳食摄入的相关性分析

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目的：过高的蛋白质摄入对运动员的机体会产生一定的负担，不利于训练以及健康。本研究的目的是更好的了解运动员的蛋白质摄入水平，并找出它与蛋白质的知识、态度以及行为间的相关性，为蛋白质营养的干预奠定理论基础。

方法：对上海市 41 名优秀运动员同步开展蛋白质的知信行调查以及膳食调查，其中蛋白质的知信行问卷内容针对运动员群体进行了制定，同时，膳食调查的方法采用的是食物频率调查法。受试队员分别按照年龄（14~17 岁，18~岁）、性别、运动员等级（健将级、1 级、2 级）以及项目类别（难美类项目，其他项目）进行分类，通过方差分析、卡方检验以及相关性分析等，对知信行调查以及膳食调查的结果进行统计分析。

结果：14~17 岁的受试队员在知识部分的平均分低于 18~27 岁的受试队员（p=0.00），2 级受试队员在知识部分的平均分低于健将级受试队员（p=0.006）；难美类项目的受试队员在态度部分的得分低于其他项目的受试队员（p =0.007）；碳水化合物的摄入水平在难美类项目受试队员中较低（p=0.03）；其余的指标，如碳水化合物摄入百分比、脂肪摄入百分比、膳食纤维、维生素 C、E、钙、铁以及锌等的摄入量在不同程度上存在性别、年龄、运动员等级以及项目类别上的差异。同时，受试队员的蔬菜、水果、鱼虾以及蛋类食物的平均摄入水平均不足，而肉类食物的平均摄入水平超标，其中性别差异存在于水果类食物的摄入量上（p=0.012），年龄差异存在于奶类食物的摄入量上（p=0.006），运动员等级差异存在于谷类、水果类以及奶类的摄入量上（p=0.001, p=0.009, p=0.029），项目类别差异存在于谷类以及蛋类的摄入量上（p=0.00, p=0.013）。从相关性分析来看，受试队员知识部分的得分分别与维生素 E 以及奶类食物的摄入量存在相关性，态度部分的得分分别与维生素 A、维生素 E、铁、锌、膳食纤维、谷类食物和蔬菜类食物的摄入量间存在相关性，行为部分的得分与水果类食物的摄入量存在相关性，此外，蛋白质的摄入水平与知识、态度以及行为调查的总分间存在相关性，以上结果均存在统计学差异。

结论：运动员对于蛋白质的知识了解程度较低，但其摄入水平处于较高范围，此外，相较于蛋白质知识部分的单独影响，知识、态度以及行为的总分对蛋白质摄入水平的影响更大。因此，解决运动员蛋白质的摄入问题，需要从其蛋白质的知识、态度以及行为各方面进行干预。

关键字 KAP 调查，膳食调查，蛋白质，运动员

分类：其他方向与主题

花青素对三阴性乳腺癌的网络药理学分析及实验验证

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目的：采用网络药理学研究花青素对三阴性乳腺癌的潜在作用机制，并通过实验对预测关键靶点进行验证，探索花青素纳米复合物对三阴性乳腺癌的抑制作用是否优于花青素。

方法：在药物靶点预测平台 Swiss Target Prediction 数据库和 CTD 数据库搜索花青素靶点。利用 OMIM 数据库和 GeneCards 数据库检索三阴性乳腺癌的靶点。将两者的靶点去重整合取交集得到花青素作用于三阴性乳腺癌的潜在靶点。交集靶点导入 STRING 数据库平台构建蛋白相互作用网络（PPI），借助 Cytoscape 3.9.1 软件筛选核心基因。在 Metascape 平台对花青素与三阴性乳腺癌交集靶点进行基因本体（GO）富集分析和京都基因与基因组百科全书（KEGG）通路分析。最后通过实验验证花青素作用于三阴性乳腺癌的核心靶点，明确花青素纳米复合物对三阴性乳腺癌的作用。

结果：花青素相关靶点 123 个，三阴性乳腺癌相关靶点 5418 个，取交集共有 94 个共同靶点。PPI 网络拓扑分析发现丝氨酸/苏氨酸蛋白激酶 AKT（AKT1）、表皮生长因子（EGFR）、肿瘤坏死因子（TNF）等是花青素治疗三阴性乳腺癌的核心靶点。KEGG 通路富集分析显示花青素治疗三阴性乳腺癌的通路涉及 EGFR 信号通路、PI3K-AKT 信号通路、JAK-STAT 信号通路、Ras 信号通路等。Western blot 实验结果表明花青素纳米复合物降低 EGFR、AKT 和 TNF 表达（$P<0.05$），对三阴性乳腺癌的抑制作用更强。

结论：通过对花青素和三阴性乳腺癌取交集得到 94 个交集靶点，进一步通过网络拓扑分析发现 EGFR、AKT、TNF、PI3K、STAT 等是花青素作用于三阴性乳腺癌的关键靶点。通过分析 20 个核心基因的 KEGG 通路发现，EGFR、AKT 和 TNF 与三阴性乳腺癌的联系最紧密。花青素可通过调控 EGFR 信号通路、PI3K-AKT 信号通路、JAK-STAT 信号通路、Ras 信号通路等发挥促进细胞凋亡，抑制细胞增殖，调节 EGFR、AKT、TNF 等蛋白表达，从而对三阴性乳腺癌起到治疗作用。

关键字 网络药理学，花青素，表皮生长因子，丝氨酸/苏氨酸蛋白激酶，肿瘤坏死因子

分类：其他方向与主题

α-klotho 通过减轻骨骼肌氧化应激和增加肝糖原含量预防运动性疲劳

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研究目的：军人和运动员经常进行长时间大强度的训练，从而引发运动性疲劳。运动性疲劳发生的机制十分复杂，可能与糖原耗竭和氧化应激有关。α-klotho 是一种抗衰老蛋白质，具有抗氧化应激和调节代谢的功能。补充外源性 α-klotho 是否具有减轻运动性疲劳的作用尚不清楚，本研究拟探究 α-klotho 对运动性疲劳的影响。

研究方法：将 30 只 C57BL/6J 小鼠随机分为三组，即安静对照组（C 组，n=10）、运动疲劳+生理盐水组（S 组，n=10）和运动疲劳+α-klotho 干预组（K 组，n=10）。经 3 天适应性训练后，后两组小鼠进行连续 6 天每天一次的力竭性游泳训练（负重为 5%体重），每次力竭训练结束后注射生理盐水或 α-klotho（2 mg/kg 体重）。最后一次运动后 24 小时测量小鼠体重和抓力，然后摘眼球取血，颈脱位处死小鼠后取材。检测血清肌酸激酶、血尿素氮和乳酸的水平，检测骨骼肌活性氧、过氧化氢、丙二醛等氧化应激指标以及 klotho/NRF2/HO-1 通路的变化，并检测肌糖原和肝糖原水平以及 AKT/GS 通路的变化。

研究结果：与 C 组相比，S 组小鼠体重和抓力、血清肌酸激酶和血尿素氮水平升高（$P<0.05$），表明本研究成功建立了运动性疲劳的动物模型。K 组小鼠体重、血清肌酸激酶和血尿素氮与 C 组小鼠无显著性差异（P>0.05），且其游泳至力竭时间显著高于 S 组（P<0.05），表明 α-klotho 干预可减轻运动性疲劳。运动性疲劳与骨骼肌氧化应激有关，S 组小鼠腓肠肌中过氧化氢和丙二醛水平显著高于 C 组（P<0.05），而 SOD 则显著低于 C 组（P<0.05），α-klotho 干预可减轻腓肠肌中氧化应激水平。文献报道，α-klotho 可通过 NRF2/HO-1 通路抑制氧化应激，本研究发现 α-klotho 干预的确升高了 NRF2 和 HO-1 的蛋白表达水平（P<0.05）。糖原耗竭是导致运动性疲劳的另一个因素，本研究发现三组小鼠肌糖原含量并没有显著性差异（P>0.05），但是 S 和 K 组小鼠肝糖原含量均显著高于 C 组（P<0.05），且 K 组肝糖原含量显著高于 S 组（P<0.05）。α-klotho 可通过激活 AKT 促进糖摄取和糖原合成，本研究结果显示 α-klotho 干预显著升高了肝脏 AKT、GS 和 GLUT4 的蛋白表达水平（P<0.05）。

研究结论：α-klotho 可能通过减轻骨骼肌氧化应激和增加肝糖原含量预防运动性疲劳。

关键字 α-klotho；运动性疲劳；氧化应激；糖原

分类：其他方向与主题

1 例腹腔镜袖状胃切除术后患者继发周围神经病变的营养护理

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目的 总结 1 例腹腔镜袖状胃切除术后患者因微量营养素的缺乏导致下肢周围神经病变的护理经验。**方法** 本例患者微量营养素指标均低于正常水平，检查显示右下肢肌力 3 级，左下肢肌力 4 级，双下肢腓侧麻木伴感觉减退，膝部见散在外伤瘢痕，肌电图显示双下肢多发周围神经损害以感觉纤维受累为主。遵医嘱予多种微量元素静脉补液治疗和维生素 B_1 0.05g 每日 2 次肌肉注射。患者血红蛋白为 96.0g/L，考虑缺铁性贫血，予以复方硫酸亚铁 200mg，每日 4 次，口服治疗。因口服铁剂对胃肠道有一定的刺激，提醒患者进餐时或餐后服用可减少刺激，在服用铁剂时禁止与茶水、牛奶同时服用，日常饮食增加易消化、富含铁元素和维生素 C 食物的摄入，给予乙酰谷酰胺注射液、甲钴胺片、维生素 B_1 针和叶酸片等营养神经和多种微量元素补液治疗，以理疗、针灸和高压氧辅助治疗，嘱患者口服复方硫酸亚铁、全安素和维生素 B_{12}. 从多途径补充微量营养素；准确评估患者的不良饮食行为，基于动机性访谈提高患者饮食依从性，根据患者情况调整饮食计划，告知患者每天能量摄入为 800-1000 千卡/天，饮水量 1500-2000 毫升/天，蛋白质补充至少 60 克/天。口服铁元素 40~60 毫克/天、复合维生素和微量元素补充剂（其中包含叶酸、硫胺素、铜）2 片/天、维生素 B_{12}500mcg/天和维生素 D_3 3000IU/天；结合多学科合作治疗开展周围神经功能锻炼，促进下肢肌力恢复；早期心理支持，加速患者康复；制定个性化的长期随访计划，根据患者恢复情况调整处理方案。**结果** 通过精心的治疗和护理，患者恢复和饮食状况良好，住院第 15 天患者血红蛋白升至 106.0g/L，右下肢肌力 4 级，左下肢肌力 4+级，出院前周围神经症状缓解，营养状态恢复良好。出院后 1 月复查，铁元素 12.7μmol/L，叶酸：10.6ng/ml 和维生素 B_{12}：185pg/ml 均在正常范围，25-羟基维生素 D：24.7ng/mL 还有待提高。**结论** 腹腔镜袖状胃切除术后做好营养管理、多学科管理、提高患者的饮食依从性、下肢功能的锻炼、心理护理和随访管理，对促进患者的身心康复具有重要作用。

关键字 减重代谢手术；腹腔镜袖状胃切除术；微量营养素；微量营养素缺乏症；周围神经系统病变；营养护理

分类：其他方向与主题

解淀粉芽孢杆菌 C-1 的益生特性和安全性评价

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目的：

解淀粉芽孢杆菌（Bacillus amyloliquefaciens）在生长过程中能产生丰富的代谢产物，具有广谱抑菌作用和抗氧化活性，是新一代的潜在益生菌。解淀粉芽孢杆菌 C-1 为本实验室从即食水果果盘上分离所得，前期研究发现，B. amyloliquefaciens C-1 发酵液除具有较强抑菌作用和抗氧化活性外，还具有维护肠道稳态的功能。基于此，本研究旨在对 Bacillus amyloliquefaciens C-1 和 C-1 后生元制剂的益生特性和安全性进行评价，探索其潜在的功能特性，为其实用性开发提供理论基础。

方法：

本研究通过测定 C-1 在多种环境下的耐受特性、抑菌作用、抗氧化活性、细胞粘附性、发酵特性以及自聚、共聚和疏水等特性，评价该菌的益生作用。通过溶血实验、全基因组分析、抗生素敏感性、大蜡螟毒力性、细胞凋亡性和小鼠急性毒理学评价等实验评价该菌的安全性。同时比较高温灭活和未灭活的全发酵液、发酵液上清、菌体的抑菌活性，初步评价 C-1 后生元制剂的可能组分来源。

结果：

C-1 环境耐受特性较好，弱酸环境（pH 5~6）下生长良好，pH 6 中 3 h 生存率为 67.48%，能耐受 10%以下 NaCl 环境但不耐受胆盐环境，生长曲线结果显示出较强环境适应能力。对多数肠道致病菌都显示出较强抑制作用，有较强抗氧化活性。自聚、共聚和疏水等特性较好，显示出较强益生特性。此外，B. amyloliquefaciens C-1 生物安全性好，对肠上皮细胞粘附力随浓度增大而增强，当菌体浓度为 1×108 CFU/mL 时粘附率高达 66.07%，表现出一定的肠道定植能力。进一步实验发现，B. amyloliquefaciens C-1 能在多种药渣发酵液中生长，其中低浓度金银花、蒲公英和菊粉发酵液还具有促生作用，具有动物饲料的应用潜力。最后，通过全基因组序列分析，未发现毒力基因和可转移的抗性基因，对多数抗生素敏感，不溶血。大蜡螟体内实验和小鼠急性毒力学评价结果均表明 C-1 安全、无毒。另外，只有过滤除菌的 C-1 的发酵液上清具有显著的抑菌活性，而其他处理组均无抑菌活性。

结论：

C-1 具有较好的益生特性和安全性，具有较强的实用价值。本研究的探究过程中发现，C-1 的益生作用主要来源于其发酵液上清，因此下一步将对 C-1 的发酵液上清制备后生元制剂，并进行相应的功能和安全性评价，以期精准开发微生态制剂。

关键字 解淀粉芽孢杆菌；益生菌；安全性评价；后生元；开发

分类：其他方向与主题

解淀粉芽孢杆菌 C-1 产生物纳米硒的表征及其抗氧化功能初步研究

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目的：

纳米硒颗粒具有抗氧化性、低细胞毒性和抗肿瘤功效，是一种新型医学纳米材料。研究发现某些益生菌可将无机态的 Se^{6+} 和 Se^{4+}还原为 Se，以纳米硒颗粒形式储存在胞内。解淀粉芽孢杆菌属于芽孢杆菌的一种，抗逆性强，次生代谢产物丰富，是一种有开发潜力的微生物。本研究以本实验室专利菌株解淀粉芽孢杆菌 C-1 为研究对象，通过优化发酵条件结合细胞水平的实验，获得抗氧化、抗肿瘤、安全无毒的复合生物纳米硒材料；通过转录组测序挖掘富硒 C-1 抗氧化代谢途径，为后续研究提供支持。

方法：

解淀粉芽孢杆菌 C-1 在含有 Na_2SeO_3的 LB+G 的培养基中经过富硒代谢产生纳米硒颗粒；通过 SEM、TEM、EDS 和 XPS 表征纳米硒颗粒；通过微板法研究富硒 C-1 对自由基的清除能力；通过 MTT 法、微板法检测富硒 C-1 对肠上皮细胞 Caco-2 和肺癌 A549 的细胞活力、细胞膜完整性的影响；通过 RT-qPCR 研究富硒 C-1 对过氧化氢诱导 Caco-2 细胞氧化应激模型的炎症因子表达量的影响；通过转录组测序分析 C-1 富硒代谢的抗氧化功能相关通路。

结果：

解淀粉芽孢杆菌 C-1 在硒终浓度 100μg/ml、菌液转接量 10%的条件下发酵 30h，最大硒转化率可以达到 55.51%；SEM、TEM 观察显示 C-1 富硒代谢前后在细菌形态无明显差异、但富硒后胞内出现纳米硒颗粒；EDS 和 XPS 结果显示胞内均有硒元素检出；富硒 C-1 对超氧阴离子、羟自由基、DPPH 自由基均具有清除能力；Caco-2 细胞实验显示，富硒 C-1 与 C-1 在实验浓度范围内（8×10^3-1×10^5CFU/mL）对于 Caco-2 细胞存活率无影响且在 1×10^7CFU/mL 浓度下均能够拮抗鼠伤寒沙门氏菌，并通过降低 LDH 的表达来保护 Caco-2 细胞膜的完整性；使用 200μM H_2O_2处理 Caco-2 4 小时，细胞的存活率下降至 90%，在此条件下诱导氧化应激模型；与 C-1 相比，富硒 C-1 可以显著降低 IL-8、TNF-α 的表达水平；A549 细胞在实验浓度范围内（8×10^4-8×10^6CFU/mL），与 C-1 相比，富硒 C-1 可以显著促进其凋亡；转录组数据分析显示，在营养体期与芽孢期均发现富硒前后氧化磷酸化通路富集有差异，此通路与抗氧化功能相关。

结论：

解淀粉芽孢杆菌 C-1 将亚硒酸盐还原为生物纳米硒，富硒代谢能力强，其生物纳米硒颗粒具有抗氧化、抗肿瘤性能，具有复合纳米硒材料开发潜力。

关键字 解淀粉芽孢杆菌；生物硒纳米 SeNPs；表征；抗氧化；新材料

分类：其他方向与主题

燕窝文化

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目的：更加全面了解燕窝饮食、药用及消费文化。

方法：通过在中国知网、万方、中国生物医学文献数据库、PubMed 和 Embase 数据库中检索国内外发表的相关研究文献，对燕窝的饮食文化、药用文化及消费文化进行回顾、分析和总结。

结果：

1、燕窝的饮食文化

早期燕窝文化文字记载多出自古代文人笔记或游记。最早关于燕窝饮食的文字相关记载可以追溯到元朝和明朝，清代为燕窝的饮食和认识的鼎盛时期，燕窝被视为珍补上品和社会地位的象征而宫廷贵族和富贵人家的喜爱。这一时期关于燕窝的记载数量更多，内容也更加详尽，主要记载在食谱和养生类古籍中。燕窝烹饪方法较多，以清炖为主，其膳食搭配讲究“以清配清，以柔配柔”。

2、燕窝的药用文化

燕窝的药用价值是基于其食用价值。最早收录燕窝的草本文献为汪昂的《本草备要》。此后，大量的医学和草本文献记载燕窝的药用价值，其中以《本草纲目拾遗》一书记载最为详尽。到近现代，谢观所编的《中国医学大辞典》成为最早收录燕窝的官方医学辞书，而《中药大辞典》中关于燕窝的记载最为全面。

燕窝有滋阴润肺，养胃，补肾，益气，补心、止痢、止汗等功效。燕窝在中医临床的应用主要包括用于咳嗽、哮喘、肺结核、虚热内火诸病、更年期综合证等疾病的治疗。现代研究表明，燕窝可能在提高免疫与抗病毒、调节肠道菌群、促进婴幼儿神经发育和母婴健康、促进认知、抗氧化、调节糖脂代谢、和改善皮肤等方面有健康效益。

3、燕窝消费文化：

最为全球最大的燕窝消费国，中国燕窝市场巨大。燕窝产品从干燕为主，转向即食、鲜炖、即炖和衍生物等产品多元化发展，且便捷化的燕窝产品更受消费者喜爱。燕窝消费群体以女性为主，且消费群体趋于年轻化，90 后成为燕窝消费的主力军。从传统的线下购买，燕窝线上购买的趋势显著上升，其主要电商销售平台为天猫和京东，同时其他电商销售渠道也逐步增长。

民间传统的燕窝鉴别燕窝真伪的秘诀为“一看二闻三观四察五摸六触七烧八品”。现代鉴别燕窝的方法有性状鉴别法、一般理化方法、显微镜鉴别法、电泳法（实时荧光定量法）、DNA 序列分析法、液相色谱法、分光光度法和液相色谱-串联质联法。为了确保燕窝的食用安全，还需对燕窝中亚硝酸盐、亚硫酸钠和焦亚硫酸钠等进行含量测定。

关键字 燕窝、饮食文化、药用文化、消费文化、鉴别方法

分类：其他方向与主题

生酮饮食调节肠道微生物菌群的饮食干预方式的研究进展

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目的：肠道微生物是人体内最丰富的微生物群体之一，人体内定植着数以万亿计的肠道茵群，维护着机体生理活动的平衡，现有研究表明肠道茵群可通过影响消化道屏障功能，调节机体免疫功能等机制来影响机体的生理活动，其影响范围可达全身包括消化系统、循环系统、内分泌系统、神经系统、免疫系统等系统。近年来，生酮饮食作为一种新型的饮食模式备受关注。生酮饮食的主要特点是低碳水化合物、高脂肪和适量蛋白质的摄入。生酮饮食(KD)自 20 世纪 20 年代以来一直是治疗癫痫的重要方法。随后 KD 的益处也进一步扩大到其他疾病，包括自闭症、II 型糖尿病和肥胖症等。此外还有最新研究发现生酮饮食不仅可以减轻新型冠状病毒肺炎患者的症状，在肿瘤治疗中，生酮饮食既可以直接发挥抑癌效应，也可以增强其他抗癌治疗方法的效果。虽然 KD 的治疗效果已被普遍接受，但对其潜在作用机制，特别是对我们的肠道微生物群的影响还尚不完全清楚。因此，本文对生酮饮食调节肠道微生物菌群在相关疾病的研究作一综述，以期更全面地了解生酮饮食通过调节肠道微生物菌群的饮食干预方式研究发展。

方法：通过检索了近 5 年收录于 PubMed、Web of Science、知网、万方等数据库中的文献，通过文献回顾的方法，使用了包括“Ketogenic deit” “intestinal microbiota”“effectiveness”“safety”及中文关键词“肠道微生物菌群”“生酮饮食”“有效性”“安全性”等关键词。通过系统检索相关数据库，筛选符合纳入标准的文献 52 篇高质量的文献进行质量评估整理分析，进行文献的回顾。

结果：首先，一些研究表明，生酮饮食可以显著降低肠道微生物的多样性，即菌群的种类和数量。这可能是由于生酮饮食会导致碳水化合物的摄入减少，从而影响肠道微生物的生长和多样性。其次，生酮饮食可能会影响肠道微生物菌群的组成。一些研究表明，生酮饮食可以导致某些菌属的增加或减少，如某些葡萄球菌属和肠球菌属的数量可能会增加，而某些丝状芽胞杆菌属的数量则可能会减少。然而，这些变化在不同的研究中也存在差异，可能是由于研究对象、研究设计和分析方法等因素的不同所致。最后，生酮饮食可能会影响菌群的代谢功能。一些研究表明，生酮饮食可以增强肠道微生物对脂肪酸的吸收和代谢，从而对身体产生一些积极的影响，如促进饱腹感和降低血糖水平。然而，这些效应的具体机制仍需进一步研究。

结论：综上所述，生酮饮食对肠道微生物菌群的影响是复杂的，生酮饮食可能会影响菌群的多样性、组成和代谢功能，但这些效应的具体机制仍需进一步研究。此外，在研究生酮饮食对菌群的影响时，研究对象的种类、研究设计和分析方法等因素都可能会对结果产生影响。因此，未来的研究需要更加系统地评估生酮饮食对肠道微生物菌群的影响，以更好地了解其对人体健康的影响。

关键字 生酮饮食；肠道微生物菌群；有效性；安全性

分类：其他方向与主题

年龄和 β 细胞功能是代谢手术后 2 型糖尿病缓解的预测因素

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目的：代谢手术是治疗 2 型糖尿病（T2DM）的有效手段，尤其是对超重或肥胖患者。本研旨在探讨中国患者代谢手术后 T2DM 缓解的临床预测因素，为术前患者选择提供依据。

方法：收集 87 例在湘雅第三医院接受代谢手术治疗 T2DM 的住院患者资料。患者平均年龄为 44.2±11.2 岁，T2DM 病程为 6.4±4.8 年，平均 BMI 为 31.29±6.51 kg/m2。有 62 例患者行袖状胃切除术，25 例行胃肠转流术。T2DM 缓解是指在没有抗糖尿病药物的情况下，HbA1c 水平低于 6.5%，FPG 浓度低于 7.1 mmol/L 至少一年。收集年龄、性别、T2DM 病程、手术方式、BMI、血脂、糖化血红蛋白、空腹血糖（FPG）水平、β 细胞功能指数和术前胰岛素使用情况等资料。

结果：1）短期（术后 1-2 年）T2DM 缓解率为 60.92%，独立预测因子为年龄和 C 肽曲线下面积（C 肽-AUC）；2）38.00%的患者获得长期缓解期（术后缓解持续超过 4 年），有 5 名患者在短期缓解后长期随访出现 T2DM 复发。长期 T2D 缓解（4-6 年）的独立预测因子是 C 肽 AUC 和 FPG；3） C 肽-AUC 预测 T2DM 缓解的最佳临界值为 30.93 ng/ml（预测短期缓解： 特异性 67.3%，敏感性 75.8%，AUC:0.674；预测长期缓解：特异性 61.9%，敏感性 81.5%，AUC:0.623）；3）使用年龄、C 肽 AUC 和 FPG 三个指标构建缓解预测模型（ACF），这是一个多维的 9 分量表：年龄小于 40 岁记 4 分，C 肽-AUC 小于 30.92 ng/ml 记 3 分，FPG 低于 7.0 mmol/L 记 2 分。总分相加值越高，术后 T2DM 缓解的可能性越大。与已报道的模型进行比较（包括 ABCD、DiaRem 和 IMS），ACF 评分系统具有最佳的预测效果。

结论：2 型糖尿病患者代谢手术治疗后短期糖尿病缓解率达 60.93%，长期缓解率达 38.00%。年龄、C 肽-AUC 和 FPG 是代谢手术后 T2DM 缓解的独立预测因素。ACF 评分模型是一个简单可靠的系统，可用于预测中国患者的 T2DM 缓解。

关键字 预测模型，2 型糖尿病，代谢手术，C-肽 AUC，胰岛功能

Category: Clinical Nutrition

Assessment of the role of Indian mustard honey in suppressing colon cancer progression by inhibiting cell proliferation and reversing drug sensitivity in 5-fluorouracil-resistant colon cancer cells

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Introduction: Colon cancer is the most prevalent cause of death from cancer across globe. Although chemotherapy drugs are predominantly used but their toxicity always remains a question. As an alternative to synthetic drugs, natural compounds or nutraceuticals are comparatively less toxic. Honey is widely used across different cultures as an alternative form of medicine. It represents a prominent source of plant-phenolic compounds and has demonstrated evidences of anti-oxidant as well as anti-microbial activities. The aim of the present work was to investigate the anti-proliferative effect of some Indian honeys and their mechanism of action in colon cancer.

Methods: In order to establish the composition-activity relationship, we evaluated the bio-active components present in the selected honey samples by GC-MS and HPLC analysis. The apoptotic activities as imparted by the honey samples were established by AnnexinV/PI staining, Real Time PCR and inmmunoblot analysis. The cancer resistant condition was created by 5-FU treatment to cells

Results: Indian honey samples showed a significant inhibitory impact on cell growth by restricting cell proliferation, causing apoptosis, and restricting the cell cycle in G2/M phase specifically to colon cancer cells. The treated cells showed increased expressions of p53, caspase 3, 8 and 9 thus indicating the involvement of both extrinsic and intrinsic apoptotic pathways. The honey samples were also found to inhibit the β-catenin/ Wnt pathway. The last part of the study showed that mustard honey prevented metastasis and chemoresistance in colon cancer cells by involving LGR-5 as a potential target. We further demonstrated the efficacy of these honey samples in colon carcinoma induced SD rats where honey showed anti-cancer properties.

Conclusions: Overall, these findings demonstrate that Indian honey can be established as effective nutraceuticals for the prevention as well as cure of colon cancer.

Key words Honey, Nutraceuticals, Colorectal carcinoma, Cell death, Chemoresistance

Category: Clinical Nutrition

Associations of dietary fat intake and visceral adiposity with cardiovascular disease risk markers in Sri Lankan healthy adults

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Background and objectives:

Sri Lankans consume more than the recommended intake of saturated fat (SFA), contributed from coconut fat, but the implications on cardiovascular disease (CVD) risk markers is still unclear. This study aimed to assess the associations between dietary fat intake with CVD risk markers in Sri Lankan adults.

Method:

In the CocoHeart-Sri Lankan cross-sectional study, 401 healthy adults (243-males and 158- females; mean±SD age 43±8 years and BMI 24.2±4.3kgm-2) had a measurement of arterial stiffness in terms of pulse wave velocity (PWV) and blood pressure using an oscillometric Mobil-O-Graph® PWA Monitor device. Body composition was measured using a multi-frequency segmental body composition analyzer. A fasting blood sample was collected to determine glycaemic and lipid biomarkers. Dietary intake was assessed using a 3-day diet diary. A general linear model and stepwise multiple linear regression model was performed to assess the impact of total fat intake on CVD risk markers and to identify their degree of variability explained by visceral adiposity.

Results:

Fasting PWV, systolic blood pressure (SBP), triacylglycerol (TAG) and HOMA-IR index were mean (± SD or interquartile range) 6.5 (±1.1) m/s, 122 (113-132) mmHg, 1.27 (0.95-1.74) mmol/l, and 1.90 (1.4-2.7), respectively. Total fat, SFA, polyunsaturated and monounsaturated fatty acid intakes as percentage of total energy (±SD or interquartile range) were 24.9% (±5.4%), 16.3% (±3.9%), 1.3% (1.0-1.6%) and 2.8% (2.2-3.5 %), respectively. Visceral adiposity was higher in Q4 quartile with higher fat intake compared to the other quartile groups (9.9, P=0.002). In multiple linear regression analyses, visceral adiposity alone explained 2.1%, 10.6% and 11.1% of the variability in PWV, SBP and TAG, respectively.

Conclusion:

In conclusion, higher intakes of dietary fat were associated with higher visceral adiposity. Visceral adiposity independently predicted about 11% of the variability in SBP and fasting TAG concentration.

Key words arterial stiffness, saturated fat, SBP, total fat, visceral adiposity

Category: Clinical Nutrition

The Association between Body Composition, Clinical Biomarkers and Type 2 Diabetes Progression: Early Findings from the TOFI_Asia Cohort

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Background and Objectives: China shoulders the rising global cases of type 2 diabetes (T2D), which may occur when younger and at lower body mass index (BMI) than Caucasian counterparts. A key driver of increased susceptibility maybe accumulation of riskier abdominal visceral adipose tissue (VAT). However, longitudinal follow-up studies in age and BMI matched cohorts investigating association of clinical biomarkers and body composition in T2D progression are limited.

Methods: 204 individuals (117 Chinese: 44% male; 87 Caucasian: 46% male) from the Thin-on-the-Outside-Fat-on-the-Inside (TOFI)_Asia baseline study were followed up after 3 years. Measurements conducted at baseline were repeated and included anthropometry, body composition using dual-energy x-ray absorptiometry and fasted blood for glycated haemoglobin (Hb_{A1c}), plasma glucose (FPG) and lipids. Significant clinical biomarkers ($p<0.1$) in models adjusted for gender, ethnicity and follow-up duration were included in repeated measures mixed model to determine effects on FPG.

Results: Like baseline, at 3 years, Chinese were younger (mean, SD, age 46±13 vs. 50±16 years) yet had similar BMI (27.0±4.0 vs. 27.0±4.5 kg/m^2) to Caucasians, with greater abdominal VAT (43.6±17.5 vs. 39.7±20.6 %). Based on FPG, at baseline, 73% were normoglycemic (79 Chinese, 70 Caucasian) while a quarter had prediabetes (38 Chinese, 17 Caucasian). However, at follow-up, 67% were normoglycemic (74 Chinese, 63 Caucasian), 30% had pre-diabetes with twice as many Chinese (40 vs 22 Caucasian), while 3% had progressed to T2D (3 Chinese, 2 Caucasian). Significant contributors of impaired FPG were hip circumference ($p<0.01$), VAT ($p<0.05$), triglyceride (TG, $p<0.0001$), low-density lipoprotein cholesterol (LDL-C, $p<0.001$) and Hb_{A1c}, which was higher in Chinese at follow-up (Hb_{A1c}*ethnicity*follow-up, $p<0.05$).

Conclusion: Early findings demonstrate the importance of lipid mediators and VAT in progression toward T2D irrespective of ethnicity and gender, with ethnic variability in Hb_{A1c}. This highlights the importance of nutritional strategies to control dysglycaemia that focus on lowering VAT, TG and LDL-C.

Key words Body composition, visceral adiposity, fasting plasma glucose, type 2 diabetes, Chinese

Category: Clinical Nutrition

Diet quality, overweight and quality of life in women with advanced breast cancer

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Background and Objectives:

Transition from curative to palliative treatment is commonly seen in advanced cancer to maintain the highest possible of quality of life (QoL). Evidences highlighted that greater body fatness has been associated with poorer treatment response. Despite the changes in eating habits upon cancer diagnosis, information on level of adherence to healthy eating guidelines and its possible influence on health outcomes are lacking. This study aims to evaluate the diet quality, weight status and QoL in advanced breast cancer patients receiving treatment.

Methods and Study Design

This was a cross sectional study conducted at National Cancer Institute, Malaysia. A total of 103 breast cancer patients diagnosed with stage III and IV were recruited from oncology wards and day care centre. Diet quality and health-related quality of life (HRQoL) were assessed using Healthy Eating Index (HEI)-2015 and European Organisation for Research and Treatment of Cancer-Quality of Life-Core 30 (EORTC-QLQ-C30), respectively. Weight status was categorised using body mass index (BMI). Analysis of variance (ANOVA) and multivariate analyses were performed to determine the relationship of diet quality with BMI and HRQoL.

Results

The mean score of HEI-2015 was 63.15 ± 0.85. Fewer participants adhered to the recommendations of dairy (1%), refined grains (1.9%), fatty acids (5.8%), and whole grains (13.6%). Patients with higher HEI score reported significant lower BMI ($p=0.017$) and poorer social functioning ($p=0.011$). Duration of diagnosis, comorbidity, and radiotherapy significantly associated with HEI score. In adjusted multivariate analysis, negative association was found between HEI score and BMI ($p=0.029$), while no significant association was shown for five functioning scales.

Conclusions:

The overall diet quality of breast cancer patients is average. Patients with higher diet quality are likely to maintain a healthy weight. An evidence-based nutrition interventions should be provided to improve diet quality and nutritional status of this population.

Key words Breast cancer, diet quality, body mass index, quality of life, advanced stage

Category: Clinical Nutrition

Image-based Meal Rating System for Nutritional Assessment and Counselling: An Exploratory Study in Vietnamese Common Foods

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Background: The Image-based Meal Rating System (IMRS) provides individuals with a convenient and intuitive way to assess the nutritional value of their meals, promote healthier eating habits, and make informed dietary choices. Our developed system, known as IMRS, utilizes visual analysis to evaluate the healthfulness of a meal and assigns it a rating on a five-colored star scale.

Methods: IMRS is based on the "Healthy Eating Plate" model and considers visual characteristics like portion size, color, variety, and composition. It comprises seven components, prioritizing whole grains, protein, and vegetables while discouraging excessive portions, unhealthy fats, sugar, and sodium. Each criterion has a maximum score of 1 point, and the final score is the sum of individual scores. The score is converted to a 70-point scale by multiplying it by 10, corresponding to a rating of 1 to 5 stars. Validity was assessed by comparing it to the nutrient-rich food index (NRF) score of 6.3. Data for validation was obtained from a published database of images and nutritional composition information for common Vietnamese foods.

Results: In total, 398 popular Vietnamese meals were evaluated, the mean±standard deviation IMRS score was 33.9±13.1 points, with the mean star was 2.6±0.9 stars. Salad (45.0 points; 3.6 stars), daily rice (39.2; 2.9), porridge, and soup (38.3; 2.8) were visually evaluated as the healthiest food, whereas confection (10.0; 1.0), baked cake (17.8; 1.5), and dessert soup (19.0; 1.7) emerged as the less healthy food. Pearson's correlation coefficient between the NRF 6.3 and IMRS was $r=0.246$ ($p<0.001$).

Conclusions: The newly developed image-based meal scoring system shows promise in improving the visual and practical aspects of nutritional assessment and counseling. Further research is needed to integrate this model with artificial intelligence technologies for more effective and user-friendly systems. This advancement has the potential to greatly enhance nutrition management.

Key words imaged-based scoring system; food record; dietary assessment; nutrition counseling; Vietnam

Category: Clinical Nutrition

Relationship between social support, sarcopenia, and cognitive impairment in Chinese community-dwelling older adults

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Background: Cognitive impairment and sarcopenia have become important challenges for the growing ageing population. Social support is protective against cognitive impairment, but its impact on sarcopenia remains unknown. The purpose of this study was to explore the correlation between social support, sarcopenia, and cognitive impairment in Chinese older adults.

Method: A multi-stage whole group sampling method was used to conduct a cross-sectional survey of 720 community-dwelling older people in Shanghai. The definition of sarcopenia was in accordance with the criteria of the Asian Working Group for Sarcopenia (AWGS) 2019. Cognitive impairment was evaluated with a computerized neuropsychological assessment device that has been previously validated. Social support was assessed using the Social Support Rate Scale. Logistic regression and mediation analyses fully adjusted for all potential confounding factors were conducted.

Results: We found that cognitive impairment was associated with sarcopenia (OR:1.668, 95%CI: 1.064, 2.617, p: 0.026) after adjusting for confounding factors. Besides, we found that older adults with highest tertile of social support score had lowest risk of cognitive impairment (OR Tertile 3vs1:0.590, 95%CI: 0.391, 0.889, p: 0.012) and sarcopenia (OR Tertile 3vs1:0.533, 95%CI: 0.290, 0.979, p: 0.043), respectively. Furthermore, sarcopenia mediated the association of social support with cognitive impairment (indirect effect=-0.004).

Conclusion: Our results suggest that social support was negatively associated with sarcopenia and cognitive impairment. And sarcopenia mediated the association between social support and cognitive impairment. This study provides strong evidence for a health promotion policy of social networks against sarcopenia and cognitive impairment in Chinese community-dwelling older adults.

Key words social suppory; sarcopenia; cognitive impairment; Chinese community-dwelling older adults

Category: Clinical Nutrition

使用合生元补充剂治疗伴有 NAFLD 的肝脏脂肪变性：随机对照试验的荟萃分析研究的系统评价

Using Synbiotics Supplementation to Treat Hepatic Steatosis with NAFLD: A Systematic Review with Meta-Analysis Study of Randomized Controlled Trials

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Background and objectives: Non-alcoholic fatty liver disease (NAFLD) is a chronic liver disease that occurs in a quarter of the global adult population. Thus far, NAFLD treatments are limited to lifestyle change and medicines with considerable adverse effects, with other novel treatment of choice, such as gut microbiota supplementation are currently being researched. This meta-analysis compares the effectiveness of prebiotics, probiotics, synbiotics, and placebo treatments for NAFLD-hepatic steatosis and has been written following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. **Methods**: This systematic review has been registered to the PROSPERO database (CRD42023392048). Assessment of the bias risk of the included studies used Cochrane Risk of Bias Tool 2. The literature search was conducted by 5 independent researchers from November 15th - December 20th 2022. **Results**: Twenty studies, limited to English language publications, have been included in the qualitative synthesis, with nineteen of those also included in the quantitative synthesis using RevMan 5.4. The outcomes of interest are Liver Stiffness Measurement (LSM), serum Alanine transaminase (ALT), aspartate transaminase (AST), homeostatic model assessment for insulin resistance (HOMA-IR), and intrahepatic triglyceride (IHTG). Out of the five outcomes of interest, AST, ALT, and IHTG demonstrate statistically significant results, supporting the use of synbiotic supplements rather than the placebo treatment, but LSM and HOMA-IR producing statistically insignificant results. To directly assess the number of lipids in patients with fatty liver disease, the parameter IHTG has been considered, which was observed in three included studies. Using synbiotics or probiotics significantly reduces IHTG with moderate heterogeneity (p=0.02;I^2=60%). This study has offered a thorough and updated meta-analysis concerning the effects of synbiotic supplementation on patients with fatty liver disease. **Conclusions**: Synbiotic supplements may serve as an alternative treatment for hepatic steatosis patients with NAFLD due to its significant benefit in reducing AST, ALT, and IHTG.

Key words NAFLD, Probiotics, Synbiotics, Hepatic Steatosis, Gut Microbiota

Category: Clinical Nutrition

精神益生菌对抑郁症患者疗效的评估：随机对照试验的综合系统评价和荟萃分析

Assessment of psychobiotics efficacy on patients with depressive disorder: A comprehensive systematic review and meta-analysis of randomized controlled trials

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Background and objectives: Depressive disorder is a highly prevalent psychiatric condition that can lead to Major Depressive Disorder (MDD), a key contributor to disability globally. During the COVID-19 pandemic, there was a surge in the number of cases due to social problems, financial instability as well as psychological stress. Several studies also reported that MDD and other psychiatric diseases correlate with gut microbiota in a concept known as the gut-brain axis. Therefore, this study aims to assess the efficacy of psychobiotics in patients with MDD. **Methods**: A systematic literature review was conducted based on six databases and has been registered to the PROSPERO database (CRD42022348953). Mean changes from the baseline of the depression rating scale served as the primary outcome, while the adverse effect was used as the secondary outcome. **Results**: This systematic review included 16 clinical trialsof which 8 studies underwent quantitative meta-analysis. Compared to the control group, psychobiotics yielded favorable results [SMD = -0.54 (-1.01 to -0.08), although the studies were heterogenous ($I2$ = 80%). Interestingly, the pooled results showed that psychobiotic can significantly alleviate depression and low mood compared to placebo with P=0.003. Minor treatment-related adverse effects were observed in some studies. This study revealed that psychobiotics have beneficial effects on depression status through the mechanism of reducing proinflammatory cytokines and improving the condition of microbiota dysbiosis in the gut. Furthermore, psychobiotics can serve as a potential therapy for depressive disorder or other psychiatric conditions. This review revealed that they also have a more significant benefit on depressive disorder compared to placebo. **Conclusions**: Psychobiotics can serve as a potential adjuvant anti-depressive drug due to their beneficial effects compared to placebo. These findings are expected to serve as a guide for future studies and during therapy selection.

Key words Depression, Psychobiotics, Probiotics, Psychiatric, Gut Microbiota

Category: Clinical Nutrition

評估外科重症加護病房患者的早期與延遲（傳統）腸內餵養對營養狀況的影響

Evaluating early versus late (traditional) enteral feeding on nutritional status in a surgical intensive care unit patients (SICU)

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Background: Most studies define early enteral nutrition (EEN) as starting within 48 hours of the initial injury or Intensive Care Unit (ICU) admission. However, adhering to guideline recommendations is challenging when providing EEN to some patients, such as those with abdominal trauma. EEN may be reluctant to be offered to these patients due to concerns about feeding-related complications.

Objectives: This study is intended to analyze the efficacy and safety of early enteral nutrition retrospectively (EEN; within 48 hours) versus late enteral nutrition (LEN; after 48 hours) in surgical intensive care unit (SICU) patients. The LEN group was used as the control group.

Methods and Study Design: This single-center, retrospective, observational study compared the clinical effects of EEN versus LEN in SICU patients. Cases in the SICU from June 2019 to November 2019 were retrospectively analyzed. Patients who received enteral nutrition therapy (ENT) for more than 7 days in the SICU and were older than 18 years were included in the study. Exclusion criteria included patients receiving total parenteral nutrition (TPN) and patients receiving palliative care (palliative care).

Results: 82 surgery ICU patients were enrolled. There were 41 patients in each group (EEN and LEN groups). EEN group led to a significant improvement in actual calorie and protein supply ($p<0.0001$), intensive care unit length of stay ($p=0.047$), and hospital length of stay ($p=0.028$). The LEN group had significantly lower albumin ($p<0.05$)、hemoglobin ($p<0.05$)、Lymphocyte ($p<0.05$), and more body weight loss ($p<0.05$). However, no significant difference was observed in the mortality rate.

Conclusion: Nutritional status among SICU patients in the EEN group improved. Relative to the LEN control group, the EEN group demonstrated improved length of stay and actual calorie and protein intake at discharge. EEN should be considered for these severely ill patients.

Key words early enteral nutrition、late enteral nutrition、intensive care unit、enteral nutrition therapy、nutritional

Category: Clinical Nutrition

Effect of milk supplemented with mulberry leaf extract, lipids and fiber on glycemic and insulin responses to a high-carbohydrate meal

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Background: Impaired glucose tolerance and diabetes prevalence are increasing dramatically in China. High postprandial glycemia, mainly induced by carbohydrate-rich diet, is associated with development of type-2 diabetes. The aim of this study was to test the effect of milk supplemented with mulberry leaf extract, lipids and soluble fiber on postprandial glucose and insulin following a high-carbohydrate meal in Chinese non-diabetics.

Study design: 31 non-diabetic Chinese adults (glycated hemoglobin A1c <6.5%) were recruited for an acute, open-label, randomized, 2-arm, cross-over controlled trial testing a standardized high-carbohydrate (65g per serving) mixed-meal breakfast with Nestlé YIYANG TangLv milk powder containing mulberry leaf extract with 1% (m/m) 1-deoxynojirimycin, lipids and soluble fiber or generic skimmed milk powder (control). Both meals with test products were carbohydrate- and protein-matched. Blood samples were taken at -5, 15, 30, 45, 60, 90, 120, 150 and 180min relative to meal intake and analyzed for glucose and insulin to calculate incremental area under the curve (iAUC) at 60, 120 and 180min.

Results: A per-protocol analysis was performed on 28 subjects (mean±standard deviation, age: 59.4±7.3 years; glycated hemoglobin A1c: 5.5±0.4%, body mass index: 24.4±1.6kg/m2). At 180min, glucose iAUC was not changed vs. control (202.6±94.6 vs. 221.2±119.0 mM*min; p=0.273), but there was a trend for decreased insulin iAUC (7115±3012 vs. 8046±3014 μIU/mL*min; p=0.087). At 120min, glucose and insulin iAUC were decreased by 14% and 17%, respectively; with a trend for the former (glucose:141.0±68.9 vs. 163.5±88.3 mM*min; p=0.073; insulin: 5090±2287 vs. 6155±2470 μIU/mL*min; p=0.018). At 60min, glucose and insulin iAUC were reduced by 24% and 23%, respectively (glucose: 50.1±19.3 vs. 65.8±35.1 mM*min; p=0.004; insulin:1874±808 vs. 2425±1181 μIU/mL*min; p=0.006).

Conclusion: Glucose and insulin responses to a high-carbohydrate meal are reduced with milk powder supplemented with mulberry leaf extract, lipids and fiber, particularly at 60 and 120min after intake, but not significantly at 180min.

Key words milk, mulberry leaf extract, postprandial glucose, insulin

Category: Clinical Nutrition

All-trans retinoic acid alleviate rheumatoid arthritis by affecting Th1-Th2 and Th17-Treg cell balance and synovial angiogenesis

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Background and objectives: The clinical treatment effect for many rheumatoid arthritis (RA) patients is not ideal, and the toxic side effects of drugs for RA are hard to overcome. It is important to explore new effective measures against RA. The aim of this study was to evaluate whether all-trans retinoic acid (ATRA) can reverse the Th1/Th2 and Th17/Treg imbalance in collagen-induced arthritis (CIA) rats and whether ATRA exerts antiangiogenic effects by inhibiting matrix metalloproteinases (MMPs) and vascular endothelial growth factor (VEGF).

Methods: Collagen-induced arthritis (CIA) rats were treated with 0.50mg/kg·b.w. ATRA or corn oil vehicle by gavage 3 times a week for 6 weeks. The arthritis index (AI) score was assessing once a week. The levels of serum cytokines and MMPs were tested by ELISA. The Th1, Th2, Th17 and Treg cells were detected by flow cytometry (FCM). The mRNA expression of T-bet, GATA3, RORγt and Foxp3 in spleens of rats were analyzed by real-time fluorescence quantitative PCR (qPCR). The qPCR and western blot (WB) assay were used to test the mRNA expression and protein expression of MMP2, MMP9 and VEGF in the synovium of rats. The microvascular density (MVD) of synovium was tested by immunohistochemical staining (IHC).

Results: Our results showed that ATRA induced CD4+ T cell differentiation by regulating T-bet and Foxp3, restoring the balance of Th1/Th2 and Th17/Treg cells, thus the expression of the proinflammatory cytokines TNF-α, IL-6, and IL-2 was inhibited, and the expression of the anti-inflammatory cytokines IL-4 and IL-10 was promoted, which further alleviated inflammation. In addition, ATRA may inhibit angiogenesis by downregulating MMP2 expression, and further reduce damage to articular cartilage and bone.

Conclusions: The present research revealed a novel mechanism by which ATRA reduces inflammation in joints, providing new evidence for the mechanism of ATRA in the treatment of RA.

Key words Rheumatoid arthritis, All-trans retinoic acid, T lymphocytes, Angiogenesis, Rat

Category: Clinical Nutrition

Encapsulated- Cow Bone Marrow Consumption Improves Brain Development and Spatial Memory Learning in Sprague Dawley Rats Offspring

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Background and Objectives The rate of fetal brain development accelerates during the second half of pregnancy and remains high throughout the first year of life. Omega-3 fatty acids, specifically docosahexaenoic acid (DHA), are widely acknowledged to influence fetal and neonatal neurodevelopment. Thus, adequate ingestion of foods rich in omega-3 fatty acids, such as encapsulated-cow bone marrow during pregnancy is crucial. This study purposed to investigate the impact of consumption of encapsulated-cow bone marrow on brain development and spatial memory learning in progeny rats. Methods and Study Design One week was spent acclimating laboratory rodents to regular light-dark cycles of 12:12 hours. The rats were then mated in a ratio of 2:1 (female to male rats) in a single cage. The presence of the vaginal plug served as a mating indicator and was recorded as day 0 of pregnancy (H0). Rat mothers were separated into four groups: P0 (regular diet, 20% casein), P1 (low protein diet, 10% casein), P2 (low protein diet with microcapsules), and P4 (low protein diet with omega-3 fatty acids). Twenty-five days old offspring were tested in a Y-arm maze in order to assess spatial memory performance. After six weeks of treatments, the offspring were dissected then brain weight was calculated. Brain sections were made using paraffin embedding and hematoxylin-eosin staining to observe hippocampus cell numbers. Afterward, the fasting blood sample was collected to ascertain serum brain-derived neurotrophic factor (BDNF). Results Compared to progeny rats receiving a diet containing encapsulated-cow bone marrow and omega-3 fatty acids, animals with reduced protein diets performed poorly on the Y- arm maze test of spatial memory, brain weight, and hippocampus cell number. Conclusion The results imply that encapsulated-cow bone marrow rich in omega-3 fatty acids may improve brain development and spatial memory learning in rats fed a low-protein diet.

Key words Brain-derived neurotrophic factor, Encapsulated- cow bone marrow, Hippocampus cell number. Omega-3 fatty acid, Spatial memory learning

Category: Clinical Nutrition

血磷水平与成年住院患者住院时间的关系研究：基于真实世界数据的横断面研究

The association between serum phosphate and length of hospital stay(LOS) in adult hospitalized patients: a cross-sectional study based on real-world data

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objectives: To investigate the association between serum phosphate and main clinical outcomes such as LOS in adult hospitalized patients.

Methods: This was a single-center, retrospective study and all the participants were recruited in Renji hospital from oct 1, 2018 to oct 31, 2022. Clinical parameters were collected from electrical medical records. Participants were categorized into 4 groups according to serum level of phosphate on admission: group 1 as reference: norm-phosphatemia (0.81~1.61mmol/L), group 2: mild hypophosphatemia (0.6~0.81mmol/L), group3: moderate-to-severe hypophosphatemia (<0.6mmol/L) and group 4: hyperphosphatemia (≥1.61mmol/L). Multivariate linear regression model was employed to analyze the association between different phosphate levels and LOS. Besides, the restricted cubic spline (RCS) model was additionally utilized to check the dose-response relationships between serum phosphate and clinical outcomes.

results: A total number of 22,157(13,436 men and 8,721 women, aged 57.3±16.2 y) hospitalized patients were recruited, among whom the median of serum phosphate was 1.14 mmol/L (quartile range: 1.01 mmol/L, 1.27 mmol/L). The overall prevalence of hypophosphatemia was 4.70 % (1043/22157). RCS model displayed J-shape non-linear correlation between serum phosphate and LOS.Multivariate linear regression analysis demonstrated that both mild hypophosphatemia(B 1.04, 95% CI 0.26, 1.82, p<0.001) and moderate-to-severe hypophosphatemia (B 4.94, 95% CI 3.86, 6.03, p<0.001) were related to the prolonged LOS even after further adjustments of potential confounders compared with norm-phosphatemia, but hyperphosphatemia group lost such correlation. Per SD decrease in serum phosphate (=0.28mmol/L) was associated with 0.38 days prolonged in LOS in fully-adjusted model. The findings in the sensitivity analyses were consistent with these results.

conclusion: The overall prevalence of hypophosphatemia was 4.70 % . Patients with moderate-to-severe hypophosphatemia had longest LOS and per SD decrease in serum phosphate (=0.28mmol/L) would increase 0.38 day in LOS in fully-adusted model which emphasized the importance of early diagnosis and treatment of hypophophatemia.

Key words serum phosphatemia, hypophosohatemia, length of stay, clinical outcomes

Category: Clinical Nutrition

Association of nutrient intake with Non-Alcoholic Fatty Liver Disease: A population-based case-control study from Delhi, India.

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Background and Objectives: Diet and nutrient intake is an important factors in the development and management of non-alcoholic fatty liver disease (NAFLD); however, optimal dietary and nutrient recommendations remain unclear. Data on nutrient intakes of community-based NAFLD patients in India is scarce.

Methods: A community-based case-control study was conducted amongst 134 cases and 134 age and gender-matched controls aged 30-60 years residing in Delhi-NCR. Participants with grade II and III fatty liver, based on USG grading were enrolled as cases while participants with normal liver were enrolled as controls. Dietary assessments were done using 3 days 24-hour diet recall and food frequency method.

Results: The median intake of cereals, pulses, milk and products, sugars, and miscellaneous food items which included ready-to-eat snacks, pickles, and sauces were significantly higher in cases than controls. Frequent consumption of GLVs and fruits was observed in 80% and 50% of cases and controls respectively. The daily consumption of other seasonal vegetables, milk, and milk products was reported in nearly 60% of cases and controls. The consumption of whole grains was low amongst both groups. The median intake of energy, carbohydrates, proteins, and fats was significantly higher amongst cases. Intake of micronutrients like thiamine, niacin, total folates, calcium, iron, and zinc was adequate amongst cases compared to the controls ($p<0.05$). The micronutrient intake of cases was better than controls. Fat, protein, and carbohydrate intake was significantly and positively correlated with NAFLD ($p<0.05$).

Conclusion: The overall nutrient intake in NAFLD cases was significantly higher than controls. The macronutrient intakes were significantly associated with NAFLD as tested by point bi-serial correlation ($p<0.05$). Associations between select macro and micronutrients and liver health markers warrant further investigation.

Key words NAFLD, NUTRITION, METABOLIC DISEASE, NUTRIENT, CASES, CONTROLS

Category: Clinical Nutrition

Anti-inflammatory, antioxidant, metabolic and gut microbiota modulation activities of probiotic in cardiac remodeling condition: Evidence from systematic study and meta-analysis of randomized controlled trials

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Backgorund and aims: Heart Failure (HF) is a global pandemic with increasing prevalence and mortality rates annually. Its main cause is myocardial infarction (MI), followed by rapid cardiac remodeling. Several clinical studies have shown that probiotics can improve the quality of life and reduce cardiovascular risk factors. This systematic review and meta-analysis aimed to investigate the effectiveness of probiotics in preventing HF caused by a MI according to a prospectively registered protocol (PROSPERO:CRD42023388870). Methods: Our main search for this review was randomized controlled trials (RCTs) or clinical trials that examined the impact of probiotics supplementation on reducing cardiac remodeling in the condition of HF or high risk for developing HF such as post-MI. We searched Embase, PubMed, the Cochrane Library, Wiley, and ProQuest before January 2nd, 2023. Results: Four independent evaluators independently extracted the data using predefined extraction forms and evaluated the eligibility and accuracy of the studies. A total of six studies consisting of 366 participants were included in the systematic review. Probiotics are not significant in intervening left ventricular ejection fraction (LVEF) and high sensitivity C-reactive protein (hs-CRP) when compared between the intervention group and the control group due to inadequate studies supporting its efficacy. Among sarcopenia indexes, hand grip strength (HGS) showed robust correlations with the Wnt biomarkers ($p<0.05$), improved short physical performance battery (SPPB) scores were also strongly correlated with Dickkopf-related protein (Dkk)-3, followed by Dkk-1, and sterol regulatory element-binding protein 1 (SREBP-1) ($p<0.05$). The probiotic group showed improvement in total cholesterol ($p=0.01$) and uric acid ($p=0.014$) compared to the baseline. Conclusion: Finally, probiotic supplements may be an anti-inflammatory, antioxidant, metabolic, and intestinal microbiota modulator in cardiac remodeling conditions. Probiotics have great potential to attenuate cardiac remodeling in HF or post-MI patients while also enhancing the Wnt signaling pathway which can improve sarcopenia under such conditions.

Key words Cardiac remodeling, probiotic, health failure, myocardial Infarction, gut microbiota modulation

Category: Clinical Nutrition

住院肝硬化患者人体测量学指标及营养状态分析

Anthropometry indicators and nutritional status analysis of hospitalized patients with liver cirrhosis

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Objectives: To analyze the anthropometric indexes and nutritional status of hospitalized patients with cirrhosis, in order to discover the nutritional risk or malnutrition of patients. Methods: A total of 164 patients with cirrhosis admitted to a Grade-3 A general hospital in Zunyi City from May 2022 to March 2023 were selected for nutritional risk screening using nutritional risk screening 2002 (NRS2002), and divided into nutritional risk group and non-nutritional risk group. Upper arm circumference (AC), upper arm muscle circumference (AMC), triceps cuticutaneous fold thickness (TSF) and grip strength (GS) were measured in the two groups. Body mass index (BMI) was calculated, and total protein, albumin and other related indexes were collected. Statistical analysis was performed on the two groups. Results: Among the 164 patients with cirrhosis, there were 124 males (75.61%) and 40 females (24.39%), with an average age of (51.02±9.33) years, and 60 patients (36.58%) with nutritional risk, including 12 patients (20%) and 27 patients (45%) with grade A and Grade B. There were 21 patients (35%) at grade C, 54 patients (32.93%) at compensation stage, of which 15 patients (27.78%) were at nutritional risk, 110 patients (67.07%) at decompensation stage, of which 45 patients (40.91%) were at nutritional risk. There were statistically significant differences in BMI, AC, AMC, GS, total protein, albumin and other indexes between the two groups ($P < 0.05$). The AC, AMC, GS, total protein, albumin and prealbumin in patients with cirrhosis with nutritional risk were significantly lower than those without nutritional risk, with statistical significance ($P < 0.05$). Conclusions: The incidence of nutritional risk in hospitalized patients with cirrhosis is high. Nutritional intervention should be performed as soon as possible to promote the prognosis of patients and improve their quality of life.

Key words cirrhosis; Anthropometry; Nutritional risks; Screening

Category: Clinical Nutrition

A study on the correlation between TyG level in early pregnancy and adverse pregnancy outcomes and complications

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Objective: To investigate the relationship between Fasting blood glucose (FBG) and serum Triglyceride (TG) in early pregnancy and preterm birth (preterm birth). PTB), Giant baby (GB), Gestational diabetes mellitus (GDM) and Gestational hypertension.

Methods: A total of 553 healthy pregnant women who delivered in Shanghai Xinhua Hospital from 2016 to 2017 were selected as the study subjects. Patients were grouped according to TyG level, and the differences in the risk of pregnancy outcomes between different TyG levels were compared. Logistic regression was used to analyze the effect of TyG level in the first trimester on adverse pregnancy outcomes.

Results: The overall incidence rate of preterm birth was 3.4%, and the high TyG group (5.5%) was 2.04 times as high as the low TyG group (2.7%). The overall incidence of macrosomia was 9%, and the incidence of high TyG group (9.8%) was 1.67 times higher than that of low TyG group. The total prevalence of gestational hypertension was 17.5%, and the prevalence of TyG high level group (21.3%) was 1.42 times higher than that of low level group (15%). Logistic regression analysis showed that high level of TyG was not a risk factor for preterm birth, macrosomia and pregnancy-induced hypertension. The total prevalence of gestational diabetes mellitus was 22.6%. The prevalence of gestational diabetes mellitus in the high TyG group (38.8%) was 2.9 times higher than that in the low TyG group (13.4%). Logistic regression analysis showed that high level of TyG was a risk factor for gestational diabetes mellitus (OR=2.41, 95%CI:1.256-4.608, $P<0.05$). ROC curve showed that TyG=7.674 was the cut-off value for the diagnosis of GDM.

Conclusions: Elevated TyG in the first trimester is a risk factor for GDM, and a TyG value of 7.674 in the first trimester can play a role in predicting GDM.

Key words TyG index, preterm birth, macrosomia, gestational diabetes, gestational hypertension

Category: Clinical Nutrition

Efficacy of Four weeks Traditional Asian Dietary Program on Gastrointestinal Symptoms, Stool Consistency and Stool Output in Healthy Volunteers

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Introduction: Traditional Asian Diet (TAD) is composed of high fiber, moderate protein, healthy fat and fermented foods. However, the clinical benefits of TAD on gastrointestinal (GI) symptoms are not known. This study aimed to examine the efficacy of TAD on symptoms, stool consistency and stool output among healthy volunteers.

Methodology: 20 eligible women (mean age 28.5±6.9yrs) were recruited in this pilot quasi-experimental study. Participants were randomized into intervention (n=10) or control group (n=10). The intervention group was prescribed the TAD program for 4 weeks which consisted of educational session using a validated instructional diet manual and weekdays lunch supplies using the designated menu. Participants in the control group were asked to maintain their habitual dietary intake. The primary outcomes were symptoms (Structured Assessment of GI Symptoms Scale or SAGIS), stool consistency (Bristol Stool Form Scale) and frequency of stool output per week. Data were tested within and between-group differences at week-0 (T0), week-2 (T1) and week-4 (T2) using the Friedman test. Data were presented in the median ±interquartile range with $p<0.05$ as significant.

Results: For within group differences, TAD was efficacious in reducing constipation (T0=1.0±3.0;T1= 0.0±1.0;T2= 0.0±1.0, p=0.006), total score of SAGIS (T0= 3.0 ±12.0;T1= 2.0±5.0;T2= 1.5±5.0, p=0.03), BSFS score (T0= 3.0±0.0;T1= 4.0± 0.0;T2= 4.0±0.0, p=0.001) and stool output per week (T0= 3.8±2.25;T1= 6.0±1.16;T2= 6.1±1.30, (p=0.005) but no differences were found for controls (all $p>0.05$). For between-group differences, compared to controls, TAD was effective for diarrhea predominant irritable bowel syndrome (p=0.004), constipation (p=0.02), BSFS score ($p<0.0001$) and stool output per week (p=0.003).

Conclusion: The four weeks TAD program has beneficial effects on GI symptoms, stool consistency and stool output per week. Further research including gut microbiome and metabolome is required to better understand the underlying mechanisms.

Key words Traditional Asian Diet, gastrointestinal symptom, stool consistency, stool output

Category: Clinical Nutrition

Interaction of vitamin D receptor gene FokI variants and PUFA w3 on perceived stress score and serum cortisol levels in nurses: a cross-sectional study

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Background/objective: There is a high prevalence of perceived stress among nurses. Recent studies have shown that PUFA w3 and genetic variants contribute to perceived stress. This study aimed to examine interactions between vitamin D receptor (VDR) gene FokI polymorphism and PUFA w3 on perceived stress score and serum cortisol levels in nurses.

Materials and methods: A total of 268 Iranian nurses (248 women; 20 men) participated in this cross-sectional study. PUFA w3 and perceived stress score of participants were evaluated using a 3-day food record and the Perceived Stress Scale (PSS)-10, respectively. Serum cortisol concentrations were evaluated by ELISA. VDR FokI polymorphism was genotyped using the restriction fragment length polymorphism method.

Results: No significant relationship was found between PUFA w3 with perceived stress score or cortisol level in FF genotype carriers, but, lower intake of PUFA was related to higher cortisol level (p=0.04) in Ff carriers. Significant interactions were observed between VDR FOKI polymorphism and intakes of eicosapentaenoic acid (EPA) (P Interaction=0.06), linoleic acid (P Interaction=0.06), and docosahexaenoic acid (DHA) (P Interaction=0.06) on serum cortisol. in this way that lower intake of EPA, linoleic acid, and DHA was associated with an increase in cortisol levels in individuals with ff genotype. Moreover, in carriers of ff genotype, lower intake of EPA was related to the elevated perceived stress score (P Interaction=0.06).

Conclusion: FokI polymorphism interacts with PUFA w3 (EPA, linoleic acid, and DHA) to increase cortisol level and with EPA to increase perceived stress score in nurses.

Key words PUFA w3; Eicosapentaenoic Acid, Docosahexaenoic Acids, Linoleic Acid, Vitamin D receptor; Receptors Calcitriol , Interaction

Category: Clinical Nutrition

Serum amino acid profiles as potential biomarkers for insulin resistance in Korean individuals with and without diabetes

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Background and objectives: Insulin resistance, which is common in individuals with type 2 diabetes mellitus (T2DM), can lead to increased proteolysis and decreased protein synthesis. Recently, the association of serum amino acid profile and diabetes has been reported. However, few studies have been reported in Korean populations, about the usefulness of serum amino acids for evaluating disease risks. The purpose of this study was to investigate the difference in serum amino acids related to insulin resistance in Korean adults with and without diabetes.

Methods: In this study, we recruited 57 Korean adults and analyzed the fasting serum levels of amino acids to compare the differences between normal control group and diabetes group. A total of 19 serum amino acids were measured using a high-performance liquid chromatography with fluorescence detection. Anthropometrics and body composition were measured using bioelectrical impedance analysis.

Results: There were 6 amino acids, which were significantly different in two groups ($p < 0.05$). Significantly decreased levels of glycine, serine and significantly increased levels of glutamine, methionine, proline, cystine in diabetics were found. But there was no significant difference in the levels of serum branched-chain amino acids, aromatic amino acids, and other amino acids between the two groups.

Conclusions: Our study revealed a significant difference in the metabolism of amino acids between individuals with diabetes and those without the condition. The changed amino acid levels detected in patients with diabetes may be indicative of the disease, and hence can potentially serve as a useful biomarker for diabetes diagnosis and prognosis.

Key words Amino acids, Diabetes mellitus, Insulin resistance

Category: Clinical Nutrition

EPA是脂类营养防控心血管事件的最佳干预方案

EPA is the optimal lipid treatment in preventing against the major cardiovascular events: a network meta-analysis of randomized controlled trials

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Background & Objectives: The role of omega-3 polyunsaturated fatty acids (PUFAs) in primary and secondary prevention on major cardiovascular events (MCE) is inconclusive due to the potential heterogeneity in study designs of formulas, dosages, and ratios of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) from the findings of previous randomized controlled trials (RCTs).

Methods & Study Design: We conducted a comprehensive narrative review of pre-clinical studies and updated a network meta-analysis (NMA) to determine the comparative efficacy against MCE with different EPA/DHA dosages and formulas. Supplements of omega-3 PUFAs were divided into < 2-g/day and ≥ 2-g/day groups, and each supplement was subdivided into high-ratio (>1) and low-ratio (≤1) groups. Primary outcomes were the efficacy against the risk of a composite MCEs involving cardiac death, hospitalization due to a cardiac event, myocardial infarction, and/or cardiac arrest, presented as hazard ratios (HRs) with 95% confidence intervals (CIs).

Results: We found that pure EPA was ranked the best option in the secondary coronary prevention (HR: 0.72, 95% CI: 0.65 to 0.81) from the NMA of 39 RCTs with 88,359 participants, with more cardioprotective benefits than mixture formulations (HR for comparisons with < 2-g/d mixture with a high EPA/DHA ratio: 0.76, 95%CIs: 0.66 to 0.87; HR for comparisons with ≥ 2-g/d mixture with a low EPA/DHA ratio: 0.82, 95%CIs: 0.71 to 0.94). There was no evidence of omega-3 PUFAs' efficacy in primary prevention. The mechanisms of omega-3 PUFAs' cardiovascular protection might link to the effects of anti-inflammation and stabilization of endothelial function from PUFA's derivatives including eicosanoids and the special pre-resolving mediators (SPMs).

Conclusions: EPA is the best lipid agent in secondary coronary prevention, which may provide the insights into optimal uses of omega-3 PUFAs in treatment guidelines.

Key words EPA, Omega-3, Network meta-analysis, Cardiovascular disease, Major cardiovascular events

Category: Clinical Nutrition

Assessment of linear growth faltering among severe acute malnourished (SAM) and non-SAM children: efficacy of fecal pH as a bedside tool

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Background and objectives: Chronic malnutrition, often manifested as linear growth failure or stunting, is the commonest form of malnutrition across the globe. Studies show, gut microbiota of stunted children are predominant in bacteria belonging to inflammogenic taxa including *Desulfovibrio* genus and *Campylobacterales* order. On contrary, gut microbiota of children with optimum linear growth is enriched in probiotic species, especially *Bifidobacterium* and commensal *Clostridium clusters XIVa and IV*. These species release short-chain fatty acid that in turn lowers the pH in the colon and contributes in stool acidification, reducing pH of stool. Assessment of fecal pH, a low cost non-invasive method, is strongly driven by abundance of these species in the gut, leading to assumption of a probable indirect inverse relationship between fecal pH and linear growth. In this study, we aimed to explore the association of fecal pH with linear growth among 6-24 months old ill, non-SAM children hospitalized for non-gastrointestinal morbidities.

Methods: This cross-sectional study was conducted on 100 non-SAM children aged between 06-24 months getting admitted in Dhaka Shishu Hospital for non-gastrointestinal pathologies. Anthropometric, socio-demographic and food frequency questionnaire data was recorded and 5g of stool sample was collected for assessing fecal pH using a pH meter.

Results: 43% of children were hospitalized for fever and 31% for pneumonia. The mean LAZ and fecal pH of the children were -0.99 ± 1.07 and 5.95 ± 0.76, respectively. Pearson correlation showed a statistically significant negative correlation between stool pH and LAZ scores ($p<0.05$). After inclusion of other factors affecting linear growth into the regression model, a statistically significant inverse association was observed between fecal pH and LAZ score ($p<0.01$).

Conclusions: Elevated fecal pH was found to have a significant association with stunted growth. Fecal pH might have emerged as a possible indirect indicator of gut microbiota status, hence a determinant of childhood stunting.

Key words Fecal pH; stunting; hospitalized; children; Bangladesh

Category: Clinical Nutrition

Prevalence and risk factors of malnutrition according to GLIM criteria in patients with hepatocellular carcinoma: a single-center cross-sectional study

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Aim: Malnutrition is highly prevalent in hepatocellular carcinoma (HCC) patients and is associated with a poor prognosis, making early identification and management crucial for improving outcomes. This study investigated malnutrition in HCC patients and evaluated the efficacy of the Nutrition Risk Screening 2002 (NRS2002) and the scored Patient-Generated Subjective Global Assessment (PG-SGA) compared to the Global Leadership Initiative on Malnutrition (GLIM) Criteria. The study also identifies independent risk factors associated with malnutrition in HCC patients.

Methods: A cross-sectional study was conducted on 207 HCC patients.Nutritional screening/assessment results and blood samples were gathered within 72 hours of admission. The performance of the screening tools was evaluated using Kappa (K) values. Logistic regression analyses were performed to determine if clinical parameters, such as serum albumin (ALB), hemoglobin (HGB), lymphocyte (LYM) count, ascites (ASC), portal hypertension (PHT), tumor diameter, tumor number, Child-Pugh class, Barcelona Clinic Liver Cancer Stage (BCLC), and Model for albumin-bilirubin (ALBI) scores, were associated with malnutrition as identified by the GLIM criteria.

Results:

Results: 30.4% of participants were at risk of malnutrition according to NRS2002. The agreement between NRS2002 and GLIM criteria was substantial (K-value: 0.626, P<0.01), with low sensitivity (65.9%) and high specificity (94.3%) for NRS2002. GLIM criteria and PG-SGA diagnosed malnutrition in 41.1% and 54.6% of participants, respectively (K-value:0.658, P<0.01). PG-SGA had high sensitivity (95.3%) but low specificity (73.8%) for identifying malnutrition according to GLIM criteria. The GLIM criteria accurately detected malnutrition (75.2% accuracy) and non-malnutrition (95.7% accuracy) in the light of PG-SGA. Age, Child-Pugh score, anemia, and ASC were significantly associated with malnutrition in multivariate logistic regression (Hosmer and Lemeshow goodness of fit x2 =9.227, P=0.324).

Conclusion: GLIM criteria can be a valuable tool for diagnosing malnutrition in HCC patients, with NRS 2002 and PG-SGA as complementary options, while understanding the

Key words hepatocellular carcinoma, malnutrition, nutrition assessment, diagnostic criteria, Global Leadership Initiative on Malnutrition

Category: Clinical Nutrition

植物蛋白在一例慢性肾脏病合并肌肉减少症患者中的应用：一例临床营养病例报告

Application of Plant Protein in a Patient with Chronic Kidney Disease and Sarcopenia: A Case Report in Clinical Nutrition

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Background and Objectives: Chronic Kidney Disease (CKD) has become a major public health problem, an irreversible and progressive condition that has emerged as one of the leading causes of death worldwide. Implementing Nutritional therapy plays an important role in preventing the progression of CKD, while also helping to reduce mortality rate and improved quality of life. Nowadays, in the nutritional therapy of patients with CKD, more and more experts are paying attention to plant-based proteins.

Case/Intervention: A 40-year-old man with end-stage of chronic kidney disease accompanied by Sarcopenia. He was admitted and treated with integrated treatment for chronic renal failure and underwent peritoneal dialysis. The results of Nutritional Risk Screening 2002 and Subjective Global Assessment showed that the patient is at high nutritional risk and diagnosed with severe malnutrition. Nutritional therapy was then administered for almost one month. He received total enteral nutrition containing a protein composition based on plant proteins while in the hospital and significantly improved body conditions and laboratory results. His whole body phase angle increased, phosphorus level, total protein and Albumin upgraded to the normal range followed by pre albumin which showed a significant increase from 79.2 mg/L to 141.3 mg/L and his infection was significantly controlled. In addition, he showed increased muscle strength as the grip strength of both hands improved and had more strength in mobility.

Conclusion: CKD is one of the most common chronic diseases worldwide, which is progressive, fatal and lethal. The results of this study demonstrated that the protective role of plant-based protein in kidney disease. This may provide new evidence for physicians and healthcare providers in the treatment and prevention of CKD.

Key words Severe Malnutrition, Chronic Kidney Disease, Sarcopenia, Clinical Nutrition, Plant Protein

Category: Clinical Nutrition

What is the best way to take oral iron supplements?

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Background: Guidelines to treat iron deficiency recommend daily 100mg oral iron in the morning away from meals and with ascorbic acid (AA). Our objectives were to 1) compare the effects of consecutive-day versus alternate-day oral iron supplementation on serum ferritin (SF) and gastrointestinal side effects; 2) assess the effects of dietary inhibitors and enhancers, and time of day, on fractional iron absorption (FIA) from oral iron supplements.

Methods: In a randomized double-blind placebo-controlled study, iron-deficient women received either daily 100mg iron for 90d, followed by daily placebo for 90d (consecutive-day-group) or 100mg iron and placebo on alternate days for 180d (alternate-day-group). We collected blood/stool samples every six weeks, and we assessed side effects using a mobile application. In a crossover study, fasting iron-deficient women received labeled Fe [54Fe]-, [57Fe]- or [58Fe] with oral doses of 100mg iron with: 1) water (reference); 2) 80mg AA; 3) 500mg AA; 4) coffee; 5) breakfast; 6) water in the afternoon. We measured FIA as erythrocyte incorporation of iron stable isotopes 14d later.

Results: At equal total iron doses, comparing consecutive-day and alternate-day groups, median SF was 43.8 (31.7 - 58.2)ug/L versus 44.8 (33.8 - 53.6)ug/L (p=0・83) and the longitudinal prevalence ratio for gastrointestinal side effects on days of iron intake was 1.56 (95%CI:1.38,1.77;p<0.0001). Compared to the reference: 80mg AA increased FIA by 30% (p=0.00034), but 500mg AA did not further increase FIA (p=0.226); coffee decreased FIA by 54% (p=0.0039); coffee with breakfast decreased FIA by 66% (p<0.0001). FIA was 37% lower (p=0.059) in the afternoon than in the morning.

Conclusions: Compared to consecutive-day dosing, alternate-day dosing had comparable efficacy but triggered fewer gastrointestinal side effects. Compared to consuming 100mg iron in the morning with coffee or breakfast, consuming it with orange juice alone results in a ~4-fold increase in FIA, and provides ~20 more mg of absorbed iron per dose.

Key words iron deficiency, oral iron supplementation, dosing regimen, iron absorption

Category: Clinical Nutrition

Inadequate energy and protein intake, underweight and malnutrition are associated with in-hospital mortality among COVID-19 rehabilitation patients during the Omicron outbreak in Hong Kong

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Objective

Malnourished COVID-19 patients were prone to higher mortality and longer length of stay (LOS). This study aims to investigate the malnutrition risk prevalence in the COVID-19 patients and how other nutritional indicators are related to the clinical outcomes in a rehabilitation hospital.

Methods

A retrospective cross-sectional study involved 174 COVID-19 patients during the rehabilitation phase. Malnutrition risk, nutritional indicators, mortality, and LOS were compared among different risk groups. Albumin, nutrition intake, and body mass index (BMI) were investigated for their effects on the clinical outcomes.

Results

The prevalence of malnutrition risk was 94.9%; those older were higher in malnutrition risk. BMI, energy and protein intakes decreased as the malnutrition risk increased. Albumin, energy and protein intakes were lower in the death group. The high malnutrition risk group and severely underweight patients had 2.7 times and 2.2 times higher in-hospital death, respectively. For subjects ⩾75 years old, the odds ratio to death was 6.2 compared to those <75 years old.

Conclusion

We observed a high malnutrition risk of 94.9% in COVID-19 patients. Patients with malnutrition risk had a lower BMI, lower nutritional intake, and a higher chance of in-hospital death. These results reinforced the importance of nutrition management in COVID-19 patients.

Key words Malnutrition, COVID-19, Clinical outcome

Category: Clinical Nutrition

Association between the imbalance of maternal folate and vitamin B12 status in early pregnancy and gestational diabetes mellitus risk is affected by serum selenium status

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Background: The role of B vitamins imbalance status on gestational diabetes mellitus (GDM) risk has aroused great interest, but existing studies are inconsistent. We aimed to assess whether the association between the unbalanced vitamins status and GDM risk can be affected by status of other micronutrients.

Methods: We measured red blood cell (RBC) folate, serum vitamin B12, D, and selenium in the first trimester of pregnancy. Association between the status of RBC folate and vitamin B12 imbalance and GDM risk were examined with logistic regression, stratified by serum selenium or vitamin D status.

Results: Overall, women in higher RBC folate/vitamin B12 ratios did not have a significantly higher risk of GDM than those in reference tertile (all $P > 0.05$). Further, women were divided into deficient and non-deficient groups according to the serum or vitamin D levels, respectively. In women with selenium deficiency, the highest odds [OR: 3.398 (1.158-9.974), P=0.026] of GDM were observed among women with the highest tertile of RBC folate/vitamin B12 ratio after adjustment for covariates; However, similar findings were not observed in pregnancies with normal selenium status. Regardless of vitamin D status, women with higher RBC folate/vitamin B12 ratios did not show a significantly higher risk of GDM.

Conclusion: Micronutrient deficiency is common in early pregnancy. Women with higher folate/vitamin B12 ratio coupled with selenium deficiency in early pregnancy have a higher GDM risk. These findings reveal the importance of micronutrients detection in early pregnancy and subsequent interventions for micronutrient deficiency.

Key words gestational diabetes mellitus; folate; vitamin B12; early pregnancy; selenium deficiency

Category: Clinical Nutrition

Improvement in body composition and glycaemic parameters with winter melon extract supplementation among type 2 diabetic patients

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Background and objectives: Winter melon (*Benincasa hispida*) is a species from cucurbit family that serves as an important vegetable in many Asian countries. There is robust *in vivo* evidence of using winter melon in improving metabolic parameters in diabetes. This study evaluated the effectiveness of winter melon aqueous extract on the body compositions and glycaemic parameters of patients with type 2 diabetes.

Methods: Powdered drink formulated with winter melon aqueous extract was prepared as test food. Another formulation of powdered drink without winter melon extract was prepared as placebo. Fifty individuals diagnosed with type 2 diabetes from outpatient clinic Hospital Universiti Sains Malaysia were included in a randomized, single-blinded, parallel trial with a 12-week intervention. The anthropometric and biochemical variables were assessed at baseline, 6 weeks and 12 weeks after beginning of the trial.

Results: Fasting plasma glucose from baseline to Week 6 in winter melon group showed a greater reduction than in placebo group (Δ -0.91 mmol/l, 95% CI: -1.89, 0.07 vs Δ -0.60 mmol/l, 95% CI: -1.53, 0.34, respectively). Body weight increased in winter melon group (Δ 0.27 kg, 95% CI: -0.54, 1.07) but decreased in placebo group (Δ -0.81 kg, 95% CI: -1.64, 0.03). However, body fat percentage did not change significantly within each group throughout the study ($p>0.05$). Conversely, mean lean body mass showed favourable trend of increment at Week 6 (Δ 0.05 kg, 95% CI: -0.40, 0.49) and Week 12 (Δ 0.16 kg, 95% CI: -0.33, 0.64) as compared to baseline in winter melon group but not in placebo group which manifested decreasing lean body mass.

Conclusions: This study suggested the potential effectiveness of winter melon extract supplementation on fasting plasma glucose and lean body mass in type 2 diabetes and is likely to be applied as an ingredient in functional food production.

Key words blood glucose, body fat, diabetes, lean body mass, winter melon

Category: Clinical Nutrition

Research progress on the role of nutrition in stroke-related sarcopenia

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Stroke is one of the most common causes of disability in adults. Sarcopenia is a syndrome characterized by progressive systemic muscle loss and functional decline. The loss of muscle mass and decreased function throughout the body after stroke cannot be explained by brain injury alone and is considered to be a secondary sarcopenia known as stroke-associated sarcopenia. Mounting evidence shows that stroke-related sarcopenia can promote the occurrence and development of sarcopenia through various pathogenesis such as muscle atrophy, dysphagia, inflammation, and malnutrition, etc. Currently, the main indicators used to assess malnutrition in patients with stroke-related sarcopenia include temporalis muscle thickness, calf circumference, phase angle, Geriatric nutritional risk index and mini-nutritional assessment short form, etc. At present, there is no particularly effective method to curb its progression, but supplementation the body with essential amino acids, vitamin D, high energy diet, avoiding Polypharmacy, as well as increasing physical activity level and reducing sedentary lifestyle may improve the malnutrition status of stroke patients, and increase the muscle mass and skeletal muscle index of stroke related sarcopenia, further delay or even prevent the development of stroke-related sarcopenia. This article reviews the latest research progress on the characteristics, epidemiology, pathogenesis and the role of nutrition in stroke-related sarcopenia, so as to provide reference for the clinical treatment and rehabilitation of stroke-related sarcopenia.

Key words Stroke; Sarcopenia; malnutrition; Temporal muscle thickness; Phase Angle; Calf circumference; Geriatric nutritional risk index

Category: Clinical Nutrition

大黄对蒙古族传统功能性食品的研究。

Study to Mongolian traditional functional food from Rheum Undulatum L.

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Background

In ancient times, Rhubarb (Rheum Undulatum L.) was widely used both in traditional medicinally and non-pharmacologically, to treat poisonous fever, internal heat, diarrhea, indigestion, menstrual cramps, bloating and constipation.Therefore, by extracting and introducing food-regulated products enriched by Rhubarb for daily use, it is possible to protect gastrointestinal function, which is a source of all diseases, to prevent blood clots, vascular hardness, diabetes, the cardiovascular system disease and preventing cancer.

Aim

Development of technology for food products with regulatory activity of Rheum Undulatum L., a traditional medicinal plant.

Research objectives

1. Developing technology of filling with Rhubarb (Rheum Undulatum L.) rhizome stem
2. Developing technology instructions for the production of concomitant pastries prepared with Rhubarb (Rheum Undulatum L.) rhizome stem
3. Calculating Standard calculation coefficient (SCC) of taste and potency of traditional medicine drugand determine the characteristics, composition, physical chemistry and hygiene of the made functional food product.

Conclusions:

1. The contents of 40 grams of brown sugar per 100 grams of Rheum Undulatum L. was the most suitable for the development of pastry filling technology. In 50 grams of pastry product 15 grams of fillings was determined as the optimal ingredient.

Rhubarb pastry product meet the technical quality requirements of MNS 2488:2021 standard, has a fat content of no more than 10% and no leaven in dough was developed under certified recipes and technological guidelines for the production of bakery products.

According to the standard calculation coefficient (SCC) of taste and potency of drug, the ingredients in 50g of the product have rlung suppressing SCC=0.76, mkhris pa suppressing SCC=1.1, badkan suppressing SCC=0.57, cool ability to suppress mkhris pa, heavy ability to suppress rlung, light and harsh ability to suppress badkan, phenolic compound content was 15 mg/g for those it's proven to perform regulatory actions.

Key words Rheum Undulatum L, functional food ,

Category: Clinical Nutrition

Nutritional Assessment of pre-dialysis Patients with Chronic Kidney Diseases using the Malnutrition Inflammation Score (MIS)

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Background and objectives

Major causes of malnutrition is insufficient nutrition and energy intake as well as the lack of relevant nutritional knowledge.The objectives of this study are to look at the result of nutritional assessment of pre-dialysis patients with chronic kidney diseases using the Malnutrition Inflammation Score (MIS) as well as the benefits of nutritional education on these patients. The study was conducted by evaluating nutritional status of 30 pre-dialysis patients with chronic kidney diseases twice with 3 months

Methods

Nutritional assessments were conducted using the Malnutrition Inflammation Score (MIS) .

Results

The sample consisted of 21 male patients and 9 female patients . The first round of assessments revealed 16 patients with ‘Mid’ malnutrition, 12 with ‘Moderate’ malnutrition, and 2 with ‘Severe’ malnutrition. The second round of assessments, taken 3 months after the first round, showed an increase of the number of patients with ‘Mid’ malnutrition to 20

Assessed by individual interviews and evaluation of food consumption , are reflected by the fact that the patients were able to lower their consumption with correct proportion of nutrients appropriate for their diseases. The patients consumed an average of 0.58 grams of protein per 1 kg of body weight per day, 1,803 milligrams of sodium per day, 467 milligrams of potassium per day, and 201 milligrams of phosphorus per day.

Conclusions

To help slow down deterioation of the kidneys, patients need to be aware of what health behaviours have direct impacts on the progression of the disease, while medical practitioners must provide educational support to promote beneficial health behaviours that help slow down deterioration of the kidneys.

Key words Malnutrition Inflammation Score

Category: Clinical Nutrition

膳食补充绿藻 Caulerpa racemosa 的抗肥胖作用：一项针对肥胖男性的随机双盲安慰剂对照临床试验

Antiobesity effect from the dietary supplementation of green algae Caulerpa racemosa: A randomized double-blind placebo-controlled clinical trial in obese men

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Background and objectives: More than 1 billion people worldwide are obese and the number is still increasing. Obesity leads to a range on cardiometabolic syndrome, such as type 2 diabetes, and cardiovascular-related disease. Various anti-obesity innovations continue to develop. Doses of 30 mg/200g BW Sea grapes *(Caulerpa racemosa)* extract (SGE) in a previous pre-clinical trial, showed that it ameliorates of obesity markers in rats model obesity. However, it has not represented the SGE efficacy in humans trial. Therefore, this clinical trial was aimed to support the effect of SGE on blood glucose (BG), total cholesterol (TC), fat mass and obesity-associated (FTO) protein and PGC-1α levels in obese men according to a prospectively registered protocol (ClinicalTrials.gov; NCT05037591). **Methods**: The study was a 4-weeks, randomized, double-blind, placebo-controlled clinical trial. A total 70 participants (35 subjects received SGE, 35 subjects received placebo) were included in this study. Evaluation during the initial visit includes physical examination in the form of Body Mass Index (BMI) and laboratory tests blood glucose (BG), triglycerides (TG), high-density lipoprotein (HDL), low-density lipoprotein (LDL) and total cholesterol (TC), FTO protein, and PGC-1α were performed on all participants within 1 week of the initial screening. SGE (1.68 g/70kg BW) were given to participants in intervention group once daily, 15 minutes before lunch, the control group received placebo. **Results**: After 4 weeks intervention, there were significant reductions ($p<0.05$) in BG, TC, LDL, TG, waist circumference, FTO protein, and body weight. There was also a significant increase in PGC-1α and HDL level ($p<0.0001$). Interestingly, a pattern of decreasing BMI was observed from baseline (0-week) after 4 weeks of SGE intervention. **Conclusions**: *Caulerpa racemosa* has potential antiobesity effect, reduce the risk and help to control cardiometabolic syndrome via upregulating of PGC-1α and HDL, and followed by downregulating of FTO protein in obese men.

Key words Obesity; Natural Product, Algae, Obese Men, Clinical Trial

Category: Clinical Nutrition

视网膜静脉阻塞患者体内长链多不饱和脂肪酸氧化的代谢组学分析

Metabolomic profiling of long-chain polyunsaturated fatty acid oxidation in patients with retinal vein occlusion

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Objective: Long-chain polyunsaturated fatty acids (LCPUFA) and their metabolites are closely related to neovascular eye diseases. However, the clinical significance of their oxidative metabolites in retinal pathologies remains inconclusive. This cross-sectional study aimed to explore metabolomic profiles of LCPUFA oxidation in retinal vein occlusion (RVO) patients, and to identify potential indicators for diagnosis and prediction of the disease progression.

Methods and Study Design: Venous blood samples were collected from 44 RVO patients and 36 normal controls. The plasma levels of ω-3 and ω-6 LCPUFA and their oxylipins were analyzed using ultra-performance liquid chromatography tandem mass spectrometry. Univariate analysis combined with principal component and orthogonal projections to latent structure discriminant analysis was used to screen differential metabolites. Ex vivo aortic ring and choroidal explant sprouting assays were used to investigate the effects of 5-oxo-eicosatetraenoic acids (ETE) on angiogenesis. Tubule formation and wound healing assays were performed to verify the effects of 5-oxo-ETE on human retinal microvascular endothelial cell (HRMEC) functions.

Results: Higher ω-6 and lower ω-3 LCPUFA levels were measured in the plasma of RVO vs. control patients. Metabolomic analysis revealed 20 LCPUFA and their oxylipins dysregulated in the RVO patients, including increased arachidonic acid (ω-6) and its lipoxygenase product 5-oxo-ETE, as well as decreased docosahexaenoic acid (ω-3). Interestingly, the 5-oxo-ETE levels were lower in the ischemic vs. non-ischemic central RVO patients. 5-oxo-ETE attenuated aortic ring and choroidal explant sprouting, and inhibited tubule formation and migration of HRMECs in a dose-dependent manner, possibly through suppressing the vascular endothelial growth factor-induced signaling pathways.

Conclusions: The plasma levels of ω-6 and ω-3 LCFPUA and their oxylipins were associated with RVO. The ω-6 LCPUFA-derived metabolite 5-oxo-ETE was a potential marker of RVO development and progression.

Key words Long-chain polyunsaturated fatty acid; Oxidative metabolism; Retinal vein occlusion; Retinal neovascularization; 5-oxo-eicosatetraenoic acids

Category: Clinical Nutrition

通过调节 PRMT-1/DDAH/ADMA 通路和调节肠道微生物组，膳食补充 Caulerpa racemosa 的心脏保护作用：对小鼠的临床前试验研究

Cardioprotective effect of dietary supplementation of Caulerpa racemosa via regulation of PRMT-1/DDAH/ADMA pathway and modulation of the gut microbiome: A preclinical trial study on mice

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Background and objectives: Alternative approaches based on natural bioresources are important in treating cardiometabolic syndrome. This study evaluated the effects of an aqueous extract of *Caulerpa racemosa* (AEC) on markers of cardiometabolic syndrome and modulation of gut microbiome in mice on cholesterol- and fat-rich diets (CFED). Properties of the AEC such as antioxidants (ABTS and DPPH) and inhibition of food hydrolyzing enzymes (lipase, α-amylase, and α-glucosidase) were also determined *in vitro*. **Methods**: A total of forty mice were divided into four groups. Group A was given a normal diet, Group B was given a CFED diet, and Groups C and D were given CFED diet and orally-administered AEC extract at 65 and 130 mg/kg BW, respectively. After 6 weeks of intervention, mice were euthanized, blood with cardiac tissue, and fecal samples were collected for further analysis. **Results**: The effective concentration (EC_{50}) values of AEC were 116.9, 121.7, and 137.9 μg/mL for DPPH, ABTS, and lipase inhibition, respectively, and were more effective than controls *in vitro*. In the mice model, the administration of 130 mg/kg BW AEC was significantly more potent in improving blood lipid and glucose profiles, oxidative stress, and inflammation characterized by up-regulation of superoxide dismutase enzyme, PGC-1α, and IL-10 as well as a lower level of TNF-α ($p=0.001$). Interestingly, the expression of PRMT-1 and ADMA were downregulated by AEC, as well as upregulating DDAH-II significantly ($p<0.05$). Furthermore, a correlation between specific gut microbiomes and biomarkers related to cardiometabolic diseases was also revealed ($p=0.001$). **Conclusions**: *Caulerpa racemosa* has potential *in vitro* antioxidant properties as a promising functional food ingredients. The *in vivo* demonstrated the role of AEC in the management of cardiometabolic syndrome via the regulation of oxidative stress, inflammation, endothelial function (PRMT-1/DDAH/ADMA pathway), and by modulating gut microbiota. Further human clinical trials are needed for the foreseeable future.

Key words Cardiometabolic Syndrome, Caulerpa racemosa, PRMT-1/DDAH/ADMA Pathway, Gut Microbiota, Cardioprotective

Category: Clinical Nutrition

超重对青年人脂肪餐后脂联素、超敏C反应蛋白的影响及性别差异

Effect of overweight on lipocalin and ultrasensitive C-reactive protein after adipose meal in young adults and gender differences

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Objective

To measure fasting and postprandial lipocalin (APN) and hypersensitive C-reactive protein (hs-CRP) in young people with different body mass index (BMI), and to analyze and assess the effects of overweight on postprandial APN and hs-CRP levels in young people and gender differences.

Methods

A total of 113 cases, aged 18.8±1.6 years (18-21 years), 42 males and 71 females were included. The concentrations of APN and hs-CRP were measured 2 hours after fasting and fat meals, and the association between APN and hs-CRP and BMI and gender differences were analyzed.

Results

The fasting and 2h postprandial APN (mg/L) of 113 young people were 0.98±0.39 and 1.52±0.61, respectively, and the 2h postprandial APN was higher than the fasting APN level ($P<0.05$). As BMI increased, fasting and 2h postprandial APN decreased, and plasma APN concentrations were similar in men and women in the three BMIs. there was a negative correlation between BMI and fasting and 2h postprandial APN ($P<0.05$). Fasting and 2h postprandial hs-CRP (mg/L) were 0.53±0.36 and 0.74±0.57 in the three BMI subgroups, respectively, and 2h postprandial CRP was higher than fasting hs-CRP levels ($P<0.05$). Both fasting and 2h postprandial hs-CRP concentrations were positively correlated with BMI values ($P<0.05$), and both fasting and 2h postprandial hs-CRP levels gradually increased with increasing BMI. In the subgroup with BMI ≥ 24, fasting and 2h postprandial hs-CRP were higher in men than in women ($P<0.05$). Lipocalin and hs-CRP were negatively correlated ($P<0.05$).

Conclusion

Higher BMI is detrimental to postprandial lipocalin secretion, and adipose postprandial inflammatory response is more severe in young men with overweight BMI than in women. Overweight and gender are important factors influencing adipose postprandial lipocalin secretion and hs-CRP production in young adults.

Key words Ultrasensitive C-reactive protein; Lipocalin; Body mass index; Fat meal; Youth

Category: Clinical Nutrition

成人膳食炎症指数与胆结石的关系

Association between Dietary Inflammatory Index and Gallstones in Adults

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Background and objectives: Gallstones are significantly correlated with diet and inflammation. However, the relationship between dietary inflammatory index (DII) and gallstones is unclear. The objective of this study was to investigate the relationship between DII and gallstones.

Methods: Data were obtained from the 2003-2020 National Health and Nutrition Examination Survey (NHANES). The second 24-h dietary recall interview data and the medical condition questionnaire data were used to calculate DII and determine gallstone history, respectively. To lessen selection bias, we utilized a 1:1 ratio for propensity score matching (PSM) by nearest neighbor matching. We analyzed the relationship between DII and gallstones using multifactorial regression. Restricted cubic curve (RCS) models were used to analyze the non-linear relationship. BMI subgroup stratification was performed to explore further the connection between DII and gallstones in different populations.

Results: 10,779 participants were included, of which the median DII was 1.25 (IQR=2.73), and about 11% (1213) of participants had a history of gallstones. Before and after PSM, univariate analysis showed that DII was higher in the gallstone group than in the non-gallstone group. Matched logistic regression analysis showed that DII scores were positively correlated with gallstone risk after adjusting for all confounding factors (OR=1.14, 95% CI 1.01, 1.29). RCS analysis suggested that DII and gallstones showed a "J"-shaped non-linear dose-response relationship (P non-linear < 0.001). The stratified analysis further found that DII was a significant risk factor for people with BMI ≥ 25 kg/m^2 (OR=1.18, 95% CI 1.03, 1.34).

Conclusions: Our findings suggest that higher DII scores are positively associated with the risk of gallstones and that there is a non-linear relationship between DII and gallstones, which is particularly significant in those with a BMI ≥ 25 kg/m^2. These results further support that avoiding or reducing a pro-inflammatory diet can be an intervention strategy for gallstone management.

Key words Dietary inflammatory index; Gallstone; Propensity score matching; Restrictive cubic spline; NHANES

Category: Clinical Nutrition

紧张性木僵患者的营养治疗

Nutritional therapy for Patients with Catatonia

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Objective: To enhance clinical understanding of nutritional therapy for patients with Catatonia, providing optimal nutritional support to improve disease progression.

Methods: Patients with Catatonia often experience difficulties with oral intake and swallowing disorders, leading to reduced food intake and increased risk of malnutrition. By analyzing the nutritional status of patients with Catatonia and combining nutritional screening, assessment, and diagnosis, individualized nutritional treatment plans are proposed.

Results: Early nutritional assessment and enhanced oral nutritional support should be provided for patients with Catatonia. Nutritional screening using the Nutritional Risk Screening (NRS2002) tool, nutritional assessment based on the Global Leadership Initiative on Malnutrition (GLIM) criteria, and swallow function assessment using the water swallow test should be employed. Dietary surveys should be conducted, along with collection of relevant medical and medication history related to nutrition, as well as assessment of nutrition-related clinical symptoms and pertinent laboratory indicators. For energy supply, a simple formula based on weight estimation is recommended, with energy requirements estimated at 25-30 kcal•kg-1 (actual body weight)•d-1. For bedridden patients, energy requirements should be estimated at 20-25 kcal•kg-1 (actual body weight)•d-1. Appropriate feeding methods should be chosen. The enteral nutrition prescription was selected based on the patient's nutritional status.

Conclusion: Clinical nutrition therapy should enhance understanding of Catatonia to enable better diagnosis and treatment of patients.

Key words Nutritional therapy, Catatonia, Clinical nutrition

Category: Clinical Nutrition

间歇性禁食作为一种营养方法用于体重管理和预防肥胖及代谢性疾病

Intermittent fasting as a Nutrition Approach for weight management and againsting Obesity and Metabolic Disease

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Obesity and its related diseases pose important global public health, financial, and social issues.Intermittent fasting (IF), as a dietary regulation mode, can reduce weight, reduce oxidative stress, improve cognitive ability, and delay aging. IF has been proposed as a potential nutritional method to combat obesity and metabolic disorder.

The aim of this study is to determine the long-term effectiveness of IF in weight loss and metabolic health; Compare the weight loss effects of different dietary patterns during fasting days.We recruited obese and pre diabetes adults with fasting lifestyle, and divided them into obese control group; Obesity fasting group; Pre diabetes control group; There were 4 groups of pre diabetes fasting group, 6 people in each group. According to the hunger score, the start time and end time of fasting were scientifically set. The average fasting time was 42 hours a week. The obese fasting group and the pre diabetes fasting group were given fasting intervention for 6 weeks. The control group maintained normal living habits. All volunteers in this study signed informed consent forms.

Research results: After 6 weeks of intervention, all fasting groups lost an average weight of 4.12 kg The FBG or mean OGTT glucose levels in the fasting group in pre diabetes were significantly lower than those in the control group ($p<0.05$). TG, TCHOL, and insulin production index increased in the fasting group, while SBP/DBP decreased in the fasting group; There is no significant change in heart rate and pulse.

Conclusion: As an alternative nutrition method to fight obesity and Metabolic disorder, IF has been widely studied. IF can lead to clinically significant weight loss and improve glucose and lipid metabolism. However, adhering to IF may be challenging. Preliminary data indicates that for obese patients with insulin resistance, IF can improve insulin resistance.

Key words Time-restricted eating; Insulin; Nutritional measures; Obesity; Metabolic disorder

Category: Clinical Nutrition

中国乳腺癌化疗患者的肌少性肥胖状况及特点

The Sarcopenic Obesity Status of Chinese Breast Cancer Patients Undergoing Chemotherapy

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Objectives

To evaluate the sarcopenic obesity status of Chinese breast cancer patients undergoing chemotherapy.

Methods

This is a cross-sectional study, and with stage I-III primary breast cancer patients receiving chemotherapy in outpatient or inpatient departments at three hospitals in Beijing were selected using a convenience sampling method. Standard tools were used to measure the physical condition of breast cancer patients. Body mass index (BMI), waist circumference (WC) and body fat percentage (% BF) were used to evaluate the obesity of patients. Appendicular skeletal muscle mass index (ASMI) and hand grip strength (HGS) were used to evaluate the muscle loss. Combined obesity and muscle loss related indicators were used to determine the sarcopenic obesity. The Kappa consistency test was used to evaluate the consistency of obesity, muscle loss and the sarcopenic obesity.

Results

A total of 142(41.6%) patients with BMI >24kg/m^2, 50(14.7%) patients with BMI≥28kg/m^2, 169 (49.3%) patients with WC≥85cm. The simple Kappa coefficients are 0.462 and 0.441. A total of 235(67.7%) patients were obese among 347 patients. 74 (21.4%) breast cancer patients were in the group of ASMI< 5.7 kg/m^2, and 52 people (15.0%) with HGS< 18kg. The Kappa value of the consistency test was 0.171. Reduce muscle mass or muscle strength combined with obesity to form two sarcopenic obesity criteria. Thera were 29 (8.4%) who met sarcopenic obesity (criterion 1) and 34 (9.8%) who met sarcopenic obesity (criterion 2). The Kappa test was used to test the consistency between the two criteria and the Kappa coefficient was 0.184.

Conclusions

Breast cancer patients undergoing chemotherapy had nutritional problems with obesity , reduced muscle mass and decreased muscle strength and a certain percentage of breast cancer patients had sarcopenic obesity.

Key words breast cancer, sarcopenic obesity, chemotherapy

Category: Clinical Nutrition

大豆卵磷脂-没食子酸复合物通过铁死亡增强人非小细胞肺癌的放射敏感性

The Soybean Lecithin-Gallic Acid Complex Enhances Radiosensitivity of Human Non-Small Cell Lung Cancer Through Ferroptosis

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Background and Objectives: Gallic acid (GA) is a type of polyphenolic compound found in various plants and foods. It has been shown to possess anticancer properties, including the inhibition of tumor cell proliferation and the enhancement of tumor cell sensitivity to cisplatin. This study aimed to investigate whether the soybean lecithin complex of gallic acid (SL-GAC) can enhance the radiosensitivity of human non-small cell lung cancer (NSCLC) by inducing ferroptosis and its related mechanisms.

Methods and Study Design: In this study, we used SL-GAC in combination with ionizing radiation (IR) to treat the A549 cell line. The effects of SL-GAC on the proliferation, migration, and invasion of A549 cells were evaluated using cell viability CCK-8, EDU staining, wound healing assay, and clone formation experiment. The levels of oxidative stress and mitochondrial damage were measured using flow cytometry to detect mitochondrial membrane potential (MMP) and reactive oxygen species (ROS), and fluorescence microscopy to observe malondialdehyde (MDA) levels and mitochondrial integrity. Western blotting was used to detect proteins related to ferroptosis.

Results: The results showed that compared with treatment with IR or SL-GAC alone, the combination of SL-GAC and IR significantly inhibited the proliferation and migration of A549 cells and caused more severe oxidative stress and mitochondrial damage, indicating that SL-GAC had a radiosensitization effect. Further studies found that the combined treatment could induce ferroptosis in A549 cells, and the radiosensitization effect could be inhibited by the ferroptosis inhibitor Fer-1, indicating that ferroptosis is an important mechanism underlying SL-GAC-induced radio sensitization of A549 cells.

Conclusions: In conclusion, our study suggests that SL-GAC may be a potential radiosensitizer for enhancing radiotherapy efficacy in patients with non-small cell lung cancer. Further validation is needed through preclinical and clinical studies.

Key words gallic acid; non-small cell lung cancer; ionizing radiation; radiosensitivity

Category: Clinical Nutrition

中等剂量维生素 K 摄入有利于 50 岁以上人群骨骼健康：一项基于 NHANES 的研究

Medium level of vitamin K intake contributes to the bone health of people 50 years and older: a NHANES-based survey

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Objective: To explore whether higher levels of VK intake contribute to the reduction of the risk of osteoporosis and bone loss in the US population over 50 years old. **Methods:** Total 5075 subjects from four NHANES cycles (2007-2008, 2009-2010, 2013-2014 and 2017-2020) were included. VK intake was divided into three groups (high, medium and low) by gender and tertile, with multiple weighted logistic regression used to investigate the effect of VK intake on the risk of osteoporosis and bone loss at five sites: femoral neck, trochanter, intertrochanter, total femur and lumbar spine and overall. **Results:** In total 1001 (18% weighted) had osteoporosis (808 females, 83% weighted), and 2226 (46% weighted) had osteopenia (1076 females, 54% weighted). Among females, the low level group had lower bone mass density and higher prevalence of osteoporosis than higher levels groups, which were not found in males. Furthermore, higher levels were associated with a reduced risk of osteoporosis in females, which remained in fully adjusted model, as well as overall and at the femoral neck and lumbar spine. Additionally, medium level was related to a decreased risk of bone loss in all five models overall and at the trochanter, intertrochanter, total femur and lumbar spine. However, in males, only medium level was associated with reduced bone loss at the femoral neck, and high level corresponds to the lumbar spine. **Conclusions:** The medium level of VK intake was beneficial in reducing the risk of osteoporosis and bone loss in females over 50 years old and was beneficial in reduced bone loss in males of same age. Medium level of VK intake is recommended to people aged 50 years and older to maintain bone health.

Key words Vitamin K; Osteoporosis; Bone Loss; Bone Health; National Health and Nutrition Examination Survey (NHANES)

Category: Clinical Nutrition

个体化医学营养治疗联合药物对肥胖型多囊卵巢综合征患者影响的临床研究

Clinical Study on the Effect of Individualized Medical Nutrition Therapy Combined with Drugs on Obese Polycystic Ovarian Syndrome Patients

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Objective: To study the effects of medical nutritional therapy combined with drugs on body composition, endocrine metabolism, and reproductive function in patients with obese polycystic ovary syndrome (PCOS), and to provide clinical basis and management experience for the treatment of obese PCOS.

Method: Through a PCOS joint outpatient clinic consisting of clinical nutrition, endocrinology, and gynecology departments, 50 obese PCOS patients were treated with personalized medical nutrition combined with medication at Shanghai 10th People's Hospital from December 2020 to June 2021. Paired sample t-tests were conducted on the body composition, endocrine and metabolic indicators, and reproductive indicators of the patients before and after treatment.

Results: After 16 weeks of intervention, obesity indicators such as body weight, body mass index, waist circumference and body fat percentage were significantly reduced ($P<0.05$), endocrine metabolic indicators such as fasting insulin, Fasting blood sugar, insulin resistance index, total cholesterol, triacylglycerol and low-density lipoprotein cholesterol were significantly reduced ($P<0.05$), and reproductive function indicators such as free testosterone, Luteinizing hormone and Luteinizing hormone/follicle stimulating hormone were significantly reduced ($P<0.05$), 81.5% of patients have improved and returned to normal menstrual cycles.

Conclusion: After 16 weeks of intervention, the combination of medical nutrition intervention and medication can effectively reduce the weight and body fat percentage of PCOS patients, and significantly improve endocrine metabolism and reproductive function. It is an effective method for treating obese PCOS.

Key words Obese, Polycystic Ovarian Syndrome,endocrine metabolism, reproductive function

Category: Clinical Nutrition

多频生物电阻抗法评估住院患者不同年龄人体成分分析研究

The multi-frequency bioelectrical impedance method to investigate age difference in body composition in inpatients

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Objective To analyze the differences in body composition such as protein, water, fat, and muscle content of different age in inpatients.

Methods The total of 202 inpatients in Shanghai Tenth People's Hospital from September 2020 to December 2020 were enrolled in this study. All participants were grouped according to the age and measured body composition such as body fat percentage, body water, muscle mass, protein, and visceral fat area, and compared body composition differences between different ages.

Results There were statistically significant differences in the comparison of calf circumference, grip strength, ECW/TBW, TBW/FFM in different ages ($P < 0.05$). With the increase of age, the risk of malnutrition (NRS 2002 $\geqslant$ 3 points) turned to an increased trend (7.1%, 8.1%, 9.9%, $P < 0.05$). However, intracellular water (ICW), total water (TBW), protein, minerals, fat-free body mass (FFM), body cell mass (BCM), bone mineral content, arm circumference (AC), arm muscle circumference (AMC) and basal metabolic rate (BMR) turned to a decreased trend with increasing age. Calf circumference was positively correlated with protein, FFM, AC, AMC, SMI, waist circumference, and BMR; the grip strength is positively correlated with protein, FFM, AMC, SMI, and BMR. The correlations between albumin, pre-albumin, total protein and the risk of malnutrition is weak, showing a trend of negative correlations.

Conclusion Between different ages, the various components of the human body are different. As the age group grows, the indexes of calf circumference, grip strength, body water content, intracellular water, extracellular water, muscle mass, and protein showed a downward trend with age. Calf circumference and grip strength were positively correlated with protein-related body composition indexes (i.e. protein, FFM, AC, AMC, SMI, BMR).

Key words body composition; age; inpatients

Category: Clinical Nutrition

营养炎症因素预测可切除胰腺癌患者的短期预后

The nutritional and inflammatory factors predict short-term outcomes of patients with resectable pancreatic cancer

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Background: The association between nutritional and inflammatory factors and prognosis has been investigated in patients with resectable pancreatic cancer (PC). However, simple and practical prognostic markers of PC are still limited and unprecisely. Methods: We conducted a retrospective observational research involving 201 patients with resectable PC undergoing elective pancreatic surgery in the First Affiliated Hospital of USTC from January 2019 to April 2023. The nutritional and inflammatory factors were collected and calculated from the hospital electronic database.The univariate analysis and logistic regressions were used for prognostic factors. Results: The mean age was 62.33±9.97 years. The regressions revealed that preoperative AGR (P=0.007), LMR (P=0.010), SIRI (P=0.011), SII (P=0.011), and NRS2002 (P=0.001) were associated with length of hospital stay after operation in patients with resectable PC. NRS2002 was also the predictor for intra-abdominal hemorrhage (OR, 0.080, 95%CI 0.008-0.811, P=0.033). However, the relationships between the nutritional and inflammatory markers and 30-day readmission and complication were not found. Conclusion: It is necessary to select appropriate assessment tools and combine laboratory markers to accurately assess patients' systemic status, and further guide individualized treatment, improve prognosis of patients with resectable PC.

Key words pancreatic cancer; surgical resection; nutritional and inflammatory factor; prognosis

Category: Clinical Nutrition

出生体重与脐动静脉血中维生素水平的关系

Relationship between birth weight and vitamin levels in umbilical artery and vein blood

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Objective: To compare the difference of vitamin levels in umbilical vein blood and artery blood, and to analyze the relationship between vitamin levels in umbilical vein blood and artery blood and birth weight. Methods: 101 pairs of mothers and infants who were hospitalized in Danyang People's Hospital, Jiangsu Province from June to September 2021 were recruited. The umbilical vein blood and artery blood of the newborn were collected after birth, and the levels of vitamin A, vitamin B1, vitamin B2, niacinamide, pantothenic acid, free folic acid, vitamin D, vitamin E, and vitamin K1 in umbilical vein blood and artery blood were detected by liquid chromatography and mass spectrometry (LC-MS/MS). The levels of vitamin B12 in umbilical blood were detected by electrochemiluminescence. Results: The levels of vitamin B2, vitamin A, vitamin E and 25-(OH)-VD3 in umbilical vein blood were higher than those in umbilical artery blood, and the levels of vitamin B12, free folate and vitamin B1 were lower. The levels of vitamin K1 and 25-(OH)-D2 were below the detection limits. Linear regression results showed that the logarithmic values of vitamin A in umbilical vein blood and artery blood were positively correlated with birth weight, while the difference of vitamin levels in umbilical vein and artery blood was not statistically correlated with birth weight. Conclusion: The levels of vitamins were different between umbilical artery and vein blood, and the levels of vitamin B12, free folate and vitamin B1 are lower. The logarithmic values of vitamin A in umbilical vein blood and artery blood were positively correlated with birth weight, while the difference of vitamin levels in umbilical vein blood and artery blood were not statistically correlated with birth weight.

Key words umbilical artery blood, umbilical vein blood, birth weight, vitamin

Category: Clinical Nutrition

活动性肺结核患者的营养状况研究及新营养风险筛查模型的建立在结核病患者中的应用：一项全国性、多中心大样本研究

Nutritional status in patients with active pulmonary tuberculosis and new nutritional risk screening model for active tuberculosis: a national, multicenter study in China

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Abstract

Background: Tuberculosis (TB) remains a significant challenge for public health and is closely associated with malnutrition; however, few studies have attempted to screen malnutrition among TB patients. The study aimed to evaluate the nutrition status and build a new nutritional screening model for active TB.

Methods: A retrospective, multicenter, large cross-sectional study was conducted in China from 1 January 2020 to 31 December 2021. All included patients diagnosed with active pulmonary TB (PTB) were evaluated both by Nutrition Risk Screening 2002 (NRS 2002) and Global Leadership Initiative on Malnutrition (GLIM) criteria. Univariate and multivariate analyses were conducted to screen the risk factors associated with malnutrition, and a new screening risk model, mainly for TB patients, was constructed.

Results: A total of 14,941 cases meeting the inclusion criteria were entered into the final analysis. The malnutrition risk rate among PTB patients in China was 55.86% and 42.70%, according to the NRS 2002 and GLIM, respectively. The inconsistency rate between the two methods was 24.77%. A total of 11 clinical factors, including elderly, low body mass index (BMI), decreased lymphocyte cells, taking immunosuppressive agents, co-pleural TB, diabetes mellitus (DM), human immunodeficiency virus (HIV), severe pneumonia, decreased food intake within a week, weight loss and dialysis were identified as independent risk factors of malnutrition based on multivariate analyses. A new nutritional risk screening model was constructed for TB patients with a diagnostic sensitivity of 97.6% and specificity of 93.1%.

Conclusions: Active TB patients have severe malnutrition status according to screening by the NRS 2002 and GLIM criteria. The new screening model is recommended for PTB patients as it is more closely tailored to the characteristics of TB.

Key words Keywords: Nutritional risk; malnutrition; Nutrition Risk Screening 2002 (NRS 2002); Global Leadership Initiative on Malnutrition (GLIM); model

Category: Clinical Nutrition

异基因造血干细胞移植患者经口能量及蛋白质达标情况及其相关因素分析：一项纵向研究

The adequacy of oral energy and protein intake in patients undergoing allogeneic hematopoietic stem cell transplantation:a longitudinal study

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Aims: Understanding the oral energy and protein intake states and related issues in allogeneic hematopoietic stem cell transplantation(allo-HSCT) patients is essential for timely and effective nutritional intervention. This study aims at finding out the longitudinal adequacy of oral energy and protein intake and the incidence of nutrition impacted symptoms(NIS) to provide suggestions for the improvement of oral intake in allo-HSCT patients.

Methods: A single-center prospective study enrolled allo-HSCT patients from 2022 to 2023. We evaluate the adequacy of oral energy/protein intake and NIS in the peritransplantation period. Generalized estimating equations(GEE) were adopted to evaluate the association between longitudinal adequacy of oral energy/protein intake and demographic as well as disease and treatment characteristics.

Results: A total of 63 allo-HSCT patients were enrolled in the study with 439 records. The adequacy of oral energy/protein intake was significantly lower than that at admission and returned to the level on of admission on the day before discharge with the range of 39.3%-63.1%， and 27.4%-62.2%, respectively. 57.1%-95.2% of allo-HSCT patients suffered from at least one nutrition impacted symptoms in the peritransplantation period. GEE indicated that the presence of NIS was a risk factor significantly associated with the adequacy of oral energy intake＜50%(OR=2.359， P=0.012)， while the use of oral nutrition supplements (ONS) was a protective factor (OR=0.133， P＜0.001). There were similar associations between the adequacy of oral protein intake＜50% and the presence of NIS (OR=2.007， P=0.048) and the use of ONS(OR=0.387， P=0.001).

Conclusion: Insufficient oral energy and protein intake and the burden of NIS in peritransplantation patients is common and further attention and intervention on these issues are needed. ONS is a potential approach to increase oral intake and future studies may further explore the value of ONS in improving nutritional status in allo-HSCT patients.

Key words oral intake; adequacy; nutrition impacted symptoms; oral nutrition supplements; allogeneic hematopoietic stem cell transplantation

Category: Clinical Nutrition

慢性阻塞性肺疾病患者营养筛查工具的比较：分层贝叶斯荟萃分析

Comparison of Nutritional Screening Tools for Patients with Chronic Obstructive Pulmonary Disease: A Hierarchical Bayesian Meta-analysis

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[Abstract] Background and Objectives: Malnutrition is a common disorder in patients with chronic obstructive pulmonary disease (COPD) and has a high risk of mortality and emergency hospitalization. An accurate nutritional assessment is critical for the precise nutritional support strategy in COPD patients. Due to the lack of a gold standard, it is hard in choosing appropriate screening tools for COPD patients. Thus, this study aimed to assess the construct validity of nutritional screening tools for COPD patients, using hierarchical Bayesian latent-class meta-analysis approaches. Methods and Study Design: A systemic search of the databases PubMed, EMBASE, SinoMed, China National Knowledge Infrastructure, and Wanfang was undertaken, and studies satisfying inclusions and exclusions criteria were identified for further analysis. The pooled estimates of sensitivity, specificity, diagnostic odds ratio, positive likelihood ratio (LR+), and negative likelihood ratio (LR-) were generated from the hierarchical summary receiver operating characteristic model. Results: A total of 9 eligible studies involving the mini-nutritional assessment (MNA), SGA, and NRS2002 were included. The pooled sensitivity was 0.92 (95% CI: 0.86－0.95) for MNA, 0.89 (95% CI: 0.85－0.92) for SGA, and 0.87 (95% CI: 0.65-0.96) for NRS2002, respectively. The pooled specificity was 0.90 (0.76－0.96) for MNA, 0.93 (0.89－0.95) for SGA, and 0.83 (0.78－0.88) for NRS2002, respectively. SGA has the highest LR+ 11.8 (95% CI: 8.0－17.4), MNA has the lowest LR- 0.09 (95% CI: 0.05－0.15) and NRS2002 has both the lowest LR+ 5.2 (95% CI: 3.5－7.7) and highest LR- 0.15 (95% CI: 0.05－0.48). Conclusions: This study demonstrated that MNA and SGA achieve good construct validity in screening the risk of malnutrition in COPD patients. Further large-scale prospective cohort studies are needed to refine these tools.

Key words chronic obstructive pulmonary disease; malnutrition; nutrition; nutritional screening; meta-analysis

Category: Clinical Nutrition

孕期体重增长速率与出生结局的关联-基于中国 TAWS 队列研究

Trajectory of gestational weight gain is related to birth outcomes: the TAWS cohort study in China

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Background Few studies have reported the timing and amount of gestational weight gain (GWG) to prevent large-for-gestational-age (LGA) or small-for-gestational-age (SGA). **Objectives** This study aimed to evaluate the association of GWG velocity with LGA or SGA based on data from the Taicang and Wuqiang cohort study (TAWS). **Study Design** Weight trajectories of 2008 women during pregnancy were plotted and fitted by cubic spline and linear mix-effect models. **Results** Compared with women who delivered appropriate-for-gestational-age (AGA) babies, women who delivered LGA had higher GWG velocities in the first trimester (0.112 kg/week vs 0.048 kg/week, $P < 0.01$), second trimester (0.741 kg/week vs 0.622 kg/week, $P < 0.01$), and third trimester (0.653 kg/week vs 0.576 kg/week, $P < 0.01$), with similar results in normal-weight and overweight/obese women; in contrast, women giving birth to SGA had lower GWG velocities in the second trimester (0.502 kg/week vs 0.622 kg/week, $P < 0.01$) and third trimester (0.522 kg/week vs 0.576 kg/week, $P < 0.01$), with similar results in underweight and normal-weight women. In AGA or LGA groups, multiparous women had lower GWG velocities in the second and third trimesters than primiparous women ($P < 0.01$), with similar results in normal-weight and overweight/obese women. **Conclusions** For overweight/obese and normal-weight women, LGA prevention should begin in early pregnancy and continue until delivery; for underweight and normal-weight women, the second and third trimesters may be critical periods for preventing SGA; and multiparous women may need less weight gain than primiparous women to achieve AGA or prevent LGA newborns.

Key words cohort study, gestational weight gain, birthweight, velocity

Category: Clinical Nutrition

嘌呤饮食对帕金森病脑深部电刺激术预后的影响

Effect of purine diet on prognosis of deep brain stimulation for Parkinson's disease

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Uric acid (UA) is a naturally occurring antioxidant that is strongly associated with the development and progression of Parkinson's disease (PD). The purine diet is an important exogenous pathway that modulates blood UA levels. Deep brain stimulation (DBS) is an important tool for PD treatment. This study aimed to explore the effects of preoperative purine diet on the prognosis of patients with PD after DBS. 64 patients with PD who underwent DBS were included in this study, and their demographic data, clinical symptom scale scores, blood UA values, and daily purine intake over 1 year were collected. Patients were followed up for improvement in motor symptoms 1 year after surgery. Using univariate and multivariate regression analyses, we found that patient higher purine intake was strongly associated with the rate of improvement after DBS and was a protective factor for patient prognosis. Daily purine intake from meat and seafood was significantly higher in the responsive patients than in the less-responsive patients. Mediation analysis showed that UA mediated 78% of the effect of purine intake on motor symptom improvement after DBS. We also analysed the effects of purine intake on functional brain connections in patients with PD and found that 25 brain regions with 27 functional connections were associated with purine intake. In summary, we observed that purine intake is strongly associated with the rate of improvement in motor symptoms after STN-DBS in patients with PD. This study provides a reference for preoperative diet planning in patients with Parkinson’s disease undergoing DBS.

Key words Purine diet, Parkinson's disease, Deep brain stimulation, Brain connectivity

Category: Clinical Nutrition

多学科团队决策管理可以改善营养不良老年住院患者的短期预后：一项多中心、随机、对照研究

The Multidisciplinary Team Decision-making Management of Malnutrition Improves Short-term Prognosis in Older Inpatients: A Multicenter, Randomized, Controlled Study

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Objective

Malnutrition is a common geriatric syndrome with a high prevalence, which leads to worse prognosis. We aimed to explore the effectiveness of a tailored optimum nutritional therapy in malnourished, older inpatients based on multidisciplinary team (MDT). The hypothesis is MDT intervention strategies may improve nutritional status, shorten hospital stay, reduce hospitalization costs and mortality in older inpatients.

Methods This is a prospective multicenter randomized controlled study. A total of 463 older patients over the age of 60 with or at risk of malnutrition were enrolled from six hospitals from February 2022 to October 2022. Eligible inpatients were randomized into a 1:1 ratio, with one group receiving a MDT intervention and the other group receiving standard medical treatment The primary outcome was nutritional status based on changes in MNA-SF scores at 3 months after discharge. K-M curve and multivariate COX regression equation were used for survival analysis.ResultsThe mean age was 75.52 years old and 50.76% were women. There was no significant difference in nutritional status, mortality, length of stay, hospital costs between the two groups at 3 months after discharge. There was a significant difference in the mortality rate at 3 months after discharge between frail and non-frail older patients (HR 0.352, 95% CI 0.136 - 0.914; p=0.039). COX regression showed that after adjusting the baseline nutritional level, lifestyle, cognition, psychology, comorbidity and polypharmacy, the MDT decision-making model could reduce the three-month mortality risk by 81.5% in older patients with malnutrition.ConclusionThe MDT decision-making model improves short-term prognosis in older malnourished inpatients, especially those with frailty and prefrailty, which indicates that early nutrition screening and comprehensive nutrition assessment should be carried out and MDT decision-making model of nutrition support should be launched for older inpatients with malnutrition, especially in frail and prefrail patients.

Key words Older adults, malnutrition, frailty, multidisciplinary team

Category: Clinical Nutrition

可活动癌症患者中肌肉量减少评价指标的比较：一项中国横断面研究

Comparison of different methods of muscle mass evaluation among ambulatory cancer patients: a cross-sectional study in China

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Background and aims: Muscle mass reduction (MMR) is one of the three etiologic criteria in the Global Leadership Initiative on Malnutrition (GLIM) framework. Multiple methods are being used to evaluate muscle mass. This study aimed to compare different methods that evaluate MRR.

Methods: A single-center cross-sectional study was conducted. All participants underwent calf circumference (CC) measurement, bioelectrical impedance analysis (BIA), computed tomography (CT) based measurement and hand grip measurement. MRR was identified by low CC, low fat-free mass index (FFMI) and low appendicular skeletal muscle index (ASMI) in BIA, low muscle mass index (MMI) in CT image at the level of lumbar vertebra 3 (L3) and low hand grip strength respectively. The correlation between low MMI and MMR diagnosed under different criteria were calculated. The correlation between MMR and one-year mortality was also evaluated.

Results: 312 cancer patients receiving outpatient intravenous treatment were evaluated. Of the 312 patients 62.8% (196/312) were male and 37.2% (116/312) were female. The median age of the patients was 59.0 years (range, 21-80y; interquartile range 52.0-65.0y). FFMI and SMI diagnosed by BIA correlated with MMI diagnosed by CT (Pearson Correlation 0.798, 0.738). Except for low hand grip strength (p=0.007), no single indicator for MMR correlated with one-year mortality. However, combination of CC, FFMI, ASMI, and MMI correlated with one-year mortality.

Conclusions: FFMI and SMI diagnosed by BIA correlated with MMI diagnosed by CT, indicating that BIA can be a good choice in evaluating MMR. Low hand grip strength and MMR diagnosed using multiple methods indicated higher one-year mortality.

Key words body composition measurement, muscle mass reduction, mortality, cancer, hand grip strength

Category: Clinical Nutrition

副干酪乳酪杆菌 207-27 介导肠-脑轴改善健康成年人睡眠和情绪

Lactobacillus. Paracasei 207-27 mediate the gut-brain axis alleviating sleep and mood in healthy adults

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Background The research on regulating sleep quality and mood by probiotics via gut-brain axis is attracting attention. **Objective** A randomized, double-blind, and placebo-controlled trial was conducted to determine the effects of L. paracasei 207-27 on sleep and mood and its accompanying mechanisms in healthy adults. **Method and study** designHealthy adults aged18-35years old, consumed L. paracasei 207-27 or placebo for 4 weeks. Fecal samples, blood samples and questionnaires were collected at baseline and the end of ingestion. Sleep quality were measured using the Pittsburgh PSQI and Bracelet; depression and anxiety were measured by the self-rating SDS and SAS; inflammatory markers (TNF-α, IL-1β and IL-6), adrenocorticotropic hormone (ACTH), corticotropin releasing hormone (CRH), Cortisol (COR), γ-aminobutyric acid (GABA) and 5-hydroxytryptamine(5-HT) were determined using enzyme-linked immunosorbent assay; the short chain fatty acids (SCFAs) were determined using GC-MS analysis; the gut microbiota was analyzed using 16S rRNA sequencing and bioinformatics. **Results** This study demonstrated that the probiotics group showed greater improvement in sleep quality than the placebo group. Significant changes in the structure of the gut microbiota were observed in the probiotics group, with a significant increase in the relative abundance of *Bacteroidota*, *Blautia* and *Faecalibacterium*, and a significant decrease in the relative abundance of *Proteobacteria* ,*Dialister* and *Collinsella*. The probiotics group significantly increased the Chao1 and Observed species compared to placebo. The probiotics group significantly increased the acetic acid, isovaleric acid and propionic acid level compared to placebo. Contrary to placebo, probiotics group significantly increased serum GABA and 5-HT levels and decreased serum CRH level. **Conclusion** In addition to improving sleep quality, L. paracasei 207-27 induced alterations in the gut microbiome. The mechanisms may be relevant to the modulation of the gut microbiome along the gut-brain axis, including the dysregulation of HPA axis activity and the elevation of neurotransmitters and SCFAs levels.

Key words Sleep quality, mood, gut microbiota, probiotics, brain-gut axis

Category: Clinical Nutrition

生酮饮食联合雷帕霉素抑制脑胶质瘤生长

Ketogenic diet Combined with Rapamycin Inhibits Glioma Growth

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Back ground & Aims: The ketogenic diet(KD) is characterized by high fat, low carbohydrates and moderate amounts of protein, and exerts its anti-cancer effects with energy supply as the starting point, but due to the significant difference in effectiveness, it may be more effective as a combination adjunct. In this study, the effects of ketogenic diet combined with rapamycin on glioma in vivo and in vitro were observed, and the possible mechanism was discussed.

Methods: 1. The MTT assay determine the effect of Ketogenic environment(KE) on the growth of U87-MG cells, and the scratch test was used to determine the effect of KE on the migration of U87-MG cells. 2. The weight, blood glucose, blood ketones, and tumor volume of nude mice were detected after nude mice transplant tumor model been established. 3. The expression of mTOR and p-mTOR in cells and tumors were identified by Western Blot, and the levels of VEGF in serum and cell culture medium were determined by ELISA.

Results: 1.KE combined with RAPA can inhibit the growth and proliferation of U87-MG cells and slow down the migration rate. Reduces the secretion of cellular VEGF levels; The combination of high concentrations of B-HB and RAPA in a low-glucose environment inhibits cellular mTOR phosphorylation. 2. KD combined with RAPA can

reduce blood glucose, increase blood ketones, block mTOR phosphorylation, and delay the growth of subcutaneous transplantation tumors in nude mice. However, the serum VEGF level of the model did not decrease, which may be related to the activation of angiogenic mimicry in extreme environments.

Conclusion: The combined application of KD and RAPA shows obvious advantages over the inhibitory effect on glioma, the mechanism may be that the two synergistically enhance the inhibition of mTOR kinase activation, cut off the downstream signaling molecule conduction chain, reduce the expression level of VEGF, or activate physiological functions.

Key words ketogenic diet; Cancer; glioma; rapamycin; nutrition; VEGF

Category: Clinical Nutrition

SARC-F 和 SARC-CalF 肌肉衰减症筛查量表在肺部恶性肿瘤住院患者中的验证性研究

The validation of SARC-F and SARC-CalF questionnaire to screen sarcopenia among lung cancer inpatients

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Background and Objectives: The SARC-F and SARC-CalF questionnaire are useful tools recommended in the Asian Working Group for Sarcopenia (AWGS) sarcopenia-diagnosing algorithm. This study aimed to validate their screening accuracy to screen sarcopenia among lung cancer inpatients.

Methods and Study Design: This was a cross-sectional study included 126 inpatients with lung cancer. Questionnaires, anthropometry and body composition measurement were conducted by trained investigators. According to AWGS2019, sarcopenia was defined for patients with low skeletal muscle index as well as either reduced hand grip strength or slow gait speed. The sensitivity and specificity of the SARC-F and SARC-CalF were calculated. Receiver-operating characteristic analysis was performed to calculate and compare the area under the curve.

Results: The inpatients had a mean age of 65.5±8.7 years and 74.6% were men. Using the cutoff value of ≥4 points of SARC-F and ≥11 points of SARC-CalF, 5 (4.0%) inpatients were classified as persons at risk of sarcopenia by SARC-F and 26 (20.6%) by SARC-CalF. The overall prevalence of sarcopenia was 19.1%, with 19.2% in men and 18.8% in women. The SARC-F questionnaire had a sensitivity of 16.7%, a high specificity of 99.0%, and an AUC of 0.7216 for sarcopenia. The SARC-CalF questionnaire had a higher sensitivity of 54.2%, a specificity of 87.3% and a significantly higher AUC of 0.8352 (P=0.0286) for sarcopenia.

Conclusions: The SARC-F questionnaire was of good validity. And the SARC-CalF questionnaire significantly improved its screening accuracy. Sarcopenia affects the health outcomes of lung cancer inpatients a lot. Therefore, the application of SARC-F and SARC-CalF questionnaire in lung cancer inpatients to promote the early case finding of sarcopenia is of great importance.

Key words SARC-F; SARC-CalF; sarcopenia; screening; validation

Category: Clinical Nutrition

妊娠期糖尿病患者产后血糖异常的影响因素分析

Predictive factors for postpartum glucose intolerance in women with gestational diabetes mellitus in a Chinese population

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Aim

The aim of this prospective cohort study was to evaluate the risk factors for postpartum glucose intolerance (GI) in women with gestational diabetes mellitus (GDM), since there is limited data in postpartum Chinese women.

Method

A total of 367 women with GDM were enrolled from the obstetrics outpatient department of Nanshan Maternal and Child Health Hospital in Shenzhen, between January and July in 2021. Of these, 288 (78.5%) underwent a 75-g oral glucose tolerance test (OGTT) at 6-10 weeks after delivery. Potential clinical risk factors for GI were analyzed by logistic regression analyses.

Results

Of the 288 women, 169 (58.7%) were normal, and 119 (41.3%) developed postpartum GI. Of those 119 women, 5 (1.7%) were impaired fasting glucose (IFG), 93 (32.3%) were impaired glucose tolerance (IGT), and 3 (1.0%) were type 2 diabetes (T2DM). By univariate logistic regression analyses, age, the level of fasting glucose, OGTT 1h and OGTT 2h in antepartum OGTT, and insulin therapy were selected as risk factors for GI. Multivariate logistic regression analysis revealed that the level of OGTT 2h in antepartum OGTT was a significant factor that predicted GI after delivery (odds ratio, 2.105; 95% CI, 1.361–3.256; P=0.001). Weight gain throughout pregnancy was marginal associated with an elevated risk for postpartum GI (odds ratio, 1.084; 95% CI, 0.989–1.189; P=0.086).

Conclusions

IGT is the major type of postpartum GI in the present study. Higher levels of OGTT 2h in antepartum OGTT may be a useful marker for identifying GDM women who are at high risk for postpartum GI. Additionally, less weight gain during pregnancy might reduce the risk of postpartum GI, and lose some weight after delivery to improve/delay postpartum GI or T2DM deserve more attention.

Key words 75-g oral glucose tolerance test, Gestational diabetes mellitus, Glucose intolerance, Postpartum, Weight gain

Category: Clinical Nutrition

上海市养老院老年人肌少症和骨质疏松症共存的患病率及相关因素

Prevalence and Associated Factors of Coexistence of Sarcopenia and Osteoporosis in older adults in a senior home in Shanghai

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Background and Objectives: Sarcopenia and osteoporosis share an underlying pathology and reinforce each other in terms of negative outcomes. The coexistence of sarcopenia and osteoporosis has been recently considered in some groups as a syndrome termed 'osteosarcopenia'. The sequelae for an individual suffering from osteosarcopenia include a greater risk of falls, fractures, institutionalization and mortality. Osteosarcopenia is common in older adults. This present study aimed to clarify the prevalence of osteosarcopenia and its associated factors in older adults in senior homes.

Methods and Study Design: This cross-sectional study included 583 participants in a senior home in Shanghai (mean age 85.0 ± 6.6 yrs). Osteoporosis history and relevant data were collected through questionnaire surveys and face-to-face interviews. In accordance with the Asian Working Group for Sarcopenia 2019 criteria, patients with possible sarcopenia were identified. MNA-SF was applied to assess their nutritional status. The influencing factors for osteosarcopenia were determined through multivariate analysis.

Results: Of the 583 participants, 47.2% had sarcopenia without osteoporosis, 5.5% had osteoporosis without sarcopenia, and 18.7% had osteosarcopenia. Univariate analysis revealed that potentially associated factors included age, gender, nutritional status, high level of nursing care, an exercise frequency of ≥3 times per week, stroke, number of comorbidities≥3, and coronary disease. After adjustment by potentially associated factors, advanced age (OR = 2.4; 95% CI = 1.1 to 5.3), women (OR = 3.5; 95% CI = 2.0 to 6.0), protein powder supplements (OR = 0.43; 95% CI = 0.18 to 0.99), risk of malnutrition / malnutrition (OR = 2.2; 95% CI = 1.4 to 3.5), and stroke (OR = 1.9; 95% CI = 1.2 to 3.0) were identified as independent explanatory factors of osteosarcopenia.

Conclusions: In conclusion, osteosarcopenia was prevalent among the elderly in senior homes; thus, healthcare professionals should be aware of the associated factors and provide appropriate treatments.

Key words Sarcopenia; osteoporosis; osteosarcopenia; AWGS 2019; older adult.

Category: Clinical Nutrition

术后胃肠功能障碍后经外周静脉的中心静脉导管异位至奇静脉：病例报道

Spontaneous migration of peripherally inserted central catheter into the azygos vein during post-operative gastrointestinal dysmotility: A case report

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Abstract: The spontaneous migration of the PICC is the displacement of the PICC tip from a satisfactory documented position in the SVC into its adjacent veins after several days or months of PICC insertion, and most frequently occurs in the ipsilateral internal jugular vein. However, it is rarely reported to detect migration of PICC tip into the azygos vein in patients who suffered from gastrointestinal dysmotility after abdominal surgery. We report two cases of spontaneous malposition of PICC into the azygos vein here and discuss the predisposing factors and processing procedures of this condition.

Methods: Two female patients with pancreatic disease were inserted PICCs on the left limbs before the abdominal surgery. After the surgery, one patient suffered from gastroparesis, and the other suffered from constipation. The nurses found that blood could not be aspirated from the PICCs while normal saline could be injected through the PICCs smoothly. We identified the malposition of the PICC step-by-step, using ultrasound, intracavitary electrocardiogram (ECG), and chest X-ray, and confirmed that the tip of the PICC migrated into the azygos vein. The patients were placed in the semi-reclining position from the supine position, and blood could be easily aspirated from the PICC after flushing with the push-pause flush technique. Intracavitary ECG displayed the elevated P, indicating that the PICC tip re-entered the SVC and was at the lower 1/3 of SVC.

Results: The PICCs of the two patients functioned well afterward and were removed after the parenteral nutrition support was completed.

Conclusion: It is critical to assess the function of the PICC before every time of infusion. For patients who undergo abdominal surgery with PICC on the left side, when they had gastrointestinal dysmotility combined with PICC dysfunction, the possibility of spontaneous migration of PICC tip into the azygos vein should be considered.

Key words Peripherally inserted central catheter; Catheter migration; Catheter dysfunction; Azygos vein; post-operative gastrointestinal dysmotility

Category: Clinical Nutrition

一例妊娠期持续性恶心呕吐合并溃疡性结肠炎孕妇的营养治疗

Nutritional management of a pregnant woman with inflammatory bowel disease and persistent nausea and vomiting during pregnancy: A case report

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Background: Nausea and vomiting of pregnancy (NVP) is a common condition during pregnancy. In most pregnant women the symptoms resolve at 16-20 weeks of gestation, whereas a few pregnant women may experience nausea and vomiting from the first trimester till the third trimester, bringing healthy risks for the mother and the baby. The situation may get worse if the mother has diseases that can affect her nutritional status, such as inflammatory bowel disease.

Methods&results: We present a case of a 39-year-old primipara with inflammatory bowel disease who suffered from persistent NVP from 5 weeks of gestation until the day of delivery. She experienced weight loss in the first trimester and insufficient weight gain in the early second trimester, as well as multiple micronutrient deficiencies and anemia during pregnancy. We advised her to avoid potential triggers of nausea, keep a diet dairy, eat small meals, avoid fasting for a long time or overeating, and avoid processed food, hard food and raw food. Steaming and simmering were recommended to make the food soft and easy to digest. Additionally, we asked the patient to try foods with high-quality protein (meat, fish or shrimp, eggs, yogurt or milk, and bean products) every day, and take 75 - 100 g of milk powder for pregnant women as an energy and nutritional supplement. She accepted regular nutritional monitoring at the department of clinical nutrition, which helped her to intake enough carbohydrates and high-quality protein and supplemented her deficient micronutrient timely. She finally gained proper weight before delivery, only experienced mild anemia in the third trimester, and had a good pregnancy outcome.

Conclusion: This case suggests that for pregnant women with multiple nutritional problems, nutritional monitoring and timely nutritional intervention plays an important part in reducing the risk of adverse pregnancy outcomes.

Key words Nausea and vomiting of pregnancy; Inflammatory bowel disease; Ulcerative colitis; Nutritional management; Compliance

Category: Clinical Nutrition

上海市养老院老年人营养不良和肌少症共存的患病率及相关因素

Prevalence and Associated Factors of Coexistence of Malnutrition and Sarcopenia in older adults in a senior home in Shanghai

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Background and Objectives: Malnutrition-sarcopenia syndrome (MSS) increases the risk of death to a higher degree than malnutrition or sarcopenia alone, although they are often overlooked and undertreated in clinical practice. This present study aimed to clarify the prevalence of MSS and its associated factors in older adults in senior homes.

Methods and Study Design: This cross-sectional study included 583 participants in a senior home in Shanghai (mean age 85.0 ± 6.6 yrs). MNA-SF was applied to assess their nutritional status. In accordance with the Asian Working Group for Sarcopenia 2019 criteria, patients with possible sarcopenia were identified. The influencing factors for MSS were determined through multivariate analysis.

Results: Of the 583 participants, 24.9% had sarcopenia with normal nutrition, 6.7% had malnutrition risk without sarcopenia, 30.7% had malnutrition risk with sarcopenia, 0.2% had malnutrition without sarcopenia, and 10.3% had MSS. Univariate analysis revealed that potentially associated factors included high level of nursing care, an exercise frequency of ≥3 times per week, polypharmacy, number of comorbidities≥3, protein powder supplements, minerals and vitamin supplements, dysphagia, stroke, dementia, and history of fractures. After adjustment by age and potentially associated factors, an exercise frequency of ≥3 times per week (OR = 0.04; 95% CI = 0.01 to 0.16), minerals and vitamin supplements (OR = 0.16; 95% CI = 0.03 to 0.79), polypharmacy (OR = 2.02; 95% CI = 1.04 to 3.90), dysphagia (OR = 4.77; 95% CI = 2.39 to 9.51), and dementia (OR = 3.09; 95% CI = 1.59 to 6.00) were identified as independent explanatory factors of MSS.

Conclusions: In conclusion, MSS was prevalent among the elderly in senior homes; thus, healthcare professionals should be aware of the associated factors and provide appropriate treatments.

Key words Sarcopenia; malnutrition; malnutrition-sarcopenia syndrome; AWGS 2019; older adult.

Category: Clinical Nutrition

循环棕榈酸水平和中国人群早发冠心病风险的相关性

Circulating palmitic acids and the risk of premature coronary artery disease in Chinese patients

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Background and Objectives: Saturated fats may increase the levels of total cholesterol (TC) and low density lipoprotein-cholesterol (LDL-C), linking to the risk of coronary artery disease (CAD). In young patients, unhealthy dietary habits are significant associated with an increased risk of CAD. Palmitic acid is one of the most important saturated fatty acids. However, its role in the development of premature CAD in Chinese patients is still unclear. This case-control study aimed to explore the association between the circulating level of palmitic acid and the risk of premature CAD in Chinese patients.

Methods and Study Design: There were 182 patients with premature CAD (≤55 or ≤65 years of age in men or women, respectively) and 173 age-matched controls included. Traditional cardiovascular risk factors were recorded. Serum palmitic acid levels were measured by ultra-performance liquid chromatography-mass spectrometry and their associations with premature CAD were analyzed by multivariate logistic regression analysis.

Results: There was a higher proportion of men, smoking, and diabetes in patients with premature CAD compared with controls. Furthermore, patients with CAD had higher serum palmitic acid, TC, and LDL-C levels, while lower levels of high density lipoprotein-cholesterol (all $P<0.05$). Serum levels of palmitic acid were mildly but significantly correlated with levels of TC and LDL-C. Multivariate logistic regression analysis revealed that serum palmitic acid (per 10 μmol/L, OR=1.35, 95% CI=1.12–1.63) were independently associated with the risk of premature CAD in Chinese patients after adjusting for age, sex, smoking, blood glucose, and blood pressure. When further adjusting the levels of LDL-C, the association between palmitic acid and premature CAD was attenuated but still significant (per 10 μmol/L, OR=1.20, 95% CI=1.02–1.41).

Conclusions: Higher circulating levels of palmitic acids are associated with the risk of premature CAD in Chinese patients. This effect may be partly mediated by increased levels of LDL-C.

Key words palmitic acids; risk factors; coronary artery disease; saturated fatty acid; young patients

Category: Clinical Nutrition

非酯化脂肪酸和中国年轻冠心病患者发病风险的相关性

Association between circulating non-esterified fatty acids and the risk of acute coronary syndrome in young Chinese patients

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Background and Objectives: Circulating non-esterified fatty acids (NEFAs) play an important role in normal nutritional metabolism, serving as the key sources of energy for much of the body, especially for the myocardium. However, it may impair endothelial function and cause coronary artery disease (CAD), while most previous studies were performed on elderly populations. This study aimed to investigate the association between circulating NEFAs and the risk of acute coronary syndrome (ACS) in young Chinese patients.

Methods and Study Design: We included a total of 202 young patients (age ≤55 years) with ACS and 192 age-matched individuals without CAD as controls in this case-control study. Traditional cardiovascular risk factors were recorded. Levels of serum NEFAs were measured by a commercial NEFAs assay kit.

Results: There was a higher proportion of men, smoking, and dyslipidemia in patients with ACS compared with controls. Furthermore, patients with ACS were with higher levels of TG and NEFAs, while lower levels of HDL-C (all $P<0.05$). Serum levels of NEFAs were mildly but significantly correlated with levels of low-density lipoprotein cholesterol, triglyceride, and high-sensitivity C-reactive protein. Multivariate logistic regression analysis revealed that male sex (odds ratios [OR]=6.54, 95% confidence interval [CI]=3.65－11.74), higher levels of TG (OR=1.839, 95% CI=1.15－2.943), and NEFAs (per 100 μmol/L, OR=1.17, 95% CI=1.076－1.276) were independently associated with the risk of ACS in young patients. Receiver operating characteristic analysis showed that levels of NEFAs (area under the curve 0.607, P=0.0002) had a significant diagnostic value for ACS in young patients.

Conclusions: Higher circulating levels of NEFAs are associated with the risk of ACS in young Chinese patients, independent of multiple conventional cardiovascular risk factors.

Key words non-esterified fatty acids; risk factors; coronary artery disease; acute coronary syndrome; dyslipidemia

Category: Clinical Nutrition

静脉脂肪乳剂在肠衰竭相关性肝病患儿的序贯应用

The sequential application of lipid emulsions in PN in children with intestinal failure-associated liver disease

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Background: Some studies have found that fish oil lipids in parenteral nutrition (PN) can alleviate intestinal failure-associated liver disease (IFALD). The aim of this study was to assess appropriately sequential application of intravenous lipids in PN and its effect on liver function in children with IFALD.

Methods: Twenty-six children with intestinal failure (IF) were recruited on sequential application of lipids from January 2014 to September 2022. 10% Fish oil lipid was introduced into PN when the value of three of liver indicators, including alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (AKP), gamma-glutamyl transferase (γ-GT), total bile acids (TBA), total bilirubin (TB), and direct bilirubin (DB) at least two-fold increased. We converted fish oil lipid into 20% medium-chain triglycerides/long-chain triglycerides (MCT/LCT) lipids or soybean oil, MCT, olive oil, fish oil (SMOF) lipids after liver function improvement.

Results: After 10% fish oil lipid, the level of TBA, ALT, AST, γ-GT, TB, and DB significantly decreased (P<0.05). The weight gain is more with use of 20% lipids than with 10% fish oil lipid (13.35 g/d vs 8.15 g/d, P=0.044). After MCT/LCT lipids, all indicators had no significant changes compared to those before MCT/LCT lipids. However, after application of SMOF lipids, the levels of TB and DB statistically decreased (P<0.05).

Conclusion: After the improvement of IFALD with fish oil lipid, SMOF lipids may be a good choice for sequential application of lipid emulsions on liver function in IF children, but large sample is still needed to prove it.

Key words lipid emulsion, children, IFALD, sequential application

Category: Clinical Nutrition

胆碱通过 SLC5A7 调控自噬来抑制肝细胞癌的进展并提高索拉非尼治疗效果

Choline suppresses hepatocellular carcinoma progression and enhances sorafenib sensitivity via SLC5A7-mediated autophagy

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Background: Hepatocellular carcinoma (HCC) is one of the leading causes of cancer-associated death. Although significant achievements have been made in the diagnosis and treatment of HCC, the prognosis of these patients remains unsatisfactory. One of the important reasons is therapeutic resistance. Emerging evidence suggests that autophagy plays a critical role in HCC tumorigenesis, metastasis, and drug resistance. Choline is an essential nutrient related to prolonged survival and reduced risk of HCC. However, it remains unclear whether this phenomenon is mediated by autophagy.

Methods: Two HCC cell lines (HUH-7 and Hep3B) were used in the present study. Cell growth was evaluated by cell counting kit 8 (CCK-8), colony formation, and in vivo mouse xenografts assays. Cell motility was calculated by wound healing and transwell assays. Autophagosomes were measured by Transmission Electron Microscopy (TEM), and autophagy flux was detected by mRFP-GFP- labeled LC3 protein. The mRNA level of genes was measured by quantitative real-time RT-PCR (qPCR). The protein levels were detected by Western blotting.

Results: We found that choline inhibited the proliferation, migration, and invasion of HCC cells by downregulating autophagy in vitro and in vivo. Upregulated expression of the solute carrier family 5 member 7 (SLC5A7), a specific choline transporter, correlated with better HCC prognosis. We further discovered that choline could promote SLC5A7 expression, upregulate cytoplasm p53 expression to impair the AMPK/mTOR pathway, and attenuate autophagy. Finally, we found that choline acted synergistically with sorafenib to attenuate HCC development in vitro and in vivo.

Conclusions: Our findings provide novel insights into choline-mediated autophagy in HCC, providing the foothold for its future application in HCC treatment.

Key words Hepatocellular carcinoma; Autophagy; Choline; SLC5A7; Sorafenib

Category: Clinical Nutrition

基于胰岛素抵抗的慢性病营养管理研究进展

Research progress of insulin resistance in nutrition management of chronic diseases

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Background and objectives: Insulin resistance (IR) is a pathological state in which target tissues fail to respond normally to insulin. At present, it is believed that IR is the common pathophysiological mechanism of metabolic syndrome. This article reviews the development process of related diseases and nutritional management caused by IR and understands the nutritional management models and characteristics of chronic diseases at home and abroad. The aim is to provide basis and guidance for better prevention and treatment of IR in the future and improve personalized and intelligent nutritional management for chronic disease patients.

Methods: Methods of document retrieval and content analysis were used to sort out and summarize the nutrition management related to IR of chronic diseases at home and abroad in this review.

Results: At present, there are many nutrition management methods for IR of chronic diseases and there are some differences in various management modes. However, the nutrition management is still not perfect. So it is necessary to develop personalized nutrition management measures based on personal diet and living habits to ensure the physical and mental health of patients, which will provide a new perspective to promote the development of nutrition and health. The effective nutritional management mode of chronic diseases is an important way to realize the control of chronic diseases.

Conclusions: In conclusion, we propose that tailored nutritional approaches should represent a promising approach for both the prevention and management of metabolic syndrome. In the future, artificial intelligence technology can be used to personalized manage chronic disease patients and improve their health levels. We need to strengthen interdisciplinary and cross regional exchanges to enhance the depth and breadth of research in this field.

Key words insulin resistance; nutrition management; chronic disease; metabolic syndrome; personalized nutritional approaches

Category: Clinical Nutrition

2型糖尿病患者的维生素D水平与心力衰竭风险：一项观察性和孟德尔随机研究

Vitamin D Status and Risk of Heart Failure among Individuals with Type 2 Diabetes: Observational and Mendelian Randomization Studies

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Objectives: Recent studies have suggested that high intakes of vitamin D may not confer greater cardiovascular benefit than moderate intakes, but evidence is limited for heart failure (HF) outcomes and for people with type 2 diabetes (T2D), among whom vitamin D insufficiency or deficiency is particularly common. This study aimed to investigate the associations of serum 25-hydroxyvitamin D [25(OH)D] with HF risk among individuals with T2D, in observational and Mendelian randomization (MR) frameworks.

Research Design and Methods: Observational analyses were performed among 15,226 participants aged 37-73 with T2D from the UK Biobank. HF incidence was ascertained through electronic health records. Cox proportional hazard regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs). MR analyses were conducted among 11,260 unrelated T2D patients. A weighted genetic risk score (GRS) for genetically predicted 25(OH)D concentration was instrumented using 62 confirmed genome-wide significant variants.

Results: The mean ± standard deviation of serum 25(OH)D concentration was 43.4 ± 20.4 nmol/L, and 65.7% participants had vitamin D less than 50 nmol/L. During a median follow-up of 11.1 years, 836 incident HF events occurred. Serum 25(OH)D was nonlinearly and inversely associated with HF and the decreasing risk tended to plateau at around 50 nmol/L. Comparing those with 25(OH)D <25 nmol/L, the multivariable-adjusted HR (95% CI) for participants with 25(OH)D of 50.0-74.9 nmol/L was 0.66 (0.53, 0.82) and was similar for 25(OH)D >75 nmol/L. In MR analysis, higher genetically predicted 25(OH)D was significantly associated with lower HF risk among people with T2D (HR: 0.64, 95% CI: 0.41, 0.99; P=0.047).

Conclusions: Higher serum 25(OH)D was associated with lower HF risk among individuals with T2D and the MR analysis suggested a potential causal relationship. These findings indicate a potential role of maintaining adequate vitamin D status in the prevention of HF among individuals with T2D.

Key words Vitamin D; Heart Failure; Cohort study; Mendelian randomization

Category: Clinical Nutrition

番茄红素对各种急性器官损伤的保护作用及其机制

The protective effects and mechanisms of lycopene on various acute organ injuries

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Acute organ injury induced by various causes has become a challenging clinical event worldwide.Among its pathophysiologic mechanisms,the imbalanced oxidative stress and dys- regulated inflammatory response are considered to play crucial roles.Lycopene is a kind of fat- soluble non-provitamin A carotenoid which is found to be the most potent singlet oxygen quencher of C40 carotenoids(CARs).Owing to its powerful anti-inflammatory,antioxiant and apoptotic regulating abilities,lycopene has been proved to reduce the risk of chromic diseases such as cancer, cardiovascular diseases(CVD) and type 2 diabetes(T2DM).Futhermore,over the past decades, multiple evidence,especially results of in vivo or in vitro experiments, have shown the protective effects of lycopene against acute organ injuries,including lung, kidney, liver, myocardium, gastric, pancrea, spinal cord and brain.The underlying mechanisms may be scavenging reactive oxygen species(ROS),enhancing cellular antioxidant capacity, inhibiting the release of inflammatory factors, regulating expressions of apoptosis-related and autophagy-related proteins,attenuating mitochondrial damage and suppressing endoplasmic reticulum stress(ERS),involving the regulation of mitogen-activated protein kinases(MAPK),nuclear factor-kB(NF-κB),toll-like receptor 4(TLR4),phosphatidylinositol 3-kinase/threonine kinase (PI3K/AKT),apoptosis and auto- phagy pathways.Through this review,we aim to investigate the effects of lycopene on various acute organ injuries,identify the possible mechanisms involved, and ultimately provide new insights for the treatment of acute organ injuries. Although there is still a lack of adverse event reporting,standardized dosages and standardized outcome indicators, the prospect of lycopene application in various acute organ injuries is promising.

Key words lycopene ; carotenoids ; phytonutrient ; clinical nutrition ; therapeutics

Category: Clinical Nutrition

营养诊断相关分组（DRGs）与人工智能背景下急诊患者的营养诊断：现状与展望

Nutritional Diagnosis Related Groups (DRGs) and Nutritional Diagnosis of Emergency Patients in the Context of Artificial Intelligence: Current Status and Prospects

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Nutritional risk or malnutrition is prevalent in emergency patients and is associated with poor clinical outcomes. As populations age, the proportion of older people attending emergency departments is increasing, and the incidence of nutritional risk or malnutrition is higher. In 2016, the Global Leadership Initiative on Malnutrition proposed malnutrition diagnostic criteria that made nutrition diagnosis more precise among the disease diagnosis related groups in China. Since the "Healthy China 2030" was proposed, the nutritional status of patients has been paid more and more attention by medical workers. However, how to accurately and efficiently evaluate the nutritional status of emergency patients is still a problem for the majority of emergency medical workers. Therefore, based on GLIM standard and DRG, this paper reviews the nutritional risk screening, malnutrition diagnosis, clinical economic benefits and the future development direction of nutritional assessment of emergency patients in order to provide references for emergency medical staff to better understand the nutritional assessment of emergency patients.

Key words Emergency; Diagnosis related groups(DRG); Global Leadership Initiative on Malnutrition （GLIM）; Mechine learning; 5G communication technology

Category: Clinical Nutrition

脆弱拟杆菌 839 预防乳腺癌患者化疗导致的骨髓抑制及胃肠道不良反应的随机对照研究

A randomized trial of Bacteroides fragilis 839 on preventing chemotherapy-induced myelosuppression and gastrointestinal adverse effects in breast cancer patients.

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Background: In breast cancer patients, chemotherapy-induced myelosuppression and gastrointestinal reactions affect patients seriously. Several retrospective studies have evaluated the role of probiotics in preventing these adverse reactions, however, the effect of probiotics remain controversial.

Objectives: To determine the efficacy of Bacteroides fragilis 839(Bf839) on the prevention of myelosuppression and gastrointestinal adverse effects in early breast cancer patients receiving adjuvant chemotherapy.Methods: 40 women with early breast cancer were randomly assigned to the Bf839 (n=20) or placebo (n=20) before the administration of adjuvant chemotherapy (4 cycles of epirubicin 100mg/m2 and cyclophosphamide 600mg/m2). Myelosuppression and gastrointestinal adverse effects were monitored in both groups.Results: The incidence of myelosuppression in the BF839 group after chemotherapy was 52.94% versus 89.47% in the placebo group (RR=0.592 ,95% CI: 0.368-0.950). Compared with baseline, the decrease of white blood cell counts in the BF839 group was 0.22±1.13×109/L versus 1.33±0.62×109/L in the placebo group, with a difference of 1.11×109/L (95% CI: 0.45-1.78; P=0.003). The neutrophil counts slightly increased in the BF839 group (0.14±1.11×109/L), while it decreased in the placebo group (1.02±0.71×109/L), with a difference of 1.16×109/L (95% CI:0.48-1.84; P=0.002). But no difference was detected about the platelet and red cell counts in the two groups. Regarding gastrointestinal adverse effects, the incidence of grade 3/4 nausea was significantly lower in the BF839 group (52.94%) compared to the placebo group (89.47%), with an RR of 0.592(95%CI:0.368-0.950). The incidence of vomiting in the BF839 group was 29.41% versus 63.16% in the placebo group (RR=0.466, 95%CI 0.07-1.050), and the incidence of diarrhea in the BF839 group was 23.53% versus 42.1% in the placebo group (RR=0.559, 95%CI 0.204-1.528).Conclusion: In early breast cancer patients receiving chemotherapy, Bf839 have the potential to reduce the incidence of chemotherapy-related leukopenia/neutropenia and gastrointestinal side effects. The effect of BF389 on myelosuppression needs further validation in other malignancies.

Key words Breast cacer; chemotherapy; Bacteroides fragilis 839; Myelosuppression;Gastrointestinal adverse effects

Category: Clinical Nutrition

美国育龄妇女的碘状况:一项 NHANES 调查

Iodine status among women of childbearing age in the United States: a NHANES survey

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Abstract

Objective: Iodine nutrition is an important public health issue. The aim of this study was to describe the trends in iodine status over time among US women of childbearing age and factors mediating changes of iodine status.

Methods: This cross-sectional survey involved 24,126 US women of childbearing age and the data were from National Health and Nutrition Examination Survey (NHANES) periods 2003-2008, 2009-2014, 2015-2020. We estimated trends of urine iodine in US women of childbearing age using linear regression analyses.

Results: From 2003-2008 to 2015-2020, urine iodine concentration (UIC) decreased from 143μg/L to 105μg/L (P trend<0.001). Age was negative associated with UIC in women of childbearing age (P < 0.001). Inadequate iodine intake was less frequent among non-Hispanic White and Hispanic compared to non-Hispanic Black in women of childbearing age. Women of childbearing age who "sometimes" and "often" consumed milk products were with higher UIC compared to those who "never or rarely" consumed milk products (0.15[0.08,0.23] and 0.33[0.25,0.42], respectively). Health insurance was positively associated with UIC (P <0.001). Education was negative associated with UIC in women of childbearing age (P < 0.001).

Conclusion: Age, race, education, health insurance and the intake of milk products were significantly associated with iodine intake in women of childbearing age. Iodine deficiency (ID) in women of childbearing age remains a global public health concern.

Key words iodine; childbearing age; women; nutrition; NHANES.

Category: Clinical Nutrition

人工智能 + 膳食分析预测孕期重金属暴露风险

Application of Machine Learning Algorithm in prediction of Heavy Metals Exposure Risk based on Dietary Data

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Objective The objective of this study is to investigate the dietary intake and serum heavy metal levels of pregnant women in Shanghai, and analyze the correlation between them. The dietary data are also used to predict the risk of heavy metal exposure in pregnant women. Methods From January 2018 to January 2021, pregnant women were enrolled and given food frequency questionnaires. Serum heavy metal levels was detected by inductively coupled plasma mass spectrometry. Multiple linear regression and quantile regression were used to analyze the correlation between diet and serum heavy metals. Additionally, K-nearest Neighbor, Adaptive Boosting algorithm, and Back Propagation neural network were used to construct predictive models, which were evaluated using accuracy, sensitivity, and specificity. Results The study enrolled 501 pregnant women, and the average serum arsenic concentration was 0.87 ppb, cadmium concentration was 0.85 ppb, mercury concentration was 0.44 ppb, and lead concentration was 6.07 ppb. Multiple linear regression analysis showed that consuming ultra-processed foods, such as snacks, was related to an increase in serum arsenic (β = 0.441, p = 0.015), while consuming leafy vegetables was related to an increase in serum cadmium (β = 0.204, p = 0.044). Quantile regression analysis supported these results and showed an upward trend. Among the three algorithms used, the KNN model performed the best, with an accuracy of 84.58%, followed by the AdaBoost model (83.96%) and BP neural network model (79.98%). Conclusion In conclusion, in the low-level exposed population of pregnant women in Shanghai, consuming snack foods was associated with an increase in serum arsenic, while consuming leafy vegetables was associated with an increase in serum cadmium. The KNN model based on dietary data was the best in predicting heavy metal risk.Acknowledgments: This research was supported by Undergraduate Innovation Program of Shanghai Jiao Tong University School of Medicine (1521Z401)

Key words diet, serum heavy metals, artificial intelligence

Category: Clinical Nutrition

n3 和 n6 多不饱和脂肪酸比例和心血管疾病高危人群心脏纤维化的相关性

Ratio of serum n-3 to n-6 polyunsaturated fatty acids and cardiac fibrosis in patients with high risk of cardiovascular disease

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Background and Objectives: Omega-3 polyunsaturated fatty acids (n-3 PUFAs), including eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), may decrease the risk of cardiovascular disease (CVD). In contrast, n-6 PUFAs, mainly arachidonic acid (AA), have a pro-inflammatory effect, which may increase the risk of CVD. This study evaluated the associations between EPA, DHA, AA, and their ratios (EPA/AA and DHA/AA) with the level of soluble suppression of tumorigenicity (sST2), a marker of cardiac fibrosis.

Methods and Study Design: Three hundred and thirty-one patients with a high risk of CVD were enrolled. The ultra-performance liquid chromatography-mass spectrometry method was used to detect the levels of serum n-3 PUFAs and n-6 PUFAs. In addition, the level of sST2 was determined by immunofluorescence assay.

Results: The median levels of EPA, DHA and AA were 0.54, 2.91, and 7.39 μmol/L respectively. The levels of AA were positively correlated with DHA ($r=0.79$, $P<0.001$) and EPA ($r=0.53$, $P<0.001$). In multiple linear regression models, after adjusting for age, sex, smoking, hypertension, diabetes and history of coronary artery disease, the levels of AA and DHA, but not EPA, were positively associated with the levels of sST2. However, the ratio of EPA/AA was negatively related to the levels of sST2 (4th vs 1st quartile: β-value=-0.21, 95%CI=-0.34 to -0.09; or per 10% increment: β-value=-0.03, 95%CI=-0.05 to -0.01). No association between the ratio of DHA/AA and sST2 was observed.

Conclusions: The levels of AA may increase the risk of cardiac fibrosis, while the ratio of EPA/AA may play a protective effect, which was not observed in DHA/AA. Further studies are needed to explore whether increased dietary intake of EPA can lower the risk of cardiac fibrosis and heart failure.

Key words Cardiovascular disease, fibrosis, omega-3 PUFAs, omega-6 PUFAs, soluble ST2

Category: Clinical Nutrition

体重减轻对提高超重或肥胖多囊卵巢综合征妇女生育能力的有效性观察研究

The effect of weight loss for improving fertility in overweight or obesity women with polycystic ovary syndrome

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Objective: To determine the effect of weight management on pregnancy rates in overweight/obese women with PCOS.

Methods: 135 overweight/obese women diagnosed with PCOS received a low-carbohydrate high-protein diet weight loss intervention for 0-3 months. The macronutrients was 30-40% of protein, 40-45% of fat, and 20-30% of carbohydrate. According to the tertile of weight loss and weight loss rate, they were divided into three groups: T1 (0.00kg, 4.70kg), T2 (4.71kg, 8.49kg), T3 (8.50kg, 28.7kg) and T1 (0.00%, 7.05%), T2 (7.06%, 12.70%), T3 (12.71%, 44.00%). Multivariate Logistic regression analysis was used to explore the influence of pre-intervention BMI and weight loss effect on the pregnancy rate of PCOS patients.

Results: Before the intervention, the average body weight of the women was 77.07±10.51kg, and the BMI was 30.36±3.63kg/m2. After 0-3 months of dietary intervention, the average weight loss rate is 9.40±5.64%, and the weight loss is 7.26±4.67kg. A total of 80 cases (59.2%) were tested successfully conceived. Logistic regression analysis showed that compared with the pre-intervention BMI 24-28 kg/m2 group, the OR (95%CI) valuesof successful pregnancy in the 29-32 and > 32 kg/m2 groups were 0.79 (0.32, 1.95) and 0.38 (0.16,0.92), respectively (P <0.05). Adjusting for age and pre-intervention BMI showed that compared with the lowest weight loss (T1) group, the OR (95%CI) values of successful conception in T2 and T3 groups were 2.14 (0.89, 5.12) and 1.35 (0.58, 3.17) respectively (P>0.05). Compared with the lowest weight loss rate (T1) group, the OR value and 95% CI of successful conception in T2 and T3 groups were 5.22 (2.01, 13.56) and 1.56 (0.68, 3.59) (P>0.05).

Conclusion: After 0-3 months of dietary intervention, a moderate range of weight loss rate can significantly improve the successful conception rate.

Key words Polycystic ovary syndrome, Weight loss, Dietary intervention, Female fertility, Reproductive health

Category: Clinical Nutrition

商用三维光学身体扫描仪在测量中国超重和肥胖成年人体成分中的适用性:基于减肥临床试验的二次分析

The applicability of a commercial 3DO body scanner in measuring body composition in Chinese Adults with overweight and obesity: a secondary analysis based on a weight-loss clinical trial

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Background: A commercial three-dimensional optical (3DO) scanning system was reported to be used in body composition assessment. However, the applicability in Chinese adults has not been well-studied.

Methods: This was a secondary analysis based on a 16-week weight-loss clinical trial with an optional extension to 24 weeks. Anthropometric indicators were measured by 3DO scanning at each follow-up visit and bioelectrical impedance analysis (BIA) was also performed to confirm the reliability of 3DO scanning. We used Lin's concordance correlation coefficients (CCC) to evaluate the correlation between two above-mentioned methods.

Results: 155 Chinese adults with overweight and obesity (47 men and 108 women, aged 32.8±6.6 years) were included in the analysis, which resulted 687 times of 3DO measurements. The proportion of fat mass, fat mass, free-fat mass was 34.0±5.3%, 26.5±4.4 kg, and 49.8±9.6 kg, respectively before the trial. And it was 30.9±5.5%, 22.4±5.8 kg, and 47.5±7.7 kg after the trial. It was similar for the changes in waist and hip circumference. The differences between 3DO scanning and BIA in free-fat mass, fat mass, and proportion of fat mass was 0.9 (-1.0, 2.7) kg, 1.3(-0.5, 3.2) kg, and 1.8 (-0.6, 4.5) %, respectively. Compared with BIA, 3DO scanning performed best in assessment of free-fat mass (CCC=0.92, 95%CI: 0.91, 0.93), then followed by fat mass (CCC=0.81, 95%CI: 0.79, 0.83) and proportion of fat mass (CCC=0.74, 95%CI: 0.71, 0.77). Subgroup analysis showed that 3DO scanning and BIA correlated better in women than that in men, and correlated better in measuring free-fat mass in participants with larger body weight (BMI≥28.0 kg/m^2) than those with smaller body weight (<28.0 kg/m^2).

Conclusions: 3DO scanning is a good tool to monitor changes in body composition in Chinese adults with overweight and obesity, however, data reliability is an important concern and the algorithm should be set accurately according to different ethnicity background.

Key words three-dimensional optical (3DO), bioelectrical impedance analysis (BIA), body composition

Category: Clinical Nutrition

克罗恩病患者膳食营养素摄入评估及其与营养状况的关系

Assessment of Dietary Nutrient Intake and its Relationship to the Nutritional Status of Patients with Crohn's disease

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Background and Objectives: To investigate the association between the dietary nutrient intake and nutritional status of patients with Crohn's disease (CD). Methods and Study Design: 60 CD patients who had been diagnosed but had not begun treatment were enrolled. The dietary nutrient intake was recorded after three days of 24-hour recall and was calculated using NCCW2006 software. The nutrition levels were assessed using the Patient-Generated Subjective Global Assessment (PG-SGA). Indicators included the BMI, mid-arm circumference, the circumference of the upper-arm muscle, triceps skinfold thickness, handgrip strength, and the circumference of the lower legs. Results: 85% of CD patients did not meet the necessary energy requirements. Of these, the protein and dietary fiber intake in 63.33%, and 100% respectively were below the standard of the Chinese dietary reference. Many patients had insufficient intake of vitamins, as well as other macro- and micronutrients. An inverse association was observed between the risk of malnutrition and higher levels of energy (1590.0-2070.6 kcal/d, OR=0.050, 95%CI=0.009-0.279) and protein (55.6-70.5g/d, OR=0.150, 95%CI=0.029-0.773). Appropriate supplementation of vitamin E, calcium, and other dietary nutrients helped to reduce the risk of malnutrition. Conclusions: Significant deficiencies in dietary nutrient intake were found in CD patients, and dietary intake was associated with the nutritional status of the patient. Appropriate adjustment and supplementation of nutrient intake may reduce malnutrition risk in CD patients. The gap between actual consumption and recommendation indicates a need for improved nutritional counseling and monitoring. Early relevant advice for the dietary guidance of CD patients may be beneficial for long-term effects associated with nutritional status.

Key words Crohn's disease • dietary intake • malnutrition • 24-hour recall • nutritional status

Category: Clinical Nutrition

妊娠期母亲血糖状况和儿童血浆氨基酸水平的关联:来自多种族亚洲出生队列的发现

Maternal Glycaemic Status during Pregnancy and Mid-Childhood Plasma Amino Acid Profiles: Findings from A Multi-Ethnic Asian Birth Cohort

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Background

Increasing maternal glycaemia across the continuum during pregnancy may predispose offspring to subsequent cardiometabolic risk later in life. However, evidence of long-term impacts of maternal glycaemic status on offspring amino acid (AA) profiles, which are emerging cardiometabolic biomarkers, is scarce. We aimed to investigate the association between maternal antenatal glycaemia and offspring mid-childhood AA profiles.

Methods

Data were drawn from the Growing Up in Singapore Towards healthy Outcomes (GUSTO) study, of which 422 mother-child dyads were followed from early pregnancy. Mothers underwent an oral glucose tolerance test (OGTT) at 26-28 weeks gestation, with fasting and two-hour plasma glucose concentrations measured, and gestational diabetes mellitus (GDM) was diagnosed per WHO 1999 guidelines. Offspring fasting plasma samples were collected at mean age 6·1 years, from which nine AAs were measured. Total branched-chain amino acids (BCAAs) were calculated as the sum of isoleucine, leucine, and valine concentrations. Multi-variable linear regression was used to estimate the association of maternal glycaemic status and offspring mid-childhood AA profiles.

Results

Approximately 20% of mothers were diagnosed with GDM. Increasing maternal fasting glucose was significantly associated with higher offspring plasma valine and total BCAAs, whereas higher two-hour glucose was significantly associated with higher histidine, isoleucine, valine, and total BCAAs, even after adjusting for child BMI z-scores. Offspring born to mothers with GDM had higher valine (standardised mean difference 0·27SD; 95%CI: 0·01, 0·52), leucine (0·28SD; 0·02, 0·53), and total BCAAs (0·26SD; 0·01, 0·52) than their counterparts.

Conclusions

Increasing maternal fasting and post-OGTT glucose concentrations during mid-late pregnancy were significantly associated with mid-childhood individual and total BCAAs concentrations. The findings suggest that higher maternal glycaemia across continuum in pregnancy, especially GDM, may have persistent programming effects on offspring AA metabolism underlying adverse cardiometabolic health.

Key words maternal glycaemia; amino acids; branched-chain amino acids; mid-childhood; gestational diabetes mellitus

Category: Clinical Nutrition

血清维生素D水平在克罗恩病活动性评估中的作用以及联合检测维生素D、身体质量指数和TNF-α对克罗恩病诊断和监测的预测价值

Serum vitamin D levels in the assessment of Crohn's disease activity and the predictive value of joint detection of vitamin D, BMI, and TNF-α for the diagnosis and monitoring of Crohn's disease

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Background: Vitamin D (VD), especially its lack, plays a role in the progression and prognosis of Crohn's disease (CD). The study investigated the use of serum 25-hydroxyvitamin D (25[OH]D), body mass index (BMI) and tumor necrosis factor-alpha (TNF-α) in the diagnosis of Crohn's disease.

Methods: Seventy-six CD patients and healthy subjects were enrolled between May 2019 and December 2020. The serum 25(OH)D, BMI, and TNF-α levels, together with other biochemical parameters were assessed before treatment. The diagnostic efficacy of the single and joint detection of serum 25(OH)D, BMI, and TNF-α was determined using receiver operating characteristic (ROC) curves.

Results: The levels of 25(OH)D, BMI, and nutritional indicators including hemoglobin, total protein, albumin, and high-density lipoprotein cholesterol were lower in CD patients, while TNF-α levels were significantly higher. The areas under the ROC curve for the single detection of 25(OH)D, BMI, and TNF-α, were 0.887, 0.896, and 0.838, respectively, with optimal cutoff values of 20.64 ng/mL, 19.77 kg/m2, and 6.85fmol/mL, respectively. The diagnostic efficacy of the joint detection of 25(OH)D, BMI, and TNF-α was highest, with an area under the ROC curve of 0.988 (95%CI 0.968~1.000).

Conclusions: Vitamin D deficiency, poor nutritional status, and high levels of inflammatory indicators were observed in CD patients. Vitamin D may be a potential interventional target in CD to improve nutritional status and reduce inflammation. The joint detection of 25(OH)D, TNF-α, and BMI showed high sensitivity, specificity, and accuracy in CD diagnosis and would thus be effective for the diagnosis of CD in clinical practice.

Key words vitamin D • Crohn's disease • BMI • TNF-α • Crohn's disease activity

Category: Clinical Nutrition

循环瘦素水平对克罗恩病活动性的评估及其与营养状况的关系
Circulating leptin levels in the assessment of Crohn's disease activity and its relation to nutritional status

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Background: Patients with Crohn's disease (CD) frequently experience malnutrition. Leptin is mainly synthesized by adipose tissue and regulates energy homeostasis. The objective of this study was to evaluate leptin levels and its relation to nutritional status in CD patients.

Methods: The study included 154 CD patients and healthy controls. Leptin level was determined before treatment.Nutrition levels were assessed using the nutrition risk screening 2002 (NRS-2002) and Patient-Generated Subjective Global Assessment (PG-SGA). Indicators included body mass index (BMI), mid-arm circumference, the circumference of the upper-arm muscle, triceps skinfold thickness, and circumference of legs.

Results: Leptin levels differed between CD patients (1025±874 ng/ml) and controls (18481222 ng/ml). Significant differences were also seen in NRS-2002 and PG-SGA scores, BMI and other nutritional indicators. Negative correlations were observed between leptin and NRS-2002, PG-SGA scores, while positive correlations with other nutritional indicators. The ROC curve showed a strong association between leptin and the diagnosis of CD, suggesting a leptin concentration below 803.02 ng/ml as a threshold for CD. In the CD group, CDAI was negatively related to BMI, upper-arm circumference, and cholesterol, while positively associated with the NRS-2002 and PG-SGA scores.

Conclusion: Dysfunctional leptin regulation may account for the poor nutritional status associated with CD. Nutritional status was also correlated with disease activity. The leptin level is thus an additional useful tool for evaluating CD patients andpredicting the disease activity and clinical response. Patients with plasma leptin levels below 803ng/ml may be candidates for developing CD. This suggests that leptin may be a potential target for intervention in CD to improve nutritional status to slow disease progression.

Key words Crohn's disease • leptin • nutrition • Crohn's disease activity index •nutritional status

Category: Clinical Nutrition

少肌性肥胖对新冠肺炎合并慢性病老年患者预后的影响

Prognostic role of sarcopenia obesity in elderly inpatients of COVID-19 combined with chronic disease

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Background and Objectives: The morbidity, incidence of complications, and mortality of COVID-19 in the elderly are high. This survey attempted to know prevalence of the nutritional status, sarcopenia, and other geriatric syndrome in elderly patients with COVID-19 in Shanghai, and analyze consequence of these situation on poor prognosis above due to COVID-19. Methods and Study Design: By review method, 113 elderly patients (73% male, 89.6±7.0 years old), whom admitted to chronic illness in a Shanghai hospital from July 2022 to December 2022, were chosen. All patients had test on comprehensive assessment after admission, including nutritional status, sarcopenia, frailty, daily living ability, cognitive psychology, etc. Demographic data, body composition, laboratory indicators, functional scores calculated for each geriatric syndrome were collected. Clinical prognostic indicators were recorded as discharge, or entering ICU to use ventilator, even death. The influence factors of poor prognosis were found using logistic regression. Results: Among 113 elderly patients, the prevalence of malnutrition was 4%, sarcopenia obesity was 35%, and depression was 19%. After corrected multivariate analysis, frailty (OR 17.8[CI1.4-227.8]), depression (OR 15.9 [CI 1.8-144.1]), and hemoglobin (OR 0.92 [CI 0.86-0.98]) were independent influencing factors of ventilator rate, while sarcopenia obesity (OR 4.7[CI 1.2-19.9]) and hemoglobin (OR 0.93 [CI 0.88-0.97]) were independent influencing factors of death. Conclusion: Sarcopenia obesity in elderly inpatients had a high prevalence, and was a risk factor for all cause death of Covid-19, while hemoglobin, as a nutritional marker, was a protective factor of ventilator rate and mortality.

Key words sarcopenia obesity, hemoglobin, geriatric syndrome, ventilator rate, elderly inpatients

Category: Clinical Nutrition

简易有氧和抗阻结合运动法对维持性血液透析肌肉减少症患者的效果研究

Effects of a simple combined resistance-aerobic exercise approach on maintenance hemodialysis patients with sarcopenia

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Objectives:To test the effects of a simple combined resistance-aerobic exercise approach on maintenance hemodialysis(MHD) patients with sarcopenia.

Methods:Thirty MHD patients with sarcopenia in our hospital from March 2021 to December 2021 were randomly divided into control group(n=15) and intervention group(n=15). The intervention group received elastic belt resistance exercise training for 12 weeks, three times a week in interdialysis. Cycling aerobic exercise training was carried out during dialysis, while the control group was only given routine treatment without any exercise intervention. After 12 weeks of intervention, taking blood for biochemical examination before dialysis , inflammation, anthropometric indexes, human body composition by bioelectrical impedance, nutritional status by NRS2002, 7SGA and GNRI were collected, as well as their sleep quality and life quality. Independent sample T test, non-parametric test and Fisher's exact probability method were used to evaluate the equilibrium of baseline. For intra-group comparison, paired T test was used for normal distribution, and Wilcoxon test was used for non-normal distribution. P<0.05 is the difference with statistical significance.

Results:A total of 26 MHD patients with sarcopenia completed the trial. In patients in the intervention group(n=13), the hemoglobin (Hb) increased, MAC, MAMC, waist circumference, calf circumference and nutritional status were obviously improved than which in the control group(n=13) , the serum creatinine and total cholesterol significantly decreased in the intervention group(P<0.05).However, there was no statistically significant difference in inflammation, most of body composition analysis index, sleep quality and most of life quality between the two groups (P>0.05).

Conclusions:The simple combined resistance-aerobic exercise approach was beneficial to increase HB level, improved nutritional status and reduced serum creatinine and blood lipid, but there was no significant improvement in inflammation index, body composition analysis index, life quality and sleep quality.

Key words Exercise; Sarcopenia; Maintenance hemodialysis; Nutrition

Category: Clinical Nutrition

体质指数对髋膝关节置换术患者术后营养生化指标及住院时间的影响

The Effects of Body Mass Index on Nutritional Biochemical Indexes and Length of Stay in Patients after Hip and Knee Replacement

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Objective To investigate the influence of body mass index (BMI) on nutritional biochemical indexes and length of stay in patients after hip and knee replacement. **Method** From January 2021 to May 2022, 214 patients who underwent hip and knee replacement in Department of Orthopedics were selected as the research objects.Based on BMI values, the patients were divided into four groups: dystrophy group (A group, BMI<18.50kg/m^2)17 cases, normal body mass group (B group, BMI18.50-24.99kg/m^2)67 cases, overweight group (C group, BMI25.00-29.99kg/m^2)104 cases,obesity group(D group, BMI30.00-39.99kg/m^2)26 cases. Nutritionists were determined to give nutritional intervention to patients 2 hours after they were awake from anesthesia. The differences of postoperative blood glucose, total protein, albumin, hemoglobin, postoperative hospital stay and total hospital stay in the four groups were observed. **Results** The blood glucose level of the normal body mass group and overweight group were lower than of the obesity group 1d after operation,the difference was statistically significant (P<0.05). The values of albumin and hemoglobin in the dystrophy group were lower than those in the normal body mass group, overweight group and obesity group 1d and 3d after operation, and the differences were statistically significant (P<0.05). The total protein value of dystrophy group and obesity group was higher than that of normal body mass group, and the difference was statistically significant (P<0.05). The postoperative hospital stay and total hospital stay in the normal body mass group and overweight group were lower than those in dystrophy group and obesity group, and the difference was statistically significant (P<0.05). **Conclusion** Body mass index (BMI) has certain influence on blood glucose, total protein, albumin, hemoglobin, postoperative hospital stay and total hospital stay in patients with hip and knee replacement.

Key words Body mass index,Hip and knee replacement,nutritional biochemical parameters,length of hospital stay.

Category: Clinical Nutrition

血清蛋氨酸代谢物水平与肝细胞癌预后的关联：广东肝癌队列研究

Serum methionine metabolites levels at Diagnosis and Hepatocellular Carcinoma Survival in the Guangdong Liver Cancer Cohort

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Aim: Methionine metabolism disorder can aggravate the damage in the pathological state of a disease, but its role in the prognosis of hepatocellular carcinoma (HCC) remains unclear. Therefore, this study aimed to evaluate the associations between serum methionine metabolites levels and HCC survival in a large prospective cohort.

Methods: We included 1080 newly diagnosed HCC patients from the Guangdong Liver Cancer Cohort enrolled between September 2013 and April 2017. Three core serum methionine metabolites including serum S-adenosylmethionine (SAM), S-adenosylhomocysteine (SAH), and homocysteine (Hcy) were measured by HPLC-MS/MS. Primary outcomes were liver cancer-specific survival (LCSS) and overall survival (OS).

Results: During a median follow-up of 1308 days, 601 deaths were identified, including 552 (92%) from HCC. In multivariable analyses, Higher serum Hcy, SAH and SAM levels were significantly associated with worse survival, independent of nonclinical and clinical prognostic factors including serum C-reactive protein, Barcelona Clinic Liver Cancer stage, and cancer treatment. The multivariate-adjusted HRs in the highest versus the lowest tertile of Hcy, SAH, and SAM were 1.29 (95% CI: 1.05-1.59, P trend = 0.016), 1.70 (95% CI: 1.36-2.14, P trend < 0.001), 1.41 (95% CI: 1.13-1.75, P trend = 0.002) for HCC-specific mortality and 1.28 (95% CI: 1.05-1.57, P trend = 0.015), 1.70 (95% CI: 1.37-2.11, P trend < 0.001), 1.40 (95% CI: 1.13-1.73, P trend = 0.001) for all-cause mortality. No overall association was observed between SAM/SAH ratio and LCSS or OS in the entire cohort. Restricted cubic spline analyses showed a dose-response associations between serum Hcy and SAH levels and worse OS (all P non-linearity < 0.05).

Conclusion: Higher serum Hcy, SAH and SAM levels were independently associated with worse survival in a population‐based HCC cohort, suggesting that they may be used as a novel metabolism-related prognostic biomarker for HCC.

Key words Methionine metabolites; S-adenosylhomocysteine; S-adenosylmethionine; homocysteine; hepatocellular carcinoma; survival.

Category: Clinical Nutrition

肾移植受者相位角、血清 25-羟基维生素 D 与其肌肉减少症的相关性研究

Association of sarcopenia with 25-dihydroxyvitamin D and phase angle in kidney transplant recipients

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Objectives: To investigate the relationship between sarcopenia and 25-dihydroxyvitamin D or phase angle (PhA) in Kidney transplantation recipients(KTR).Methods: In this study, we investigated the prevalence of sarcopenia and the relationship between sarcopenia and 25-dihydroxyvitamin D or PhA, and evaluated the discrimination performance of these factors for sarcopenia in 82 kidney transplant recipients. Demographic information, body composition and blood biochemical indexes were collected in the Outpatient service.Sarcopenia was diagnosed by Asian Working Group for Sarcopenia (AWGS) 2019 consensus.Categorical variables were expressed as count and percentage, and continuous variables were expressed as mean ± SD. Logistic regression models were used to estimate the ORs of the associations of 25-dihydroxyvitamin D or PhA with sarcopenia. the discrimination performance for sarcopenia was assessed by AUC-ROC.Results: A total of 82 KTR were enrolled in the study. The patients had a mean age of 44.11±11.58 years, 53were males (65%). The sarcopenia group had low levels of weight, BMI, MAMC, waist circumference, hip circumference, left crus surrounds, right crus surrounds,handgrip strength,pinch strength,nutrition index,PhA and 25-dihydroxyvitamin D. 25-dihydroxyvitamin D (odds ratio (OR) 0.94, 95% confidence interval (CI) 0.89-0.993, p=0.026) and PhA (OR 0.429, 95%CI 0.237-0.777, p=0.005) were signifcantly associated with sarcopenia.Te area under the bootstrap receiver-operating characteristic curve (AUC-ROC) was 0.747 for the combination of 25-dihydroxyvitamin D and PhA.Conclusion:25-hydroxyvitamin D and PhA were associated with the risk of sarcopenia and it can be used in clinical practice to predict sarcopenia in kidney transplant patients.

Key words Sarcopenia,25-dihydroxyvitaminD ,PhA,Kidney transplantation recipients

Category: Clinical Nutrition

维持性血液透析患者捏力及握力与肌肉质量的相关性研究

Correlation study between pinch strength and hand grip strength and muscle mass in maintenance hemodialysis patients

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Objective: To investigate the correlation between PS and HGS and muscle mass in MHD patients. Methods: This was a cross-section and single center study. A total of 140 MHD patients treated during March 2021 in our center were enrolled in this study. Their PS and HGS were measured before dialysis. Multi-frequency body composition analyzer was used to measure the lean, body cell mass (BCM) and other body components, and the anthropometric data such as the height, weight, mid-arm muscle circumference and laboratory parameters before dialysis were collected. According to gender, clinical characteristics were compared between the two groups. Spearman or Pearson, multiple linear regression were utilized to analyze the correlation between the PS, HGS, muscle mass and laboratory parameters of MHD patients. Results: Compared with female patients, male patients had higher HGS, PS, lean, BCM, skeletal muscle mass (SMM) and predialysis serum creatinine, and had lower triceps skinfold thickness and interleukin -6 (IL-6), but had no significant differences in the dialysis vintage, serum albumin and body mass index. Multivariate regressive linear regression model showed that higher PS was independently correlated with higher serum creatinine, lean and BCM, and higher HGS was independently correlated with higher serum creatinine, lean and younger age ($P<0.05$). Conclusion: In MHD patients, HGS and PS were positively correlated with lean, BCM, SMM measured by bioelectrical impedance analysis. It can be seen that PS and HGS can be used as a good index to evaluate muscle function of MHD patients.

Key words Pinch strength; Handgrip strength; Muscle mass; Maintenance hemodialysis

Category: Clinical Nutrition

血液微量元素与甲状腺结节合并代谢综合征的相关性研究

Correlation between serum trace elements and thyroid nodules combined with metabolic syndrome

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Background: Previous studies have shown that the occurrence of thyroid nodules is strongly associated with metabolic syndrome, although the association between the occurrence of thyroid combined metabolic syndrome and detectable trace elements in the blood remains inconclusive. This study aimed to study the relationship between some trace elements and thyroid nodules combined with metabolic syndrome in iodine-sufficient areas of Dalian City, Liaoning Province, China.

Methods: The levels of 13 blood trace elements were determined using Inductively coupled plasma-Mass Spectrometry 2030 (ICP-MS 2030).All participants underwent thyroid ultrasound. The relationship between serum trace elements and thyroid nodules combined with metabolic syndrome was analyzed.

Results:

(1) Comparative analysis of trace element differences between TN(+)/MS(+) group, TN(+)/MS(-) group, TN(-)/MS(-) group, the results showed that there were significant differences in zinc, copper, iron and magnesium content between the three groups.

(2) The serum trace element Zn was significantly positively correlated with TC and LDL-C; Serum trace element Cu was positively correlated with TC, LDL-C and HbA1c. Serum trace element Mg was significantly negatively correlated with BMI, SBP, DBP, FPG, TG, and HbA1c.

(3) Multivariate logistics regression analysis showed that the higher the Cu concentration, the higher the probability of patients being in the TN(+)/MS(+) group; The lower the Mg concentration, the higher the probability that the patient will be in the TN(+)/MS(+) group.

Conclusion: In the current study, the regression results showed that slightly higher concentrations of Mg had a protective effect on patients with thyroid nodule and metabolic syndrome. Therefore, this study provides a new idea for clinical intervention and supplementation of exogenous trace elements in the prevention and treatment of thyroid nodules and metabolic syndrome diseases. The observed association of Mg with thyroid nodules and metabolic syndrome populations warrants further study.

Key words Trace elements; thyroid nodules; metabolic syndrome; magnesium; cuprum

Category: Clinical Nutrition

基于CT机体组成成分和炎症营养参数的评分系统预测急性粘连性小肠梗阻术后并发症的研究

Nomogram of Combing CT-Based Body Composition Analyses and Inflammatory-nutritional score: Prediction of Postoperative complications in Acute Adhesive Small Bowel Obstruction Patients

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Background

Based on computed tomography images, A nomogram combined with body composition and inflammatory-nutritional score was developed and validated to investigate the predictive value of postoperative complications in patients diagnosed as acute adhesive small bowel obstruction.

Methods

A total of 189 acute adhesive small bowel obstruction patients at our hospital from January 2019 to February 2022 were retrospective enrolled and randomly divided in a ratio of 7:3 (n=132) into training and validation cohorts (n=57). Body composition was measured at the level of the third lumbar vertebra based on computed tomography images. Preoperative neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio were calculated by division of neutrophils and platelets by lymphocytes measured in peripheral blood. Nomogram was built using univariate and multivariate logistic regression analysis and assessed in the two cohorts.

Results

In the multivariate analysis, skeletal muscle area, platelet-to-lymphocyte ratio, bowel ischemia, C-reactive protein levels, and American Society of Anesthesiologists score were independent risk factors for complications after surgery. The prognostic model had an area under the receive operating characteristic curve of 0.829 (95% CI, 0.747-0.910). The calibration curve showed good consistency between the predicted and observed outcomes. Decision curve analysis indicated that patients with acute adhesive small bowel obstruction can benefit from the prediction model.

Conclusion

Our study developed and validated a CT based nomogram that incorporates body composition and inflammatory-nutritional score, which can be useful in prediction of complications preoperatively and guiding treatment decisions.

Key words body composition, inflammatory-nutritional score, acute small bowel obstruction, postoperative complications, prediction

Category: Clinical Nutrition

中老年人群奶制品摄入与握力的关联性研究：TCLSIH队列

Association between Dairy Products Consumption and Muscle Strength in Middle Aged and Older Adults: The TCLSIH Cohort Study

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Background: Dairy products provide high quality protein and many other bioactive nutrients which is as an attractive candidate food for evaluation the potential role in promoting muscle health. Therefore, we performed this cross-sectional study to investigate the association of dairy consumption with handgrip strength in middle aged and older adults using data from the Tianjin Chronic Low-grade Systemic Inflammation and Health (TCLSIH) study.

Methods: We used data from 15,011 middle-aged and older adults in the TCLSIH study. Dairy products including milk, low-fat milk and yogurt consumption was assessed using a validated food frequency questionnaire. Handgrip strength was measured using a dynamometer. The relationships between dairy consumption (total dairy, milk, low-fat milk and yogurt) and handgrip strength were assessed using covariance analysis, adjusted for potential confounders.

Results: The mean consumption of total dairy, milk, low-fat milk, yogurt, and total dairy protein was 115.2 (112.1, 118.3) g/day, 56.7 (55.0, 58.4) g/day, 22.9 (21.7, 24.1) g/day, 35.7 (34.4, 37.0) g/day, and 3.67 (3.57, 3.77) g/day, respectively. After adjustment for multiple confounders, the least square means (95% confidence interval) for handgrip strength across total dairy consumption categories were 35.0 (34.8, 35.2) kg, 35.3 (35.1, 35.5) kg, 35.4 (35.2, 35.7) kg, and 35.6 (35.4, 35.7) kg (P for trend <0.001). In addition, the association between categories of milk and yogurt consumption and handgrip strength did not substantially change. However, we did not find significant relationship between categories of low-fat milk consumption and handgrip strength.

Conclusion: Higher consumption of total dairy, milk, and yogurt were positively associated with handgrip strength, while low-fat milk showed no association. Results imply the need for further study on the specialized effects of different dairy types on muscle health.

Key words handgrip strength; dairy products; milk; low-fat milk; yogurt

Category: Clinical Nutrition

低血糖生成指数的文献计量分析与可视化研究

A bibliometric and visual analysis of low glycemic index

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Objective: To investigate the current status, hotspots and frontiers trends of low glycemic index (LGI) through bibliometric analysis.

Methods: We searched all research publications related to LGI from 2003 to 2022 on the Web of Scientific Core Collection (WoSCC). CiteSpace and VOSviewer software was used to analyze the cooperative relationships between countries, institutions, and authors, conduct co-occurrence analysis, cluster analysis, keyword burst analysis, and to analysis the co citation situation of cited journals and literature, and drawing a visual graph.

Results: A total of 5867 papers were included, with an increasing trend of annual publication. LCD categories mainly included Nutrition Dietetics, Food Science Technology and Endocrinology Metabolism which reflected the interdisciplinary characteristics. The United States was the largest research center of the whole world in the field of LGI. Universities were main research institutions and five of the top 10 institutions were from USA. American Journal of Clinical Nutrition was the leading journal. The hotspots of LCD are five aspects, “diabetes”, “glycemic index”, “glycemic load”, ”diet” , ”insulin”. We summarized that “irritable bowel syndrome“, “antioxidant property”, and “celiac disease” are becoming frontiers trends of LCD research in the future and deserve further study.

Conclusions: Over the past 20 years, research on LCD has received great attention. In order to explore LCD field better, multi-level mechanism research will be required in the future.

Key words Bibliometric analysis, low glycemic index, CiteSpace, VOSviewer, diabetes

Category: Clinical Nutrition

食物营养综合评价方法中关于标准选择问题的探讨
Discussion about selection of standards in comprehensive evaluation of food nutrition

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Objective: This paper makes research on the rationality of selection of standards in the comprehensive evaluation of food nutrition. Method: This paper studies the models of nutrient profile both at home and abroad, food nutrition labeling and other data used to evaluate the food nutrition. It introduces the selection of standards in the comprehensive evaluation of food nutrition. Results: People's demand for nutrients is influenced by food's nutrients, food intake and its frequency, ethnicity and others. For now, no well-recognized golden standard is applied to the nutrient profile, and no unified standard can be used to evaluate the nutrition of food. There is no best method for the evaluation process. Conclusion: No existing standards used for the evaluation of food nutrition is fully scientific or rational. Their accuracy and evaluation results need further research.

Key words food; standard; nutrient profile; nutritional evaluation; Food Labeling

Category: Clinical Nutrition

孕妇维生素D缺乏对子代健康的影响

Impacts of vitamin D deficiency in pregnant women on their children

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Vitamin D deficiency is a common problem worldwide,especially in pregnant women.Vitamin D is very important for the health of Pregnant women and plays a key role in growth and metabolism for children.It is not only regulates calcium and phosphorus metabolism and maintains plasma calcium and phosphorus levels, but also plays an important role in regulating immunity and preventing metabolic syndrome. The level of 25(OH)D in pregnant women is closely correlated to that in fetus blood circulation (umbilical cord blood). When severe vitamin D deficiency occurs in pregnant women, their fetuses in the uterus begin to lack vitamin D. In China, since some pregnant women and doctors worry that long-term vitamin D supplementation may lead to poisoning, many pregnant women do not timely and adequately receive vitamin D supplements.So it is necessary to monitor and supplement vitamin D for prevention and treatment of vitamin D deficiency in pregnant women.This article reviews studies on vitamin D deficiency and supplementation in pregnant women.

Key words Vitamin D deficiency; Pregnant; Calcium and phosphorus metabolism; Liposoluble vitamins; Children

Category: Clinical Nutrition

肌肉衰减症的诊断和治疗相关进展：关于指导性文件的系统综述

Advances in diagnosis and management of sarcopenia: a systematic review of guidance documents

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Abstract

Background and Objectives: Multiple organizations have published a variety of guidance documents to offer recommendations that can implement in clinical practice and/or research. We aimed to appraise the methodological quality of included documents, and synthesize available recommendations for the screening, diagnosis and management of sarcopenia based on them.

Methods: We searched electronic database, guideline database, guideline organizations and professional societies websites for clinical practices, consensus statements and position papers in terms of sarcopenia, muscle atrophy or muscle loss from their inception date to April 2023. We screened relevant reviews and studies of all references as well to identify other relevant citations. The Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument was used to assess the methodological quality.

Results: Thirty-seven guidance documents published between 2010 and 2023 were included. Included documents performed well in the domains of Clarity of Presentation (median 80%, IQR 18) and Scope and Purpose (median 78%, IQR 16). Only 4 (11%) of the documents fulfilled ≥ 50% of all the AGREE II domains. Screening for sarcopenia is recommended by numerous documents and SARC-F was the most recommended tool. Muscle function is the core of the three-level diagnosis of sarcopenia. The management strategy for both age-related and disease-related sarcopenia mainly focused on exercise and nutrition intervention. In addition, the documents also emphasize the importance and significance of a multidisciplinary team to engage in the full-life cycle management of sarcopenia.

Conclusion: Guidance documents available on the diagnosis and management of sarcopenia has advanced referential recommendations that have guiding significance. But the inconsistency in recommendations and variation in methodological rigour suggests that high-quality evidence for guidance document development is lacking yet.

Key words Sarcopenia, diagnosis, management, guidance, AGREE II, systematic review

Category: Clinical Nutrition

磷脂是肝细胞癌组织生物标志物的潜在重要来源：涉及靶向代谢组学的前瞻性队列研究结果

Phospholipids are potentially important source of tissue biomarkers for hepatocellular carcinoma: results of a prospective cohort study involving targeted metabolomics

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Background and Objectives: Previous studies have indicated that hepatocellular carcinoma (HCC) is linked to abnormal phospholipid metabolism. However, comprehensive analysis of phospholipids for HCC is very limited, especially in the tissue level. Herein, we sought to compare phospholipids between in tumor and normal tissue adjacent to the tumor and to identify the risk of cancer-related death in HCC patients.

Methods and Study Design

Quantitative comprehensive phospholipidomic analysis was performed using hydrophilic liquid chromatography-electrospray ionization-triquadrupole-mass spectrometry (HILIC-ESI-MS/MS), allowed for comparison of 266 different lipids between paired tumor and adjacent tissue cancer tissue from HCC patients in a prospective cohort (n = 87). Differential metabolites were identified by paired t tests and orthogonal partial least-squares discriminant analysis (OPLS-DA). We assessed the risk predictivity of metabolites using multivariable cox regression models.

Results

Significant differences were found in 58 lipid compounds between the two types of tissue. PC(30:0), lysoPE (22:2) and SM(d38:0) represent notable biomarkers that differentiate HCC from nondiseased tissue, and lysoPG species are depleted in the tumor tissue of HCC patients. A combination of 5 metabolites of independent effects showed the potential to predict HCC prognosis, with an AUC of 0.992 (95% CI: 0.978-1). Regarding prognosis, PC(30:1), PE(32:1) and SM(d38:0) in tumor, lysoPC (20:1) and total lysoPG in normal tissue may predict HCC mortality and constitute important biomarkers in the multivariate analysis.

Conclusions

Our study reveals that phospholipids play a crucial role in tumor and normal tissue, and represent a robust lipid signature with prognostic potential. A better understanding of the cancer-associated glycerolipid and sphingolipid metabolism may lead to novel therapeutic strategies.

Key words hepatocellular carcinoma; metabolomics; phospholipids; prognosis; liquid chromatography-mass spectrometry

Category: Clinical Nutrition

联合补充鱼油与维生素 D3 对非酒精性脂肪肝患者肠道菌群和粪便代谢物的影响:随机对照试验

Supplementation with fish oil plus vitamin D3 on gut microbiota and fecal metabolites in non-alcoholic fatty liver disease subjects: a randomized controlled trial

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The present study aimed to investigate the effects of fish oil plus vitamin D_3 (FO + D) on gut microbiota and fecal metabolites in nonalcoholic fatty liver disease (NAFLD) subjects. A total of 61 subjects were randomly divided into three groups: FO + D group (2.34 g/day of eicosatetraenoic acid (EPA) + docosahexaenoic acid (DHA) + 1680 IU vitamin D_3), FO group (2.34 g/day of EPA + DHA), and CO group (1.70g/d linoleic acid). Supplementation with FO + D was associated with significantly increased the relative abundance of *Alistipes* and 1,25-dihydroxyvitamin D_3 levels, compared with FO group. The relative abundances of *Eubacterium* were significantly increased whereas 8,9-DiHETrE levels were significantly decreased in the FO + D group, compared with CO group. Correlation analyses showed that changes of 1,25-dihydroxyvitamin D_3 levels were inversely correlated with HOMA-IR levels, while 8,9-DiHETrE levels were positively associated with adiponectin levels. This study demonstrated that FO + D supplementation could regulate gut microbiota and fecal metabolomic profiles through which mediated glucolipid metabolism and chronic inflammation to alleviate NAFLD.

Key words Non-alcoholic fatty liver disease; Gut microbiota; Fecal metabolomics; Fish oil; Vitamin D3; Randomized controlled trial.

Category: Clinical Nutrition

饮食营养干预对肥胖儿童肠道菌群的影响

Changes of Gut Microbiota in Children with Obesity Participating in Diet-Based Nutritional Intervention

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Background: Gut microbiota plays a key role in the development of obesity in children. However, there has been limited research on changes of gut microbiota in obese children before and after weight loss. This study profiled and compared gut microbiota composition of obese children before and after diet-based nutritional intervention.

Methods: 30 obese children received nutritional intervention for 12 weeks. Their body composition was measured using bioelectrical impedance (Inbody S10) and fecal samples were collected at 0,12 weeks. Fecal samples from 48 normal-weight children were also collected as control group. The gut microbiota was profiled with 16S amplicon sequencing.

Results: Over the intervention of 12 weeks, obese children experienced a significantly decrease in body weight, BMI, BMI z-score and body fat ($p<0.001$,all). The alpha and beta diversity of gut microbiota indicate that dietary intervention significantly affect the composition, richness and structure of microbiota in obese children than obese children without treatment and control group. After nutritional intervention (NTA group), compared with before intervention (NTB group) and the control group, the relative abundance of Actinobacteria and Actinobacterta increased significantly ($P < 0.001$, all), while Bacteroides decreased significantly ($P < 0.001$, all). At the genus level, compared to the Control and NTB group, the NTA group had significantly higher relative abundance of Bifidobacterium, Collinsella, Streptococcus, Blautia and Escherichia-Shigella ($P < 0.05$, all) and had lower relative abundance of Bacteroides and Megamonas ($P < 0.001$, both). At the functional level, carbohydrate and nucleotide metabolism were increased and lipid, energy and amino acid metabolism were decreased in the NTA group than the Control and NTB groups.

Conclusions: The gut microbiota of obese children showed characteristic changes with Bifidobacterium as the dominant bacteria after nutritional intervention. The altering of gut microbiota by diet-based nutritional interventions could be a promising strategy to help control childhood obesity.

Key words child; gut microbiota; obesity; nutritional intervention

Category: Clinical Nutrition

短双歧杆菌 207-1 对改善健康成人的心理健康和睡眠的影响：一项随机、双盲、安慰剂对照试验

Effects of Bifidobacterium breve 207-1 on Improving Mental Health and Sleep in Healthy Adults: A Randomized, Double-Blind, Placebo-Controlled Trial

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Gut microbiota and mental health are closely related. Our study aims to explore the efficacy and safety of *Bifidobacterium* breve 207-1 in improving stress-related symptoms (e.g., anxiety, depression, insomnia) in healthy adults. A total of 120 healthy adults with subclinical symptoms of high mental stress, overweight, insomnia and constipation were retrospectively registered and were randomly assigned to receive low dose 207-1 (LD, n = 40) or high dose 207-1 (HD, n= 40) or placebo (PL, n = 40) for 28 days. Fecal and blood were collected from the participants before and after the trial. Participants were also asked to take medical examinations and complete the Pittsburgh Sleep Quality Index (PSQI), the Self-Rating Depression Scale (SDS), and the Self-Rating Anxiety Scale (SAS) before and after the intervention. The results showed that 207-1 stimulated the proliferation of neurotransmitters such as 5-HT and GABA, and inhibited HPA axis hyperactivity. The PSQI scores in the HD group decreased significantly which represented improved sleep quality. In addition, the gut microbiota has changed under the intervention of 207-1. There was a significant increase in *B. breve* in the LD and HD groups ($P < 0.05$). The relative abundance in the control group of *Eggerthelia*, *Desulfovibrio* and *Desulfobacterota* were significantly higher than the probiotics groups ($P < 0.05$). And the relative abundance of *Ruminococcus* in the LD group significantly decreased while SCFAs increased, especially acetic acid and propionic acid ($P < 0.05$). In conclusion, *B. breve* 207-1 alleviates mental stress and sleep problems in healthy adults by directly affecting neurotransmitters and hormones, as well as indirectly by regulating the composition of gut microbiota and promoting SCFAs synthesis. Probiotics have some potential efficacy in regulating mental health and therefore are expected to be a new therapeutic target for mental illness.

Key words Bifidobacterium, gut microbiota, 5-HT, GABA, HPA axis, SCFAs

Category: Clinical Nutrition

2型糖尿病综合治疗中营养干预的meta分析

A meta-analysis of medical nutrition interventions in the comprehensive treatment of type 2 diabetes mellitus

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Abstract: Objective The aim of this study was to evaluate the effectiveness of different existing interventions in the management of type 2 diabetes mellitus in the comprehensive treatment by using meta-analysis method by evaluating the existing interventions in the domestic literature at this stage. Methods Various mainstream electronic resource databases were searched, including: CBM, Wanfang database and CNKI, for original literature that met the objectives of the study. Literature inclusion and exclusion criteria were developed for literature screening. The Cochrane systematic evaluation method was used to conduct meta-analysis of the included literature. Results There were statistically significant differences between modified medical nutrition therapy and conventional medical nutrition therapy in terms of FPG, 2hPG, HbA1c, TC, TG, and BMI, and the study effects were more favorable to the intervention group. Conclusion The results of the analysis showed that the final effect of the interventions on the group of patients with type 2 diabetes mellitus by using new measures such as nutritional behavioral interventions, low GI dietary mix, nutrient energy adjustment, dietary structure improvement, nutritional health education, individualized nutritional therapy and medicinal food, based on the traditional medical nutrition therapy, was more significant in terms of FPG (fasting blood glucose), 2hPG (2 h postprandial blood glucose), HbA1c (glycated hemoglobin), TC (blood glucose), and BMI. The final effect was more significant in FPG (fasting glucose), 2hPG (2h postprandial glucose), HbA1c (glycosylated hemoglobin), TC (total serum cholesterol), TG (triglycerides), and BMI (body mass index) than the traditional model, which had a significant positive impact on the treatment of type 2 diabetes, effectively lowering the patients' blood glucose and correcting their metabolic disorders, thus improving their quality of life. The modified medical nutrition therapy has a more significant positive impact on the control of type 2 diabetes and has clinical promotion significance.

Key words Type 2 diabetes mellitus nutritional intervention nutritional therapy

Category: Clinical Nutrition

猪皮胶原低聚肽通过 PHD-HIF1α 途径保护 DSS 诱导的小鼠溃疡性结肠炎的作用及其机制

Effect and mechanism of collagen oligopeptides from porcine skin protecting DSS-induced ulcerative colitis in mice via PHD-HIF1α pathway

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Collagen oligopeptides are a typical small molecule peptide compound with various biological activities. Pork skin is a good source of collagen peptides, but its application in dietary therapy has only recently been explored. In present study, the intestinal protective effects of pork skin collagen oligopeptides (CH) were examined in DSS-induced colitis in C57BL/6 mice and H2O2-induced human intestinal epithelial Caco-2 cells, respectively. CH could effectively alleviate the weight loss, diarrhea, rectal bleeding, colon shortening and other colitis symptoms and histopathology changes of the colitis mice. CH protected intestinal barrier function of colitis mice by maintaining the key tight junction proteins of colon, such as ZO-1, Occludin, and Claudin-4, inhibiting pro-inflammatory cytokines and myeloperoxidase activity, and enhancing peripheral blood white blood cells and lymphocytes. CH could promote HIF-1α Hydroxylation decomposition by promoting the expression of PHD. In oxidative damage model of Caco-2 cells induced by H2O2, CH reduced intracellular reactive oxygen species production, plasma membrane damage, and cell apoptosis induced by increasing the expression of tight junction proteins (ZO-1, Occludin, and Claudin-4). Overall, our research results indicated that CH exerted anti-colitis efficacy via inhibiting intestinal hypoxia and exerting anti-oxidative and anti-inflammatory effects.

Key words collagen oligopeptides, colitis, inflammatory, tight junction protein, HIF-1α; PHD

Category: Clinical Nutrition

极低能量脂肪膳食治疗孕期罕见高脂血症

Treatment of Rare Hyperlipidemia in Pregnancy with Extremely Low-Fat and Low-Energy Diet----a Case Report

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Hyperlipidemia is one of the causes of acute pancreatitis (AP), a condition which is potentially more dangerous during pregnancy. Until now, there are not any specific diagnostic criteria and management protocols for this condition which complicates pregnancy.

Objective: Report the therapy progress and effect of extremely low-fat and low-energy diet for a rare hyperlipidemia during pregnancy.

Method: Use diet which offer energy range from 1190.7kcal/d to 1460 kcal/d(reached 60% of the minimum requirement for a pregnant woman) and fat range from 5g/d to 20g/d to treat a rare hyperlipidemia during pregnancy. The patient had a history of four episodes of acute pancreatitis, three of them occurring in pregnancy and induced adverse obstetrical outcomes. Genetic testing were conducted.

Outcome: The pregnant women's triglycerides were decreased from 19.37 mmol/L to 5.6 mmol/L, total cholesterol were decreased from 7.57 mmol/L to normal range. There was no intrauterine growth retardation during the entire pregnancy and the patient delivered a healthy baby weighing 2,500g with Apgar scores of 9 and 9 at 1 and 5 minutes.

Genetic testing detected a likely pathogenic mutation(GPIHBP1;NM_178172.3;c.48_49insGCGG;p.Pro17Alafs*22;EX1;Hom). It is may related to chylomicronemia.

Conclusion: Diet with energy reached 60% of the minimum requirement for a pregnant

woman, and adequate protein, very low fat but enough DHA and EPA may help pregnant women with chylomicronemia to decrease blood fat and won't induce intrauterine growth retardation.

Key words Low-Fat and Low-Energy; Hyperlipidemia; Acute pancreatitis; Diet management; Pregnant.

Category: Clinical Nutrition

纤维蛋白原与清蛋白比值指数对胃间质瘤危险程度分级的预测价值

Predictive value of fibrinogen-to-albumin ratio index for risk classification of gastric stromal tumor

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Objective To investigate the value of fibrinogen-to-albumin ratio index (FARI) in predicting the risk classification of gastric stromal tumor. Methods A total of 208 patients with gastric stromal tumor diagnosed by postoperative pathology and immunohistochemistry after surgical or endoscopic resection were collected retrospectively.According to postoperative pathology, the patients were divided into low risk group and high risk group, and the relationship between preoperative clinical data and the risk of gastric stromal tumor was analyzed. Results Single factor analysis showed that the differences of clinical symptoms, neutral points leaf nuclear count, platelet count, NLR, PLR, albumin, fibrinogen, FARI, triglyceride, high-density lipoprotein cholesterol,tumor cell morphology, fission like counting, tumor size had statistical significance (P < 0.05) between the two groups.Logistic regression analysis showed that FARI[OR=1.18; 95%CI (1.03, 1.35); P<0.05]and HDL-C[OR=0.18; 95%CI (0.09, 0.33); P<0.01] were independent risk factors for the risk degree of gastric stromal tumor. The ROC curve analysis showed that when the area under the FARI curve was 0.711 and the optimal threshold value was 7.86%, the sensitivity and specificity for predicting the risk of gastric stromal tumor were 0.551 and 0.806. Conclusion FARI can be used as an independent predictor of the risk degree of gastric stromal tumors,,and has a certain guiding significance in the early prediction of risk classification and prognosis prediction.

Key words gastric stromal tumor; fibrinogen-to-albumin ratio index; risk classification

Category: Clinical Nutrition

摄入全脂牛奶不增加冠心病患者心血管及代谢风险：一项多中心前瞻性随机对照研究

Daily full-fat milk intake does not increase cardiometabolic risks in patients with coronary artery disease: a multi-center randomized controlled trial

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Aims

This randomized controlled trial aims to verify what effect full-fat milk intake has on cardiovascular health in patients with coronary artery disease (CAD).

Methods

Patients diagnosed with CAD were enrolled from 2020-2021 and randomized to four groups: (A) skim milk, (B) full-fat milk from corn-fed cows, (C) full-fat milk from grass-fed cows, and (D) placebo according to milk components. Daily intake of 500ml milk was continued for 12 weeks in trial groups and no milk or other dairy products was taken in the placebo group. All patients had blood tests for glucose, lipids profile and biochemical parameters before and after milk intake. Cardiac MR scan was performed to observe heart geometry and straining change over the 12-week period.

Results

A total of 160 patients were enrolled and completed the study, with average age of 66 and 65 % male. No death or myocardial infarction happened in four groups. There was no significant difference in biochemical and lipid profile among four groups after 12-week full-fat milk, or skim milk or no dairy intake at all. Full-fat milk did not increase triglycerine, total cholesterol, LDL-C, Lp(a),or Apo(B) levels. Significant reduction of fasting glucose was found only in patients taking full-fat milk from grass-fed cows (-0.73mmol/l, $P<0.01$). Cardiac MR scan suggested that the left ventricular geometry and function remained unchanged, which was comparable to the skim milk or placebo controls. Nevertheless, favorable LV straining change was observed (increased LV radial strain rate) in patients taking full-fat milk from grass-fed cows.

Conclusions

Diet containing a moderate portion of full-fat milk neither increases blood lipid and metabolic burden, nor jeopardizes heart function in cardiovascular patients. Moreover, full-fat milk from grass-fed cows may even lower blood glucose level and improve myocardial vitality, possibly by enhancing insulin sensitivity, and therefore benefit cardiovascular health, which is unseen in skim milk.

Key words full-fat milk, coronary artery disease, cardiometabolic risks

Category: Clinical Nutrition

中国 GLIM 标准对造血干细胞移植患者营养不良诊断的影响

The influence of the China GLIM standards on the diagnosis of malnutrition in patients with hematopoietic stem cell transplant

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Background: Muscle-related indicator is removed from Global Leadership Initiative on Malnutrition (GLIM) criteria implemented in China. This article aims to explore the role of muscle mass in the diagnostic criteria of malnutrition and the effects of GLIM-China for diagnosing malnutrition.

Methods: A total of 98 inpatients with hematopoietic stem cell transplants (HSCT) were recruited. Nutrition risk was assessed by using the Nutritional Risk Screening 2002 (NRS-2002). Appendicular skeletal muscle mass (ASMI) and fat-free mass index (FFMI) were determined using the bioelectrical impedance analysis (BIA) method. Malnutrition is defined by GLIM-China, GLIM, and PG-SGA. We use erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) to assess inflammation in GLIM and GLIM-China. The correlation or consistency among ASMI, FFMI, ESR, CRP, GLIM-China, GLIM, and PG-SGA was evaluated, respectively.

Results: All the patients had nutritional risk. The magnitude of malnutrition using PG-SGA, GLIM, and GLIM-China was 75.5, 80.6, and 64.3%, respectively. GLIM-China and PG-SGA showed the same performance ($p = 0.052$ vs. 1.00) and agreement (kappa = 0.404 vs. 0.433, $p < 0.0001$) with FFMI. Consistency was noted between ASMI and PG-SGA in the assessment of malnutrition ($p = 0.664$) with a good agreement (kappa = 0.562, $p = 0.084$). ASMI and FFMI could determine muscle mass reduction, which could not be determined by BMI, albumin (ALB), and pre-albumin (pre-ALB); 34% of GLIM-China (-) patients were with low ASMI, and 40% with low FFMI; 30.0% of patients with PG-SGA (<4) still have low ASMI, and 38.2% have low FFMI.

Conclusion: If only the PG-SGA scale is used as a diagnostic criterion for evaluating malnutrition, a large proportion of patients with reduced muscle mass will be missed, but more patients with muscle loss will be missed via GLIM-China. Muscle-related indicators will help diagnose malnutrition.

Key words Muscle mass, HSCT, Malnutrition, GLIM-China, PG-SGA

Category: Clinical Nutrition

严重烧伤患者的肠内谷氨酰胺补充：系统评价和 meta 分析的更新

Enteral Glutamine Supplements for Patients with Severe Burns: Update of Systematic Review and Meta-analysis

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Background and Objectives: Our previous study in 2009 concluded that glutamine may shorten the length of hospital stay (LOS) in patients with severe burns. Recent large-scale studies have suggested a decline in the effectiveness of glutamine in treating patients with severe burns over the last decade. Therefore, we conducted this systematic review and meta-analysis to update the status of glutamine uses in patients with severe burns.

Methods and Study Design: We retrieved related literature prior to December 2022 using the PubMed, Web of Science, Cochrane Library, Embase, SinoMed, Wanfang, and China National Knowledge Infrastructure (CNKI) databases. Data from studies that compared enteral glutamine for severe burns with a control group were extracted, pooled, and analyzed.

Results: Six randomized controlled trials involving 1,398 patients were included in the analysis. There were no significant differences in overall mortality (risk ratio [RR] =0.37; 95%confidence interval [CI], [0.06, 2.37]; P=0.30) or infectious morbidities (RR=0.73; 95%CI, [0.41, 1.31]; P=0.29). The incidence of MODS was similar between the two groups (RR=0.27; 95% CI, [0.03, 2.24]; P=0.22). The LOS (mean difference [MD] =-8.97; 95%CI, [-15.22, -2.71]; P=0.005) and LOS/total burn surface area (TBSA) (MD=-0.27; 95%CI, [-0.54, -0.00]; P=0.05) decreased in the enteral glutamine group. The incidence of wound infection was significantly reduced (RR=0.42; 95% CI, [0.16, 1.06]; P=0.07).

Conclusions: Compared to the control group, enteral glutamine administration may not improve the mortality, although it may be associated with a shorter LOS, a lower LOS/TBSA ratio, and may reduce the risk of wound infection in patients with severe burns.

Key words glutamine, enteral, severe illness, burn, mortality, infection

Category: Clinical Nutrition

ω-3 脂肪酸对住院的 COVID-19 患者的疗效：一项纳入随机对照试验的系统评价和 meta 分析

Efficacy of omega-3 fatty acids for hospitalized COVID-19 patients: a systematic review and meta-analysis of randomized controlled trials

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Background and Objectives: Emerging expert consensuses and guidelines recommend that omega-3 fatty acids may have anti-inflammatory effects in hospitalized patients with coronavirus disease (COVID-19). However, these recommendations are based on pathophysiological studies of inflammation rather than direct clinical evidence. We conducted this systematic review and meta-analysis to evaluate the efficacy of omega-3 fatty acid supplementation in hospitalized patients with COVID-19.

Methods and Study Design: We retrieved literature from PubMed, Web of Science, Embase, China National Knowledge Infrastructure (CNKI), WANFANG, Chinese Biomedical Literature Database, and Cochrane Library databases up to April 10, 2023. Data from studies comparing omega-3 fatty acids with a placebo or other pharmaceutical nutrients were analyzed.

Results: Of the 3032 records, 42 full-text articles were reviewed, five eligible studies were identified, and one study was found in the references. Six studies involving 273 patients were included, pooled, and analyzed. Compared to the control group, omega-3 fatty acid intervention reduced the overall mortality of hospitalized patients with COVID-19 (RR=0.76; 95% CI, [0.61, 0.93]; P=0.010). No serious or unexpected drug-related adverse events were observed. No statistical significance was observed in the levels of inflammatory markers such as CRP (MD=-9.69; 95% CI, [-22.52, 3.15]; P=0.14; I2=97%) and IL-6; however, the neutrophil/lymphocyte ratio was significantly lower in the omega-3 FAs group on day 7 ($P < 0.001$).

Conclusions: Omega-3 fatty acid administration may be associated with reduced mortality in hospitalized patients with COVID-19. Given the small sample size of enrolled studies, more rigorous and large-scale trials are urgently needed in the future to verify its efficacy.

Key words SARS-CoV-2, COVID-19, omega-3 fatty acids, pandemic, mortality

Category: Clinical Nutrition

膳食矿物质与常见恶性肿瘤患者的营养风险：中国的一项多中心横断面研究

Dietary minerals and nutrition risk of common malignant tumor patients: a multi-center cross-sectional study in China

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Objective:

The objective of this academic article is to examine the correlation between mineral intake through diet and the nutritional status of patients suffering from common malignancies.

Methods:

Participants were recruited 8 hospitals around the China. Briefly, 866 patients with malignant tumors were supplied with detailed information on both dietary mineral intake and nutritional conditions. Dietary intake and appetite scores were collected and the intake amounts of dietary minerals such as calcium ion (Ca), phosphorus ion (P) and sodium ion (Na) were estimated according to the Chinese food composition table. The Global Leaders' Malnutrition Initiative diagnostic criteria for malnutrition and the short Nutritional Risk Screening Scale were used to measure nutritional status.

Results:

A total of 866 patients with malignant tumors were included, 385 patients (44.5%) with NRS 2002 ≥3 was at nutritional risk, and 283 patients (32.7%) with GLIM ≥2 were diagnosed with malnutrition. Univariate analysis revealed a statistically significant relationship between dietary mineral intake and the occurrence of nutritional risk ($p<0.0001$). After controlling for relevant confounders, multivariate Logistic regression analysis revealed that moderate intake of dietary minerals Ca、P、Se and Mn (OR,95%CI; 0.53, 0.32-0.88; 0.40, 0.24-0.67; 0.59, 0.36-0.98; 0.46, 0.28-0.76) was protective factors for nutritional risk when determining the presence of nutritional risk based on the NRS 2002 scales, and high intakes of dietary minerals P、Zn、Se and Mn (OR,95%CI; 0.39, 0.21-0.72; 0.36, 0.19-0.68; 0.51, 0.28-0.92; 0.40, 0.22-0.74) was protective factors for nutritional risk, while no dietary mineral intakes were found to be protective factors for malnutrition when judging nutritional status according to GLIM diagnostic criteria.

Conclusions:

Intake of the dietary minerals P and Se plays a protective role in the nutritional status of patients with malignancy. Moderate intake of the dietary minerals Ca and Mn and higher intake levels of the mineral Zn might be protector against nutritional risk in patients with malignant tumors.

Key words Tumor patient; Dietary minerals; Malnutrition; Influencing factor; Nutritional risk

Category: Clinical Nutrition

微信平台是管理妊娠期糖尿病患者的好方法:一项前瞻性研究
WeChat Platform is a Good Way to Manage Women with Gestational Diabetes Mellitus: a Prospective Study

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Follow-up rate of postpartum visits for gestational diabetes mellitus (GDM) patients is low and need to be improved. In this prospective trial, GDM patients were enrolled in and were managed throughout their pregnancies via WeChat platform. Questionnaires were sent to collect data about post-partum 75g OGTT results via WeChat platform. From January 2016 to February 2020, 490 participants were included, and 375 completed questionnaires. Among the 375 participants, 277 (73.9%) completed post-partum OGTT. More than two-thirds (72.9%, 202/ 277) had a normal glucose level and less than one third (27.1%, 75/ 277) had an abnormal glucose result. Univariate and multivariate regression analyses were performed and showed that women who failed to return for post-partum OGTT were more likely to report prior GDM than women who returned (OR 0.44, 95% CI 0.20-0.94). Women who had an abnormal post-partum OGTT result were more likely to use insulin treatment during pregnancy (OR 3.74, 95% CI 1.97-7.08) and more likely to deliver by cesarean section (OR 1.83, 95% CI 1.02-3.28) compared to women who had normal post-partum glucose results. In conclusion, rates of postpartum glucose testing after GDM pregnancies may be increased by sending alerts and managing by the WeChat platform.

Key words Gestational diabetes mellitus (GDM), Oral glucose tolerance test, Postpartum period, WeChat platform, Insulin treatment.

Category: Clinical Nutrition

慢性疾病与 COVID-19 患者的疾病严重程度密切相关:系统综述和荟萃分析

Comorbid Chronic Diseases are Strongly Correlated with Disease Severity among COVID-19 Patients: A Systematic Review and Meta-Analysis

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Coronavirus disease 2019 (COVID-19) has resulted in considerable morbidity and mortality worldwide since December 2019. In order to explore the effects of comorbid chronic diseases on clinical outcomes of COVID-19, a search was conducted in PubMed, Ovid MEDLINE, EMBASE, CDC, and NIH databases to April 25, 2022. A total of 36 peer-reviewed articles, including 32948 COVID-19 cases were selected. We found diabetes was present in 12.0%, coronary artery disease/cardiovascular disease (CAD/CVD) was in 9.0%, and hypertension was in 23.0%, which were much higher than that of chronic pulmonary disease (4.0%). Specifically, preexisting chronic conditions are strongly correlated with disease severity [Odds ratio (OR) 3.80, 95% CI 1.58 to 7.40], and being admitted to intensive care unit (ICU) (OR 3.20, 95% CI 1.80 to 7.86); in addition, compared to COVID-19 patients with no preexisting chronic diseases, COVID-19 patients who present with either diabetes, hypertension, CAD/CVD, or chronic pulmonary disease have a higher risk of developing severe disease, with an OR of 2.81 (95% CI 2.90 to 4.42), 3.04 (95% CI 2.45 to 4.83), 3.54 (95% CI 2.47 to 7.49) and 2.93 (95% CI 2.05 to 8.80), respectively. Surprisingly, we found no correlation between chronic conditions and increased risk of mortality (OR 2.19, 95% CI 0.35 to 15.77). Taken together, cardio-metabolic diseases, such as diabetes, hypertension and CAD/CVD were more common than chronic pulmonary disease in COVID-19 patients, however, each comorbid disease was correlated with increased disease severity. After active treatment, increased risk of mortality in patients with preexisting chronic diseases may reduce.

Key words coronavirus disease 2019 (COVID-19), diabetes, cardiovascular diseases, hypertension, chronic pulmonary disease, meta-analysis

Category: Clinical Nutrition

非酒精性脂肪肝和心血管疾病的关系
Nonalcoholic fatty liver disease and cardiovascular disease

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Nonalcoholic fatty liver disease (NAFLD) and cardiovascular disease (CVD) are two diseases that are common in the general population. To date, many studies have been conducted and demonstrate a direct link between NAFLD and CVD, but the exact mechanisms for this complex relationship are not well established. A systematic search of the PubMed database revealed that several common mechanisms are involved in many of the local and systemic manifestations of NAFLD and lead to an increased cardiovascular risk. The possible mechanisms linking NAFLD and CVD include inflammation, oxidative stress, insulin resistance, ectopic adipose tissue distribution, dyslipidemia, endothelial dysfunction, and adiponectin, among others. The clinical implication is that patients with NAFLD are at an increased risk of CVD and should undergo periodic cardiovascular risk assessment.

Key words Nonalcoholic fatty liver disease; Cardiovascular disease; Metabolic syndrome; Risk assessment

Category: Clinical Nutrition

利拉鲁肽和胰岛素通过 Wnt 信号通路对人脂肪间充质干细胞的成脂分化具有相反作用

Liraglutide and Insulin Have Contrary Effects on Adipogenesis of Human Adipose-Derived Stem Cells via Wnt Pathway

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Background: Glucagon-like peptide-1 (GLP-1) has been reported to have beneficial impacts on improving human's metabolism and ameliorating insulin resistance. While insulin is another important and conventional drug in diabetes treatment, but it has an adverse effect on weight gain.

Purpose: To make sure whether GLP-1 and insulin play different roles in human adipose-derived stem cells(hADSCs).

Methods: We examined the in vitro roles and molecular mechanisms of liraglutide, a GLP-1 analogue, and human insulin on hADSCs isolated from subcutaneous adipose tissue. Different concentrations (0, 0.1, 1, 10, 100nM) of liraglutide and insulin were added to proliferation and differentiation medium of hADSCs, respectively.

Results: Liraglutide inhibits while insulin promotes the proliferation and differentiation at the concentration of 100nM. Moreover, the levels of GSK-3 increase during differentiation and liraglutide could down-regulate it when compared with insulin. We also find that the activation of phosphorylated GSK-3α and GSK-3β is involved in the differentiation roles. And classical and non-classical Wnt pathways all play roles in the differentiation, which are characterized with the up/down-regulation of the expression of adipogenesis genes such as PPAR-γ and CEBP-α.

Conclusion: Liraglutide and insulin have contrary effects on the proliferation and adipogenesis via Wnt pathway in primary cultured ADSCs. Those effects could partly explain the different roles of GLP-1 and insulin on weight gain and insulin resistance.

Key words liraglutide, insulin, human adipose-derived stem cells, obesity, Wnt signaling pathway

Category: Clinical Nutrition

NRS-2002 和 MUST 作为 GLIM 第一步诊断克罗恩住院患者营养不良——一项回顾性研究

GLIM criteria using NRS-2002 and MUST as the first step adequately diagnose the malnutrition in Crohn's disease inpatients: A retrospective study

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Objective: This study aims to investigate the incidence of nutritional risk and malnutrition in Crohn's disease inpatients and compare the suitability of Nutritional Risk Screening 2002 (NRS-2002) and Malnutrition Universal Screening Tool (MUST) as the fifirst-step screening tool for GLIM criteria. **Methods:** We selected the clinical data of Crohn's disease inpatients in our hospital from August 2016 to December 2019. NRS-2002 and MUST were used for nutritional screening. GLIM and PG-SGA were used for malnutrition assessment, respectively. Patients without nutritional risk screened by NRS-2002 but with malnutrition risk screened by MUST were especially screened out. ASMI, FFMI, BFP, and body cell mass were measured by the Biospace Inbody S10 composition analyzer. **Results:** A total of 146 Crohn's disease patients were enrolled, of which 62.3 and 89.7% had nutritional or malnutrition risk according to NRS-2002 and MUST, respectively. The prevalence of malnutrition assessed by GLIM was 59.6% (87 cases) and 82.2% (120 cases) when NRS-2002 and MUST were used as the fifirst step of GLIM respectively. Meanwhile, 99 patients (67.8%) had malnutrition when assessed by PG-SGA. There were 41 patients who were not at nutritional risk according to NRS-2002 but were at malnutrition risk determined by MUST. At last, 33 patients were GLIM-defifined, and 16 patients were PG-SGA-defifined malnutrition among the 41 patients.**Conclusion:** The nutritional risk or malnutrition is common in Crohn's disease inpatients. It is recommended to use a variety of nutritional assessment tools for Crohn's disease inpatients. MUST can be used as a good supplement for the patients with a score of NRS-2002 lower than 3 in order to decrease the miss rate of GLIM-defifined malnutrition.

Key words nutritional risk, malnutrition, nutritional risk screening 2002, Malnutrition Universal Screening Tool (MUST), Global Leader Initiative on Malnutrition (GLIM)

Category: Clinical Nutrition

早期肠内营养对接受机械通气的新冠患者预后的影响：系统评价和 meta 分析

Early enteral nutrition for mechanically ventilated COVID-19 patients: A systematic review and meta-analysis

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Background: This study aims to systematically review the efficacy of early enteral nutrition for mechanically ventilated Corona Virus Disease 2019 (COVID-19) patients.

Methods: Relevant clinical studies published from December 2019 to March 2023 were retrieved from the electronic databases. The primary outcome was overall mortality. The secondary outcomes included length of hospitalization, intensive care unit length of stay, and duration of mechanical ventilation. The quality of enrolled studies was evaluated using the ROBINS-I tool. The meta-analysis was performed using RevMan 5.4 software.

Results: A total of 1229 potentially relevant titles and abstracts were screened. After reviewing, five studies enrolling 2054 patients were eventually included. All five articles were retrospective cohort studies. There was no significant difference in overall mortality [relative risk=0.92, 95% confidence interval (0.74,1.15), P=0.48] between the early enteral nutrition group and late enteral nutrition group. The patients who received early enteral nutrition tend to stay in the hospital for less time but the difference is not significant [mean difference = -4.82, 95% confidence interval (-11.47, 1.83), P=0.16]. The patients who received early enteral nutrition was on mechanical ventilation for less time[mean difference = -0.70, 95% confidence interval (-0.99, -0.40), P<0.00001].

Conclusion: Early enteral nutrition help wean patients from the ventilator, and may reduce intensive care unit hospitalization, and help reach the feeding target of ventilated patients with COVID-19. Owing to the small number of included studies and the relative low quality of study design, more rigours, large scale clinical trials are urgent needed to verify above findings.

Key words Early enteral nutrition; COVID-19; Mechanical ventilation; Systematic Review; Meta-analysis

Category: Clinical Nutrition

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Key words

Category: Clinical Nutrition

客观营养指数评价新冠肺炎住院患者营养不良状况及其与预后的关系

Evaluation of Malnutrition by Objective Nutritional Index and Association with Prognosis in hospitalized patients with COVID-19

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Background and Objective: we aimed to (1) investigate the prevalence of nutrition risk defined by NRS2002 and malnutrition assessed by the objective indexes (PNI and COUNT) in in hospitalized patients with COVID-19; (2) observe the nutritional intervention for them; (3) explore predictors for discerning the critical patients and predicting the mortality of patients with COVID-19.

Methods and Study Design: Present study was a monocentric retrospective study. We included a total of 464 hospitalized patients confirmed with COVID-19 between December 2022 and January 2023 at Ningbo Medical Center Lihuili Hospital, China. Data on clinical features, complications, laboratory parameters and nutrient requirement were analyzed retrospectively. ROC curve analysis was used to discern critical patients and mortality with COVID-19.

Results: The incidence of nutritional risk was 53.00%（246/464）among these patients. The prevalence of malnutrition was 79.09% and 88.79%, as diagnosed by the PNI and COUNT, respectively. The total in-hospital mortality was 3.02% (14/464). Univariate analysis revealed that older age, lower BMI and Comorbidities including diabetes, hypertension and cardiovascular were significant associated with nutritional risk. Among 464 patients, only 107(23.06%) cases received nutritional support. The cut-off value≥817.54 for SII and≥5.5 for COUNT was associated with a higher risk of critical cases in COVID-19 patients, and the cut-off value ≥ 3274.34 for SII and≥5.5 for COUNT was associated with a higher risk of mortality in the ROC curve analysis.

Conclusions: The incidence of nutritional risk and malnutrition was high among hospitalized patients with COVID-19. The SII and COUNT scores are independent predictors of the prognosis for the disease severity and mortality in hospitalized COVID-19 patients.

Key words malnutrition, COVID-19, PNI, COUNT, SII

Category: Clinical Nutrition

CT与BIA在老年肌肉衰减症患者体成分评估中的比较
Comparison of CT and BIA in the Assessment of Body Composition in elderly patients with Sarcopenia

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Background: Sarcopenia is defined as a syndrome with decline in muscle mass and strength associated with functional decline. Accurate methods for assessing body composition in elderly patients with sarcopenia are essential to determine muscle condition as well as monitor therapeutic interventions.

Objectives: The purpose of our study was to compare the accuracy of measurements of body composition made using analysis of computed tomography (CT) scans at the L3 vertebral level, and bioelectrical impedance analysis (BIA).

Methods and Study Design: The diagnosis of sarcopenia were based on the definition of primary sarcopenia produced by the Asian Working Group for Sarcopenia (AWGS). CT and BIA were performed in 14 patients recruited from a clinical trial investigating age-related sarcopenia with no more than seven days apart. CT image slices at the third lumbar vertebrae (L3) level were analyzed using SliceOmatic V4.2 software (Tomovision, Montreal, Canada) to calculate the surface area of the muscle tissue and adipose tissue.

Results: Our results show strong correlations between fat-free mass on CT and BIA ($r=0.8696, P<0.0001$) and fat mass on CT and BIA ($r=0.9255, P<0.0001$). On Bland-Altman analysis, two methods showed ideal consistency. Average bias for fat-free mass on CT and BIA was -4.3289 with 95% limits of agreement (LOA) of -10.0020 to 1.3443. For fat mass on CT and BIA, average bias was 2.8717, with 95% limits of agreement (LOA) of -1.8720 to 7.6155.

Conclusions: Our study showed that BIA underestimated fat mass and overestimated fat-free mass compared with CT when assessing sarcopenia. If patients with sarcopenia are overestimated by using the BIA method to assess muscle mass, appropriate treatments including nutritional and exercise interventions may be delayed and may affect prognosis.

Key words Sarcopenia, Body Composition, Anthropometry, Electric Impedance, Tomography X-Ray Computed

Category: Clinical Nutrition

体重减轻对鼻咽癌患者无进展生存期影响的定量评估

Quantitative evaluation of the effect of weight loss on the Progress Free Survival of patients with nasopharyngeal carcinoma

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OBJECTIVE

Critical weight loss plays an important role in nasopharyngeal carcinoma (NPC) severity, and is associated with worse therapeutic outcomes. While there is no national or international consensus on weight loss cutoff points to identify the point at which patients with NPC should be urged to initiate dietitian referrals. Therefore, we performed a repeated weight assessment and systematic and statistical interpretation of data on a NPC cohort to define an effective indicator for weight loss in patients with NPC to address the gap in knowledge regarding the relationship between weight loss and NPC prognosis.

MATERIALS AND METHODS

681 newly diagnosed NPC patients were included in our retrospective cohort analysis. Cox regression model was performed to selected the most effective indicator for weight loss, and restricted spline curve was plotted to determine potential cutoff values. Cox proportional hazards model and Kaplan-Meier method were conducted to select and verified the best cutoff values for prognosis prediction. C-index was performed to assess the prognostic predict value of PWL in NPC.

RESULT

Among three alternative indicators, percent weight loss (PWL) was the most important information retaining variable for NPC prognosis. The risk of tumor progression of NPC increased almost linearly with the increasing of PWL, and cutoff values, 6.3% and 13.2%, effectively differentiate patients into different risk group (5-year PFS 84.5, 77.9%, 67.3% in low- media- and high- risk group respectively). These PWL cutoff values improved the predictive capability of traditional prognostic model in NPC progression (0.675 in traditional model vs. 0.697 in PWL model P=0.004).

Conclusion

These results suggested that PWL appeared to be a promising prognostic predictor for NPC. Stratifying patients with NPC based on the present cutoff values may help in identifying patients at higher risk for worse outcomes.

Key words nasopharyngeal carcinoma; weight loss; cut-off values; PFS

Category: Clinical Nutrition

标准肠内营养与免疫调节肠内营养治疗对食管癌临床疗效的影响：系统评价和荟萃分析

Clinical efficacy of standard enteral nutrition and immunomodulating enteral nutrition in treatment of esophageal cancer: a systematic review and meta-analysis

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Objectives: To compare the effects of standard enteral nutrition with immunomodulating enteral nutrition on postoperative outcomes in patients with esophageal cancer.

Methods: A comprehensive search of PubMed, Cochrane and Web of Science for articles published from January 2000 to March 2023 was conducted to collect randomized controlled clinical studies on the association of standard enteral nutrition and immunomodulating enteral nutrition with clinical outcomes in esophageal cancer. Perioperative outcomes included postoperative infectious complications and postoperative length of hospital stay. Long-term outcomes included 2-year mortality. The results were analyzed using systematic evaluation methods, and the combined odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. After data extraction and quality analysis of the included literature, meta-analysis was performed using RevMan 5.4 software.

Results: Seven studies reporting 642 subjects (397 in the intervention group and 245 in the control group) were included. The intervention group was treated with IMPACT (Novartis/Nestlé) immunomodulating enteral nutrition which contains Ω-3 fatty acids, arginine and nucleotides, while the control group was treated with standard enteral nutrition. All the components except the extra immunomodulatory nutritional substrates were exactly the same between the two groups. Meta-analysis showed that immunomodulating enteral nutrition had no statistically significant effect on postoperative infection complications (OR= 0.84; 95% CI: 0.53,1.32; P= 0.44), length of hospital stay (MD= -1.91; 95% CI: -5.60,1.77; P= 0.31) and 2-year mortality (OR= 0.78; 95% CI: 0.34, 1.75; P= 0.54).

Conclusions: Immunomodulating enteral nutrition may improve perioperative outcomes and reduce 2-year mortality in patients with esophageal cancer, but the difference is not significant compared to standard enteral nutrition given the short follow-up period and the inadequate sample size of the retrieved studies. Therefore, further confirmation is needed to improve the understanding of immunomodulating enteral nutrition.

Key words Standard enteral nutrition; Immune enteral nutrition; Esophageal cancer; Nutritional therapy; Meta-analysis.

Category: Clinical Nutrition

系统评价新冠肺炎营养干预临床研究的方法学质量

Methodological Quality Assessment of Clinical Studies Investigating Nutrition Interventions for COVID-19

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Aim: To evaluate the methodological quality of clinical studies regarding nutrition interventions for coronavirus disease 2019 (COVID-19).

Methods: We searched six databases from inception to January 2023. We included randomized controlled trials (RCTs), non-randomized controlled trials, cohort studiesand case-control studies exploring the role of nutrition interventions in the prevention and treatment of COVID-19 disease and post-COVID syndrome. Risk of bias was assessed by the Cochrane Risk of Bias Tool (RoB2) for RCTs, the Risk Of Bias In Non-randomised Studies of Interventions (ROBINS-I) for non-randomized controlled trials, and the Observational Study Quality Evaluation (OSQE) for cohort studies and case-control studies.

Results: A total of 27 studies were included, including 13 RCTs and 14 cohort studies. Twenty types of nutrition interventions were involved in these studies, and all these nutrition interventions were reported to have beneficial effects on COVID-19 disease or post-COVID syndrome except glutamine. Judging by RoB2, all the 13 RCTs were rated at high risk of bias. Judging by OSQE, 1 (7%) cohort study wasrated at low risk of bias, 9 (64%) cohort studies were rated at moderate risk of bias, and 4 (29%) cohort studies were rated at high risk of bias.

Conclusion: Most of the clinical studies regarding nutrition interventions for COVID-19 seem insufficiently protected against bias. Improving the methodological quality of clinical studies should be a top priority in this field.

Key words nutrition interventions; COVID-19; methodological quality; RCT; cohort study

Category: Clinical Nutrition

婴幼儿期0-2岁体格发育轨迹与青春早期血压和心率的关联:基于中国西部农村的出生队列研究

Life-course physical growth trajectories from birth to two years of age and blood pressure at early adolescence: a birth cohort

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Objectives

To examine the associations of life-course physical growth trajectories from birth to two years of age with adolescent blood pressure (BP), and the causal mediating role of adolescent current adiposity and puberty onset.

Methods

We analyzed data from a prospective birth cohort of children born to mothers who participated in a randomized controlled trial of antenatal micronutrient supplementation in China. We measured infant weight and length at birth, 1, 3, 6, 9, 12, 18, and 24 months of age, which were converted into z scores by the INTERGROWTH-21st and WHO standards. Adolescent BP was assessed using a validated electronic sphygmomanometer and converted into percentiles by sex, age and height. We used group-based trajectory modeling to identify the weight-, length-, BMI- and weight-for-length-for-age and sex z score (WAZ, LAZ, BAZ, WFL) trajectories during the first two years, and examined their associations with adolescent BP. The natural indirect effect (NIE) and proportions mediated (PM) by adolescent BAZ and puberty onset were estimated by inverse odds ratio weighting.

Results

Among 1388 infants enrolled for long-term follow-up, 741 (60.9% male) adolescents aged 10-14 were followed, with a mean age of 11.26 (SD, 0.57). Distinct growth trajectories were identified, implying catch-up growth after birth. BAZ and WFL trajectories were associated with adolescent systolic and diastolic BP and BP percentiles, with adjusted mean differences ranging from1.70 to 5.29 mmHg. In addition, these relationships between growth trajectories and adolescent systolic BP percentiles were largely mediated by adolescent BAZ with maximum PMs of 87%, while the corresponding PMs of puberty onset were small with NIEs crossing null points. The NIEs were not statistically significant for adolescent diastolic BP.

Conclusions

Early-life growth trajectories from birth may have causal relationships with adolescent systolic BP. Routine monitoring infant growth has the potential utility to predict the life-long risk of hypertension and other cardiovascular diseases.

Key words birth cohort, physical growth, life-course trajectory, blood pressure, early adolescence

Category: Clinical Nutrition

炎症相关营养筛查工具与血液肿瘤患者住院时长的关系

The association between an inflammation-based nutritional tool (Glasgow Prognostic Score) and length of hospital stay in patients with haematological cancer

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Objective: Glasgow Prognostic Score (GPS) is a prognostic tool that combined an inflammatory marker [C-Reactive Protein (CRP)] with a nutritional marker (serum albumin). Yet, there is few published work on the reliability of GPS in patients with haematological cancer.

Methods: This is a retrospective single-centre study. All the participants were adult inpatients in Ren Ji Hospital between 2018 and 2022. Serum levels of CRP and albumin were measured at admission. GPS was calculated as follows: point "0" as CRP<10 mg/L and albumin≥35 g/L; point "2" as CRP≥10 mg/L and albumin<35 g/L; point "1" as either CRP≥10 mg/L or albumin<35 g/L. Patients with point "0" were classified as low-risk while point "2" as high-risk. Length of hospital stay (LOS) was defined as the interval between admission and discharge date. Other information, including general characteristics, liver and renal function tests, and full blood counts, were obtained from the medical records.

Results: Of 1,621 patients, 8.8% of patients were high risk. The average age is 59.6 y and the average LOS is 6.0 d. GPS was associated with LOS (β=2.7 d; 95% CI: 0.8 d, 4.6 d; p trend<0.001) after adjustment of sex, age, type of disease, BMI, alanine aminotransferase, aspartate aminotransferase, total bilirubin, estimated glomerular filtration rate, haemoglobin, red blood cell count, white blood cell count, and fasting blood glucose. Each point of GPS was associated with 1.9 days (95% CI: 1.4 d, 2.4 d) longer in LOS with full adjustment. The association was more prominent in younger patients (<65 y), patients with leukaemia and myelodysplastic syndrome, and those with normal body weight status (18.5-24 kg/m^2), compared with their counterparts.

Conclusion: GPS was associated with LOS in Chinese patients with haematological cancer, indicating GPS could be a useful assessment tool to predict outcome.

Key words Glasgow Prognostic Score, length of hospital stay, haematological cancer

Category: Clinical Nutrition

活动性肺结核患者的营养状况研究及营养筛查新模型的建立：一项全国性、多中心、大样本回顾性研究

Nutritional status in patients with active pulmonary tuberculosis and new nutritional risk screening model for active tuberculosis: a national, multicenter, cross-sectional study in China

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Abstract

Background: Tuberculosis (TB) remains a significant challenge for public health and is closely associated with malnutrition; however, few studies have attempted to screen malnutrition among TB patients. The study aimed to evaluate the nutrition status and build a new nutritional screening model for active TB.

Methods: A retrospective, multicenter, large cross-sectional study was conducted in China from 1 January 2020 to 31 December 2021. All included patients diagnosed with active pulmonary TB (PTB) were evaluated both by Nutrition Risk Screening 2002 (NRS 2002) and Global Leadership Initiative on Malnutrition (GLIM) criteria. Univariate and multivariate analyses were conducted to screen the risk factors associated with malnutrition, and a new screening risk model, mainly for TB patients, was constructed.

Results: A total of 14,941 cases meeting the inclusion criteria were entered into the final analysis. The malnutrition risk rate among PTB patients in China was 55.86% and 42.70%, according to the NRS 2002 and GLIM, respectively. The inconsistency rate between the two methods was 24.77%. A total of 11 clinical factors, including elderly, low body mass index (BMI), decreased lymphocyte cells, taking immunosuppressive agents, co-pleural TB, diabetes mellitus (DM), human immunodeficiency virus (HIV), severe pneumonia, decreased food intake within a week, weight loss and dialysis were identified as independent risk factors of malnutrition based on multivariate analyses. A new nutritional risk screening model was constructed for TB patients with a diagnostic sensitivity of 97.6% and specificity of 93.1%.

Conclusions: Active TB patients have severe malnutrition status according to screening by the NRS 2002 and GLIM criteria. The new screening model is recommended for PTB patients as it is more closely tailored to the characteristics of TB.

Key words Nutritional risk; malnutrition; Nutrition Risk Screening 2002 (NRS 2002); Global Leadership Initiative on Malnutrition (GLIM); model

Category: Clinical Nutrition

血脂相关指标在肌肉衰减症和骨骼肌衰减中的作用

Role of circulating lipid factors in Skeletal Muscle Atrophy and Sarcopenia

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Background & Objective: Compelling evidence supports a role for excess fatty acids synthesized in intramuscular space or dietary intermediates resulting in skeletal muscle function decline. Thus, our study aimed to explore complex interactions between circulating lipid factors and sarcopenia in older people and analyze their potential mechanisms.

Methods: Muscle mass (MM), hand grip strength (HGS), physical performance, circulating factors, and metabolic markers were measured during cross-sectional study in Peking Union Medical College Hospital (PUMC Hospital) multicenter prospective longitudinal sarcopenia study (PPLSS).

Results: The sarcopenic group had significantly higher serum high-density lipoprotein cholesterol (HDL-C) (1.59±0.56 vs. 1.29±0.33mmol/L, P=0.01) and lower serum total triglyceride level (1.11±0.61 vs. 1.38±0.76mmol/L, P=0.017). Pre-sarcopenic (1.50±0.62mmol/L), sarcopenic (1.57±0.20mmol/L) and severe sarcopenic subjects (1.48±0.56mmol/L) were higher HDL-C levels than control subjects, and pre-sarcopenic subjects presented lowest total triglyceride level (1.00±0.47mmol/L), probably sarcopenic subjects shown the highest level (1.58±0.91mmol/L).High level of HDL-C was associated with a 5.3-fold increased risk of sarcopenia [OR=5.272, 95%CI (2.163, 12.848)], while serum total triglyceride level was protective from sarcopenia [OR=0.546, 95%CI (0.309, 0.965)]. Based on the analysis of dietary fat and cholesterol content, it was found that fat and cholesterol from meat are protective factors for sarcopenia [for dietary fat from meat, OR=0.900, 95%CI (0.843, 0.972); for dietary cholesterol from meat OR=0.983, 95%CI (0.971, 0.999)].

Conclusions: High level of the circulating lipid cytokines HDL-C was associated with an increased risk of sarcopenia, while the total triglyceride was associated with a decreased risk of sarcopenia in our Chinese patient cohort. The reason why high serum HDL-C level resulted in muscle mass loss is that high cholesterol levels reduce insulin levels rather than dietary fat and cholesterol, which indicated the elderly persons should take an appropriate amount of meat

Key words Sarcopenia; Sarcopenic Obesity; Cholesterol; Insulin; Dietary fat

Category: Clinical Nutrition

血清微量元素水平与早产低体重儿出生结局的关系

ASSOCIATION OF SERUM TRACE ELEMENT LEVELS WITH BIRTH OUTCOMES IN PRETERM LOW BIRTH WEIGHT INFANTS

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Background and Objectives This study aimed at evaluating the relationship between serum trace element levels and gestational age (GA), anthropometric parameters at birth, and complications in preterm low birth weight (LBW) infants.

Methods and Study Design From March 2020 to August 2020, infants whose GA＜37 weeks and birth weight (BW)＜2500 g admitted to the neonatal intensive care unit (NICU) within 24 hours after birth were included. The concentrations of serum trace element levels were measured by inductively coupled plasma mass spectrometry (ICP-MS) within 48 hours after birth. Correlations of the levels of zinc (Zn), copper (Cu), selenium (Se), Manganese (Mn) and GA, anthropometric parameters at birth, and complications were determined.

Results A total of 83 premature infants were enrolled, including 46 male infants (55.4%) and 37 female infants (44.6%) with GA of 32.3(29.9,34.0) weeks and BW of 1650(1300,1960) g. Serum Zn levels were 1.22(1.03,1.43) mg/L, Cu levels were 180.30(134.00,275.30) μg/L, Se levels were (40.76±6.66) μg/L and Mn levels were 3.65(2.05,4.52) μg/L. Cu levels were inversely correlated with BW-for-age z scores (r=-0.451, P=0.000) and length-for-age z scores at birth (r=-0.231, P=0.036). Se levels were positively correlated with head circumference (HC) at birth (r=0.290, P=0.009). Mn levels were significantly higher in premature infants with hyperbilirubinemia than those without (P＜0.05).

Conclusions Preterm LBW infants had lower serum Cu levels after birth and intrauterine growth restriction might influence serum Cu levels. Serum Mn levels were higher and there was a significant difference between preterm infants with and without hyperbilirubinemia.

Key words trace elements, low birth weight, preterm infants, birth outcomes, serum trace element levels

Category: Clinical Nutrition

早产低体重儿肠外营养中的血清微量元素水平及微量元素补充剂安全性

SERUM TRACE ELEMENT LEVELS AND SAFETY OF TRACE ELEMENTS SUPPLEMENTATION FOR PARENTERAL NUTRITION IN PRETERM LOW BIRTH WEIGHT INFANTS

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Background and Objectives To evaluate the serum levels of trace elements and the safety of multi-trace element injection I [MTEI-(I)] for parenteral nutrition in preterm LBW infants.

Methods and Study Design From March to August 2020, infants were included with GA ＜37 weeks and BW＜2500g admitted to NICU within 24 hours after birth. PN with MTEI-(I) at 1 ml• kg• day was administrated to the infants. The concentrations of serum trace element levels were detected by ICP-MS pre- and post-supplementation. The weight of infants was measured every day. Length, head circumference, pre-albumin (pre-ALB), albumin (ALB), C-reactive protein (CRP), procalcitonin (PCT), routine blood tests, liver and kidney functions and adverse drug reactions (ADR) of infants were monitored and detected.

Results A total of 43 preterm infants were enrolled, including 22 male infants and 21 female infants with GA of (31.4±2.4) weeks and BW of 1430(1200,1830)g. Administration of MTEI-(I) in parenteral nutrition was initiated 2(1, 2) days after birth, and continued for 11(9, 17) days. Serum Cu and Se levels were higher than those in pre-parenteral nutrition (P＜0.05), whereas serum Mn levels were lower than those before (P＜0.05). A positive correlation between serum Zn levels after supplementation and weight growth velocity in hospitalized preterm LBW infants was found (P＜0.05). Serum Se levels were positively correlated with weight and weight-for-age z-scores at discharge (P< 0.05). Additionally, PCT, aspartate transaminase (AST), gamma-glutamyl transferase (GGT), total bilirubin (TB), blood urea nitrogen (Bun) was significantly lower (P< 0.05), while pre-ALB, alkaline phosphatase (AKP), direct bilirubin (DB), creatinine (Cr) were higher (P＜0.05).

Conclusions Parenteral supplementation of MTEI-(I) at 1 ml• kg• day was safe for preterm LBW infants and might increase serum Cu levels, maintain the levels of serum Zn and Se, and improve serum Mn levels.

Key words trace elements, low birth weight, preterm infants, efficacy safety, baby

Category: Clinical Nutrition

室间隔缺损患儿住院期间营养风险筛查及临床结局

NUTRITION RISK SCREENING AND CLINICAL OUTCOMES OF PEDIATRIC PATIENTS DURING HOSPITALIZATION FOR VENTRICULAR SEPTAL DEFECT

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Background and Objectives The study aimed at analyzing the Screening Tool for the Assessment of Malnutrition in Pediatrics (STAMP) scores of hospitalized children with ventricular septal defect (VSD).

Methods and Study Design Children with VSD discharged from SCMC between January 2019 and December 2020 were enrolled. Data including age at admission, anthropometric measurements, STAMP scores, LOS, and hospitalization cost were collected retrospectively. A STAMP score≥4 indicated high nutrition risk (HNR). Otherwise, a score of 0-3 reflected low and medium nutrition risk (LMNR). Analysis was performed to find if there were statistically significant differences in multiple variables between different nutrition risk groups and patients with or without malnutrition.

Results 1. 3,100 pediatric patients were admitted with VSD. Highest STAMP scores during hospitalization were compared and showed that 7% (n=32/455) cardiac patients, 52% (n=1343/2557) patients undergoing cardiac surgery, and 62.5% (n=55/88) ICU patients were categorized as high nutrition risk.

2. VSD patients with high nutrition risk had longer LOS (p=0.000), higher total costs of hospitalization (p=0.000), and higher costs of antibiotics (p=0.000).

3. The prevalence of VSD pediatric patients with acute and chronic malnutrition at admission was 16.0% and 16.6%, respectively. There were no statistically significant differences in antibiotics costs, total daily costs, and daily antibiotics costs between two groups. Nor did the study find significant differences in LOS, total costs of hospitalization, costs of antibiotics, total daily costs, and daily costs of antibiotics.

Conclusions The incidence of high malnutrition risk in VSD patients during hospitalization was 46.1%. Surgical patients with VSD had a higher proportion of HNR (52.5%). Compared with weight and height at admission, nutrition risk screening results were better in forecasting indicators such as LOS, total cost, cost of antibiotics, and daily costs, thus implying the necessity of regularly screening VSD pediatric patients for nutrition risks during hospitalization.

Key words Nutrition risk screening, Children, ventricular septal defect, STAMP, Hospitalization

Category: Clinical Nutrition

两种脂肪乳剂静脉滴注对早产儿临床结局的影响

THE EFFECTS OF TWO KINDS OF INTRAVENOUS FAT EMULSION ON THE CLINICAL OUTCOME OF PREMATURE INFANTS

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Background and Objectives To evaluate the effects of two kinds of intravenous fat emulsion on the clinical outcome of premature infants, further evaluate the clinical efficacy and safety of SMOF fat emulsion in premature infants and finally provide clinical evidence for the application of SMOF in premature infants.

Methods and Study Design Preterm infants (gestational week ≤37W, birth weight ≤2000g, admission 72h after birth, PN support ≥ 14 d) in neonatal intensive care unit (NICU) of our hospital from May 1, 2018 to October 31, 2019 were divided into SMOF group and MCT/LCT group separately. Subjective respectively added the fat emulsion to PN from the initial dose of 1.0g/kg/d, increased to 3g/kg/d at the speed of 0.5-1.0g/kg/d. Other nutritional support conditions were completely consistent. Blood samples were collected before PN and 14 days after PN. The liver enzyme levels, kidney function, inflammatory factors, nutritional indicators and incidence rate of PNAC, duration of PN use and length of hospital stay were collected.

Results A total of 182 premature infants were included in the study. In terms of growth and development index, the weight of the SMOF group recovered earlier to the age of birth ($p<0.05$). Furtherly, there was no significant difference between initial fat emulsion, initial amino acid use and in liver function indexes, renal function indexes, infection indexes and nutritional indexes between the two groups at 0 and 14 days. Additionally, PN use duration in SMOF group was shortened ($p<0.05$). The incidence of PNAC was low.

Conclusions Under the standard application of PN, the weight of SMOF group recovered earlier to birth age and PN duration was significantly shortened, which may be related to the increased gastrointestinal tolerance of SMOF. SMOF can shorten the duration of PN use and the time to return to the birth date.

Key words Fat emulsion, Baby, Premature infant, SMOF, Parenteral Nutrition

Category: Clinical Nutrition

COVID-19 封城后肥胖儿童的代谢特征
METABOLIC CHARACTERISTICS AMONG CHILDREN WITH OBESITY POST-COVID-19 LOCKDOWN

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Background and Objectives To investigate the prevalence of obesity and metabolic characteristics in children pre- and post-COVID-19 home confinement.

Methods and Study Design A cross-sectional study was conducted on children with obesity visiting the nutrition clinic of Shanghai Children's Medical Center from April to August 2020 (Group 2020) and in the identical months of 2019 (Group 2019).

Results 114 (7.35%) patients in Group 2019 were diagnosed with overweight or obesity, whereas 176 (9.87%) in Group 2020 (P=0.010). Increased rates of insulin resistance (n=63, 35.8% vs. n=25, 21.9%, P=0.014), impaired fasting glucose (n=31, 17.6% vs. n=8, 7.01%, P=0.010), impaired glucose tolerance (n=13, 7.39% vs. n=2, 1.75%, P=0.034), non-alcohol fatty liver disease (n=38, 21.6% vs. n=11, 9.65%, P=0.008), vitamin D deficiency (n=31, 21.0%vs. n=4, 2.63%, P=0.000) and insufficiency (n=37, 17.6% vs. n=3, 3.51%, P=0.000) were observed in Group 2020.

School children (64.16 ± 21.33 vs. 51.77 ± 19.89 cm2, P=0.009), pre-adolescents (97.01 ± 27.84 vs.77.42 ± 26.50 cm2, P=0.008), adolescents (125.15 ± 31.42 vs. 86.79 ± 33.87 cm2, P=0.002), patients diagnosed with class I (69.51 ± 25.85 vs.43.55 ± 19.67 cm2, P=0.001) and class II obesity (86.23 ± 32.36 vs. 54.83 ± 21.95 cm2, P=0.003) in Group 2020 gained more visceral adipose tissue. In addition, preschoolers and school children in Group 2020 had higher fasting insulin levels (12.2 ± 6.79 vs. 5.32 ± 0.85 μIU/mL, P=0.021; 14.56 ± 9.45μIU/mL, P=0.037) and HOMA-IR values (3.16 ± 1.96 vs. 1.19±0.26, P=0.021; 3.24 ± 2.00 vs. 2.3 ± 1.25 P=0.017). A positive correlation of visceral fat area existed with fasting insulin levels (r=0.592, P=0.000), 2-hour postprandial insulin (r=0.326, P=0.000), HOMA-IR (r=0.583, P=0.000) and serum uric acid levels (r=0.433, P=0.000) while negative with serum 25-hydroxy vitamin D levels (r=-0.415, P=0.001).

Conclusions COVID-19 homebound children without obesity might turn increasingly centrally obese and suffer from pre-diabetes at a lower age.

Key words Obesity, COVID-19, Children, Metabolic, Prediabetes

Category: Clinical Nutrition

65岁及以上2型糖尿病患者的血清维生素D水平与合并高血压的关系

Association of serum vitamin D levels with combined hypertension in patients aged 65 years and older with Type 2 Diabetes Mellitus

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BACKGROUND: Epidemiological studies have found that vitamin D is associated with glucose metabolism as well as endothelial function. The aim of this study was to investigate the relationship between vitamin D levels and complicated hypertension in type 2 diabetic (T2DM) patients aged 65 years and older. METHODS: In this cross-sectional study, 602 T2DM admitted to the Department of Endocrinology at Xinhua Hospital from December 2015 to July 2018 were divided into a non-hypertensive group (n=207) and a hypertensive group (n=395). Basic information and laboratory results were collected from the medical records. RESULTS: Among these patients, combined hypertension accounted for 65.61%. Patients in the hypertensive group had lower serum 25(OH)D concentrations than those in the non-hypertensive group ($P < 0.05$). The results of binary logistic regression showed that low vitamin D concentration was a risk factor for combined hypertension in diabetic patients aged 65 years and older ($P < 0.05$). In addition, serum 25(OH)D levels <34.85 nmol/L according to ROC analysis indicated that hypertension may be present in patients aged 65 years and older with T2DM ($P < 0.05$). CONCLUSION: This study suggests an association between vitamin D level and complicated hypertension with serum 25(OH)D <34.85 nmol/L indicating possible hypertension in T2DM patients aged 65 years and older. Further studies are required to evaluate the causative relationships between serum 25(OH)D and hypertension, the effect of vitamin D supplementation on hypertension, and patients with T2DM.

Key words Type 2 DM, Vitamin D, Hypertention

Category: Clinical Nutrition

骨钙素在男性2型糖尿病患者的维生素D和葡萄糖稳态之间的关联中具有调解作用

Osteocalcin has a mediation role in the association between vitamin D and glucose homeostasis in male type 2 diabetes patients

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Background The relationship between vitamin D (VD) and glucose metabolism is conflicting among recent studies, and whether osteocalcin (OC) makes a mediating difference in this process is still unknown. Thus, we aimed to investigate the mediating role of OC in the link between VD and glucose metabolism in male patients with type 2 diabetes.

Methods A total of 1,066 male patients with type 2 diabetes admitted to the Department of Endocrinology at Xinhua Hospital from June 2016 to July 2019 were recruited in this cross-sectional study. Duration of diabetes, age, height, weight, glycosylated hemoglobin A1C (HbA1c), fasting blood glucose (FBG), and fasting insulin (FINS), 25(OH)D and OC at admission were collected from medical records. Analysis of mediating effect was performed to assess the mediating effects of OC on the relationship between VD and glucose metabolism.

Results Among the patients, the prevalence of severe vitamin D deficiency, moderate vitamin D insufficiency, and vitamin D non-deficiency was 13.23%, 51.69%, and 35.08%, respectively. With the increase of VD levels, all markers of glucose metabolism all showed a gradually decreasing trend ($P < 0.05$). Multiple linear regression analysis and mediating effect analysis revealed that VD regulated HbA1c and FBG (both $P < 0.05$) directly, while OC played a mediating role in the link between VD and HbA1c and FBG, but not FINS, HOMA-IR and HOMA-β.

Key words type 2 diabetes, vitamin D, osteocalcin, glucose homeostasis, male

Category: Clinical Nutrition

慢性阻塞性肺疾病合并肿瘤患者在体组成与血脂的相关研究

Association between Body Composition and Lipid Profile in Patients with Chronic Obstructive Pulmonary Disease Concurrent Tumors

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Objective: This study aims to analyze the variations in body composition and lipid levels among patients suffering from chronic obstructive pulmonary disease (COPD) along with tumors.

Methods: We enrolled 95 male patients with COPD who attended our hospital and divided them into three groups according to the Nutritional Risk Screening 2002 (NRS2002) and whether they had respiratory tumor disease: COPD without nutritional risk (COPD+NNR group, N=21), COPD with nutritional risk (COPD+NR group, N=56), and COPD with both nutritional risk and respiratory tumor disease (COPD+NR +CA group, N=18).

Results: Statistical analysis showed significant differences in body weight (BW), body fat (BF), percentage body fat (PBF), whole body phase angle (PhA), low-density lipoprotein (LDL), and triglycerides (TG) between the three groups (all $P < 0.05$). We found a negative correlation between BW, BF, PBF, PhA, and TG levels and patients with higher NRS2002 scores in the COPD+NNR and COPD+NR groups ($r=-0.492$, $r=-0.407$, $r=-0.303$, $r=-0.398$, $r=-0.329$, all $P < 0.05$). Regression analysis revealed that PhA was an independent protective factor for patients at risk of malnutrition ($P=0.019$, $OR=0.224$). Additionally, a positive correlation was found between BW, PBF, and BF and patients with oncological disease in the COPD+NR and COPD+NR+CA groups ($r=0.270$, $r=0.232$, $r=0.268$, all $P<0.05$). Regression analysis found that PhA was an independent risk factor for patients with tumors ($P=0.028$, $OR=2.773$).

Conclusion: COPD+NR had the poorest nutritional status among the three groups, with lower BW, BF, PhA, and TG, which increased nutritional risk. Increasing PhA, however, was associated with a lower probability of nutritional deficiency, but an increased risk of tumor development. To support this finding, a larger sample size is needed.

Key words chronic obstructive pulmonary disease, tumor, body composition, lipids

Category: Clinical Nutrition

素食者与杂食者的膳食炎症指数和血清炎症标志物比较

Comparison of dietary inflammatory index and serum inflammatory markers between vegetarians and omnivores in Chinese population

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BACKGROUND: Most previous studies on the association between vegetarian diet and inflammation have used only one inflammatory factor e.g. C-reactive protein(CRP) and the findings were generally inconsistent. This study aimed to investigate the correlation between diet and inflammation in Chinese vegetarians using dietary indices and multiple inflammatory markers.

METHODS: 279 vegetarians and omnivores of the same sex and age recruited in Shanghai, 2016. 24-hour dietary review questionnaire were collected and used to calculate Dietary inflammatory index (DII) and Energy-adjusted inflammatory index (EDII) of both groups. In addition, energy intake matched vegetarian and omnivore recipes were designed and used to calculate a theoretical DII. The theoretical DIIs were also compared between groups to provide a theoretical basis for the anti-inflammatory potential of vegetarian diets. Five serum inflammatory markers CRP, interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α), neutrophil-lymphocyte ratio (NLR), and platelet-lymphocyte ratio (PLR) were measured.

RESULTS: (i) Vegetarians had significantly lower E-DII and theoretical DII than omnivores (2.43±1.04 vs. 2.88±0.95, P<0.001). (ii) In contrast, the raw DII of vegetarians was not significantly different from that of omnivores, probably due to lower energy intake in vegetarians than in omnivores (1367.97±479.75 vs. 1724.78±568.13, P<0.001). (iii) CRP was lower in vegetarians than in omnivores (P=0.001) thought four other inflammatory biomarkers (NLR, PLR, TNF-α, and IL-6) were significantly higher in the vegetarians (P<0.05)

CONCLUSION: A theoretical vegetarian diet with adequate energy intake as well as a balanced dietary intake showed good anti-inflammatory effects, though this was not fully reflected in the existing vegetarian population in this study, probably due to insufficient energy intake in the vegetarian population.

Key words vegetarian; dietary inflammatory index; inflammatory biomarkers

Category: Clinical Nutrition

修正营养不良诊断后住院患者 DRG 付费补偿与 CMI 的比较

Comparison of DRG based reimbursement and CMI within hospitalized patients before and after modified malnutrition diagnosis

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Background & aims: Malnutrition was often underappreciated in clinical practice. Lack of professional and accurate diagnosis of malnutrition results in the reduction of Diagnosis Related Group (DRG) payment and the decrease of Case-Mix Index (CMI). The aim of this study was to explore the effects of adding proper nutritional diagnosis and modifying complication groups on the compensation of DRG and CMI.

Methods: Retrospective analysis was performed on patients admitted to hospital from January to June 2022 who had undergone nutritional assessment. According to the results of patient-generated subjective global assessment (PG-SGA) within 24 hours of admission, the patients were diagnosed with well nourished, mild malnutrition, moderate malnutrition or severe malnutrition. CMI and DRG hospital internal control standard were recalculated and compared with the original values.

Results: A total of 254 patients were enrolled, including 40 patients with mild malnutrition, 74 patients with moderate malnutrition, 122 patients with severe malnutrition. Among all subjects, 111 changed complication groups. The median of DRG hospital internal control standard (12006.09 vs. 13797.19, $p = 0.01$) and the median of CMI (0.91 vs. 1.04, $p = 0.026$) were significantly higher than those before modification of diagnosis. For inflammatory bowel disease (IBD) patients, the CMI value, hospital control standard of DRG and the classification of DRG were significantly different compared with those before revision of diagnosis ($p < 0.001$).

Conclusion: Fully identification and correctly codification of malnutrition cases are conducive for hospitals to receive proper DRG compensation, and further contribute to the improvement of medical quality and the economic sustainability of hospitals.

Key words Malnutrition; DRG; CMI; PG-SGA

Category: Clinical Nutrition

肌肉减少症的特殊膳食模式：中国 1059 名社区居民的横断面研究结果

Association of Dietary Patterns and Sarcopenia: a cross-sectional study of 1059 participants in China

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Background: Sarcopenia, defined as the loss of muscle mass and strength, has been associated with increased hospitalization and mortality. Dietary pattern analysis is a whole diet approach used to investigate the relationship between diet and sarcopenia. This study aims to estimate the prevalence of sarcopenia and explore possible factors associated with it among a large population in Beijing, China.

Methods: A cross-sectional study with 1059 participants aged more than 50 years was performed. Sarcopenia was defined based on the guidelines of the Asian Working Group for Sarcopenia. The total score of the MNA-SF questionnaire was used to analyse nutrition status. The baseline demographic information, diet structure and eating habits were collected by clinicians trained in questionnaire data collection and anthropometric and bioimpedance measurements.

Results: The overall prevalence of sarcopenia was 8.8% and increased with age: 5%, 5.8%, 10.3% and 26.2% in the 50-59, 60-69, 70-79, and ≥80 years groups, respectively. Marital status (with or without a spouse) was not an independent factor associated with sarcopenia or income status. However, nutritional risk or malnutrition, vegetable diet, advanced age and spicy eating habits were risk factors for sarcopenia. Meanwhile, daily fruit, dairy and nut consumption were protective factors against sarcopenia.

Conclusions: Although further studies are required to explore the association between healthy dietary patterns and the risk of sarcopenia, the present study provides basic data for establishing dietary guidelines for the prevention of sarcopenia in elderly Chinese individuals.

Key words sarcopenia; prevalence; dietary patterns; older adults

Category: Clinical Nutrition

口服肿瘤营养补充监测通过调节白介素对肠胃道癌症术后患者营养状态和体重指数及骨骼肌的影响

Effect of post-discharge oral nutritional supplement on BMI and skeletal muscle mass through interleukin group in malnourished patients with gastrointestinal cancer

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Background and Objectives

Gastrointestinal cancer (GI) patients often suffer from malnutrition after surgery, especially for those post-discharge ones. Most studies focused on oral nutrition supplement (ONS) for clinical outcomes in patients during hospital stay. This study was to investigate the impact of tumor-specialized ONS (TSONS) on BMI and skeletal muscle mass (SMM) in post-discharge malnourished GI patients after surgery through interleukin (IL) group.

Methods

A retrospective study was delivered in a real-life clinical setting. GI adults at risk of malnutrition after surgery from December 2021 to October 2022 were recommended to receive hospital-prepared TSONS, containing 18% protein, 50.0% fat and 32.0% carbohydrate per service, to reach 500 kcal per day up to 3 weeks. Nutritional status was evaluated by Scored Patient-Generated Subjective Global Assessment. Generalized Linear Mixed Models (GLMM) was used with subject fix effects to analyze the effects on BMI and SMM.

Results

In total, 42 eligible GI patients receiving three-week TSONS were included in this analysis. Three-week TSONS improved nutritionals status ($P<0.001$). After stratified by the status of body weight and appendicular skeletal muscle index (ASMI), underweight or low ASMI patients gained better nutrition status than other counterparts. Regarding IL factors, the median values got slightly increased in patients with normal weight and overweight, and normal ASMI, compared to those with underweight or low ASMI, although no significance was found. GLMM showed that IL2 and IL10 were positively associated with SSM ($\beta=2.1$, $P=0.019$) and BMI ($\beta=1.3$, $P=0.002$), respectively, while IL4 was negatively associated with BMI ($\beta=-1.6$, $P=0.012$).

Conclusion

Three-week TSONS improved nutritional status in malnourished GI patients after surgery. Three-week TSONS could affect IL group to increase BMI and SSM. In the future, RCT with longer TSONS period is required to investigate the impacts of IL groups on BMI and SSM.

Key words malnutrition, body mass index, sarcopenia, skeletal muscle mass, interleukin, oral nutritional supplements; gastrointestinal cancer

Category: Clinical Nutrition

乳腺癌化疗患者膳食营养行为及影响因素：一项基于健康行为改变整合理论的多中心调查研究

The Dietary Nutritional Practice of Breast Cancer Patients Receiving Chemotherapy and its Associated Factors: A Multicenter Survey from Hospitals in China Based on the Integrated Theory of Health Behavior Change

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Background and Objectives: Chemotherapy often disturbs breast cancer patients' nutritional status, and females need to conduct active dietary nutritional practice to maintain healthy dietary habits and normal nutritional status. With the guidance of the 'Integrated Theory of Health Behavior Change ', the objective of this survey is to determine the level and associated factors of patients' dietary nutritional practice from the perspective of health self-management.

Methods and Study Design: This was a multicenter cross-sectional study. A total of 396 breast cancer patients undergoing chemotherapy were included from three hospitals spanning three cities in China. Face-to-face investigations were conducted using the Questionnaire of demographic and clinical characteristics; the Dietary Nutritional Knowledge, Attitude and Practice Questionnaire; a Strategies Used by People to Promote Health; Consideration of Future Consequences Scale-Food; Treatment Self-Regulation Questionnaire and Perceived Social Support Scale.

Results: The results showed overall satisfactory dietary nutritional practice with a score of 37.97±5.13. In the final regression model, patients with higher scores for positive attitude and decision making, future-oriented consequences, friend support, lower scores for amotivation, lower body mass index and average monthly household incomes and cancer stage, had endocrine therapy and higher education level, and lived in the urban area had higher dietary nutritional practice levels (adjusted R^2=46.3%, $p < 0.001$).

Conclusions: Targeted nutritional interventions should be designed by health professionals based on females' self-care self-efficacy, consideration of future consequences of food, treatment self-regulation and perceived social support. Female patients who have a higher body mass index and income and cancer stage, live in rural areas, have a lower education level, and without endocrine therapy are the focus population of intervention.

Key words behavior; breast cancer; chemotherapy; diet; nutrition

Category: Clinical Nutrition

基于体重下降和炎症状态的预后分级系统是晚期恶性肿瘤患者预后判断的有效指标

A promising prognostic grading system incorporating weight loss and inflammation in patients with advanced cancer

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Background: Involuntary weight loss and elevated systemic inflammation are frequently observed in cancer patients with advanced stages. Our objective is to develop a weight loss and inflammation grading system (WLAIGS) and investigate its prognostic performance in patients with advanced cancer.

Methods: This multicenter prospective cohort study included 4570 (40.0%) patients in stage III and 6853 (60.0%) patients in stage IV. A 4 × 4 matrix representing four different percent weight loss (WL %) categories within each of the four different neutrophil-to-lymphocyte ratio (NLR) categories was constructed. The WLAIGS consisted of four grades, with hazard ratios (HRs) for overall survival (OS) increasing from grade 1 to grade 4. Comprehensive survival analyses were performed to investigate the association between WLAIGS and OS. The secondary outcomes were short-term survival, malnutrition, and quality of life.

Results: We totally recorded 5,046 death cases during the median follow-up of 17.33 months. Kaplan-Meier curve showed survival rate decreased from grade 1 to grade 4 in patients with advanced cancer ($P<0.001$). The WLAIGS was an independent risk factor associated with OS adjusting for confounders, with HRs increasing from 1.19 (95% Confidence interval (CI), 1.11 - 1.29; $P<0.001$) in grade 2, 1.48 (95% CI, 1.37 - 1.59; $P<0.001$) in grade 3 to 1.72 (95% CI, 1.57 - 1.88; $P<0.001$) in grade 4. A similar survival trend from grade 1 to 4 was observed in lung, upper gastrointestinal, hepatobiliary, pancreatic, and colorectal cancers. In each WL% group ($2<WL\%\leq 6$; $6<WL\%\leq 10$, $WL\%>10$), a NLR above 3 was associated with shorter survival and served as an independent prognostic predictor. The risk of short-term mortality, malnutrition, and poor quality of life increased with WLAIGS grade. Two internal validation cohorts confirmed results of our study.

Conclusions: The WLAIGS, which reflects malnutrition and systemic inflammation status, is a robust and convenient tool in predicting the prognosis of patients with advanced cancer.

Key words Weight loss; Inflammation; Advanced cancer; Prognosis; Grading system

Category: Clinical Nutrition

血清营养标志物在肿瘤恶液质患者预后判断中的作用分析

Comprehensive Evaluation the Prognostic Value of Serum Nutritional Markers in Cancer Patients with Cachexia

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Background: Our objective is to comprehensively investigate the prognostic value of three serum nutritional markers including albumin, prealbumin and transferrin in patients with cancer cachexia.

Methods: Concordance index and receiver operating characteristic curves were applied to compare the prognostic value of different markers. The primary outcome was overall survival (OS) using the Kaplan–Meier method generated by log-rank test. A Cox proportional hazard regression model was used to identify independent predictors associated with OS. The second outcomes included short-term survival and quality of life.

Results: This multicenter prospective cohort study included 1303 patients with cancer cachexia, with 592 death cases during a median follow-up of 20.23 months. Albumin was the most accurate predictor for survival, followed by transferrin and prealbumin. Kaplan-Meier curves showed patients with low albumin, prealbumin, or transferrin had significantly shortened OS. Multivariate Cox regression analysis showed low albumin (hazard ratio = 1.55, 95% confidence interval = 1.31–1.84, $P < 0.001$), prealbumin (HR = 1.33, 95%CI = 1.11–1.59, $P = 0.002$), and transferrin (HR = 1.46, 95%CI = 1.22–1.74, $P < 0.001$) were independent risk factors for prognosis in cancer patients with cachexia. The prognostic value of low albumin was significant in patients with upper gastrointestinal, hepatobiliary and pancreatic and colorectal cancers; low prealbumin was significant in colorectal cancer; and low transferrin was significant in patients with upper gastrointestinal and colorectal cancer. All three nutritional markers were valuable in predicting survival for patients in advanced stage. The risks of short-term mortality and poor quality of life were significantly increased in patients with low albumin, prealbumin, and transferrin.

Conclusion: Low albumin, prealbumin, and transferrin negatively affect prognosis of patients with cancer cachexia, especially in advanced stages. Our results highlight the significance of routinely checking serum nutritional markers to early predict the prognosis of patients with cancer cachexia.

Key words Albumin; Prealbumin; Transferrin; Cancer Cachexia; Prognosis

Category: Clinical Nutrition

基于 BMI 的炎症指数是老年肿瘤患者的预后判断指标

Body Mass Index-Based Inflammation Index is a Promising Prognostic Predictor in Older Adult Cancer Patients

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Backgrounds: Older patients with cancer are often encountered with decreased immune responses, chronic inflammation status, and malnutrition. The present study aimed to develop a novel body mass index (BMI)-based inflammation index for older patients with cancer.

Methods: Concordance index and receiver operating characteristic curves were applied to compare the prognostic value of various BMI-based inflammation indices. The overall survival (OS) was calculated using the Kaplan–Meier method generated by the log-rank test. A Cox proportional hazard regression model was performed to identify independent predictors associated with OS. The second outcomes included short-term survival, malnutrition and cachexia.

Results: This multicenter prospective study totally included 2376 older patients with cancer, with 1112 death cases during a median follow-up of 17.43 months. BMI to C-reactive protein/lymphocyte ratio (BCLR) was the most accurate index in predicting survival. A low BCLR was significantly associated with shortened OS and served as an independent risk factor for survival in older patients with cancer (hazard ratio[HR]=1.51, 95% confidence interval[CI]=1.32–1.73, P<0.001). In the subgroup analysis, a low BCLR was an unfavorable factor negatively affecting survival in older patients with lung (HR=1.40, 95%CI=1.13–1.73, P=0.002), upper gastrointestinal (HR=1.32, 95%CI=1.01–1.73, P=0.041), hepatobiliary and pancreatic (HR=1.78, 95%CI=1.10–2.88, P=0.020) and colorectal cancer (HR=2.24, 95%CI=1.57–3.18, P<0.001). In addition, the prognostic value of low BCLR was significantly in underweight, normal as well as overweight and obesity populations. Multivariate logistic regression models showed that a low BCLR independently increased the risk of short-term mortality, malnutrition and cancer cachexia in older patients with cancer. Two internal validation cohorts at a ratio of 7:3 confirmed the results of our study.

Conclusion: The BCLR is a promising indicator to assess nutritional-inflammatory status in older patients with cancer and can be used to identify patients with worse prognoses in the clinical practice.

Key words Body mass index; Inflammation; Cancer; Older patients; Prognosis

Category: Clinical Nutrition

改良的控制营养状态 (CONUT)评分是肿瘤恶液质患者预后判断的有效指标

Modified Controlling Nutritional Status (mCONUT) serves as a promising prognostic scoring system in patients with cancer cachexia

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Backgrounds: Malnutrition and systemic inflammation are considered as two hallmarks of cancer cachexia. Our objective is to construct a modified Controlling Nutritional Status (mCONUT) by introducing C-reactive protein (CRP) as an inflammatory parameter and investigate its prognostic value in patients with cancer cachexia.

Methods: This multicenter cohort study included 5221 patients with cancer, among whom 1719 were diagnosed with cachexia. We set three optimal cut-off values for CRP to construct a four-scale mCONUT scoring system. Patients were divided into low and high CONUT/mCONUT groups, with cut-off scores of 5 and 7, respectively. Concordance index and receiver operating characteristic curves were used to compare prognostic values between two systems. The primary outcome was overall survival (OS) and comprehensive survival analyses were performed. The secondary outcomes were short-term survival, malnutrition, and quality of life.

Results: During the median follow-up of 17.47 months, 813 deaths were recorded. The mCONUT was more accurate than CONUT in predicting survival in patients with cancer cachexia. Patients in the high CONUT/mCONUT group had a significantly shorter OS. Multivariate Cox analysis confirmed high CONUT (hazard ratio [HR] =1.34, 95% confidence interval [CI] =1.13–1.58, P<0.001) and mCONUT (HR=1.46, 95% CI=1.26–1.69, P<0.001) were independent risk factors for survival adjusting for confounders. In subgroup analyses, a high mCONUT score had a significantly negative effect on survival in cachexia patients with upper gastrointestinal (HR=1.71, 95% CI=1.32–2.22, P<0.001) and colorectal (HR=2.63, 95% CI=1.77–3.90, P<0.001) cancer, especially for advanced stage patients. The risk of short-term mortality and experiencing malnutrition rose to 2.17 (95% CI=1.48–3.20, P<0.001) and 1.92 (95% CI=1.13–3.47, P=0.022) times, respectively, in the high mCONUT group, as well as with poorer life quality. Two internal validation cohorts confirmed results of our study.

Conclusion: mCONUT comprehensively reflects nutritional, immune, and inflammatory status and serves as a powerful prognostic factor in patients with cancer cachexia.

Key words Controlling Nutritional Status; Systemic inflammation; C-reactive protein; Cancer Cachexia; Prognosis

Category: Clinical Nutrition

北京市视网膜动脉硬化患病率及营养代谢相关危险因素

Prevalence of retinal arteriosclerosis and nutritional metabolism associated risk factors in Beijng city, China

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Abstract

Aims: To estimate the prevalence of retinal arteriosclerosis (RA), and to explore potential nutritional metabolism risk factors of RA in people of Beijing city the capital of China.

Methods: Examine physical and biochemical parameters to the general population in health examination institutions in 2020, include total of 17130 subjects （10613 men and 6517 women）. RA was diagnosed according to the results of a funduscopic examination performed by expert ophthalmologists. Diagnosis of metabolic syndrome (MS) was based on the IDF (2016) definitions for the Chinese people standard, type 2 diabetes mellitus (DM2) and coronary heart disease (CHD) diagnosis was according to patients' memory with exact diagnostic time in a self-administered questionnaire. Univariate and multivariate Logistic regression analyses were conducted to evaluate the demographic and clinical factors associated with retinal arterial athemsclerosis

Results: The prevalence of RA was 19.74% in male and 12.15% in female respectively. Multiple logistic regression analysis shows, the multivariate-adjusted odds ratio of age was 1.111 (95%CI: 1.106~1.116), waist circumference (WC) was1.009 (95%CI: 1.003 ~1.014), body mass index (BMI) was1.046 (95%CI: 1.026~1.067),systolic blood pressure was 1.013 (95%CI:1.010~1.015), fasting plasma glucose(FPG) was 1.066 (95%CI:1.031~1.102), white blood cell counts (WBC) was1.046(95%CI:1.014~1.079),serum uric acid（UA） was 1.002(95%CI:1.001~1.002),DM2 was 1.593(95%CI:1.372~1.851),MS was 1.203(95%CI:1.062~1.361),smoking index was 1.000(95%CI: 1.000 ~1.001). The areas under ROC curves show that age, WC, FPG, SBP have the greater ability to discriminate RA than others.

Conclusion: These results indicate that RA in people of Beijing city had a higher prevalence than national averages. Age, SBP, FPG, WC, DM2, MS, WBC, BMI, UA were all nutritional metabolism risk factors for RA.

Key words retinal arteriosclerosis, general population, nutritional metabolism, risk factors

Category: Clinical Nutrition

基于 GLIM 标准的三种营养诊断工具对肝胆胰肿瘤患者营养不良评价比较

Comparison of GLIM, PG-SGA and PNI in diagnosing malnutrition among patients with hepatobiliary-pancreatic tumors

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Objective: To compare the diagnostic value of three tools—the Global Leadership Initiative on Malnutrition (GLIM) criteria, patient-generated subjective global assessment (PG-SGA), and prognostic nutritional index (PNI) in malnutrition among hospitalized patients with hepatobiliary- pancreatic tumors. Meanwhile, to observe the nutritional intervention of these patients.

Methods: Present study was a cross-sectional study, including 378 hospitalized patients with hepatobiliary- pancreatic tumors between December 2021 and July 2022 at Ningbo Medical Center Lihuili Hospital, China. The incidence rate of malnutrition was diagnosed using the three tools. The consistency of the three tools was analyzed by Cohen's kappa statistic. Data, including nutritional characteristics and nutritional interventions, were collected. The nutritional intervention was observed according to the principles of Five Steps Nutritional Treatment.

Results: ① The incidence of nutritional risk was 43.65%（165/378）among these patients. The prevalence was36.24%, 36.77%, and 55.82%, as diagnosed by the GLIM, PG-SGA, and PNI, respectively. The diagnostic concordance of PG-SGA and GLIM was higher (Kappa = 0.772, < 0.001) than PNI vs. GLIM (Kappa = 0.258, P < 0.001). ②Univariate analysis revealed that older age and lower BMI were significant associated with nutritional risk and malnutrition. ③ Among 165 patients with nutritional risk, only 56 cases received nutritional support. Most of patients (109/165,66.06%) did not meet the nutritional support standard.

Conclusion: The incidence of nutritional risk and malnutrition is high among hospitalized patients with hepatobiliary- pancreatic tumors. The GLIM showed the lowest prevalence of malnutrition among the three tools. The PG-SGA and GLIM had a relative high level of agreement. There was a low proportion of nutritional support in patients. More prospective and well-designed cohort studies are needed to confirm the relevance of GLIM criteria in clinical practice in the future.

Key words GLIM, PG-SGA, PNI, malnutrition, hepatobiliary-pancreatic tumors, hospitalized patients

Category: Clinical Nutrition

基于患者参与框架改善门诊头颈部肿瘤放疗患者营养状况的应用研究

Application of Patient Engagement Framework in improving nutritional status of outpatients with head and neck cancer undergoing radiotherapy

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Object The purpose of this study is to explore the effect of applying the ' patient participation framework ' to outpatients with head and neck cancer radiotherapy.

Methods According to the start time of the first radiotherapy, the patients were divided into intervention group and control group. The patients in the control group were treated with routine nursing measures. On the basis of routine nursing measures, the patients in the intervention group were allowed to actively participate in symptom management through the patient participation framework and electronic information platform. Doctors, nurses and patients worked together to carry out individualized symptom guidance and intervention. Radiation-induced oral mucositis, nutritional status and other radiotherapy-related adverse reactions were evaluated at 4 and 7 weeks of radiotherapy.

Results A total of 67 patients were included. The occurrence time of radioactive oral mucositis in the intervention group was later than that in the control group, and the incidence of moderate to severe radioactive oral mucositis was significantly lower than that in the control group ($P < 0.05$). Weight and Body Mass Index loss in the control group were more significant than those in the intervention group at weeks 4 and 7 after RT($P<0.05$). The loss of albumin and hemoglobin decreased more significantly in the control group at week 7 after RT than that in the intervention group ($P<0.05$), but the differences were not significant at week 4 after RT .There were significant differences between the intervention group and control group in the terms of adverse reactions, including moderate-severe pain, nausea, vomiting.

Conclusion Through electronic information means, patients can actively participate in nutrition management, doctors, nurses and patients work together to carry out individualized nutrition guidance and nutrition intervention, which can effectively improve the nutritional status of patients and reduce the incidence of radiotherapy-related adverse reactions.

Key words Patient Engagement Framework; outpatient; radiotherapy;nutritional status

Category: Clinical Nutrition

炎症性肠病住院患者营养状况的评价及与疾病进展的相关性研究

Evaluation of nutritional status of inpatients with inflammatory bowel disease and its correlation with disease progression

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Objective: This study evaluates the nutritional status of patients with inflammatory bowel disease, investigates the association of nutritional status and disease progression, and analysis the influence factors of inflammatory bowel disease patients with nutritional risk.

Methods: 125 patients with inflammatory bowel disease from October 2020 to October 2021 in the Grade A Hospital in Shenyang were selected. According to nutritional risk screening 2002, all patients were divided into nutritional and non-nutritional risk groups.

Results: The average age of subjects was 37±27 years old, and the number of males was higher than that of females. Compared with the non-nutritional risk group, patients with perianal lesions and disease activity in the mild, moderate, severe stages , C-reactive protein and incidence of disease complications were higher in the nutritional risk group, and the number of patients in the body composition index, remission stage, albumin, transferrin, retinol-binding protein, hemoglobin, etc. were lower ($P<0.05$). The incidence of inflammatory bowel disease combined with hypoproteinemia was 36.8%, anemia 56.8%, sarcopenia 23.2%, and inflammatory infection 52.0%. In regression analysis, the possibility of nutritional risk in the disease active stage was 2.486 times higher than that in the remission stage; For each 1-unit reduction in Body mass index, the risk of developing nutritional risk increased by 63.9%. The nutritional risk was positively correlated with disease activity ($rs=0.384$); Albumin, retinol-binding protein, hemoglobin, body mass index, body fat, bone mineral content, skeletal muscle content, basal metabolic rate, etc. were negatively correlated with disease activity.

Conclusions: Poor nutritional status of patients with inflammatory bowel disease; The body composition index, nutritional risk, albumin, retinol-binding protein, and hemoglobin affected the progression of inflammatory bowel disease. Disease activity was a risk factor for nutritional risk, and body mass index is a protective factor.

Key words Inflammatory bowel disease; Nutritional assessment; Nutritional risk screening 2002; Body composition; Nutritional risk;

Category: Clinical Nutrition

头颈癌患者围手术期的营养状况及体成分的研究

Nutritional status and body composition in perioperative patients with head and neck cancer

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Background We aimed to describe nutrition status and body composition profile in pre- and post-operative head and neck cancer (HNC) patients managed by the evidence-based whole-course nutritional support.

Methods This work is a prospective cohort study of patients who were newly diagnosed HNC and would underwent operation. Nutrition assessment, which included Scored Nutritional Risk Screening (NRS 2002) and Patient-Generated Subjective Global Assessment (PG-SGA), and body composition were conducted initially before surgery and recorded after surgery.

Results A total of 96 surgery patients with HNC were included. According to the preoperational SMM, all patients, of which 10 patients were missed, were divided into high SMI (N=43) and low SMI groups (N=42). (1) The NRS 2002 postoperative were higher than that on admission ($p<0.01$), and the PG-SGA were higher after surgery 2 weeks than 0 days ($p<0.01$). No matter pre- and post-operatively, there were significantly higher scores in low SMI group, both preoperatively (NRS 2002: $p=0.01$) and 0 days (NRS 2002: $p=0.008$, PG-SGA: $p=0.006$), 2 weeks postoperatively (PG-SGA: $p=0.036$). (2) There were significantly greater weight and BMI decline in high SMI group (△BMI: $p=0.034$, △weight: $p=0.046$). (3) Three post-operative serum nutritional indicators, include albumin, prealbumin and PNI, were lower than that preoperatively, but the values after 2 weeks were raised than that after surgery 1week (all $p<0.01$). There was no statistical difference for the prealbumin preoperative and that postoperative 2 weeks. (4) The negative correlation of SMM loss and prealbumin was observed ($r=-0.255$, $p=0.029$). Preoperative BMI ($p<0.01$), tumor differentiation ($p=0.003$) and nutritional risk ($p=0.049$) were the risk factors for weight loss.

Conclusions For HNC perioperative patients, fat and skeletal muscle mass were both declined, and the loss of adipose tissue was earlier than the muscle. Except for preoperative BMI, prealbumin should be taken into account as an indicator for nutritional status in clinical practice.

Key words Head and neck cancer; HNC; Nutrition status; body composition; weight loss

Category: Clinical Nutrition

多学科营养管理改善食管癌放化疗患者的营养指标和住院结局：一项随机对照试验

Multidisciplinary nutritional management improves nutritional and hospitalized outcomes of patients with esophageal cancer undergoing chemoradiotherapy: A randomized control trial

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Introduction: This study aimed to investigate the effects of multidisciplinary whole-course nutrition management on nutritional status and complications during the course of treatment in patients with esophageal cancer (EC) undergoing chemoradiotherapy.

Materials and Methods: A total of 36 EC patients undergoing chemoradiotherapy were randomly divided into a control group (n=18) and an intervention group (n=18). Participants in the control group were given routine nutritional support, whereas patients in the intervention group were provided with whole-course nutrition management from the Nutrition Support Team (NST). Nutrition-related indicators, i.e., serum albumin level (ALB), hemoglobin (Hb), and C reactive protein (CRP) were assessed before, during and after treatment in both groups. The incidence of complications (e.g., lymphocytopenia, radiation esophagitis, and myelosuppression), clinical outcomes, length of hospital stay, and hospital costs were also recorded. Differences between the two groups were tested using the Mann-Whitney U test and chi-square test.

Results: The ALB and Hb levels of the patients in the control group decreased (ALB: -2.6 (-5.6, 0), p=0.01; Hb: -12.0 (-27.0, -2.0), p=0.04) and CRP increased (8.9 (2.9, 14.9), p=0.02) significantly compared to those before treatment, while the indicators of participants in the intervention group did not change (p>0.05). The incidence of grade ≥Ⅱ lymphocytopenia was higher in the control group than that in the intervention group (33.3% vs 61.1%, p=0.03). Moreover, compared with the control group, the average lengths of hospital stay were decreased by 12 days (47 (40, 50) vs 35 (23, 40), p=0.001), and the in-patient expenses were decreased by 20,504 CNY in the intervention group (p=0.004).

Conclusion: Multidisciplinary whole-course nutrition management would maintain the nutritional status of EC patients undergoing chemoradiotherapy. It might lower the incidence of complications, shorten the hospital stays and reduce the in-patient expenses.

Key words nutrition management, esophageal cancer, chemoradiotherapy, nutritional status, complication

Category: Clinical Nutrition

鼻饲管喂养对食管癌患者营养状况和生活质量的影响：一项回顾性研究

Nasogastric tube feeding improves nutritional status and physical state in esophageal cancer patients during chemoradiotherapy: A retrospective study

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Objective To compare the complication rates, nutritional status, and physical state between esophageal cancer (EC) patients managed by nasogastric tube (NGT) feeding versus those managed by oral nutritional supplementation (ONS) during chemoradiotherapy.

Methods EC patients undergoing chemoradiotherapy managed by non-intravenous nutritional support in our institute were retrospectively recruited and divided into an NGT group and an ONS group based on the nutritional support method. The main outcomes, including complications, nutritional status, and physical state, were compared between groups.

Results The baseline characteristics of EC patients were comparable. There were no significant differences in the incidence of treatment interruption (13.04% vs. 14.71%, $P = 0.82$), death (2.17% vs. 0.00%, $P = 0.84$) or esophageal fistula (2.17% vs. 1.47%, $P = 1.00$) between the NGT group and ONS group. Body weight loss and albumin loss were significantly lower in the NGT group than in the ONS group (both $P < 0.05$). EC patients in the NGT group had significantly lower Nutritional Risk Screening 2002 (NRS2002) and Patient-Generated Subjective Global Assessment (PG-SGA) scores and significantly higher Karnofsky Performance Status (KPS) scores than patients in the ONS group (all $P < 0.05$). The rates of grade >2 esophagitis (10.00% vs. 27.59%, $P = 0.03$) and grade >2 bone marrow suppression (10.00% vs. 32.76%, $P = 0.01$) were significantly lower in the NGT group than in the ONS group. There were no significant differences in the incidence of infection and upper gastrointestinal disorders or therapeutic efficacy between groups (all $P > 0.05$).

Conclusions EN through NGT feeding leads to significantly better nutritional status and physical state in EC patients during chemoradiotherapy than EN via ONS. NGT may also prevent myelosuppression and esophagitis.

Key words Esophageal cancer; malnutrition; nasogastric tube feeding; physical state

Category: Clinical Nutrition

GLIM营养不良诊断标准在中老年内科住院患者中的应用

GLIM criteria-defined malnutrition informs on clinical and financial implications for middle-aged and elderly inpatients

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Objective: Malnutrition, a common diagnosis among elderly patients, can lead to a more complex hospitalization process with an increased length of stay and higher cost. Studies regarding malnutrition in inpatients using the Global Leadership Initiative in Malnutrition (GLIM) criteria are still limited. The aim of this study is to analyze clinical and financial implications among middle-aged and elderly inpatients with GLIM-defined malnutrition.

Methods: This study retrospectively collected the data of the electronic medical records of patients who were aged ≥40 years and newly hospitalized at the internal medicine departments in a Guangzhou academic hospital between January and February 2021. Patients who were bed-bound on admission, with terminal stage of disease, hospitalized less than 24 hours, and/or didn't accept diagnosis and treatment were excluded. Nutritional assessment using the GLIM criteria was conducted within the first 24 hours of admission. The variables recorded included demographic, anthropometric, clinical and hospitalization data. Logistic regression was used to assess the odd ratios [95% confidence intervals, OR(95%CI)] of anemia (hemoglobin <120g/L for male and <110g/L for female), hypoalbuminemia (albumin <30g/L), hypoprealbuminemia (prealbumin <0.20g/L) and hypotransferrinemia (transferrin <2.00g/L). In the fully adjusted model, age, sex and medicine department were adjusted.

Result: A total of 1289 inpatients [aged 64 (56-71)years, 53.5% male] were included in this study. According to the GLIM criteria, 374 inpatients (29.7%) were malnourished. For malnourished patients, the median stay of hospitalization was 29% longer [9(7-13) vs. 7(5-10)days, p<0.001] and the median expenses was 28% higher [total cost, 15631(10050-30894) vs. 12213(8192-28338) yuan, p<0.001; medicine cost, 3412(1526-7423) vs. 1479(718-3348)yuan, p<0.001]. They also had higher risk for anemia [adjusted OR(95%CI), 2.63(2.00-3.49)], hypoalbuminemia [adjusted OR(95%CI), 3.04(2.05-4.53)], hypoprealbuminemia [adjusted OR(95%CI), 2.79(1.85-4.21)], and hypotransferrinemia [adjusted OR(95%CI), 2.11(1.55-2.89)].

Conclusions: Malnutrition according to the GLIM criteria is common in middle-aged and elderly patients and lead to poorer hospitalization outcomes, longer stay, and higher expenses.

Key words malnutrition; GLIM; albumin; hospital expenses; length of hospital stay

Category: Clinical Nutrition

新诊断胰腺癌患者体重变化与血小板淋巴细胞比值相关关系

Platelet to lymphocyte ratio differences in newly diagnosed pancreatic cancer patients' weight loss trajectories: the role of inflammation

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Background: Unintentional weight loss is a common symptoms of pancreatic cancer, associating with systemic inflammation and affecting treatment, survival outcomes, and quality of life. The platelet to lymphocyte ratio (PLR) is a marker of systemic inflammation and was proven to be associated with poor outcomes in many cancer patients. The aim of this study is to determine the role of PLR in weight loss in patients with pancreatic cancer.

Methods: This study retrospectively collected the data from electronic medical records of an academic hospital in Guangzhou. Patients newly diagnosed pancreatic cancer and hospitalized between 2019 and 2021 were included. Those who were bed-bound on first admission, with terminal stage of cancer, or with less than twice readmission during the following 12-month period were excluded. Demographic (age, sex, current smoking status, regular drinking status), disease specific variables (TMN stage, treatment parameters), as well as dietary energy intake, weight and blood cells parameters during 12-month follow up period were assessed. Trajectory analyses were performed to identify distinct subgroups that share similar course of changes of weight.

Results: A total of 136 patients with pancreatic cancer [aged 58.7±10.1years, 58.1% male] were included in this study. Participants have a median of 6(3-9) monthly records across a 7(4-12) months span. Based on records over the follow-up period, two weight trajectories were identified: stable pattern [weight loss, 3.3(0-6.6)%, n=79, 58.1%] and decreasing pattern [weight loss, 14.3(11.3-19.4)%, n=57, 41.9%]. The patients with decreasing weight pattern tended to be younger (aged 56.3±11.1 vs. 60.4±9.1years, p=0.020), with lower baseline lymphocyte counts [1.27(1.07-1.55) vs. 1.56(1.19-1.95), p=0.007] and higher baseline PLR [203(155-239) vs. 154(114-238), p=0.024].

Conclusion: An elevated PLR associated with greater weight loss in patients with pancreatic cancer. Based on these readily-available and routine biomarkers of systemic inflammation we may identify pancreatic cancer patients at risk for excessive weight loss.

Key words weight loss; trajectory modeling; pancreatic cancer; platelet to lymphocyte ratio; lymphocyte

Category: Clinical Nutrition

营养因素与克罗恩病肛瘘

Nutritional factors and anal fistula in Crohn's disease

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Background and Objectives: Anal fistula has a high incidence and poor prognosis in patients with Crohn's disease(CD), early detection and treatment can reduce the recurrence. We aimed to investigate risk factors(including nutritional factors) related to anal fistula in CD patients and provide some clues for early screening.

Methods and study design: 122 CD patients were enrolled and divided into two groups: with (CD-AF)or without anal fistula(CD) according to the MRI of anal fistula. Data about demography, disease activity, history of surgery, serological indicators, nutritional factors (e.g. BMI, WHR, controlling nutritional status score, sarcopenia, body fat rat, visceral fat rate, phase angle etc.) were collected.

Results: CD-AF group had more males, younger age, less body fat, more patients with history of perianal surgery, higher blood hemoglobin and CRP concentration than CD group. There were no difference among factors including Crohn’s Disease Activity Index(CDAI) score, other nutritional factors, lesion range and history of intestinal surgery. Logistic regression analysis showed significant differences on female (OR=0.106, 95% CI=0.013-0.862, P=0.036), age (OR=0.941, 95% CI=0.894-0.990, P=0.019), history of perianal surgery(OR=4.250, 95% CI=1.074-16.811, P=0.039).

Conclusions: The characteristic of male, younger age and history of perianal surgery may be potential risk factors for anal fistula in CD patients. However, the severity of CD and nutritional factors had no significant effect on the incidence of anal fistula.

Key words Crohn's disease; Anal fistula; Nutrition

Category: Clinical Nutrition

100个已知和可疑影响因素与总体卵巢癌症风险和6种组织类型的潜在因果关系：一项孟德尔随机化研究

Potential causal associations of 100 known and suspected influencing factors with risk of overall ovarian cancer and six histotypes: A Mendelian randomization study

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Background: Observational studies have linked various exposures to ovarian cancer (OC) risk, but the findings are potential subject to reverse causation and confounding. Besides, limited studies have comprehensively investigated these associations by different histotypes. Herein, we performed comprehensive Mendelian randomization (MR) analyses to systematicly evaluate potential causal associations of known and suspected influencing factors with risk of OC and six common histotypes. Methods: Two-sample MR analyses were applied to data from the genome wide association study summary results comprising a total of 25,509 women with epithelial OC and 40,941 controls of European descent in the Ovarian Cancer Association Consortium. Genetic instrumental variables associated with influencing factors were selected. Inverse-variance weighted method was used as the primary analysis, and the MR assumptions were evaluated in sensitivity analyses. MR-PRESSO method was applied for the detection and correction of potential horizontal pleiotropy.Results: OC and six histotypes were considered in this study. Of 100 known and suspected influencing factors, 46 were identified to be related to OC risk. Notably, alcohol drinking, cigarette smoking, chronotype, time spent driving, sugar or poultry or vegetable intake, linoleic acid or saturated fatty acids (FA), age at first birth or at menopause, hysterectomy, several body size factors, endometriosis, schizophrenia, glycoprotein acetyls, and telomere length were significantly positively associated with risk of OC or six histotypes. In contrast, income, past tobacco smoking, time spent using computer, 25 hydroxyvitamin D, cheese or fruit intake, dietary change, omega-3 FA, parity, C-reactive protein, HDL cholesterol, proinsulin levels, testosterone, and tumor necrosis factor were significantly inversely associated with risk of OC or histotypes.Conclusions: Our study adds to current knowledge on the causal effect of known and suspected influencing factors on OC and six histotypes. Further investigation is needed to better understand potential pathways or mechanisms of these factors.

Key words Association; Histotypes; Mendelian randomization; Ovarian cancer; Risk factor.

Category: Clinical Nutrition

有营养风险和高 NRS 2002 评分与 COVID-19 患者的疾病进展和不良预后密切相关

Nutritional risk and a high NRS2002 score are closely related to disease progression and poor prognosis in patients with COVID-19

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Objectives: To investigate the impact of nutritional risk and the NRS2002 score on disease progression and prognosis in patients with COVID-19.

Methods: This was a retrospective cohort study including 1228 COVID-19 patients, who were divided into a with-nutritional risk group (patients with NRS2002 score ≥3) and a without-nutritional risk group (patients with NRS2002 score <3) according to the NRS2002 score at admission. The differences in clinical and outcome data between the two groups were compared, and the relationship between the NRS2002 score and the disease progression and prognosis of COVID-19 patients was assessed.

Results: Of 1228 COVID-19 patients, including 44 critical illness patients and 1184 non-critical illness patients, the rate of harboring nutritional risk was 7.90%. Compared with those in the without-nutritional risk group, patients in the with-nutritional risk group had a significantly longer coronavirus negative conversion time, significantly lower serum albumin (ALB), total serum protein (TP) and hemoglobin (HGB), a significantly greater proportion with 3 or more comorbidities, and a significantly higher rate of critical illness and mortality (all $P<0.001$). Multiple regression analysis showed that nutritional risk, NRS2002 score and ALB were risk factors for disease severity. In addition, nutritional risk, NRS2002 score and TP were risk factors for prognosis. The NRS2002 score showed the best utility for predicting critical illness and death in COVID-19 patients.

Conclusions: Nutritional risk and a high NRS2002 score are closely related to disease progression and poor prognosis in COVID-19 patients. For patients with NRS2002 score >0.5, early intervention of malnutrition is needed to reduce the occurrence of critical disease. Additionally, for patients with NRS2002 score >5.5, continuous nutritional support therapy is needs to reduce mortality and improve prognosis.

Key words coronavirus disease 2019 (COVID-19), nutritional risk, NRS2002 score, disease progression, prognosis

Category: Clinical Nutrition

住院患者炎症水平与水溶性维生素之间的关系:一项基于真实数据的横断面研究

The association between inflammation and water-soluble vitamins in hospitalized patients: a cross-sectional study based on real-world data

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Background and Aims The association between inflammation and serum level of water-soluble vitamin remained unclear. We thus performed the current cross-sectional study based on real-world data to evaluate the association between serum level of C-reactive protein (CRP), a biomarker for inflammation, and water-soluble vitamin.

Methods Participants were recruited from our hospital from Oct 1, 2018 to Oct 31, 2022. Serum concentration of CRP and water-soluble vitamins measurements, fasting blood glucose, total bilirubin, direct bilirubin, alanine transferase, albumin, prealbumin, total cholesterol, triglycerides and the estimating glomerular filtration were abstracted from medical records. Information on age, sex, body weight, height, primary diagnosis, the history of chronic disease, diet intake, and surgery were collected as well. The association between CRP and water-soluble vitamins was analyzed by logistics regression analysis.

Results Of 9,818 patients, the median serum of CRP concentration was 0.66 (interquartile range: 0.5~3.02) mg/L. The prevalence of low level of vitamin B_6 was 21.6%, and it was 13.6% for vitamin B_{12}, 5.0% for vitamin C, 2.7% for vitamin B_1, 1.6% for vitamin B_2, and 1.0% for vitamin B_9 in the current study. The risk of the low level of vitamin C (OR=1.06, 95%CI:1.02, 1.11) increased and vitamin B_6 (OR=0.94, 95%CI:0.90, 0.98) decreased with the increase of CRP level after further adjustment of potential confounders. Age and serum level of PreAlb interacted with the association between CRP and vitamin C. The association between CRP and vitamin C was similar between young adults (<65 y) and elderly adults (≥65 y). The association between CRP and vitamin C only remained in those whose serum level of pre-albumin was 160 mg/L or more.

Conclusion Inflammation was associated with high risk of low level of vitamin C and low risk of vitamin B_6, while it was not associated with vitamin B_1, B_2, B_9, and B_{12}.

Key words water-soluble vitamins; C-reactive protein (CRP); vitamin C; vitamin B family; hospitalized patients

Category: Clinical Nutrition

青少年短道速滑运动员的维生素 D 和血清炎症标志物之间的关系-试点研究

Relationships between Vitamin D and Hemogram-derived inflammatory markers in Adolescent Short Track Speed Skaters-Pilot Study

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Objectives: It was our purposes to test the relationship between 25-hydroxyvitamin D status and hemogram parameters - WBC, NEUTH(%), LYMPH(%), EOS(%), Mono(%), NEUYH, LYMPH, EOS, Mono, PLT, MPV, RDW, NLR and PLR, which are blood-borne inflammatory makers for adolescent short track speed skaters.

Methods: We enrolled 20 adolescent short track speed skaters (12 male, 8 female). The age, height and weight were respectively:13.0±1.7 years, 161.5±8.6 cm, 52.1±8.7 kg. This work used commercially available ELISA kits to test serum 25-hydroxyvitamin D concentration. Blood counts were measured by Beckman Coulter LH750 blood cell analyzer. Furthermore, inflammatory makers derived from hemogram parameters i.e. PLR and NLR were counted.

Results: Vitamin D deficiency and insufficiency were observed in 20% and 80% of the short track speed skaters in our study, respectively. A notably negative relationship between 25(OH)D level and mean platelet volume in male participants and a notably positive association between 25(OH)D and eosinophils (%) and eosinophils in female participants were found, but not in all athletes. For all participants, a notably positive correlation was observed only between vitamin D and monocytes.

Conclusions: According to the findings of our work, we noted that the low serum 25-hydroxyvitamin D in adolescent short track speed skaters is prevalent. Moreover, vitamin D deficiency may play a role in augmenting the risk of inflammation in adolescent athletes.

Key words 25(OH)D; inflammation; athletes

Category: Clinical Nutrition

动物双歧杆菌乳亚种 XLTG11 辅助治疗儿童功能性便秘：一项随机、双盲、安慰剂对照研究

Adjunctive Efficacy of Bifidobacterium animalis subsp. Lactis XLTG11 for Functional Constipation in Children: a Randomized, Double-blinded, Placebo-Controlled Study

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Background

Functional constipation (FC) can seriously affect the physical and mental health of children.

Objective

The goal of this study is to assess the efficacy and safety of Bifidobacterium animalis subsp. Lactis XLTG11, as an adjunct to the treatment of FC in children with a randomized, double-blinded, placebo-controlled study design.

Method

Eligible diarrheal children were randomized into intervention group (IG, n=65, conventional treatment with probiotic) and control group (CG, n=66, conventional treatment without probiotic). The primary outcome measure was the fecal frequency. Fecal gut microbiota (GM) analysis, the parents' subjective feelings score (PSFS) and the quality of family life scores (QFLS) were performed. PICRUSt was used to predict gene family abundances based on 16S information.

Result

The frequency of feces (times/week, t/w) in IG was significantly higher than that of children in the CG (3.69±2.62 t/w vs.3.18±1.43 t/w, 4.03±2.54 t/w vs. 2.89±1.39 t/w and 3.74±2.36 t/w vs. 2.94±1.18 t/w and 3.45±1.98 vs. 3.17±1.41 t/w for the 1st, 2nd, 3rd and 4th week after intervention, respectively) ($F=7.60$, $p=0.0067$). After intervention, both of the PSFS (7.05±2.04 vs. 6.04±1.71 for IG and CG, $p<0.05$) and QFLS (7.31±1.82 vs. 6.36±1.76 for IG and CG, $p<0.05$) in IG were significantly higher than those of children in CG ($p<0.01$). After intervention, the dominate species changed to Bifidobacterium_longum, Bifidobacterium_breve and Escherichia_coll in IG. After XLTG11 treatment, the short chain fatty acids metabolism related genes were up-regulated while the methane metabolism related gene was down-regulated.

Conclusion

Administration of XLTG11 at a dose of 1×1010 CFU/day to children can increase the fecal frequency, improve the fecal consistency and bring beneficial changes of intestinal microbiota composition and regulate SCFs and methane metabolism related genes in GM of children with CF with safety and reliability.

Key words probiotic, constipation, children, gut microbiota, RCT

Category: Clinical Nutrition

动物双歧杆菌乳亚种 XLTG11 辅助治疗儿童急性腹泻：一项随机、双盲、安慰剂对照研究

Adjunctive Efficacy of Bifidobacterium animalis subsp. Lactis XLTG11 for Acute Diarrhea in Children: a Randomized, Double-blinded, Placebo-controlled Study

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Background

Acute diarrhea continues to be a leading cause of morbidity, hospitalization, and mortality worldwide. Probiotics have been proposed as a complementary therapy in the treatment of acute diarrhea.

Objective

The goal of this study is to assess the efficacy and safety of Bifidobacterium animalis subsp. Lactis XLTG11, as an adjunct to the treatment of acute watery diarrhea in children with a randomized, double-blinded, placebo-controlled study design.

Method

Eligible diarrheal children were randomized into intervention group (IG, n=35, conventional treatment with probiotic) and control group (CG, n=35, conventional treatment without probiotic). The primary assessments of this study were total duration of diarrhea . Fecal samples were collected from all children before and after intervention to measure levels of sIgA, calprotectin, human beta-defensin 2 (HBD-2), and cathelicidin (LL-37), and to analyze the gut microbiome (GM) composition. PICRUSt was used to predict gene family abundances based on 16S information.

Result

The total duration and the duration of hospital stay of diarrhea in the IG [(121.3±11.5 h) and (3.4±1.1d) were significantly shorter than those of children in the CG [(133.4±14.1h) and (4.0±1.3 d), p <0.001 and p=0.041, respectively). More children in the IG showed improvements in diarrhea for both per protocol analysis (57.1% vs 25.7%, p<0.001) and intention-to-treat analysis. The calprotectin levels in IG was markedly lower than that in CG after the intervention (928.91±158.90 ng/g vs. 1029.86±133.25 ng/g, p=0.028). The intervention led to higher abundance of species Bifidobacterium_longum and Bifidobacterium_breve and higher alpha-diversity of GM (p<0.05). XLTG11 treatment upregulated the functional genes of gut microbiota involving immunity and nutrient absorption.

Conclusion

Administration of XLTG11 at a dose of 1×1010 CFU/day to children resulted in shorter duration of diarrhea, faster improvement in fecal consistency, and beneficial changes in GM composition and related gene functions.

Key words probiotic, diarrhea, children, gut microbiota, RCT

Category: Clinical Nutrition

动物双歧杆菌亚种 Lactis BLa80 辅助治疗儿童急性腹泻：一项随机、双盲、安慰剂对照研究

Adjunctive Efficacy of Bifidobacterium animalis subsp. Lactis BLa80 for Acute Diarrhea in Children: a Randomized, Double-blinded, Placebo-controlled Study

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Background

Acute diarrhea continues to be a leading cause of morbidity, hospitalization, and mortality worldwide. Probiotics have been proposed as a complementary therapy in the treatment of acute diarrhea.

Objective

The goal of this study is to assess the efficacy and safety of Bifidobacterium animalis subsp. Lactis BLa80, as an adjunct to the treatment of acute watery diarrhea in children with a randomized, double-blinded, placebo-controlled study design.

Method

Eligible diarrheal children were randomized into intervention group (IG, n=58, conventional treatment with probiotic) and control group (CG, n=53, conventional treatment without probiotic). The primary assessments of this study were duration of diarrhea. Fecal samples were collected from all children before and after intervention to measure levels of sIgA, calprotectin, human beta-defensin 2 (HBD-2), and cathelicidin (LL-37), and to analyze the gut microbiome (GM) composition. PICRUSt was used to predict gene family abundances based on 16S information.

Result

After the intervention, the total duration of diarrhea in the IG (125.2±14.1 h) was significantly shorter than that in the CG (138.7±16.4 h, $p < 0.001$). More children in the IG showed improvements in diarrhea than those in the CG for both per protocol analysis (84.4% vs 45.3%, $p<0.001$) and intention-to-treat analysis (81.7% vs. 40.0%, $p<0.001$). The LL-37 levels in the IG was markedly higher than that in the CG after the intervention (4415.00±1036.93 pg/g vs. 3679.49±871.18 pg/g, $p=0.0175$) . The intervention led to higher abundance of species Bifidobacterium_breve and Collinsella_aerofaciens and higher alpha-diversity ($p<0.05$). BLa80 treatment upregulated the functional genes of gut microbiota involving immunity regulation.

Conclusion

Administration of the Bifidobacterium animalis subsp. Lactis BLa80 at a dose of 5×109 CFU/day to children aged 0-3 years resulted in shorter duration of diarrhea, faster improvement in fecal consistency, and beneficial changes in GM composition and gene functions.

Key words probiotic, diarrhea, children, gut microbiota, RCT

Category: Clinical Nutrition

鼠李乳杆菌 LRa05 对儿童急性腹泻的辅助治疗作用：一项随机、双盲、安慰剂对照研究

Adjunctive Efficacy of Lactobacillus Rhamnosus LRa05 for Acute Diarrhea in Children: a Randomized, Double-blinded, Placebo-controlled Study

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Background

Acute diarrhea continues to be a leading cause of morbidity, hospitalization, and mortality worldwide. Probiotics have been proposed as a complementary therapy in the treatment of acute diarrhea.

Objective

The goal of this study is to assess the efficacy and safety of Lactobacillus rhamnosus LRa05, as an adjunct to the treatment of acute watery diarrhea in children with a randomized, double-blinded, placebo-controlled study design.

Method

Eligible diarrheal children were randomized into intervention group (IG, n=57, conventional treatment with probiotic) and control group (CG, n=53, conventional treatment without probiotic). The primary assessments of this study were duration of diarrhea. Fecal samples were collected from all children before and after intervention to measure levels of sIgA, calprotectin, human beta-defensin 2 (HBD-2), and cathelicidin (LL-37), and to analyze the gut microbiome (GM) composition. PICRUSt was used to predict gene family abundances based on 16S information.

Result

After the intervention, the total duration of diarrhea in the IG (122.4±13.5 h) was significantly shorter than that in the CG (138.7±16.4 h, $p < 0.001$). More children in the IG showed improvements in diarrhea than those in the CG for both per protocol analysis (70.2% vs 45.3%, $p=0.008$) and intention-to-treat analysis (66.7% vs. 40.0%, $p=0.003$). The LL-37 levels in the IG was markedly higher than that in the CG after the intervention (4349.35±1143.86 pg/g vs. 3679.49±871.18 pg/g, $p=0.042$). The intervention led to higher abundance of Bifidobacterium longum and lower abundance of Enterococcus faecium, Lactobacillus rhamnosus, and Bacteroides fragilis ($p<0.05$). LRa05 treatment up-regulated the functional genes of gut microbiota involving immunity regulation.

Conclusion

Administration of the Lactobacillus rhamnosus LRa05 at a dose of 5×109 CFU/day to children aged 0-3 years resulted in shorter duration of diarrhea, faster improvement in fecal consistency, and beneficial changes in GM composition and gene functions.

Key words probiotic, diarrhea, children, gut microbiota, RCT

Category: Clinical Nutrition

同型半胱氨酸-蛋氨酸循环代谢产物、细胞因子与急性缺血性脑卒中关系的研究

Study on the relationship between homocysteine-methionine cycle metabolites, cytokines and acute ischemic stroke

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Abstract:

Objectives: This paper discusses the relationship between homocysteine (Hcy), S-adenosylmethionine (SAM), S-adenosylhomocysteine (SAH) and cytokines and acute ischemic stroke (AIS).

Materials and Methods: 123 AIS patients hospitalized in the Department of Neurology of the first hospital of Hebei Medical University were included as the case group, and 125 non stroke patients who underwent physical examination in our hospital were selected as the control group. Collect general information of subjects and the results of blood biochemistry and blood routine examination at admission or physical examination. The serum levels of oxidized low density lipoprotein cholesterol (ox-LDL), interleukin 6 (IL-6) and tumor necrosis factor α (TNF-α)、 Intercellular adhesion molecule 1 (ICAM-1), high-sensitivity C reactive protein (hs-CRP), homocysteine (Hcy), SAM and SAH were detected and analyzed.

Results: The serum levels of Hcy, SAM and SAM / SAH in the case group were significantly higher than those in the control group ($P \leqslant 0.05$). The serum SAH level in the case group was significantly lower than that in the control group ($P < 0.05$). Serum hs-CRP, ICAM-1, IL-6, TNF-α, the blood neutrophil lymphocyte ratio (NLR) and platelet lymphocyte ratio (PLR) in the case group were significantly higher than those in the control group ($P < 0.05$). Logistic regression analysis showed that Hcy and SAM were the risk factors of AIS ($P < 0.05$).

Conclusions: The increase of serum Hcy and SAM concentration is the risk factor of AIS; the change of the cytokine level is related to the pathogenesis of AIS. The more serious the patient's condition is, the lower TNF-α, the higher the levels of blood neutrophil lymphocyte ratio (NLR) and platelet lymphocyte ratio (PLR). These three indexes can be utilized to judge the severity of patients' early disease.

Key words ischemic stroke, S-Adenosylmethionine, S-Adenosylhomocysteine, homocysteine, cytokines

Category: Clinical Nutrition

肌少症对维持性血液透析患者生存预后的影响分析

Impact of sarcopenia on mortality in patients undergoing hemodialysis

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Background: Sarcopenia, characterized by impaired muscle mass and function, is a common complication in maintenance hemodialysis(MHD). However, research on the mortality of sarcopenia in MHD patients is limited. **Objective**: To investigate the impacts of sarcopenia on mortality in MHD patients. **Methods**: All 143 MHD patients recruited in this cohort study in March 2021 were tested with bioelectrical impedance analysis and grip strength. Demographic data and laboratory indicators were collected. The patients were divided into sarcopenia and non-sarcopenia groups according to the criteria established by the Asian Working Group on Sarcopenia. By following up for 18 months, the survival status was documented. Kaplan-Meier survival curve, multivariate Cox proportional hazard model, and Fine-Gray competing risk model were used to assess the relationship between sarcopenia and all-cause mortality, cardio-cerebrovascular mortality, and infectious disease mortality. **Results**: The sarcopenia group had older age, higher spKt/V, the ratio of extracellular to intracellular water and IL-6, and lower BMI, serum phosphorus, serum creatinine, serum albumin, serum prealbumin, extracellular water, intracellular water, grip strength, appendicular skeletal muscle index levels and physical activity compared to the non-sarcopenia group, all with statistically significant differences (all $P< 0.05$). Kaplan Meier curves showed that the overall survival rate of the sarcopenia group was lower than those of the non-sarcopenia group (Log-rank test $x^2=15.99$, $P< 0.001$). Multivariable Cox regression analysis and Fine-Gray competing risk model demonstrated that sarcopenia was independently correlated with all-cause mortality and infectious diseases mortality after adjusting for confounding factors ($HR= 2.75$, 95%CI 1.07-7.10, $P= 0.036$; $SHR= 5.76$, 95%CI 1.15-28.96, $P= 0.034$). **Conclusion**: There was highly prevalent sarcopenia among this cohort of patients with MHD. Moreover, sarcopenia was an independent predictor of all-cause mortality and infectious disease mortality in MHD patients.

Key words sarcopenia; maintenance hemodialysis; all-cause mortality; infectious disease mortality

Category: Clinical Nutrition

一项 meta 分析：口腔微生物对恶性肿瘤生存期的影响

Prognostic Impact of Oral Microbiome on Survival of Malignancies: A Systematic Review and Meta-Analysis

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Background Emerging studies have shown that there is a close link between oral microbiome and the occurence of malignancies. However, the prognostic significance of oral microbiome for patients is poorly investigated. This meta-analysis aimed to evaluate the effect of oral microbiome on survival of malignant neoplasms.

Methods PubMed, Embase, and Cochrane Library databases until September 2022 were searched. The hazard ratio (HR) corresponding to 95% confidence interval (CI) of survival including overall survival (OS), disease-specifific Survival (DSS), progression-free survival (PFS), and disease-free survival (DFS) were analyzed using Review Manager 5.4 software.

Results A total of 15 studies, covering 5191 samples with different types of cancers, were selected based on specified inclusion and exclusion criteria. In univariate and multivariate analysis, patients with low diversity of oral microbiome, or Fusobacterium-high/positive, or P. gingivalis positive in cancer tissue had poorer OS (univariate HR = 1.74; 95% CI: 1.15－2.62; P = 0.009; multivariate HR = 1.56; 95% CI: 1.07－2.27; P = 0.02), DSS (univariate HR = 2.06; 95% CI: 1.50－2.84; P < 0.00001; multivariate HR = 1.80; 95% CI: 1.48－2.20; P < 0.00001), and PFS/DFS (univariate HR = 2.00; 95% CI: 1.12－3.58; P = 0.002; multivariate HR = 1.78; 95% CI: 11.05－3.02; P = 0.003). We also did a further subgroup analysis, Fusobacterium positive or high abundance in cancer tissues had poor OS than those without by multivariate analysis. But had no effect on PFS or DFS by univariate and multivariate analysis. P. gingivalis positive in cancer tissue also had worse OS.

Conclusions Oral microbiome may be the prognostic factors on survivals of patients with malignancies.

Key words Oral Microbiome, Malignancies, Survival, Meta-Analysis

Category: Clinical Nutrition

运动员感染 COVID-19 后的营养状态评估和饮食应对策略

Assessment of nutritional status and dietary coping strategies after COVID-19 infection in athletes

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Objective: COVID-19 imposed restrictions are associated with many health consequences, particularly in athletes. Adverse changes in physical activity and nutrition may affect subsequent athletic and competition performance. Studies to date have shown that athletes who are typically young, healthy and free of comorbidities are at lower risk of serious symptoms and fatal outcomes from COVID-19 infection than the general population. However, the potential short- and long-term effects of COVID-19 infection remain largely unknown. This study was conducted to assess the impact of COVID-19 infection and pandemic restriction on the nutrition and physical activity of athletes; and to compare the blood index results of athletes before and after infection.Methods: Twenty-seven professionally trained male football players (mean age = 16.03 ± 1.14 years, height = 178.4 ± 5.8 cm, weight = 72.3 ± 5.4 kg; BMI = 24.0 ± 2.6 kg-m-2) underwent pre- and post-COVID-19 surveys and completed dietary and physical activity surveys.Results: 1. After COVID-19 infection, athletes' physical activity gradually resumed and dietary modification strategies using high quality vegetable protein instead of meat and enhanced intake of different substances such as essential fatty acids, linoleic acid, essential amino acids and the aforementioned vitamins and minerals improved the immune response, especially in the case of viral infections, and immunity improved and increased.2. COVID-19 infection causes a marked deterioration in the performance of blood indicators. Following COVID-19 infection, testosterone and ferritin are reduced. Consumption of processed meat and replacement of meat with plant-based protein affected haemoglobin concentrations ($p = 0.045$). Changes in fat content were associa of unsaturated fatty acids ($p = 0.033$).

Conclusion: Nutritional status and blood markers in athletes following COVID-19 infection should be regularly followed up every three months to assess and adjust dietary strategies timely.

Key words COVID-19; diet; football athletes; nutrition; sport performance

Category: Clinical Nutrition

康复营养干预在肌少症性吞咽困难的应用效果
Effectiveness of rehabilitative nutritional intervention in sarcopenic dysphagia

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OBJECTIVE: Sarcopenic dysphagia is characterized by dysphagia caused by sarcopenia and loss of swallowing muscle mass and function. The purpose of this article is to explore and review the effectiveness of rehabilitative nutritional management in the application of myasthenia gravis dysphagia.

METHODS: The keywords "rehabilitation nutrition, myasthenia gravis, sarcopenia, swallowing dysfunction" were searched in "CNKI, Wan fang , PubMed" databases and summarized.

RESULTS: The essence of rehabilitation nutrition is the combination of nutritional support and rehabilitation therapy, and the rehabilitation nutritional interventions for myasthenia gravis have been attracting attention in recent years. The current nutritional interventions are mostly based on dietary intake and enteral nutrition calculated and guided by professionals, and the starting amount of nutritional intake varies from person to person, ranging from 1200 kcal/d to 1900 kcal/d. Rehabilitation interventions include resistance exercises, respiratory training, walking, oral exercises, and tongue exercises. According to the results of the current study, "active rehabilitative nutritional interventions in patients with myasthenia gravis can improve the Mini-Nutritional Assessment Profile, biochemical nutritional indicators, anthropometric data, bioimpedance body composition, modified Barthel Index, tongue pressure measurements, separate use of Functional Independence Measure and Mann Assessment of Swallowing Ability, grip strength, and skeletal muscle mass index, and providing high energy intake of ≥30 kcal/IBW/day may be more effective in improving myasthenia gravis swallowing. Therefore, rehabilitative nutritional management may improve not only swallowing function and nutrition but also function, activity, participation, and quality of life in patients with myasthenia gravis swallowing disorder. CONCLUSION: According to the results of the current study, rehabilitation nutrition management is beneficial for patients with sarcopenic dysphagia; Moreover, the combination of rehabilitation nutrition intervention may be a major direction for future research.

Key words Rehabilitation nutrition; Myasthenia gravis; Sarcopenia; Swallowing dysfunction

Category: Clinical Nutrition

维持性血液透析患者的高血清降钙素水平与其更好的营养状态相关

Higher Serum Calcitonin Levels Are Associated With a Better Nutritional Status in Patients Undergoing Maintenance Hemodialysis

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Objective: This study aimed to investigate the relationship between serum calcitonin levels and the nutritional status in patients undergoing maintenance hemodialysis (MHD).

Design and Methods: Patients undergoing MHD at our center in March 2021 were enrolled in this cross-sectional study. Patients' demographic and clinical data and blood samples were collected before the hemodialysis sessions. Serum calcitonin levels and other biochemical parameters were measured using electrochemiluminescence. The nutritional status of these patients was comprehensively evaluated using grip strength (GS), pinch strength, mid-arm muscle circumference(MAMC), triceps skinfold thickness, 7-point subjective global assessment (SGA), and nutritional risk screening 2002 (NRS 2002). Multivariate binary logistic regression and multiple linear regression analyses were performed to investigate the relationship between serum calcitonin levels and the nutritional status.

Results: In total, 155 patients (90 men, 65 women) were included, with a median age of 66 (range, 58.0–75.0) years and a median dialysis vintage of 28 (range, 11.0–55.0) months. The median serum calcitonin level of all participants was 3.37 (range, 0.55–43.01) pg/mL. Forty-four patients (28.4%) and 33 patients (21.3%) were malnourished, as defined by the 7-point SGA, and with nutritional risk, as defined by the NRS 2002, respectively. After adjusting for confounding factors, the results of the multivariate binary logistic regression analyses showed that higher calcitonin levels or higher serum calcitonin tertiles were independently associated with better nutrition, and multiple linear regression analysis showed that higher serum calcitonin levels were independently associated with higher levels of GS and higher values of MAMC.

Conclusion: Higher serum calcitonin levels were independently associated with a better nutritional status in patients undergoing MHD; however, multicenter studies with larger sample sizes are still needed to determine its value as a novel nutritional biomarker in patients undergoing MHD.

Key words Serum calcitonin; Maintenance hemodialysis; Nutritional risk; NRS 2002; SGA

Category: Clinical Nutrition

MIND饮食对卒中的影响研究进展

Research progress on the effect of MIND diet on stroke

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Objective: The incidence of stroke has increased significantly in recent years, which is inseparable from people's dietary habits. The purpose of this paper is to explore the effect of MIND diet on stroke and to provide ideas for stroke prevention and healthy dietary guidance. Methods: The keywords "MIND diet, Mediterranean diet, Anti-hypertensive diet, Stroke, Cerebrovascular disease" were searched in CNKI, Wan fang and PubMed databases and summarized. Results: The MIND diet consists of a Mediterranean diet and an Anti-hypertensive diet consisting of whole grains, green leafy or other vegetables, berries, legumes, nuts, lean meat, fish, poultry and olive oil, and a reduced intake of cheese, butter, fried foods and sweets. According to the present study, the final food frequency questionnaire score correlated negatively with the occurrence of stroke events, meaning that the higher the MIND diet dependence, the lower the incidence of stroke, while the MIND diet was found to be associated with a slower decline in cognitive function after stroke after adjusting for age, sex, physical activity, education, caloric intake and smoking. Therefore, the MIND diet is negatively associated with stroke and may have a preventive and mitigating effect on the onset of cognitive impairment after stroke. Conclusion: The MIND diet is negatively associated with the occurrence of stroke and may have a preventive and mitigating effect on the development of cognitive impairment after stroke.

Key words MIND diet; Mediterranean diet; Anti-hypertensive diet; Stroke; Cerebrovascular disease

分类：临床营养

海南省 6542 名中老年人饮茶行为调查及其与糖尿病的相关性分析

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目的：调查海南省中老年人饮茶行为现况及其与糖尿病的相关性，进一步为中老年人饮茶行为与糖尿病的关系提供科学依据。

方法：本课题开展现况研究，采用多阶段随机抽样方法，在海南省各地区抽取 35 岁～74 岁的中老年人进行问卷调查、体格测量和空腹血糖检测。应用 Excel 2016 进行数据的录入、核查以及清理，SPSS 25.0 进行统计分析。计量资料中，正态分布采用平均值±标准差（`X±S ）描述；若为偏态分布时，采用中位数、下上四分位数 M(P25~P75)表示。经检验，若数据为正态，组间比较采用单因素方差分析；若为偏态，组间比较采用 K-W 检验。计数资料用频数和百分比描述，组间比较采用 c2 检验。饮茶行为与糖尿病相关性采用二元 logistic 回归进行分析；以 P 值＜0.05 表示差异具有统计学意义。

结果：

1．根据饮茶行为分为不饮茶者（1978 人，占 30.2%），偶尔饮茶者（2362 人，占 36.1%），经常饮茶者（2202 人，占 33.7%）。其中，男性（46.3%）经常饮茶者的比例高于女性（20.9%）且差异具有统计学意义（c2=648.94，P 值＜0.001）。与不饮茶者和偶尔饮茶者相比，经常饮茶者的 BMI(24.14±3.53 kg/㎡）、收缩压（132.39±19.80mmHg）、舒张压（84.23±13.38mmHg）及吸烟比例（53.0%）均为最高的且差异具有统计学意义（F BMI=30.24，F 收缩压=27.66，F 舒张压=39.17，c2 吸烟=370.52，P 值均＜0.05）。从经常饮茶者 2202 名中，根据饮茶种类分为绿茶组（1141 人，占 51.8%）、红茶组（426 人，占 19.3%）、乌龙茶/铁观音组（284 人，占 13.4%）、普洱茶/砖茶组（142 人，占 6.4%）、其它组（199 人，占 9.0%）。其中，绿茶组的 BMI（24.50±3.47 kg/㎡）、舒张压（86.16±13.54mmHg）及吸烟比例（57.1%）是五组中最高的且差异具有统计学意义（F BMI=7.48，F 舒张压=13.26，c2 吸烟=43.23，P 值均＜0.05）。经常饮茶者 2202 名中，有 73 例未填写饮茶浓淡程度该选项，将其剔除后剩余 2129 人；在 2129 人中，根据饮茶浓淡程度分为淡茶组（666 人，占 31.3%）、适度组（1237 人，占 58.1%）、浓茶组（226 人，占 10.6%）。其中，适度组的舒张压（84.70±13.58mmHg）是三组中最高的且差异具有统计学差异（F 舒张压=4.97，P 值=0.007）。

2．研究对象中 493 名检出糖尿病，占 7.5%。其中男性 342 名（10.4%），女性 151 名（4.6%），男性检出率高于女性且差异具有统计学意义（c2=78.65，P 值＜0.001）。随着年龄的增长，糖尿病检出率呈现上升趋势（c2=190.72，P 值＜0.001）。吸烟者（11.2%）检出率高于不吸烟者（6.4%）且差异具有统计学意义（c2=38.72，P 值＜0.001）。经常饮茶者（9.0%）检出率高于不饮茶者（6.0%）和偶尔饮茶者（7.5%）且差异具有统计学意义（c2=14.15，P 值=0.001）。糖尿病组的 BMI（24.51±4.08 kg/㎡）、收缩压（141.30±20.90mmHg）、舒张压（87.46±13.83mmHg）均高于正常组且差异具有统计学意义（F BMI=25.10，F 收缩压=179.79，F 舒张压=81.90，P 值均＜0.05）。

3．二元 logistic 回归分析结果显示，经单因素分析，纳入差异具有统计学意义的变量；调整性别、年龄、教育水平、职业、婚姻状态、收入、是否吸烟、BMI、收缩压、舒张压的影响后，饮茶行为与糖尿病检出情况之间无关联（OR 偶尔饮茶=1.052，95%CI=[0.813～1.362]；OR 经常饮茶=0.978，95%CI=[0.750～1.276]；P 值均＞0.05）。

结论：海南省中老年人饮茶行为较为普遍，其中男性饮茶人数多于女性，大多数人更倾向于饮用绿茶且浓度适中。饮茶行为与糖尿病检出情况之间无关联，未来需要开展更大样本的前瞻性研究观察其因果关系。

关键字 关键词：饮茶行为，糖尿病，中老年人，关联性

分类：临床营养

肠道菌群及其代谢产物在乳腺癌发病机制中的研究进展

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目的　乳腺癌是世界范围内女性最常被诊断的癌症，也是导致女性死亡的主要原因之一。近年来，乳腺癌的发病率和病死率也呈逐年递增的趋势，乳腺癌的预防和治疗也愈渐重要。本文为了深入探讨肠道菌群与乳腺癌发生的风险关联，以及在乳腺癌的发病机制中可能发挥的作用，综述了近五年国内外肠道菌群与乳腺癌的相关研究，为乳腺癌的防治提供理论支持，为未来乳腺癌的研究提供新的思路。

方法　通过文献研究的方法，在知网、万方、Pubmed 和 FMRS 外文医学信息资源检索平台，查阅近五年国内外关于肠道菌群和乳腺癌研究的文献，中文文献 145 篇，包括论著 69 篇，学位论文 71 篇，会议论文 2 篇，综述 3 篇；英文文献 250 篇，包括 SCI 收录 75 篇，系统评价 3 篇。对文献进行整理、综合、分析，梳理肠道菌群与乳腺癌发生的风险关联，探究肠道菌群及代谢产物在乳腺癌的发病机制中可能发挥的作用。

结果 肠道菌群及其代谢产物与乳腺癌发生之间的相关作用机制：一方面，肠道菌群对乳腺癌发生有促进作用，肠道菌群能通过影响细胞信号通路、某些细菌产生的毒素使活性氧增加导致 DNA 双链断裂从而引起宿主细胞的增殖及 DNA 的损害，促进癌症发生；一些细菌通过抑制宿主的免疫机制，使机体的免疫系统无法识别肿瘤，从而刺激致癌作用；肠道菌群还参与调节雌激素和雌激素代谢物水平，增加乳腺癌发生风险。另一方面，肠道菌群也能抑制乳腺癌，肠道菌群通过控制人体免疫反应从而抑制乳腺的早期癌变；肠道菌群产生的代谢产物，如短链脂肪酸、次胆汁酸、氨基酸，也能影响乳腺癌细胞增殖、细胞凋亡、细胞侵袭及基因表达及诱导抗肿瘤免疫应答，抑制乳腺癌细胞生长、增殖和转移。

结论 乳腺癌受多种因素的影响，研究表明，肠道菌群及其代谢产物可通过参与宿主细胞的增殖及 DNA 的损害、参与免疫及炎症反应、调节雌激素水平等途径在乳腺癌的发生发展中起到重要作用。尽管对于肠道菌群与乳腺癌之间的关联已经取得了一定的研究成果，但是仍存在一些问题：①关于肠道菌群与乳腺癌的关系尚不完全清楚，肠道菌群在乳腺癌中发挥具体作用的机制仍十分不明确，需要更深入的基础研究探索肠道菌群与乳腺癌之间的机制；②肠道菌群数目庞大，构成复杂，因此可能忽视未检测到或者丰度太低的菌种，无法准确掌握肠道中所有微生物的数据；③关于肠道细菌的检测方法尚不统一，且健康肠道菌群的概念没有量化指标，这也可能是研究者得出相反结论的可能原因；④目前的研究样本量较小，且大都是动物实验，不具代表性，需进行大样本量的数据收集及临床试验来获得更为准确的结论。因此需要更多的研究来解决这些问题，以期促进肠道菌群与乳腺癌研究的进展。

关键字 肠道菌群 代谢产物 乳腺癌 免疫炎症 雌激素

分类：临床营养

基于 DIP 背景下探讨建立膝关节置换术的加速康复营养管理路径的必要性

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目的：随着我国人口老龄化的发展，膝关节置换手术多以老年人为主，老年患者术前容易出现低蛋白血症，导致术后更加容易出现营养不良，因此对该群体实施营养管理尤其重要。在加速康复外科理念指导下，整个围手术期采用有循证医学依据的治疗方式，可以有效减少手术应激反应，并发症及病死率等；然而当前医疗卫生系统提出按病种分值（DIP）付费为主的多元复合式医保支付方式，在该模式下探讨如何建立营养管理路径具有重要意义，同时为促进患者康复，缩短住院周期等提供参考依据。

方法：本研究采用循证医学方法，通过查阅文献、外出交流学习、专家咨询等构建膝关节置换术患者的加速康复营养管理理论框架，然后基于 DIP 付费的病种路径要求，并与多方沟通协作制定基于 DIP 背景下的膝关节置换术加速康复营养管理路径。并通过观察营养路径实施前后的住院患者满意度、住院天数、术后并发症发生率（切口感染、发热、泌尿系统感染）等的变化。

结果：最终形成的基于 DIP 背景下的膝关节置管术加速康复营养管理路径大致如下：①成立多学科营养管理小组，构建营养管理的组织架构，并明确小组成员职责；②将营养管理流程路径化，形成宣传手册，定期为医护开展营养相关培训；③将该流程形成方案，医务科并定期对其进行质量控制；④住院期间根据临床诊疗的各个环节，制定具体的营养管理方案，并在方案内进行操作，若存在变异需记录并说明原因；⑤患者出院后进行营养追踪管理等系列举措。该路径实施后，一方面规范了临床营养诊疗行为，促进膝关节手术患者的系统营养管理。另一方面路径实施前后的患者满意度（85% vs. 96%）显著提升，住院平均天数（8.6 天 vs. 7.2 天）减少，住院期间术后相关并发症发生率显著降低（25.3% vs. 13.5%）；营养风险筛查率显著提升（27% vs. 70%）；营养评估率（23% vs. 47%）；患者术日饥饿发生情况显著降低（53%vs.34%）。

结论：基于 DIP 背景下建立膝关节置换术的加速康复营养管理路径对于规范化营养诊疗流程，促进患者康复，缩短住院天数等均有显著意义。成熟的路劲是开展 DIP 收费的前提，可以合理配置医院的各项资源，建立一套标准化、规范化的治疗模式。同时也提升了住院患者的满意度，这对于竞争激烈的医疗环境下，如何提升医院的就医优势，如何降低医疗费用等均有重大意义，值得推广和参考。

关键字 加速康复外科，DIP，营养路径；

分类：临床营养

富含大豆蛋白的全餐干预对老年人肾功能和肌肉健康的影响

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目的：观察富含大豆蛋白的全餐干预对老年人肾功能和肌肉健康的影响。

材料与方法：上海市中心城区某养老院招募年龄大于 65 岁的老人 84 例，按完全随机化分组，最终完成为期 14 周（2 周诱导期，12 周正式干预）大豆蛋白全餐干预和相关检测的老人 67 例，其中干预组 33 人，对照组 34 人。男性 25 例，女性 42 例，平均年龄（84.58±6.86）岁。全餐干预方法：对照组采用养老院常规饮食，提供能量 1500kcal，蛋白质 60g；干预组额外补充含 30 克大豆蛋白的制品，以大豆分离蛋白粉、大豆粉、大豆组织蛋白（TVP）产品的形式平均分配到三餐中，额外增加 30g 蛋白质采用减少主食的方式保证两组人群膳食供餐热量的均衡性。

早餐：对照组是养老院常规膳食；试验组在常规膳食基础上，增加大豆蛋白 10 克。形式：高蛋白（32%）豆浆代替一般豆浆；或在粥/燕麦片、肉包、刀切里加入 TVP。

午餐、晚餐：对照组是养老院常规膳食【大荤+小荤+时蔬+主食】；试验组是在常规膳食基础上，根据菜品状态添加不同形式的 TVP 产品，并给与老人适口的杂粮饭（红豆黑米饭和绿豆薏仁饭交替）。

结果：1.肝肾功能指标：肾功能中肾小球滤过率(ml/min)、尿素(mmol/L)干预组终期较基线增加（两项指标基线和终期分别为 73.73±12.95 vs 76.67±12.82、6.16±1.46 vs 6.61±1.36）（P<0.05），肌酐(umol/L）终期较基线降低（基线和终期分别为 71.81±11.48 vs 66.95±12.12），对照组三项指标未见明显差异（P>0.05，三项指标基线和终期分别为 79.72±18.11 vs 78.19±22.87、6.49±1.85 vs 7.28±3.63、66.44±16.13 vs 67.91±16.53）；干预组血尿酸(mmol/L) 较基线降低（P<0.05）(基线和终期分别为 312.91±64.47 vs 292.21±60.46),对照组未见明显差异(P>0.05，基线和终期分别为 299.82±62.65 vs 295.18±72.57)。两组人群肝功能(丙氨酸转氨酶、门冬氨酸转氨酶、碱性磷酸酶、谷氨酰基转移酶)和胱抑素 C 终期与基线比较未见明显差异（P>0.05）

2. 肌肉质量和力量：体重（kg）、全身骨骼肌（kg）、小腿围（cm）和握力（kg）干预组终期较基线升高（P<0.05）（四项指标基线和终期分别为 58.91±9.83 vs 59.42±9.98、20.90±4.00 vs 21.26±4.01、33.86±2.50 vs 34.33±2.74、19.18±6.50 vs 20.87±5.94 ），对照组小腿围（cm）终期较基线降低（P<0.05）（基线和终期为 32.89±3.70 vs 32.23±3.60），对照组体重（kg）、全身骨骼肌（kg）、握力（kg）未见明显差异（P>0.05，三项指标基线和终期分别为 56.14±10.25 vs 55.82±9.68、19.87±4.08 vs 19.96±3.87、17.82±5.46 vs 18.52±5.43）。两组人群四肢骨骼肌指数（kg/m2)终期与基线未见明显差异。

3.糖脂代谢指标：干预组血脂总胆固醇(mmol/L)、甘油三脂(mmol/L)、低密度脂蛋白(mmol/L)终期较基线降低（P< 0.05，三项指标基线和终期分别为 4.18±1.14 vs 3.73±1.10、1.49±0.73 vs 1.22±0.68、2.27 ±0.87 vs 2.01 ±0.89），对照组未见明显差异（P>0.05，三项指标基线和终期分别为 4.32±0.96 vs 4.18±1.01、1.20±0.57 vs 1.10±0.34、2.39±0.79 vs 2.33±0.87))。两组人群高密度脂蛋白 (mmol/L)、空腹血糖(mmol/L)终期与基线未见明显差异（P>0.05）。

结论：富含大豆蛋白的膳食干预能改善老年人的肾功能、血尿酸，不影响肝功能；增加体重和骨骼肌质量，提高肌肉力量；改善老年人血脂代谢（降低血液总胆固醇、甘油三酯、低密度脂蛋白的水平）。

关键字 关键词：老年人，大豆蛋白，全餐干预，肾功能，肌肉健康

分类：临床营养

食物改性在老年吞咽困难患者分级饮食中的应用

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食物改性在老年吞咽困难患者分级饮食中的应用

1. 背景与目的：

1.1 随着老龄化的趋势，老年营养成为一个重要议题。高龄老人由于身体机能减退比如消化道疾病等基础疾病，吸收利用营养的能力下降。很多患者又伴有吞咽障碍的问题甚至发生率高达 60%以上。吞咽障碍的高发又加重营养不良状况的发生。针对这一情况。国外有研究在 VVST（容积-粘度吞咽测试）实验的基础上，用一种特定粘度和质地的改性饮食，对进食的有效性进行评估，结果表明该食物具有很好的安全性。此测试也主要针对的是液体性状食物的进食安全和有效的评估。1.2 中国在这一领域的研究进步较晚，其饮食习惯和日本更接近，有必要对日本的相关资料和产品进行研究和了解。日本 2004 摄食吞咽康复学会就将吞咽困难的损害程度进行了分类，并列入了不同层次可选用的食物。食物特点为粘度降低，聚合性增加。不易松散引起呛咳和误吸。更爽滑降低吞咽难度易于咽下。国际吞咽困难饮食标准化委员会（IDDSI）成立于 2016 年，2017 年也发布了吞咽困难患者的饮食框架。我国相应的标准也在随后陆续推出。符合以上国内国际标准并整合本土化饮食风味型态来应对医疗机构吞咽障碍患者的营养需求已经成为当务之急，并突破（VVST）容积-粘度测试）指导下的仅为液体的食物形态。 2.方法：

2.1 本研究主要采用定性与定量混合研究法，主要通过设计适宜本土风味吞咽障碍专用营养套餐。结合患者吞咽能力给予相应产品和喂食手法，评估其安全性和有效性。适宜本土高龄老人饮食套餐根据患者进食能力，取得科学合理的营养配比和营养密度，能够根据患者每天的能量需求进行定制化调配。 3 结果：

3.1 基于中国本土化吞咽障碍专用套餐和食物改性方案适宜老年吞咽障碍患者，具有便捷高效的特点，同事能够减少吞咽障碍后误吸性肺炎的发生。通过专用食物的营养供给和吞咽练习，部分患者已能够成功拔除喂养管鼻饲。 4. 结论：

4.1 本土化吞咽障碍专用套餐和食物改性方案具有更人文关怀的优势，病人在安全进食的同时享受食之愉悦，对于机能减退无法恢复如常的患者，避免了永远不再享用美食终身管饲的遗憾。生活质量因食之愉悦大大改善。

关键词：老龄 吞咽障碍分级饮食 吞咽功能评估 食物改性 风味

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关键字 老龄 吞咽障碍分级饮食 吞咽功能评估 食物改性 风味

分类：临床营养

基于 VVST 的进食管理在脑卒中吞咽障碍患者康复中的应用效果

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目的：脑卒中吞咽障碍康复期盲目进食常引起呛咳、误吸，增加了吸入性肺炎发生风险，延长住院时间和费用。本研究通过探讨基于容积-粘度吞咽测试(Volume-Viscosity Swallow Test，VVST）的进食管理模式在脑卒中吞咽障碍康复期患者中的应用效果，以期为加速患者进食恢复，降低吸入性肺炎的发生率，缩短留置胃管时间，改善患者的营养状况，提高生活质量提供重要参考依据。

方法：选取 2020 年 1 月至 2020 年 12 月期间我院康复科一病区收治的 30 例脑卒中且存在吞咽障碍的患者为研究对象，入选标准为经 MRI 或 CT 确诊患有脑卒中，洼田饮水试验 2~4 级，生命体征平稳，意识清醒、知情同意且能配合完成康复训练，排除存在严重肝肾疾病，意识模糊或昏迷者。进食管理采用基于 VVST 的进食管理策略，在经口进食之前采用床旁的 VVST 进行吞咽评估，判断患者经口进食的食物容积和粘度，根据评估结果指导家属使用食物增稠剂（舒适素等）进行食物改性。由营养医师根据患者体格和疾病应激情况确定营养和能量需要目标值，并指导家属搭配饮食结构。康复技师每日对患者进行进食体位指导、酸柠檬冰棒的冰刺激、舌操训练、咳嗽训练、口腔周围肌肉训练和屏气发声训练等吞咽康复训练，促进吞咽恢复。家属每日记录患者经口进食量，并监测体重和营养相关生化指标等。干预一周后采用经口进食量占目标量比值、吸入性肺炎等相关并发症发生率和功能性经口摄食量表（Functional Oral Intake Scale，FOIS）对其效果进行评价，并随访记录患者的胃管拔除时间。

结果：共纳入符合条件患者 30 例，其中绝大多数为男性共 29 例（占 96.67%）。年龄在 20~76 岁之间，中位年龄为 62 岁。疾病类别中脑梗死占多数，共 23 例（占 76.67%）；脑出血相对较少，共 7 例（占 23.33%）。干预一周后，患者经口进食量占目标量比值平均为 86.45%，其中 20 例患者（66.67%）恢复正常经口进食。干预前，患者的 FOIS 得分平均为 1.37±0.81 分，干预后 FOIS 得分平均为 6.17±0.16 分，差异有显著统计学意义（P<0.01）。干预前后患者的营养相关生化指标显示，白蛋白（34.92±3.25g/L vs. 39.92±1.99g/L）、血红蛋白（120.67±16.77g/L vs. 135.13±12.01g/L）和前白蛋白（184.97±49.44mg/L vs. 231.00±55.24mg/L）变化显著，差异均有统计学意义（P<0.01）。患者的胃管拔出时间平均为 11.83±3.64 天，且干预期间均未观察到吸入性肺炎等相关并发症发生。

结论：基于 VVST 的进食管理及康复训练，可有效促进脑卒中吞咽障碍患者的吞咽功能恢复，缩短留置胃管时间。多学科团队合作既能保证患者的营养状况，又能加速患者顺利拔管，具有较的指导意义和参考价值。

关键字 VVST，脑卒中；吞咽障碍；食物改性

分类：临床营养

一例神经性厌食症患者营养治疗病例分享

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目的　神经性厌食患者因体重过低，存在不同程度的营养不良。合理有效的营养治疗十分必要。通过对一例神经性厌食患者的营养治疗过程进行回顾总结，提高临床对神经性厌食症营养诊疗的认识，探讨如何对神经性厌食患者进行更加合理的营养治疗。

方法 对我院收治的一例神经性厌食症患者临床症状、实验室检测、膳食回顾、人体测量学指标，营养筛查、评估及治疗进行回顾性分析，详细总结营养治疗调整过程。

患者,女,24 岁,因“反复心情不好，暴饮暴食与进食减少 7 年”入院，患者 7 年前读高中时开始比较在意体重问题，认为自己比别人胖，开始减肥。大学出现厌食、暴饮暴食，在外院就诊，诊断“进食障碍”，应用“舍曲林和奥氮平”治疗，病情控制，逐渐停药，但病情时好时坏，出现饮食不规律、酗酒、莫名的流泪，开心不起来，疲乏无力，有时有想死念头，来我院就诊。诊断为“1、重度营养不良伴消瘦；2、肝功能不全；3、低钾血症；4、神经性厌食；5、抑郁状态；6、贫血；7、低蛋白血症；8、白细胞减少”。 查体：身高 160cm，体重 33kg，BMI12.89，神清，纳差，精神萎靡，面色蜡黄，消瘦，体型极度消瘦，营养不良。实验室检查：白细胞 3.67*10^9/L↓，血红蛋白 109g/L↓；总蛋白 67 g/L，白蛋白 37.6g/L↓，前白蛋白 200mg/L,谷丙转氨酶 177.9U/L↑，谷草转氨酶 484.5U/L↑，谷草/谷丙 2.7↑，尿素氮 <1.40mmol/L↓，甘油三酯 1.82mmol/L↑，高密度脂蛋白胆固醇 2.10mmol/L↑，低密度脂蛋白胆固醇 1.56mmol/L↓，钾 3.38mmol/L↓，氯 95.1mmol/L↓

结果　营养治疗的主要目的是改善患者营养状况，恢复体重，饮食模式正常化。患者入院后给予营养治疗，经过营养筛查评估，患者 NRS-2002 评分 3 分，GLIM 标准诊断为重度营养不良，膳食回顾调查发现入院前每日能量摄入 100-300kcal，入院后结合患者情况，给予饮食联合口服营养补充，并进行营养宣教。为避免再喂养综合征，初始剂量从 750Kcal 开始，逐渐加量至 1600-1700Kcal/天（肠内营养制剂能全力+高蛋白饮食），益生菌调节肠道菌群。早期患者食欲欠佳，每日饮食摄入能量 200-300kcal,饮食以清淡、细软、少油腻、易消化为主，避免胀气食物，肠内营养制剂能全力 500ml 进行口服营养补充，密切监测患者的出入量、生命指征和化验室指标，尤其是电解质水平，防止再喂养综合征。患者遵医良好，从重症医学科转出，后期饮食能量摄入增加至 900-1000kcal。住院 24 天后，恢复正常饮食，体重增加至 38.5kg，BMI15.04；血红蛋白 93g/L，总蛋白 55.8g/L↓，白蛋白 32.8g/L↓，前白蛋白 290mg/L。情绪较前稳定，饮食较前改善出院。两个月后体重已增加至 47Kg，BMI18.4。

结论 临床需提高对神经性厌食营养治疗的认识，通过更加合理、有效的营养治疗来改善患者营养状况，更好诊治患者。

关键字 神经性厌食，营养不良，营养治疗

分类：临床营养

健康青年的基础代谢率与体成分的相关性分析

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题目 健康青年的基础代谢率与体成分的相关性分析目的　探讨健康青年的基础代谢率与体成分的相关性。方法　通过对河南省人民医院职工中的青年志愿者进行问卷调查，筛选出合格的受试者 36 名，其中男性 11 名，女性 25 名，在标准化实验条件下（测试前，健康青年需保证餐后 2 小时以上，测试前未进行剧烈运动，测试过程中不说话、移动或思考，平静的倚靠在椅背上。连续监测 10~15 分钟，并将变异系数≥20%的案例移除本研究），使用营养代谢车（即间接测热法）进行静息能量代谢率测试，使用人体脂肪成分分析仪（即生物电阻抗法）对其进行人体成分测定，比较营养代谢车实测值与体成分仪预测值、H-B 公式预测值（男性：66.47+13.75W+5.0033H-6.755A；女性：655.1+9.563W+1.85H-4.676A，其中 W 代表体重（kg），H 代表身高（cm），A 代表年龄（岁））和 Schofield 公式预测值（Schofield 公式按照不同年龄对应不同公式，由于此研究年龄均＞18 岁，所以男性静息能量代谢率计算公式为 15.057W+10.04H+705. 8，女性静息能量代谢率计算公式为 13.623W+283H+98.2，其中 W 代表体重（kg），H 代表身高（cm））的差异。结果　通过与代谢车 REE 实测值(rest energy expenditure measured by indirect calorimetry，REEIC)比较，H-B 公式预测得到的 REE 值与实测 REEIC 比较，在男性和女性中均无显著差异；应用人体脂肪成分分析得到的预测 REE 值与实测 REEIC 有显著差异，其中青年男性预测值为 1614.55±36.39kcal/d，显著低于实测值 1886.73±95.40kcal/d，青年女性预测值为 1236.12±20.24kcal/d，显著低于实测值 1436.44±49.38kcal/d；WHO 推荐的 Schofield 公式，其中青年男性预测得到的 REE 值与实测值无显著差异，青年女性预测值为 1294.77±26.67kcal/d，显著低于实测值 1436.44±49.38kcal/d。青年男性受试者代谢车测量的基础能量消耗与常见身体成分各参数的均无显著相关性；青年女性的实测 REE 值与身高、相位角和健康评分无统计学差异，与体质量、体质指数、总水分、体脂肪、骨骼肌、体脂比、腰臀比和内脏脂肪面积有统计学差异（P＜0.05），且均呈正相关，其中，与体质量、体水分和骨骼肌的相关性最高，其次实测 REE 值与体脂肪面积、体脂肪和体质量指数的相关性，相关性较小的是腰臀比和体脂比结论　（1）H-B 公式可较好的预测健康青年的代谢值。提示在无营养代谢车准确获取其能量代谢值的情况下，可以使用 H-B 公式快速、简便的获得我国健康青年人群的实际基础代谢值。（2）Schofield 公式可预测男性青年的代谢值，而高估了健康女性青年的代谢值。提示在无营养代谢车准确获取其能量代谢值的情况下，可以使用 Schofield 公式快速、简便的获得我国健康男性青年人群的实际基础代谢值。关键词　间接测热法；基础代谢率；体成分；健康青年作者姓名　王鑫鑫单位　河南省人民医院邮箱　1056917727@qq.com

关键字 间接测热法；基础代谢率；体成分；健康青年

分类：临床营养

改良营养不良通用筛查工具在炎症性肠病患者中的应用研究

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目的 探讨炎症性肠病（inflammatory bowel disease，IBD）患者专用的改良营养不良通用筛查工具（midifiable Malnutrition Universal Screening Tool，mMUST）的应用效果。方法 选取江苏省某三级甲等医院 2023 年 2 月~2023 年 4 月收治的 IBD 非手术患者 82 例，其中克罗恩病（Crohn's disease，CD）患者 64 例，溃疡性结肠炎（ulcerative colitis，UC）患者 18 例；男 68 例、女 14 例，年龄 18~69 岁，平均（44.94±16.51）岁；确诊病程＜5 年 8 例，5~10 年 49 例，＞10 年 35 例；疾病严重程度：缓解期 33 例，轻度活动期（仅 UC 患者）11 例，中度活动期 32 例，重度活动期 7 例。由 2 名经过相关知识培训的消化内科专科护士和 1 名营养支持专科护士对符合纳入标准的 IBD 患者于入院 24 h 内抽空腹血查实验室指标，完成人体成分测量及分别使用 mMUST 和 NRS 2002 对患者进行营养风险筛查。mMUST 筛查方法包括 BMI、近期体质量下降情况和疾病所致饮食摄入减少 3 个方面的内容。BMI（kg/m2）＞20.5 计 0 分，18.5~20.5 计 1 分，＜18.5 计为 2 分，最近 3~6 个月内体质量下降＜5% 计 0 分，5%~10% 计 1 分，＞10%计 2 分；IBD 活动期症状，即最近两周每天腹泻大于 4 次或者进食减少，计 2 分。3 个条目得分相加，总分 0~6 分，0 分为低风险，1 分为中等风险，≥ 2 分为高风险状态。NRS 2002 的筛查方法 该量表包括 3 方面的内容：（1）疾病严重度评分（0~3），本研究者参考浙江省医师协会营养医师专业委员会等编写的《营养风险筛查疾病严重程度评分专家共识》，IBD 急性期（CD 的中度活动期和重度活动期及 UC 活动期为急性期）评 1 分[9]。疾病活动性评估：CD 患者依据 Harvey 和 Bradshow 的简化克罗恩病活动指数（Crohn’ disease activity index, CDAI）计算法分为缓解期、中度活动期和重度活动期。UC 病情分为活动期和缓解期, 活动期 UC 依据改良的 Truelove 和 Witts 严重程度分型标准分为分轻、中、重度;（2）营养状态评分（0~3），根据体质量减少量、食物摄取量的变化和 BMI 值进行评分；（3）年龄评分，≥70 岁者评 1 分。疾病严重度评分+营养状态评分+年龄评分≥3 分评定为存在营养风险。 结果 mMUST 和 NRS 2002 筛查 IBD 患者营养风险一致性较好（Kappa= 0.806，P＜0.01），mMUST 对 IBD 患者筛查出低营养风险者 34 例（41.46%），中等风险 12 例（14.63%），高风险 36 例（43.91%）；NRS 2002 对 IBD 患者营养风险筛查，无风险者 57 例（69.51%），高风险者 25 例（30.49%）；两组筛查高风险患者比例结果差异无统计学意义（ χ^2 =3.058，P=0.076）。mMUST 筛查两组除白细胞和球蛋白无差异外，中高营养风险组 BMI、握力、血红蛋白、总蛋白、血清白蛋白、前白蛋白值均低于低营养风险组；中高营养风险组 C 反映蛋白（C reaction protein，CRP）＞5 mg/L 的比率和粪钙卫蛋白＞50 μg/g 的比率均高于低营养风险组，差异有统计学意义（P＜0.05）；采用二分类 logistic 回归分析探讨 IBD 患者营养风险的相关因素，以营养风险等级为因变量（0=低营养风险，1=中高营养风险），以 CRP（1=小于等于 5，2=大于 5）、粪钙卫蛋白（1=小于等于 50，2=大于 50）、BMI、握力、CRP、血沉、血红蛋白、总蛋白、血清白蛋白、前白蛋白作为自变量进行二分类 logistic 回归分析，结果显示，BMI 和前白蛋白是营养风险的影响因素。 结论 mMUST 将疾病营养条目具体为 IBD 活动期症状，即近两周每天腹泻大于 4 次或者进食减少评 2 分，以更适用于 IBD 患者的营养风险筛查，值得临床推广。

关键字 炎症性肠病；营养风险；筛查

分类：临床营养

西南地区某医科高校大学生痤疮患病情况及饮食相关影响因素调查分析

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目的：本研究通过以西南地区某医科高校大一至大四的大学生为研究对象进行痤疮患病率的流行病学调查及饮食相关影响因素的分析研究，旨在为中国大学生痤疮防控的营养健康教育提供可参考的科学依据。方法：采用整群随机抽样的方法，以西南地区某医科高校为例，对大一至大四的临床医学、预防医学、食品卫生与营养、儿科、麻醉、影像学等专业的学生进行横断面调查。根据预调查试验得到西南地区某医科高校痤疮患病率为 31.46%，取 P=0.3146，1-P=0.6854，计算得样本量为 871，为了减少抽样误差需扩大样本含量，扩大样本量 20%，取样本量为 1045。采用面对面调查的方式，用自行设计的“西南地区某医科高校痤疮流行病学调查表”进行问卷调查，调查该校大学生的痤疮患病率及饮食相关影响因素。寻常痤疮的诊断标准：黑头粉刺、炎症性丘疹、脓疱、结节、囊肿和瘢痕，好发于青少年，皮损主要发生于颜面和胸、背部。结果：共发放 1045 份问卷，回收问卷 914 份。调查的大学生中痤疮患病率为 32.49%。痤疮组的抑郁症发生率高于非痤疮组的抑郁症发生率 ，且差异有统计学意义（ x^2=12.083，P<0.001）；痤疮组的敏感性皮肤比例高于非痤疮组的敏感性皮肤比例，且差异有统计学意义（ x^2=32.964，P<0.05）。一二级家属均患病的人群痤疮患病率最高，无家族史的人群痤疮患病率最低（ x^2=74.789，P<0.001）；注重防晒人群的痤疮患病率比不注重防晒人群的痤疮患病率低，且差异有统计学意义（ x^2=6.985，P<0.05）；使用护肤品人群的痤疮患病率比不使用护肤品人群的痤疮患病率高，且差异有统计学意义（ x^2=11.450，P<0.05）；油性皮肤人群的痤疮患病率最高，中性皮肤人群的痤疮患病率最低，不同类型皮肤人群的痤疮患病率差异有统计学意义（ x^2=98.780，P<0.001）；油腻食品摄入量较少的人群痤疮患病率最低，摄入量极多的人群痤疮患病率最高（ x^2=10.212，P<0.001）。多因素 Logistic 回归分析结果显示：一级家属患病和一二级家属均患病、使用护肤品、油性皮肤、混合性皮肤和干性均是影响因素。以无家族史患病人群为对照，一级家属患病 (OR=3.937，95%CI: 2.431-6.375)和一二级家属均患病人群的痤疮患病率更高(OR=2.626，95%CI: 1.244-5.546)；与没有使用护肤品人群相比，使用护肤品人群的痤疮患病率更高(OR=1.791，95%CI: 1.209-2.654)；以中性皮肤人群的痤疮患病率为对照，油性皮肤 (OR=5.594，95%CI: 5.594- 10.843)、干性皮肤(OR=2.720，95%CI: 1.941-3.814)和混合性皮肤人群的痤疮患病率更高(OR=18.610，95%CI: 8.189-42.290)。结论：痤疮是大学生的常见病，一级家属患病和一二级家属均患病、使用护肤品、油性皮肤、混合性皮肤和干性皮肤是大学生痤疮患病的影响因素。在有家族史、皮肤属于油性、混合性和干性的基础上，油腻食品是大学生痤疮患病和复发的诱发因素。在大学生痤疮防控的营养健康教育工作中，针对高危人群需要进行减油的营养宣教。

关键字 痤疮；大学生；患病情况；油腻食品；皮肤类型

分类：临床营养

血清 VD3 和 DII 与糖尿病患者 NAFLD 发生及其纤维化进展的关系研究

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目的 大量研究文献指出血清维生素 D3（SVD3）水平与非酒精性脂肪肝病（NAFLD）的发生呈负相关关系，而膳食炎症指数（DII）与 NAFLD 肝纤维化的进展呈正相关关系，但在糖尿病人群中 SVD3 和 DII 与 NAFLD 发生、肝组织纤维化进展的相关关系研究还较少见，研究 SVD3 和 DII 在糖尿病和糖尿病合并 NAFLD 两组人群之间的关系有利于临床诊疗过程中对两组人群的营养膳食指导，为优化两类患者营养膳食干预提供科学依据。

方法 连续性纳入 2023 年 4 月-2023 年 6 月在常州市中医医院内分泌科住院的 2 型糖尿病患者共 71 人，根据是否合并 NAFLD 分为 T2DM 组（n1=47）和 T2DM+NAFLD 组（n2=24）。NAFLD 诊断参照中华医学会肝脏病学会分会制定的《非酒精性脂肪性肝病诊疗指南》相关标准。记录患者的性别、年龄、身高、体重、T2DM 病程等一般资料，计算体质指数（BMI），使用食物频率法问卷调查表（FFQ）调查记录所有被研究者的饮食史并计算 DII 评分。所有研究对象于住院后次日清晨空腹 8 小时以上抽取外周静脉血进行以下生化指标的测定：白细胞计数（WBC），血小板计数（BPC）糖化血红蛋白(HbA1c)、空腹血糖(FBG)、血钙(Ca)、血磷(P)、血肌酐(SCr)、血尿素氮(BUN)、总胆固醇(TC)、总甘油三酯(TG)、高密度脂蛋白胆固醇(HDL-C)、低密度脂蛋白胆固醇(LDL-C)、丙氨酸氨基转移酶(ALT)、天门冬氨酸氨基转移酶(AST)、总胆红素（TBIL）、SVD3 以及餐后 2 小时 C 肽，评估所有研究对象的胰岛功能，计算 NAFLD 纤维化评分，并根据 NAFLD 纤维化评分，将 T2DM+NAFLD 组进一步分为无纤维化组和可能有纤维化组。以上数据，分别使用 t 检验（符合正态分布）或 Mann-Whitney U（不符合正态分布）进行单因素分析，用 logistic 回归进行多因素分析，探索 SVD3 和 DII 与 NAFLD 在糖尿病患者中发生的关系以及 SVD3 和 DII 与糖尿病患者肝组织纤维化进展的关系。

结果 研究发现，NAFLD 糖尿病患者膳食维生素 D 水平显著高于非 NAFLD 糖尿病患者膳食维生素 D 水平，且后者平均摄入量并未达到居民膳食指南推荐量，但 SVD3 水平均未提示两组人群 VD 缺乏，且 SVD3 在两组间无显著差异，DII 评分在两组之间也不存在显著差异。在控制年龄、BMI、WBC、BPC、ALT、AST、TBIL、SCr、BUN、TC、TG、LDL、HDL、FBG、HbA1c、餐后 2 小时 C 肽这 16 个因素后，结果显示 SVD3 水平每降低 1ng/mL，糖尿病患者患 NAFLD 的风险就增加 0.124 倍（P=0.019），而 DII 评分在两组人群中的差异依然不显著（P=0.157）。在 NAFLD 糖尿病患者中，无论是血清维生素 D3 还是 DII 评分，其对 NAFLD 进展性纤维化的影响均不显著，控制其他因素后依然没有显著效应。

结论 SVD3 水平与糖尿病患者发生 NAFLD 呈负相关关系，而 DII 评分效应无论在评估糖尿病患者发生 NAFLD 风险中还是评估 NAFLD 糖尿病患者发生 NAFLD 进展性纤维化中都没有显著效应，这可能与膳食调查过程中对回忆偏移的控制有关。

关键字 膳食炎症指数，非酒精性脂肪肝病，维生素 D，2 型糖尿病。

分类：临床营养

上海地区老年人膳食炎症指数与营养状况的关系研究

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目的：在老龄化日益严重的当下，老年人营养状况的关注度逐渐增高，老年人的膳食状况关系着老年人的生活各方面，对其生活质量有着举足轻重的影响。本研究以上海地区老年人为研究对象，调查其膳食营养摄入情况和营养状况，用膳食炎症指数（dietary inflammation index, DII）评价老年人的膳食质量，并分析其与营养状况的关系，有助于精准指导老年人健康饮食、降低炎症相关疾病风险，为促进健康老龄化提供依据。

方法：选择 2022 年 8-9 月在复旦大学附属华东医院营养科体检的 65 岁以上老年人 102 例，采集患者的相关信息，根据食炎症指数分为抗炎饮食组(31 例)和抗炎饮食组(71 例)。根据全球领导人发起的营养不良(GLIM)诊断标准评估营养状况，将营养状况分为营养不良与营养正常。用 24 小时膳食回顾法记录老年人膳食摄入情况，使用 SY 营养软件分析营养素摄入量和膳食结构，在此基础上计算膳食炎症指数，将 DII≥0 定义为促炎饮食，DII＜0 定义为抗炎饮食。使用 SPSS21.0 软件对数据进行单因素相关分析和 Logistic 回归分析。

结果：本研究调查老年人群的平均年龄为 76.42±9.31 岁，其中有男性 84 例，女性 18 例，GLIM 标准诊断营养不良的发生率为 18.63%，抗炎饮食比例为 30.39%。抗炎饮食组老年人的营养不良发生率显著低于促炎饮食组（6.45% vs. 23.94%，P<0.05），且 GLIM 的表观型标准中低 BMI 指数的发生率也显著低于促炎饮食组（3.33% vs. 9.72%，P<0.05）。抗炎饮食组老年人的体重低于促炎饮食组（67.7±10.5 kg vs. 68.8±7.7 kg，P<0.05），两组老年人的身高、BMI 和握力没有差异。分析营养素摄入情况发现，老年人群的平均能量摄入为 1417.5±420.6 Kcal，碳水化合物平均摄入 173.3±61.7 g，蛋白质平均摄入 67.6±21.6 g，脂肪平均摄入 50. 5±24.9g。两组老年人的平均能量、碳水化合物和脂肪的摄入量没有差异。抗炎饮食组的老年人蛋白质（80.8g vs. 63.5g）、膳食纤维（10. 9g vs.8.2g）、维生素 B_2（1.27mg vs.1.17mg）、n-6 脂肪酸（7.17g vs. 6.09g）和 n-3 脂肪酸（0.89g vs. 0.59g）的摄入量均显著高于促炎饮食组（P<0.05）。膳食结构分析发现，抗炎饮食组的老年人的豆类食物（46.9 g vs. 32.09 g）、肉鱼类食物（250.2 g vs. 173.7 g）摄入量均显著高于促炎饮食组（P<0.05）。Logistic 回归分析显示，促炎饮食是老年人出现营养不良的危险因素（RR=4.57，95%CI＝1.27~21.15，P＝0.042）。

结论：随着全国老龄化程度也日益严重，对老年人的营养健康的关注度也日益上升。本次针对上海地区老年人的调查发现，大多数老年人的饮食属于促炎饮食，膳食质量有待改善。抗炎饮食的老年人营养不良率和低 BMI 发生率更低。对于老年人来说，充分摄入豆类食物、肉鱼类食物，增加膳食中蛋白质、膳食纤维、维生素 B_2、n-6 脂肪酸和 n-3 脂肪酸摄入量，有助于可以降低膳食中的炎症潜能，改善营养不良发生的风险。

关键字 老年人，营养状况，膳食炎症指数，GLIM 营养评估

分类：临床营养

医学营养治疗对 2 型糖尿病影响的网状 Meta 分析

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目的　通过网状 Meta 分析评价医学营养治疗对 2 型糖尿病患者血糖控制指标：空腹血糖(FPG)餐后 2 小时血糖(2hPG)　糖化血红蛋白(HbA1c)胰岛素抵抗指数(HOMA-IR)空腹胰岛素(FINS);心血管危险因素指标：总胆固醇(TC)甘油三酯(TG);体重管理指标：体质指数(BMI)的影响效果，旨在为临床医学营养治疗及护理提供有力的证据。

方法　检索 CNKI、万方、维普、SINOMED、Web of Science、Pubmbed、Medline、Cochrane Library 中关于 2 型糖尿病患者膳食营养素或膳食补充剂干预的随机对照试验，检索时限为 2016.01.01-2023.05.01，并于 2023.06.01 进行更新检索。采用 Stata17.0 软件进行传统 Meta 分析、网状 Meta 分析，结局指标均为连续性变量，采用均数差(MD)　标准化均数差(SMD)及其 95%置信区间（95%CI）作为效应量指标。Stata 中进行不一致性检验，当证据网络呈现闭环时，采用节点劈裂法进行一致性检验，P>0.05　时可认为不一致性不显著，则采用一致性模型进行网状 Meta 分析。通过累积排序概率图曲线下面积（surface under the cumulative ranking,SUCRA）呈现每个干预措施成为最佳干预的可能性。0≤SUCRA≤1，为 1　时提示干预措施绝对有效，为　0　时则提示干预措施绝对无效。根据　SUCRA　值的大小进行干预措施优劣的排序。

结果　初检出相关文献 27608 篇（中文 26526 篇、英文 1082 篇）。剔除重复发表、不符合纳入标准 2239 篇。经阅读文题和摘要后纳入 863 篇，最终纳入 22 篇随机对照研究，其中中文 14 篇，英文 8 篇。根据 Cochrane5.3 系统评价手册、改良 Jadad 评分量表对随机对照研究进行质量评价和分级，双人核对一致性 Kappa=0.847。涉及 20 种营养素/膳食补充剂，包含杏仁、枣、大豆蛋白、五味子、亚麻籽、绿色菠萝蜜粉、维生素 D、仁山紫竹盐、咖啡、乳清蛋白、黄色百香果粉(FAMA)、姜黄与胡椒碱混合物(CURPI)、全谷物、麦麸膳食纤维饼、葡萄籽提取物原花青素(GSPE)、维生素 C+维生素 E、葡萄籽提取物原花青素(GSPE)+维生素 C+维生素 E、蜂胶、燕麦、深海 N-3puFA 胶囊等 20 种干预方法。根据累积排序概率曲线下面积(SUCRA)排序结果提示，绿色菠萝蜜粉、亚麻籽、蜂胶、杏仁、全谷物、麦麸纤维饼对降低 T2DM 血糖水平及脂代谢指标呈现较高效的干预效果（P<0.05)。GRADE 及 CINeMA 评价结果提示“关键”结局有 FPG、2hPG、HbA1c、“重要”结局有 HOMA-IR、TC、TG、BMI、FINS。整体质量中等偏上。

结论　本研究证据显示，绿色菠萝蜜粉对降低空腹血糖(FPG)和糖化血红蛋白(HbA1c)效果最优；亚麻籽对降低餐后 2 小时血糖（2hPG)优于葡萄籽提取物原花青素(GSPE)+维生素 C+维生素 E;在降低胰岛素抵抗指数(HOMA-IR)方面，蜂胶排序第 1，其次为乳清蛋白饮料；杏仁对降低总胆固醇(TC)、甘油三酯(TG)疗效显著；全谷物对降低体质指数(BMI）效果优于杏仁；麦麸纤维饼可有效降低空腹胰岛素水平(FINS），但仍需更多高质量且多中心大样本随机对照试验进行进一步验证。

关键字 2 型糖尿病；网状 meta；营养素；医学营养治疗

分类：临床营养

12 种膳食营养干预模式对 2 型糖尿病影响的网状 Meta 分析

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目的　通过网状 Meta 分析评价 12 种膳食营养干预对 2 型糖尿病患者血糖管理(空腹血糖　(FPG)　餐后 2 小时血糖（2hPG)　糖化血红蛋白（HbA1c）胰岛素抵抗指数(HOMA-IR)、心血管危险因素(总胆固醇(TC)甘油三酯(TG)、体重管理(BMI)等临床结局指标的影响效果，旨在为临床医学营养治疗及护理提供有力的证据。

方法　检索 CNKI、万方、维普、SINOMED、Web　of Science、Pubmbed、Medline、Cochrane Library 中关于 2 型糖尿病患者膳食营养干预的随机对照试验，检索时限为 2010.01.01-2023.05.01，并于 2023.06.15 进行更新检索。采用 Stata17.0 软件进行传统 Meta 分析、网状 Meta 分析，结局指标均为连续性变量，采用均数差(MD)　标准化均数差(SMD)及其 95%置信区间（95%CI）作为效应量指标。Stata 中进行不一致性检验，当证据网络呈现闭环时，采用节点劈裂法进行一致性检验，P>0.05　时可认为不一致性不显著，则采用一致性模型进行网状 Meta 分析。PROSPERO 注册号：CRD42023429616。

结果　初检出相关文献 301997 篇（中文 3957 篇、英文 298040 篇），剔除重复发表、不符合纳入标准 19930 篇。经阅读文题和摘要后纳入 3135 篇，最终纳入 18 篇文献（中文 14 篇、英文 4 篇），共 1687 例患者。根据 Cochrane 质量评价标准对随机对照研究进行质量评价和分级，双人核对一致性 Kappa=0.897。具体膳食营养干预方法包含低碳水饮食干预、低脂饮食干预、东亚替代饮食模式、韩国食物交换模式、医学营养治疗(MNT)、碳水化合物计数法、数字化膳食模式、低血糖指数(LGI)　膳食干预、多因素地中海饮食干预、水溶性膳食纤维干预、低血糖指数(LGI)　和低血糖负荷(LGL)　、“倡联宣行理论”(Propose- Coalition - Propaganda - Action,PCPA)饮食干预等 12 种。根据累积排序概率曲线下面积（SUCRA）排序结果提示，医学营养治疗(MNT)、数字化膳食模式、低血糖指数(LGI)和低血糖负荷(LGL)的干预效果最好（P<0.05)。采用联赛图对结局指标进行两两比较分析：在控制糖化血红蛋白指数方面：数字化膳食模式及个性化医学营养治疗优于常规糖尿病膳食干预、韩国食物交换模式、东亚替代饮食式；LGI+LGL、碳水化合物计数法、LGI 膳食干预优于东亚替代饮食模式，差异有统计学意义（P<0.05）。表 6 在降低胰岛素抵抗指数方面，使用 LGI 膳食干预优于个性化医学营养治疗和常规糖尿病膳食干预；水溶性膳食纤维干预优于常规糖尿病膳食干预，差异有统计学意义（P<0.05）。在降低 BMI 方面，　LGI＋LGL 膳食模式优于低碳水饮食干预、个性化医学营养治疗及 PCPA 饮食干预/与低碳水饮食干预、个性化医学营养治疗及 PCPA 饮食干预相比，LGI＋LGL 膳食模式降低 BMI 效果更佳，详见表 7，差异有统计学意义（P<0.05）。GRADE 及 CINeMA 评级结果提示“关键”结局有 FPG、2hPG、HbA1c“重要”结局有 HOMA-IR、TC、TG、BMI。整体质量中等偏上，可为临床提供较好的借鉴意义。

结论　本研究证据及排序聚类热图显示，医学营养治疗(MNT)对降低 FPG 效果最优，首选 LGI 膳食干预 2hPG、HOMA-IR,数字化膳食模式对降低 HbA1c 效果最优，LGI +LGL 营养干预对降低 TC、TG、BMI 效果最优。但仍需更多高质量且多中心大样本随机对照试验进行进一步验证。建议未来临床建立基于数字化的“互联网+”糖尿病膳食营养干预平台，线上与线下管理相结合的一体化模式，助力提升糖尿病诊疗效率，让糖尿病全程管理成为现实，让更多患者通过膳食营养干预减轻糖尿病的困扰。

关键字 2 型糖尿病；网状 meta；医学营养治疗；营养干预；

分类：临床营养

益生菌/益生元对新型冠状病毒感染非重症监护病房住院患者临床结局影响的系统评价及 Meta 分析

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目的：在新冠全球大流行期间，微生态制剂已被推荐应用于新型冠状病毒感染患者的诊疗，已有研究者进行临床研究以探索其应用价值。本研究拟系统评价益生菌对新型冠状病毒感染非重症加强护理病房住院患者临床结局的影响，通过整合相关研究证据，更精准地估计益生菌对 COVID-19 患者的效果。

方法：计算机检索 PubMed、Web of Science、CINAHL、Cochrane、知网、万方数据库，搜集关于因新型冠状肺炎病毒感染住院的非重症监护病房住院患者补充益生菌/益生元临床结果的随机对照研究及队列研究，试验组或观察组采用益生菌干预，对照组采用不含益生菌的标准护理。检索时限均从建库至 2023 年 1 月 31 日。此外，追溯纳入研究的参考文献，以补充获取相关文献。关注的结局指标包括炎性指标（C-反应蛋白、白细胞介素-6、临床改善相关指标（氧支持、症状改善所需时间、症状改善率、核酸转阴/病毒脱落、进入 ICU 率）和临床结局指标（死亡率、住院时间）。筛选符合纳排标准的文献后提取数据并使用 Cochrane 协作网系统评价员手册 5.1 版风险偏倚评估工具和纽卡斯尔-渥太华量表评价纳入文献质量，对于可定量合成的研究采用 RevMan5.4 进行 Meta 分析。如存在无法获取的原始数据，使用 GetData Graph Digitizer2.26 从图中提取数据。对于连续性资料，采用均数差（mean difference，MD）作为效应量，对于二分类资料，采用比值比作为效应量，各效应量均给出其点估计值和 95%可信区间。

结果：数据库检索获得 72 篇文献，其中 7 篇文献满足纳入排除标准，含 3 篇随机对照试验和 4 篇队列研究，均为中高质量文献，共 944 例患者。其中 RCT 试验组 150 例，对照组 152 例；队列研究的试验组 287 例，对照组 355 例。系统评价结果显示，益生菌干预组相比对照组能降低 CRP（MD=-0.77，95%CI:-1.35～-0.19，P=0.009），症状改善所需时间更短（MD=-2.33，95%CI:-4.54～-0.12，P＜0.05），且重症监护病房住院时间短于对照组（MD=-7.34，95%CI:-9.70～-4.98，P＜0.00001）。但未发现益生菌干预在减少氧支持、加快核酸转阴/病毒脱落、减少进入 ICU 率方面的有益作用。

结论：目前关于益生菌在新型冠状病毒感染中应用的科学研究有限。中高质量的研究证据显示，在非 ICU 新冠肺炎患者中使用益生菌可降低 C-反应蛋白。同时，高质量的观察性研究证据显示，益生菌可减少症状改善所需时间和减少 ICU 住院时间。益生菌在新型冠状病毒感染非重症监护病房住院患者诊疗中存在应用价值。但益生菌种类繁多，其因果关系尚不明确，基于高剂量单株益生菌研究证据可能更有利于研究探索。面对来势汹汹的新型病毒，缺乏临床治疗经验，需要在治疗中试错，但仍需要在散发的地区继续开展更多和更大规模的研究，以进一步明确益生菌在新冠患者中的应用价值。

关键字 益生菌/益生元；COVID-19；住院患者；Meta 分析

分类：临床营养

新型多糖-蛋白质复合凝胶制剂的制备及其对吞咽障碍的治疗应用研究

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目的：
吞咽障碍是一种较为常见的临床症状，患者由于下颌、双唇、舌、软腭、咽喉、食管口括约肌或食管功能受损，导致进食或饮水时出现咽下困难。这种情况可能导致误吸、窒息、吸入性肺炎，严重影响患者的生活质量甚至可能致命。
本研究通过对微生物发酵方式制备的新型多糖-蛋白复合凝胶吞咽障碍凝胶制剂的硬度、内聚性等物理特性的研究，根据需要调整复合胶液的添加量，实现对凝胶体性能的优化，从而为治疗吞咽障碍的凝胶制剂的开发提供了依据，同时探讨该多糖-蛋白质复合凝胶对吞咽障碍的潜在治疗效果，为吞咽障碍患者的治疗和康复提供理论支持。

方法：
本研究通过单因素实验和正交实验设计，探究了羟丙基甲基纤维（多糖）、高酰基结冷胶和脱脂牛乳中（牛乳蛋白）三种材料形成的复合凝胶体的最佳发酵条件和添加剂量。将不同浓度的复合胶液添加到基础凝胶制剂中，采用质构仪测试复合凝胶的硬度和内聚性，流变仪测试复合凝胶的稳定性和流动性，并使用扫描电镜测试复合凝胶的微观网状结构。

结果：
通过单因素实验和正交实验得到最优实验条件：羟丙基甲基纤维素浓度为 0.3wt%，高酰基结冷胶浓度为 0.3wt%，发酵时间为 13h，蔗糖添加量为 5wt%，保加利亚乳酸杆菌添加量为 2wt%，发酵温度为 40℃。羟丙基甲基纤维素与高酰基结冷胶按照 1：1 的比例形成复合凝胶，复合凝胶添加量为牛乳体积的一倍量。
羟丙基甲基纤维素主要影响复合凝胶体的内聚性，而高酰基结冷胶主要影响复合凝胶体的硬度。在一定的添加范围内，复合凝胶的硬度和内聚性随着添加量的增加先增大后减小，流动性随着添加量的增加而增大。此外，通过扫描电子显微镜（SEM）对吞咽障碍凝胶制剂的微观结构进行了观察，发现随着复合胶液添加量的增加，凝胶体微观结构更加平滑。通过幂律方程拟合，发现羟丙基甲基纤维素、高酰基结冷胶、脱脂牛乳形成的吞咽障碍凝胶制剂是物理性凝胶，其内部结构键之间的作用力较弱，有利于提高凝胶体的流变性质。复合凝胶在受到外力破坏后仍能保持凝胶状态，并表现出较弱的频率依赖性。

结论：
该多糖-蛋白质（牛乳蛋白-羟丙基甲基纤维素-高酰基结冷胶）复合凝胶在吞咽过程中能够保持良好的凝胶状态和流动性，有助于改善吞咽障碍患者的吞咽功能。此复合凝胶为吞咽障碍的治疗提供了一种新的理论基础和实用方法，有望为吞咽障碍患者的治疗和康复带来新的希望。

关键字 吞咽障碍；复合凝胶；吞咽特性；

分类：临床营养

老年糖尿病患者衰弱发生情况评估及营养相关影响因素的路径分析研究

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目的：探讨老年糖尿病患者衰弱的发生情况及营养相关的影响因素。

方法：

采用横断面研究设计。通过问卷调查、病历查阅、人体测量、营养评估等方法收集 233 例门诊随访老年糖尿病患者的一般状况、糖尿病治疗及疾病严重程度、营养状况、心理状况、肌少症及衰弱的发生情况。主要测评指标及工具包括：四肢骨骼肌质量指数（appendicular skeletal mass index， ASMI）、年龄矫正的 Charlson 合并症指数（aged-adjusted Charlson comorbidity index，ACCI）、9 个条目的患者健康问卷（9-itemPatient Health Questionnaire，PHQ-9）、简易营养评估工具（mini nutritional assessment，MNA）、24 小时膳食回顾、食物频率问卷（Food Frequency Questionnaire，FFQ）、国际体力活动短问卷、修订版中国内地老年人群 Fried 衰弱表型评估工具。

结果：

1. 衰弱前期者占 41.20%，衰弱者 4.72%，修订版本与 Fried 原始版本对衰弱评价的一致性较好（kappa=0.896， P<0.001）；采用两种标准判定得出衰弱及衰弱前期的阳性率，无统计学差异（P=0.705）；与台湾修订版本一致性亦较好（kappa=0.775，P<0.001），采用台湾标准判定衰弱前期和衰弱的阳性率（36.91%）低于本研究修订版（45.92%），差别有统计学意义（P<0.001）。

2. 修正后衰弱及肌少症影响因素路径分析模型拟合较好，标化的路径系数提示抑郁（PHQ-9）对衰弱的影响达到中等程度效应，其余变量对衰弱和肌量总的影响均为小效应。以高主食摄入为特征的膳食模式 4 对骨骼肌质量（ASMI）有正向的直接效应（β=0.281）；营养良好状况（MNA）对 ASMI 有正向的直接效应（β= 0.192），对衰弱有负向直接效应（β=0.166）；抑郁（PHQ-9）对 MNA 有负向直接效应（β=0.431），对衰弱有正向直接效应（β= 0.257）。

结论：

1.老年糖尿病患者病情较为复杂、共病问题严重，由糖尿病导致的慢性并发症发生率较高，伴发轻微抑郁症状及抑郁者比例高，是衰弱及老龄相关肌少症的高危人群。

2. 老年糖尿病患者在主观营养评价存在营养不良风险及营养不良者的检出率较高。膳食摄入量存在严重的摄入不足。能量摄入不足者比例高，能量、蛋白质、碳水化合物及总脂肪摄入量上均低于同年龄组全国大城市平均水平。

3. 老年糖尿病患者衰弱前期检出率较高。Fried 衰弱表型评估的五项中以握力和体力活动下降的检出率最高，步速降低的检出率最低， 握力界值的修订对衰弱评估，尤其是衰弱前期的评估具有较高的敏感性。步速由于与严重肌少症相关未能体现出在衰弱前期患者上的敏感性。 4. 以高主食摄入为特征的膳食模式、抑郁症状对患者综合性营养评估（MNA）和骨骼肌质量（ASMI）存在直接影响，对衰弱具有间接的保护性影响；提示富含碳水化合物的高主食膳食模式对维持肌肉质量和身体功能存在积极影响，摄入食物量及其提供的总能量的充足对老年糖尿病患者很重要。抑郁可对患者衰弱造成直接的影响，疾病严重程度可通过影响膳食模式和抑郁，进而导致衰弱。

关键字 Fried 衰弱表型， 老年糖尿病，衰弱， 影响因素

分类：临床营养

肺结核合并新型冠状病毒感染患者营养支持治疗的效果评价

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【摘要】目的：研究营养支持治疗对肺结核合并新型冠状病毒感染患者治疗效果的影响。方法：将本院 2022-2023 年住院肺结核合并新型冠状病毒感染患者 42 例，随机分成两组：营养组（22 例）由营养师根据患者情况提供高热量高蛋白营养治疗饮食，对照组（20 例）则自行饮食。监测饮食治疗前后两组患者的身体质量指数（BMI)、血红蛋白（HB)、血清白蛋白（ALB)、总淋巴细胞计数（TLC）等生化指标。结果：20 天后营养组体质指数、血红蛋白、血清白蛋白、总淋巴细胞计数明显上升，高于对照组。2 个月，4 个月，6 个月肺 CT 病灶吸收明显高于对照组，结核菌阴转率明显高于对照组，具有统计学显著性差异（P>0.05)。结论肺结核合并新型冠状病毒感染患者进行营养支持治疗可改善患者的营养状况，提高临床疗效，促进患者康复。

【关键词】肺结核合并新型冠状病毒感染；营养支持治疗

Evaluation of the Effectiveness of Nutritional Support Treatment for Patients with Pulmonary Tuberculosis Combined with Covid-19 Infection

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Abstract: Objective: To study the effect of nutritional support therapy on the treatment effect of tuberculosis patients with Covid-19 infection. Methods: 42 tuberculosis patients with Covid-19 infection hospitalized in our hospital from 2022 to 2023 were randomly divided into two groups: the nutritional group (22 patients) was provided with a high-calorie and high-protein nutritional treatment diet by a dietitian according to the patients' condition, while the control group (20 patients) was fed on their own. Biochemical indicators such as body mass index (BMI), haemoglobin (HB), serum albumin (ALB) and total lymphocyte count (TLC) were monitored in both groups before and after the diet treatment. Results: Body mass index, haemoglobin, serum albumin and total lymphocyte count increased significantly in the nutrition group after 20 days, which was higher than that in the control group; absorption of lung CT lesions at 2 months, 4 months and 6 months was significantly higher than in the control group, and the negative conversion rate of tuberculosis was significantly higher than in the control group, with statistically significant differences (p>0.05). Conclusion: Nutritional support therapy for tuberculosis patients with Covid-19 infection can improve the nutritional status of patients, enhance clinical efficacy and promote their recovery.

[Key words] covid-19 infection; nutritional support therapy

肺结核和新冠肺炎是两种对公众生命健康构成极大危害的传染病，对全球公共卫生和经济形成严重威胁，已引起全世界的高度关注。规范化营养支持治疗可有效改善肺结核合并新型冠状病毒感染患者的营养状况、免疫功能和临床结局，加速机体康复并降低复发风险，提高生活质量，在新型冠状病毒感染患者的治疗与康复中发挥着重要作用[1]。《新型冠状病毒感染诊疗方案(试行第十版)》中也明确提出，应将营养支持治疗新型冠状病毒感染患者治疗与康复的全过程,为了评价肺结核合并新型冠状病毒感染患者的营养状况，探讨营养支持在肺结核治疗中的作用，对 2020 年 6 月至 2023 年 1 月在本院住院的 42 例肺结核患者进行了对比研究。

通过观察肺结核合并新冠病毒感染患者，营养支持治疗前后的情况，我们发现，给与营养支持的患者，其体质指数、血红蛋白、血清白蛋白、总淋巴细胞计数均有显著增高（P>0.05） 2 个月，4 个月，6 个月肺 CT 病灶吸收明显高于对照组，结核菌阴转率明显高于对照组。肺结核合并新冠病毒感染患者康复出院后，应继续实施营养支持治疗，以维护营养状况，降低复发风险，改善生活质量。[2]人类使自身的免疫力提高并强大起来，才能更好的应对各种病原体及疾病[3 4

5]。此外，我们的临床研究也显示，经营养支持治疗后，对照组 2.4.6 月末痰菌阴转率均显著低于营养组。进一步证实了营养支持治疗在肺结核病治疗中的重要性。

综上所述，对肺结核合并新冠感染患者的营养治疗，应根据其具体的营养状况来制订合理而切实可行的饮食治疗方案，以改善患者营养状况并提高机体的免疫功能，增强对疾病的抵抗能力，配合药物治疗可促进患者早日康复。

关键字 肺结核合并新型冠状病毒感染患者　临床营养

分类：临床营养

植物性食物干预在慢性病管理中的应用

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近 30 年来，我国居民膳食模式正在悄然发生着变化：（全）谷类、豆类消费量逐年下降；动物性食物和油脂摄入量逐年增多，导致能量摄入过剩；膳食纤维丢失而引起摄人量不足，这些因素都可能增加慢性疾病的发生风险。许多营养研究都研究了以植物为基础的饮食模式作为慢性病的管理。

心脏健康：- 最近一项涉及 214108 名男性和女性的研究发现，含有木脂素的植物性饮食“与降低冠心病风险有关”，木脂素是一种由全谷物、水果、蔬菜中的植物产生的化合物- 2021 年 9 月美国营养学会会议上公布的年轻成年人冠状动脉风险发展（CARDIA）研究结果也发现，富含植物源性食物的饮食与更好的心血管健康之间存在联系。- INTERMAP 研究证明了植物性饮食与血压的关系，这是一项横断面研究，包括美国、英国、日本和中国的 4680 名 40 至 59 岁的男性和女性，表明多吃植物性食物，同时限制动物性食物、精制谷物和含糖饮料与降低血压有关- 哈佛 T.H.Chan 公共卫生学院 2021 的一项研究发现，“高质量的植物性饮食，包括绿叶蔬菜、全谷物和豆类，可能会长期降低高达 10%的总体中风风险

大脑健康：2019 年的人群队列研究包括 16948 名居住在新加坡的中国人（基线年龄为 45 至 74 岁，20 年后再次接受采访），该研究发现，在中年时遵循植物性饮食，如地中海饮食或 DASH 饮食，可以使日后认知能力下降的风险降低 33%

血糖管理：《营养与饮食学会杂志》2020 年的一项研究发现，全谷物改善了血红蛋白 A1c 和 C 反应蛋白水平，这是衡量糖尿病严重程度和心脏病风险的两个指标。“对 22 项随机对照试验的综述还发现，全谷物大米降低了甘油三酯水平，全谷物燕麦降低了总胆固醇和低密度脂蛋白胆固醇水平

控制体重:

植物性食物的低血糖指数和高纤维含量有助于让你更长时间地保持饱腹感，这有助于控制食欲和控制体重

肠道健康：

多吃植物也有利于肠道中的微生物组，纤维提供了肠道生物群落生存所需的许多益生元食物，并保护肠道内壁免受病原体入侵

减少癌症风险：

加利福尼亚州的 10 万名基督复临安息日会教徒是一个宗教团体，他们的饮食以植物为主，戒酒、吸烟和吃猪肉，这项为期 15 年的研究表明，与很少吃水果相比，每周吃三次或三次以上的水果相当于减少三分之二患肺癌的风险。同样，每周至少吃三次豆类、葡萄干、枣或干果可以降低患癌症的风险

免疫力：

以植物为基础的饮食以及多种维生素、矿物质、抗氧化剂和其他化合物可以支持免疫系统的健康。颜色越鲜艳的水果或蔬菜，所含的抗氧化剂就越能增强免疫力

本报告综合分析各个植物性饮食对慢性病的研究证据结果，使营养师能够将科学应用于患者的临床实践。

关键字 植物性饮食，慢性病管理

分类：临床营养

老年肿瘤患者营养管理的证据总结

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目的：随着社会发展、医疗科技等各个方面水平的不断提升，全球各地人口老龄化的进程也在不断加速，老年肿瘤患者的发病率和死亡率均呈现迅速的上升趋势，老年人群中，肿瘤发病率和死亡率的增长不容忽视。较差的营养状态，加之老年患者较高的共病负担、自身躯体功能的不断退化大大降低老年肿瘤患者的耐受程度和治疗效果，对其身体的正常功能产生较大影响（如吞咽功能、消化功能），进而使老年人更容易出现营养问题。但相关研究表明，对老年患者进行营养干预的措施可以改善患者的营养状态，因此，老年肿瘤患者营养管理的问题值得医护人员关注。目前我国仅存在针对老年患者肠内肠外营养的专家共识，尚未有相关指南或证据总结。鉴于老年人身体和营养状况的特殊性，国内外专门针对老年肿瘤患者营养管理的证据较少，但一些关于老年人、癌症患者或老年肿瘤的指南中会提出对于老年肿瘤患者的营养建议，证据较分散，故此，本研究旨在检索并评价国内外老年肿瘤患者营养管理相关证据，对最佳证据进行总结，为临床提供参考。

方法：系统检索英国国家卫生和临床技术优化研究所、国际指南协作网、美国国立指南库、加拿大医学会临床实践指南文库、美国医疗保健研究与质量局、BMJ 最佳临床实践、UpToDate、Cochrane Library、JBI 证据总结数据库、Web of Science、PubMed、CINAHL、EmBase、万方数据库、中国知网、维普数据库、梅斯医学网站、医脉通等指南网及数据库，以及中华医学会肠外肠内营养学分会、欧洲临床营养和代谢学会、美国国家综合癌症网络、美国癌症协会等专业网站中关于老年肿瘤患者营养管理相关内容的文献，由 3 名研究者对文献质量进行评价，由 2 名研究者进行资料提取与汇总。 检索时限：2018 年 1 月至 2023 年 2 月。

结果：本研究最初检索到文献 1971 篇，去除重复篇目并根据文献的纳排标准，经过多次筛选一共纳入 10 篇证据，其中有 2 篇临床决策、4 篇指南，1 篇专家共识，1 篇证据总结和 2 篇系统评价。经研究小组评价，10 篇证据的质量水平较高，均准予纳入。最终总结了 30 条证据，分别为 1 级证据 12 条、2 级证据 1 条、3 级证据 3 条、4 级证据 1 条、5 级证据 13 条，归类为营养风险筛查与评估、营养教育/营养咨询、营养支持 3 个方面。

结论：临床医护人员应根据患者的个体情况，依照循证护理的标准，结合实际情景应用实践证据，对老年肿瘤患者进行营养管理，提高其预后及生活质量，推动循证证据向临床实践的转化。

关键字 老年；肿瘤；营养管理；证据总结

分类：临床营养

双肺移植治疗 Kartagener 综合征患者营养支持

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探讨 Kartagener 综合征（由慢性鼻窦炎、内脏反位和支气管扩张三联征组成，为原发性纤毛运动障碍（primary ciliary dysiderations,PCD）的一个亚型，是一种较为罕见的先天性常染色体隐性遗传病，临床上又称“镜面人”）伴重度营养不良患者双肺移植术前后的营养支持流程。方法：回顾性分析 2017 年 12 月我院收治的 1 例 Kartagener 综合征患者的临床资料，受者男性，37 岁。因“呼吸困难 3 年，进行性加重 1 年”于 2017 年 12 月收住河南省人民医院胸外科。患者 3 年前活动后出现呼吸困难，伴咳嗽、咯血、胸闷、气急，给予抗感染、机械通气等对症治疗，上述症状未明显缓解，近 1 年来症状进行性加重，无法脱离氧疗，入院诊断为“Kartagener 综合征，呼吸衰竭、肺部感染、肺大泡，鼻窦炎术后”。术前体重 34kg，身高 170cm，BMI 指数 11.8kg/m2，术前 6 个月体重 37kg，极低体重，恶液质状态，重度营养不良；入院 HGB 117×109/L，ALB 30.8g/L，PA 49mg/L，低蛋白血症；入院前经口自主进食，膳食结构欠均衡，日均能量摄入约 600kcal，蛋白质能量摄入不足，营养支持喂养不足；v-vst 容积粘度试验测试吞咽功能正常，影响进食量的主要因素为缺氧，食欲差；营养依从性良好。于 12 月 26 日行左右肺叶切除术+双侧肺移植术+胸膜粘连烙段术。术后除抗感染、抗排异、肺康复等临床治疗外，营养医师全程参与，给予个性化营养治疗。患者入院后半流质饮食，经营养评估营养素摄入不足，遂留置胃管鼻饲饮食，应用肠内营养制剂持续泵注，总能量摄入 1250~1400kcal/d，状况改善后经口自主进食。术后留置胃管鼻饲饮食，术后第一日始肠外营养给予结构脂肪乳注射液（力文）250ml 和鱼油脂肪乳注射液（尤文）100ml 联合应用，同时给予注射用水溶性维生素（欣维）、脂溶性维生素 II 注射液（维他利匹特）和门冬氨酸钾镁注射液（瑞阳）等维生素、矿物质补充至术后第七日。术后第一日因腹胀禁食水，胃肠减压，第二日开始启动肠内营养支持，营养科遵循序贯性营养治疗原则，个体化配制预消化型和低脂型肠内营养制剂，逐步过渡至均衡型全营养配方制剂，过程中依据患者胃肠道耐受情况进行相应调整。术后第八日患者开始吞咽功能康复训练，后逐步开始进食半流质食物和口服营养补充，直至患者康复出院，居家期间进行营养随访。结果：双肺移植手术顺利，术后 29 天康复出院，随访 52 月，享有与同龄健康人同等的生命质量，体重增加至 53.5kg，BMI 指数 18.5kg/m2。结论：合理的营养支持有助于肺移植患者营养不良的纠正，帮助患者顺利渡过感染和排异关口，提高生命质量。

关键字 Kartagener 综合征；双肺移植；营养评定；营养支持；营养监测

分类：临床营养

城市糖尿病人群肥胖营养指标的相关性分析

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目的 了解城市人群糖尿病的流行情况及相关营养指标,分析糖尿病人群的危险因素，为评估城市人群糖尿病流行情况及采取相应的预防措施提供依据。方法 研究对象采用整群随机抽样的方法,选择 2019 至 2020 年全年体检量在 10000 人次以上的机构作为抽样池,分别选取北方和南方两个具有代表性的体检中心。研究对象主要来源于城市地区,年龄分布为 20～80 岁。对研究对象进行病历信息摘录、体格检查和实验室检查,排除患有严重疾病者、严重精神疾病者、孕妇以及缺失相关数据者。中心性肥胖采用"中国成人超重和肥胖症预防控制指南"推荐的标准,对纳入人群进行判断,同时采用 1997 年 ADA 提出的糖尿病诊断标准对糖尿病进行判断。计量资料以均数±标准差表示,组间比较采用 t 检验和方差分析;计数资料用率或构成比表示,组间比较采用卡方检验。危险因素分析采用单因素和多因素 Logistic 回归分析,计算比值比(OR)及其 95%可信区间(CI)。结果 本次研究共纳入有效样本例数 79012 名,其中男性为 48171 名,女性为 30841 名,各性别的平均年龄分别为 46.4±13.9 岁和 44.4±13.3 岁。其中本次抽样中糖尿病患病率为 4.6%,男性为 5.9%,女性为 2.7%,性别间比较差异有统计学意义(P＜0.001)。男性和女性糖尿病的患病率分别为 8.4%和 4.5%,各年龄段男性普遍高于女性。北方地区为 6.1%,南方地区为 3.9%,北方地普遍高于南方地区,且男性的南北差异显著大于女性(P＜0.001)。北方地区的糖尿病患病率为 11.7%,南方地区为 4.4%,同样北方地区糖尿病患病率普遍高于南方地区,且男性的南北差异也显著高于女性。吸烟者为 6.2%,不吸烟者为 4.2%,男性吸烟者高于不吸烟者(P＜0.001);饮酒者为 6.0%,不饮酒者为 4.4%(P＜0.001)。吸烟者中男、女性糖尿病的患病率分别为 7.4%和 5.1%,不吸烟者则为 9.0%和 4.5%,男性吸烟者低于不吸烟者(P＜0.001);饮酒者中男、女性糖尿病的患病率分别为 9.5%和 7.4%,不饮酒者则为 8.1%和 4.2%,饮酒者均高于不饮酒者（P＜0.001)。单因素 Logistic 回归分析结果显示,年龄增大、生活在北方地区、吸烟、饮酒、超重肥胖、中心性肥胖均为糖尿病的危险因素。结论 糖尿病与年龄增大、生活地域、吸烟饮酒、超重肥胖和中心性肥胖等多种因素密切相关，尤其肥胖营养指标是糖尿病人群患病的独立危险因素。因此对于糖尿病人群应加强健康宣传教育,并提倡坚持体育运动,提倡戒烟限酒,合理膳食,这可能预防及控制相关诱发糖尿病的危险因素,从而减少和延缓糖尿病的发生，同时为临床糖尿病患者的临床营养效果评估提供参考方向。

关键字 糖尿病；营养；肥胖；体成分；相关性

分类：临床营养

基于指南指导的对一例晚期心力衰竭合并肌少症患者的护理体会

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目的 总结1例基于指南指导对晚期心力衰竭合并肌少症患者的护理体会。

方法 运用Gorden 11项健康功能型态评估内容对患者进行详细评估，发现患者存在的护理问题主要有知识缺乏、心输出量减少、肌肉衰减综合征等。通过6分钟步行测试，发现患者步速为0.26m/s，小于0.8m/s。患者优势手握力24kg，低于男性大于25kg标准。患者体重指数17，小腿围26.5cm，小于31cm，经过人体成分分析显示患者下肢肌肉力量和质量都有所减弱。护理成员通过文献检索，指南查阅，与患者共同拟定①合理的、个性化的心力衰竭管理方案：根据美国AHA健康管理手册，将患者健康状况分为绿、橙、红三个阶段，要求患者每日监测自己症状、体重，并说出自己处于哪个阶段和相应的处理方案；②营养方案：根据肌少症和心力衰竭营养指南与专家共识，计算患者需要1040~1560kcal/d的能量，以1500kcal为标准，计算患者每日需要蛋白质75g、脂肪48g，碳水化合物192g，根据患者饮食习惯为患者计算一周食谱，指导患者如何用手丈量食物量，改变患者饮食习惯，合理配置每日需要能量及饮食营养素摄入；③运动方案：根据心力衰竭及肌少症运动指南与专家共识，为患者拟定相应的运动强度（以40%的心率储备百分数为目标即运动目标心率不超过81.2次/分）、运动时间（20~30次/分）、运动频率（每周5次）及运动形式（第1~2周以有氧为主，第3周开始加入抗阻运动，有氧运动与抗阻运动相互交替），并对患者进行具体指导，加强患者疾病自我管理能力。

结果 通过1个月的护理干预，患者谷丙转氨酶由40.7 U/L降至32.1 U/L；γ-谷氨酰基转移酶由66.0 U/L降至61.7U/L；白蛋白由31.5g/L提升至43.2g/L；总蛋白由71.3g/L提高至77.8g/L；前白蛋白由159mg/L提高至210mg/L；直接胆红素由5.4umol/L降至4.1umol/L；运动时间由被动运动15min转为主动运动30min；患者优势手握力由24kg提高至29kg；患者步速由0.26m/s提高至0.52m/s。患者体重指数由17提高至21kg；ADL评分由70分升高至90分；ARC-F评分由14分降至9分；自我护理能力评估量表正面得分57分（总分140分）提高至88分，负面得分21分（总分32分）降至88分；匹兹堡睡眠质量由11分降至6分；患者双下肢水肿消失。

结论 该案例护士基于指南指导为患者提供具体的心力衰竭及肌少症运动、营养等个性化指导方案，同时对患者进行健康教育，提高患者疾病自我管理知识，有效改善患者症状，缓解肌肉衰减症状。基于指南制定并实施针对心力衰竭合并肌少症患者的干预措施，提高患者自我护理能力和生活质量方面效果显著，值得在临床中进行推广应用。

关键字 心力衰竭；肌少症；个案护理；营养支持；心脏康复

分类：临床营养

营养、免疫与肿瘤预防（综述）

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越来越多的研究发现，慢性炎症和感染是肿瘤发生的一个重要的原因，从肿瘤的发生、发展，到侵袭、转移，炎症反应贯穿始终，并可降低肿瘤的治疗效果。炎症的诱因包括微生物和病毒感染、过敏源、自身免疫性疾病，以及由应激、损伤或其他功能失调的组织、受损细胞等产生的内源性产物。当机体受到内外源损伤或感染时，免疫系统被激活，大量炎细胞浸润并导致多种细胞因子分泌，形成急性炎症。当致炎因素持续存在和（或）炎症状态不能得到及时猝灭时，则会进一步发展为以单核细胞浸润为主的慢性炎症，形成慢性系统性低度炎症 (chronic systemic low-grade inflammation，ChSLGI)。慢性的炎性微环境持续产生大量的活性氧（reactive oxygen species，ROS）、活性氮（reactive nitrogen species，RNS）、趋化因子等炎性介质，使细胞正常的内环境稳定发生改变。ROS 可引起细胞内大分子尤其是 DNA 分子的损伤，出现 DNA 链断裂和碱基突变，导致与细胞凋亡、DNA 修复、细胞周期关卡等细胞基本进程相关的蛋白翻译后修饰，RNS 则可诱导脂质过氧化进一步生成其他活性簇如丙二醛（MDA）等，二者协同诱导抑癌基因突变，大大增加慢性炎症癌变的危险。感染应激条件下，激活的免疫细胞会产生大量 ROS 直接杀灭病原体，同时免疫细胞的耗氧量也会显著增加。受到病原刺激的中性粒细胞，还可在短时间内产生大量的胞外 ROS，形成细胞外陷阱来清除病原微生物及受感染细胞，发挥抗炎作用。促炎应激是任何受到损伤或损伤威胁的细胞所固有的反应包括氧化应激、DNA 损伤引起的细胞反应（细胞应激）、线粒体应激和内质网应激导致的未折叠蛋白生成反应（endoplasmic reticular unfolded protein response，UPRER），以及自噬作用的改变、炎症小体的形成、非编码 RNA 反应、可诱导信号通路网络的形成和表观遗传变化等。细胞应激(Cellular stress，CS)是一种典型的细胞对任何形式的胞内大分子损伤做出的反应，旨在恢复细胞和组织的稳态。细胞应激可以使细胞对破坏因子产生抵抗，并恢复细胞内和组织内的稳态。在部分适应了损伤因子的长期作用后，细胞可维持其促炎状态，形成组织细胞的应变稳态。内质网(ER)应激，包括钙依赖机制和 UPRER，被认为是机体从稳态到功能紊乱的关键环节，是应激适应相关疾病包括肿瘤的共同的细胞分子机制。同时，从炎症、免疫，到肿瘤的发生、发展、转移，营养起着举足轻重的作用，本文综述了炎症-免疫反应中涉及的主要营养素和非营养素成分，包括维生素 D（VD）VD 和 VK2 的免疫调节作用、VC 和 VE 的抗炎作用、矿物质元素如锰、锌、铜、硒、铁、镁等在抗氧化酶系中的作用，及非营养素成分营养物质如辅酶 Q10、谷胱甘肽、植物化学物等在免疫、抗氧化损伤、抗炎等中的作用。

关键字 炎症，免疫，营养素，功效营养，肿瘤预防

分类：临床营养

孕期膳食炎症指数及增重与妊娠结局的相关性研究

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目的：探讨孕晚期膳食炎症指数（Dietary Inflammation Index, DII）、妊娠期增重（Gestational Weight Gain, GWG）与分娩孕周、分娩方式和出生体重等妊娠结局的相关性。

方法：以 2016 年 1 月至 2017 年 1 月在上海交通大学医学院附属新华医院建档、分娩的 235 名孕妇作为研究对象，进行基本信息、孕晚期三日膳食摄入和孕期增重情况收集。将计算得出的膳食炎症指数按三分位法分组，妊娠不同时期的增重按《中国妇女妊娠期体重监测与评价》分为增重不足、适宜和过多组，比较不同组别妊娠结局发生率的差异。应用 SPSS26.0 统计软件进行非参数秩和检验、卡方检验、线性回归、logistic 回归等分析方法。

结果：

1. 本研究最终纳入资料完整者 235 人。按照妊娠期体重总增长进行分组：妊娠期总增重不足组共 13 人，约占 5.53%；妊娠期总增重适宜组共 71 人，约占 31.21%；妊娠期总增重过多组共 151 人，约占 63.26%。按照妊娠早期体重总增长进行分组：妊娠早期增重不足组共 92 人，约占 39.15%；妊娠早期增重适宜组共 61 人，约占 25.96%；妊娠早期增重过多组共 82 人，约占 34.89%。按照妊娠中晚期体重总增长速率进行分组：妊娠中晚期增重过慢组共 9 人，约占 3.83%；妊娠中晚期增重适宜组共 49 人，约占 20.85%；妊娠中晚期增重过快组共 177 人，约占 75.32%。

2. 不同膳食炎症指数分组的妊娠结局比较显示，膳食炎症指数与早产、剖宫产、巨大儿、低出生体重儿等不良妊娠结局的发生均无显著关联，与妊娠晚期增重关联同样不显著（$p>0.05$）。

3. 不同妊娠期总增重的妊娠结局比较显示，剖宫产发生率具有统计学意义（$p=0.040$），增重不足组的发生率最高，为 69.23%；不同妊娠早期增重的妊娠结局比较显示，剖宫产发生率具有统计学意义（$p=0.028$），增重过多组的发生率最高，为 65.85%；不同妊娠中晚期增重速率的妊娠结局比较显示，早产发生率具有统计学意义（$p=0.021$），增重较快组发生率最高，为 10.73%。

4. 交叉两项影响因素后结果显示，妊娠期总增重不足+饮食促炎组和妊娠期总增重过多+饮食抗炎组相比，各不良妊娠结局的发生率均无显著差异（$p>0.05$）；妊娠早期增重过多+妊娠中晚期增重过慢组和妊娠早期增重不足+妊娠中晚期增重过快组相比，各不良妊娠结局的发生率均无显著差异（$p>0.05$）。

5. 多因素 Logistic 回归显示，孕早期、晚期增重指数（kg/m2）是早产的显著影响因素（OR=1.310 95%CI：1.009~1.702 OR=0.563 95%CI：0.330~0.959）；孕早期增重指数（kg/m2）是剖宫的显著危险因素（OR=1.183 95%CI：1.026~1.365）。

结论：本研究发现，与妊娠期总增重适宜相比，增重不足或过多的孕妇剖宫产发生率更高；与妊娠期早期增重不足相比，增重适宜或过多的孕妇剖宫产发生率更高；与妊娠期中晚期增重不足或适宜相比，增重过多的孕妇早产发生率更高。而膳食炎症指数与妊娠结局、妊娠期增重之间的关联均不显著。

关键字 膳食炎症指数；妊娠期增重；妊娠结局

分类：临床营养

脑胶质瘤患者的肠道菌群多样性分析和研究

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目的：人体肠道内存在数量庞大、结构复杂的微生物群落，彼此之间相互作用，相互制约，处于动态平衡状态，直接参与人体的消化吸收、营养代谢、能量供应等诸多方面的功能，对宿主的健康和营养起重要的作用。本研究主要目的为探讨肠道微生物群落结构和多样性特征在脑胶质瘤发生中可能的作用。方法：选取健康人（Healthy control，H）和脑胶质瘤患者（glioma patient，G）粪便作为研究对象，利用焦磷酸测序技术，采用基于 16S rRNA 的高通量测序技术，对粪便环境总 DNA 提取并进行 16S rDNA V3-V4 区扩增测序，在分析肠道细菌群落多样性的基础上，分析脑胶质瘤患者和健康人的大便细菌群落在门、科和属三种水平上的多样性及差异，分析粪便细菌群落与胶质瘤的相关性。结果：对健康对照组和脑胶质瘤组的结果进行组间比较（PCoA、NMDS、PLS-DA）分析，shannon 指数和 simpson 指数分析显示，脑胶质瘤组内的菌群多样性显著高于健康对照组（$p<0.05$），表明两组样本的肠道菌群组成具有显著差异，即脑胶质瘤患者具有特征性的肠道菌群结构。对两组样本的多样性指数进行分析，结果显示脑胶质瘤组内的菌群多样性显著高于对照组，而在门、科和属水平上的分析也证明了这一点。在门水平上，健康对照组有 13 个门，脑胶质瘤组有 17 个门，两组共有 13 个门，脑胶质瘤患者组有 4 个独有的门；在科水平，脑胶质瘤组检到 106 个科，健康对照组检测到 76 个科，两组共有 108 个科；在属水平，健康对照组有 230 个菌属，脑胶质瘤组有 287 个菌属，其中脑胶质瘤患者组有 68 个独有的属，健康对照组有 11 独有的属，$p<0.01$，表明患者组的肠道微生态多样性，在三个水平均较健康对照组高。门水平，Firmicutes 是占主导优势的菌门，其次是 Bacteriodetes 和 proteobacteria，其中 Bacteriodetes 在脑胶质瘤组的丰度显著下降（$p=0.040$），同时 Proteobacteria，Actinobacteria 和 Saccharibacteria 的相对丰度在两组之间也存在统计学差异，脑胶质瘤组的厚壁菌门/拟杆菌门的丰度比（1.45）较健康对照组（1.04）升高了 39.6%。科水平，主导优势菌是 bacteroidaceae，其次是 Lachnospiraceae，有 4 个科和 3 个属的相对丰度在两组之间的差异有统计学意义，而检出率上（$p<0.05$），则有 12 个科和 16 个属的检出率在两组之间有统计学差异（$p<0.05$），Bifidobacterium 和 Lactobacillus 在脑胶质瘤组中的检出率也显著高于健康对照组（$p<0.05$）。LEfSe 分析表明，在脑胶质瘤组中起到重要作用的微生物类群远超过健康对照组，这一结果提示：相对于关键菌株在脑胶质瘤发生、发展中的作用，也许菌群之间相对丰度的改变以及外来菌株的侵袭在脑胶质瘤中的作用也不容忽视。

关键字 脑胶质瘤；肠道菌群；高通量测序；群落结构；菌群多样性

分类：临床营养

电子化住院患儿营养筛查和评估在多中心临床应用的效果评价

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目的

应用电子化营养筛查和营养评估工具调查住院患儿营养不良风险和营养不良及其程度的现状。

方法

前瞻性观察研究，选择 2018 年 4 月 1 日至 2022 年 12 月 31 日间全国 24 家医院新入院的患儿。入选标准：(1)矫正月龄 1 个月≤年龄＜18 岁；(2)住院时间≥48 小时；(3)签署知情同意书。排除标准：(1)无法配合测量身高体重者；(2)存在胸腹水或水肿等影响体格测量准确性的患儿。儿童营养筛查和营养评估系统均通过手机 app 或网页版软件完成，营养筛查由护士执行，在患儿入院时即刻完成营养筛查评分表，营养筛查表分为三部分内容：1）根据 ICD-10 疾病编码判断疾病风险，分为无（0 分）和有（1 分）；2）饮食摄入情况，分为无改变（0 分）、近 1 月来较前减少，但一半能完成（1 分）和近 1 月来较前减少一半以上（2 分）；3）生长指标测量，包括身高、体重和头围，采用 Z 值评分法，结果分为 Z 值> -1（0 分）、Z 值介于-1 和-2 之间或 BMI 达超重水平（1 分）、Z 值介于-2 和-3 之间或 BMI 达肥胖水平（2 分）和 Z 值≤ -3（3 分）。评价标准采用 WHO 生长标准和中国肥胖儿童标准。总分≥2 分提示该患儿存在营养不良风险。住院期间每 7 天重复筛查一次直至患儿出院。对于有营养不良风险患儿进一步进行营养评估，由营养（医）师执行，采用主观全面营养评价表（Subjective Global Nutritional Assessment，SGNA），结果分为营养良好、中、重度营养不良。

结果

本研究共纳入住院患儿 143378 例，其中 1031 例（0.7%）患儿由于输入信息错误或体格测量数据缺失而剔除，最终获得有效数据 142347 例。男性患儿 88210 例（62%），女性患儿 54137 例（38%），内科患儿占 68.2%，外科患儿占 31.8%。日常筛查完成数为 64215 人，出院筛查完成数为 64826 人。患儿入院营养不良风险发生率为 29.3%（41943 例），日常营养不良风险率为 38.4%。各家医院在营养不良风险发生率上存在差异，且差异有统计学意义（P<0.001）。内科患儿中营养不良风险比例为 28.0%，外科患儿中营养不良风险比例为 33.4%。不同病区间患儿的营养不良风险率存在差异，其中普外科/新生儿外科、血液肿瘤科和内分泌遗传代谢科患儿营养不良风险发生率较高，分别为 58.8%，41.7%和 34.3%，显著高于其他病区（P<0.001）。婴儿的营养不良风险发生率占 41.3%，高于其他年龄段患儿，差异有统计学意义（P<0.001）。总体营养评估异常率为 18%，其中中度营养不良发生率为 14.2%，重度营养不良发生率为 3.8%。SGNA 结果提示 18%患儿需进一步营养支持，其余患儿进行营养宣教或随访。

结论

营养筛查和营养评估数据化平台的临床应用，一方面充分发挥了护士职能，促使医疗人员及早关注患儿的营养问题，另一方面为后续营养干预提供了科学依据。

关键字 营养筛查，营养评估，住院儿童

分类：临床营养

n-3 脂肪酸改善癌症患者骨骼肌健康的研究进展

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摘要：肌肉减少症是一种以进行性、广泛性的骨骼肌含量减少和功能减退为主要特点的综合征。也被称为肌少症，在癌症患者中，由于食欲下降、高代谢状态、化疗对消化系统(如恶心、呕吐、食欲不振乃至无法进食)及躯体活动(如虚弱、乏力等)造成影响，一方面造成肌肉合成必需的蛋白质、维生素等营养素的相对缺乏或摄入不足，另一方面造成肌肉的失用状态，导致肌肉蛋白流失增加、合成减少。因此，大多数患者会出现不同程度的营养不良，营养不良患者常常表现为体重的下降、骨骼肌量减少、肌力异常以及躯体功能的减退等，因此会导致肌少症甚至是恶病质，影响患者机体成分的正常代谢，还会降低患者治疗疗效、生活质量，明显缩短生存期。此外化疗药物还可能作用于肌肉减少症发生的某条通路或某些关键分子，诱导或加速肌肉的流失，影响肌肉蛋白的合成，老年肿瘤患者，因为年龄因素，肌肉减少的程度会进一步加重，不仅降低生活质量，也会降低治疗效果，也会影响疾病的预后。近年来有研究表明，给予癌症患者 n-3 脂肪酸补充剂，对于肌少症的预防和治疗具有积极影响。癌症以全身炎症为主要特点，促炎细胞因子以及肿瘤分解代谢因子的作用会驱动机体的各种代谢改变，而炎症是肿瘤状态下肌肉萎缩的主要驱动因素。其已被证明具有抗炎特性，可以下调癌症患者的促炎细胞因子生成和急性期蛋白反应。促炎细胞因子 IL-1、IL-6 和 TNF-a 被认为在癌症相关恶病质的病理发生中起着核心作用。其次，n-3 脂肪酸还可提高胰岛素的敏感性，n-3 脂肪酸主要参与胰岛素受体和胰岛素受体底物-1 的酪氨酸磷酸化，即肌肉中磷脂酰肌醇 3-激酶的活性含量。GLUT-4 是骨骼肌中主要的葡萄糖转运蛋白异构体，其表达率影响葡萄糖转运速率。补充 n-3 脂肪酸可提高胰岛素的敏感性。此外，还可提高代谢的灵活性和能量利用，其对线粒体功能有积极影响，包括线粒体数量的增加，电子传输链中酶复合物功能的改善，以及能量利用率的提高。然而目前 n-3 脂肪酸干预是否可以改善癌症患者骨骼肌状态的研究较少，存在意见不一致的情况，且涉及到的相关指标较少。鉴于此，本文对 n-3 脂肪酸改善肿瘤患者骨骼肌状态的相关研究作一综述，为其应用于癌症患者的营养治疗奠定一定程度的理论基础。

关键字 肌肉减少症；n-3 脂肪酸；营养治疗；癌症

分类：临床营养

基于倾向性评分匹配的食管癌手术患者规范化肠内营养住院费用研究

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目的　评价规范化应用肠内营养治疗对食管癌手术患者住院费用的控制效果，以期为食管癌手术患者规范化使用肠内营养，降低医疗成本，减轻病人经济负担提供参考。**方法**　回顾性收集河北省某三甲医院 2019 年 1 月—2022 年 9 月收治的食管癌手术患者一般资料及住院费用数据。根据术后是否规范化应用肠内营养（每日应用肠内营养制剂能量大于 1000 kcal ，持续 3 d 以上的患者）分为治疗组和对照组，通过倾向性评分匹配法（PSM）对两组进行匹配，选取年龄、性别、住院天数、医疗付款方式、是否转科、是否存在营养风险、是否经术前新辅助治疗、手术方式、肿瘤部位等因素作为匹配变量，采用 1:1 最邻近匹配法，以倾向性评分 logit 转换后标准差的 0.2 倍为卡钳值，以保证匹配结果的优良性。比较两组患者住院费用，评价住院费用构成。**结果**　研究共纳入 1612 例食管癌手术患者，其中治疗组 847 例，对照组 765 例。治疗组食管癌手术患者平均总住院费用为 102212.21 元，对照组为 99504.83 元，差异无统计学意义（t=1.741，P=0.082），但两组材料费、西药费、床位费、手术费等均有显著差异（P<0.001）。考虑到两组患者在性别、住院天数、是否存在营养风险等基线资料可能存在差异，住院费用不具有可比性，故本研究进一步采取倾向性评分匹配以排除混杂因素的影响。经 PSM 后组间不均衡的协变量均已得到控制，两组成功匹配 569 对患者，治疗组和对照组平均总住院费用分别为 92622.3 和 100532.9 元，规范化应用肠内营养可以显著降低食管癌手术患者的住院费用（t=-5.412，P<0.001），比较两组患者的各项住院费用，与对照组相比治疗组材料费、西药费分别降低 7265.33、1738.55 元，差异有统计学意义（P<0.05）；从住院费用构成比上来看，食管癌手术患者住院费用中材料费占比最高，在治疗组和对照组分别占比 41.96%和 45.88%，西药费在两组分别占比 28.34%和 27.84%，占住院总费用的第二位，其余依次是手术费、化验费、检查费。**结论**　食管癌患者术后规范应用肠内营养治疗可以显著降低住院费用，建议食管癌患者术后规范应用肠内营养，以减轻患者医疗经济负担。同时，在患者住院过程中医疗机构和相关部门应建立医疗材料使用和监管体系，加强对食管癌手术中一次性耗材的管控，尽量避免不合理的材料费支出。合理控制药品费是降低住院费用的关键一步，应从降低药品成本、规范医院用药制度、制定合理医疗和合理用药的统一标准等方面来控制药品费用，以此降低住院费用，减轻食管癌手术患者的经济负担。

关键字　肠内营养；食管癌；住院费用；倾向性评分匹配

分类：临床营养

上海老年人小腿围和骨密度的相关性研究

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上海老年人小腿围和骨密度的相关性研究
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目的：小腿围是一种可重复且简单的评价方法。小腿围是营养评估中的重要指标。小腿围与慢性病之间有一定的相关性。本研究主要探讨上海社区部分非失能老年男性小腿围与骨密度（bone mineral density，BMD）之间的关系。
方法：上海市徐汇区漕河泾社区医院共招募年龄在 65 岁到 100 岁之间的老年男性受试者 216 人。采用双能Ｘ线吸收仪（DXA）测量全身骨量、全身骨密度、左上肢骨量、左上肢骨密度、右上肢骨量、右上肢骨密度、腰椎骨量、腰椎骨密度、骨盆骨量、骨盆骨密度、左下肢骨量、左下肢骨密度、右下肢骨量、右下肢骨密度。四肢骨骼肌含量(ASM)、计算四肢骨骼肌指数（ASM/身高 2 ）。骨骼肌力量采用握力器测定优势手握力，骨骼肌功能采用 6 米步速。测量受试者的小腿围、身高、体重，计算体质指数（BMI）。采用电化学发光法（Electrochemiluminescence immunoassay，ECLIA）检测血清 25(OH)D3 水平。采用问卷形式调查人口学状况。采用 MNA-SF 进行营养风险评估。
结果：1.将 214 名受试者分为两组，小腿围小于 34cm 的为组 1，小腿围大于等于 34cm 的为组 2，将两组进行 T 检验。分析结果显示腰围组 1 小于组 2（P＜0.05）、总 MNASF 总分组 1 小于组 2（P=0.003）、总骨量组 1 小于组 2（P=0.003）、 左上肢骨量组 1 小于组 2（P＜0.05）、右上肢骨量组 1 小于组 2（P=0.003）、右上肢骨密度组 1 小于组 2（P=0.036）、腰椎骨密度组 1 小于组 2（P=0.011）、骨盆骨量组 1 小于组 2（P=0.017）、骨盆骨密度组 1 小于组 2（P=0.002）、左下肢骨量组 1 小于组 2（P=0.002）和右下肢骨量组 1 小于组 2（P=0.001）具有显著性差异。步速、握力、VD3、总骨密度、左上肢骨密度、腰椎骨量、左下肢骨密度和右下肢骨密度均无显著性差异。2.采用 Pearson 相关数据分析显示总骨量（r=0.422，P<0.001）、总骨密度（r=0.245，P=0.003）、左上肢骨量（r=0.417，P<0.001）、左上肢骨密度（r=0.305，P<0.001）、右上肢骨量（r=0.425，P<0.001）、右上肢骨密度（r=0.304，P<0.001）、腰椎骨量（r=0.286，P<0.001）、腰椎骨密度（r=0.221，P=0.007）、骨盆骨量（r=0.371，P<0.001）、骨盆骨密度（r=0.409，P<0.001）、左下肢骨量（r=0.420，P<0.001）、左下肢骨密度（r=0.276，P=0.001）和右下肢骨量（r=0.489，P<0.001 与小腿围均显著相关性，差异均有统计学意义（P＜0.05）。
结论：小腿围与骨密度之间存在一定程度的正相关关系，即小腿围的增大可能与骨密度的增加相关。这是因为骨骼肌的运动和载荷作用可以刺激骨组织的生长和增强，提高骨密度。因此，较粗的小腿围通常骨骼肌肉量较多，骨密度可能较高。但这种关系还受遗传、年龄、性别、饮食、运动习惯等其他因素的影响。老年男性中，小腿围和骨密度成正相关，小腿围是骨密度的重要预测因子。

关键词：小腿围、骨密度、骨量
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关键字 小腿围、骨密度、骨量

分类：临床营养

生命早期早产儿的肠道菌群及短链脂肪酸的变化特征及关联分析

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目的：生命早期一千天是儿童生长发育的“机遇窗口期”，为远期生长发育和健康奠定基础。肠道菌群及其主要代谢产物短链脂肪酸可以介导饮食对人体生理的影响而发挥重要功能，但关于婴幼儿的相关研究还比较缺乏。本研究旨在比较早产儿与足月儿出生至 2 岁期间粪便菌群及其代谢产物短链脂肪酸（short-chain fatty acids，SCFAs）的构成，并分析两者变化特征及其相关性。

方法:（1）选取 2014 年 6 月至 2015 年 12 月在上海交通大学医学院附属新华医院出生且满足入组条件的 38 名早产儿与 32 名足月顺产儿为研究对象，连续收集其出生后第 7 日，28 日，70 日和 2 岁的粪便样本；（2）对 121 份粪便样本 DNA 进行 16S rRNA 基因高通量测序及生物信息学分析；（3）采用 GC-MS 检测粪便 SCFAs 的含量，比较两组 SCFAs 的构成与水平差异；（4）Spearman 相关性分析探讨 2 岁时的肠道菌群与 SCFAs 的关联。

结果：（1）聚类热图结果显示 7 日龄早产儿的肠道菌群与其余各年龄的早产儿和足月儿肠道菌群组成差异最大；2 岁龄时早产儿与同龄足月儿肠道菌群组成趋于相似； 7 日龄、28 日龄和 70 日龄的足月儿肠道菌群构成彼此相似，聚为一簇。差异性分析显示 7 日龄早产儿比 7 日龄足月儿富集了更高相对丰度的肠球菌属（*Enterococcus*），假单胞菌属（*Pseudomonas*），棒状杆菌属（*Corynebacterium*）和布劳特氏属（*Blautia*），及更低相对丰度的大肠杆菌-志贺菌属（*Escherichia-Shigella*）。出生 7 天至 70 天内早产儿持续呈现较低丰度的拟杆菌属（*Bacteroides*）。2 岁龄时早产组变形菌门细菌（Proteobacteria）相对丰度显著高于足月组（P＜0.05），*Escherichia-Shigella* 和克雷伯菌属（*Klebsiella*）丰度显著高于足月组（P<0.01），但粪杆菌属（*Faecalibacterium*）低于足月组（P<0.05）。（2）婴幼儿粪便中乙酸、丙酸和丁酸为 SCFAs 的主要构成部分，约占 90%的总 SCFAs 含量。28 日龄时早产儿戊酸、己酸和异丁酸水平均显著高于足月儿（P＜0.05），而其余同年龄段各 SCFAs 在早产儿和足月儿间未发现显著性差异。早产组和足月组的组内分析显示乙酸、丙酸、丁酸、戊酸、异丁酸、异戊酸水平随年龄增长发生显著变化，在 2 岁时均达到最大值（P＜0.001）。（3）2 岁时早产儿的身高及身高别年龄（HAZ）显著低于同龄足月儿（P=0.006，P=0.001）。Spearman 相关分析显示，乙酸水平与 *Blautia* 和 *Anaerostipes* 丰度呈负相关（P<0.05），与韦荣球菌属（*Veillonella*）和狄氏副拟杆菌属（*Parabacteroides*）丰度呈正相关（P<0.05），丙酸水平与纺锤链杆属（*Fusicatenibacter*）和 *Faecalibacterium* 丰度呈正相关（P<0.05）。

结论：出生 70 天内早产儿和足月儿的肠道菌群构成差异显著，呈现持续低丰度 *Bacteroides*。出生至 2 岁间，幼儿粪便 SCFAs 的主要构成部分乙酸、丙酸和丁酸水平均随年龄增加而变化，未发现在同年龄段早产儿和足月儿间有显著差异。未来需要扩大队列人数深入探讨短链脂肪酸对早产儿生长发育的影响。

关键字 早产儿，生命早期，肠道微生态，短链脂肪酸

分类：临床营养

根治性胰十二指肠切除患者的三联预康复

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目的 根治性胰十二指肠切除术是目前临床上治疗壶腹周围癌以及部分良性肿瘤的标准手术方式。由于手术切除范围广、过程复杂、创伤大，导致 PD 术后常常发生较多的并发症和较高的病死率。随着加速康复外科的兴起，该理念也运用到胰腺外科手术中，效果亦得到肯定。“预康复”正是基于 ERAS 优化理念而提出的术前管理新策略，即术前有效的优化患者的运动功能能力，增强个体的功能储备，以使他们能够更好的承受随之而来的手术应激的过程被称为预康复。在新医改的政策要求下，预住院，即预登记住院已在我院广泛应用。因此，为提高患者的就医体验，合理利用预住院时间，本研究采用随机对照研究探索三联预康复是否能够对根治性胰十二指肠切除术患者的预后产生积极的影响。方法 将 2021 年 2 月~2022 年 7 月就诊于胆胰外科门诊拟行根治性胰十二指肠切除术的 88 例患者按照随机数表法随机分为对照组（n=46）和预康复组（n=42）。对照组自就诊至手术前接受常规术前教育，预康复组在对照组基础上进行三联预康复即：组建多学科预康复团队，有氧运动，呼吸锻炼，营养指导，心理支持。采用 6 分钟步行距离试验（6MWD）、住院并发症、医院焦虑抑郁量表等以评定疗效。结果 入组时 6MWD 水平比较，差异无统计学意义（P＞0.05）。预康复组术前一天与入组 6MWD 差值，术后 30 天 6MWD 显著高于对照组，差异有统计学意义（t=6.079，P＜0.001；t=4.785，P＜0.001）。两组术后并发症比较，预康复组胸腔积液的发生率低于对照组（c2=4.615，P=0.032），并发症个数≥3 个的也明显低于对照组（卡方值=6.395，P=0.011）。两组术后住院时间比较，预康复组术后住院时间明显低于对照组（t=3.147，P=0.002）。入组时焦虑抑郁水平比较，差异无统计学意义（P＞0.05）。术后 30 天的焦虑抑郁水平比较，差异亦无统计学意义（t=1.341，P=0.183；t=0.992，P=0.324）。讨论 三联预康复是基于 ERAS 理念提出的术前优化策略，通过运动锻炼、营养支持、心理干预等方式，增强个体的功能储备，提高对手术的耐受以达到加速康复的目的。目前，就预康复尚无标准化方案，尤其针对胰十二指肠切除术患者。因我院广泛应用预住院管理模式，为规范预住院患者院前管理，合理利用术前等待时间，故本研究探索三联预康复在 PD 患者中的应用效果。结果发现预康复可显著提高 PD 患者的术前及术后运动能力，这与运动锻炼可提高机体生理应激能力，改善器官组织应激状态下的顺应性，增强患者对手术耐受力有关。预康复可降低并发症的发生，缩短住院时间，但是本研究尚未发现预康复对患者焦虑抑郁水平的影响，可能是因为本研究干预内容涉及心理支持较少，对音乐疗法的依从性不足有关。结论 三联预康复可提高根治性胰十二指肠切除术患者的术前及术后运动能力，降低术后并发症，缩短住院时间，改善患者临床结局。

关键字 胰十二指肠切除术；预康复；加速康复外科；6 分钟步行距离试验；并发症；住院时间

分类：临床营养

全身炎症反应和胰岛素抵抗对不同营养状况脑卒中患者预后的协同影响

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目的

本研究旨在探讨不同营养状况的脑卒中静脉溶栓患者全身炎症反应和胰岛素抵抗(Insulin resistance，IR）对预后的预测价值。

方法

所有患者诊断和治疗均符合 AHA/ASA 声明中对于急性缺血性脑卒中的标准，且在发病后 4.5 小时内尽快行静脉溶栓。在患者入院后，立即由神经内科医师记录患者性别、年龄、发病时间、血压、美国国立卫生研究院卒 中量表评分(National Institute of Health stroke scale，NIHSS）、TOAST 分型，以及高血压、糖尿病等病史；测量患者的身高和体重；收集患者静脉溶栓后次日清晨空腹状态下的血清标本，记录淋巴细胞总数、白蛋白、C 反应蛋白（C-reactive protein，CRP）、空腹血糖、总胆固醇（TC）、甘油三酯（TG）、低密度脂蛋白（LDL-c）、高密度脂蛋白（HDL-c）。预后营养指数（Prognostic Nutrition Index，PNI）由白蛋白（g/L)+5*淋巴细胞总数(*10^9/L）计算得到。选取了 CRP、CAR 和 LCR 作为全身炎症指标，其中 CAR 等于 CRP 除以白蛋白，LCR 等于淋巴细胞除以 CRP。IR 相关指数为 TyG、LHR、TG/HDL-c 和 TC/HDL-c，TyG=Ln（TG（mg/dl）*空腹血糖（mg/dl）/2)，LHR 等于 LDL-c 除以 HDL-c。

在静脉溶栓后第 1 年时对患者进行随访，采用改良 Rankin 量表（Modified Rankin Scale，mRS）评估患者预后，mRS≥3 分定义为预后不良，mRS＜3 分定义为预后良好。

结果

1. 不同 PNI 组患者基线分布特征

本研究共纳入 733 例患者。其中，平均年龄为 66.29±11.88 岁，平均 PNI 为 45.64±4.76。比较不同 PNI 组（营养不良组，PNI≤45 .5vs.营养良好组，PNI＞45.5）年龄（72.21 vs.62.42，*P*＜0.001）、PNI（41.99vs.49.27 ，*P*＜0.001）、CAR（4.38 vs.4.09，*P*＜0.001）、LCR（0.95vs.0.52，*P*=0.001）、TyG（13.47vs.13.23，*P*＜0.001）、LHR（2.70 vs.2.54，*P*=0.04）、TG/HDL-c（1.66 vs. 1.37，*P*=0.002)、TC/HDL-c（4.68vs.4.45，*P*=0.026)。然而，低 PNI 组患者的 CRP（6.08vs.11.82，*P*＜0.001）低于高 PNI 组患者。

2. 不同 PNI 组全身炎症指标和 IR 相关指数的分布特征

不同 PNI 组中全身炎症指标的分布曲线显示，低 PNI 组的 CAR 和 LCR 值显著高于高 PNI 组（*P*＜0.05）。同样，我们分析了不同 PNI 组中不同 IR 相关指数分布的差异，发现与高 PNI 组患者相比，低 PNI 组的 TyG、LHR、TG/HDL-c 和 TC/HDL-c 分布均较高（*P*＜0.05）。

3.不同 PNI 组患者全身炎症指标和 IR 相关指数对预后的影响

对纳入的全体患者进行 Logistic 回归分析，校正年龄、性别、NIHSS 评分、TOAST 分型等潜在混杂因素后，未观察到全身炎症指标和 IR 相关指数对脑卒中静脉溶栓患者预后的预测价值。依据 PNI 进行分组分析后，仅在低 PNI 组中观察到 CRP(OR=1.87，95% CI:1.04-3.37，*P*=0.038)和 CAR(OR=1.91，95% CI:1.06-3.42，*P*=0.030)较高的患者预后不良的风险增加。而在高 PNI 组中未观察到全身炎症指标和 IR 相关指数对脑卒中静脉溶栓患者预后的预测价值。

4.不同 PNI 组患者全身炎症指标和 IR 相关指数对预后的协同影响

对全身炎症指标和 IR 相关指数进行多因素交互分析时，仅在低 PNI 组的 Logistic 回归分析中发现，高 CRP 高 TyG(OR=1.02，95% CI:1.03-1.26， P=0.012)与低 CAR 高 TyG(OR=1.67，95% CI: 1.47-1.95，P=0.026)脑卒中静脉溶栓患者预后不良的风险增加。而在总体及高 PNI 组患者中，未观察到全身炎症指标和 IR 相关指数对脑卒中静脉溶栓患者预后的预测价值。

结论

营养状况较差的脑卒中溶栓患者全身炎症反应和 IR 水平较高。对于营养状况较差的患者，较高的 CRP 和 CAR 与预后不良风险增加相关。高 CRP 高 TyG 或低 CAR 高 TyG 可协同显著

预测营养状况较差的脑卒中溶栓患者的不良预后。对于营养状况良好的患者，未观察到全身炎症反应和 IR 对预后的预测价值。

关键字 营养预后、全身炎症、胰岛素抵抗、脑卒中

分类：临床营养

上海市某养老院老人营养不良和握力与照护等级的相关性研究

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目的：养老院老人年龄高，运动少，食物摄入和消化吸收能力有限，是营养不良的高危人群。握力与老人生活质量和健康结局密切相关。研究显示握力低下会导致更高的残疾，心血管疾病，慢性阻塞性肺病和癌症的发生风险。养老机构根据老人照护等级提供匹配服务，而高照护等级的老人健康状况和活动能力更差。本研究旨在调查养老院不同照护等级老人营养和握力状况，分析营养不良和握力与照护等级的相关性，为针对性干预提供参考。

方法：调查上海市某养老院所有≥60 岁入住对象，共包含 583 人（平均 85.96±6.58 岁，女性 65.0%）。采用问卷调查与面对面访谈相结合的方式，收集研究对象的人口学资料、每周运动频次、疾病史、护理等级、膳食类型、营养补充剂和药物等方面的数据。老人护理等级由专业人员根据上海市质量技术监督局 2013 年发布的 DB31/T684-2013 进行半年一次评定。评定从自理能力、认知能力、情感和视力等方面进行，评定结果分为 1-4 级，等级越高的老人独立生活的能力越差。护理等级 3-4 级是高护理等级，1-2 级是低护理等级。运用微型营养评定简表（MNA-SF）评估老人营养状况，MNA-SF 最高得分 14 分，12 分及以上表示营养正常，得分 8-11 分表示存在营养不良风险，得分<8 分表示营养不良。依据亚洲肌少症共识 2019 调查研究对象握力，低握力切点值为男性<28kg，女性<18kg。采用 Spearman 秩和检验分析营养不良与照护等级的相关性。采用多因素 Logistic 回归分析高照护等级相关因素。

结果：调查发现 84.0%老人处于高照护等级。在高照护等级老年群体中，营养不良占比分别为 12.2%（60/493），营养不良风险的占比为 40.6%（200/493）；在低照护等级的老年群体中，营养不良占比分别为 1.1%（1/90），营养不良风险的占比为 20%（18/90），高照护等级老年群体的营养不良和营养不良风险率显著高于低照护群体（$p<0.001$）。握力测量结果显示男性握力为 17.6±7.9 kg，女性为 12.3±5.4kg。老人握力异常率高达 84.0%，其中男性握力异常率为 88.7%，女性为 82.3%，性别间差异显著（$p<0.05$）。此外，高照护等级老年群体的握力异常率也显著高于低照护群体（88.8% vs 61.1%，$p<0.001$）。分析显示 MNA-SF 得分、握力均与照护等级呈显著的负相关性（MNA-SF：$r_s= -0.457$，$P<0.001$；握力：$r_s= -0.550$，$P<0.001$）。经多因素分析发现营养不良/存在营养不良风险（OR 2.3；95%CI 1.3-4.1）、低握力（OR 3.0；95%CI 1.7-5.2）、共病数≥3（OR 4.9；95%CI 2.3-10.6）是高照护等级的危险因素，口服营养补充 ONS（OR 0.5；95%CI 0.26-0.96）是保护因素。

结论：养老院老人营养不良和握力与更高的照护等级密切相关。我们的研究结果建议对老人进行营养状况调查和进行口服营养补充，以期延缓老年人照护等级的升高及健康状况的下降。

关键字 握力；营养不良；老年人；照护等级；MNA-SF。

分类：临床营养

基于 CiteSpace 对近五年糖尿病患者营养不良的文献计量研究与热点分析

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目的：剖析近五年来国内外对于糖尿病患者营养不良的相关文献，探讨研究的前沿热点。对未来发展进行预测，为后续研究提供参考依据。

方法：采用文献分析法，使用由陈超美教授设计的 CiteSpace（6.2.2）可视化软件进行科学知识图谱的绘制。文献来源为“Web of Science 核心合集”，检索词：TS=“malnutrition ”AND “Diabetes OR Diabetes mellitus”，时间跨度为 2017-01-01 至 2022-12-31，共得 1119 篇文献，文献纳入标准：与糖尿病患者营养不良相关的文献，排除标准：会议、报刊文章、图书、重复发表的文献，余 1102 篇。参数：时间分区设置为 2017.1-2022.12，切片默认“1”，节点类型依次选择作者、机构、国家、关键词、共被引文献，阈值为预定参数。对以上节点绘制网络图谱，探析糖尿病患者营养不良研究的热点及发展趋势。

结果：1）发文情况：近五年，国内外有关糖尿病患者营养不良的研究的发文量与热度呈不断上升的趋势。发文量从 2017 年 118 篇增长至 2019 年 164 篇；2019-2021 年增长幅度最大（从 164 到 240 篇）；2022 年与前一年基本持平（237 篇）；整体发展趋势十分稳定，预计 2023 年发文量将继续增多；作者发文量前五名为：Matia-martin,Pilar、Palma,Samara、Zugasti,Ana、Sanz-paris,Alejandro、Burgos,Rosa，均为 8 篇；2）2017-2022 年共有 269 个国家及机构涉及糖尿病患者营养不良的研究，主要为伦敦大学、卡罗林斯卡学院、哈佛大学、上海交通大学及 UDICE-法国研究型大学等，主要集中于欧美地区，我国上海交通大学排第四位；3）研究最多的前三个国家为：美国、中国、英国；其次是印度、西班牙等，每个国家之间的联系十分紧密；美国以 230 篇列首位，占总发文量 20.9%，中国位于第二位，以 132 篇占总发文量 12.0%；4）利用 CiteSpace 软件绘制近五年关键词共现知识图谱，排除糖尿病患者与营养不良的基础词汇，对前十的关键词进行统计可分为三个主题：第一：表明循证医学研究：危险因素（risk）、发病率（prevalence）、相关性（association）；第二：揭示干预模式及效果：死亡率（mortality）、结局（outcome）、营养状况（nutritional status）、BMI、管理（management）；第三：与其他疾病相关：肥胖症（obesity）、慢性肾脏疾病（chronic kidney disease）；5）用 CiteSpace 对 1102 篇文献进行突现词分析。五年间持续时间超两年的有肾病分期、效果及心血管风险；2017-2019 年主要针对治疗手段及效果、心血管疾病、肾病方向；2020 年开始逐渐加强对胎儿、初生重、生长发育及胰岛素敏感性的研究；6）对关键词进行聚类分析发现，有 clinical characteristcs、chronic pancreatitis、early life、gastric bypass、renal tubule、chronic heart failure 等；涉及胃部、肾部、胰腺及心血管疾病；7）共被引文献分析：Cederholm T 在 2017 年发表在《Clinical Nutrition》上的《ESPEN guidelines on definitions and terminology of clinical nutrition》被引次数最多（23 次）；

结论：1）对近五年的发文量分析，有关糖尿病患者营养不良的研究呈逐年上升的趋势；2）研究的主要机构为各大综合类高校，说明对糖尿病患者营养不良的研究涉及多学科、多领域、多角度；3）美国在此研究方面有显著的学术地位，我国紧随其后位于第二；可见我国近五年对此研究逐渐重视，有巨大的发展空间；4）研究热点主要针对糖尿病患者营养不良的干预、预后及相关疾病的研究；5）近五年的研究热点不断变换，从开始的治疗策略、干预效果、其他疾病，逐渐向婴幼儿、生长发育及生理生化方面转变；6）本研究仅对 Web of Science 核心合集收录的文献进行研究，不能完全代表研究情况；由于 CiteSpace 分析的是文献计量的特定信息，可能会遗漏一些关键细节，对该领域的最新研究进展及内容仍需进一步探讨。

关键字 糖尿病；营养不良；CiteSpace；可视化分析

分类：临床营养

维持菌群平衡对血脂、肠道症状的影响

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目的　通过对比降脂前后患者肠道症状评分，分析肠道微环境整体水平和乳酸菌群的变化，及有无使用营养膳食补充剂菊粉情况下，对照比较肠道乳杆菌群、菌群水平对血脂的影响。方法　差异性分析采用 spss22.0 软件，计数资料运用 x2 检验、配对样本 t 检验（组间差异）；还运用非参数秩和检验（多组不符合正态分布的数据）、单因素方差分析（符合正态分布）、非参数多元方差分析（群落组成结构差异）等统计方法，并采用 16Sr RNA（高通量测序技术）对标本中肠道菌群进行总数及物种丰度分析。结果 Chaol 多样性分析可反应肠道菌群总数量，数值越大反应菌群总含量越高，非血脂异常组为 2269.8±960.7，治疗组入组前为 1474.9±566.2 ；对照组入组数值为 1434.3±301.5，出组时为 1441.2±553.7，前后未出现明显差异（P>0.05）。Simpson 指数可反应菌群群落的多样性，数值越大，多样性越高，非血脂异常组为 0.931±0.082，治疗组入组前为 0.886±0.079，出组时为 0.960±0.012（P<0.05），对照组入组为 0.932±0.046，出组时为 0.902±0.081（P>0.05），与血脂异常组相比，非血脂异常组的 Chaol 和 Simpson 指数明显升高，差异有统计学意义（P<0.05）。上述结果说明血脂异常患者肠道菌落的丰度和多样性较血脂正常人明显减弱，复方治疗后患者肠道菌群丰富度及物种数均较前得到改善明显，对照组未出现明显改变。　结论　血脂异常患者和非血脂异常患者肠道菌群的差异性物种为厚壁菌门、拟杆菌门等（P＜0.05）；　血脂异常易引发患者肠道菌群物种丰度及物种总量降低（Chaol 多样性；Simpson 指数），服用降脂药物后较前均有改善。添加菊粉时对血脂异常疾病的治疗效果优势显著，出组时乳杆菌属（Lactobacillus）丰度升高明显，且对血清胆固醇、高密度脂蛋白(HDL)、粪便标本肠道菌群等改善显著。乳杆菌属丰度改善不仅促进肠道蠕动，改善血脂异常患者腹胀、便溏等临床症状，研究表明课提高机体抗氧化能力，因此营养干预肠道菌群，或对血脂疾病综合治疗，具有一定的长期意义。讨论 肠道菌群素有人体第二基因库之称，通过相关基因调节可在人体内发挥一定的抗氧化功能。乳酸菌(Lactic acid bacteria，LAB)是一类可利用碳水化合物产生乳酸的微生物菌群。肠道菌群的代谢活动，与人体脂质代谢息息相关。研究表明，脂质代谢异常会影响肠道菌群平衡，通过任婷婷等对高脂饮食形成的血脂异常模型大鼠血清及肠道菌群检测结果的对比分析，造模大鼠胆固醇、甘油三酯及低密度脂蛋白升高，同时肠道菌群中双歧杆菌、乳杆菌等多种有益菌菌群的数量明显减少，两者具有一定相关性[7]

关键字 血脂，肠道症状，肠道菌群，乳杆菌

分类：临床营养

吞咽困难的老年患者治疗：如何用创伤最小的方式来解决营养不良

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摘要/Abstract

目的：目前，全世界吞咽困难患者已经达到了 5.904 亿人，约占世界人口的 8%。而现有的解决吞咽困难的主流方法为经鼻置胃肠管，但这种方法可能会让患者在生理上产生不适，同时基于心理健康和人文关怀的角度，留置胃肠管的方向可能会使患者陷入社交尴尬的境地。因此，研究非管饲方法代替管饲方法供给吞咽困难患者营养变得尤为重要。

方法：我们在 Pubmed、Web of Science、Cochrane Library 和中国知网中搜索了已公开发表的文献，并首先初步浏览了标题和摘要，随后审查了符合我们主题的论文全文，文章的语言仅限于英语和中文。

结果：应用微凝胶增稠流食避免误吸已经成为目前的一个热门的研究方向。微凝胶不仅可作为维生素、电解质等微量营养物质载体，还可以充分满足患者的总营养需求。一篇发表在美国老年医学学会杂志（Journal of The American Geriatrics Society）上的临床试验显示，神经源性吞咽困难的患者食用低于/高于体温的微凝胶增稠流食有利于刺激其吞咽反射，这提示了一种改善神经源性吞咽困难临床症状的潜在手段。海藻酸盐-抗酸剂（Gaviscon Advance, GA）可以通过其流变学性质，形成粘性抗酸凝胶基质，从而形成返流的物理屏障，以保护食道免受胃蛋白酶和胆酸汁损伤。离体动物模型充分表明，单独的酸（pH ＞ 1.3）无法对食道产生实验性损伤，但在添加胃蛋白酶后，导致食管受到显著损伤，从而引发食管周围显著的炎症反应。这种炎症反应若长期存在，将会引起炎性息肉、肠上皮化生甚至食管癌的发生。GA 可以特异性地从返流物中去除胃蛋白酶和胆汁酸，并限制其扩散，降低返流物的腐蚀性，保护食管免受损伤。此外，GA 具有很强的影响胃蛋白酶活性的能力，也为对抗胃食管反流病食管损伤提供了第二种急诊。因此，吞咽困难患者的营养支持中加入 GA 可有效防止返流的发生。此外，使用天然辣椒素对吞咽困难患者的吞咽功能也可能会有帮助，其机制是通过对大脑皮层的反复刺激，诱导传入神经元向岛叶皮层传递信号，来激活反馈环路和脑干吞咽中枢，进而恢复岛叶皮层的功能，诱发皮层神经可塑性，提高食管体蠕动收缩的幅度、持续时间和速度。

结论：使用微凝胶制作胶状食物，同时添加天然辣椒素或海藻酸盐-抗酸剂，可以有效地避免吞咽困难患者在进食过程中引发的呛咳问题，这可能是一种治疗吞咽困难的非管饲新方法。

关键字 吞咽困难；微凝胶；海藻酸盐-抗酸剂；辣椒素

分类：临床营养

富含大豆蛋白的全餐干预对长期照护机构老年人肌肉健康的影响：一项开放标签随机对照平行试验

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目的：长期照护机构的老年人面临更高的肌少症风险。营养干预是延缓肌少症发生发展的有效手段，要求摄入更高的蛋白质并均匀地分配在三餐之间，然而与大豆蛋白相关的干预研究较少。本研究旨在探索富含大豆蛋白的全餐干预对长期照护机构老年人肌肉健康的影响。

方法：本研究是一项为期 12 周的单中心、两个平行组、开放标签、随机对照试验。以上海市某医养结合养老院入住的老年人为招募对象，通过面对面访谈对参与者进行筛选纳入。最终纳入 84 名研究对象，随机分为干预组（n=43）和对照组（n=41）。干预组的参与者每天接受大豆蛋白全餐干预，即在现有餐食基础上，分别在早、中、晚以不同膳食形式提供大豆蛋白制品（含 30g 大豆蛋白，来源于大豆蛋白固体饮料与大豆组织蛋白）。膳食食谱由专业营养师制定，由专业厨师进行膳食制作。在满足个性化能量需求的基础上，受试者每日蛋白质摄入量达 1.5g/kg 并均匀分布在三餐间。对照组的参与者保持日常膳食习惯。以瘦体重的变化为主要结果，在基线，第 6 周和第 12 周通过通过生物电阻抗分析测量受试者肌肉量（soft lean mass, SLM）、去脂体重（fat free mass, FFM）、骨骼肌质量（skeletal muscle mass, SMM）、四肢骨骼肌质量（appendicular skeletal muscle mass, ASM）和体重。依据 2019 亚洲肌少症共识计算骨骼肌指数（skeletal muscle mass index, SMI）：ASM/身高^2。 以肌肉力量、身体功能和小腿围为次要结果，依据 2019 亚洲肌少症共识测量握力、6m 步态用时、5 次起坐试验和小腿围。对数据进行意向性分析（intention-to-treat, ITT）。使用配对 t 检验或 wilcoxon 符号秩和检验分析基线与同组内 12 周的差异。使用线性混合效应模型比较组间干预差异，固定效应包括时间、组和时间×组。$p < 0.05$ 被认为具有统计学意义。

结果：参与者平均年龄为 84.9±7.0 岁，其中女性约占 61.9%。参与者的基线数据得到很好的平衡。在为期 12 周的研究中，对照组的小腿围相较于基线有显著的下降（33.0±3.5 cm - 32.0±3.1 cm, p=0.003），干预组相较于基线的得到很好的维持，干预组和对照组的差异存在显著的统计学意义（$p_{时间×组}$ =0.001）。6m 步态用时在干预组中相较于基线有减少的趋势，在对照组中相较于基线有增加的趋势，两组间的差异存在显著统计学意义（$p_{时间×组}$ = 0.014）。此外，干预组 SLM、FFM、SMM、ASM、SMI 和体重等肌肉质量相关指标相较于基线均有显著升高（$p<0.05$），对照组相较于基线均无统计学差异（$p>0.05$），但这些指标两组间的差异并不显著（$p_{时间×组}$ >0.05）。

结论：12 周大豆蛋白全餐干预有助于改善长期照护机构老年人的肌肉量和身体功能，维持小腿围，但对肌肉力量影响不大。

关键字 大豆蛋白，肌少症，肌肉健康，长期照护机构，全餐干预。

分类：临床营养

不同类型限时进食法减重效果分析：系统综述与网状 meta 分析

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目的：本研究通过利用网状 meta 分析的方法对比不同类型限时进食法对超重/肥胖患者减重效果及机体代谢的影响，为超重/肥胖患者营养干预的选择提供参考依据。

方法：检索 Medline、Embase、Web of science、Cochrane Central Register of Controlled Trials、ClinicalTrials.gov 中自建库至 2022 年 12 月 31 日所有关于限时进食对超重/肥胖患者影响的研究，并对相关研究的参考文献及学术组织网站进行检索，补偿可能缺漏的研究。运用 Stata 16.0 、R 4.2.1 及 OpenBUGS (version 3.2.3)进行贝叶斯网状 Meta 分析，分别通过直接及混合比较的方法探究 4/20(每天进食 4h)、6/18（每天进食 6h）、8/16（每天进食 8h）及 10/14（每天进食 10h）的限时进食法对超重肥胖患者干预的有效性（体重下降，维持瘦体重，降低内脏脂肪，维持空腹血糖，降低总胆固醇，降低 LDL-C，增加 HDL-C 及降低甘油三酯）及可接受性，根据 R 软件得出的排序概率矩阵表，计算累积排序概率曲线下面积（surface under cumulative ranking curve，SUCRA）并绘制 SUCRA 曲线，获得不同限时进食法在有效性及可接受性方面的排序结果。最后通过绘制二维图判断综合效果最好的限时进食法。

结果：共检出相关研究 24633 篇，经筛选最终纳入分析的研究为 14 项，共涉及研究对象 676 人。直接比较的 meta 分析显示 6/18 (*MD*=-6.26, *95%CI* -8.07, -4.45)，8/16(*MD*=-3.04, *95%CI* -3.22, -2.87)及 10/14（*MD*=-0.75, *95%CI* -1.06, -0.44）的减重效果优于 UD（习惯进食组）；在维持瘦体重方面，UD 优于 8/16(*MD*=-0.99, *95%CI* -1.07, -0.91)；10/14 在血糖维持方面较 UD 差(*MD* = -8.17, *95% CI* -12.15, -4.18)；在降低总胆固醇及 LDL-C 方面的效果，UD 优于 8/16(*MD*=5.73, *95%CI* 1.88, 9.58; *MD*=5.73, *95%CI* 1.88, 9.58)；可接受性在各组间无显著差异。综合比较结果显示减重效果最好的为 6/18，其次为 8/16。在维持瘦体重方面，UD 优于 8/16(*MD*=0.98,*95%CI* 0.13, 1.65)，并且可能优于其他限时进食法。减少内脏脂肪的最佳方法可能是 6/18，但各组间无统计学差异。在维持空腹血糖方面，6/18 及 UD 优于 8/16(*MD*=-5.99,*95%CI* -11.35, -1.23；*MD*=7.79,*95%CI* 0.91, 15.9)。但在降低总胆固醇，升高 HDL-C，降低 LDL-C 及降低甘油三酯水平方面，各类型限时进食法均与 UD 无显著差异，但排序结果显示 8/16 及 10/14 的效果可能相对较好。结果还显示，UD 的接受性优于 8/16(*OR*=-12.41,*95%CI* 1.74,350.55)，6/18 可能为依从性最好的干预方法，而其他组间差异无统计学意义。最后，根据不同结局指标的 SUCRA 绘制二维图，在综合了降低体重及维持瘦体重，降低体重及减少内脏脂肪，降低体重及可接受度高三张二维图，结果均显示 6/18 为综合效果最好的干预方法。敏感性分析结果显示：在分别排除存在共患病、发表时间早于 2020 年、干预时间小于 3 周的研究后发现结果无明显改变，说明结果具有一点稳定性。漏斗图显示纳入研究存在一定的发表偏倚。

结论：限时进食法可有效降低超重/肥胖患者的体重，但在维持瘦体重及空腹血糖方面，效果可能低于 UD。在综合主要结局指标后，6/18 似乎是兼顾效果及可接受性的最佳选择。

关键字 超重；肥胖；限时进食法；网状 meta 分析

分类：临床营养

孕期贫血与儿童发育行为关联研究进展

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孕期贫血与儿童发育行为关联的研究进展

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摘要：孕期贫血是世界范围的公共卫生问题，据联合国儿童基金会发布的《世界儿童状况报告（2009）》显示，全球妇女发生孕期贫血的概率约为50%[1]，国内的相关报道指出，我国的孕期贫血发生率大约在32.6%～34.4%[2]。越来越多的研究显示，孕期贫血不仅对母亲的健康产生影响，对儿童的智力、认知、神经、运动等发育行为也产生不良影响[2-6]。《中国妇女发展纲要（2021-2030年）》将改善妇女营养状况，预防和减少孕产妇贫血作为妇女健康的主要目标[7]。本文对孕期贫血与儿童发育行为关系的研究进行文献综述，旨在系统性的阐述孕期贫血与儿童发育行为的关系，为相关干预策略提供科学依据。

关键词：孕期；贫血；生长发育迟缓

1. 孕期贫血

孕期贫血是孕期常见并发症的一种。孕妇贫血发生的原因主要与机体生理需要量增加,相对膳食铁摄入不足有关。孕妇贫血诊断标准：根据Hb水平分为轻度贫血(100-110g/L)、中度贫血(70-99g/L)、重度贫血(40-69g/L)和极重度贫血[40g/L]。

2. 儿童发育行为

儿童早期发育包括语言、运动、认知、心理社会情感等方面，儿童早期发育受遗传-环境相互作用，以及相关技能发展具有敏感期。

3. 孕期贫血与儿童发育行为的关系

3.1 孕期贫血与儿童贫血的关系

研究发现母亲孕期贫血是儿童贫血的危险因素，儿童贫血是儿童发育迟缓的危险因素，Lou等的研究发现6~12月龄的儿童低血红蛋白浓度与认知和精神运动发育状况有关。孕期贫血反映了母亲的营养水平，进而从一定程度上反映了家庭的经济水平。

3.2 孕期贫血与智力发育和认知功能的关系

新生儿早期发生的IDA可降低机体免疫力,影响儿童生长发育,对婴幼儿智力发育和认知功能有着长期不可逆的损害作用,并可增加婴幼儿死亡率。研究表明,缺铁组儿童在写作、阅读、数学、运动能力、空间记忆等方面与非缺铁组相比存在显著差异；同时易出现焦虑、失落、沮丧等情绪。提示缺铁可导致婴幼儿智能发育落后和行为异常改变,并可能对儿童脑发育造成永久性影响。

3.2 孕期贫血与神经发育的关系

孕期的缺铁性贫血会影响海马形态形成和胎儿期神经源性神经营养因子的生成,其影响程度与孕期贫血的程度相关,可见孕晚期以及出生后早期的铁缺乏可造成婴幼儿长期不可逆的神经发育损害。

3.3 孕期贫血与运动发育的关系

Tran 等发现，孕晚期贫血与婴儿运动发育有关。这一发现与Chang等对中国850名妇女及其子女的调查结果一致，该调查发现，孕中期贫血与两岁儿童的运动发育较差有关。

关键字 孕期；贫血；生长发育迟缓

分类：临床营养

不同周期低碳水化合物饮食干预对超重或肥胖人群减重效果的影响

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[摘要]目的：本研究旨在探讨不同干预周期的低碳水化合物饮食干预对超重或肥胖人群减重效果的影响，以期为超重肥胖选择合理的减重方案奠定理论基础。方法：选取 2021 年 1 月-2021 年 12 月在新疆医科大学某附属医院临床营养科门诊就诊的超重或肥胖者作为研究对象。严格按照纳入排除标准筛选研究对象，最终纳入干预 1 个月者 37 例、干预 2 个月者 26 例、干预 3 个月者 27 例。入组的研究对象在专业营养师的指导下采用低碳水化合物饮食模式进行三个不同周期的减重干预。低碳水化合物饮食干预期间三大营养素供能比分别为：碳水化合物供能＜40%，蛋白质供能＞30%，脂肪供能＞30%。观察三个不同周期低碳水化合物饮食干预前后研究对象的体重、腰臀围、体质指数、体成分指标、血脂等相关指标的变化及其在不同干预周期之间的差异。以此来探讨不同周期的低碳水化合物饮食干预对超重或肥胖人群减重效果的影响。结果：（1）不同周期的低碳水化合物饮食干预后，研究对象体重、体质指数、腰围、臀围均明显低于低碳水化合物饮食干预前，干预前后差异有统计学意义（P＜0.05）。干预 3 个月后体重、体质指数、腰围、臀围低于干预 1 个月和干预 2 个月，且组间差异具有统计学意义（P＜0.05）。（2）不同周期低碳水化合物饮食干预后，研究对象体脂肪、内脏脂肪面积和体脂百分数均较低碳水化合物饮食干预前减少，干预前后差异有统计学意义（P＜0.05）。且干预 3 个月后体脂肪、内脏脂肪面积和体脂百分数均低于干预 1 个月和干预 2 个月，且组间差异有统计学意义（P＜0.05）。（3）不同周期低碳水化合物饮食干预后，研究对象体内其它成分（蛋白质重量、身体水分含量、细胞内液、细胞外液及无机盐）与低碳水化合物饮食干预前相比均有一定程度下降，组间比较差异无统计学意义（P＞0.05）；（4）不同周期低碳水化合物饮食干预后，研究对象总胆固醇（TC）、甘油三酯（TG）、高密度脂蛋白（HDL-C）、低密度脂蛋白（LDL-C）、空腹血糖均较低碳水化合物饮食干预前下降，其中 TG 水平在不同周期的低碳水化合物饮食干预前后差异具有统计学意义（P＜0.05）。且干预 2 个月 TG 水平（0.99±0.41）mmol/L 低于干预 1 个月（1.03±0.37）mmol/L 和干预 3 个月（1.07±1.44）mmol/L，组间差异不明显（P＞0.05）。结论：不同周期的低碳水化合物饮食干预均能有效减重，低碳水化合物饮食干预 3 个月后减重和改善体脂的效果更佳。低碳水化合物饮食干预 1 个月后研究对象的总胆固醇和甘油三酯即有明显下降。

关键字 低碳水化合物饮食干预；超重肥胖；体成分；血脂

分类：临床营养

基于医护患视角的消化道癌症患者营养管理需求及影响因素质性研究

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【摘要】目的　关注消化道癌症患者营养管理问题，从患者、家庭、医护、环境支持等四个层面探讨了临床有效营养管理的影响因素，探究营养管理的影响因素及应对策略，为消化道癌症患者营养管理模式提供借鉴。

方法　采用目的抽样法，2023 年 2 月-2023 年 4 月，选取江苏省某三级甲等肿瘤医院工作的医生、护士、患者及家庭照顾者，运用现象学半结构式访谈方法进行深度访谈，共访谈 6 名医生，6 名护士，2 名营养师，5 名患者，5 名家庭照顾者，对收集数据采用 Colaizzi 七步法分析访谈资料。访谈提纲为：针对医务人员①您认为消化道肿瘤癌患者有哪些营养相关的问题？②目前临床上对消化道肿瘤患者是怎样进行营养管理的？效果如何？③您认为消化道肿瘤患者营养管理应该包含哪些内容？④您认为对消化道肿瘤患者进行营养管理有哪些阻碍因素？如何解决？针对患者及家属：①您在患者的营养护理方面遇到了哪些问题和困难？②这些营养相关照护问题对患者产生哪些影响？③ 患者的照护对您的生活产生哪些影响？④ 在患者的营养护理方面？您希望得到哪些指导？

结果　分别从 4 个方面讨论，包括（1）尚未形成针对不同类型消化道癌症患者的个性化、全程化的营养管理方案；（2）营养管理过程中未充分发挥营养专业人员的作用，在患者、家庭照顾者营养科普及医护人员营养培训方面未建立规范的体系，且缺乏评价指标及质量控制措施来促进营养管理质量持续改进；（3）从患者、家庭、医护、环境支持等四个层面发掘临床有效营养管理的影响因素：①在患者层面，进食相关症状、感知获益、心理作用是主要影响因素；②在家庭层面，家庭应对型态、家庭营养健康信念、家庭沟通氛围、家庭照顾者知识和技能、家庭现实条件是主要因素；③在医护层面，营养支持通路的建立、医护营养健康意识、医护营养专业知识水平、角色与工作量冲突是主要因素；④在环境支持层面，膳食配置缺乏、营养管理信息系统，设备限制、DRGs 支付方式下不合理控制营养治疗成本是主要因素。

结论　消化道癌症患者存在大量营养需求和疑惑，同时医务人员、家庭照顾者营养素养不足，未能高效满足患者需求，建议改善患者进食相关症状，帮助其树立正确的营养健康意识、引导心理的正向支持作用；同时整合家庭内外资源，聚集家庭优势，提升家庭应对营养管理能力；充分调动社会组织支持，建立与完善营养科普与培训体系；争取医院政策支持，灵活精准的落实消化道癌症营养管理工作。

关键字 消化道癌症；营养需求；营养管理；质性研究；

分类：临床营养

老年认知衰弱患者的口腔健康与营养状况分析

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目的： 既往研究显示口腔不健康和营养不良与认知功能和身体衰弱的出现和恶化有关，并且通过适当的干预措施可加以改善。但是，目前针对老年认知衰弱患者的口腔健康状况和营养不良研究相对较少。本研究旨在探讨 60 岁及以上老年住院认知衰弱患者的口腔健康状况与营养不良情况。

方法：横断面研究数据来源于重庆医科大学附属第一医院老年综合评估数据库。时间自 2016 年 4 月至 2021 年 12 月。所有参与者都接受了由专业评估人员进行的面对面评估。身体虚弱是由 Fried 量表评估。认知功能采用简明精神状态检查量表评估。口腔健康状况采用汉化版简明口腔健康检查表(BOHSE)进行评估。营养状况采用微量营养评估量表(MNA)评估。认知衰弱定义为同时存在至少 1 个 Fried 标准和轻度认知障碍。以认知衰弱患者为研究对象，既没有身体衰弱也没有认知障碍的患者作为对照组，收集两组的一般人口学特征、口腔健康评分以及营养状况评估分别进行比较。采用二元 logistic 回归分析探讨认知衰弱的危险因素。口腔健康评分与营养筛查评分之间的相关性采用 Spearman 分析方法进行分析。

结果：研究共纳入 425 名认知衰弱患者(245 名女性)和 491 名非认知衰弱患者(283 名女性)。单因素分析显示，两组患者在年龄、受教育程度、居住情况、是否合并糖尿病、体重指数、睡眠评分、抑郁等方面差异均有统计学意义。认知衰弱组的口腔健康评估总分高于对照组(4.35 ± 2.68 vs 3.64 ± 2.60, Z = 4.07, P < 0.001)。认知衰弱组的口腔健康评估条目：舌头、黏膜组织、牙龈、天然牙、义齿、咀嚼牙和口腔卫生出现健康变化和不健康状态的平均得分和比例均高于对照组(P < 0.05)。二元 logistic 回归分析显示，在调整年龄、性别、文化程度、居住状态后，4 颗及以上自然牙的缺失或损坏(OR = 1.91, 95%CI: 1.20 ~ 3.07, P = 0.007)以及咀嚼对位少于 11 对与认知衰弱独立相关。单因素分析显示认知衰弱组患者具有营养不良风险和营养不良状况的比例均高于对照组，差异有统计学意义。二元 logistic 回归分析显示，在调整相关因素后营养不良风险(OR= 3.728, 95%CI: 2.288 ~ 6.075, P= 0.000)和营养不良 (OR = 8.301, 95%CI: 3.617 ~ 19.050, P= 0.001)与认知衰弱相关。双变量分析显示，口腔健康评分与营养评分之间存在线性相关，相关系数为-0.109（P = 0.025)。

结论：60 岁以上老年认知衰弱住院患者的口腔健康状况不佳和营养不良的比例较非认知衰弱患者更高。4 颗或更多的天然牙缺失或损坏，咀嚼位牙齿咬合对位数量减少以及营养不良都是认知衰弱的独立危险因素。并且，认知衰弱患者的口腔健康评分与营养不良之间存在相关性。

关键字 认知衰弱；口腔健康；营养不良；危险因素

分类：临床营养

木瓜壳寡糖复合营养素对膝骨关节炎患者 作用疗效及生活质量的研究

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目的　膝骨关节炎（Knee Osteoarthritis，KOA）患者常伴随剧烈疼痛甚至诱发残疾，严重影响患者生活质量，造成较大的社会经济负担，木瓜壳寡糖复合营养素是一种具有多种高活性营养素的膳食补充剂，文中旨在探讨木瓜壳寡糖复合营养素对膝骨关节炎患者安全性及生活质量的影响。　方法　选取 2020 年 5 月至 2021 年 12 月在河北医科大学第三医院关节科就诊的 94 例膝骨关节炎患者，通过随机数字表法将患者随机分为试验组（n=48）和对照组（n=46），试验组患者口服木瓜壳寡糖复合营养素 13 g/次，2 次/日，15 周 1 疗程，连续 15 周。对照组患者双膝骨关节腔内注射玻璃酸钠注射液，左右膝骨关节 1 支/次，1 次/周，5 周 1 疗程，连续 5 周。随访 15 周，于干预前、第 5 周、第 10 周检测两组患者血液指标（肝功能、肾功能、CRP 水平）；于干预前、第 5 周、第 10 周、第 15 周对两组患者进行疗效指标评价[西安大略和麦克马斯特大学骨关节炎指数评分（WOMAC）]、生活质量评价[健康调查简表（SF-36）]、胃肠道症状分级评分（GSRS）调查。　结果　两组患者不同时点肝功能（ALT、AST、GGT）、肾功能（GLU、CREA、UA）指标进行组内比较，随干预时间延长，差异均无统计学意义（P＞0.05）；两组患者不同时点 CRP 指标、WOMAC 总分、疼痛评分、僵硬评分、日常活动难度评分、不同时点生理机能、生理职能、躯体疼痛、一般健康状况、精力、社会功能、情感职能和精神健康进行组内比较，随干预时间延长，差异具有统计学意义（P＜0.05）；简单效应分析得知，第 5 周试验组患者与对照组患者 WOMAC 总分、僵硬评分、日常活动难度、社会功能、精神健康评分指标差异具有统计学意义（P＜0.05）；第 15 周试验组患者与对照组患者 CRP 指标、一般健康状况、躯体疼痛评分差异具有统计学意义（P＜0.05）；第 5 周、15 周试验组患者与对照组患者疼痛评分差异具有统计学意义（P＜0.05）；第 10、15 周试验组患者与对照组患者生理职能、精力、情感职能差异具有统计学意义（P＜0.05）；第 5 周、10 周、15 周试验组患者与对照组患者生理机能差异具有统计学意义（P＜0.05）。试验组、对照组患者组内干预前、第 5 周、第 10 周、第 15 周 GSRS 评分呈现显著下降趋势，比较差异具有统计学意义（P＜0.01）。第 15 周，与对照组患者相比，试验组患者 GSRS 评分显著下降，比较差异具有统计学意义（P＜0.01）。结论　木瓜壳寡糖复合营养素可缓解膝骨关节炎患者疼痛症状及僵硬程度、改善患者生活质量，减轻膝骨关节炎患者炎症反应、改善生活质量、调节胃肠道功能状态，作用疗效安全，其改善程度不弱于关节腔内注射玻璃酸钠，是较为理想的膝骨关节炎膳食营养补充剂。

关键字 木瓜；壳寡糖；膝骨关节炎；作用疗效；安全性；生活质量

分类：临床营养

富含蛋白质/肽的营养补充剂对伴随肌肉衰减症的老年骨关节炎患者的改善效果的临床研究

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背景：

骨关节炎（Osteoarthritis, OA）是一种慢性退行性关节疾病，但是OA也可累及关节周围肌肉和神经，导致肌无力和疼痛。肌肉衰减症（sarcopenia, SA）被定义为年龄相关的进行性、广泛性骨骼肌质量减少、肌肉力量下降伴随着身体功能下降的一类综合征。肌肉衰减症会导致肌肉力量衰减，使得身体无法有效地支撑和保护关节，从而导致骨关节炎的发生和加剧。而另一方面，骨关节炎也会影响肌肉的健康，如导致肌肉的流失等。研究表明，OA和SA在老年人中常伴随出现，且互相影响和促进。富含蛋白质的饮食干预措施已纳入肌肉衰减症的预防与治疗，但其对同时有SA和OA老年患者的改善作用目前尚不清楚。因此，本研究旨在探索富含蛋白质/肽的营养补充剂对伴随肌肉衰减症的老年骨关节炎患者的改善作用。

方法：

本研究采用随机、双盲、安慰剂对照的单中心临床试验研究设计。将130名（50-70岁）被临床和放射影像学同时诊断为轻中度骨关节炎（K&L分级I或II级 ）和肌肉衰减症（SCAR-CalF量表≥11）的老年人按照随机、平均分成富含蛋白质/肽的营养补充剂干预组（Protein/peptide-rich supplement group, PR）和安慰剂对照组（Placebo group, PL ）。富含蛋白质/肽的营养补充剂干预组和安慰剂对照组受试者在早晚各服用一次15g营养补充剂或者安慰剂，持续12周。

本次研究的测量指标包括多个方面，用于评估干预前后骨关节炎和肌肉衰减症的改善情况。在干预前后采集受试者的参数，包括身体功能指数SPPB（short physical performance battery）、握力、骨关节炎指数WOMAC、膝骨关节炎（MRI）、身体成分测定（Inbody）、骨密度检测(DXA)、SARC-CalF量表、SF-36健康状况调查表、血常规和尿常规等参数，以便评估干预前后的变化。

结果：

最终有124人完成了整个临床试验，分别是PR组63人，PL组61人。干预结束后，与PL组相比，PR组的首要结局SPPB (7.78±1.53 vs 6.66±1.00, p＜0.0001)、握力(21.45±4.57 vs 19.33±4.79, p＜0.0001)和骨关节炎指数WOMAC (31.63 ±7.61 vs 35.34±5.00, p＜0.0001)均表现出显著的组间差异性；而其他次要结局如骨骼肌质量指数、SARC-CalF量表、SF-36健康状况调查表也均表现出显著的组间差异。骨关节炎K&L分级组间无差异，骨关节炎K&L分级组间无差异，但MRI和DXA检测结果显示，PR组分别有9名（ 14.2%）和6名受试者（ 9.5%）干预后骨赘和骨密度得到改善，而PL组均未得到改善。血液检测指标显示，与PL组相比，PR组的CK、CKMB、IGF-1和血清白蛋白显著提高，而CRP显著降低。此外，血常规与尿常规检测显示两组之间无显著差异。

结论：

本临床研究显示富含蛋白质/肽的营养补充剂可以有效的改善伴随肌肉衰减症的老年骨关节患者的症状，本结果为OA合并SA的老年患者的营养干预提供新的证据。

临床注册号：Chictr.org.cn (ChiTR2200056415)

关键字 肌肉衰减症，骨关节炎，营养干预，蛋白质

分类：临床营养

中青年女性（25-45 岁）体重管理人群的静息能量消耗预估值与实测值的差异及相关因素

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中青年女性（25-45 岁）体重管理人群的静息能量消耗预估值与实测值的差异及相关因素
摘要

目的

了解减重门诊中青中年女性人体成分和静息能量消耗（resting energy expenditure，REE）情况；分析 Harris-Benedict 估算法(H-B)与间接测热法(indirect calorimetry，IC)实测法，这两种方法在体重管理中青年人群中，预估与实测 REE 的差异；并体格测量和分析人体成分等指标与二者差异值和差异率的相关性。

方法

选择 2023 年 1 月 1 日至 3 月 31 日期间，河南省人民医院营养门诊中欲进行体重管理的 112 例中青年女性患者。记录各研究对象的性年龄、身高、体重，并计算 BMI(=体重 kg/身高 m2)；应用间接测热法（Medgraphics，CCM Express）检测得到 REE 实测值，公式法（H-B）得到 RE 预估值，应用生物电阻抗法（InBody 770）测得体脂肪、去脂体质量、肌肉量、骨骼肌量、内脏脂肪面积、体脂率、腰臀比、全身相位角等体成分指标结果。采用 SPSS 21.0 软件进行统计学分析,计量资料以均数±标准差((c)±s)表示。两组间比较采用独立样本 t 检验,三组间采用单因素方差分析。分类资料之间采用卡方检验。使用 Wilcoxon 符号秩和检验比较 REE 预估值和实测值的差异（总体一致性），采用 Bland-Altman 法评估 REE 预估值和实测值的个体一致性。Spearman 相关性分析和多元线性回归分析方法，分析人体成分各指标与差异值（REE 实测值-REE 预估值）和差异率（（REE 实测值-REE 预估值）/REE 实测值*100%）的相关性。P<0.05 提示差异具有统计学意义。

结果

中青年女性体重管理人群中，公式法（H-B）预估值与 IC 法实测值之间的差异有统计学意义（P＜0.05）。HB 公式法低估了该样本人群实际的基础能量代谢水平，个体差异性较大；H-B 预估值对 REE 的低估程度与 REE 实测值呈正相关（P＜0.05）。年龄、体重、身高和 BMI 与 REE 预估值和实测值的差异不相关（P＞0.05），与其差异率不相关（P＞0.05）；体重与 REE 实测值和预测值均相关，但与二者差异值和差异率不相关；BMI 与 REE 预测值相关，但与 REE 实测值、二者差异值和差异率不相关。人体成分相关指标中体脂肪量与 REE 预测值相关，但与 REE 实测值不相关；内脏脂肪面积、体脂率、腰臀比、全身相位角等指标，与上述差异值和差异率均不相关（P＞0.05）；去脂体重、肌肉量、骨骼肌量不仅与 REE 实测值相关，且分别与差值和差异率相关（P＜0.05）。

结论

间接测热法在部分中青年体重管理女性的能量评估中，优于 H-B 公式法进行预估。结合人体测量和人体成分等指标，有助于明确影响 REE 预估值与 REE 实测值产生差异的影响因素，可能有助于找到中青年体重管理群体中，应用间接测热法评估能量消耗的强适应症，进而开展分类评估，最终提高工作效率，节约医疗资源。

关键字 体重管理；能量消耗；间接测热法；人体成分；差异

分类：临床营养

基层肌肉减少症患者抗阻运动干预的实践与思考

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题目：基层肌肉减少症患者抗阻运动干预的实践与思考

目的：通过对肌少症患者行弹力绳训练的探究和实践，评估弹力绳抗阻训练干预的可行性、依从性及干预效果，旨在为肌少症预防和治疗提供证据支持。

方法：从2021年10月至2022年11月，在重庆市忠县拔山中心卫生院来院患者中筛选出肌肉减少症患者（基层招募的符合亚洲肌少症工作组2019诊断标准的65岁以上中国老年人），采用随机对照试验方法，对干预组行每周3次、每次30分钟、持续12周的弹力绳抗阻运动训练，对照组老年人仅行健康教育、不进行任何规律的运动干预、保持以往的日常活动量。对研究对象干预前、干预后的身体成分、运动指标、健康量表进行资料收集分析。

结果：本研究共纳入年龄大于65岁的肌肉减少症患者共50人参与研究，包括干预组（为期12周的弹力绳抗阻运动）25人，对照组（常规健康教育组，维持既往日常运动量）25人，其中干预组因不能坚持运动而中途退出2人，对照组因失访原因退出2人，最终纳入分析的干预组共23人，对照组23人。结果显示：通过对干预组进行12周的弹力绳抗阻运动干预，可增加肌少症老年人握力、小腿围、全身肌肉量、骨骼肌质量指数、6米步速，改善5次椅坐实验，提高简易体能测试量表（Short physical performance battery，SPPB）得分、简易智能评价量表（Mini-mental State Examination，MMSE）得分、微型营养状况评分（short-form Mini-nutritional Assessment，MNA-SF）得分、营养评价问卷简表（Simplified nutrition assessment questionnaire，SNAQ）得分，降低简易五项评分问卷（The Simple Five item Scoring Scale for Sarcopenia，SARC-F）得分、老年抑郁量表（The geriatric depression scale，GDS）得分、工具性日常生活活动能力（Instrumental Activity of Daily Living，IADL）得分，且结果具有统计学意义（$P<0.05$）。

结论：基层肌肉减少症患者行弹力绳抗阻运动可行，观察到12周的弹力绳抗阻运动改善了肌少症患者肌肉量、肌力、身体功能，可能在一定程度上也改善了肌少症患者的营养状况、认知功能、焦虑抑郁情绪。思考：但研究中在基层行弹力绳抗阻运动干预的标准化存在一定困难，仍需进一步优化干预方案。本研究仅单独行运动干预，今后可考虑行营养及运动联合干预以评估是否获取更佳的干预效果。且基层大多数老年人尚不知晓肌少症这一疾病，这要求我们全科医生加强对基层居民的健康宣教及生活方式指导，期望今后能提高居民对肌少症的了解及重视，合理进行早期干预，延缓肌少症的进展、减少并发症及不良后果的产生。

关键词：肌肉减少症，抗阻运动，营养

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关键字 肌肉减少症，抗阻运动，营养

分类：临床营养

以护士为主导的多学科协作营养管理在胃癌患者中的应用效果分析

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【摘要】 目的 探讨以护士为主导的多学科协作营养管理对胃癌患者的影响。方法 采用便利抽样法，选取 2020 年 1 月-2021 年 12 月郑州大学附属肿瘤医院 124 例胃癌患者为研究对象，按照入院时间分为两组，2020 年 1-12 月收治的 51 例患者为对照组，2021 年 1-12 月收治的 55 例患者为研究组。对照组采用常规营养管理，研究组在对照组基础上给予以护士为主导的多学科协作营养管理。比较两组干预前后营养分级、欧洲癌症研究与治疗组织生命质量测定量表（EORTC QLQ-C30）评分；统计患者营养管理目标达标情况、胃肠道不良反应发生情况。结果 干预后，研究组营养情况优于对照组，EORTC QLQ-C30 评分高于对照组，差异有统计学意义（P＜0.05）；研究组营养管理目标达成率为 67.27%（37/55）， 高于对照组 39.22%（20/51），两组差异有统计学意义（P＜0.05）；研究组胃肠道不良反应发生率为 3.64% （2/55），低于对照组的 17.65%（9/51），差异有统计学意义（P＜0.05）。结论 胃癌患者中实施以护士为主导的多学科协作营养管理可改善其营养状况、生活质量，提升营养管理目标达标率，降低胃肠道不良反应发生率。 以护士为主导的多学科协作营养管理不局限于当下患者存在的症状、问题，而着重改善整体生活质量。本研究中，研究组干预后 EORTC QLQ-C30 评分较对照组高，说明以护士为主导的多学科协作营养管理可改善患者生活质量。考虑是因为：该方法可促使护士有明确目标，吸收各学科专家意见、建议，更好落实护理工作，促进患者康复，改善其躯体功能、社会功能；该方法还强调由以往的以疾病为中心转变成以患者为中心，由单个医护人员服务转变为多个医护人员共同为患者提供服务，可更好满足胃癌患者疾病认知、角色转变等方面需求；该方法还能加强护患沟通，促使患者感受到被尊重、被重视，营造良好医患关系，利于帮助其缓解不良情绪，增强战胜疾病信心，以积极态度面对疾病，改善生活质量。综上所述，在胃癌患者中实施以护士为主导的多学科协作营养管理可改善患者营养状况及生活质量，提升营养管理目标达标率，减少胃肠道不良反应发生。本研究不足之处在于所选病例数较少，干预时间短，后续研究中需扩大样本量， 延长干预时间，进一步改进干预方案；所用在肿瘤患者营养风险评估量表虽然信效度较好，但属于新型量表，临床使用率低，今后仍需与较成熟的营养风险筛查 2002、患者主观营养评估量表进行对比研究，验证其临床实用性。

关键字 胃癌； 多学科协作； 营养管理；

分类：临床营养

低血糖生成指数膳食及膳食评价对 2 型糖尿病患者治疗影响

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目的:糖尿病是一组以慢性高血糖为特征的代谢性疾病，目前已成为继心脑血管疾病、肿瘤之后另一个严重危害人类健康的慢性非传染性疾病。同时糖尿病是一种长期慢性疾病，而膳食营养治疗是治愈慢性病的最终解决方案。医学营养配餐治疗是糖尿病治疗的基础，而“平衡膳食，适量运动”，是糖尿病医学营养配餐方案策略制定的核心。并且老年人是该病主要的患病人群。饮食管理是糖尿病治疗的“五驾马车”之一，需要患者终身密切关注。因为医学营养配餐治疗是治疗糖尿病的基础，所以目前为止各种配餐治疗层出不穷，对于此我们更应该选取合适的方法。低血糖生成指数膳食属于目前临床中的新型膳食干预措施之一，即为医务人员结合患者的血糖生成指数，落实膳食指导工作，稳定糖尿病人的血糖。本研究主要探讨低血糖生成指数膳食及膳食评价对 2 型糖尿病患者治疗效果的影响。方法: 选取 2022 年 3 月 22 日~ 12 月 26 日收治的 80 例 2 型糖尿病患者为研究对象，按照随机数字表法分为对照组和观察组各 40 例，对照组采用糖尿病健康教育及饮食指导，观察组采用低血糖指数膳食及膳食评价，一段时间后，比较两组干预前后膳食总能量、三大产能营养素供能比，体质量指数（ BMI）、空腹血糖、餐后 2 h 血糖、总胆固醇、甘油三酯、糖化血红蛋白指标改善情况。结果: 干预前，两组患者膳食总能量、三大产能营养素功能比、体质量指数（BMI）、空腹血糖、餐后 2h 血糖、总胆固醇、甘油三酯、糖化血红蛋白指标情况无差异（P>0.1）；干预后，两组患者总热量、脂肪、碳水化合物等 摄入量均降低，且观察组低于对照组，蛋白质摄入量均增加，且观察组高于对照组，差异具有统计学意义(P < 0.05)；干预后，两组患者空腹血糖(FBG)、餐后 2 h 血糖(2h PG)均降低，且观察组空腹血糖 FBG、餐后 2h 血糖 2h PG 低于对照组，差异具有统计学意义(P < 0.05)；干预后，两组患者血白蛋白(ALB)、前白蛋白(PA)、血红蛋白(Hb)水平均降低， 但观察组患者血白蛋白 ALB 水平高于对照组，差异具有统计学意义(P < 0.05);干预后，两组患者简化营养食欲问卷 (SNAQ)各方面评分及总分均升高，且观察组患者进餐时饱腹感与总分均高于对照组，差异具有统计学意义 (P < 0.05);两组患者低血糖事件发生率比较，差异无统计学意义(P > 0.05)。结论: 低血糖生成指数膳食不仅干预可改善 2 型糖尿病患者患者营养摄入状况、血糖水平及白蛋白水平，增强患者食欲，降低低血糖事件发生率；同时低血糖生成指数膳食及膳食评价可控制 2 型糖尿病患者的各项生化指标，从而提高其生活质量。

关键字 低血糖生成指数膳食；糖尿病；营养；膳食

分类：临床营养

溃疡性结肠炎患者营养不良患病率的回顾性研究

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目的：溃疡性结肠炎（ulcerative colitis，UC）是炎症性肠病（inflammatory bowel disease，IBD）的一种。IBD 患者由于疾病炎症状态、症状导致的进食减少、肠道吸收功能减低等因素，常合并营养不良。但既往对于 IBD 患者营养方面的关注更多聚焦于克罗恩病（Crohn’s disease，CD）患者，而对 UC 患者关注较少，且缺乏大样本量的研究。本研究依据全球领导人发起的营养不良评定（诊断）标准共识（Global Leadership Initiative on Malnutrition, GLIM），回顾性分析我院住院的活动期 UC 患者营养不良的患病率。

方法：收集 2014 年 11 月至 2022 年 8 月在北京协和医院住院的 UC 患者临床病历信息，并调查这些患者后续在我院的随访情况，截止时间为 2023 年 4 月 12 日。纳入标准：（1）年龄 18-70 岁；（2）明确诊断 UC，且处于疾病活动期；（3）住院记录完整，明确记录身高、体重、饮食、体重变化情况、病情活动度、病变范围；排除标准：（1）合并其他脏器严重疾病（心、肺、肾、肝等），或内分泌系统、血液系统、免疫系统慢性疾病；（2）合并其他神经-肌肉相关疾病或骨科疾病，如重症肌无力、帕金森、骨折等；（3）有肿瘤病史或合并肿瘤；（4）妊娠或哺乳期妇女。以 NRS 2002 作为筛查工具，依据 GLIM 标准，分析 UC 患者的营养不良患病率。多次住院患者以第一次住院信息为准。肌肉量评估方面，以西门子 Syngo.via 软件测量 CT 第三腰椎横截面的肌肉面积，除以身高平方得到骨骼肌指数（skeletal muscle index, SMI），男性＜40.8cm2/m2, 女性＜34.9cm2/m2 判定为有肌肉减少。

结果：依据纳入、排除标准，共纳入 606 例 UC 患者。依据 GLIM 诊断营养不良 394 例，营养不良患病率 65.0%，其中有 22 例患者虽然 BMI≥18.5、无体重下降或下降幅度未达 GLIM 诊断标准，但有肌肉减少，因此仍符合营养不良诊断。营养不良组与非营养不良组在年龄、性别比、疾病诊断时的年龄方面无显著差异。在病情轻度（114 例）、中度（266 例）、重度活动(226 例）的患者中，营养不良患病率依次为 10.2%、40.1%、49.7%（P ＜ 0.001）。在病变范围为直肠（25 例）、左半结肠（99 例）、全结肠（482 例）的患者中，营养不良患病率依次为 1.5%、12.9%、85.6%（P ＜ 0.001）。在营养不良的患者中，有 65 例（16.5%）在本次住院或后续随诊过程中进行了手术治疗，在无营养不良的患者中，有 14 例（6.6%）在本次住院或后续随诊过程中进行了手术治疗，显著低于营养不良患者（P ＜ 0.001，OR = 2.794, 95%CI 1.528-5.111）。在营养不良的患者中，有 68 例（17.1%）患者病程中有肠外表现，在无营养不良的患者中，有 30 例（14.2%）患者病程中有肠外表现，两组无显著差异。

结论：本单中心回顾性研究显示，住院治疗的活动期 UC 患者中营养不良患病率 65.0%。随着疾病活动度增加或病变范围扩大，营养不良患病率逐渐升高。营养不良的患者需要手术治疗的风险显著升高，但可能不增加患者肠外表现发生的风险。

关键字 溃疡性结肠炎；GLIM；营养不良

分类：临床营养

低血糖负荷饮食结合移动饮食管理对 2 型糖尿病患者血糖改善的效果探索

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目的 本研究用低血糖负荷（glycemic load, GL）饮食为 2 型糖尿病患者设计精准饮食治疗方案，移动健康平台对患者每日饮食情况进行管理，探索二者结合对 2 型糖尿病患者血糖及体重的影响，为 2 型糖尿病防治提供更科学、可行、合理、精准的饮食管理方法。

方法 在医院招募 2 型糖尿病患者 32 例，对其进行统一的糖尿病医学营养教育和移动饮食管理平台（“薄荷营养师”小程序，由 “薄荷健康”提供）的使用培训，包括糖尿病饮食治疗的基本原则、食物量的衡量和估算等，让研究对象建立食物“份”的概念，学会并应用粗略估算食物大小的方法，了解食物选择技巧，认识食物标签、血糖生成指数及血糖负荷指数表等，同时还需教会研究对象使用移动饮食管理平台，提高后续记录结果的可信度。由研究者为研究对象制定个性化食谱，对研究对象进行连续 42 天的低 GL 食物交换份法干预，GL 目标为 30~50/天，所有对象要求每日在移动饮食管理平台上传三餐图片，记录全部摄入的食物及其数量，研究者每日对研究对象记录结果进行核查、调整，并计算、记录研究对象每日饮食 GL 和能量摄入情况，向研究对象反馈结果和饮食调整建议。在干预前和干预后的第 14、28、42 天检测并比较研究对象干预前后的体重、体脂率、身体质量指数(body mass index, BMI)、腰围、空腹血糖（fasting blood glucose, FBG）、2 小时餐后血糖（postprandial 2h blood glucose, 2hPBG）、空腹胰岛素（fasting insulin, Ins）、空腹 C 肽（fasting C-peptide, C-P）和糖化血红蛋白（glycosylated hemoglobin, HbA1c）。

结果 本研究共招募符合研究纳入标准的 2 型糖尿病患者 44 人，在干预结束时，共有 32 名研究对象完成了全部随访，男 21 例，女 11 例，平均年龄为（53.78±8.61）岁。干预期间，研究对象的平均每日饮食 GL 和能量摄入均低于干预前（60.90±8.75 vs 45.73±13.29，$P<0.001$；1530.84±169.12 kcal vs 1301.89±250.87 kcal，$P<0.001$），且基本达到预期目标。与干预前相比，研究对象的空腹血糖从第 28 天起出现明显下降，且差异持续到干预结束（$P<0.05$），第 28 天、42 天分别降低了 0.48mmol/L、0.56mmol/L（$P=0.04$，$P=0.007$）；糖化血红蛋白、体重、BMI、腰围均从第 14 天起出现明显下降，且差异持续到干预结束（$P<0.05$），糖化血红蛋白第 14 天、28 天、42 天分别降低了 0.22%、0.42%、0.45%（$P=0.013$，$P<0.001$，$P<0.001$），体重分别降低了 0.70kg、1.04kg、1.16kg（$P<0.001$，$P<0.001$，$P<0.001$），BMI 分别降低了 0.24 kg/m^2、0.34 kg/m^2、0.34 kg/m^2（$P<0.001$，$P<0.001$，$P=0.002$），腰围分别降低了 1.09cm、1.82cm、2.48cm（$P<0.001$，$P<0.001$，$P<0.001$）。根据研究对象试验前的空腹血糖进行分组分析，在 FBG≤7mmol/L 的研究对象中，空腹血糖呈下降趋势，但未出现统计学差异（$P\geq0.05$）；在 FBG＞7mmol/L 的研究对象中，空腹血糖从第 28 天起出现明显下降，且差异持续至干预结束（$P<0.05$），第 28、42 天分别降低了 0.74 mmol/L 和 0.80mmol/L（$P<0.001$，$P<0.001$）。

结论 低 GL 饮食结合移动饮食管理对于 2 型糖尿病患者空腹血糖、糖化血红蛋白、体重、BMI、腰围等指标均有明显的改善效果，且对于血糖控制欠佳的患者改善效果更好，两种方法的结合可成为 2 型糖尿病防治更科学、可行、合理、精准的饮食管理方案。

关键字 2 型糖尿病；低血糖负荷；饮食治疗；移动饮食管理

分类：临床营养

莲花的乙醇花瓣提取物抑制肺癌生物学行为的研究

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背景与目的：癌症作为一个世界范围的主要公共卫生问题，其发病率和死亡率都在不断上升。据统计，2022 年，中国和美国分别有约 482 万和 237 万癌症新发病例，以及 321 万和 64 万癌症死亡病例。在我国，肺癌是发病率最高的癌症，也是癌症死亡的主要原因，因此，需要迫切寻求肺癌治疗的方式，以便更好治疗该疾病。近年来，植物化合物在肿瘤治疗方面的研究日益增多，临床前和临床数据均表明生物活性成分具有巨大的癌症预防和抗癌治疗潜力，是肿瘤治疗的一个新的方向。在众多药用植物中，莲花具有许多生物活性成分，包括生物碱、多酚、萜类化合物和类固醇，有各种生物和药理活性，例如抗氧化、抗炎、免疫调节、抗病毒和降血糖等。目前，几乎所有莲花的植物部分都被用作食品和药物，莲花的各个部分作为药物治疗疾病已有多年的历史，其种子提取物和叶子提取物显示出抑癌活性，从莲花中提取的生物活性物质在肺癌中的抑癌作用已被证实。莲花的花瓣提取物在人类宫颈癌中发现可以诱导细胞凋亡，但在肺癌中并未有相应研究。本研究旨在分析莲花的花瓣提取物对肺癌细胞增殖、周期、迁移的影响，以便寻求肺癌治疗的新策略。

方法：我们用乙醇提取莲花花瓣中活性成分，并鉴定出其中的活性成分。选用不同剂量的乙醇花瓣提取物处理肺腺癌细胞 A549，分别用 MTT 法和流式细胞术检测细胞活力、凋亡/坏死和细胞周期。通过黏附、菌落形成、创面愈合等实验，评价莲花乙醇花瓣提取物的抗转移作用。并在体内构建肺癌小鼠模型，用不同剂量的乙醇花瓣提取物治疗肺癌小鼠，测量肺癌小鼠肿瘤的大小及生长情况，评价体内莲花乙醇花瓣提取物的抗癌作用。

结果：莲花乙醇花瓣提取物能降低肺癌细胞活力并且呈剂量依赖性，且诱导肺癌细胞的坏死和细胞周期阻滞，并通过促进 caspase-3 活化和抑制 Bcl-2 表达来诱导细胞凋亡。此外，还能抑制 Akt/mTOR 信号通路。体内实验中，莲花的乙醇花瓣提取物能抑制肿瘤的生长，表现出抗癌活性。

结论：体内、外数据均表明莲花的乙醇花瓣提取物具有抗癌的作用，莲花的乙醇花瓣提取物通过诱导细胞凋亡及抑制 Akt/mTOR 信号通路来抑制肺癌的恶性生物学行为。因此，我们猜想，莲花作为有强大生物活性的物质，其花瓣的乙醇提取物可能是肺癌治疗的一种有前景的药物治疗策略。

关键字 肺癌、细胞凋亡、莲花、植物化合物

分类：临床营养

基于互联网的代餐减重干预对超重/肥胖者膳食模式的影响

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目的 探讨基于互联网的代餐减重干预方案（MetaWell）的减重效果以及其对超重/肥胖者膳食模式的影响。**方法** 招募了 220 名符合纳入排除标准并签署了知情同意书的超重/肥胖者作为研究对象，通过随机数字表法随机分为试验组（n=110）与对照组（n=110）。试验组即 MetaWell 组，采用互联网指导联合代餐的干预方案，本方案提供配套的体脂秤和每天最多三份代餐饼干，受试者通过手机 APP 进行数据上传及接收由本计划认证的体重管理人员的指导意见，减重期间的能量摄入为 800kcal/d-1200 kcal/d；对照组进行常规健康教育（HE），即 HE 组，受试者仅进行一次面对面的减重饮食指导健康教育，并获得一份基于限制能量平衡膳食制定的减重食谱（男性 1500 kcal/d，女性 1200kcal/d）。MetaWell 组的干预共分为 2 个阶段：第 0-3 个月为体重减轻阶段，常规使用代餐饼干；第 3-6 个月为持续体重减轻过渡到体重维持阶段，不常规使用代餐，仅在监测到明显的体重反弹时使用代餐饼干进行 2-3 天的干预，使用与上个阶段相同的方案。在基线和减重 6 个月时收集数据，测量身高、体重和腰围，计算 BMI；通过简化版食物频率表收集食物摄入情况；采用简易饥饿程度量表(0-10 分)进行饱腹感评估。分析干预前后能量和蛋白质、脂肪、碳水化合物的摄入量变化以及膳食模式的变化，观察饱腹感、体重、BMI、腰围的变化。**结果** 减重 6 个月后，MetaWell 组和 HE 组的膳食模式都发生了变化，MetaWell 组中减少了以泡菜、速食为主的膳食模式，油炸面食、泡菜、加工肉类食物在 HE 组的各种膳食模式中均消失了，干预后 MetaWell 组和 HE 组的各膳食模式中均增加了蔬菜类、水果类、坚果等食物中的一种或多种，提示互联网指导联合代餐减重干预和健康教育均可促进膳食模式朝着更有利于减重的健康方向改变。相较于基线水平，减重 6 个月时两组都有更低的能量摄入（均 $P<0.001$），脂肪（均 $P<0.001$）和碳水化合物（MetaWell 组 $P<0.001$，HE 组 $P<0.05$）的摄入量也明显降低，并且蛋白质摄入量均保持在每日推荐摄入量水平。饱腹感方面，6 个月时 MetaWell 组和 HE 组均可减弱受试者的午餐前饥饿感（$P<0.05$），睡前的饥饿评分则无明显变化（$P>0.05$）。在减重 6 个月时，MetaWell 组与 HE 组相比，MetaWell 组在体重、BMI、腰围方面减少的更多（均 $P<0.001$）。MetaWell 组体重下降中位数为 5.70kg，腰围下降中位数为 7.10cm；HE 组体重下降中位数为 0.10kg，腰围下降中位数为 0.55cm。MetaWell 组的身体形态学指标得到了明显的改善。 **结论** MetaWell 组和 HE 组均可引导受试者的膳食模式朝着更健康的方向发展，相对于 HE 组，MetaWell 组具有更好的减重效果。

关键字 减重，互联网，代餐，膳食模式，随机对照试验

分类：临床营养

头颈部肿瘤放疗患者营养状况分析

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目的：调查头颈部恶性肿瘤患者放疗期间的营养状况、饮食摄入情况及营养支持情况。方法：采用方便取样法，选取 2021 年 8 月至 2022 年 4 月我院放疗科头颈部恶性肿瘤拟放疗患者为研究对象，放疗前和放疗期间（第 1、2、3、4、5、6 周）分别完成营养风险筛查 NRS-2002，24h 膳食回顾，并进行面对面半结构式访谈。采用 SPSS25.0 统计软件分析营养状况、饮食摄入情况及营养支持情况。结果：59 人全部完成 7 次随访，并对其结果进行分析。共 59 人纳入分析，其中鼻咽癌 17 例，下咽癌 7 例，下颌恶性肿瘤 7 例，鼻腔恶性肿瘤 6 例，喉癌 5 例，腮腺恶性肿瘤 4 例，舌癌 3 例，扁桃体恶性肿瘤 3 例，其它头颈部恶性肿瘤 7 例。放疗前、放疗期间（第 1、2、3、4、5、6 周）患者营养风险的发生率逐次增加
（8.5% vs 8.5% vs 8.5% vs 10.2% vs 15.3% vs 20.3%vs 25.4%，P ＜ 0.05），差异有统计学意义。放疗前、放疗期间（第 1、2、3、4、5、6 周）患者饮食摄入热量逐次减少
（（1754.44 ±417.45）kcal vs （1551.86 ±486.16）kcal vs （1624.22 ±443.43）kcal vs （1494.29 ±465.89）kcal vs （1414.58 ±450.24）
kcal vs （1412.08 ±474.25）kcal vs （1358.61 ±477.97）kcal，P ＜ 0.05），差异有统计学意义。有营养风险的患者放疗前营养支持率是 40.00%，放疗期间（第 1、2、3、4、5、6 周）营养支持率分别是 20.00%、20.00%、33.33%、66.66%、33.33%、46.67%。结论： 头颈部恶性肿瘤放疗患者的营养风险发生率随着放疗进行逐渐增加、饮食摄入热量随着放疗进行逐渐减少，而有营养风险患者的营养支持率较低。

关键词：头颈部肿瘤；放疗；营养风险；营养支持

目的：调查头颈部恶性肿瘤患者放疗期间的营养状况、饮食摄入情况及营养支持情况。方法：采用方便取样法，选取 2021 年 8 月至 2022 年 4 月我院放疗科头颈部恶性肿瘤拟放疗患者为研究对象，放疗前和放疗期间（第 1、2、3、4、5、6 周）分别完成营养风险筛查 NRS-2002，24h 膳食回顾，并进行面对面半结构式访谈。采用 SPSS25.0 统计软件分析营养状况、饮食摄入情况及营养支持情况。结果：59 人全部完成 7 次随访，并对其结果进行分析。共 59 人纳入分析，其中鼻咽癌 17 例，下咽癌 7 例，下颌恶性肿瘤 7 例，鼻腔恶性肿瘤 6 例，喉癌 5 例，腮腺恶性肿瘤 4 例，舌癌 3 例，扁桃体恶性肿瘤 3 例，其它头颈部恶性肿瘤 7 例。放疗前、放疗期间（第 1、2、3、4、5、6 周）患者营养风险的发生率逐次增加
（8.5% vs 8.5% vs 8.5% vs 10.2% vs 15.3% vs 20.3%vs 25.4%，P ＜ 0.05），差异有统计学意义。放疗前、放疗期间（第 1、2、3、4、5、6 周）患者饮食摄入热量逐次减少
（（1754.44 ±417.45）kcal vs （1551.86 ±486.16）kcal vs （1624.22 ±443.43）kcal vs （1494.29 ±465.89）kcal vs （1414.58 ±450.24）
kcal vs （1412.08 ±474.25）kcal vs （1358.61 ±477.97）kcal，P ＜ 0.05），差异有统计学意义。有营养风险的患者放疗前营养支持率是 40.00%，放疗期间（第 1、2、3、4、5、6 周）营养支持率分别是 20.00%、20.00%、33.33%、66.66%、33.33%、46.67%。结论： 头颈部恶性肿瘤放疗患者的营养风险发生率随着放疗进行逐渐增加、饮食摄入热量随着放疗进行逐渐减少，而有营养风险患者的营养支持率较低。
关键词：头颈部肿瘤；放疗；营养风险；营养支持
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关键字 头颈部肿瘤；放疗；营养风险；营养支持

分类：临床营养

肿瘤合并肝硬化、脂肪肝，药物性肝损伤等肝病的临床流行病学特征现况调查

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目的 肝硬化、肝功能异常、脂肪肝，药物性肝损伤等肝病是肿瘤患者常见共病。其中肝功能不全会导致化疗延迟或停止，影响其他抗肿瘤治疗的进一步实施及治疗疗效，严重者可发展为肝功能衰竭。肝功能不全的危险因素包括肝脏原发或继发性肿瘤、脂肪肝、肝硬化、手术创伤、药物性肝损伤、营养不良等。营养不良不仅是肝病的危险因素，也会导致已有肝病患者病情加重，病死率增加。合理的营养支持治疗不仅利于减少肝脏负担，也能帮助肝细胞修复，对于肝病患者的康复有着举足轻重的作用。因此，本研究对恶性肿瘤合并肝病的流行病学特征进行调查，从而为恶性肿瘤合并肝病患者的营养支持提供理论依据。方法 选择 2021 年我院出院的 96107 例恶性肿瘤患者为研究对象，根据病案首页记录的肝功能情况进行整理分类，分析肿瘤合并肝病患者的流行病学特征。结果 2021 年我院出院的 96107 名患者中，出院诊断合并肝病相关诊断的患者占 6.29%，发病率前 5 位的合并肝病分别为，肝硬化（2.78%）、肝功能异常(1.24%)、脂肪肝(1.20%)、药物性肝损伤(0.63%)、肝功能不全(0.34%)，其他（0.1%）。其中肝癌合并肝病的发病率为 58.38%，以肝硬化为主；其他消化系统癌合并肝病的发病率为 3.72%，以肝功能异常和药物性肝损伤为主；入院肝功能正常，出院并发肝功能不全的患者中，手术相关肝损伤占 82.32%，化疗相关占 32.38，其他治疗相关占 8.10%；术后并发肝功能不全的患者中肝胆原发癌及肝转移癌约占 2/3，上消化道癌、黑色素瘤、肺癌、淋巴瘤等其他癌占 1/3。肝病相关诊断发病率最高的三个科室，脂肪肝为：B 超射频消融单元（3.68%）、移植与免疫护理单元（3.07%）、乳腺内科（3.39%）；药物性肝损伤为：B 超射频消融单元（2.35%）、日间病房（1.93%）；肝硬化（不含酒精肝硬化）为：介入科 31.57%、肝胆外一 19.19%、肝胆外二 30.26%；肝功能异常为：B 超射频消融单元 8.32%、妇科 2.98%、淋巴瘤科 2.42%。结论 恶性肿瘤尤其是原发性肝癌或肝转移癌患者容易合并肝硬化、肝功能异常、脂肪肝、药物性肝损伤及肝功能不全等肝病，不同肿瘤部位患者合并肝病的发生率及肝病类型差异较大。原发性肝癌及肝转移癌、肝脏手术及射频消融治疗、化疗是恶性肿瘤患者并发肝功能异常及药物性肝损伤的危险因素，应注意早期全程监测这部分患者的肝功能指标及营养状况，包括早期进行营养风险筛查及饮食指导，发现营养风险尽早进行个体化营养支持治疗及随访，并注意监测体重及肝功能指标，根据病情变化随时调整营养方案。

关键字 恶性肿瘤 合并症 肝病 肝损伤 横断面调查

分类：临床营养

2022 年重庆市某肿瘤专科医院肿瘤患者营养现况及其影响因素分析

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目的

新型冠状病毒（新冠病毒）感染导致了一场持续的全球大流行，适宜的营养支持有助于增强机体免疫力，提升高危人群对新冠病毒的防御能力，延缓疾病进展，同时减少康复期不良症状的发生，尤其营养不良对恶性肿瘤患者的不利影响贯穿其整个病程，是造成患者住院时间延长、失代偿事件发生以及死亡率增加的重要因素，营养风险筛查既是营养照护的起点也是营养照护计划实施和调整的依据。本研究旨在运用营养不良状况，用营养风险筛查（Nutritional risk screeing 2002, NRS 2002）量表及患者主观整体评估（Scored patient-generated subjective global assessment, PG-SGA）量表明确调查重庆大学附属肿瘤医院肿瘤患者的营养状况及其影响因素。

方法

选择从 2022 年 8 月 17 到 2022 年 11 月 10 日在重庆大学附属肿瘤医院接受治疗的 497 例肿瘤患者作为研究对象。收集其相关资料等，设计完善的病历资料登记表，建立数据库，分析其一般临床特征。使用 NRS 2002 及 PG-SGA 两个量表评估患者营养状况以定量评估区分营养不良严重程度。NRS2002 与人体测量、生化参数、死亡率预测具有很好的相关性，其评分<3 分，表示无营养风险，≥3 分，表示存在营养风险。PG-SGA 评分 0-1 分无营养不良，2-3 分、4-8 分、≥9 分分别定义为可疑/轻度、中度、重度营养不良。对所收集到的资料使用 SPSS 22.0 进行统计学分析，应用卡方检验比较不同特征肿瘤患者 PG-SGA 评分，以评估患者发生营养不良的风险，分析其影响因素。

结果

本研究共纳入 493 例患者，其中男性占比 65.7%，女性占比 34.3%；参与者平均年龄 62 岁；其中消化系统肿瘤肿瘤占比 16.2%，呼吸系统肿瘤占比 64.8%，其余系统肿瘤占比 19%；BMI 位于 18-24 的占比 60.8%%，＜18 或＞24 的占比 39.2%。患者中存在营养风险的有 57.1%，且中、重度营养不良的发病率为 86.3%（中度 33%、重度 53.3%），11.5%为可疑/轻度营养不良，只有 2.2%的患者无营养不良。营养不良的风险存在性别、年龄、及瘤种差异：男性患者中、重度营养不良风险率为 85.6%，优于女性的 87.2%（P＜0.01）。78.2%的＜60 岁患者存在中、重度营养不良风险，而≥60 岁患者的风险率升高为 93.9%，差异有统计学意义（P＜0.01）。非消化系统肿瘤的中、重度营养不良风险率 85.5%，低于消化系统肿瘤的中重度营养不良风险 90.4%（P＜0.01）。

结论

良好的营养状况是免疫系统发挥正常生理功能的重要基础，然而肿瘤患者大多存在不同程度的营养风险及营养不良，营养不良状况与其年龄、性别及肿瘤类型有关。我们呼吁重视肿瘤患者的营养状况，重点关注等营养不良高风险人群，需更加重视营养支持的核心和基础作用，充分发挥营养支持的临床功效和卫生经济学作用。

关键字 恶性肿瘤；营养不良；营养风险筛查；

分类：临床营养

术前预康复对结直肠癌手术患者临床结局的影响

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目的　探讨术前预康复对结直肠癌手术患者预后的影响，评价术前预康复的价值。

方法　检索 PubMed、Embase、Cochrane Library、Web of science、知网、维普、万方数据库,检索时限从各数据库建库至 2022 年 4 月。收集术前预康复对结直肠癌手术患者影响的相关文献。由 2 名研究员独立对纳入文献进行质量评价并提取文献资料。据 Cochrane 偏倚风险评价工具对纳入的随机对照试验（RCT）进行评价，采用 RevMan5.3 软件对预后指标（住院时间、术后总并发症发生率、术后首次排气时间、术后胃肠功能障碍发生率、术后死亡率等）进行 meta 分析。纳入标准：（1）研究对象为接受结直肠肿瘤切除术的患者；（2）研究中有明确术前预康复和对照组的比较；（3）研究术前预康复和术后临床结局的关系；（4）可以获取原文且能准确提取研究数据；（5）文献必须全文刊出；（6）文献语种为中文或英文。排除标准:（1）综述、病例报告、评论等非对照性研究；（2）未能对术前预康复组和对照组主要的管理措施进行描述；（3）主要临床结局指标数据不完整；（4）针对同一研究人群重复发表的文献;（5）偏倚较大。

结果 本研究共纳入 16 篇文献，研究总样本量为 4713 例,其中术前预康复组 1358 例,对照组（术前未采取预康复相关措施）3355 例。其中 11 篇文献描述了预康复与住院时间的关系，其中 5 篇为随机对照试验，6 篇为队列研究。共纳入 3887 例受试者，预康复组 991 例，对照组 2896 例，各研究之间异质性较大（P＜0.05，I2=82%），故采用随机效应模型，合并统计量分析显示：与对照组相比较，术前预康复组住院时间缩短（WMD=-0.92，95%CI：-1.81~-0.03，P＜0.05）。9 篇文献描述了预康复与术后总并发症发生率的关系，其中 5 篇为随机对照试验，4 篇为队列研究，共纳入 1035 例受试者，预康复组 391 例，对照组 644 例，各研究之间异质性较小（P＞0.05，I2=0%），故采用固定效应模型，合并统计量分析显示：与对照组相比，预康复组术后总并发症发生率较低，（OR=0.54，95%CI：0.40~0.73，P＜0.05）。5 篇文献描述了预康复与术后首次排气时间的关系，其中 3 篇为随机对照试验，2 篇为队列研究。共纳入 641 例受试者，预康复组 301 例，对照组 340 例，各研究之间异质性较大（P＜0.05，I2=72%），故采用随机效应模型，合并统计量分析显示：术后首次排气时间缩短（WMD=-0.38，95%CI：-0.63~-0.13，P＜0.05）。9 篇文献描述了预康复与术后胃肠功能障碍发生率的关系，其中 6 篇为随机对照试验，3 篇为队列研究。共纳入 1033 例受试者，预康复组 390 例，对照组 643 例，各研究之间异质性较小（P＞0.05，I2=0%），故采用固定效应模型，合并统计量分析显示：术后胃肠功能障碍发生率较低（OR=0.52，95%CI：0.39~0.71，P＜0.05），但在术后肺炎发生率、术后吻合口瘘发生率、术后死亡率方面无明显差异。

结论 结直肠癌患者术前预康复可降低术后总并发症的发生率，减少胃肠功能障碍的发生情况，缩短术后首次排气时间，明显改善结直肠癌手术患者的临床预后，但术后死亡率未见明显差异。

关键字 预康复；结直肠癌；手术；预后

分类：临床营养

慢阻肺患者营养状况调查以及相关影响因素分析

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目的：慢性阻塞性肺疾病（chronic obstructive pulmonary disease，COPD，简称慢阻肺）是一种异质性肺部疾病，当COPD伴有呼吸症状的急性恶化，并带来显著的发病和死亡风险时，称为慢阻肺急性加重（AECOPD）。研究表明，大部分AECOPD患者的营养状况较差，严重影响疾病状态和预后。本研究拟采用改良的营养风险筛查表（NRS-2002）和微型营养评价简表（MNA-SF）对住院治疗的AECOPD患者的营养状况进行筛查和评估，分析急性加重期慢性阻塞性肺疾病患者存在营养风险或营养不良可能的危险因素。

方法：随机抽取2022年9月~12月山东省潍坊市某医院确诊的83例AECOPD住院患者作为研究对象。使用改良的营养风险筛查表（NRS-2002）评价患者的营养风险，≥3分表明患者存在营养风险，<3分为无营养风险；采用MNA-SF量表对患者进行营养状况评估，>11分为营养良好组，≤11分为营养不良组。使用结构化问卷收集患者的一般情况（性别、年龄、婚姻史、居住地、职业、吸烟状况）、改良版的医学研究委员会呼吸困难量表（mMRC评分量表）和慢性阻塞性肺疾病评估测试（CAT评分）；进行体格检测（如：身高、体重、血压等），并计算体重指数（BMI）；由临床医生咨询患者的临床表现（如咳嗽、咳痰、胸闷、喘息等）；采集患者静脉血和动脉血，进行相关血液指标的检测（如：血常规、C反应蛋白、血脂、血气学指标等）；并收集部分患者的肺功能指标等，分析不同营养状况下相关指标的差异、相关性及影响因素。

结果：在调查的83例AECOPD患者中，绝大多数患者为男性（81.9%），农民（75.9%），目前吸烟率为8.4%，经NRS-2002筛查存在营养风险及经MNA-SF评估为营养不良的患者分别均为30例（36.1%）。NRS-2002评分与淋巴细胞计数（LYM）呈负相关（r=-0.284，P=0.009）；与中性粒细胞计数（NEU）、血小板/淋巴细胞（PLR）、中性粒细胞/淋巴细胞（NLR）均呈正相关（r=0.360，P=0.036；r=0.241，P=0.028；r=0.244，P=0.026）。MNA-SF评分与LYM和嗜酸性粒细胞计数（EOS）均呈正相关（r=0.416，P<0.001；r=0.312，P=0.004），与NEU、PLR、NLR、mMRC评分均呈负相关（r=-0.542，P=0.001；r=-0.361，P=0.001；r=-0.372，P=0.001；r=-0.252，P=0.021）。AECOPD患者的营养风险影响因素分析经多元Logistic回归发现，LYM可能降低患者的营养风险，OR（95%CI）为0.21（0.08,0.52）（P=0.001），OR_{adj}（95%CI）为0.14（0.05,0.43）（P=0.001）；PLR可能增加患者的营养风险，OR_{adj}（95%CI）为1.01（1.00,1.01）（P=0.015）；NLR则对营养风险无影响（P>0.05）。评估AECOPD患者营养不良的影响因素经多元Logistic回归分析发现，ALB和LYM可能是保护因素，OR（95%CI）分别为0.89（0.80,0.99）和0.23（0.10,0.57），混杂因素校正后的OR_{adj}（95%CI）分别为0.88（0.79,0.99）和0.16（0.06,0.48），（P均<0.05）；PLR和NLR仅在校正混杂因素后发现可能是危险因素，OR_{adj}（95%CI）分别为1.01（1.00,1.01）和1.11（1.00,1.23），（P均<0.05）。

结论：AECOPD患者的NEU、PLR和NLR越高，经NRS-2002筛查的营养风险越高；NEU、PLR、NLR和mMRC评分越高，经MNA-SF评估的营养状况越差。ALB和LYM是AECOPD患者合并营养风险或营养不良可能的保护因素，PLR、NLR则是可能的危险因素，这提示对AECOPD患者加强营养可能会增加对炎性相关指标的改善，具有一定的临床指导意义。

关键字 慢性阻塞性肺疾病；急性加重；营养不良；MNA-SF；NRS-2002

分类：临床营养

日常可食用海藻摄入频率与握力的关联性研究

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目的：肌少症（sarcopenia，肌肉衰减综合征）是一种进行性和全身性的骨骼肌疾病，其特征是随年龄增加，骨骼肌质量、肌肉力量和身体活动功能不断下降。对老年人造成许多不良后果，如跌倒、残疾、骨折、发病率和死亡率增加等。其中肌肉力量下降是肌肉衰减综合征的核心组成成分，它是多种疾病的发病及死亡的良好预测因子。目前认为，膳食营养是预防肌肉力量下降的重要策略之一。可食用海藻富含膳食纤维、多酚以及多不饱和脂肪酸等营养物质，具有抗炎、抗氧化等功效，对维持骨骼肌健康有诸多益处。动物实验研究显示，海藻摄入能够改善骨骼肌耐力，但目前尚缺乏可食用海藻摄入与肌肉力量关联的流行病学研究。握力是流行病学调查中广泛使用的肌肉力量评估方法之一，具有简单方便的特点。因此，本研究拟设计横断面研究以探讨一般成年人群可食用海藻的摄入频率与握力的关联。

方法：本研究的研究对象均来自天津慢性低水平全身炎症与健康（Tianjin Chronic Low-grade Systemic Inflammation and Health, TCLSIH）队列。可食用海藻摄入频率采用经信效度检验的半定量食物频率量表（food frequency questionnaire, FFQ）进行评估。握力采用可调整的液压手持式电子握力计进行测量。参与者被要求站直，双手自然下垂，但不靠在身体上，手掌朝向大腿。在测量过程中，评估者给予口头鼓励以激发参与者的最大表现。参与者被要求对每只手进行两次最大力量测量，测量值以公斤（kg）为单位记录，精确到 0.1 kg。左右手各测两次，四次测量的最大握力值被纳入统计。采用协方差分析探讨可食用海藻的摄入频率与握力的关联，并计算每组握力的最小二乘均值及其 95%置信区间（confidence interval, CI）。

结果：该横断面研究使用 2013 年至 2019 年 TCLSIH 队列研究的基线数据。最终共纳入 30,422 名参与者，平均年龄为 41.7 ± 12.0 岁（年龄范围：18.1-93.6 岁）。其中男性 16,252 人，占总人群的 53.4%。在调整人口统计学和生活方式等相关混杂因素之后，本研究发现可食用海藻的摄入频率与男性和女性握力均呈正相关。在男性中，几乎不摄入可食用海藻组、<1 次/周以及≥1 次/周组的握力最小二乘均值和 95% CI 分别为 42.9 (40.3, 45.6) kg、43.7 (41.1, 46.5) kg 和 43.8 (41.2, 46.6) kg，趋势性 P 值<0.0001；在女性中，几乎不摄入、<1 次/周以及≥1 次/周组的握力最小二乘均值和 95% CI 分别为 25.8 (23.8, 27.9) kg、25.9 (23.9, 28.0) kg 和 26.2 (24.2, 28.4) kg，趋势性 P 值<0.001。

结论：无论在男性还是女性中，较高的可食用海藻摄入频率与较高的握力显著相关。本研究表明，可食用海藻的摄入可能对改善或维持肌肉力量产生有益影响。研究结果为以膳食营养干预改善肌肉衰减综合征提供了数据基础。未来还需要进行前瞻性队列研究或随机对照试验来阐明二者之间因果关系。

关键字 可食用海藻　握力　肌肉衰减综合征　成年人群　横断面研究

分类：临床营养

减重辅助治疗儿童隐匿性阴茎的疗效观察

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减重辅助治疗肥胖儿童隐匿性阴茎的疗效观察

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目的：探讨减重辅助治疗肥胖儿童隐匿性阴茎的临床疗效。我国儿童隐匿性阴茎发病率较高，并呈上升趋势。目前临床多采用手术或激素类药物治疗，但对于肥胖儿童手术后治疗效果不太理想。而激素治疗引起内分泌紊乱风险高。由于肥胖儿童隐匿性阴茎是一种阴茎体显露异常的综合征，因此隐匿性阴茎矫正手术是否必要，以及手术年龄的选择，尚未有比较权威的意见，因此，临床研究一直在寻求更加安全有效的肥胖儿童隐匿性阴茎治疗方法。 方法　选择 2021 年 3 月-2022 年 6 月我院收治的 60 例门诊就诊的隐匿性阴茎肥胖男童，年龄 5-12 岁，阴茎长度 1.1-2.5cm,。肥胖诊断标准：体重超过同年龄、同身高 20%，BMI>25kg/m2。患儿发育及排尿均正常，雄性激素和雌性激素检查结果均正常。排除标准：接受手术、伴有两性畸形、先天性心脏病、肝肾功能损害严重等有其他基础疾病的患儿。随机分为观察组和对照组各 30 例，两组患儿年龄、身高 BMI 等一般资料比较，差异均无统计学差异，具有可比性。观察组采用负压吸引治疗，联合医学营养减重体重管理(营养师制定个性化减重方案，针对每个肥胖患儿不合理的膳食结构和进食量，制定和调整膳食，微信跟踪指导，以平衡膳食为目标，在保证营养素供给基础上，控制总热量，安全、有效地减重。同时进行健康教育，调整生活方式，每天适量运动)，对照组采用单纯负压吸引治疗。负压吸引可改善阴茎血液循环，从而促进阴茎海绵体发育，达到治疗隐匿性阴茎的效果。两组均治疗 2 个月，比较两组阴茎外观评分、阴茎伸长长度、直径、总有效率。减重疗效判定标准：参考 6-18 岁学龄儿童青少年性别年龄 BMI 筛查超重与肥胖界值。　结果　治疗 2 个月后，观察组体重均降低 5%以上，总有效率高于对照组，差异有统计学意义（P<0.05），观察组阴茎松弛长度（治疗前 2.85±0.52，治疗后 4.10±0.61）、伸直长度（治疗前 4.09±0.68，治疗 6.41±0.86）和阴茎直径（治疗前 1.65±0.31，治疗后 2.90±0.43）均大于对照组（松弛长度治疗前 2.88±0.49，治疗后 3.38±0.57；伸长长度治疗前 4.06±0.64，治疗后 5.38±0.81；阴茎直径治疗前 1.67±0.29，治疗后 2.09±0.46），差异有统计学意义（P<0.05）。　结论　减重辅助负压吸引治疗肥胖儿童隐匿性阴茎疗效显著，改善患儿阴茎外观，增加患儿阴茎伸长长度和直径，值得临床进一步推广。

关键词：儿童隐匿性阴茎；减重；负压吸引

关键字 儿童隐匿性阴茎；减重；负压吸引

分类：临床营养

老年人日常膳食白藜芦醇摄入与肌肉衰减综合征的关联研究

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目的 肌少症（sarcopenia，肌肉衰减综合征）是一种进行性和全身性的骨骼肌疾病，其特征是随年龄增加，骨骼肌质量、肌肉力量和身体活动功能不断下降。对老年人造成许多不良后果，如跌倒、残疾、骨折、发病率和死亡率增加等。目前认为，膳食营养是预防肌少症的的重要策略之一。白藜芦醇（resveratrol, RES）是一种天然多酚类物质，在日常食物中广泛存在，它具有抗衰老、抗氧化和抗炎特性，这些特性均与维持骨骼肌健康高度相关。然而，目前很少有研究探讨日常膳食 RES 摄入量与肌肉衰减综合征之间的关联。本研究主要目的是探讨在一般老年人群中 RES 摄入量与肌肉衰减综合征的关联。

方法 本研究为横断面研究，所有参与者均来自“天津慢性低度炎症与健康促进队列研究（TCLSIH）”的基线调查。通过参与者自填的标准化生活方式问卷和健康相关检查，收集了一系列研究调查资料：一般人口学和社会经济学特征（包括：性别、年龄、受教育程度、家庭收入和职业状况），体格检查（包括：体重、身高和腰围），健康生活习惯（包括：身体活动、总能量摄入、吸烟状况和饮酒状况），个人疾病史（包括：糖尿病、高血压、高脂血症和心血管疾病）以及自我评价的抑郁症状。肌少症的诊断基于亚洲肌少症工作组 2019 共识（Asian Working Group for Sarcopenia: 2019 Consensus, AWGS 2019）：低四肢骨骼肌量（男<7.0 kg/m2，女<5.7 kg/m2）伴有低握力（男<28 kg，女<18 kg）和/或低 6m 步行速度（<1.0 m/s）。膳食中 RES 摄入量采用经信效度验证的食物频率问卷（food frequency questionnaire, FFQ）进行评估。采用多元 Logistic 回归模型探讨 RES 摄入量四分位与肌肉衰减综合征患病率之间的关联。以最低分位作为参考组，计算各组的比值比（odds ratio, OR）及 95%置信区间（confidence interval, CI）。

结果 本研究最终纳入 3,643 名 60 岁以上老年人，其中男性 1,640 人（45.0%），女性 2,003 人（55.0%）。平均年龄为 66.6 ± 5.37 岁（年龄范围：60.0-88.0 岁），肌肉衰减综合征的患病率为 15.0%。在进行年龄、性别、身体质量指数、身体活动量、受教育程度、职业状况、吸烟状况、饮酒状况、个人疾病史（糖尿病、高血压、高脂血症和心血管疾病）、抑郁症状以及膳食模式等混杂变量进行调整后，RES 摄入量四分位分组与肌肉衰减综合征患病率的 OR 值及 95% CI 分别为：1.00 (参考值)、0.81 (0.60, 1.10)、0.79 (0.59, 1.07)和 0.55 (0.40, 0.77)（趋势性 P 值<0.001）。

结论 本研究发现，在老年人中 RES 摄入量与肌肉衰减综合征患病率显著负相关，即 RES 摄入增加与老年人患肌肉衰减综合征的风险降低有关。本研究结果将为以膳食营养干预改善肌少症提供数据基础。未来还需更多的队列研究和干预试验来进一步探讨 RES 摄入量与肌少症的关联以及相关的作用机制。

关键字 老年人　肌肉衰减综合征　白藜芦醇　横断面研究

分类：临床营养

从营养治疗融合辨证施膳的角度分析 1 例脾虚型肥胖患者的干预效果

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目的：展示营养治疗融合辨证施膳的干预效果，探讨从中西医思维融合的角度利用食物进行临床治疗的可行性。方法：以 1 例脾虚型单纯性肥胖患者为例，根据患者中西医诊断，现代营养学治疗手段中选择高蛋白饮食法，中医部分依据其脾虚证进行辨证施膳指导，连续干预 2 个月，记录舌象、脉象、体重（去脂体重、身体脂肪量）、BMI、体脂肪率（皮下脂肪量、内脏脂肪面积）、脾虚症状量表，对数据进行分析、整理。结果：干预后该患者症状明显好转，治疗显效；体重减轻 25.8 斤（其中去脂体重减轻 0.6 斤、身体脂肪量减轻 25.4 斤）、BMI 降低 5.1、体脂肪率降低 5.5%（其中皮下脂肪量下降 16.6 斤、内脏脂肪面积下降 5.5）；根据自拟脾虚症状量表，该患者临床症状、体征明显改善，证候积分减少 66.7%，治疗显效。结论：肥胖症的发生从现代医学角度分析，根本原因在于能量摄入大于能量消耗，潜在病机包括基础代谢低下、胰岛素抵抗等。从传统医学角度分析肥胖症的发生有可能是由于肝、肾、肺功能的失常，但最终会体现出脾虚的症状。陈秋亦提出“五脏六腑皆可令人肥，非独脾也，但终以脾虚为结局”。脾虚证与能量代谢异常在表观结果上趋同，因此营养治疗融合辨证施膳在脾虚型肥胖患者治疗中能够起到降低体脂肪率及症状调节的作用。可充分利用天然食物自身的特点调整机体状态，以达到减脂的目的。笔者认为，食物的功能主要体现在两个方面，一是食物所含有的蛋白质、脂肪、碳水化合物、矿物质、维生素等的种类及数量，这是从食物的构成、代谢途径、预期靶位上来考虑的，方法学上应用的是现代医学的循证思维，从微观至宏观。此时，食物的价值是如何完成机体高蛋白饮食治疗的需求。食物功能的第二个体现是，食物自身的性味、归经、功效，更多是以归纳演绎的思维指导治疗，从宏观至微观。例如该患者食用的自拟健脾食疗方。方中山药为君，甘平，健脾益气，补脾脏之不足，使脾运健旺从而运化水湿。白扁豆、薏苡仁为臣。白扁豆，甘性微温，健脾化湿；薏苡仁，甘淡性凉，健脾以绝生痰之源，利水而除已成之湿。山楂为佐，其酸甘性微温，消食健脾，行气散瘀，化浊降脂。本文仅以 1 例脾虚型肥胖患者的干预为例，一方面展现综合干预效果，另一面希望更多从业者关注营养学上中西医思维的融合。通过此案例分析建议营养师、中医师、健康管理师等从业者可尝试中西医思维，在实践工作中融合运用。

关键字 肥胖症；脾虚；营养治疗；辨证施膳

分类：临床营养

维持性血液透析患者营养不良炎症评分与临床指标的相关性分析

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维持性血液透析患者营养不良炎症评分与临床指标的相关性分析

目的：探讨维持性血液透析患者于营养不良炎症评分(MIS)与 C 反应蛋白等临床指标的相关性。

方法：收集 2018～2022 年在牡丹江医学院附属第二医院接受维持性血液透析治疗的肾脏疾病患者。其中透析时间＜3 个月；近 2 周内有感染、创伤、手术等导致的临床炎症反应；近 3 个月使用激素或免疫抑制剂治疗；伴有心衰或/和肝功能衰竭或/和肿瘤、结核病史；实验室检查资料不全者被排除至实验之外，最终收集 213 例肾脏疾病患者作为本实验的研究对象。根据临床病历收集实验对象的一般资料及实验室检查资料，一般资料包括：年龄、性别、身高、体重、体重指数(BMI)；实验室检查资料包括：C 反应蛋白、白蛋白、C 反应蛋白/清蛋白比值(CAR)、血红蛋白、同型半胱氨酸、肌酐、总胆固醇、高密度脂蛋白、低密度脂蛋白、极低密度脂蛋白、血钙、血镁、血磷、甲状旁腺激素。根据营养不良原炎症评分表对患者营养状态进行评估，评分表包括相关病史、体质量指数、体格检查和实验室指标 4 个方面，共 10 项指标，各项 0～3 分，共分为三组：营养不良炎症评分轻度组（0<MIS≤8）、营养不良炎性评分中度组（8＜MIS≤18）、营养不良炎性评分重度组（MIS>18）。利用方差分析比较各组实验对象 C 反应蛋白，白蛋白等临床指标的差异，经皮尔森相关性分析探讨营养不良炎症评分与各临床参数的相关性，同时利用多因素线性回归探讨营养不良炎症评分的独立影响因素。

结果：58.2%的研究对象被划分为营养炎性评分轻度不良组，21.5%的研究对象被划分为营养炎性评分中度不良组，20.3%的研究对象被划分为营养不炎性评分重度不良组。经方差分析显示年龄、C 反应蛋白、白蛋白、CAR、血红蛋白、肌酐、血钙、血镁、甲状旁腺激素在不同级别组间差异具有统计学意义(p＜0.05)，而其余指标的组间差异比较并不具有统计学意义(p＞0.05)；经 Pearson 相关分析发现年龄(r=0.113,P<0.001)、C 反应蛋白(r=0.256,P<0.001)、CAR(r=0.317,P=0.023)、肌酐(r=0.196,P<0.001)、血钙(r=0.281,P=0.014)与营养不良炎症评分呈正相关。体重指数(r=-0.142,P<0.001)、白蛋白(r=-0.128,P=0.008)、血红蛋白(r=-0.176,P<0.001)、低密度脂蛋白(r=-0.162,P<0.001)、血镁(r=-0.121,P<0.031)、血磷(r=-0.136,P=0.02)与营养不良炎症评分呈负相关。多因素线性回归结果显示 C 反应蛋白(β=0.062，P＜0.001)、CAR(β=0.093，P=0.004)、血红蛋白(β=0.079，P=0.01)、肌酐(β=0.081，P=0.005)是营养不良炎症评分的独立影响因素。

结论：营养不良炎症评分与 CAR 等临床指标相关，其中 C 反应蛋白、CAR、血红蛋白、肌酐是营养不良炎症评分的独立影响因素，营养不良炎症评分在一定程度上反映了维持性血液透析患者的营养状态。

关键字 营养不良炎症评分；C 反应蛋白；血液透析

分类：临床营养

营养干预对头颈部肿瘤患者放化疗影响的 Meta 分析

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目的　头颈部肿瘤是颈部肿瘤、口腔肿瘤、耳鼻喉科肿瘤、面部肿瘤等头部和颈部肿瘤的总称。放化疗由于能够保留容貌及对脏器功能影响较小成为大部分头颈部治疗肿瘤的主要治疗手段，其副作用之一是食欲减退。所以接受放化疗的头颈部肿瘤患者营养不良发生率尤为显著。本研究旨在运用 Meta 分析的方法，收集对头颈部肿瘤患者在放化疗过程中应用进行营养支持的相关研究，系统评价营养支持对头颈部肿瘤放疗患者的免疫功能和营养状况的影响。

方法　以头颈部肿瘤、营养、共识、NRS2002、PG-SGA 为检索词在 PubMed、Web of Science、MEDLINE、中国知网、万方数据库和维普数据库等数据库筛选近十年符合纳入标准的文献并进行资料提取，初次检索 273 篇文献，排除研究对象不是头颈部肿瘤的患者、未采取营养干预措施、研究方法不符等条件，纳入 16 篇文献，共 1397 例头颈部肿瘤患者，分为试验组 699 例和对照组 698 例，运用 SPSS 软件进行 Meta 分析。

结果　头颈部肿瘤患者出现营养不良与肿瘤的局部浸润和压迫导致患者进食受限、疼痛、吞咽困难和肿瘤代谢产物作用于下丘脑摄食中枢使患者食欲下降及放疗或放化疗毒副反应等密切相关。对头颈部肿瘤患者进行营养干预后，随着放化疗的进行，PG-SGA 评分、NRS2002 评分两者都有所升高，试验组的结果均优于对照组（P＜0.05）；头颈部肿瘤患者放化疗后，人体指标（体重、体质指数、体质量）、血液学指标（血红蛋白、白蛋白、前蛋白、淋巴细胞数、转铁蛋白、免疫球蛋白等）持续降低，经过营养干预的实验组，各项指标均优于同期的对照组（P＜0.05）；放化疗后的毒副反应（黏膜炎、吞咽困难、味觉异常、呕吐、并发症等），试验组的发生率明显低于对照组（P＜0.01）；对头颈部肿瘤患者进行营养风险评估，及时有针对性的进行营养干预（肠内营养支持或肠外营养支持）后，试验组的远近期疗效明显优于对照组（P＜0.05）；头颈部肿瘤放化疗患者营养状况与总体健康状况（个体生活、家庭生活、社交活动等）呈正相关，头颈部患者的营养状况越好，其生活质量越好。

结论：以患者为中心，由健康营养师、护士、主治医生及患者家属等共同参与的营养管理，能够显著改善患者的人体指标和营养状况，降低放化疗毒副反应的发生率，改善预后，提高近远期疗效，延缓肿瘤进展，降低并发症发生率，提高肿头颈部瘤患者生活质量，延长患者寿命。在头颈部肿瘤患者在放化疗前、放化疗中及放化疗后进行全程、多学科、有针对性、规范科学的营养管理有重要的临床价值。

关键字 头颈部肿瘤　营养干预　生活质量　meta 分析

分类：临床营养

慢性肾脏病患者饮食酸负荷与肾病进展

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目的：慢性肾脏病已经成为全球性的公共健康问题，我国慢性肾脏病的患病率居高不下。饮食干预作为治疗方式之一，能有效延缓和控制慢性肾脏病的病程。最近越来越多的研究表明，通过减少饮食中的酸负荷能降低对肾脏的负担和损害，是一项新的保护肾脏的措施。但目前在我国饮食环境下，饮食酸负荷对慢性肾脏病患者营养状况和肾功能的影响尚不明确。本研究旨在分析饮食酸负荷与我国慢性肾脏病患者营养状况的关系，并探讨饮食酸负荷对慢性肾病进展的影响。

方法：纳入复旦大学附属华山医院肾病门诊慢性肾脏病 3-5 期患者共 90 例。收集患者的三日饮食日记，对患者进行体格测量（身高、体重、上臂围、上臂皮褶厚度、腰围、臀围、小腿围、握力），采集患者的生化指标数据（血常规、尿常规、血糖、肝功能、肾功能、电解质等）。使用膳食分析软件录入患者的三天饮食日记并采用 Remer and Manz 公式计算肾脏净排酸（net acid excretion，NAEs）。肾脏净排酸是由尿铵排泄量、磷酸盐排泄量和尿中丧失的碳酸氢根量组成，可以对内产酸提供一个估计值。根据饮食组成估算出来的肾脏净排酸值在成年人中已经过验证，表明可以反映摄入的饮食酸负荷。将患者根据肾脏净排酸值分为低、中、高三组。随访这些慢性肾脏病患者肾功能三年，记录达到终点事件的时间。终点事件被定义为肾小球滤过率下降大于 25% 或进入透析或进入肾移植。数据分析采用 SPSS19.0 统计软件进行统计分析，以 $p<0.05$ 为有统计学意义。

结果：老年慢性肾脏病患者（年龄≥65 岁）和男性的饮食酸负荷较高。能量、脂肪摄入量越多，饮食酸负荷越高。对食物大类进行分析，肉类摄入越多，饮食酸负荷越高，蔬果摄入量越高，饮食酸负荷越低。体格检查及营养相关生化指标方面，饮食酸负荷与体重、体质指数、腰围、臀围、小腿围、腰围身高比、血红细胞压积、尿肌酐和尿尿素氮呈正相关，但与血白蛋白、血钙、血磷水平无相关性。Kaplan-Meier 生存分析显示饮食酸负荷摄入越高，肾功能恶化越快。

结论：慢性肾脏病患者的饮食酸负荷与肉类等产酸食物摄入增多有关，与体重、体质指数、腰围、臀围等呈正相关。本研究提示饮食酸负荷加快了慢性肾脏病的进展，但还需要大样本量的随机对照研究以进一步证实饮食酸负荷对慢性肾脏病患者营养状况的作用以及对肾功能恶化的直接影响。

关键字 慢性肾脏病、饮食酸负荷、营养状况、肾功能

分类：临床营养

基于认知行为疗法的“互联网+医学营养治疗”对超重肥胖的短期治疗效果

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【目的】超重肥胖已成为严重影响国人身心健康的主要公共卫生问题。医学营养治疗作为超重肥胖的基础治疗方法，其传统的治疗模式为门诊访谈+定期线下随访，由于访谈和指导时间不足，可能造成减重方案实践性不强、患者认知和行为改变不足，从而导致患者失访率、退出率较高、减重效果欠佳、减轻体重难以维持，影响治疗效果。常规医学营养治疗更强调行为改变的执行，而认知行为疗法作为一种常用的心理治疗方法，更专注于影响人们的思维方式，改变认知、改善情绪感受从而改变行为，强调认知和行为的共同改变，有利于巩固医学营养治疗的效果。因此本研究旨在分析基于认知行为疗法的“互联网+医学营养治疗”对超重肥胖人群的短期治疗效果，为肥胖治疗提供新的方法选择。

【方法】选取 2023 年 1-3 月我院肥胖专病门诊接诊的 26 例年龄在 18～60 岁、BMI≥24.0 的超重肥胖患者作为研究对象，通过门诊访谈、制定个体化减重方案、微信线上每日沟通、个体化营养指导及教育等方式对其进行为期 4 周的干预。干预过程中重在分析患者日常饮食行为及其思维方式，发现其不良饮食行为的原因，改变患者对减重和饮食的错误认知，结合其自身实际情况提出针对性的改变措施，帮助其建立正确的认知，改变饮食、运动及生活方式等行为并培养饮食正向观念和健康的饮食习惯，关注改变行为后的心理感受，在干预过程中持续不断强化重新建立的认知和行为。其中减重饮食方案的目标能量值系参考 Inbody770 人体成分分析仪的基础代谢率制定，目标能量为“基础代谢率+50～100kcal”，干预中结合患者饮食调整后的感受灵活调整，饮食模式以低 GI 高蛋白饮食（碳水化合物供能比 40%～50%、蛋白质供能比 20%～30%）为主。使用 SPSS27.0 对数据进行统计分析，采用配对 t 检验分析比较干预前后患者的体重、体脂肪、体质指数、体脂率、内脏脂肪面积和骨骼肌等肥胖评价指标，P<0.05 为差异有统计学意义。

【结果】患者平均年龄为 32.78±10.17 岁，其中女性占比 58.3%。通过 4 周干预，患者平均体重减轻 4.19kg（t=7.739，P<0.0001），体脂肪减轻 3.90kg（t=8.282，P <0.0001），体质指数下降 1.95kg/m^2（t=6.285，P<0.0001），体脂率下降 3.64%（t=9.294，P<0.0001），内脏脂肪面积减少 19.88cm^2（t=7.461，P<0.0001），干预前后差异均具有统计学意义。干预前后骨骼肌的差异不具有统计学意义（t=1.751，P=0.094）。

【结论】基于认知行为疗法的“互联网+医学营养治疗”可在短期内有效降低患者体重、体脂率及内脏脂肪面积，然而其长期效果仍需进一步的研究探索。

关键字 医学营养治疗；认知行为疗法；超重肥胖；互联网+

分类：临床营养

Child-Pugh 分级联合 ALBI 评分和 NRS2002 对原发性 肝癌患者发生术后肝功能衰竭的预测价值

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目　的：探讨 Child-Pugh 分级联合 ALBI 评分和 NRS2002 对原发性肝癌患者发生术后肝功能衰竭的预测价值

方　法：收集 2019 年 01 月 01 日-2020 年 12 月 31 日期间在广西医科大学附属肿瘤医院肝脏胆道病区行肝癌手术治疗的 439 例原发性肝癌患者的相关临床资料。根据原发性肝癌患者是否发生术后肝功能衰竭将其分为术后肝功能衰竭组与无术后肝功能衰竭组，分别对两组患者相对应的临床资料进行一般资料比较以及单因素分析，利用二元 Logistic 回归分析原发性肝癌患者发生术后肝功能衰竭的独立危险因素并建立 Child-Pugh 分级联合 ALBI 评分、Child-Pugh 分级联合 NRS2002、ALBI 评分联合 NRS2002 以及 Child-Pugh 分级联合 ALBI 评分和 NRS2002 的组合，使用受试者工作特征曲线分析分别比较 Child-Pugh 分级、ALBI 评分、NRS2002、Child-Pugh 分级联合 ALBI 评分、Child-Pugh 分级联合 NRS2002、ALBI 评分联合 NRS2002 以及 Child-Pugh 分级联合 ALBI 评分和 NRS2002 对原发性肝癌患者发生术后肝功能衰竭的预测能力。

结　果：1、在单因素分析中，术后肝功能衰竭组 PT 的 $\bar{x}\pm s$ 为 13.17±1.36s，无术后肝功能衰竭组患者的 PT 的 $\bar{x}\pm s$ 为 12.22±1.39s，P<0.001，差异具有统计学意义。术后肝功能衰竭组患者的 HBsAg 阳性例数占比为 91/102，无术后肝功能衰竭组患者的 HBsAg 阳性例数占比 268/337， P=0.026，差异具有统计学意义。术后肝功能衰竭组患者的 ALBI 评分为-2.23±0.36，无术后肝功能衰竭组患者的 ALBI 评分为-2.41±0.34， P<0.001,差异具有统计学意义。术后肝功能衰竭组患者的 NRS-2002 大于等于 3 分的例数占比为 44/102，无术后肝功能衰竭组患者 NRS-2002 大于等于 3 分的例数占比为 62/337， P<0.001,差异具有统计学意义。术后肝功能衰竭组患者的肝切除范围大于等于 3 个肝段的例数占比为 34/102，无术后肝功能衰竭组患者的肝切除范围大于等于 3 个肝段的例数占比为 60/337， P=0.001，差异具有统计学意义。术后肝功能衰竭组患者的 Child-Pugh 分级为 B 级的例数占比为 16/102，无术后肝功能衰竭组患者的 Child-Pugh 分级为 B 级的例数占比为 6/337， P<0.001，差异具有统计学意义。2、两组患者的二元 Logistic 回归分析结果：PT 的 OR 值为 1.62，ALBI 评分的 OR 值为 3.99，NRS2002 的 OR 值为 1.366，肝切除范围的 OR 值为 3.51，Child-Pugh 分级的 OR 值为 2.50，P 值均小于 0.05，表明 PT 时间长、ALBI 评分高、NRS2002 评分高、肝切除范围大、Child-Pugh 分级差是原发性肝癌患者发生术后肝功能不全的独立危险因素。3、将 Child-Pugh 分级、ALBI 评分和 NRS2002 纳入 Logistic 回归模型，建立 Child-Pugh 分级联合 ALBI 评分和 NRS2002：logit（P）=-3.401+0.922*Child-Pugh 分级 +1.440* ALBI 评分+0.0.297* NRS2002。Child-Pugh 分级、ALBI 评分、NRS2002、Child-Pugh 分级联合 ALBI 评分、Child-Pugh 分级联合 NRS2002、ALBI 评分联合 NRS2002 以及 Child-Pugh 分级联合 ALBI 评分和 NRS2002 预测原发性肝癌患者发生术后肝功能衰竭的 ROC 曲线下区域面积分别为 0.625、0.657、0.606、0.699、0.648、0.691 和 0.712。Child-Pugh 分级联合 ALBI 评分和 NRS2002 的最佳截断值为-1.084，当该评分大于等于-1.084 时，原发性肝癌患者发生术后肝功能衰竭的发病率明显高于该评分小于-1.084 时的情况。

结　论：Child-Pugh 分级联合 ALBI 评分和 NRS2002 对原发性肝癌患者发生术后肝功能衰竭的预测价值较单独使用 Child-Pugh 分级、ALBI 评分、NRS2002 或 Child-Pugh 分级联合 ALBI 评分、Child-Pugh 分级联合 NRS2002、ALBI 评分联合 NRS2002 更高，提示在临床上可作为预测原发性肝癌患者发生术后肝功能衰竭的有效工具。

关键字 Child-Pugh 分级；ALBI 评分；NRS2002；原发性肝癌；术后肝功能衰竭

分类：临床营养

厦门城乡结合部居民初发缺血性脑卒中患者的膳食调查及营养风险筛查分析

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目的：研究厦门城乡结合区域居民膳食营养素的摄入与初发缺血性脑卒中的关系，探索与缺血性脑卒中相关的危险因素及保护性因素，为厦门地区城乡结合部缺血性脑卒中患者进行膳食指导和健康管理提供实践依据。方法：选取 2023 年 1 月~4 月厦门医学院附属第二医院神经内科住院接收的，并自愿进行营养风险筛查及膳食均衡调查的初发缺血性脑卒中患者。排除精神障碍和严重痴呆患者、鼻饲、不愿意或没有能力完成问卷者。共收集 41 例患者，男 29 例，女 12 例，年龄 35~89 岁，平均（63.37±2.21），其中 65 岁以上者 19 例。利用调查问卷及半定量食物频率问卷对《中国居民膳食指南（2022）》的知晓及过去一年内的膳食营养状况进行调查，对患者膳食状况进行分析；并利用营养风险筛查评分简表（NRS-2002 表），按是否需要营养干预分为 NRS-2002 评分 <3 分组（ 32 例 ）与 NRS-2002 评分≥3 分组 (9 例 ） 比较两组患者基本情况、生化指标、营养摄入情况，并分析影响患者 NRS-2002 评分的危险因素及相关性。采用 SPSS25.0 统计软件进行数据处理。将膳食营养数据和基线资料调查信息合并后，组间比较采用独立样本 t 检验，计数资料采用卡方分析; 影响因素分析采用 logistic 回归分析，P＜0. 05 为具有统计学差异。结果： 患者中初中以下文化程度（文盲和小学）的患者占 45.7%，初中文化程度占 31.7%，高中以上文化程度仅占 17.1%。仅有 22%的患者知晓《中国居民膳食指南（2022）》，48.8%的患者体质量 BMI＞23.9，62.5%的患者每日盐摄入量＞5g/天，24.4%的患者油摄入量＞35g/天，17.1%的患者谷类摄入量＞300g/天，73.2%的患者每日无坚果的摄入，46.3%的患者每周无鱼产品摄入，36.6%的患者每日水摄入＜1500ml，17.1%的患者每日酒精摄入＞15g。NRS-2002 评分 <3 分组与 ≥3 分组两组的血清尿酸、血钾、血钙、总胆固醇、甘油三酯、高密度脂蛋白胆固醇、低密度脂蛋白胆固醇水平比较无明显差异，在盐、谷类、坚果摄入方面存在差异（p＜0.05）。患者的年龄、文化程度是影响患者营养风险的重要因素。结论：厦门城乡结合区域初发缺血性脑卒中患者对《中国居民膳食指南（2022）》知晓率低，谷类摄入过量的比例相对较高，蔬菜类、水果类、豆类、奶类食品、水摄入频率较低且摄入量普遍不足，水产品摄入相对较高。城乡结合部居民脑卒中患者，年龄和文化程度是影响营养风险的重要因素，其居民营养认知水平有待于提高。aCCI 评分、mRS 评分与营养风险具有相关性； 营养风险不同的脑卒中患者在膳食摄入方面存在差异，进行营养膳食指导对降低患者营养风险具有重要作用。

关键字 缺血性脑卒中，膳食调查，营养风险筛查

分类：临床营养

个性化医学营养干预对妊娠期糖尿病孕妇体重增长、血糖控制及临床结局的影响

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目的 本研究旨在探讨个性化医学营养干预对妊娠期糖尿病孕妇体重增长、血糖控制和临床结局的影响，为妊娠期糖尿病孕妇的治疗和管理提供参考。

方法 选取航空总医院 2021 年 1 月-2022 年 12 月产科门诊建档并于孕 24-28 周行 OGTT 试验诊断为妊娠期糖尿病的孕妇 150 例作为研究对象，按照随机数字表法分为研究组和对照组各 75 例。研究组和对照组孕妇均接受妊娠期糖尿病常规干预，包括能量摄入控制、饮食运动日记、体重记录、血糖监测记录、定期产检。研究组在以上妊娠期糖尿病常规干预的基础上，加入个性化医学营养干预，包括评估孕妇个性化的饮食习惯和喜好，按照不同营养素的摄入比例，制定个体化的饮食方案，建立个人档案及微信群，进行专人随访管理、饮食拍照上传反馈，并定期组织答疑、健康教育、朋伴交流等活动。两组干预至妊娠结束，对比两组孕妇基本信息、体重增长水平、血糖水平、妊娠结局、分娩并发症等指标。用 SPSS 17.0 统计分析软件对数据进行分析：对正态分布的计量资料以均数±标准差表示，并采用两样本均数比较 t 检验分析数据；对非正态分布的计量资料，采用秩和检验分析数据；计数资料以例(%)表示，采用卡方检验。P<0.05 为差异有统计学意义。

结果 （1）比较两组孕妇年龄、文化程度、孕前体重指数、入组前体重较孕前体重增长量、诊断妊娠期糖尿病时的空腹血糖和糖化血红蛋白水平，差异均无统计学意义（P 均＞0.05）。（2）比较两组孕妇体重增长情况，研究组孕 24-27+6 周、孕 28-36+6 周体重增长量及孕期体重增长总量均明显低于对照组，差异均有统计学意义（P 均<0.05）。（3）比较两组孕妇孕 37 周或不足孕 37 周时分娩终止孕周的空腹血糖、餐后 2 小时血糖及糖化血红蛋白数值，研究组均较对照组低，差异均有统计学意义（P 均<0.05）。（4）比较两组孕妇妊娠合并症的发生率，研究组妊娠期高血压、早产、巨大儿的发生率均较对照组低，差异均有统计学意义（P 均＜0.05），而羊水过多、胎膜早破、低出生体重儿的发生率，研究组和对照组比较差异均无统计学意义（P 均＞0.05）。（5）比较两组分娩并发症的发生率，研究组剖宫产率、新生儿低血糖发生率均较对照组低，差异均有统计学意义（P 均＜0.05），而产后出血、胎儿窘迫、新生儿窒息的发生率，研究组和对照组比较差异均无统计学意义（P 均＞0.05）。

结论 积极有效的个性化营养干预能够控制妊娠期糖尿病孕妇妊娠期体重增长，降低平均血糖水平，并可在一定程度上改善其临床结局，值得临床应用和推广。

关键字 营养干预；妊娠期糖尿病；临床结局；体重增长；血糖控制

分类：临床营养

NRS2002 在肝包虫病人围手术期中的应用

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目的：肝包虫病在我省的发生率较高，是由棘球属虫种的幼虫寄生于人体内引起的慢性寄生虫病，手术是治疗该疾病的有效手段之一，手术风险高、创伤大、术后并发症多，易引起患者营养不良。使用营养风险筛查 2002 对我院肝包虫病区患者进行营养风险筛查并了解营养风险发生率和营养干预的效果。

方法：收集 2020 年我院肝包虫病区的患者 90 例，采用 NRS2002 对入院 24h 的患者进行营养风险筛查。营养风险筛查 2002 量表包括营养状况评分（0-3 分）、疾病严重程度评分（0-3 分）及年龄评分（0-1 分）。NRS2002≥3 表示营养风险，应进一步实施营养评估和干预；NRS2002<3 分无营养风险应定期进行营养风险筛查；分为营养风险组和无营养风险组，无营养风险组的患者 7 天后给与复筛；比较两组患者年龄、性别、BMI、血清白蛋白、营养干预情况、住院天数和临床结局。

结果：1、90 例患者中男性占 33%，女性占 67%，年龄在 6 岁至 87 之间。BMI 在正常范围占 76.7%、超重 8.9%、消瘦 14.4%。营养风险发生率 70%，其中营养风险组 63 人，非营养风险组 27 人。2、营养风险组男性占 19%、女性占 81%，这与女性的 BMI、饮食情况以及居住环境活动能力有关，特别是高原地区所特有的地理位置和居住环境影响患者的饮食，以谷类和肉类为主，水果蔬菜摄入较少；男性的 BMI 会高于女性，营养风险筛查时，营养状况受损部分男性略低于女性，这也是男性的营养风险发生率低于女性的原因。对 63 名有营养风险的患者进行营养干预，其中营养干预率达 76%,通过口服或鼻饲方式不同程度进行营养治疗。3、非营养风险组男性占 66.7%,女性占 33.3%；住院 7 天后给与复筛，结合患者术后饮食不佳、低蛋白血症、感染、应激、卧床等因素，营养风险发生率明显提高，营养干预率达 37%，术后出现营养不良后才实施营养干预，所以这部分患者的营养干预时间较晚，出现并发症的发生率也较高。4 有营养风险组的患者，整个围手术期过程中实施营养干预，尤其术前及时加强营养，术后出现低蛋白血症、感染、活动能力减弱、饮食摄入不佳、住院天数延长的情况低于非营养风险组的患者（P<0.05）。对该 90 例肝包虫患者进行膳食调查、生活习惯、发病时间、活动能力等方面分析，肝包虫患者营养不良的发生率和饮食欠佳、长期卧床、年龄较大、患病时间较长、低蛋白血症等因素密切相关。

结论：　NRS2002 作为住院患者营养风险筛查的首选工具，方便简单的广泛应用于临床实践中，对早期发现患者营养不良和改善患者临床结局有意义。通过实施 NRS2002 对有营养风险的肝包虫患者尽早实施营养干预，强化营养治疗围绕整个手术期，可减少并发症、缩短住院时间、改善临床结局。该研究存在不足之处是部分肝包虫患者有水肿、腹水、意识不清、体重不明的情况也不适用于 NRS2002；特有的地理位置和文化习俗，大部分患者语言不通、饮食习惯单一，围手术期营养宣教和出院后随访以及家庭营养干预这部分欠缺。

关键字 NRS2002; 肝包虫

分类：临床营养

偏头痛患者长期患病加重肥胖的相关研究

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目的：偏头痛与肥胖皆为人群中的常见疾病，过去大量研究已经确定这两者之间存在流行病学联系，肥胖人群的偏头痛患病率更高，肥胖者的某些特征，如缺乏运动、不良的饮食、亚健康的身体情况、以及社会压力等都影响偏头痛的发展。研究发现超重与肥胖人群存在较高的偏头痛患病率及患病程度增高的风险。然而，目前尚无明确研究探讨偏头痛患病时长是否会影响肥胖程度。因此，本研究旨在通过分析不同偏头痛患病时长的受试者体成分，探讨偏头痛患病时长对肥胖指标的可能影响。

方法：本研究方案获得福建医科大学附属第二医院研究伦理委员会批准，门诊招募根据 ICDH3 标准确诊偏头痛的患者为受试者。根据患病时长分组，患病小于 1 年（n=18）、患病 1~5 年（n=26）、患病 5~10 年（n=18）、患病大于 10 年（n=27）的偏头痛受试者，以生物电阻抗的方法测量患者空腹的体组成。根据患者的病史及相关检查，有以下情况之一者予以排除：1）既往已接受其他偏头痛药物治疗者；2）BMI≤18.5 者；3）有糖尿病、心血管疾病、肿瘤等躯体疾病者；4）正处于妊娠、哺乳期者；5）有精神疾病者；6）非长住泉州，不能随访者。以 Mann-Whitney U test 检验各组间差异，以 Spearman 秩相关系数计算患病时长与指标的相关性。P＜0.05 表示有统计学差异。

结果：不同患病时长的患者在年龄组成（P = 0.23）和身高（P = 0.64）上没有显著差异；体重（P = 0.04）和腰围（P = 0.04）在各组间存在显著差异，虽然并不是单调增加的趋势，观察到患病小于一年的受试者在年龄、体重、腰围、体脂肪等指标上接近患病时长超过 10 年的受试者，但患病时长大于 10 年的受试者体重显著高于患病 1~5 年的受试者（P = 0.02），腰围也显著大于 1~5 年的受试者（P = 0.005）；体组成中的上臂围（AC）、上臂肌肉围（AMC）、瘦体重（SLM）、骨骼肌（SMM）、总量水分（TBW）、去脂体重（FFM）、内脏脂肪面积（VFA）、全身相位角（PhA）、骨骼肌质量指数（SMI）、总水分/去脂体重、骨骼肌/内脏脂肪等指标没有表现出差异，但在患病超过一年的人群中，脂肪量（r =0.238 , P =0.046 ）、腰围（r = 0.323，P = 0.006）与患病时长存在一定的相关性。

结论：长期患病的偏头痛患者有更大的体重，更多的脂肪量以及更大的腰围，但肌肉相关指标却无明显差别，提示长期偏头痛可能会加重肥胖。今后临床在对偏头痛的治疗上可以关注肥胖相关的指标，以及减重对偏头痛的影响，如发作频率、对患者生活的影响程度等。偏头痛与肥胖的联系已有研究，但两者相互作用的长期影响还缺乏足够的观察，目前本研究的样本量尚不足够，还需要更多的受试者、更长的观察时间以及能够前后自身对照的数据。

关键字 偏头痛；肥胖；体重；体脂

分类：临床营养

营养干预在高脂血症肥胖患者中的应用效果及对患者血脂水平产生的影响

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【摘要】目的　探讨营养干预在高脂血症肥胖患者中的应用效果及对患者血脂水平产生的影响效果；方法　选择2020年3月至2022年3月间我院收治的高脂血症肥胖患者100例为本次研究对象，根据数字表法随机将患者分成观察组和对照组，每组50例，对照组患者实施常规护理，其具体的内容有：对每一位患者创建个人资料数据库，数据库中的信息主要包含体重指数、饮食习惯、低密度脂蛋白、高密度脂蛋白、总胆固醇和患者的基础信息等等。在开展常规治疗工作时，使用药物干预、饮食干预和健康教育等多种方式，临床营养师积极干预介入全程指导，从而使高脂血症患者得到积极的治疗。观察组患者实施营养干预，具体内容包含：健康饮食指导、在预防高脂血症等慢性疾病时，良好的饮食习惯发挥着十分重要的作用、高脂血症饮食要做到规律、合理，控制油脂摄入等。对两组患者在治疗前后的患者满意度、体检指标和血脂水平等进行综合的分析，并使用自制问卷开展满意度调查工作，实现对调查结果的科学评估；结果　　实施教育前两组患者血脂水平相比无明显差异（P＞0.05），实施教育后，观察组患者的血脂水平显著优于对照组，两组患者相比差异有统计学意义（P＜0.05），实施教育前两组患者体检指标水平相比无明显差异（P＞0.05），实施教育后，观察组患者的体检指标水平显著优于对照组，两组患者相比差异有统计学意义（P＜0.05），观察组患者治疗总满意率显著高于对照组，两组患者相比差异有统计学意义（P＜0.05）；结论　教育前两组患者血脂水平相比无明显差异，但教育后观察组患者血脂水平有一定程度的改善，与对照组相比有显著差异；从体格检查指标来看，两组教育前BMI无显著差异，但教育后观察组BMI值显著低于对照组；从两组患者的教育满意度来看，观察组患者的教育满意度显著高于对照组。在常规治疗和教育的基础上，对高胆固醇、高饱和脂肪酸等食物的摄入量进行严格的管控，可显著改善其血脂水平和体格检查指标，在摄入不同能量以后，对肥胖高脂血症患者进行营养干预，对糖尿病、高血压等基础疾病进行了积极的改善，在高脂血症肥胖患者使用营养干预措施开展治疗工作时，患者的饮食结构变得更加合理，实现了对高脂血症肥胖患者饮食模式和饮食结构的科学调整，并显著提高患者对临床营养师及医生的满意度。

关键字　【关键词】高脂血症；肥胖患者；营养干预；血脂水平

分类：临床营养

基于转录组学初探托吡酯改善脂肪细胞胰岛素抵抗的机制

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目的：肥胖和偏头痛频率之间呈正相关，且全身肥胖和腹部肥胖都与偏头痛的高发率有关。与其他神经精神慢性治疗药物不同，托吡酯除具有预防偏头痛作用外，同时，可降低偏头痛患者体脂率并改善患者胰岛素抵抗水平，然而，其具体机制尚未被阐明。本研究使用转录组学方法探讨托吡酯改善脂肪细胞胰岛素抵抗水平的作用靶点，阐释其作用机制，为托吡酯导致偏头痛患者体重降低的机制提供分子生物学证据，也为其临床应用提供实验基础及理论依据。

方法：使用 MTT 检测不同托吡酯浓度下 3T3-L1 前脂肪细胞的存活率，选择最适托吡酯浓度进行后续实验。前脂肪细胞诱导分化完成后，使用棕榈酸诱导脂肪细胞胰岛素抵抗模型，经托吡酯干预，检测干预前后葡萄糖摄入量的变化，并通过转录组学，分析其可能的调控靶点及其影响的代谢通路。

结果：MTT 结果显示，100mM 托吡酯会使脂肪细胞存活率显著下降（P<0.001），50mM 为最适托吡酯浓度。使用 50mM 托吡酯干预胰岛素抵抗模型脂肪细胞后，脂肪细胞葡萄糖摄入量显著上升(P<0.001)，提示托吡酯改善机体糖代谢。RNA-seq 分析了 4 个胰岛素抵抗模型组和 4 个托吡酯治疗组的表达谱，结果显示共有 437 个 seqRNAs 在各组之间有差异表达(P<0.05)。对比模型组，治疗组样本中共 33 个基因表达上调，404 个下调。在使用托吡酯后，Ctgf 等基因被激活（P<0.05），这些基因功能主要参与脂肪细胞发育，胶原蛋白生物合成过程的正向调节（positive regulation of collagen biosynthetic process）、软骨细胞分化（chondrocyte differentiation）等功能，Mapk8、Kpna4、Kpna1 等基因被抑制(P<0.001)，这些基因主要参与蛋白质去泛素化（protein deubiquitination）、组蛋白修饰（histone modification）等功能。KEGG 通路富集分析表明托吡酯主要通过激活 Hippo 信号通路、Notch 信号通路及抑制核质运输（Nucleocytoplasmic transport）致使脂肪细胞胰岛素下游信号通路下调，进而影响细胞葡萄糖代谢。

结论：托吡酯可直接作用于脂肪细胞并改善其胰岛素抵抗水平，胰岛素抵抗水平的改善主要通过影响多个靶点及调节 Hippo 信号通路、Notch 信号通路及核质运输，提示偏头痛病人体脂率降低的可能机制。其中 Hippo 信号通路上游的膜蛋白受体感受到胞外环境的生长抑制信号后，经过一系列激酶的磷酸化反应，可负向调控脂肪细胞形成，可能为未来重要的调控靶点。然而我们的研究仍有不足，我们通过体外实验探索了托吡酯改善脂肪细胞胰岛素抵抗相关机制，但是，人体是一个复杂的有机整体，若想明确托吡酯降低偏头痛患者体脂的机制，还需在体内进行更深入的研究。

关键字 偏头痛，托吡酯，脂肪细胞，胰岛素抵抗，转录组

分类：临床营养

相位角测定在腹部外科住院患者中的应用价值

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目的　研究相位角（phase angle, PA）与腹部外科住院患者营养状况和住院时间的关系，探究相关影响因素，为住院患者营养干预提供支持。 方法　采用横断面研究纳入 2019 年 12 月至 2021 年 7 月山东省某三甲医院腹部外科住院患者 1131 例。记录患者一般资料，测定握力，行人体成分分析检查和血清学指标测定，用 NRS2002 量表进行营养风险筛查。根据亚洲肌肉减少症工作组（AWGS）2019 诊断标准，进行患者肌肉减少症的诊断。根据 Kyle 标准，生物电抗阻＜5kHz 时，男性＜5.0°、 女性＜4.6°表示为低 PA。将患者分为低 PA 值组和正常 PA 值组，比较相关指标的差异,包括年龄、体重、握力、身体质量指数（body mass index, BMI）、去脂体重、四肢骨骼肌指数、左上臂肌肉围度、白蛋白、血红蛋白、红细胞、钠、钾、是否为肿瘤、是否为肌肉减少症、是否饮酒、NRS2002 评分、总胆红素等指标。通过单因素分析筛选对 PA 值有影响的相关因素。 结果　低 PA 组与正常 PA 组在年龄、是否为肿瘤、是否为肌肉减少症、NRS2002 评分、总胆红素水平等变量上比较有统计学意义（P＜0.05），即患者年龄较大、有营养风险、有黄疸症状、是肿瘤疾病，PA 值会越低，并且 PA 值越低，住院时间越长；低 PA 组与正常 PA 组在性别、是否饮酒等变量上比较无统计学意义（P＞0.05）；低 PA 组体重、握力、身体质量指数、骨骼肌质量、去脂体重、四肢骨骼肌指数、左上臂肌肉围度、白蛋白、血红蛋白、红细胞、钠、钾均明显低于正常 PA 组（P＜0.05），提示正常 PA 组住院患者营养状态较好；低 PA 组患者住院时间明显高于正常 PA 组（P＜0.05），提示低 PA 组患者需治疗时间较长，恢复较慢；PA 与年龄、NRS2002 评分、有无肌肉减少症、总胆红素水平、是否为肿瘤及住院时间呈负相关（P＜0.05）；通过统计低 PA 值组和正常 PA 值组患者重点人群占比，发现低 PA 值组中的老年患者、有营养风险患者、肌肉减少症患者、黄疸患者、肿瘤患者占的比例明显高于正常 PA 值组。 结论　PA 与腹部外科住院患者的营养状况和住院时间密切相关，能够反映患者的预后和一般情况。PA 与年龄、NRS2002 评分、是否为肌肉减少症、总胆红素水平、是否为肿瘤及住院时间呈负相关；PA 值越低，营养状况越差，而营养不良与不良临床结局和预后存在密切联系，不良临床结局包括功能下降、高发病率和死亡率和住院时间的延长。对于手术患者来说术前营养不良与术后并发症增加、住院时间延长和死亡率增加有关。营养不良也是肿瘤患者的一个普遍问题，腹部肿瘤患者，特别是上消化道和肝、胰、胆道肿瘤患者，营养不良的代谢风险较高。根据 PA 值提示，老年患者、有营养风险患者、肌肉减少症患者、黄疸患者、肿瘤患者需得到重点关注。

关键字 腹部外科；住院患者；相位角；营养状况；住院时间；影响因素

分类：临床营养

枸杞 ACE 抑制肽对射血分数保留心衰小鼠心肌纤维化的保护作用初步探讨

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【目的】

枸杞 ACE 抑制肽（Angiotensin Converting Enzyme Inhibitor Peptide，ACEIP）作为枸杞蛋白来源的天然生物活性肽对射血分数保留心衰（Heart Failure with Preserved Ejection Fraction，HFpEF）心肌纤维化和血脂代谢的作用效果尚不清楚。因此，本研究拟观察枸杞 ACEIP 对 HFpEF 模型小鼠心肌纤维化、胶原沉积和血脂水平的影响，探讨枸杞 ACEIP 对 HFpEF 小鼠的保护作用。

【方法】

50 只七周龄野生型雄性 C57BL/6N 小鼠适应性喂养一周后，按体重随机分组，分为对照组 10 只，给予普通饮食饮水，HFpEF 造模组 40 只，给予高脂饮食（HFD）和 0.5g/L N^{ω}-硝基-L-精氨酸甲酯（N^{ω}-Nitro-L-arginine-methyl ester hydrochloride，L-NAME）的饮用水，进行为期 8 周的造模。造模成功后将 HFpEF 造模组小鼠随机分为 HFpEF 组、枸杞 ACEIP 7mg/kg 组（低剂量组）、枸杞 ACEIP 14mg/kg 组（中剂量组）和枸杞 ACEIP 28mg/kg 组（高剂量组），每组各 10 只。对照组和 HFpEF 组采用生理盐水每天对小鼠进行灌胃，枸杞 ACEIP 各剂量干预组采用等浓度法每天对小鼠进行灌胃干预，枸杞 ACEIP 低剂量组每天给予 7mg/kg 的 ACEIP 灌胃，枸杞 ACEIP 中剂量组每天给予 14 mg/kg 的 ACEIP 灌胃，枸杞 ACEIP 高剂量组每天给予 28mg/kg 的 ACEIP 灌胃，进行为期 8 周的枸杞 ACEIP 干预。干预结束后称取小鼠体重（BW）和心脏组织质量（HW）；采用试剂盒检测小鼠血清中总胆固醇（TC）、甘油三酯（TG）、高密度脂蛋白胆固醇（HDL）、低密度脂蛋白胆固醇（LDL）水平；采用马松染色和天狼猩红染色评估小鼠心肌纤维化和胶原沉积程度。

【结果】

经过枸杞 ACEIP 干预 8 周后：（1）相较于对照组小鼠，HFpEF 组小鼠体重出现了显著增加（P＜0.01）；相较于 HFpEF 组小鼠，枸杞 ACEIP 各剂量组小鼠出现体重降低（P＜0.01），并随枸杞 ACEIP 干预剂量增加而降低；（2）HFpEF 组小鼠的 HW/BW 明显高于对照组（P＜0.01），随枸杞 ACEIP 干预剂量增加，小鼠的 HW/BW 明显低于 HFpEF 组（P＜0.01）；（3）试剂盒检测小鼠血脂结果显示，HFpEF 组小鼠血清 TC、TG、LDL 明显高于对照组小鼠（P＜0.01），HDL 明显低于 NC 组小鼠（P＜0.01）；与 HFpEF 组小鼠相比，枸杞 ACEIP 各干预剂量组小鼠血清 TC、TG、LDL 出现明显降低（P＜0.01），HDL 水平随干预剂量增加出现明显升高（P＜0.01）；（4）马松染色结果显示，HFpEF 组小鼠较于对照组小鼠心肌微血管周围明显出现蓝色胶原纤维，但枸杞 ACEIP 中、低剂量组的胶原纤维均出现一定程度减少，且枸杞 ACEIP 高剂量组蓝色胶原纤维显著减少，心肌纤维化程度出现明显改善；（5）天狼猩红染色结果显示，对照组小鼠心肌细胞排列整齐，胞浆纹理清晰，而 HFpEF 组小鼠胞浆纹理模糊不清，胶原沉积明显增加，可见大量被染成红色的胶原纤维，枸杞 ACEIP 干预后，红色胶原纤维明显减少，枸杞 ACEIP 各干预剂量组小鼠均在一定程度上改善了上述的病理变化。

【结论】

枸杞 ACEIP 干预能够有效降低 HFpEF 小鼠的体质量和心脏脏器系数，改善血脂代谢异常，减轻心肌纤维化和胶原沉积的发生，从而对 HFpEF 心肌纤维化起到一定的保护作用。

关键字 枸杞；枸杞 ACEIP；射血分数保留心衰；心肌纤维化

分类：临床营养

孕期膳食质量与妊娠期糖尿病的关联研究

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目的 本研究通过中国孕期膳食平衡指数（diet balance index for pregnancy，DBI-P）和膳食炎症指数（dietary inflammatory index，DII）两种方法分析上海地区女性孕期膳食质量与妊娠期糖尿病（gestational diabetes mellitus，GDM）发生及糖脂代谢的关联，以期为提供合理孕期膳食指导，防治 GDM 提供科学数据。

方法 采用病例对照研究，选取 2018 年 1 月至 2021 年 1 月在上海市中医药大学附属第七人民医院产科定期就诊的孕 18~23 周的孕妇。根据《妊娠合并糖尿病诊治指南（2014）》进行 GDM 诊断，对照组为同院同期血糖筛查结果正常的健康孕妇。收集人口学信息和血生化指标，采用经信度效度检验的半定量食物频率问卷（Food frequency questionnaire，FFQ）收集孕妇自怀孕至孕中期的饮食情况，并分别采用 DBI-P 和经能量校正的膳食炎症指数（energy-adjusted-DII，E-DII）评估膳食质量。采用非参数检验分析 GDM 孕妇和非 GDM 孕妇之间的社会人口学资料、血生化水平、膳食摄入水平和饮食质量评分的差异。采用 Logistic 回归模型和分层分析探究两种膳食质量评分与 GDM 的关联，并作趋势性检验和固定增量变化检验，采用线性回归模型分析与糖脂代谢指标的相关性。

结果 总计纳入 523 例满足入组条件的研究对象，包括 160 例 GDM 患者。与非 GDM 组相比，GDM 组的谷薯类摄入量更少（P=0.031）。DBI-P 评分中，GDM 孕妇和非 GDM 孕妇低中度摄入过量比例分别为 6.9%和 3.6%，组间差异显著（P=0.036）；低中度摄入不足比例分别为 71.9%和 65.3%，低中度膳食失衡比例分别为 74.4%和 69.2%。E-DII 评分中，中位数和四分位数间距为-0.90（-1.75，0.04），组间差异无统计学意义。E-DII 得分更高的孕妇摄入更多的能量、总脂肪（P<0.01），而蛋白质、多不饱和脂肪酸、碳水化合物、膳食纤维、铁、锌、镁、维生素 B1、维生素 B2、维生素 B6、叶酸、烟酸、抗坏血酸、胡萝卜素、视黄醇和维生素 E 摄入更少（P<0.05）。调整年龄、孕前 BMI、孕期增重、孕次、产次、营养补充剂、身体活动、职业和总胆固醇与高密度脂蛋白胆固醇的比值（TC/HDL-C）后，DBI-P 和 E-DII 与 GDM 风险均无关（Ptrend>0.05）。分层分析中两种膳食质量评分与 GDM 的相关性与年龄（≤30 岁或>30 岁）和孕前 BMI（<18.5 kg/m2，18.5~23.9 kg/m2 或>23.9 kg/m2）均无交互作用（P for interaction>0.05）。正端分（high bound score，HBS）分别与 OGTT 1h（β=0.105，P=0.012）、OGTT 2h（β=0.077，P=0.026）、低密度脂蛋白胆固醇（LDL-C）（β=3.723，P=0.011）水平呈正相关，负端分（low bound score，LBS）与 OGTT 0h 呈正相关（β=0.011，P=0.021），膳食质量距（diet quality distance，DQD）分别与 OGTT 0h（β=0.013，P=0.004）和 OGTT 1h（β=0.040，P=0.019），E-DII 与 HDL-C 呈线性正相关（β=0.024，P=0.047）。

结论 目前缺少统一的膳食评价方法评估孕期膳食质量与 GDM 风险的关联。本研究采用 DBI-P 和 E-DII 两种评估方法，发现上海地区女性孕期的膳食模式呈抗炎趋势，但 62~88%女性存在孕期谷薯类、乳类、禽畜肉类和鱼虾类摄入不足的情况，特别是 GDM 患者的谷薯类摄入量更少。两种膳食质量评分与 GDM 相关糖脂代谢指标呈显著正相关，可能具有预测糖脂代谢异常的功能。未发现两种膳食质量评分与 GDM 风险相关。未来有待扩大样本进一步验证孕期膳食质量和 GDM 发生风险的关联和潜在机制。

关键字 膳食平衡指数；膳食炎症指数；妊娠期糖尿病；糖脂代谢

分类：临床营养

枸杞 ACEIP 通过下调 ANP、BNP、β-MHC 基因表达减轻 HFpEF 小鼠心肌肥厚的作用效果

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【目的】

观察枸杞蛋白衍生的血管紧张素转换酶抑制肽（Angiotensin Converting Enzyme Inhibitory Peptide，ACEIP）在不同剂量下对射血分数保留心衰（Heart Failure with Preserved Ejection Fraction，HFpEF）模型小鼠心肌肥厚的干预效果，并探索其潜在的保护作用机制。

【方法】

50 只 8 周龄 C57BL/6N 雄性小鼠随机分为正常对照组 10 只和造模组 40 只。正常对照组小鼠给予标准饮食和自由饮水，造模组小鼠给予高脂饮食和每升含 0.5 克 N^{ω}-硝基-L-精氨酸甲酯（N^{ω}-Nitro-L-arginine methyl ester hydrochloride，L-NAME）的饮用水进行造模。第 8 周造模成功后，将 40 只造模成功的小鼠随机分为模型组、枸杞 ACEIP 低剂量组（7mg/kg）、枸杞 ACEIP 中剂量组（14mg/kg）、枸杞 ACEIP 高剂量组（28mg/kg），共干预 8 周。干预结束后对小鼠进行心脏超声检测，测得舒张末期和收缩末期的左室后壁厚度和左室室间隔厚度。测量小鼠心脏组织重量（Heart wight，HW）和胫骨长度（Tibial length，TL），并计算比值。对小鼠心脏横切面进行苏木精-伊红染色染色，观察心脏组织形态的变化情况。使用麦胚凝集素染色法观察小鼠心肌细胞大小形态的改变。Q-PCR 法检测小鼠心脏组织中心房利钠肽（Atrial natriuretic peptide，ANP）、脑钠肽（Brain natriuretic peptide，BNP）和 β-肌球蛋白重链（β-myosin heavy chain，β-MHC）mRNA 表达水平。

【结果】

经 8 周枸杞 ACEIP 干预后，模型组小鼠的左室后壁厚度和左室室间隔厚度在舒张和收缩末期较正常对照组小鼠均增厚（$P<0.01$），但通过不同剂量的枸杞 ACEIP 干预后模型组小鼠左室肥厚均有所缓解（$P<0.05$ 或 $P<0.01$），并随枸杞 ACEIP 干预剂量的增加，小鼠左室肥厚改善效果越明显。模型组小鼠的 HW/TL 较对照组均显著升高（$P<0.01$），但经过枸杞 ACEIP 干预后模型组小鼠 HW/TL 均有一定程度的降低（$P<0.01$），并随枸杞 ACEIP 干预剂量的增加而降低。苏木精-伊红染色心脏横切面全景片中结果显示，模型组小鼠左室室间隔厚度和左室后壁厚度较其它各组中最厚，这与小鼠心脏超声检测结果一致，经过低中高剂量枸杞 ACEIP 干预后，上述心肌病理性肥厚特征得到一定改善。麦胚凝集素染色结果可见正常对照组小鼠心肌细胞面积最小，模型组小鼠心肌细胞面积明显增大，但在各剂量枸杞 ACEIP 组中，高剂量枸杞 ACEIP 组小鼠心肌细胞面积减小最为明显，说明枸杞 ACEIP 在 HFpEF 小鼠体内模型中具有减轻心肌肥厚的生物活性。Q-PCR 结果显示正常对照组小鼠心脏组织中 ANP、BNP 和 β-MHC 的 mRNA 表达水平明显低于模型组小鼠（$P<0.01$），不同剂量下枸杞 ACEIP 干预能够降低模型组小鼠心肌 ANP、BNP 的 mRNA 表达水平（$P<0.01$），并有剂量依赖效应；模型组小鼠经枸杞 ACEIP 干预后心脏组织中 β-MHC 的 mRNA 表达水平降低，且当枸杞 ACEIP 干预剂量为 28mg/kg 时，其表达水平下降较模型组更加显著（$P<0.01$）。

【结论】

枸杞 ACEIP 可能通过下调 ANP、BNP、β-MHC 的 mRNA 表达来延缓小鼠心肌肥厚，对 HFpEF 起到保护作用。

关键字 枸杞 ACEIP；HFpEF；心肌肥厚；ANP；BNP；β-MHC

分类：临床营养

术前 NRI 联合 NLR 在肝细胞癌患者预后中的预测价值研究

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原发性肝癌是世界范围内与癌症相关的最常见死亡原因之一，其发病率和死亡率常年居高不下。HCC 患者较易患有营养风险，并且在我国 HCC 多为慢性乙型病毒性肝炎相关性 HCC，营养风险状态和慢性炎症感染背景与 HCC 患者的预后密切相关。营养风险指数（Nutritional Risk Index，NRI）作为一项新颖营养风险筛查工具，由于其计算简便，是基于血清白蛋白和体重情况计算的一项营养风险筛查方法，能够客观的反应患者的营养风险状况，目前已被应用在预测肿瘤患者的预后上。中性粒细胞/淋巴细胞比值（Neutrophil/Lymphocyte Ratio，NLR）是一项容易获得且计算简便的炎症评分指标，直接反映了宿主全身炎症反应和免疫反应平衡的标志物，近来慢性炎症状态作为一研究热点，目前已被证实与多种恶性肿瘤的预后相关。由于 HCC 流行病学和生物学行为的多样性导致了单一预后指标的局限性，并且 HCC 患者较突出的问题是营养风险状况以及 HBV 慢性感染的背景，因此本研究将探讨术前 NRI 联合 NLR 在 HCC 患者预后中的预测价值，为 HCC 患者在临床上的诊疗策略提供参考依据。

目的 探讨术前 NRI 联合 NLR 在行根治性肝癌切除术的肝细胞癌（hepatocellular carcinoma，HCC）患者预后中预测价值。方法 1、回顾性分析 2014 年 1 月 2016 年 12 月期间在广西医科大学附属肿瘤医院肝胆外科行根治性肝癌切除术的 747 例 HCC 患者的临床病例资料。根据患者术前 NRI 及 NLR 的评分，分为高 NRI 组、低 NRI 组、高 NLR 组和低 NLR 组；随后根据 NRI 联合 NLR 分为低 NRI+低 NLR 组、低 NRI+高 NLR 组、高 NRI+低 NLR 组及高 NRI+高 NLR 组共 4 个联合分组。3、运用卡方检验、t 检验或非参数检验分析比较各组患者的临床资料，使用二元 Logistic 回归分析患者术后发生 Clavien-Dindo II 级及以上并发症的独立危险因素，用 Kaplan-Meier 法分析各组患者术后 RFS 及 OS 的情况，采用单因素、多因素 COX 回归模型分析影响 HCC 患者 OS 和 RFS 的独立危险因素。结果 1、高 NRI 组术后 Clavien-Dindo II 级及以上并发症发生率（32.2%）低于低 NRI 组（46.1%），低 NLR 组 Clavien-Dindo II 级及以上并发症发生率（33.5%）低于高 NLR 组（43.7%），差异均具有统计学意义（P 值均＜0.05）。高 NRI+低 NLR 组术后 Clavien-Dindo II 级及以上并发症发生率（30.1%）均低于低 NRI+低 NLR 组（38.4%）、低 NRI+高 NLR 组（52.0%）及高 NRI+高 NLR 组（34.6%），差异具有统计学意义（P＜0.001）。二元 Logistic 回归分析显示较晚的 BCLC 分期（OR：1.500，95%CI：1.038-2.167，P =0.031）、有门脉高压（OR：2.074，95%CI：1.322-3.252，P=0.001）、高 TBil（OR：1.045，95%CI：1.017-1.074，P=0.002）、有腹水（OR：1.960，95%CI：1.154-3.331，P=0.013）以及术中出血量多（OR：1.002，95%CI：1.001-1.002，P＜0.001）是 HCC 患者术后发生 Clavien-Dindo II 级及以上并发症的危险因素。2、高 NRI 组患者的 OS 和 RFS 均优于低 NRI 组患者（P 值均＜0.05）；低 NLR 组患者的 OS 和 RFS 均优于高 NLR 组患者（P 值均＜0.05）；高 NRI+低 NLR 组患者的 OS 和 RFS 均优于其他联合分组患者（P 值均＜0.05）。3、肿瘤大小（HR=1.088，95%CI：1.059-1.117，P＜0.001）以及肿瘤包膜是否完整（HR=1.727，95%CI：1.336-2.232，P＜0.001）是影响 HCC 患者 OS 的独立危险因素。术前 AFP （HR=1.273，95%CI：1.041-1.556，P＝0.019）、NRI（HR=0.725，95%CI：0.542-0.969，P ＝ 0.030）、肿瘤大小（HR=1.080，95%CI：1.053-1.107，P＜0.001）、肿瘤包膜是否完整（HR=1.531，95%CI：1.200-1.954，P＝0.001）以及术中出血量（HR=1.000，95%CI：（1.000-1.001），P＜0.001）是影响 HCC 患者 RFS 的独立危险因素。结论 1、较晚的 BCLC 分期、有门脉高压、高 TBil、有腹水以及术中出血量多是 HCC 患者术后发生 Clavien-Dindo II 级及以上并发症的危险因素；肿瘤直径大和肿瘤包膜不完整是影响 HCC 患者 OS 的独立危险因素；术前 AFP 高、低 NRI、肿瘤直径大、肿瘤包膜不完整以及术中出血量多是影响 HCC 患者 RFS 的独立危险因素。2、单独应用 NRI 或 NLR 时均可以预测 HCC 患者术后 Clavien-Dindo II 级及以上并发症的发生、OS 及 RFS，但 NRI 联合 NLR 对 HCC 患者术后发生 Clavien-Dindo II 级及以上并发症、OS 及 RFS 的预测价值大于单独使用 NRI 或
NLR。

关键字 术前；营养风险指数；中性粒细胞/淋巴细胞比值；肝细胞癌；预后

分类：临床营养

药食同源中药复方对 2K1C 高血压大鼠肠道菌群结构及血清代谢物的影响

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目的

探究药食同源中药对二肾一夹（2K1C）大鼠血压、肠道菌群结构和血清代谢物的调控作用，为临床研究药食同源中药降血压作用提供实验参考。

方法

选取 8 周龄 220g SD 雄性大鼠，手术构建 2K1C 高血压大鼠模型，手术后常规饲养 6 周，待大鼠血压升高至平稳后，随机挑选收缩压大于 21.3 kpa 的大鼠 45 只，随机分为 5 组，每组 9 只，分为模型组，灌胃 PBS 溶液；低剂量组，灌胃中药浓缩液（10 μL/只）；中剂量组，灌胃中药浓缩液（50 μL/只）；高剂量组，灌胃中药浓缩液（100 μL/只）；阳性对照组，灌胃氯沙坦（0.06 mg/只）。所有大鼠每天灌胃一次，观察大鼠生活状态，每周测量并记录大鼠血压水平，干预 6 周后，收集大鼠眼外周血、盲肠内容物和粪便样品，利用高效液相质谱仪（LC-MS）和 16S rDNA 对各组大鼠血清代谢物和肠道菌群结构进行检测分析。本研究使用的药食同源中药复方由经验方中公示和在试点的药食两用中药组成，包括葛根，夏枯草，杜仲叶，菊花，山楂，芹菜（旱芹）。

结果

药食同源中药干预 6 周后，2K1C 高血压大鼠血压水平明显下降，且血压水平降低程度与药食同源中药剂量之间存在明显的量效关系。16S rDNA 测序结果显示，在门水平上（图 A），2K1C 高血压大鼠肠道微生物群落的主要由厚壁菌门（Phylum Firmicutes）、拟杆菌门（Bacteroidetes）、变形菌门（Proteobacteria）、放线杆菌门（Actinobacteria）、和酸杆菌门（Acidobacteria）组成，其中，与模型组相比，药食同源中药组的拟杆菌门（Bacteroidetes）相对丰度升高，厚壁菌门（Phylum Firmicutes）相对丰度降低。在属水平上（图 B），2K1C 高血压大鼠肠道微生物群落的主要由乳酸杆菌属（Lactobacillus）、肠球菌属（Enterococuus）、布劳特氏菌属（Blautia）、罗姆布茨菌属（Romboutsia）和丁酸弧菌属（Anaerostipes）组成，比较相对丰度，发现药食同源中药组乳酸杆菌属（Lactobacillus）明显高于 2K1C 高血压模型组。不同处理的大鼠血清代谢产物亦存在明显差异，筛选得到 143 个差异性血清代谢产物。其中，药食同源中药组血清中牛磺胆酸（taurocholic acid），L-抗坏血酸（L-ascorbic acid），焦谷氨酸（pyroglutamic acid），苯乙酰甘氨酸（phenylacetylglycine）显著上调，甘氨胆酸（glycocholic acid）显著下调（图 C、D）。血清代谢产物显著性富集 KEGG 通路分析表明：甘氨胆酸（glycocholic acid）和牛黄胆酸（taurocholic acid）参与初级胆汁酸和次级胆汁酸生物合成；苯乙酰甘氨酸（phenylacetylglycine）参与苯丙氨酸代谢；胞嘧啶（cytosine）、胞嘧啶核苷（cytidine）和脱氧胞苷（deoxycytidine）参与嘧啶代谢；L-抗坏血酸（L-ascorbic acid）和焦谷氨酸（pyroglutamic acid）参与谷胱甘肽代谢；从而发挥调节大鼠的血压水平的作用。

结论

药食同源中药通过改善 2K1C 高血压大鼠肠道菌群结构，提高部分优势菌群（拟杆菌、乳酸杆菌）的丰度，调节血清代谢产物，增加血清代谢物牛磺胆酸（taurocholic acid），L-抗坏血酸（L-ascorbic acid），焦谷氨酸（pyroglutamic acid），苯乙酰甘氨酸（phenylacetylglycine），发挥对 2K1C 高血压大鼠血压的调控作用。

关键字 2K1C 高血压大鼠，药食同源中药，肠道菌群，血清代谢产物

分类：临床营养

青光眼小梁切除术后五年手术结局与膳食营养关系的调查研究

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目的：调查评估青光眼小梁切除术患者的营养状况，分析对其术后第 5 年结局的远期影响，研究有利于青光眼患者视力保持的合理膳食。

方法：2015 年 1 月至 2017 年 6 月由同一人电话随访志愿参加本队列研究的 2010 年 1 月至 2012 年 5 月在本院眼科诊断为原发性开角型或闭角型青光眼患者情况,手术均由同一术者完成的首次接受小梁切除术患者 153 人，邀请再次回我院复诊，由本院眼科原手术医生评估术后 5 年的病情。本调查持续 1 年半，记录完整资料者共 41 例，其中男性 35 例、平均年龄 51±15 岁，女性 6 例、平均年龄 65±13 岁。对所有患者进行膳食频率表法膳食调查，回顾患者术后第 5 年的膳食史，由信息系统计算膳食营养素摄入量，分析膳食组成；继续完善术后眼科病情的随访资料。分析所有患者术前营养状况与术后第 5 年是否存在差异；分析手术成功与失败患者之间的营养状况和膳食组成是否存在差异，不同手术结局是否与其相关。

结果：

① 首次手术后第 5 年有 6 人（14.6%）体重下降 5%以上，19 人（46.3%）体重增加 5%以上，其他 16 人体重保持。

② 首次手术后的第 5 年，患者日均膳食摄入能量较手术前减少 10%以上者 7 人（17.1%），而 20 人（48.8%）膳食能量摄入增加 10%以上，其他 14 人（34.1%）无明显变化。

③ 按照首次手术后 5 年的随访情况，将患者分为手术成功组 37 例和失败组 4 例，两组的术前眼压差异不显著，但是术后第 5 年的眼压差异显著，说明患者术前眼压均衡，但是术后临床结局明显不同。

④ 两组患者手术前后的体重、身体质量指数(BMI)差异均不显著，与手术结局相关度均不显著；在手术失败者 4 人中，有 1 人体重下降，2 人体重保持，1 人体重增加。

⑤ 首次术后第 5 年两组间能量和各种营养素摄入量差异不显著，均与手术结局相关度很低。

结论：本调查表明原发性青光眼患者在目前手术方式和应用药物抗瘢痕化的治疗措施下，接受小梁切除术的术后成功与失败患者间的营养状况差异均不显著，术后第 5 年的手术结局与其相关度低，营养状况对青光眼患者小梁切除术后远期效果无明显影响，患者日常膳食不需要特殊调整。由于患者返京复诊困难，因此本调查规模小，而且我院眼科临床技术成熟，纳入调查的手术失败患者例数很少，均可能影响调查结果。

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关键字 青光眼，小梁切除术，营养，膳食

分类：临床营养

维生素 D 干预对非酒精性脂肪肝病的保护作用及机制研究

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目的：非酒精性脂肪肝病（Nonalcoholic fatty liver disease，NAFLD）是指除酒精和其它损肝因素所导致的以肝脏中脂肪过度沉积为主要特征的病理综合征，其发病机制复杂，目前尚不明确。铁死亡作为一种新的细胞死亡方式，研究发现细胞内脂质异常堆积导致的氧化还原失衡引起的铁死亡可能是加剧脂代谢紊乱的重要环节。流行病学证据发现维生素 D（VD）的缺乏与 NAFLD 的发生率和严重程度相关，但其中的具体调节机制尚不清楚，且相关基础研究缺乏。因此，本研究以高脂饮食（High fat diet，HFD）喂养的 C57BL/6J 小鼠及棕榈酸（Palmitic acid，PA）诱导的小鼠正常肝细胞 AML12 作为体内、外脂肪变性模型，探究 VD 对 NAFLD 的影响及其潜在机制。

方法：1.体内实验：4 周龄的 SPF 级雄性 C57BL/6J 小鼠适应性喂养一周后随机分成 4 组进行造模：正常对照组（CON，n=10）和正常干预组（CON+VD，n=10），给予普通饲料；模型组（HFD，n=10）和模型干预组（HFD+VD，n=10），给予高脂饲料，周期为 8 周。造模结束后，CON 组和 HFD 组每周给予 0.1 ml 玉米油腹腔注射，CON+VD 组和 HFD+VD 组每周给予 1.68 IU/g VD 腹腔注射，周期为 16 周。试验结束后，收集小鼠的血液和肝脏样本，观察 VD 对 NAFLD 小鼠的干预效果，包括体重、肝指数、血脂、肝功能指标、肝脏脂质蓄积、氧化应激指标以及铁沉积情况。逆转录－聚合酶链反应（RT-PCR）检测肝组织中脂代谢相关信号分子（CD36、LPL、SREBP-1c、FAS、PPARα、CPT1）的 mRNA 表达情况；蛋白免疫印迹法（WB）检测肝组织中 VDR 和铁死亡相关分子（ACSL4、TFR1、SLC7A11、GPX4）的蛋白表达水平。2.体外实验：1）取 0.2mM PA 及 10 nM 1,25(OH)2D3 同时处理 AML12 细胞 24h，RT-PCR 法检测肝细胞中 CD36、LPL、SREBP-1c、FAS、PPARα、CPT1 的 mRNA 表达情况；WB 法检测肝细胞中 VDR、ACSL4、TFR1、SLC7A11 和 GPX4 的蛋白表达水平；3）合成 si-VDR 序列，借助 GP-siRNA-Mate plus 转染 AML12 细胞，检测 VDR 下调后 AML12 中 CD36、LPL、SREBP-1c、FAS、PPARα、CPT1 的 mRNA 和 VDR、GPX4、SLC7A11、ACSL4 和 TFR1 的蛋白表达水平。3.符合正态分布的计量资料以均数±标准差表示，两组之间的均数比较采用独立样本 t 检验，多组之间均数比较采用单因素方差分析（one-way ANOVA），$P<0.05$ 认为差异有统计学意义

结果：1. 与 HFD 组相比，干预 16 周后 HFD+VD 组小鼠体重、肝指数、肝脏脂质蓄积、血脂（TC、TG、LDL-C）、肝功能指标（AST 和 ALT）、氧化应激指标（MDA）以及铁沉积水平均显著下降（$P<0.05$），HDL-C、SOD 和 GSH 水平均显著上升（$P<0.05$）；分子水平上，与 HFD 组相比，HFD+VD 组小鼠肝脏中 CD36、LPL、SREBP-1c 和 FAS 的 mRNA 水平显著下调（$P<0.05$），PPARα 和 CPT1 的 mRNA 水平显著上调（$P<0.05$）；WB 结果显示，与 HFD 组相比，HFD+VD 组 VDR、GPX4 和 SLC7A11 蛋白水平显著上调（$P<0.05$），ACSL4 和 TFR1 的蛋白水平显著下调（$P<0.05$）。

2. 与 PA 组相比，1,25(OH)2D3 和 PA 共培养 AML12 细胞 24h 后，CD36、LPL、SREBP-1c 和 FAS 的 mRNA 水平显著下调（$P<0.05$），PPARα 和 CPT1 的 mRNA 水平显著上调（$P<0.05$）；WB 结果显示，与 PA 组相比，1,25(OH)2D3+PA 组 VDR、GPX4 和 SLC7A11 蛋白水平显著上调（$P<0.05$），ACSL4 和 TFR1 的蛋白水平显著下调（$P<0.05$）。

3. 与阴性对照组相比，si-VDR 组 CD36、LPL、SREBP-1c 和 FAS 的 mRNA 水平显著上调（$P<0.05$），PPARα 和 CPT1 的 mRNA 水平显著下调（$P<0.05$）；WB 结果显示，与阴性对照组相比，si-VDR 组 GPX4 和 SLC7A11 蛋白水平显著下调（$P<0.05$），ACSL4 和 TFR1 的蛋白水平显著上调（$P<0.05$）。

结论：维生素 D 干预对 HFD/PA 诱导的肝损伤具有保护作用，其机制可能与 VDR 介导的铁死亡有关。

关键字 非酒精性脂肪肝病、维生素 D、VDR、铁死亡

分类：临床营养

营养干预对高原地区运动员的影响

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高原训练的主要目的是通过改善机体对氧的摄入、携带和释放能力，能够有效提高机体对耐氧能力和抗乳酸能力，以此增强呼吸系统和心血管系统的功能。 由于高原地区特殊的地理和气候特点，高原训练时，所有的新陈代谢代谢都加剧，对运动员营养代谢及消化功能有一定的影响。因此在高原低压缺氧的环境下，科学合理的营养干预是保证取得高原训练理想效果的有力保障。为此，本文采用文献资料综述的方法，比较全面地综合了营养干预对高原地区运动员的影响，能够保持高原缺氧环境下运动员良好的训练效果，并使其机体储能水平得以提升，确保有效实施运动员在这种环境下的训练计划。

一、高原地区营养干预对运动员的影响

1. 合理均衡的膳食

合理的膳食不仅是保证运动员科学训练和保持良好的运动能力以此疲劳恢复的基础，而且有利于预防运动损伤的发生。高原训练过程中采用低脂肪和蛋白质、高糖的膳食模式，但要合理适量，保证机体营养平衡和充足。

2. 蛋白质、糖及脂肪

乳清蛋白作为骨骼肌的能量供应，对蛋白质的合成和肌肉的增长有着促进作用，增强机体抗疲劳能力和免疫能力，从而有利于高原训练期间能快速消除疲劳和恢复体能。

高原训练时补充耗氧量少的糖类物质可增强肌肉蛋白质的合成，提升机体免疫力和机体耐缺氧能力，同时能防止能量物质的耗竭缺乏导致的疲劳积累。研究报道，低聚果糖作用下能够长时间的保持运动员的血糖浓度，且不会产生过多的胃酸。

高脂食物在高原低氧环境下需要消耗更多氧气才能转化为能量，不易消化吸收，所以忌吃油腻、高脂、膨化及油炸食物，肉食最好以红肉为主。

3. 水分

在高原训练期间的补水量是平原补水量的 3-4 倍，采取“少量多次”的原则，并做好尿重比与体重的记录工作，确保运动员训练过程中水分的充足。

4. 抗氧化剂的补充

高原训练期间，合理使用抗氧化剂有利于增加机体的自由基清除能力，快速消除疲劳的恢复体力。目前比较常用且效果最好的抗氧化剂包括 VE、VC 和番茄红素。建议在高原训练期间补充 VC-300mg、VE-60mg 及 10-20mg 的番茄汁/番茄红素胶囊。

5. 增加肌肉力量营养品的补充

增加肌肉力量的营养品的摄入可改善机体的合成代谢减弱、分解代谢加强，肌肉量下降等问题。目前，这类营养品包括精氨酸、鸟氨酸、HMɞ 等。

二、抗缺氧中药的补充

高原训练时，服用一些抗缺氧的药物（红景天、枸杞、西洋参等）可以帮助运动员快速适应低氧环境下的抗缺氧能力、提高运动能力和运动水平。

三、总结

综上所述，通过对运动员进行营养干预有利于增强在高原训练中的适应效果使得在特殊的环境下的整体训练水平得以提升。因此，在实践中应重视营养干预工作的开展，使得他们在高原环境下能够保持良好的身体状态。

关键字 营养干预，高原地区

分类：临床营养

肌肉减少症与直肠癌术前放疗患者毒副反应和临床结局的相关性

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目的：肌肉减少症（sarcopenia,Src）在癌症患者中越来越被认为是不良的预后因素，可能会影响患者的生存率和并发症风险，是患者营养状况的代表。对于一些癌症，包括胃癌、食管癌、胰腺癌、肺癌等，低肌肉质量与较差的短期和长期临床结局相关。本研究主要目的是通过利用放疗定位 CT 图像获取第三腰椎横断面肌肉面积来确定是否肌肉减少症（Sarcopenia），并探究其在预测直肠癌术前放化疗患者毒副反应和临床结局方面的可行性。

材料和方法： 本研究随机选取 247 例于 2017 年 1 月至 2019 年 7 月在本中心接受术前放化疗的直肠癌患者，收集患者临床病理特征，包括年龄、性别、BMI、病理分期、放疗计划、化疗方案，放疗期间的副反应（白细胞减少、血红蛋白降低、恶心、乏力、结肠炎、小肠炎、膀胱炎）、手术间隔时间以及治疗至疾病进展时间(time to progress ，TTP/ 和患者总生存时间(overall survival, OS)。利用 SliceOmatic（版本号 5.0）在定位 CT 图像上对第三腰椎骨骼肌进行分割并计算得到相应的肌肉质量指数（SMI）。根据常规 Src 判定阈值（男性：50 cm2/m^2，女性：39 cm2/m^2），将患者分为 Src 组和非 Src 组。血液毒性（HT）是根据 RTOG 的急性辐射发病率评分标准分级的。白细胞（≥1 级）或中性粒细胞（≥1 级）的患者被认为有 HT。采用 Kaplan-Meier 方法评估肌肉减少症与放疗毒副反应的相关性，以及对总生存期（OS）和无病生存（DFS）等临床结局的影响。

结果： 共纳入患者 247 例，其中男性 172 例，女性 75 例，男性第三腰椎 SMI 平均为 47.75± 7.99cm^2/m^2，女性平均为 38.38±5.57cm^2/m^2，男性大于女性（P<0.01）。线性回归分析发现，PI 与年龄呈负相关(P<0.01)，与 BMI(B=1.237，P<0.01）成正相关，与 T 分期、CEA 无明显相关。男性人群中 Src 患者共 111 例（69.8%），女性 48 例（30.2%），Src 患者平均 SMI 为 40.73±5.8cm^2/m^2，非 Src 患者的 SMI 为 52.45±7.2cm^2/m^2；Src 与非 Src 相比发现，患者平均年龄偏高（59.23±10.09 VS 54.49±9.84），BMI 偏低（22.64±2.78 VS25.68±2.97），差异均具有统计学意义（P<0.01），而两组间的疾病分期、放疗计划、化疗方案均无统计学差异（P>0.05）。与非 Src 患者相比，Src 患者在放化疗期间发生的副反应（白细胞减少、中性粒细胞及血红蛋白降低、恶心、乏力、结肠炎、小肠炎、膀胱炎）程度较为严重，但差异均无统计学意义（P>0.05）。所有患者均在放化疗后接受手术治疗，统计发现与 Src 组患者相比非 Src 组放化疗结束至手术的间隔时间偏短（83.3±35.4 VS 88.75±28.55），但差异不具有统计学意义（P>0.05）。随访期间（3 年）共 5.5%（6 例）患者死亡，20%（22 例）出现肿瘤进展，其中 Src 组患者死亡 4 例，出现肿瘤进展 12 例，均高于非 Src 组，但差异均不具有显著性。

结论：通过 CT 测定的骨骼肌减少症可用于预测结直肠癌患者的预后，预测癌症特异性结果的最佳参考值应通过进一步的研究来定。有必要对接受术前放化疗的患者进行必要的营养筛查和营养支持以减少潜在的毒副反应发生率，提高患者预后和临床结局。

关键字 肌肉减少症，第三腰椎横断面肌肉面积

分类：临床营养

头颈部肿瘤患者放疗期间营养风险相关因素及护理探讨

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摘要：目的 头颈部肿瘤（Head and Neck Cancer，HNC）是一种发生于患者颅底以下、锁骨以上以及颈椎以前的恶性肿瘤，具有极高的致死率，对人体身心健康造成严重损害；放射治疗（简称“放疗”）是现阶段治疗头颈部肿瘤的重要手段之一，然而该方法在有效杀死肿瘤细胞的同时，也会对人体口腔黏膜以及腺体组织造成已定损伤，从而引发营养状况的恶化，即营养风险。本研究旨在探讨头颈部肿瘤患者放疗期间营养风险形成的相关因素，从而有针对性地为患者制定护理措施，以降低放疗过程中营养风险的发生率，提高生存质量。方法 选取我院 2021 年 1 月至 2022 年 11 月期间收治的头颈部肿瘤放疗患者 85 例为研究对象，对患者的一般人口学资料进行分析整理，应用 Logistic 回归分析对头颈部肿瘤患者放疗期间营养风险的相关危险因素进行分析，从而探讨患者放疗期间营养风险形成的相关危险因素。结果： 放疗前营养不良患者 4 例，放疗中新增营养不良患者 36 例，放疗后新增营养不良患者 10 例。放疗后营养正常患者 35 例，营养不良患者 50 例，放疗期间共有营养风险患者 50 例。单因素分析结果显示，年龄≥60 岁、治疗性置管、NRS 评分＞3 分与患者营养风险形成之间存在联系（P<0.05）；Logistic 多元回归分析结果显示，年龄≥60 岁、治疗性置管、NRS 评分＞3 分均为头颈部肿瘤患者放疗期间营养风险形成的独立危险因素（P<0.05），特别是置入胃管时机对 HNC 患者营养风险的发生情况产生的影响，本研究中治疗性胃管置入患者发生营养风险几率较大，这可能是由于头颈部肿瘤患者在进行放疗治疗的过程中会出现严重的口腔黏膜反应，从而导致患者吞咽困难，对进食及营养产生严重影响，临床中往往在患者已经出现了较为严重的口腔毒性反应后，再予以置管治疗，即治疗性置管，而此时患者常伴有一系列鼻咽腔炎症，此时置入胃管不但会增加患者痛苦程度，其对于帮助患者进食及增加营养摄入等方面的效果均有限；此外，一旦置管失败，会加重患者的心理负担，从而延误病情。结论 本研究中头颈部肿瘤患者放疗期间营养风险发生率为 58.8%，处于正常水平；年龄≥60 岁、治疗性置管、NRS 评分＞3 分均为头颈部肿瘤患者放疗期间营养风险形成的相关因素。对于存在营养风险的患者，在实施各项治疗与护理干预前，充分考虑对这类患者的营养状况，从而对治疗及护理方案进行适当调整，以达到最佳治疗与护理效果，降低放疗过程中营养风险及不良反应的发生率，提高生存质量。

关键字 头颈部肿瘤：放射治疗：营养风险：相关因素

分类：临床营养

强化左旋肉碱和牛磺酸肠内营养在老年管饲患者中的应用研究

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本研究拟探讨添加左旋肉碱及牛磺酸肠内营养与普通配方在老年管饲患者中应用后的不同结局，特别是针对改善老年患者营养状况、减少肠内营养并发症及促进神经功能好转方面做出观察；同时探讨一定剂量的左旋肉碱及牛磺酸添加或联合使用后的不同结局与初步可能机制。为今后制定老年患者微营养素摄入量标准以及规范肠内营养治疗提供实验依据。1、病例选择;在我院神经科、全科医学科、康复科 2019 年 4 月-2022 年 11 月收治老年鼻饲患者中选取 153 例，均伴有吞咽功能障碍的患者。按照随机双盲法将患者分为对照组（常规营养安素组）和观察 1 组（左旋肉碱治疗组）、观察 2 组（左旋肉碱+牛磺酸治疗组）各 51 例。对照组予以整蛋白肠内营养（安素），观察 1 组在此基础上予以自制强化左旋肉碱组件（5g/1000ml）的肠内营养自配制剂，观察 2 组添加的牛磺酸及左旋肉碱（各 5g/1000ml）。三组患者的肠内营养支持均为 30 天。2、结果：三组患者在肠内营养支持前后及组间的营养状况（BMI、皮褶厚度）无明显差异（P＞0.05）;但观察 1 组、2 组支持后血浆肉毒碱浓度较支持前、较对照组均有明显升高（P< 0.05）；观察 2 组治疗后血浆牛磺酸浓度较治疗前、较对照组和观察 1 组均有明显升高（P< 0.05）。观察 2 组 SGA 营养评估支持前后及较对照组、观察 1 组不良率均有明显下降（P< 0.05）；而观察 1 组和对照组 SGA 营养评估支持前后不良率无明显变化（P＞0.05），观察 1、2 组 MNA-SF 评分支持前后及较对照组有明显上升（P< 0.05），对照组 MNA-SF 评分支持前后无明显变化（P＞0.05）；NRS-2002 评分三组患者营养支持前后及组间均无明显变化（P＞0.05）。三组患者的 NIHSS 评分、血压及 Hcy 水平在营养支持前后及组间均无明显差异（P＞0.05），而空腹血糖观察组 1，2 支持后较支持前、较对照组均有明显下降（P＜0.05）。营养支持后观察 2 组的 Hcy 水平明显低于对照组、观察 1 组（P＜0.05）。观察 1、2 组的胃肠道不良反应发生率平均为 16.7%，观察 1、2 组的胃肠道不良反应（腹胀腹泻、便秘、呕吐等）发生率较营养支持前较对照组显著下降（P＜0.05）。 特别是观察 2 组的腹泻发生率更低，我们考虑是由于联合应用左旋肉碱和牛磺酸组件，改善了脂肪代谢的环境，稳定了患者的营养状况，提高了患者对配方的耐受性。对长期管饲老年患者的营养支持时，除了关注患者能量、蛋白质的供给外，还应该及时关注左旋肉碱、牛磺酸等这类条件必需微营养素，其功效应引起重视[48]。强化左旋肉碱的肠内营养能使老年患者更好适应配方，更能改善营养不良，患者更能持久耐受。观察 1、2 组血清 TNF-α 水平较支持前、较对照组均有明显下降（P<0.05 ）。我们也初步发现左旋肉碱联合应用牛磺酸在老年管饲患者上优势更为突出：使得患者能更好更快的适应配方，发生腹泻的并发症也相应更少；糖代谢更趋于稳定，能量供给的效率提升，抗感染的基础得以巩固。3、结论：（1）强化左旋肉碱的肠内营养能使老年患者更好适应配方，可降低患者的炎症反应水平，有助于控制感染。（2）可更好的稳定糖脂代谢，控制代谢性并发症的发生发展，可能会改善临床最终结局。

关键字 肠内营养，牛磺酸，左旋肉碱，老年管饲

分类：临床营养

临床营养支持对结直肠癌化疗患者作用的研究

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目的：探讨肠内外营养支持对结直肠癌化疗患者营养状况、免疫状况及不良反应的影响。在结直肠癌治疗的众多手段中，化疗为重要手段之一，可有效抑制病情进展、延长患者生存期[2]。但患者在接受化疗中也会对肠屏障造成损伤，影响机体对肿瘤的免疫监控功能，引起患者食欲下降，膳食摄入减少，造成一系列如恶心呕吐腹泻[1] 、骨髓抑制、白细胞下降等不良反应 [6, 7]。且相关研究也报道，结直肠癌患者营养指标与化疗预后息息相关[8]。即化疗可通过影响患者营养状况和免疫状况，增加不良反应发生，进而影响化疗效果和疾病预后。方法：采用随机数字表法将研究对象分为观察组和对照组，每组各 100 例。观察组男性 60 例，女性 40 例，平均年龄为 60.97±7.951 岁，BMI 为 19.85±1.114 kg/m2，肿瘤直径大小≤5cm 者 60 例，>5cm 者 40 例，肿瘤分化程度为低、中、高者分别有 45 例、34 例、21 例，TNM 分期为 T1-T2 者 59 例，T3-T4 者 41 例，平均 NRS 2002 评分为 3.62±0.789；对照组男性 58 例，女性 42 例，平均年龄为 61.12±7.853 岁，BMI 为 19.86±1.118 kg/m2，肿瘤直径大小≤5cm 者 61 例，>5cm 者 39 例，肿瘤分化程度为低、中、高者分别有 48 例、32 例、20 例，TNM 分期为 T1-T2 者 53 例，T3-T4 者 47 例，平均 NRS 2002 评分为 3.74±0.872。两组患者出生性别、年龄、BMI、肿瘤大小、肿瘤分化程度、TNM 分期及 NRS 2002 评分均无差异（P>0.05），具有可比性，（P>0.05）。在化疗基础上，两组患者均接受膳食指导，对照组患者经口摄入能量不足部分采用经肠外营养补充，观察组患者则采用肠内联合肠外的方法补充。比较两组患者营养状况、免疫状况和不良反应发生率的差异。结果：化疗后，观察组患者血清 TP、PA、ALB 水平改善情况较对照组明显（P<0.05）；观察组患者血清 IgG、IgM 及 IgA 升高水平也较对照组显著（P<0.05）；观察组患者总不良反应发生率低于对照组（ x 2=4.861，P=0.027），白细胞下降、消化道反应、肝功能损伤及骨髓抑制发生例数均低于对照组。在本研究中发现，在结直肠癌术后患者行化疗期间给予个体化的肠内和肠外营养支持，可有效改善血清总蛋白、白蛋白及前白蛋白水平降低情况。白蛋白由肝脏产生，不仅与患者营养状况相关，与机体免疫功能也密切相关，其血清水平对患者预后有一定的指示作用。前白蛋白在体内储存很少，生物半衰期仅 1.9 天，故其水平是反映营养状况的灵敏指标。另外，患者血清 IgG、IgM 及 IgA 水平也得到有效改善，即患者的营养状况和免疫状况均得到有效恢复。在本研究中发现，经肠内营养和肠外营养给予患者充足的能量物质和抗氧化微量营养素可有效降低患者白细胞下降水平，减少消化道不良反应和肝功能损伤，改善骨髓抑制情况，从而间接提高患者生活质量，改善疾病预后。结论：在结直肠癌患者化疗期间，给予适当的肠内及肠外营养支持，可有效改善患者营养状况和免疫状况，降低不良反应发生率，降低不良反应发生率，从而提高患者生活质量，改善预后。

[Abstract]Objective: To explore the effect of enteral and parenteral nutrition support on the nutritional status, immune status and adverse reactions of patients with colorectal cancer during chemotherapy. Methods: A total of 200 colorectal cancer patients who were treated in our hospital from February 2018 to March 2021 were collected as the research objects, and they were randomly divided into the observation group and the control group with 100 cases each. The general conditions of the two group patients are comparable (P>0.05). On the basis of chemotherapy, both group patients received dietary guidance. The control group received parenteral nutrition supplementation for the insufficient oral energy intake, and the observation group received parenteral nutrition combined with parenteral nutrition. The differences in nutritional status, immune status and incidence of adverse reactions between the two group patients were compared. Results: After chemotherapy, the improvement of serum TP, PA and ALB levels in the observation group was more significant than that in the control group (P<0.05); The elevated levels of serum IgG, IgM and IgA in the observation group were also significantly higher than those in the control group (P<0.05); The incidence of total adverse reactions in the observation

group was lower than that in the control group (χ^2=4.861, P=0.027). The incidence of leukopenia, gastrointestinal reactions, liver damage and bone marrow suppression were all lower than those in the control group. Conclusion: During chemotherapy for patients with colorectal cancer, proper enteral and parenteral nutritional support can effectively improve the nutritional status and immune status, and reduce the incidence of adverse reactions.

关键字 结直肠癌；肠内营养；肠外营养；营养状况；不良反应

分类：临床营养

多学科协作式营养策略对乳腺癌术后化疗患者营养指标及 T 淋巴细胞亚群的影响

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目的：探析对乳腺癌术后化疗患者提供多学科协作式营养策略干预对其营养指标、T 淋巴细胞亚群的影响。方法：选取本院外科肿瘤科 2019 年 3 月-2021 年 9 月间收治乳腺癌根治术后化疗患者 100 例，以随机数字表设计原则对患者每组 50 例划分为对照组、观察组，所有患者均提供对应术后营养干预，对照组配合常规膳食干预，观察组配合多学科协作式营养策略干预。从两种营养干预措施下患者营养目标变化、T 淋巴细胞亚群变化及毒副作用发生率进行比较。结果：在干预前两组患者转铁蛋白、血清前白蛋白以及血清白蛋白指标无显著差异（P＞0.05），干预后两组患者营养指标有所提升，观察组显著高于对照组（P＜0.05）。干预前两组患者 T 淋巴细胞亚群指标无显著差异（P＞0.05），干预后观察组患者 CD4+、CD4+/CD8+高于对照组，CD8+低于对照组（P＜0.05）。在不良反应方面观察组患者骨髓抑制发生率显著低于对照组（P＜0.05）。乳腺癌患者无论接受手术根治治疗或者术后化疗都会极大程度影响，此时机体需要营养如果得不到满足则免疫力会逐渐下降，胃肠功能紊乱不能得到调整，不但不利于术后机体康复，同时因化疗而产生的不良反应发生风险也会明显增加，因此对乳腺癌术后化疗患者进行肠内营养支持从而改善其机体营养状态，提升生活品质与康复效果，有重要意义[6]。乳腺癌术后化疗患者无论病情、治疗方案、机体状态都相对特殊，因此常规膳食营养措施已经难以满足康复及治疗的需求，甚至部分患者因长期不能得到满意的营养支持效果而对医护行为产生抵触情绪[7]。本研究对收治乳腺癌术后化疗患者提供多学科协作式营养支持干预，在于根据患者实际情况提供合理全面的合理且阶梯营养支持服务，这不但要具有掌握营养知识的专业医护人员，同时也要有具体科学的干预流程进行引导，保障方案的确实实行。多学科合作理念下成立专业 NST 营养小组，小组成员定期接受关于营养知识内容的培训并充分考虑到患者的身体机能、化疗进程以及饮食摄入情况，在表 1 数据中观察组患者营养指标干预后所得数据显著优于对照组，说明多学科协作（MDT）策略下患者营养摄入得到保障，相对于常规营养干预措施在调整机体血清蛋白质水平以及促进营养状态恢复方面具有显著优势。T 淋巴细胞亚群因为乳腺癌患者机体在异常应激状态下而出现明显波动，已经有相关研究[8-10]对恶性肿瘤术后化疗患者进行追踪检测，发现此类患者免疫功能下降典型表现为 Th 淋巴细胞浓度下降，Ts 淋巴细胞亚群浓度上升，观察组患者干预后各项 T 淋巴细胞指标稳定性更高，也为患者耐受化疗奠定良好基础。结论：对收治乳腺癌手术后化疗患者提供多学科协作式营养支持策略干预对于改善机体营养状态，调整 T 淋巴细胞亚群浓度以及更好的接受化疗干预有积极价值，值得推广。

【Abstract】Objective: To explore the effect of providing multidisciplinary collaborative nutrition strategy intervention on the nutritional indicators and T lymphocyte subsets for breast cancer patients undergoing chemotherapy. Method: A total of 100 patients undergoing chemotherapy after radical mastectomy in our hospital between January 2020 and October 2021 were selected. Based on the principle of random number table design, 50 patients in each group were divided into control group and observation group. All patients were provided Corresponding to postoperative chemotherapy nursing intervention, the control group cooperated with routine dietary intervention, and the observation group cooperated with multidisciplinary cooperative nutrition strategy intervention. Compare the changes of patients' nutritional goals, T lymphocyte subsets and the incidence of toxic and side effects under the two nutritional interventions. Results: Before the intervention, there was no significant difference in the transferrin, serum prealbumin and serum albumin indexes between the two groups of patients (P>0.05). After the intervention, the nutritional indexes of the two groups of patients

improved, and the observation group was significantly higher than the control group (P <0.05). There was no significant difference in T lymphocyte subgroup indexes between the two groups before the intervention (P>0.05). After the intervention, the CD4+, CD4+/CD8+ of the observation group were higher than those of the control group, and the CD8+ was lower than the control group (P<0.05). In terms of adverse reactions, the incidence of bone marrow suppression in the observation group was significantly lower than that in the control group (P<0.05). Conclusion: Providing a multidisciplinary collaborative nutritional strategy intervention for breast cancer patients undergoing chemotherapy has a positive value in improving body nutrition and adjusting the status of T lymphocyte subsets, reducing the risk of adverse reactions, ensuring treatment and rehabilitation effects, and is worthy of clinical promotion .

关键字 多学科协作式；营养支持；乳腺癌术后化疗；营养指标；T 淋巴细胞亚群

分类：临床营养

2 型糖尿病患者中非酒精性脂肪性肝病患病患者与非患者膳食摄入情况的差异以及膳食摄入与肝酶、血脂水平之间的相关关系

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【目的】非酒精性脂肪性肝病（nonalcoholic fatty liver disease, NAFLD）是全球最常见的肝病，NAFLD 在中国的患病率在过去二十年中升高了一倍，随着城市化进程的发展，NAFLD 正成为一个亟待解决的公共卫生问题。2 型糖尿病（type 2 diabetes mellitus, T2DM）与 NAFLD 之间关系密切，相互影响，普通成人 NAFLD 患病率为 20%~33%，NAFLD 在 T2DM 患者中的发生率显著提高，甚至达到 70%~80%。本文探究 T2DM 患者中 NAFLD 患病者与非患病者饮食习惯和肝酶水平、血脂等生化指标之间的差异，以及膳食摄入与 NAFLD 患病、肝酶水平、血脂等生化指标之间的相关关系，旨在为 NAFLD 和 T2DM 联合防治的膳食指导和膳食干预策略提供理论依据。

【方法】采用回顾性分析的方法，对北京积水潭医院内分泌科 2022 年 1 月至 2022 年 12 月住院糖尿病患者进行一般状况调查（性别、年龄、民族、身高、体重、BMI、血压等）、膳食调查、饮酒史调查，检查肝脏影像学，检测血脂（CHO、TG、HDL-C、LDL-C、APOA1、APOB）、血糖（GLU、HbA1c）、肝酶（ALT、AST、GGT）水平等生化指标。膳食调查利用膳食史法，调查近半年粮谷类、蔬菜类、水果类、大豆类、奶类、脱脂奶类、肉蛋类、坚果类、油脂类的摄入情况，并计算每日总能量、蛋白质、脂肪、碳水化合物摄入量，以及蛋白质、脂肪、碳水化合物供能比。调查过程中，使用食物模型、食物图片和食物容器帮助被调查者判断膳食摄入量水平。NAFLD 的诊断符合非酒精性脂肪性肝病防治指南（2018 更新版）的要求，无过量饮酒史的定义为过去 12 个月男性每周饮用乙醇小于 210 g，女性小于 140 g（啤酒、白酒、红酒的酒精含量分别按 3.5%、45%、10%计算）。

【结果】共调查符合条件的受试者 341 人，研究结果显示，在不同类型糖尿病患者中，仅 T2DM 患者 NAFLD 患病率更高（65.1%）。T2DM 患者中 NAFLD 患病的分布不受性别、民族的影响（$P > 0.05$）。T2DM 患者中，NAFLD 患病者的年龄更低（55.2±1.1 vs. 63.3±1.1）、体重更大（76.9±1.1 vs. 66.6±1.0 kg）、舒张压更高（77.9±0.8 vs. 72.2±0.9 mmHg）（$P < 0.05$）。T2DM 患者中，NAFLD 患者具有更高的血清 ALT（35.64±2.80 vs. 16.57±0.88 IU/L）、AST（27.89±1.74 vs. 18.55±0.66 IU/L）、GGT（40.67±4.27 vs. 18.66±1.24 IU/L）水平，以及更高的 TG（3.12±0.30 vs. 1.53±0.09 mmol/L）和更低的 HDL-C（1.08±0.22 vs. 1.21±0.37 mmol/L）水平（$P < 0.05$）。NAFLD 患者体内 TP（69.28±0.61 vs. 66.67±0.67 g/L）、ALB（42.31±0.28 vs. 40.88±0.41 g/L）、PA（253.83±4.22 vs. 229.73±5.63 mg/L）、HGB（143.64±1.27 vs. 134.82±1.81 g/L）水平更高（$P < 0.05$），血糖水平（11.65±0.38 vs. 10.61±0.59 mmol/L）、VD（16.74±0.96 vs. 16.75±0.96 ng/ml）水平则无统计学差异（$P > 0.05$）。T2DM 患者中 NAFLD 患病者具有更高的每日总能量（1837.50±33.29 vs. 1709.17±32.40 kcal）、蛋白质（67.46±1.41 vs. 62.62±1.43 g）、碳水化合物摄入（248.19±5.42 vs. 227.14±5.57 g）（$P < 0.05$）；食物种类上，NAFLD 患病者粮谷类（260.68±6.68 vs. 233.93 g）、水果（161.89±10.61 vs. 125.38+12.35）摄入较多，蔬菜（452.25±8.58 vs. 487.82±11.45 g）、奶类（135.92±10.09 vs. 181.82±13.27 g）摄入较少（$P < 0.05$）。膳食总能量、蛋白质及粮谷类摄入与 ALT、TG、ALB、PA 及 HGB 水平呈正相关（$P < 0.05$）；碳水化合物摄入与 ALT、TG、ALB、HGB 水平呈正相关（$P < 0.05$）；膳食总能量、蛋白质、碳水化合物及粮谷类摄入与 HDL-C 水平呈负相关（$P < 0.05$）；水果摄入与 ALT 水平呈正相关（$P < 0.05$）；奶类摄入与 TG、PA、HGB 水平呈负相关（$P < 0.05$）。

【结论】在 T2DM 患者中，NAFLD 患病者相比非患者具有更高的肝酶水平和血脂水平，且在膳食上摄入更高的总能量、蛋白质、碳水化合物、粮谷类和水果，而蔬菜和奶类则摄入更少。较高的总能量、蛋白质、碳水化合物、粮谷类和水果摄入与 T2DM 患者体内肝酶水平和/或血脂水平呈正相关。T2DM 合并 NAFLD 患者体内较高水平的 ALB、PA、HGB 等反应营养状况的指标可能与较高的膳食能量、蛋白质、碳水化合物、粮谷类摄入有关。

关键字 非酒精性脂肪性肝病，二型糖尿病，膳食摄入，肝酶水平，血脂水平

分类：临床营养

抑制 XOR 活性可以激活 Nrf2/HO-1 信号轴并抑制 JNK 磷酸化降低非酒精性脂肪肝大鼠脂质堆积

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目的：观察非酒精性脂肪肝大鼠黄嘌呤氧化还原酶（XOR）活性抑制后的脂质代谢情况，探究 XOR 在非酒精性脂肪肝发生发展中可能的作用及机制，为非酒精性脂肪肝的防治提供理论依据。

方法：SPF 级 SD 大鼠 18 只，体重（200±20）g，根据体重随机将大鼠分为三组分别为对照组(Control 组，n=6)、高脂组（HF 组，n=6）以及高脂+非布司他组（HF＋F 组，n=6）。实验期间，对 Control 组大鼠给予普通饲料饲养，对 HF 组及 HF＋F 组大鼠给予纯化高脂饲料饲养，持续造膜 12 周。非酒精性脂肪肝大鼠模型造模成功后，HF＋F 组大鼠给予 15 mg/kg bw 的非布司他灌胃，其余两组给予等剂量超纯水灌胃，持续干预 12 周。实验结束后，取大鼠肝脏组织进行 HE 染色以及油红 O 染色并进行病理组织学观察；采用比色法检测各组大鼠血脂和肝功水平，包括胆固醇（T-CHO）、甘油三酯（TG）、低密度脂蛋白（LDL-C）、高密度脂蛋白（HDL-C）血浆含量以及谷丙转氨酶（ALT）、天门冬氨酸氨基转移酶(AST)血浆酶活力；采用酶联免疫吸附法（ELASA）检测各组大鼠 XOR 血浆酶活力以及相关氧化应激指标，包括超氧化物歧化酶(SOD)、谷胱甘肽过氧化物酶（GSH-Px）以及 8-羟基脱氧鸟苷(8-OHDG)；采用蛋白免疫印迹法（Western Blot，WB）检测各组大鼠肝脏细胞核因子 E2 相关因子 2（Nrf2）、血红素加氧酶-1（HO-1）、c-Jun 氨基末端激酶（JNK）、磷酸化 c-Jun 氨基末端激酶（P-JNK）及 XOR 的蛋白表达水平；采用实时荧光定量聚合酶链式反应（RT-qPCR）检测各组大鼠肝脏 XOR 的 mRNA 转录水平。

结果：与 Control 组相比，HF 组大鼠血浆 XOR 活性、肝脏 XOR 蛋白表达水平以及相关 mRNA 转录水平显著升高（P＜0.05）；而与 HF 组相比， HF+F 组大鼠血浆 XOR 活性、肝脏 XOR 蛋白表达水平以及相关 mRNA 转录水平显著下调（P＜0.05）。根据病理组织学观察结果，与 Control 组相比，HE 染色显示 HF 组大鼠肝细胞脂肪变性严重并出现细胞空泡化，油红 O 染色显示肝脏脂肪过度堆积；而与 HF 组相比，HF+F 组大鼠肝细胞脂肪变性减轻，肝脏脂肪堆积减轻。血脂、肝功以及相关氧化应激水平检测结果显示，与 Control 组相比， HF 组大鼠 TG、T-CHO、LDL-C 血浆含量以及 AST 血浆酶活力显著升高（P＜0.05），SOD 和 GSH-Px（P＜0.05）血浆酶活力显著降低；而与 HF 组相比，HF＋F 组大鼠 TG、LDL-C 血浆含量以及 AST 血浆酶活力显著降低（P＜0.05），同时，SOD 和 GSH-Px 血浆酶活力显著升高（P＜0.05）。对于 JNK 信号通路相关蛋白及 mRNA 转录水平的检测结果显示，与 Control 组相比，HF 组大鼠 Nrf2、HO-1 蛋白表达水平显著降低（P＜0.05），JNK 蛋白磷酸化水平显著上调（P＜0.05）。与 HF 组相比，HF＋F 组大鼠 Nrf2、HO-1 蛋白表达水平显著升高（P＜0.05），同时，JNK 蛋白磷酸化水平显著下调（P＜0.05）。

结论：抑制 XOR 活性可以降低氧化应激，激活 Nrf2/HO-1 抗氧化机制，同时也可以抑制 JNK 信号通路磷酸化，从而改善高脂饮食诱导的非酒精性脂肪肝大鼠脂质堆积。

关键字 XOR；氧化应激；Nrf2/HO-1；JNK 信号通路；脂质堆积

分类：临床营养

膳食炎症指数与肌肉衰减症在老年人群中的关联

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目的：研究表明，慢性炎症的特点是 IL-6、TNF α 和 C 反应蛋白 (CRP) 等炎症因子浓度升 高，其与老年人群的肌肉质量和力量降低有关。慢性炎症通过多种信号通路影响肌肉蛋白代 谢，导致肌肉质量、力量和功能丧失。尽管肌肉衰减症是多因素联合作用的，从衰老和癌症 相关的机制来看，慢性炎症的作用与肌肉衰减症的发生有一定的关系。饮食可能在调节慢性炎症方面 发挥着重要作用，同时在肌肉质量功能增加方面发挥重要作用。饮食炎症指数 (DII) 是根 据各种饮食成分的促炎症和抗炎症特性来估计饮食的整体炎症潜力。DII 分数越高，说明饮 食中的炎症潜力越大，表现在血浆中的炎症因子水平越高，它是一个旨在评估饮食炎症潜力 的工具，但关于 DII 和肌肉衰减症之间的关联的现有研究是有限的。因此，我们旨在研究 DII 与 65 岁以上老年人群肌肉衰减症发生的关系，为老年人健康提供可靠的饮食模式。

方法：本研究是基于参加 1999-2006 年美国国家健康和营养调查 (NHANES) 的人群，测量了身 体成分以及进行全身 DXA 扫描。全身 DXA 扫描是用 Hologic QDR4500A 扇形光束密度计 (Hologic, Inc., Bedford, Massachusetts) 进行的，排除了怀孕、肥胖 (>136 公斤) 、身高 (>196 厘米) 的参与者，同时排除了（年龄＜65 岁）的人群。筛选出的四肢骨骼肌质量 (ASM) 按体重指数 (BMI) 划分，按照美国国立卫生研究院 (NIH) 对肌肉衰减症的定义 ，男性 ASM/BMI<0.789，女性 ASM/BMI<0.512 被判定为肌肉衰减症。DII 是由 Shivapa 开发的一种评估饮食成分潜在炎症水平的评分系统。在这项研究中，DII 通过 24 小时膳食消耗量计算，将 24 小时膳食营养素摄入量数据和膳食补充剂数据相加，然后使用 27 种营养素用于计算 DII 评分。将 DII 分为四分位数后，采用多因素 Logistic 回归分析 DII 与肌肉衰减症之间的关系。在上述分析基础上，增加了能量调整的 DII 分 数 (E-DIITM) ，再用平滑曲线拟合和 Logistic 回归模型来评估 E-DII 和肌 肉衰减症之间的关系。

结果：本研究参与者的平均年龄为 (73.1±7.6 岁) ，DII 在最高四分位数时，肌肉衰减症的比例高于最低四分位数。平滑曲线拟合结果显示 EDII 得分与肌肉 衰减症的发生呈正相关 。Logistic 回归确认的肌肉衰减与与 EDII 评分独立相关(OR = 1.23, 95% CI[1.13 - 1.53], P=0.01) ，另外，较高的 E-DII 得分与较低的 (ASMI) 有关 (β=-0.02,P < 0.03)。在男性老年患者中，此结果更显著。

结论：我们观察到饮食炎症指数得分越高，老年人的肌肉衰减症的可能性越大，这对老年人的健康饮食有较高的研究价值。但是，本项研究属于横断面研究，未来需要更多的研究和证据来阐明观察到的关联的潜在机制，为后续研究有启示作用。

关键字 饮食炎症指数 四肢骨骼肌质量 NHANES 肌肉衰减症

分类：临床营养

成人特殊医学用途全营养配方粉临床研究

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目的：口服营养补充(oral nutritional supplements, ONS)是一种有效的营养支持方式，可以加强食物中的蛋白质、碳水化合物、脂肪、矿物质和维生素等营养素含量，提供均衡的营养素以满足机体对营养物质的需求。越来越多的研究证据支持 ONS 可以改善社区和住院营养不良及营养不良高危患者的营养状况及临床结局。本研究旨在评价特医全营养配方粉在具有营养缺乏风险或已发生营养缺乏的老年人群中，是否符合其营养补充需求；与接受常规营养指导和饮食调整特医全营养配方粉在营养状态、运动情况、短期临床结局和生活质量等方面的改善效果。同时评估其对受试人群的安全性。

方法 ：从医院门诊、社区等机构招募 90 名 60~80 周岁存在营养不良或风险的中老年人作为研究对象。根据受试者的统计机构生成随机数表，进而得到随机分组表。研究者根据受试者的入组顺序给予受试者编号，并参照随机分组表将受试者随机分配进入特医全营养组或对照组。特医全营养组给予膳食指导及每日服用特医全营养配方粉能量 500kacl；对照组仅给予膳食指导建议，干预周期为 12 周。期间将通过测量基线与干预后受试者血生化、血常规、粪便状态、腹痛、腹泻、腹胀情况，观察产品对人体的安全性。通过营养不良评估量表 MNA、膳食调查、体重、BMI、非意向性减重体重百分数、无脂体重、握力、小腿围、上臂围、功能限制问卷（SARC-F）、体力活动量表（PASE）、生活质量问卷（EQ-5D）观察产品对人体的营养补充性。

结果：干预 12 周后，特医全营养组的 MNA 评分的增加明显高于对照组（P＜0.0001）；特医全营养组的体重增加（P=0.001）、BMI 增加（P=0.001）明显优于对照组，非意向减重体重百分数明显低于对照组（P＜0.001）；特医全营养组的平均握力增加（P＜0.001）和平均小腿围增加（P＜0.001）明显高于对照组；特医全营养组的 SARC-F 得分的减少程度明显大于对照组（P＜0.05）。干预 12 周后，特医全营养组、对照组的排便频率、腹泻频率、腹痛频率、腹胀频率的变化无明显差异（P＞0.05）。

结论：特医全营养配方粉可以改善中老年人群的营养状况，降低营养不良发生的风险；可以增加体质量和 BMI 水平；可以增加握力和小腿围等机体功能；能够改善受试者的平均血红蛋白浓度。特殊医学全营养配方粉不会引起胃肠道的不良反应和肝肾功能的损伤。肠道安全性记录、血常规和血生化分析发现，受试者食用特医全营养配方粉未出现明显的不良反应，血液检测指标也保持稳定。

关键字 特殊医学配方食品；营养不良；营养不良风险

分类：临床营养

营养精神病学研究进展

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目的：自 2015 年营养精神病学的概念提出，基于营养干预策略的精神疾病防治已引起广泛关注与认同。其中 ω-3 多不饱和脂肪酸、N-乙酰半胱氨酸、维生素 D 等众营养物质在精神疾病防治中发挥重要作用。目前，营养精神病学机制研究主要集中于调控肠道菌群、神经炎症和氧化应激损伤等领域。随着营养学学科的快速发展及其与精神病学学科的深度融合，营养精神病学的研究必将出现飞速发展。本文综述了营养精神病学的研究进展，简介了营养素防治神经精神疾病的相关机制，为基于营养精神病学的神经精神疾病机制研究和防治策略的建立拓宽了思路。

方法：为探讨营养物质摄入和精神疾病发生发展的关系,作者以营养精神病学作为关键词在 Pubmed、Web of Science、ScienceDirect、中国知网学术期刊数据库、万方学术期刊数据库等多个数据库检索了 2022 年 12 月 20 日前已发表的中英文文献,大量阅读后筛选出符合主题的文献,同时对已查阅文献的参考文献应用文献追溯法进行查询，最终纳入 96 篇相关文献。

结果：

（1）ω-3 多不饱和脂肪酸作为辅助性药物的抗抑郁作用已被证实，ω-3 多不饱和脂肪酸还可以改善创伤后应激障碍、阿尔兹海默症、双相情感障碍和精神分裂症的异常行为表现。

（2）服用适量 N-乙酰半胱氨酸可改善抑郁症状；N-乙酰半胱氨酸通过抑制突触前谷氨酸释放来对抗精神分裂症患者大脑中的氧化应激损伤；N-乙酰半胱氨酸在治疗成瘾、阿尔兹海默症、双向情感障碍、强迫等精神疾病方面也发挥重要作用。

（3）足够的维生素 D 可改善情绪，增加认知能力。维生素 D 缺乏与一系列精神障碍有关，包括抑郁症、双相情感障碍、精神分裂症和阿尔兹海默症。

（4）营养物质可能通过调控肠道菌群稳态、调控神经炎症和调控氧化应激损伤等机制作用于神经精神疾病。

结论：随着人们对营养物质研究的深入，营养素对精神疾病的调节作用现已被广泛认可。虽然营养对精神疾病调节作用相关机制仍不明确，缺乏服用相关营养素防治精神疾病的大规模临床研究，但已有的科研成果已经为解决这些问题提供了重要启示。综合当前最新研究发现，后续研究可围绕以下内容展开：1）研究并总结相关营养素作用的中枢脑区，并寻找其他可有效发挥神经精神疾病干预作用的营养素；2）明确各种营养素对不同神经精神疾病的调节作用，探索营养素的联合应用方案；3）进一步探索营养素在神经精神疾病方面的临床意义并开展相关循证医学研究。随着生命科学的快速发展和人类健康观念的转变，营养精神病学的研究必将达到一个新的高度，并将为精神疾病的早期防治及后期干预提供帮助。

关键字 营养精神病学；ω-3 多不饱和脂肪酸；N-乙酰半胱氨酸；维生素 D；神经精神疾病

分类：临床营养

孕早期血清肝酶水平预测妊娠期糖尿病的队列研究

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题目：孕早期血清肝酶水平预测妊娠期糖尿病的队列研究。目的：通过前瞻性队列研究，收集正常孕妇孕早期常规临床检测的肝功能生化等指标，随访至孕中期，以探讨孕早期血清肝酶水平对妊娠期糖尿病（GDM）发病风险的临床预测价值。方法： 选取 2020 年 7 月 1 日至 2023 年 2 月 1 日郑州大学第三附属医院产科门诊，建卡立档的孕妇，且符合纳入排除标准，签订知情同意书，收集孕妇孕 6-13 周血清肝酶水平及基本人口学基本特征，最终确定研究对象 1295 人，进行前瞻性队列研究。根据国际糖尿病与妊娠协会（IADPSG）（2010 版）GDM 诊断标准及孕中期 75g 口服葡萄糖耐量试验（OGTT）结果，纳入人群分为 GDM 组和非 GDM 组。本研究较现有发表文献的创新处，在于首先，前瞻性队列研究在验证因果关系上更强，为探讨孕早期血清肝酶预测 GDM 的临床应用价值具有非常重要的意义。其次，创新之处在于本研究纳入了五种血清肝酶水平指标（AST : aspartate aminotransferase, ALT： alanine sminotrancferase, GGT ：g-gamma-glutamyl transferase, ALP ：alkaline Phosphatase，AST/ALT：the ratio of alanine sminotrancferase and alanine sminotrancferase），比较全面整体的分析了，孕早期血清肝酶水平对孕中期 GDM 发生风险的临床预测的应用价值。并且采用了有力的统计预测模型的统计方法。本研究运用 SPSS25.0 统计学软件分析，将孕早期五种血清肝酶水平分别四分位后（Q1、Q2、Q3、Q4），采用先单因素分析后多因素分析的方法，运用二元 logistic 回归模型分析，用比值比（odds ratio, OR）及 95%可信区间（CI）表示不同模型下孕早期血清肝酶水平与 GDM 发病风险的关系。为了深入分析，并进一步采用了 R 软件 4.2.2 版本绘制了限制性立方样条图（RCS），研究了孕早期血清肝酶与 GDM 发生风险的非线性关系，绘制受试者工作特征（ROC）曲线，评价预测模型的临床应用价值。结果：1295 例孕妇中发生 GDM 的有 240 人，GDM 发生率为 18.5%。单因素分析发现，GDM 组血清肝酶水平最高四分位数值均高于非 GDM 组血清肝酶最高四分位水平，差异均具有统计学意义[ALT：17.55(11.43，28.9)VS12.5(9.60，18.0)，AST：18(15.23，24.2) VS 16.4(14.3，19.2)，GGT：14.95（11.5，21.4）VS 11.2（9，15），ALP：48.05（40.56，58.8）VS 42.9（37.02，50.2），*P*均<0.01]； AST/ALT 比值与 GDM 发生风险呈负相关，AST/ALT 比值在 GDM 组低于非 GDM 组[1.01（0.79，1.33）VS1.28（1.02，1.58），*P*<0.01]。调整潜在混杂因素后，血清 GGT（OR=7.9，95%CI：4.44～14.17，P<0.05）、血清 ALP（OR=2.9，95%CI：1.89，4.66，P<0.05）仍是 GDM 发生风险的独立风险因素。AST/ALT 比值（OR=0.3，95%CI：0.12～0.45，P<0.05）与 GDM 发生风险呈负相关关系。含血清 GGT、血清 ALT、血清 ALP 的联合模型（AUC=0.751，P<0.05）对孕妇孕期 GDM 的发生风险具有很好的预测价值。限制性立方样条图（RCS）显示，进一步调整年龄、BMI、居住地、家族史等潜在混杂因素后，孕早期血清 GGT 与 GDM 发生风险呈剂量反应关系，且存在非线性关系（*P*<0.0001，*P*-Nonlinear <0.0001）；血清 ALP 与 GDM 发生风险呈剂量反应关系，但不存在非线形关系（*P*<0.0001，*P*-Nonlinear =0.0893）；血清 AST/ALT 比值与 GDM 存在剂量反应关系，但不存在非线形（（*P*=0.0004，*P*-Nonlinear =0.0614）。结论： 孕早期血清肝酶水平高的孕妇发生 GDM 风险更高，血清 GGT、血清 ALP、AST/ALT 比值，将有望成为 GDM 孕早期预测性生物标志物。从而进一步提高 GDM 的早期筛查效率，为预防、降低 GDM 发生具有重要的公共卫生学意义和临床应用价值。

关键字 孕早期；血清肝酶；妊娠期糖尿病；预测价值。

分类：临床营养

某三甲医院老年患者营养风险与营养治疗干预的队列研究

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目的： 调查内蒙古鄂尔多斯地区老年科住院患者营养风险发生率，营养不良发生率，以及当地老年患者营养路径实施状况与临床结局的相关性。 我国是世界上老年人口最多的国家，高龄伴多种慢性疾病的老年衰弱患者营养风险率高。全国住院患者营养风险发生率 40%-50%，老年患者营养风险发生率 40%-80%。老年营养不良导致机体储备能力和抵御能力下降的状态，使机体对不良结局的易感性增加，体现了老年人健康的异质性。全国的老年住院患者营养风险与营养治疗有文献报道，但是内蒙古鄂尔多斯地区老年住院患者的营养风险与营养治疗现状未有报道。方法：收集我院老年科 2022 年 7-2022 年 12 月期间，住院 169 例老年患者的基本信息，其中营养师参与营养治疗的干预组患者 75 例，未有营养师参与营养治疗对照组患者 94 例，采用 NRS2002 营养筛查、GLIM 营养营养不良诊断分别评估其营养状态，患者出院时收集营养治疗方案。比较两组生化指标、住院时间、住院费用的差别。 结果：169 例患者接收营养筛查与数据采集，排除筛查数据不完整患者 34 例，最终 138 例纳入研究，其中营养师干预组 65 例，对照组 73 例。我院老年科营养风险发生率是 48.6%（67 / 138），营养师参与的有营养风险接收营养治疗率 74.1%（20 / 27），与对照组营养治疗率 55%（22 / 40）存在明显差异。接收均衡规范的营养治疗方面，营养师参与的有营养风险接收营养治疗率 50%（10 / 20），与对照组 13.6%（3 / 22）存在显著差异。接收营养治疗的患者中，肠外营养与肠内营养比例为 2:1，其中 32.2%患者接收肠外联合肠内营养治疗。根据营养不良评估，营养师干预组有营养不良患者 27 例（轻度营养不良 18 例，中重度营养不良 9 例），占比 37%。对照组组有营养不良患者 28 例（轻度营养不良 17 例，中重度营养不良 11 例），占比 44.4%。67 例营养风险患者中有 42 例患者采集到完整营养相关的指标白蛋白、前白蛋白、血红蛋白，且均有统计学差异(P ＜ 0. 05) 。营养师干预组共 20 人，人均住院费用 7107.64 元，平均住院天数 6 天；对照组 22 人，人均住院费用 7554.06 元，平均住院天数 8 天 ，两组间均无统计学差异(P ＞0. 05) 。结论:内蒙古鄂尔多斯地区老年患者营养风险与营养不良发生率高，营养治疗率低、均衡营养治疗率低，临床营养师通过营养治疗路径参与到老年患者治疗团队可规范营养治疗，改善老年患者营养治疗成功率，但因老年患者异质性强，营养路径患者的住院时间与住院费用未有显著差别。

［关键词］老年患者；营养路径、营养不良、临床结局

关键字 老年患者；营养路径；营养不良；临床结局

分类：临床营养

新冠肺炎危重症患者临床治疗中的营养支持——病例报告

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摘要：目的：2020 年新型冠状病毒肺炎在全世界范围内广泛而迅速地传播，而人群对 COVID-19 引起的 SARS-CoV-2 普遍易感，大部分患者症状较轻，且预后良好。但存在基础疾病、免疫力低下等营养不良的人群，尤其是那些患有糖尿病、高血压等多种基础疾病的老年人群患病率更高。老年住院患者中患有高血压、心血管疾病，其死亡率更高，在这场流行病战役中严重受创。同时，我们发现新冠住院患者中普遍存在营养不良，其不利于疾病的治疗与患者的康复，患者良好的营养状态对疾病的进展与转归起到更重要的作用，尤其是危重症患者。作为临床营养医师，我们更关注住院病人在临床治疗过程中的营养状态。本文中，我们报导了一例 88 岁的高龄危重症患者，希望本文为从事老年危重症患者临床营养治疗的同仁提供更多的思考与借鉴。方法：临床营养支持治疗，患者男，88 岁，入院诊断为重型新型冠状病毒性肺炎、多发性脑梗死、慢性肾功能不全及高血压 3 级；查体体温 37.7℃，脉搏 83 次/分，呼吸 20 次/分，血压 128/60 mmHg（在当地医院住院期间可高达 180 - 200/80 - 90 mmHg），口唇轻度发绀，不吸氧静息状态下，血氧饱和度为 88%，经鼻导管高流量吸氧 4L/min，吸氧浓度 60%，血氧饱和度为 98%；实验室检查：白蛋白 33g/L，前白蛋白 68mg/L，葡萄糖 6.65mmol/L，肌酐 162umol/L，尿素氮 10.02mmol/L，尿素 510umol/L，C-反应蛋白 124.8mg/L；身高 178cm，体重 50kg，BMI 为 15.78kg/m2，消瘦体型；入院后经营养风险筛查 NRS-2002 评分为 6 分，MNA-SF 得分为 3 分，患者存在营养不良，需给与营养支持治疗。积极予以饮食指导，鼓励患者进食。因患者病情较重，查体及治疗不配合，加之情绪恐惧烦躁，进食困难，无法正常经口进食摄入足量食物，床位医生予以脂肪乳注射液和复方氨基酸注射液等肠外营养。考虑到患者年龄、精神状态及胃肠道功能等情况，我们与患者家属和床位医生沟通后，建议床位医生评估患者身体条件及状态，可行鼻胃管置入术。床位医生评估患者状态后行鼻胃管置入术，成功试饮水后启用肠内营养，逐步由肠外营养为主过渡至肠内营养为主。在肠内营养支持治疗过程中，患者出现消化道出血，予禁食、水，行抑酸、护胃、止血等治疗，患者营养方案由肠内营养调整为肠外营养。结果：最终经过积极的临床及营养支持治疗，患者的康复出院。结论：整个临床治疗过程中，我们根据患者身体状态及病情制订个性化营养计划，并根据患者疾病变化，及时调整营养方案，最终患者的康复出院，充分说明了危重症患者个性化营养支持的重要性。

关键字 新型冠状病毒肺炎；老年患者；营养不良；营养支持，肠内营养；肠外营养

分类：临床营养

住院患者血清矿物质水平与营养风险的关系研究

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目的 对住院患者血清矿物质水平进行现状描述;分析住院患者血清矿物质水平与营养状况之间的关系。国民营养与健康状况是反映一个国家经济发展、卫生事业水平和人口素质的重要内容，近年来许多营养相关性疾病发病率日益升高,特别是在心血管系统疾病、内分泌系统疾病中尤为多见，营养风险和营养不良是住院患者中常见的症状，发生率均较高。

方法 选用国民营养基础数据库（CNFD2020）—河北省 2259 例住院患者，采用问卷调查的方式收集患者人口学资料、入院后的生化检验结果并进行体格测量，同时采用营养风险筛查评分简表（NRS 2002）、全球领导人营养不良倡议（GLIM）营养不良诊断标准进行营养状况评估。数据前处理—采取多重插补的方法进行临床缺失数据的填补（BMI、腰围、臀围、生化指标等 36 个连续性变量），得到 5 组填补数据，然后立即进行插补后的统计分析，根据填补后数据统计描述与填补前进行比较，选择最优的一组数据进行分析。连续性变量，服从正态分布用均数±标准差描述，采用 t 检验进行组间比较；分类变量采用率进行描述，采用卡方检验进行组间比较。不服从正态分布用非参数检验进行组间比较，并利用多因素 Logistic 回归模型分析营养状况的影响因素。

结果 共纳入 2259 例住院患者，经 NRS 2002 评分≥3 分存在营养风险的患者 886 例（39.2%）；GLIM 评分≥2 分诊断为营养不良的患者 503 例（22.3%）；经单因素分析显示，有无营养风险组人群其血清矿物质钠离子（Na）、氯离子（Cl）、钙离子（Ca）浓度水平差异具有统计学意义（P<0.0001）。利用多因素 Logistic 回归控制年龄、性别、教育程度、身体质量指数（BMI）、是否患有高血压、是否患有糖尿病、血脂是否异常、疾病类型、营养干预方式、握力、总蛋白、白蛋白、白细胞、血红蛋白等相关混杂因素后，结果显示基于 NRS 2002 评分简表判定是否存在营养风险时，血清 Cl 离子水平[OR, 95%CI; 0.54, (0.41, 0.71)]是发生营养风险的保护因素，而血清 Na 的中等水平含量[OR, 95%CI; 0.68, (0.52, 0.89)]是发生营养风险的保护因素；基于 GLIM 营养不良诊断标准判定是否存在营养不良时，血清 Na、Cl 离子水平[OR, 95%CI; 0.61,(0.45,0.82); 0.54, (0.41, 0.73)]是营养不良的保护因素，而 Mg 离子的中等水平含量[OR, 95%CI; 0.59, (0.44, 0.80)]是营养不良的保护因素。

结论 血清矿物质 Na、Cl 离子含量维持在适当水平对住院患者的营养状况起保护作用，Mg 离子中等水平含量可能是住院患者发生营养风险的保护性因素。住院患者人群中，营养状况的好坏严重影响了患者的生命质量，只有及时监测营养和健康状况及其变化规律，找到更加全面评估营养状况的方法，才能有效改善患者的营养状况。

关键字 住院患者；血清矿物质；营养状况；营养不良；影响因素

分类：临床营养

结直肠癌患者围手术期营养管理的证据总结

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【摘要】 目的 检索并筛选结直肠癌围手术期营养管理的相关证据，并对最佳证据进行总结。方法 计算机检索英国医学会、UpToDate、国际指南协作网、医脉通、英国国家卫生与临床优化研究所网站、苏格兰校际指南网、加拿大安大略注册护士协会网站、美国国家癌症综合网、围手术期护理中心、欧洲临床营养与代谢学会网站、中华医学会肠外肠内营养学会网站、美国肠外肠内营养学会网站、Cochrane Library、Scopus、台湾结直肠外科医师学会、 Web of Science、PubMed、中国知网、万方数据库、维普数据库、中国生物医学文献数据库等发表的临床决策、指南、证据总结、专家共识、系统评价，以“结直肠癌/结直肠恶性肿瘤”/“围手术期/围手术/术前/术后/手术” “饮食/营养”“系统评价/系统综述/Meta 分析”为中文检索词,以“colorectal cancer/tumor/oncology/neoplasm*/carcinoma*”“perioperative/preoperative/postoperative/operation/operative/surgery”“nutrition/diet“ “systematic review/meta-analysis“为英文检索词,检索时限为 2012 年 1 月—2023 年 2 月。 2 名研究者对文献进行质量评价、证据提取与总结。 结果 共纳入 18 篇文献，包括临床决策 4 篇、指南 3 篇、 证据总结 1 篇、专家共识 5 篇、系统评价 5 篇。 总结出 29 条证据，包括多学科团队、营养风险筛查与评估、营养支持原则、术前营养支持、术后营养支持、出院及随访 6 个方面。包括实施多学科综合治疗协作组（multiple disciplinary team，MDT）模式，多学科治疗团队中应包含专业的营养学家，最好是肿瘤营养学方面的专家，以提供营养支持；结直肠癌患者一经确诊，即应进行营养风险筛查及营养状况评估，并贯穿于患者治疗全过程。对于营养风险筛查，推荐采用营养风险筛查 NRS2002 评分工具，评分≥ 3 分者为具有营养风险。NRS2002 评分无营养风险者，建议住院期间每周筛查 1 次。GLIM 标准是国际上最新的营养不良诊断方法，推荐用于结直肠癌患者。存在营养风险或营养不良 、不能进食时间超过 5～7 天、 经口摄入量减少或摄入量不到目标推荐量的 50%且时间超过 7 天的患者，术前均应接受营养教育及营养支持治疗。老年肌肉减少症患者是一类特殊的营养不良高危人群。术前总蛋白/氨基酸摄入达标比总能量摄入达标更重要，建议蛋白/氨基酸摄入达到 1.0～1.5 g/（kg·d）。术前尽可能维持病人正常容量状态并且纠正水、电解质平衡紊乱。术中根据血流动力学监测采用 GDFT，使血管内容量和心输出量达到最佳。推荐行肿瘤大手术的营养不良患者在围手术期或至少在术后使用富含精氨酸、ω-3 脂肪酸、核糖核苷酸的特殊营养制剂，并建议在术前使用 5 ~ 7 d(GPP)。结直肠癌患者无论接受根治手术还是姑息手术，均应按照 ERAS 原则和流程实施围手术期的营养管理。血糖管理应贯穿整个围手术期，根据手术类型和病人具体情况制定个体化血糖控制目标及治疗方案。加强胃肠手术病人出院后的营养管理，对存在营养风险或营养不良病人应进行合适的营养治疗，并定期随访和监测。 结论 该研究总结的结直肠癌患者围手术期营养管理的最佳证据具有科学性和系统性，为医护人员对结直肠癌围手术期患者实施营养管理提供循证依据。

关键字 结直肠肿瘤； 围手术期； 围手术期护理； 营养不良； 营养支持； 循证护理学

分类：临床营养

FOCUS-PDCA 循环管理在提高住院患者营养风险筛查 2002 准确性中的应用

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目的：应用 FOCUS-PDCA 循环规范管理 NRS2002 的临床应用，提高筛查准确性，及时、准确地发现存在营养风险的患者，给予规范化的营养治疗，以改善临床结局。方法：收集深圳某三甲医院营养风险相对较高的 8 个科室（消化内科、神经内科、肾脏内科、呼吸内科、肿瘤血液科、神经外科、胃肠外科和重症医学科）2021 年 4 月新住院患者的营养风险筛查 2002 评分，对其总分和各项（疾病严重程度、营养状态受损程度和年龄）评分进行审核，统计其准确性及错误类型。纳入标准 ：(1)年龄≥18 岁 ；(2)住院时间超过 24 小时。排除标准：住院 24 小时内行急诊手术。患者住院后 24 小时内，护理人员和营养医师同期、分别为其进行营养风险筛查；以营养医师的评分为标准，判断护理人员的营养风险筛查评分是否准确。对同一患者，当护理人员营养风险筛查表中 A、B 和 C 项评分均与营养医师的评分一致时，视为“准确”；如其中任一项评分有误，则视为“不准确”。对同一患者，当护理人员营养风险筛查表中 A 项评分与营养医师的 A 项评分一致时，视为“A 项评分准确”；B、C 项亦然。对同一患者，若营养医师 NRS2002 评分≥3 分，而护理人员评分＜3 分，则筛查结果视为“假阴性”；反之，若营养医师 NRS2002 评分＜3 分，而护理人员评分≥3 分，则视为“假阳性”。然后运用 FOCUS-PDCA（Find-organize-clarify-understand-select-plan-do-check-act）循环管理对营养风险筛查 2002 评分过程中存在的问题进行分析和改进，再收集改进后（2021 年 8 月）的营养风险筛查 2002 评分，对其准确性及错误类型进行统计，评价管理效果。结果：(1)我院通过个体化专科培训、改进医院信息系统、建立营养护理小组和加强多部门协同管理等多项措施进行持续改进，使相关科室的营养风险筛查 2002 评分准确率由改进前的 53.0%（294/555）提高至改进后的 81.1%（473/583），差异有统计学意义（ χ^2 =102.606，P=0.000）；(2)改进前后营养状态受损程度项准确率由 64.14%提高到 90.57%，差异有统计学意义（ χ^2 =114.484，P=0.000），改进前后疾病严重程度项准确率由 78.56%提高到 89.54%，差异有统计学意义（ χ^2 =25.736，P=0.000），年龄项准确率由 96.22%提高 97.77%，差异无统计学意义（ χ^2 =2.369，P=0.124）。(3)改进前后筛查结果的假阴性率分别为 21.08%和 4.97%（ χ^2 =65.957，P=0.000），差异有统计学意义；筛查结果的假阳性率分别为 0.54%和 1.03%，差异无统计学意义（P=0.507）。结论：在 FOCUS-PDCA 循环管理中，我们通过寻找、组织、澄清、 理解、选择、计划、实施、检查及执行多个步骤的实施，达到了优化质量管理的目的。本次研究中，实施后营养风险筛查准确率显著高于实施前，说明 FOCUS-PDCA 循环管理有助于提高住院患者营养风险筛查准确性，提升护理团队营养知识水平和营养风险筛查技能，增强医护人员对患者营养状况的关注度，减少漏筛实际存在营养风险的患者，保障患者营养诊疗的及时、规范化实施。

关键字 FOCUS-PDCA 循环管理；营养风险筛查 2002；准确性；住院患者

分类：临床营养

间歇性断食的减重作用及其机制的研究进展

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超重/肥胖是一种以体内脂肪堆积过多和（或）分布异常、体质量增加为主要特征的慢性代谢性疾病。目前在全球范围内，超重和肥胖的患病率正逐年上升。超重/肥胖是心脑血管疾病、2 型糖尿病、癌症等慢性非传染性疾病的独立危险因素，极大加重了医疗负担。因此，针对超重/肥胖机制及防治方法的研究已成为世界各国学者和政府关注的重点。传统减重的方法主要为持续限能量饮食（CR）和体育运动，而这两种方法的减重效果并不是十分理想，主要原因是患者难以坚持。间歇性断食（IF）又称轻断食，是一种正常能量和能量限制（或完全禁食）交替进行的膳食模式，是现在比较流行的减重方法。IF 可大致分为时间限制断食（TRF）、隔天断食（ADF）和周期性断食（PF）三大类，除此以外还有一些宗教相关的断食模式，如伊斯兰教的斋月断食、佛教的过午不食等。与 CR 相比，IF 不需要每天严格限制饮食，较容易坚持，减重效果也比较明显。各类间歇性断食方法对超重及肥胖的作用机制主要包括代谢转换、调节肠道菌群、适应代谢节律等，其他机制还包括通过肠道通透性升高诱发内毒素血症，进而引起系统性炎症，促进肥胖，IF 人为地延长了禁食时间，降低肠道通透性，改善内毒素血症及系统性炎症。IF 提高了热休克蛋白 HSP70 水平，减轻胰岛素抵抗和糖耐量异常。另外，IF 也可升高人体及实验动物脂联素水平。脂联素促进机体从糖代谢转变为脂代谢，改善胰岛素抵抗。目前的研究证明，不同类型的 IF 方式均具有一定的改善超重和肥胖的效果，但仍存在以下问题需要解决：如何在保证减重效果的前提下减少断食日的饥饿感；如何在达到减重目的的同时维持瘦体质量的质量；如何在进行 IF 的同时确保充足的营养摄入；如何为超重/肥胖患者选择合适的 IF 方案；如何确定各种断食方式的适用范围；IF 方案要持续多长时间。随着精准医学概念的不断深化，超重/肥胖的干预也需要“私人定制”。IF 模式为我们提供了一种可行的减重思路，但并不是治疗肥胖问题的“唯一答案”。在未来，我们也许可以将 IF 与其他膳食模式（如高蛋白膳食模式）联用，结合运动、心理干预，个性化补充营养素、益生菌及其他食物活性成分，使减重效果最优化的同时保证机体健康。目前各个医学基础学科蓬勃发展，基因组学、蛋白组学、代谢组学等技术日新月异，相信在不久的将来，超重/肥胖问题能够拥有良好的解决方案。

关键字 肥胖；体质量超标；间歇性断食；代谢转换；肠道菌群调节

分类：临床营养

基于代谢组学的多囊卵巢综合征研究进展

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多囊卵巢综合征（PCOS）是育龄妇女常见的内分泌和代谢性疾病，是以雄激素过多（多毛症和/或高雄激素血症）和卵巢功能障碍（排卵障碍和/或卵巢多囊样改变（PCOM））为主要特征的疾病，还伴有不同程度的糖脂代谢异常。在育龄期妇女中，PCOS 的患病率为 6%～20%。PCOS 的发病机制尚不清楚，可能是一种复杂的多基因疾病，受遗传因素、环境因素和内分泌等多种因素的影响。某些药物（特别是丙戊酸盐类抗癫痫药）和精神心理因素也影响 PCOS 的发生。目前尚无针对 PCOS 通用的治疗方法，治疗主要以症状为导向，并适应患者的病情变化和个人需求。　目前，对 PCOS 发病机制的研究主要基于基因组学、蛋白质组学和代谢组学等技术。其中，代谢组学是继基因组学和蛋白质组学之后发展起来的，可以揭示 PCOS 的代谢特征，筛选生物标志物。代谢组学可以定量识别小分子生物活性代谢物，反应疾病状态下的代谢特征。它不仅可以表明遗传表型的差异，而且还可以指出环境因素所引起的表型差异。基因组学和蛋白质组学仅表明生物体内发生的代谢紊乱，而代谢组学是基因组学和蛋白质组学变异的结果，可以描述生物体生理和病理状态。因此，代谢组学为 PCOS 的临床诊断及治疗提供了新方向。但是，代谢组学技术仍处于发展阶段，还需深入研究。本文旨在总结近期代谢组学在 PCOS 中的应用以及研究进展，从代谢物、代谢途径等方面进行阐述。PCOS 常伴有不同程度的代谢异常，这些异常会影响多种代谢途径，特别是类固醇激素、氨基酸、碳水化合物、脂质、嘌呤和柠檬酸循环的代谢紊乱。采用核磁共振法、液相色谱-质谱法及气相色谱-质谱法等技术检测生物样本中小分子代谢物，分析正常人与 PCOS 患者代谢的差异。通过对生物样品（如血液、尿液和卵泡液）进行代谢组学分析，可以了解 PCOS 的病理变化，从而为 PCOS 临床的诊断及治疗提供新方向。代谢组学在 PCOS 不同表型（肥胖及脂代谢紊乱、胰岛素抵抗和高雄激素血症）中都得到了很好的应用。代谢组学不仅可以寻找 PCOS 潜在的生物标志物，有利于 PCOS 的诊断，而且还可以应用于 PCOS 的疗效评价及预后。目前代谢组学技术仍处于发展阶段，而且还存在一定的局限性。因此克服代谢组学技术存在的问题的同时，还需要大样本的临床试验来验证当前的研究结果，以期为 PCOS 的临床诊断及治疗提供了可行的方案。

关键字 多囊卵巢综合征；代谢组学；研究进展

分类：临床营养

“5+2”间歇性断食联合中链三酰甘油对超重/肥胖患者体脂及糖脂代谢的影响

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目的 探讨“5+2”间歇性断食模式联合中链三酰甘油对超重/肥胖患者体脂及糖脂代谢的影响，为寻求更安全有效的肥胖干预方法提供参考。

方法 根据纳入标准选取 2018 年 9 月至 2019 年 9 月在南宁市第二人民医院临床营养科门诊就诊的 68 例超重/肥胖患者作为研究对象。剔除在研究期间发生严重不良反应、因各种原因不能继续本研究或失访者。采用随机数字表法将受试者随机分为“5+2”间歇性断食模式联合中链三酰甘油组和“5+2”间歇性断食组，各 34 例。其中 “5+2”间歇性断食模式联合中链三酰甘油组年龄（33.06 ±6.01）岁，男性 4 例，女性 30 例；“5+2”间歇性断食组年龄（33.38±7.93）岁，男性 6 例，女性 28 例。两组受试者的年龄、性别差异均无统计学意义（均 P>0.05），具有可比性。“5+2”间歇性断食组给予“5+2”间歇性断食组干预，一周内选择周末 2 天作为断食日，另外 5 天为非断食日。“5+2”间歇性断食模式联合中链三酰甘油组给予“5+2”间歇性断食模式联合中链三酰甘油组干预，并于断食日将食用油脂替换为中链三酰甘油。比较 2 组患者干预前及干预 12 周后体格测量、体成分分析、血液实验室检测指标的变化情况。

结果 干预前，两组受试者各体格测量指标和体成分指标差异无统计学意义（P>0.05）。干预后，“5+2”间歇性断食模式联合中链三酰甘油组受试者各体格测量指标和体成分指标均较干预前降低，且腰臀比低于“5+2”间歇性断食组组（均 P<0.05）；“5+2”间歇性断食组体质指数、体重、肥胖度、腰围、臀围、身体总脂肪、体脂率、内脏脂肪面积、内脏脂肪等级均较干预前下降（均 P<0.05）。干预前，“5+2”间歇性断食模式联合中链三酰甘油组受试者总胆汁酸和高密度脂蛋白胆固醇水平低于“5+2”间歇性断食组（均 P<0.05），其余实验室检查指标差异无统计学意义（均 P>0.05）。干预后，两组受试者空腹血糖、总胆固醇、三酰甘油、低密度脂蛋白胆固醇、空腹胰岛素、胰岛素抵抗指数、同型半胱氨酸水平均较干预前下降，高密度脂蛋白胆固醇，25-羟基维生素 D2、25-羟基维生素 D3、维生素 B12、叶酸水平均较干预前升高（均 P<0.05）；“5+2”间歇性断食模式联合中链三酰甘油组受试者总胆红素、直接胆红素、高密度脂蛋白胆固醇、25-羟基维生素 D2、25-羟基维生素 D3，水平均高于“5+2”间歇性断食组，而谷草转氨酶、碱性磷酸酶、总胆汁酸、总胆固醇、三酰甘油、低密度脂蛋白胆固醇和同型半胱氨酸均低于“5+2”间歇性断食组（均 P<0.05）。

结论 “5+2”间歇性断食模式联合中链三酰甘油与单纯“5+2”间歇性断食组干预均可降低超重/肥胖患者的体脂，改善糖脂代谢，但联合干预对腰臀比及血脂改善的效果更好。关于这种膳食模式的最佳持续时间及其对不同性别、不同年龄层患者的作用效果是否一致、减重后是否易反弹、配合何种类型的运动方式更有利于减重等问题，仍有待更进一步的研究。

关键字 "5+2"间歇性断食；中链三酰甘油；肥胖；体脂；糖脂代谢

分类：临床营养

相位角与老年肿瘤患者肌肉减少症的关系研究

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相位角与老年肿瘤患者肌肉减少症的关系研究
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[摘要]目的：分析相位角与老年肿瘤患者肌肉减少症的相关性，并探讨相位角预测老年肿瘤患者肌肉减少症的可行性。方法：通过对某肿瘤专科医院 2019.1-2023.4 年于胸外科、头颈外科入院拟行手术治疗的 140 例老年肿瘤患者进行问卷调查，收集其一般人口学信息如性别、年龄、BMI、合并疾病及生化检验指标等资料，并测量握力、生物电阻抗仪器测量体成分以及相位角及其它营养学相关指标，采用 2019 年亚洲肌少症工作组诊断共识诊断肌肉减少症；按性别分层比较肌肉减少症组与非肌肉减少症组间的相位角水平，Pearson 相关分析相位角与肌肉减少症诊断指标的相关性，多因素 Logistic 回归分析肌肉减少症发生的危险因素及相位角水平与肌肉减少症患病风险的关联性，ROC 曲线确定相位角预测老年肿瘤患者肌肉减少症的最佳截断值。结果：肌肉减少症组相位角、身体总水分（TBW）、细胞内水分（ICW）、细胞外水分（ECW）、骨骼肌、身体体重指数（BMI）、身体细胞量（BCM）、上臂围（AC）、营养风险筛查评分（NRS）、营养不良诊断评分（GLIM）、格拉斯哥预后评分（mGPS）、前白蛋白（PALB）均与非肌肉减少症组有显著差异（$P < 0.05$）；按性别分类，男女肌肉减少症病人的相位角平均水平均低于非肌肉减少症病人（$P < 0.05$）。相关分析显示相位角与骨骼肌质量（$r = 0.486$，$P < 0.001$）、SMI（$r = 0.523$，$P < 0.001$）、握力（$r = 0.492$，$P < 0.001$）均呈正相关；相关分析显示去脂体重、细胞内水、细胞外水、BCM、PNI（预后营养不良指数）、左大腿围均与握力、SMI 呈正相关；而细胞外水/细胞内水 (ECW/ICW)、NRS、GLIM、血小板/淋巴细胞计数（PLR）与握力、SMI 均呈负相关。Logistic 回归分析显示相位角（OR= 0.041，95%CI：0.003 ~ 0.572），高血压（OR= 0.161，95%CI：0.028 ~ 0.937），NRS （OR= 1.82，95%CI：1.086 ~ 3.050）与肌肉减少症的发生呈独立相关；与相位角的最低四分位水平(Q1) 相比，相位角 Q2、Q3、Q4 患病风险的 OR 值分别为 0.303（95%CI：0.078 ~ 1.182）、0.147（95%CI：0.026 ~ 0.841）、0.029（95%CI：0.002~ 0.545）；ROC 曲线显示预测老年肿瘤患者肌肉减少症的相位角最佳截断点为 4.75°，灵敏度和特异度分别为 71.4%和 62.8%。按性别分类，预测老年男性肿瘤患者肌肉减少症的相位角最佳截断点为 4.95°，灵敏度和特异度分别为 75%和 58.4%；预测老年女性肿瘤患者肌肉减少症的相位角最佳截断点为 4.35°，灵敏度和特异度分别为 80%和 60%。结论：相位角水平与老年肿瘤患者肌肉减少症的患病风险独立相关，相位角对老年肿瘤肌肉减少症病人具有一定的预测价值。

［关键词］ 相位角 ；肌肉减少症 ；老年肿瘤患者

关键字 相位角 ；肌肉减少症 ；老年肿瘤患者

分类：临床营养

孕前体重指数与孕晚期糖化血红蛋白与妊娠糖尿病患者合并发生其他代谢性疾病的关联

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目的：探讨孕前体重指数（BMI）与孕晚期糖化血红蛋白（HbA1c）水平对妊娠糖尿病患者合并发生其他代谢性疾病的影响，分析孕前 BMI 和 HbA1c 的交互作用对结局的影响，为妊娠糖尿病患者的个性化体重管理及血糖的精准干预提供理论依据。

方法：回顾性选取西安母婴纵向队列中 2015 年 1 月至 2018 年 12 月在西北妇女儿童医院产科住院分娩的单胎活产妊娠糖尿病患者。最终纳入的受试者在孕 24 至 28 周进行口服葡萄糖耐量试验筛查妊娠糖尿病时均未发生其他代谢性疾病，并根据孕前 BMI 分为 4 个组别（体重不足组，<18.5 kg/m^2；正常体重组，18.5-24.9 kg/m^2；超重组，25.0-29.9 kg/m^2；肥胖组，≥30.0 kg/m^2）；根据孕晚期 HbA1c 水平分为 2 个组别（正常 HbA1c 组，<5.7%；高 HbA1c 组，≥5.7%）。主要结局为妊娠高血压、子痫前期、亚临床甲状腺功能减退症、甲状腺功能减退症、甲状腺功能亢进症、肝内胆汁淤积症和桥本甲状腺炎等代谢性疾病的总发病率。次要结局为上述主要结局的各个组成部分的发病率。采用 Logistic 回归模型进行统计分析，在调整患者年龄、教育水平、胎次、既往剖宫产史、糖尿病家族史和高血压家族史后，计算调整后的比率比（*aOR*）和 95%的置信区间（CI）以评估孕前 BMI 和孕晚期 HbA1c 与妊娠糖尿病患者合并发生其他代谢性疾病之间的关系。

结果：本研究共纳入 8928 名妊娠糖尿病患者，分娩年龄中位数为 31（29，34）岁，其中 24.2%超过 35 岁；孕前超重率为 16%，肥胖率为 2.6%。肥胖组中孕晚期 HbA1c 中位数为 5.50%（5.20%，5.80%），高于其他三组（*P*< 0.001）。高 HbA1c 组共有 1861 例（20.8%），其孕期增重程度高于 HbA1c 正常水平组的患者（*P*< 0.001）。本研究中有 16.2（n=2058）的受试者发生妊娠代谢性疾病。与正常孕前 BMI 相比，孕前超重和肥胖增加了代谢性疾病的总发病率（超重 *aOR*= 2.21，95%CI：1.69-2.89；肥胖 *aOR*= 5.20，95%CI：3.45-7.84），特别是增加了发生子痫前期（超重 *aOR*= 2.21，95%CI:1.69-2.89；肥胖 *aOR*= 5.20，95%CI:3.45-7.84）和妊娠高血压（超重 *aOR*= 2.55，95%CI：1.84-3.53；肥胖 *aOR*= 6.21，95%CI:3.82-10.10）的风险。同时，孕晚期高 HbA1c 水平组相比正常 HbA1c 水平组发生先兆子痫（*aOR*= 1.60，95%CI：1.24-2.06）和妊娠高血压（*aOR*= 1.58，95%CI:1.15-2.16）的风险更高。此外，孕前 BMI 正常但孕晚期 HbA1c 水平不同的两组患者，除先兆子痫外（*P*= 0.003），代谢性疾病的总发病率以及各疾病发病率的差异没有统计学意义。然而，孕前肥胖的妊娠糖尿病患者，孕晚期 HbA1c 正常水平组相比于高 HbA1c 组，总发病率显著降低（27.2% vs 46.2%，*P*= 0.004），尤其是发生妊娠高血压风险显著降低（6.0% vs 17.9%，*P*= 0.004）。

结论：孕晚期糖化血红蛋白水平反映了妊娠糖尿病患者的血糖控制情况，是预测妊娠期代谢性疾病的重要指标，因此在定期产科检查中应加以考虑。同时，应根据孕前 BMI 对孕妇给予合理的血糖控制建议，对其进行产科检查和随访教育，监测和控制血糖水平，以进一步减少不良妊娠期代谢性疾病的发生。

关键字 孕前体重指数；糖化血红蛋白；妊娠代谢性疾病；妊娠糖尿病；妊娠高血压

分类：临床营养

化疗期肿瘤患者肠黏膜屏障功能分析

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目的：化疗是肿瘤患者重要的治疗方式之一，同时也是影响肿瘤患者的营养健康状况的重要因素。通过检测化疗期肿瘤患者肠黏膜屏障功能指标，探讨化疗对肿瘤患者肠道功能的影响，以便及早开展相关营养治疗。方法：收集内蒙古自治区人民医院肿瘤中心 2021 年 3-5 月进行化疗的患者（排除标准：终末期、已进行放疗、免疫治疗等其他治疗、恶病质、禁食水或因化疗存在严重胃肠道反应的患者）作为研究组（n=30 例），同时选取同期住院非肿瘤患者（排除标准：急性期、重症感染、外科术后、炎性肠病、短肠综合征、自身免疫系统疾病、禁食水等）作为对照组（n=30 例），进行 1：1 匹配。收集性别、年龄、既往史、现病史等一般资料，并分别检测患者外周静脉血中反映肠黏膜屏障功能的指标二胺氧化酶(Diamine oxidase, DAO)、D-乳酸（D-lactic acid，D-LC）、内毒素(lipopolysaccharide，LPS)水平。数据利用 SPSS21.0 进行处理。结果：1.两组患者基线资料可比，研究组年龄（58.00±7.74）与对照组（57.30±6.41）年龄差异无统计意义（t=-0.382，P=0.704），性别也无统计学差异（ x 2=0.271，P=0.795）。2.对比两组肠黏膜屏障功能的指标，研究组二胺氧化酶 DAO（5.82±1.00）高于对照组 DAO（4.69±2.35），差异有统计学意义（t=-2.307，P=0.027），D-乳酸（D-LC）水平研究组（14.17±2.76）高于对照组（12.05±4.98），但差异无统计学意义（t=-1.929，P=0.061），内毒素(LPS) 水平研究组（12.66±4.44）高于对照组（11.23±5.58），差异无统计学意义（t=-1.040，P=0.303）。3.考虑消化道对肠黏膜屏障功能的影响，根据肿瘤类型将研究组患者分为消化道肿瘤和非消化道肿瘤，并进一步分析两组肠黏膜屏障功能的指标。消化道肿瘤组 DAO（4.32±2.59）、D-LC（12.36±5.08）及 LPS（12.35±5.86）水平与非消化道肿瘤组 DAO（5.84±1.11）、D-LC（11.73±5.07）及 LPS（12.70±2.09）对比，差异无统计学意义（分别为 t=-1.820，P=0.062；t=0.322，P=0.751；t=-0.186，P=0.854）。4.考虑疾病进展的影响，按肿瘤分期进行分析，III 和 IV 期患者 DAO（5.39±1.80）、D-LC（13.62±4.27）及 LPS（13.64±5.40）高于 I 和 II 期 DAO（4.48±2.57）、D-LC（10.97±5.29）及 LPS（11.56±3.40），但差异无统计学意义（分别为 t=1.044，P=0.307；t=-1.379，P=0.180；t=-1.147，P=0.264）。5.根据是否转移进行分组，存在转移的患者 D-LC 水平（13.74±2.16）高于未转移患者（10.89±6.04），但差异无统计学意义（t=0.015，P=0.988）；DAO 和 LPS 水平接近分别为（4.99±2.43 vs 4.98±2.06）、（12.57±4.36 vs 12.46±4.71）。结论：1.化疗期肿瘤患者虽没有明显的肠黏膜屏障功能损伤，但是肠黏膜屏障各项指标均高于对照组。2.肿瘤类型、分期及是否转移等情况分析，未见明显差异，可能与本次收集样本量相关，下一步研究需进一步扩大样本量，同时随访分析多次化疗后肠黏膜屏障功能的变化以及肠黏膜屏障功能是否对患者的生存期有影响。3.化疗药物本身的非特异性、引起肠道菌群紊乱及容易出现胃肠道反应影响进食等情况是其可能引起肠道屏障功能受损的主要原因。需要关注化疗患者的肠道屏障功能，给予合理的营养治疗，帮助维护肠道健康及营养状况，减少并发症、保证抗肿瘤治疗的顺利开展。

关键字 化疗，肠黏膜屏障功能，营养支持

分类：临床营养

代谢相关脂肪性肝病基于中国居民膳食指南的个体化干预研究

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目的　以中国居民膳食指南为基础，结合 MAFLD 的疾病代谢特点，为 MAFLD 患者制定个体化膳食及运动处方，探索个体化限制能量平衡膳食联合运动指导的干预方式对改善 MAFLD 的作用，为 MAFLD 及相关代谢紊乱的防治提供思路和科学依据。

方法　收集 2020 年 11 月至 2023 年 01 月于天津市第二人民医院诊治并行人体成分分析检查的 MAFLD 患者，排除患有肝性脑病、严重感染、肾病综合征、恶性肿瘤、甲状腺功能异常、严重精神疾病及长期卧床等疾病的患者，共纳入 127 例（男性 112 例，女性 15 例）MAFLD 患者，根据是否接受个体化饮食运动干预分为干预组和对照组，分别在入组时（T0）收集患者的人体测量指标、实验室检测指标，通过问卷调查了解患者的一般信息、家族史、膳食及生活习惯、食物频率等，根据患者实际情况给予干预组患者个体化膳食处方和运动处方，对照组给予常规健康宣教，6 个月后（T1）再次收集患者的资料，比较干预前后人体测量指标和实验室检测指标的变化。

结果　127 例 MAFLD 患者（对照组 32 例，干预组 95 例）中，平均年龄为 34.02 岁±6.72 岁，其中男性 112 例（占 88.19%），研究对象中具有高血压家族的患者占 51.97%（n = 66），正在经历被动吸烟的患者占 40.94%（n = 52），汽车出行者占 62.99%，久坐者（＞8 h/d）占 48.82%，饮食口味重者占比＞50%，爱加餐者占 37.01%。食物因子分析提取五个主因子（总方差贡献率为 59.69%），分别解释为“菌蔬”因子、“粮乳”因子、“肉蛋”因子、“水产”因子和“零食”因子，分别以是否高尿酸、高血糖、高甘油三脂、高胆固醇、低 HDL-C 及高 LDL-C 为因变量，以五个主因子的因子得分为自变量进行 Logistic 回归分析。其中“肉蛋”因子的上五分位（Q5）可使高甘油三酯和高胆固醇的危险性分别增加为其下五分位（Q1）的 5.60 倍（95%CI: 1.41, 22.24）和 6.45 倍（95%CI: 1.51, 27.63），水产因子的中五分位（Q3）可使高胆固醇的危险性增加为其 Q1 的 4.54 倍（95%CI: 1.10, 18.78）。T0 时分别对干预组和对照组的人体测量指标及生化检测指标进行 t 检验，结果显示两组患者在各检测指标的分布差异均无统计学意义；对干预组和对照组在 T0 和 T1 时的指标分别进行配对 t 检验，除对照组的 HbA1C 在干预前后的变化差异无统计学意义外，对照组和干预组的其它指标在干预前后的变化差异均有统计学意义(P<0.05)；分别对各指标的组间变化差值(T1-T0)进行 t 检验，除 TBIL 和 HDL-C 变化差值的分布差异无统计学意义外，其它指标变化差值的分布差异均有统计学意义(P<0.05)，其中干预组各指标的变化差值均小于 0，对照组各指标(除 ALT、AST 和 TBIL 外)的变化差值均大于 0。

结论　MAFLD 患者中不良的饮食及生活习惯占比较高，膳食不均衡（如“肉蛋”因子）可增加 MAFLD 相关的代谢异常，基于中国居民膳食指南个体化制定膳食及运动干预方案有助于降低 MAFLD 患者的体重、体质指数、腰围、内脏脂肪面积、体脂比等人体测量指标，可有效改善患者糖脂代谢状况。

关键字　限制能量平衡膳食；有氧运动；抗阻运动；代谢相关脂肪性肝病；中国居民膳食指南

分类：临床营养

益生菌辅助治疗结直肠癌有效性和安全性的系统评价和试验序贯分析

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目的：结直肠癌作为世界上第三大常见恶性肿瘤，也是全球癌症第二大主要死因，其治疗策略仍是以手术为主的综合性治疗，而术后感染对患者的预后有较大影响。既往研究表明，益生菌似乎可以降低结直肠癌患者术后感染发生率，但鉴于益生菌在结直肠癌患者围手术期管理中的临床价值尚未达成共识，本文旨在通过系统评价结合试验序贯分析的方法评估益生菌辅助治疗结直肠癌的有效性和安全性，从而为结直肠癌的围手术期管理提供循证依据。

方法：计算机检索 Medline、Embase、Cochrane Library、CBM 等数据库，搜集益生菌辅助治疗结直肠癌患者的 RCT。检索时限均为从建库至 2023 年 1 月。采用主题词和自由词相结合的方式进行检索。由 2 位研究者按纳入排除标准独立筛选文献，并按预先设计好的资料提取表提取纳入研究的基线数据、益生菌的类别、疗程以及结局指标等信息，评价纳入研究的偏倚风险后，采用 RevMan 5.4 软件进行 Meta 分析，同时采用 TSA v0.9 软件进行试验序贯分析，最后采用漏斗图检验发表偏倚。

结果：最终纳入 21 个随机对照研究，共涉及 1602 名结直肠癌手术患者。Meta 分析结果显示：益生菌可显著降低结直肠癌术后感染发生率（RR=0.51, 95%CI 0.42~0.62, p<0.05）， 且 TSA 结果显示：虽然样本量未达到期望信息量（RIS=2897），但累积 Z 值既穿过传统界值线亦穿过 TSA 界值线，因此，依然表明该 Meta 分析结果存在假阳性概率较低，结果较为明确。与此同时，Meta 分析结果亦提示，益生菌可以缩短结直肠癌患者的平均住院日（MD= -1.23, 95%CI -2.18 ~ -0.28, p<0.05）。值得注意的是，采用不同菌株的益生菌，结直肠癌患者的结局存在差异，亚组分析结果显示，乳酸杆菌（RR=0.42, 95%CI 0.25~0.73, p<0.05）、双歧杆菌（RR=0.47, 95%CI 0.30~0.74, p<0.05）、乳酸杆菌和双歧杆菌联合（RR=0.51, 95%CI 0.35~0.74, p<0.05）以及多元复合菌株（RR=0.58, 95%CI 0.44~0.78, p<0.05）可显著降低结直肠癌术后感染发生率，且差异有统计学意义；可能受纳入研究数量限制，单独使用布拉式酵母菌并未显示出在结直肠癌患者围手术期管理中的潜在获益。研究中未见益生菌相关不良反应发生的报道，亦缺乏结直肠癌患者出院后的随访数据。因此，益生菌对于结直肠癌患者远期的预后影响无法通过全因死亡率进行系统评估。

结论：益生菌可降低结直肠癌术后感染发生率并缩短平均住院日。但受纳入研究数量和质量的限制，目前的研究结果尚不足以支持在结直肠癌患者围手术期常规使用益生菌，尚需进一步开展更多高质量的针对不同益生菌菌株、剂量、使用时间节点以及疗程等的多中心前瞻性临床研究予以验证。

关键字 结直肠癌；益生菌；系统评价；Meta 分析；试验序贯分析

分类：临床营养

人参皂苷衍生物 Rh2-O 诱导肝癌细胞免疫原性细胞死亡的作用及机制研究

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目的：本研究通过细胞实验及动物实验研究人参皂苷衍生物 Rh2-O 诱导 Huh-7 肝癌细胞免疫原性细胞死亡的作用及其可能的分子机制，为人参皂苷及其衍生物预防肿瘤或作为抗肿瘤免疫调节剂提供理论依据。

方法：1. 体外培养 Huh-7 细胞，设置 Rh2-O 药物组、空白对照组及阳性对照组。采用 CCK8、流式细胞术分别检测细胞活力和细胞凋亡，ELISA 及化学发光法分别检测细胞上清 HMGB1 和 ATP 的含量，免疫荧光法检测细胞 CRT 的膜外翻，从细胞水平探索 Rh2-O 诱导肿瘤细胞释放损伤相关分子模式的作用。通过小鼠疫苗实验从动物水平验证 Rh2-O 诱导 Huh-7 肝癌细胞免疫原性细胞死亡的作用。

2. 通过荧光探针 DCFH-DA 检测细胞内活性氧水平，Western Blot 和 QPCR 技术分别检测内质网应激和自噬相关的蛋白与基因的表达水平，利用线粒体红外荧光探针观察线粒体形态，免疫荧光法检测线粒体与 LC3B 蛋白的共定位，从细胞水平探讨 Rh2-O 诱导 Huh-7 肝癌细胞免疫原性细胞死亡的可能作用机制。通过使用内质网应激抑制剂 4-PBA 和自噬抑制剂 3-MA 验证内质网应激和自噬在 Huh-7 肝癌细胞免疫原性细胞死亡中的重要作用。

结果：1. 细胞实验结果显示，Rh2-O 作用于细胞后显著降低细胞活力、促进细胞凋亡（$P<0.05$),诱导细胞 HMGB1 的分泌、ATP 的释放及 CRT 的膜外翻（$P<0.05$）。动物实验结果显示，注射癌细胞疫苗组中 11 只小鼠在活的癌细胞再攻击后有 4 只小鼠出瘤，注射 PBS 组中 7 只小鼠在活的癌细胞再攻击后全部出瘤，PBS 组小鼠的体重在实验观察后期急剧下降。表明 Rh2-O 可诱导肝癌细胞免疫原性细胞死亡。

2. 细胞实验中，Rh2-O 使细胞内产生应激，蓄积大量的 ROS（$P<0.05$），提高内质网应激信号通路相关蛋白如 PERK、eIF2a、p-eIF2a 的表达水平（$P<0.05$）。内质网应激抑制剂 4-PBA 预处理后，可显著减弱由 Rh2-O 诱导的 CRT 膜外翻（$P<0.05$）。同时，构建小鼠肝癌模型后，灌胃给药，Rh2-O 组脾脏指数显著高于 Rh2-O+4-PBA 和生理盐水组，且 Rh2-O 显著抑制小鼠肿瘤的生长。说明 Rh2-O 诱导癌细胞免疫原性细胞死亡的机制可能与内质网应激有关，且 Rh2-O 在体内具有提高机体抗肿瘤免疫的功效。

3. 细胞实验中，Rh2-O 可破坏线粒体形态，提高 P62、LC3、Atg3 的基因表达与 LC3A、LC3B 的蛋白表达水平（$P<0.05$），促进线粒体与自噬标志蛋白 LC3B 的共定位，自噬抑制剂 3-MA 预处理后可显著降低 Rh2-O 诱导 Huh-7 细胞 ATP 的分泌量。说明 Rh2-O 诱导癌细胞免疫原性细胞死亡的机制还可能与线粒体自噬有关。

结论：Rh2-O 可诱导肝癌细胞发生免疫原性细胞死亡，其机制可能与 Rh2-O 激活内质网应激促进细胞 CRT 膜外翻，及诱导线粒体自噬有关。

关键字 人参皂苷；肝癌；免疫原性细胞死亡；内质网应激；线粒体自噬

分类：临床营养

“5+2”间歇性断食模式对体重超标患者的临床效果研究

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目的 分析“5+2”间歇性断食模式对体重超标患者的临床效果，以期为超重和肥胖的干预提供新思路。

方法 选取 2018 年 9 月至 2019 年 3 月在南宁市第二人民医院临床营养科就诊的 68 例体重超标患者作为研究对象。纳入标准：①年龄 16~60 岁；②体质指数（body mass index，BMI）>24 kg/m2；③腰围>80 cm（女性）或 85 cm（男性）；④具有良好的依从性，能严格执行"5+2”间歇性断食减重方案，并按时复诊；⑤患者均签署了知情同意书。排除标准：①处于妊娠期或哺乳期；②确诊具有以下一种或几种疾病，如严重的消化系统疾病（消化性溃疡活动期、肝硬化等）、慢性肾脏疾病（慢性肾小球肾炎、慢性肾功能不全、糖尿病肾病、全身性疾病累及肾脏等）、心血管疾病（高血压、冠心病、风湿性心脏病、心肌病、心功能不全等）、脑血管疾病（脑出血、脑梗死等）、内分泌系统疾病（甲状腺功能亢进、甲状腺功能减退、糖尿病等）、传染性疾病（结核、伤寒等）、慢性消耗性疾病（恶性肿瘤、艾滋病等）、痛风急性发作期、精神性疾病；③就诊前半年内曾参加过其他临床试验；④进行"5+2”间歇性断食期间发生严重不良反应，因各种原因不愿意继续本研究或失访。实施“5+2”间歇性断食干预 12 周，对比干预前后体格测量指标（体重、体质指数、腰围、臀围、腰臀比等）、体成分分析指标（身体总水分、身体总蛋白、身体总脂肪、体脂率、内脏脂肪面积、去脂体重、骨骼肌重量、基础代谢率、全身相位角等）、实验室检查指标[红细胞计数、血红蛋白、丙氨酸转氨酶、总胆红素、直接胆红素、碱性磷酸酶、总胆汁酸、总蛋白、白蛋白、前白蛋白、尿素、肌酐、总胆固醇、三酰甘油、高密度脂蛋白胆固醇、低密度脂蛋白胆固醇、空腹血糖、空腹胰岛素、胰岛素抵抗指数、25-羟维生素 D2、25-羟维生素 D3 等]以及肝脏脂肪沉积的变化。

结果 由于依从性不佳与失访等，最终 56 例患者完成本研究。其中男 10 例、女 46 例，年龄 19~49 岁，轻度脂肪肝 25 例、中度脂肪肝 20 例、重度脂肪肝 3 例、无脂肪肝 8 例。经“5+2”间歇性断食干预后，体重超标患者体重、BMI、腰围、臀围、腰臀比、身体总水分、身体总蛋白、身体总脂肪、体脂率、内脏脂肪面积、去脂体重、骨骼肌重量、基础代谢率和全身相位角均低于干预前（P<0.05 或 P<0.01），血清总胆固醇、三酰甘油、低密度脂蛋白胆固醇、空腹血糖、空腹胰岛素水平和胰岛素抵抗指数均低于干预前（P<0.05 或 P<0.01）。体重超标患者干预前后的红细胞计数、血红蛋白、丙氨酸转氨酶、天冬氨酸转氨酶、总胆红素、直接胆红素、总胆汁酸、总蛋白、白蛋白、前白蛋白、尿素、肌酐、尿素水平比较差异无统计学意义（P>0.05）；干预后的血清碱性磷酸酶、总胆固醇、三酰甘油、低密度脂蛋白胆固醇、空腹血糖、空腹胰岛素水平和胰岛素抵抗指数低于干预前（P<0.01），高密度脂蛋白胆固醇、25-羟维生素 D2、25-羟维生素 D3 水平高于干预前（P<0.01）。与干预前相比，干预后轻、中、重度脂肪肝的受试者人数均有所减少，无脂肪肝受试者的人数显著增多（Z=-3.932，P=0.084）。

结论 “5+2”间歇性断食模式可有效降低体重超标患者的体重和体脂率，改善糖脂代谢和非酒精性脂肪肝，对肝、肾功能无不良影响，具有良好的减重效果。

关键字 体重超标；“5+2”间歇性断食；糖脂代谢；非酒精性脂肪肝

分类：临床营养

痛风石感染合并低蛋白血症的个体化营养治疗

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痛风可致关节炎症，低嘌呤饮食是痛风医学营养治疗方式，牛奶及其提取物乳清蛋白粉（特殊医学用途食品，FSMP）属于低嘌呤食品。本文报道 1 例长期不科学素食导致痛风急性发作伴痛风石破溃低蛋白血症患者，住院期间拒绝降尿酸药物治疗，坚持素食，但增加特殊医学用途食品乳清蛋白粉和牛奶摄入后，患者尿酸值不升反降，同时改善低蛋白血症，改善患者预后。营养治疗低蛋白血症需要增加蛋白质摄入，高尿酸营养治疗需要限制蛋白质摄入，以减少外源性嘌呤摄入。个体化营养治疗可促进 UA（Uric Acid,UA）排泄，减少 UA 负荷，减少痛风发作频率和缓解症状，同时改善患者营养状况，改善低蛋白血症。案例提示个体化营养治疗可有效影响痛风石破溃合并感染患者的预后。

本个案报道，我院收治的 1 例拒绝药物治疗的“素食”急性痛风发作患者，经手术清创抗感染后，配合个体化营养治疗，患者伤口愈合良好，血 UA 值明显降低，且患者体重增加，血红蛋白（Hemoglobin, Hb）和白蛋白(Albumin, Alb）等营养相关指标得到明显改善。

入院时，患者软组织破溃感染，急诊行“痛风刮开引流术”，1 周后，患者 Alb 由 26.8g/L 降为 24.3g/L，且持续低蛋白血症时间≥1 周，提示患者处在急性营养缺乏状态。临床医生请营养科会诊后，营养科医生对患者行营养风险筛查和拟定个体化营养治疗方案。在营养干预 12 天（在素食基础上增加鸡蛋 60g，蛋清 100g, 牛奶 250mL，主食增加约 75g），患者体重增加 3.5kg，血浆白蛋白增加 4.4g/L，总蛋白增加 7.2g/L。在干预第 13~21 日，在原饮食基础增加乳清蛋白粉（10g/次，2 次/日，口服），尿酸值由 458μmol/L 降至 366μmol/L，7 天下降 92μmol/L。

患者增加蛋白质摄入，血 UA 明显下降，营养干预 12 天后在增加牛奶、鸡蛋基础上增加乳清蛋白粉摄入，患者血 UA 的下降速度较前加速，考虑原因为以下：第一，乳清蛋白粉可促进尿酸排泄。乳清蛋白属于组件型的配方食品，属于特殊医学用途食品的一种，它是应用现代工艺从牛奶中提取出来的优质蛋白补充剂，属于低嘌呤食品。第二，增加乳品摄入后，促进患者黄嘌呤和别嘌醇的排出增加。最后，患者加速的降尿酸效果受牛奶和乳清蛋白粉的协同作用，遂降尿酸效果更明显。

此案例提示，为营养不良和低蛋白血症痛风患者提供个体化营养治疗，可改善患者临床结局。另外，在案例研究过程中发现关于乳制品加速嘌呤代谢的机制的研究并不够详尽，提示未来需要增加乳清蛋白粉及乳类促进尿酸排泄的研究，以进一步明确其发生机制。

关键字 痛风，低蛋白血症，低嘌呤饮食，乳清蛋白粉，特殊医学用途食品，医学营养治疗

分类：临床营养

基于 COM-B 模型的乳腺癌患者化疗期体重管理方案的应用研究

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摘要：目的　乳腺癌已成为全球第一大癌症，其发病和死亡例数均为女性癌症首位。乳腺癌相关营养不良包括营养不足和营养过剩(超重和肥胖)两个方面。约 1%的乳腺癌患者发生营养不足，超过 50%的乳腺癌患者发生营养过剩(超重和肥胖)。相对于营养不足而言，乳腺癌患者营养过剩的发生率更高。由于能量摄入过多、体力活动减少、药物等因素影响，化疗患者体重增加的可能性高出不化疗患者的 65%。超重和肥胖是乳腺癌患者预后不良的重要危险因素。能力、机会、动机-行为(capability, opportunity, motivation-behavior, COM-B)模型是一种行为改变模型，其认为行为的改变受客观能力、机会和主观动机的影响，同时客观能力和机会也会影响主观动机。该模型为行为干预的设计提供了理论指导，国外已将其应用于慢性病防治，安全性、适用性较好。故本研究探索基于 COM-B 模型的乳腺癌患者化疗期体重管理方案的应用研究，为临床实践提供参考。方法　采用便利抽样法，选取安徽省某三甲医院日间病房术后首次化疗的乳腺癌患者为研究对象，其中 2022 年 3 月-4 月收治的 31 例为对照组，2022 年 5 月-6 月收治的 30 例为试验组。对照组实施常规化疗护理，试验组实施基于 COM-B 模型的体重管理方案[包括组建多学科体重管理团队、构建“2+X”(营养+运动+若干行为)体重管理方案、实施“2+X”体重管理方案]。干预 5 个月后评价两组患者空腹血糖(FPG)、血脂(TC、TG、LDL-C、HDL-C)、人体成分指标(体重、BMI、身体水分、肌肉量、去脂体重、体脂肪、内脏脂肪面积、体脂率)、自我管理能力(癌症患者自我管理测评量表)及生活质量[乳腺癌患者生命质量测定量表(FACT-B)评分]的差异。结果　干预后，试验组 FPG、TC 及 TG 均明显低于对照组(t=3.719、P<0.001；t=4.332、P<0.001；t=3.376、P=0.001)，HDL-C 明显高于对照组(t=-3.090、P=0.003)；试验组体重、BMI、体脂肪、内脏脂肪面积及体脂率均低于对照组(t=2.740、P=0.008；t=2.723、P=0.008；t=2.980、P=0.004；t=2.664、P=0.010；t=4.093、P<0.001)，身体水分、肌肉量及去脂体重均高于对照组(t=-5.559、P<0.001；t=-6.467、P<0.001；t=-5.211、P<0.001)；试验组癌症患者自我管理测评量表总分及日常生活管理、症状管理、心理管理、与医护人员沟通、信息管理、自我效能感管理 6 个维度单项得分均明显高于对照组(t=-32.421、P<0.001；t=-24.591、P<0.001；t=-19.473、P<0.001；t=-18.517、P<0.001；t=-5.446、P<0.001；t=-15.692、P<0.001；t=-12.536、P<0.001)；试验组 FACT-B 总分及生理状况、社会/家庭状况、情感状况、功能状况、附加关注 5 个维度单项得分均明显高于对照组(t=-7.590、P<0.001；t=-6.207、P<0.001；t=-8.470、P<0.001；t=-4.765、P<0.001；t=-6.524、P<0.001；t=-8.307、P<0.001)，以上差异均有统计学意义(均 P<0.05)。结论　基于 COM-B 模型的体重管理方案安全可行，适用于乳腺癌化疗患者。该方案在一定程度上改善了乳腺癌患者化疗期空腹血糖、血脂水平，减轻其人体成分丢失程度，控制其体重增加趋势，提高其自我管理能力及生活质量。

关键字 COM-B 模型；乳腺癌；体重管理；营养状态；自我管理；生活质量

分类：临床营养

药食同源中药在防治热应激损伤中的应用

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近年来，全球气候变暖导致持续高温和极端高温天气出现，热应激性疾病在全球范围内日益增多。热应激是内环境稳定受到威胁时，机体的一种不协调状态，其主要特征为各系统功能的反射性强化，但这种反射缺乏整体协调性。适度应激会改善人体对环境的适应力，增强机体对热应激的抵抗力和耐受力。然而长时间的暴露于高温环境下，机体产热与散热失衡，核心体温迅速升高，引起机体基础代谢增加以及血液的重新分布，增高的代谢要求导致内脏供血减少，从而导致机体代谢紊乱。中暑便是一种由热应激引起的、危及生命的疾病，与循环衰竭和多器官功能障碍有关，会对机体造成不同程度的损伤。现代中药药理学对热应激导致机体损伤的作用机制研究一直在持续开展，热应激除直接热损伤外，还可通过多种机制引起机体损伤，包括调节细胞热休克蛋白的表达，促进活性氧的产生，促进炎症反应的发生。而药食同源中药是中医药理论与饮食文化相互渗透的产物，其疗效独特、药性平和、副作用小和耐药性低等特点，适用于应对热应激损伤等情况，对改善热应激具有积极作用，能够减缓机体的损伤效应，诱导机体产生耐热性。药食同源中药富含维生素、微量元素及其他活性成分，充分利用其多成分、多靶点的特点，既具备营养作用，又能缓解热应激损伤，也正是这个特点为机体提供了抵抗高温的有效物质基础，有助于适应高温环境并减轻高温环境所带来的影响。药食同源中药在改善膳食营养方面具有重要的意义，合理地利用药食同源中药可以使机体获得更多的蛋白质、纤维素、维生素和微量元素，提高身体免疫力和耐受力，缓解热应激带来的伤害。近年来的多项研究表明，营养丰富的食物和中药中的一些成分通过纠正体内水分和电解质失衡，从而预防和治疗热应激损伤，但目前对于这些食物和中药调节体温以及对机体损伤防护机制的研究尚未被完全阐明，需要进一步的探讨和完善。热应激是一个重要的研究领域，可以帮助我们更好地了解人体的生理机制，并开发新的治疗方法和应用。药食同源中药已经被证明在预防和治疗热应激、提高身体免疫力和抗病能力方面具有广泛的应用前景。因此，我们需要系统总结药食同源中药与热应激的关系，深入探索药食同源中药在热应激预防和治疗方面的应用，以促进人类健康和福祉。

关键字 药食同源中药；营养；热应激；机体损伤

分类：临床营养

肥胖症腹腔镜袖状胃切除术术后减重效果预测因素研究

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目的：随着膳食模式的转变，慢性非传染性疾病的患病率逐年上升，已成为严重的公共卫生问题。肥胖本身是一种慢性代谢性疾病，也是心脑血管疾病、糖尿病、高血压、高血脂等慢性病的重要危险因素，因此，控制体重对降低慢性非传染性疾病的风险、减少疾病相关医疗负担非常重要。目前，减肥手术是治疗病态肥胖和肥胖相关疾病最有效的治疗方法，而腹腔镜袖状胃切除术（LSG）因不改变胃肠道解剖关系、减重效果较好等特点，因此是目前世界范围内应用最多的减重手术。但因个体营养状况及代谢差异等的影响，仍有一部分人术后不能达到预期效果。因此，本研究通过危险因素筛查，构建 LSG 术后减重效果（不足）的预测模型，以期根据患者术前机体状况预测术后的减重效果，早期筛查可能发生术后减重效果不良的患者，以便医护人员在术前、术后对患者提供针对性的机体改善措施，达到预期治疗效果。

方法：采用回顾性研究，根据一定的纳入和排出标准，采集分析 2018 年 8 月-2021 年 6 月在山东省某三甲医院进行 LSG 手术、满足条件的患者的临床资料，总计 991 例。将研究对象按照 7:3 随机分为建模组（693 例）和验证组（298 例），以术前各项临床检测指标为自变量，以术后一年患者多余体重减轻率（%EWL）为因变量，对建模组资料采用单因素分析筛选影响术后减重效果的变量、多因素 Logistic 回归分析构建预测模型；建模后，以 298 例患者作为验证组，用已构建的预测模型给验证组的每一位患者建立预测概率，根据预测概率和实际概率绘制 ROC 曲线、Calibration 校准曲线和 DCA 决策曲线，验证预测模型。

结果：1.本研究总计纳入 991 例行 LSG 的患者，其中，男性 293 例（29.6%），女性 698 例（70.4%），平均年龄为 32±8 岁，术前平均 BMI 为 43.08±8.94kg/m2。术后减重良好患者（%EWL≥50%）有 887 例（89.5%），术后减重不足患者有 104 例（10.5%）。

2. 单因素分析中，术后一年减重不足和和减重良好患者在不同性别（p=0.006）、糖化血红蛋白（p=0.037）、空腹胰岛素（p=0.007）、空腹 C 肽（p=0.005）、白蛋白（p=0.022）、甘油三酯（p=0.003）、脂蛋白磷酸酶 A2（p=0.032）、BMI（p＜0.001）、舒张压（p=0.014）、腰围（p＜0.001）、臀围（p＜0.001）、阻塞性睡眠呼吸暂停综合征（p=0.002）、2 型糖尿病（p=0.010）、维生素 D 缺乏（p＜0.001）、甲状腺结节（p=0.029）和脂肪百分比（p=0.004）中差异具有统计学意义，以上因素可作为减重效果的影响因素。

3. 多因素 Logistic 分析显示：空腹血糖（OR=1.016；p=0.009）、甘油三酯（OR=1.505； p＜0.001）、BMI（OR=1.123； p＜0.001）、糖尿病（OR=1.912； p=0.030）、维生素 D 缺乏（OR=3.229； p＜0.001）、脂肪百分比（OR=1.110；p=0.001）是 LSG 治疗效果的独立预测因素，并得到效果预测模型：Y=-13.589+0.015×空腹胰岛素+0.403×甘油三酯+0.116×BMI+0.696×糖尿病+1.198×维生素 D 缺乏+0.092×脂肪百分比。

4. 验证组的 ROC 曲线下面积为 0.827（95%CI：0.756-0.898），ROC 曲线中最佳 Cut-off 值是 0.133，灵敏度与特异度分别为 69.0%和 81.4%，约登指数为 0.504。构建的预测模型具有较好的判别能力，能够较好的区分术后减重不足和术后减重效果良好的患者。

结论：研究构建的 Logistic 多因素预测模型具有较好的判别能力，可用于对 LSG 术后减重不足风险的预测。

关键字 腹腔镜袖状胃切除术；肥胖；减重效果；预测因素；多余体重减轻率

分类：临床营养

日间病房恶性肿瘤患者营养风险及营养不良横断面调查

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目的：日间治疗模式是国家近年来大力倡导的肿瘤患者治疗模式，该模式收治的肿瘤患者相对来说健康状态较好，加之日间治疗的“短、平、快”特点，使得患者的营养风险筛查和评估被忽视，因此，对于该部分患者的营养风险及营养不良情况尚少有研究。本研究对此进行调查，并评估该人群合并营养风险及营养不良的高危因素。方法：采用横断面研究方法，入组 2020-11-23 至 2020-12-14 期间就诊北京大学肿瘤医院日间病房进行静脉输液治疗的恶性肿瘤患者，纳入标准：1）年龄≥18 岁；2）病理诊断为恶性肿瘤；3）认知功能正常；4）接受输液治疗。排除标准：1）一般状况差，KPS 评分＜60；2）无法站立完成人体测量或无法手持握力器；3）患者或家属拒绝入组。收集信息内容包括：社会人口学资料，包括性别、年龄和文化程度；疾病与治疗相关资料，包括疾病诊断、肿瘤分期、是否接受过胃肠道手术、治疗方案是否含化疗、卡式功能状态（Karnofsky Performance Status，KPS）评分、是否合并糖尿病、血清白蛋白水平。人体测量包括体重、身高、握力和人体成分测量（InBody770）。采用营养风险筛查表（Nutritional Risk Screening 2002，NRS 2002）进行营养风险筛查，采用整体营养状况主观评估（Patient-Generated Subjective Global Assessment，PG-SGA）进行营养不良评定，调查营养风险及营养不良的患病率，并分析潜在的相关影响因素。 结果：在 562 例接受日间治疗的恶性肿瘤患者中，男女比例 1.7:1，中位年龄 59（52-65）岁，最常见的原发肿瘤部位为消化系统，营养风险（NRS 2002 ≥3 分）发生率为 24.2%，营养不良（PG-SGA 定性评价 B 或 C）发生率为 31.0%，其中严重营养不良（PG-SGA 定性评价 C）发生率为 12.6%。营养风险比例最高的癌种是胃癌（47.1%），其次为肝胆胰/壶腹肿瘤（40.0%）；营养不良发生率最高的癌种为肝胆胰/壶腹肿瘤（50.0%），其次为胃癌（44.2%）。营养风险的单因素分析显示，KPS 评分＜90、胃肠道术后、治疗方案含化疗、低蛋白血症、握力不足、低相位角的患者更易合并营养风险（p＜0.05），进一步多因素分析显示，KPS 评分＜90、胃肠道术后、低蛋白血症为恶性肿瘤患者营养风险发生的独立危险因素（P＜0.05）。营养不良的单因素分析显示，KPS 评分＜90、胃肠道术后、握力不足、低相位角的患者更易合并营养不良（p＜0.05），进一步多因素分析显示，KPS 评分＜90、胃肠道术后、低相位角是营养不良发生的独立危险因素（P＜0.05）。 结论：接受日间治疗的恶性肿瘤患者虽然营养风险及营养不良发生率较常规住院患者偏低，但仍有较高比例存在营养风险及营养不良，临床不应忽视。对于 KPS 评分＜90、胃肠道术后、低白蛋白血症、低相位角的患者应重点对营养问题给予关注。

关键字 恶性肿瘤；营养风险；营养不良；日间治疗

分类：临床营养

Ⅰ～Ⅲ型脊髓性肌萎缩儿童体格生长与骨健康状况的横断面调查

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目的：探讨Ⅰ～Ⅲ型脊髓性肌萎缩症（spinal muscular atrophy，SMA）儿童的体格生长与骨健康状况，以期为SMA患儿的长程个体化营养管理及SMA多学科的诊治与管理提供理论依据。

方法：回顾性收集2018年5月～2022年12月就诊于复旦大学附属儿科医院SMA多学科诊治团队儿童的临床资料，包括病史、喂养状况、体格测量、血清25-羟基维生素D水平和骨密度值指标。采用WHO Anthro和 WHO Anthro Plus软件，计算体格测量指标Z值评分并评价其营养状况。5岁以下儿童身高别体重Z值＞+2 标准差为超重、＞+3 标准差为肥胖；5～19岁儿童年龄别身体质量指数Z值＞+1 标准差为超重、＞+2 标准差为肥胖；身高别体重Z值/年龄别身体质量指数Z值＜-2 标准差为消瘦，＜-3 标准差为重度消瘦。骨密度检查采用双能X线吸收法检查腰椎骨密度，所得Z值评分诊断骨质疏松症，Z值<-2.5标准差为骨质疏松症，Z值为-1.0～-2.5标准差为低骨量，Z值>-1.0标准差为骨密度正常。参照2011年美国医学研究所及2016年全球营养性佝偻病管理共识提出的儿童维生素D营养状况的判定标准评价患儿维生素D水平，血清25-羟基维生素D <30 nmolL为维生素D缺乏，35～50nmolL为维生素D不足，>50nmolL则为适宜。

结果：共纳入210例SMA儿童，男94例，女116例，年龄中位数为3.6（2.0，6.2）岁；Ⅰ型29例（13.8%），Ⅱ型130例（61.9%），Ⅲ型51例（24.3%）。23.3%（49例）的儿童存在喂养相关问题。2.9%（6例）通过鼻饲/经皮胃镜下胃造瘘术喂养，均为Ⅰ型儿童。210例SMA儿童的营养状况评估显示， 31.0%（65 例）的儿童存在营养不足及营养过剩的问题，其中消瘦占 10.5%（22例），重度消瘦占6.7%（14例），超重占9.0%（19例），肥胖占4.8%（10例）。Ⅰ型儿童年龄别身高Z值为（0.45±1.57），Ⅱ型为（-0.47±1.18），Ⅲ型为（-0.33±1.21），3组患者Z值评分差异具有统计学意义（F=6.455，P=0.002），其中Ⅰ型与Ⅱ型、Ⅲ型间的差异具有统计学意义（P＜0.05），Ⅱ型与Ⅲ型间的差异无统计学意义。Ⅰ型儿童年龄别体重Z值评分为（-0.60±1.24），Ⅱ型为（-0.36±1.37），Ⅲ型为（-0.06±1.30），3组患者Z值评分的差异无统计学意义（F=1.446，P=0.238）。Ⅰ型儿童身高别体重Z值/年龄别身体质量指数Z值评分为（-1.19±1.67），Ⅱ型为（-0.36±1.72），Ⅲ型为（0.02±1.44），3组患者Z值评分差异具有统计学意义（F=5.026，P=0.007），其中Ⅰ型与Ⅱ型、Ⅲ型间的差异具有统计学意义（P＜0.05），Ⅱ型与Ⅲ型间的差异无统计学意义。42例儿童完善了双能X线骨密度检测，所得Z值评分为（-1.86±1.44），78.6%（33例）存在骨密度低下，骨密度低下的儿童中45.5%（15例）为骨质疏松症。50例儿童完善了维生素D水平检测，结果为（82.60±39.90）nmol/L，其中10.0%（5例）存在维生素D缺乏，12.0%（6例）存在维生素D不足。

结论：脊髓性肌萎缩症儿童存在营养不良/过剩、骨密度低下、维生素 D 缺乏等营养相关问题。Ⅰ型与Ⅱ型、Ⅲ型间的体格生长状况差异较为明显。SMA儿童需开展全面的营养检测与评价，加强对骨健康的关注，对SMA多学科长程的诊疗管理具有一定的临床意义。

关键字 脊髓性肌萎缩，生长状况，骨健康，血清25-羟基维生素D水平

分类：临床营养

4-5 期慢性肾脏病非透析患者瘦体组织下降的列线图模型建立及分析

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目的　瘦体组织也称为瘦体重或去脂体重,它是衡量人体肌肉质量的重要指标。正常情况下，50 岁后人体肌肉质量每年以 1%~2%的速度减少，表现为肌肉质量与瘦体重减轻、肌肉功能和力量降低等。除年龄、性别外，瘦体组织质量还受疾病、营养状况、炎症、身体活动水平等因素影响。已有研究发现在慢性肾脏病（chronic kidney disease, CKD）患者瘦体组织质量下降更早且更加明显，大约 30%～50%的 CKD 患者存在肌肉蛋白分解增加，导致骨骼肌萎缩、蛋白质能量消耗、身体机能和运动耐力低下甚至肌少症,而且这种现象在 CKD4～5 期患者中更突出。CKD 患者瘦体组织下降是一个复杂的病理生理过程，影响因素较多，但是瘦体组织或肌肉质量检测方法临床未广泛应用。因此如何早期有效识别和筛查相关风险因素，对预防及及时纠正瘦体组织流失十分必要。本研究拟通过横断面研究调查 4-5 期 CKD 非透析患者瘦体组织下降状况，并采用列线图构建瘦体组织下降的预测模型，以期为临床早期识别与筛选瘦体组织下降风险因素提供依据。

方法　选取 2018 年 7 月至 2021 年 12 月在武汉市第五医院就诊的 CKD4-5 期非透析患者 247 例，根据瘦体组织指数（LTI）分为正常 LTI 组和低 LTI 组，收集临床资料，Logistic 回归分析瘦体组织下降的危险因素，并通过 R 软件包(R3.5.3)构建列线图预测模型，绘制校正曲线及 ROC 曲线评价模型区分度和精准度。

结果　①247 例 CKD4～5 期患者中正常 LTI 组 148 例（59.92%）、低 LTI 组 99 例（40.08%）.

②单因素分析结果显示，两组在年龄、性别、糖尿病肾脏病原发病、NRS2002 评分、体质量指数、小腿围、血红蛋白、血清白蛋白、二氧化碳、估算肾小球滤过率、血磷上差异有统计学意义（P＜0.05 ），在血压、肾小球肾炎或高血压肾损害或其他原发病、CKD 病程、吸烟饮酒史、CKD 分期、尿素氮、血肌酐、血尿酸、血钾、血钙、总胆固醇、甘油三酯、超敏 C 反应蛋白上差异无统计学意义（P＞0.05）。

③将单因素分析差异有统计学意义指标作为自变量进行赋值，以瘦体组织下降为应变量（低 LTI 组=1，正常 LTI 组=0），进行多因素 Logistic 回归分析。Logistic 回归分析显示年龄（OR=1.441,P=0.012)、糖尿病肾脏病（OR=2.153,P=0.029)、体质量指数（OR=1.639,P=0.023)、小腿围（OR=3.247,P=0.011)、二氧化碳（OR=3.573,P=0.004)是瘦体组织下降的独立危险因素。

④利用 R 软件包(R3.5.3)根据多因素 Logistic 回归分析结果构建 CKD4-5 期患者瘦体组织下降的列线图模型。对列线图模型进行验证，结果显示校正曲线均趋近于理想曲线，校准曲线斜率接近 1（ x 2=3.549，P=0.637）；ROC 曲线 AUC 为 0.792(95%CI：0.714～0.897)。

结论　基于年龄、糖尿病肾脏病、体质量指数、小腿围、二氧化碳 5 项独立危险因素建立的列线图预测 CKD4-5 期非透析患者瘦体组织下降风险具有较好的区分度和紧精确度。

关键字 慢性肾脏病；瘦体组织；危险因素；列线图

分类：临床营养

2 型糖尿病患者肌脂比与炎症因子、胰岛素抵抗的相关性研究

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目的： 探讨 2 型糖尿病（type 2 diabetes mellitus,T2DM）患者骨骼肌质量与内脏脂肪面积比值即肌脂比（Skeletal muscle mass to visceral fat area ratio,SVR）与中性粒细胞（neutrophil,Neu）/淋巴细胞（lymphocyte,Lym）比值（neutrophil to lymphocyte ratio,NLR）、胰岛素抵抗（insulin resistance,IR）的相关性。

方法： 选取 2022 年 6 月至 2023 年 3 月于上海中医药大学附属第七人民医院内分泌科就诊的 201 例 T2DM 患者作为研究对象。所有患者均符合 2022 年美国糖尿病学会发布的糖尿病医学诊疗标准。排除标准：（1） I 型糖尿病、特殊类型糖尿病；（2）存在感染或其他系统性疾病，如肿瘤、严重肝肾疾病、系统性免疫疾病等；（3）资料不完整。收集研究对象的一般临床资料，测定身体测量指标：身高、体重、腰围、臀围，计算身体质量指数（body mass index, BMI）=体重（kg）/身高 2（m2），、腰臀围比值（waist hip ratio,WHR）=腰围（cm）/臀围（cm）。测定生化指标：NLR、空腹血糖（fasting plasma glucose,FPG）、空腹胰岛素（fasting insulin,FINS）、甘油三脂（triglycerides,TG）、总胆固醇（total cholesterol,TC）、低密度脂蛋白（low-density lipoprotein,LDL）、高密度脂蛋白（heigh-density lipoprotein,HDL），稳态模型评估 IR 指数（homeostasis model assessment of insulin resistance,HOMA-IR）、胰岛素敏感性指数（international sensitivity index,ISI）。HOMA- IR=FPG╳FINS/22.5, ISI=Ln 1/(FPG╳FINS)。采用多频生物电阻抗法测定骨骼肌含量（appendicular skeletal muscle mass,ASM）、体脂肪量（total body fat,TBF）、内脏脂肪面积（viscera fat area,VFA）、基础代谢量。计算体脂肪量占体质量百分比（TBF%）、四肢骨骼肌质量指数（appendicular skeletal muscle mass index,ASMI）与 SVR。组间差异采用单因素/Kruskal-Wallis 方差分析。采用 pearson/Spearman 相关分析 NLR 与 ASMI、VFA、SVR 及 HOMA-IR、ISI 的相关性。采用多元线性回归分析方法分析 SVR 和 IR 的关系。所有统计分析均采用 SPSS23.0 软件进行统计学分析，P<0.05 为差异有统计学意义。

结果： 本研究共纳入 201 例 T2DM 患者，其中男性 126 例，女性 75 例。根据 SVR 水平三等分，在男性人群 Q1:<0.384kg/cm2，Q2:0.384-0.524kg/cm2，Q3:>0.524kg/cm2；女性人群 Q1:<0.420kg/cm2，Q2:0.420-0.624kg/cm2，Q3:>0.624kg/cm2。每组共 67 例，其中男性 42 例，女性 25 例。结果显示，男性 T2DM 中，和 Q3 组相比，Q1、Q2 两组 TBF、TBF%、VFA 显著增高（P<0.05）；同时 SVI、ASM、ASMI、基础代谢量、细胞总水分显著降低（P<0.05）；而去脂体重、矿物质含量、细胞内水分之间无统计学差异。女性 T2DM 中，和 Q3 组相比，Q1、Q2 两组 TBF、TBF%、VFA 显著增高（P<0.05）；同时 SVR、ASM、ASMI、基础代谢量、细胞总水分显著降低（P<0.05）；而去脂体重、细胞内水分、细胞外水分之间无统计学差异。两变量的相关分析结果显示 NLR 和 ASM、ASMI、SVR、ISI 呈负相关（P<0.005），和 TBF、TBF%、VFA、HOMA-IR 呈正相关（P<0.005）。 多元线性回归分析结果显示，回归方程显著，其中 ASMI、VFA、SVR 和 HOMA-IR 独立相关（F=25.584,P<0.001），共解释 HOMR-IR 34.3%的变异； VFA、TBF%、SVR 和 HOMA-IR 独立相关（F=46.105,P<0.001），共解释 ISI 48.5%的变异。

结论：体脂肪分布和脂肪组织功能障碍是肥胖相关 IR 发展的关键因素，但肥胖症患者身体成分变化的一个重要特征是体脂肪和肌肉的含量及比例发生变化，脂肪量的增加和肌肉量的下降往往同时发生。骨骼肌质量降低和内脏脂肪堆积与炎症性细胞因子表达增加相关，因此 SVR 水平降低反映机体的慢性低度炎症状态；而 IR 被认为是一种慢性炎症，IR 的程度直接与机体的炎性程度相关。本次发现 T2DM 患者中 SVR 与 NLR、HOMA-IR 存在负相关，和 ISI 存在正相关。提示 SVR 因同时考虑到脂肪和肌肉质量的变化及比例，作为一种新的肥胖衡量指标，与 IR 的风险增加密切相关，可作为 IR 的预测指标。

关键字 2 型糖尿病，肌脂比，骨骼肌质量，内脏脂肪面积，炎症因子，胰岛素抵抗

分类：临床营养

弹力带抗阻运动训练联合补充富含亮氨酸的乳清分离蛋白粉对老年肌少症患者的影响

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背景

肌少症是一种与衰老相关的进行性骨骼肌疾病，随着肌肉质量和功能的进行性、普遍性丧失，老年人发生跌倒、骨折、失能等情况的风险升高，生活质量下降，住院率及死亡率升高。随着我国人口老龄化趋势的加速，肌少症患病率越来越高，已造成较大的疾病负担，但目前尚无有效的药物疗法。补充优质膳食蛋白质和进行抗阻运动训练目前是亚洲肌少症工作组推荐的首选干预方法，但目前关于不同膳食蛋白质和抗阻运动训练方法的临床研究证据仍然不足，急需积累相关证据，为科学防治肌少症提供更多的依据。

目的

观察富含亮氨酸的乳清蛋白补充联合弹力带抗阻运动对 60 岁以上老年肌少症患者体成分、肌肉功能及血生化指标的临床干预效果。

方法

招募 40 名符合亚洲肌少症工作组诊断标准的老年肌少症患者，以 1：1 的比例随机分为联合组（20 名）和对照组（20 名）。联合组受试者每周进行三次不连续弹力带抗阻运动训练，每次 40 分钟，同时每日补充 20g 乳清蛋白粉（含 2.28 克亮氨酸，6.82 克其它必需氨基酸），对照组者仅保持正常的日常轻体力活动且不进行额外的营养补充，试验组和对照组所有受试者都能接受到医院营养科个体化的肌少症饮食指导。经过为期 12 周的膳食营养补充及抗阻运动训练后，通过生物电阻抗分析受试者体成分（肌肉量、脂肪量、水分等）并根据身高对肌肉量进行标准化；通过惯用手握力、5 次椅立实验及计时起立行走试验评估肌肉功能；通过常规血生化检查血液指标（血糖、血脂、脂蛋白胆固醇等）。

结果

12 周乳清蛋白联合抗阻运动干预后的老年肌少症受试者的四肢骨骼肌肌肉增量（+0.17±0.52 kg vs. -0.45±0.98 kg）、四肢骨骼肌肌肉量占体重百分比增量（+ 0.81±1.31 kg vs. -0.97±2.61 kg）、四肢骨骼肌肌肉指数增量（+0.07±0.20 kg/m2 vs. -0.17±0.35 kg/m2）以及下肢骨骼肌肌肉指数增量（+0.07±0.14 kg/m2 vs. -0.11±0.26 kg/m2）均显著高于对照组的增量（$P<0.05$）。与对照组相比，联合干预后还可显著升高患者的 HDL-C 水平(1.52±0.36mmol/L vs. 1.20±0.21 mmol/L，$P<0.01$)。但经过联合干预后，受试者的握力（23.73±5.81 kg vs. 21.08±6.48 kg）、5 次椅立实验时间（11.96±3.53s vs. 12.79±2.61s）及计时起立行走试验时间（8.82±2.19s vs. 9.97±2.83s）与对照组并无显著差异。

结论

12 周富含亮氨酸的乳清蛋白补充联合弹力带抗阻运动训练能够有效改善老年肌少症受试者肌肉量变化量并升高密度脂蛋白胆固醇水平，但对干预后的肌肉量结局以及肌肉功能没有显著影响。未来有待延长干预期以及使用更多不同的营养补充和运动形式进一步探究老年肌少症的改善措施。

关键字 乳清蛋白；亮氨酸；抗阻运动；弹力带；肌少症

分类：临床营养

不同肠内喂养方式对神经危重症患者胃肠道功能的影响

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目的：目前，ICU 患者肠内营养的最佳输注方式仍存在争议。2017 年，重症监护营养专家小组确定，有必要将连续输注与间歇输注试验作为未来十年要进行的“十大”优先研究项目之一。在神经危重症领域，针对该方式的研究较少，本文探讨三种不同肠内喂养方式（即连续输注、循环输注和间歇输注）对神经危重症患者胃肠道功能（达到热量目标的平均持续时间、胃残留、腹泻、腹胀、误吸、便秘、呕吐和吸入性肺炎）的影响。

方法：采用随机化方法将入院的 90 例神经危重症患者采用 1：1：1 的比例随机分配到每个组。连续输注组：输注泵 24h 内以每小时恒定的速率持续泵入营养液；循环输注组：输注泵输注时间为 16 小时，速率恒定；间歇输注组：肠内营养液 4 次/天，每次输注时间为 60～120min。患者每天摄入营养液及输注泵管均由纽迪西亚制药(中国江苏无锡)有限公司提供，所含热量为 750kcal/500ml，总量为 1000ml。连续输注组和循环输注组开始泵速为 20ml/h，患者无不良反应后以连续组泵速为 42ml/h、循环组泵速为 63ml/h 的速度持续泵入。间歇组将每天的喂养量分为四餐，于 08:00、12:00、18:00 和 22:00 通过胃管泵入。若每餐前胃残留≤250ml， 60min 内输注完毕；若胃残留＞250ml，则可 120min 内输注完毕。三组患者均每 4h 检查一次胃残留，如果不能耐受，泵速将减少一半。喂养不耐受定义为胃残留＞250mL，如果胃残留＞ 500mL，停止肠内营养并于 4h 后重新评估。主要结果是每组患者达到热量目标的平均持续时间（天数）。次要结果包括胃残留、腹泻、腹胀、误吸、便秘、呕吐、吸入性肺炎的发病率。观察时间为 5 天。

结果：最终纳入连续输注组患者 28 例、循环输注组患者 30 例，间歇输注组患者 27 例。三组患者在达到热量目标的平均持续时间（天数）、胃残留、腹泻、腹胀、便秘的方面差异无统计学意义（P＞0.05），间歇输注组在呕吐、误吸、吸入性肺炎方面优于连续输注组与循环输注组，差异有统计学意义（P＜0.05）。

结论：以间歇输注的方式进行肠内营养支持可有效减少神经重症患者呕吐、误吸及吸入性肺炎的发生率，并在达到热量目标的平均持续时间、胃残留、腹泻、腹胀、便秘方面与连续输注和循环输注相当。与连续输注肠内营养液相比，间歇输注是一种更符合人体进食规律的方式，允许患者进行大范围的肢体活动，促进患者食物消化，维持肠道内稳态，从而有效保护神经危重症患者胃肠道功能，降低肠内营养并发症，提高患者的生活质量，减少住院时间和住院费用，降低病死率，是一种更为有效、安全、经济的肠内喂养方式。

关键字 神经危重症患者；肠内营养；连续输注；循环输注；间歇输注；胃肠道功能

分类：临床营养

营养状况与老年髋部骨折患者术后活动水平、照护需求及死亡风险的相关性研究

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目的： 髋部骨折是老龄化人群中失能、死亡的重要原因之一，而营养不良又进一步加重了不良预后，严重影响老年人健康相关生活质量。本研究旨在探讨营养状况与老年髋部骨折后活动功能、照护需求和死亡风险的相关性，以期为该人群针对性的营养干预提供依据，从而提高老年髋部骨折患者护理质量。

方法： 对 2022 年 8 月至 2023 年 4 月期间在北京某三甲医院住院的年龄 472 例老年髋部骨折患者≥ 65 岁的在术前应用简易营养评估量表（MNA-SF）评估营养水平。研究护士在住院期间为研究对象提供富含能量和蛋白质的营养补充剂，出院时给予营养补充建议。研究对象住院时间中位数为 5 天，84%的患者在入院 48 小时内进行了手术。随后评估术后 4 个月的活动水平、入住护理机构率及死亡率。4 个月的随访数据由研究护士与患者或照顾者进行电话访谈收集。以年龄、性别、ASA、骨折前活动能力、记忆功能和基线 MNA-SF 评分为自变量，采用优势比（OR）和 95%可信区间进行年龄调整后应用单因素和多因素二元 logistic 回归分析，检测自变量与髋部骨折 4 个月后活动能力变化与入住护理机构的相关性。采用采用风险比（OR）和 95%可信区间年龄校正后应用单因素和多因素 Cox 比例风险模型检测变量与 4 个月随访期间死亡率的相关性。在校正年龄后的单变量分析中，每个预测变量都单独根据年龄进行调整，而在多变量分析中，所有预测变量同时引入模型。根据 MNA-SF 计算的 4 个月累积生存期采用 K-M 生存分析和 Mantel Cox 检验。

结果：基线时，41 例（9%）患者存在营养不良，200 例（42%）存在营养不良风险。11 例（2.3%）患者无法移动，66 例（14%）患者生活在护理机构。经过 4 个月的随访，162 例（45%）患者活动能力下降，77 例（24%）患者转移到医疗机构。随访期间，90 例患者死亡。在多变量 COX 比例风险模型中，营养不良与死亡率相关（HR2.16； 95%CI 1.07-4.34）。在多变量 logistic 回归中，存在营养不良风险（OR2.42；95%CI 1.24-3.31）和营养不良（OR6.10；95%CI 2.01-18.5）的患者与进入护理机构相关。营养不良风险（OR2.03；95%CI 1.24-3.31）与活动水平下降相关。

结论： 本研究的主要发现是通过 MNA-SF 评估的营养不良或营养不良风险对髋部骨折后的活动能力、入住护理机构和死亡结局具有重要的预测价值。营养不良或营养不良风险是髋部骨折不良结局的独立危险因素。同时，我们的研究也发现，经过 MNA-SF 评估存在营养不良风险患者可能发展为轻度至中度营养不良患者人群，在对老年髋部骨折患者设计营养干预措施时需关注此人群。

关键字 hip fractures nutrition

分类：临床营养

胰腺癌患者围手术期营养管理的最佳证据总结

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目的 胰腺癌是全球范围内导致癌症死亡的第 4 大病因，其发病率和死亡率不断增加。目前，手术切除是治愈胰腺癌患者和提高生存率的唯一手段。而营养不良已被证实是影响胰腺癌发生及预后的独立危险因素。研究发现胰腺癌患者围手术期合理营养管理有利于维持机体体重、内脏蛋白，提高手术耐受力，降低术后并发症的发生率以及缩短住院时间，但国内 64 家胰腺外科的数据显示胰腺手术围术期营养支持不规范，其指征、途径和时间等尚无统一标准。因此，本文总结胰腺癌患者围手术营养管理的最佳证据，为临床优化胰腺癌围手术期营养管理方案提供循证依据。方法 根据 PIPOST 确定循证问题，系统检索建库至 2023 年 2 月 10 日包括 Cochrane Library、BMJ Best Practice、UpToDate、JBI 临床治疗和护理证据在线数据库（Clinical Online Network of Evidence for Care and Therapeutics，JBI）、美国国立指南库（National Guideline Clearinghouse，NGG）、苏格兰学院际指南网（Scottish Lintecollegiate Network，SIGN）、加拿大临床实践指南数据库（Canadian Medical Association Clinical Practice Guideline，CMA）、美国国家癌症综合网、英国国家临床优化研究所（NICE）、美国医师协会指南、Clinicalkey for Nursing、RNAO、PubMed、Web of Knowledge、Embase、中国生物医学文献服务系统（CBM）、中国知网、万方数据库、维普数据库，中华医学会网，欧洲肠内肠外营养学会网，美国肠内肠外营养学会网，美国营养师学会 ACG 网，中国肠内肠外营养学会网，中国营养师网的国内外数据库及营养相关网站中关于胰腺癌患者围手术期营养管理措施的所有证据，检索类型包括临床决策、指南、专家共识、证据总结、系统评价。结果 共检索 1910 篇文献，共纳入 17 篇文献，包括 8 篇指南，6 篇专家共识，3 篇系统评价。经文献质量评价后提取证据并进行汇总，总结包括管理通则、能量和蛋白质需求值、营养风险筛查与评估、术前营养管理、术中营养管理、术后营养管理、血糖营养管理、并发症营养管理及出院后营养管理 9 个方面 43 条证据。讨论 组建多学科团队，按照规范流程实施胰腺癌全程化营养管理，选择合适的工具，规范营养筛查与评估，采用恰当的营养支持方式，做好术前、术中、术后的营养管理，重视出院后营养管理，做好随访。结论 胰腺癌患者围手术期营养管理的最佳证据过程具有科学性和严谨性，医务人员应结合临床实际提高胰腺癌患者营养管理质量，促进患者康复。但由于部分证据从国外文献或专家共识中获取，其适用性有待进一步验证。因此医护人员在应用证据时，应充分评估，个体化地进行循证转化及应用，提高胰腺癌患者营养管理水平，促进患者康复。

关键字 胰腺癌；围手术期；营养管理；循证护理学

分类：临床营养

维生素 D 缺乏与 2 型糖尿病合并代谢性炎症综合征的相关性研究

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目的 维生素 D（VitD）在肝脏经 25 羟化酶转化为 25(OH)D，25(OH)D 在血液中含量高且稳定，临床上通过检测 25(OH)D 水平来了解 VitD 的营养状况。2 型糖尿病（type 2 diabetes mellitus,T2DM）患者高发代谢性炎症综合征(Metabolic inflammatory syndrome, MIS)[1]。我们的研究探讨维生素 D 缺乏与 2 型糖尿病合并代谢性炎症综合征的相关性。

方法 选取我院 2019 年 1 月~2019 年 12 月采用回顾性病例系列研究的方法，连续纳入符合诊断标准、病历资料完整的 T2DM 患者 122 例。纳入标准：（1）均符合 1999 年世界卫生组织（WHO）制定的 T2DM 诊断标准[3]；（2）病历资料完整。排除标准：有长期饮酒史、妊娠高血压或继发性高血压病史、其他类型的糖尿病、住院期间处于感染及相关疾病、肝肾功能不全、恶性肿瘤、自身免疫性疾病史或其他严重疾病等。按照是否并发代谢性炎症综合征（MIS）分为 MIS 组和非 MIS 组，观察指标有性别、年龄、高血压史、吸烟、饮酒史、糖尿病病程、BMI、FPG、HbA1c、TC、TG、HDL-C、LDL-C、UA、CRP、25(OH)D 等。 采用 SPSS19.0 统计软件对数据库进行统计分析。计量资料先进行方差齐性检验，如果方差齐，则以(`x± s)表示，组间比较采用 t 检验；如果方差不齐，以中位数与四分位数间距表示［M（QL，QU）］，组间比较采用秩和检验；计数资料以率表示，组间比较采用 x^2 检验。多因素分析采用二分类 Logistic 回归分析。以 P<0.05 为差异有统计学意义。

结果 BMI〔OR=2.162，95%CI(1.149~4.066)，P=0.017〕和 CRP〔OR=1.234，95%CI(1.022~1.492)，P=0.029〕的回归系数分别为 0.771 和 0.211，25(OH)D〔OR 值 0.414，95%CI(0.272~0.629)，P=0.0001〕的回归系数为-0.883。

结论 我们的资料显示 CRP 的回归系数为正数，说明其增高可促进 T2DM 发生 MIS，而 25(OH)D 的回归系数为负数，表明 25(OH)D 显著降低可促进 T2DM 发生 MIS。研究显示，25(OH)D 水平与胰岛素敏感性呈正相关，VitD 缺乏的个体有更高的胰岛素抵抗和 T2DM 危险[7-9]。DM 患者 Vit D 不足或缺乏广泛存在，低水平 Vit D 除与 DM 发生密切相关外，还会增加 DM 并发症发生率[10]，还有人发现高水平 CRP、高 BMI 是 T2DM 合并 MIS 的危险因素[12]，而血清 25-(OH)D 与 T2DM 伴发 MIS 的 hsCRP、HOMA-IR 关系密切[2]。这些研究的结果提示 VitD 可能参与了 T2DM 的胰岛素抵抗，同时也可能与慢性低度炎症密切相关。代谢失调所致的产物，如游离脂肪酸、脂多糖等使巨噬细胞极化，常常诱发慢性低度炎症[12,13]，也称代谢性炎症，慢性低度炎症与代谢性疾病关系密切，其参与并导致 AS、T2DM、NAFLD 及肥胖等代谢性疾病的发生。T2DM 患者低的血清 25(OH)D 水平、高水平 CRP 均与发生 MIS 独立相关，同时也提示 T2DM 并发 MIS 的机制可能为慢性低度炎症。

我们的资料还显示 BMI 的回归系数为正数，说明其增高可促进 T2DM 发生 MIS。因为肥胖是 MIS 的一个常见组分，故 BMI 与 MIS 是正相关关系。有研究表明单核巨噬细胞侵袭脂肪细胞可导致肥胖[14]。因此，BMI 增高是慢性炎症的结果，BMI 增高是 T2DM 发生 MIS 的独立危险因素。

总之，当 T2DM 患者出现血清维生素 D 水平显著降低或 CRP 水平显著升高，或明显肥胖时，发生 MIS 的风险显著增大。

关键字 维生素 D；2 型糖尿病；代谢性炎症综合征；C 反应蛋白；肥胖

分类：临床营养

生酮饮食治疗患儿基线营养状况和主要照顾者对生酮饮食知晓现况调查

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目的：了解生酮饮食（Ketogenic diet，KD）治疗前期患儿的基线营养状况和主要照顾者对KD的知晓现况，以期为后续进行有效治疗、探索KD长程管理模式提供依据。

方法：收集2020年4月至2023年3月于复旦大学附属儿科医院神经内科启动生酮饮食治疗患儿的基本资料、体格检查、骨密度及维生素D水平监测结果。对其主要照顾者采用现场调查方式，应用问卷调查表对患儿的日常饮食行为和主要照顾者在启动前期对生酮饮食治疗知晓现况进行调查。采用WHO儿童体格参考标准评估患儿营养状况。参照2011年美国医学研究所及2016年全球营养性佝偻病管理共识提出的儿童维生素D营养状况的判定标准评价患儿维生素D水平。

结果：本次研究共纳入82例患儿，调查共收集有效问卷82份，其中97.6%为药物难治性癫痫患者。22.0%的患儿存在营养不足、超重/肥胖，42.6%存在骨密度降低，11.1%存在维生素D缺乏/不足。问卷调查对象中，患儿的父母占91.5%。主要照顾者的文化程度，小学学历占9.8%，初中学历占 18.3%，专科学历占 43.9%，本科及以上学历占 28.0%。在患儿的日常饮食行为调查中显示，8.5%的患儿已满6月龄及以上但未予添加辅食，46.3%的患儿存在挑食偏食等问题。在KD启动前期，80.5%的主要照顾者通过神经内科专科门诊就诊，从而知晓患儿可尝试使用KD治疗，12.2%通过微信、网络、相关书籍等方式了解KD治疗，7.3%通过病友或好友了解KD治疗。34.1%的主要照顾者在入院前曾自行了解过生酮饮食相关知识。2例主要照顾者曾主动尝试KD，4例主要照顾者在入院前曾给予患儿尝试 KD，尝试的方式均为规避主食从而体验 KD。对于生酮饮食治疗的执行问题，72.0%的主要照顾者担心患儿难以接受KD，29.3%担心繁琐严格的操作过程无法胜任，22.0%担心自己无法准确接受营养师的指导。对于KD的疗效的期待，所有主要照顾者均期望患儿癫痫发作得到明显控制，78%期望患儿认知能力得到改善，75.6%期望能够减停所有KD药物，34.1%期望在KD治疗的同时能够改善患儿的营养状况，7.3%期望患儿在KD治疗的同时能够减重。

结论：启动生酮饮食治疗的患儿存在不同程度的营养不足/过剩、骨密度降低及维生素D不足/缺乏的问题。日常存在不良饮食行为的比例较高。主要照顾者对于KD治疗相关知识的知晓度较低，对于KD疗效的期待值较高。专业医师及营养师在常规诊疗过程中需关注患儿营养及骨健康等相关问题，加大KD治疗宣教力度，以保障KD能够安全有效的实施。

关键字 生酮饮食，营养状况，主要照顾者，知晓现况

分类：临床营养

营养支持改善晚期癌症病人心理问题研究

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营养不良是影响晚期癌症病人生存质量的主要因素之一。这里营养不良包括：1、食欲减弱。在癌症晚期阶段，患者的食欲通常会减退，往往合并有发烧、疲劳、疼痛等症状，也会影响正常进食，严重者甚至无法进食。而身体同时会产生大量的废物，可导致体重减轻、免疫力下降、新陈代谢紊乱、心理问题增加，生存质量降低；2、疾病对人　体能量的消耗。癌症患者的能量消耗惊人，但营养的摄入却远不及正常人。食管癌、胃癌等消化系统肿瘤患者，更是存在消化吸收障碍。高达 80%的晚期癌症患者存在体重减轻和消瘦的现象。短期内体重严重下降，又被称为恶病质，一般还会合并乏力、贫血、疲乏的问题。在这种情况下，患者生活质量也受到严重的影响，生存期普遍较短。

为了找出问题所在，我院安宁疗护科对近两年 56 例终末期癌症患者进行了包括临床、心理和饮食营养方面在内的一系列全面检测并进行了客观评估。评估结果显示，一半以上患者存在心理问题，且大多数人都出现了营养不良的症状，其中一部分无法进食的患者，均出现失眠、苦恼、情绪悲观、消极等心理问题，癌痛明显的患者甚则出现严重的抑郁、焦虑、躁狂等症状，严重影响了病人的生存质量，也增加了家属负担。

此外，结果还显示，晚期癌症患者生存质量与心理问题和饮食营养不良之间存在相关性。饮食是人体对外摄取营养的主要途径，癌症晚期患者大多数会食欲减弱，营养吸收减少。已有的研究结果表明，大脑对生化失调和营养缺乏的敏感性，要远远超出其它任何一个器官,当食欲减弱、营养摄取不足时，大脑会迅速做出反应。比如血糖水平失衡会刺激大脑神经产生对某些食物的渴求和依赖，并由此而引发患者情绪波动。B 族维生素缺乏的普遍症状是：多疑，幻觉，情绪波动大，焦虑和紧张不安，以及听觉和视觉的异常反应。人的大脑中 60%是脂肪，而必需脂肪酸与大脑的机能则密切相关。大脑脂肪的缺乏与精神分裂症及狂躁，抑郁症等均有一定关系。

因此，对于疗护中心来说，怎样让晚期癌症患者舒适度过好最后的生活，提供身体、心理、精神等方面的精心照料和人文关怀等服务非常重要。通过改善饮食营养、干预心理健康等措施，能有效改善心理问题，控制或延缓痛苦和不适症状，从而提高生命质量，帮助患者舒适、安详地离世。

关键字 晚期癌症；营养不良；心理问题；营养支持；生存质量

分类：临床营养

通过短链脂肪酸水平探讨阻塞性睡眠呼吸暂停合并高血压的机制研究

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目的：短链脂肪酸（SCFAs）是不可消化的膳食纤维在结肠中经多种细菌发酵而产生的代谢产物，主要成份有乙酸、丙酸和丁酸，占短链脂肪酸的95%以上（三者在肠道中的比例结构约为3:1:1）。我们前期发现OSA合并高血压患者的肠道菌中产SCFAs菌群丰度险降低。然而，患者血液或粪便中SCFAs水平尚未被验证。本研究将探讨OSA合并高血压患者粪便和血液中SCFAs水平和血压的关系。

方法：2020年8月到2021年5月至福建医科大学附属第二医院睡眠医学中心招募体重指数大于24kg/m^2符合入组条件的受试者。通过多导睡眠呼吸监测和诊断，将受试者分组为：（1）对照组（Non-OSA，N＝12）：血压<130/85mmHg，AHI<5 次/小时；（2）重度 OSA 组（OSA，N＝11）：血压<130/85mmHg，AHI≥30次/小时；（3）重度OSA合并高血压前期组（OSApHTN，N＝13）：130/85mmHg≤血压<140/90mmHg，AHI≥30次/小时；（4）重度OSA合并高血压组（OSAHTN，N＝11）：血压≥140/90mmHg，AHI≥30次/小时。

结果：与对照组相比，OSApHTN（P=0.012）和OSAHTN组（P=0.025）粪便中乙酸含量下降；与OSA组比较，OSApHTN和OSAHTN组粪便中乙酸含量也减少，但仅OSApHTN组与OSA组差异有统计学意义（P=0.035）。与对照组比较，OSApHTN（P=0.0188）和OSAHTN组（P=0.0305）粪便中丁酸含量也都减少，且差异具有统计学意义；但四组间丙酸的含量无统计学差异。血浆中四组间乙酸和丁酸浓度无显着差异。与对照组比较，OSA（P=0.011）和OSApHTN组（P=0.037）中血浆丙酸浓度升高且差异具有统计学意义。通过多元线性回归分析粪便中乙酸、丁酸和血浆中丙酸对呼吸暂停低通气指数（AHI）和血压的关系发现，发现当粪便中丁酸水平越低则AHI越高，呈现负向的关联性（R^2=0.157, P=0.047），收缩压（R^2=0.293, P=0.044）和舒张压（R^2=0.162, P=0.017）与粪便中丁酸水平亦是呈现负关联性。

结论：OSA合并高血压患者的粪便中乙酸和丁酸浓度显著降低，但血浆中丙酸浓度增加。其中，粪便中的丁酸水平不仅与OSA严重度呈负相关联性，也与血压呈负相关联性。

关键字 短链脂肪酸，阻塞性睡眠呼吸暂停，高血压

分类：临床营养

基于基因表达谱识别心脏型或神经型的阻塞性睡眠呼吸暂停患者

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目的：阻塞性睡眠呼吸暂停（OSA）是一种常见且逐渐被重视的睡眠障碍性疾病，并被证实是一种异质性疾病。既往研究中发现可通过异质性为出发点来探讨其可能的分型，并针对不同的亚型采用个体化治疗策略后取得良好疗效，但是其与 OSA 发病机制之间的联系尚未理清。因此，从 OSA 的分子分型出发，旨在寻找各个分型的内在发病机制和治疗靶点的指标。

方法：招募因反复出现睡眠呼吸障碍症状并至我院进行多导睡眠呼吸监测（PSG）检查后诊断为 OSA 的患者 54 例作为研究对象。测量所有受试者的身高、体重、腰围、臀围、血压及其他参数，PSG 检查次晨患者的空腹静脉血液，提取外周血单个核细胞的 RNA。采用 Illumina 高通量测序技术对样本进行 RNA 测序后行差异表达基因分析、共识聚类、加权基因共表达网络分析。

结果：通过共识聚类可将 OSA 初步分为 4 型（C1~C4 型）：心脏型、全身型、神经型、早期型 OSA。各个分型在一般表型上如年龄、身体质量指数、腰围、臀围、吸烟、饮酒、心血管疾病、糖尿病、脂肪肝、其他代谢异常（包括高尿酸、高血脂、高血糖等代谢异常的疾病）均无差异。从各个分型的 PSG 参数中，在本研究中也发现了 C3 型 OSA 患者的中枢性呼吸暂停指数（CAI）和低通气指数（HI）高于其它 3 型的 OSA 患者，且差异具有统计学意义。通过差异分析及加权基因共表达网络分析发现各个分型的表达模式不同，每个分型都有其独特的信号通路，通过信号通路的表达差异造成各个分型受到影响的靶器官不同。此外，各个分型其相关模块通路基因也有所差异：C1 型相关模块通路的基因主要有 CACNB1、NDUFB3 和 NDUFB5，其中 CACNB1 在 C1 型中高表达，在 C2 型和 C3 型中低表达，而 NDUFB3 和 NDUFB5 在 C1 型中呈现出较其余 3 型低表达；C3 型相关模块通路的基因较多，其中包括 PRL24、PRS6 等编码核糖体的基因和 UQCR10、PARK7，这些基因在 C3 型中都呈现出较其余 3 型高表达。

结论：基于基因表达谱通过共识聚类可将 OSA 分为 4 个分型，其中 C1 型 OSA 主要富集于心脏相关的疾病，初步将其归类为心脏型 OSA；C3 型 OSA 主要富集于神经退行性疾病，初步将其归类为神经型 OSA。不同分型的 OSA 患者有自己独特的基因表达模式，有助于我们评估 OSA 患者病情及针对不同分型的 OSA 患者给予个性化的治疗。

关键字 阻塞性睡眠呼吸暂停，基因表型，共识聚类，多导睡眠呼吸监测

分类：临床营养

1 例血液透析患者合并新型冠状病毒肺炎的营养治疗

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患者男性，51 岁，主因“血液透析两年余，发热伴咳嗽 4 天”经门诊以“尿毒症，肺部感染”于 2022-12-20 收入肾病科。入科后完善相关化验检查（2022-12-20），血常规：血红蛋白 98 g/L，中性粒细胞百分比 84.1%，C-反应蛋白（定量）296.57mg/L；生化示：白蛋白 37.5g/L，钠 133.4mmol/L，钾 4.85mmol/L，尿素氮 25.4mmol/L，肌酐 1103umol/L，葡萄糖 26mmol/L。前降钙素测定：6.13ng/ml。病危患者核酸检测阳性（+），流式细胞因子六项检测：IL-695.895pg/ml。临床诊断：1.慢性肾脏病 5 期 肾性贫血 血液透析状态 2.肺部感染 3.型呼吸衰竭 4.新型冠状病毒感染 5.冠状动脉粥样硬化性心脏病 6.糖尿病。患者 因喘息、气促进行性加重，呼吸衰竭，于 2022 年 12 月 22 日转至综合重症医学科。入住监护室后给予气管插管呼吸机辅助通气，留置胃管，连续性床旁血液净化治疗。患者 2022.12.24-2023.1.1 临床给予肠内营养混悬液 1000ml，热量 1000kcal，2023.1.2-2023.1.8 临床给予肠内营养混悬液（TPF） 1000ml，热量 1500kcal。2023-1-9 日病情稳定转回肾病科，恢复 3 次/周血液透析治疗。请营养科会诊，我科参与治疗。严格营养诊疗流程：营养风险筛查（NRS2002）4 分，营养评估，给予营养诊断：蛋白质-能量营养不良。患者转回肾病科当日胃管回抽出褐色液体，胃液常规分析潜血阳性（+），给予禁食水，胃肠减压，抑酸，凝血酶止血等对症治疗。2023.1.13 日胃管无咖啡样物质，停胃肠减压，予鼻饲饮食，以短肽型肠内营养制剂 50g(201kcal)启动胃肠道，根据患者胃肠耐受情况循序渐进增加，第 8 日热量达到 1549kcal，蛋白质 79 克（1.1g/kg/d）。第 15 日给患者拔胃管，可经口进食半流食，以烂粥、面汤为主，ONS 给予 1247kcal 补充。第 23 日停 ONS，改为软食。治疗期间定期复查肝肾功能等化验，2023.2.3 日生化提示：血清白蛋白 34.6g/L，钠 137.8mmol/L，钾 4.51mmol/L，整个营养治疗期间患者胃肠耐受可，无腹胀、腹泻、反流等并发症。于 2023-02-06 出院。本病例经个体化营养治疗，患者营养指标恢复良好，治疗顺利进行，取得了很好的效果。

关键字 透析 新型冠状病毒肺炎 营养治疗

分类：临床营养

孕期使用叶酸补充剂对母婴健康影响 的研究进展

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目的　孕期妇女营养状况对母体健康及胎/婴儿的生长和发育具有非常重要的影响，孕期膳食结构和比例失衡以及缺乏某些关键的营养物质会导致孕妇和胎儿发生不良健康结局。通过对文献进行综述进一步为这一特殊人群科学合理精准的补充叶酸营养补充剂提供理论依据和剂量参考指导。方法 通过综述国内外不同孕期妇女使用叶酸补充剂对母婴健康的影响，结果 叶酸(Folic Acid)是维生素 B6，是许多植物和动物组织中的碳单位供体，参与体内遗传物质的调控、RNA 的表达和蛋白质的产生等过程，为胚胎发育过程中的神经管发育提供营养。人体自身不能合成叶酸，主要从叶酸强化食品和叶酸营养补充剂中获得。母体叶酸水平与妊娠期糖尿病、妊娠高血压、先兆子痫、后代超重和肥胖以及其他妊娠结局发展之间存在联系。不补充叶酸或补充较高剂量叶酸会增加妊娠期糖尿病的风险，且有研究指出叶酸补充剂量<800ug/d 为安全剂量，育龄妇女每天应服用 400-800 微克的叶酸，既往妊娠受神经管畸形影响的妇女应每天服用 500 微克。叶酸代谢异常和血液同型半胱氨酸水平升高会加速子痫前期的发展。从怀孕开始就补充足够的叶酸有助于生理性滋养细胞增殖和血管生成，并且有助于避免在妊娠晚期出现血液同型半胱氨酸水平升高。母体微量营养素状态不足会破坏全身代谢稳态，进一步恶化为代谢综合征，同时增加巨大儿的发生率 。孕前和孕早期产妇叶酸不足是胎儿发生神经管畸形（NTD）的常见风险因素，孕前期和怀孕的前三个月每天摄入 400 微克叶酸，可以确保胎儿在器官发生过程中有充足的血液叶酸水平，并将神经管缺陷的风险降低 50-70%。在围孕期服用叶酸增补剂还可以显著降低子代发生先天性心脏病的风险。但产妇高剂量叶酸摄入增加可能会降低下丘脑摄食中枢的甲基化水平，进而增加了男性后代超重或肥胖的风险，过量叶酸的摄入还会导致后代发生过敏性疾病、肿瘤、癫痫和自闭症等长期性的健康危害。结论 不仅遗传和环境因素会影响母体和子代的妊娠结局，母体叶酸营养状况也会影响母子的健康状况。为了平衡和改善微量营养素缺乏和妊娠结局，应大力倡导孕妇在妊娠期间和受孕前使用叶酸、铁、钙和多种微量营养素补充剂 。未来的研究可侧重于在叶酸补充的合理时间和剂量、妇女对叶酸补充剂的可接受性以及过量补充引起不良妊娠的机制和对于高危孕妇的叶酸补充剂量的精准化还需要作进一步的研究。

关键字 关键词：孕期；叶酸；叶酸补充剂；母婴健康

分类：临床营养

一例携带 LPL 基因 2 个杂合变异多次复发高甘油三酯性胰腺炎的营养治疗报告

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摘要：目的：高甘油三酯血症性急性胰腺炎（hypertriglyceridemia acute pancreatitis，HTG-AP），复发率高、药物控制血脂效果欠佳。脂蛋白酯酶(LPL)基因是家族性脂蛋白脂酶缺乏症中最重要的候选基因,它的突变可解释极度的 HTG 及由此导致的 AP，而该类型患者胰腺炎发作后通过自行实施的“低脂饮食”易造成蛋白质营养不良或肌肉量下降。方法：通过一例 HTP-AG 患者基因检测，明确其高血脂的原因，通过人体成分分析和动态甘油三酯监测进行个体化营养治疗。结果：患者贺 X，男，36 岁，2004 年因“腹痛”首次诊断“急性胰腺炎”，发作时甘油三酯最高，2011 年 11 月起于我院进行长期治疗，截止 2022 年于我院诊断急性胰腺炎住院记录 16 次。出院诊断为“反复发作急性胰腺炎，高甘油三酯血症，胆囊结石，血小板紫癜（过敏性）”。母亲有高脂血症和反复发作性胰腺炎病史，父母及患者本人均有胆囊结石胆囊切除史。患者出院后长期“素食”，体重由发病前 80kg 减至 60kg，为进一步调整膳食结构减少复发来我科就诊。对受检者家系全外显子组及毗邻剪接区域进行基因变异分析，发现受检者携带 LPL 基因上的 2 个杂合变异，即 M1：c.293C>T:p.A98V 和 M2：c.835C>G:p.L279V，一代测序验证结果显示这两个变异真实可靠，其中 M1 遗传自母亲，M2 遗传自父亲，构成复合杂合变异。LPL 基因异常可导致常染色体隐性遗传的高脂蛋白血症 1 型（OMIM#238600）[检测机构：上海韦翰思生物]。营养治疗：患者于 2021 年 12 月来我科就诊，身高 170cm，体重 60kg，给予人体成分分析和 24h 膳食调查，根据患者理想体重计算能量和蛋白质目标量（25kcal/kg.d，1.0-1.2g/kg），增加豆制品、鱼肉、兔肉、鸡胸等食物摄入，居家烹饪替换烹调用油为 MCT，通过微信每日膳食打卡由专业营养医师每日调整居家和外餐的膳食选择。经过三个月随访，患者骨骼肌指数由 7.5kg/m2 上升到 8.1kg/m2，TG 由 10.92mmol/L 下降至 4.05mmol/L，肌酐由 55umol/L 上升到 86umol/L，前白蛋白由 170mg/L 上升到 206mg/L。结论：反复发作的 HTG-AP 要针对患者不同的代谢类型给予个体化的营养指导，同时达到降低 TG 和提高患者蛋白质储备和肌肉储备的效果。

关键字 高甘油三酯；胰腺炎；脂蛋白酯酶

分类：临床营养

认知障碍和贫血的相关性

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目的：据2021年人口普查显示我国60岁以上人群占18.7%，总人数高达2.64亿，再次展示我国老龄社会的现状，随之而来的衰老性相关疾病引起社会极大关注，认知障碍为痴呆的核心症状，我国痴呆的患病率居高不下，65岁以上人群痴呆患病率达5.6%，且在未来30年，我国每10年将增加619万阿尔茨海默病患者。贫血影响着全球约17.6亿人，有约17%的65岁以上的老年患者受累，而住院老人贫血患病率更是高达48%。二者作为老年人群常见疾病，均严重影响患者的身心健康，给社会带来严重的负担，贫血可能促使认知障碍的发生，认知障碍患者也更容易发生贫血，故本研究拟探讨认知障碍与贫血的相关性，为临床中可通过早期干预老年住院患者的贫血来减少认知障碍的发生提供临床依据。方法：将2012-2021年重庆医科大学附属第一医院及重庆市潼南区双江中心卫生院的住院患者纳入为研究对象，排除有严重听力或言语障碍、有严重精神疾病或精神行为异常病史、有严重并发症或多器官功能衰竭而无法配合该项研究的患者，采用调查问卷的方式搜集一般资料（性别、年龄、居住情况、现居住地、文化程度、婚姻状况）、认知功能测试结果、简化的老年抑郁量表结果及血常规各指标，分析认知功能正常组和认知障碍组贫血及相关指标的差异，采用logistic回归分析认知障碍和贫血之间的相关性。结果：1、研究一共纳入了2089名老人，有832（39.8%）存在认知障碍，884（42.3%）存在贫血。2、认知障碍组和正常组比较，贫血患者更多（56.4% VS 33.3%），中重度贫血患者占比较大，且贫血类型的差异有统计学意义（p=0.035）。3、贫血组与正常组比较，在认知各领域的得分均较低，且两组的差异在不同的认知功能测试上基本是相同的。4、单因素logistic回归分析显示贫血影响认知障碍的发生（OR=2.621，95% CI：2.188-3.140，p＜0.001），而在调整性别、年龄、居住情况、现居住地、文化程度、婚姻状况后，贫血仍显著影响认知障碍的发生（OR=2.159，95%CI：1.757-2.653，p＜0.001）。认知障碍严重程度与贫血严重程度呈正相关（r=0.253，p＜0.001）。结论：认知障碍和贫血具有相关性，贫血为认知障碍的危险因素。

关键字 认知障碍，贫血，相关性，危险因素

分类：临床营养

一例“不明原因”持续腹胀的高龄新冠危重症患者营养管理的报告

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摘要：目的：对一例危重症新冠高龄患者的营养管理中反复持续腹胀的原因分析，为临床危重症感染患者实施肠内营养治疗的不耐受情况提供临床解决思路。方法：通过测量腹围、监测腹内压，阶梯式减量的肠内营养喂养以及腹部体征监测和血液学LPS检验等方法对可能产生的腹胀原因逐一进行排除。内容：患者男性，85岁，2022年12月23日（Day 1）出现高热38.6度，新冠病毒抗原阳性，退烧处理体温于3日后正常，发病6日后再次高热伴腹泻黄色稀便，静息状态指尖氧饱和度波动在88%-90%，胸部CT提示病毒性肺炎遂入院。入院时（D10）NRS 2002营养筛查提示存在营养风险，身高172cm，体重下降>10%，BMI：21.97kg/m2，给予优质高蛋白普食和伊力佳500ml/d进行口服营养补充。既往便秘，有冠状动脉粥样硬化性心脏病和高血压病病史。因食欲差进食逐渐减量，于发病第15天（D15）给予安置胃管并给予持续泵注的方式逐日增量至伊力佳1000ml（1000kcal，40g蛋白质；泵速70-80ml/h）。患者D17起逐渐出现腹胀，给予乳果糖及开塞露辅助排便，排便次数减少至1/日，腹部张力正常，肠鸣音正常，D24患者自觉腹胀程度增加，肠鸣音仍正常，腹部张力正常，全腹无压痛，伊力佳缓慢增加至1250ml，静脉增加氨基酸250ml。患者自D17至D45间，出现心律失常，持续主诉腹胀，腹围自96-97cm增加值103-104cm，肠内营养量逐渐减至400ml，制剂类型由含由有渣整蛋白过渡到无渣低脂短肽患者均耐受不良，大便可解，体检全腹无压痛、反跳痛，血LPS阴性，大便培养阴性。腹部CT见小肠仍胀气明显，结直肠内粪便堆积。D50调整为米粉、米汤等流质饮食喂养后腹胀缓解，D60天出现右上腹疼痛、高热，胆囊肿大、少量泥沙样结石伴胆囊周围积液。血培养结果提示屎肠球菌（多重耐药菌）。外科给予穿刺引流后腹胀缓解，腹围降至96-97cm，经胃管继续给予自制低脂匀浆膳和低脂短肽混合喂养，未再主诉腹胀问题。结果：根据血培养结果以及腹部症状和体征的变化，可推断患者出现腹胀的阶段可能存在肠道菌群紊乱和菌群移位，主要表现为小肠账气和持续的肠内喂养不耐受。结论：新冠高龄患者的肠内营养管理出现的腹胀，除外考虑制剂本身的选择、喂养的温度和速度以外，还应重点关注肠道通透性增加、不同时期菌群移位导致自发性腹膜炎的可能性。

关键字 新冠肺炎；肠内营养；腹胀

分类：临床营养

出血性卒中患者蛋白质及血糖代谢特点及营养干预

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目的：了解出血性卒中蛋白质及血糖代谢特点并据此进行合理的营养干预。

方法：回顾性分析南部战区空军医院神经外科 ICU2019 年 8 月至 2022 年 8 月收治的 31 例出血性脑卒中患者，观察并记录患者入院时和入院 7 天、14 天、21 天的营养指标：总蛋白（TP）、白蛋白（ALB）、视黄醇结合蛋白（RBP）、血红蛋白（Hb）及血糖情况进行统计学分析。

结果：总蛋白与白蛋白与入院时比较，呈下降趋势，至 21 天有回升；视黄醇结合蛋白 14 天内无显著性差异，至 21 天时较入院时更高；血红蛋白呈现持续下降趋势；血糖入院时高，14 天后逐步趋于平稳。差异均存统计学意义 （P<0.05）。

结论：3.1　胃肠道功能维护。出血性脑卒中患者应激性激素明显升高，小肠粘膜通透性增加，肠腔内细菌毒素移位导致肠源性感染，加重全身炎症反应。实施肠内营养应注重喂养时机，无禁忌时入 ICU 24~48h 早期即可开始肠内营养，使胃肠道粘膜得到滋养；选择合适的喂养方式及个体化营养配方，合理使用益生菌及膳食纤维，维持与促进肠功能恢复。

3.2　蛋白质代谢特点及营养干预 。出血性卒中早期机体蛋白质分解比正常提高 40%~50%，本研究中即使在给予 1.2~2.0g/kg/d 蛋白质的情况下，总蛋白、白蛋白的下降趋势至 21 天时才出现回升；视黄醇结合蛋白(RBP)的半衰期很短(0.5d)，灵敏性较 ALB 高。本组病例在 14 天内 RBP 无显著性差异，至 21 天时更高。表明一定范围内蛋白质供给量增加，能迅速补充消耗的蛋白质，有效减缓机体蛋白质进行性分解。

3.3　血红蛋白代谢特点及营养干预。急性脑卒中患者贫血的发生率约为 15% ～ 29% 。血红蛋白浓度低于 111 g/L 与不良预后显著相关。患者的低血红蛋白水平可能是持续炎症反应的结果。同时卧床导致胃肠蠕动减慢，影响了包括铁在内的微量元素、营养物质的吸收，营养治疗时在满足能量-蛋白质需求的基础上，每周给予血类如猪血、鸭血，肝类食物如猪肝、鹅肝 50~75g，增加富含叶酸、维生素 A、维生素 B6、维生素 B12 的食物有助于贫血防治。

3.4　血糖代谢特点及营养干预。脑卒中发生的 48 小时内，50%的非糖尿病患者可出现卒中后高血糖（PSH）。可导致大量的乳酸堆积引发细胞酸中毒，脑细胞损伤程度加剧，对卒中预后有不利影响。因此需要积极有效控制血糖波动，营养治疗时首先选用低 GI 配方有助于血糖平稳。

关键字 出血性卒中 营养

分类：临床营养

微型营养评估与老年人的衰弱和营养状况的相关因素分析

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[背景] 引言：衰弱是一种对低水平应激事件抵抗力降低的状态，是随着衰老观察到的多个生理系统逐渐衰退的结果。许多因素可导致衰弱的发病，而营养状况似乎起着关键作用。本研究的目的是探讨采用微型营养评估(Mini Nutritional Assessment，MNA)评估的老年人营养状况与衰弱的关系。

[方法]从 2020 年 6 月至 2021 年 7 月，我们对北京市某三甲医院的 146 名男女患者进行了横断面研究。研究对象为年龄≥65 岁、伴或不伴髋部骨折的患者。研究样本包括 62 例因髋部骨折住院的患者和 50 例非骨折的门诊患者。所有研究对象均抽取静脉血进行实验室检查，并接受包括日常生活活动能力(ADL)、工具性日常生活活动能力(IADL)、简易精神状态量表(MMSE)在内的多维度老年评估。

[目的]评估一组老年患者的营养状况使用微型营养评估和衰弱指数，以及两者之间的关系。我们应用了多因素分析和衰弱指数。采用生活质量量表(IADL)、简明精神状态量表(MMSE)、老年抑郁量表(GDS)、微型营养评估（MNA） 、共病情况采用老年疾病累积评分量表(CIRS-G)进行评估。采用握力测定法测量肌力，采用欧洲健康、老龄化和退休调查-衰弱指数(SHARE-FI)计算衰弱评分。

[结果]平均年龄 81.7 岁(7.65)。106 名患者(72.6%)为女性，40 名为男性(27.4 %)。基本人体测量数据显示，平均体重为 57.67 公斤(13.7)，平均身高为 1.52 米(0.09 米)；体重指数为 24.85 (5.32)千克/平方米。结果显示，14.1%的营养状况正常的患者患有虚弱，而 42.1%的患者有营养不良和虚弱的风险。约 38%的研究人群处于衰弱状态，住院老年患者衰弱患病率更高。虚弱受试者中，65%存在营养不良风险(RMN)，10%营养不良。衰弱前期组和非衰弱组的患病率和 RMN 逐渐减少。营养状况与衰弱程度密切相关，在 Logistic 回归中，MNA 是预测衰弱前期和衰弱的最佳变量。

[结论]老年人即使有正常的营养状况，衰弱仍然存在；当营养状况下降时，这个年龄组的衰弱患病率更高。MNA 可以生成重要的信息,来帮助识别实质性的以低成本和护理的方式帮助识别衰弱和衰弱前患者的很大一部分。

关键字 衰弱；营养不良；微型营养评估；老年人

分类：临床营养

个体化营养治疗在胃肠道肿瘤患者康复期生存质量的研究

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目的　探讨个体化营养治疗在胃肠道肿瘤患者康复期中的生存质量的研究。方法　符合研究方案要求的胃肠道恶性肿瘤患者共 60 例，随机分为研究组（最终 30 例，个体化营养治疗和个体化护理 ）和对照组（最终 29 例，传统饮食教育和常规护理），为期 6 个月。分别对两组患者入院时、随访 1、3、6 个月营养状况主观评价分级指标和客观营养状况指标（包括白细胞计数、红细胞计数、血红蛋白、总蛋白、白蛋白、前白蛋白）进行合理评估，同时比较两组患者的康复期相关指标和随访 6 个月的生活质量。结果　两组研究对象的基线资料具有可比性。干预后研究组生存质量评分增高，而对照组下降，两组间变化差值有显著性差异。入组时，两组患者的 SGA (Subject Global Assessment) 量表和客观营养状况指标比较无统计学差异（P ＞ 0.05），干预后两组患者的 SGA 量表指标和客观营养指标明显优于入组时，其中以研究组的 SGA 量表和客观营养状况指标最优，差异显著（P ＜ 0.05）；对两组患者随访 6 个月发现，研究组患者的短期生活质量评分明显优于对照组（P ＜ 0.05）。结论 早期个体化营养治疗在胃肠道恶性肿瘤康复期发挥了重要的作用，其不仅可以有效改善患者营养状况，且在一定的程度上提高了患者的生活质量，值得推广。

据《2012 年全球癌症统计》报告，2012 年全球恶性肿瘤患者新发及死亡病例分别为 1,410 万和 820 万，其中 57% 的新发患者以及

65% 的死亡患者来自于发展中国家[1]。胃肠道恶性肿瘤是我国最常见的恶性肿瘤之一，由于其高消耗性，患者经常出现营养不良及营养不均衡状况，据不完全统计，我国胃肠道肿瘤患者出现营养不良的情况占约占 50% ，并且由于疾病本身存在糖代谢异常 [2] ，机体蛋白质消耗出现的持续性负氮平衡 [3] 及脂肪分解能力增加，氨基酸氧化变快 [4] 等内在因素和日常生活中饮食不振等外在因素严重影响患者的预后康复 [5] 。对患者进行营养治疗的主要目的是为了帮助患者改善其营养不良的症状，增加患者的免疫力，避免患者出现并发症或不良反应，进而提高患者的生存质量。因此，营养治疗对于胃肠道恶性肿瘤患者十分必要[6]。

本研究探讨个体化的营养治疗对对胃肠道恶性肿瘤患者康复期的营养状况及生存质量（outcome）的影响，以期为胃肠道恶性肿瘤患者的康复期治疗提供更多临床依据。

关键字 营养治疗；胃肠道恶性肿瘤；个体化；生存质量

分类：临床营养

基于补偿结转行为模型的减重代谢术后患者健康行为形成机制及相互关系研究

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目的　基于补偿结转行为模型(compensatory carry-over action model, CCAM)框架，探讨减重代谢术后患者的饮食和体力活动行为的形成机制及相互作用关系。

方法　采用横断面研究方法，基于CCAM收集2021年8月至2022年8月在南医大一附院收治的281例患者的临床资料，包括：①行为(饮食依从性、体力活动总量)；②行为认知因素(饮食意向/自我效能、体力活动意向/自我效能、补偿信念、转移认知)；③主观结局(感知压力、幸福感、生活质量)。通过多元线性回归分析CCAM的初始假设是否成立，再在回归分析结果基础上建立结构方程模型进行路径分析，并探究补偿信念或转移认知在饮食和体力活动关系间的中介作用。采用近似误差均方根(RMSEA)、比较拟合指数(CFI)等评价模型拟合优度。

结果　多元回归分析共剔除5条假设路径［β(0.057~0.164),P>0.05]。结构方程模型分析显示：①作为前认知因素，补偿信念仅对饮食有显著影响(β=-0.406,P<0.001)，而补偿信念对体力活动、转移认知对饮食和体力活动影响均无统计学意义(P>0.05)。②补偿信念对行为意向的影响、转移认知对自我效能的影响、意向和自我效能对相应行为的影响均成立[β(0.174~0.558),P<0.05]，与CCAM原假设一致。③行为对主观结局影响方面，体力活动仅对感知压力影响显著(P=0.004)，其他路径在回归分析阶段就已被剔除；而饮食对感知压力、幸福感、生活质量均具有显著影响[β(0.164~0.718),P<0.05]。④中介分析结果显示，在转移认知与饮食和体力活动的联系中，自我效能均起完全中介作用[P(0.009~0.015)]；在补偿信念与体力活动的联系中，意向完全中介(P=0.007)，在补偿信念与饮食的关系中，意向部分中介(P=0.006)。

结论　减重代谢术后患者整体行为习惯较差。在前认知因素中，转移认知的结转效应并不能直接影响患者行为，而抑制补偿信念促进饮食行为可能更为有效；从行为对结局的影响来看，饮食干预的优先级高于体力活动。从行为交互作用角度出发，减重代谢术后饮食干预在总体行为模式促进中将起主导作用。应教育患者在减重代谢术后形成正确的饮食认知，及时发现行为补偿倾向，减少补偿信念对行为模式的损害，以积极生活方式巩固手术的减重效果，避免复胖的发生。

关键字 饮食；体力活动；减重代谢手术；结构方程模型

分类：临床营养

控制营养状态评分对糖尿病足溃疡创面修复的相关性分析

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[摘要]目的：糖尿病足病是一种难治性疾病，常发展为难治性溃疡。糖尿病足溃疡是糖尿病的严重并发症，具有治疗时间长、预后差的特点。糖尿病足部感染、糖尿病皮肤病、周围神经病变、血管疾病等综合引起塌陷，严重影响患者的生活质量，威胁患者的生命安全。因此，采取及时有效的方法治疗糖尿病足溃疡显得尤为重要。对控制营养状态评分对糖尿病足溃疡创面修复的相关性进行详细的分析与研究。方法：本研究从于 2019 年 11 月 20 日至 2022 年 11 月 20 日期间在我院接受过糖尿病足溃疡治疗的所有糖尿病足溃疡患者中随机抽取出 80 例作为一般资料。并按照是否创面修复分为非创面修复组(n=47)、创面修复组(n=33)。通过比较分析创面修复与住院时间情况、创面修复组与非创面修复组的临床特征及 CONUT 评分、糖尿病足溃疡创面修复的多因素 Logistic 回归分析结果。结果：非创面修复组的患者是 47 例，占比 58.75%；创面修复组的患者是 33 例，占比 41.25%。非创面修复组的住院时间是 16.0（10.5～24.0）d，创面修复组的住院时间是 44（31.0～61.8）d（P＜0.05）。创面修复组患者的 FPG、血清白蛋白、总淋巴细胞计数、HDL-C 均低于非创面修复组（P＜0.05）；创面修复组的 TC、TG、LDL-C、CysC、FINS、ABI、Conut 评分均比非创面修复组高（P＜0.05）。CONUT(5-12 scores)*、TC、ABI、Wagner grade 是糖尿病足溃疡创面修复的独立危险因素。结论：控制营养状态评分与糖尿病足溃疡创面修复具有明显的相关性，早期改善糖尿病足溃疡的营养状况，可促进患者的创面修复情况。患者早期 DFU 评估可帮助临床医生判断糖尿病足溃疡创面修复风险，改善患者早期营养状况，或降低糖尿病足溃疡创面修复风险。本研究是一项回顾性研究，旨在综合评价脂肪、肌肉、液体等营养缺乏患者的 DFU 营养状况。本研究是一项横断面、单中心临床研究。影响患者糖尿病足溃疡创面修复风险的 DFU CONUT 评分仍需进行多中心、大样本及相关的前瞻性研究。

关键字 控制营养状态评分；糖尿病足溃疡；创面修复；相关性

分类：临床营养

三种医学营养减重法对超重或肥胖多囊卵巢综合征患者代谢参数和雄激素水平的影响

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目的　探讨 3 种医学营养减重法对超重或肥胖多囊卵巢综合征（PCOS）患者代谢参数和雄激素水平的影响。方法　本研究为随机对照试验，选取 2018 年 10 月至 2020 年 2 月于北京大学第一医院就诊的 90 例 PCOS 合并超重或肥胖患者进行 8 周的营养减重，随机分为限能量膳食（CRD）组、高蛋白饮食（HPD）组、高蛋白高膳食纤维饮食（HPD+HDF）组，每组 30 例；所有患者体质指数（BMI）为（28.07±3.59）kg/m2。检测体成分、胰岛素抵抗和雄激素指标，以评价 3 种减重方法的疗效。结果　CRD 组有 8 例患者因不能严格完成随访而退出，故在减重结束时，CRD 组、HPD 组、HPD+HDF 组共 22、30、30 例患者纳入最终分析，3 组患者减重后体重分别下降 4.20（11.92，1.80）、5.00（5.10，3.32）、6.10（8.10，3.07）kg（P=0.038），PBF 分别下降 2.55（3.73，0.27）%、2.9（3.60，0.50）%、3.1（4.27，1.17）%（P=0.043），HPD+HDF 组的体重和 PBF 较 CRD 组下降更多（P＜0.05），但与 HPD 组间差异无统计学意义；3 组 BMI 分别下降 0.8（1.70，0.40）、0.9（1.23，0.50）、2.2（3.30，1.12）kg/m2（P=0.002），FM 分别下降 2.50（3.70，0.22）、1.60（1.90，0.85）、4.35（5.55，2.42)kg（P＜0.001），VFA 分别下降 6.8（18.27，0.40）、13.4（17.35，7.30）、23.45（32.57，11.85）cm2（P＜0.001），HPD+HDF 组的 BMI、FM 和 VFA 较其它两组下降更多。CRD 组在减重后 FFM 下降 0.65(1.40，-1.50）kg，BMR 下降 14.00（34.25，-1.50）kcal（P＜0.05）。3 组患者减重后 HOMA-IR 指数、FPG、FIN、TT 和 FAI 均下降，SHBG 均升高（均 P＜0.05）。3 组 HOMA-IR 指数和 FAI 指数在 3 组间的差异无统计学意义。结论　3 种方法均可有效降低超重或肥胖 PCOS 患者的体重，改善胰岛素抵抗和高雄激素血症，HPD 法和 HPD+HDF 法可以更显著的减轻脂肪，并且可以同时保留肌肉、基础代谢率；但在改善 IR 和雄激素水平方面三种减重方法尚未发现明显差异。

关键字 多囊卵巢综合征；减重；限能量膳食；高蛋白饮食；膳食纤维

分类：临床营养

血液透析与腹膜透析患者营养摄入的对比分析

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采用不同透析方式的慢性肾脏病患者可能有不同的饮食模式和营养状况。尽管一些研究比较了血液透析（HD）和腹膜透析（PD）患者的营养状况，但没有研究比较不同透析方式患者的营养摄入情况。本研究通过比较采用不同透析方式的慢性肾脏病患者,营养摄入情况和营养状况的区别。本研究选取了 2021 年 1 月至 2021 年 12 月期间在某三甲医院门诊就诊的维持性透析患者，其中 HD 患者 30 名和 PD 患者 30 名，使用半定量食物频率问卷（SQFFQ）评估患者的长期的饮食摄入情况，按照《中国食物成本表第 6 版》计算出研究对象每天各营养素的摄入量，每种营养素的摄入量与推荐的营养素参考值进行了比较。收集患者实验室检查参数对比患者的营养状况，比较 HD 和 PD 患者的营养摄入情况和营养状态的区别。结果发现 HD 患者的平均年龄高于 PD 患者（59.5±8.1;50.6±9.2, p=0.001)。营养摄入情况 HD 组优于 PD 组，PD 组有 4 名中重度营养不良患者(13.3%)，反映了 PD 患者中重度营养不良可能更普遍,HD 组能量摄入明显高于 PD（1573±395.35;1265±388.42,9,p=0.001），无论是 HD 还是 PD 组都没有摄入最够的能量和蛋白质，且 PD 组更突出，因此 PD 患者可能更需要强化的营养干预。通过对比实验室检查结果间接评估了患者的营养状况,发现 HD 组患者的血清白蛋白、前白蛋白和钾水平明显高于 PD 患者（p＜0.05），其他结果没有显著差异。结论：对比了采用不同透析方式的慢性肾脏病患者，HD 患者营养摄入情况和营养状态明显优于 PD 患者。蛋白质和能量储备的相关指标是透析患者生存情况的有力预测指标，维持性透析患者常会出现能量和蛋白质储备不足，主要原因是营养缺乏或蛋白质和能量消耗。未来我们可以使用 SQFFQ 作为一个有价值的工具来找出在透析患者中摄入过多或过少的必需营养素的患者，了解导致透析患者 PEW 的多种因素，临床医生或临床药师可根据患者的饮食情况和疾病状态，制订个体化的营养治疗方案，改善患者营状况、延缓疾病进展。

关键字 腹膜透析；血液透析；营养摄入；营养状态

分类：临床营养

脑卒中吞咽障碍患者住院期间分级营养管理方案应用效果观察

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目的 观察分级营养管理对脑卒中吞咽障碍患者住院期间的应用效果。**方法** 采用类实验研究方法，将2021年1月～6月、2021年7月～12月期间入住上海市某三级医院神经内科符合纳入标准的脑卒中患者，分别设为对照组和观察组。两组患者基线数据（包括年龄、BMI、GCS、NIHSS、吞咽分级、NRS2002等）无统计学差异（P＞0.05）。对照组患者给予常规营养护理，所有入组患者根据研究医院护理部下发营养管理制度进行营养监测。观察组患者给予分级营养管理，依据卒中营养标准化管理模式（Screening-Assessment-Plan-Intervention-Monitoring，SAPIM），采用多学科合作团队方式进行干预。联合应用洼田饮水试验、改良版容积-黏度测试(volume-viscosity swallow test,V-VST)以及才藤氏分级工具进行吞咽分级及营养干预。比较两组患者的营养状况、目标量完成值、肠内营养并发症发生率、住院时间、置管时间、护士知信行、质量指标的差异。**结果** 干预后两组患者的血清白蛋白、前白蛋白、视黄醇结合蛋白、热量目标完成值、蛋白质目标完成值、置管时间差异有统计学意义（P＜0.05）。两组患者住院天数差异无统计学意义（P=0.561），两组患者肠内营养并发症发生率差异无统计学意义（P＞0.05）。实施前后护士知信行调查中知识部分和行为部分差异有统计学意义（P＜0.05），信念部分差异无统计学意义（P=0.080）。方案实施前后医疗质量指标-脑梗死患者吞咽功能筛查率、两组吞咽筛查准确率及持续监测率差异有统计学意义（P＜0.05）。**结论** 分级营养管理可促进患者、实践者及系统三方面改变，有助于改善脑卒中吞咽障碍患者的营养状况，缩短鼻胃管置管时间，促进热量及蛋白质摄入，促进护士知信行以及医疗护理质量的改变。本研究可为脑卒中吞咽障碍患的营养管理规范化提供实践依据。

关键字 脑卒中；吞咽障碍；分级营养管理

分类：临床营养

生活方式对高尿酸血症患者体成分和实验室检查指标的影响

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目的：高尿酸血症(HUA）是因体内嘌呤代谢出现紊乱所引起的一类代谢异常综合征。近年来，HUA 的疾病负担不断加重。降尿酸药物可能会对 HUA 患者带来副作用，而通过改变生活方式来进行 HUA 的非药物治疗不仅具有非常重要的经济学意义，同时也具有一定的安全性。因此，本研究旨在探求生活方式干预是否可以控制 HUA 患者体重、改善空腹血糖（FBG）和血脂、降低尿酸水平，减缓 HUA 的进程，为今后的健康管理提供科学的参考依据。方法：在 2019 年 1 月-12 月于中国医科大学附属第一医院体检中心体检且进行体成分分析的 18 岁以上人群中选择符合入组标准的 HUA 患者为研究对象，共 66 名。对研究对象实施为期 8 周的生活方式干预与健康监测。8 周生活方式干预的主要内容为低碳水化合物饮食干预、运动干预和健康教育，研究对象需在干预前、干预 4 周、干预 8 周分别到医院进行体成分分析和实验室检查。结果：生活方式干预 4 周与干预前相比，HUA 患者体质指数(BMI)下降 1.8kg/m2、体脂肪下降 3.52kg、内脏脂肪面积下降 15.43cm2、FBG 下降 0.21mmol/L、甘油三酯（TG）下降 0.61mmol/L、总胆固醇（TC）下降 0.47mmol/L、血清低密度脂蛋白（LDL-C）下降 0.31mmol/L、血清高密度脂蛋白（HDL-C）下降 0.08mmol/L、女性患者尿酸下降 34.75μmol/L，差异均有统计学意义；骨骼肌质量、肌酐（Cr）、肾小球滤过率（GFR）和男性患者尿酸的差异均无统计学意义。生活方式干预 8 周与干预前相比，HUA 患者 BMI 下降 3.49kg/m2、体脂肪下降 6.15kg、内脏脂肪面积下降 25.07cm2、TG 下降 0.59mmol/L、TC 下降 0.40mmol/L、LDL-C 下降 0.28mmol/L、男性患者尿酸下降 92.76μmol/L、女性患者尿酸下降 84.63μmol/L，差异均有统计学意义；骨骼肌质量、FBG、HDL-C、Cr 和 GFR 的差异均无统计学意义。结论：生活方式干预可以改善 HUA 患者的 BMI、体脂肪、内脏脂肪面积、尿酸水平、FBG、TG、TC、LDL-C 和 HDL-C。

关键字 高尿酸血症；体成分；空腹血糖；血脂；生活方式干预

分类：临床营养

针对中国就医难，咨询医院医生与营养师难，而开展的私人医生，营养师与健康管家的服务

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目的

私人医生，营养师与健康管家是专门从事 Primary care 的医疗人员团队。在国际上，它被认为是加强 Primary care 的重要组成部分之一，在世界范围内引起了越来越多的关注。目前的中国存在着病人找不到正确的医院看病，医院挂号预约难，患者出现了大病也迟迟不能入院的情况。并且，疾病的治疗需要营养师的配合，中国患者很难得到医院营养师的指导。因此中国需要更加的发展 Primary care。需要提供能够贴身与患者，解决患者各种困难的私人医生与营养师与健康管家共同开展的服务。

方法

实施三甲医院绿色通道服务

(1) 预约三甲医院知名专家门诊

(2)一周内安排门诊就诊

(3) 就诊当天健康管家全程陪同，代取药、病历、报告等

预约三甲医院进行 VIP 高端体检

（1）最快 5 个工作日内安排体检

（2）专业私人医生，营养师与健康管家和营养师的配合服务（体检前代预约，体检全程陪同，体检后代取报告，建立并更新个人健康与营养的档案）

私人医生，营养师与健康管家的联合服务

（1）私人医疗团队 24 小时服务（全科医生、健康管家，注册营养师）

（2）个性化健康与营养评估及健康与营养管理方案

（3）提供健康与营养周报、月报

医生，营养师与健康管家的上门服务

团队上门医学咨询及基础健康检查，营养师进行上门营养指导与饮食调查

结果

目前已对 70 名患者实行了私人医生，营养师与健康管家的服务，并有 40 名患者持续接受了此项服务。项目中对于 70 名患者实行了检查前准备跟进、上门服务、陪诊和陪同检查工作。安顿患者健康与营养服务和跟踪管理、并进行了月度统计。在健康科普工作中，开展了长达 1 年的通过在微信上每周发表 5 篇健康与营养小贴士，并在公众号上发表了 23 篇营养相关文章。在调查反馈问答中，得到了 80%以上的顾客满意度。并有 40 名患者持续接受了私人医生，营养师与健康管家的联合服务。

结论

在所有环境中提供医疗保健都需要安全、及时、适当。为实现这一目标，私人医疗团队服务在医疗保健系统中很重要，因为它是患者与医疗保健与营养教育与改善的第一次接触。许多国家和地区已经证明私人医疗团队服务在 Primary care 中发挥着重要作用。通过开展中国式私人医疗团队，使得更多营养师能学习和发挥在医疗团队的作用，来共同改善患者的健康，提供专业化的临床营养教育。

关键字 私人健康营养团队，Primary care，医疗团队，上门服务

分类：临床营养

老年稳定期慢性阻塞性肺疾病患者营养不良与肌少症患病情况及相关性评价

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摘要：

目的 分析老年稳定期慢性阻塞性肺疾病(COPD)患者营养不良与肌少症的患病情况及两者的相关性。

方法 采用横断面调查研究，连续选取2019年12月-2021年1月北京医院COPD呼吸康复营养联合门诊就诊的老年COPD稳定期患者60例以及同时期同年龄段社区非COPD体检老年人72例作为对照组。比较两组患者基础资料、人体测量指标（小腿围、握力、体重指数（BMI）、去脂体重（FFM）、肌肉量、细胞内水分（ICW）、细胞外水分（ECW）、细胞外水分/细胞总水分（ECW/TBW）、四肢骨骼肌量、体脂肪、去脂体重指数（FFMI）、内脏脂肪面积等）、血液学指标的差异，并按照营养不良问题全球领导倡议（GLIM）营养不良诊断标准进行营养不良诊断，按照2019年亚洲肌少症工作组（AWGS）提出的肌少症的诊断标准进行肌少症评估，计算两组人群营养不良及肌少症的患病率，并对肌少症与营养不良患病率进行相关性评价。

结果 老年COPD稳定期患者营养风险发生率为60%，营养不良患病率为25%；对照组人群营养风险发生率为30.6%，营养不良患病率为11.1%，老年COPD患者营养风险及营养不良发生率较对照组显著增加（$p<0.01$，$p<0.05$），COPD患者重度营养不良患病率高于对照组（$p<0.05$）；中低龄老年人（<80岁）营养不良患病率为15.5%，高龄老年人（≥80岁）营养不良患病率为27.3%，两组人群存在显著性差异（$p<0.05$）。两组人群肌少症患病率分别为28.3%和13.9%，老年COPD患者肌少症及重度肌少症患病率较对照组均显著增高（$P<0.05$）；按照GLIM营养不良诊断标准，老年人群肌少症与营养不良的患病率具有高度一致性(Kappa =0.90)。

结论 老年稳定期COPD患者具有较高的营养风险，高龄老年人更易发生营养不良和肌少症，肌少症与营养不良在老年COPD人群的患病率具有高度一致性。

关键字 慢性阻塞性肺疾病稳定期 老年人 营养不良 肌少症

分类：临床营养

我国肿瘤放疗患者营养管理的文献计量学分析

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目的　　了解关于肿瘤患者放疗营养的研究现状，梳理研究的热点问题，为推动放疗营养相关研究提供参考。

方法　　应用文献计量学法，以放疗或放射治疗，营养或饮食为主题词，在中国知网数据库（CNKI）检索于 2022 年 5 月前收录的放疗营养相关文献。利用 CNKI 的分析功能、EXCEL 软件分析文献数量、机构分布，统计高频关键词。利用 CiteSpace 软件进行关键词共词分析，绘制突现词谱。

结果　　共检出有效文献 841 篇，合著率仅为 25.3%；医学院校及其附属医院是发文的主力军；基金论文所占比例为 29.25%；在所检出的文献中，核心期刊文章为 108 篇，仅占 12.84%，高频关键词主要为营养护理、营养支持、头颈部肿瘤、鼻咽癌、放疗、放射治疗、预后及影响因素；1987-2011 年突变强度最高的词为“放射治疗”，突变强度为 17；其次为“护理”，突变强度为 4.65；营养状况”的突变强度为 3.71；“食管癌”，突变强度为 3.64。另外，2012-2022 年出现的突现词还有“饮食护理”、“直肠癌”、“营养评价”、“预后”，突变强度分别为 13.29、11.81、4.06、3.91；研究内容主要集中在某一种干预方法对改善患者围放疗期营养状况的效果观察、不同营养筛查工具对患者预后的比较及不同肿瘤患者围放疗期营养状况变化与影响因素分析。

结论　　近年来，我国肿瘤放疗患者营养支持相关研究总体呈波动上升趋势，研究范围不断扩大，但总体重视程度有待加强，研究设计及论文质量有待提高，同时相关干预多为短期，建议加强长期跟踪与随访，拓宽研究对象的范围，同时推动跨机构、跨地域的合作交流，充分把握研究热点，提升科研水平。本文基于 CNKI 数据库分析了肿瘤放疗患者营养相关文献，总体上文献数量呈逐年上升趋势，但是研究内容、研究方法、研究对象仍需进一步拓宽，研究的深度、广度和研究质量都有很大的提升空间；在进行深层次地探讨、改进和丰富营养干预方法的同时，也需规范适合不同人群的饮食摄入及营养状况评估方法，为今后更准确的营养筛查提供依据

关键字 放疗；营养；文献计量学；分析

分类：临床营养

基于 Web of Science 肿瘤放疗患者营养管理相关研究的文献计量学分析

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目的　了解肿瘤患者放疗营养的研究现状，梳理研究的热点问题，为推动放疗营养相关研究提供参考。

方法　应用文献计量学法，以放疗或放射治疗，营养或饮食为主题词，在 Web of Science 核心合集数据库检索于 2022 年 10 月前收录的放疗营养相关文献。利用 Web of Science 数据库的数据分析功能对肿瘤放疗营养相关文献的发文量、文章发表期刊及基金资助机构的情况进行分析，应用 CiteSpace 软件对作者分布、国家分布及关键词进行可视化分析。

结果　本次共检索到相关文献 2050 篇，经查重、阅读相关题目及摘要，最终纳入文献 1237 篇。WOS 数据库显示相关文献最早发表于 1979 年，此后放疗营养相关文献基本呈逐年增长态势，2014 年-2021 年该领域文献总量呈直线增长；共有 61 个国家的学者发表过相关文献，其中，发文量排名前三的国家分别为美国、中国和澳大利亚；“Ravasco,Paula”为该领域高产、高被引作者；在文献期刊发表方面，刊载肿瘤放疗营养相关文献最多的期刊是 “SUPPORTIVE CARE IN CANCER”，共刊文 67 篇，占总文献数的 5.41%；除放疗、肿瘤及营养等关键词外，文章中出现较多的关键词为生活质量、体重丢失、头颈部肿瘤、肠外营养、肠内营养及饮食摄入。

结论　肿瘤放疗患者营养相关文献发文量总体呈上升趋势，发文质量较高。美国、中国及澳大利亚三国在该领域的研究占主导地位。我国研究的深度、广度和研究质量都有很大的提升空间，且与其他国家交流合作较少，未来可加强国际间合作，以提高研究质量。肿瘤放疗患者营养相关研究主题多样，较为分散，尚未形成成熟的研究热点，但肿瘤放疗患者的生活质量、免疫营养、干预时机很可能依旧是未来研究的重点，与此同时，运动及心理，由于其与营养相互影响，因此，未来可能仍需进一步研究，包括对运动进行量化、个体化指导以及提高对患者心理的关注。

关键字 Wob of Science；放疗；营养；文献计量学分析

分类：临床营养

维生素 D 通过抑制 TGFBR2/SMAD 信号通路延迟异位子宫内膜间质细胞分泌促炎趋化因子

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背景：子宫内膜异位症（内异症）是指具有活性的宫腔内膜组织异位到子宫腔以外的部位生长,如卵巢、盆腔等并出现反复周期性出血；导致疼痛和不孕等临床症状。内异症在育龄期女性中的发病率约为 10%-15%。内异症的病因存在多种假说：如经血逆流学说、血行或淋巴转移学说等,但其发病机制仍有待进一步探索。本项目组前期临床队列研究中对比发现内异症患者血清中低维生素 D 浓度与子宫内膜异位存在免疫相关性。

目的：检测和比较分析从 2022 年 9 月到 10 月间到我院妇科门诊就诊的非内异症女性和内异症患者子宫内膜内的维生素 D 衍生物 1,25(OH)2D3 表达情况的，并通过 RNA-sequence 技术以及生信分析研究 1,25(OH)2D3 浓度差异对异位内膜间质细胞增殖、细胞迁移和侵袭的作用及相关信号通路分子,进一步探讨维生素 D 在内异症中的调节机制及相关的细胞分子机制,为临床内异症的治疗提供新思路。

方法：采集非内异症女性及内异症患者术前血清,通过 ELISA 实验检测两组血清中维生素 D 衍生物 1,25(OH)2D3 的表达以及其他免疫促炎趋化因子的表达水平。同时收集 1,25(OH)2D3 表达差异最大的非内异症女性与内异症患者的子宫内膜样本并提取 total RNA。通过 RNA-sequence 测序技术以及生信分析寻找 1,25(OH)2D3 调控内异症子宫内膜间质细胞的信号通路分子，并通过 RT-qPCR 和 Western Blot 技术验证相关通路基因及蛋白的表达。构建体外细胞模型，增加培养基中 1,25(OH)2D3 浓度 37 度孵育 24 小时。CCK8 法检测处理后细胞增殖能力的改变,Transwell 法检测细胞迁移侵袭的活性,Western Blot 检测下游 TGFBR2/SMAD 信号通路的活化情况。显着性水平被认为是 $P<0.05$。

结果：维生素 D 浓度分别与 IL6 与 IL10 的浓度负相关，与 Treg 细胞以及 Th17 细胞的浓度正相关；提示内异症的发生与血清中低维生素 D 浓度相关性。此外，RNA-sequence 测序技术以及生信分析结果提示低维生素 D 浓度可上调 TGFBR2/SMAD 信号通路，促使异位子宫内膜间质细胞分泌促炎趋化因子，加速子宫内膜的迁移。

结论：血清中低维生素 D 浓度与内异症的发生存在免疫相关性，而高浓度维生素 D 通过抑制 TGFBR2/SMAD 信号通路延迟异位子宫内膜间质细胞分泌促炎趋化因子，缓解内异症的恶化。

关键字 子宫内膜异位症，维生素 D 衍生物 1,25(OH)2D3，TGFBR2/SMAD 信号通路，促炎趋化因子

分类：临床营养

Ⅲ期胃癌伴急性非手术相关上消化道出血的临床预后特点

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目的：我国的胃癌发病率较高，尤其局部晚期胃癌比例高且容易出现上消化道出血，局部晚期胃癌占 70.67%。胃肠道出血是癌症患者常见的和危及生命的并发症。目前尚无专门针对胃癌合并上消化道出血的诊断和治疗的指南。我们旨在阐明临床Ⅲ期胃癌合并非手术相关性急性上消化道出血患者的诊治和临床预后。

方法：

我们回顾性分析临床诊断和治疗信息的Ⅲ期胃腺癌并发非手术相关急性上消化道出血在中国医学科学院癌症医院从 2004-2020 年 83 例Ⅲ期胃腺癌合并非手术相关急性上消化道出血患者的临床资料。对患者进行了电话随访。采用 SPSS 20.0 软件建立数据库进行统计分析。采用 Cox 比例风险模型分析生存率及相关危险因素。

结果：

83 例合并非手术相关急性上消化道出血的Ⅲ期胃腺癌患者的中位年龄为 60 岁（35-83 岁）。其中男性 59 例（71.1%），女性 24 例（28.9%），男女比例为 2.45：1。病理分类主要为溃疡类型（局部溃疡类型和浸润性溃疡类型）64 例（77.1%）；73 例（88%）为病理低分化。50 例（60.2%）患者接受了手术治疗，56 例（67.5%）患者接受了化疗。50 例（60.2%）出血后接受手术，56 例（67.5%）患者接受化疗。中位随访时间 15 个月，患者中位总生存期(OS)为 18.0 个月。1 年和 3 年的生存期率分别为 34%和 13%。化疗期间急性上消化道出血患者的中位 OS 时间（15.0 个月）明显低于化疗期间未出血患者（21.5 个月）(P=0.001)。对于出血后接受手术治疗的患者，中位 OS 时间为 25.0 个月，优于未接受手术治疗的患者的 OS 时间(12.0 个月，P<为 0.001)。多因素分析显示，出血后手术治疗是影响Ⅲ期胃腺癌伴非手术相关急性上胃消化道出血患者生存的独立预后因素(HR=0.284,95%CI：0.149-0.542，P<0.001)。

结论：Ⅲ期胃腺癌合并急性非手术相关上消化道出血患者的生存期较差，出血后的手术治疗是影响此类患者生存期的独立预后因素。

关键词：胃癌；上消化道出血；生存率；预后

关键字 胃癌；上消化道出血；生存率；预后

分类：临床营养

中国肥胖儿童人体成分指标与肥胖相关代谢指标的关系

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Background: Body mass index (BMI) is commonly used as the standard value to evaluate the childhood obesity. Recently, many studies have confirmed that the indicators of body composition is more meaningful to evaluate the physical condition than the BMI. However, there is still insufficient proof for its clinical application, so this study aimed to evaluate the correlations between the indicators of body composition and serum obesity-related metabolic complications among Chinese obese children.

Methods: 90 obese children, aged 7-12 years, were recruited in the Clinic Nutrition Outpatients of Beijing Children's Hospital from July 2018 to April 2021, who were classified as mild and severe obesity group. Their body composition were determined and serum were obtained to measure the metabolic indicators. Then their correlations were determined by the pearson regressions.

Results: see attachment

Conclusions: see attachment

关键字 Body composition, adiposity factors, muscular factors, metabolic complications, children

分类：临床营养

浅谈生酮饮食的抗肿瘤作用

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目的：探讨一种高脂肪（总能量 65%~90%）、适量蛋白质和低碳水化合物（总能量低于 10%）组成，同时添加机体生长发育和正常生理活动所需的多种维生素和矿物元素等物质组成的生酮饮食（Ketogenic diet，KD）在抗肿瘤治疗中的具体作用机制，探寻其在临床中应用的价值。方法：深入阅读近 10 年 KD 与肿瘤相关研究，从肿瘤细胞代谢特点、KD 的抗肿瘤机制及其临床应用等几个方面探讨其在肿瘤中的作用及应用前景。结果：KD 抗肿瘤中研究开始较早，近年来研究越来越多，逐渐成为抗肿瘤研究的热点之一。首先肿瘤细胞代谢特点——肿瘤细胞的代谢重编程即“Warburg 效应”，代谢重编程广泛存在于肿瘤的形成、发展、侵袭和迁移过程中，肿瘤细胞通过快速切换其能量代谢方式来实现其快速增殖，同时，肿瘤细胞对葡萄糖有极高的依赖性，无法利用酮体供能。KD 抗肿瘤作用机制研究显示：其使机体能量供应由葡萄糖代谢转为脂代谢，阻断了 Warburg 效应，减少碳水化合物和蛋白质的摄入，可以有效地降低胰岛素的水平，限制肿瘤细胞的生长。血液中较低水平的葡萄糖也能够抑制胰岛素样生长因 1insulin-like growth factor-1，IGF-1）和其它的一些促进肿瘤生长的因子，从而通过降低 PI3K/Akt/mTOR 通路的活性来抑制肿瘤生长；KD 可抑制肿瘤标志物转酮醇酶样蛋白-1（Transketolase-like-1,TKTL-I）的表达，降低肿瘤细胞有氧糖酵解，抑制肿瘤增殖和侵袭，还可抑制肿瘤细胞表达免疫抑制蛋白，改善肿瘤免疫应答的抑制；KD 通过糖代谢和脂代谢两个途径增强肿瘤细胞内 ROS，从而增加癌细胞的氧化应激；其可抑制核因子 kB（nuclearfactorkappaB,NF-kB）的表达，NF-kB 的代谢产物 BHB 能阻止 K+外流抑制 NL-RP3 炎症体从而减轻炎症，从而改善机体胰岛素敏感性抑制促炎细胞因子分泌等发挥抗肿瘤作用；KD 能改变肠道菌群增加趋化因子受体细胞数量并抑制 PD-I1 表达协助 PD-1 抑制剂抑制肿瘤生长等。临床应用研究显示：KD 抑制肿瘤生长、增强放疗、化疗、免疫治疗临床常用治疗的敏感性，提高疗效、改善预后，另有临床研究显示：KD 可改善患者的情绪、社交功能、睡眠质量等。结论：KD 抗肿瘤作用机制复杂，临床应用前景可观，是肿瘤治疗的一种新选择。

关键字 生酮饮食；肿瘤；抗肿瘤机制

分类：临床营养

Nrf2 可通过 NOX1 抑制铁死亡改善肌少症

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背景：随着全球老龄化进程加剧，老年人口所占比重不断增大，我国目前已进入老 龄化社会。肌肉减少症 （Sarcopenia，肌少症）是一种增龄相关的、广泛性、进行性的骨骼肌含量、体 积和功能减退性疾病，与环境、遗传、疾病、营养等诸多因素有关，其显著 影响老年人活动能力，增加外科手术风险，给社会带来了沉重的医疗和经济负担。Nrf2 是细胞内重要的内源性抗氧化应激分子，可降低氧化应激水平、改善能量代谢。NOX1 是骨骼肌内主要的 NADPH 氧化酶，可上调氧化应激状态，调节细胞新陈代谢。铁死亡是由 ROS 和游离铁致死性蓄积，通过“芬顿反应”诱发的细胞死亡，与多种衰老疾病密切相关。目前，在肌少症患者骨骼肌内发现 Nrf2 蛋白含量降低、NOX1 活性升高、铁死亡显著激活，但其具体机制及因果关系尚不明确。方法：采用 20 月龄老年雄性野生型及 Nrf2 基因敲除（Nrf2 knockout， Nrf2 KO）小鼠，通过对其行为学检测、活体体成份分析、病理学切片染色观察 及线粒体形态学和功能测定等多种检测手段，检测 Nrf2 KO 对老年小鼠骨骼肌含 量及功能、线粒体形态及功能、NOX1 表达量及铁含量、MDA 含量、总抗氧化能力等铁死亡相关指标的影响。同时，通过慢病毒载体构建 Nrf2 敲低（sh-Nrf2）的 C2C12 细胞，检 测 sh-Nrf2 及其成熟肌管细胞直径、ROS 含量、铁含量、MDA 含量及 NOX1 蛋 白含量变化，并通过 Seahorse 细胞能量代谢仪检测 ATP 动态生成速率。进一步 将 sh-Nrf2 组 C2C12 细胞给与 NOX1 抑制剂 2-APT 干预，检测其 MDA 及 ROS 含量及细胞能量代谢改变。结果：Nrf2-KO 老年小鼠骨骼肌含量、四肢最大抓力、最大转棒速度、最大跑步速度、ATP 含量及线粒体复合体 complex I、II、IV 酶活性显著下降，同时，肌纤维横截面积减小、肌原纤维萎缩、蛋白质分解通路激活、胶原含量增多、线粒体形态及排列紊乱伴染色加深、体积皱缩；对铁死亡指标检测发现，Nrf2 KO 显著增加老年小鼠骨骼肌非血红素铁及 MDA 含量，降低抗氧化能力及 GPX4、Fth、Ftl、FPN 等分子表达量，同时引起 NOX1 表达升高。细胞实验发现 Nrf2 敲低引起成熟肌管细胞直径下降、肌萎缩通路分子 mRNA 水平及 NOX1 的蛋白表达显著上升、ATP 生成总量及线粒体 ATP 生成速率下降，同时 ROS 含量、铁含量及基础和 Erastin 诱导状态下的 MDA 含量增高、铁死亡核心分子 GPX4、Fth、Ftl、SLC40A1 蛋白水平下降。通过对 sh-Nrf2 施加 NOX1 抑制剂 2-APT 干预后发现，ROS 含量及基础和 Erastin 诱导状态下的 MDA 含量显著降低，同时细胞代谢水平降低得到改善。结论：Nrf2 KO 可加重老年小鼠肌少症表型，并显著增加 NOX1 表达、激活铁死亡。抑制 NOX1 可降低 Nrf2 基因沉默导致的 C2C12 细胞铁死亡激活及细胞代谢障碍。

关键字 Nrf2，NOX1，肌少症，铁死亡

分类：临床营养

铁死亡在肌少症中显著激活

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背景：肌少症（sarcopenia,SP）著降低老年人群活动能力和生活质量，增加外科手术风险，给社会带来沉重的经济负担，目前发病机制不明。铁死亡作为一种铁依赖性、脂质过氧化损伤为特征的细胞死亡形式，近期研究发现与衰老、炎症等多种慢性疾病密切相关。目前，铁死亡及相关基因在 SP 患者骨骼肌中改变情况尚不明确。方法：从同济大学附属第十人民医院发起的一项前瞻性队列中收集患者临床信息及肌肉样本，并对 SP 和非肌少症（NSP）患者肌肉非血红素铁含量检测、总抗氧化能力（T-AOC）、脂质过氧化物 MDA 含量、线粒体形态学进行检测。同时从 GEO 数据库获取 SP 和对照组（NSP）骨骼肌 RNA-seq 数据，使用 limma 算法进行差异表达基因（|log2FC|>1,p-<0.05）分析，并从 FerrDb 数据库下载所有铁死亡相关基因，通过 R 语言 Venn Diagram 获得两者的交集基因（F-DEGs）。结果：本研究共纳入 SP 和性别、年龄匹配的 NSP 患者各 12 例。临床资料分析提示 NSP 与 SP 的瘦体重、CRP、白细胞、血红蛋白、血浆白蛋白水平存在显著差异。肌肉含量及功能分析提示 SP 组 ASMI、L3-SMI、肌纤维横截面积、优势手握力、骨骼肌 ATP 含量及线粒体 SDH 酶活性较 NSP 显著下降，胶原纤维含量、凋亡阳性肌核占比显著增加，蛋白分解通路显著激活，透射电镜下异常线粒体数目增多。铁死亡结局指标分析提示：与 NSP 组相，SP 骨骼肌中 T-AOC（44.67±9.48mmol/g v.s. 23.77±7.32mmol/g）、非血红素铁含量（0.65±0.15mg/dl v.s. 1.25±0.25mg/dl）、MDA 水平显著升高（27.10±5.18mg/g v.s. 44.67±9.48mg/g），同时透射电镜发现线粒体发生染色加深、体积皱缩及数量下降等特征性改变。生信分析共纳入 SP 和性别、年龄匹配的 NSP 患者各 20 例，分析得到 7 个铁死亡相关 F-DEGs，分别为 SLC38A1、ATP5MC3、SCD、NOX1、DUOX1、ALOXE3 以及 ALOX12B，进一步验证发现仅有 NOX1 表达量在 SP 组骨骼肌中显著上调。结论：SP 患者骨骼肌含量、力量及线粒体功能显著下降，同时伴有铁死亡激活。铁死亡通路相关分子中，NOX1 在 SP 组表达量显著升高。

关键字 肌少症，铁死亡

分类：临床营养

癌症预康复理念在超重或肥胖乳腺癌放疗患者中的临床应用研究

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背景 由于辅助治疗直接影响肿瘤生存期，但其启动时间通常受初始治疗后患者恢复状态制约。在辅助治疗前有针对性地进行干预，能够改善机体代谢并减少相关并发症发生，有利于提高患者生活质量和生存周期。癌症预康复（cancer prehabilitation, CP）是指在肿瘤确诊到实施确定性治疗的期间，进行生理和心理学方面评估、病情判断，并进行针对性的干预，改善患者的健康状况及功能能力，减少肿瘤、放化疗及手术等所带来的危害和严重程度。三联预康复措施包括在治疗前有计划系统性实施的营养指导、康复训练和心理支持。尽管越来越多的证据表明癌症预康复措施是一种有效的肿瘤临床干预治疗方法，但目前尚未见到预康复理念在超重或肥胖 BC 放疗患者中的相关应用报道。Toohey K 等学者认为 BC 领域的预康复是一个新兴研究领域。

目的 探究癌症预康复理念对超重或肥胖乳腺癌（breast cancer, BC）患者辅助放疗期间营养状态、血脂代谢及并发症的影响。

方法 选取 2020 年 1 月至 2022 年 3 月在江苏省人民医院浦口分院放疗科接受辅助放疗的 BC 术后患者 118 例进行回顾性研究，将其分为预康复组（n=63）和对照组（n=55），比较两组 HB、ALB、TG、TC、HDL-C、LDL-C、FACIT-F 评分、JSEQ 评分、皮肤毒性反应评估以及疼痛 VAS 评分。

结果 放疗过程中，在营养指标方面，两组的血红蛋白水平均降低但差异无统计学意义（P＞0.05），预康复组血清白蛋白水平较对照组维持更好，差异有统计学意义（P＜0.05）；在血脂代谢方面，预康复组 TG 升高幅度低于对照组，差异有统计学意义（P＜0.05），而两组 TC、HDL-C 和 LDL-C 变化无统计学意义（P＞0.05）；并发症方面，预康复组患者 FACIT-F 评分、JSEQ 评分、皮肤毒性反应程度以及疼痛 VAS 评分指标均优于对照组，差异有统计学意义（P＜0.05）。

结论 在超重或肥胖 BC 患者辅助放疗中，CP 策略不仅有助于维持营养状态，改善血脂代谢，还有助于改善 BC 患者相关并发症。

关键字 癌症预康复；乳腺癌；放射治疗；血脂代谢；并发症

分类：临床营养

肥胖儿童青少年血清 TNF-α、IL-6 及 hs-CRP 与体成分相关性研究

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目的　在肥胖状态下，人体脂肪细胞发生功能紊乱，可分泌多种细胞炎症因子，例如肿瘤坏死因子-α(tumor necrosis factor-α，TNF-α)、白介素(interleukin，IL)-6、IL-8 及高敏 C 反应蛋白(high-sensitivity C-reactive protein，hs-CRP)。其中，TNF-α、IL-6 及 hs-CRP 是参与儿童青少年肥胖发展研究最多的炎症参数。本探究拟探讨肥胖儿童青少年血清肿瘤坏死因子-α(TNF-α)、白介素-6(IL-6)及高敏 C 反应蛋白(hs-CRP)与体成分的关系。方法　纳入 2020 年 4 月至 2022 年 1 月在营养科门诊就诊的肥胖儿童青少年 105 例。均完成炎症因子检测和体成分检测。结果　TNF-α 与体脂百分比呈正相关(r=0.224，P=0.022)，而与去脂体重百分比呈负相关(r=-0.226，P=0.021)。IL-6 与腰臀比、腰围身高比、体质指数(BMI)、体脂肪、体脂百分比及肥胖度呈正相关(r 和 P 分别为：r=0.197，P=0.044；r=0.370，P＜0.001；r=0.303，P=0.002；r=0.257，P=0.008；r=0.325，P=0.001；r=0.348，P＜0.001)，而与去脂体重百分比及骨骼肌百分比呈负相关(r 和 P 分别为：r=-0.316，P=0.001；r=-0.223，P=0.022)。hs-CRP 与 BMI、体脂肪及肥胖度呈正相关(r 和 P 分别为：r=0.261，P=0.007；r=0.220，P=0.024；r=0.244，P=0.012)，而与去脂体重百分比呈负相关(r=-0.194，P=0.047)。结论 肥胖儿童青少年血清 TNF-α、IL-6 及 hs-CRP 与体成分可能有相关性。即在肥胖儿童青少年群体中，体脂肪可能促进炎症的发生，而骨骼肌等瘦体组织的占比升高可能抑制该作用。

关键字 肥胖；儿童；青少年；炎症因子；体成分

分类：临床营养

经皮内镜下胃造瘘术对食管鳞状细胞癌患者同步放化疗期间的影响： 一项前瞻性研究

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Background and Aims: This prospective study aimed to compare the changes in nutritional status and complications among patients with esophageal squamous cell carcinoma(ESCC) who received enteral nutrition through oral intake, percutaneous endoscopic gastrostomy (PEG), and an enteral nasogastric tube (NG) during concurrent chemoradiotherapy (CCRT).

Methods: A total of 141 patients were included: 38, 74, and 29 patients were fed through oral intake, PEG, and NG, respectively. The clinical characteristics and baseline nutritional status of the three groups were recorded and analysed. The patient generated subjective global assessment score, skeletal muscle index, and quality of life were evaluated before and after CCRT; the incidence of adverse events during feeding using PEG and NG was also recorded. The correlations among the different nutritional pathways and the CCRT-related complications (e.g., radiation esophagitis and myelosuppression) were assessed.完整版见附件

关键字 esophageal cancer, PEG, CCRT, radiation esophagitis, enteral nutrition

分类：临床营养

生酮饮食对 BALB/c 裸鼠 A549 肺癌生长影响的实验研究

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目的：探讨生酮饮食（ketogenic diet，KD）对 BALB/c 裸鼠 A549 肺癌生长的影响及可能机理。

方法：取 40 只 BALB/c 裸鼠，构建肺癌荷瘤小鼠模型，并随机分为四组，每组 10 只，分别给予标准饮食（standard，SD）20%糖生酮饮食（20％糖 KD），10%糖生酮饮食（10％糖 KD）及无糖生酮饮食（NCKD）饲养。观察小鼠肿瘤生长情况、生存时间及血糖和血酮的变化。采用酶联免疫吸附分析法（ELISA）检测血胰岛素和血胰岛素样生长因子－1 的变化。当小鼠肿瘤体积超过 1000m^3时即为观察终点，处死小鼠。从接种到观察终点之间的天数记为小鼠生存时间。

结果： 接种后第 16 天，各 KD 组肿瘤体积显著小于 SD 组（P<0.001）SD 组肿瘤平均体积为(320.59±36.03) mm^3 ,20％糖 KD 组为（206.11±42.68) mm^3 ,10％糖 KD 组为（218.03 士 35.80) mm^3 , NCKD 组为(249.36 士 44.01) mm^3 ,差异有统计学意义，P<0.001；各 KD 组与 SD 组之间两两比较差异均有统计学意义，P 值均＜0.001。接种后第 8 天各 KD 组血糖水平较 SD 组降低，SD 组为（7.16±0.33) mmol / L ,20％糖 KD 组为(3.93±0.20) mmol / L ,10％糖 KD 组（4.02 士 0.26) mmol / L , NCKD 组为（3.89±0.17) mmol / L ,各 KD 组与 SD 组之间两两比较差异均有统计学意义，P<0.001。接种后第 8 天各 KD 组血酮水平较 SD 组升高，各 KD 组与 SD 组之间两两比较差异均有统计学意义，P<0.001。SD 组、20％糖 KD 组、10％糖 KD 组和 NCKD 组的中位生存时间分别为 28、36、32 和 34 d , Logrank 检验显示，SD 组与 20％糖 KD 组差异有统计学意义，P<0.001; SD 组 10％糖 KD 组差异有统计学意义，P=0.001; SD 组与 NCKD 组差异有统计学意义，P=0.005。

结论：生酮饮食可抑制 BALB/c 裸鼠 A549 肺癌的生长，其作用机制与血糖及血酮的变化相关。

关键字 肺癌；生酮饮食；BALB/c 裸鼠；血糖；血酮

分类：临床营养

口服营养补充对食管癌放疗患者营养状况、生活质量及放射性损伤影响的研究

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目的：口服营养补充（ONS）对食管癌放疗患者营养状况、免疫功能、生活质量及放射性损伤的影响。

方法：采用随机对照研究方法，招募解放军总医院第一医学中心放射治疗病区拟行 30~45 次一个周期放疗的食管癌患者 65 例。随机分为：饮食指导组（对照组，n=30）和口服全营养组（ONS 组，n=35），饮食指导组按照总能量 30kcal/kg～35kcal/kg，蛋白质 1.2g/kg～1.5g/kg 指导饮食，ONS 组为饮食指导联合口服倍瑞康全营养制剂 400ml/d（提供热量 600kcal，蛋白质 40g），确保能量和蛋白质达标。放疗结束时，比较两组血常规、免疫指标、抗氧化指标、生活质量、PG-SGA 评分、人体成分变化及急性放射损伤的影响。

结果：基线时两组中度及重度营养不良比例分别为：74.19%和 62.97%，而放疗结束时为：83.87%和 81.47%。放疗结束时两组 PG-SGA 评分较基线时均显著增高，但 ONS 组 PG-SGA 评分显著低于对照组（P<0.05）。放疗期间 ONS 组能量、蛋白质和脂肪摄入量显著高于对照组（P<0.05）。放疗结束时，体成分分析发现两组相位角、瘦体重、去脂体重指数及骨骼肌指数与基线时比显著降低，但 ONS 组瘦体重和去脂体重指数均显著高于对照组（P<0.05）；两组白细胞计数、总蛋白、白蛋白、IgG、SOD 水平较基线时显著降低，且对照组血红蛋白、红细胞计数及 IgA 和 ONS 组 IgM 较基线时显著降低，但 ONS 组血红蛋白、红细胞计数、总蛋白、白蛋白、SOD 及 IgA 水平显著高于对照组（P<0.05）；两组受试者 QOL 生活质量评分较基线时均显著降低，但 ONS 组 QOL 生活质量评分显著高于对照组（P<0.05）；放疗结束时两组放疗损伤发生比例明显增高，但 ONS 组咽和食管损伤情况构成比较对照组显著降低（P<0.05）。

结论：食管癌患者放疗期间 ONS 能降低瘦体重丢失、改善血清蛋白水平、提高抗氧化能力，进而改善其营养状况、生活质量及降低咽和食管放射性的损伤。

关键字 食管癌；放射治疗；口服营养补充；营养状况

分类：临床营养

初治肺癌患者肌肉衰减症相关因素分析

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目的 ：肺癌是在全球新发恶性肿瘤中发病率第二、死亡率很高的肿瘤类型。肌肉衰减症在肺癌患者中广泛存在，且与放化疗毒性、减少身体活动、生活质量下降和生存率下降有关，需要密切关注。本研究拟调查初次接受化疗的肺癌住院患者中肌肉衰减症的现患率，及其相关危险因素，为肺癌患者的营养风险筛查和管理提供参考。

方法：该研究为横断面观察性。连续定点收集 2021 年 12 月至 2022 年 3 月间北京某三甲医院肺癌病房收治的初次化疗的肺癌成年患者。对符合纳入及排除标准的入组患者，在入院 24 小时内采用 NRS-2002 进行营养风险筛查；采用问卷收集其病史资料；查阅病历系统调取其治疗前生化指标；采用多频生物电阻抗法（mBIA）测量其四肢肌肉量，采用握力和 6 米步速的方法对肌肉力量何功能进行评估，并根据 AWGS2019 标准诊断肌肉衰减症（SAR）。采用 t 检验和卡方检验比较组间差异，单因素分析及二元 Logistic 回归分析肺癌合并肌肉衰减症及合并营养不良的危险因素。

结果：研究期间收集肺癌成年住院患者共 126 例。全部入组患者中，SAR 的现患率为 19.8%。男性、女性患者 SAR 现患率分别为 19.6%和 21.4%，性别间无显著差异（P>0.05）；老年组（年龄≥65 岁）患者 SAR 现患率为 27.4%，显著高于中青年组（9.4%，P=0.013）。老年（年龄≥65 岁）（OR=4.43，P=0.048）、低 BMI（OR=0.644，P=0.001）、既往合并 COPD（OR=13.748，P=0.007）、冠心病（OR=8.128，P=0.008）是肺癌患者中 SAR 的相关危险因素；对于 65 岁以上的老年人以及 COPD、冠心病患者而言，SAR 的患病风险显著增加。

结论：肺癌成年住院患者中肌肉衰减症的现患率较高。针对肺癌住院患者，尤其是老年患者，保持 BMI 在合理范围、有效管理 COPD 和冠心病等合并疾病，有助于延缓肌肉衰减症的发生。

关键字 肺癌 肌肉衰减症 营养风险 营养管理

分类：临床营养

ECMO 患者的营养联合心脏康复治疗 1 例

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目的　探讨 ECMO 患者全程营养治疗过程及与心脏康复的关系，鼓励营养医师作为 ECMO-MDT 小组成员，为不同疾病阶段的患者提供个体化的营养治疗方案。方法 回顾性分析我院收治的 1 例青年 ECMO 患者，执行规范的临床营养诊疗流程，利用生物电阻抗分析 BIA 方法测定瘦组织体重、全身骨骼肌含量、基础代谢和相位角等指标，生化方法测定血清总蛋白、白蛋白、前白蛋白、视黄醇结合蛋白水平，动态评估患者的营养状态。结果　本例患者经 ECMO-MDT 团队全程、规范、联合治疗，最终成功救治，预后良好。通过复习文献，我们发现 ECMO 患者的营养诊疗目前缺乏统一的标准，在获得进一步证据之前，针对一般危重患者的指南建议也可以遵循，入院 24-48 小时内应早期开启肠内营养，能量及营养素供给最终目标制定需参考年龄、基础代谢、疾病应激等多种因素，尤其是针对肥胖患者，应充分考虑不同 BMI 范围，以免过度喂养或喂养不足。胃肠道症状在早期 EN 过程中常见，影响达到目标需要量，但相较于肠外或延迟肠内营养，EEN 仍有其优势，并且与严重并发症或预后不良无关。BIA 是临床上常用的客观指标检测，具有操作简单、无创、低廉、可重复性好等优势，即使是卧床或者体重无法精确得到时，瘦体重的测量结果仍具有一定的稳定性。在该例患者的 3 次 BIA 分析结果中，我们发现 FFM、骨骼肌含量、蛋白质等瘦体组织相关指标在急性发病后的 1 个月内呈现持续下降趋势，即使是能量补充充足、血清蛋白水平稳定的情况下。在进入康复锻炼后期，各个指标才有缓慢上升趋势。康复期如果缺乏饮食及运动干预，患者也可能出现体重异常增长，需门诊坚持调整营养处方，可采用限能量饮食模式，持续 BIA 监测在治疗中有重要意义。相位角反应的是人体细胞膜对交流电产生阻碍作用的大小。有文章指出相位角低值与住院患者营养不良及住院 30 天内死亡率升高相关，与多种传统营养评价方法评价患者营养状况及死亡率相比，结果存在较高的一致性。但目前研究方法涉及样本例数偏少，研究周期较短，循证医学证据不足，不同疾病的相位角预测值尚不确定，得进一步探讨和深入。结论 医学营养治疗是心脏疾病危重期和康复期的组成部分，干预时间可能需要 3-6 个月，甚至更久。营养医师作为 MDT 小组成员，应动态监测及个体化调整营养治疗处方，平衡体重异常增长和心脏疾病相关性营养不良的发生，减少心脏康复患者再入院和住院天数、提高治疗依从性、提高生活质量。

关键字 体外膜肺氧合 ECMO；多学科诊疗团队 MDT；营养治疗；心脏康复；

分类：临床营养

营养在卒中相关肌肉减少症中的作用研究进展

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卒中是成年人致残最常见的原因之一。肌肉减少症（简称肌少症）是一种以进行性全身肌肉损失和功能下降为特征的综合征。卒中后全身肌肉量的减少和功能的下降不能单独用脑损伤来解释，它被认为是一种继发性肌少症，称为卒中相关肌少症。卒中相关肌少症具有明显的特征，如肌肉质量迅速下降、肌肉结构性改变（肌纤维向快收缩纤维转移）、大脑损伤导致双侧肢体功能的差异表现、肌肉萎缩与年龄无关、神经营养失衡的分解代谢信号激活。越来越多的证据表明，卒中相关肌少症可通过肌肉萎缩、吞咽困难、炎症、营养不良等多种发病机制促进肌少症的发生及发展。营养不良与肌肉减少症密切相关。卒中后患者营养不良可导致死亡率、并发症和不良的功能预后风险增加。当前，用于评估卒中相关肌少症患者营养不良的指标主要有颞肌厚度（TMT)、小腿围(CC)、相位角（PA）、老年营养风险指数（GNRI）及微型营养评估简表（MNA-SF)等。TMT 对肌少症的早期诊断意义重大，用于识别急性中风后肌少症 TMT 的有效临界值，男性为 3.83 mm，女性为 2.78 mm。中风患者诊断为肌少症的小腿围周长的截断值分别为：男性< 31cm，女性< 30 cm。PA 是鉴别卒中患者营养不良与肌少症的有效指标，区分营养不良的截断值：男性为 5.05º，女性为 3.96º；而区分卒中后肌少症的截断值：男性为 5.28º，女性为 4.62º。GNRI 在描述住院老年患者的营养状况和营养相关并发症方面具有预后价值，也是 3 个月和 6 个月死亡率的独立预测因子，GNRI 值< 92 被认为是营养状况受损。MNA-SF 是一种简单、快速的筛查和评估营养状态的工具，具有较高的敏感性和特异性，分值低于 7，则认为患者“营养不良。目前还没有特别有效的方法阻止卒中相关肌少症的进展，但补充身体所必需氨基酸、维生素 D、高能量饮食和避免多药联合使用的生活方式能够改善卒中患者营养不良的状态，增加卒中相关肌少症患者的肌肉质量和骨骼肌指数，延缓甚至预防卒中相关肌少症的发展。本文就卒中相关肌少症的特征、流行病学、发病机制及营养在卒中相关肌少症中的作用等方面的最新研究进展进行综述，为卒中相关肌少症的临床治疗和康复提供参考。

关键字 卒中；肌肉减少症；营养；颞肌厚度；相位角；MNA-SF；GNRI

分类：临床营养

基于 Lasso-Logistic 回归构建脑卒中发生风险预测模型

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目的　探讨影响脑卒中发生风险的因素，构建并验证脑卒中发生风险的预测模型。　方法　将 2021 年 1 月-12 月乌鲁木齐市某三甲医院住院患者作为研究对象，利用 Lasso 回归筛选出与脑卒中相关的变量，用于构建多因素 Logistic 回归分析模型；采用列线图实现模型的可视化，Bootstrap 法对列线图预测模型进行内部验证，应用 ROC 曲线分析列线图预测模型预测发生脑卒中风险的能力。

结果　本研究纳入 595 名研究对象，有 344(57.82%)人患脑卒中。男性的终生中风发病率比女性高约 30%，女性患脑卒中的风险低主要是受到雌激素的保护，激素通过抗氧化应激、扩张血管、增加脑部血流量等方面对心脑血管发挥保护作用，从而降低发病风险。Lasso 回归筛选出 7 个与脑卒中发生风险相关的变量，分别是性别、年龄、小腿围、握力、舒张压、中性粒细胞百分比、钠离子；脑卒中的发病率随着小腿围以及握力的降低而逐步升高，小腿围和握力与心血管疾病的发生风险呈负相关，小腿围和握力降低已被证明与之后一系列的健康后果有关，包括更高的全因死亡率、发病率、认知度下降和衰弱，并有研究显示，握力每下降 5kg，中风风险就会随之增加 9%。Logistic 回归分析发现性别、小腿围、握力、舒张压、中性粒细胞百分比、钠离子是脑卒中发生风险的影响因素（均 P<0.05）。舒张压升高更易患脑卒中，高血压本就是脑血管疾病背后最重要的罪魁祸首，血压水平与脑卒中发病的关系比冠心病密切。大约 3/4 的急性卒中患者血压水平升高，其中我国自发性脑出血患者中约 50％～70％都是高血压性脑出血。脑卒中患者在发病早期会发生颅内压增高，从而导致应激状态，使血浆儿茶酚胺和皮质醇增高，同时由于脑组织受压导致交感神经兴奋，更进一步刺激机体释放中性粒细胞，使中性粒细胞增多，因此增加了脑卒中的患病风险。钠离子下降促进脑卒中发生风险升高，中风在内的神经系统疾病经常因电解质失衡而复杂化。血清钠紊乱仍然是脑卒中患者中最常见的电解质失衡，严重的低钠血症可能会进一步恶化患者的神经状态，早期发现快速下降的血清钠水平有助于对患者立即采取措施。应用 ROC 曲线分析列线图预测模型预测脑卒中发生风险的能力，0.80 为曲线下面积，说明该模型的预测价值高。

结论　本研究建立的风险预测模型有较好的预测能力，可用于指导临床医务人员尽早识别出脑卒中的高风险人群，为早诊断早治疗提供依据。

关键字 脑卒中；Lasso 回归；列线图

分类：临床营养

维持性血液透析患者营养状态评价及干预研究

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目的：分析探索维持性血液透析对患者的营养状态评价及干预研究价值。方法：选取本院自2022年1月到2022年12月60例经血液透析治疗的患者，按照随机法分为研究者和对照组，每组30例。其中对照组年龄（54.39 ± 7.77）岁，研究者年龄（54.17 ± 7.28）岁，两组无显著性差异，可以进一步对比。对照组患者使用一般护理，主要为定期检查患者的心理和精神状态、定期配置药物，控制病情、根据患者的情况提供营养支持、合理安排活动和休息、定期清洁和通风、根据患者的情况提供复健理、遵医嘱定期检测病情、宣传和实践健康知识等。研究组患者使用营养护理，主要为饮食指导按照营养专家根据患者的个体情况提供的饮食指导，比如调整饮食，减少摄入热量，清淡饮食等、摄入特殊营养素患者可以参照医生的指导，根据自身情况服用多种维生素和矿物质类营养补充剂，以满足体内营养元素的需要、减少低营养食品的摄入（低营养食品，如油炸食品，高热量低营养的饮料等）、改善生活质量（督促患者加强体育锻炼，改善心理素质，尽量减少负担、减少精神压力，改善生活质量，以期获得良好的营养状况）。对比两组患者的营养情况。结果：在使用营养护理后，研究组患者的白蛋白（33.22±2.70）明显优于对照组患者（29.21±3.37），血红蛋白研究组患者（106.29±6.77）也明显优于对照组患者（98.26±5.35），P<0.05，差异有显著性。结论：蛋白质-能量营养不良（PEM）可以被定义为″体内蛋白质池减少的状态，伴有或不伴有脂肪消耗或功能减退的状态，至少部分是由相对于营养需求的营养摄入不足引起的，并且/或者通过营养补充得到改善″。PEM在接受维持性血液透析治疗的维持性血液透析患者中很常见。然而，PEM似乎在透析开始之前就已经开始了。在肾脏病饮食调整研究中，一旦GFR低于60毫升/分钟，平均血清白蛋白水平就开始下降。有许多因素与维持性血液透析患者的营养状况下降有关。在透析治疗过程中，有强制性的氨基酸损失，在腹膜透析过程中，氨基酸的损失一般较高。据估计，在血液透析过程中会损失5-8克的氨基酸，而在腹膜透析过程中大约会损失5-12克/天的氨基酸。在透析治疗过程中，可能会有生物相容性的HD膜诱发炎症级联。维持性血液透析患者往往有一些潜在的合并症与营养不良有关，包括糖尿病、胃肠道疾病、炎症或自身免疫性疾病，以及经常服用多种药物的副作用。

关键字 维持性血液透析患者营养状态评价及干预研究

分类：临床营养

中医药营养

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目前我国养生市场很活跃、呈现多样性、全面开花局面、但是养生理念五花八门！中医药养生会走几个极端！1 、自然养生市场；和日常吃饭没什么两样、主要靠稀有动植物资源猎奇为主、价格不断攀升！难以扩大规模！2 现代中医药养生市场、其实是两张化验单的养生市场、一张是人体营养物质成分组合表；另一张是食谱和药品的成分组合表。这个市场是主流、是西方的养生理论、不太符合中华民族的身体健康状况！3、是传统中医药理论指导下的养生观念、只有中医药养生理论才是人力医养结合的最高境界！本公司的市场目标让全中国人民都来享受中医药养生服务！目前国内中药消费量逐年上升、中医药养生理念日益深入人心、但是理论指导不够！如果加强理论宣传、潜在市场很大。以中医药养生理念为主的消费习惯、消费方式而组合消费群体会日益壮大！比如：动物类食品、民间认为：吃肝补肝、吃肾补肾、也就是吃什么补什么、这里有很大的误区；影响了食疗的发展！我们谈一下吃肾补肾、如果把猪或羊肾放在厨房进行烹调、做到再好他也是一道菜！没有什么补肾的作用！如果放在中药房来煮、三对猪肾加上二百元的中药来煮汤喝、达到的 补肾效果要比单纯吃一年的猪肾效果要好几十倍！这样谁都吃得起。一天吃一对羊肾做的菜、一年差不多消费两万元、还可能吃出毛病！　食疗养生部;主要职能：为不同需求的顾客提供食品和配餐、比如四季养生食谱、争取三年左右做到网上销售。2、养生方案策划部；可以顾客健康状况制定每个人自己的养生方案、例如：多种慢性病、亚健康、案例：一女性患者、血液病、在大医院治疗八个月、化费 60 多万元无效！躺在医院病床、奄奄一息准备后事、我用中医药食疗方案给她延长了半年的寿命。已婚女人前几年患乳腺癌、术后因心脏病无法化疗、我用中医药心脏置换疗法在一个月给她换了一个心脏、及时的进行了化疗、不到半年癌细胞彻底清除！至今非常健康。一男子年近花甲、前年冬天突然患心脏喘息、脉象极其微细、心脏近于衰竭！遵循内径急则治标原则先治疗喘息！然后治本、进行中医药心脏置换疗法、五个月以后心脏功能恢复 80%！一年以后心脏功能还童二十年！一八十岁老妇人一年前患双脚至膝盖水肿、几乎卧床难以行动！今年 3 月开始进行中医药心脏置换治疗、口服中药十付、一个月以后老人走路轻松、还可以干家务、跳广场舞、心情甚是愉快、子女也非常高兴。每一个内脏置换治疗方案都是价值连城！！！

关键字 亚健康　　中医药　　内脏修复

分类：临床营养

1 例食管癌患者的营养治疗

王海生、付佳佳、李昕、刘丽波、赵丽婷*
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患者男性，63 岁，主因“进食后吞咽困难伴呛咳 6 月余”经门诊以“食管恶性肿瘤”于 2022-03-18，08:39 收入胸心外科。外院行胃镜检查提示：食管肿物；取病理结果提示：中分化鳞状细胞癌。入科后完善相关化验检查（2022-3-19），化验血常规：血红蛋白 129g/L；血生化示：白蛋白 27.6g/L，钾 3.16mmol/L。2022-3-24 日行胃镜检查，取病理后行基因检测，根据检测结果，请肿瘤科会诊后于 2022-4-6 转至肿瘤科治疗。临床诊断：1.食管恶性肿瘤 2.胸腔积液 3.高血压 4.低蛋白血症 5.电解质紊乱 6.营养不良 7.胃造瘘术后。患者于 2022-3-18 入院，入院以来进食少量流食，后因病情进展无法进食，为进一步疾病治疗，于 2022-3-22 行胃造瘘术，因腹胀腹痛未排气排便，肠内营养无法实施，临床给与禁食水，2022-3-23 请营养科会诊，我科参与治疗。营养治疗经过：1.营养风险筛查评分（NRS2002）4 分；2.营养评估方面通过膳食调查，体格检查，人体测量，实验室检查综合评估后营养诊断为：蛋白质-能量营养不良。3.营养治疗方式：TPN→SPN+EN→TEN→HEN。第 1 日给予 TPN(AA500ml+GLN50ml+F125ml+w-3F50ml+50%G200ml)约 900kcal，TPN 循序渐进增加至 1300kcal。第 5 日给予少量胃造瘘营养液（200kcal），患者耐受良好。第 10 日停 PN，同时 EN 给予 1500kcal，第 14 日转肿瘤科继续治疗，TEN 继续给与 1500kcal，根据临床治疗计划给与制定家庭肠内营养治疗方案，指导家属制作食物匀浆 HEN（1700kcal）。治疗期间定期复查肝肾功能等化验，血清白蛋白 34.9g/L，前白蛋 231mg/L（2022-4-18），营养状况改善明显，患者顺利完成肿瘤化疗第一阶段治疗，于 2021-04-18，10:52 出院。本病例经多学科合作，个体化营养治疗，患者营养指标恢复良好，治疗顺利进行，取得了很好的效果，为食管癌肿瘤患者个体化营养治疗提供参考。

关键字 食管癌，营养治疗

分类：临床营养

超重及肥胖对青年人脂肪餐后血脂代谢水平的影响

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目的：目前有关脂联素及脂代谢等研究对象多为中老年人及有代谢综合征（MS）病人，针对健康年青人的研究数据较少。人一天中的大部分时间处于餐后的状态，餐后血脂代谢异常是心血管疾病发生的独立危险因素。本研究检测不同体质指数（BMI）年青人空腹及脂肪餐后甘油三酯（TG）及脂联素浓度，分析评估超重及肥胖对青年大学生餐后 TG 及脂联素水平的影响及性别差异。

方法：按纳入、排除标准共纳入 113 例青年大学生，年龄 18.8±1.6 岁（18～21 岁），其中男性 42 例，女性 71 例。根据 BMI 值（kg/m2）分为不足组（BMI＜18.5）、正常组（18.5≤BMI＜24）和超重组（BMI≥24），分别为 29 例、62 例、22 例。分别测量空腹、脂肪餐后 2 小时、4 小时、6 小时 TG 及空腹、脂肪餐后 2 小时脂联素的浓度，并分析各参数与 BMI、性别之间的相关性。检验水准为 α=0.05。本研究经伦理审查批准，受试者知情同意并签署知情同意书。

结果：113 例青年人空腹、脂肪餐后 2h、4h、6h 的 TG（mmol/L）浓度分别为 0.91±0.40、0.83±0.38、0.82±0.39、0.89±0.35。空腹、餐后 2h 脂联素（mg/L）浓度分别为 0.98±0.39、1.52±0.61。餐后各时间点 TG 浓度均与 BMI 值呈正相关（P＜0.05）。不同性别空腹 TG 水平相似，随着 BMI 的增加，空腹 TG 水平逐渐升高。女性餐后 TG 2h、4h 下降，但男性 TG 无显著变化。在女性中，3 个不同 BMI 组的 TG 曲线呈马鞍型；而在男性中，超重组的 TG 曲线在 2h 出现峰值，BMI 不足组的 TG 曲线在 2h 出现下降。餐后脂联素浓度与 BMI 值呈负相关（R=-0.613，P＜0.05）。三种 BMI 分组中，无论男女，餐后脂联素均高于空腹水平（P＜0.05）；并且，无论餐前还是餐后，BMI 不足组的脂联素明显高于 BMI 正常组和超重组（P＜0.05）。随着 BMI 的升高，男女性餐后脂联素浓度均呈现下降趋势。BMI 正常组及超重组的男性餐后脂联素小于女性（P＜0.05）。

结论：相对 BMI 不足及正常组，超重组青年人的脂肪餐后 TG 代谢能力更弱，尤其是男性。BMI 越高，越不利于餐后脂联素分泌，男性更为严重。超重及性别是影响青年人脂肪餐后 TG 及脂联素分泌的重要因素。

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关键字 脂联素；甘油三酯；体质指数；脂肪餐；青年

分类：临床营养

儿童生命前 8 年超重/肥胖及体脂率与母亲孕早期 BMI 和妊娠期糖尿病的关系

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目的：评估母亲孕早期 BMI 和妊娠期糖尿病与子代生命前 8 年超重/肥胖及体脂率的关系。

方法：前瞻性研究包括所有在妊娠 24-28 周进行 75 g 口服糖耐量试验的母亲，其子女在 5 岁及 8 岁时完成随访。测量并记录后代出生体重、性别、身高，采用生物电阻抗法（BIA）对其进行体重及人体成分测量。

结果：共有 167 对母子被纳入分析，随访时后代平均年龄为 5 岁及 8 岁，超重/肥胖率分别为 12 例（7.2%）及 27 例（16.2%）。子代在 5 岁及 8 岁时的体重、BMI 值、体脂百分比在母体 BMI 三分位数显著增加（P 均＜0.05），8 岁时的超重/肥胖率及内脏脂肪面积明显增加（P 均＜0.05）；子代 5 岁时高低脂率的风险从母体 BMI 最低三分之一对比最高三分之一，优势比（ORs）别为 3.67（96%Cl：1.56-8.54）；子代 8 岁时超重/肥胖及高体脂率的风险从母体 BMI 最低三分之一对比最高三分之一，优势比（ORs）分别为 4.65（96%Cl：1.55-13.96）及 3.37（96%Cl：1.41-8.10）；调整变量后的多元 logistic 回归分析显示，母体高 BMI 和 GDM 子代 5 岁时高体脂率的 OR 为 3.47（96%Cl：1.11-10.88），子代 8 岁时超重/肥胖及高体脂率的 OR 分别为 8.40（96%Cl：2.13-33.07）及 3.86（96%Cl：1.23-12.16），但 5 岁时高体脂率、8 岁时时超重/肥胖及高体脂率与母体高 BMI 的相关性大于 GDM（OR：5.73Vs2.85，7.33Vs5.78，5.40Vs3.22，P 均＜0.05）。5 岁及 8 岁子代的 BMI 及体脂率均在低 BMI 无 GDM、低 BMI 有 GDM、高 BMI 无 GDM、高 BMI 有 GDM 四组间显著逐渐增加（P 均＜0.05）。

结论：本研究表明，母体高 BMI 和 GDM 状态均会增加子代 5 岁及 8 岁的体脂率及 8 岁时超重/肥胖的发生率，但母体高 BMI 相较于 GDM 状态更值得关注。

关键字 超重/肥胖，体脂率，GDM，母体 BMI

分类：临床营养

相位角水平与急性髓系白血病住院患者营养状况的相关性和影响因素分析

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目的 探讨用生物电阻抗法测得相位角与急性髓系白血病住院患者营养风险及营养状况的相关性，并对其低相位角的危险因素进行分析。 方法 74 例急性髓系白血病住院患者应用营养风险筛查 2002(NRS 2002)、主观整体评估法(PG-SGA)、营养相关生化指标、人体成分分析，人体测量，评价 PA 与营养风险及营养状况的相关性。根据 Kyle 标准将患者分为低 PA 组和正常 PA 组，采用单因素及多因素 Logistic 回归分析低相位角的危险因素。 结果 对研究对象 74 例急性髓系白血病住院患者进行评价中 66.2%（49/74）PA 低于正常。低 PA 组白蛋白（ALB）、血红蛋白（HB）、上臂肌围（AMC）、去脂体重（FFM）、骨骼肌质量指数（ASMI）均低于正常 PA 组（均 P<0.05），浮肿指数（ECW/TBW）高于后者（P<0.001），提示正常 PA 组患者整体营养状态好于低 PA 组。患者 PA 与 BMI、红细胞、血红蛋白、肌酐、血清白蛋白、超氧化物歧化酶、铁、总铁结合力、骨骼肌指数、去脂体重、上臂肌围呈正相关性（P＜0.01）；PA 与年龄、NRS2002、PG-SGA、住院天数、浮肿指数（ECW/TBW）呈负相关性（P＜0.05）。单因素分析结果显示，AML 住院患者低相位角风险与性别、年龄、BMI、SMI、HB、Alb 有关 （P<0.05），而与 NRS2002 评分、PG-SGA 评分、临床结局无关（P>0.05））。Logistic 回归分析发现，低 SMI（p=0.016，OR=5.021）和存在血红蛋白缺乏（p=0.009，OR=6.133）是 AML 住院患者存在低 PA 的危险因素（P＜0.05）。结论 急性髓系白血病住院患者存在低相位角的比例较高，且受低 SMI、血红蛋白缺乏等多种因素影响，PA 与多项营养指标相关性密切，PA 测量有助于快速判断病人的营养风险，为及时进行营养干预的实施提供了客观依据。

关键字 相位角 ;人体成分 ;急性髓系白血病

分类：临床营养

一例新冠后病毒性脑炎患者腹泻的原因分析及营养治疗过程分享

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目的　分享新冠病毒感染后病毒性脑炎患者出现腹泻的原因及营养治疗过程。方法　以荥阳市人民医院神经内科住院的 1 例新冠病毒感染后病毒性脑炎患者出现腹泻为例，系统分析其出现腹泻的相关因素并梳理营养治疗过程。结果 患者以“发热 1 周，精神异常、意识障碍伴肢体抽搐 3 天。”入院，入院后查新型冠状病毒核酸检测阳性，伴有发热、咳嗽、咳痰，并间断出现精神行为异常、躁狂、肢体抽搐，给予留置胃管，鼻饲整蛋白型肠内营养制剂，治疗上给予抗感染、激素抗炎、免疫治疗、营养神经、改善循环等药物应用。治疗过程中，患者出现腹泻症状，表现为：大便次数增多，呈水样便，每天 8-10 次。结合患者病史及用药情况，分析患者腹泻与以下因素有关：①新冠病毒感染导致病毒性肠炎，②抗生素应用导致肠道菌群失调，③不排除艰难梭菌感染，④可能存在肠道炎症性病变，⑤肠内营养液相关性因素。综合上述相关因素，我们首先调整了肠内营养液的脂肪比例，给予患者低脂型肠内营养制剂，并降低营养液能量密度，同时完善粪便常规+药敏培养、艰难梭菌培养。通过给予蒙脱石散、益生菌、炒面粉应用 3 天后，患者腹泻次数仍较多，大便培养结果：正常菌群生长，未检出沙门菌及志贺菌；艰难梭菌鉴定：阴性。结合患者病情及检验结果，停用肠内营养液，调整为流质匀浆膳，并在上述防腹泻方案基础上加用盐酸洛哌丁胺及生长抑素。应用新方案 3 天后患者大便次数减少，每天 4-5 次，粪便内容物较前增加，停用生长抑素，继续应用蒙脱石散、益生菌、炒面粉及盐酸洛哌丁胺。2 天后患者腹泻次数进一步减少，每天 2-3 次，粪便内容物及稠硬度均较前增加，逐步停用蒙脱石散及盐酸洛哌丁胺，继续应用益生菌及炒面粉。2 天后，患者排黄色软便，停用炒面粉，继续应用益生菌。动态观察 3 天，患者每天排黄色成型软便。经过上述综合治疗，患者腹泻症状最终得以纠正。结论 腹泻是一种常见症状，新冠病毒感染后患者出现腹泻有多种原因，除了新冠病毒感染胃肠道黏膜导致病毒性肠炎外，还需要结合患者的病史、抗生素应用情况及营养支持方案逐步分析腹泻原因，并完善粪便常规+药敏培养、艰难梭菌培养等相关检验，根据检验结果及患者病情变化制定更合理的治疗方案。

关键字 腹泻，新冠病毒感染，病毒性脑炎，营养治疗

分类：临床营养

肥胖个性化营养管理的临床疗效观察

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肥胖个性化营养管理的临床疗效观察

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【摘要】目的 个性化营养管理对门诊肥胖患者临床疗效观察 方法 通过对 2020 年 12 月~2022 年 3 月在减肥门诊进行规范化营养管理的患者分析，进行良好生活方式及平衡膳食的干预，肥胖患者不仅体重下降，代谢性综合征相关指标也得到了明显改善。该方法安全、有效、科学合理。

【关键词】肥胖 人体成分分析 代谢性综合征 医学营养减重 低能量平衡膳食

WHO 和 WOF 的数据显示：目前全球近 20 亿（超过 40%）成年人和近 3.4 亿(超过 18%)儿童青少年超重或肥胖。而我国有 50%的成年人和 20%的儿童青少年超重和肥胖。而肥胖在整个生命周期内，导致糖尿病、高血压、痛风等代谢性疾病、肿瘤患病风险增加，平衡膳食与良好生活方式的干预，会使患者生存质量迅速提升。

1. 临床资料

1.1 一般资料

随机选择我院医学营养减重门诊 114 例肥胖且合并肝功能异常、血脂升高、高胰岛素血症、睡眠呼吸暂停呼吸综合征、多囊卵巢综合征患者。男性 48 例，年龄 20~61 岁，女性 66 例，年龄 19~65 岁。

1.2 诊断标准

参照 2011 年发布的《中国成人肥胖症防治专家共识》，提出的计算方法：体重指数（BMI）=体重（kg）÷身高（㎡），BMI≥28kg/㎡既诊断为肥胖。参照 2005 年国际糖尿病联盟（IDF）的诊断标准，腰围男性≥90cm，女性≥80cm 且符合 TG≥1.7mmol/L；收缩压≥130mmHg 或舒张压≥85mmHg；空腹血糖≥5.6mmol/L/或诊断为 2 型糖尿病，只要符合任意 2 项，既诊断为代谢性综合征。

1.3 纳入标准

符合上述诊断标准，未采取任何药物治疗，能完成 6 个月医学减重方案的患者。

1.4 排除标准

①肥胖合并多种并发症，需要口服药物、注射胰岛素控制病情的患者。

②不能严格按照医学减重方案完成 6 个月疗程的患者。

③肥胖合并妊娠患者。

2. 营养治疗方法

2.1 建立医学减重档案：建立规范化干预流程，使用人体成分分析仪器 inboday770，测量身高、体重、体脂百分比、内脏脂肪面积、腰臀比、基础代谢率。监测频率：1 月 1 次。

表 1 BIA 测试数据

2.2 综合型评估：病史调查、膳食状况评估、身体活动能力评估、健康风险评估

2.3 营养干预方案

关键字 肥胖 人体成分分析 代谢性综合征 医学营养减重 低能量平衡膳食

分类：临床营养

重症机械通气患者静息代谢能量消耗实测值与 H-B 公式预计值对比研究

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目的 对重症机械通气患者进行精准有效的营养支持仍是目前临床面临的热点和难点问题。营养不足或营养过剩，均有可能对患者的病情和预后带来不良影响。合理营养支持的前提是对患者的能量消耗进行精准评估。指南和专家共识均推荐以间接测热法（Indirect calorimetry, IC）是目前用于重症患者评估能量消耗的金标准。基于此，本研究拟比较重症机械通气患者间接测热法测定的静息能量代谢值（Resting Metabolic Energy expenditure, REE）与 HarrisBenedict（HB）公式法的差异，了解重症患者的代谢特点，为提供合理的临床营养支持提供参考依据。

方法 以 2021 年 3 月-2021 年 7 月在河南省人民医院重症监护室接受机械通气的 53 例重症患者为研究对象，在患者机械通气后 2-3 天，采用美国 MGC Diagnostics 公司生产的 CCM Express 能量代谢车根据间接测热法对患者进行静息能量测定；并采用公式法，根据患者身高、体重、应激状态等采用 HB 公式计算其能量估计值，比较基于间接测热法的静息能量代谢测定值和基于 HB 公式法的能量估计值差异。利用 SPSS 26.0 软件进行统计分析，采用描述性分析、配对样本 t 检验方法进行统计分析，以 P<0.05 为差异有统计学意义。

结果 共纳入 53 例患者，其中男性 30 例（占 56.60%），女性 23 例（占 43.40%）；年龄在 21~79 岁之间，平均年龄为 57.02±14.91 岁；平均身体质量指数（Body Mass Index, BMI）为 24.02±4.87kg/m^2。根据间接测热法结果，将 REE/HB 比值在 90%以下定义为低代谢状态，90%~110%之间为正常代谢状态，110%以上为高代谢状态，结果显示处于低代谢状态 5 人（9.43%），正常代谢状态 7 人（13.21%），高代谢状态 41 人（77.36%）。间接测热法测得的能量需求平均值为 1934.75±496.42kcal，HB 公式法计算能量需求平均值为 1412.13±213.00kcal，t 检验结果显示，差异具有统计学意义（t=8.471，P<0.001）。进一步对不同性别比较显示：男性患者的 REE 平均值为 2030.47±523.06kcal，HB 公式法计算能量值为 1527.43±171.90kcal，两者比较差异有统计学意义（t=5.587，P<0.001）；女性患者的 REE 平均值为 1809.91±439.37kcal，HB 公式法计算能量值为 1261.74±162.82kcal，两者比较差异有统计学意义（t=6.677，P<0.001）。

结论 重症机械通气患者由于能量消耗增加，蛋白质分解加快，增加营养不良风险，加重疾病及并发症，严重影响患者预后。研究发现重症机械通气患者大多处于高代谢状态，虽然 HB 公式法简便易行，在临床上应用较广，但 HB 公式计算估计值与采用间接测热法测得 REE 值仍存在较大差距，公式法在评估重症机械通气患者中均在明显的局限性。因此对于重症机械通气患者建议尽量采用间接测热法进行能量评估，针对性进行个体化营养治疗，以有效保证能量供应，降低住院期间营养不良发生率，减少并发症发生，提高重症机械通气患者的治疗效果。

关键字 机械通气；重症；间接测热法；HB 公式法

分类：临床营养

胃癌患者肌肉减少症危险因素分析

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【摘要】 目的 分析胃癌患者肌肉减少症发生率，分析其与肿瘤临床分期、特征因素、化疗后不良反应及外周血炎症指标的相关性，并分析四肢骨骼肌指数（appendicular skeletal mass index，ASMI）与患者主观整体评估量表（the patient-generated subjective global assessment，PG-SGA）这两种评估方式对患者营养状况评定的相关性。方法 收集我院 2019 年 1 月至 2022 年 2 月共 125 例胃癌患者的临床资料，采用生物电阻抗法（bioelectrical impedance analysis，BIA）分析患者的机体组成，利用 ASMI 评估肌肉减少症的发生情况，并探究肌肉减少症组和对照组临床特征、化疗后不良反应、血液学指标等差异，分析肌肉减少症发生的危险因素，最后运用 Pearson 相关分析法分析 ASMI 与 PG-SGA 评分的相关性。结果 125 例患者中，肌肉减少症发生率为 43.2%。肌肉减少症组患者年龄更大，化疗后 III/IV 级不良反应发生率更高；此外，肌肉减少症组 BMI 更低，而 PG-SGA 评分、NLR 更高（P 均<0.05）。单因素分析及多因素分析显示，年龄、PG-SGA 评分、化疗后 III/IV 级不良反应、NLR 为肌肉减少症发生的独立危险因素（P 均<0.05)。受试者工作特征曲线（ROC）分析表明 NLR 拥有最大曲线下面积(Area under curve, AUC)[0.702，95%CI(0.61-0.8)]，当 NLR 为 3.24 时，灵敏度及特异度分别为 74.1%及 66.2%，具有最佳肌肉减少症诊断效能。ASMI 与 PG-SGA 评分具有显著负相关性(相关系数 r= -0.38，P<0.001)。结论 老年、化疗后不良反应发生及患者全身炎症状态与胃癌肌肉减少症发生密切相关，且 ASMI 与 PG-SGA 这两种评估方式对患者营养状况的评定具有较好相关性。

【关键词】 胃癌;四肢骨骼肌指数；肌肉减少症

关键字 胃癌；四肢骨骼肌指数；肌肉减少症

分类：临床营养

急性胰腺炎患者 H2H 营养管理方案的构建与应用

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目的 构建急性胰腺炎患者 H2H 营养管理方案，探讨该方案对首发急性胰腺炎患者自我管理能力和再入院率的影响。 方法 选取江苏省某三级甲等医院消化内科 2019 年 12 月至 2020 年 12 月收治的 143 例急性胰腺炎患者为研究对象，采用随机数字表法分为实验组 71 例，对照组 72 例，对照组采取常规的住院护理管理、出院宣教和随访。观察组在常规护理基础上，由营养支持小组开展 H2H 营养管理干预。①医院（Hospital）由消化内科医师、营养科医师、注册营养师与专科护士（包括省市级消化内科、营养支持、糖尿病专科护士共 6 名），根据中华医学会肠外肠内营养学分会要求建立营养支持小组，构建符合多学科合作的营养治疗方案，根据方案定制食谱。营养支持小组充分了解患者病情及治疗方案后，根据患者病情、营养状况制定住院期间肠内、肠外营养支持计划，根据患者营养状况、饮食习惯等讨论制定出院后营养支持方案，编制一周食谱（大体重患者在制定食谱的同时配合减重计划），并于出院前三天开始试行，教会患者使用手机 APP 记录每日饮食及运动情况，根据患者反馈情况进行调整。②家庭（Home）鼓励家属参与患者疾病管理，监督其体重、饮食摄入及运动情况。对于方案执行较好，体重明显改善者根据患者需求调整随访时间；执行情况不理想者加强宣教及监督。比较 2 组患者出院后 1、3、6、12 个月急性胰腺炎复发再入院率、再入院后平均住院天数、出院后一年内再入院次数有无差异。采用成年人健康自我管理能力测评工具调查患者入院后及出院后 6 个月自我管理能力。 结果 出院后 6 个月及 12 个月实验组患者再入院率均明显于对照组（5.63% vs 20.83%， x 26 个月=7.168，P6 个月=0.007；14.08% vs 29.17%， x 212 个月=4.789，P12 个月=0.029）；且实验组首发 AP 患者在出院后一年内复发 2 次及以上复发率显著少于对照组（2.82% vs 13.89%， x 2=5.701，P=0.029）。结论 对急性胰腺炎患者实施 H2H 营养管理干预能够提高患者的自我管理能力，降低胰腺炎患者疾病的再入院率和平均再住院天数，值得临床推广应用。

关键字 营养管理；急性胰腺炎；H2H

分类：临床营养

成都某三甲医院超重/肥胖人群食物成瘾发生率调查及影响因素分析

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目的：研究超重/肥胖人群中食物成瘾(FA)的发生情况和影响因素分析。方法：采用方便抽样法，对2021年8月至2022年1月期间于成都市某三甲医院内分泌代谢科住院和代谢减重门诊就诊的126例超重/肥胖患者进行横断面FA现状调查。采用一般资料问卷表、半定量食物频率表和改良版耶鲁食物成瘾量表2.0（mYFAS 2.0）进行资料的收集和食物成瘾的判定。根据mYFAS 2.0量表的判定结果将所有研究对象分为FA组和非FA（NFA)组，比较两组间人口学资料、体格测量数据、实验室指标和膳食摄入情况的差异，并分析其影响因素。结果：1）126例超重/肥胖患者中男性85(67.5%)例，女性41(32.5%)例，年龄[52(46-59)]岁，其中共55例被判定为FA，占比为43.7%。2）FA组藏族、居住在高原、有脂肪肝病史的比例及居住地海拔、BMI、腰围、臀围、体脂率、内脏脂肪等级和糖化血红蛋白（HbA1c）均高于NFA组(P＜0.05)；而两组间性别、年龄、婚姻状况、受教育程度、职业劳动强度、吸烟史、饮酒史等人口学资料和基础代谢率、空腹血糖（FPG）、餐后2h血糖（2hPBG）、甘油三酯（TG）、总胆固醇（TC）、高密度脂蛋白胆固醇（HDL-C）、低密度脂蛋白胆固醇（LDL-C）、尿酸（UA）等体格测量实验室指标的差异无统计学意义（P＞0.05）。同时对于膳食摄入情况的比较，FA组能量、脂肪、碳水化合物、钠、锰的摄入量均高于NFA组（P＜0.05），而两组其他营养素之间的差异无统计学意义（P＞0.05）。3）Spearman相关分析显示，FA与BMI、腰围、臀围、居住地海拔、脂肪肝、体脂率、内脏脂肪等级及摄入的能量、脂肪、碳水化合物、钠和锰的摄入量呈正相关(P＜0.05)。经共线性诊断后，剔除变量锰、腰围和臀围进行的二元Logistic回归分析显示，BMI和脂肪的摄入量是FA的主要影响因素(P＜0.05)。结论：成都地区超重/肥胖人群中FA率较高，主要受BMI和脂肪的摄入量的影响。建议国内应重视对FA问题的关注，对超重/肥胖人群应定期尽早进行FA的筛查，及时制定相应的干预措施，同时应重视生活方式的预防，并做好风险管控。

关键字 超重/肥胖；食物成瘾；改良版耶鲁食物成瘾量表2.0；影响因素

分类：临床营养

探讨医护一体化管理对维持性血液透析病人的营养状况的影响

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目的：探讨医护一体化管理下维持性血液透析病人的营养状况。血液透析是终末期肾脏病患者的主要的有效治疗方法之一，有研究表明维持性血液透析(MHD)患者的死亡率高达21%-23%，其中营养不良是其独立的危险因素。所以MHD患者的营养不良状况应引起医护人员的重视，并采取相应的处理措施，改善患者的营养状况，可以减少并发症的发生，减少病死率。

方法：选择2021年-2022年度本医院维持性血液透析患者共50例，其中男性23例，女性27例，平均年龄在37±12岁，透析年限＞1年。将其分为A、B两组，调查所有患者的进食量及饮食结构并且运用人体学测量及血清生化指标检查对所有患者的营养状况进行评估。A组常规组共25例患者，其中男性12例，女性13例,给予患者低盐低脂低钾低磷饮食，限制水的摄入。B组实验组共25例，男性11例，女性14例，B组病人在主管医生，主管护士和肾病营养师的联合下根据病人的实际情况对病人实行个体化饮食，需要计算出每人每日的进食量，进水量合理分配至每餐。通过对比两组病人的营养状况指标，血液透析前的相关指标及相关并发症来探讨医护一体化管理对病人营养状况的改善情况。

结果：对比两组患者观察6个月后发现就患者的皮脂层方面实验组高于常规组患者，在皮肤及毛发光泽度方面实验组高于常规组，在精神及体力方面实验组也高于常规组。说明医护一体化管理下B组患者其营养状况指标及血液透析前的相关指标高于常规组（$p<0.01$），具有统计学意义；相关并发症发生率下降（$P<0.05$）具有统计学意义。

结论：医护一体化管理是治疗维持性血液透析患者的一种新型的管理模式，这种管理模式下医生可以更加有效的了解患者的病情及其变化及时进行调整处方，护士也可以充分的与病人进行沟通对患者及时进行精准指导护理，进行更加精细化护理，方便了患者。所以医护一体化管理对血液透析患者的影响是有益的，可以改善维持性血液透析病人的营养状况，降低并发症的发生，减少并死率。

关键字 维持性血液透析　　医护一体化　　营养

分类：临床营养

糖尿病控糖有效需要坚持新的生活习惯

卢静*
宁波立悦健康管理科技有限公司

一、低糖适量饮食控糖

英国研究表明：Ⅱ型糖尿病与体内的能量平衡密切相关，如果你摄入的能量超出你所燃烧的，那么超出的部分会形成脂肪积存在肝脏和胰脏，对一些人来说就会导致血糖升高及Ⅱ型糖尿病，而通过恰当的饮食管理可治愈Ⅱ型糖尿病。

上世纪中叶美国糖尿病协会推荐的饮食加药物疗法，误导了世界范围的糖尿病治疗，这个方案制定是只重视了热量的供给，而忽视了高血糖指数的食物对劳损的 B 细胞的刺激。胰岛素的核心问题就是胰岛 B 细胞劳损，再用食物刺激它更加重了劳损，当年美国糖尿病协会建议把高血糖指数的食物（精米、精面、薯类）控制在全天主食的 60%，是学术上犯得错误。哈佛建议 0 糖，把高血糖指数食物的摄入，降到最低点。

二、建立新的生活习惯

“冰冻三尺，非一日之寒”，糖尿病可以说是错误生活方式导致的疾病。因此，改变过往的生活习惯，对长期控制血糖至关重要，更是真正有效治疗糖尿病的开始。

一）、饮食习惯

1、每餐只吃七分饱！六菜一豆三主食。

2、每餐主食免不了，杂粮杂豆营养好；五谷杂粮替米饭，黑麦荞麦换小麦（面）；粥和面汤要远离，实在想喝冲燕麦；芋头山药都是宝，占分主食控糖好！

3、餐餐都要有蔬菜，苦瓜降糖惹人爱；胡萝卜洋葱可多吃，秋葵木耳圆白菜。

4、鸡鸭鱼肉不吃皮，牛肉羊肉受爱戴；最好远离猪全身，瘦肉少许也无害。

5、特别注意要补钙，免疫防线不易坏；每周吃上 2 次鱼，豆浆牛奶（低脂）每日带；钙片记得及时吃，太阳也要多晒晒。

6、低盐低脂很重要，糖友用量要控好；5 克盐（每日）、30 克油（每日），防并发又稳血压。

7、三餐吃饭要按时，两餐之间加辅食；水果干果不乱吃，种类和量控制死；水果升糖要辨别，推荐蓝莓猕猴桃，荔枝榴莲可别碰，香蕉山竹不要吃；血脂不高加坚果，花生瓜子山核桃，大枣红果不要碰，蜜饯果干更不行；实在没啥好选择，可吃黄瓜西红柿。

8、不吃烟熏火烤肉，腌制食品也少吃。

9、进食速度要控制，细嚼慢咽绝对是；吃饭顺序也讲究，蔬菜肉蛋先于主食。

10、每天保证 8 杯水，桑叶淡茶胜咖啡；含糖饮料不能碰，烟酒果汁也不行。

二）、生活习惯

11、心情舒畅很重要，心情抑郁血糖高！

12、每日定量做运动，充足睡眠保障好。

13、每日测量血压糖，及时调整（饮）食（运）动量。

14、定期医院去体检，异常指标关注到。

15、食疗控糖要三心：信心、耐心和恒

关键字 控制血糖　饮食习惯

分类：临床营养

质子泵抑制剂对胃癌患者部分胃切除术后营养状况和生活质量的影响

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目的：对于部分胃切除术患者，由于分泌胃酸的壁细胞及分泌胃泌素的 G 细胞大部分保留，胃酸分泌功能较强，胃内容物、胆汁及十二指肠内容物可反流入残胃内胃酸或预防吻合口溃疡及反流性食管炎，引发反流性食管炎，导致反酸、烧心甚至吞咽困难等症状，严重影响患者的术后生活质量。故临床实践中，部分胃切除术后患者多使用质子泵抑制剂预防反流。探讨质子泵抑制剂对部分胃切除术后患者营养状况和生活质量的影响。方法：选取 2021 年 1 月至 2021 年 6 月的某肿瘤医院普外科行部分胃切除术的 35 例胃癌患者作为研究对象，采用随机数字表法将其分为观察组和对照组。观察组术后接受质子泵抑制剂治疗 1 月，对照组术后不接受质子泵抑制剂，两组术后均常规接受镇痛、抗炎、预防感染、肠外肠内营养等支持治疗，出院后接受家庭肠内营养治疗。分别于术前、术后 1 月、术后 3 月监测营养指标，包括 BMI、血清白蛋白、血红蛋白，并使用 EORTC-QLQ-C30 和 EORTC-QLQ-STO22 量表评估患者术后 3 月的生活质量。结果：①两组患者的性别、年龄、手术方式，以及术前 BMI、血清白蛋白、血红蛋白比较，差异均无统计学意义（P ＞ 0.05），具有可比性。②两组术后 1 月 BMI、血清白蛋白、血红蛋白比较，差异均无统计学意义（P ＞ 0.05）；观察组术后 3 月的血清白蛋白和血红蛋白均显著低于对照组，差异有统计学意义（P ＜ 0.05），两组术后 3 月 BMI 比较，差异无统计学意义（P ＞ 0.05）。③对于 EORTC-QLQ-C30 评分，观察组在恶心和呕吐评分上优于对照组（P ＜ 0.05），在腹泻评分上差于对照组（P ＜ 0.05），其他指标差异均无统计学意义（P ＞ 0.05）。④对于 EORTC-QLQ-STO22 评分，观察组的疼痛和饮食受限评分显著高于对照组（P ＜ 0.05），返流症状评分显著低于对照组（P ＜ 0.05），其他指标差异均无统计学意义（P ＞ 0.05）。结论：部分胃切除术后使用质子泵抑制剂虽然一定程度上改善了患者的返流症状和恶心呕吐，但可导致患者进食受限且易发生腹泻，影响患者营养吸收和代谢。因此，部分胃切除术后患者不建议常规使用质子泵抑制剂，临床应根据患者的具体情况斟酌使用。

关键字 质子泵抑制剂；部分胃切除；营养状况；生活质量

分类：临床营养

12 周乳清蛋白补充有效改善老年糖尿病患者的肌少症

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目的：

观察每日补充富含亮氨酸的乳清蛋白对老年糖尿病患者肌少症相关指标及糖尿病指标的影响，探索乳清蛋白对肌肉量、肌肉力量、肌肉功能以及血糖和胰岛素敏感性的影响。

方法：

招募 32 名≥65 岁老年糖尿病肌少症患者，随机分为乳清蛋白组和空白组对照组。两组均保持原有膳食摄入和运动水平。在此基础上，乳清蛋白组每天额外定时补充 20g 乳清蛋白粉（含有 18.2g 氨基酸，其中 9.1g 必需氨基酸、2.28g 亮氨酸），干预 12 周后结束。在干预前、后分别通过生物电阻抗分析法评估受试者的四肢肌肉量，握力计测量患者双手最大握力，记录五次起坐和计时起立消耗时间，并抽血化验糖尿病相关指标。比较两组受试者肌肉量、肌肉指数、肌肉力量（握力）、肌肉功能（五次起坐时间、计时起立实验）的改变以及血液指标（血糖、糖化血红蛋白、C 肽的变化）。

结果：

两组受试者基线时的年龄、性别、肌肉量、肌肉力量、肌肉功能以及血液指标之间无统计学差异。乳清蛋白干预 12 周后患者的肌肉量增加量为 0.133±0.605 kg，显著高于空白对照组的-0.449±0.979 kg（P<0.05）（肌肉量改善率：乳清蛋白组=67%，空白对照组=25%）；乳清蛋白组的肌肉指数增值为 0.057±0.230 kg/m2，显著高于空白对照组的-0.170±0.351 kg/m2（P<0.05）（肌肉指数改善率：乳清蛋白组=67%，空白对照组=25%）。两组受试者的握力变化及五次起坐时间的差异无统计学意义（P>0.05），但计时起立试验改善具有统计学意义（乳清蛋白组：2.952±2.256s vs.空白对照组：-1.368±1.443s，P<0.05）。干预前后两组患者的血液指标（血糖、糖化血红蛋白以及 C 肽）均无显著差异（P>0.05）且仍处于糖尿病诊断范围之内。

结论：

12 周的亮氨酸-乳清蛋白干预能够有效改善 65 岁以上糖尿病患者的肌少症，显著增加肌肉量以及肌肉指数，并能一定程度改善肌肉功能，对糖尿病相关指标无明显影响。

关键字 肌少症；糖尿病；老年；乳清蛋白；亮氨酸

分类：临床营养

外周血炎症因子水平与原发性肺癌患者营养状况相关性临床研究

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目的　探究原发性肺癌营养不良患者与外周血炎症因子水平的相关性。方法　对我院 2018 年 1 月至　2021 年 12 月的 222 例住院原发性肺癌患者应用 PG-SGA 进行营养状况评估，并根据 PG-SGA 评分将患者分成三组：无或可疑营养不良组，中度营养不良组及重度营养不良组。分析患者营养不良的发生情况及其与临床病理特征、营养指标及外周血多项炎症指标的关系。结果　222 例原发性肺癌患者中，无或可疑营养不良者占 34.2%（76/222），中度营养不良者占 36.0%（80/222），重度营养不良者占 29.8%（66/222）。三组患者的性别和年龄构成、病理组织学类型及血脂水平，无统计学意义的差异（P>0.05）。随着营养不良程度加重，患者的临床分期较晚，其体质指数、血红蛋白、淋巴细胞计数、前白蛋白、白蛋白、预后营养指数呈逐步下降趋势，差异均有统计学意义（P<0.05）。重度营养不良患者更易出现血小板和 D-二聚体的升高，且外周血中性粒细胞计数、单核细胞计数、C-反应蛋白、白细胞介素-6、中性粒细胞与淋巴细胞比值、血小板与淋巴细胞比值水平更高，而淋巴细胞与单核细胞比值更低，差异均有统计学意义（P<0.05）。营养指标前白蛋白和预后营养指数预测营养不良的最佳截断值分别为 163 和 43；炎症因子指标 CRP、IL-6、NLR、PLR 和 LMR 预测营养不良的最佳截断值分别为 31.5、13.5、4.2、177.4 和 1.9。经营养支持治疗后，中重度营养不良患者营养指标 PAB、ALB 水平较治疗前明显提高，炎症因子 CRP、IL-6 水平较治疗前明显降低，差异均有统计学意义（P<0.05）。结论　原发性肺癌患者营养不良发生率高，营养不良是患者生存及预后的重要影响因素。PG-SGA　评分与炎性指标及营养指标具有较好的相关性。参考患者的 PG-SGA 评分及相关血液学指标及炎性指标水平，尽早及时地对原发性肺癌患者进行营养评估，必要时予以临床干预，改善患者炎症水平，提高患者的营养及免疫状态，进而改善患者生存。营养干预对肺癌患者预后影响期待后续更大样本研究和进一步的随访统计结果来证实。

关键字　原发性肺癌；营养不良；营养评估；PG-SGA；炎症因子；营养支持治疗

分类：临床营养

肠内营养管饲肿瘤临床护理技术路径

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据全国三等甲级医院 2.3 万例住院肿瘤患者的调查结果，营养不良发生率 79.4%，而中、重度营养不良发病率为 58%,因营养不良而死亡的患者占死亡总数的 40.5%。肿瘤患者的中低度长时间应激状态、各种原因致使患者无法经口摄食或摄食的减少均是热量-蛋白质缺乏型营养不良发生的原因。为满足患者对热量-营养素的生理需求，对胃肠道功能正常或基本正常的肿瘤患者采用管饲或口服的方式，经消化道给予热量-营养素的营养：包括提供大分子聚合物(整蛋白)型、小分子聚合物(氨基酸、短肽)型肠内营养制剂、特殊医学配方食品、均浆膳食和普通食物，这样营养素可直接经肠吸收、利用，符合生理方式、供给方便、费用低廉，还有助于维持肠黏膜结构和屏障功能完整性。肠内管饲输注是肿瘤临床的重要手段之一，依据患者消化道解剖结构的连续性、消化吸收功能、肠内营养液反流情况和误吸的风险、管饲喂养时间、患者的精神状况恰当选择肠内营养管饲通路。那么置入肠内营养管饲通路后，肠内营养管在留置期内的正常使用，是患者营养液正常供给的最基本的保障。在临床工作中妥善留置肠内营养管并保持其畅通涉及：喂养管路使用与管理、喂养方式、防治并发症、堵管与冲管、“药物与药物”以及“药物与营养制剂”间的作用、管饲营养制剂选择等。本临床护理技术路径针对因咀嚼、吞咽或咽下障碍致经口进食困难而胃肠道功能基本正常的肿瘤患者，实施肠内管饲营养时的管路选择和维护，主要介绍肿瘤患者常用几种肠内营养管路的目的、适应症与禁忌症、置入操作内容、带管的护理、并发症的预防及护理、带管患者的心理护理、带管患者的延续护理。涉及肿瘤临床常用的鼻肠管(nasointestinal tube,NIT)、鼻胃管(nasogastric tube,NGT)、经皮内镜下胃造口（percutaneous endoscopic gastrostomy，PEG）和经皮内镜下空肠造口（percutaneous endoscopic jejunostomy，PEJ）。鼻肠(胃)途径放置导管，其远端放在十二指肠或空肠中。仅用于胃肠减压者，可置入胃腔内。内镜协助下的微创(如 PEG/J)和外科手术时的胃肠造口，用于需要超过 1 月管饲的患者，以期为从事肿瘤营养的临床护理工作人员参考。

关键字 肠内营养 管饲 护理 临床路径

分类：临床营养

重度营养不良肿瘤患者院内临床管理技术路径

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2013 年初中国科学技术大学附属第一医院组建起了专业诊治营养不良肿瘤患者的肿瘤内科临床团队。临床营养医师负责监控评估重度营养不良（PG-SGA≥9 分）住院肿瘤患者住院期间的诊疗措施到位情况，本临床路径推荐接受上述治疗的甄选对象、营养代谢与肿瘤学评估方法，营养代谢治疗及抗肿瘤药物治疗方法及疗效评估。

非终末期 PG-SGA≥9 分肿瘤患者，检测 TNF-a、IL-1、IL-6、CRP、皮质醇、胰岛素激素血液水平、基础代谢率和人体成分分析。据影像学检查明确病灶位置、数量和大小，以及完善肿瘤组织细胞学，肿瘤标志物数据。

非蛋白质热卡 20～20kcal/kg/d，兼顾患者的应激状态、年龄情况及体力活动系数，蛋白质摄入量为 1.8-2.0g/kg/d。非荷瘤状态下三大营养素的供能比为碳水化合物 50%～55%、脂肪 25%～30%、蛋白质 15%。

规避再喂养综合征，由临床营养医师根据患者胃肠功能情况，遵循五阶梯原则经计算决定补给方式补足患者能量和氮生理需求量，优先推荐口服营养补充（ONS），仅存肠道功能者推荐鼻肠管或胃造瘘、空肠造瘘管饲。肠内营养不满足生理需求，推荐肠外营养。或部分肠内联合肠外营养支持治疗。生命体征不平稳者，不推荐肠外营养支持，以维持水电解平衡及减症对症处理为主。代谢调节剂常用 ω-3 多不饱和脂肪酸、谷氨酰胺、支链氨基酸、沙利度胺、烟酰胺、胰岛素、糖皮质激素、孕激素、维生素等，以阻止分解代谢、降低炎症状态和为生长迅速的细胞提供热量氮量。

抗肿瘤药物治疗：脏器功能允许的情况下，据循证医学证据行个体化用药，择细胞周期特异性化疗药物，用时相依赖注药方式，联合分子靶向药物、免疫检查点抑制剂治疗、内分泌治疗，或者联合另一种细胞周期特异性化疗药等。热量和氮量补足的当日即开始实施上述的抗肿瘤药物治疗。营养状况显著改善后，实施权威指南推荐的药物治疗方案。

减症治疗：　重度营养不良患者易合并发热、感染、疼痛等诸多不良症状体征，快速、合理、有效控制/缓解不良症状和体征对于增加热量-营养素摄入吸收并减少其消耗。

所有重度营养不良的肿瘤患者，完成 1 周期营养代谢及抗肿瘤治疗后，需再次对各重要脏器功能、营养学指标、炎性因子，激素水平，人体能量代谢车检测和人体成分分析等结果进行复查。2 周期抗肿瘤治疗后需对营养指标及代谢指标复查的同时，对肿瘤病灶的影像学及肿瘤标志物变化等做好评估，做好出院营养指导及随访计划。

关键字 恶性肿瘤，营养不良，代谢调理，营养支持

分类：临床营养

改善患者进食能力肿瘤内科技术路径

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肿瘤患者进食能力是指患者通过口腔咀嚼吞咽动作顺利下咽完成进食动作，且胃的生理活动正常，肠道可以正常消化吸收热量-营养素、蠕动排泄和屏障功能完善。进食能力下降多由肿瘤伴发不良症状体征、抗肿瘤治疗副反应以及耦合疾病所致，引发热量-蛋白质缺乏型营养不良和抗肿瘤药物治疗不耐受。为改善肿瘤患者进食能力下降和消化吸收障碍、维护其胃肠道功能，本路径推荐“改善患者进食能力肿瘤内科技术”的甄选对象、治疗方法和效果判定。

肿瘤患者进食能力评估　　据味觉改变、恶心、早饱等食欲相关症状的综合量表，对营养状况、肿瘤学特征、心理状态行全面系统了解、分析和判断：进食能力下降的定性、定量评估、营养状态评估、心理因素评估和肿瘤学因素评估。

患者肠功能屏障功能：无统一诊断标准。我们临床上目前应用血清 D-乳酸、二胺氧化酶、内毒素检测，同时结合患者血 PCT、IL-6、CRP 综合评估。

治疗方法　　患者进食能力下降肿瘤相关因素：咀嚼吞咽困难、消化道梗阻、术后胃瘫、疼痛、抗肿瘤治疗副反应等，非肿瘤因素包括：便秘、发热、抑郁焦虑症的躯体症状。

癌性肠梗阻、吞咽困难、疼痛、高热、口腔炎、浆膜腔积液等由肿瘤疾病及伴随症状可引起的进食能力下降，减除患者肿瘤负荷是改善进食能力下降现象的关键环节和有效保障。参照我科室营养不良抗肿瘤药物治疗临床技术路径执行。

食欲刺激剂首推甲地孕酮，提高肿瘤患者食欲和体重，并下调炎性细胞因子促蛋白质合成代谢。热量-蛋白质补足前提下，食欲刺激剂、胃肠动力药和有氧运动改善患者食欲，注意排大便。便秘患者服用乳果糖，甚至开塞露灌肠，进食高膳食纤维食物。有效止痛治疗及减轻局部炎症及水肿，短期内改善患者症状，可快速改善患者食欲。

经口进食或肠内营养增加肠道血流量，促肠道蠕动,保护肠黏膜屏障功能。刺激胃肠液和胃肠激素分泌，维护肠道屏障和肠道菌群平衡，防止肠源性感染。足量足疗程中效糖皮质激素抗炎、谷氨酰胺、维生素 C 等治疗放射性肠炎。

疗效评价　　采用厌食/恶液质治疗的功能性评估,总分值≤24 分为存在厌食。视觉模拟量表评估厌食程度，0 分则食欲正常，10 分即极度厌食。“0-2”分“正常/基本正常进食者”，“3-5”分“轻度厌食”，“6-8”分“中度厌食”，大于“8”分“重度厌食”。

针对营养状况、症状体征、心理因素行系统评估，对比分析。

关键字 恶性肿瘤，进食能力下降，临床路径，肠功能屏障，代谢调节

分类：临床营养

诊治肿瘤不良征象临床技术路径

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肿瘤患者常伴发蛋白质和葡萄糖代谢异常、癌因性疲劳、抑郁焦虑症、高凝状态、癌症疼痛、发热、消化道梗阻、胸腹水及皮下水肿等临床现象，阻止患者热量营养素摄入，和增加热量消耗。为缓解营养不良肿瘤患者相伴的营养代谢紊乱相关不良症状和体征，提高抗肿瘤药物治疗的患者耐受性，推荐该技术路径的甄选对象、药物应用方法和评效评估及随访。

纠正患者负氮平衡状态：满足外源性热量和蛋白质的补足，并实施代谢调理治疗。打击肿瘤负荷，降低机体肿瘤组织代谢活跃程度。

降低环境中葡萄糖浓度：临床减少葡萄糖供给，提高脂肪的能量来源比率（占非蛋白能量 50%左右）。

患者癌因性疲乏（CRF） 结合临床表现及 CRF 评估量表评估患者，积极治疗基础疾病，西药对症治疗或根据辨证加用中药治疗。

血液高凝状态：对于无抗凝治疗禁忌的处于活动期恶性肿瘤合并其他急性疾病或活动受限的住院患者行预防性抗凝治疗。

癌症疼痛 根据 NCCN 及中国癌痛治疗指南，对癌痛患者进行规范化全程管理。

发热 发热时患者组织器官代谢增强，和消化吸收功能障碍，能量消耗增加，体温升高 1℃，基础代谢率提高 13%。治疗原则是据病因处理。

上消化道梗阻：手术、放疗、食管狭窄扩张、食管支架置入。质子泵抑制剂抑制胃酸分泌、奥曲肽抑制消化液分泌、皮质醇激素消肿治疗。胃肠道喂养包括鼻胃管、鼻肠管、胃造口术、小肠造口术等。

恶性肠梗阻 禁食、胃肠减压、灌肠促排便、纠正水电解质和酸碱平衡紊乱、防治感染等基础疗法；依据肠功能状况选择合适营养方式干预改善患者营养；糖皮质激素、甘油果糖消除消化道管壁组织间水肿，推荐中效糖皮质激素；生长抑素类似物如奥曲肽抑制消化道腺体分泌；镇静止吐、止痛；抗肿瘤药物治疗肿瘤并监测治疗不良反应；监测症状体征变化，及时评效并及时调整方案。

浆膜腔积液及皮下水肿 治疗以缓解症状、改善生活质量为目的。

皮下水肿 对于淋巴管受阻引起水肿，尽可能减轻水肿、预防感染，一经诊断积极治疗、维持终生。

随访评估 针对患者营养状况、症状体征、心理因素、肿瘤负荷行系统评估。实验室参数：血常规、电解质、肝肾功能、炎症参数（IL-1、IL-6、CRP）、白蛋白、前白蛋白等，肠屏障功能，每周检测 1~2 次。人体测量参数、人体成分分析、生活质量评估、体能评估、症状体征评估、心理状态、肿瘤病灶评估。每 4~8 周评估一次。每 3 个月到医院或接受电话随访调整治疗方案。

关键字 恶性肿瘤，营养不良，营养代谢紊乱，消化道梗阻

分类：临床营养

肿瘤患者营养诊断临床技术路径

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肿瘤患者营养不良及代谢紊乱的发生率高，在肿瘤人群中及时发现营养不良及代谢紊乱的患者进而为接下来的临床干预提供依据，和对接受营养代谢治疗和/或抗肿瘤药物治疗后的疗效进行科学的评估，本临床路径推荐“肿瘤患者营养诊断”常用的筛查评估工具、方法。

肿瘤患者营养评估包括膳食调查、人体学测量、能量需求估算和营养评估量表。所有肿瘤患者均行营养筛查，住院患者营养筛查在入院后 24h 之内由营养护士（公共营养师）实施，使用营养风险筛查量表 NRS-2002。由于肿瘤患者营养筛查的假阴性发生率较高较率，接下来，所有患者入院后 48h 内由临床营养师或营养医师完成 PG-SGA 法的营养状态评估：以 PG-SGA2、3 分作为可疑营养不良患者， PG-SGA≥4 分作为诊断营养不良切点值而列为中度营养不良，PG-SGA≥9 分作为重度营养不良列入重点关注。PG-SGA 评分 1、0 者无营养不良。再行综合营养评估。在抗肿瘤药物治疗 2-3 个周期结束后行综合营养状态评估。同步行肿瘤学评估。

综合评价包括能耗水平、应激程度、炎症指标、代谢状况、以及患者进食能力、体力体能状况、心肺肝肾功能、肠屏障功能、心理状态等。方法包括病史采集、体格检查、实验室检查、器械检查等。

采集患者肿瘤直接相关的临床表现及其变化以及抗肿瘤病史。24 小时回顾法判断患者每天的能量及各营养素摄入，病史采集需重点关注营养相关病史，如体重变化，摄食量变化，消化道症状，食物过敏等，以了解患者营养不良的原因（摄入不足、吸收障碍、消耗增加等）及营养不良的类型（能量缺乏型、蛋白质缺乏型及混合型）。通过健康状况自我评分（KPS 评分），生活质量量表 QLQ C30 对患者体能及心理状况等进行评估。

测量患者的体重、身高、上臂中点周径（非利手）、上臂肌肉周径（非利手）、三头肌皮褶厚度（非利手）、双小腿最大周径进行，6 分钟步行试验进行体能测定，非利手握力进行肌力测定。血常规、肝肾功能、电解质、血糖、TNFα、IL-1、IL-6、CRP 血液炎症因子和糖皮质激素、胰岛素激素水平，肠黏膜屏障功能（血乳酸、血清二胺氧化酶、D-乳酸），前白蛋白、白蛋白、微量元素、代谢因子及产物等。

所有患者完成营养治疗及抗肿瘤药物治疗计划后，需再次行营养评估、肿瘤的影像学及肿瘤标志物评估以及各重要脏器功能评估，做好随访计划，明确返回医院复查的日期和项目。

关键字 恶性肿瘤，营养不良，营养代谢，营养评估

分类：临床营养

营养不良患者抗肿瘤药物治疗临床技术路径

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抗肿瘤药物治疗减除患者机体肿瘤负荷是营养治疗取得成功的有效保障、纠正营养不良代谢紊乱的关键环节。由于营养状况差，抗肿瘤药物治疗风险较大。基于循证医学证据实施个体化抗肿瘤药物治疗同步联合营养疗法，治疗重要脏器功能代偿的营养不良肿瘤患者。本临床路径推荐了“营养不良肿瘤患者实施抗肿瘤药物治疗”的甄选对象、药物应用方法和效果判定。

治疗方案

患者入院之始接受肿瘤诊断及营养诊断。PG-SGA 法评估患者营养状态，将肿瘤患者分为无营养不良、可疑营养不良、中度营养不良及重度营养不良四类。可疑营养不良者和中度营养不良者，即可接受抗肿瘤治疗同时联合饮食指导和营养教育或者营养疗法。对于重度营养不良患者，先接受营养疗法，3-5 天时间逐步满足肿瘤患者对热卡量和氮量需求，即行抗肿瘤药物治疗，并继续联合营养疗法。所有患者完成两个治疗周期的抗肿瘤药物治疗后，要重新系统进行营养评估、症状评估、肿瘤病灶的影像学评估和了解肿瘤标志物变化情况等。

可疑营养不良者和部分中度营养不良者的抗肿瘤药物治疗，参照临床肿瘤学权威指南执行。对于重度营养不良和部分中度营养不良患者，推荐应用细胞周期特异性细胞毒物，以时相移赖给药方式注药。可联合另一种非同一细胞周期的周期特异性细胞毒药物的联合化疗。推荐同步联合应用抗血管生成药物或其他特定驱动基因的分子靶向药物，以及免疫检查点抑制剂。以上均同步联合实施营养疗法。

据患者胃肠道功能情况，选用膳食指导或营养教育、特医食品强化、管饲补充营养和静脉营养输注。热量 20-25/Kg/天，蛋白质 1.0/Kg/天（中度营养不良者 1.5/Kg/天，重度营养不良者 2.0/Kg/天）。

纠正胃肠道功能措施包括：甲地孕酮促食欲，使用促胃肠动力药物，肠道屏障修复与维护等。采取抗呕、止吐、解痉、止痛、抗焦虑、抑郁、镇静；运动等对症处理方法。尽量经口进食或肠内（鼻胃管、鼻肠管、胃造瘘、空肠造瘘等）喂养。

疗效评价与随访

所有患者完成抗肿瘤药物治疗计划后，行营养状态评估、症状评估和肿瘤病灶的影像学评估、肿瘤标志物变化情况以及各重要脏器功能评估。做好随访计划，定期随访和做好社区营养膳食指导工作。明确返回医院复查的日期和项目，后者应包括肿瘤疾病情况和营养状况两个方面。

关键字 恶性肿瘤，营养不良，抗肿瘤药物治疗，

分类：临床营养

肿瘤代谢调节治疗临床技术路径

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代谢调节剂治疗方法就是临床应用代谢调节剂缓解患者机体营养不足代谢紊乱状态，干扰肿瘤组织能量-营养素代谢过程的治疗方法，也称肿瘤代谢调节治疗或代谢治疗。肿瘤患者多发热量-蛋白质缺乏型营养不良，在保证患者热量和营养素供给量的同时，使用代谢调节剂促机体组织合成代谢，减少机体蛋白质分解，弱化荷瘤机体炎症状态和为生长迅速的组织细胞提供营养底物的治疗，称作肿瘤代谢营养治疗。广义的肿瘤代谢调节治疗还应包括减症治疗、抗肿瘤药物治疗减少肿瘤负荷等。本临床路径就治疗目的、药物选择和疗效评价等提出系统建议。

治疗方案

代谢调理与营养支持治疗联合抗肿瘤药物治疗并行，纠正“热量-蛋白质缺乏型营养不良”肿瘤患者的营养不良代谢紊乱状态。营养支持　20-25kcal /kg /d 计算非蛋白质热卡，碳水化合物和脂肪各占非蛋白能量来源 50%（荷瘤者），蛋白质 1.5-2.0 g/kg/d，兼顾患者活动和高热等应激状态。营养干预方式依据患者进食能力呈阶梯状排列，渐次为饮食+营养教育、饮食+经口补充营养制剂、全胃肠内营养支持、部分肠内联合部分肠外营养支持、全胃肠外营养支持。

应用代谢调节剂：支链氨基酸、多不饱和脂肪酸、谷氨酰胺、核苷酸、精氨酸、烟酰胺、左卡尼丁等具有药理学作用的营养素，沙利度安等化学药物和胰岛素、甲地孕酮和糖皮质激素等生物激素。

肠道功能调节　肠道是人体能量-营养素消化吸收器官，修复和维护肠功能是代谢调节疗法的重要组成部分。积极消除原发因素，改善水电解质紊乱，促肠动力恢复，保持大便通畅。经口提供益生菌及谷氨酰胺，加强经口/肠内管饲补充营养制剂。甲地孕酮增强食欲，治疗抑郁症等。

其它调节方法　有氧运动可促肠道蠕动尽快恢复正常，减少炎性细胞因子表达，下调炎性通路和 UPP 通路，阻止蛋白质分解。改善心肺等脏器功能。改善血液循环，预防血栓形成和改善患者的不良心理状态。抑郁症的躯体症状者均有厌食症状，应用抗抑郁症、安眠、镇静药物治疗；并及时有效处理不良症状，改善不良体征。注意沟通舒缓患者情绪。

疗效评价与随访

每周检测 1 次的疗效评价指标：血常规，电解质，肝功能、肾功能，以及 IL-1、IL-6、TNF、CRP 等炎症因子、白蛋白及前白蛋白血液水平；人体成分分析、体能评估。所有肿瘤患者出院后均应该定期（至少每 3 个月一次）到医院门诊或接受电话随访。

关键字 恶性肿瘤，代谢调节，营养支持，营养不良

分类：临床营养

癌性恶液质肿瘤营养内科临床技术路径

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癌性恶液质（CACS）严重影响患者生活质量及治疗耐受性，发生于恶性肿瘤任何临床分期。CACS 可预防、可逆转。本临床技术路径包括癌性恶液质的临床处理，包括诊断、治疗、评估、随访。

临床处理原则

CACS 分为恶液质前期、恶液质期、恶液质难治期。恶液质前期患者有厌食和代谢改变，体重丢失≤5%。恶液质期患者非自主意愿 6 个月内体重丢失＞5%，或 BMI＜18.5kg/m^2，同时伴体重丢失＞2%，同时伴摄食减少和/或系统性炎症。恶液质难治期患者肿瘤持续进展，对各种治疗无反应。

采用综合性药物治疗的策略：抗肿瘤药物治疗、营养支持治疗、代谢调节治疗、修复胃肠道功能、减症治疗、有氧运动和心理治疗。恶液质前期的患者，及时有效的处理，可及时逆转；恶液质期的患者可逆转，是重点关注及干预的人群；恶液质难治期的患者难以逆转，减症、心理支持及营养支持等。

抗肿瘤药物治疗　　成功治疗 CACS 患者的根本保障。包括化疗、靶向治疗、免疫治疗、内分泌治疗。

采用单药反应佳的细胞周期特异性化疗药物，采用时相依赖注药方式，以减少单次给药剂量和增加给药频率方式注入药物，并根据瘤种、分期和病理分级来选择。一旦患者营养状态情况显著好转，调整至指南推荐标准抗肿瘤药物方案。

营养支持治疗　　贯穿治疗全过程，首选营养咨询+膳食，或强化补充特医食品，进而推荐管饲营养，或肠内联合肠外营养，甚至完全肠外营养。营养支持起步时避免再喂养综合征的发生。

代谢调节治疗　　推荐多种代谢调节剂联合使用，降低炎症因子的表达，抑制肌肉蛋白分解，维持氮平衡，增加能量摄入、减轻胰岛素抵抗、高脂血症。甲地孕酮强烈刺激食欲，并抑制炎性细胞因子活性，有效提高患者的食欲和体重。

修复胃肠道功能　　是治疗 CACS 的重要部分，贯穿全病程，包括：促食欲，促胃肠动力恢复，适量补充谷氨酰胺、益生菌、膳食纤维修复肠屏障功能，治疗恶性肠梗阻、放射性肠炎，经口进食或管饲营养，审慎、合理使用抗生素。止吐、解痉、止痛、抗焦虑。

心理疗法、运动调节　　CACS 患者易发焦虑、抑郁等心理障碍，厌食是常见躯体症状。采用支持性心理治疗、药物治疗、物理疗法、运动疗法等并举。重度心理障碍者请专业医师指导诊治。

减症治疗　　CACS 患者常伴发热、疼痛、腹泻、失眠等，增加营养消耗并影响热量摄入，有效缓解症状是逆转 CACS 不可或缺。

关键字 恶性肿瘤，癌性恶液质，抗肿瘤药物治疗，营养支持治疗，代谢调节治疗

分类：临床营养

癌性机械性肠梗阻肿瘤内科临床技术路径

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癌性肠梗阻（MBO）以重度热量-蛋白质缺乏型营养不良为主，肿瘤临床分期晚，伴中重度营养不良，甚至高龄和伴发其他基础疾病，手术治疗无法实施或疗效不佳。融合肿瘤内科、消化内科和营养科临床技术，　“癌性机械性肠梗阻（MMBO）内科临床技术路径” 推荐 MBO 诊断、抗肿瘤药物、营养代谢和减症治疗等方案及疗效评估。

目的：控制 MBO 症状，维持水电解质酸碱平衡，改善和纠正营养不良状态；维护患者肠屏障功能，控制感染，提高患者生活质量，同时尽可能的延长患者生存期。适用：肿瘤临床分期晚（腹腔、腹膜广泛转移、癌性腹腔积液）、一般状况差和营养不良的 MMBO 患者。

肿瘤学诊断　　涉及患者生命体征、肿瘤相关因素及梗阻状况、营养代谢状态乱状态三方面。据患者病史、抗肿瘤治疗史、临床表现和影像学资料做出 MMBO 诊断。

营养代谢诊断：患者膳食调查、人体学测量、能量需求估算和营养评估量，PG-SGA 营养状态评估。完成血常规、肝肾功能、血清电解质、血糖、血炎症因子水平及糖皮质激素、胰岛素激素水平检测，前白蛋白、白蛋白血液水平和血乳酸、血清二胺氧化酶、D-乳酸等肠黏膜屏障功能检测。以及人体成分分析检测和基础能量代谢检测。

综合性药物治疗：营养调理治疗、MMBO 内科处理和减症治疗、基于循证医学证据的个体化抗肿瘤药物治疗，疗效评价和随访。MMBO 内科处置：禁食及胃肠减压、纠正水、电解质和酸碱平衡的紊乱、防治感染等基础疗法；人工营养干预改善患者营养状态；消除消化道管壁组织间水肿；抑制消化道腺体分泌；积极审慎应用抗肿瘤药物治疗原发病和监控治疗相关不良反应；镇静止吐、镇痛；严密观测症状及体征的变化，及时评价疗效并实施调整方案。

抗肿瘤药物治疗　　应用抗肿瘤药物治疗是成功疏通肠道的前提。审慎平衡患者耐受性和疗效间的。对于预估治疗敏感的患者，积极审慎应用包括化疗、分子靶向药物、免疫检查点抑制剂和/或内分泌药物。

疗效评价与随访　　MMBO 相关症状、水电解质、酸碱平衡、营养状态评估、进食能力、肠屏障、肿瘤病灶的影像学评估以及各重要脏器功能评估。做好随访计划，定期随访和做好肠梗阻缓解后膳食指导工作。明确返回医院复查的日期和项目，后者应包括肿瘤疾病情况和营养状况两个方面。

关键字 癌性肠梗阻，营养不良，内科治疗，营养代谢，抗肿瘤药物治疗

分类：临床营养

肿瘤患者营养支持临床技术路径

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【目的】 采取多种人工营养方式补充热量及各种营养素的生理需求，改善营养不良肿瘤患者的营养代谢状况。【治疗方法】三级营养诊断将患者分无营养不良、可疑营养不良、中度营养不良及重度营养不良四类。再据患者经口进食和胃肠消化吸收食物能力，渐次采取如下能量营养素共给方式：首先选择营养指导（教育）下自主进食的方法，再依次选择口服或管饲输入 FSMP 和/或普通膳食、完全管饲方式输入营养液方式即 TEN、 PPN 联合 PEN、TPN。以日常膳食为主要进食方式时，以经口补充摄入 FSMP 为辅助方式，满足患者每日热量-营养素生理需求。对仅有咀嚼、吞咽、或胃排空环节轻中度障碍者，可选择 PEN；当患者咀嚼、吞咽、或胃排空等环节出现障碍，而肠道功能基本正常的前提下，所有的营养素完全由管饲方式以肠内营养制剂、FSMP、均浆膳食方式注入十二指肠。喂养途径是鼻肠管、胃造瘘或空肠造瘘的方式。输注方法有连续输注及间歇重力滴注，一次性投给方式仅作为补充。肿瘤内科临床实践中联合 PEN+PPN 方式，大多用于营养治疗初期阶段和尚存部分肠道功能者，或者在 TPN 向 TEN 过渡期间，以及尚存部分肠道功能的极重度营养不良肿瘤患者。胃肠道完全不能使用的情况下的维持患者生存的唯一热量营养素来源途径。TPN 推荐以全合一（All In One，AIO）的方式输注，模拟生理摄入方式减少代谢并发症的发生，热量和营养素足量输注的保证，提高营养素的吸收和利用率。TPN 期间需监测代谢性并发症。

TPN 时 20-25kcal /kg /d，TEN 时则 25-30kcal/kg/d，兼顾体力活动、应激状态等。荷瘤患者者热卡来源：非蛋白热卡中碳水化合物与脂肪各 50%，轻度营养不良者蛋白质需求量 1.2g/kg/d，和支链氨基酸≥0.3 g/kg/d；中度营养不良 1.5g/kg/d，支链氨基酸≥0.3 g/kg/d，必需氨基酸≥0.8 g/kg/d；重度营养不良 1.8-2 g /kg/d，支链氨基酸≥0.6 g/kg/d，必需氨基酸≥1.2 g/kg/d。注意微量营养素的补充。对于胃肠道功能尚存者，推荐乳清蛋白等蛋白质组件，注意补充益生菌、益生元和谷氨酰胺，调理胃肠道菌群平衡和修复肠道屏障。

（注：作者李世伟为肿瘤内科主治医师和临床心理医师）

关键字 三级营养诊断，营养不良，营养代谢，肠内营养，肠外营养，肠功能屏障

分类：临床营养

肿瘤营养内科临床质量管理

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【目的】 为规范肿瘤内科临床营养和抗肿瘤药物治疗等医疗服务行为，保证和提升临床医疗质量和服务技术水平，加强肿瘤内科和临床营养科两个学科的充分融合，做好肿瘤营养内科临床管理的核心和质量保证。【实施方法】以三级甲等肿瘤专科医院肿瘤内科和临床营养科的核心制度为抓手，建立健全科室管理体系，明确各类各级专业技术人员责任范围、流程及其监控体系一体化，将各种不良事件的获悉渠道多样化、及时化。同步规范开展肿瘤内科和营养代谢诊疗业务。遵循临床诊疗指南、临床技术操作规范、行业标准和临床路径等有关要求开展诊疗工作，遵守医疗质量安全核心制度。加强病历质量管理，全员参与、覆盖肿瘤营养代谢内科诊疗服务全过程的医疗质量管理与控制工作制度。【病区患者诊疗流程】 患者肿瘤诊断明确，入院后营养风险筛查然和筛查性营养状态评估，医师评估肿瘤疾病并完善三级营养诊断工作。由医师同步做出明确的肿瘤学诊断和营养代谢诊断。入院患者依据营养状况诊断决定是否营养干预或营养干预方式方法，并接受抗肿瘤药物治疗。对于重度营养不良肿瘤患者，则列为临床“重点关注对象”，在热量和氮量不足的当日，即可开始实施抗肿瘤药物治疗，只是方案是遵循循证医学证据基础上的个体化用药。待到营养状况显著改善后，再行实施指南推荐下的治疗方案。

所有住院患者同步实行肿瘤内科和营养查房制度，并依据本院的有关规定书写病历及相关医疗文书。同步实行肿瘤内科和营养完整系统的治疗医嘱制度。常态化实施针对肿瘤患者的营养知识宣教工作。遵守医院感染管理制度，加强医院感染管理。完善科室业务专业人员健康档案和卫生检查制度。完善的肠内营养配制室工作制度。

实行三级查房制，联合临床营养师或临床营养医师制订营养代谢治疗方案，并由管床医师完成患者及其亲属的病情和治疗方案的详细说明和征得患者或其家属同意。建立完善急症处理规范、管理措施和评价流程，以及疑难、重症及死亡病例讨论制度。建立完善的会诊制度、值班、交接班制度。

关键字 肿瘤内科，临床营养，质量管理，营养风险筛查，营养状态评估，三级查房

Category: Precision Nutrition

中国西北地区儿童睡眠与肠道微生物关联研究

The association of sleep pattern and gut microbiota in the children from the northwest region in China

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Introduction Sleep is increasingly gained the public attention for its potential health function. To date, the evidence had partly confirmed the association between sleep and gut microbiome, but it is unclear whether sleep pattern associates with the features of gut microbiota in Children.

Objectives This study was to examine the association of sleep pattern and gut microbiota in a group of apparently heathy children living in the northwest region in China.

Methods The hospital-based study finally included 100 eligible children. The basic information and sleep data including the bedtime and wake-up time of weekdays and weekends was together collected in detail by the designed questionnaire. The included children were classified into two groups according to the bedtime (earlier bedtime ≤22:00, later bedtime >22:00). A metagenome-wide association study was performed to examine gut microbiota in the children with earlier and later bedtime.

Results A significant difference in the richness and diversity of gut microbiota were observed in the children (ages 5.6 ± 2.2 years) with earlier and later bedtime (p=0.044). In genus level, there was significant difference in Collinsella, Akkermansia, Coprococcus and Bacteroides between the two groups; furthermore, the relative abundance of Coprococcus, and Akkermansia were obviously increased in the earlier bedtime children, while the relative abundance of Bacteroides were conversely decreased in the later bedtime children. In addition, in species level, Alistipes finegoldii and Akkermansia muciniphila were significantly enriched in the children with earlier bedtime as compared to those children with later bedtime.

Conclusion The current results of this study shows a noteworthy association between sleep pattern and gut microbiota in the northwest regional children in China. Of these, later bedtime sleep was distinctly associated with the specific commensal bacteria that might be due to the eating time or foods, which could affect the gut microbiota through modulating nutrient or neurotransmitter metabolism.

Key words Sleep pattern; Gut microbiota; Children; Metagenome-wide association study; Relative abundance

Category: Precision Nutrition

Assessment of cardiometabolic health and HRQoL in an online questionnaire: NutrIMDEA survey

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Background and objectives: Precision health evaluation concerns metabolic wellbeing as well as the examination of risk factors and lifestyle determinants including quality of life domains. This investigation focused on the comparison of diverse cardiometabolic health related scores and the interactions of lifestyle, cardiometabolic markers and health-related quality of life (HRQoL) factors in order to develop precision nutrition.

Methods and study design: Information from 17,332 participants was analyzed from the NutrIMDEA cohort. The data collection period was carried out through an online survey. The baseline questionnaire considered socio-demographic data, cardiometabolic markers, anthropometric variables and lifestyle factors. Seven cardiometabolic related scores (LS7, HLS, 20-years DRS, FBS, CLI, WAI derived, LWB-I) were computed and interpreted. Also, physical and mental domains of SF12 Health Survey (PCS12/MCS12) were assessed.

Results: Analyses concerning cardiometabolic outcomes and HRQoL measurements demonstrated age and sex interactions. Total Physical Activity and the Mediterranean Diet Score (MEDAS-14) showed cardiometabolic interactions using LS7 as the comparison score. LWB-I as standard, evidenced the greatest association with the MCS12 component. Noteworthy, LS7 showed good discrimination against PCS12, while LWB-I demonstrated an excellent capacity for MCS12 contrasts.

Conclusions: A main finding was the interaction between MEDAS-14 and PA on the LS7 scale as well as the major effects of lifestyle factors on HRQoL (MCS12/PCS12) among scores, which need to be described with precision when implementing cardiometabolic screenings with health purposes.

Key words public health, precision nutrition, health-related quality of life, physical health, mental health

Category: Precision Nutrition

Exercise-induced Bioactive Peptide Irisin for Health Promotion

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Objective: As we all know, Exercise is Medicine. Exercise is a publicly recognized and effective interventional strategy for health promotion or the rehabilitation of chronic diseases, which may be highly due to the generation and secretion of exercise-induced myokine irisin. However, the potential targeted molecular mechanisms for the prevention and treatment of chronic diseases upon exercise interventions urgently need to be systematically explored and elucidated.

Methods: The mouse models with common and high-incidence chronic diseases including metabolic diseases such as obesity, type II diabetes mellitus (T2DM) and non-alcoholic fatty liver disease (NAFLD), neurological diseases such as brain aging and AD, and musculoskeletal diseases such as sarcopenia and osteoporosis were established. These model mice were subjected to exercise and exogenous recombinant irisin interventions for confirming its functions and underlying mechanisms through behavioral examination, pathological tissue staining, TSM, Western blot, RT-PCR, and transcriptomic analysis. Meanwhile, the model mice with specific overexpression or knockout of irisin precursor, FNDC5, were also used for exploring targeted signal pathways and molecules as well as cross-talk communication from the perspectives of function-of-gain and function-of-loss.

Results: Exercise and exogenous recombinant irisin interventions could result in effective alleviation or treatment of above-mentioned chronic diseases through regulating energy metabolism, maintaining cellular homeostasis, rescuing the impaired functional status of autophagy, and enhancing mitochondrial quality control, as well as promoting cell communication among tissues and organs upon exercise-induced irisin. Exogenous recombinant irisin intervention revealed the similar efficacy with exercise interventions.

Conclusion: Exercise-induced irisin is beneficial to the prevention and rehabilitation of chronic diseases and health promotion. Meanwhile, irisin as the precision target is also good candidate for the monitoring and diagnosis of these chronic diseases. Moreover, elucidating and clarifying precision targeted molecules for chronic diseases could provide promising thoughts for the development of novel and effective drugs, functional foods, and exercise mimetics.

Key words Bioactive peptide; Irisin; Chronic disease; Functional food; Exercise mimetics

Category: Precision Nutrition

基于梯度提升回归树与人工蜂群算法的“糖 - 蛋白质”补剂推荐方法

Personalized Recommendation Method of "Carbohydrate-Protein" Supplement Based on Gradient Boosting Regression Tree and Artificial Bee Colony Algorithm

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Consumption of carbohydrate-protein supplements (CPS) is a classic method used by endurance athletes to improve sports performance, increase glycogen replenishment and positive nitrogen balance, and reduce muscle damage. Existing studies provide CPS consumption recommendations based only on a person's weight. It is important to note that various variables might impact individual nutritional demands, and one-sided index selection cannot accommodate the human body's diversity. The goal of this work was to develop a tailored CPS intake method for endurance athletes based on individual multiple characteristics, gradient boosting regression tree (GBRT), and artificial bee colony (ABC) algorithm. In this study, 171 endurance sports enthusiasts were recruited, and a 1-hour rowing race was used as the exercise protocol; 46 indicators of participants were collected; We investigated previous researchers' CPS supplementation method, which was to limit the rate of carbohydrate consumption between 0.5 and 1.2g/kg/h while maintaining a carbohydrate to protein ratio of 4:1; GBRT was used to construct endurance sports performance regression models; After the model was fitted, we selected 23 indicators from the original 45 based on the mean decrease in impurity (MDI) and modeled them again using GBRT, and found that the model’s performance was improved; Finally, we use the ABC algorithm, combined with the effective CPS strategies derived by previous researchers and the fitted GBRT, to provide a personalized CPS intake protocol. This study’s results indicate that it is feasible to use GBRT and ABC to make personalized CPS intake recommendations. Our next studies would focus on increasing the volume of the dataset to iterate, update, and enhance the robustness of the model.

Key words sports nutrition, carbohydrate-protein supplement, artificial intelligence, machine learning, sports performance

分类：精准营养

中国南北方儿童叶酸代谢相关的基因多态性特征分析

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目的　研究中国南北方儿童5，10-亚甲基四氢叶酸还原酶（MTHFR）基因rs1801133位点、甲硫氨酸合成酶还原酶(MTRR)　基因rs1801394位点和甲硫氨酸合成酶（MTR）基因rs1805087位点多态性分布的特征。

方法　通过早期儿童营养包干预长期营养健康作用评估项目分别收集贵州省与河南省的儿童血液样本共计1104例（福泉市297例，贵定县293例，汝阳县251例，嵩县263例），提取所有样本DNA，采用竞争性等位基因特异性聚合酶链式反应（Kompetitive allele specific PCR，KASP）方法对所有样本MTHFR基因rs1801133位点、MTRR基因rs1801394位点和MTR基因rs1805087位点的多态性进行检测，统计分析三个位点的基因型分布，通过 χ2检验比较各地区多态性分布特征的差异，认为双侧P值小于0.05具有统计学显著性。

结果　检出MTHFR基因rs1801133位点分布特征为：在成功分型的1092例样本中，CC野生型占31.5%，CT杂合突变型占44.8%，TT纯合突变型占23.6%，三种基因型的占比约为3:5:2。其中，福泉的分布特征为CC野生型占44.4%　，CT　杂合突变型占43.1%，TT纯合突变型占　12.5%；贵定的分布特征为CC野生型占47%　，CT　杂合突变型占44.5%，TT纯合突变型占　8.5%；汝阳的分布特征为CC野生型占15.2%　，CT　杂合突变型占46.4%，TT纯合突变型占38.4%　；嵩县的分布特征为CC野生型占　15.7%，CT　杂合突变型占45.8%，TT纯合突变型占38.6%　。检出MTRR基因rs1801394位点分布特征为：在成功分型的1092例样本中，AA野生型占56.3%，AG杂合突变型占37.9%，GG纯合突变型占5.7%，三种基因型的占比约为6:3:1。其中，福泉的分布特征为AA野生型占56.9%　，AG杂合突变型占36%　，GG纯合突变型占7.1%　；贵定的分布特征为AA野生型占57.6%，AG杂合突变型占37.1%，GG纯合突变型占5.3%；汝阳的分布特征为AA野生型占56.4%，AG杂合突变型占40%，GG纯合突变型占3.6%；嵩县的分布特征为AA野生型占54.2%，AG杂合突变型占38.9%，GG纯合突变型占6.9%。检出MTR基因rs1805087位点分布特征为：在成功分型的1093例样本中，AA野生型占81%，AG杂合突变型占17.6%，GG纯合突变型占1.2%，GG基因型占比很小，AA和AG基因型的占比约为8:2。其中，福泉的分布特征为AA野生型占77.8%　，AG杂合突变型占19.9%　，GG纯合突变型占2.4%；贵定的分布特征为AA野生型占80.6%，AG杂合突变型占18.7%，GG纯合突变型占0.7%；汝阳的分布特征为AA野生型占82.1%，AG杂合突变型占16.3%，GG纯合突变型占1.6%；嵩县的分布特征为AA野生型占84.4%，AG杂合突变型占15.3%，GG纯合突变型占0.4%。比较福泉市和贵定县三个位点的多态性分布特征，均未观察到统计学显著性（MTHFR基因rs1801133位点：χ2　=2.4535，P=0.2932；MTRR基因rs1801394位点：χ2　=0.7898，P=0.6737；MTR基因rs1805087位点：χ2　=2.7825，P=0.2488）。比较汝阳县和嵩县三个位点的多态性分布特征，均未观察到统计学显著性（MTHFR基因rs1801133位点：χ2　=0.0274，P=0.9864；MTRR基因rs1801394位点：χ2　=2.7436，P=0.2537；MTR基因rs1805087位点：χ2　=2.1044，P=0.3492）。比较贵州和河南三个位点的多态性分布特征，MTHFR基因rs1801133位点的多态性分布具有统计学显著性（χ2　=169.3431，P<0.0001），其他两个位点的多态性分布特征均未观察到统计学显著性（MTRR 基因 rs1801394 位点：χ2　=1.2016，P=0.5484；MTR基因rs1805087位点：χ2　=3.1828，P=0.2036）。

结论　MTHFR基因rs1801133位点在南北方儿童中的多态性分布有差异，河南省儿童的TT纯合突变型占比更高；MTRR基因rs1801394位点和MTR基因rs1805087位点在南北方儿童中的多态性分布没有差异。结果提示，检测MTHFR基因rs1801133位点的多态性，可为个性化指导儿童增补叶酸提供科学依据，从而有效预防叶酸缺乏导致的巨幼红细胞性贫血和神经精神性疾病。

关键字 儿童；叶酸；基因多态性

分类：精准营养

藤茶提取物颗粒剂的制备工艺的研究

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藤茶提取物颗粒剂的制备工艺的研究
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二氢杨梅素（DMY）主要存在于藤茶中，藤茶提取物是以优质的藤茶（显齿蛇葡萄叶，葡萄科蛇葡萄属显齿蛇葡萄 Ampelopsis grossedentata 的叶）为原料，通过纯水浸提、离心、膜分离、浓缩、杀菌、干燥等工艺生产出来的粉末状产品。该产品中二氢杨梅素含量能达到 40%以上。

DMY 的主要活性成分为一种特殊类型的黄酮类化合物，除具有清除自由基、抗氧化、抗血栓、抗肿瘤、消炎等普通黄酮类化合物的多种奇特功效，还具有解除醇中毒、预防酒精肝、脂肪肝、抑制肝细胞恶化、降低肝癌的发病率等作用，是保肝护肝，解酒醒酒的良品。但是由于 DMY 代谢迅速，在体内半衰期短，所以其在体内生物利用率不高，为了解决这一问题，本文以藤茶提取物为主料，添加不同辅料，以不同比例乙醇做为润湿剂，采用湿法制粒技术，制备藤茶提取物颗粒，延缓其在胃内的分解速率，提高其生物利用率。对藤茶提取物颗粒的配方进行筛选，对其制备工艺进行优化，通过对成品的堆积密度、振实密度、休止角、通过率、可压性、片剂的硬度、片剂的脆碎度及崩解进行验证比对，最终得出：产品制备过程中，最佳产品配比为：以乳糖为辅料，辅料与藤茶提取物的质量比为 2:8；最佳制粒工艺为：使用 50%乙醇做润湿剂，添加量占总质量的 10%，烘干温度为 55-65℃，烘干时间为 4h。在该配比及工艺下生产出的产品的颗粒度符合药典要求，使用该颗粒进行压片后，片剂的硬度、脆碎度及崩解时限指标均能符合药典要求，且成品得率达到 90%。由此可知，使用该工艺能制备出合格的藤茶提取物颗粒，且该颗粒能直压成片剂。经胃液模拟崩解试验验证，颗粒产品制成的片剂产品的崩解速率＜颗粒产品的崩解速率＜粉末的崩解速率，证明该工艺条件下制备的藤茶提取物颗粒，可以延长 DMY 在体内的存留时间，进而提高其生物利用率。

综上所述，使用制剂化技术对藤茶提取物原料进行改良，不仅能够满足市场上商用 DMY 制剂原料稀缺的现象，经过颗粒加工后产品，流散性好，在保健食品应用时压片比较方便快捷，可压性好，且能延长 DMY 在体内的存留时间，进而提高其生物利用率，在国际上可以解决卡脖子问题，让国产制剂核心技术更加充分发挥其竞争力，同时能够进一步降低国产藤茶提取物原料的生产应用成本。

关键字 藤茶提取物 颗粒 片剂 生物利用

分类：精准营养

个性化叶酸补充预防神经管缺陷研究进展

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神经管缺陷（NTDs）是全球关注的重要公共卫生问题之一。育龄期妇女适时足量补充叶酸可有效降低 NTDs 的发病率。近年来我国生育政策发生变化，高龄产妇数量增多，增加了出生缺陷发生及死亡的风险，迫切需要制定更为有效的应对策略，进一步提高 NTDs 的一级预防水平。

1、 NTDs 人群流行状况：全世界每年有约 30 万 NTDs 患儿出生，其广泛分布于全球范围，但是 NTDs 的发生有显著的地域和人群特点。北美和欧洲的发病率明显低于西太平洋和东地中海地区，经济收入较高地区的发病率显著低于低收入地区。我国也是 NTDs 高发的国家之一，整体呈现北方高于南方，农村高于城镇的特点。2008 年我国开始全面推广围孕期妇女免费补充叶酸计划，监测数据显示自 2000 年以来 NTDs 发病率已由 1.19‰持续下降到 2011 年的 0.45‰，下降幅度超过 60%，证明我国 NTDs 的一级预防措施效果显著。

2、 叶酸补充与预防 NTDs：大量人群流行病学调查及干预研究已经证实，叶酸缺乏与 NTDs 发生密切相关，孕母体内叶酸水平是影响后代 NTDs 发病率的重要因素。对育龄期妇女的大规模研究表明，绝大多数地区育龄期妇女无法达到足够的叶酸水平来预防 NTDs 的发生，尤其需要关注发展中国家叶酸缺乏状况。尽管有各种食物强化叶酸、膳食补充叶酸等措施和建议，但叶酸补充剂仍然发挥着重要作用。有报道称在叶酸水平相对低的人群中，围孕期补充 400μg 叶酸能够使 NTDs 发生风险减少 85%。

3、 叶酸代谢风险水平评估与个性化补充： NTDs 发病机制复杂，神经管的发育分化受基因的严格调控。参与叶酸代谢途径的基因也成为研究其发生机制的热点。叶酸代谢通路关键酶的基因突变对叶酸的吸收和代谢的影响已经明确，如亚甲基四氢叶酸还原酶(MTHFR)和甲硫氨酸合成酶还原酶(MTRR)等基因位点多态性与发生 NTDs 的风险密切相关。多项研究证实根据 MTHFR C667T 及 A1298C、MTRR A66G 位点基因多态性，评估叶酸代谢能力风险等级，给予孕妇个性化叶酸补充指导，可以更有效预防母亲不良妊娠结局和新生儿缺陷发生。红细胞或血清叶酸浓度作为评估体内叶酸摄入的生物标志物。世界卫生组织建议育龄期妇女的红细胞叶酸浓度大于 906 nmol/L，以最大限度地降低 NTDs，但是没有明确的血清叶酸浓度阈值确定叶酸缺乏。一项研究结果显示红细胞叶酸浓度为 1180 nmol/L(95%CI：1050-1340 nmol/L)时，NTDs 的风险显著降低，MTHFR 基因型也是影响红细胞叶酸浓度的重要因素之一。

4、结论：在新的生育政策形势下，针对个体 NTDs 危险因素，探索叶酸补充个性化方案，可进一步提高 NTDs 的一级防控水平，同时增加可靠的生物标志物将有助于在前瞻性和回顾性研究中准确量化叶酸的摄入量，可有效评估干预效果。

关键字 基因型风险水平 个性化叶酸补充 预防 神经管缺陷

分类：精准营养

微量营养素与衰弱的孟德尔随机化研究

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目的：衰弱是与年龄相关的一种综合征，表现为生理储备和功能下降，应对突然的打击处理能力下降，容易发生各种不良事件，甚至死亡其发病机制不明确。微量营养素如维生素和微量元素,对人类健康和发展至关重要。人体需要特定的微量营养素才能发挥正常的生理功能，长期缺乏或含量异常变化会导致生理功能紊乱，引发多种疾病。有观察性研究发现微量营养素与衰弱的相关性，但不能说明两者之间的因果关系。故本研究采用两样本孟德尔随机化研究方法探讨八种微量营养素，即维生素，包括维生素 B6、叶酸、维生素 B12、维生素 C、维生素 D 和维生素 E，及矿物质锌和硒与衰弱之间的因果关系。

方法：研究数据来自 IEU OpenGWAS 数据库，微量营养素为暴露，其中维生素 B6、叶酸、维生素 B12、维生素 C 和维生素 E 数据包含 64，979 例样本，维生素 D 数据选用血清 25-羟基维生素 D，其包含 443，734 例样本，锌数据包含 2603 例样本，硒数据包含 2874 例样本；作为结局的衰弱指数数据包含 175，226 例样本。在全基因组水平上选择了与微量营养素和衰弱显著相关的 SNPs(将维生素 D、E、C 和 B12 的 P 值设置为 P<5×10-6，其余的设置为 P<5×10-8，r2<0.001，遗传距离=10000 kb)，并为保证遗传变异与潜在的混杂因素无关，进行水平多效性检验。通过以上分析本研究确定了与 8 种循环营养素有关的 241 个 SNP 作为工具变量。为评估所选择的工具变量是否存在弱工具变量偏移，本研究对 F 统计量进行计算，其结果表明无弱工具变量。所有的孟德尔随机化分析均使用 R 软件中的“TwoSample MR”包进行。对于统计学假设检验来说，对 p 值进行 Bonferroni 校正，经计算得校正后的 p 值为 0.00625（0.05/8，8 为检验次数）。本研究认为，p<0.00625 是存在因果关系的证据，而 0.00625＜p＜0.05 是存在因果关系的提示证据。采用 MR-Egger、加权中位数（Weighted median）、逆方差加权（IVW）、简单模式（Simple mode）和加权模式（Weighted mode）五种 MR 分析方法，以探究 8 种微量营养素和衰弱的因果关系，其中以逆方差加权(IVW)法作为主要的 MR 分析方法。并运用 Cochran’s Q 统计量检验进行异质性检验，Mr-PRESSO、Mr-Egger 截距和留一法进行敏感性分析以保证结果的稳定性和可靠性。

结果：本研究发现，经过 Bonferroni 校正后维生素 D 水平与衰弱风险呈负相关，即血清维生素 D 水平每升高 1ng/mL，衰弱发生风险降低 11.7%(IVW：OR = 0.883；95% CI，0.826-0.943；P < 0.001)。目前，现有数据并不支持其他五种维生素，即维生素 B6、叶酸、维生素 B12、维生素 C 和维生素 E 与衰弱发生风险之间的因果关系(IVW：OR = 1.104，95% CI：0.893-1.364，P> 0.05；OR = 0.930，95% CI：0.750-1.153，P> 0.05；OR = 0.963，95% CI：0.887-1.046，P> 0.05；OR = 0.914，95% CI：0.830-1.008，P> 0.05；OR =0.969，95% CI：0.875-1.073，P> 0.05；)。在矿物质方面，硒、锌和衰弱发生风险均未发现存在因果关联的证据(IVW：OR = 0.987，95% CI：0.961-1.015，P> 0.05；OR = 1.008，95% CI：0.971-1.046，P> 0.05；)。

结论：本研究表明遗传预测的血清 25-羟基维生素 D 水平与衰弱的发病风险降低存在因果关联。其说明可以利用微量营养素预防衰弱，但需要对其机制进行进一步研究。

关键字 微量营养素；血清 25-羟基维生素 D；衰弱；两样本孟德尔随机化

分类：精准营养

维生素 D 与肌少症相关指征的孟德尔随机化研究

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目的：维生素 D 参与控制和调节人体多个系统的生理和功能，可导致骨骼肌质量、力量和功能的丧失，最终发展为肌少症。基于目前有限的研究结果，维生素 D 与肌少症的发生发展之间存在关联，但无法确定明确的因果关系。因此，本研究采用孟德尔随机化(MR)方法，探讨维生素 D 与肌少症相关指征之间的因果关系。

方法：本研究采用双样本 MR 和多变量 MR 方法。在本研究的第一阶段，使用双样本 MR 方法，探究维生素 D 相关指标作为暴露和肌少症相关指征的因果关系。在第二阶段中，考虑到暴露因素之间可能存在的关联性，采用多变量 MR 方法，探讨相关暴露共同与肌少症相关指征的因果关系。本研究数据来自 IEU OpenGWAS 数据库，维生素 D 相关指标作为暴露数据，包括 25 羟维生素 D 水平（n=443,734）、维生素 D 结合蛋白（n=3,301）、维生素 D 缺乏症（n=209,607）和维生素 D 补充剂（n=335,591）；肌少症相关指征作为结局数据选用来自 UK Biobank 握力(n = 256,523)、骨骼肌质量(ALM, n = 450,243)和步行速度(n = 459,915)的 GWAS 汇总数据。数据分析中首先在全基因组水平上筛选与维生素 D 相关指标显著相关的 SNPs($P<5\times10^{-6/8}$，$r^2<0.001$，遗传距离=10000 KB)作为工具变量，并对其进行水平多效性检验，确保遗传变异与潜在的混杂因素无关。随后在结局数据中筛选与工具变量相关的 SNP 并进行整合生成分析数据。为评估所选择的工具变量是否存在弱工具变量偏移，本研究对 F 统计量进行计算，其结果表明无弱工具变量。本研究共使用 MR-Egger、Weighted median、IVW、Simple mode 和 Weighted mode 五种 MR 分析方法。其中逆方差加权（IVW）法作为主要结果，同时采用 Cochrans Q 检验评估工具变量的潜在异质性，如不存在异质性，则需使用固定效应模型代替 IVW 方法。为了进一步保证 MR 因果影响估计的可靠性，本研究运用 MR-PRESSO、MR-Egger 截距和留一法进行敏感性分析以保证 MR 假设。

结果：针对统计学假设检验的需求，对 p 值进行 Bonferroni 校正，经计算得校正后的 p 值为 0.00417（P/检验次数），即 p<0.00417 提示存在因果关系，而 0.00417＜P＜0.05 提示存在潜在的因果关系。在第一阶段的双样本 MR 中，经过 Bonferroni 校正后，25 羟维生素 D 水平与步速存在因果关系（IVW：P＜0.001，β= 0.0429，95% CI：0.0200-0.0657）维生素 D 水平与 ALM 存在潜在的因果关系（IVW：P=0.011，β= 0.0622，95% CI：0.0143-0.1101）。即 25 羟维生素 D 水平与步速和 ALM 存在正相关的因果关联。但现有数据并不支持其他暴露与结局之间存在因果关系。第二阶段的多变量 MR 的结果中显示，在考虑维生素 D 结合蛋白的作用影响下，25 羟维生素 D 水平和步速仍存在因果关系（P=0.004，β= 0.0387，95% CI：0.0123-0.0652）。

结论：本研究表明，遗传预测的 25 羟维生素 D 水平与步速和 ALM 存在正相关的因果关联，在考虑维生素 D 结合蛋白的作用影响下，25 羟维生素 D 水平和步速的因果关系仍然存在。

关键字 维生素 D； 肌肉减少症； 孟德尔随机化

分类：精准营养

关于精准营养研究中运用的方法与技术系统综述

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目的：系统了解精准营养研究中运用的方法与技术，为精准营养在公共卫生与营养学研究中的发展提供依据。

方法：检索 2012-2022 年中国知网、万方、Pubmed、Sciencedirect 等专业文献数据库和其他资源的文献，其中以“精准营养”为中文检索词检索到中文文献 162 篇，以“precision nutrition, personalized nutrition, personalised nutrition”为英文检索词检索到英文文献 1029 篇。按照文献纳入标准：（1）研究论文或系统综述（2）公开发表的中英文全文文献搜索或有英文摘要的研究；（3）研究对象为人；（4）与精准营养的方法和技术关的研究文献，和排除标准：（1）重复文献；（2）农业研究中精准营养相关文献；（3）临床疾病研究；（4）动物实验 ；（5）其他明显与本次研究主题无关，研究类型模糊或研究方案表述不清的文献。将文献检索结果分三类汇总分析：（1）精准营养与传统营养研究的关系；（2）多组学技术运用于精准营养的研究；（3）其他精准营养新技术和新理念。

结果：24 篇文献纳入本次系统综述评价，研究首先发现精准营养研究指标在传统营养研究基础上拓宽，关注遗传背景及其表观修饰、肠道微生物、环境暴露等多个方面的个体化差异，获取人口统计学信息（年龄、性别、生命阶段）、表型（人体测量学、标准临床生物标志物、营养状况生物标志物、文化、膳食摄入评估、膳食追踪、体力活动等）、基因组（基因检测、组学分析）、生活方式等信息。其次，独立或联合运用多组学技术（基因组学、表观基因组学、转录组学、蛋白组学、代谢组学、食物组学、微生物宏基因组学），采用高通量分析方法获得基于证据的精准营养标志物（遗传生物标记、表观遗传标记、转录组标记、非编码 RNA 标记、蛋白质标记、代谢组和脂质组标记、肠道微生物标记）：其中研究较多的营养基因组研究了个体之间的遗传变异对营养需求、健康状况、以及患营养相关慢性疾病的风险，运用遗传风险评分（genetic risk score， GRS）或 PGS(多基因评分)应用于预测携带多个风险基因的个体在不同饮食干预下具有巨大潜力和潜在应用价值；营养代谢组学主要包括客观膳食评估、代谢谱和疾病风险预测，与肠道微生物多样性、遗传相互作用和饮食敏感性的关系；微生物组学可预测膳食对机体反应，主要是针对西方肥胖或超重人群，采取纤维摄入和能量限制的膳干预措施，观察微生物基因丰富度/多样性，肠型（细菌比例）及指示菌变化。最后进一步推进信息学与数据科学整合，重视人为数据分析，结合机器学习，整合多尺度的数据，扩大证据基础，鼓励开发精准营养研究的新工具，推进即时检测工具用于精准营养评估。

结论：精准营养的研究方法是基于传统营养评价干预技术的基础上，独立或联合运用多组学分析技术、互联网及算法技术、可穿戴设备和大数据技术、环境暴露技术，获得基于个体的营养健康数据，对个体或群体营养和健康作出精准评估，并针对性开展差异化的营养技术进行临床患者的营养支持、特殊营养不良人群的营养干预以及需要营养改善人群的健康促进。

关键字 精准营养、基因组学、代谢组学、肠道微生物组学、机器学习

分类：精准营养

基因多态性对叶酸干预心脑血管疾病的系统综述

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心脑血管疾病（Cardio-cerebro vascular disease, CVD）是临床上常见的慢性病，也是我国人群死亡的主要原因，其发病率日益增加且呈现出年轻化的发病趋势。2018 年我国的 CVD 报告结果显示，我国有高达 2.9 亿的 CVD 患病人口，并且 CVD 死亡率位居首位[1]。国内外大量流行病学研究表明，同型半胱氨酸(homocysteine, Hcy)与高血压、冠心病、脑卒中等心脑血管疾病密切相关，高 Hcy 血症（HHcy）是心脑血管疾病的独立危险因素[2-4]。叶酸在同型半胱氨酸代谢中具有重要的作用，Hcy 可在蛋氨酸合成酶的作用下，与 5-甲基四氢叶酸提供的甲基发生甲基化后，又重新合成蛋氨酸。叶酸与蛋氨酸代谢途径一旦发生障碍，可导致高 Hcy 血症的发生[5]。因此，叶酸可通过降低同型半胱氨酸有效降低心脑血管疾病的风险，叶酸在辅助治疗和预防心脑血管疾病方面也引起国内外学者的广泛关注。

近年来研究显示叶酸代谢酶的基因多态性通过影响体内叶酸水平和循环代偿，直接或间接参与心脑血管疾病的发生和发展。本文采用循证医学方法，对叶酸干预心脑血管疾病相关的基因多态性研究进行了系统梳理和分析。本研究共检索到 3632 篇文献（英文 1470 篇，中文 2162 篇），删除重复文献和不相关文献后纳入 33 篇，在文章的参考文献中发现新的文献 5 篇，最终共有 38 篇文献纳入本综述，全部为叶酸干预对心脑血管疾病影响的试验研究。受试人群主要以中国人群为主，也有波兰、德国、美国等欧美人群。干预时间从 2 周到 4.5 年不等。涉及包括 MTHFR、MTR、CBS、NOX4、DPEP1 共 5 个基因的约 7 个 SNP 位点，其中大部分文献是根据 MTHFRC677T 不同基因型进行叶酸干预试验，叶酸干预的效果也最为显著。亚甲基四氢叶酸还原酶（methylenetetrahydrofolate reductase，MTHFR）是一种参与叶酸代谢的关键酶，MTHFR 可以催化 5，10-亚甲基四氢叶酸转化为 5-甲基四氢叶酸，该转化过程也为 Hcy 的甲基化提供甲基，从而可以快速调节血浆 Hcy 浓度。常见的 MTHFR 基因 677C→T 多态性与酶活性降低相关，CT 降低 30%，TT 降低 70%，导致叶酸减少和 Hcy 水平升高。研究结果显示，叶酸干预心脑血管疾病需要考虑 MTHFR C677T 基因多态性所带来的影响，TT 型受试者中 MTHFR 酶活性降低，他们可能需要更高的叶酸来调节同型半胱氨酸，特别是当 TT 型受试者中叶酸水平也较低时，低剂量或短时间叶酸补充可能不足以克服高同型半胱氨酸水平 TT 参与者的低叶酸状态和酶功能障碍并存的问题。因此，对于具有心脑血管疾病基础的 TT 基因型受试者，可根据个体情况酌情增加补充剂量，来克服生物学上的不足，以进一步降低心脑血管疾病发病的风险。

关键字 基因多态性，叶酸干预，同型半胱氨酸，心脑血管疾病

分类：精准营养

番茄红素对非酒精性脂肪肝小鼠肝脏脂质组学的研究

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非酒精性脂肪肝（Non-alcoholic fatty liver disease，NAFLD）的发病率逐年升高，且是引起非肝硬化性肝细胞癌的最常见的原因。NAFLD给全社会造成严重的疾病负担，亟需探寻NAFLD的有效预防策略和治疗措施。番茄红素是一种类胡萝卜素，其对NAFLD的发生发展也有一定的延缓作用，研究表明番茄红素能够显著降低高脂饮食诱导的非酒精性脂肪肝炎及肝细胞癌的发病率，番茄红素能显著调节脂质代谢，发挥预防和治疗NAFLD的作用，然而系统探究番茄红素对NAFLD小鼠的肝脏脂质组分的变化，进而揭示番茄红素可能发挥的脂质调节的作用机制还不明确。因此，本文拟探究不同剂量番茄红素干预对高脂诱导的NAFLD小鼠的肝脏脂质组学作用。本研究纳入85只C57BL/6J小鼠，适应性喂养一周后，随机挑选15只作为对照组（CON组），继续给予维持饲料，其余小鼠为高脂造模组，给予D12492高脂饲料饲养，12周后在对照组和高职模型组中分别随机选择5只小鼠，麻醉后解剖，观察NAFLD模型建立的情况。随后将高脂造模小鼠随机分为4组，模型对照组（MON组）、番茄红素低剂量组（50mg/kg·d ，LYC-L组）、番茄红素中剂量组（100mg/kg·d ，LYC-M组）和番茄红素高剂量组（200mg/kg·d ，LYC-H组），每组15只，给予番茄红素灌胃干预12周。脂质组学分析结果显示，5组肝脏样本共检测到551种代谢物，主要包含甘油脂类（Glycerolipids, GL）、甘油磷脂类（Glycerophosphatide, GP）和鞘脂类（Sphingolipids, SP）。主成分分析显示，CON组与MON组肝脏样本在得分散点图中区分明显，说明两组间脂质构成差异明显，模型构建成功。构建各组与MON组比较的OPLS-DA模型，各模型真实稳健，不存在过拟合现象，OPLS-DA得分图显示各组与MON组的分区显著，均位于不同的象限。对差异脂质进行筛选和层次聚类分析，发现差异脂质主要集中在甘油脂类、甘油磷脂类和鞘脂类，CON组与MON组之间差异脂质数量最多，主要表现为MON组37种TG水平上调，48种磷脂酰胆碱（Phosphatidylcholine，PC）水平下调和 18 种磷脂酰乙醇胺（Phosphatidyl ethanolamine，PE）水平下调。随着番茄红素干预剂量的增加，各组与MON组组间差异脂质种类数量增加。对差异脂质进行比较发现，鞘脂类中（神经酰胺非羟基脂肪酸-鞘氨醇、己糖基神经酰胺非羟基脂肪酸-鞘氨醇和鞘磷脂是鞘脂的主要亚类），与MON组比较，LYC-M、LYC-H组SM（d14:0/24:2） 、HexCer/NS（d16:1/35:0）水平显著降低，LYC-H组Cer/NS（d18:2/20:0）水平显著降低，各干预组中HexCer/NS（d18:1/31:0）水平均显著下调（P＜0.05）。在甘油磷脂中，番茄红素干预对PE（13:0/22:3）、PC（17:1/17:1）、 PC（6:0/27:0）和 PC（16:2e/24:4）的水平具有上调趋势。在甘油脂中比较了甘油二酯（Diacylglycerol，DG）水平，与MON组相比，LYC-H组DG（18:2/20:3）和DG（20:3/20:4）水平显著下降，LYC-M组和LYC-H组DG（20:3/22:6）和 DG（22:4/22:6）水平显著下降（P＜0.05）。KEGG代谢通路富集分析发现CON组与MON组有差异的改变的代谢通路主要包括为甘油磷脂代谢、胆碱代谢和逆行性内源性大麻素信号通路，番茄红素干预能够调节NAFLD小鼠胆固醇代谢、脂肪的消化吸收、脂肪细胞的脂解作用、脂质和动脉粥样硬化等代谢通路。基金来源：江苏省科学基金青年项目（NO：BK20200366）。

关键字 番茄红素；非酒精性脂肪肝；脂质组学

分类：精准营养

肠道微生物预测肥胖干预效果的研究进展

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目的 通过对肠道微生物与肥胖干预效果进行荟萃分析，旨在探讨在膳食干预的肥胖人群中，肠道微生物群的基线组成对宿主和微生群的反应，以期对肠道微生物群在精准营养中的靶点作用提供科学依据。方法 以中英文为“肥胖”、“超重”、“减肥”、“肠道菌群”、“干预”、“随机对照”、“膳食建议”、“obesity” 、“overweight”、“weight loss” and “gut microbiota” and “dietary intervention”为关键词或主题词在中国知网，万方数据库以及Pubmed，Sciencedirect，Web of science 等数据库检索自 2010 年以来至 2022 年 6 月 1 日的国内外肠道菌群预测膳食干预对肥胖管理作用的文献。通过对标题或标题和摘要，选择对人群进行的观察性和临床试验，以及系统回顾进行文献筛选。纳入标准：(1)公开发表的中英文实验研究或综述文献；(2)超重肥胖与肠道微生物之间人群干预的文献；(4) 肠道微生物预测不同膳食/营养素对肥胖机个体代谢影响的人群研究文献。排除标准：(1)肠道微生物与肥胖研究载体为动物；(2)肠道微生物与肥胖相关性的横断面调查文献；（3）药物和手术相关肥胖干预试验；（4）肠道微生物对疾病、2 型糖尿病等影响。结果 本研究共检索到 2676 篇文献，其中英文 2667 篇，中文 9 篇，删除重复文献后纳入 2532 篇，根据标题和摘要选择了 104 篇进行深入阅读，最后纳入 27 项研究。研究包括系统综述 9 篇和肥胖干预试验研究 18 篇，试验研究包括一个基线或干预前的微生物群样本，用于分类或预测对饮食的反应。干预措施主要涉及膳食纤维摄入、能量限制、运动干预及生活方式干预等不同种类，受试人群以丹麦、法国、英国等欧美人群为主，干预时间从 6 周到 3 年不等。肠道微生物群在预测饮食对超重肥胖个体干预效果的作用，主要涉及微生物基因丰富度/多样性，肠型（细菌比例）及指示菌（细菌类群）三种方式。 结论 ①成年肥胖人群肠道微生物种类多、基因计数较高（>480000），高纤维和限能量膳食干预后，肠道菌群组成稳定，肠道益生菌丰度增高，有助于胰岛素抵抗、血脂异常和慢性炎症缓解；②肠道菌群中普雷沃氏菌/拟杆菌（P/B）较高的成年肥胖个体，高纤维和限能量膳食干预后，减重效果显著，1 年内体重保持稳定；③嗜粘蛋白阿克曼菌(Akkermansia muciniphila) 等特定细属的丰度可以作为血糖、血脂、体脂等健康状况的预测指示菌。肠道微生物群作为治疗肥胖的技术手段具有广阔的应用前景，但这一领域的研究仍然具有挑战性，需要更大规模的人群研究，直到个性化营养切实实现并可转化为临床实践。

关键字 肠道微生物 精准营养 肥胖　干预

分类：精准营养

餐后血糖反应精准预测的前沿研究进展

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餐后高血糖反应（Postprandial glucose response，PPGR）是糖尿病前期、二型糖尿病的主要危险因素，并且与肥胖、高血压和高血脂等代谢综合征相关疾病密切相关。维持正常的血糖水平对于控制代谢综合征相关疾病的的发生发展至关重要。传统的 PPGR 控制措施，将 PPGR 归因于所摄入的食物，认为血糖反应是所摄入食物的固有特性。然而，近几年研究发现不同人群对同一食物的血糖反应具有高度的可变性。餐后血糖反应除了与食物有关，受试者因素如遗传因素、生活方式、胰岛素敏感性及肠道微生态特点等都影响血糖反应。随着近年计算能力和生物信息学专业知识的飞速发展，整合膳食摄入、受试者生物信息的机器学习算法在精准预测 PPGR 方面取得了令人鼓舞的结果：以色列 Zeevi D 等通过对 800 名受试者持续一周 46898 餐血糖反应的监测，设计了一致整合血液参数、饮食习惯、人体测量、体力活动和 16s 肠道微生物指标的机器学习算法，发现该方法相比传统的血糖控制方法，预测能力明显提高。为了了解精准预测 PPGR 的进展，本研究建库以来对国内外文献进行系统检索并进行荟萃分析，以期对餐后血糖的精准管理提供依据。通过对文献的系统检索，本文共纳入 7 篇文献，从纳入文献可见受试对象包括健康成人、糖尿病前期和糖尿病人群；人群种族为以色列人、美国人、英国人和丹麦人；研究类型包括 2 篇特定食物干预的 PPGR 预测实验和 5 篇膳食干预的 PPGR 预测实验；从文献出处分析其中 3 篇文献来自于以色列魏兹曼科学研究所。对 7 篇文献结果分析可见 7 篇文献较为一致地认为整合膳食因素和肠道微生态特征等个体信息的机器学习算法预测血糖比传统的依靠食物中能量和碳水化合物方法预测血糖更为准确。以色列魏兹曼科学研究所的双盲对照人群干预结果显示，其预测 PPGR 的准确性可以与接受专业人员指导的金标准对照相当。但是从本文也可以看出现有的研究也存在许多问题：文献报道数量仍有限，且许多研究集中于相同的研究单位；部分研究受试者例数有限；干预实验的周期较短；研究人群集中于欧美人群；另外对于机器学习算法的纳入指标等也不尽相同。因此，仍需在不同人种、不同饮食习惯及肠道微生态特征的人群中开展更多的大规模研究，进一步对纳入指标、机器学习算法等进行优化，提高 PPGR 预测的准确性，以早日实现对餐后血糖的精准管理。

关键字 餐后血糖反应，精准营养，精准预测，肠道微生物

分类：精准营养

基因多态性在肥胖干预中作用的荟萃分析

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肥胖及与肥胖相关的糖尿病、血脂异常等代谢性疾病已成为全世界的主要公共卫生问题。众所周知，通过饮食/生活方式干预可以有效减轻体重。然而，长期以来，在减肥试验中发现针对相同的干预措施个体之间存在明显的差异。除了行为和心理因素外，科学家们试图从遗传因素的角度探索个体差异的原因。近年来研究显示脂肪及肥胖相关基因（the fat mass and obesity-associated gene ，FTO）、ADIPOQ、MTNR1B、MC4R、BDNF 等基因的多个多态位点在肥胖干预过程中发挥重要的作用。在肥胖干预试验中，携带不同基因型是否会对减肥的干预效果产生影响，目前尚不清楚。本研究系统检索了 2010 年 1 月 1 日至 2022 年 6 月 1 日期间发表的肥胖相关干预试验，以分析基因多态性在肥胖干预中的作用。

通过对文献的系统检索可见，国内外已开展了大量基因与肥胖干预的研究，本文共有 99 篇文献纳入分析，包括系统综述 5 篇、meta 分析 2 篇和肥胖干预试验研究 92 篇。肥胖的干预方式包括限制能量膳食、运动干预及生活方式干预不同种类，受试人群主要以西班牙、 巴西、德国等欧美人群为主，干预时间从 2 周到 2 年不等。通过本荟萃分析，可以看到不同基因位点在肥胖干预的作用：①对于目前研究最多的 FTO 基因 rs9939609 位点，meta 分析结果显示 FTO rs9939609 次要等位基因的携带与减肥干预后肥胖的差异变化无关。②部分 SNP 位点在肥胖干预实验中取得了比较一致的结果：FTO 基因 rs1558902 次要等位基因携带与肥胖干预的减肥获益有关；ADIPOQ 基因的 rs3774261、rs266729、rs1501299 位点的次要等位基因携带与肥胖干预血脂指标的改善有关。但由于研究的数量有限，部分研究集中于某些实验室，其结果尚待进一步验证。③大部分基因位点在肥胖干预实验中研究数量较少，部分仅为 1 篇报道，并且一些 SNP 位点各研究结果之间存在高度异质性，尚不能对其在肥胖干预中的作用进行评估。

综上，基因多态性对肥胖干预影响的研究之间总体上存在较高的异质性。这一方面与受试人群、种族差异、干预方式、干预周期、体力活动、年龄及对干预实验的依从性等因素的影响有关，尚需在更多的大样本干预试验中进一步研究；另一方面肥胖等复杂疾病的发生涉及因素很多，从基因方面，单独一个位点的作用可能不足以对肥胖的干预效果产生明显的影响，开展多基因的联合分析 ，综合评估多个不同基因的遗传变异影响，或许会为肥胖的精准干预提供更为准确的信息。

关键字 基因多态性；肥胖；生活方式干预；膳食干预

分类：精准营养

基于精准营养干预的代谢相关指标研究进展

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1. 目的：精准营养利用多种新技术，结合膳食摄入、生活方式、表型和基因型等方面，实现个性化和准确的营养干预。近年来，随着基因组学、代谢组学、蛋白组学等技术的发展，精准营养可利用的技术随之扩展。其中，是代谢方面的指标（代谢表型、代谢组和生物标志物）是精准营养指标评价研究的重要方面，现做系统综述。

2. 文献检索方法：

利用计算机检索 Pubmed、Science direct、web of science、中国知网、万方数据库分别以中文“（精准营养 or 个性化营养）并且（代谢表型 or 代谢组 or 生物标志物）”和英文“((personalised nutrition) OR (personalized nutrition) OR (precision nutrition)) AND ((metabotype) OR (metabotyping) OR (metabolic phenotyping) OR (metabolomics) OR (metabonomics) OR (biomarker))”等为关键词或主题词进行摘要关键词篇名检索。此外还通过手工检索相关期刊与书籍、查找会议摘要、检索互联网，并通过参考文献和引文进一步查找可能相关的研究。检索过程中，未对国家、人种、语言和发表时间进行任何限制。

3. 纳入文献结果分析

3.1 代谢表型研究

有 3 篇文献使用了相同的代谢表型指标，对目标人群进行分类，诊断指标为：给予 4 种标志物（甘油三酯、总胆固醇、直接 HDL 胆固醇和葡萄糖）的 k-means 聚类分析形成不同代谢型人群。另一项研究对干血斑 27 种代谢标志物[9]（总胆固醇、20 种脂肪酸和 6 种类胡萝卜素）进行 k-means 聚合分析，确定代谢类型。上述研究表明代谢物或代谢组数据可以单独作为个性化膳食指导的判断依据，快速有效的给予精准的膳食建议，而且与相比膳食等其他数据，代谢表型数据可以提供更多精确营养信息。3.2 代谢组学研究

代谢组学是精准营养评价的重要技术手段。代谢组学能够测定数千种食品特异性的化学物质，识别人体摄食后组织体液中的副产物，监测机体对饮食干预后的生化反应，监测饮食习惯造成的机体长期或短期的变化，评价机体营养状况，并指导如何进行营养治疗。

3.3 生物标志物研究

有 4 篇基于生物标志物进行的个性化营养的研究。主要依据的代谢物包括血糖、总胆固醇、类胡萝卜素、脂肪酸、血浆游离氨基酸、胰岛素、HOMA-IR 等指标；

4. 结论

基于精准营养干预的代谢相关指标进行系统综述的主要结果如下：1）个体血液代谢物可用于个体代谢表型分型，依据表型和判定树法，向个体提供靶向膳食建议。2）个体尿液代谢组核磁波谱特征及代谢物可判断其膳食结构。3）新生儿干血斑法检测代谢物可用于婴幼儿代谢紊乱及相关疾病的筛查。4）以个体血液代谢物水平数据进行健康风险评分，可用于 II 糖尿病、胰岛素抵抗及相关并发症患者差异化健康指导，并具有显著效果。5）血液氨基酸指标 AILS 可用于预测糖尿病风险，PFAA 可用于老年人精准营养发展。6）针对血液空腹血糖、空腹胰岛素、HOMA-IR 作为长期减肥的预后标志物的指标。到目前为止，代谢相关的生物标志物尚未应用于临床治疗，但已有代谢表型、代谢组和生物标志物指标在精准营养干预的探索，为精准营养发展提供重要指标支撑。

关键字 精准营养、代谢表型、代谢组、生物标志物

分类：精准营养

亚麻籽油对 1 型糖尿病肝脏炎症和肠道菌群的作用研究

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研究发现 1 型糖尿病与肝脏炎症关系密切，提示 1 型糖尿病肝脏炎症的发生及进展机制可能是提高 1 型糖尿病生活指标并延长期生存期的潜在干预靶标之一。肠道微生物组成的变化与 1 型糖尿病及其并发症之间存在显著的相关性，肠道菌群及其产物可能通过影响肠道通透性和肠粘膜免疫系统参与 1 型糖尿病的发病与进展。研究发现富含 α-亚麻酸的亚麻籽油显示出改善 2 型糖尿病的潜能，但是亚麻籽油对 1 型糖尿病的影响和作用机制仍不清楚。因此，本研究旨在探索不同剂量的亚麻籽油对由链脲霉素诱导的糖尿病小鼠肝脏炎症和肠道微生物群的影响。本研究将 48 只 6 周龄的 C57BL/6J 雄性小鼠分为对照组、糖尿病组、糖尿病+7.0% w/w 亚麻籽油组和糖尿病+10.5% w/w 亚麻籽油组，干预持续 6 周。本研究发现 7.0% w/w 和 10.5% w/w 的亚麻籽油组显著改善了 1 型糖尿病小鼠胰腺组织的数量和大小。10.5% w/w 亚麻籽油组喂养 1 型糖尿病小鼠 4 周后，显著降低空腹血糖水平。在干预 6 周后的口服葡萄糖耐量试验中 10.5% w/w 亚麻籽油组喂养显著降低了小鼠餐后血糖水平。7.0% w/w 和 10.5% w/w 亚麻籽油组显著上调 1 型糖尿病小鼠肝糖原水平。亚麻籽油干预可显著降低 1 型糖尿病小鼠肝脏炎症水平，包括显著降低肝脏脂多糖、肿瘤坏死因子-α 和白介素-1β 水平。此外，7.0% w/w 和 10.5% w/w 的亚麻籽油喂养明显下调了肝脏炎症相关基因和蛋白的表达（Toll 样受体 4、髓样分化因子 88 和 P65），且研究发现 7.0% w/w 亚麻籽油的对肝脏炎症的调节作用更加明显，提示亚麻籽油对 1 型糖尿病肝脏炎症的作用可能存在剂量效应关系。亚麻籽油干预后未显著改变粪便微生物群的 α-多样性（ACE、Chao1、Simpson 和 Shannon 指数）。进一步利用主成分分析评估亚麻籽油对肠道菌群 β-多样性的作用，结果显示不同剂量亚麻籽油干预可能会改变 1 型糖尿病小鼠肠道菌群的整体物种分布。10.5% w/w 亚麻籽油组干预显著增加 1 型糖尿病小鼠肠道菌群中的类杆菌门、乳球菌科、穆里巴卡尔科和链球菌属的相对丰度，从而发挥进一步调节粪便微生物群的作用。总体而言，亚麻籽油可能通过调节肝脏脂多糖/ Toll 样受体 4/髓样分化因子 88 途径，并显著调节肠道微生物群，从而在改善 1 型糖尿病肝脏炎症中发挥重要作用。此外，研究还提示不同剂量亚麻籽油干预可能在链脲霉素诱导的 1 型糖尿病小鼠中作用机制不同。基金来源：本项目由中央高校基本科研业务费专项资金资助（编号：2242021R40022）。

关键字 亚麻籽油；1 型糖尿病；肝脏炎症；肠道菌群

分类：精准营养

茶多酚可能通过调节 T 细胞耗竭改善糖尿病肾病临床症状

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目的：T 细胞耗竭相关研究广泛集中于肿瘤和感染性疾病，对于其是否参与代谢性疾病及其并发症发生发展尚不清楚。本文旨在通过生物信息学方法筛选可能影响糖尿病肾病（DN）发生发展的 T 细胞耗竭相关中枢基因，进行靶向天然活性成分筛选，为日常饮食添加天然活性成分补剂以达到防治 DN 的研究提供分子生物学依据。

方法：从 GEO 数据库下载中国 DN 患者肾小管数据集 GSE96804 获取基因表达谱，利用 ImmuCellAI 进行免疫细胞浸润分析，利用 WGCNA 法构建 DN 基因共表达网络，选择与 DN 高度相关的模块，提取相关基因。通过 Genecards 数据库获取 T 细胞耗竭基因，两者关联获得 DN 相关 T 细胞耗竭基因，对其进行生物富集分析和蛋白质相互作用网络构建，通过 Cytoscape 软件的 MCODE 算法筛选功能模块基因。利用模块基因构建 Lasso 回归模型筛选中枢基因，绘制 ROC 曲线验证模型准确性。通过 Nephroseq 肾脏数据库验证 DN 患者血清肌酐清除率、肾小球滤过率与中枢基因表达相关性。通过 KIT 肾脏单细胞数据库进行表达分析验证。最后再通过 CNKI、Pubmed、Web of Science 和 Cochrane 等数据库全面检索筛选整理对免疫调节及 DN 防治有积极作用的可供膳食添加的天然活性成分，提取核心成分为有效成分，利用 AutoDock Vina 软件进行分子对接模拟验证和 SwissADME 药代动力学分析。

结果：免疫细胞浸润分析发现，CD4 naive 细胞、$CD4T^{+}$细胞、$CD8T^{+}$细胞、Tcm 细胞、Tem 细胞、iTreg 细胞、nTreg 细胞、Tfh 细胞、Th1 细胞、Th17 细胞、Th2 细胞等 T 细胞亚型在 DN 肾小管组织高度浸润，WGCNA 分析发现 brown 模块和 magenta 模块与 DN 最为相关，且共获得 36 个交集基因为 DN 相关 T 细胞耗竭基因，富集分析显示其主要参与细胞氧化磷酸化、内源性细胞凋亡和 IL12 介导的信号通路等生物学过程，通过 MCODE 算法获取到 8 个核心功能模块基因，Lasso 回归模型共识别出 4 个与 DN 发展发展关系密切的核心基因，其风险评分公式=（0.219×Exp HNRNPU）+（0.621×Exp SRSF1）＋（-0.197×Exp COX5B）＋（-0.620×Exp NDUFA7），其中 HNRNPU 和 SRSF1 高表达为 DN 危险因素，COX5B 和 NDUFA7 低表达则为 DN 发生发展的保护因素。ROC 曲线分析结果显示，核心基因的 ROC 曲线下面积（AUC）均＞0.92，NDUFA7 最高可达 0.98，提示该模型具有很高的准确性，验证分析显示，核心基因在 DN 患者、正常成年人及儿童肾组织细胞表达具有差异，并且 HNRNPU 和 SRSF1 高表达与 DN 患者肾小球滤过率下降显著相关（P＜0.05），COX5B 和 NDUFA7 低表达则与 DN 患者血清肌酐清除率上调显著相关（P＜0.05），提示 DN 相关 T 细胞耗竭基因影响 DN 患者肾脏滤过功能，参与 DN 发生发展，是早期筛查和精准治疗的生物标志物。通过文献筛选，茶叶的主要成分茶多酚是国人日常饮食广泛接触的具有抗氧化、抗炎、调节血糖的天然活性成分复合物，选取其核心成分表没食子儿茶素没食子酸酯（EGCG）与核心基因进行分子对接，其结合活性均＜-6kal/mol，药代动力学分析显示，其对肝药酶 CYP1A2、CYP2C19、CYP2C9、CYP2D6 和 CYP3A4 均无抑制作用，是潜在的优效活性成分，但是其胃肠吸收度和脂溶性较差，可对其进行表面修饰或脂质体包合，提高口服生物利用度。

结论：T 细胞在 DN 患者肾组织高水平浸润，其耗竭基因通过内源性细胞凋亡途径影响患者疾病进程，茶多酚主要成分 EGCG 是潜在的靶向活性成分，可在日常膳食中添加经修饰的 EGCG，有利于 DN 患者改善临床症状。

关键字 T 细胞耗竭；糖尿病肾病；表没食子儿茶素没食子酸酯；基因组学；日常膳食

分类：精准营养

肠道菌群干预在肿瘤患者肌肉减少症防治中的作用与研究进展

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目的：综述肠道菌群干预在癌症患者肌肉减少症防治中的关联、干预效果及存在的局限性。

方法：从肠道菌群变化、炎症和机体免疫代谢三个方向，分析肠道菌群与癌症患者肌肉减少症的关联。评估肠道菌群相关的主要干预措施，包括粪菌移植、益生菌、益生元、合生元或后生元的补充以及特定饮食的添加等的治疗效果。

结果：肠道菌群紊乱可能与癌症患者肌肉减少症的发生有关。肠道菌群干预可能通过提高肿瘤患者自身免疫、调节机体代谢以及减轻治疗副作用来维持患者的肌肉质量及功能。然而，相关研究仍存在一些局限性，如抗生素的使用、尚未清晰的作用机制、安全性以及影响因素的复杂性等。

结论：尽管研究显示肠道菌群干预可能是癌症患者肌肉减少症防治的潜在靶点，但需要充分考虑现有研究的局限性，并在未来的研究中进一步明确其作用机制、安全性和影响因素。

摘要：肌肉减少症是一种以骨骼肌质量、力量和功能逐渐减少为特征的综合征。癌症是引起肌肉减少症的主要原因之一，尽管肌肉减少症在癌症患者中的患病率很高，但仍缺乏有效的预防和治疗方法。虽然目前尚不清楚癌症患者肌肉减少症发展的机制，但越来越多的研究表明，肠道菌群与癌症患者肌肉减少症的治疗和预后有很强的关联。人类肠道寄生着大量微生物，它们参与许多重要的生理过程，如能量代谢、免疫调节和肠道粘膜防御，通过调节神经、免疫和内分泌系统，可能成为癌症患者肌肉减少症管理的潜在靶点。本文献综述总结并讨论了肠道菌群干预与癌症患者肌肉减少症之间的关系以及干预的效果。首先，肿瘤的发展和肌肉减少症通常伴随着肠道菌群和代谢物的改变；炎症在肿瘤和肌肉减少症的发展中起着重要作用；肠道菌群可能在癌症肌肉减少症患者的免疫系统调节和体内代谢过程中发挥重要作用。鉴于此，本文分别从肠道菌群变化、炎症和机体免疫代谢三个方向介绍了肠道菌群与癌症患者肌肉减少症的关联。目前，有积极效果的肠道菌群相关干预方式主要包括粪菌移植，益生菌、益生元、合生元、后生元的补充以及特定饮食成分添加。本文进一步阐述了这些干预在治疗癌症患者肌肉减少症中的有效性。最后本文也讨论了相关研究存在一些局限性，包括可能影响肠道菌群平衡的抗生素使用，肠道菌群组成复杂，其潜在作用机制尚未完全理解，以及安全性和影响因素的复杂性。综上所述，目前研究指明肠道菌群干预可以作为一个新的靶点，通过提高肿瘤患者自身免疫、调节机体代谢以及减轻治疗副作用来维持患者的肌肉质量及功能，但需要考虑到上述的局限性。

关键词：肿瘤；癌症；肌肉减少症；肠道菌群

关键字 癌症；肌肉减少症；肠道菌群

分类：精准营养

维生素 C 代谢调控路径

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目的：维生素 C 是人体必需的营养素，可作为羟化酶的辅酶，促进胶原纤维形成；还原超氧化物及其他活性氧化物，清除自由基，提高人体的免疫功能。虽有上述研究，维生素 C 下游代谢通路仍需进一步研究。代谢组学是依赖灵敏、稳定的分析流程和数据库,利用色谱-质谱联用、核磁共振技术对生物体内以及生物样品所有的小分子代谢物进行鉴定和定量分析的学科。代谢组学方法可将代谢物种类和含量的变化与生物表型变化建立更直接的联系。本研究的目的为利用代谢组学技术检测维生素 C 的相关代谢调控通路，进一步丰富维生素 C 调控机制理论。

方法：招募被试 10 名，男性，年龄 25.1±5.2 岁，BMI 值 23.4±3.6，身体健康，均衡饮食，日常无服用维生素 C 习惯；肝肾功能无异常；无心血管病、呼吸系统疾病、胃肠道疾病。空腹抽血 5 mL，分为两部分，分别加入抗凝剂或不加入抗凝剂，4℃下 3000 rpm 离心 10min，取上清，血浆进行高分辨非靶向代谢组学分析项目，采用超高效液相色谱-串联飞行时间质谱联用仪检测样本中代谢物含量；血清利用荧光法检测维生素 C 含量；之后将代谢物与维生素 C 含量进行 spearman 相关性分析，$P<0.05$ 作为代谢物和维生素显著相关标准。

结果：10 名被试者维生素 C 水平均在正常范围内，平均为 12.4 μg/mL；与维生素 C 呈正相关的代谢产物有 Indole-3-acetonitrile（吲哚环化合物，植物生长素）；与维生素 C 呈负相关的代谢产物有 NG,NG-dimethyl-L-arginine(ADMA，内源性 NO 合酶抑制剂)、1-hexadecyl-sn-glycero-3-phosphocholine（1-O-十六烷基-sn-甘油基-3-胆碱磷酸）、 15-ketofluprostenol（11-酮氟前列腺素，前列腺素 D2 类似物）、Lys-Trp（赖氨酸-色氨酸双肽，与 11-酮氟前列腺素正相关）、4,6-dioxoheptanoic acid（4,6-二氧代庚酸，血红素生物合成抑制剂）、D-leucinamide, n-[(phenylmethoxy)carbonyl]-l-leucyl-n-[(1s)-1-formyl-3-methylbutyl]-（蛋白酶体抑制剂）。

结论：除经典途径外，维生素 C 水平可能通过促进植物生长素合成，抑制炎性反应，促进 NO 和血红素合成，以及蛋白酶体降解活动发挥作用。

关键字 维生素 C；代谢组学；炎症；一氧化氮；血红素；蛋白酶体

分类：精准营养

基于基因组学的机器学习模型探讨血府逐瘀汤干预胰腺癌患者预后的药效作用机制

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目的：团队以往研究发现，血府逐瘀汤作为代表性的传统理血方剂，对代谢性疾病及其并发症有良好治疗效果。胰腺癌作为消化系统恶性肿瘤，具有发病隐蔽、预后差等特点，虽其对肝癌等有治疗作用，但对胰腺癌是否具有药效作用及其分子机制尚不清楚。本文旨在通过生物信息学方法探讨血府逐瘀汤干预胰腺癌的分子生物学机制，为其精准医学防治及日常饮食辅助提供理论依据。

方法：基于 R 语言并联合 TCMSP、HERB、GEO、STRING、HPA、GEPIA、UALCAN、TIMER、Pubchem 多个数据库资源，首先获取血府逐瘀汤的活性药物成分和作用靶点，对胰腺癌芯片 GSE62452、GSE28735 和 GSE16515 进行差异分析，获得血府逐瘀汤干预胰腺癌的药物作用靶点，进行生物富集分析；从 TCGA 数据库下载胰腺癌患者临床信息和 RNA 测序数据，使用 LASSO 算法建立风险预测模型，筛选预后相关基因标志物并进行差异表达验证及免疫细胞浸润分析，最后再基于预后基因进行反向活性成分映射，利用 Autodock Tool 软件进行分子对接验证，筛选核心靶点的强结合活性药物成分。

结果：共获得 138 个血府逐瘀汤干预胰腺癌的药物作用靶点，主要富集与代谢途径和癌症通路，通过 LASSO 回归聚焦后获得 MET、TOP2A、AKR1B10 和 KIF11 四个核心分子靶点与患者预后密切相关，表达矩阵与免疫组化初步验证发现其均在 PAAD 中高水平表达（P＜0.05），免疫浸润发现 4 个核心靶点均与 B 细胞浸润呈正相关。经过反向映射，共获得 4 个核心分子靶点对应的包含在血府逐瘀汤 11 味药物组分中的 51 种关键活性成分，其中 MET 对应 5 种活性成分，TOP2A 对应成分 39 种活性成分，AKR1B10 对应 10 种活性成分，KIF11 则仅对应 1 种活性成分洋川芎醌，木犀草素、槲皮素、洋川芎醌和 gibberellin-17 这 4 种活性成分均对应多个核心靶点，将核心靶点蛋白作为大分子受体，活性成分作为小分子配体进行 55 次分子对接筛选，分子对接结果显示所有核心靶点和活性成分均具有强结合活性（结合能≤-5kj/mol），其中 AKR1B10 与异麦角甾苷、槲皮素和顺式二氢槲皮素的结合活性最强（结合能≤-10kj/mol）。

结论：天然黄酮类化合物是血府逐瘀汤改善胰腺癌患者预后的主要活性成分，其可能通过调节免疫及代谢通路发挥药理学作用，可在临床防治及日常饮食中添加黄酮类化合物辅助治疗。

关键字 胰腺癌；血府逐瘀汤；黄酮类化合物；代谢途径；生物信息学

分类：精准营养

国产化数字能量代谢舱在精准营养应用中的价值分析

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摘要：目的：2017 年 6 月 5 日出台的《“十三五”食品科技创新专项规划》，首次强调了精准营养及技术。“精准营养”借助多组学、可穿戴、影像学、生物信息学、人工智能等多种新技术和新理念对不同个体提供量身定制的膳食和生活方式干预。近年来，多项研究已表明，能量代谢失衡与糖尿病、肥胖、心血管疾病、癌症等一系列重大慢性非传染性疾病以及老龄化密切相关，加强对机体能量代谢调控机制的基础研究，是应对慢病挑战的关键所在。目前国内使用代谢舱均为进口，针对精准营养产、学、研、用一体化需求，安徽宏元聚康医疗科技有限公司自主研发的国内首套国产化数字能量代谢舱应运而生。探讨国产化数字能量代谢舱在精准营养应用中实际价值。方法：国产化数字能量代谢舱利用高精度算法对舱体内环境进行实时监测和控制；融合智能传感技术对舱内受试者实施时序化检测；并通过舱体内不同生活情景模拟，采集受试者实时状态。同时还整合了代谢组学、宏基因组学的多维数据和样本分析，运用新思维和新策略，打造精准评估、预测到干预的智能化的营养健康管理闭环。结果：国产化数字能量代谢舱通过智能传感器与深度学习算法对人体基础代谢率进行连续动态监测，分析三大产能营养素等能量代谢物的相对利用率和筛选出差异显著的代谢标志物，为个性化饮食提供帮助。在宏基因方面，通过研究肠道菌群菌属基因，进而研究参与应对肠道细菌经常遇到的耐氧性和耐酸性压力的基因分布，构建肠道菌与外界环境元素（主要是氧、糖、脂肪、蛋白质）的关联机制。例如正在开展分析蔬菜摄入量（少量组与大量组）对比的通过调节肠道菌内含有丰富的氨基酸和维生素 B 的合成基因，进而调节营养物质的替代来源。调节外界代谢输入与肠道菌的丰度、各分类水平结构，进一步通过预测和调节菌群代谢功能，精确调节人体内的碳水化合物和能量代谢。结论：代谢舱是国际上公认的人体能量代谢测量的金标准，致力于“适度”公共营养到追求“精准”的个性化营养，宏元聚康公司在人体代谢方面 10 多年间精耕细作，开发出国内首套具有完全自主知识产权的数字能量代谢舱，并开拓代谢组学分析与肠道菌群宏基因组学分析功能。基于个体化的纵向大数据分析，为个体精准干预指导和疾病预防提供方案，也有助于个体对自身健康和疾病状态的理解。当然，精准营养研究还处于初步阶段，需要社会各界协同创新，实现精准营养相关研究成果的顺利落地。

关键字 国产化代谢舱；精准营养；价值分析

分类：精准营养

补充食物源性低聚肽促进年轻男性自行车运动员脂质代谢

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体脂堆积和血脂异常与肥胖和心脏代谢疾病的发生有关。此外，脂质的代谢水平被认为是心肺能力和延长耐力水平的决定因素。在细胞培养模型、动物模型和人体研究中，大米和大豆多肽等食物来源的寡肽已被证明可以直接调节异常的脂质代谢或促进血脂和脂肪氧化。然而，补充多种食物来源的寡肽是否能促进运动员的脂质降解和脂肪氧化尚不清楚。目的: 研究在运动前及运动过程中摄入食物源性寡肽对年轻男性自行车运动员脂质代谢的影响。方法:16 名男性自行车运动员(年龄:17.0±1.0 岁；身高:178.4±6.9cm；体重:68.7±12.7kg；体重指数:21.5±3.4kg/m；最大摄氧量:56.3±5.8mL/min/kg)参与了这项随机对照交叉试验。每个参与者喝两种饮料，含有或不含复合低聚肽(Treatment/Control)，低聚肽总摄入量为 0.5 g/kg 体重，两次测试之间有 2 周的洗脱期。每次测试运动员完成 24 小时的测试方案，包括 30 分钟的静坐，85 分钟的长时间运动加上 5 分钟的冲刺(PE)，60 分钟的短暂恢复期，20 分钟的计时赛(TT)，休息直到第二天早上。采集血液样本进行血脂和其他生物标志物的生化分析。运用组学方法检测血浆甘油三酯(TGs)、游离氨基酸(FAAs)和三羧酸(TCA)循环中间产物。此外，收集呼出气体以评估脂肪氧化率。结果:摄入复合低聚肽后仅 20 分钟，血浆 FAAs 中有 5 种在运动前(pre-Ex)升高，大多数 FAAs 在 PE 和 TT 后明显升高。在 PE 和 TT 后，血清 TG 和非酯化脂肪酸水平分别低于对照组。此外，血浆 TGs 的组学分析表明，与对照组相比，在 PE 后和次晨大多 TGs 下降。同时，脂肪氧化率在摄入后仅 20 分钟和前 85 分钟的 PE 期间开始增加。TCA 循环中间产物的水平在各个状态下均没有差异。结论:摄入食物来源的寡肽会增加血浆中 FAAs 的水平，并在安静时、运动中和恢复期间促进脂质降解，直到运动后次晨。升高的循环和细胞内 FAA 通量可能调节代谢途径中底物的选择，与神经内分泌因子的释放结合，通过乙酰辅酶 A 反馈抑制减缓碳水化合物代谢。FAAs 为 TCA 循环提供了更多的底物，这可能会增加脂肪酸生产能量的可用性。这项研究的发现为促进血脂异常相关代谢障碍(如肥胖)人群的脂质代谢以及在耐力训练中改善生理功能提供了新的见解。

关键字 食源性低聚肽; 长时间运动;脂质降解;脂肪氧化

分类：精准营养

基因-饮食联系和精准营养在肥胖症的研究进展

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摘要：目的 在过去的几十年里，肥胖症的迅速上升与我们生活环境的深刻变化相吻合，包括不健康的饮食模式、久坐的生活方式和缺乏运动。肥胖的遗传倾向可能与这种致肥环境相互作用，决定了肥胖症的流行。精准营养和饮食干预的理念被认为是根据基因组背景、习惯性食物和饮料消费、营养素摄入以及一个人的代谢组学、微生物组和其他全息图谱，对每个饮食习惯和建议进行单独定制以预防慢性疾病。越来越多的研究发现，脂肪的变化和对低热量减肥饮食的代谢反应可能被与肥胖、代谢状态和对营养物质的偏好有关的遗传变异所改变。方法 系统地搜查了在PubMed、知网、Medline 上搜索了发表的相关文章。这篇综述总结了最近关于基因-饮食相互作用的研究数据，并讨论了代谢组学和肠道微生物组研究的整合，以及这些发现在精准营养中的潜在应用。在此，我们强调了最近关于肥胖症的基因-饮食相互作用的研究数据，并讨论了这些发现如何为了解肥胖症和相关疾病中基因和环境因素之间相互作用的更复杂结构提供信息。结果 随着全息技术和分析方法的快速发展，最近的全基因组分析揭示了中间表型的遗传学，如循环代谢物（代谢组学）和肠道微生物组。整合代谢组学和肠道微生物组的研究信息，将为基因-环境互动在包括肥胖在内的复杂性状中的作用提供新的见解，并有助于对肥胖的精确预防和管理。基因-环境相互作用可能反映了一种因果机制，即变异体和环境暴露对同一个体的疾病或病症的致病作用，遗传因素影响了对环境因素的敏感性。结论 在此，我们强调了最近关于肥胖症的基因-饮食相互作用的研究数据，并讨论了这些发现如何为了解肥胖症和相关疾病中基因和环境因素之间相互作用的更复杂结构提供信息。来自饮食干预试验的数据表明，脂肪的变化和对低热量减重饮食的代谢反应可能被遗传变异所显著改变，特别是那些与肥胖、2 型糖尿病、代谢和食物偏好有关的变异。另一方面，很少有研究调查代谢组学机制和肠道微生物组的潜在作用，它们可能在遗传变异和环境影响肥胖和健康的界面上发挥作用。将基因、饮食习惯、代谢物和肠道微生物组的数据整合到人类健康调查中的研究，将是不久的将来精准营养学中最令人兴奋的领域之一。

关键字 肥胖症、基因-饮食相互作用、精准营养

分类：精准营养

基于 Web of Science 数据库精准营养在医学领域的文献计量学研究

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目的：基于 Web of Science 数据库，全面分析精准营养在医学领域的相关文献，探讨该领域的发展状况、研究热点及研究前沿，为我国精准营养的进一步发展提供借鉴和参考。方法：以 Web of Science 数据库核心合集作为检索源检索，检索 TS=“precision nutrition OR personalized nutrition” AND TS=“Medicine”的期刊论文,检索时间限定为建库至 2022 年 12 月 12 日，语种为英语，文献类型为 review 和 article；利用可视化工具 VOSviewer 和 CiteSpaceV (6.1 R2)软件对精准营养在医学领域的相关文献时间分布、期刊分布、作者、国家、关键词进行可视化分析并绘制知识图谱.结果：共筛选出 438 篇文献，发文量整体呈上升趋势，2021 年达到高峰；发文量前五的国家分别为美国、意大利、英国、中国、西班牙；在该领域内，最活跃的三个国家分别是：美国、意大利、英国；其中，与中国合作关系最密切的国家是美国；发文量最多的作者为意大利学者加斯巴里尼·安东尼奥，发布的文献数量为 8 篇，我国发文最多的学者发布了 2 篇文章；发文量前的期刊多为临床营养相关期刊，其他较少，比如心血管领域相关期刊。高频关键词主要有 nutrition、personalized medicine、obesity、diet、nutrigenomics、health、cardiovascular-disease、physical-activity 等。结论：近年来对精准营养领域的关注度日益上升，发文量呈快速上升趋势，特别是肥胖、糖尿病领域，文献质量较高，各国合作较为密切，精准营养已经成为营养和生物领域的研究前沿热点。研究方法多以干预性研究和基础研究为主；研究多集中在发达国家，近年来我国的研究也占据了重要地位。研究热点主要关注的是肥胖的体重管理、生活方式干预、影响因素分析、循证医学、基因组学、肠道菌群研究等方面，围绕着精准营养的机制及干预效果开展了深入研究。

关键字 精准营养；个性化营养；研究热点；文献计量学；

分类：精准营养

基于 Web of Science 数据库精准营养在医学领域的研究现状及热点分析

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目的：基于 Web of Science 数据库，全面分析精准营养在医学领域的相关文献，探讨该领域的发展状况、研究热点及研究前沿，为我国精准营养的进一步发展提供借鉴和参考。方法：以 Web of Science 数据库核心合集作为检索源检索，检索 TS=“precision nutrition OR personalized nutrition” AND TS=“Medicine”的期刊论文,检索时间限定为建库至 2022 年 12 月 12 日，语种为英语，文献类型为 review 和 article；利用可视化工具 VOSviewer 和 CiteSpaceV (6.1 R2)软件对精准营养在医学领域的相关文献时间分布、期刊分布、作者、国家、关键词进行可视化分析并绘制知识图谱.结果：共筛选出 438 篇文献，发文量整体呈上升趋势，2021 年达到高峰；发文量前五的国家分别为美国、意大利、英国、中国、西班牙；在该领域内，最活跃的三个国家分别是：美国、意大利、英国；其中，与中国合作关系最密切的国家是美国；发文量最多的作者为意大利学者加斯巴里尼·安东尼奥，发布的文献数量为 8 篇，我国发文最多的学者发布了 2 篇文章；发文量前 10 的期刊多为临床营养领域相关期刊，其他领域期刊为心血管领域等相关期刊。高频关键词主要有 nutrition、personalized medicine、obesity、diet、nutrigenomics、health、cardiovascular-disease、physical-activity 等。结论：近年来对精准营养领域的关注度日益上升，发文量呈快速上升趋势，特别是肥胖、糖尿病领域，文献质量较高，各国合作较为密切，精准营养已经成为营养和生物领域的研究前沿热点。研究方法多以干预性研究和基础研究为主；研究多集中在发达国家，近年来我国的研究也占据了重要地位。研究热点主要关注的是肥胖的体重管理、生活方式干预、影响因素分析、循证医学、基因组学、肠道菌群研究等方面，围绕着精准营养的机制及干预效果开展了深入研究。

关键字 精准营养；个性化营养；研究热点；文献计量学；

Category: Basic Nutrition& Research

High-sucrose aggravates arthritis via TLR4 pathway in surgically induced osteoarthritis model

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Background and objectives: Toll-like receptor 4 (TLR4) plays a crucial role in initiating inflammation in response to pathogens or endogenous molecules through the activation of nuclear factor-κB (NF-κB). In previous study, we have demonstrated that excessive sucrose consumption contributed to osteoarthritis (OA) pathogenesis with hepatic inflammation. However, little is known regarding the role of high sucrose (HS)-mediated inflammatory responses on OA pathogenesis. Thus, we investigated effect of HS using destabilized medial meniscus (DMM) mice model according to TLR4 expression.

Methods: Eight-week-old male C57BL/6J mice either wild-type (WT) or TLR4 knock-out (TLR4 KO), were subjected to two dietary conditions: standard chow or HS diets, containing 66% sucrose for an eight weeks. The pathogenesis of knee OA, metabolic parameters, inflammation levels in the liver and intestine morphology were investigated.

Results: HS diet resulted in slightly increased the severity of OA, as indicated by the Osteoarthritis Research Society International (OARSI) score and synovitis following DMM surgery, but no differences found in body or metabolic organ weight. Interestingly, TLR4 KO markedly reduced synovitis in HS-fed group. HS supplementation significantly induced hepatic lipid accumulation with pro-inflammatory gene expressions such as Tumor necrosis factor-α and Interleukin-1β, whereas these changes were restored in HS fed TLR4 KO mice. Moreover, HS-mediated increased villus length of small intestine and crypts depth of large intestine significantly shorten the crypts depth of both small and large intestine.

Conclusions: These findings suggested that excessive sucrose intake deteriorates OA, hepatic stress and intestine morphological changes via TLR4-mediated immunomodulation.

Key words Osteoarthritis, High sucrose, TLR4, Hepatic Inflammation, Intestine morphology

Category: Basic Nutrition& Research

p-Coumaric acid-enriched peanut sprout extract suppresses liver inflammation and fibrosis in high fat/high sucrose diet-fed aging mice

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Background and objectives: Aging is a ubiquitous biological process that induces diseases and mortality in response to various stressors. It has been reported high fat/high sucrose (HFHS) diet contributes to metabolic inflammation in the liver during aging. Previously we demonstrated the beneficial effect of *p*-Coumaric acid (PCA) enriched in peanut sprouts extract (PSE) in attenuating hepatic fibrosis and inflammation in HFHS-fed young C57BL/6 mice. However, the impact of PCA and/or PSE on aging and senescence-associated liver pathophysiology have not been well established. Therefore, we aimed to investigate whether PSE and PCA could reduce the susceptibility of hepatic inflammation and fibrosis response to HFHS in aging mice.

Methods: C57BL/6 male old (15 months) mice were fed with low-fat diets (11% calories fat, LF) or high-fat diets (60% calories fat, 0.2% cholesterol) with 20% sucrose drink (HFHS). A subgroup of HFHS-old mice received PSE (10 mg/kg BW, HFHS+PSE) or PCA (10 mg/kg BW, HFHS+PCA) by oral gavage for 11 weeks. C57BL/6 male young (5 weeks) mice were used as a negative control.

Results: While consuming an HFHS increased body weight gain, adipose tissue mass, hyperglycemia, hyperinsulinemia, and hypercholesterolemia compared to the LF diet, these effects were mitigated by PSE and PCA treatment. Additionally, PSE and PCA improved the hepatic triglyceride, total cholesterol, lipid peroxidation, and hepatic lipogenesis against HFHS challenged. Histological analysis revealed reductions in collagen accumulation induced by HFHS with the treatment of both PSE and PCA, indicating their potential to decrease fibrosis. Moreover, PSE and PCA significantly diminished gene expression signatures of inflammation and fibrosis, suggesting their beneficial effects on mitigating these processes caused by HFHS consumption.

Conclusions: Our study suggested the potential role of PSE and PCA in improving HFHS-mediated hepatic inflammation and fibrosis response in aging mice.

Key words Liver inflammation and fibrosis, Peanut sprouts, p-Coumaric acid, High fat and high sucrose, Aging

Category: Basic Nutrition& Research

Evaluation of various cooking methods on the Glycemic Response of Jasmine White Rice

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Background and objectives: Jasmine White Rice is a commonly consumed rice in Asia. The GI for white rice is always at the medium to high range by cooking in the conventional way which is using a rice cooker. There has been no research done to assess and compare the effects of cooking rice in other methods to reduce the glycemic response. In this study, we aimed to evaluate the effect of various cooking methods compared to the conventional way of cooking rice on the glycemic response. **Methods:** Ten healthy participants participated in the study. They were served 60g of raw Jasmine White Rice prepared by six different cooking methods. The participants were reminded via text message to consume food that were high in carbohydrates and to fast overnight for 10-14 hours on the evening prior to the test sessions. **Results:** There were no significant differences between the five cooking methods and the conventional method. However, there was significant reduction in glycemic response between overnight rice and porridge. There was also significant difference between rice cooked and drained in 1:7 water and porridge, and between retorted rice and porridge. **Conclusions:** Compared to porridge, storing the cooked rice in a chiller and reheating, cooking and draining in 1:7 water, and retort cooking the rice can improve glycemic response. Other methods can result in different glycemic responses but are found to not be statistically significant.

Key words Glycemic response, white rice

Category: Basic Nutrition& Research

Peyssonnelia caulifera Okamura extract improves the high fat diet-induced intestinal barrier dysfunction and gut microbiota imbalance

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Background and objectives: A high-fat diet can increase the permeability of the gastrointestinal tract, which is known as leaky gut. Recent studies have shown that defects in the gut barrier are associated with a variety of diseases, including metabolic disorders such as obesity, diabetes, and arthritis. *Peyssonnelia caulifera Okamura* (PC), a red seaweed native to Jeju Island in South Korea, which has been subject to limited research regarding its effects on obesity and/or barrier dysfunction. Thus, the aim of our study is to identify the impact of PC extract (PCE) on obesity-mediated impermeable gut barrier.

Methods: 6-weeks C57BL/6 male mice were randomly divided into three groups: (1) low-fat diet (LF) with 11% of calories from fat; (2) high-fat diet (HF) with 60% of calories from fat; (3) HF+PCE. HF+PCE group were orally administered 10mg/kg BW of PCE via gavage for 8 weeks *ad libitum*.

Results: Compared to HF-fed group, PCE for 8 weeks significantly reduced inflammatory gene expressions such as monocyte chemoattractant protein-1 (Mcp1) and tumor necrosis factor α (Tnfα), in adipose and liver tissue without affecting body weight and fat/liver mass. In addition, PCE treatment restored the expression of tight junction protein, such as occluden, claudin-1 and claudin-4 in the colon. Interestingly, mice fed with PCE showed an increase in autochthonous protective bacteria, including *Lachnospiraceae* and *Ruminococcaceae*. Additionally, the PCE group of mice exhibited an improved Firmicutes/Bacteroidetes ratio, which contributed to maintaining normal intestinal homeostasis.

Conclusions: Our result showed that PCE administration restored expressions of inflammatory gene and tight junction protein with prevent gut microbiota imbalance, against long-term consumption of HF diet.

Key words Peyssonnelia caulifera Okamura extract; leaky gut, intestinal permeability, Tight junction; High fat diet.

Category: Basic Nutrition& Research

Peanut sprout extracts mitigate dexamethasone-induced skeletal muscle atrophy in mice on a high-fat/high-sucrose diet

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Background and objectives: Sarcopenia and muscle atrophy, prevalent conditions associated with aging and various factors, result in the decline of skeletal muscle mass and function, posing significant health risks and impairing cellular energy production. While our previous studies have shown that peanut sprout extract (PSE) effectively reduced lipid accumulation, and mitigated high-fat diet-induced obesity, its effects on myosteatosis and sarcopenia have not yet been investigated.

Methods: To investigate the effect of PSE on muscle atrophy and myosteatosis, C57BL/6 male mice were divided into four groups: (i) Control, (ii) dexamethasone (Dex), (iii) Dex+high fat/high sucrose (HFHS), and (iv) Dex+HFHS+PSE. The mice were orally administered PSE (10 mg/kg BW) along with either low-fat diet (LF, 11 % kcal fat) or HFHS (60 % kcal fat with 20 % sucrose in D3) for a duration of 10 weeks. In the last 6 days, dexamethasone (Dex, 10 mg/kg BW) was treated to exacerbate the muscle atrophy.

Results: The results showed that PSE treatment reduced triglyceride levels of skeletal muscle, preserved muscle fiber size compared with Dex+HFHS. Interestingly, Dex and HFHS mediated impaired grip strength and muscular strength, biomarkers for functional muscle atrophy, were significantly ameliorated by PSE administration. Additionally, PSE treatment decreased the expression of muscle atrophy markers and improved the protein expression level of mitochondrial transcription factor A (TFAM) and oxidative phosphorylation (OXPHOS) in skeletal muscles. The aggravated proinflammatory responses such as tumor necrosis factor-α (TNFα) gene expression and nuclear factor-κB (NFκB) protein expression were inhibited by PSE in skeletal muscles. We also confirmed the protective effect of PSE against muscular atrophy *in vitro* using C2C12 cells treated with Dex.

Conclusions: These findings indicated that PSE effectively mitigated skeletal muscle atrophy induced by Dex and HFHS *in vivo* and *in vitro* inhibition of proinflammatory responses and amelioration of mitochondrial function.

Key words Skeletal muscle atrophy, Sarcopenia, Peanut sprout, High fat and high sucrose, Dexamethasone

Category: Basic Nutrition& Research

HUMAN MILK OLIGOSACCHARIDE SUPPLEMENTATION DURING AND AFTER ANTIBIOTIC TREATMENT AFFECTS THE MICROBIOME AND THE INFLAMMATORY ENVIRONMENT OF THE GUT

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Background and objectives:

The objective of this study was to investigate the effect of human milk oligosaccharide (HMO) supplementation during and after antibiotic treatment on the microbiome, short chain fatty acid (SCFA) concentrations and the cytokine profile in the gut.

Methods:

Thirty-two BALB/C mice were divided into four groups receiving either no treatment, ampicillin, or ampicillin+HMO1 or HMO2 for seven days. During the subsequent two weeks of recovery the mice either received no supplement or continued to receive HMOs. Fecal samples were collected for 16S sequencing at baseline, on day 7, 14 and 21 (upon euthanasia). Ileum tissue and cecum content were collected for cytokine and (SCFA) concentrations, respectively.

Results:

16S sequencing of fecal samples revealed an almost complete elimination of the microbiota after seven days of ampicillin treatment with a gradual recovery of bacteria over the next two weeks. Bray-Curtis dissimilarity test showed a continued distinction between the HMO supplemented groups and both the control and ampicillin treated groups on day 14 and 21.

Analysis of cecum content showed an increase in the concentration of acetate when animals where supplemented with ampicillin+HMO1 compared to ampicillin alone. Cytokine measurements on ileum homogenates showed a decrease in pro-inflammatory cytokines (e.g. IFNγ, IL-17 and MCP1) when animals received HMOs during and after antibiotic treatment compared to control and ampicillin alone.

Although the overall results were similar between the two HMO supplemented groups, there were distinct differences in both the microbiome composition and cytokine profile of the gut following the supplementation.

Conclusion:

HMO supplementation during and after ampicillin treatment affects the microbiome composition, and the pro- and anti-inflammatory cytokine environment in the gut. The changes were similar between the two HMO groups, but with slight differences indicating different mechanism of action for the HMOs.

Key words Human milk oligosaccharides, antibiotic recovery, microbiome, cytokines

Category: Basic Nutrition& Research

Diets enriched in sugar, refined or whole grain differentially influence plasma and liver cholesterol and triglyceride concentrations with concurrent changes in gut microbiota composition in ApoE-/- mice

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Aims: We aimed to compare the effects of diets enriched in sugar, refined grain (RG) or whole grain (WG) on plasma and liver total cholesterol (TC) and triglyceride (TG) concentrations, liver biomarkers of oxidative stress, and gut microbiota composition in $ApoE^{-/-}$ mice.

Methods: Forty-four male $ApoE^{-/-}$ mice aged 8wk old were randomly fed an isocaloric WG, RG or sugar-enriched diet for 12wk. Diets were matched for similar macronutrient composition but differed in types of carbohydrates. Fecal samples were collected from week 8 to 12 and liver tissues were collected following euthanization at week 12. Concentrations of plasma and liver TC and TG, liver oxidative stress biomarkers, including superoxide dismutase (SOD) and malondialdehyde (MDA), and gut microbiota composition were measured using standard methods.

Results: Sugar-enriched diet resulted in higher plasma and liver TC concentrations than WG-enriched diet and higher plasma TG concentrations compared to both RG- and WG-enriched diets (all $P<0.05$). Liver TG and MDA concentrations and SOD activity were not significantly different among diet groups. In comparison to WG-enriched diet, sugar-enriched diet resulted in lower relative abundance of Alistipes and Bacteroides, which was inversely associated with plasma or liver TC concentrations, and higher relative abundance of Lactobacillus, which was positively associated with plasma and liver TC concentrations and inversely associated with the liver SOD activity (all $P<0.05$). The relative abundance of Colidextribacter and Lachnoclostridium were lower in WG- than RG-enriched diet, and they were inversely associated with liver SOD activity and MDA content (all $P<0.05$).

Conclusions: Sugar-enriched diet had unfavorable effects on concentrations of plasma and liver TC and liver TG compared to WG-enriched diet, with concurrent changes in the relative abundance of gut microbiota. These results suggested that changes in gut microbiota composition could partially contribute to alterations in TC and TG profiles induced by different types of carbohydrates.

Key words sugar; refined grain; whole grain; total cholesterol; triglyceride; oxidative stress; gut microbiota

Category: Basic Nutrition& Research

Establishment of Asian Food Composition Database - Philippines

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The importance of food composition tables and databases is essential in understanding human nutrition and recommending appropriate dietary interventions, analyzing nutrient intakes, formulating dietary guidelines for a specific population, and crafting nutrition, food security, health, and agricultural policies.

This three-year project is an initiative to preserve the Asian food culture and biodiversity and improve the Asian Food and Agriculture Cooperation Initiative (AFACI) member countries' capacity to set up a Food Composition Database (FCDB). The project also aims to develop an FCDB of the Philippines' primary production and export of food items which will be linked and integrated with the databases created by AFACI member countries to build the Asian Food Composition Database. To establish this FCDB, a steering committee was established to recommend food items and review the project's accomplishments. The project team collected samples from 10 different commercial and distribution sources in other regions and submitted them for analysis to selected ISO-Certified Laboratories.

The project team members' capacity development highlights the project's first year. This was accomplished by selecting the 100 food items, which will be part of the database, procurements, and documentation of the food sources and analyzing the mandatory nutrients of the project's 20 out of 100 food item requirements. This project is expected to improve the capacity of AFACI member countries in setting up an FCDB by providing the essential infrastructure for food and nutrition research and dietary practice and promoting regional advocacy and international cooperation.

Key words food composition database, AFACI, Philippines

Category: Basic Nutrition& Research

Effects of eel essence on fat oxidation and anti-fatigue property in diet-induced obesity mice model

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Eel meat contains high-quality protein and various essential amino acids, fatty acids (EPA/DHA), special nutrients and other chemical components. The more of amino acid composed content are glutamine, branched-chain amino acids, alanine, lysine and arginine. The purpose of this experiment is to evaluated the Nutraceutical functions of eel essence. In this experiment, 4 groups of C57BL/6J mice were respectively fed diets containing either normal fat (16 kcal%, AC), high fat (54 kcal%, HC), AC group or HC group were fed by oral gavage the eel essence (767 mg/kg body weight, AEE and HEE), for 8 weeks, based on a 2 × 2 factorial design, to test the significance of the effect of fat quantity, the effect of eel l essence and their interaction.

Compared to the AC group, the HC group and the HEE group had significantly more body weight, more fat composition percentage, higher feed efficiency and higher energy efficiency. The HC group was a diet-induced obesity animal model. Improvement of some Metabolic syndrome risk factors could be observed in the groups fed eel essence, including higher serum HDL concentration and lower serum LDL concentration. But abdominal fat accumulation was not improved in HEE group. The higher strength of Whole-limbs grip measurement and longer time of exhaustion of swimming was observed in eel essence groups.

The gene expression of hepatic acyl-CoA thioesterase 1 (ACOT1) was significantly decreased in the HEE group. ACOT1 regulates fasting hepatic fatty acid metabolism by balancing oxidative flux and capacity. It is speculated that the excessive fatty acids oxidation was reduced by the eel essence. Hence, it was concluded that eel essence has the potential to regulate fat oxidation and anti-fatigue.

Key words Eel, Diet-induced-obesity, LDL, Anti-fatigue, Acyl-CoA thioesterase 1

Category: Basic Nutrition& Research

A formulated beverage containing Mulberry Leaf extract and Tryptophan taken with evening-meal results in improved sleep and next-day cognitive function in adults: a double-blind placebo-controlled cross-over RCT

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Background and objectives: Poor sleep is associated with cognitive impairment across the lifespan. Diet and nocturnal metabolism are modifiable factors that could potentially improve sleep quality. This study evaluated the effectiveness of a formulated beverage containing Mulberry Leaf extract (750mg) and Tryptophan (120mg) taken with evening-meal to improve sleep and next-day mood and cognitive performance in healthy adult poor-sleepers.

Methods: A double-blind, 2-arm, cross-over RCT was conducted (ClinicalTrials.gov: NCT05372900). Adults (age 25-50) self-identifying as poor sleepers were recruited. Poor sleep was confirmed at screening by the Pittsburg Sleep Quality Index (score >5) and actigraphy (<85% mean sleep efficiency) over 14-days. All participants received standardized evening meals (glycemic load of 55 ±10%) and test beverages to be consumed concurrently ~4-hours before bed. Intervention phases lasted 14-days punctuated with a 28-42day washout period. Primary outcomes were: Sleep Efficiency (SE) and Sleep Onset Latency (SOL) measured by actigraphy. Secondary outcomes included: mood, sleep quality and cognitive performance measures at breakfast, lunch and dinner time (~1-1.5hours, 6 and 12-hours post-morning waking).

Results: Intention-to-treat analysis were performed using linear mixed model adjusting for baseline and treatment order. Consumption of the treatment compared to control resulted in significant improvement of SOL (actigraphy=-3.48 mins, p=.026; self- report=-16.7mins, p=.031), albeit no significant effect on SE (p=.230). The following morning participants reported feeling significantly less sleepy (p=.041) and more aroused (p=.026). Cognitive performance was improved on several tests at breakfast, lunch and dinner timepoints: For psychomotor vigilance, reaction time (p=.598, p=.051, p= .024) and lapses (p=.027, p=.005, p=.004) were significantly reduced. Participants also produced fewer false alarms on the 2-Back task (p=.014, p=.045, p=.030). Additionally, participants reported improved perceived performance over the day (p=.014, p=.063, p=.010).

Conclusions: These findings may represent a new simple strategy to support sleep, mood and cognitive benefits in the general adult population.

Key words mulberry leaf extract, tryptophan, sleep, cognition

Category: Basic Nutrition& Research

印度农村少女血清铁调素水平与贫血的关系

Association of serum hepcidin levels with anemia among rural adolescent girls in India

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Introduction: In India, anemia affects around 40% adolescent girls (CNNS, 2018) and is associated with adverse functional consequences on physical and cognitive health. Hepcidin is the iron-regulatory hormone and an early marker of iron deficiency anaemia. The present study was undertaken to assess the association of serum hepcidin with anaemia and other factors among rural adolescent girls in India.

Methodology: A cluster randomized control trial study was conducted in Ballabgarh block of Faridabad District, Haryana, India. Baseline data of a total of 198 non-anaemic and 202 anaemic adolescent girls (12–19 years) was analysed for haemoglobin and serum level of hepcidin, ferritin, folate acid, soluble transferrin receptor, vitamin B 12 and CRP. Iron deficiency was characterized as ferritin deficiency plus sufficient folate amongst participants with CRP ≤ 5 mg/l in addition to individuals with elevated sTfR and sTfR–ferritin index in participants with CRP >5 mg/l. Folate deficiency was characterised as sufficient ferritin along withdeficiency of folate, irrespective of CRP concentrations.

Results: Serum hepcidin was found to negatively correlated with hemoglobin (r= -0.128, p=0.026), folate (r= -0.207, p<0.001), vitamin B 12 (r=-0.1151, p=0.049) and positively correlated with Soluble transferrin receptor (mg/L) (r=0.167, p=0.010). Anaemic participants had significantly higher hepcidin levels (β, 31.16; p= 0.047). Hepcidin levels were significantly higher in girls with folate deficiency (β, 0.0003; p= 0.009) and lower in girls with inflammation (β, -0.0002; p= 0.043).

Conclusion: Serum hepcidin is significantly associated with anemia, folic acid deficiency and inflammation but not with iron deficiency. The utility of serum hepcidin as a marker for diagnosis of anemia and iron deficiency needs further research.

Key words Hepcidin, Anaemia, Iron, Folate

Category: Basic Nutrition& Research

Effect of canola oil or soybean oil on the pathological conditions of spontaneously hypertensive rats stroke-prone (SHRSP)

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Background and Objections

Canola oil (Can) and several edible oils reduce the lifespan in stroke-prone spontaneously hypertensive rats (SHRSP) compared to soybean oil (Soy). However, the cause or mechanism of this abnormal action of Can is unknown. In the present study, biological and physiological parameters were measured in SHRSP fed a Can or Soy diet to determine the mechanism of Can-induced reduction in survival.

Methods

Male or female SHRSP rats were fed a test diet from 4 or 5 weeks of age. The test diets consisted of a conventional diet or AIN-93G mixed 9:1 with Can or Soy, without Soy mixed with 7% oil. After a fixed period of consumption of the test diets, blood and tissue samples were harvested, and biological parameters were measured using GC, LC/MS/MS, ELIZA, RT-PCR, and histological analysis.

Results

During the feeding period, body weight, and food intake did not differ between the two dietary groups. In male SHRSP, systolic blood pressure was higher on the Can diet than on the Soy diet. Life expectancy on the Can diet was shorter than on the Soy diet for both sexes. Serum and liver lipid levels reflected those of the test diet, but phytosterol levels were significantly higher in the Can group. The Can diet also influenced serum steroid hormone levels, decreasing testosterone, increasing aldosterone, and altering the genes involved. Histological analysis revealed that the Can diet promotes the pathogenesis of renal dysfunction in SHRSP.

Conclusion

Feeding SHRSP on a Can diet causes an increase in systemic blood pressure, phytosterol accumulation in tissues, and changes in steroid hormone levels. These biological changes are thought to promote renal dysfunction, increased blood pressure, and fatal strokes associated with a shortened life span.

Key words canola oil, soybean oil, SHRSP, lifespan, steroid

Category: Basic Nutrition& Research

Molecular mechanism of intestinal alpha-glycerophosphocholine metabolism and TMAO production

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Backgrounds and objectives: Choline is an important nutrient for phospholipids and acetylcholine synthesis. Alpha-glycerophosphocholine (GPC) has been expected for the prevention of brain disorders such as Alzheimer's disease. However, recent studies showed that high intake of choline-containing compounds can be metabolized to trimethylamine (TMA) by intestinal microflora and subsequently converted to trimethylamine N-oxide (TMAO) in the liver, which is tightly associated with atherosclerosis progression. In this study, we examined the TMAO production by GPC supplementation and explored the mechanism of the absorption and metabolism of GPC in the digestive tract in vivo.

Methods: Male 7 weeks old ICR mice were orally administered choline (500mg/kg) and an equimolar dose of GPC to examine blood TMAO level. Next, this study used human intestinal epithelial cell (Caco-2) model with transwell system Caco-2 cells to examine GPC permeability and metabolism in the digestive tract. We focused on an enzyme GDE5 which can convert GPC to choline and created intestinal epithelial cell-specific GDE5 knockout mice (GDE5KO mice). GDE5KO mice were subjected to oral administration of GPC to clarify the key roles of GDE5 in GPC absorption and metabolism.

Results: GPC supplementation showed higher blood TMAO levels than free choline. Exogenously added GPC was hydrolyzed to choline in the apical medium from Caco-2 cells. GDE5 deletion in the intestinal epithelial cells alleviates GPC-induced TMAO boost in blood in vivo.

Conclusion: GPC is possibly converted to choline in the absence of gut microbiota. Intestine-specific GDE5 KO mice decrease TMAO production, suggesting the involvement of the intracellular enzyme GDE5 in GPC degradation and choline/TMA synthesis in the digestive tract. New food pairing to inhibit intestinal GPC degradation would be a promising strategy not only to enhance GPC absorption which is key for the prevention of brain diseases but also to decrease a risk related to TMAO production.

Key words GPC, Glycerophosphocholine, TMAO, choline, GDE5

Category: Basic Nutrition& Research

Energy cost of selected physical activities among community-dwelling older Filipinos in Taguig City, Philippines

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Background and objectives: Aside from a healthy diet, regular physical activity is essential for healthy aging. However, more older adults tend to be physically inactive. Current measures of energy cost of physical activity are based on the adult populations. Considering the different physiologic changes on older adults, this study aimed to measure and determine the energy cost of selected physical activities to have a better understanding of their health as well as their capabilities to perform physical activities.

Methods: This is a cross-sectional study among 16 Filipinos, 60-79 years old, residing in Taguig City. The study used the Global Physical activity Questionnaire (GPAQ) to determine the level of physical activity among the participants. A Dual X-Ray Absorptiometry (DXA) machine was used to measure the body composition while the indirect calorimeter (COSMED Fitmate) was utilized in measuring the resting metabolic rate (RMR) of the participants. The energy cost of the three exercise routines including treadmill walking, self-paced walking, and exercise routine based on DOST-FNRI developed manual were measured using a portable indirect calorimeter (COSMED K5). Results were presented as percentage and average.

Results: Results revealed that 29.4% of the participants are not meeting the recommended physical activity level based on the GPAQ score. Meanwhile, 21.0% have low muscle mass based on body composition. The average RMR of the participants was 1228 + 268.7. The average METs for walking on treadmill at different speeds ranges from 2.3-2.5; 2.1-3.9 METs for self-faced walking and 1.5-2.2 METs for the exercise routine based on DOST-FNRI developed manual.

Conclusion: The measured METs of the different activities performed using an indirect calorimeter were presented in this study. The results may serve as basis in the development of a more appropriate guideline and interventions for physical activity of Older Filipinos.

Key words energy costs, older adults, indirect calorimetry, Filipinos

Category: Basic Nutrition& Research

Evaluation of Prebiotic Activity Score of Tapioca Resistant Maltodextrin

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Background and Objectives: Tapioca resistant maltodextrin (TRM) is a novel non-viscous, soluble resistant starch with potential health benefits. This study seeks to evaluate the TRM's prebiotic activity score (PAS) in comparison to commercial prebiotics including inulin, fructooligosaccharides (FOS), and konjac glucomannan hydrolysate (KGMH).

Methods: The PAS measures prebiotic efficacy based on the ability to promote probiotic growth and inhibit pathogen growth. Probiotic strains (*Lactobacillus salivarius* B37, *L. acidophilus* LA5, *L. paracasei* L45, *L. rhamnosus* L34, and *L. paracasei* TISIR 2593) and the pathogen *Escherichia coli* ATCC 25922 were inoculated at 1% (v/v) into their respective culture media: Tryptic Soy Broth (TSB) for probiotics and de Man, Rogosa and Sharpe (MRS) broth for enteric culture. Media were supplemented with 1% (w/v) of either inulin, FOS, KGMH, TRM, or glucose. Cultures were incubated at 37 °C for 24 hours. Bacterial cell counts were determined pre- and post-incubation using the pour plate method and PAS calculations.

Results: Among tested strains, *L. salivarius* B37 exhibited the highest PAS with KGMH (0.226), followed by TRM (0.005), while inulin and FOS displayed negative results. In the growth of *L. acidophilus* LA5, *L. paracasei* L45, and *L. rhamnosus* L34, TRM (with PAS values of 0.435, 0.224, and 0.238, respectively) and KGMH (with PAS values of 0.323, 0.656, and 0.121, respectively) demonstrated superior PAS compared to inulin. For *L. paracasei* TISIR 2593, TRM (0.376) and inulin (0.216) presented positive PAS values, whereas FOS and KGMH presented negative PAS values. Notably, FOS displayed negative PAS values for all probiotic strains, while TRM showed positive results across all probiotics.

Conclusions: The findings indicated that TRM exhibits the highest PAS for *L. acidophilus* LA5, *L. paracasei* TISIR 2593, and *L. rhamnosus* L34 without negative effects on any probiotics. These results highlight the potential health benefit of TRM.

Key words Tapioca resistant maltodextrin, Prebiotic activity score, Probiotic, Dietary fiber

Category: Basic Nutrition& Research

Supplementation with N3 milk shows bifidogenic effect and improves health-linked microbial-metabolites in plasma: A randomized, double-blind, controlled trial

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Background and objectives

Supplementation with galacto-oligosaccharides (GOS) has been previously linked to several health benefits, predominantly via gut microbiome modulation. N3 milk is transformed from standard milk by one-step in situ trans-galactosylation, where 90% of lactose is converted to a GOS blend and small amounts of glucose and galactose. In a clinical study, we investigated the hypothesis that N3 milk modulates gut microbiome and a range of health-linked biomarkers.

Methods

A randomized, double blinded, controlled clinical trial in n=26 healthy volunteers using crossover design (2 weeks intervention periods and 2 weeks washout period). Participants consumed once daily 33 g of N3 milk powder dissolved in approximately 200 ml of liquid during the intervention period and the same amount of lactose-free skimmed milk during the control period. Stool and overnight fasting blood samples were collected at the start and the end of both intervention periods. Gut microbiome was assessed using shotgun metagenomics. Plasma metabolites were analyzed with both targeted and untargeted metabolomics methods.

Results

Two weeks of supplementation with N3 milk led to highly significant increase in proportion of gut bifidobacteria, compared to lactose-free milk ($p<0.0001$). Plasma acetate ($p<0.025$), caprylic acid ($p<0.05$), ketone bodies ($p<0.04$), beta alanine ($p<0.01$) and vitamin B3 ($p<0.025$) also increased. Untargeted plasma metabolomics revealed a shift in amino acid metabolism with N3 milk, manifesting as an increase in 3-indole propionate ($p=0.01$), accompanied by a decrease in two uremic toxins, p-cresol sulphate ($p=0.02$), and indoxyl-sulphate ($p=0.04$).

Conclusions

N3 milk increased the relative amount of bifidobacteria present in the gut, along with microbiome-mediated plasma metabolites linked to immune and metabolic health benefits.

Key words Bifidobacteria, milk, galacto-oligosaccharides, acetate, 3-indole propionate

Category: Basic Nutrition& Research

Dietary calcium intake controls intestinal development via 1,25(OH)2D3-VDR signaling

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Background and objectives

Active vitamin D [$1,25(OH)_2D_3$]-vitamin D receptor (VDR) signaling is responsible for the mechanism on the intestinal active calcium absorption. Since the expression of $1,25(OH)_2D_3$-VDR responding calcium transporters were decreased by dietary calcium supplementation, changes in luminal calcium concentrations also affect vitamin D action. In this study, we evaluated the effect of calcium intake on $1,25(OH)_2D_3$ action with both intestinal epithelial cells and tissues derived from mice, and investigated the importance of $1,25(OH)_2D_3$-VDR signaling during intestinal tissue formation.

Methods and Results

Firstly, we evaluated the cellular response to $1,25(OH)_2D_3$ treatment in intestinal epithelial cells from p53-null mice when calcium concentration in the culture medium was changed. The expression levels of targets responding $1,25(OH)_2D_3$-VDR signaling, such as *cyp24a1* and *trpv6*, increased by $1,25(OH)_2D_3$ treatment in dose-dependent manner when calcium concentration was 1mM, but this change disappeared when concentration was increased to 5mM. In the next step, to investigate whether the dietary calcium intake altered the responsiveness of $1,25(OH)_2D_3$-VDR signaling in the intestinal epithelium, mice lacking VDR activity in the intestine were demonstrated and the changes in expression of vitamin D responsive molecules were assessed in mice receiving 0.5% and 1.0% calcium diets. The signals of epithelial localization of vitamin D-responsive cell adhesion factor (claudin2) were enhanced by an increase in dietary calcium intake, indicating the importance of appropriate amounts of calcium intake. Further, intestinal epithelial organoids were developed with the intestinal crypts derived from mice lacking genetic VDR activity (VDR-), and the importance of $1,25(OH)_2D_3$-VDR signaling during intestinal tissue formation was evaluated. As a result, the efficiency of organoid formation was markedly reduced in VDR- compared to those from wild type mice.

Conclusions

These results suggest that calcium in the intestinal lumen is a determinant of $1,25(OH)_2D_3$-VDR signaling in the intestine, and considered to be the facilitative factor for normal development of intestinal tissues.

Key words vitamin D, vitamin D receptor, calcium, intestinal epithelium, intestinal organoid

Category: Basic Nutrition& Research

The role of cross-talk axis between vitamin D and phosphorus metabolism in mice

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Background and objectives: Vitamin D endocrine system regulates phosphorus transport broadly. In phosphorus homeostasis, extracellular ATP is one of a capable supplier for inorganic phosphorus and those system is partly promoted by ENPP1 action. Our previous study demonstrated the vitamin D-dependent transcriptional control of ENPP1. In this study, to examine the interaction of vitamin D and ENPP1-mediate phosphorus metabolism, the effect of dietary phosphorus on the regulation of phosphorus homeostasis was demonstrated in mice.

Methods and Results: Firstly, to examine phosphorus homeostasis, a normal diet (0.5% phosphorus) and a low phosphorus diet (0.25%) were administrated to ENPP1 lowering-of-function mutant mice (ENPP1asj). ENPP1asj fed a normal diet had lower serum phosphorus concentrations than wild-type mice. Compared to mice with normal diet, low-phosphorus diet did not further reduce serum phosphorus concentrations. In addition, osteoclast bone resorption activity observed by histological analysis was increased by low phosphorus diet in ENPP1asj mice. These results suggested that phosphorus homeostasis was maintained by osteoclast bone resorption. Secondly, to examine the interaction between vitamin D and ENPP1 in phosphorus metabolism, we generated vitamin D receptor-deficient mice lacking vitamin D function (VDRKO). Whereafter, VDRKO was crossed with ENPP1asj to generate double mutant mice (VDRKO-ENPP1asj). Serum phosphorus levels were reduced in VDRKO and ENPP1asj compared to wild-type mice. A greater reduction in serum phosphorus concentrations were observed in VDRKO-ENPP1asj. The impaired bone resorption in VDRKO was improved in VDRKO-ENPP1asj. These results indicated that phosphorus mobilized by bone-resorption was not sufficient to maintain homeostasis in mice lacking both vitamin D and ENPP1 action.

Conclusions: In conclusion, dietary phosphorus restriction did not disturb phosphorus homeostasis in the presence of vitamin D-VDR signaling regardless of ENPP1 action. Furthermore, ENPP1 was suggested to maintain phosphorus homeostasis through a mechanism independent of vitamin D function with respect to phosphorus metabolism.

Key words phosphorus metabolism, phosphorus, vitamin D, enpp1, calcium

Category: Basic Nutrition& Research

The Effect of Breed and Lactation Period on Sheep Milk Oligosaccharides

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Background and objectives: Milk oligosaccharides are abundant in human milk and have numerous biological functions for newborns, and milk oligosaccharides found in domestic animals also have similar physiological functions to human milk oligosaccharides. Sheep milk is currently growing in China and is mainly used for home consumption and production of infant formulas. However, there are few studies on sheep milk oligosaccharides. Thus, this study was conducted to provide an analysis of sheep milk oligosaccharides among different breeds and lactation periods. Methods: The sheep milk oligosaccharides in different breeds (Hu sheep, East Friesen sheep, East Friesen-Hu crossbred sheep) at different lactation periods (colostrum, mature milk) were extracted using ethanol and purified by graphitized carbon SPE columns. Qualitative and quantitative analyses of sheep milk oligosaccharides were performed using ultrahigh-performance liquid chromatography-electrospray ionization-tandem mass spectrometry. Results: Among 19 milk oligosaccharides identified in sheep milk, 9 were neutral and 7 were sialylated. There were 19 and 16 types of oligosaccharides in colostrum and mature milk from Hu sheep, 18 and 15 types from East Friesen sheep, and 15 and 14 types from East Friesen-Hu crossbred sheep, respectively. Moreover, Hu sheep colostrum had the highest abundance of milk oligosaccharides among six sheep milks, followed by East Friesen sheep colostrum, while East Friesen-Hu crossbred sheep mature milk had the lowest abundance of milk oligosaccharides. Conclusions: The abundance of sheep milk oligosaccharides was significantly influenced by the breeds and lactation period ($P < 0.05$) while the type of sheep milk oligosaccharides was not greatly affected. These findings provide evidence for the potential value of sheep milk for the commercial applications of milk oligosaccharides in functional foods.

Key words oligosaccharides, sheep milk, Hu sheep, East Friesen sheep, East Friesen-Hu crossbred sheep

Category: Basic Nutrition& Research

Altered Intestinal Phenotype and Microbiota in Osteogenesis Imperfecta Mouse Models

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Osteogenesis imperfecta (OI) is an inheritable bone fragility disorder characterized by age-dependent hypermetabolism. OI is mainly caused by genetic mutations in collagen-I, a dominant intestinal component sustaining intestinal structure and function. With rising attention on the gut-bone axis, it remains unclear whether OI-related collagen-I defects affect the intestinal structure and microbiota.

This project randomly assigned OI mice (Col1a1$^{Jrt/+}$, Oim$^{-/-}$) and their wild-type counterparts to three age groups (4-, 8-, and 12 weeks). Body weight and intestinal length were determined during dissection. The intestinal structure was evaluated via histomorphometry. Cecal microbial fatty acids profiling was conducted using gas chromatography. Real-time polymerase chain reaction analyzed total RNA expression in duodenal samples.

Results showed that male and female OI mice had less weight gain over 4 to 12 weeks of age. Further, Col1a1$^{Jrt/+}$ and Oim$^{-/-}$ mice had longer relative intestinal lengths. Healthier villus-crypt units were also observed in Col1a1$^{Jrt/+}$ mice at all ages. Genetically, collagen-I and III, critical for intestinal structure, were less expressed in male Col1a1$^{Jrt/+}$ and Oim$^{-/-}$ mice, while tight junction proteins' expression significantly decreased in female Oim$^{-/-}$ mice. Noticeably, expression of CYP24A1 was significantly lower in all OI mice at 4 weeks old, suggesting better calcitriol-mediated calcium uptake in the duodenum. Lastly, cecal fatty acids profiling addressed decreased saccharolytic and proteolytic activities in 4-week female Col1a1$^{Jrt/+}$ mice.

This study demonstrates that collagen-I mutation results in a unique intestinal phenotype in OI. Longer intestines with healthier villi and decreased CYP24A1 expression suggest potential compensating mechanisms in OI mice. Additionally, decreased microbial activities in female OI mice imply potential microbial composition alterations. In summary, this study provides valuable insights into intestinal phenotype contribution and potential microbial involvement in OI pathophysiology, which may ultimately lead to the development of novel strategies addressing the nutritional and metabolic needs of OI patients.

Key words Microbiota, intestinal phenotype, gut barrier, osteogenesis imperfecta, gut-bone health

Category: Basic Nutrition& Research

The bone-derived components from adult chickens provide a protective action against impaired bone metabolism in VDRKO mice

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Background and objectives

Post-laying hens called adult chickens are characterized by the presence of medullary bone forming a reticular structure in the endocortical domain, which is resorbed during the formation of the eggshell to supply calcium. Remarkable bone metabolism occur in the hen's body, and medullary bone is considered to contribute to calcium homeostasis. In this study, we tested whether the oral administration of bone-derived components from adult chickens to animals could improve bone metabolism.

Methods

The effects of bone-derived components from adult chickens were investigated in systemic vitamin D (VD) receptor knockout mice (VDRKO), in which VD-dependent calcium homeostasis are disrupted. Meat samples were prepared from adult chickens or young chickens with no egg-laying experience by pressing meat parts including bones, heat-sterilizing, and freeze-drying. The test diets (adult chicken bone-containing diet and young chicken bone-containing diet) were prepared by replacing 25% of the diet weight with each meat sample. The control diet didn’t contain meat sample. Wild-type mice (WT) and VDRKO were fed one of each diet for 4 weeks from 5 weeks of age.

Results

Hypocalcemia and decreased bone strength, characteristic of VDRKO, was observed only in the young chicken bone-containing group and the control diet group and improved to the same level as WT in the adult chicken bone-containing diet group (adult chicken group). Micro-CT analysis of the femurs showed a significant increase in cortical bone and cancellous bone mineral density in VDRKO adult chicken group compared to the control diet group. The impaired apparent calcium absorption in VDRKO was partly recovered by the dietary treatment, the adult chicken group significantly increased only in female mice.

Conclusions

These results suggest that bone-derived components from adult chickens contain VD-independent factors that contribute to bone health, one that improves calcium absorption in the intestinal tract and one that has a direct improving effect on bone.

Key words bone metabolism, adult chicken, calcium absorption efficiency, bone strength, bone mineral density

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Randomized control trial on Weekly Iron and Folic Acid Supplementation (WIFAS) in Malaysia

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Background and objectives: Weekly iron and folic acid supplementation (WIFAS) providing 60 mg of iron and 2.8 mg of folic acid is recommended by WHO to prevent iron-deficiency anemia. However, given the lack of high-level evidence, it has not been recommended to reduce the risk of neural tube defects (NTDs). The aim of this study was to investigate the effect of two doses of folic acid, compared with placebo, on red blood cell (RBC) folate, a biomarker of NTD risk.

Methods: This study was conducted in Malaysia using a three-arm double-blind efficacy trial. Non-pregnant women (n=331) were randomized to receive 60 mg iron and either 0, 0.4, or 2.8 mg folic acid once weekly for 16 weeks.

Results: At 16 weeks, women receiving 0.4 mg and 2.8 mg folic acid per week had a higher mean RBC folate than those receiving 0 mg (mean difference (95% CI) 84 (54 to 113) and 355 (316 to 394) nmol/L, respectively). Women receiving 2.8 mg folic acid had a 271 (234 to 309) nmol/L greater mean RBC folate than those receiving 0.4 mg. Moreover, women in the 2.8 mg group were seven times more likely to achieve an RBC folate >748 nmol/L, a concentration associated with a low risk of NTD, compared with the 0.4 mg group. Other factors such as folate intake and selected snp were looked into as well.

Conclusion: Weekly IFA supplements containing 2.8 mg folic acid increases RBC folate more than those containing 0.4 mg. This shows the potential for RBC folate to increase to concentrations associated with a reduced risk of NTDs. Thus, a guideline revision and inclusion of WIFAS in the WHO Essential Medicine List (EML) would be warranted to accelerate the reduction of NTDs and anemia worldwide.

Key words Weekly Iron Folic Acid Supplementation (WIFAS), neural tube defects, Essential Medicines List

Category: Basic Nutrition& Research

ANTI-OBESITY ACTIVITY OF Momordica cochinchinensis L. SPRENG FRUIT ARIL EXTRACTS ON SPRAGUE DAWLEY RATS FED WITH HIGH FAT DIET AND GENES EXPRESSION (PPARγ, C/EBP AND UCP1)

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Momordica cochinchinensis L. Spreng or gac fruit has a high concentration of carotenoids. There is no study on the gac carotenoids as anti-obesity. The study aimed to investigate the effects of gac aril carotenoid rich-extract (GACRE) against rats fed with a high-fat diet (HFD), through biochemical parameters, adipose tissue mass, adipocyte number and size, liver- and kidney histology, and PPARγ, C/EBP and UCP1 gene expression. The Sprague Dawley rats (n=32); were grouped into G1: regular diet (ND), G2: HFD and G3 and G4: HFD with eight-week GACRE supplementation using oral gavage at 50 mg/kg (GACRE-50) and 200 mg/kg (GACRE-200), respectively. As a result, rats fed with HFD and supplemented with GACRE-50 and GACRE-200 did not significantly decrease in body weight. Rats given GACRE-200 had significantly lower aspartate transaminase levels, but no differences in the level of alanine transaminase, direct-, or total bilirubin. Both groups of rats supplemented with GACRE-50 and GACRE-200 showed a significant decrease of about 50% in the creatine level, but no significant difference in amylase and lipase. In the cardiac function and blood glucose test, obese rats fed GACRE-200 showed a significant decrease in triglyceride, creatine kinase and blood glucose at 32.17%, 22.16%, and 31.30%, respectively. Besides, the administration of GACRE did not significantly decline white- (WAT) and brown adipose tissue (BAT) mass, adipocyte number, and size. The liver histology of HFD rats supplemented with GACRE-200 developed microvesicular steatosis, hepatic sinusoidal congestion, and widening sinusoidal space. PPARγ and UCP1 gene expression was higher in BAT compared to WAT, that linearly proportionate to BAT numbers that are significantly higher than WAT. Higher BAT numbers increased activation of UCP1 and thermogenesis, leading to the effectiveness of GACRE has anti-obesity effects. The results indicate that GACRE exhibited minimal anti-obesity effects at a dosage of 200 mg/kg.

Key words Momordica cochinchinensis, Gac aril carotenoids rich extract, liver histology, anti-obesity, PPARγ, C/EBP and UCP1 gene expression

Category: Basic Nutrition& Research

无麸质饮食的演变及其在炎症性疾病治疗中的关系
Evolution of the gluten free diet and their relation in treatment for inflammatory diseases

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BACKGROUND AND OBJECTIVES: According to OMS, a diet is considered healthy when it's main goal is to protect humans, their organism from denutrition in all ways. There are some diseases and intolerance to food that need special diets to keep people healthy, this is the case of the gluten free diet which is a special diet that has to be followed for healthy reasons in cases such as arthritis, irritable bowel syndrome or celiac disease. The main goal of this research is to determine the effect of a dietary plan with a gluten free diet, also to observe the role of the diet in a gut microbiota level and how it interferes with the absorption of some nutrients.

METHODS: this investigation is a review. The pages for investigation used were proquest, pubmed and scielo. The criterias used were types of inflammatory diseases and their treatment, also gut microbiota and its correlation with nutrients.

RESULTS: in all studies they had a result that gluten free diet is a good option of treatment for inflammatory diseases, however in the absorption level and microbiota, there was evidence of some nutrients that weren't absorbed completely such as some vitamins and minerals. It is recommendable to take probiotics to keep the gut microbiota diversity.

CONCLUSIONS: In the last 20 years there has been an incidence of inflammatory diseases worldwide. People decided to adopt certain lifestyles considering nutrition as their main goal to control inflammation. It is important to have a diet with fiber and vitamins

Key words arthritis, celiac disease, gluten free diet, gut microbiota, inflammatory disease.

Category: Basic Nutrition& Research

儿童和青少年血清锌水平与呼吸系统疾病发病风险的队列研究

A cohort study of plasma zinc levels with risks of incident respiratory diseases in children and adolescents

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Respiratory diseases (RDs) remains a major health risk in children and adolescents. However, whether a higher level of plasma zinc reduced the risk of RDs in children and adolescents is still unknown. We aimed to examine the association of plasma zinc levels with RDs incidence based on a Chinese multi-communities' prospective cohort.

Methods:

We registered the 3753 participants aged 6 to 17 years, who were free of prevalent RDs at baseline, from 14 districts or counties across Sichuan Province, China between September 9, 2016 to Jun 30, 2017. The incident RDs for the participants were followed through the provincial level hospital admission database until December 31, 2020. We estimated the hazard ratios of plasma zinc levels with the risk of incident RDs using cox proportional hazards regression models. The effect modifications by father's education, ethnicity, child's BMI, and child's sex were evaluated through stratified analyses.

Results:

The participants whose fathers were retired or farmer or Han ethnicity, as well as the participants with a higher BMI, or were males, or aged younger than 12 years were at higher risks of incident RDs. The adjusted HRs were 0.67(95% CI: 0.46-0.97), 0.67(95% CI: 0.45-0.99), 0.60(95% CI: 0.40-0.90), and 0.66(95% CI: 0.45-0.98) for the participants in the 2nd, 3rd, 4th, and 5th quintiles of plasma zinc levels, compared with those from the lowest quintile level, respectively. The participants who had higher BMI levels were particularly at higher risks. The study associations remained largely unchanged after excluding parental asthma prevalence cases, or additionally adjusting for the dietary factors.

Conclusion:

Higher levels of plasma zinc were associated with a lower risk of incident RDs in children and adolescents. Developing plasma zinc levels could benefit respiratory health in children and adolescents.

Key words plasma zinc, respiratory diseases, children and adolescents, prospective cohort

Category: Basic Nutrition& Research

长期高脂饮食通过肠道菌群及其代谢物对肥胖性肌肉衰减症的影响及机制研究

Long-term high-fat diet induces sarcopenic obesity in natural aging rats by modulating the gut microbiota and metabolites

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Background: The lack of suitable animal models for sarcopenic obesity (SO) limits in-depth research on the mechanism, prevention and treatment of the disease, and the role of gut microbiota and its metabolites in SO is still unclear. Thus, we aimed to investigate whether long-term high fat-diet (HFD) can cause SO in natural aging animal models, and the effects of gut microbiota and its metabolites on the development of SO.

Results: After feeding for 80 weeks, HFD resulted in obesity-related metabolic disorders, including body weight gain, dyslipidemia, impaired glucose tolerance, insulin resistance, and systemic inflammation in natural aging rats. HFD also promoted a decrease in muscle mass, strength, function, and fiber cross-sectional area and an increase in muscle fatty infiltration in natural aging rats. 16S rRNA, non-targeted and targeted metabolomics analysis revealed thatHFD contributed to the dysbiosis of gut microbiota and its related metabolites in natural aging rats, mainly characterized by an increase in pathogenic bacteria and metabolites including g__Eubacterium_hallii_group, g__Coprococcus, g__Collinsella, g__unclassified_f__Eggerthellaceae and trimethylamine N-oxide (TMAO), as well as a decrease in probiotics and metabolites, including g__Butyricimonas, g__Akkermansia, g__Flavonifractor, g__Intestinimonas and short-chain fatty acids (SCFAs). HFD also destroyed the gut barrier function in natural aging rats, as evaluated by reducing levels of colonic mucin-2, tight junction proteins, goblet cells and elevating serum level of FITC-dextran 4. Correlation analysis revealed that the positive association between pathogenic bacteria, TMAO and SO-related phenotypes, and the negative association between probiotics, SCFAs, and SO-related phenotypes. Moreover, removing gut microbiota with antibiotics treatment partially ameliorated HFD-induced SO and decreased the levels of SCFAs and TMAO in natural aging rats. In addition, TMAO treatment could cause systemic inflammation and sarcopenia in HFD-fed, aged rats.

Conclusions: Long-term HFD leads to SO in natural aging rats, partially through the gut–microbiota–metabolites–muscle axis.

Key words High fat-diet; Natural aging; Sarcopenic obesity; Gut microbiota; Metabolites; Trimethylamine N-oxide

Category: Basic Nutrition& Research

遵守 2018 年 WCRF/AICR 饮食建议与肠道微生物群和炎症水平的关系

Associations of adherence to the 2018 WCRF/AICR dietary recommendations with gut microbiota and inflammation levels

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Background: Whether adherence to the World Cancer Research Fund and the American Institute for Cancer Research (WCRF/AICR) dietary recommendations has an effect on gut microbiota and inflammatory status in people at high risk for CRC remains unclear.

Objectives: We aimed to assess the association of adherence to the WCRF/AICR diet with gut microbiota and inflammation in a cross-sectional setting.

Methods: The WCRF/AICR diet adherence scores were calculated for 151 participants from 7-day dietary records. The gut microbiota was analyzed by 16S rRNA gene sequencing. Inflammatory marker levels (FCP, IL6, IL8, IgA, IgM, and IgG) were assessed in 97 adenoma patients. In multivariate-adjusted linear regression analyses, we investigated the association of individual and total dietary adherence scores with gut microbiota and inflammatory marker levels, with a gender-stratified analysis for inflammation.

Results: Participants with higher total adherence score had lower relative abundance of *Proteobacteria* (β -0.041, 95%*CI* -0.073; -0.009), *Enterobacteriaceae* (β -0.035, 95%*CI* -0.067; -0.003), and an unidentified *Enterobacteriaceae* (β -0.029, 95%*CI* -0.055; -0.003) at the genus level compared with those reporting low adherence scores. Intake of plant-based food was associated with increased abundance of *Phascolarctobacterium* (β 0.013, 95%*CI* 0.001; 0.026); Limiting fast food was associated with increased abundance of *Bacteroidaceae* (β 0.149, 95%*CI* 0.040; 0.257) and *Bacteroides* (β 0.149, 95%*CI* 0.040; 0.257). Limiting sugary drinks was associated with lower abundance of *Lachnospiraceae* (β -0.155, 95%*CI* -0.292;-0.018). In terms of inflammation, plant-based food intake (β -0.251, 95%*CI* -0.450; -0.052) and 'fast food' restriction (β -0.226, 95%*CI* -0.443; -0.008) were associated with lower IGG levels in men; Alcohol restriction was associated with lower IL6 (β -7.095, 95%*CI* -11.286; -2.903) and IL8 (β -7.965, 95%*CI* -14.700; -1.230) in women, but with higher IL6 (β 0.918, 95%*CI* 0.161; 1.675) in men.

Conclusion: Our findings support the association of adherence to the WCRF/AICR diet with gut microbiota and inflammation.

Key words Diet; WCRF/AICR; Colorectal cancer; Gut microbiota; Inflammation;

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日粮烟酰胺核酸对骨骼肌和下丘脑功能调控的量效机制研究

Dietary nicotinamide riboside affects motor function and hypothalamic gene expression in a dose-dependent manner

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Nicotinamide ribose (NR) is a dietary vitamin B3 that is a precursor for the essential metabolic cofactor nicotinamide adenine dinucleotide (NAD+). We previously established that among a range of concentrations, 30 mg NR per kg diet best supported metabolic health in mice. High, as well as low levels of NR had negative health effects through distinct mechanisms. Since motor performance and hypothalamic responses are important physiological read-outs for metabolic health, we now investigated this in detail. Male C57Bl/6JRccHsd mice were fed a semi-purified obesogenic diet (40% fat) containing 0.14% L-tryptophan and either 5, 30, or 900 mg NR per kg diet for 15 weeks. Compared to 30NR- fed mice, feeding a 5NR and 900NR diet lowered grip strength in mice, which was dependent on intervention time. The 900NR diet negatively affected motor coordination. Anti-oxidant defense genes *Prdx3* and *Sod1* were decreased by 900NR in the skeletal muscle. In the hypothalamus, gene expression of *Tdo2*, the first rate limiting enzyme in the de novo NAD+ synthesis, was upregulated by 900NR feeding, whereas *Qdpr* was unaffected. The 5NR group displayed an upregulation of hypothalamic *Mapk1* (Erk2), a gene associated with neuronal plasticity, as well as of *Mthfs*, a key enzyme in folate metabolism. In conclusion, high dose NR reduces motor performance, which was associated with a reduction of the anti-oxidant defense in skeletal muscle. Low intake of NR implicates an interaction in the hypothalamus between the two B-vitamins folate and vitamin B3, with unknown functional consequences. Our results strengthen our previous observations that 30NR is the optimal dose to support metabolic health.

Key words Nicotinamide riboside; motor function; transcriptional signature; dose-dependent response

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一株四川泡菜源乳酸菌对单核细胞增生李斯特氏菌的抑制作用

Inhibition of Listeria monocytogenes by a lactic acid bacterium isolated from Sichuan pickles

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Objective: To screen a strain of lactic acid bacteria (LAB) from traditional Sichuan pickles with the best antibacterial activity against *Listeria monocytogenes*, and to investigate its antibacterial substances. **Methods**: The Oxford cup and drilling method were used to screen a strain of LAB9 with the best inhibitory effect on *Listeria monocytogenes*. Bacterial identification was done through 16S rDNA gene sequencing. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined using the dilution ratio method. Preliminary analysis of antibacterial substances was performed through organic acid exclusion assay, protease, acid-base and heat sensitivity tests. To investigate bacteriocin encoding gene, polymerase chain reaction (PCR) was performed by specific primers. Then, its drug resistance and safety were evaluated. **Results**: LAB9 was identified as *Lactobacillus plantarum*. The diameter of antibacterial circles of LAB9 against *L. monocytogenes* were measured to be 19.85 ± 0.14 mm and 11.84 ± 0.16 mm by two inhibition assays. The MIC and MBC of LAB9 were 4 mg/ml and 32 mg/ml, respectively. According to preliminary investigations, antibacterial substances were mainly bacteriocins, although the effect of organic acids cannot be excluded. The PCR detection of several bacteriocin coding genes revealed that LAB9 was harboured six bacteriocin gene among the tested genes, including PLNJK, plnW, plnEF, plnA, plnQ, nis, and plnXY. Among the seven commonly tested antibiotics, only gentamicin and vancomycin showed tolerable effects on the strain. In addition, LAB9 did not exhibit hemolytic activity. **Conclusion**: This study screened a strain of *Lactobacillus plantarum* LAB9 that produces bacteriocins but does not exclude organic acids, and exhibits strong inhibitory effects on *Listeria monocytogenes*. These findings provide a valuable foundation for the control of *Listeria monocytogenes* at low temperatures and the development of novel antimicrobial drugs suitable for application in the food industry.

Key words Listeria monocytogenes, lactic acid bacteria, Lactobacillus plantarum, antibacterial substances

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一株泡菜源乳酸菌对副溶血性弧菌的抗菌物质分析与生物膜抑制作用研究

Analysis of antibacterial substances and biofilm inhibition of Vibrio parahaemolyticus by a pickle-derived lactic acid bacteria strain

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Objective: To screen a strain of lactic acid bacteria (LAB) from traditional Sichuan pickles that exhibits antibacterial activity against *Vibrio parahaemolyticus* and inhibiting biofilm formation. **Methods**: A strain of LAB29 with the best inhibitory effect on *V. parahaemolyticus* was screened using the Oxford cup and double agar diffusion method. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined using the dilution ratio method. Bacterial identification was done through 16S rDNA gene sequencing. Preliminary analysis of antibacterial substances was performed through organic acid exclusion assay, protease, acid-base and heat sensitivity tests. To investigate bacteriocin encoding gene, polymerase chain reaction (PCR) was performed by specific primers. Biofilm biomass was assessed by crystal violet staining. **Results**: Strain LAB29 was identified as *Lactobacillus plantarum*. The inhibition circles of LAB29 against *V. parahaemolyticus* were measured to be 17.41 ± 0.06 mm and 26.36 ± 0.21 mm by two inhibition assays. The MIC and MBC of LAB29 were 8 mg/ml and 16 mg/ml. According to preliminary investigation, the antibacterial substances were bacteriocins, which were sensitive to temperature changes and acidic conditions. These bacteriocin-encoding genes in LAB29 were identified using PCR amplification, including *nis*, *plnQ*, *plnEF*, *plnW*, and *plnA*. Moreover, LAB29 significantly inhibited *V. parahaemolyticus* biofilm formation and showed potential for effective removal of mature biofilm. Treatment with strain product at concentrations of 64 and 128 mg/mL for 12 h resulted in 63.70% and 29.90% inhibition rates of biofilm. Even after 96 h, the inhibition rates remained at 49.10% and 1.23%. **Conclusion**: This study successfully screened a bacteriocin-producing strain, *Lactobacillus plantarum* LAB29. It can exhibit potential as a novel LAB biological agent for preventing and controlling the growth and biofilm formation of *Vibrio parahaemolyticus*. This research contributes to the development of new antibacterial agents and the elimination of pathogenic bacteria biofilm contamination.

Key words Vibrio parahaemolyticus, lactic acid bacteria, Lactobacillus plantarum , antibacterial substances, biofilm inhibition

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维生素 D3 通过靶向调控 NLRP3 炎性小体活化改善 SARS-CoV-2 核衣壳蛋白引起的过度炎症

Targeting NLRP3 inflammasome by vitamin D3 attenuates SARS-CoV-2 nucleocapsid protein-caused hyperinflammation in vitro and in vivo

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Background: SARS-CoV-2 infection-caused coronavirus disease 2019 (COVID-19), a global crisis, is characterized by severe inflammatory responses with no satisfactory therapies. Vitamin D3 (VD3) with excellent anti-inflammatory properties is considered as a potential candidate for COVID-19 treatment; however, little information is available regarding the exact effects of VD3 on SARS-CoV-2 infection as well as the underlying mechanism. Our study aimed to delineate the effect of VD3 on SARS-CoV-2 infection-caused hyperinflammation and the potential involvement of the NOD-like receptor family pyrin domain containing 3 (NLRP3) inflammasome.

Methods and Study Design: A stable expression SARS-CoV-2 N protein human bronchial epithelial cell line (HBE-N) was established by lentiviral vector transfection. C57BL/6J mice were injected with AAV-Lung-EGFP-N (AAV-N) to induce lung injury, followed by treatment with or without VD3. Western blotting, immunofluorescence analysis, ELISA kits, and enzymatic activity assay kits were used to detect protein levels and activities. Specific inhibitors, agonists or siRNAs transfection, and immunoprecipitation were used to explore the underlying mechanism.

Results: VD3 significantly reduced N protein-caused hyperinflammation in HBE cells. Meanwhile, VD3 decreased NLRP3 expression, caspase-1 activity, and interleukin-1β (IL-1β) release in HBE-N cells. Notably, zYVAD-fmk, MCC950, NLRP3 or caspase-1 siRNA enhanced VD3-induced NLRP3 inflammasome inactivation, with subsequent suppression of IL6 and IL1β release in HBE-N cells, which were abolished by nigercin. Moreover, VD3 increased NLRP3 ubiquitination (Ub-NLRP3) expression and the binding of the vitamin D receptor (VDR) with NLRP3, with decreased BRCC3 expression and NLRP3-BRCC3 association. VD3-induced Ub-NLRP3 expression, NLRP3 inflammasome inactivation and hyperinflammation were improved by G5 or BRCC3 siRNA, which were attenuated by TEI-9647 or VDR siRNA in HBE-N cells. Finally, the results of the in vivo study in AAV-N-infected lungs were consistent with the findings of the in vitro experiment.
Conclusions: VD3 attenuated SARS-CoV-2 N protein-caused hyperinflammation by inactivating the NLRP3 inflammasome partially through the VDR-BRCC3 signaling pathway.

Key words Vitamin D3; COVID-19; NLRP3 inflammasome; VDR; BRCC3

Category: Basic Nutrition& Research

四川泡菜源乳酸菌的耐药性分析及安全性评价

Drug resistance analysis and safety evaluation of lactic acid bacteria from Sichuan pickles

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Objective: To analysis the drug resistance and evaluate the safety of 34 strains of lactic acid bacteria (LAB) isolated from traditional pickles in Sichuan. **Methods**: The K-B paper diffusion technique and the antibiotic resistance gene test were used to analyze the drug resistance of the 34 LAB strains. Safety evaluation was evaluated by the hemolysis test, toxicity-related enzyme test, and biogenic amine characterization test. **Results**: The results showed that all 34 strains of LAB exhibited varying degrees of resistance to 12 commonly used antibiotics, and indicating full multi-drug resistance. Vancomycin and streptomycin had the highest rates of antibiotic resistance (100.00%), followed by gentamicin (97.06%), levofloxacin (94.12%), sulfisoxazole (91.18%), tetracycline (64.71%), and clindamycin (58.82%). Conversely, five other antibiotics showed relatively low resistance rates, or even zero resistance to chloramphenicol. Vancomycin resistance gene (*van*X) and rifampicin resistance gene (*rpo*B) were found in 79.41% and 11.76% of LAB strains, respectively. Furthermore, all the tested LAB strains were considered safe as they did not showed either gelatinase, tryptophanase, lecithinase, DNAse or hemolytic activity, and produce biogenic amines. **Conclusion**: This study aimed to evaluate the drug resistance and safety of the 34 isolated LAB strains in order to prevent the selection of drug-resistant or unsafe strains. The findings provide a foundation for the production and application of novel lactic acid bacteria.

Key words Lactic acid bacteria, drug resistance, safety evaluation, antibiotic resistance genes

Category: Basic Nutrition& Research

后生元：定义、制备、健康益处、应用现状及未来展望

Postbiotics: Current Status and Future Perspectives on Definition, Production, Health Benefits, and Applications

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Postbiotics are defined as a "preparation of inanimate microorganisms and/or their components that confers a health benefit on the host". As a new class of functional food ingredients, postbiotics have gained increasing attention in recent years due to their potential health-promoting effects and their safety profile compared to probiotics. However, the regulatory framework for postbiotics is still lacking in many countries, which poses a challenge for their development and commercialization. The health benefits of postbiotics have been demonstrated in numerous studies, including improving gut health, modulating the immune system, and preventing and treating various diseases. Various methods have been developed for the preparation and identification of postbiotics, such as cell-free supernatant, exopolysaccharides, and peptidoglycans. In terms of industrial applications, postbiotics have been used in the food, feed, cosmetics and pharmaceutical industries, showing great potential for improving human and animal health. However, further research is needed to fully understand the mechanisms underlying the health benefits of postbiotics and to optimize their production and formulation. This review summarizes the current understanding of postbiotics, including their definition, regulatory status, health benefits, preparation and identification methods, industrial applications, and future prospects. It is expected to provide a reference for establishing regulatory guidelines, optimizing production processes, and exploring new application areas of postbiotics.

Key words Postbiotics, Definition, Health benefits, Regulatory, Application

Category: Basic Nutrition& Research

转录组学探究不同减重方式对肥胖小鼠多器官功能的影响

Distinct effects of weight loss paradigms on multiple organs transcriptome of diet-induced obese mice

Lin Shi*,Tianqi Liu,Yuan Liu
Sh

Obesity and its related metabolic diseases bring great challenges to public health. In-depth understanding on effects of weight loss interventions is critical for weight management. We used high-fat-high-fructose (HFHF) diet induced obese mice model to investigate how exercise, intermittent fasting, or the change of daily diet from HFHF to normal chow could affect multiple organs (i.e., quadriceps femoris muscles, liver, subcutaneous fat and scapular brown fat) in high-fat-high-fructose diet induced obese mice at the genetic level through high-throughput transcriptomics. The 3 types of weight loss paradigms led to a significant weight loss of obese mice, and no significant difference in weight was found between the mice underwent interventions and normal controls (i.e. mice fed on normal chow) ($p>0.05$). Results from comprehensive analyses on the transcriptome of multiple organs followed by the RT-QPCR verifications indicate tissue-specific effects of 3 paradigms: exercise and intermittent fasting significantly reduced inflammation in mice, and improved the metabolism of glucose and lipid in liver, inhibiting insulin resistance in muscle tissue, amino acid metabolism and thermogenesis in adipose tissue. Exercise in particular enhanced brown fat thermogenesis. Intermittent fasting effectively improved the amino acid metabolism function of the liver and adipose tissue. The change of daily diet however failed to improve metabolic status and biological dysfunctions induced by HFHF in mice, although it caused significant weight loss. Notably, we identified gene contributors that were significantly associated with weight loss induced changes in physiological indicators in obese mice, such as BCAT2, Ubb, Mlycd and Il4i1. Interestingly, those genes could greatly predict the degree of weight gain for those mice after weight loss that retuned to be fed with HFHF. Collectively, our study provides novel insights on the underlying mechanisms of weight loss effects of popular paradigms.

Key words Weight loss, multiple organs, transcriptome , obesity

Category: Basic Nutrition& Research

母乳脂质替代品对初断乳大鼠脂质代谢的影响

The Effects of Human Milk Fat Substitutes on Lipid Metabolism in First-Weaned Rats

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Objective: To investigate the impact of human milk fat substitutes (HMFS) on lipid metabolism and body fat content of first-weaned rats.

Methods: Thirty male Sprague Dawley rats were randomly divided into three groups and fed with blend vegetable oil (BVO) (Control), BVO + OPO (1,3-dioleic acid-2-palmitoyl triglyceride) (OPO), or HMFS for six weeks. Body weight, body fat, serum and liver lipid profile, fecal short-chain fatty acids (SCFAs), gut microbiota, liver lipidomics, and gene and protein expression related to lipid metabolism were measured.

Results: HMFS did not affect the growth performance of rats (body weight: Control: 298.38 ± 26.73 g, OPO: 287.82 ± 19.85 g and HMFS: 302.31 ± 19.21 g) but significantly decreased body fat content (Control: 28.70 ± 1.17 cm3, OPO: 22.51 ± 1.10 cm3 and HMFS: 14.90 ± 0.95 cm3) ($p<0.05$) and serum and liver lipid levels compared to BVO ($p<0.05$). HMFS also increased the abundance of *Bacteroidetes* and SCFAs in the gut and altered the liver lipid metabolism profile, mainly by increasing glycerophospholipids and decreasing glycerides. HMFS upregulated the expression of genes and proteins involved in lipid oxidation and downregulated those involved in lipid synthesis in the liver.

Conclusion: HMFS can reduce body fat content in rats by modulating the "*Bacteroidetes*-SCFAs-glycerophospholipid metabolic pathway" through the "microbiota-gut-liver axis". HMFS may have nutritional benefits for infants and provide a theoretical basis for its application in infant formula.

Key words human milk fat substitutes; lipid metabolism; body fat; intestinal microbiota; SCFAs

Category: Basic Nutrition& Research

成人血清25-羟维生素D水平与高脂血症发病风险的队列研究
A cohort study of serum 25-hydroxyvitamin D levels and the risk of hyperlipidemia in adults

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Abstract: [Objective]: To investigate the association between serum 25(OH)D levels and the risk of hyperlipidemia development in an adult population by a three-year follow-up survey using a prospective cohort study design. [Methods] Cox risk regression models were constructed to explore the relationship between serum 25(OH)D levels and the incidence of hyperlipidemia based on the data; the relationship between serum 25(OH)D levels and the risk of developing hyperlipidemia was obtained by stratified analysis of traditional risk factors for hyperlipidemia at baseline, providing a reliable basis for vitamin D prevention of hyperlipidemia. [Results] The overall 25(OH)D level in the study population was 25.89(21.50,29.82) ng/ml, the vitamin D deficiency rate was significantly higher in women than in men (22.06% vs. 10.94%); Using vitamin D-sufficient respondents as a reference, vitamin D deficient hyperlipidemia prevalence was 1.612 times higher than the prevalence of hyperlipidemia in those with adequate vitamin D (95% CI: 1.228-2.116; P=0.001); Further stratified analysis found that vitamin D deficiency increased the risk of developing hyperlipidemia in those with a positive family history of diabetes, low education, BMI <24, not exercising, smoking, alcohol consumption and residence in an urban area were characteristics of the subgroup of respondents in which vitamin D insufficiency increased the risk of developing hyperlipidemia. For the critical value of 25(OH)D level that predicts the occurrence of hyperlipidemia, a subject operating characteristic curve (ROC) was constructed, from which an AUC value of 0.664 (95% CI: 0.631-0.697), and, a 25(OH)D critical value of 31.65 ng/ml can be derived.[Conclusion] The findings suggest that low levels of 25(OH)D population has a higher incidence of hyperlipidemia . Vitamin D insufficiency increases the risk of hyperlipidemia. It is recommended that vitamin D supplementation be given in people with vitamin D insufficiency to reduce the occurrence of hyperlipidemia.

Key words Vitamin D; Hyperlipidemia; Cohort study

Category: Basic Nutrition& Research

飞燕草素通过降低 PD-L1 表达阻断 TNBC 免疫逃逸

Delphinidin blocks TNBC immune escape by Reducing PD-L1 expression

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Abstract Objective To investigate the potential mechanism of Delphinidin in inhibiting suppresses PD-L1 expression pathway on the cell membrane of Triple negative breast cancer and the underlying immune escape, and to provide a new measure for Delphinidin to improve TNBC treatment with immune checkpoint blockades. Methods MDA-MB-231 were treated with different concentrations of Delphinidin (0, 20, 40, 80μM), the ability to detect cell proliferations and drug sensitivity by CCK-8, and the biological characteristics of Delphinidin on MDA-MB-231 cells were detected by Wester-blot. Ficoll density gradient centrifugation separated lymphocytes in peripheral blood, and NK and CD8+ T cells were sorted by immunomagnetic beads to construct a co-culture system with MDA-MB-231 cells to simulate the immune microenvironment. Settings: Blank control control group; Co-culture group of NK, CD8+T and TNBC; Co-culture of the dosing Co-culture + Delphinidin group, a total of 3 groups. The apoptosis status of MDA-MB-231 cells was detected by flow cytometry Annexin-V-FITC/PI double staining and immunofluorescence multicolor staining experiments, the killing activity of T cells and NK cells was verified, and the effect of Delphinidin on the ratio of PD-L1 and CD8+T/NK cells in each group and the mechanism of PD-L1 protein expression on the cell surface were analyzed. Results Compared with the control group, Delphinidin effectively inhibited the proliferation of MDA-MB-231 cells and induced apoptosis. Compared with the Control group and Co-culture group, the proportion of PD-L1 and CD8+ T/NK cells in the Co-culture + Delphinidin group decreased, the tumor killing activity of CD8+ T and NK cells was enhanced, and the expression level of PD-L1 protein in the experimental group was significantly reduced . Conclusion Delphinidin can effectively inhibit the proliferation of MDA-MB-231 cells, increase the killing activity of immune cells and block immune escape by reducing the expression level of PD-L1 on the surface of TNBC cells.

Key words Triple-negative breast cancer; Delphinidin; PD-L1; Immune evasion; In vitro co-culture

Category: Basic Nutrition& Research

肠道 Reg4 缺乏通过增加小鼠肠道脂肪吸收而导致高脂肪饮食诱导的肝脏脂肪变性

Intestinal Reg4 deficiency confers susceptibility to high-fat diet-induced liver steatosis by increasing intestinal fat absorption in mice

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Background & Aims: Regenerating gene family member 4 (REG4) is a novel marker for enteroendocrine cells and is selectively expressed in specialised enteroendocrine cells of the small intestine. However, the exact roles of REG4 are largely unknown. In this study we investigate the effects of REG4 on the development of dietary fat-dependent liver steatosis and the mechanisms involved.

Methods: Mice with intestinal-specific Reg4 deficiency (Reg4DIEC) and Reg4-floxed alleles (Reg4fl/fl) were generated to investigate the effects of Reg4 on diet-induced obesity and liver steatosis. Serum levels of REG4 were also measured in children with obesity using ELISA.

Results: Reg4DIEC mice fed a high-fat diet demonstrated significantly increased intestinal fat absorption and were prone to obesity and hepatic steatosis. Importantly, Reg4DIEC mice exhibit enhanced activation of adenosine monophosphate-activated protein kinase (AMPK) signalling and increased protein abundance of the intestinal fat transporters, as well as enzymes involved in triglyceride synthesis and packaging at the proximal small intestine. Moreover, REG4 administration reduced fat absorption, and decreased the expression of intestinal fat absorption-related proteins in cultured intestinal cells possibly via the CaMKK2-AMPK pathway. Serum REG4 levels were markedly lower in children with obesity with advanced liver steatosis ($p < 0.05$). Serum REG4 levels were inversely correlated with levels of liver enzymes, homeostasis model assessment of insulin resistance, low-density lipoprotein cholesterol, and triglycerides.

Conclusions: Our findings directly link Reg4 deficiency with increased fat absorption and obesity-related liver steatosis, and suggest that REG4 may provide a potential target for prevention and treatment of liver steatosis in children.

Key words Liver steatosis; Fat absorption; Reg4; AMPK; Childhood obesity.

Category: Basic Nutrition& Research

菊花挥发油的化学成分、抑菌和抗肿瘤活性

Chemical composition, antibacterial and Antitumor activity of the essential oils of Chrysanthemum morifolium Ramat

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The essential oils of Chrysanthemum morifolium Ramat were extracted by steam distillation and analyzed by Gas chromatography-mass spectrometry (GC－MS). The volatile oil was evaluated for antibacterial activity against five Gram-positive bacteria (Staphylococcus aureus, Staphylococcus epidermidis, Bacillus subtilis, V. Streptococci, S. pneumoniae), three Gram-negative bacteria (Escherichia coli, Pseudomonas aeruginosa, Shigella flexneri) and two molds (Candida albicans, Cryptococcus neoforman). In vitro, cell proliferation inhibition action on human liver cancer HepG-2 was examined by 3-(4,5-dimethyl)-2,5-diphenyl-2H(MTT) method and cell apoptosis was observed using flow cytometry. In vivo, S-180 tumor-bearing mice were used to research antitumor effect. A total of 59 compounds were identified and caryophyllene oxide was the most abundant volatile component (7.39%). The volatile oil showed promising antibacterial activity against 5 Gram-positive bacteria (S. aureus, S. epidermidis, B. subtilis, V. Streptococci, S. pneumoniae) and 2 molds (Candida albicans, Cryptococcus neoforman). The oils showed significant antitumor activity towards HepG-2 cells with IC50 valued 1.42 μL/mL and increased the apoptotic rates in a dose dependent manner. In addition, the oils inhibited tumor growth of S-180 tumor-bearing mice and the tumor suppressor rate of high dose reached 54.94%. Giving the oils improved the thymus/weight index of tumor-bearing mice which means it increased immune function. All these findings suggest that the essential oil has antibacterial and antitumor activity. It is a candidate for exploring new health foods, the food additive and drugs.

Key words Chemical composition; Antibacterial activity; Antitumor activity; Chrysanthemum morifolium Ramat; Essential oil

Category: Basic Nutrition& Research

学龄儿童患甲状腺结节者甲状腺激素与血清微量元素关系：病例对照研究

Association between thyroid hormone status and trace elements in serum of school-aged children with Nodular Goiter: A case-control study

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Objective: The importance of the thyroid gland in maintaining human health is well recognized. Certain microelements, except for iodine, have been involved in thyroid hormone metabolism in the last decades. However, few studies evaluated the individual iodine status.

Method: The present study was conducted based on a cross-sectional survey of dietary reference intake of iodine in children with different iodine intake areas in Shandong, China. In this comparative study, 182 children without goiter (control group) and 91 adults with diagnosed thyroid nodules (TN) were examined. The 24-h urine iodine excretion assessed iodine status. Serum samples were collected to determine thyroid stimulating hormone (TSH), free thyroxine (FT4), free-iodothyronine (T3), and trace elements. Inductively coupled plasma mass spectrometry (ICP-MS) was used for the measurements of 17 trace elements in the serum of patients with NG and the control group. The subjects of the case-control study were matched by propensity score matching.

Results: Patients with nodular goiter had lower serum values of Zn and higher serum values of I, Ni and Cd than those in the control group. The result revealed a significant positive trend among the odds of TN and I, Ni and Cd [the OR was 4.21 (95% CI: 1.50, 11.84), 4.00 (95% CI: 1.33, 12.03) and 3.33 (95% CI: 1.11, 10.01) for the high concentration, respectively, Ptrend<0.05]. The risk of TN was significantly increased with insufficient Zn [relative to Q2, OR=2.51 (95% CI: 1.08, 5.83) for Q1, Ptrend<0.05]. The ROC showed that the addition of multiple elements of I, Zn, Ni and Cd significantly improved the prediction of TN in children than serum iodine and urine iodine excretion.

Conclusion: This study proved that a combination of high concentrations of I, Ni and Cd and low concentration of Zn in blood serum resulted in the highest risk of thyroid nodules.

Key words Nodular goiter Serum microelements School-aged Children Case-control study

Category: Basic Nutrition& Research

丝氨酸缺乏对母体及其子代健康和硒蛋白表达的影响

Effects of insufficient serine on health and selenoprotein expression in rats and their offspring

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Objective: To observe the impact of insufficient exogenous and/or endogenous serine on selenoprotein expression and health of pregnant rats and their offspring. Method: Experiment 1 was conducted in male rats, in which the dose-dependent effects of serine on selenoprotein expression and thyroid hormones (T3, T4 and TSH) were investigated by feeding either a serine adequate diet (20C), serine-deprived diet (20CSD) or 20CSD with different serine levels (0.5, 1.0, and 2.0 times the amount of serine in 20C). In experiment 2, a PHGDH inhibitor was administrated to pregnant rats fed either 20C or 20CSD. Blood and organ tissues of pregnant rats and offspring were subjected to the analyses of thyroid hormone, serine and homocysteine and GPx3 and SELENOP in plasma and expression of GPx1 and DIO1, 2 in tissues respectively. Result: In experiment 1, plasma SELENOP and GPx3 levels in adult male rats increased with the increasing dose of serine. Immunohistochemical results showed that GPx1 expression in liver and kidney of male rats also increased with increasing serine supplementation. Amongst all diet groups, only male rats fed 20CSD had significantly lower plasma TSH and T4 levels ($P<0.05$). In experiment 2, GPx1 and DIO2 expression in the liver and kidney were suppressed in pregnant rats administered with a PHGDH compared to those who were not ($P<0.05$). Also, offspring born to pregnant rats administered with a PHGDH inhibitor exhibited slower growth rates and hyperhomocysteinemia compared to offspring from mothers not administered with the inhibitor ($P<0.05$).Conclusions: Insufficient exogenous serine through the diet decreased selenoprotein synthesis in adult male rats. However, this was not observed in pregnant rats, whereby exogenous or endogenous serine deficiency had no effect on the selenoprotein levels. A possible explanation is that dams may have an adaptive mechanism to limit maternal serine utilization and ensure adequate supply to the fetus.

Key words Serine, PHGDH inhibitor, GPx, SELENOP, DIO2

Category: Basic Nutrition& Research

短双歧杆菌 207-1 对生命早期抗生素暴露小鼠肠道菌群构建、肠道发育以及远期炎症性肠病的影响

Effects of Bifidobacterium breve 207-1 on gut microbiota composition, gut development and long-term inflammatory bowel disease in antibiotic-exposed mice in early life

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Objective: To explore the possible mechanism of Bifidobacterium breve207-1 (B.breve207-1) on the changes of intestinal microbiota, mucosal barrier and immune response in antibiota-exposed mice in early life, and the effect of B.breve207-1 on long-term inflammatory bowel disease (IBD) in antibiota-exposed mice in early life.

Methods: Neonatal mice were randomly divided into five groups and received interventions from birth to 7 weeks of age: NS-Water, NS-DSS, Ceftri-DSS, Ceftri+207-1-DSS, Ceftri+207-1-207-1+DSS.

Results: Compared with the blank control group, the colitis model group had a significant increase in the pathological score (P< 0.05).Compared with the colitis model group, the pathological scores of the 207-1 short-term group were significantly decreased (P< 0.05).At the age of 7 weeks, the Chao1 index and ACE index of Ceftri+207-1-DSS group were higher than those of NS-Water, NS-DSS, CEFtri-DSS and Ceftri+207-1-207-1+DSS groups.According to the analysis of intestinal microbiota, the relative abundance of Firmicutes in Ceftri+207-1-DSS group was significantly higher than that in other groups.Compared with NS-Water and Ceftri-DSS, the early treatment of Ceftri+207-1-DSS promoted the higher expression of MUC2, Clauding-1, ZO-1, Occludin and secretory immunoglobulin A (sIgA). In terms of immune level, the levels of serum immune factors IL-6, IL-17A and TNF-α in Ceftri+207-1-DSS group were significantly lower than those in CEFTri +207-1-DSS group (P< 0.05).

Conclusions: Antibiotic exposure in early life significantly changes the composition of gut microbiota in neonatal mice, reducing the species richness and evenness of gut microbiota to varying degrees. These changes will affect adulthood and participate in the development of long-term inflammatory bowel disease. Short-term use of B.breve 207-1 can regulate intestinal flora, reduce the damage of intestinal flora caused by antibiotics, and have a profound regulatory effect on the composition of intestinal microbiota, the immune system and the development of intestinal mucosal barrier in early life.

Key words Bifidobacterium breve 207-1; Intestinal mucosal barrier; Gut microbiota; Colitis; Antibiotics

Category: Basic Nutrition& Research

脂肪组织Fas信号影响肠道微生物群稳态及促进非酒精性脂肪肝的发展

Adipose tissue Fas signaling affects gut microbiota homeostasis and promotes the development of non-alcoholic fatty liver

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Background and Objectives

Non-alcoholic fatty liver disease (NAFLD) is one of the most common liver diseases, and obesity has been recognised as a risk factor for NAFLD. However, the underlying mechanisms of obesity-associated NAFLD pathogenesis remain largely unknown. Fas (CD95) is a member of the tumour necrosis factor (TNF) receptor superfamily and is upregulated in adipose tissue of obese individuals. Adipose tissue-activated Fas signaling does not cause adipocyte apoptosis, but affects adipocytes in a non-apoptotic manner. The development of NAFLD is associated with adipose tissue inflammation and intestinal dysfunction. Here, we aimed to investigate the effect of adipose tissue-specific Fas overexpression on high-fat diet (HFD)-induced NAFLD in mice.

Methods and Study Design

Adipose tissue-specific overexpressing Fas mice (Adi-Fas) mice and littermates ($Fas^{CKI/CKI}$) were fed with normal chow or HFD for 10weeks to induce obesity and non-alcoholic fatty liver disease. Body weight gain was checked weekly. Hepatic steatosis was monitored by histological analysis. Gut microbial composition was analyzed by 16S rRNA gene sequencing.

Results

We demonstrated that adipose tissue Fas signaling is enhanced in obesity. After HFD/ND feeding, hepatic steatosis was more severe in Adi-Fas mice compared to $Fas^{CKI/CKI}$ mice .16S rRNA gene sequencing revealed that the beta diversity of the microbiome was significantly different between Adi-Fas and $Fas^{CKI/CKI}$ mice. At the genus level, there were four significantly different genera between the two groups: *Akkermansia, Lactobacillus, Odoribacter, Anaeroplasma. Akkermansia muciniphila* (Akk), a member of the *Akkermansia* genus, is a well-known beneficial bacterium in the gut microbiota. It can regulate immunological and metabolic functions. We found that the abundance of Akk was significantly decreased in Adi-Fas mice.

Conclusions

Our study has shown that Fas overexpression in the adipose tissue may promote the progression of NAFLD through changes in the abundance and species of the gut microbiota.

Key words NAFLD; obesity; adipose tissue; Fas signaling; gut microbiota

Category: Basic Nutrition& Research

生命早期补充短双歧杆菌 207-1 可缓解小鼠肠道菌群失调并具有长期代谢益处

Supplementation of Bifidobacterium breve 207-1 in early life alleviates intestinal microbiota dysbiosis and has lasting metabolic benefits in mice

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Intestinal microbiota alterations in early life are reported to have lasting metabolic consequences in adulthood, providing potential approaches for the prevention of metabolic diseases. This study investigated whether the short-term use of a potential probiotic strain *Bifidobacterium breve* 207-1 (207-1) could alleviate intestinal microbiota dysbiosis in mice following antibiotic exposure in early life and thus improve long-term metabolism on a high-fat diet (HFD). Exposure to ceftriaxone in the first 2 weeks of life significantly impaired glucose metabolism and intestinal microbiota construction of mice at weaning (4 weeks). Oral administration of 207-1 at 2 to 4 weeks effectively protected mice from damage due to antibiotic exposure, including reducing fasting blood glucose level, improving glucose tolerance, increasing intestinal microbiota diversity, and increasing fecal short-chain fatty acids level. The HFD starting from week 4 to 9 led to significant metabolic disorders in mice such as increased visceral and subcutaneous fat levels, increased liver fat accumulation, impaired glucose tolerance, insulin resistance, and leptin resistance. However, mice exposed to ceftriaxone in early life did not develop more severe disruptions in lipid and glucose metabolism after feeding HFD. Of note, short-term use of 207-1 in the early stage of life improved lipid metabolism after feeding HFD in adulthood, including reduced visceral fat, lower serum cholesterol levels, lower liver triglyceride levels, and increased serum glucagon-like peptide-1 levels; the relative abundance of beneficial intestinal bacteria such as *Ligilactobacillus* and *Dubosiella* was significantly increased in these mice. Collectively, short-term supplementation of 207-1 in early life can alleviate intestinal microbiota dysbiosis and improve glucose metabolism caused by antibiotic exposure, and has a long-lasting metabolic protection effect in mice.

Key words early life; intestinal microbiota; Bifidobacterium; metabolism; high-fat diet

Category: Basic Nutrition& Research

副干酪乳杆菌 207-27 对生命早期抗生素暴露的小鼠远期结肠炎保护作用与机制

The protective effect and mechanism of Lacticaseibacillus paracasei 207-27 on chronic colitis in antibiotic-exposed mice in early life

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Evidence shows that antibiotic exposure in early life increases the risk of IBD by causing intestinal flora dysbiosis and affecting the development of the intestinal immune system. This study aimed to investigate the possible protective effect and mechanism of short- and long-term application of Lactobacillus paracasei 207-27 to ameliorate intestinal flora disorders caused by early-life antibiotic exposure in mice with DSS-induced colitis. In this study, we intervened neonatal mice with Ceftriaxone, and L.paracasei 207-27 was administered two hours after antibiotics. L.paracasei 207-27 were used for continuous gavage for three weeks and six weeks. The first batch of mice was executed on day 21, and the second batch of mice was executed on day 46, after a four-day intervention with 3% DSS to induce colitis.The results showed that on day 21, the alpha diversity of intestinal flora, short-chain fatty acids levels, and splenic immune factor levels were higher in the Ceftri+207-27 group compared to the Ceftri group, with significantly lower serum IL-6 and TNF-α levels. On day 46, in splenic and serum IL-6 and TNF-α levels, the 207-27 short-term group was similarly lower than the Ceftri-DSS group. In colonic IL-17, TNF-α, and INF-γ levels, there was a decreasing trend in the 207-27 short- and long-term groups compared to the Ceftri-DSS group, and the 207-27 long-term group has significantly higher levels of Claudin and sIgA. In conclusion, short-term administration of L.paracasei 207-27 improves intestinal flora composition and effectively alleviates colitis symptoms, and long-term use of L.paracasei 207-27 has a protective effect on the intestinal barrier.

Key words Lacticaseibacillus paracasei 207-27; chronic colitis; antibiotic; early life;

Category: Basic Nutrition& Research

人参对脑卒中后血脑屏障的保护作用

Protective effect of ginseng on the blood-brain barrier after stroke

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Stroke is the leading cause of disability globally and the second leading cause of death in China, with ischemic stroke accounting for 86% of all strokes. Its high incidence imposes a serious burden on society. Chinese medicine ginseng is the root of the plant ginseng of the five-plus family, which has the effect of tonifying vitality, tonifying the spleen and benefiting the lungs, and calming the spirit. Here, we investigate the role of ginseng in mouse ischemic stroke models as well as the mechanism of action. Ginseng extract gavage was performed 24h after mouse MCAO(I/R)(Middle Cerebral Artery Occlusion and Reperfusion) modeling, and administered continuously for 3 days. After 3 days, the area of cerebral infarction decreased, the permeability of the blood-brain barrier decreased, and the tight junction protein Claudin-5(closed protein-5), Occludin, and ZO-1(closed small cyclin 1) decreased. At the same time, the expression of pro-inflammatory factors IL-1β, TNF-α and IL-6 decreased. Therefore, we conclude that ginseng may increase the structure and function of the blood-brain barrier after acute stroke by reducing the inflammatory response.

Key words ginseng, stroke, blood-brain barrier, MCAO(I/R), tight junction protein

Category: Basic Nutrition& Research

超重和肥胖患者血液和血液外泌体中的 miR-3064-5p 与代谢性炎症有平行关系

The miR-3064-5p in Blood and Blood Exosomes Has a Parallel Relationship with Metabolic Inflammation in Overweight and Obese Patients

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Objective: Metabolic inflammation promotes the development of chronic metabolic diseases such as obesity, type 2 diabetes, etc. This study aimed to explore whether miR-3064-5p in blood and blood exosomes has parallel relationship with inflammation in overweight and obese people and to analyze its potential as a marker for metabolic inflammation.

Method: A case-control design was used to recruit volunteers into the case group (BMI≥24, n=73) and the control group (18.5<BMI<24, n=73). The body composition and retrospective dietary questionnaire were determined. The level of miR-3064-5p in blood and blood exosomes and inflammatory cytokines (IL-6/Hs-CRP) in serum were analyzed. The t-test or Mann-Whitney U test was used to compare the differences between the two groups. Spearman rank correlation and multiple regression analysis were used for correlation analysis.

Result: As compared to the control group, overweight and obese volunteers in the case group have significantly higher ($p<0.05$) waist-to-hip ratio (WHR), body fat mass, visceral fat index (VFI), basal metabolism, and skeletal muscle mass, and significantly increased ($p<0.05$) daily intake of energy, fat, carbohydrates, saturated fatty acids, unsaturated fatty acids, n-6 and linolenic acid. Furthermore, volunteers in the case group have significantly elevated ($p<0.05$) levels of miR-3064-5p in blood and blood exosomes, which was positively correlated with BMI, WHR, body fat mass and VFI. The miR-3064-5p level was also significantly associated with obesity (odds ratio of 6.96, 95% CI 3.37-14.37) and overweight (odds ratio of 2.26, 95% CI 1.65-3.10). Meanwhile, volunteers in the case group have significantly higher ($p<0.05$) levels of IL-6 and Hs-CRP which were correlated positively with the miR-3064-5p level in blood and blood exosomes.

Conclusion: The miR-3064-5p in blood and blood exosomes has a parallel relationship with metabolic inflammation in overweight and obese patients, suggesting that it has potentials as a new marker for predicting the development of metabolic inflammation.

Key words Metabolic inflammation; miR-3064-5p; Obesity; Overweight; Cytokines

Category: Basic Nutrition& Research

多组学揭示肥胖易感和肥胖抵抗小鼠肠道菌群和代谢功能图谱
Exploring Gut Microbiota and Metabolomics in Obesity-Prone and Obesity-Resistant Mice: A Multi-Omics Study

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Background and Objectives

The same high-calorie diet does not cause obesity or metabolic disorders in some people (called "obesity-resistant (OR)). Another group of people experience substantial weight gain and metabolic disorders (called "obesity-prone (OP)). In this study, we analyzed the gut microbiota and metabolomics in OP and OR mice to provide a theoretical basis for obesity phenotype differences.

Methods and Study Design

The methods included constructing an OP and OR model by inducing mice with a long-term high-fat diet, and integrating microbial genomics (16S rDNA), metabolomics (serum samples and fecal samples) and pathology methods.

Results

We successfully constructed an OP and OR mice model. We identified the respective dominant bacteria of OP and OR mice, and found that Clostridium sensu stricto, Blautia, Helicobacter, Dubosiella, Phocea, Harryflintia, Roseimarinus, etc. were significantly increased in OP mice; on the contrary, Intestimonas, Duncaniella, etc. were significantly increased in OR mice. In addition, we found that there were differential metabolites in the systemic and gut microbiome-related metabolism of OP and OR mice. These differential metabolites were involved in various metabolic pathways such as amino acid metabolism, energy metabolism, and nervous system. By studying the relationship between the differential intestinal bacteria and metabolites of OP and OR mice, we obtained the relationship pairs that may contribute to the differences in OP and OR phenotypes.

Conclusions

We identified and analyzed the dominant intestinal bacteria, metabolic characteristics and functional spectrum of OP and OR mice, respectively. Furthermore, we elucidated the potential roles of key gut bacteria and metabolites in mice with differential OP and OR phenotypes.

Key words obesity susceptibility, obesity resistance, microbial genomics, metabolomics, gut microbiota

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补充维生素 D3 通过调节肠道菌群的组成改善高脂饮食诱导的小鼠肥胖

Vitamin D3 supplementation improves obesity induced by high-fat diet in mice by regulating the composition of gut microbiota

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Purpose: Individuals with vitamin D (VD) insufficiency have a greater tendency to develop obesity and increase systemic inflammation. Gut microbiota is involved in the regulation of host inflammation and energy metabolism, which plays a role in the pathogenesis of obesity. The present study aimed to evaluate the effects of different doses of VD_3 on body weight, serum lipids, inflammatory factors and intestinal barrier function, and the regulatory effect on gut microbiota in obese mice.

Methods: Male C57BL/6J mice received a normal chow diet (NCD, 10% fat) or high-fat diet (HFD, 60% fat) to induce obesity within 10 weeks. Then, obese mice were supplemented with 5,650, 8,475, or 11,300 IU VD_3/kg diet for 8 weeks. Finally, body weight, average food intake and VD_3 intake, serum and epididymis adipose tissue $25(OH)D_3$, TG, TC, LDL-C, HDL-C, glucose, TNF-α, IL-1β, MCP-1, lipopolysaccharide, zonula occludens-1 and occludin were analyzed. And 16s rRNA analysis was performed to analyze gut microbiota composition in caecum contents.

Results: VD_3 supplementation reduced body weight and the levels of $25(OH)D_3$, TG, TC, HDL-C, TNF-α, IL-1β and lipopolysaccharide, and increased the mRNA relative expression of zonula occludens-1 of caecum in HFD-fed mice. Moreover, VD_3 increased α-diversity, reduced *Firmicutes/Bacteroidetes* ratio and altered microbiota composition by increasing relative abundance of *Bacteroidetes, Proteobacteria, Desulfovibrio, Dehalobacterium, Odoribacter,* and *Parabacteroides,* and reducing relative abundance of *Firmicutes* and *Ruminococcus.* There were significant differences between HFD and NCD groups in several metabolic pathways, including endotoxin biosynthesis, tricarboxylic acid cycle, lipid synthesis and metabolism, and glycolysis.

Conclusions: VD_3 inhibited weight gain, reduced levels of blood lipids and inflammatory factors, improved endotoxemia, gut barrier function and regulated gut microbiota dysregulation in obese mice, with the low and middle internal exposure doses showing better effects than high internal exposure dose in improving gut microbiota dysregulation.

Key words vitamin D; obesity; gut microbiota; inflammation; gut barrier

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人参皂苷 Rg2 通过 Akt/FoxO1 途径调节 HepG2 细胞的糖代谢和糖原代谢进而缓解胰岛素抵抗

Ginsenoside Rg2 alleviates insulin resistance by regulating gluconeogenesis and glycogen metabolism via Akt/FoxO1 pathway in HepG2 cells

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Background: Ginsenoside Rg2 is a key bioactive compound from Panax ginseng Meyer and shows anti-cancer, antidiabetic, anti-amnestic, and neuroprotective effects. However, the impact of Rg2 on hepatic glucose production via the Akt pathway is not addressed.

Purpose: To investigate the protective effect of Rg2 against insulin resistance via the Akt pathway.

Methods: HepG2 cells were stimulated with 1 μM insulin for 36 h to establish a reliable insulin resistance cell model. Then, Metformin HCL, Rg2, and Akt inhibitor were added to treat the obtained cells. The glucose consumption and glycogen synthase were determined so as to evaluate hepatic glucose production. Moreover, the genes involved in gluconeogenesis, glycogenolysis and glycogenesis were explored with RT-q-PCR and western blot. At last, the critical role of Rg2 in the Akt/FoxO1 pathway was further identified with Akt inhibitor, triciribine.

Results: Our findings suggested that Rg2 decreased hepatic glucose production by activating Akt at Ser473 in HepG2 cells. Akt inactivated FoxO1 by promoting nuclear export and reducing the levels of phosphoenolpyruvate carboxykinase and glucose 6-phosphatase. Moreover, Rg2 enhanced GSK3β phosphorylation and weakened GS phosphorylation via Akt/FoxO1 pathway, thus increasing glycogen synthase.

Conclusion: Rg2 alleviated insulin resistance by inhibiting gluconeogenesis and glycogenolysis and induced glycogenesis via the Akt/FoxO1 pathway in HepG2 cells. Our results highlighted that Rg2 might be utilized to develop healthy foods and prevent diabetes.

Key words ginsenoside Rg2, insulin resistance, gluconeogenesis, glycogenesis, glycogenolysis

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生命早期母乳菌群与婴儿肠道菌群构建的关系

The relationship between breast milk microbiota and the construction of infant intestinal microbiota

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Objective:

To examine the relationship between breast milk microbiota and the construction of infant intestinal microbiota.

Methods:

A mother-infant cohort study was conducted from November 2020 to July 2021 in West China Second Hospital, Chengdu, China. 21 mother-infant pairs who were vaginally delivered and exclusive breast fed were included in this study. Infants' stools and breast milk were collected at 0 day, 7 day and 30 day after birth. The 16S rRNA sequencing and bioinformatic analysis was used for identifying the diversity and composition of microbiota, and source tracking analysiswas performed to determine the contribution of breast milk microbiota to infant gut microbiota.

Results:

The alpha diversity indices of microbiota in breast milk were significantly higher than that in infant intestine (adjusted $P<0.01$, respectively), bacterial communities were more closely related between infants' gut and breast milk at day 0, then developed into different communities. At the phylum level, Firmicutes, Actinobacteriota and Proteobacteriashowed similar trend in both infant gut and breast milk within 1 month. At the genus level, the most predominant taxa in infant intestine shipped from Escherichia-Shigella to Bifidobacterium, while Streptococcus in breast milk was stably predominant taxa within first month; and Bifidobacterium showed a similar trend in infant gut and breast milk. Microbial source tracking revealed that, breast milk contributed 40.4% to 50.94% microbes to infant intestine, breast milk and infant gut shared proportion of 60.64% to 67.89% of Bifidobacterium within 1 month.

Conclusion:

These findings suggest that microbiota composition of breast milk and infant intestine differed from each other and both in highly dynamic variation during first month after birth. Breast milk microbiota, particularly Bifidobacterium, influence the breast-fed infants' intestinal microbiota establishment and development, and provide more convincing evidence for microbial contribution of breast feeding.

Key words early life; breast feeding; infant gut microbiota; breast milk microbiota; Bifidobacterium

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硒与食管癌：一项基于生信分析的病例对照研究

Selenium and Esophageal Cancer: A Case - control Study Based on Bioinformation Analysis

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Objective

This paper attempts to investigate the relationship between selenium and esophageal cancer (EC) and the role of glutathione peroxidase 3 (GPx3) in it based on the bioinformatic analysis. A case - control study was conducted to verify the relationship between selenium and precancerous esophageal lesions (EPLs).

Methods

Using databases such as GEPIA and TCGA, we clarified the differential expression of GPx3 in EC tissues and normal tissues, screened differentially expressed genes (DEGs), and performed visualization analysis of GO and KEGG pathway enrichment and protein interaction network (PPI). One hundred pairs of dietary and plasma samples from EPLs cases and health controls from Huai'an, Jiangsu were screened, and the level of dietary selenium, and the concentration of plasma selenium and related enzymes in the two groups were analyzed using inductively coupled plasma mass spectrometry (ICP-MS) and enzyme-linked immunosorbent assay (ELISA) kits.

Results

Data from 182 tumor tissues and 286 normal tissues were obtained from the database, and the expression of GPx3 in tumor tissues was found to be significantly lower than that in normal tissues. Further analysis revealed that in EC tissues with high expression of GPx3, DEGs were mainly involved in fat digestion and absorption pathways, and the core protein fatty acid binding protein 1 (FABP1) was significantly downregulated. Our case-control study found that dietary selenium levels and plasma selenium concentration were not associated with the EPLs risk. However, both the decrease concentration in GPx3 and the increase in FABP1 were positively correlated with the EPLs risk in a significant manner.

Conclusion

The validation of bioinformatic analysis by our case - control study suggests the potential of selenium to play a role in EC prevention and control at the stage of EPLs. In addition, whether GPx3 can affect EC through the expression of FABP1 needs to be further studied.

Key words esophagus cancer; esophageal precancerous lesions; selenium; GPx3; FABP1

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肠道菌群特征及小肠 RNA 甲基化水平下降与高脂饮食压力下 GLP1 分泌紊乱之间的关联研究

An associations between the disordered gut microbiota , decreased small intestinal RNA methylation level and disturbed GLP1 secretion under high-fat diet stress

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High-fat diet disturbs the microbiota, causing metabolic disorders and promoting the occurrence and development of obesity through direct and/or indirect interactions between the microbiota, the metabolites and local or remote tissues. Reduced glucagon-like peptide-1 (GLP1) level is often observed in obese mice, which is proposed to be associated with microbiota and their metabolites. Numerous studies have revealed the critical role of epigenetic modifications in gene expression and metabolism, with m6A methylation on RNAs as the most abundant modification across their metabolism. In the present study, we found that the expression of small intestinal gcg and pc3, two key genes for GLP1 expression, were significantly downregulated in obese mice, which should be directly responsible for the reduced GLP1 level. Immunohistochemistry analysis indicated that high-fat diet slightly increased the density of enteroendocrine L cells in the small intestine, implying that the decreased GLP1 levels was not caused by changes in the number of L cells. Instead, the small intestine m6A level as well as the expression of known “writers”, mettl3/14 and wtap, were found to be positively correlated with the expression of gcg and pc3. Fecal microbiota transplantation with feces from normal and obese mice daily to the pseudo-sterile mice reveled that high-fat diet aggravated microbial dysbiosis, contributing to the reduced epigenetic modification. However, as the most direct and universal methyl donor, production of fecal S-adenosylmethionine was neither affected by the different dietary patterns nor their shaped microbiota, while S-adenosylmethionine levels in intestinal tissues are associated with different dietary patterns. These results suggested that the decreased GLP1 level in obese mice may be mediated by the microbiota-regulating epitranscriptome, and highlighted the epitranscriptomic modifications as an additional level of interaction between diet and the individual health.

Key words gut hormones; Western diet; m5C; m6A; obesity

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限制时间饮食对阿尔兹海默症认知功能障碍的改善作用及肠脑轴机制研究进展

Time-Restricted Feeding Alleviates Cognitive Impairment in Alzheimer's Disease: Exploring the Role of Gut-Brain Axis Mechanism

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Abstract

Background and Objectives: In recent years, research on improving brain cognitive function through non-pharmacological interventions such as time-restricted feeding (TRF) has become a hot topic in the field of nutrition. The gut and brain interact through the nervous and circulatory systems. Our previous studies have shown that intermittent fasting can regulate the gut microbiota, increase short-chain fatty acids, tauroursodeoxycholic acid, and indole-3-propionic acid, and ameliorate insulin resistance-induced neuronal energy metabolism dysfunction. However, it is still unclear whether TRF can regulate cognitive dysfunction related to Alzheimer's disease (AD) via regulating the gut-brain axis.

Methods and Study Design: Based on AD transgenic animal models, we conducted a 3-month TRF intervention, utilizing behavioral tests, multi-omics analysis, microbiota removal, PET/CT, and inhibitors/lentiviral intervention to analyze the improvement of cognitive dysfunction in AD and the gut-brain axis mechanism.

Results: The current study found that TRF improved cognitive function in AD mice and reduced the excessive deposition of Aβ. TRF intervention reshaped the gut microbiota of AD mice and increased propionic acid levels in feces. Further validation revealed that propionic acid and *Bifidobacterium pseudolongum* (a propionic acid-producing bacterium) supplementation yielded similar results to TRF in improving AD cognitive function. TRF intervention restored brain propionic acid metabolism and inhibited neuroinflammation. Concurrently, our additional research also demonstrates the critical mediating role of the tryptophan metabolite indole-3-propionic acid in the improvement of AD cognitive function through intermittent fasting.

Conclusion: Our research revealed that time-restricted feeding effectively improves AD-related cognitive dysfunction, partly through regulating the expression of neuroprotective gut microbial metabolites. This study provides new theoretical foundations for brain health nutrition intervention strategies through regulating dietary rhythms or intervening in gut microbiota homeostasis.

Key words AD; Gut-Brain Axis; Intermittent Fasting; Propionic Acid; Indole-3-Propionic Acid

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中国 6 城市母乳寡糖

Study on the Composition Characteristics of Breast Milk Oligosaccharides in Six Cities of China

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中国 6 城市母乳低聚糖的特征研究

Key words HMOs; region; lactation; blood genotype

Category: Basic Nutrition& Research

中国健康儿童肠道菌群年龄相关的变化

Age-related changes in gut microbiota from healthy Chinese children

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Introduction The composition and function of human gut microbiota is influenced by genetics and lifestyles from birth to the childhood. The age-related alterations in microbiomes vary across populations, our current understanding of the composition and stability of the human gut microbiota is based largely on studies of infants and adults living in developed countries. In contrast, information regarding the gut microbiota in Chinese healthy children is limited.

Objectives In this study, we aim to investigate the age-related changes in gut microbiota in the healthy children living in the northwest region in China.

Methods We conducted shotgun metagenomic sequencing of fecal samples, as well as fecal and blood metabolomics to characterize the gut microbial communities of 100 healthy Chinese children aged 0-12 living in the northwest region in China.

Results We identified a significantly change in the gut microbiota in the children with the age. At the phylum level, the abundances of Actinobacteria were significantly reduced with age increased in children (p value <0.05); at the genus level, the abundances of Eggerthella, Erysipelatoclostridium, Tyzzerella, Flavonifractor, and Bididobacterium were significantly reduced with the age increased (p value <0.05), while Coprobacer, Lactobacillus, Oscillibacter, Odoribacter and Christensenella were significantly increased with the age increased (p value <0.05). Importantly by combining the fecal and blood metabolism, we found caffeine metabolism and steroid hormone biosynthesis were both significantly correlated with age. Moreover, 32 metabolic pathways presented significantly different during aging were observed.

Conclusion Collectively, our study demonstrated age-related changes in children’s gut microbiota using the multiomics analysis, as well as the connections between metabolites and host-microbe interactions, which giving a better understanding of alterations in the human microbiome in a Chinese population.

Key words age; gut microbiota; metabolomics; multiomics analysis; children

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三种海藻岩藻聚糖的化学成分及抗氧化能力的测定与比较

Determination and Comparison of Chemical Composition and Antioxidant Capacity of Fucoidan Extracted from Three Species of Seaweed

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Objective: The main aim of this study was to focus on the fucoidan extracted sample (S-5) from New Zealand sporophyll Undaria pinnatifida, and to determine and compare its chemical composition and biological activities with other commercial fucoidan samples of different origin and species. Methods: The methods of quality control were compared to testing standard methods for fucoidan SC/T 3404-2012, published by the People's Republic of China Aquatic Products Industry.

Results: The fucose content from the fucoidan sample S-5 was 44.6 %, and its percentage content was the highest value in all the monosaccharide contents. For the content of sulphate, fucoidan sample S-5 contains the highest percentage of sulphate contents (32.0 %) as compared to the other fucoidan commercial products. Collectively, the aforementioned results may indicate that the three factors which relate to differences between the composition of fucoidan include the extraction method, the seaweed species and its origin. According to the metal analysis results, toxic metal element content, including Pb, As, Hg, Cd and Cr, of fucoidan sample S-5 was significantly and statistically lower than the other fucoidan samples. Pertaining to antioxidant activity, all fucoidan samples generated antioxidant effects in the dose-dependent manner for the anti-oxidant assays. Notably, because fucoidan sample S-5 had the highest sulphate content, it also generated the highest antioxidant effects in comparison to all other fucoidan samples. This was especially true in the treatment concentration range of 0 to 62.5 μg/mL, suggesting that this concentration range is the most effective at producing antioxidant effects from S-5.

Conclusion: The unique environmental conditions made the fucoidan sample extracted by New Zealand sporophyll Undaria pinnatidifa different in its chemical composition, with higher antioxidant activity and less presence of toxic metal elements. Therefore, the sporophyll Undaria pinnatifida from New Zealand is presented as the better source to develop fucoidan-based nutraceutical products.

Key words Fucoidan, Undaria pinnatifida, Seaweed

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酿酒酵母和甘露寡糖对生命早期抗生素暴露小鼠远期结肠炎的缓解作用

Saccharomyces cerevisiae and mannan oligosaccharides alleviate long-term DSS-induced colitis in early-life antibiotic-exposed mice

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Aims: To investigate the possible protective effects and mechanisms of *Saccharomyces cerevisiae* and mannan oligosaccharides against long-term colitis in antibiotic-exposed mice in early life.

Methods: Newborn Balb/c mice in the NS-water, NS-DSS, Ceftri-DSS, Ceftri+SC(s)-DSS, Ceftri+SC(l)-DSS and Ceftri+SC+MOS(l)-DSS groups received the corresponding interventions from birth. After 3 weeks of age, mice in the Ceftri+SC(l)-DSS and Ceftri+SC+MOS(l) groups continued to receive SC or SC+MOS intervention, while mice in the rest of the groups stopped the intervention. In 6 weeks-6 weeks+4 days, except for the NS-water group, the drinking water in all other groups was replaced with 3% DSS to induce colitis. HE pathological staining of colonic tissues after DSS treatment was obtained and scored for inflammation. The expression of anti-inflammatory cytokines (IL-5, IL-10, IL-13, TGF-β) and pro-inflammatory cytokines (IL-6, IL-12 (p40), IL-17a, TNF-α, IFN-γ) in colon and spleen tissues was measured. Meanwhile, the levels of cytokines (IL-5, IL-6, IL-10, IL-13, IL-17a, TNF-α, TGF-β) in serum were measured. Using 16s RNA sequencing technology to analyze the change of intestinal microbiota.

Results: Inflammation scores raised significantly in all DSS-induced groups, and the Ceftri+SC(s)-DSS, Ceftri+SC(l)-DSS, and Ceftri+SC+MOS(l)-DSS groups all had lower inflammation scores than the Ceftri-DSS group. *S. cerevisiae* and MOS increased the expression and content of IL-10, IL-13 and TGF-β and decreased the expression and content of IL-17a, TNF-α and IFN-γ). Long-term use of *S. cerevisiae* increased the relative abundance of beneficial intestinal bacteria *Akkermansia* and *Blautia*.

Conclusions: *S. cerevisiae* and MOS alleviate long-term DSS-induced ulcerative colitis in early-life antibiotic-exposed mice. The alleviating effect was mainly through modulating immunity.

Key words early life; antibiotic-exposed; colitis; Saccharomyces cerevisiae; Mannan oligosaccharides; immune response; gut microbiota

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中国成年女性膳食硒水平及其与2型糖尿病的关系研究
The dietary Se status and its relationship with T2DM in Chinese Female Adult

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Background: Selenium (Se) plays a crucial role in human health. Determining the plasma/dietary Se levels and describing the distribution of dietary Se intake in Chinese female adults by using the nationally representative data has not been reported. Moreover, the association between dietary Se intake and type 2 diabetes mellitus (T2DM) is controversial. Thus, the present study aimed to describe the distribution of dietary Se intake, analyze the possible factors related to dietary Se levels, and observe the association between dietary Se intake and T2DM in Chinese female adults. Method: Using the multistage stratified random sampling method, a total of 3015 female adults from the China Nutrition and Health Surveillance in 2015 (CNHS 2015) were included. The plasma Se concentrations were detected by inductively coupled plasma mass spectrometry. Daily Se intake was calculated from plasma Se concentrations using the formula lg(Y) = 1.624 lg(X) + 3.389. Results: The P50 (P25-P75) of dietary Se level was 55.19 (40.51-70.25) μg/d. Dietary Se intake varied among subgroups, including nationality, location, latitude, residence region, and education level. The multivariate-adjusted OR of T2DM was 2.025 (95% CI: 1.158-3.541, P＜0.01) for the highest quartile of dietary Se intake in comparison with the lowest quartile. Conclusion: The median dietary Se intake in Chinese female adults was lower than Chinese recommended nutrient intake (RNI, 60μg/d). There were 41.09% of the population having Se dietary levels lower than the Chinese estimated average Requirement (EAR, 50μg/d) and 58.41% lower than the RNI. Nobody exceeded the tolerable upper intake levels (400μg/d, tolerable upper intake level) in our population. Besides, the study supports that a higher dietary Se intake may increase the risk of T2DM in Chinese female adults.

Key words Dietary Se; Chinese Female Adult; Type 2 Diabetes Mellitus

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硒缺乏通过 GPx1/H2O2/NF-κB 途径增加肾脏 AT1 受体功能导致高血压的作用及机制

Selenium deficiency causes hypertension by increasing renal AT1 receptor expression via GPx1/H2O2/NF-κB pathway

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Background and objectives: Epidemiological studies show an association between low body selenium and the risk of hypertension. However, whether selenium deficiency causes hypertension remains unknown. Our present study determined the role and mechanism of selenium deficiency in the pathogenesis of hypertension.

Methods and results:

16 weeks of selenium-deficient diet in Sprague-Dawley rats developed hypertension, accompanied with decreased sodium excretion. The hypertension of selenium-deficient rats was associated with increased renal angiotensin II type 1 receptor (AT1R) expression and function that was reflected by the increase in sodium excretion after the intrarenal infusion of the AT1R antagonist candesartan. Selenium-deficient rats had increased systemic and renal oxidative stress; treatment with the antioxidant tempol for 4 weeks decreased the elevated blood pressure, increased sodium excretion, and normalized renal AT1R expression. Among the altered selenoproteins in selenium-deficient rats, the decrease in renal glutathione peroxidase 1 (GPx1) expression was most prominent. GPx1, via regulation of NF-κB p65 expression and activity, was involved in the regulation of renal AT1R expression because treatment with dithiocarbamate (PDTC), an NF-κB inhibitor, reversed the up-regulation of AT1R expression in selenium-deficient renal proximal tubule (RPT) cells. The up-regulation of AT1R expression with GPx1 silencing was restored by PDTC. Moreover, treatment with ebselen, a GPX1 mimic, reduced the increased renal AT1R expression, Na+-K+-ATPase activity, hydrogen peroxide (H_2O_2) generation, and the nuclear translocation of NF-κB p65 protein in selenium-deficient RPT cells.

Conclusions: Our results demonstrated that long-term selenium deficiency causes hypertension, which is due, at least in part, to decreased urine sodium excretion. Selenium deficiency increases H_2O_2 production by reducing GPx1 expression, which enhances NF-κB activity, increases renal AT1R expression, causes sodium retention and consequently increases blood pressure.

Key words Angiotensin II type 1 receptor, Hypertension; Kidney; Oxidative stress; Selenium deficiency

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天津某区50-60岁中老年人能量需要量研究

The study of energy metabolism of 50-60y people in one district of Tianjin

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[Abstract] Objective: To measure the basal metabolism and resting metabolism energy consumption, as well as daily exercise energy consumption of the 50-60 years old people, and to accumulate basic data for revising Chinese DRIs. Objects: 20 rural middle-aged and elderly people aged 50-60 year in a certain district of Tianjin, with half male and half female. Male age: 55.6±2.5 years old, height: 168.6±5.1 centimeters,weight:64.1±5.6kilograms;female age: 55.2±3.2 years old, height: 155.9±2.4 centimeters, weight: 55.5±3.3 kilograms. Methods: Measurement of basal metabolism energy consumption: Every morning before the start of the measurement, warm up the cardiopulmonary function meter for 30 minutes. After each study subject breathes steadily, continue to measure for 15-20 minutes. Measurement of resting metabolic energy consumption: the resting metabolic energy consumption of each subject was measured 2 hours after breakfast every morning. 30 minutes before the measurement, the subjects lay flat and did not perform any activities. Then the resting metabolic energy consumption of each subject was measured by measuring basal metabolism energy consumption. The average value of each subject was taken for 2 consecutive days, and the data of basal metabolism energy consumption and resting metabolism energy consumption were finally obtained. Measurement of exercise energy consumption: During the experiment, each study subject wore an accelerometer at 8 am in the morning. After continuously wearing it for 4 days, the accelerometer was removed to obtain the daily exercise energy consumption of each study subject. The average of the 4-day energy consumption results was calculated to obtain the daily exercise energy consumption of each study subject. Results: basal metabolism: 1619.80± 277.28 kcal for male and 1018.16 ± 195.60 kcal for female; Resting metabolic male: 1867.83 ± 220.36 kcal; Female: 1178.95 ± 203.83 kcal; Daily exercise energy consumption for males: 447.89 ± 250.38 kcal; Female: 356.24 ± 172.52 kcal.

Key words basal metabolism resting metabolism exercise energy consumption

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探究肠道微生物及代谢产物与认知功能之间的关系：一项孟德尔随机化研究

Investigating causal associations among gut microbiota, metabolites and cognitive impairment: A Mendelian Randomization Study

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Background: Recent studies have indicated that the gut microbiota was associated with cognitive impairment through the gut-brain axis, among which metabolic pathways played an important role. However, the underlying causality remained unclear.

Objectives: Our study aimed to evaluate potential causal relationships among gut microbiota, metabolites, and cognitive impairment through a Mendelian randomization approach.

Methods: We selected genetic variants associated with gut microbiota traits (N=18340) and gut microbiota-derived metabolites (N=7824) from genome-wide association studies, and cognitive performance data were obtained from a recent study including 373617 participants. Five recognized Mendelian randomization methods were applied to assess causal estimates, with the inverse-variance weighted regression as the primary method. Moreover, we performed sensitivity analyses to test the robustness of causal estimates.

Results: In this study, the significant associations of greater abundance of *Actinobacteria* (OR, 0.955; 95%CI, 0.930-0.982), *RuminococcaceaeUCG005* (OR, 0.968; 95%CI, 0.943-0.993), *Roseburia* (OR, 0.964; 95%CI, 0.934-0.995), and *Collinsella* (OR, 0.966; 95%CI, 0.934-0.998) with lower risk of cognitive impairment were found. While higher levels of *Rikenellaceae* (OR, 1.039; 95%CI, 1.010-1.069), *LachnospiraceaeUCG001* (OR, 1.031; 95%CI, 1.007-1.054), *Dialister* (OR, 1.040; 95%CI, 1.006-1.075), *Rhodospirillaceae* (OR, 1.029; 95%CI, 1.004-1.056), *Faecalibacterium* (OR, 1.029; 95%CI, 1.003-1.057), *Barnesiella* (OR, 1.030; 95%CI, 1.003-1.053), *Bacteroidaceae* (OR, 1.037; 95%CI, 1.001-1.076), and *Bacteroides* (OR, 1.037; 95%CI, 1.001-1.076) were associated with higher risk of cognitive impairment. Meanwhile, we also identified suggestive associations between 2 gut microbiome-dependent metabolites (acetylcarnitine and allantoin) and cognitive impairment.

Conclusion: The present study highlights a landscape of causal relationships among gut microbiota, gut metabolites, and cognitive impairment by a two-sample Mendelian randomization approach. These findings might provide new targets for treatments and offer valuable insights for further studies on the underlying mechanisms.

Key words gut microbiota; metabolites; cognitive impairment; Mendelian randomization

Category: Basic Nutrition& Research

成人血清25-羟基维生素D缺乏与高脂血症相关性研究

Study on the correlation between serum 25-hydroxyvitamin D deficiency and hyperlipidemia in adults

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Objective To explore the relationship between serum vitamin D deficiency and the risk of hyperlipidemia in adults. Methods A total of 2072 eligible subjects over 18 years of age were included in the multi-stage sampling method. Serum 25(OH)D levels and lipid metabolism indexes were detected, and relevant demographic and physical indicators were collected. Serum 25(OH)D levels were divided into adequate, insufficient, and deficient groups. The correlation between serum 25(OH)D level and hyperlipidemia was analyzed statistically. Result The rate of hyperlipidemia was 42.18%, while the rate of vitamin D deficiency was 19.88%, and the rate of vitamin D deficiency was 23.68% in patients with hyperlipidemia. The incidence of hyperlipidemia was significantly higher in subjects with vitamin D deficiency than in patients with vitamin D sufficiency (23.68% vs 17.11%, P = 0.001). After adjusting for age, region, exercise, BMI, fasting blood glucose, and blood pressure, lowering serum 25(OH)D concentration significantly increased the risk of hyperlipidemia (P = 0.0481), and the risk of dyslipidemia increased by 0.842 times for every 10 ng/mL decrease in serum 25(OH)D level (95%CI: 0.728,0.974). After further stratification of hyperlipidemia, compared with the vitamin D adequate group, the risk of total cholesterol abnormality and triglyceride abnormality were 1.459 and 1.578 times of the vitamin D deficiency group after multivariate adjustment. For every 10 ng/mL decrease in serum vitamin D level, the risk of total cholesterol abnormality and triglyceride abnormality were 1.459 and 1.578 times of the vitamin D deficiency group. Abnormal total cholesterol and triglyceride increased the risk by 0.817 times and 0.793 times; There was no significant difference between vitamin D adequate and vitamin D deficient groups in the stratification of LDL and HDL abnormalities. Conclusion Serum vitamin D deficiency may be an independent risk factor for the high incidence of hyperlipidemia in adults.

Key words Vitamin D; hyperlipidemia; Total cholesterol; triglycerid

Category: Basic Nutrition& Research

运动对 TAMO 诱导的 APP/PS1 小鼠高血压的保护作用
Trimethylamine N-oxide induced hypertension in APP/PS1 mice and protective role of voluntary exercise

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Background and Objectives: The effects and potential mechanisms of trimethylamine N-oxide (TMAO) intervention on blood pressure require full exploration. This study aimed to investigate whether TMAO could induce hypertension via the renin-angiotensin system (RAS) in APP/PS1 mice, and whether exercise can reverse TMAO-induced hypertension.

Methods and Study Design: APP/PS1 Mice were randomly assigned into three experimental groups, i.e. control (CON), trimethylamine N-oxide (TMAO) and voluntary exercise (EX) with a total of 12 weeks intervention. A tail-cuff Method , Visitech system Corporation was used to measure systolic blood pressure (SBP), diastolic blood pressure (DBP), MAP and pulse in the conscious mice. Bile acid concentrations in feces were determined via UPLC-MS. Key markers associated with hypertension in kidney were measured via Western blot.

Results: We observed that TMAO induced increased systolic blood pressure in mice, accompanied by insulin resistance and basal metabolic disorders. In the kidney, the expression of angiotensinogen and ACE1 protein was significantly up-regulated, SOD activity was decreased, MDA content was significantly increased, and renal tissue fibrosis was observed. Meanwhile, the expression of FXR and TGR5 protein in colon decreased significantly, and the metabolism of fecal bile acids was abnormal. Exercise treatment was found to reduce systolic blood pressure, increase SOD activity, decrease MDA content and improve kidney injury. An upregulated colonic FXR and TGR5 protein level after exercise treatment resulted in the suppressed bile acid (BA) synthesis. Moreover, Exercise treatment decreased total fecal BA contents, especially fecal secondary BA levels, mainly including muro-cholic acid, hyodeoxycholic acid, 6-Keto-lithocholic acid and 7-Keto-lithocholic acid, and elevated dehydro-lithocholic acid.

Conclusions: TMAO induced hypertension by activating the RAS. Voluntary exercise could reverse the ACE-AngⅡ-AT1R axis, renal injury and BA metabolism induced by TMAO, proposing a novel mechanism for hypertension prevention.

Key words trimethylamine N-oxide, hypertension, voluntary exercise, renin-angiotensin system, bile acid metabolism

Category: Basic Nutrition& Research

人参皂苷提取物通过改善线粒体功能和激活 AMPK 信号通路缓解游离脂肪酸诱导的 HepG2 细胞非酒精性脂肪肝病

Ginsenoside extract alleviates nonalcoholic fatty liver disease by promoting mitochondrial function and activating the AMPK pathway in free fatty acid-induced HepG2 cells

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Nonalcoholic fatty liver disease (NAFLD) is the most common chronic liver disease and is closely associated with the development of various metabolic diseases such as obesity. Hepatic steatosis, oxidative stress, and mitochondrial dysfunction are the main manifestations, and alleviating lipid disorders by inhibiting fatty acid synthesis (FASN) and reducing fatty acid oxidation are effective ways to hinder the process of NAFLD. Ginseng is a valuable medicinal herb rich in many bioactive components such as ginsenosides. It has been reported that ginsenosides Rg1 and CK can reduce lipid accumulation. The moderate cost of ginsenoside extract (GE) makes it more suitable for application than monomer. However, the effect and mechanism of GE on NAFLD are less concerned. In this study, free fatty acid (FFA) induced HepG2 cells were used as the model for NAFLD to investigate the effects and mechanisms of GE. The results suggest that GE exerts antioxidant in FFA induced HepG2 model. Moreover, GE treatment can significantly inhibit hepatic lipid accumulation, reduce reactive oxygen species (ROS) generation, and improve mitochondrial function. Furthermore, GE promotes AMPK phosphorylation, downregulates the expression of sterol regulatory element binding protein-1c (SREBP-1c), FASN, and dperoxisome proliferator activated receptor gamma (PPARγ). The changes contribute to inhibiting fatty acid synthesis and promote fatty acid catabolism. Our findings suggest that GE has the potential for the treatment of NAFLD.

Key words ginsenoside extract; Non-alcoholic fatty liver disease; HepG2; AMPK pathway; mitochondrial function

Category: Basic Nutrition& Research

植物性饮食可以降低胃癌前病变的风险：基于饮食模式评分和粪便代谢组学的新证据

Plant-Based Diet can reduce the risk of Gastric Precancerous Lesions: A New Evidence from Case-control study based on Dietary Pattern Scoring and Fecal Metabolic Profiling

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Background: The relationship between plant-based diet indices and gastric precancerous lesions risk remains unclear. Metabolomics can identify biomarkers of PDIs and GPL and strengthen understanding of the potential mechanisms.

Objectives: The present study aimed to explore the relationship between three indices, including overall plant-based diet, healthy plant-based diet, unhealthy plant-based diet, and GPL.

Methods: In this case-control study, 1,130 subjects were included using 1:1 propensity score matching for age and sex. PDIs were calculated from FFQs. Odds ratios and 95% confidence intervals was calculated using logistic regression. Fecal metabolites of 58 participants were profiled using untargeted metabolomics. With VIP value > 1, log2Fold change > 1 or < -1, t-test ($p < 0.05$) as the standard, the differences in metabolites between the PDIs and case-control groups were screened. Pathway analysis relies on the KEGG database. Pearson's correlation analysis was used to evaluate correlations.

Result: The highest hPDI had lower odds of GPL after controlling for potential confounders (OR, 0.227; 95% CI, 0.112 - 0.457). In contrast, higher the uPDI, higher was the risk of GPL (OR, 2.964; 95% CI, 1.649 - 5.328). Metabolomic analysis identified six different substances between the patients and control group, and KEGG enrichment analysis revealed D-arginine and D-ornithine metabolism ($p = 0.0067$), linoleic acid metabolism ($p = 0.017$), biosynthesis of unsaturated fatty acids ($p = 0.042$), and arginine and proline metabolism ($p = 0.047$) have changed. The correlation analysis results showed that luteolin 7-sulfate may be used as a biomarker for the association between PDIs and GPL, and stable differences in N-acyl amides with PDIs has not been reported before.

Conclusions: Our found a negative correlation between PDIs and GPL risk, and considered luteolin 7-sulfate as a marker between a plant-based diet and GPL. The results support the benefits of a plant-based diet in preventing GPL.

Key words Gastric Precancerous Lesions; Plant-based diet; Metabolomics; Dietary pattern; Case-control study

Category: Basic Nutrition& Research

生命早期补充婴儿双歧杆菌与 2'-岩藻糖基乳糖对小鼠肠道菌群、肠道发育及免疫功能具有潜在的长期益处

Bifidobacterium infantis and 2'-Fucosyllactose supplementation in early life may have potential long-term benefits on gut microbiota, intestinal development, and immune function in mice

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Background: The health benefits of nutritional interventions targeting the gut microbiota in early life are transient, such as probiotics, prebiotics, and synbiotics.

Objective: This study sought to determine whether supplementation with B. infantis 79 (B79), 2'-fucosyllactose (2'-FL), or both would lead to persistent health benefits in neonatal BALB/c mice.

Methods: Neonatal mice were gaveged from birth to postnatal day (PND) 21, and received four times of intraperitoneal injections of Ovalbumin (OVA) from PND 22 to 49, and sacrificed at PND 21 or 56. The neonatal mice were divided into control group, B79 group, 2'-FL group and B79 + 2'-FL group, which were treated with normal saline, B79 bacterial suspension, 2'-FL solution or mixed solution of B79 and 2'-FL respectively. The intestinal development, immune function and gut microbiota of mice were measured.

Results: We found that at postnatal day (PND) 21, Ki67 and MUC2 expression increased while total serum IgE content decreased in the B79, 2'-FL, and B79+2'-FL groups. The gut microbiota's structure and composition altered as well. The levels of propionic acid, sIgA, and IL-10 increased in the 2'-FL group. Moreover, butyric acid content increased while IL-6, IL-12p40 and TNF-a decreased in the B79+2'-FL group. At PND 56, Ki67 and MUC2 expression increased while the gut microbiota remained altered in all three groups. The serum total IgG level increased only in the B79+2'-FL group.

Conclusion: Early life supplementation with B79, 2'-FL, or their combination persistently alters the gut microbiome and promotes intestinal development in mice. The immunomodulatory capacity of B79 and 2'-FL occurs during weaning, and their combination may persist into adulthood.

Key words Bifidobacterium infantis; Human milk oligosaccharides; intestinal development; gut microbiota; immune function

Category: Basic Nutrition& Research

一种植物源性配方对胃癌前病变大鼠肠道微生物组的影响

Effects of Plant-Based Medicinal Food on gut microbiome in rats of Precancerous Lesions of Gastric Cancer model

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Background：The Plant-Based Medicinal Food (PBMF) tested in this study is a novel product formulated by 12g Coix seed, 12g Lentinula edodes, 12g Asparagus officinalis L., 12g Houttuynia cordata, 12g Dandelion, and 9g Grifola frondosa. Although the protective effects of natural plants or edible foods on gastric carcinoma were proved, and dysbiosis of the gut microbiota is also reported in gastric carcinogenesis, little is known about whether gut microbiota is a regulatory target for natural plants in blocking carcinogenesis. Therefore, the study aims to explore the modulation of PBMF on gut microbiota in Precancerous Lesions of Gastric Cancer (PLGC) rats.

Methods: A model of PLGC was established in Wistar rats using a combination of N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) in drinking water and 8% NaCl diet for 20 weeks. The establishment of PLGC model was evaluated by histopathological evaluation of gastric tissue. Surviving PLGC rats were randomly divided into model control group, PBMF low-dose, medium-dose, and high-dose groups, and all rats were fed normal drinking water ad libitum, which lasted 14 weeks. Histopathological changes of gastric tissues were evaluated by HE staining. The gut microbiome was evaluated by 16S rDNA gene sequencing of feces samples.

Results: The PLGC rat model was successfully established. Following PBMF administration, inflammation and defects of the mucosa were reduced, the degree of atrophy and atypical hyperplasia of gastric tissues were relieved, pseudo-pyloric metaplasia and dysplasia were rare. PBMF significantly increased the abundance of Ruminococcus and Turicibacter, while decreasing Bacteroides and Escherichia-shigella.

Conclusions: PBMF alleviates the pathologic lesion of PLGC. The mechanism of action is partially regulated by the gut microbiome, manifested as increasing abundance of probiotics such as Ruminococcus and Turicibacter, as well as the decreasing abundance of conditional pathogens such as Bacteroides and Escherichia Shigella.

Key words Plant-Based Medicinal Food, Precancerous Lesions of Gastric Cancer, Histopathological examination of the gastric tissue, 16S rDNA gene sequencing, Gut microbiota.

Category: Basic Nutrition& Research

结直肠癌患者脂代谢相关差异表达的 LncRNAs 筛选和分析

Comprehensive Analysis of Differentially Expressed LncRNAs associated with Lipid Metabolism in Patients with Colorectal Cancer

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Abstract:Colorectal cancer (CRC) is one of the most common cancers worldwide and is related to diet and obesity.Currently, crosstalk between lipid metabolism and CRC has been reported; however, the specific mechanism is not yet understood. In this study, we screened differentially expressed long non-coding RNAs (lncRNAs) and mRNAs from primary cancer, paracancer, and white adipose tissue of CRC patients. We screened and analyzed the genes differentially expressed between primary and paracancer tissue and between paracancer and white adipose tissue but not between primary and white adipose tissue. We identified a lncRNA (MIR503HG) that may be involved in the crosstalk between CRC and lipid metabolism through exosome delivery. Despite the limited sample size in this study, the findings raise the possibility of crosstalk between lipid metabolism and CRC through the exosomal delivery of lncRNAs.

Key words colorectal cancer; lncRNA; white adipose tissue; high-throughput sequencing; bioinformatics

Category: Basic Nutrition& Research

基于脂质组学对不同泌乳期绵羊乳中特征脂质的定性和定量比较

Lipidomics-based study of the differences in lipid composition between ewe colostrum and mature milk and screening for its biomarkers

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Background and Objectives Ewe milk, a gradually valued source of special quality small variety milk, has incrementally attracted the attention of researchers because of its nutritional abundance and distinct characteristics. In recent years, with the trend of consumer upgrading in the mother and baby industry, the infant formula market is also heating up rapidly. However, there are few international studies on non-ruminant small species milk sources, and few studies have been reported on the nutritional composition of Chinese ewe milk and its mechanisms of change and nutrition in relation to lactation. Methods and Study Design In this study, a lipidomic technique based on ultra-high performance liquid chromatography coupled with a triple quadrupole mass spectrometry was used to analyze the lipid composition in ewe milk at different lactation periods. Results Herein, 877 lipids assigned to 26 subclasses were identified in ewe colostrum and mature milk. A total of 606 peaks in positive ion mode and 271 peaks in negative ion mode were detected, 108 significantly different lipids were investigated (variable importance in projection > 1.0, fold change ≥ 2 or ≤ 0.5, and $P < 0.05$). Absolute quantitative analysis of differential lipids showed that lipid subclasses such as PC, PE, LPE, HexCer and TG were significantly increased in ewe mature milk. Four potential lipid biomarkers, namely, LPE(0:0/16:0), LPE(16:0/0:0), Carnitine(C14:1), and Carnitine(C18:1), were selected from the 108 significantly different lipids based on fold change values. Conclusions Analysis of the related metabolic pathways of the significantly different lipids revealed that they mainly affect vitamin digestion and absorption, fat digestion and absorption, and cholesterol metabolic pathways. Our results improve the understanding of the differences between ewe colostrum and mature milk and provide effective precision nutrition information for functional studies of ewe milk and related product development.

Key words Lipidomics; ewe colostrum; ewe mature milk; differential lipids; precision nutrition

Category: Basic Nutrition& Research

丁酸盐通过调控肠道黏膜屏障和神经炎症改善 LDLR-/- 小鼠认知功能的机制研究

Ameliorative effects of butyrate on cognitive impairment via regulation of gut mucosal barrier function and neuroinflammation in LDLR-/- mice

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Short-chain fatty acids, the main metabolites produced by bacterial fermentation of dietary fiber, possess neuroactive properties. The present study aimed to investigate if and how intestinal mucosal barrier function, neuroinflammatory signaling and tryptophan metabolism mediate butyrate's effect on the brain's cognitive function in a mouse model. Sixteen LDLR knockout mice were fed with an atherosclerotic diet and concomitantly treated by intragastric administration with either normal saline as model group or 400mg/kg/day sodium butyrate for 8 weeks. In the intestinal tissue, butyrate ameliorated mucosal barrier function, increased expression of tight junction protein, and inhibited inflammatory pathways by targeting the toll-like receptor 4 signaling and the nod-like receptors domain containing 3 inflammasome. Consequently, butyrate reduced not only the serum level of lipopolysaccharide but also its capability to cross the blood-brain barrier, leading to the suppression of both tau phosphorylation and neuroinflammation in the cortex and hippocampus. Subsequently, butyrate delayed cognitive impairment via decreasing latency to the platform and lengthening swimming distance in the target quadrant. Nevertheless, butyrate showed no effect on serotonin, indoleacetic acid, L-kynurenine, niacinamide, and their metabolites, indicating that the observed effects on cognitive function are unrelated to the tryptophan pathway. In summary, the present study provided the novel experimental evidence that butyrate played a neuroprotective role by improving intestinal mucosal barrier function and reducing the penetration of intestinal endotoxin from the gut to the central nervous system, and then alleviating neuroinflammatory response.

Key words Butyrate, Cognition, Neuroinflammation, Gut mucosal barrier, Tryptophan metabolism

Category: Basic Nutrition& Research

富含皂苷、黄酮和生物碱的物质治疗自身免疫性疾病的效果：一项基于动物实验的系统评价和 Meta 分析

Efficacy of substances containing 3 types of active ingredients-saponins, flavones, and alkaloids in regulation of cytokines in autoimmune diseases: a systematic review and Meta-analysis

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Background and Objectives: Autoimmune diseases bring a heavy economic and medical burden. To systematically evaluate the effects of treatment with substances containing saponins, flavones, and alkaloids in animals with autoimmune diseases (AIDs).

Methods and Study Design: The protocol for this systematic review and meta-analysis was prospectively registered with PROSPERO (CRD42023395741). Searches were conducted in the China National Knowledge Infrastructure, Wanfang, Chinese Science and Technology Journals, China Biomedical, PubMed, Cochrane Library, and Embase databases to screen for animal studies investigating the therapeutic effects of saponins, flavones, or alkaloids on autoimmune diseases; consequently, corresponding data extraction tables were prepared. Systematic Review Centre for Laboratory Animal Experimentation was used to assess the risk of methodological bias in the included literature. RevMan 5.4 was used for the meta-analysis on the 8 serum cytokines.

Results: A total of 31 studies were included, all of which were randomized controlled studies. Meta-analysis indicated that substances rich in saponins, flavones, and alkaloids reduced serum levels of interleukin-1β (SMD = -1.94, 95% CI [-2.99, -0.90], P = 0.0003), interleukin-6 (SMD = -1.65, 95% CI [-2.33, -0.97], P < 0.00001), interleukin-17 (SMD =-2.41, 95% CI [-3.61,-1.20], P < 0.0001), tumor necrosis factor α (SMD =-1.84, 95% CI [-2.61,-1.06], P < 0.0001), and interferon γ (SMD =-1.54, 95% CI [-2.43, -0.65], P = 0.0007), but increased serum levels of interleukin-4 (SMD = 1.30, 95% CI [0.15, 2.44], P = 0.03) and interleukin-10 (SMD = 2.05, 95% CI [1.39, 2.70], P < 0.00001) in animal models. However, no significant regulatory effect of these three active components was observed on serum levels of interleukin-2 (SMD = -0.63, 95% CI [-1.82, 0.57], P = 0.30).

Conclusions: Substances containing saponins, flavones, and alkaloids regulated the changes of immune-related cytokines, it may be a novel dietary substance to relieve and control autoimmune diseases in the future.

Key words autoimmune disease, saponin, flavone, alkaloid, system evaluation, meta-analysis

Category: Basic Nutrition& Research

吡喃花色苷Vitisin A对脂质代谢紊乱的调控作用
Regulatory effect of pyranocyanoside Vitisin A on lipid metabolism disorder

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ji nan university

Red wine is a popular alcoholic beverage that has been consumed worldwide for hundreds of years. The color of red wine has always been considered to be one of its major sensorial attributes which is first perceived by the consumer. This characteristic was originally associated with the presence of anthocyanins, an important group of water-soluble phenolic pigments. Pyranoanthocyanins, a group of anthocyanin-derived pigments, are produced in red wines during the fermentation and aging processes, which formed a new pyran ring from C4 and C5 hydroxyl condensation, These compounds are responsible for a gradual change of the red-purple color towards orange hues, which are particularly important for imparting the color to aged red wines. In recent years, pyranoanthocyanins have attracted attention primarily because of their better chemical stability, higher color intensity, and higher antioxidant potential compared to their anthocyanin counterparts in vitro, but few in vivo studies on bioactivities of pyranoanthocyanins . Vitisin A is the main pyranoanthocyanin detected in aged wines, which forms upon the reaction between pyruvate with anthocyanins. In our previous study, we found that vitisin A exhibited a better hypocholesterolemic activity than its counterpart Cyanidin-3-O-glucoside (C3G) in HepG2 cells. However, the plasma lipid-lowering effect of Vitisin A in vivo is still unclear. The present study was carried out to compare the plasma lipid-lowering activities of Vitisin A with its anthocyanin counterpart C3G in ApoE-/- mice fed a high-fat diet, and to explore the underlying mechanism related to lipid metabolism.

Key words Red wine, Vitisin A, C3G, HepG2 cells, ApoE-/- mice, lipid metabolism.

Category: Basic Nutrition& Research

RGS12 在人类肿瘤中的作用：一项泛癌分析

Roles of RGS12 in Human Cancers: a Pan-Cancer Analysis

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Background: RGS12, a member of the Regulator of G-protein signaling (RGS) protein family, enhance the deactivation of G proteins to turn off GPCR signaling and is increasingly thought to play significant roles in human tumors. This study aims to explore the potential role of RGS12 with a view to providing insights on pathologic mechanisms implicated here.

Methods: The potential roles of RGS12 in 33 different tumors were investigated based on The Cancer Genome Atlas (TCGA), Genotype-tissue expression (GTEx), Cancer Cell Line Encyclopedia (CCLE), Tumor Immune Estimation Resource (TIMER), and Clinical Proteomic Tumor Analysis Consortium (CPTAC) datasets and various other bioinformatic tools. The expression difference, protein mutation and phosphorylation status, survival, pathological stage, DNA methylation, protein-protein interaction, and immune cell infiltration related to RGS12 were analyzed. Then lentivirus was transfected to knockdown the expression of RGS12 in NSCLC cells and the migration was analyzed using single-cell motility assay and wound healing assay.

Results: Differential expression levels of RGS12 were observed in most cancer types. RGS12 expression in tumor samples correlates with poor overall survival in several cancers. Enhanced phosphorylation levels of S172, S174, S711, and S849 were observed in several tumors, including breast cancer. RGS12 correlated with tumor immunity and associated with different immune cells and genes in different cancer types. DNA methylation correlated with RGS12 dysregulation in cancers. RGS12 was notably associated with most immune cells in most cancers. RGS12 in cancer correlates with tumor progression and the immune response, although these data require further confirmation. Furthermore, knockdown of RGS12 inhibit the migration of NSCLC cells.

Conclusion: Our study offers a comprehensive understanding of the oncogenic roles of RGS12 across different tumors. RGS12 may correlate with tumor immunity.

Key words pan-cancer; RGS12; prognostic biomarkers; immunotherapy; cell migration

Category: Basic Nutrition& Research

营养、肠道菌群和疾病：相互作用和影响

Nutrition,Gut Microbiota and Disease: Interaction and Influence

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The relationship between different dietary methods, nutrients, gut microbiota and diseases has become the focus of recent research.

The composition of the gut microbiota is influenced by dietary habits and food intake components. Research showed that various dietary choices, including Mediterranean diet, intermittent fasting and low-fat vegan diet, can alter changes in the gut microbiota, contribute to reduce cardiovascular risk factors, loss weight and improve mood. Nutrients also have a certain impact on gut microbiota. Natural foods such as vegetables, nuts, Konjaku flour, cocoa powder and some probiotics foods effectively increase the diversity of gut microbiota, change the composition and function of gut microbiota. Poor dietary habits such as high-fat diet and long-term use of protein supplements may have a negative impact on the gut microbiota. Previous studies revealed that besides metabolic diseases such as type 2 diabetes, chronic kidney disease and obesity, as well as cardiovascular diseases such as hypertension and coronary heart disease, cancers such as breast cancer and colorectal cancer also have a certain relationship with gut microbiota.

Research on brain disorders such as Parkinson's disease, Alzheimer disease and depression have revealed that bidirectional communication between the brain and the intestine is influenced by gut microbiota and related metabolites, and interacts with the host through biochemical and functional inputs, thereby affecting the host's homeostasis and health. Nutrients can influence physiological and psychological responses through microbiome－gut－brain axis, subtly intervening in brain activity and the function of known regions that regulate emotions and stress responses.

The gut microbiota not only affects the host's metabolism, but also has a certain relationship with the host's physical and mental health, and related diseases. The pathogenesis of gut microbiota related diseases and how to improve gut microbiota to enhance quality of life are issues worth paying attention to in the future.

Key words nutrition;gut microbiota; interaction;influence;disease

Category: Basic Nutrition& Research

中国上海地区母血、脐带血和母乳中的类胡萝卜素含量及其与母亲饮食摄入的关系

Carotenoid profile in maternal/cord blood, breast milk, and its associations with maternal dietary intake: a longitudinal study in Shanghai, China

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Carotenoids are important bioactive substances in breast milk that promote vision, cognition and respiratory health in infants. This study aims to explore the carotenoid profile in breast milk and maternal/cord plasma of healthy mothers in Shanghai, China and its correlation with dietary intake. Maternal blood, umbilical cord blood, and breast milk samples from five lactation stages (colostrum, transitional milk, and early-, mid-, and late-term mature milk) were collected. Concentrations of carotenoids were analyzed by high-performance liquid chromatography. The maternal carotenoid dietary intake was evaluated through the 24-hour dietary review questionnaire and the food frequency questionnaire. The results show that the concentrations of carotenoids in breast milk changed over the progress of lactation. β-Carotene was the primary carotenoid in colostrum. Lutein accounts for approximately 50% of the total carotenoids in transition milk, mature milk and cord blood. A high correlation between carotenoids in umbilical cord blood, breast milk and maternal blood was observed. Dietary carotenoid intakes of lactating mothers also differed significantly across lactation stages, although no correlation with breast milk was found. These findings may shed light on the transport mechanism of carotenoids between mothers and infants and help guide the development of formulas for Chinese infants as well as the nutritional diets of Chinese lactating mothers.

Key words breast milk; carotenoids; lactation stage; maternal/cord blood; maternal diet; China

Category: Basic Nutrition& Research

支链氨基酸代谢紊乱介导高脂喂养 APP/PS1 小鼠的阿尔兹海默症病理的恶化

Aberrant branched-chain amino acids metabolism mediates high fat diet-induced aggravation of Alzheimer's disease-related pathology in APP/PS1 mice

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Background and Objectives

Type 2 diabetes has been recognized as a risk factor for developing Alzheimer's disease (AD), and studies indicate that insulin resistance plays an important role in AD-related pathology. However, mechanisms underlying the effects of insulin resistance on AD remains largely unclear. Some studies presented a correlation between insulin resistance and impaired branched-chain amino acids (BCAAs) metabolism in epidemiology and experiment . Moreover, increases in blood BCAAs levels are reported to associate with the risk for AD. Nevertheless, it needs to be further confirmed whether aberrant BCAAs metabolism participates in insulin resistance-related development of AD. Thus, this study is aimed to investigate the role of BCAAs metabolism disorders in high fat diet (HFD)-induced exacerbation of AD-related pathology.

Methods and Study Design

Three-month old male APP/PS1 mice were fed HFD, HFD with high BCAAs (+100%), HFD with low BCAAs (-50%) or control diet, respectively. After nine-month treatment, oral glucose tolerance test and Morris water maze were performed. Serum BCAAs and branched-chain α-keto acids (BCKAs) levels, BCAAs metabolism-related protein levels in liver, Aβ deposition and microglia activation in brain were determined.

Results

Compared to control diet feeding, mice in HFD group displayed impaired glucose tolerance and hepatic BCAAs degradation, followed by increases in serum BCAAs and BCKAs levels. Cognitive impairment, larger cerebric Aβ deposition, and over-activated cerebric microglia were observed in HFD fed mice. Meanwhile, HFD with low BCAAs feeding decreased serum BCAAs and BCKAs levels, and alleviated AD-related pathology in mice compared to HFD group. Conversely, HFD with high BCAAs feeding further worsened above pathologies.

Conclusions

HFD feeding leads to insulin resistance, suppressed hepatic BCAAs metabolism, aggravated AD-related pathology in APP/PS1 mice. Results of BCAAs adjustment in HFD farther reveals that aberrant BCAAs metabolism contributes to insulin resistance-induced acceleration of AD progression. Targeting BCAAs metabolism may become a potential therapeutic intervention for AD.

Key words Insulin resistance; Alzheimer's disease; branched-chain amino acids; APP/PS1; High fat-diet

Category: Basic Nutrition& Research

短链脂肪酸和微生物组对中国农村人口 2 型糖尿病的影响： 来自河南农村队列的证据

The effect of short-chain fatty acids and the microbiome on type 2 diabetes in a Chinese rural population: Evidence from the Henan Rural Cohort

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Objectives We aim to evaluate the dose-response relationship between faecal short-chain fatty acids (SCFAs) and T2DM risk and explored the contribution of the intestinal microbiome in a population-based cohort.

Methods This study recruited 100 subjects from the Henan rural cohort and performed an integrated analysis of the microbiome and targeted metabolomics. Logistic regression and restricted cubic spline assessed the associations between SCFA concentrations and T2DM risk. Generalized linear models identified the gut microbial traits related to SCFAs and T2DM.

Results Comparing with the lowest triple of total SCFA, acetate and butyrate, the risk of T2DM was respectively 0.291 (95%CI: 0.085-0.991), 0.160 (95%CI: 0.044-0.574) and 0.171 (95%CI: 0.047-0.620), with S-shaped dose-response relationships ($P < 0.05$). Both valerate and caproate levels performed significant differences on the alpha-diversity indices and overall microbiota composition. The ACE index interacted with high valerate on GLU level and the Shannon index interacted with medium butyrate on INS level (all $P < 0.05$). Three specific microbiota taxa with regard to valerate or caproate, including genus Prevotella_9, Odoribocter and Blautia, were also found to correlate with T2DM risk.

Conclusion T2DM were negatively linked to faecal SCFA levels in a non-linear manner, and gut microbial traits about SCFA also influenced T2DM in the rural Chinese population. Significantly, increasing microbial diversity attenuated the association between SCFAs and T2DM risk factors.

Key words T2DM; SCFAs concentrations; intestinal microbiome; dose-response relationships; interaction

Category: Basic Nutrition& Research

短链脂肪酸水平和膳食质量与2型糖尿病的关系：基于河南农村队列的巢式病例对照研究

Association between fecal short-chain fatty acid levels, dietary quality and type 2 diabetes: a nested case-control study based on Henan Rural Cohort

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Background and Objectives: There is limited evidence on the relationship between short-chain fatty acid levels (SCFAs), diet quality and type 2 diabetes (T2D) in rural Chinese populations. We aimed to investigate the characteristics of SCFAs in rural population and to examine the relationship between SCFAs levels, dietary quality and T2D.

Methods and Study Design: A total of 97 adults were recruited to the nested case-control study. Dietary quality was assessed by the Alternate Healthy Eating Index 2010 (AHEI-2010) and SCFAs levels were analyzed using the GC-MS system. Generalized linear regression and restricted cubic splines analysis were conducted to calculate the odds ratio for T2D relative to SCFAs level and investigate the dose-response relationship. Finally, generalized linear regression models were used to study the combined effect of SCFAs levels and AHEI-2010 scores on T2D and to calculate their additive and multiplicative scales.

Results: T2D participants had lower levels of acetic acid and butyric acid, with higher fecal acetic acid levels associated with an 85.7% reduction in risk of T2D and butyric acid levels were 80.3% lower at the extreme third after adjusting for confounding factors. We also observed a significantly lower risk of T2D with acetic acid levels >1338.588 mg/g or butyric acid levels >588.122 mg/g. In addition, the risk of higher acetic acid levels of T2D was 0.002 (95% CI:0.000, 0.114) compared to participants with lower AHEI-2010 scores (All P<0.05).

Conclusions: In this study, participants have low adherence to the dietary guidelines for Chinese residents, and those with T2D have lower fecal levels of acetic and butyric acid. Higher levels of acetic and butyric acid are negatively associated with risk of T2D, with a non-linear dose-response relationship. Higher AHEI-2010 scores and fecal levels of acetic acid may have a positive joint effect on the reduced risk of T2D.

Key words Short-chain fatty acids; Dietary quality; T2D; Nested case-control study, Henan Rural Cohort

Category: Basic Nutrition& Research

GPR116过表达在胃癌预后评估中的意义
Significance of Overexpression of GPR116 in the Evaluation of Prognosis of Gastric Cancer

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Objective: This study aims to investigate the expression of G protein-coupled receptor 116 (GPR116) in gastric cancer (GC) and the significance of clinical prognosis.

Methods: The expression level of GPR116 mRNA in GC was analyzed using Gene Expression Omnibus and Ualcan database. The expression of GPR116 in GC tissue was detected by immunohistochemistry. The correlation between the GPR116 protein and clinicopathological parameters was analyzed. The relationship between the expression of GPR116 and the prognosis of GC patients was analyzed and further validated by Kaplan-Meier plotter database. The correlation between the GPR116 and any identified differentially expressed genes was analyzed by linkedOmics database. The gene enrichment analysis of GPR116-related genes was carried out using Web-based gene set analysis tool.

Results: The expression of GPR116 was significantly up-regulated in the GC tissue. Its expression level was significantly correlated with TNM staging and depth of invasion. Prognostic analysis suggested that the high GPR116 expression was significantly correlated with poor overall survival in GC patients. Multivariate COX analysis showed that the GPR116 overexpression was an independent prognostic indicator in GC patients (HR=1.855; 95% IC 1.021-3.370; P=0.043). The results of enrichment analysis showed that the GPR116 and related genes were mainly involved in extracellular matrix-receptor interaction pathway, focal adhesion pathway, cell adhesion molecule pathway, PI3K-Akt signal pathway, DNA replication, cell cycle and so on tumor-related pathways.

Conclusion: GPR116 is highly expressed in the GC tissue and is correlated with the poor prognosis of GC patients. It is expected to be a potential new target for GC treatment.

Key words GPR116, gastric cancer, bioinformatics analysis, immunohistochemistry, prognosis, signal pathway

Category: Basic Nutrition& Research

不同妊娠期母体叶酸浓度与新生儿出生体重之间的关系：系统综述

Associations between maternal folate concentrations at different trimesters and neonatal birth weight: a systematic review

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OBEJCTIVE: A systematic review using PRISMA guidelines was conducted to evaluate an association between maternal serum/plasma or red blood cell (RBC) folate concentrations at different trimesters and neonatal birthweight.

METHODS: PubMed, Scopus, Embase, Web of Science and Cochrane Library databases were searched up to April 19th 2022. Eligible studies included an exposure of maternal serum/plasma, or RBC folate and birthweight or low birthweight outcomes: small-for-gestational-age (SGA), fetal growth restriction (FGR), and low birth weight (LBW). All studies were summarized in detail but only the studies reporting OR or β coefficients were included in the discussion.

RESULTS: Thirteen studies were identified, of which, 6 studies and 4 studies reported β or ORs coefficients for an association with birthweight and low birthweight outcomes, respectively, one study reported both of the two indicators. Studies examining birthweight as an outcome reported statistically significant positive associations with serum/plasma, or RBC folate in early (n=3) and late pregnancy (n=3), but not in mid-pregnancy (n=5). Statistically significant inverse or no associations were reported between maternal folate concentration and odds of low birthweight (LBW, SGA, FGR) in early (n=2), mid- (n=1), and late (n=3) pregnancy. Increased odds of low birthweight outcomes were only observed in the lowest categories of exposure indicating folate deficiency and in socio-economically disadvantaged populations.

CONCLUSIONS: Maternal folate concentration may be positively associated with birthweight in early and late pregnancy. Maternal folate concentrations in each trimester might have inverse association with SGA, LBW and FGR in pregnant women at risk of nutritional deficiencies. More well-designed studies considering major potential confounders including BMI, education, and socio-economic status are warranted to further clarify the roles of maternal serum/ plasma and RBC folate concentrations at different trimesters in neonatal birth weight.

Key words folate concentration; trimesters; birthweight; small-for-gestational-age; fetal growth restriction; low birth weight

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肠道微生物对氧化偶氮甲烷诱导的小鼠结直肠癌癌前病变发展的影响及其可能的潜在机制

Effect of intestinal microbes on the development of azomethane-induced colorectal precancerous lesions in mice and its possible underlying mechanism

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BACKGROUND:

Gut microbiota contributes to the carcinogenesis of colorectal cancer (CRC). In this study, the effects of gut microbiota alteration caused by broad-spectrum antibiotics on azoxymethane (AOM)-induced CRC and the underlying mechanisms were investigated in vivo.

METHODS:

Eighty 3- to 4-week-old male ICR mice were randomly divided into Control group, AOM intervention group (AOM group), antibiotic intervention group (Abx group), and antibiotic+AOM intervention group (AbxAOM group). The AbxAOM group and Abx group were gavaged with antibiotics solution, Control group and AOM group were gavaged with an equal volume of pure water twice a day for 14 days. Then AOM group and AbxAOM group were intraperitoneally injected with AOM solution (10 mg/kg.bw), Control group and Abx group were injected with the corresponding volume of sterile 0.9% NaCl solution once a week for 4 weeks. On the 28th week of the experiment, the intestinal tissues were collected for histology, real-time quantitative polymerase chain reaction and immunohistochemistry. Feces from mice were detected by 16S ribosomal RNA gene sequencing.

RESULTS:

AOM treatment could lead to colon pathological damage, aberrant crypt foci(ACF) formation and adenocarcinoma development. Compared with AOM group, Abx treatment efficiently mitigated the degree of weight loss and suppressed the formation of ACF. The mRNA expression levels of Vascular cell adhesion molecule-1, Intercellular cell adhesion molecule-1, Ki-67, Interleukin-1β(IL-1β), IL-6, Tumor necrosis factor-α, Vascular endothelial growth factor A, Toll-like receptors 4, Nuclear factor kappa B p65(NF-κB p65) and Cyclooxygenase-2 were substantially downregulated in the mice of AbxAOM group compared with AOM group. Moreover, Abx treatment remarkably decreased the protein expression level of NF-κB p65 and the abundance of bacteria Akkermansia and Streptococcus.

CONCLUSIONS:

These findings suggest that intestinal microbiota alteration caused by antibiotics could prevent AOM-induced intestinal carcinogenesis via reducing the formation of ACF and inhibiting the inflammatory reaction. The underlying molecular mechanisms likely rely on suppressing the TLR4/NF-κB/COX-2 signaling pathway.

Key words Colorectal cancer; Antibiotics; Azoxymethane; Gut microbiota; Carcinogenesis

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肠道菌群和 COVID-19 的因果关系研究-两样本孟德尔随机化
Causal Association between Gut Microbiome and COVID-19 - A two-sample Mendelian Randomization Study

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Aims:

Although COVID-19 is primarily a respiratory disease, it causes a full spectrum of harm, with substantial evidence that it affects gastrointestinal function. This study was performed to investigate the causal association between covid-19 and gut microbiota using Mendelian randomization (MR).

Methods:

The GWAS statistics with COVID-19 were obtained from the results of the seventh round of the COVID-19 Host Genetics Initiative study. GWAS statistics for gut microbiota were derived from the largest available meta-analysis of genome-wide association studies conducted by the MiBioGen consortium (n = 13,266).

Results:

Reverse variance-weighted estimates demonstrated that Peptococcus was protective against COVID-19 (OR = 0.96, 95% CI: 0.94-0.99, P = 0.027) and that Dorea and Rikenellaceae (RC9gut group) increased the risk of COVID-19 (OR = 1.07, 95% CI. 1.01-1.13, P = 0.014; OR = 1.03, 95% CI: 1.00-1.06, P = 0.024, respectively). Reverse MR analysis showed that COVID-19 was positively associated with LachnospiraceaeNK4A136group and Oscillospira (OR = 1.19, 95% CI. 1.02-1.39, P = 0.024; OR = 1.25, 95% CI: 1.00-1.55, P = 0.046, respectively), but negatively associated with Paraprevotella and Subdoligranulum (OR = 0.74, 95% CI. 0.59-0.97, P = 0.040; OR = 0.86, 95% CI: 0.74-1.00, P = 0.048, respectively).

Conclusion:

We confirmed the causal relationship between gut microbiome and COVID-19, providing an innovative perspective for COVID-19 research: prevention and treatment of COVID-19 is facilitated by specific regulation of gut microbiome.

Key words COVID-19; gut microbiome; Mendelian randomization

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染料木黄酮通过雄激素受体途径抑制去势抵抗前列腺癌
Genistein inhibits castration-resistant prostate cancer via the androgen receptor pathway

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Background: Prostate cancer is one of the most frequent malignant tumours. The patients' survival time is significantly shorter after prostate cancer develops into castration-resistant prostate cancer (CRPC). Genistein has different biological activities, including the prevention and treatment of PCA disease.

Objectives: This study aimed to investigate the antitumor effect of Genistein in the de novo pathway and AR signalling pathway in CRPC and potential mechanisms of action.

Methods: The expression of key enzymes in the de novo pathway was detected by Western blot. DHT and T levels were measured by ELISA kits. AR distribution was assessed by laser confocal.

Study Design: A xenograft tumor mouse model established with 22R V1 cells was divided into the experimental group and the control group, and the former was given 100 mg/kg.bw/day of Genistein. Divide Genistein into different concentrations (0, 12.5, 25, 50, 100 μM) to treat 22RV1 and VCaP cells for 48 h.

Results: Genistein inhibits CRPC cell proliferation and in vivo tumorigenesis. Genistein blocks de novo androgen synthesis by downregulating the expression of AKR1C3, SRD5A2, CYP11A1, and 3βHSD in the de novo synthesis pathway in CRPC cells. Moreover, Genistein can inhibit the activation and nuclear translocation of the AR signalling path.

Conclusions: Genistein inhibits the progression of CRPC via the androgen receptor pathway.

Key words Genistein; castration against prostate cancer; de novo pathway.; androgen receptor; nuclear translocation

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白介素33通过诱导肝窦内皮细胞功能障碍促进糖尿病小鼠肝纤维化

Interleukin 33 promotes hepatic fibrosis by stimulating liver sinusoidal endothelial cell dysfunction in diabetic mice

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Objective: We intended to investigate the role of IL-33 in diabetes-associated hepatic fibrosis and the underlying mechanisms.

Methods: Eight-week-old C57BL/6J mice and IL-33-/- mice were established to type 2 diabetes as shown in Figure 1A. Wild-type diabetic mice were given an intraperitoneal injection of anti-IL-33 neutralizing antibody (αIL-33, 37 μg/kg·BW), recombinant mouse IL-33 (rIL-33, 12.5 μg/kg·BW) for the last 12 weeks, or rapamycin (1 mg/kg·BW) twice a week for last 8 weeks. Serum, liver, and other biological samples were collected for serological and histopathological examination.

Scanning electron microscopy was applied to measure hepatic sinusoidal cell capillarization. The expression levels of autophagy-related proteins LC3II/I and p62 were detected by Western Blot. The human liver endothelial cell line SK-Hep1 and human hepatic stellate cell line LX-2 were cultured to identify the role of IL-33 in endothelial dysfunction and the following hepatic stellate cell activation in vitro.

Results: Compared with non-diabetic mice, the diabetic mice exhibited increased hepatic collagen deposition. IL-33 knockout or αIL-33 administration alleviated diabetes-associated liver fibrosis as shown by Sirius Red staining and hepatic hydroxyproline content. Furthermore, exogenous IL-33 blocked blunted liver sinusoidal endothelial cell dysfunction and endothelial inflammation during diabetic liver fibrosis progression. In vitro, rIL-33 aggravated autophagy disruption in the presence of palm acid and high glucose in SK-Hep1 cells, which was blunted by autophagy agonist rapamycin treatment. LX-2 co-cultured with rIL-33-pretreated SK-Hep1 displayed augmented activation as demonstrated by immunoblot staining of αSMA.

Conclusion: We underscore the importance of IL-33 signaling in the development of diabetic liver fibrosis. During the progression of diabetes-associated liver disorder, IL-33 promotes liver fibrosis by driving LSEC dysfunction through autophagy inhibition. Our findings demonstrate that IL-33 is an attractive therapeutic target for diabetic liver fibrosis.

Key words IL-33, liver fibrosis, liver sinusoidal endothelial cell, autophagy, hepatic stellate cell

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不同阶段轻度认知障碍者氧化固醇、肠道微生物群和脑葡萄糖摄取的关联性:一项巢式病例对照研究

Association of oxysterols, gut microbiota and brain glucose uptake in different stages of mild cognitive impairment: A nested case-control study

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Background and Objectives

Studies have proven that cholesterol and its metabolite oxysterols, the gut microbiota, and brain glucose uptake are regulatory factors for mild cognitive impairment (MCI), but their association remains unclarified. This study was conducted to explore the relevance of these factors above in early MCI (EMCI) and late MCI (LMCI) patients.

Methods and Study Design

369 middle-aged and elderly Chinese participants [123 EMCI subjects, 123 LMCI subjects, and 123 matched controls (CON)] were recruited from a prospective cohort based on their cognitive functions. Dietary cholesterol was assessed by food-frequency questionnaires. Serum cholesterol, oxysterols, gut microbiota along with glucose uptake factors were detected. Spearman correlation and regression model were used to identify their correlations and distinguish MCI patients from healthy controls.

Results

Compared to CON group, higher serum Triglyceride and 27-hydroxycholesterol (27-OHC, an abundant oxysterol in the periphery) in the LMCI group, and higher 7α-hydroxycholesterol/7β-hydroxycholesterol (7α-OHC/7β-OHC) in the EMCI group were observed. A lower abundance of *Firmicutes* and *Clostridiales*, but a higher abundance of *Bacteroidetes*, *Prevotellaceae*, *Proteobacteria*, and *Enterobacteriaceae* were found in the LMCI group. Increased levels of fasting blood glucose and hemoglobin A1c (HbA1c), while decreased serum concentration of glucose transporter 1 (GLUT1) and glucose transporter 4 (GLUT4) were found in the EMCI and LMCI groups compared to CON group. Additionally, 7α-OHC/7β-OHC was positively correlated with HbA1c ($r=0.158$, $P=0.002$) but inversely associated with *f_Lachnospiraceae* ($P<0.05$). Besides, there was a positive association between 3β-hydroxy-5- cholestenoic acid (27-CA)/27-OHC with GLUT1 ($r=0.210$, $P=0.034$) and *g_Rodentibacter* ($P<0.05$). Further, the combination of oxysterol, gut microbiota, and glucose uptake-related factors could effectively predict the onset of MCI (AUC= 0.950).

Conclusion

Cholesterol/oxysterols, gut microbiota, and glucose uptake were remarkably changed with a significant correlation in different MCI stages, whose combination showed a prominent predictive value for MCI. Potential mechanism deserves further exploration subsequently.

Key words cholesterol, oxysterol, gut microbiota, brain glucose uptake, mild cognitive impairment

Category: Basic Nutrition& Research

维生素 D3 联合叶酸调节 27-羟基胆固醇代谢和认知功能：一项随机对照试验

Vitamin D3 combined with folic acid supplementation regulates 27-hydroxycholesterol metabolism and cognitive function: a randomized controlled trial

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Background and Objectives

The deficiency of vitamin D (VD) and folic acid (FA) are risk factors for mild cognitive impairment, which might be associated with 27-hydroxycholesterol (27-OHC) metabolism and its synthetase CPY27A1. However, the role of VD and FA supplementation on cognition is still controversial. This study aimed to investigate the effects and mechanisms of different doses of VD combined with FA on the global or domain-specific cognitive functions of VD deficiency patients.

Methods and Study Design

516 participants with VD deficiency were randomly divided into 4 groups, placebo, 400 μg FA (FA), 800 IU VD with 400 μg FA (LVD+FA) or 1600 IU VD with 400 μg FA (HVD+FA) daily respectively for 6 months. Global and domain-specific cognitive tests were conducted, and blood concentrations of 25-hydroxyvitamin D [25(OH)D], FA, homocysteine (Hcy), 17 kinds of oxysterols, and the activities of 27-OHC metabolic enzymes were assessed. A generalized linear mixed model and Bayesian structural equation were applied to analyze the relationships between the indicators above.

Results

Serum 25(OH)D was positively associated with Montreal Cognitive Assessment and domain-specific cognition, while Hcy showed reverse effects ($P<0.05$), despite no difference in global or domain-specific cognitive functions.

There was higher serum 25(OH)D in LVD+FA and HVD+FA groups, but lower in FA group ($P<0.05$). Meanwhile, serum FA was increased in groups intervened with FA ($P<0.001$), while serum Hcy was decreased in FA and LVD+FA groups ($P<0.05$). The serum 25(OH)D level was stimulated by 27-OHC, Hcy and interventions, investigated by Bayesian.

Besides, serum 3β-hydroxy-5-cholestenoic acid, the metabolite of 27-OHC, was increased in HVD+FA group. 7-keto-27-hydroxycholesterol and 7α/β-hydroxycholesterol were decreased in LVD+FA and HVD+FA groups. Moreover, CYP27A1 and CYP27B1 in FA and HVD+FA groups were significantly lower than placebo group ($P<0.05$).

Conclusions

The supplementation of VD combined with FA improves global and domain-specific cognitive functions by regulating serum 25(OH)D, FA, Hcy and 27-OHC metabolism.

Key words Vitamin D, Folic acid, 27-hydroxycholesterol, Cognitive function, Randomized controlled trial

Category: Basic Nutrition& Research

蜜橘黄素通过自噬- hippo 通路减轻肝纤维化中肝细胞的上皮间质转化

Nobiletin alleviated epithelial-mesenchymal transition of hepatocyte in liver fibrosis based on autophagy-Hippo pathway

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Objective: Nobiletin is a polymethoxy flavone with diverse bioactivities, yet information regarding its impact on liver fibrosis remains limit. The objective of this study was to investigate the effects of nobiletin on liver fibrosis and elucidate its underlying mechanisms. Methods: The present study employed a carbon tetrachloride (CCl4)-induced liver fibrosis mouse model and administered nobiletin via gavage for three weeks. In vitro experiments were conducted using LO2 cells stimulated with transforming growth factor β1 (TGF-β1) to induce epithelial-mesenchymal transition. Chloroquine, 3-methyladenine, and siYAP were utilized to investigate the involvement of the autophagy-Hippo/YAP pathway in nobiletin-treated liver fibrosis. Results: Nobiletin effectively inhibited liver fibrosis in CCl4-induced mice by reducing inflammation and fiber deposition in the liver. Furthermore, it attenuated epithelial-mesenchymal transition in hepatocytes, thereby alleviating inflammation and reactive oxygen species generation. The comprehensive investigation unveiled that the hepatoprotective effect of nobiletin against liver fibrosis was attributed to the activation of autophagy, as evidenced by a significant increase in LC3 II expression and concomitant degradation of p62 upon nobiletin treatment. Moreover, nobiletin was found to activate the Hippo/YAP pathway by downregulating YAP expression and its downstream effectors in liver fibrosis. The results of experiments with chloroquine, 3-methyladenine, and siYAP suggested that autophagy mediated the inhibitory effects on YAP. Conclusion: Nobiletin exhibited a protective effect against liver fibrosis, and the underlying mechanism may be attributed to autophagy-Hippo/YAP pathway activation.

Key words Nobiletin; liver fibrosis; autophagy; Hippo; epithelial-mesenchymal transition

Category: Basic Nutrition& Research

27-羟基胆固醇通过调节 Th17/Treg 平衡及其相关的免疫反应引起学习和记忆功能下降

27-hydroxycholesterol impairs learning and memory via regulating Th17/Treg balance and the related immune responses in vivo

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Background and Objectives Oxysterols, especially 27-hydroxycholesterol (27-OHC), have received extensive attention in the pathogenesis of cognitive decline. Oxysterols are reported to be the agonist of retinoic acid-related orphan receptor-γt (RORγt), which is specifically involved in the differentiation and functionality of Th17 cells. However, whether 27-OHC impairs the learning and memory ability by regulating RORγt expression and the related immune responses is still unclear.

Methods and Study Design In this study, 40 male C57BL/6J mice (10 mice/group) were treated with 27-OHC (5.5mg/kg) combined with SR1001(RORγt inhibitor, 25mg/kg) for 21 days. The neurobehavioral tests were conducted to assess the learning and memory ability of mice. The proportion of Th17 and Treg cells was determined by flow cytometry (peripheral blood mononuclear cell (PBMC), hippocampus). The mRNA and protein expression level of T-cell-specific transcription factors and the immunomodulatory factors were detected by qRT-PCR, western blot and ELISA (serum, cerebral cortex).

Results We found that there were higher proportion of Th17 cells but lower Treg cells in PBMC and hippocampus of 27-OHC treated mice. Using of SR1001 significantly inhibited the expression of RORγt mRNA and protein in cerebral cortex. Compared with the 27-OHC group, the Th17 cells proportion in hippocampus, as well as the serum level of IL-17A and IL-17A/IL-10 ratio were remarkably decreased in 27-OHC+SR1001 group; while the Treg cells proportion was increased and the expression level of transforming growth factor-β (TGF-β) and interferon-λ2 (IFN-λ2) was also upregulated. In addition, reduced amyloid-beta (Aβ) plaque area and downregulated expression of amyloid precursor protein (APP) were observed in cerebral cortex of 27-OHC+SR1001 mice, and their performance in Morris water maze test was significantly improved.

Conclusions Our study indicates that 27-OHC induces learning and memory impairment by upregulating the expression of RORγt and disturbing the Th17/Treg balance and the related immune responses.

Key words 27-hydroxycholesterol; RORγt; Th17/Treg; learning and memory; C57BL/6J mice

Category: Basic Nutrition& Research

维生素D联合叶酸和维生素B12通过CYP27A1 SUMO化修饰调节学习记忆能力

Vitamin D combined with folic acid and vitamin B12 regulate learning and memory ability through CYP27A1 SUMOylation

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Aims

The aim of this study is to explore the intervention and mechanisms of vitamin D combined with folic acid and vitamin B12 through CYP27A1 SUMOylation on learning and memory ability, and to provide new ideas for potential pathways and targets from the perspective of dietary nutrition in cognitive dysfunction related diseases.

Methods

The C57BL/6J wild-type mice were used to establish vitamin D-deficient and CYP27A1 knockdown (Cyp27a1-/-) mouse model, randomly divided into 5 groups according to body weight, included control group, vitamin D deficiency and 27-OHC treatment group, vitamin D and folic acid/vitamin B12 treatment group, 2-D08 (SUMOylation inhibitor) treatment group and Cyp27a1-/- knockdown group, respectively. The learning and memory ability of the mice were evaluated by Morris water maze and Novel object recognition test; blood and brain level of 27-OHC was detected by HPLC-MS; SUMOylation of CYP27A1 and its related factor were determined by qRT-PCR, Western Blot and immunoprecipitation; brain Aβ deposition was observed by immunohistochemistry.

Results

Vitamin D deficiency can work together with 27-OHC load, increase brain Aβ deposition, further impair learning and memory ability. CYP27A1 protein can occur SUMOylation modification, vitamin D deficiency and 27-OHC load can increase SUMOylation modification level, inhibiting CYP27A1 expression can reduce the level of SUMOylation modification. Vitamin D combined with folic acid and vitamin B12 supplementation can moderate CYP27A1 SUMOylation level, down-regulate CYP27A1 expression, decrease peripherals and brain 27-OHC load, reduce Aβ deposition and improve the learning and memory ability.

Conclusion

From the perspective that CYP27A1 participate in both 27-OHC and vitamin D metabolism, the study indicated that vitamin D combined with folic acid and vitamin B12 can moderate CYP27A1 SUMOylation and CYP27A1 expression, reduce blood and brain 27-OHC load, then decrease brain Aβ deposition, improve the learning and memory ability. CYP27A1 SUMOylation modification is an important target for cognitive dysfunction early identification and intervention.

Key words 27-hydroxycholesterol; vitamin D; CYP27A1; SUMOylation; learning and memory ability

Category: Basic Nutrition& Research

透明质酸作为天然味觉增强剂的应用和机理初探
Hyaluronic Acid Applied as a Natural Flavor Enhancer

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Creating natural flavor enhancers presents a promising approach to reducing excessive seasoning consumption. This study aimed to determine whether food-grade hyaluronic acid (HA) could serve as a viable option to decrease salt content in low-sodium foods without sacrificing saltiness. Using both an artificial tongue and Quartz crystal microbalance with dissipation (QCM-D), we examined the effects of different molecular weights (100 kDa, 400 kDa) and concentrations (0.2% w/v, 0.4% w/v) of HA on the saltiness perception of NaCl solutions. HA has been confirmed with a taste-enhancing effect. Furthermore, when added to the pre-made dishes such as Sichuan fish and black pepper steak, HA was found to reduce salt content by 10 % while maintaining both saltiness and consumer preference. Simulation with a hydrogel artificial tongue revealed that Na+ adhesion correlated with increasing molecular weight and concentration of HA. The QCM-D results supported this finding, showing that 100 kDa HA enabled greater permeation of Na^+ into the oral mucosal layer and thus showed stronger perception of saltiness in comparison to 400 kDa HA. Overall, the mucoadhesion and mucopenetration of HA make it a promising alternative to traditional seasonings and could facilitate the pursuit of healthier dietary habits.

Key words hyaluronic acid; taste perception; molecular weight; mucoadhesion; mucopenetration

Category: Basic Nutrition& Research

烟酰胺单核苷酸通过提高抗氧化能力和减少 ECM 产生缓解呼吸性粉尘诱导的肺损伤

Nicotinamide mononucleotide alleviates respiratory dust-induced lung injury by enhancing antioxidant capacity and reducing ECM production

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Objective: Pulmonary diseases caused by respirable dust still threaten tens of millions of people's health, such as pneumoconiosis and chronic obstructive pulmonary disease. Nicotinamide mononucleotide (NMN) is a B vitamin derivative with anti-inflammatory and antioxidant effects. The purpose of this study aimed to investigate the beneficial role of NMN in respiratory dust-caused pulmonary injury and its mechanism.

Methods: The lung injury mouse model was established using silica by intratracheally administration, and NMN (500/1000 mg/kg.bw) was given via intragastric administration. Histopathological staining was used to evaluate the effect of NMN on silica-induced lung injury, and transcriptome sequencing was used to further analyze the underlying mechanism. Then, the involved key molecules were verified by q-PCR and Western blot.

Results: NMN alleviates silica-induced lung injury, characterized by reducing inflammatory infiltration and inhibiting cell proliferation. Compared with the control group, 1962 genes were significantly up-regulated (595 genes were down-regulated by NMN treatment), and 1518 genes were significantly down-regulated (275 genes were up-regulated by NMN treatment) after silica exposure. KEGG enrichment analysis showed that the down-regulated genes after NMN treatment were mainly enriched in ECM receptor binding ($P<0.0001$) and cytokine-cytokine binding pathway ($P<0.0001$), while the up-regulated genes were mainly enriched in metabolism of xenobiotics by cytochrome P450 ($P<0.0001$), retinol metabolism ($P<0.001$) and glutathione metabolism pathway ($P<0.01$), suggesting that NMN treatment alleviates silica-induced oxidative injury and inhibits ECM production. Furthermore, q-PCR results showed that the mRNA expressions of MMP-9, Col1a1, and Fn1 were significantly decreased, while Cyp2f2 was increased, and NMN inhibited the expression of extracellular matrix protein.

Conclusion: NMN alleviates silica-induced lung injury by improving antioxidant capacity and reducing ECM production in the lung microenvironment, suggesting that NMN has the potential to mitigate respiratory dust-induced lung injury.

Key words Nicotinamide mononucleotide; Lung injury; respiratory dust; antioxidant; ECM production

Category: Basic Nutrition& Research

血浆镁与中国45岁以上成年人代谢综合征的关系研究

Association of plasma Magnesium with metabolic syndrome in Chinese adults over 45 years old

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Magnesium (Mg) is an essential nutrient for the maintenance of vital physiological functions. Mg deficiency is frequent in obese patients, subjects with type-2 diabetes (T2DM), and metabolic syndrome (MetS). This study aimed to evaluate the relationship between plasma magnesium levels and metabolic syndrome (MetS) in people over 45 years of age in China. A total of 2101 subjects were randomly selected from the China Nutrition and Health Surveillance (CNHS) (2015-2017). According to the criterion of the International Diabetes Federation (IDF) in 2009 to define participants with MetS. The plasma Mg was tested by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The plasma Mg was categorized into quintiles. Multivariate logistic regression analysis showed that plasma Mg was inversely associated with MetS, IFG, Hypertension, and increased TG, but not with decreased HDL-C and central obesity. This association was not altered by further adjustment for potential confounding variables including age, gender, education, nationality, area, residence, BMI, and heart rate. Restricted Cubic Splines (RCS) analysis showed that the curve leveled off when plasma Mg was below 0.85 mmol/L, and then tended to decrease as plasma Mg increased. Our results suggest that plasma Mg is inversely associated with MetS and the odds risk of MetS was reduced with increasing plasma Mg and the threshold value was 0.85 mmol/L in people over 45 years of age in China.

Key words magnesium; metabolic syndrome； CNHS； RCS

Category: Basic Nutrition& Research

大豆卵磷脂可减轻 SAMP8 小鼠的记忆缺陷和肌肉衰减

Soy lecithin alleviates memory deficits and muscle attenuation in SAMP8 mice

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Background and Objective: Soy lecithin (SL) have beneficial effects on many chronic diseases including age-associated neurodegenerative disease and sarcopenia. However, the specific mechanisms and regulation targets are unclear. In this study, we investigated the effects of SL on learning and memory impairment and muscle attenuation in SAMP8 mice. Meanwhile, we explored the regulatory mechanism of FNDC5/irisin in muscle-brain crosstalk.

Methods: SAMP8 mice were randomly divided into 3 groups: model (M) group, 200 mg/kg·d soy lecithin (200-SL) group, 100 mg/kg·d soy lecithin (100-SL) group. SAMR1 were as the control group. The mice in M and control groups were treated with 0.5% CMC-Na, and other groups were provided SL by daily intragastric administration for 8 weeks. Morris water maze test was used to evaluate the cognitive decline. Grip strength and rotarod tests were used to evaluate the attenuation of muscle. The activity of superoxide dismutase (SOD) and malondialdehyde (MDA) content in brain were measured to assess the physiological changes. Moreover, mRNA and/or protein expressions of FNDC5/irisin was gauged.

Results: In behavior test, compare with M group, the latency of Morris water maze test of 200-SL group and 100-SL group were significantly reduced, while number of crossing the platform and time in target quadrant were increased. Mice in 200-SL and 100-SL group had greater grip strength and the latency for the mice to fall from the rod were increased. Meanwhile, the improvement of 200-SL group was better than that of 100-SL group ($P < 0.05$). Similar trend was observed in physiological changes. The MDA level was effectively decreased and the SOD activity increased in hippocampus of SL groups ($P < 0.05$). Besides we got the phenomenon that soy lecithin could up-regulate the mRNA and protein expressions of FNDC5/irisin in brain.

Conclusion: Soy lecithin could alleviate the impairment in learning and memory and motor coordination in SAMP8 through regulating FNDC5/irisin pathway.

Key words soy lecithin; cognition; memory; sarcopenia; muscle attenuation; FNDC5; SAMP8; irisin

Category: Basic Nutrition& Research

长链非编码 RNA TCONS_00077866 通过靶向抑制 miR-1231 进而上调 IGF1R 的表达参与调节高硬脂酸诱导的 β 细胞衰老

LncRNA TCONS_00077866 silencing alleviates stearic acid-evoked β-cell senescence via relieving its suppression of miR-1231 and then upregulating IGF1R expression.

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Objective: Chronic exposure to high concentration of stearic acid leads to β-cell senescence, leading to the development of type 2 diabetes. However, the underlying molecular mechanisms remain largely unclear. Here, we aimed to investigate the role of lncRNA TCONS_00077866 (lnc866) in stearic acid-induced β-cell senescence.

Methods: Expressions of senescence related genes and senescence-associated β-galactosidase activity were used to measure β-cell senescence. Co-expression network of lncRNA-miRNAs-mRNA was constructed to predict the potential downstream target of lnc866. Gain and loss of function approaches were applied to identify the role of lnc866 and miR-1231 in stearic acid-induced β-cell senescence and dysfunction. Smart Silencer and Adeno-associated Virus were used to knockdown lnc866 expression in vitro and in vivo, respectively. Luciferase reporter activity assay was used to verify the binding sites between lnc866 and miR-1231, as well as miR-1231 and Igf1r.

Results: Stearic acid significantly increased lnc866 and decreased miR-1231 expressions. Inhibition of lnc866 effectively ameliorated high stearic acid diet-induced upregulation of Cat, Ldha, Igf1r, Bambi, Cdkn2a, Trp53bp1, Cd99, Ccl2, Il1a, Il6, Tnfα and downregulation of Ins1, Mafa, as well as the increase in senescence-associated β-galactosidase activity both in mice and β-TC6 cells. Meanwhile, overexpression of miR-1231 also alleviated stearic acid-induced β-cell senescence and impaired glucose-stimulated insulin secretion in β-TC6 cells. Silencing lnc866 and overexpression of miR-1231 significantly suppressed stearic acid-increased IGF1R level. Transfection of miR-1231 mimic showed inhibitory effect on luciferase activity in human embryonic kidney 293 cells transfected with plasmid carrying lnc866 or 3′ UTR of the Igf1r gene.

Conclusions: Silencing lnc866 ameliorates stearic acid-induced β-cell senescence by alleviating its suppression of miR-1231 on IGF1R. These findings not only enrich our understating of the molecular mechanisms of stearic acid-induced β-cell dysfunction but also provide potential targets for preventing high fat diet-induced type 2 diabetes.

Key words stearic acid, lncRNA, miRNA, β cell senescence, Igf1r

Category: Basic Nutrition& Research

轻度认知功能障碍与肌肉衰减症之间的相关性：脂质在此关系中的前瞻性作用

Correlation between Mild Cognitive Impairment and Sarcopenia: The prospective role of Lipids in the link

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There is evidence of correlation between mild cognitive impairment (MCI) and sarcopenia (SA). However, the influencing factors and the mechanism such as age-related lipid redistribution remain unknown. This study aimed to clarify the role of dietary fats and erythrocyte lipids profile in the link of MCI and SA. 1050 participants aged 65 to 85 were divided into control, MCI, SA, and MCI&SA groups. Bioelectrical impedance analysis was used to evaluate appendicular lean mass. Cognition and dietary nutrition were detected by neuropsychological tests and food frequency questionnaire. UHPLC-QExactive-MS/MS and UHPLC-Qtrap-MS/MS were used to conduct the lipidomics analysis. Lower dietary intake of different phospholipids, unsaturated fatty acids and kinds of choline were significantly associated with MCI&SA. Least absolute shrinkage and selection operator, multivariate logistic regression, receiver operating characteristic curve and validation tests gave the evidence that specific phospholipids and unsaturated fatty acids might be the critical factors in the processing of MCI and SA as well as in their link. The lipidomic analysis observed a clear discrimination of the lipid profiles in the individuals who are in MCI, SA or MCI&SA compared with control. Lower expressions in certain phospholipid species such as sphingomyelin and phosphatidylethanola-mines, decreased phosphatidylcholine with more unsaturated double bonds, lower level of lipids with C20:5 and C20:4, higher level of lipids with C18:2 and lipids with remodeling length of acyl chain might be closely related to the link of MCI and SA. Inadequate dietary intake and lower concentration of erythrocyte lipid profile of phospholipids and unsaturated of fatty acids might be the key points in the progress of MCI and SA as well as in their link. They could be used as the prospective biomarkers for the higher-risk of cognitive decline and/or SA in elderly population.

Key words Mild cognitive impairment; Sarcopenia; Dietary fats; Lipid profile; Lipidomics

Category: Basic Nutrition& Research

Akkermansia muciniphila 通过调节 db/db 小鼠肠道微生物组成和代谢改善 2 型糖尿病相关认知功能障碍

Akkermansia muciniphila reverse type 2 diabetes-associated cognitive dysfunction by regulating gut microbial composition and metabolism in db/db mice

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Objective: Type 2 diabetes-associated cognitive dysfunction (TDACD) is one of the central nervous system complications of type 2 diabetes mellitus (T2DM). Akkermansia muciniphila was reported beneficial for T2DM, obesity, and Alzheime's disease (AD). However, the effect and underlying mechanisms of A. muciniphila on TDACD remain unknown. Here, we aimed to confirm the effect of A. muciniphila treatment in improving db/db mice and associated mechanisms.

Methods: The db/db mice were treated with alive or pasteurized A. muciniphila for 5 weeks. Morris water maze was performed to measure spatial learning and long-term memory. The impacts of A. muciniphila on neuronal loss, neuroinflammation, intestinal barrier, and hepatic steatosis were determined. The 16S rRNA high-throughput sequencing was employed to analyze gut microbiota composition in mice feces. Using liquid chromatography-mass spectrometry analysis, we performed the integrative untargeted metabolomic analysis of metabolite alterations in the serum and brain tissues.

Results: Alive and pasteurized A. muciniphila treatment effectively improved spatial learning and long-term memory, increased the levels of GFAP, and alleviated the reduction of colonic mucus cells. Alive A. muciniphila inhibited the loss of hippocampal neurons in CA1 and CA3 subsets. Moreover, A. muciniphila modulated gut microbial diversity but did not induce major rearrangements of the fecal microbiota. A. muciniphila treatment altered the levels of various metabolites in serum and brain tissues of db/db mice, which were involved in multiple metabolic pathways and were mainly involved in the glycine, serine and threonine metabolism pathway, glyoxylate and dicarboxylate metabolism pathway, and aminoacyl-tRNA biosynthesis pathway.

Conclusions: These findings revealed that the gut microbiota has a role in the prevention and treatment of TDACD by A. muciniphila, and that the microbiota-gut-brain axis and the regulatory effects of metabolites are significant protective mechanisms of A. muciniphila. It represents a novel probiotic dietary intervention for delaying the progression of TDACD.

Key words Akkermansia muciniphila, type 2 diabetes mellitus, cognitive dysfunction, gut microbiota, metabolomics

Category: Basic Nutrition& Research

妊娠期糖尿病产妇母乳低聚糖的变化及其对婴儿生长发育的影响

Changes of breast milk oligosaccharides in women with gestational diabetes mellitus and their effects on infant growth and development

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Objective: The aim of this study was to investigate the changes and differences between the levels of HMOs in GDM mothers and healthy mothers at different stages of lactation, and to understand the association between HMOs and infant growth and development.

Methods: This study was selected from healthy full-term newborns delivered at Peking University Third Hospital and Beijing Haidian District Maternal and Child Health Hospital from June 2021 to April 2022 (mother-infant pairs), and they were divided into GDM group and healthy control group according to whether the mothers had GDM. The levels of 14 HMOs in colostrum, transition milk and mature milk were measured using ion chromatography analysis, and analyzed according to the type of secretory phenotype.

Results: A total of 53 maternal and infant pairs were obtained, including 28 pairs in the GDM group and 25 pairs in the healthy group. The total levels of the 14 HMOs decreased with lactation time in both groups and were higher in the GDM group than in the healthy group. Most HMOs showed a clear temporal trend, decreasing with increasing lactation time; however, 2'-FL remained unchanged or experienced fluctuations and remained at higher levels. LNnT was significantly higher in the GDM group than in the healthy group at all time points, and its concentration was negatively correlated with the length-for-age Z score of 3-month-old infants in the GDM group; Significant group differences were also found in LNT, 3-FL, LNFP-II, 3'-SL and LST c, but not in all stages of lactation.

Conclusion: We found differential HMOs in mothers with and without GDM of the $Se^{+}Le^{+}$ phenotype, which may be key factors influencing infant growth and development, and are associated with growth-related indicators in infants, but the results are not uniform and all need further study.

Key words Gestational diabetes mellitus, Human milk oligosaccharides, Secretory phenotype, Infant growth and development

Category: Basic Nutrition& Research

基于蛋白质组学探讨 AKK 菌对肥胖大鼠胆固醇代谢的影响与机制

Lable-free Quantitation Proteomics Reveals Akkermansia muciniphila Improve cholesterol metabolism in obese rats

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Abstract: objective to investigate the effect and mechanism of Akkermansia muciniphila on cholesterol metabolism in obese rats.

Methods: SD rats were divided into 3 groups:LF group(fed with normal diet + normal saline), HF group(fed with HFD+ suspension without Akkermansia muciniphila), and AKK group(fed with HFD+ suspension containing Akkermansia muciniphila). Rats in each group were given intragastric administration once a day for 4 weeks. Serum TG, TC, HDL-C and LDL-C were detected. The liver protein were analyzed by Lable-free Quantitation Proteomics analysis.The difference of CYP7A1 protein expression in liver was detected by Western blot.

Results: the body weight, TG, TC and LDL-C levels of rats in the AKK group were significantly lower than those in the HF group. 4220 proteins were identified by proteomics. 44 up-regulated proteins and 28 down-regulated proteins were found in AKK group compared with HF group, 176 up-regulated proteins and 313 down-regulated proteins in HF group compared with LF group. The enrichment analysis of differential protein signaling pathways showed that there were 10 differential protein pathways between AKK group and HF group, and 15 signal pathways between HF group and LF group. Among them, multiple protein expression differences were found in the pathways closely related to cholesterol metabolism, such as primary bile acid synthesis pathway, steroid hormone synthesis pathway and PPAR pathway. The expression of CYP7A1, CYP4A2 and CYP3A9 in AKK group was significantly higher than that in HF group. Western blot results showed that the expression of CYP7A1 protein in AKK group was significantly higher than that in HF group.

Conclusion: Akkermansia muciniphila can significantly reduce the body weight and cholesterol level of obese rats induced by high-fat diet, which may be related to the up-regulation of the expression of CYP7A1, CYP4A2, CYP3A9 and the synthesis of primary bile acid and steroids.

Key words Akkermansia muciniphila; obesity; rats; cholesterol metabolism; proteomics

Category: Basic Nutrition& Research

岩藻多糖免疫调节作用与构效关系研究进展

Research progress on the immune regulatory mechanism and structure-activity relationship of fucoidan

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Objective Fucoidan is a water-soluble polysaccharide composed of L-fucose and organic sulfate groups, mainly exists in the cell wall matrix of brown algae. It has significant immunomodulatory activity and has good development value in food and medicine fields. Here we systematically summarize the immune regulatory mechanism of fucoidan, and the relationship between the chemical structure and immune regulation in this paper, aiming to provide reference basis for deeper study and development of the structure-activity relationship of fucoidan.

Methods: We used the Fucoidan, Chemical modification, Immune regulation, and Biological activity as search terms, conducted literature searches on databases such as PubMed, Web of Science, MEDLINE, China Knowledge Network, Wanfang Database, and Vip Database.The literatures of the past decade were selected and analyzed.

Results: Fucoidan can significantly increase the immune organ index of the spleen and thymus, and enhance the activity of immune organs and promote the proliferation of immune cells and improve the cellular and molecular immune response levels, regulate the cytokine secretion. Moreover, fucoidan stimulates the innate and adaptive immune defense systems of the body by interfering with the process of virus adsorption, transcription, and synthesis, which can be used as an immune adjuvant to increase the production of antigen specific antibodies in the body. It can bind to receptors, then activates the intracellular pathways, activates immune cells, promote the release of cytokine and enhance immune activity. The relative molecular weight, monosaccharide composition, glycosidic bond types, chemical modifications, and advanced conformation of fucoidan can affect its immunomodulatory activity.

Conclusion: This paper has significance for further studying on the range of molecular weight, monosaccharide types, glycosidic bond types, chemical modification methods and advanced conformations of fucoidan, and it is of great significance in revealing its structure-activity relationship and developing more effective analogues or derivatives as novel drugs for disease treatment.

Key words Fucoidan; Immunoregulation; Chemical structure; Advanced conformation

Category: Basic Nutrition& Research

每日运动大鼠的免疫生理变化

Daily Exercises Causes Immune physiological changes in Rats

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Objective To investigate the effect of daily continuous exercise on physiological changes of weight and immune factor levels of rats.

Methods Twelve healthy SD male rats (200±20 g) were randomly divided into one control group and one exercise group. All rats were kept in polypropylene boxes in a controlled animal breeding cabinet, under standard environmental conditions with controlled temperature (20–25 ℃) and relative humidity of 50–60%. Rats were free to water and standard diet. The rats in the exercise group received a fixed 1 h (0.5 h each in the morning and in the afternoon) daily treadmill running in a normal temperature environment. The experiment lasted for 4 weeks. Weight of all rats was measured at the beginning of the experiment and the end of every week. After the experiment, blood samples were collected and serum was separated for biochemical analysis.

Results Compared with the initial level, the weight of rats in both groups significantly increased at day 28 (both $P<0.05$); however, the D-value of weight gain in exercise group was lower than that in control group ($P<0.05$). Compared with control group, the spleen and thymus indexes of rats in exercise group significantly increased, the content of serum hs-CRP significantly decreased, the level of TNF-α and IL-6 significantly increased (all $P<0.05$), and the expression of Nrf2 was up-regulated. There was no difference in IL-2 and liver index between two groups.

Conclusion Our findings suggested that increased immune organ index and anti-inflammatory factors, as well as down-regulation of pro-inflammatory factor might be contributed to continuous running. Exercise daily had an effect on decreased body weight, which was related to promoting energy consumption.

Key words Exercise, Immune, Weight, Rat

Category: Basic Nutrition& Research

甜菜碱通过抑制 NLRP3 炎症小体的激活改善同型半胱氨酸诱导的认知障碍

Betaine ameliorates homocysteine-induced cognitive dysfunction by suppressing NLRP3 inflammasome activation

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Sun Yat-sen University

Background:

Dementia is one of the major public health problems, and homocysteine (Hcy) increases dementia risk. Betaine, as an important methyl donor in the human body, can reduce Hcy, but whether betaine can improve cognition by reducing Hcy is not yet clear. We aimed to investigate the effect and mechanism of betaine on Hcy-induced cognitive impairment in SD rats.

Methods:

Nine-week-old SD rats were administered Hcy (400 μg/kg) via vena caudalis injection for 14 days, along with normal or betaine-supplemented (2.5% w/v) drinking water. The learning and memory behavior of the SD rats was evaluated by the Y-maze and novel object recognition test 24 h after the last administration. Histological damage was observed using HE staining. Immunofluorescence and Western blot assays measured microglial activation and expression of NLRP3 inflammasome-associated molecules in the hippocampus.

Results:

The results of Y-maze and new object recognition experiments showed that the time and distance in the new arm were decreased, the time to explore new objects and the discrimination index were reduced in the Hcy group, and betaine supplementation could improve their learning and memory abilities. In addition, pericellular spaces were enlarged and cell morphology was disturbed in the Hcy group and betaine supplementation could significantly alleviate the pathological damage. Betaine ameliorated Hcy-induced inflammatory response by inhibiting NLRP3/caspase-1/GSDMD pathway.

Conclusions:

We found that betaine could improve cognitive ability in Hcy-induced SD rats, and the possible mechanism was the inhibition of neuroinflammation. Our results provide new ideas for improving cognitive performance and the application of betaine.

Key words betaine, homocysteine, cognitive, inflammation

Category: Basic Nutrition& Research

蓝莓花色苷对老年轻度认知功能障碍患者认知功能及炎性水平的影响

Effect of blueberry anthocyanins on cognitive function and inflammatory level in elderly mild cognitive impairment patients

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Objectives: This study aimed to assess the effect of blueberry extracts supplementation and the underlying mechanism on improving the cognitive function in the elderly patients with mild cognitive impairment (MCI). Methods: 48 subjects aged 60-90 years from all screened subjects participated in the intervention study. The subjects participated in the intervention study were randomly assigned to the intervention group or blank control group. The former received blueberry extracts treatment for 12 weeks, while the latter did not receive any intervention. The neuropsychological test was the Clinical Dementia Rating (CDR), the Mini-Mental State Examination (MMSE) and the basic cognitive aptitude test (BCAT). The inflammation factors measured was Interleukin-6 (IL-6) and tumor necrosis factor-α (TNF-α). Results: After 12 weeks of intervention, we observed significant improvement in their total BCAT score, space imagery efficiency, working memory and recognition memory of subjects in patients with blueberry extracts supplementation comparing to those in the control group (P=0.006, 0.023, 0.000, 0.005, respectively). However the levels of inflammatory factors (IL-6 and TNF-α in serum) showed no significant changes after intervention. Conclusion: These results indicate that blueberry has a beneficial effect on cognitive function of the elderly MCI patients, which might provide therapeutic potential for Alzheimer's disease.

Key words blueberry extracts; mild cognitive impairment; cognitive function; inflammation factors

Category: Basic Nutrition& Research

花色苷调节星形胶质细胞-神经元乳酸穿梭缓解 APP/PS1 小鼠认知障碍的机制研究

Anthocyanin regulates astrocyte-neuron lactate shuttle to alleviate cognitive impairment in APP/PS1 mice

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Background: As most common cause of dementia, Alzheimer's disease (AD) is becoming a dire global health concern among the elderly. Previous studies have found that diet, rich in anthocyanins, is an effective way to delay AD progress, but the mechanism is still unclear.

Objective: To identify the promoted effects for astrocyte-neuron lactate shuttle (ANLS) of Cyanidin-3-O-glucoside (Cy3G), the most common anthocyanin in diet, and find out the related mechanism of mTOR-HIF1α pathway.

Methods: Six-month-old APP/PS1 mice were gavaged with Cy3G (50 mg/kg·bw) and HIF1α inhibitor PX-478 for 2 months, behavioral tests and related proteins were detected to confirm whether Cy3G promotes ANLS through HIF1α pathway. Furthermore, the co-culture model of primary rat astrocytes and neurons was established in vitro. The protection of Cy3G on $A\beta_{25-35}$-induced neuron activity damage and the inhibition of Cy3G on $A\beta_{25-35}$-induced astrocyte activation were detected by CCK-8. In addition, whether Cy3G could promote lactate metabolism through mTOR-HIF1α pathway was evaluated by detecting ANLS-related proteins and glycolysis rate after added HIF1α inhibitor PX-478 or mTOR inhibitor Rapa.

Results: Cy3G effectively alleviated cognitive impairment, inhibited brain damage, decreased proinflammatory cytokines levels and neuronal loss in APP/PS1 mice. Furthermore, Cy3G inhibited activation, changed the metabolic pattern, up-regulated the expression of ANLS-related proteins, and elevated the glycolysis of cultured astrocytes through the mTOR-HIF1α pathway. Strikingly, Cy3G promoted ANLS and protected primary cultured neurons induced by $A\beta_{25-35}$ in astrocyte-neuron co-culture system.

Conclusion: Our study identifies lactate metabolism disorder and ANLS inhibition are important features of AD, and suggests Cy3G promotes ANLS and provides reliable theoretical basis for the formulation of nutritional prevention programs for AD.

Key words Cyanidin-3-O-glucoside; Cognitive impairment; astrocyte-neuron lactate shuttle; Alzheimer's disease; mTOR-HIF1α pathway

Category: Basic Nutrition& Research

蓝莓提取物经 MEK-ERK-BDNF/UCH-L1 信号通路拮抗 Aβ25-35 神经毒性对大鼠和小鼠海马神经保护作用的研究

Blueberry extracts antagonize Aβ25-35 neurotoxicity and exert a neuroprotective effect through MEK-ERK-BDNF/UCH-L1 signaling pathway in rats and mice hippocampal

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Background: Alzheimer's disease (AD) is an age-related neurodegenerative disorder. Previous studies have indicated that the blueberry (BB) extracts have protective effects on brain function. However, its underlying mechanism remains largely unexplored.

Objective: Our research planned to explore the effects and mechanism of BB extracts in improving the learning and memory capacity of AD mice based on the pathway of MEK-ERK.

Methods: 3-month-old APP/PS1 transgenic mice were divided into AD+BB, AD, and control (CT) group. Morris water maze test (MWMT) was applied to evaluate the learning and memory capacity. Moreover, the swimming distance and time in the acquisition trial, as well as swimming distance, swimming time, and crossing times in the target quadrant in the probe trial, were recorded. In vitro, the Aβ25-35-injured rat hippocampal neurons were exposed to BB extracts of different concentrations. In addition, the expressions of MEK-ERK-BDNF/UCH-L1 pathway-related genes at the mRNA and protein levels were assessed.

Results: Our data showed that the AD mice exhibited weak learning and memory capacity in the acquisition trial and probe trial of the MWMT, while the AD+BB group exhibited significantly better performance. In the AD group, the expressions of both MEK2 and ERK1/2 at the mRNA and protein levels were significantly elevated, the expression of UCH-L1 at the mRNA level was decreased and the expression of BDNF was increased significantly. With the treatment of BB extracts, the expressions of MEK2 and ERK1/2 were inhibited, and the expressions of UCH-L1 and BDNF at the mRNA level returned to normal. A similar regulate effect of BB extracts on the expressions of UCH-L1 and BDNF was observed.

Conclusions: BB extracts might be beneficial for AD by improving the learning and memory capacity. Excessively activated MEK-ERK pathway and abnormal expressions of BDNF and UCH-L1 might be risk factors for AD.

Key words Blueberry extracts, Alzheimer's disease, MEK-ERK, BDNF, UCH-L1

Category: Basic Nutrition& Research

不同嘌呤含量食源性低聚肽对大鼠血尿酸的影响

Effects of food-derived oligopeptides with different levels of purine on hyperuricemia rats

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Objective: To determine the purine content of food-derived oligopeptides from different food sources and to study the effects of food-derived oligopeptides with different purine contents on blood uric acid level, renal function and renal structure in hyperuricemia rats. Methods: The purine content of 10 different kinds of food-derived oligopeptides was determined by high performance liquid chromatography. And soybean peptide, mung bean peptide and marine fish protein peptide were selected as high, medium and low purine food-derived oligopeptides as gavage intervention substances in rats. Hyperuricemia rat model was constructed with 10%fructose. Blood samples were collected to detect uric acid, creatinine and urea nitrogen on 7 d,14 d,21 d and 28 d after modeling, and kidney tissues were collected and stained with HE to observe the histological changes of kidneys at 28 d after the experiment. Results: Soybean peptide with high purine content had the effect of reducing blood uric acid at four time points in the experiment($P<0.05$). The renal injury was significantly improved, and the blood creatinine and urea nitrogen were decreased($P<0.05$). However, the effect of low and medium purine food-derived oligopeptides was similar to that of soybean peptides only after 7 days of modeling, and there was no effect of reducing uric acid and improving kidney damage in the late modeling period; The marine fish protein peptide with low purine also had the effect of increasing blood uric acid after 14 days of modeling. Conclusion: The purine content of food-derived oligopeptides is not consistent with the source food. Soybean food-derived oligopeptides can continuously reduce the blood uric acid, alleviate kidney injury and renal dysfunction in model rats.

Key words food-derived oligopeptides; hyperuricemia; serum uric acid; serum creatinine; renal function.

Category: Basic Nutrition& Research

基于代谢组学的高尿酸血症和血脂异常关系分析

Metabolomics-based analysis of the relationship between hyperuricemia and dyslipidemia

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Objectives:Although the strong correlation between dyslipidemia and hyperuricemia has been acknowledged, little is understood regarding the underlying relationship between these two factors. The goal of this work was to determine the differential metabolites produced by human umbilical vein endothelial cells (HUVECs) following treatment with uric acid (UA) and to look into how hyperuricemia and dyslipidemia interact.

Methods: Metabolomic profiling of 16 cell samples, 8 of which were treated with UA (8 mg/dl) for 24 hours and 8 of which were not, was performed via a liquid chromatograph with mass spectrometry (LC -MS). Finding the differential metabolite associated with lipid metabolism through a metabolomic approach, and then adequately validating its protective function on HUVECs using assays such as cellular vitality, reactive oxygen species, migration potential, and gene and protein expression of inflammatory pathway and downstream inflammatory factors.

Results:Taurochenodeoxycholic acid(TCDCA) (the differential metabolite of human umbilical vein endothelial cells, HUVECs) and the TCDCA-involved primary bile acid synthesis pathway were significantly negatively correlated with high uric acid (UA) levels, according to metabolomics analysis. Compare to the outcomes observed in UA-treated HUVECs, TCDCA protects against UA-induced cell damage and oxidative stress, increases proliferation and migration, and decreases apoptosi. Meanwhile, TCDCA may protect HUVECs by inhibiting UA-induced P38MAPK/NF-B p65 pathway gene and protein expression, as well as downstream inflammatory factors.

Conclusions: Our findings suggest that hyperuricemia, which is frequently associated with dyslipidemia, may be related to a decrease in bile acids caused by high levels of UA.

Key words Hyperuricemia, Dyslipidemia, Taurochenodeoxycholic acid, Vascular endothelial injury

Category: Basic Nutrition& Research

生命早期肠道菌群紊乱可性别差异性地影响幼年期大鼠血压调节

Gut Microbiota Perturbation at Early Life could Influence Pediatric Blood Pressure Regulation in a Sex-dependent Manner in Juvenile Rats

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Backgroud and objectives: The present study aimed to investigate whether gut dysbiosis induced by ceftriaxone in early life could influence pediatric blood pressure regulation in childhood with or without exposure to a high-fat diet (HFD).

Methods: Sixty-three newborn pups of Sprague-Dawley rats were administered ceftriaxone sodium or saline solution until weaning at 3 weeks, and the rats were fed a HFD or regular diet from 3 to 6 weeks. Tail-cuff blood pressure; the expression levels of genes of the renin-angiotensin system (RAS); the concentrations of IL-1β, IL-6, and TNF-α in the colon and prefrontal cortex; the composition of fecal microbiota were analyzed.

Results: Ceftriaxone treatment significantly increased the diastolic blood pressure of male rats at 3 weeks. At 6 weeks, systolic blood pressure (SBP) was significantly increased only in ceftriaxone treated male rats fed with HFD. The RAS showed increased activation in the kidney, heart, hypothalamus, and thoracic and abdominal aorta of male rats, but only in the kidney, heart, and hypothalamus of female rats. HFD-fed female rats showed a decreased level of IL-6 in the colon. α diversity of gut microbiota decreased and the Firmicutes to Bacteroidetes ratio increased in both male and female rats at 3 weeks; however, these parameters recovered to various degrees in female rats at 6 weeks.

Conclusions: Early-life gut dysbiosis induced by antibiotics combined with a HFD in childhood could be involved in pediatric blood pressure regulation and increase SBP in juvenile rats, and these effects occurred in a sex-dependent manner.

Key words gut microbiota; blood pressure; ceftriaxone; high-fat diet; pediatric hypertension

Category: Basic Nutrition& Research

中国育龄女性机体铁代谢与2型糖尿病的关系:中国成人慢性病和营养监测(2015)的结果

Association of Body Iron Metabolism with Type 2 Diabetes Mellitus in Chinese Women of Childbearing Age: Results from the China Adult Chronic Disease and Nutrition Surveillance (2015)

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Up to now, evidences for the associations of iron metabolism biomarkers other than ferritin with Type 2 Diabetes Mellitus (T2DM) are sparse and inconsistent, and whether there is a threshold effect remains controversial. In the present study, we aimed to examine the associations between various iron biomarkers, including serum ferritin (SF), transferrin, soluble transferrin receptor (sTfR), transferrin saturation (TSAT), serum iron, total body iron (TBI), and sTfR-to-lgferritin index, and risk of T2DM as well as impaired glucose metabolism in Chinese women of childbearing age. A total of 1145 women were divided into three groups based on the levels of fasting blood glucose and HBA1c [normal blood glucose metabolism group (NGM); impaired glucose metabolism group (IGM); T2DM group]. The levels of SF, sTfR, and TBI in IGM and T2DM groups were higher than those in NGM group ($p < 0.05$). There was no significant difference in transferrin levels among the three groups. After adjusting for age, sociodemographic, life-style, and body mass index, blood pressure, lipids, hypersensitive C-reactive protein, and α-acid glycoprotein, SF and sTfR were positively associated with the risk of IGM [fourth vs first quartile: SF odds ratio (OR) = 1.93 (95% CI 1.17-3.20) and sTfR OR = 3.08 (95% CI 1.84-5.14)] and T2DM [SF OR = 2.39 (95% CI 1.40-4.06) and sTfR OR = 3.84 (95% CI 2.53-5.83)]. Neither transferrin nor TSAT were associated with IGM and T2DM risk. There was a nonlinear relationship between SF and the T2DM risk (p for non-linearity < 0.01). Our findings suggested that the SF and sTfR could be independent predictors for T2DM risk.

Key words iron metabolism biomarkers; type 2 diabetes mellitus; association; women of childbearing age

Category: Basic Nutrition& Research

学龄前儿童尿碘浓度和尿碘/肌酐比值的变化

Variation in Urinary Iodine Concentration and Urinary Iodine/Creatinine Ratio in Preschool Children

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Background

Variation in different urinary measurements for evaluation of iodine status is of concern to clinicians and researchers.

Objective

The present study aims to analyze the inter- and intra-individual variations of urinary iodine concentration (UIC), urinary iodine/creatinine ratio (UI/Cr) and evaluate their application in assessing iodine nutrition of preschool children.

Methods

Four repeated spot urine samples were collected from 163 children at different time within one day. Urinary iodine concentration (UIC) and urinary creatinine concentration (UCr) were measured, and UI/Cr was calculated.

Results

The UIC ($p<0.001$) and urinary iodine/creatinine ($p=0.019$) of multiple measurements were significant different. UIC of morning urine was highest (99.83 μg/L) and then gradually decreased with collection time ($P<0.001$). On the contrary, the UI/Cr of morning urine samples increased with time. By computing the mean coefficients of variance (CV) of intra-individual and inter-individual, the intra-individual variation of UI/Cr (68%) was significantly lower than that of UIC (86%), but the inter-individual was lowest in the UIC (78.62%) of morning urine. In addition, UIC and UI/Cr showed moderate correlations ($r=0.52$, $p<0.001$), with kappa values of 0.42 in assessing iodine nutrition.

Conclusions

UIC of morning urine was more stable and reliable in evaluating iodine nutrition of preschool children at the population level. UI/Cr has lower intra-individual variation and may be more suitable for evaluating individual iodine nutrition.

Key words Iodine, urinary iodine concentration, urinary creatinine, urinary iodine/creatinine ratio

Category: Basic Nutrition& Research

住院的学龄前儿童的人体测量参数与其碘营养状态的关系

Association of anthropometric parameters with iodine status in hospitalized preschool children

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Tianjin Medical University

Abstract:

Background: Iodine is a trace element necessary for the synthesis of thyroid hormones. Especially it is crucial for neurodevelopment and intellectual development of children. Our study aimed to investigate iodine status in hospitlized children, and explore the association between their anthropometric parameters with iodine nutrition.

Methods: A total of 535 hospitalized children aged 3-7 years from Tianjin Children's Hospital were enrolled. Anthropometric data, dietary data, urine samples and blood samples were collected. Urinary iodine concentration (UIC) and creatinine were determined, and the urinary iodine/creatinine ratio (UIC/Cr) was calculated. Usual food intake was determined using a short food frequency questionnaire.

Results: The mean age was 4.6±1.1 years old and the median UIC was 51.7 (18.3, 120.9) μg/L. UIC (40.1μg/L vs. 123.0μg/L) and UIC/Cr (297 μg/g vs. 497μg/g) were significantly lower in in-patient children when compared to out-patient children. Both UIC and UIC/Cr were decreased as height z-score and weight z-score, UICs were significantly lower in children with weight z-score > 1(39.4 μg/L) and height z-score >1 (33.6 μg/L). In addition, UIC was negatively correlated with height (). Adjusted by age, sex and parent education, it was found height-z score >1 was the risk factor for UIC<100μg/L (OR=3.6 (1.2, 10.8), P=0.020). This trend was only found in in-patient children.

Conclusions: The iodine nutriton of hospitalized preschool children was insufficient. Height z-score>1 was probably the risk factor for iodine deficiency in children after hospital admission.

Key words Urinary iodine concentration; anthropometric parameters; Iodine deficiency; Micronutrients; Public health.

Category: Basic Nutrition& Research

精制青稞在改善肥胖和血糖方面表现出与全谷物青稞相似的特性

Refined Highland Barley Display the Similar Properties with Whole Grain Highland Barley in Ameliorating Obesity and Blood Glucose

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Highland barley has attracted much attention due to its extremely rich nutritional and functional ingredients. Previous studies revealed that whole grain highland barley (WGHB) could help reduce the risk of several chronic and metabolic diseases, including obesity and diabetes. However, whether refined highland barley (RHB) could still play a beneficial role, and the potential mechanisms by which RHB and WGHB improve obesity and glucose tolerance, need further investigation. This study evaluated the anti-obesity and hypoglycemic effects of RHB in high-fat diet (HFD)-fed mice and further compared it with the intervention of WGHB. The results showed that both RHB and WGHB could suppress weight gain and improve glucose tolerance. In addition, they could significantly increase the abundance of genus Lachnospiraceae_NK4A136_group, Akkermansia, Bifidobacterium, Lachnospiraceae_UCG-001, and Alloprevotella in feces, and alter the liver gene transcription profile. Overall, our findings suggested that RHB could ameliorate obesity and glucose tolerance via remodeling gut microbiota, and we also found that it had similar effects to WGHB.

Key words hulless barley; refined grain; inflammation; hypoglycemic effect; gut microbiota

Category: Basic Nutrition& Research

白藜芦醇通过抑制肠道 FXR 和清道夫受体 SR-B1 减少乳糜微粒分泌

Resveratrol intervention attenuates chylomicron secretion via repressing gut Farnesoid X receptor and scavenger receptor SR-B1

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Two common features of dietary polyphenols have hampered our mechanistic understanding of their beneficial effects for decades: targeting multiple organs and extremely low bioavailability. We show here that resveratrol intervention (REV-I) in high fat diet (HFD)-challenged male mice inhibited chylomicron secretion, associated with reduced expression of jejunal but not hepatic scavenger receptor class B type 1 (SR-B1). Intestinal-mucosa-specific SR-B1$^{-/-}$ mice on HFD challenge exhibited improved lipid homeostasis but showed virtually no further response to REV-I. SR-B1 expression in Caco-2 cells cannot be repressed by pure resveratrol while fecal-microbiota transplantation from mice on REV-I suppressed jejunal SR-B1 in recipient mice. REV-I reduced fecal levels of bile acids including chenodeoxycholic acid (CDCA) and activity of fecal bile-salt hydrolase (BSH), while CDCA stimulated FXR and SR-B1 in Caco-2 cells. We conclude that gut microbiome is the primary target of REV-I, and REV-I improves lipid homeostasis at least partially via attenuating CDCA-stimulated gut SR-B1 elevation.

Key words resveratrol; chylomicron; gut microbiota; bile acids; SR-B1

Category: Basic Nutrition& Research

高脂饮食和高糖饮食通过调控不同的肠道微生物源性胆汁酸代谢诱导小鼠葡萄糖稳态失调

High fat diet and high sugar intake divergently induce dysregulation of glucose homeostasis through distinct gut microbiota-derived bile acid metabolism in mice

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igh calorie diet such as excessive fat and sugar intake always accompanied by impaired glucose homeostasis. However, it remains unclear how fat and sugar individually affect host glucose metabolism. In this study, mice were fed with high fat diet (HFD) or 30% sucrose in drinking water (HSD) for 24 weeks, and glucose metabolism, gut microbiota composition, as well as bile acid (BA) profile were investigated. In addition, the functional changes of HFD or HSD-induced gut microbiota were further verified by fecal microbiota transplantation (FMT) and ex vivo culture of gut bacteria with BAs. Our results showed that both HFD and HSD caused dysregulated lipid metabolism, while HFD feeding had a more severe effect on impaired glucose homeostasis, accompanied by reduced hyocholic acid (HCA) levels in all studied tissues. Meanwhile, HFD had a more dramatic influence on composition and function of gut microbiota as well as secondary BA producers than HSD. In addition, the phenotypes of impaired glucose homeostasis and less formation of HCA caused by HFD can be transferred to recipient mice by FMT. Ex vivo culture with gut bacteria and BAs revealed HFD-altered gut bacteria produced less HCA than HSD, which might closely associated with the reduced relative abundance of C7 epimerase-coding bacteria g_norank/unclassified_f_Eggerthellaceae and bile salt hydrolase-producing bacteria Lactobacillus and Bifidobacterium in HFD group. Our findings revealed that the divergent effects of different high-calorie diets on glucose metabolism may be due to the gut microbiota-mediated generation and metabolism of BA, highlighting the importance of dietary management in T2DM.

Key words high-energy diet, bile acid, gut microbiota, glucose homeostasis, Hyocholic acid

Category: Basic Nutrition& Research

基于碘溢出假设对中国青年人碘膳食参考摄入量的研究

Study on dietary reference intake of iodine using iodine overflow hypothesis in Chinese young adults

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Background Thyroid dysfunction is increasingly attributed to excess iodine intake as the enforcement of Universal Salt Iodization (USI) in China. However, the traditional balance study could be no longer applied in the individuals due to iodine over-nutrition.

Objectives Iodine overflow hypothesis is firstly proposed to build the iodine dietary recommended intake (DRIs) in Chinese young adults, including Estimated average requirement (EAR) and Recommended nutrient intake (RNI).

Methods A total of 74 healthy subjects (male 38 and female 36) were recruited in this study. After the 14-days iodine depletion, iodine supplementation was performed for 6 stages and each of 5 days. Designed diets were provided and all foods and excreta (urine, feces) were collected to examine daily intake, excretion and the incremental (Δ) iodine in relation to stage 1. The dose-response associations of Δ iodine intake and Δ iodine excretion, as well as Δ iodine retention, were fitted by the mixed effects models (MEMs).

Results Daily iodine intake of all subjects increased from 14.9 μg/day to 133.5 μg/day, whilst iodine excretion elevated from 51.5 μg/day to 154.1 μg/day. The Δ iodine intake increased from 16.3 μg/day to 119.4 μg/day, while Δ iodine excretion elevated from 21.8 μg/day to 102.5 μg/day. In final, zero balance in vivo was dynamically achieved as iodine intake at 48.0 μg/day for male and 52.2 μg/day for female. The iodine EAR and RNI were further calculated as 48.0 μg/day and 67.2 μg/day for male and 52.2 μg/day and 73.1 μg/day for female. The RNI values could be corresponded to daily iodine intake of 1.04 μg/kg•day for male and 1.40 μg/kg•day for female, respectively.

Conclusion The iodine overflow hypotesies had been validated and the data indicated that one-half of current dietary iodine intakes could be enough in Chinese young adults, which would be beneficial for the making DRIs in future.

Key words Iodine; Dietary recommended intake; Estimated average requirement; Recommended nutrient intak; Chinese young adults;

Category: Basic Nutrition& Research

四川泡菜中抑菌乳酸菌的筛选及其抑菌物质的初步探究

Screening of antibacterial lactic acid bacteria from Sichuan pickles and characterization of their antibacterial substances

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Objective The study aimed to screen lactic acid bacteria (LAB) from Sichuan Pickles with antibacterial properties against foodborne pathogens and to examine their antibacterial substances. **Methods** Bacterial identification was done through 16S rDNA gene sequencing. The bacteriostasis experiment was performed using the Oxford cup method, while a preliminary investigation of the antibacterial substance was done through acid excretion and protease sensitivity testing. **Results** A total of 42 LAB strains with robust growth abilities were identified. 16S rDNA gene sequencing revealed the presence of 9 species belonging to 3 genera, including 23 strains of *Lactobacillus plantarum*, 10 strains of *Lactobacillus casei* and *Lactobacillus paracasei*, 2 strains each of *Lactobacillus harbinensis*, *Pseudomesenteroides leuconostoc*, and *Pediococcus ethanolidurans*, and 1 strain each of *Lactobacillus acidipiscis*, *Lactobacillus buchneri*, and *Lactobacillus xiangfangensis*. Results of the inhibition experiment indicated that the fermentation supernatant of 39 bacteria strains inhibited *Vibrio parahaemolyticus* and 30 of them still maintained their antibacterial activity after the acid elimination experiment. Among all strains, the strongest inhibitory effect on *Vibrio parahaemolyticus* was observed in *Lactobacillus plantarum* LAB13, with an antibacterial circle diameter of 16.21 mm after acid elimination. Treatment with proteinase K, trypsin, and pepsin resulted in the disappearance of the antibacterial activity of *Lactobacillus plantarum* LAB13, leading to the preliminary conclusion that the main antibacterial substances in the fermentation supernatant were protein. *Lactobacillus plantarum* LAB13 also displayed antibacterial activity against *Listeria mononuclearum* and *Salmonella typhimurium*. **Conclusion** A strain of *Lactobacillus plantarum* LAB13 with inhibitory properties against *Vibrio parahaemolyticus* was identified in Sichuan Pickles. The preliminary analysis of its antibacterial substance suggests it is protein-based. This research serves as a reference for future screening of LAB with antibacterial abilities.

Key words Sichuan pickle; lactic acid bacteria; Vibrio parahaemolyticus; Lactobacillus plantarum; antibacterial activity

Category: Basic Nutrition& Research

二氢杨梅素通过 AMPK/SIRT3/STAT3 信号通路促进 ILC3 细胞激活缓解高脂诱导肠屏障破坏的研究

Dihydromyricetin alleviates high-fat diet induced intestinal barrier damage by promoting ILC3s activation through AMPK/SIRT3/STAT3 signaling pathway

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Objective: To investigate the effects and underlying mechanism of DHM on ameliorating HFD-induced intestinal barrier integrity damage via SIRT3-mediated immune function of ILC3 cells. Methods: C57BL/6 male mice were fed with control, high-fat diet (HFD), or HFD+DHM diets for 12 weeks. The intestinal permeability and expression of intestinal tight junction (TJ) protein were detected to evaluate the effects of DHM on intestinal barrier integrity. The IL-22 expression of group 3 innate lymphoid cells (ILC3s) in small intestine lamina propria was tested by flow cytometry to estimate the effects of DHM on ILC3 function. In addition, MNK3 cell line, expresses the same transcription factors and cytokines as ILC3, was used to investigate the molecular mechanism. In vitro experiments, the total and phosphorylation of AMPK, SIRT3, and STAT3 was detected by qRT-PCR or Western blotting to explore the underlying mechanism under DHM-induced IL-22 expression. Results: DHM effectively reversed the increased intestinal permeability and decreased expression levels of TJ molecules induced by HFD, and that it could promote ILC3 activation and IL-22 secretion. Moreover, DHM promoted the expression of AMPK phosphorylation and SIRT3 activation which in turn to increase STAT3-induced IL-22 expression in MNK3 cells. And this effects of DHM on SIRT3 and IL-22 were attenuated by AMPK inhibition. Conclusions: DHM improved IL-22 production of ILC3 cells to alleviate HFD-induced intestinal barrier destruction via AMPK/SIRT3/STAT3 pathway. (This work was supported by grants from National Natural Science Foundation of China: 81973039 and 81872625)

†These authors have contributed equally to this work.

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Key words Dihydromyricetin; intestinal barrier; IL-22; SIRT3.

Category: Basic Nutrition& Research

二氢杨梅素调控肠道 GLP-1 水平改善 II 型糖尿病的作用及机制研究

Dihydromyricetin improves T2DM induced by high-fat diet via affecting GLP-1 secretion by regulation of intestinal L-cell and IELs

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Objective: To investigate the effect of dihydromyricetin (DHM) on the development of type II diabetes (T2DM) induced by high-fat diet (HFD), and to explore the mechanism involved with GLP-1 expression modulated by intestinal L-cell and IELs.

Methods: C57BL/6 male mice aged 6-8 weeks were fed with HFD (45% fat) for 8 weeks to establish T2DM model. DHM (mass ratio of 0.6%) was added to 45% fat to observe the effect of DHM on T2DM development. The body weight and food intake in each group were recorded, and the blood glucose, blood lipid (LDL-C, HDL-C, CHO, TG), serum GLP-1 and insulin were measured. Intestinal pathology and immunofluorescence detection of GLP-1 expression were detected. 16s RNA high-throughput sequencing analysis of gut microbiota changes and LC-MS analysis of intestinal non-targeted metabolites were carried out. The frequency and phenotype of intestinal epithelial lymphocytes (IELs) and the expression level of DPP4/CD26 were analyzed by flow cytometry.

Results: Compared with the control group, HFD resulted in a reduced glucose tolerance, while an increased fasting blood glucose, serum TG, CHO and LDL-C. And the serum insulin, GLP-1 and HDL-C levels were decreased in HFD group. Gut microbiota and metabolites were notably changed in HFD group. DHM evidently alleviated the HFD-induced increased abundance of *Desulfobacterot*, the decreased abundance of *Verrucomicrobiota* and the decreased ratio of *Firmicutes/Bacteroidetes*. Flow cytometry assay showed that the IELs quantity and the proportion of its different phenotype were apparently altered after DHM treated. And the expression of DPP4/CD26 was decreased by DHM treatment.

Conclusions: DHM might ameliorate GLP-1 secretion in intestinal L cells by regulating gut microbiota and its metabolites, and inhibit GLP-1 degradation by regulating the number and phenotype of IELs and its DPP4/CD26 expression, thereby increasing serum GLP-1 level and improving T2DM development.

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Key words Type II Diabetes; Dihydromyricetin; GLP-1; Gut Microbiota; IELs

Category: Basic Nutrition& Research

二氢杨梅素对胆碱缺乏L-氨基酸限定的高脂饮食诱导的小鼠非酒精性脂肪性肝炎的影响

Effect of dihydromyricetin on a choline-deficient and L-amino acid-restricted high-fat diet-induced non-alcoholic steatohepatitis in mice

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Aim: To investigate the ameliorative effects of dihydromyricetin (DHM) on Non-alcoholic steatohepatitis (NASH) in mice induced by a choline-deficient, L-amino acid-restricted, high-fat diet. Methods and study design: C57BL/6J mice were fed with a choline-deficient, L-amino acid-defined, high-fat diet (CDAHFD) for 4 weeks to establish a NASH mice model. Mice were randomly divided into four groups: CON group (common diet), CDAHFD group (CDAHFD), DHML group (CDAHFD with DHM of 200 mg/kg/d) and DHMH group (CDAHF with DHM of 400 mg/kg/d). After sacrifice, the HE staining and qRT-PCR assays were used to assess liver inflammation and fibrosis. Liver index and serum biochemicals as well as the levels of TG, TNF-α, IL-1β, SOD and GSH-Px in liver were measured to test hepatic lipids accumulation and oxidative stress. Results: DHM significantly improved pathological changes in liver tissue of CDAHFD-induced NASH mice model, as evidenced by increased hepatocyte hypertrophy, vacuolization, inflammatory cell infiltration, hepatic lipid accumulation and liver index. Meanwhile, DHM treatment remarkably ameliorated HFD-induced hepatic inflammatory injuries, as evidenced by reduced expressions of MCP-1, TNF-α, CCL2, CXCL2 and CXCL10 as well as the reduced levels of TNF-α and IL-1β in liver tissue. Moreover, CDAHFD feeding elicited aggravated oxidative stress in hepatocytes as seen by decreased levels of SOD and GSH-Px, which were dominantly inhibited by DHM. Additionally, DHM administration could significantly ameliorate liver fibrosis and suppress the related gene expression such as a-SMA、Co1α1 and TIMP-1 in CDAHFD-induced mice. Conclusion: Our results suggested that DHM improved liver fibrosis by reducing hepatic lipids accumulation, inflammation and oxidative stress in NASH mice model.

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Key words Non-alcoholic steatohepatitis; Dihydromyricetin; Oxidative stress; Inflammation; Hepatic fibrosis

Category: Basic Nutrition& Research

杨梅素可改善非酒精性脂肪性肝炎小鼠的肝脏炎症和纤维化

Myricetin attenuates liver inflammation and fibrosis in mice with nonalcoholic fatty liver disease

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Objective: The objective of this study was to investigate the potential role of myricetin in attenuating liver inflammation and fibrosis in non-alcoholic steatohepatitis (NASH). Methods and study design: C57BL/6J mice were randomly divided into the CON, NASH, and NASH + Myricetin groups. Mice in the NASH and NASH + Myricetin groups were fed with choline-deficient L-amino acid-defined, high-fat diet, while mice in the CON groups were fed with a standard chow diet. We garaged mice of the NASH + Myricetin group with myricetin of 100mg/kg·bw /day for four weeks, and other groups were garaged with saline solution. We detected the body weight, liver index, liver histology (HE staining, OilrRed O staining, Wolf scarlet staining), serum biochemical indices, TG, and TNF-α levels in liver tissue. And qRT-PCR assay was used to assess liver inflammation and fibrosis. Results: There was a significant accumulation of lipid droplets, a large number of fat vacuoles and bubble-like hepatocytes, increased TG accumulation in liver tissue, and a significantly increased serum ALT level in the NASH group. However, myricetin supplementation could effectively attenuate lipid accumulation and liver injury in the NASH + Myricetin group. Moreover, the serum Tch and HDL-C levels of mice in the NASH group were significantly decreased, which was reversed after myricetin intervention. Meanwhile, compared with the CON group, qRT-PCR results showed that the mRNA expression of liver inflammation-related genes MCP-1, CXCL10, and TNF-α) as well as fibrosis-related genes Col3α1 and TIMP- 1 were significantly increased in NASH group, which were notably inhibited by myricetin intervention indicated. Conclusions: Myricetin could significantly attenuate liver inflammation and fibrosis in mice with nonalcoholic steatohepatitis.

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Key words nonalcoholic steatohepatitis; inflammatory response; fibrosis; myricetin

Category: Basic Nutrition& Research

紫檀芪干预后小鼠盲肠内容物的非靶向代谢组学研究

Non-targeted metabolomics study of cecal contents after pterostilbene intervention

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Background and Objectives

The metabolomics of cecal contents after pterostilbene intervention was studied based on reversed-phase high-performance liquid chromatography and UHPLC-Q-Exactive mass spectrometry.

Methods and Study Design

C57BL/6J male mice were gavaged with pterostilbene (100 mg/kg) and sacrificed at 0,5,15, 30, 60, 90, 120, 180, 270, 360, 480, 600, 720, and 1440 min after intervention. We set up an effective high-performance liquid chromatography assay to quantify pterostilbene concentrations. We performed the metabolomic profile of cecal contents at 0 min (CON), 720 min (CE6H), and 1440 min (CE12H) after pterostilbene intervention by UHPLC-Q-Exactive mass spectrometry.

Results

The peak concentration of pterostilbene in serum, small intestine, cecum, and colon contents of mice was 15 min, 30 min, 4.5 h, and 6 h, respectively. Distinct metabolite clustering was apparent among the CON, CE6H, and CE12H groups with the PCA model. There was a clear separation between the CON, CE6H, and CE12H groups by PLS-DA analysis. Compared with the CON group, we screened a total of 482 differential metabolites in the CE6H group and 360 differential metabolites in the CE12H group. Most of the differential metabolites were steroid-related metabolites in the KEGG compound database. Compared with the CON group, the cholesterol sulfate ($P<0.001$) was significantly increased, and 4a-Methylzymosterol($P<0.05$), L-Arginine($P<0.001$), 16b-Hydroxyestrone($P<0.01$), and L-Glutamine($P<0.001$) were significantly decreased in the CE6H group. However, the 4a-Methylzymosterol and 16b-Hydroxyestrone gradually returned to normal in the CE12H group. KEGG pathway enrichment analysis suggested that metabolic differentials were mainly involved in protein digestion and absorption and arginine and proline metabolism. The cecal testosterone concentrations were significantly increased after pterostilbene intervention.

Conclusions

Our results indicated that pterostilbene might increase testosterone concentrations by promoting the metabolism of steroids and inhibiting testosterone reduction in the cecum.

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Key words Pterostilbene; Cecal contents; Non-targeted metabolomics; High-performance liquid chromatography; Testosterone

Category: Basic Nutrition& Research

白藜芦醇通过上调 ATGL/CGI58 和 Rab7/LC3β 提高 NAFLD 小鼠肝脏脂质分解

Resveratrol enhances hepatic lipid hydrolysis in NAFLD mice by upregulating ATGL/CGI58 and Rab7/LC3β

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Objective

In order to clarify the effect of resveratrol on enhancing hepatic lipid hydrolysis in NAFLD mice through SIRT1 and PLIN2.

Methods and Study Design

32 C57BL/6 male mice aged 6-8 weeks were randomly divided into the control (CON), high-fat (HFD), high-fat with low-dose resveratrol (FLR) and high-fat with high-dose resveratrol (FHR) groups. The body weight, liver weight, blood lipids, blood glucose, liver function indicators were detected. Western blot and tissue immunofluorescence staining were used to detect the protein expression levels of hepatic lipid hydrolysis related molecules SIRT1, PKA, p-PKA, PLIN2, ATGL, CGI58, HSL, Rab7, LC3β and co-location situation of lipolysis and lipolysis pathway related genes (ATGL/CGI58, Rab7/LC3β) in mouse liver.

Results

Compared with CON group, body weight, liver weight, blood glucose, blood lipid, liver function and the relative area of lipid droplets in liver tissue of mice in HFD group tended to increase.Resveratrol intervention significantly inhibited the increase of body weight, liver weight and blood TG content in NAFLD mice, and reduced the hepatic lipid droplet area and the lipid accumulation in the liver of NAFLD mice, indicating that high-fat feeding can successfully establish NAFLD mice model. However, RSV intervention notably reduced lipid accumulation in NAFLD mice, characterized by the increased expressions of hepatic lipid hydrolysis-related genes SIRT1, p-PKA, PLIN2, ATGL, CGI58, HSL, Rab7 and LC3β in liver tissue. Moreover, the co-localization degree of ATGL/CGI58 and Rab7/LC3β were improved in the FLR and FHR groups. These results indicated that resveratrol could increase the expression of hepatic lipid hydrolysis-related molecules, and enhance the degree of co-localization of lipolysis related molecules ATGL/CGI58 and lipophagy related molecules Rab7/LC3β.

Conclusion

RSV improves the hepatic lipid accumulation in NAFLD mice by upregulating ATGL/CGI58 and Rab7/LC3β via PLIN2.

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Key words NAFLD;resveratrol; lipolysis; lipophagy

Category: Basic Nutrition& Research

紫檀芪改善短期睡眠限制小鼠肝脏代谢酶乙酰化水平及分子机制研究

The positive effects of pterostilbene on the acetylation of hepatic metabolizing enzymes of mice subjected to sleep restriction

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Objective

Our previous studies have confirmed that Pterostilbene (PTE) is effective in ameliorating disorders of glucose and lipid metabolism in short-term sleep-restricted (SR) mice, the mechanism is unclear. The aim of this study was to investigate the effect of PTE on acetylation modification and explore the molecular mechanism in terms of influence on NAD+-dependent deacetylase SIRT activity, expression and circadian rhythm oscillation.

Methods

C57BL/6J male mice were randomly divided into three groups: control (CON), sleep-restriction (SR) and sleep-restriction + pterostilbene (SR+PTE). Mice were forced to keep awake in the sleep-disrupted cages for 20h per day lasted for 5 days and PTE(100mg/kg) was given once a day. The liver tissues were collected at Zeitgeber time ZT0(8:00), ZT4, ZT8, ZT12, ZT16, ZT20 and ZT24. Global proteome and lysine acetylation analyses of ZT4 and ZT16 livers were used label-free quantitative proteomics technology and liquid chromatography-tandem mass spectrometry (LC-MS/MS). The transcription and protein expression abundance of deacetylases (Sirt1 and Sirt3) and NAD synthase Nampt were further measured, and rhythm oscillations were analyzed by cosiner. Furthermore, NAD+/NADH content and its catabolic enzyme CD38 activity were detected in vitro.

Results

PTE had an ameliorative effect on the acetylation levels of 11 glycolytic enzymes (17 sites), 8 lipid metabolizing enzymes (8 sites) and 12 protein metabolizing enzymes (22 sites) in the liver of SR mice. PTE increased NAD+/NADH content, Nampt, Sirt1, Sirt3 transcription and protein expression abundance while maintaining rhythm oscillations. PTE inhibited CD38 activity.

Conclusions

PTE intervention corrects metabolic disturbances caused by short-term sleep restriction, which is associated with its improvement of acetylation modification levels of liver metabolizing enzymes, improvement of hepatic NAD+/NADH content, maintenance of hepatic deacetylase Sirt1, Sirt3 expression and possible molecular mechanisms of circadian rhythm oscillations.

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Key words Pterostilbene; Sleep restriction; Deacetylase; Proteomics; Acetylation modification

Category: Basic Nutrition& Research

二氢杨梅素抑制 NLRP3 炎性小体活性减轻 ApoE-/-小鼠动脉粥样硬化的作用机制研究

Dihydromyricetin ameliorates atherosclerosis in ApoE-/- mice by inhibiting NLRP3 inflammasome activity

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Objective

To investigate the effect of DHM (dihydromyricetin) on atherosclerosis in ApoE-/- mice induced by high-fat diet (HFD) and to reveal the molecular mechanism involved with NLRP3 inflammasome activity.

Methods

Forty healthy male ApoE-/- mice were randomly divided into 4 groups: control group, HFD group, HFD+low dose (300 mg/(kg.d)) of DHM group and HFD+high dose (500 mg/(kg.d)) of DHM group. Body weight and oral glucose tolerance test of mice was recorded. Serum TCH, TG, LDL-C, HDL-C, AST and ALT were detected to levels of metabolism. Serum TNF-α and IL-1β were detected to levels of inflammation. Oil red O, HE and EVG staining were used to observe the aortic lesions. The mRNA and protein expression levels of NLRP3 inflammasome activation were measured by qRT-PCR, Western blot and immunohistochemical.

Results

DHM significantly improved the body weight of the high-fat diet groupand the glucose tolerance ($P < 0.05$). The serum TCH, TG, LDL-C, AST, ALT, TNF-α and IL-1β levels were significantly decreased ($P < 0.05$). The atherosclerotic plaque and necrosis area of the aortic valve were reduced ($P < 0.05$), and the collagen fiber content was increased ($P < 0.05$).DHM inhibited the mRNA and protein expression of NLRP3, IL-18 and ASC in HFD mice ($P < 0.05$).Immunohistochemical staining showed that the expression of NLRP3 protein in aorta was significantly improved ($P < 0.05$).

Conclusion

DHM can ameliorate the occurrence of atherosclerotic plaque in ApoE-/- mice induced by HFD, and its protective mechanism may be related to the inhibition of the NLRP3 inflammasome activation.

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Key words dihydromyricetin; endothelial cells; atherosclerosis; NLRP3 inflammasome

Category: Basic Nutrition& Research

二氢杨梅素通过肠道菌群及其代谢物调节高脂饮食诱导的MAFLD小鼠肠黏膜屏障功能的作用研究

Dihydromyricetin regulates the intestinal mucosal barrier function of mice with MAFLD through regulating gut microbiota and its metabolites

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Objective To investigate the effects of dihydromyricetin (DHM) on the intestinal mucosal barrier of mice with metabolism-related fatty liver disease (MAFLD) induced by high-fat diets (HFD) and evaluate the mechanism involved with gut microbiota and its metabolites. **Methods** The mice were fed HFD for twelve weeks to establish a mouse MAFLD model. DHM was mixed into the diets to intervene the mice. After eight weeks of intervention, mixed antibiotics were used to eliminate gut microbiota. After the intervention, the intestinal mucosal barrier functions were measured, including intestinal mucosa's permeability, serum LPS, pro-inflammatory cytokines mRNA expressions, intestinal tight-junction protein expression levels, and electron microscopic ultrastructural changes, respectively. Furthermore, high-throughput sequencing of 16sRNA was used to measure gut microbiota species' diversity comparison and changes. GC-MS was used to detect the changes of short-chain fatty acids in cecal contents. **Results** After the intervention of DHM, the intestinal mucosal barrier functions were significantly improved. The intestinal mucosal permeability and the expression level of pro-inflammatory factors including IL-1β, IL-6, and TNF-α in the colon were decreased. The expression level of intestinal tight junction proteins such as ZO-1 and Occludin were increased, and the intestinal microvilli structure was notably improved. DHM administration resulted in an improved gut microbiota diversity induced by HFD, as evidenced by increased abundance ratio of Bacteroides to Firmicutes, particularly increased flora species such as Faecalibaculum, Lachnospiraceae and Clostridium species, etc. The content of butyric acid was increased significantly. After clearance of the gut microbiota, the ameliorative effect of DHM on the intestinal mucosal barrier of MAFLD mice was eliminated. **Conclusions** DHM improves the intestinal mucosal barrier function of mice with MAFLD by regulating the diversity of gut microbiota and its metabolites.

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Key words dihydromyricetin; metabolism-related fatty liver disease; intestinal mucosal barrier; gut microbiota.

Category: Basic Nutrition& Research

内源性 n-3 PUFAs 通过重塑肠道菌群改善阿尔兹海默模型小鼠疾病的发生发展

Endogenous n-3 PUFAs ameliorate the development and progression of AD via gut microbiota remodeling in mice model

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Objective: To explore the role of gut microbiota in the beneficial effects of endogenous n-3 polyunsaturated fatty acids (n-3 PUFAs) on Alzheimer's disease (AD) in mice. **Method:** AD model mice APPPS1 and Fat-1 mice that could synthesize n-3 PUFA were hybridized. The offspring were divided into four groups according to their genotypes: wild type group (WT), endogenous synthetic n-3 PUFA group (Fat-1), AD model group (APPPS1), and Fat-1/APPPS1 double expression gene group (Fat-1/APPPS1). Learning ability and Aβ amyloid deposition were tested to estimate AD symptoms. Intestinal permeability, endotoxin (LPS) level, and central nervous system (CNS) inflammation were measured to assess intestinal barrier function. Variations in gut microbiota were detected by 16S rRNA gene sequencing. **Result:** Increased endogenous n-3 PUFA significantly improved learning ability, and reduced Aβ amyloid deposition in APPPS1 mice. Meanwhile, elevated endogenous n-3 PUFAs also significantly improved intestinal barrier function and reduced LPS influx, which in turn reduced CNS inflammation and microglial polarization. In addition, elevated endogenous n-3 PUFAs improved the dysbiosis of gut microbiota, raised α diversity, increased the abundance of *Bacteroidales S24-7*, and reduced proportions of several harmful bacterial genera, such as *Faecalibaculum* and *Desulfovibrio*. Moreover, the beneficial effects of endogenous n-3 PUFAs were transferable by gut microbiota transplantation. **Conclusion:** The gut microbiota contributed to the beneficial effects of endogenous n-3 PUFAs on improving AD symptoms and CNS inflammation.

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Key words Alzheimer's disease; gut microbiota; gut-brain axis; n-3 polyunsaturated fatty acids

Category: Basic Nutrition& Research

萝卜硫素改善棕榈酸诱导肝细胞损伤的转录组学研究

The transcriptomics for sulforaphane ameliorating the hepatocyte injury induced by palmitic acid

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Objectives To investigate the effect of Sulforaphane (SFN) in attenuating palmitic acid (PA)-induced hepatocytes injury and to reveal the potential mechanism.**Methods and Study Design** HHL5 cells were treated with 200 μmol/L of PA for 24 h to establish the injury model and then the model was treated with 5 μmol/L of SFN, co-cultured with PA for 24 h. The total RNA of the cells was extracted to establish the library and sequenced by the Illumina platform. Gene ontology (GO) and Kyoto encyclopedia of genes and genomes (KEGG) enrichment analysis for differentially expressed genes (DEGs) were implemented by software with a P-value cutoff of 0.05 to judge statistical significance. HHL5 cells were transfected with siRNA to knock down PCSK9 and then the autophagy-related proteins levels were examined by western blot. **Results** Eighty-six DEGs that changed under the PA treatment and returned to normal levels under the SFN treatment were found, among which the foldchange of PCSK9 was relatively high and was abundant in liver tissue, suggesting that the PCSK9 might play an essential role in this model. GO enrichment showed that the DEGs were enriched in inflammation and oxidative stress. The KEGG pathway analysis showed that DEGs were involved in the autophagy pathway, suggesting that autophagy might be the potential mechanism in the effect of SFN on PA-induced hepatocyte injury. Further validation was done by western blot, and we found that both SFN and knocking down of PCSK9 could increase the protein level of P62 induced by PA and upregulate the protein level of LC3II to a higher degree. **Conclusions** SFN can regulate autophagy to achieve the therapeutic effects of fatty acid induced hepatocyte injury, and PCSK9 might play a vital role in the process.

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Key words sulforaphane, hepatocyte, transcriptome, autophagy, palmitic acid

Category: Basic Nutrition& Research

生酮饮食对中风模型的神经保护作用机制研究进展

Progress in the study of neuroprotective mechanism of ketogenic diet on stroke model

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OBJECTIVE: In recent years, there have been many studies on the effects of ketogenic diet on stroke models. This paper aims to explore the neuroprotective mechanism of ketogenic diet on stroke models, and to provide ideas for future research and application of ketogenic diet in stroke. METHODS: The keywords "Ketogenic diet, Stroke, Neuroprotection, Mechanism of action" were searched in "CNKI, Wan fang and PubMed" databases and summarized. RESULTS: The ketogenic diet is a high-fat, low-carbohydrate diet, and studies have shown that pretreatment with the ketogenic diet in stroke models improves early motor behavior outcomes in ischemic stroke and has neuroprotective effects. According to the present findings, the mechanism of neuroprotective effects of ketogenic diet in stroke models may be the following: (1) Neuroprotective effects through inhibition of Drp1 mitochondrial translocation, inhibition of nucleotide-binding domain-like receptor protein 3 inflammasome activation, inhibition of endoplasmic reticulum stress, and protection of mitochondrial integrity, thereby exerting neuroprotective effects; (2) Elevated extracellular adenosine levels after ketogenic diet intervention, increased Akt and ERK1/2 phosphorylation via A1 adenosine receptor activation, and upregulated HIF and HIF regulatory genes; (3) Neuroprotective effects of ketogenic diet through its own morphology on astrocytes and/or microglia. CONCLUSION: The mechanism of neuroprotective effects of ketogenic diet in stroke models may be related to the protection of mitochondrial integrity, increased phosphorylation of Akt and ERK1/2, upregulation of HIF and HIF regulatory genes, and altered morphology of glial cells.

Key words Ketogenic diet; Stroke; Neuroprotection; Mechanism of action

Category: Basic Nutrition& Research

肠道菌群与糖尿病的机制研究进展

Research progress on the mechanism of gut microbiota and diabetes mellitus

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Intestinal flora is involved in host immunity, nutrition, energy metabolism regulation and other processes.The imbalance of intestinal flora is the clinical manifestation of the occurrence and development of metabolic diseases such as diabetes. The mechanisms of improving the progression of diabetes through intestinal flora include promoting the secretion of incretin, producing short-chain fatty acids to reduce chronic low-grade inflammation, and regulating bile acid anabolic metabolism.To treat diabetes mellitus through interventions targeting to correct the imbalance of intestinal flora (such as diet adjustment, supplement of prebiotics and probiotics, Chinese and western medicine treatment, fecal bacteria transplantation, etc.), therefore, the regulation of intestinal flora has become a new direction in the treatment of diabetes.At present, there are few clinical treatments for regulating intestinal flora with limited effects, and those with health-promoting effects need to be further confirmed and evaluated, and the potential mechanisms of these effects should be evaluated in future studies.In addition, there are no clear criteria for evaluating adverse reactions (AEs) of probiotic-containing products in the current study, and prospective studies with larger samples are needed in combination with metagenomics, transcriptomics, proteomics, and metabolomics studies.In the context of precision medicine, personalized and genetically modified intestinal microflora may be used for the prevention and treatment of metabolic diseases in the future. "Microbiotics" and "microbial therapy", which influence microflora through diet, are expected to become the core of new therapeutic methods.In conclusion, the study of intestinal flora will provide new ideas for the early prevention and treatment and prognosis of metabolic diseases such as diabetes.

Key words Intestinal flora, diabetes, short chain fatty acid, bile acid, microecologics, probiotics, prebiotics

Category: Basic Nutrition& Research

Flavonifractor plautii 菌维持血管弹性网络防止动脉硬化
Flavonifractor plautii maintains vascular elastic network and Protects against Arterial Stiffness

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Flavonifractor plautii maintains vascular elastic network and Protects against Arterial Stiffness

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Aim: Dysbiosis of gut microbiota is closely involved in the development of several cardio-metabolic disorders including obesity, hypertension, type 2 diabetes mellitus (T2DM), metabolic syndrome and atherosclerosis which could damage host physiology and homeostasis. The diversity of gut microbiota has been reported to be inversely associated with arterial stiffness in white women and several evidence from murine models demonstrated that aberrant gut microbiota associated with obesity promoted vascular dysfunction, whereas, depletion of gut microbiota with broad-spectrum antibiotics reversed aging-related arterial stiffness. It is well known that arterial stiffness not only precedes systolic hypertension which has a major impact on cardiovascular health, but also contributes to the damage of several target organs. However, the causal role of gut microbiota in the progression of arterial stiffness and the specific species and metabolites responsible for this change remain largely unknown. Therefore, we aim to figure out the molecular mechanisms mediating the role of altered microbiota in the progression of elevated arterial stiffness.

Methods: A total of 44 medication-naïve subjects with elevated arterial stiffness (defined as brachial-ankle pulse wave velocity (baPWV)≥1400 cm/s) and 45 age- and sex-matched normal controls free of established cardiovascular diseases, obesity, diabetes and hypertension, which were previously reported to be associated with perturbation of gut microbiota, were recruited. The composition and metabolic

capacities between these two groups were compared with the integration of metagenomics of fecal samples and plasma metabolomics. Subsequently, angiotensin II (AngII) and humanized model using fecal microbiota transplantation (FMT) in C57BL/6J male mice were employed to evaluate the protective effect of *Flavonifractor plautii* (*F. plautii*) and its metabolite cis-aconitic acid (CAA) on arterial stiffness. The arterial stiffness of mice was assessed by tail-cuff blood pressure, abdominal and carotid artery PWV and circumferential cyclic strain. For further mechanism linking *F. plautii* to protection against arterial stiffness, elastin fiber staining and collagen fiber staining with Picro Sirius red was performed. Immune histochemical analyses of matrix metalloproteinase-2 (MMP2) and monocyte chemoattractant protein-1 (MCP-1) in mouse aortas were performed to find the regulatory factors of elastin network. Statistical analyses were performed using R software and GraphPad Prism 8.0. Comparison of basic characteristics was conducted with independent Student's t-test or ANOVA for normally distributed data and Wilcoxon rank-sum test or Kruskal-Wallis test for non-normally distributed variables. The normal distribution assumption was tested with Shapirrio -Wilk test and Q-Q plots.

Results: Human fecal metagenomic sequencing revealed a significantly high abundance and centrality of *F. plautii* in normal controls, which was absent in the microbial community of subjects with elevated arterial stiffness which suggested that *F. plautii* was a keystone bacterium closely correlated with arterial stiffness. Moreover, glucose metabolism and blood pressure only mediated part of the effect of *F. plautii* on lower arterial stiffness, suggesting that unknown mechanisms other than these known risk factors mediate the protective effect of *F. platii* on lower arterial stiffness. The microbiome of normal controls exhibited an enhanced capacity for glycolysis and polysaccharide degradation, whereas, those of subjects with heightened arterial stiffness were characterized by increased biosynthesis of fatty acids and aromatic amino acids. Integrative analysis with metabolomics profiling further suggested that increased CAA served as the main effector for the protective effect of *F. plautii* against elevated arterial stiffness. Moreover, supplementation of *F. plautii* attenuated blood pressure and arterial stiffness in both AngII-induced and humanized model of arterial stiffness. Furthermore, the beneficial effect of *F. plautii* on lowered pulse wave velocity was mainly mediated by an inhibition of matrix metalloproteinase-2 (MMP2) and nuclear factor kappa-B activation, resulting in a substantial decrease in elastic fiber fragmentation indicating the protective effect of vascular elastic network.

Conclusions: Collectively, our study uncovers a causal link between dysbiosis of gut microbiota and arterial stiffness. The elevated arterial stiffness is caused partially by a reduction of *F. plautii* in gut, resulting in enhanced activation of MMP2, which in turn exacerbates vascular elastic fragmentation stiffness. From a clinical perspective, the findings raise the possibility of maintaining vascular health by targeting gut microbiota and that *F. plautii* has the potential to be a next-generation probiotics for managing vascular health.

Key words Gut microbiota; Flavonifractor plautii; Arterial stiffness; Elastic fiber

分类：基础营养研究

有关于酚类物质的时间营养学研究

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有关于酚类物质的时间营养学研究

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【目的】

哺乳动物的内源性昼夜节律（Circadian rhythm）与 24 小时的光照周期相适应。主昼夜节律振荡器位于大脑视交叉神经上核（SCN），子振荡器存在于大脑的其他区域和周围器官中。据报道，各种外周组织和细胞系的体外培养物都表现出昼夜节律。昼夜节律被环境，如阳光、食物和温度，以及各种药物和化学物质所诱导。昼夜节律主要由核心的昼夜时钟基因控制，如 Clock、Bmal1、Per 和 Cry，通过一个具有负反馈环的基因调控网络进行控制。

酚类物质是大量存在于蔬菜、水果和饮品（咖啡、啤酒）中的有机物质。据报道，人类平均每天要消耗约 200 毫克的酚类物质。酚类物质具有广泛的生理活性，如抗氧化、抗动脉硬化、抗感染、抗肿瘤和抗骨质疏松的作用，酚类物质是维持生物稳定性和疾病预防及治疗作用的重要活性成分。然而，酚类物质作用于生物昼夜节律的机制仍然是未知的。为了给酚类药物、保健食品和补充剂的合理应用提供理论指导，本研究旨在从时间营养的角度研究酚类物质对构成昼夜节律的时钟基因 Per2 在细胞水平表达的影响。

【方法】

实验对象是小鼠 PER2:: LUC K.I. 胚胎成纤维细胞系（MEF）。在 MEF 细胞中，荧光素酶被接入时钟基因 Per2 的下游，通过在培养基中加入荧光素，可以依据细胞发光量来定量 PER2 的表达量。在细胞培养基中加入浓度梯度的酚类物质，测量时钟基因 PER2 的表达水平。 为了消除荧光素的假阳性，增加荧光素的浓度，也进行了对照实验。 使用实时 LUC 检测仪（LumiCycle; Actimetrics, Wilmette, IL, USA）。使用 R 软件从记录的数据中计算波形的振幅，相位和周期，用 Actimetrics 软件对 LumiCycle 进行测量，并进行正弦拟合。

【结果】

长期添加超过 1mM 的 Hippuric acid（马尿酸）会导致相位提前、振幅增加和周期缩短；长期添加超过 10uM 的 Ferulic acid（阿魏酸）会导致振幅增加和周期延长。其他酚类物质也有非浓度计量依赖的变化。

【结论】

研究酚类化合物时需要考虑生物节律。已有报道表明，昼夜节律会影响酚类化合物的吸收和代谢，从而影响其对身体的作用和功能。此外，膳食中的酚类化合物已被证明在对代谢和生理产生许多有益效果。本研究结果表明，酚类物质摄入引起的对生物钟节律的影响非常重要，酚类物质有可能成为昼夜节律调节食品，因为它们会影响时钟基因表达的振幅，相位和周期，并且在不同的剂量浓度下对表达有不同的影响。这些发现可能有助于为航空旅客和轮班工作人员提供机上膳食的饮食建议，以减少时差反应症状。

关键字 酚类，时钟基因，时间营养学，per2

分类：基础营养研究

基于转录组学和代谢组学探究一种改善睡眠组合物对斑马鱼睡眠行为的影响

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目的：探究一种新型后生元组合物对斑马鱼睡眠的改善作用，并进一步探讨其对 γ-氨基丁酸受体 α1 亚单位（gabra1），褪黑素受体 1 类亚型（mtnr1aa），5-羟色胺（血清素）受体（htr2aa）mRNA 表达以及肠道菌群多样性的影响。

方法：随机选取 5 dpf 野生型 AB 品系斑马鱼，在解剖显微镜下挑选发育正常的斑马鱼，采用水溶给样的方式确定后生元组合物样品的最大检测浓度，并使用 10mM 戊四唑（PTZ）诱导活体斑马鱼建立失眠症模型。后生元组合物样品为自然阳光千觉百寐后生元压片糖果配置液，选取低、中、高（500 μg/mL、1000 μg/mL、2000 μg/mL）3 个质量浓度样品，同时设置空白对照组、模型组和阳性对照组（地西泮 10μg/mL），每组均处理 30 尾斑马鱼幼鱼。使用行为分析仪测量斑马鱼的运动距离和处于失眠状态的时间，计算睡眠改善作用。通过 q-PCR 检测 gabra1、htr2aa 和 mtnr1aa 的相对表达量。采用 16sRNA 测序对斑马鱼的肠道菌群进行多样性分析。

结果：在观察的 1h（3600s）内，模型组觉醒活动时间较空白对照组明显增加（P＜0.001），提示造模成功。与模型组相比，高剂量样品组斑马鱼的觉醒活动时间明显降低，差异有统计学意义（P＜0.001）。低剂量、中剂量、高剂量样品均显著下调了斑马鱼的失眠时间，差异有统计学意义（P＜0.001）。低剂量、中剂量、高剂量样品对睡眠的改善作用分别为 56.7%、59.7%、95.1%，其中高剂量组对睡眠的改善作用优于阳性对照组（79.7%），差异有统计学意义（P＜0.001）。与模型组相比，低、中、高剂量样品组 gabra1 和 mtnr1aa 基因相对表达量显著升高，htr2aa 基因相对表达量显著降低，差异有统计学意义（P＜0.01）。alpha 多样性分析结果表明，在给予样品后，斑马鱼体内的物种多样性降低，这可能与给予样品后短时间内导致部分特定的益生菌益生菌扩增引起的多样性降低有关。模型组斑马鱼肠道中主要的益生菌双歧杆菌属（Bifidobacterium），乳杆菌属（Lactobacillus），拟杆菌（Bacteroides）相对丰度较正常对照组降低；低、中、高剂量样品组斑马鱼肠道内双歧杆菌属、乳杆菌属、拟杆菌丰度较模型组有所增加，表明自然阳光千觉百寐后生元压片糖果对睡眠的改善作用可能与增加斑马鱼体内与睡眠调控有关的益生菌双歧杆菌属，乳杆菌属，拟杆菌相对丰度有关。

结论：低、中、高剂量自然阳光千觉百寐后生元压片糖果样品对失眠症斑马鱼均有显著改善作用，具体表现为下调斑马鱼的失眠时间。其改善睡眠的作用机制与上调 gabra1 和 mtnr1aa 基因表达和下调 htr2aa 基因表达，增加斑马鱼体内益生菌双歧杆菌属，乳杆菌属，拟杆菌相对丰度，增加体内葡萄糖酸的含量，激活 GABAA 受体有关。

关键字 后生元，斑马鱼，失眠，代谢组学，肠道菌群

分类：基础营养研究

孕早期尿碘水平与胎儿出生结局的关联性研究

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目的：碘是人体所必需的一种微量元素，孕妇由于需要给胎儿提供碘以及对于碘的排除率增加，会导致对于碘的需求量迅速增加，并且孕早期是胎儿生长发育的关键时期，孕早期孕妇碘摄入缺乏以及过量均会导致不良出生结局，例如早产、低出生体重儿、小于胎龄儿等，并对婴幼儿远期影响深远。本研究的目的是调查武汉市孕妇孕早期碘营养状况，探讨不同尿碘浓度对胎儿出生结局的影响，为指导孕早期不同碘营养状况妇女合理补碘提供基础数据资料。

方法：本研究以同济出生队列（TJBC）中的孕妇和婴儿作为研究对象，收集和记录孕妇的基本信息，包括年龄、身高、孕前体重、民族、学历、异常生育史，吸烟饮酒史等；通过膳食频率问卷调查孕妇孕早期膳食摄入情况并收集尿液采用砷-铈催化分光光度法检测尿液中的尿碘浓度（UIC）；并且收集分娩时胎儿身长、体重等基本信息。将孕早期孕妇尿碘中位数按照 WHO 标准分为四组，采用多元线性回归以及 logistic 回归分析孕早期尿碘和胎儿出生结局之间的关系，用分层分析分析评估潜在的交互作用。

结果：本研究共纳入孕早期孕妇 935 名，其尿碘中位数为 174.49μg/L。碘缺乏（<150μg/L）者 377 人，占 40.32%；碘适宜组（150-249μg/L）者 341 人，占 36.47%；碘超适宜组（250-499μg/L）者 193 人，占 20.64%；碘过量组（>500μg/L）者 24 人，占 2.57%。以碘适宜组作为参照，碘缺乏组孕妇孕前体重（53.25±7.07）显著低于碘适宜组（55.24±9.33），碘过量组孕妇孕前体重（56.82±10.68）显著高于碘适宜组（55.24±9.33）。多元线性回归结果显示，在校正了相关混杂因素后，尿碘浓度每增加一个单位，碘过量组胎儿出生体重 Z 评分减少 0.06 个 SD（95%Cl：-0.74，-0.01）。多元 logistic 回归结果显示，在校正了相关混杂因素后，碘缺乏组（OR：1.87；Cl:1.01,3.52）以及碘超适宜组（OR:2.34;Cl:1.15,4.77）早产发生风险均增加。分层分析结果显示，在女婴中，尿碘浓度每增加一个单位，碘超适宜组胎儿出生身长增加 0.12cm（95%Cl：0.03，0.90）；在碘缺乏组，母亲孕前 BMI 异常（包括消瘦、超重以及肥胖）会增加早产发生风险，OR 值为 2.12（95%Cl：1.01，4.46）；在碘超适宜组，母亲年龄小于 28.5 岁以及非初产妇发生早产的风险增加，OR 值分别为 2.63（95%Cl：1.02，6.81）、2.32（95%Cl：1.07，5.04）。

结论：通过对孕早期妇女尿碘的测量及其与出生结局之间的关联性分析，本研究发现孕早期妇女碘营养状况充足，但碘缺乏人群仍然较多，占 40.32%；并且孕早期妇女碘缺乏、超适宜以及过量均会对胎儿产生不利的影响，增加不良出生结局的风险。建议加强对妊娠期妇女尿碘值的监测以及加强对碘营养方面的宣讲，以便改善孕期碘营养状况，确保胎儿健康生长，避免不良出生结局的发生。

关键字 孕早期；尿碘；出生结局

分类：基础营养研究

中老年糖尿病患者维生素 D 水平与肥胖发病的相关性研究

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[背景]肥胖是一个世界性的流行病学问题。近年来，全球范围内肥胖的患病率也有逐年升高的趋势。在过去十年中，有关维生素 D 不足与人体测量状态之间关系的研究数量有所增加，肥胖和维生素 D 缺乏都已被公认为世界范围内的主要公共卫生问题，且有研究证实肥胖与维生素 D 密切相关。中国人口老龄化问题日益突出，而对于中老年人群来说，其糖尿病的发病风险远高于其他人群，尤其是肥胖的中老年人。就目前而言，已经有多种研究结果表明，维生素 D 缺乏可能会引起肥胖、血糖升高、胰岛素抵抗等疾病的发生，但临床中暂无研究结果证明维生素 D 与这些疾病之间存在一定的关联，也缺少证明中老年糖尿病患者体内维生素 D 缺乏易患肥胖的科学证据。本文就维生素 D 与中老年糖尿病患者的肥胖发病的相关性进行研究。

[目的]本研究以中老年糖尿病患者为试验对象,研究维生素 D 与中老年糖尿病患者中的肥胖之间是否存在关联。以及不同水平的维生素 D 是否对肥胖有不同的影响。[方法]选取 270 例中老年糖尿病患者(男 78 例、女 192 例),以体质指数(BMI)≥27.5 作为判断肥胖的标准,将 270 例中老年糖尿病患者分组之后，分别收集两组对象的一般资料和相关血清指标，计算相应指标。比较两组糖尿病患者的一般资料及各项血清指标的差异性,并分析肥胖组中老年糖尿病患者维生素 D 水平与肥胖之间的相关性。

[结果]3 组不同血清维生素 D 组间的年龄、地区、是否补钙之间没有统计学差异,而性别有统计学差异。不足组的相关代谢指标均高于维生素 D 充足组,且 BMI、腰围、空腹胰岛素、HOMA-IR、HOMA-β 随着维生素 D 水平的增高而降低。维生素 D 缺乏、不足组肥胖的风险度高于维生素 D 充足组。多因素调整之后,结果仍具有统计学意义。肥胖组中,肥胖的患者血清 25(OH)D 水平低于体重正常患者,但未有统计学意义;然而,在肥胖患者中相关代谢指标如腰围、BMI、腰围、腰臀比率、舒张压、收缩压、糖化血红蛋白、空腹胰岛素、HOMA-IR 和超敏 C 反应蛋白均高于体重正常组的患者。

[结论]中老年糖尿病患者中,肥胖患者体内的维生素 D 水平较低。肥胖患者维生素 D 水平与腰围、BMI、空腹胰岛素、HOMA-IR、HOMA-β 呈负相关。维生素 D 每降低 10 ng/mL,肥胖的患病概率就会增加。本研究不仅体现了中老年糖尿病肥胖患者体内维生素 D 水平与肥胖之间的关系,还为中老年糖尿病肥胖患者寻找新的治疗方法提供科学依据。

关键字 维生素 D；肥胖；糖尿病；中老年

分类：基础营养研究

补充维生素 D 对中老年 2 型糖尿病患者生活质量的影响

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[背景] 近些年来，糖尿病的患病率逐年增长，如今糖尿病已经成为全球发病率最高的疾病之一。糖尿病长期的高血糖症会引起多种并发症，糖尿病及其并发症严重影响了患者的生活质量。目前，生活质量的保障和提高已成为糖尿病防治的重要内容。维生素 D 缺乏在全世界变得更加普遍，与其有关的健康问题受到学者的高度关注。基于现有对于维生素 D 对糖尿病影响的研究，本研究提出，给中老年 2 型糖尿病患者补充维生素 D 可以提高其生命质量。

[目的]通过随机对照试验,使用 SF-36 生活质量量表评价维生素 D 补充对中老年 2 型糖尿病患者生活质量的影响,为维生素 D 在提高糖尿病生活质量方面的作用提供更加全面客观的证据。

[方法] 采用分层随机抽样的方法，随机选取了 50 岁以上的 T2DM 患者作为研究对象，基于年龄（±3 岁）、性别、口服降糖药的类型和剂量以及糖尿病持续时间（± 6 个月），参与的研究对象被分为两组，即维生素 D 干预组（135 名）和对照组（135 名）。维生素 D 干预组受试者每天服用 800 IU 维生素 D3 滴剂；对照组的受试者不接受维生素 D3 制剂补充，干预时间为 30 个月。拟采用 SF-36 生命质量量表，通过编码、计分、换算，得出生活质量各维度得分、生活质量总分和心理健康总分、生理健康总分，从而对补充维生素 D 后的 2 型糖尿病患者进行生命质量进行评估。

[结果]1.在干预前，两组患者 SF-36 量表中的心理健康（MH）以外的其他维度的评分没有显著的统计学差异（P>0.05）；2.在经过维生素 D 干预后，维生素 D 干预组生活质量 SF-36 量表的各项指标均显著高于对照组，其差异具有显著的统计学意义（t=0.021、0.004、0.005、0.032、0.027、0.000，P<0.05）。干预组患者的心理健康领域、生理健康领域和生活质量总评分与对照组患者比较有显著的提高，具有统计学意义（P<0.05）。3. 30 个月后，未进行补充维生素 D 的对照组患者中的生活质量总体有所下降，差异具有统计学意义（F=0.324、0.203、2.948、6.007、4.719、29.316、25.812、22.181，P＜0.05）。4.男性、女性糖尿病患者在生活质量各维度得分上没有显著差异，这说明性别因素对糖尿病患者生活质量的影响并不显著。生活在城镇的病人，除了身体功能（PF）、身体健康状况（HT）之外，其它指标与乡村病人相比，无显著性差异；但两组间躯体痛（BP）均显著高于城镇，有显著差异（P<0.05)；农村居民的生活质量总分较城镇居民显著降低（P<0.05）。不同户外活动时间的患者在生活质量各维度得分无明显差异（P＞0.05）。[结论]：研究发现，对 2 型糖尿病患者进行维生素 D 补充可以显著提高患者的生活质量，支持维生素 D 可能通过多途径影响 2 型糖尿病病情和生活质量，为探索维生素 D 在 2 型糖尿病防治中发挥重要作用提供了数据支持。

关键字 维生素 D；糖尿病；生活质量量表 SF-36；

分类：基础营养研究

成人血清 25-羟维生素 D 水平与高血压发病风险的队列研究

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[背景]目前，高血压已成为具有高合并症和高死亡率的全球流行病，我国高血压患者达 2.45 亿，高血压造成的社会负担日益加重，迫切需要新的方法来阻止其发生发展。已知高钠、低钾、超重和肥胖是我国高血压发病的重要危险因素，积极寻找其他危险因素成为高血压防治的研究新方向。在过去二十年中，我国高血压发病率增长快速，而维生素 D 缺乏也已成为当前普遍的营养状况问题之一。考虑到高血压流行的危害性以及维生素 D 补充的便利性，探索维生素 D 营养状态与高血压之间的关系，对于高血压防控举措的完善具有重要的公共卫生意义。

[目的]为了解维生素 D 在预防高血压方面的作用，分析维生素 D 水平与高血压发病的相关性，为维生素 D 应用于高血压防控提供人群数据。

[方法]本研究采用前瞻性队列研究设计，包含基线研究数据和随访研究数据两部分。研究内容包含开展问卷调查、实施人体测量和进行实验室检测。研究对象均同意并签署知情同意书，本研究从始至终严格遵守赫尔辛基宣言。采用标准问卷，收集参与者的人口统计学资料（年龄、性别和居住地区等）、社会经济状况（教育程度）、吸烟习惯（目前吸烟、已戒烟或从未吸烟）、饮酒状况（目前饮酒、已戒酒或从未饮酒）、体育活动和糖尿病家族史等。在清晨空腹状态下对研究对象进行体格检查和生化指标检测，内容包含身高、体重、腰围和血压的测量以及对调查对象禁食 12 h，采集外周静脉血 5 mL，转速 3000 r/min，离心 10 min 后，取上层血清检测所需指标。用 SPSS27.0 进行 cox 回归，分析维生素 D 水平与高血压发病之间的相关性。

[结果] 本研究最终纳入 1523 名研究对象，其中男性 628 人，女性 895 人，研究对象的平均年龄为 50.52±13.95 岁。三年随访期间新发高血压 186 例（男性 84 例，女性 102 例），高血压累计发病率为 12.21%。研究对象血清 25(OH)D 水平的均值为 25.16±6.45 ng/mL，维生素 D 缺乏（<20 ng/mL）和不足（20-29 ng/mL）的百分比分别为 20.42%和 57.72%。高血压在血清 25(OH)D 水平较低的人群中发生率较高，但血清 25(OH)D 水平与高血压发病率并无相关性（P-trend ＞0.05）。进一步分层分析发现，在男性（调整 HR = 1.62，95% CI：1.08-2.42）、超重/肥胖（调整 HR =1.30，95% CI：1.05-1.60）舒张压≥85（调整 HR = 1.84，95% CI：1.15-2.94）、饮酒（调整 HR =1.46，95% CI：1.00-2.13）或高学历（调整 HR =1.19，95% CI：1.00-1.41）等特征的亚组研究对象中，维生素 D 缺乏会增加高血压发病风险。

[结论] 低水平 25(OH)D 的人群高血压发生率较高，并且在男性、超重/肥胖、收缩压≥85 或饮酒的人群中，维生素 D 缺乏会增加高血压发生风险。建议在维生素 D 缺乏的男性、超重/肥胖、收缩压≥85、饮酒和高学历人群中给与维生素 D 补充，以减少高血压的发生。

关键字 维生素 D；高血压；队列研究；

分类：基础营养研究

唾液酸调节肝脏巨噬细胞 Siglec-E 配体缓解非酒精性脂肪性肝炎

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目的：唾液酸化是一种常见的糖基化修饰，广泛存在于细胞表面，其在细胞信号传导中发挥重要作用。唾液酸酶可通过去唾液酸化以下调细胞唾液酸化水平，研究显示抑制唾液酸酶 NEU3 表达可改善高脂饮食诱导的肝脏损伤，但具体机制尚不清楚。Siglec-E 配体是细胞表面的一种唾液酸化的糖蛋白，可结合巨噬细胞表面 Siglec-E 受体发出免疫抑制信号，减少促炎因子的分泌。本研究为探究唾液酸对 NASH 肝脏炎症的保护作用及其分子机制。

方法：动物实验：8 周龄雄性 C57BL/6J 小鼠 60 只，随机分为对照组（Con）、模型组（CDAHFD）、唾液酸低剂量组（SAL）和唾液酸高剂量组（SAH）。Con 组喂食正常饲料，CDAHFD、SAL、SAH 组喂食 NASH 模型饲料；SAL、SAH 组饮水中添加唾液酸，干预剂量分别为 50 mg/kg.d-1、200 mg/kg.d-1，其余组饮用纯净水。喂养 8 周后，通过肝脏油红 O 染色、H&E 染色、Masson 染色评价肝脏损伤情况，检测血清 ALT、AST，检测肝脏 TC、TG，检测肝脏炎症因子及唾液酸代谢相关酶水平。免疫荧光染色定位巨噬细胞和唾液酸代谢相关酶，评价肝脏巨噬细胞唾液酸代谢相关酶表达水平。流式细胞术检测肝脏巨噬细胞占比、巨噬细胞 Siglec-E 配体水平。细胞实验：LPS（100 ng/ml）+PA（100 μmol/L），单独或联合 400 μg/ml 唾液酸、Siglec-E 配体阻断剂（20 μg/ml）处理 RAW264.7 细胞，24 h 后检测唾液酸代谢相关酶、Siglec-E 配体及炎症因子水平。

结果：与 Con 组相比，CDAHFD 组小鼠体重、肝体比显著升高（P < 0.001），血清 ALT、AST 和肝脏 TC、TG 显著升高（P < 0.001）；相较于 CDAHFD 组，SAL、SAH 组小鼠肝体比、肝功能、和肝脏 TC、TG 均显著下调（P < 0.01）。与 Con 组相比，CDAHFD 组小鼠肝脏出现明显脂质沉积、肝细胞气球样变、炎性细胞浸润、轻度纤维化；相较于 CDAHFD 组，SAL、SAH 组小鼠肝脏脂质沉积、肝细胞损伤、炎性细胞浸润均显著缓解，未见纤维化。与 Con 组相比，流式细胞术显示，CDAHFD 组小鼠肝脏巨噬细胞占比显著增加（P < 0.05），肝脏炎症因子 TNF-α、IL-1β、IL-6、CCL2 水平均显著升高（P < 0.05）；相较于 CDAHD 组，SAL、SAH 组小鼠肝脏巨噬细胞占比明显降低（P < 0.05），炎症因子 TNF-α、IL-6、CCL2 也显著下降（P < 0.05）。与 Con 组相比，CDAHFD 组小鼠肝脏巨噬细胞 Siglec-E 配体呈现代偿性升高；较于 CDAHFD 组，SAL、SAH 组肝脏巨噬细胞 Siglec-E 配体进一步升高（P < 0.001），且呈现剂量效应。免疫荧光染色显示，与 Con 组相比，CDAHFD 组小鼠肝脏巨噬细胞唾液酸酶 NEU3 和唾液酸转移酶 ST8SIA6 表达增加（P < 0.001）；相较于 CDAHFD 组，SAL、SAH 组肝脏巨噬细胞 NEU3 表达显著降低（P < 0.05）。细胞实验显示，LPS+PA 干预后，RAW264.7 细胞分泌炎症因子显著上调（P < 0.001），而唾液酸干预可显著上调细胞 Siglec-E 配体（P < 0.001），抑制炎症因子分泌（P < 0.01）；然而，在 Siglec-E 配体阻断后，唾液酸抑制巨噬细胞分泌炎症因子的作用消失（P < 0.01）。

结论：唾液酸可能通过抑制肝脏巨噬细胞 NEU3 表达，上调巨噬细胞 Siglec-E 配体水平，以抑制巨噬细胞分泌炎症因子，从而改善 NASH 小鼠肝脏炎症。

关键字 唾液酸；非酒精性脂肪性肝炎；巨噬细胞；Siglec-E 配体；Neu3

分类：基础营养研究

叶黄素对小鼠视网膜组织脂质代谢组学的影响

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目的：叶黄素是一种含氧类胡萝卜素，广泛存在于植物性食物中。人体内不能合成叶黄素，只能靠外源摄入获取人体所需的叶黄素。叶黄素是构成视网膜黄斑色素的主要成分，对于维持眼底黄斑形态及视功能至关重要。最近的研究发现，叶黄素可能缓解脂代谢紊乱，减少脂质异位沉积。然而，叶黄素如何影响视网膜脂质代谢的机制仍然未知。本研究旨在探讨叶黄素对小鼠视网膜组织脂质代谢组学特征的影响，增加对叶黄素改善视网膜生理功能作用的理解。

方法：选取健康雄性 8 周龄 C57 小鼠 24 只，随机分 2 组，每组 12 只，即叶黄素缺乏组和叶黄素补充组。叶黄素缺乏组饲喂叶黄素缺乏饲料（饲料不含叶黄素）；叶黄素补充组饲喂叶黄素添加饲料（饲料含 7mg 叶黄素/kg）。28 天饲喂结束后采用视网膜电图（ERG）检测小鼠视网膜电生理功能变化。检测结束后摘取小鼠视网膜组织，采用苏木精-伊红染色法观察视网膜结构变化。采用液相色谱-质谱联用技术(HPLC-MS)对小鼠的视网膜组织代谢质谱进行分析，利用主成分分析（PCA）观察组内的总体分布和组间分散程度，进一步采用有监督的正交偏最小二乘法判别分析（ OPLS-DA），筛选潜在的生物标志物，并初步识别出组间差异。计算所有 QC 样本中代谢特征的相对标准偏差，并去除> 30%的值。投影值大于的变量(VIP＞1) 被视为差异变量。使用 FDR (Benjamini-Hochberg)对 P 值进行了多重检验校正。本研究筛选潜在差异代谢物的条件设置为 VIP ＞1、校正后 P＜0.05。

结果：ERG 结果显示，叶黄素补充组较叶黄素缺乏组 ERG a 波和 b 波振幅显著升高（t = 2.98，P < 0.05 ; t = 1.82，P < 0.05）。叶黄素缺乏组视网膜 HE 感光细胞计数为（168.70±19.33），叶黄素补充组为（188.00±12.56），叶黄素补充组较叶黄素缺乏组感光细胞数有升高趋势。代谢组学结果显示叶黄素缺乏组和叶黄素补充组代谢轮廓发生明显分离，表明叶黄素缺乏组和叶黄素补充组的视网膜脂质代谢谱存在明显差异（R2 = 0.74；Q2 = -0.59）。筛选并鉴定出叶黄素缺乏组和叶黄素补充组间有 303 个差异性脂质代谢产物。差异脂质代谢产物中有 193 个代谢物上调，110 个代谢物下调。差异脂质代谢物主要富集在甘油脂类代谢、甘油磷脂代谢、鞘脂类代谢、亚麻酸代谢、花生四烯酸代谢等代谢通路。

结论：叶黄素可能通过调控视网膜中甘油脂类代谢、甘油磷脂代谢、鞘脂类代谢等相关代谢通路，从而发挥维持视网膜功能的作用，研究结果为从多组学角度阐释叶黄素改善视网膜功能作用机制提供了新的思路与依据。

关键字 叶黄素；视网膜生理功能；代谢组学；脂质代谢；

分类：基础营养研究

食物成瘾大学生的自主神经调节能力降低

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目的：

食物成瘾（Food Addiction，FA）是指对长期食用的高加工、高糖、高热量食物产生耐受性依赖，停止食用则会产生戒断行为的一种慢性、易复发性精神疾病。食物成瘾的发生类似药物成瘾的犒赏机制，可能与自主神经系统功能受损有关，自主神经系统功能受损会降低包括进食在内的机体应激能力。但是，目前仍然缺乏食物成瘾与自主神经功能异常关联性的直接证据。研究表明，青年人是各年龄段食物成瘾的高发人群。而大学生作为国家发展的后备力量，是一个不容忽视的群体，且大学生正处于从青少年向成人过渡的关键阶段。在这一过程中，大学生心理、生理会发生较大变化，这些变化既有与一般青年的相似性，也有大学生这一特殊群体的独特性。大学生的情绪丰富、情感体验深刻与其生理与性的成熟、自我意识发展、社会需要的发展及面临社会环境的复杂性等密切相关。本研究通过 Ewing 试验诱发心血管发射和心率变异性改变，旨在观察食物成瘾对大学生自主神经调节能力的影响。

方法：

使用耶鲁食物成瘾问卷在 895 名大学生中筛选出食物成瘾者 91 人。随机抽取 14 名食物成瘾者设为食物成瘾组（FA，男 10 名，女 4 名，21.9±2.7 岁，22.1±2.6kg/m^2），另在调查群体中随机抽出 55 名非食物成瘾者设为正常对照组（C，男 41 名，女 14 名，21.4±2.6 岁，21.8±2.7kg/m^2），观察两组受试者 4 分钟静息、1 分钟深呼吸、1 分半 Valsalva 状态和 2 分钟站立状态下心血管反应的差异，使用 Firstbeat SPORTS 实时监测试验过程中心率变异性的变化。

结果：

1）FA 组和 C 组 Ewing 试验的深呼吸心率差、坐-立位 30s/15s RR 间期比值未见显著性差异，Valsalva 状态 FA 组 RR 间期比值显著低于 C 组；2）静息状态下 FA 组 SDNN 显著低于 C 组，提示 FA 组副交感神经活性减弱；3）深呼吸期间两组间时域和频域指标未见显著性差异；4）Valsalva 状态下 FA 组 SDNN 显著低于 C 组，PNN50（P=0.06）、VLF（P=0.06）倾向低于 C 组，提示 FA 组交感神经活性减弱；5）站立状态 FA 组 LF/HF 显著低于 C 组，提示交感神经调节功能下降，自主神经系统的均衡性受损。

结论：

食物成瘾易造成冲动、焦虑、抑郁等情绪调节和心理健康问题，还与机体代谢紊乱和多种慢性疾病的发生、发展及转归等生理健康问题相关，是目前人群营养状况研究的热点之一，但是迄今尚未在食物成瘾人群中进行过心率变异性的研究。在本研究中，食物成瘾组心率变异性时域、频域参数在 Ewing 试验静息、Valsalva 动作和站立过程中较正常对照出现的显著或倾向降低，提示食物成瘾者心率变异性的总张力和均衡性下降，交感和副交感紧张性调节的能力降低，表明食物成瘾大学生的自主神经调节能力下降。

关键字 食物成瘾、Ewing 试验、心率变异性、自主神经

分类：基础营养研究

高脂膳食添加荷叶粉对糖耐量和肝脏的影响

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目的：本研究尝试探索高脂膳食添加荷叶粉对大鼠空腹血糖、口服糖耐量、皮下脂肪组织、内脏脂肪组织和肝脏重量及器官指数的影响，为进一步开发荷叶相关保健产品提供理论依据。

方法：将 30 只 4-6 周龄 SPF 级雄性 Wistar 大鼠适应性喂养 1 周后采用随机数字随机分为 3 组，包括低脂对照组（LF）、高脂组（HF）和高脂+荷叶粉组(HL)。大鼠一只一笼，每周更换垫料，实验环境每天昼夜循环光照 12h，环境温度为 22～24℃，相对湿度为 50%～55%。LF 组采用普通饲料，HF 和 HL 组采用脂肪提供 35%能量的高脂饲料，HL 组添加 5%的荷叶粉，HF 添加等量的纤维素。每周记录两次剩食量并测量一次体重，计算采食量和饲料利用效率。喂养 3 周后隔夜禁食，鼠尾采血测定空腹血糖并进行口服糖耐量试验。喂养 5 周后禁食，第二日异氟烷麻醉后行腹主动脉取血留样，再放尽血后取肝脏准确称重记录，记录皮下和内脏脂肪组织重量，测定身长和尾长，计算肝脏指数、脂肪组织器官指数、BMI 和 Lee’s 指数。

结果：实验膳食添加 3 天后，高脂组和荷叶粉添加组采食量显著高于低脂对照组。从第 9 天开始，荷叶粉添加组采食量显著高于高脂组和低脂对照组，高脂组采食量高于低脂对照组，这些差别一致持续到实验结束。膳食添加荷叶粉有降低饲料利用率的趋势，但未显著改变饲料利用效率。荷叶粉添加组在头 2 周体重低于高脂组，但差异没有统计学意义。各组体重始终没有显著差异。喂养 3 周后荷叶粉添加组空腹血糖显著低于高脂组，荷叶粉添加组餐后 15 分钟和 30 分钟血糖水平显著低于高脂组。荷叶粉添加组口服糖耐量试验曲线下面积显著小于高脂组。高脂组盲肠长度显著大于低脂对照组，高脂组盲肠内容物重量显著大于低脂对照组和荷叶粉添加组。荷叶粉添加组肝脏重量和肝脏指数均显著高于低脂对照组和高脂组。荷叶粉添加有增加附睾脂肪、肠系膜脂肪等内脏脂肪组织重量的趋势，但增加量没有统计学差异。高脂膳食添加荷叶粉未显著改变身长、脂肪组织器官指数、BMI 和 Lee’s 指数。

结论：高脂膳食添加荷叶粉可以显著降低空腹血糖水平并改善高脂膳食引起的糖耐量受损，但会增加肝脏重量和肝脏指数，而对体重和脂肪组织重量没有显著影响。膳食添加荷叶粉在高脂膳食背景下减少盲肠内容物重量、增加采食量、增加肝脏重量和肝脏指数的相关机制有待进一步研究。

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关键字 荷叶粉；肝脏；脂肪组织；糖耐量；大鼠

分类：基础营养研究

木瓜壳寡糖复合营养素对大鼠骨关节炎的作用及机制研究

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目的：本研究采用 Hulth 法制作大鼠 OA 模型，观察木瓜壳寡糖复合营养素对大鼠 OA 疗效作用的影响，评价其对软骨形态学变化，并初步探讨其可能的作用机制，旨在为治疗 OA 提供新思路及新方法。方法：健康清洁级雄性 SD 大鼠 20 只，适应性饲养 1 周后，按照体质量随机分为 4 组：空白对照组、模型对照组、木瓜壳寡糖组、冲击波组，每组 5 只。除空白对照组外，其余三组采用 Hulth 法建立 OA 模型。造模术 1　周伤口愈合后，木瓜壳寡糖组给予大鼠木瓜壳寡糖复合药膳（0.21 g/100 g/d），冲击波组给予 1.0 bar，6 Hz，800 次剂量的冲击波干预；空白对照组及模型对照组给予大鼠等剂量的生理盐水。持续干预 6　周，实验结束后采用麻醉断颈法处死大鼠。通过病理学观察大鼠膝骨关节形态改变；通过免疫组化方法检测大鼠体内 Collagen Ⅱ及 Aggrecan 的变化。每周对各组大鼠进行 Lequesne　MG 行为学评分。干预 6 周后，统一处死大鼠，取关节软骨组织，采用改良 Mankin 评分、免疫组化法检测 Collagen Ⅱ、Aggrecan 表达水平，评估骨关节炎程度。结果：干预 6 周后，空白对照组大鼠关节表层、移形层、辐射层和钙化层，结构清晰可辨，软骨细胞分布均匀且排列整齐，潮线完整、明显，软骨表面光滑平整，无炎性细胞浸润，无血管神经浸润，关节软骨分层明显，细胞排列有序；模型对照组表面关节面软骨层广泛破坏，裂痕深入软骨层，软骨细胞及软骨基质丢失，潮线不完整；木瓜壳寡糖组软骨表面轻微粗糙，软骨细胞增生明显，排列规则，结构层次清楚完整，潮线清楚。冲击波组软骨表面轻微粗糙，分层不明显，潮线消失，软骨细胞增生明显但结构混乱，带有血管的纤维组织增生。与空白对照组相比，模型对照组 Lequesne MG 行为学评分较高（P＜0.05），改良 Mankin 评分较高（P＜0.05），Collagen Ⅱ及 Aggrecan 表达水平较低（P＜0.05）；与模型对照组相比，木瓜壳寡糖组及冲击波组 Lequesne MG 行为学评分较低（P＜0.05），木瓜壳寡糖组与冲击波组 Lequesne MG 行为学评分无显著差异（P＞0.05）；与模型对照组相比，冲击波组 Collagen Ⅱ、Aggrecan 表达水平较高（P＜0.05），木瓜壳寡糖组与冲击波组 Collagen Ⅱ及 Aggrecan 表达水平无显著差异（P＞0.05）。通过线性拟合回归分析后发现，Mankin 评分与 Collagen II、Aggrecan 表达水平之间存在显著相关关系，Mankin 评分越高，其表达水平越低。结论：木瓜壳寡糖复合营养素对 OA 具有良好的疗效作用，其疗效不弱于冲击波干预，可一定程度上改善 OA 疼痛症状。其作用机制可能与促进 Collagen Ⅱ及 Aggrecan 高度表达有关，从而达到调节软骨细胞增殖、修复软骨组织的功能。日后将进一步深入研究木瓜壳寡糖复合营养素作为辅助干预 OA 的应用潜力，以开发更安全、更有效，减轻 OA 疼痛症状、缓解 OA 病理进程的干预措施。

关键字 木瓜；壳寡糖；骨关节炎；Ⅱ型胶原蛋白；蛋白聚糖

分类：基础营养研究

混合抗生素影响高脂饮食诱导小鼠糖脂代谢的免疫机制探索

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目的 通过动物实验探讨通过混合抗生素干预肠道菌群从而影响棕色脂肪组织活性和白色脂肪组织棕色化的免疫调节机制，为肥胖的综合防治提供新的理论依据和行之有效的干预措施。方法 将 80 只 10 周龄 C57BL/6 雄性小鼠随机分为对照组、高脂组、抗生素组和抗生素高脂组（N=20）。实验第 0-2 周对照组和高脂组采用生理盐水灌胃，抗生素组和抗生素高脂组采用混合抗生素灌胃，灌胃体积均为 0.2mL/d/只。实验第 3-8 周对照组和抗生素组采用普通饲料喂养，高脂组和抗生素高脂组采用高脂饲料喂养，饲喂结束后使用 β-3-肾上腺素能受体激动剂连续 5 天进行腹腔注射。实验期间每周测量小鼠体重，灌胃结束时收集小鼠粪便，第 0、2、4、8 周测量小鼠空腹血糖；实验结束时进行口服糖耐量实验，收集小鼠血清、脏器、内脏脂肪和粪便，测定血清游离脂肪酸、甘油三酯、总胆固醇、高密度脂蛋白和低密度脂蛋白，ELISA 法检测小鼠血清 TNF-α、IL-10、IL-4、IL-13、IL-33 和 MCP-1 含量；测定小鼠肝脏、肾脏和脾脏的脏器系数；取小鼠白色和棕色脂肪组织进行 HE 染色，观察脂肪细胞形态并测量其直径；RT-qPCR 法测量棕色脂肪组织 UCP-1、PPAR-γ、PGC-1α 和 RIP140 的表达量；取灌胃结束和实验结束时收集到的小鼠粪便进行二代测序分析其肠道菌群结构。结果 高脂饮食引起小鼠体重增加，空腹血糖、口服糖耐量、血清总胆固醇、高密度脂蛋白、TNF-α 和 MCP-1 表达量升高，脏器系数降低($p<0.05$)。第 4 周至实验结束，高脂组体重显著高于抗生素高脂组($p<0.05$)。与抗生素高脂组相比，高脂组第 8 周空腹血糖、口服糖耐量、血清总胆固醇、白色脂肪炎症细胞浸润比例以及血清 TNF-α 和 MCP-1 含量升高；棕色脂肪组织 UCP-1、PPAR-γ 含量以及血清 IL-10、IL-4、IL-13 和 IL-33 含量降低 ($p<0.05$)。灌胃结束时，抗生素灌胃小鼠的肠道菌群 α 多样性低于生理盐水灌胃小鼠（$p<0.05$），生理盐水灌胃各组间和抗生素灌胃各组间的肠道菌群 ACE 和 Chao1 指数无差异，生理盐水灌胃各组和抗生素灌胃各组的微生物群落组成分别较相近；实验结束时抗生素组肠道菌群 ACE 和 Chao1 指数低于对照组($p<0.05$)；抗生素组和对照组微生物群落组成较为相近，高脂组和高脂抗生素组微生物群落组成较为相近。 结论 高脂饮食诱导小鼠糖脂代谢紊乱，导致机体炎症增加，白色脂肪组织棕色化程度降低；短期混合抗生素的使用能够调节高脂饮食诱导小鼠的肠道菌群，介导相关抗炎因子的表达增加，从而上调宿主免疫，改善高脂饮食诱导小鼠的糖脂代谢。

关键字 肠道菌群；高脂饮食；混合抗生素；糖脂代谢；免疫

分类：基础营养研究

肠道菌群在不同 BMI 人群基础能量代谢中的特征分析

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目的：基于对不同 BMI 人群的基础能量代谢调查，采集研究对象的粪便，分析不同 BMI 人群肠道菌群的结构特点及与能量代谢的相关关系，探索肠道菌群与肥胖发生发展的关系，为肥胖的综合防治提供新的理论依据。

方法：招募并纳入 82 名健康成人作为研究对象，根据《中国成人超重和肥胖症预防控制指南（试行）》2003 年版中提出的中国人肥胖诊断 BMI 界值为标准将研究对象分为正常体重组、超重组、肥胖组和消瘦组共四组，进行问卷调查、体格测量、生化检测、体成分分析和基础能量消耗测量，收集研究对象身高、体重、糖脂代谢指标、体脂、基础能量消耗等指标和信息，并利用生物学技术和生物信息学分析方法研究受试者肠道菌群结构图谱，比较不同组间肠道菌群的结构差异及其与能量代谢指标之间的关系。

结果：（1）物种多样性：四组间在 ACE 指数和 Chao1 指数上差异有统计学意义（P＜0.05），正常体重组的 ACE 指数和 Chao1 指数均高于其他组。（2）菌群相对丰度差异：门水平上，厚壁菌门和拟杆菌门在各个组内的比例均占据绝对优势，正常体重组的厚壁菌门含量高于超重组而拟杆菌门含量低于超重组（P＜0.05），四组之间厚壁菌门与拟杆菌门的比值（F/B）的差异无统计学意义（P＞0.05），但正常体重组与超重组之间、超重组与肥胖组之间有差异（P＜0.05），正常体重组和肥胖组的 F/B 均高于超重组；属水平上，四组间菌属有一定程度的差异（P＜0.05）。超重组的普雷沃氏菌属、假单胞菌属、肠球菌属等 9 种菌属含量高于正常体重组，而大肠志贺埃希菌属、罗氏菌属、双歧杆菌属等 7 和菌属在正常体重组的含量高于超重组；肥胖组的考拉杆菌属和 Prevotellaceae.NK3B31.group 的含量高于正常体重组，乳杆菌属、罕见小球菌属、双歧杆菌属等 16 种菌属在正常体重组的含量高于肥胖组；消瘦组的假单胞菌属、普雷沃菌属、拟杆菌属等 13 种菌属含量高于正常体重组，而布劳特氏菌属、Fusicatenibacter、琼脂杆菌属等 18 种在正常体重组的含量高于消瘦组。（3）与能量代谢指标相关关系：门水平上，拟杆菌门与 BMI 呈正相关，脱硫菌门与基础能量消耗呈负相关（P＜0.05）；属水平上，Muribaculaceae 与 BMI 呈负相关，副拟杆菌属和罕见小球菌属与基础能量消耗呈负相关（P＜0.05）。

结论：不同 BMI 人群肠道菌群结构不同，与正常组相比，超重组、肥胖组和消瘦组菌群物种丰富度降低，有益菌（双歧杆菌、乳杆菌等）在超重、肥胖组相对丰度下降，肠道菌群结构在不同水平上与 BMI、基础能量消耗等能量代谢相关指标有不同的关联，某些特定的菌群可能与肥胖的发生发展密切相关。

关键字 超重肥胖　基础代谢　肠道菌群　双歧杆菌

分类：基础营养研究

肠道菌群紊乱对肥胖小鼠能量代谢及脂肪组织功能的影响

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目的：探索肠道菌群紊乱对高脂饮食下诱导的肥胖小鼠能量代谢、白色脂肪组织（WAT）及棕色脂肪组织（BAT）相关功能表达的影响，为肠道菌群对超重肥胖人群的基础代谢及能量消耗的有益作用提供依据。

方法：10 周龄 C57BL/6 雄性小鼠 80 只随机分为四组：对照组、高脂组、抗生素组和抗生素高脂组（N=20）。抗生素组和抗生素高脂组以混合抗生素灌胃、其余两组以生理盐水灌胃 2 周，灌胃体积为 0.2mL/d/只，随后高脂组和抗生素高脂组以高脂饲料、其余两组以普通饲料喂养 10 周，实验结束时各组进行 β3-肾上腺素能受体激动剂进行注射，诱导 WAT 棕色化相关基因的表达。实验期间观测小鼠体重、空腹血糖并收集灌胃结束后小鼠粪便。实验结束测量小鼠基础代谢率（BMR）、肛温并进行口服糖耐量实验，收集小鼠粪便、血液、皮下白色脂肪、附睾及肩胛区棕色脂肪组织。全自动生化分析仪测定血清游离脂肪酸、甘油三酯、总胆固醇、高密度脂蛋白、低密度脂蛋白水平；RT- qPCR 法测量脂肪组织棕色化相关基因表达（UCP1、PPAR-γ、PGC-1 及 RIP140）；qPCR 法测定 WAT 线粒体 DNA 表达；16SrDNA 测序技术分析小鼠肠道菌群结构。

结果：灌胃 2 周后，对照组粪便肠道菌群 α 丰富度（ACE、Chao1 指数）及多样性（Shannon 和 Simpson 指数）指标均显著高于抗生素组，高脂组 α 丰富度及多样性指标显著高于抗生素高脂组（$p<0.001$）。不同饲料喂养 1 周后，小鼠组间体重开始出现差异，高脂饲料喂养组体重增长较普通饲料组更快，且从第 4 周起高脂组体重显著高于抗生素高脂组（$p<0.05$）。实验结束时，饲喂结束时抗生素组肠道菌群 α 丰富度显著低于对照组，高脂饲喂引起小鼠糖耐量受损，体重、空腹血糖、总胆固醇、高密度脂蛋白胆固醇显著增加，高脂组总胆固醇及高密度脂蛋白含量显著高于抗生素高脂组($P<0.05$)。抗生素组整体 BMR（mlO2/h）显著低于抗生素高脂组，抗生素组单位体重 BMR（mlO2/h/g）及整体 BMR 均显著低于抗生素高脂组（$P<0.05$）。高脂组小鼠 BAT 的 ppar-γ 和 UCP-1 表达显著低于抗生素高脂组，高脂组 WAT 的线粒体 DNA 拷贝数显著低于抗生素高脂组（$p<0.05$）。

结论：短期抗生素干预会造成肠道菌群紊乱，但紊乱效果在饲养后期有所恢复，可能受饲养时间及高脂饲料影响。高脂饮食能够显著增加小鼠体重、血糖、血脂水平，导致小鼠肥胖。在高脂饮食诱导下，早期肠道菌群紊乱一定程度上使小鼠 BAT 中部分棕色化相关基因及线粒体功能表达增加，基础代谢率提高，提示肠道菌群可能在调节高脂饮食诱导的肥胖中发挥促进脂肪供能及提高能量代谢的作用。

关键字 能量代谢；肠道菌群；肥胖；白色脂肪；棕色脂肪；

分类：基础营养研究

益生菌诱导白色脂肪组织棕色化的可能性探索

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目的：选择代表性益生菌，从中介巨噬细胞的免疫功能来探索白色脂肪组织发生棕色化改变的可能性，从白色脂肪组织棕色化角度为肥胖防治提供理论依据，以及对益生菌的开发利用提供新思路。

方法：选择鼠李糖乳杆菌(Lactobacillus rhamnosus GG,LGG)作为受试菌，在 MRS 培养基上厌氧培养 48h 后调整菌浓度为 1×10^7CFU/ml，与细胞浓度为 $5x10^5$的小鼠巨噬细胞系 RAW264.7 细胞共培养 24h，收集共培养上清液。将小鼠胚胎成纤维细胞系 3T3-L1 细胞诱导分化为成熟脂肪细胞后，加入不同体积共培养上清液，以 β3-AR 激动剂（CL-316243）为阳性对照，3T3-L1 细胞完全培养基为空白对照，共同培养 3d。结束培养后收集细胞上清液测定葡萄糖消耗量；同时收集细胞的总 RNA，并使用实时荧光定量 PCR（Quantitative Real-time PCR，qPCR）测定解耦连蛋白（Uncoupling protein 1，UCP1）、过氧化物酶体增殖子激活受体 γ(peroxisome proliferator activated receptor-γ，PPARγ）、含 PR 结构域的锌指蛋白 16（positive regulatory domain zinc finger protein16，PRDM16)、PPARγ 共激活因子 1α(peroxisome proliferator activated receptor-γcoactivator-1 α，PGC-1α）、受体相互作用蛋白 140(receptor-interacting protein 140，RIP140)和细胞死亡诱导 DFFA 样效应蛋白 A（Recombinant Cell Death Inducing DFFA Like Effector A，Cidea）的基因表达水平；采用酶联免疫吸附试验(enzyme-linked immunosorbent assay，ELISA)检测细胞上清液中脂联素（adiponectin，ADP）、肿瘤坏死因子（Tumor necrosis factor，TNF-α）的分泌量。

结果：3T3-L1 前脂肪细胞经过两种诱导培养基和完全培养基的共同作用，经过 12 天的时间能够分化成为成熟的白色脂肪细胞。与空白对照组相比，不同干预体积的 LGG 上清液均能够明显促进细胞对葡萄糖的摄取和消耗（$P<0.05$），但是葡萄糖的消耗量均低于对应的阳性对照组（$P<0.05$），LGG 菌通过中介 RAW264.7 巨噬细胞作用于成熟脂肪细胞，短期内即可迅速提高成熟脂肪细胞对葡萄糖的利用率，提高能量代谢效率，表现出脂肪组织棕色化的特点；与此同时还发现随着 LGG 菌浓度的增加，葡萄糖的利用率也随之提高。与空白对照组相比，LGG 菌和 RAW264.7 细胞的共培养上清液可以通过促进成熟脂肪细胞 UCP1、PPARγ、PGC-1α 的基因表达以及使 RIP140 的基因表达受抑制（$P<0.05$），以诱导白色脂肪组织逐渐向棕色化样改变，且基因表达水平低于阳性对照组（$P<0.05$），但是不能影响 PRDM16 和 Cidea 基因的表达（$P>0.05$）；比较不同浓度 LGG 菌诱导的棕色化标记基因表达水平，发现 LGG 菌使白色脂肪组织发生棕色化改变的程度可能与其浓度成正比（$P<0.05$）；与空白对照组相比， LGG 菌对脂肪细胞因子具有很好的调节作用，可以通过提高 ADP 的分泌促进棕色化，并抑制 TNF-α 的分泌，降低脂肪细胞的慢性炎症（$P<0.05$）。

结论：本研究发现 LGG 菌具有特异性调节以巨噬细胞为中心的机体免疫功能，以诱导白色脂肪组织向棕色化转变，且诱导棕色化的程度可能与 LGG 浓度成正比，说明以该菌株为代表的益生菌具有预防肥胖发生的潜力。

关键字 肥胖；益生菌；鼠李糖乳杆菌；巨噬细胞；脂肪细胞；白色脂肪组织棕色化

分类：基础营养研究

社区管理 2 型糖尿病患者营养素模式与血糖控制的关联性

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【摘要】 目的 了解社区卫生服务中心糖尿病慢病管理（社区管理）的 2 型糖尿病（T2DM）患者营养素摄入与血糖控制的关系，为促进糖尿病患者膳食营养健康提供科学证据。**方法** 数据来源于 2015 年“中国糖尿病足预防模式项目”基线调查，利用食物频率表收集调查对象过去一年的膳食情况，获得营养素摄入状况。采用因子分析构建营养素模式，并以因子得分均分为 T1-T3 组；分别以空腹血糖（FBG）、餐后 2h 血糖（2h PBG）控制是否达标为因变量，进行非条件多因素 logistic 回归分析影响因素。**结果** 共 1782 名调查对象纳入研究。社区管理 2 型糖尿病患者每标准人能量日均摄入量为 1985.8 kcal。蛋白质、脂肪、碳水化合物日均摄入量分别为 48.9g、67.4g、275.7g，占每日总热量的比值分别为 9.8%、30.6%、58.2%。膳食纤维、胆固醇、维生素 A、维生素 B1、维生素 B2、维生素 B3、维生素 C、维生素 E、锰、镁、锌、磷、钙、钾、硒日均摄入量分别为 17.3g、303.6mg、391.9ugRAE/d、1.2mg/d、0.9mg/d、18.8mgNE/d、26.5mg/d、6.1mg-αTE/d、388.1mg/d、11.5mg/d、1167.9mg/d、592.4mg/d、2203.2mg/d、49.2umg/d，中国居民膳食营养素推荐摄入量（RNI）达标率分别为 24.4%、49.5%、11.9%、39.8%、27.4%、81.5%、43.1%、96.2%、83.6%、69.4%、74.6%、93.4%、19.5%、58.9%、31.2%。本研究通过因子分析获到 3 种营养素模式：高矿物质高膳食纤维模式、高维生素高钙钾模式、高胆固醇高硒模式。随因子得分等级增加，高矿物质高膳食纤维模式各单一组分日均摄入量和 RNI 摄入达标率增加，T3 组锰、镁、维生素 B1、膳食纤维、锌、磷碳水化合物 RNI 摄入达标率分别为。高维生素高钙钾模式各单一组分日均摄入量及 RNI 摄入达标率也随因子得分等级增加而增加，T3 组维生素 A、钙、维生素 B2、维生素 C、钾 RNI 摄入达标率分别为 35.0%、52.2%、68.2%、82.4%、96.1%。高胆固醇高硒模式随因子得分等级增加，蛋白质、硒、维生素 B3、维生素 E 日均摄入量和 RNI 摄入达标率增加，脂肪和胆固醇的日均摄入量（36.4%、450.7mg）也逐渐增加至超过 RNI，RNI 摄入达标率（42.0%、11.4%）降低，RNI 摄入超标率（57.96%、11.39%）增加。其中，随因子得分等级增加，高维生素高钙钾模式血糖达标率越高（T3 组 FBG 和 2h PBG 达标率分别为 63.4%、30.7%），高矿物质高膳食纤维模式与高胆固醇高硒模式 2h PBG 达标率也越高（T3 组 2h PBG 达标率分别为 30.5%、29.9%）。多因素 logistic 回归分析结果显示，调整 BMI、身体活动、药物治疗、糖尿病病程、糖尿病家族史和糖尿病并发症等强影响因素和能量摄入后，与 T1 组相比，高维生素高钙钾模式 T3 组与 FBG（*OR*=1.427，*95%CI*：1.087~1.874）和 2h PBG（*OR*=1.504，*95%CI*：1.072~2.111）达标率呈正相关；未观察到高矿物质高膳食纤维模式、高胆固醇高硒模式与 FBG、2h PBG 控制达标之间存在统计学关联。**结论** 社区管理 T2DM 患者蛋白质、膳食纤维、维生素 A、维生素 B1、维生素 B2、钙等营养素摄入缺乏现象普遍存在。富含维生素 A、钙、维生素 B2、维生素 C、钾的高维生素高钙钾模式可有效提高患者 FBG 和 2h PBG 达标率，调整营养素摄入结构对糖尿病防治有重要作用。

关键词：糖尿病；空腹血糖；餐后 2 h 血糖；营养素模式；因子分析

关键字 糖尿病；空腹血糖；餐后 2 h 血糖；营养素模式；因子分析

分类：基础营养研究

玉木耳多糖对高胆固醇小鼠脂质代谢及其肠道菌群的影响

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目的：

以玉木耳多糖(ACP，Auricularia cornea var. Li. polysaccharides)为研究对象，建立高胆固醇小鼠模型，探究 ACP 对高胆固醇症小鼠脂质代谢和肠道菌群的影响。

方法：

1.采用水提醇沉法提取的方法，从玉木耳中提取分离纯化得到 ACP，测定其含量、分子量、结构和单糖组成，并评估其纯度。

2.选择 C57BL/6J 雄性小鼠，建立高胆固醇模型。实验动物分为正常组（CG），模型组（M），ACP 低、中、高剂量组和辛伐他汀药物干预组。观察肝脏组织病理切片，通过检测分析小鼠血清中生化指标和肝脏组织中功能关键酶、氧化应激指标以及脂肪酸组成变化，研究 ACP 干预对高胆固醇小鼠脂质代谢的影响。

3.采用 16S rDNA 测序方法对实验小鼠的肠道内容物样本进行高通量测序。通过肠道微生物 Alpha 和 Beta 多样性分析，研究 CG、M 和 ACP 高剂量组之间微生物多样性及丰度差异；Spearman 分析研究标志微生物物种与血脂四项指标之间的相关性，并对脂质代谢和肠道菌群进行联合分析，探讨 ACP 干预对高胆固醇小鼠肠道菌群的影响。

结果：

1. ACP 含量为 89.19%，ACP 的分子量（Mw）为：8.37×106。ACP 结构：具有 β-糖苷键的带有吡喃构型的多糖。ACP 主要组成：葡萄糖（47.56%）；木糖（30.78%）；甘露糖（7.66%）；半乳糖（1.78%）；果糖（0.85%）。

2.肝脏组织油红 O 和 H&E 染色的病理切片结果表明，ACP 能抑制脂滴聚集，同时减少细胞炎症，缓解肝脏损伤。经过高、中、低三种不同剂量的 ACP 对高胆固醇小鼠干预后，小鼠血清中 TC、LDL-C 含量降低，HDL-C 含量升高；肝功能酶 AST、ALT 活力显著下降；小鼠肝脏中抗氧化物质 SOD、GSH 含量升高，脂质氧化损伤代谢物 MDA 含量降低，MUFA 含量明显下降，PUFA 含量明显上升，且随着 ACP 浓度的升高，肝脏脂肪酸的含量变化越明显，说明 ACP 对高胆固醇小鼠肝脏脂肪酸代谢有影响具有一定剂量-效应关系。

3. 通过 16S rDNA 测序，对各组小鼠肠道内容物中的菌群分布进行了分析。ACP 干预组与 M 组相比，ACP 干预组的 ace 指数和 Shannon 指数均有所上升，这说明经 ACP 干预后，高胆固醇小鼠的肠道微生物组的多样性和丰度明显上升。16S rDNA 测序结果表明，实验小鼠肠道内有益菌属 *Blautia*，*Lactobacillus* 的丰度提高，*Faecalitalea*，*Lachnospiraceae*，*Lachnoclostridium*，*Proteobacteria* 等有害菌的丰度降低。高胆固醇小鼠经 ACP 干预后，能够降低有害菌的丰度和多样性，增加有益菌的丰度，且有益菌的增加与 TC、TG、LDL-C 负相关，与 HDL-C 正相关（$P<0.05$），有害菌则与之相反。

结论：

ACP 能够抑制高胆固醇小鼠肝脏脂滴聚集，减少细胞炎症，调节脂质代谢，缓解肝脏损伤。并且 ACP 可以通过提升肠道内有益菌属的丰度，促进有益菌繁殖，降低有害菌的相对丰度来改善高胆固醇小鼠肠道微生物群失调，从而降低机体患肥胖代谢性疾病的概率。

关键字 玉木耳多糖；高胆固醇症；脂质代谢；肠道菌群

分类：基础营养研究

三种活性胶原蛋白肽联合使用对地塞米松诱导的斑马鱼骨关节损伤的修复功能研究

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目的：关节软骨是组成活动关节关节面的有弹性的负重组织，可减轻反复滑动中关节面的摩擦。胶原是关节软骨内主要纤维蛋白成分，维持软骨的结构和形状。随着年龄增加，关节软骨内的胶原交联增加，胶原弹性下降，引起软骨结构及功能的改变。运动损伤也可引起关节软骨损伤。胶原蛋白肽是胶原蛋白水解后的产物。研究表明，胶原蛋白肽可促进软骨的合成代谢，减缓软骨破坏进程。本研究利用地塞米松诱导的转基因软骨荧光斑马鱼软骨损伤模型评价联合使用三种牛皮来源的活性胶原蛋白肽（triple bioactive collagen peptides, TCPs）对于软骨损伤的修复和预防作用。

方法：抗软骨损伤实验：72 hpf 转基因软骨荧光斑马鱼（Tg (Col2a1a:eGFP)）以地塞米松处理建立软骨损伤模型，同时给予不同浓度的三种活性胶原蛋白肽混合物。三种活性胶原肽均来源于牛皮胶原蛋白水解，水解过程条件有所不同。每种活性胶原肽均有独特的肽段分布，平均分子量为 2~3kDa。地塞米松与三种活性胶原蛋白肽共同处理 48h 后收样，在荧光显微镜下拍照并分析斑马鱼颅面软骨的荧光强度。预防软骨损伤实验：24hpf 和 48hpf 转基因软骨荧光斑马鱼用三种活性胶原蛋白肽混合物分别预处理 48h 和 24h 后加入地塞米松共同处理，48h 后收样，并在荧光显微镜下拍照，分析斑马鱼颅面软骨的荧光强度。两组实验均同时设置正常对照组（未作任何处理的转基因软骨荧光斑马鱼）、模型对照组（地塞米松诱导的软骨损伤模型）和阳性对照硫酸软骨素组（1000 μg/mL）。

结果：地塞米松处理显著降低转基因软骨荧光斑马鱼颅面软骨的荧光强度，硫酸软骨素可有效恢复地塞米松诱导的软骨损伤。抗软骨损伤作用：与模型对照组相比，三种活性胶原蛋白肽联合使用可显著恢复斑马鱼颅面软骨的荧光强度（$p<0.05$），且在较高浓度组（458 μg/mL）与较低浓度（229 μg/mL）组均可观察到该修复效果，两组之间未显示显著性差异，提示三种胶原蛋白肽联合使用对于软骨的修复在低浓度时即可起效。预防软骨损伤作用：与未预处理的实验组相比，三种活性胶原蛋白肽联合预处理（229 μg/mL）24h 和 48h 均可显著恢复地塞米松诱导的颅面软骨荧光强度（$p<0.01$），但较长的预处理时间（48h）并未显示更好的恢复效果（p>0,05）。提示三种胶原蛋白肽预处理可在一定程度上预防地塞米松诱导的软骨损伤，且较短的预处理时间即可起效。

结论：三种牛皮来源的活性胶原蛋白联合使用对地塞米松诱导的转基因软骨荧光斑马鱼软骨损伤有明显的修复和预防作用。

关键字 斑马鱼，骨关节炎，软骨损伤，活性胶原蛋白肽

分类：基础营养研究

新一代潜在益生菌用于缓解改善小鼠动脉粥样硬化疾病的机制研究

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目的：益生菌对小鼠动脉粥样硬化疾病进程的影响及其机制探究，为动脉粥样硬化的防治提供新颖、高效且安全干预手段。

方法：选用 Apoe 基因敲除小鼠模型，将 6 周龄雄性 C57BL/6 小鼠随机分为：空白对照组（mock，n=6）、阴性对照组（PBS，n=6）、阳性药物组（他汀类药物，n=6）、益生菌组（丁酸梭菌，n=6）。实验期间，mock 组给予普通饲料；其他组在先给予一周普通饲料适应后，后续均给予西方饮食饲料，持续 13 周。3 周后开始进行药物或益生菌干预，每周干预三次，阴性对照组给予 0.1ml PBS 灌胃；阳性药物组给予 20mg/kg 他汀类药物灌胃；益生菌组给予 1.0×109 CFU/ml，0.1ml 丁酸梭菌灌胃，持续干预 12 周。实验结束后，通过油红 O 染色对小鼠主动脉内的斑块面积进行评估；利用免疫荧光技术对主动脉瓣区域内的巨噬细胞标志物 CD68 的表达进行检测；采用流式细胞术检测小鼠外周血中巨噬细胞和单核细胞水平；收集小鼠血清样本，通过试剂盒检测其总胆固醇(TC)、甘油三酯（TG）、高密度脂蛋白（HDL）、低密度脂蛋白（LDL）含量；采用实时荧光定量 PCR（RT-qPCR）法检测肝脏中检测胆固醇代谢通路相关基因的表达情况，其中包括胆固醇摄取，胆固醇的逆向转运（RCT），胆固醇合成，胆汁酸代谢信号通路等。

结果：与 mock 组相比，PBS 组的小鼠主动脉斑块面积明显增多（P<0.05），且小鼠主动脉瓣内巨噬细胞水平显著增高（P<0.05）；与 PBS 组相比，丁酸梭菌干预组的小鼠主动脉斑块面积明显减少（P<0.05），小鼠主动脉瓣内巨噬细胞标志物 CD68 的阳性信号也显著减少（P<0.05），且其效果能与他汀类药物干预组相当；与 mock 组相比，PBS 组小鼠外周血中的促炎型单核细胞数量显著升高（P<0.05），但在丁酸梭菌干预后，小鼠外周血中的促炎型单核细胞数量明显降低（P<0.05）；与 PBS 组相比，丁酸梭菌组小鼠血清中的 TC、TG、LDL 水平显著降低（P<0.05），且其血清中的 HDL 含量表现出更高的水平（P<0.05）；RT-qPCR 的结果显示：与 mock 组相比，PBS 组肝脏组织中的胆固醇摄取相关基因 SR-B1、SREBP2、LDLR mRNA 水平显著降低（P<0.05），与 PBS 组相比，丁酸梭菌干预组的肝脏组织中的 SR-B1、SREBP2、LDLR mRNA 水平显著升高（P<0.05）；

结论：丁酸梭菌可能通过增强肝脏细胞表面受体 SR-B1 的表达来促进 HDL 参与的胆固醇逆向转运，且能激活肝脏细胞中的胆固醇代谢信号通路 SREBP2/LDLR 来增强肝脏细胞对血液中 LDL 摄取能力，从而降低外周血中胆固醇含量，达到抑制动脉粥样硬化疾病进程的效果；丁酸梭菌也可能通过降低外周血中促炎型单核细胞水平来抑制小鼠体内炎症水平，进而减少血液中的单核细胞进入主动脉的内皮细胞下层，从而抑制内皮细胞下层中泡沫细胞的形成，达到缓解动脉粥样硬化的效果。

关键字 丁酸梭菌、胆固醇代谢、动脉粥样硬化

分类：基础营养研究

长双歧杆菌 CECT7894 对婴幼儿功能性便秘的随机、阳性对照研究

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目的：通过功能性便秘患儿口服长双歧杆菌 CECT7894 和/或乳果糖的随机、阳性对照研究，来证实长双歧杆菌 CECT7894 对改善功能性便秘婴幼儿便秘情况，以及改善肠道微生态的作用，探讨长双歧杆菌可能改善便秘的潜在的作用机制。

方法：在上海儿童医学中心和上海交通大学医学院附属新华医院招募 0-3 周岁的功能性便秘患儿，通过随机分组的方式将他们分为益生菌组和阳性对照组（益生菌+乳果糖），益生菌组给予每日 6 滴的长双歧杆菌 CECT7894 制剂，联合组给予每日 6 滴的长双歧杆菌制剂 CECT7894 和每日 5ml 的乳果糖，疗程均为 28 天。收集患儿一般信息资料、28 天日志报告、布里斯托粪便评分、入组前及干预 28 天后粪便样本收集，以及简易生活质量评估。对干预前后的粪便样本进行 16SrDNA 菌群检测，对比两组治疗前后组内和组间的生活质量和粪便评分、分析 α-多样性指数（chao、sobs、shannon、simpson）、肠道菌群构成、肠道菌群结构、群落组成以及物种显著性差异。

结果：本研究共纳入 54 个样本，包括益生菌组 36 个，阳性对照组（益生菌+乳果糖）18 个。其中，干预前益生菌组（Pro1）有 22 个样本，干预后益生菌组（Pro2）有 14 个样本。干预前阳性对照组（PLAC1）有 10 个样本，干预后阳性对照组（PLAC1）有 8 个样本。结果显示，益生菌组和阳性对照组的生活质量和粪便评分在治疗后均得到显著改善，但组间的差异没有显示出统计学意义（P＞0.05），自我评价便秘状况有轻微改善；干预前后的 α-多样性指数也没有显著性差异（P＞0.05）；尽管优势菌种相同，且干预前后没有变化，但干预前后的菌群构成在门水平和属水平上都体现出了差异，主要体现在拟杆菌门、变形菌门、拟杆菌属、活泼瘤胃球菌属和大肠杆菌志贺菌属。干预后，益生菌组和阳性对照组组间的肠道菌群 α-多样性指数没有显著性差异（P＞0.05）；阳性对照组的拟杆菌门相对丰度高于益生菌组（7.71%-3.52%），而变形菌门的相对丰度低于益生菌组（6.51%-10.81%）。治疗前后，益生菌组和阳性对照组的肠道菌群分布差异在组间和组内均没有统计学意义（P＞0.05）。

结论：长双歧杆菌联合乳果糖治疗改善了功能性便秘婴幼儿的生活质量和粪便评分，但对于肠道菌群多样性和菌群分布没有显著的改善作用，其改善便秘症状的机制可能和改变了便秘患儿的菌群构成和相对丰度的改变有关。在关于长双歧杆菌改善便秘症状和肠道菌群的关联性上，未来还需要更大的样本量、更完善的设计来完善研究。

关键字 长双歧杆菌、肠道菌群、α-多样性、便秘、婴幼儿、肠道菌群构成

分类：基础营养研究

锌硒铬改善妊娠期糖尿病大鼠雌性子代葡萄糖稳态和肝脏内质网应激跨代效应的甲基化调控机制

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目的：探讨锌硒铬补充对妊娠期糖尿病（gestational diabetes mellitus, GDM）雌性子代葡萄糖稳态和内质网（endoplasmic reticulum，ER）应激跨代效应的甲基化调控机制。

方法：30 只 SPF 级成年雌性 SD 大鼠（记为 F0）随机分为 3 组，每组 10 只，分别为正常对照组（CTR 组），妊娠期糖尿病模型组（GDM）和模型+锌+硒+铬组（Zn+Se+Cr）。正常对照组给予低脂饲料（low fat diet，LF）喂养，其余各组给予高脂高糖饲料（high fat and sucrose diet，HFS）喂养，干预组大鼠每日用相应剂量的酵母锌（10 mg/kg.bw）、硒（20 μg/kg.bw）和铬（20 μg/kg.bw）水溶液灌胃，对照组和 GDM 模型组则给予相应剂量的不含锌硒铬的酵母水溶液灌胃。HFS 喂养 6 周后，所有 F0 代雌鼠与正常雄性大鼠交配，直至其自然分娩产生 F1 代，F1 代雌鼠的干预和处理与 F0 代相同，直至 F1 代自然分娩出 F2 代。饲料和干预在整个实验周期保持不变。F0 代和 F1 代雌鼠分别进行孕前、孕 15.5 d 及产后分别进行口服葡萄糖耐量试验（oral glucose tolerance test, OGTT），并计算其曲线下面积（area under the curve，AUC）。ELISA 测定血清胰岛素含量，Western blot（WB）检测肝脏 ER 应激和胰岛素信号通路相关蛋白的表达。采用 5-mC DNA ELISA 试剂盒检测 F1 代和 F2 代新生雌鼠肝脏组织全基因组 DNA 甲基化水平，焦磷酸测序法测定 F1 代和 F2 代新生雌鼠肝脏组织内质网氧化还原酶 1α（endoplasmic reticulum disulfide oxidase 1α，ERO1α）等 ER 应激相关基因启动子区域 CpG 岛的甲基化水平，并进一步利用荧光定量 PCR 技术检测候选基因及 DNA 甲基化转移酶（DNA methyltransferases，DNMTs）的转录水平。

结果：GDM-F1 代的出生体重、身长、血清葡萄糖和胰岛素水平显著高于 CTR-F1 组（$P < 0.05$），出现血脂异常。F0 代母鼠锌硒铬补充可以显著改善 GDM 导致的子代出生体重、身长、血清葡萄糖和胰岛素水平的增加及血脂异常。GDM-HFS/F2 代出生体重、身长、血清葡萄糖和胰岛素水平也显著高于 CTR-LF/F2 组（$P < 0.05$）。F0 和 F1 代均给予锌硒铬干预，其 F2 代（GDM+S-HFS+S/F2）出生身长、体重、血清葡萄糖和胰岛素水平显著低于 GDM-HFS/F2 组（$P < 0.05$）。GDM-F1 和 GDM+HFS-F2 雌鼠肝脏组织全基因组 DNA 甲基化水平均显著高于正常对照组，ERO1α 基因启动子区域与对照组相比表现为高甲基化修饰状态，伴随着 ERO1α 的基因表达量显著下调。进一步发现 GDM-F1 和 GDM+HFS-F2 雌鼠肝脏组织中仅 DNMT1 的表达量显著增加，DNMT3a 和 DNMT3b 的表达量无显著变化；ER 应激相关蛋白（GRP78，p-PERK，p-IRE1α，p-eIF2α，ATF4，CHOP，TRB3，p-IRE1α 和 p-c-Jun）的表达量显著增加，胰岛素信号通路相关蛋白的表达显著减少。锌硒铬补充可以显著改善 GDM 雌性子代 ERO1α 基因启动子区域的高甲基化修饰状态，改善其 ER 应激和胰岛素抵抗。

结论：锌硒铬补充对 GDM 雌性子代的葡萄糖稳态的改善作用存在跨代效应。GDM 雌性子代肝脏 ER 应激相关基因甲基化水平发生改变，其中 ERO1α 启动子区域的甲基化水平显著增加，伴随其基因表达量下降。锌硒铬补充可以纠正这些异常甲基化修饰，可能是其改善肝脏 ER 应激具有跨代效应的机制之一。

关键字 妊娠期糖尿病；锌；硒；铬；葡萄糖稳态；内质网应激；跨代效应；DNA 甲基化

分类：基础营养研究

槲皮素抑制动脉粥样硬化血管平滑肌细胞巨噬细胞样表型转换的作用研究

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目的：动脉粥样硬化（atherosclerosis，AS）中巨噬细胞吞噬胆固醇脂质形成的泡沫细胞是构成斑块的主要细胞类型，近期研究发现在人类冠状动脉粥样硬化斑块中，至少有50%的泡沫细胞由血管平滑肌细胞负载脂质后经历巨噬细胞样表型转换衍生而来。槲皮素作为一种膳食中广泛存在的天然多酚类植物化合物，安全性高，价格低廉，研究证实其对动脉粥样硬化发生发展的多个关键环节均表现出良好的保护效应，如调节胆固醇稳态抑制巨噬细胞泡沫化；促进巨噬细胞表型由M1向M2表型转变。本研究旨在探讨槲皮素对动脉粥样硬化斑块血管平滑肌细胞巨噬细胞样表型转换的调控功能及潜在分子机制，为槲皮素的开发利用及动脉粥样硬化的防治提供新思路。

方法：30只健康雌性ApoE KO小鼠，随机分为3组（每组10只），即普通饲料组（ND）、高脂组（HFD）、槲皮素干预组（HFD+quercetin 100 mg/kg•bw，HFD+Que）。槲皮素每日经灌胃给予，非槲皮素特殊干预的各组小鼠分别接受同等频次的生理盐水（经口灌胃，0.9%，80 ml/kg.bw）。喂养16周后处死小鼠，留取血样，主动脉等组织。采用试剂盒测定各组小鼠血脂水平；采用主动脉窦横切面油红O染色观察各组小鼠动脉粥样硬化斑块形成情况；使用苏木精-伊红（HE）染色检查动脉粥样硬化斑块组织病理学情况；利用免疫荧光共定位结合激光共聚焦扫描检测主动脉斑块处血管平滑肌细胞巨噬细胞样表型转换相关蛋白表达情况。同时，使用氧化型低密度脂蛋白（ox-LDL）和（或）槲皮素处理小鼠主动脉血管平滑肌细胞（MOVAS）对槲皮素调控血管平滑肌细胞巨噬细胞样表型转换的作用及潜在分子机制进行验证。

结果：（1）主动脉窦横切面油红 O 染色和HE染色显示，与ND组小鼠相比，HFD组小鼠主动脉窦横切面处存在大量脂质沉积，且该组小鼠血清 TC、TG 及 LDL-C 等水平明显升高（$p<0.01$）；（2）槲皮素可显著改善HFD诱导的主动脉脂质沉积，同时有效降低HFD小鼠血脂TC、TG和LDL-C水平（$p<0.01$）；（3）免疫荧光分析结果显示，与HFD组相比，HFD+Que组AS斑块中CD68表达显著降低（$p<0.05$），同时 α-SMA表达显著升高（$p<0.05$）。（4）ox-LDL（100μg/ml）可显著上调MOVAS中巨噬细胞标志蛋白CD68、F4/80、GAL-3蛋白水平（$p<0.05$），并下调平滑肌细胞标志蛋白 α-SMA表达（$p<0.05$），槲皮素（20μM）干预可有效逆转ox-LDL的上述作用，同时减少细胞油红O阳性染色面积（$p<0.05$）。

结论：槲皮素可能通过下调巨噬细胞标志蛋白CD68、F4/80、GAL-3表达水平，上调平滑肌细胞标志蛋白 α-SMA表达水平，抑制动脉粥样硬化斑块血管平滑肌细胞发生巨噬细胞样表型转换，并由此降低其泡沫化水平发挥动脉粥样硬化保护作用。

关键字 动脉粥样硬化 槲皮素 血管平滑肌细胞 表型转换

分类：基础营养研究

富氢水调控衣康酸代谢重编程缓解运动疲劳

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目的：肌肉运动疲劳（Exercise-induced muscle fatigue）影响运动效能。短时间高强度的剧烈活动或者长时间锻炼均可导致肌肉运动疲劳，使得机体生理过程不能持续其机能在一特定水平上和/或不能维持预定的运动强度。肌肉运动疲劳多伴随着代谢物、活性氧和活性氮蓄积，机体氧化应激水平增加、炎症级联反应激活而导致肌肉功能受损。目前对于抗疲劳成分的研究与开发是运动营养领域的重点问题。氢气(Hydrogen，H2)具有安全性高，选择性抗氧化作用显著，副作用少，成本低等优势，在抗运动疲劳中应用前景十分广阔，目前已经有部分研究显示氢气能够缓解运动疲劳，减轻运动损伤，但是对于氢气抗疲劳的机制并未深入，特别是从代谢调控角度阐释氢气的作用机制。因此，本研究拟采用富氢水（Hydrogen-rich water）供氢，从血清代谢物角度出发，探讨氢分子缓解运动疲劳的分子机制，为阐明运动疲劳发病机制提供理论基础。

方法：首次将 18 只 8w 龄雄性 C57BL/6 小鼠随机分为 3 组，分别为对照组、疲劳组和富氢水组。对照组正常饮食、饮水，疲劳组与富氢水组小鼠负重游泳（5%体重）4 周构建运动性疲劳小鼠模型，另外富氢水组饮用富氢水(氢浓度>1.5ppm，8h 更换一次)。造模结束后利用行为学实验（跑台、转棒实验）评价小鼠运动功能变化情况；采集小鼠血清样本，检测血生化指标（包括尿酸氮、血乳酸、肌酸激酶），腓肠肌 HE 染色，肝糖原、肌糖原 PAS 染色；通过血清代谢组学分析聚焦到异常改变的衣康酸（Itaconate），进一步利用 PCR、WB 检测衣康酸合成酶 IRG1 及下游 NRF2/HO-1 基因表达情况，并检测血清 MDA、SOD、GSH-Px 等氧化应激指标。

结果：与疲劳组相比，富氢水能有效延长小鼠跑台运动耗竭时长、转棒旋转时间，降低血清尿酸氮、乳酸、肌酸激酶水平，减少肝糖原、肌糖原耗竭情况，减轻腓肠肌损伤情况，这些结果提示富氢水能够缓解运动疲劳，加速运动能力恢复，减轻运动损伤；并通过小鼠血清代谢组学分析，发现糖代谢产物衣康酸在运动疲劳后小鼠血清中显著下降，而富氢水显著提高了血清衣康酸水平，提示衣康酸可能是富氢水缓解运动疲劳的代谢靶分子；进一步分子实验发现，富氢水上调了衣康酸合成酶 IRG1 基因表达，增加衣抗酸合成以恢复血清衣康酸，激活下游 Nrf2/HO-1 通路，缓解肌肉氧化损伤而发挥抗疲劳效应。

结论：富氢水表现出良好的抗运动疲劳效应，通过调控衣康酸/Nrf2/HO1 途径，缓解炎症级联反应引起的氧化应激，发挥抗疲劳效能。

关键字 富氢水，运动疲劳，衣康酸，氧化应激

分类：基础营养研究

纳米硅通过抑制 AFMID 调控色氨酸代谢缓解非酒精性脂肪肝

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【目的】

作为全球第一大慢性肝病，非酒精性脂肪肝病（Nonalcoholic fatty liver disease，NAFLD）严重威胁人类健康。近年来，多项体内外研究成果表明，氢疗法对多种脂代谢紊乱相关疾病的防治效果显著，应用前景广阔。但由于受氢气本身的可燃性、强扩散性、难溶于水等缺陷的掣肘，氢医学研究及应用面临很大阻碍。为了克服这些缺陷，本课题组一直寻找能给身体输送氢气的材料，其中固态供载体是目前可行的载氢手段之一。本课题组所关注的新型储氢材料纳米硅（Silicon, Si），进入人体后缓慢释放氢气，作用时间长且载氢量大。本研究拟从纳米硅的生物安全性及产氢效能出发，着眼于肝脏脂毒性及炎症，探讨纳米硅产氢缓解 NAFLD 的分子机制。研究结果为推动氢医学的转化与应用提供方向，为阐明 NAFLD 发病机制提供理论依据。

【方法】

纳米硅表征检测：利用 TEM、Zeta 粒径、ICP-OES 检测，描述 Si 的形貌、粒径、电位、晶体结构、镜面结构及材料中硅元素含量；

生物安全性评价：12 只 8w 龄雄性 C57BL/6 小鼠随机分为 2 组，分别食用正常饲料和 Si 添加饲料，连续喂养 3 个月。检测小鼠体重、血清学指标（包括 BUN、CRE、ALT、AST、TG、CHO、GSP）、行为学（运动功能、神经功能）、重要脏器病理变化（心、肝、胰、肺、肾、脑）、肝脏硅残留量等，以此评价 Si 的生物安全性；

体内实验：18 只 8w 龄雄性 C57BL/6 小鼠随机分为 3 组（CON，HFD，HFD+Si），分别喂养普通饲料，高脂饲料，高脂+Si 饲料，以构建膳食添加 Si 的 NAFLD 小鼠模型。检测小鼠体重、血生化指标（包括 ALT、AST、TG、CHO、LDL），肝脏油红 O 染色。利用 PCR、WB 检测脂代谢、氧化应激及炎症相关基因表达情况；进一步对小鼠肝脏进行转录组芯片检测，分析后聚焦到异常表达的差异基因芳基甲酰胺酶（arylformamidase，AFMID），并对其差异表达进行 qRT-PCR 验证；

体外实验：利用 400uM PA 以及梯度浓度 Si（100，200，400uM）处理 AML-12 24h，以构建体外细胞模型。利用 CCK8 检测细胞活力；油红 O 染色检测细胞甘油三酯含量；利用 ROS、MDA、MitoSOX 试剂盒检测细胞氧化应激水平，利用 PCR、WB 检测脂代谢、氧化应激及炎症基因表达情况。

【结果】

实验所用 Si 是 330nM 左右的圆球形颗粒，硅含量高达 98.3%；膳食添加 Si 对小鼠健康无影响，且在肝脏无残留。体内外实验结果均表明 Si 可有效缓解脂毒性及肝脏炎症反应。分析 Si 处理 NAFLD 小鼠肝脏转录组芯片并经 PCR 验证，进一步关注到芳基甲酰胺酶（arylformamidase，AFMID）。AFMID 是色氨酸-犬尿氨酸代谢途径的重要水解酶，对维持色氨酸代谢稳态具有重要意义。

【结论】

纳米硅的生物安全性高，供氢可行性高；纳米硅可能通过抑制 AFMID 基因表达，进而恢复 NAFLD 中的色氨酸代谢异常，缓解非酒精性脂肪肝脂毒性及肝脏炎症。

关键字 纳米硅；非酒精性脂肪肝；AFMID；色氨酸；炎症

分类：基础营养研究

代糖摄入对有氧运动改善肥胖小鼠骨骼肌功能和糖脂代谢的影响及分子机制探讨

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研究目的：世界卫生组织最新数据显示全球肥胖和超重人数约 19 亿，严重影响全民健康和生活质量。肥胖的主要诱因是高糖高脂饮食模式引起的能量摄入与消耗严重不均。运动是减重、改善肥胖引发的多种代谢疾病的有效方式。代糖因其甜度高、热量低、口感好的特点作为糖的替代品在食品加工中被广泛使用。本研究探索蔗糖和代糖（三氯蔗糖与低聚异麦芽糖）摄入对有氧运动干预高脂诱导肥胖小鼠过程中骨骼肌功能、炎症和糖脂代谢调控的影响及潜在分子机制。

研究方法：6 周龄健康雄性 C57BL/6J 小鼠随机分为对照组（普通饲料，NC，n=12）和肥胖组（60%高脂饲料，n=72），饲养 8 周后，根据 Lee 指数确定肥胖小鼠。肥胖小鼠随机分为 6 组，即持续高脂组（HFD，n=12）、自然恢复组（普通饲料替换高脂饲料喂养，Re，n=12）、普通食水运动训练组（EX+W，n=12）、运动训练+三氯蔗糖干预组（EX+TGS，n=12）、运动训练+低聚异麦芽糖干预组（EX+IMO，n=12）、运动训练+蔗糖干预组（EX+SUG，n=12）。运动组小鼠进行三天适应性跑台训练（速度为 5m/min，30 min/d，坡度为 0°）后，正式训练 3 周，直至肥胖小鼠体重与 NC 组无显著差异。运动方案为 76% VO_2max，以 12m/min、坡度为 0°，60min/d，5d/周。干预后测定骨骼肌运动能力，血糖、血脂、胰岛素分泌、葡萄糖耐受等生化指标；组织病理学监测股四头肌结构；联合转录组学、实时荧光 PCR 和蛋白免疫印迹等分子生物技术分析不同处理对肌肉功能及相关分子通路的影响。

研究结果：HFD 组小鼠体重、空腹血糖、血脂显著高于 NC 组（$p<0.05$），葡萄糖耐受力和胰岛素敏感性明显下降（$p<0.05$），小鼠股四头肌纤维面积显著减少，炎症细胞浸润增加（$p<0.01$）。3 周运动减重有效降低小鼠体重，减重效果优于自然恢复组。摄入 IMO 或 SUG 不影响运动减重效果，且 EX+TGS 组体重显著低于其他运动干预组（$p<0.05$）。耐疲劳实验数据表明，与 NC 组相比，HFD 组小鼠运动距离和时长显著下降（$p<0.01$），运动干预组与自然恢复 Re 组无显著差异，而 EX+IMO 组运动能力显著升高（$p<0.05$）。与 Re 组相比，运动干预显著增加股四头肌纤维面积，降低炎症细胞浸润明显降低（$p<0.01$），其中 EX+IMO 组效果最佳。但是，TGS、SUG 摄入影响运动对高脂小鼠肌肉纤维的改善效果（$p<0.05$），不能有效恢复小鼠骨骼肌运动能力。骨骼肌转录组学分析表明，对比 HFD 组，EX 显著改变 931 个基因，主要涉及的关键途径包括 AMPK、PI3K-AKt、MAPK、mTOR 以及氨基酸和脂肪酸代谢。对比 Re 与 HFD，仅鉴定出 261 个差异表达基因。RT-qPCR 和蛋白免疫印迹结果证实不同糖摄入对运动减重过程中骨骼肌关键通路基因和蛋白表达的显著影响。

结论：有氧运动显著改善高脂高糖诱导肥胖小鼠骨骼肌功能受损和糖脂代谢异常，与脂肪酸氧化、氨基酸代谢和炎症调节密不可分。尽管持续 3 周停止高脂饮食摄入即可减重，但不能有效调节机体代谢、增强肌肉功能。运动减重期间应避免蔗糖和三氯蔗糖摄入，而适当补充低聚异麦芽糖可与运动协同增强肌肉运动能力、抑制骨骼肌炎症和骨骼肌胰岛素抵抗。

关键字 代糖，运动，肥胖，骨骼肌，胰岛素抵抗

分类：基础营养研究

食品营养强化剂 碳酸钙中钡含量的测定研究

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钙元素是构成人体的重要成分，是维持组织细胞渗透压和保持体内酸碱平衡的无机盐之一。在机体各种生理和生化过程中，对维持生命起着重要的作用。

碳酸钙作为最简单的钙源，添加到不同食品类别中，对其杂质要求不同，杂质准确定量至关重要。本文通过对 GB 1886.214-2016 中不同前处理技术对结果的影响性，以及和 GB5009.268-2016 第一法结果进行比对，对 GB 1886.214-2016 进行补充研究适用于食品营养强化剂碳酸钙中钡含量的测定方法。

食品营养强化剂 碳酸钙中钡含量的检测指标为：≤300mg/kg

方法：采用加热煮沸、过滤及乙酸钠无水与三水的对比及 ICP-MS 的定量检测

结果：与 GB 1886.214-2016 检测方法相比，加热煮沸使其溶解更彻底且排出溶液中的 CO2，过滤消除溶解浑浊对结果的影响，无水乙酸钠溶解速度更好。采用 5009.268-2016 第一法 ICP-MS 检测，结果在指标范围内。

结论：检测方法:样品管的制备：称取 1g 样品，加入 1+3 盐酸溶液 8mL 加热煮沸，若溶液浑浊，需冷却过滤澄清。加水 20mL、2g 无水乙酸钠、1mL 冰乙酸溶液和 0.5mL 铬酸钾溶液加水至刻度。标准管及结果判断按照 1886.214-2016 进行检测判断。

1、引言

钡，是碱土金属中最活泼的元素，在自然界以重晶石（BaSO4）和毒重石（BaCO3）的形式存在。钡在各器官有少量沉着，骨中钡有一部分可转变为不溶性的硫酸盐。除硫酸钡外，其他钡盐均有毒性。

2、材料与方法

2.1 仪器与试剂

仪器：ICP-MS

试剂：

乙酸钠：无水、三水

盐酸溶液：1+3

冰乙酸溶液：1+19

铬酸钾溶液：50g/L

钡标准溶液：0.1mg/mL

2.2 检测方法：

GB 1886.214-2016 规定了钡的检测方法。而在实验过程中，加入 8mL 盐酸溶液溶解，溶液微浑浊，再加入 2mL 盐酸溶液，溶液无变化。加热之后溶液无变化。此实验现象直接影响结果，钡含量超出指标范围。乙酸钠，标注不清晰，选择三水与无水的同时操作，加入三水乙酸钠溶解较慢；加入无水乙酸钠，立即摇匀溶解，溶解较快。

GB5009.268-2016 第一法检测结果，在指标范围内。

3、结果与分析

结合 ICP-MS 检测结果，对检测方法进行补充完善：①加酸后加热煮沸，溶解完全，排出溶液中的 CO2。②溶解之后的浑浊溶液过滤澄清。③乙酸钠选择无水乙酸钠。

4、结论：

食品营养强化剂 碳酸钙中钡的检测方法：称取样品 1.00±0.01g 于 50mL 比色管中。加水润湿缓慢加入 8mL 盐酸溶液，煮沸溶解，冷却。若溶液浑浊，需过滤。移取 3mL 钡标准溶液于另一个比色管中，分别加水 20mL，2g 无水乙酸钠，立即摇匀溶解，加入 1mL 冰乙酸溶液和 0.5mL 铬酸钾溶液，加水至刻度，摇匀。放置 15min 后比较浊度。试验溶液所呈浊度不应深于标准比浊溶液。

5、参考标准

GB 1866.214-2016

GB5009.268-2016

瞿理志　我国碳酸钙现象及其发展方向

关键字 碳酸钙，钡，准确性

分类：基础营养研究

保健食品中维生素 B2 的检测方法研究

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目前对于维生素 B2 的检测，普遍采用的为 GB5009.85-2016《食品中维生素 B2 的检测》进行检测的。此标准方法第一法为高效液相配备荧光检测器的检测方法，第二法为荧光分光光度计检测方法。

由于保健食品及其原料复配营养素样品基质较为简单，而维生素 B2 的含量相对较高，由于维生素 B2 的溶解性较差，因此在使用 5009.85-2016 方法对保健食品及其原料复配营养素中维生素 B2 的含量的检测时稍不注意，就较容易会产生检测偏差。因此我们可以寻找一种相对较为简便，且检测结果重复性较好的方法。

我们了解到维生素 B2：（1）可被光破坏；（2）在碱溶液中加热可被破坏。这两个性质是造成其损失的主要原因。因此针对维生素 B2 的检测，不仅需要避免其造成损失的条件，还需要针对其微溶于水，及在强酸溶液中稳定的物理特性进行，对高含量的样品需先进行预先处理后可以进行检测。

针对样品中维生素 B2 含量较高的情况，且其在强酸条件下溶解性较高和在强酸溶液中稳定的特性，我们可以采用对预检测样品减少称样量并先用强酸溶液进行溶解，溶解之后在进行后续的检测操作。

我们分别选取了一个多种维生素的保健食品和一个含有维生素 B2 复配营养素样品，样品中维生素 B2 的标识含量分别为保健食品为 1mg/g，复配营养素样品为 20mg/g。我们在同等条件下，分别称取不同的样品质量对样品进行加入 1mL1+1 盐酸溶解后，用纯净水定容至 100mL。然后分别稀释至溶液溶度至 1μg/mL 以内后，然后过滤上机检测。

检测条件：

仪器设备：安捷伦 1260 高效色谱仪配备荧光检测器

色谱柱：C18，4.6× 250mm 填料粒径 5μm

流动相：0.05moL/L 乙酸钠溶液+甲醇(65+35)

流速：1.00mL/min

柱温为：30℃

检测波长为：激发波长 462nm，发射波长 522nm

进样体积为：20μL

对不同样品质量下同时进行了五组的检测结果进行比对，比对结果如下表：

表 1 保健食品：

质量 g

结果
mg/g

质量 g

结果 mg/g

质量 g

结果 mg/g

质量 g

结果 mg/g

质量 g

结果 mg/g

0.1012

1.12

0.2013

1.08

0.3012

1.07

0.5018

1.08

1.0021

1.07

0.1026

1.04

0.2022

1.05

0.3027

1.08

0.5009

1.08

1.0035

1.04

0.1009

1.08

0.2056

1.07

0.3036

1.07

0.5023

1.07

1.0011

1.08

0.1016

1.06

0.2041

1.08

0.3009

1.07

0.5041

1.09

1.0019

1.03

0.1021

1.09

0.2057

1.06

0.3033

1.09

0.5026

1.07

1.0027

1.05

平均值：

1.08

1.07

1.08

1.08

1.05

变异系数：

2.52%

1.09%

0.74%

0.69%

1.76%

表 2 复配营养素

质量 g

结果 mg/g

质量 g

结果 mg/g

质量 g

结果 mg/g

质量 g

结果 mg/g

质量 g

结果 mg/g

0.0503

22.82

0.1012

22.44

0.1511

22.68

0.2013

21.58

0.3016

21.97

0.0502

21.78

0.1009

21.86

0.1521

21.78

0.2007

22.46

0.3023

22.54

0.0505

22.66

0.1011

22.52

0.1509

22.42

0.2019

22.68

0.3011

21.26

0.0512

21.41

0.1008

22.14

0.1513

22.19

0.2012

21.89

0.3009

20.99

0.0507

22.09

0.1013

21.72

0.1507

21.74

0.2003

21.77

0.3018

22.34

平均值：

22.15

22.14

22.16

22.08

21.82

变异系数：

2.39%

1.41%

1.64%

1.91%

2.76%

通过数据比对，发现此方法可以对维生素 B2 进行较好的检测，而且检测结果的复现性也比较好。所有的检测结果都符合标准的要求。所有数据的变异系数也比较小，符合我们的要求范围。

对于我们先添加 1mL 的 1+1 盐酸进行溶解后，直接进行检测的操作。此方法相对 GB5009.85-2016《食品中维生素 B2 的检测》的方法，整体检测快速，处理过程简单，只是先添加 1mL1+1 盐酸溶液进行溶解，溶解后可直接定容。混匀后，进行稀释后就可以直接进行上机检测。此检测方法对于保健食品以及原材料复合营养素类产品检测有明显优势，能够快速高效的完成此类产品的检测。

关键字 保健食品，维生素 B2，快速，检测，高效

分类：基础营养研究

孕妇乳母营养补充食品中不同叶酸来源的稳定性研究

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叶酸是一种水溶性 B 族维生素，人体无法合成也无法储存，所以必须通过外源途径进行补充。叶酸的主要生理功能：①参与核酸合成中嘌呤和嘧啶形成，在细胞分裂和繁殖中起重要作用；②在制造神经末梢和构成传递神经冲动的过程中提供大量游离碳离子，保证神经系统正常发育；③预防神经管发育畸形等。孕产妇缺乏叶酸，会导致胎儿的 DNA 合成障碍，细胞分裂减弱。且叶酸的缺乏会影响脊柱的关键部位发育受损，从而引起脊柱裂。由此可见叶酸补充对于孕产妇及胎儿的重要性。

作为体内生化反应中一碳单位转移酶系的辅酶，起着一碳单位传递体的作用。参与嘌呤和胸腺嘧啶的合成，进一步合成 DNA 和 RNA。参与氨基酸代谢，在甘氨酸与丝氨酸、组氨酸和谷氨酸、同型半胱氨酸与蛋氨酸之间的相互转化过程中充当一碳单位的载体。参与血红蛋白及甲基化合物如肾上腺素、胆碱、肌酸等的合成。叶酸对蛋白质、核酸的合成及各种氨基酸的代谢有重要作用。参与嘌呤和嘧啶合成:作为辅酶参与核酸合成中嘌呤和嘧啶的形成，在细胞 DNA 合成中发挥作用。参与氨基酸相互转化:参与二碳氨基酸和三碳氨基酸相互转化。此外，叶酸还是含铁血红蛋白的组分。

目前，市面上产品中的叶酸化合物来源主要为叶酸（合成）和 6S-5-甲基四氢叶酸钙。合成叶酸本身不具备活性，其进入人体后需通过酶系统作用转化成 5-甲基四氢叶酸，继而被吸收利用。有些人群体内没有此类酶，无法代谢吸收叶酸，从而在体内产生毒性。6S-5-甲基四氢叶酸钙，不受叶酸代谢酶转化的影响，可直接被吸收利用，此外活性叶酸作为人体内源性的基础物质，不会引起过敏等不良反应。整体而言，对于孕妇乳母此类特殊时期人群而言，更安全更高效更高吸收的吸收叶酸是她们的一项重要需求。因此，本文对孕妇乳母营养补充食品中使用合成叶酸和 6S-5-甲基四氢叶酸钙的稳定性进行试验研究。

试验方案：以叶酸成分计，每 10 克成品中添加 380μg 叶酸（有效成分计）。分别放置常温和恒温恒湿箱中，进行常温和加速试验，分别检测目标月份的叶酸含量，进行记录并跟踪。（均为铝箔袋包装；常温环境避光、阴凉干燥处放置；加速环境为 37±2℃、相对湿度 75±5%、避光）。成品配料为下表 1：

表 1

配料	添加量
大豆分离蛋白粉	8g
亚麻籽油微囊粉	0.2g
叶酸	

合成叶酸 0.38mg/
6S-5-甲基四氢叶酸钙 0.5mg

低聚异麦芽糖

补充至 10g

检测结果如下图 1、图 2 所示：
图 1

图 2

根据图 1、图 2 结果显示：合成叶酸和 6S-5-甲基四氢叶酸钙在常温第 0-9 月、加速第 0-2 月时，整体变化趋势一致。合成叶酸在常温第 9 个月后、加速第 3 个月时出现断崖式衰减，其整个货架期衰减率为 20-25%。6S-5-甲基四氢叶酸钙的货架期衰减率＜10%，整个货架期中衰减情况相对平稳。整体而言 6S-5-甲基四氢叶酸钙的稳定性远优于合成叶酸。

综上所述，无论是吸收利用效率还是产品中的稳定性方面，6S-5-甲基四氢叶酸钙都是优质的叶酸来源选择。

关键字 叶酸、6S-5-甲基四氢叶酸钙、孕妇乳母

分类：基础营养研究

4 周双歧杆菌补充联合运动训练通过短链脂肪酸提高越野滑雪运动员的骨骼肌耐力和脂代谢

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目的：结合血浆靶向代谢组学和粪便宏基因组学，探讨 4 周补充双歧杆菌联合运动训练对越野滑雪运动员运动表现和代谢的影响。

方法： 选取 16 名男性专业越野滑雪运动员，实验前对受试者进行健康调查及检测，排除心脑血管、高血压、糖尿病、肝/肾 功能等各种疾病隐患以及牛奶过敏和乳糖不耐受者，入选者实验前签署《知情 同意书》。随机分为低剂量组（L）和高剂量组（H）。补充方案为：低剂量组每次补充动物双歧杆菌 BL-99 1×108 CFU，高剂量组每次补充 BL-99 1×109 CFU，每天 4 次（随三餐及晚上 21:00），每周 6 天，连续 4 周。试验以双盲模式进行。同时记录每周选取两天对受试者进行膳食调查和能量消耗监测。在试验前、后采集受试者血液和粪便样本，进行血液生化测试、血液靶向代谢组学和粪便宏基因测定。采用体成分仪分析干预前后受试者身体成分。采用德国 ISOMED2000 等速测试系对受试者的踝关节、膝关节进行力量测试，分别在角速度为 60°/s 时重复屈伸 5 次测量其膝关节、踝关节的伸峰力矩体重比（MT/BW）。使用 SPSS 23.0 统计分析软件对基础运动能力及血液常规生理生化数据进行分析，数据均采用平均值±标准差（Mean±SD）表示，以 P<0.05 为显著性水平。采用夏皮洛-威尔克检验（Shapiro-Wilktest）对数据进行正态性检验，服从正态分布采用重复测量方差分析对数据进行检验，若数据符合球形性检验，则以主体内效应检验结果为准，若不符合，则以多变量检验结果为准。根据分析结果，若时间点和益生菌剂量之间存在交互效应，则继续进行简单主效应分析，若不存在交互效应，则分析其主效应。

结果：补充双歧杆菌 4 周后，各项指标变化如下。（1）L 组和 H 组在饮食摄入量、能量消耗和身体成分方面均无显著差异。（2） L 组甘油三酯和低密度脂蛋白胆固醇含量均显著降低。（3）L 组和 H 组踝关节和膝关节等速肌力均显著增加。（4） H 组的 1RM 卧推显著增加。（5）血液靶向代谢组学分析显示，L 组和 H 组中包括乙酸、丙酸和丁酸在内的短链脂肪酸的数量都增加了 2-5 倍。差异代谢与常规指标的相关性分析显示，乙酸和丁酸与甘油三酯呈负相关，戊酸与低密度脂蛋白显著负相关。同时，乙酸、丁酸、丙酸和戊酸与等速肌力相关。（6）代谢组学和宏基因组学联合分析表明，L 组和 H 组的双歧杆菌与乙酸、丁酸和戊酸均呈显著正相关。（7）差异代谢和差异基因联合途径的富集分析集中在碳代谢和丁酸代谢。

结论：4 周双歧杆菌补充联合运动训练可能通过短链脂肪酸提高越野滑雪运动员的骨骼肌耐力和脂代谢，但本研究中未观察到补充双歧杆菌的剂量效应。

关键字 双歧杆菌，短链脂肪酸，越野滑雪运动员，脂代谢，肌肉力量

分类：基础营养研究

真空冷冻干燥技术对果蔬感官及营养的影响综述

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干燥技术是食品加工中的一个重要环节，可直接影响产品的品质及贮藏保存。为保持产品品质可控且实现食品的高效脱水，目前常见的干燥技术包括热风干燥，真空干燥，喷雾干燥，热差膨化干燥，红外干燥，微波干燥，以及至少使用两种或两种以上的联合干燥技术等。上述干燥方式在整个干燥过程中，会使物料长期处于温度相对较高的状态，发生相对严重的热积累现象，使脱水制品的营养物质会发生严重降解，颜色发生显著变化，产品形状会发生明显皱缩。目前，真空冷冻干燥技术与其他干燥技术相比，对热敏感度高，容易氧化的食品能够较好的保持其原本的营养价值，以最大限度保持食品原有的风味口感，并且食品本身的结构在干燥之后也不会受到破坏，能够保留食品原有的形状，是一种十分理想的食品干燥加工技术。近年来，随着技术提升及成本降低，真空冷冻干燥技术在速食方便食品加工中的应用越来越广泛，本综述主要从几种不同干燥方式对果蔬类食物基础营养方面的影响进行阐述，其中真空冷冻干燥技术作为较为理想的干燥方式，进行了重点论述，此外真空干燥技术中单一干燥方式相较分程式干燥方式，存在一定弊端，恒温干燥条件其单位耗能高，且干燥强度低，而分程式干燥因其分为预热升温、等速干燥、降速三个阶段，根据温差及真空度产生的压力差变化，可提升脱水速率，在保证产品品质的前提下，可大大降低干燥能耗成本。目前，真空冷冻干燥技术已广泛应用于果蔬类食物干燥，在柑橘类，瓜果类，浆果类，核果类，仁果类等水果中被广泛应用，另外在根茎类，叶菜类，花菜类，食用菌类等蔬菜类食物中也有诸多使用，此外在各类果蔬粉加工贮藏中的使用也十分常见。因真空冷冻干燥技术对果蔬的营养保持效果好，破坏率低，与其他干燥技术相比，干燥后的果蔬产品色泽，风味及品质均接近于新鲜果蔬，其水分含量低，更便于运输及保存，可大大减少运输成本及仓库存储压力。通过对不同干燥工艺及冻干工艺在果蔬类食品加工中的应用进行综述，探讨不同干燥工艺的应用现状、冻干过程中可能存在的风险，以及行业目前的应对措施，进一步推动真空冷冻干燥技术的推广，以期为干燥技术的使用在食品工业中的研究与应用提供相关参考。

关键字 干燥技术；冷冻干燥；果蔬品质；

分类：基础营养研究

乳铁蛋白与骨桥蛋白协同保护小鼠肠道屏障完整性及抗肠炎功能的研究

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背景：

世界卫生组织数据显示，腹泻病是造成五岁以下儿童死亡的第二大原因，每年约有 52.5 万名五岁以下儿童死于腹泻病。研究也表明母乳喂养能够降低婴幼儿腹泻的发病率与死亡率，其与母乳成分中的免疫活性成分相关，研究报道乳铁蛋白（Lactoferrin, LF）和骨桥蛋白（Osteopontin, OPN）均能调节机体免疫、促进免疫系统的成熟，然而婴幼儿配方奶粉中同时添加两种蛋白是否有协同作用以及其最适宜比例尚需进一步研究。

方法：

小鼠适应一周后,按照 300mg/kg 体重给予其乳铁蛋白和骨桥蛋白的混合物，比例为 LF：OPN=1:0、1:10、1:5、1:1、1:0.2、1:0.2、0:1，对照组灌喂同等剂量的生理盐水，连续进行七天灌喂，每两天记录一次体重，模型组不灌喂蛋白混合物或生理盐水。在第七天结束后腹腔注射脂多糖（LPS）造模，第八天处死小鼠，收集血液、肠道组织样品。肠道组织进行切片病理学评价，如损伤评分、隐窝深度、绒毛长度等，并对肠道病理学完整性进行评价，包括紧密连接蛋白的表达量和杯状细胞的数量。血清样本检测 D-乳酸、二胺氧化酶（DAO）、炎症因子（IL-6、IL-1β、IL-10、IL-4、TNF-α）的含量，用于评估肠组织炎症反应和肠屏障受损状况。

结果：

1、模型组 DAO 活性、D-乳酸含量相比于对照组显著升高，浓度约为对照组的 2 倍，差异具有统计学意义，表明 LPS 破坏了肠屏障的完整性，增加肠道通透性。与模型组相比，各处理组均显著降低了血清中 DAO 的活性以及 D-乳酸含量，均具有统计学差异。其中，当 LF ： OPN=1 :10 ~ 1 ： 1、1 ： 0.1 相较于 LF、OPN 单体，小鼠血清 DAO 的活性以及 D-乳酸含量。

2、模型组的肠道组织的绒毛长度变短、隐窝深度变浅，出现上皮细胞脱落以及炎症浸润的现象。损伤评分量化肠道的损伤程度显示，模型组 HE 损伤得分（11.6）显著高于对照组（2.24），各蛋白混合物均降低了 HE 损伤得分，当 LF:OPN=1:5 时，HE 损伤得分最低（4.66），与模型组相比具有显著差异。同时统计了绒毛长度、隐窝深度，发现模型组显著下调了绒毛长度以及隐窝深度，不同比例蛋白对此均有显著的改善作用。

3、在蛋白混合物的干预下，相比于对照组和模型组，紧密连接表达量上调；与模型组相比，单体以及混合蛋白均显著提高了杯状细胞的数量，具有统计学差异；相比于对照组，模型组的促炎因子 IL-6、IL-1β 的表达量上调，抗炎因子 IL-10 的表达下降；同时，蛋白混合物的干预可以缓解 IL-6、IL-1β 的增加以及 IL-10 的下降。

结论：

乳铁蛋白和骨桥蛋白的在保护小鼠肠道屏障、抵抗肠炎方面具有正向协同作用，其为婴儿配方的创制提供了数据支持。

关键字 乳铁蛋白；骨桥蛋白；肠炎；婴幼儿；母乳成分

分类：基础营养研究

CCAAT/增强子结合蛋白 α 通过 Runx1 负性调控成骨细胞分化成熟的机制研究

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骨质疏松症的发生发展在于成骨细胞（促骨形成）以及破骨细胞（增进骨吸收）在数量和功能上的动态平衡被打破，而目前临目前临床上使用的绝大多数抗骨质疏松的药物如雷洛昔芬、双膦酸盐、地诺单抗的作用靶点均在于抑制骨吸收，进而延缓骨质流失，虽然这些抑制骨吸收的药物均能有效预防骨折发生，但使用 5 年后是否还存在有效治疗尚且存疑，且会导致不典型股骨骨折发生的副作用，双膦酸盐还会导致下颌骨坏死等不良事件发生。而针对促进骨形成的药物主要有特立帕肽和阿巴洛肽，它们均能有效降低髋部骨折发生率以及增加椎体骨密度，但只能使用 2 年，继续使用则会增加患骨肉瘤的风险，且 2 年后得通过长期口服抑骨吸收药物维持已增加的骨密度。因此，立足于骨形成，不断深入研究其调控理论对于未来开发出新的安全、有效的药物意义重大。转录因子作为一类维持人体细胞结构和功能稳定的因子，其对于骨形成调控作用尚未形成系统理论。我们通过前期大量的研究，已经发现转录因子 Runx1 通过 Bmp7/Alk3/Smad1/5/8/Runx2/ATF4 以及 WNT/β-Catenin 信号通路正向、持续促进骨形成，而值得注意的是，在这个过程中，我们发现有另外一个转录因子——CCAAT/增强子结合蛋白 α（C/EBPα）的表达总与 Runx1 的表达相反，即在 Runx1 敲低的小鼠早期或者成熟成骨细胞中，C/EBPα 的表达均明显升高，这就不由得引起我们猜想：在成骨细胞分化调控过程中，是否 Runx1 与 C/EBPα 存在某种反向调控关系？是否 C/EBPα 位于 Runx1 的上游，行使一个负向调控作用？于是，我们首先成功构建了在成骨细胞分化早期和成熟期特异性敲除 C/EBPα 的小鼠模型，即 C/EBPαf/fTwist2-cre 和 C/EBPαf/fCol1a1-cre 小鼠，X-ray 结果提示 4 周龄 C/EBPα 突变小鼠小梁骨和皮质骨骨量均较同窝对照组明显增高。将 C/EBPα 突变小鼠及其同窝对照组小鼠的骨髓基质干细胞（BMSCs）以及新生小鼠头盖骨进行成骨诱导培养 14 天后，Wester Blot 结果提示 Runx1 在 C/EBPα 突变小鼠组表达明显上调，在 Runx1 介导的下调的信号通路蛋白 ALK3/Bmp7/Runx2/ATF4 在 C/EBPαf/fCol2a1-cre（软骨细胞阶段）、C/EBPαf/fTwist2-cre、C/EBPαf/fCol1α1-cre 三种基因型小鼠的成骨细胞中，表达呈不同程度上调。通过启动子预测软件我们成功预测了 C/EBPα 在-4000bp 至+200bp 基因序列区段中，可能与 Runx1 启动子结合的可能位点，并通过 qPCR 实验进一步验证 C/EBPα 与 Runx1 启动子-1517bp 上结合发挥负向调控作用。我们因此得出结论：C/EBPα 通过抑制 Runx1 的表达，从而负性调控成骨细胞分化，并持续抑制成骨细胞分化成熟。C/EBPα 将成为新的治疗包括骨质疏松在内的骨代谢相关疾病的作用靶点。

关键字 CCAAT/增强子结合蛋白 α，Runx1, 成骨细胞，骨形成，WNT/β-Catenin 信号通路

分类：基础营养研究

矢车菊素-3,5-O-双葡萄糖苷调控 NLRP3 炎性小体及自噬对 DSS 所致实验性结肠炎小鼠肠纤维化作用的机制研究

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目的：探讨矢车菊素-3,5-O-双葡萄糖苷对 DSS 所致结肠炎小鼠肠纤维化的作用及对 NLRP3 炎性小体及自噬的影响。

方法： 48 只 C57BL/6 雄性小鼠适应性喂养一周后，随机分成正常对照组、DSS 组、5－氨基水杨酸组（5-ASA，50mg/kg）、矢车菊素-3,5-O-双葡萄糖苷低剂量（10mg/kg）组、矢车菊素-3,5-O-双葡萄糖苷中剂量（50mg/kg）组、矢车菊素-3,5-O-双葡萄糖苷高剂量组（150mg/kg），每组 8 只。（1）建模：正常对照组全程自由饮用蒸馏水，模型组饮用 2.5%DSS 水。（2）给药：从第三周开始灌胃给药，DSS 使用生理盐水灌胃，药物组按照相应剂量进行灌胃。（3）检测：观察小鼠临床表现，计算小鼠的临床疾病指数（DAI）。记录小鼠体重、结肠长度、重量，收集下腔静脉血。采用 ELISA 试剂盒测定血清中白介素 IL-1β、IL-6、IL-17A、IL-18、肿瘤坏死因子-α（TNF-α）的水平。取结肠进行 HE 染色、Masson 染色、阿利新蓝染色和 PAS 染色，观察结肠的纤维化程度和结肠黏膜状态。实时荧光定量 PCR（qRT-PCR）检测结肠组织中纤维化相关因子（α-SMA、CollagenI）、紧密连接蛋白（Zo1、Claudin1、Occludin）及 NLRP3 炎症小体相关因子（Nlrp3、Caspase1、Asc、Il1β）的 mRNA 表达。蛋白免疫印迹法检测结肠内 NLRP3 炎症小体相关因子（NLRP3、Caspase-1、ASC、IL-1β ），纤维化相关因子（α-SMA、Collagen-I），自噬相关因子（Beclin1、LC3II/I、p62）。免疫组织化学法观测结肠组织紧密连接蛋白（ZO-1、Claudin-1、Occludin）及纤维化相关因子（α-SMA、Collagen-I ）的表达。

结果：经矢车菊素-3,5-O-双葡萄糖苷药物处理，DSS 诱导的结肠炎肠纤维化小鼠体重下降、结肠缩短及脾肿大症状明显减轻，结肠重量与长度之比降低，DAI 指数评分增高。同时组织学观察也发现，矢车菊素-3,5-O-双葡萄糖苷干预能够减少 DSS 处理所诱发的结肠组织中炎性细胞的浸润，缓解炎症所造成的肠上皮组织损毁的发生，减少黏膜损伤，隐窝结构丧失，且能改善因 DSS 所诱发的结肠黏膜中杯状细胞及黏蛋白 MUC2 的减少的症状。矢车菊素-3,5-O-双葡萄糖苷干预降低 DSS 诱导的慢性结肠炎小鼠血清中炎性因子 IL-1β、IL-6、IL-17A、IL-18 和 TNF-α 水平，减缓了结肠炎炎症。矢车菊素-3,5-O-双葡萄糖苷也能促进结肠紧密连接蛋白 ZO-1、Claudin-1、Occludin 的表达，降低肠上皮通透性。qRT-PCR 结果显示，矢车菊素-3,5-O-双葡萄糖苷可以增加 Zo1、Claudin1、Occludin 的 mRNA 表达，减少 Nlrp3、Caspase1、Asc、Il1β、α-SMA、Collagen 的 mRNA 表达。此外，蛋白免疫印迹结果显示，矢车菊素-3,5-O-双葡萄糖苷能抑制 NLRP3、Caspase-1、ASC、IL-1β、α-SMA、Collagen-I、p62 的蛋白表达，增加 LC3II/I、Beclin1 的蛋白表达。免疫组化结果证实矢车菊素-3,5-O-双葡萄糖苷能增加 ZO-1、Claudin-1、Occludin、α-SMA、Collagen-I 的表达。

结论：矢车菊素-3,5-O-双葡萄糖苷能够诱导自噬，调控 NLRP3 炎症小体从而修复肠粘膜屏障功能，改善 DSS 所致结肠炎小鼠肠纤维化症状，抑制结肠炎的发生。

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关键字 矢车菊素-3,5-O-双葡萄糖苷；NLRP3 炎性小体；自噬；结肠炎

分类：基础营养研究

白耙齿菌多糖对来曲唑诱导的多囊卵巢综合征大鼠的干预效果研究

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目的　探究白耙齿菌多糖（Irpex lacteus polysaccharide，ILP）对来曲唑诱导的多囊卵巢综合征（PCOS）模型大鼠的改善作用。方法　将32只6周龄的雌性SD大鼠随机分成4组，每组8只，模型（PCOS）组每日灌服来曲唑-羧甲基纤维素钠混悬液1mg/kg（CMC，1%）；阳性对照二甲双胍（Metformin，Met）组每日灌服来曲唑-羧甲基纤维素钠混悬液1mg/kg（CMC，1%）+Met（265 mg/kg）；ILP组每日灌服来曲唑-羧甲基纤维素混悬液1mg/kg（CMC，1%）+ILP（1000 mg/kg）；空白对照（Normal）组连续灌胃羧甲基纤维素钠混悬液1mg/kg（CMC，1%）21天。在此期间每3天称量一次体重，在建模结束前连续10天通过对大鼠的阴道涂片进行巴氏染色来判断各组大鼠的动情周期。在建模前一天对大鼠进行断食并测量它们的空腹血糖（FBG）。取大鼠双侧卵巢称重并计算相对质量，其中一侧卵巢用4%多聚甲醛溶液固定。通过H&E染色观察ILP对PCOS大鼠卵巢内卵泡发育的影响，通过Masson`s染色观察卵巢组织内部的纤维化情况。采用酶联免疫吸附法（ELISA）检测大鼠血清中促卵泡生成激素（FSH）、促黄体生成素（LH）、雌二醇（E2）、睾酮（T）、空腹胰岛素（FINS）的水平，并计算LH/FSH比值和HOMA-IR水平。采用生化试剂盒测定大鼠血清中超氧化物歧化酶（SOD），丙二醛（MDA），总胆固醇（TC）、甘油三酯（TG）、高密度脂蛋白胆固醇（HDL-C）、低密度脂蛋白胆固醇（LDL-C）的水平。Western blot及免疫组化检测TGF-β1/Smad通路中相关蛋白的表达，qRT-PCR检测大鼠卵巢Sod1、Sod2、Cat、Gpx3、Mgst1、Gsta4、Gsr和Prdx3等抗氧化酶的表达水平。结果　PCOS组大鼠动情周期紊乱，卵巢呈多囊样改变，体重以及卵巢相对质量显著升高（P<0.05）。ILP恢复了大鼠的动情周期，卵巢多囊样明显减少，体重以及卵巢相对质量显著降低（P<0.05）。ILP降低了PCOS大鼠血清中T、LH、TC、TG、LDL-C、FBG、INS 和　HOMA-IR（P<0.05）的表达，升高了E2、FSH和HDL-C的表达（P<0.05）。同时ILP升高了血清中SOD及卵巢中Sod1、Sod2、Cat、Gpx3、Mgst1、Gsta4、Gsr和Prdx3的抗氧化水平，降低了血清中MDA的表达水平。此外，ILP处理下调了TGF-β1、TGF-βRI、p-Smad2/Smad2、p-Smad3/Smad3和Smad4以及CTGF、α-SMA和Collagen Ⅰ的蛋白水平，增加了Smad7在卵巢中的表达水平。结论　结果表明，ILP能够降低PCOS大鼠的体重和卵巢相对质量，改善PCOS大鼠的性激素紊乱、糖脂代谢异常、氧化应激和卵巢纤维化，对来曲唑诱导的PCOS大鼠具有潜在的治疗作用。

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关键字 白耙齿菌多糖；多囊卵巢综合征；TGF-β1/Smad；氧化应激；代谢紊乱

分类：基础营养研究

灰树花多糖通过调节氧化应激和慢性炎症对 PCOS 大鼠卵巢纤维化的改善作用

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目的：本文研究灰树花多糖（GFPS）通过调节氧化应激和慢性炎症对多囊卵巢综合征（PCOS）大鼠卵巢纤维化的改善作用，并进一步探索其具体分子机制。

方法：将所有大鼠随机分为正常组、PCOS 组、Met 组和 GFPS 组，每组 8 只。正常组每天灌胃等体积的 1%CMC 混悬液，PCOS 组接受 1%CMC 混悬液（含来曲唑 1mg/kg·day），Met 组接受 1%CMC 混悬液（含来曲唑 1mg/kg·day）+ Met（265mg/kg·day），GFPS 组接受 1%CMC 混悬液（含来曲唑 1mg/kg·day）+ GFPS（600mg/kg·day）持续 21 天。造模期间，每三天给大鼠称重，造模第十天采用巴氏染色法观察大鼠动情周期变化，造模结束后，腹主动脉取血制备血清。卵巢、子宫和内脏脂肪（腹部脂肪、子宫周围脂肪、肾脏周围脂肪）在冰上快速分离，并计算各脏器相对质量。马松染色测定大鼠卵巢纤维化面积。ELISA 试剂盒测定大鼠性激素水平（FSH、LH、E2、T）、氧化应激水平（MDA、SOD、GSH-Px），肝肾功能指标（CRE、BUN、AST、ALT），计算 LH/FSH 比值。RT-qPCR 方法检测大鼠卵巢组织抗氧化酶和炎症因子的 mRNA 表达，蛋白质印迹(Western blot)法和免疫组化法检测 TGF-β1/Smad 主要通路和纤维化因子的表达。

结果：研究结果表明 GFPS 降低了 PCOS 大鼠体重和卵巢、内脏脂肪相对质量，恢复了卵巢体积，减少了卵巢纤维化面积，降低了 PCOS 大鼠 T 、LH 水平，升高了 E2、FSH 水平，并降低了 LH/FSH 比值。GFPS 干预后，PCOS 大鼠不规则的动情周期逐渐恢复， PCOS 大鼠卵巢组织囊状卵泡和闭锁卵泡减少，正常发育的卵泡、黄体和颗粒细胞数目不断增加。此外，GFPS 升高了 PCOS 大鼠血清中 SOD、GSH-Px 水平，降低了 MDA、CRE 和 BUN 水平，AST 和 ALT 水平没有明显变化。GFPS 可以通过上调 PCOS 大鼠卵巢组织的抗氧化基因酶 Cat，Sod2，Gpx3，Mgst1，Gsta4，Sod1，Gsr and Prdx3，下调炎症因子 Nlrp3，Asc，Caspase1，Il1β，Il18，Tnfα and Il6 的 mRNA 表达改善 PCOS 大鼠卵巢组织氧化应激和慢性炎症。最后，Western Blotting 和免疫组化结果提示，GFPS 降低了 PCOS 大鼠 TGF-β1、TGF-βRI、p-Smad2/Smad2、p-Smad3/Smad3、Smad4，升高了 Smad7 蛋白表达和降低 TGF-β1/Smad 信号通路的主要因子 TGF-β1、 Smad2 、Smad3、Smad4 的阳性表达，升高 Smad7 的阳性表达。

结论：综上所述，GFPS 通过调节 PCOS 大鼠血清中性激素水平，恢复了 PCOS 大鼠动情周期，减少了卵巢纤维化面积，对大鼠肾脏具有一定的保护作用，并通过改善 PCOS 大鼠氧化应激、慢性炎症水平和调控 TGF-β1/Smad 通路的分子机制最终改善了 PCOS 大鼠的卵巢纤维化。

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关键字 灰树花多糖；多囊卵巢综合征；卵巢纤维化；慢性炎症；氧化应激

分类：基础营养研究

桑黄多糖对来曲唑诱导多囊卵巢综合征大鼠的临床症状改善效果

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目的：观察桑黄多糖（PLP）对来曲唑诱导的多囊卵巢综合征（PCOS）大鼠的临床症状改善效果。方法：将 24 只 6 周龄 SD 大鼠随机分为四组：正常组、PCOS 模型组、二甲双胍（Met）阳性药物对照组和 PLP 治疗组，每组 6 只。（1）建模：PCOS 模型组、Met 组及 PLP 组连续 21 天每日灌服来曲唑-羧甲基纤维素混悬液 1mg/kg（CMC，1%），正常组连续 21 天每日灌服等剂量生理盐水。（2）给药：Met 组同时每日灌服二甲双胍（265mg/kg），PLP 组同时每日灌服 PLP（1000mg/kg），均至 21 天。（3）检测：干预期间，每三天记录一次大鼠体重，第 12 天起连续 10 天收集大鼠的阴道涂片以观察其动情周期变化。干预结束后，所有大鼠禁食 12h，进行口服葡萄糖耐量试验，分别在灌服葡萄糖（2g/kg）0、30、60、90、120min 后检测大鼠血糖水平。试验结束后，麻醉各组大鼠并自腹主动脉处采血，离心取上清液用于性激素水平（促卵泡激素、黄体生成素、雌二醇、睾酮）、糖脂代谢水平（胰岛素、甘油三酯、总胆固醇、高密度脂蛋白胆固醇、低密度脂蛋白胆固醇）及氧化应激水平（超氧化物歧化酶、丙二醛）的检测；取大鼠双侧卵巢剥除多余脂肪组织，取一侧卵巢进行石蜡包埋并切片后，分别进行 H&E 染色及 Masson 染色以观察卵巢形态结构及纤维化程度，另一侧卵巢使用 Western Blot 法和免疫组织化学法检测 TGF-β1/Smad 信号通路因子及纤维化相关因子（Collagen Ⅰ、α-SMA、CTGF）的表达水平，使用实时荧光定量 PCR 法检测抗氧化酶（Cat、Sod2、Gpx3、Mgst1、Prdx3、Gsta4、Gsr 和 Sod1）的基因表达水平。结果：PLP 干预能够有效降低 PCOS 大鼠的体重，恢复 PCOS 大鼠正常动情周期及卵巢组织中的卵泡发育，并改善卵巢纤维化程度。PLP 通过降低 PCOS 大鼠 T、LH、LH/FSH 水平并升高 E2 水平，改善 PCOS 大鼠的内分泌紊乱。PLP 还可以通过降低 FBG、INS、HOMA-IR、TC、TG、LDL-C 水平并升高 HDL-C 水平，调节 PCOS 大鼠糖脂代谢水平异常。PLP 干预后 PCOS 大鼠的氧化应激水平也得到改善，表现在血清中 MDA 水平的降低及 SOD 水平的升高，卵巢中抗氧化酶（Cat、Sod2、Gpx3、Mgst1、Prdx3、Gsta4、Gsr 和 Sod1）基因表达水平的升高。此外，PLP 还可以通过上调 PCOS 大鼠卵巢中 Smad7 的表达，下调 TGF-β1、Smad2、Smad3、Smad4、Collagen Ⅰ、α-SMA 及 CTGF 的表达发挥抗纤维化的作用。结论：PLP 干预能恢复 PCOS 大鼠正常动情周期及卵巢组织中卵泡发育，调节生殖内分泌紊乱、胰岛素抵抗及血脂代谢水平异常，并能通过减少氧化应激，抑制 TGF-β1/Smad 通路的激活，调控 collagen Ⅰ、α-SMA 和 CTGF 在卵巢中的表达，改善 PCOS 大鼠卵巢纤维化水平，提示它可能在治疗 PCOS 及预防和延缓 PCOS 的远期并发症中起关键作用。

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关键字 桑黄多糖；多囊卵巢综合征；来曲唑；糖脂代谢；纤维化

分类：基础营养研究

氧化铈纳米颗粒加重多囊卵巢综合征（PCOS）大鼠氧化应激和卵巢纤维化的机制探讨

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目的：本研究拟探讨食品包装用紫外线屏蔽剂氧化铈纳米颗粒（CeNPs）对来曲唑（1 mg/kg/d）诱导的PCOS大鼠激素水平及卵巢纤维化的影响。方法：雌性SD大鼠随机分为control组（生理盐水），PCOS组，PCOS + CeNPs低、中、高剂量处理组（30 mg/kg/d, 300 mg/kg/d和600 mg/kg/d），连续灌胃给药28天，每3天称重一次。在给药第12天起，连续10天内通过巴氏染色法测定大鼠阴道脱落细胞学的变化并记录观察大鼠动情周期。给药结束当日处死大鼠，收集腹主动脉血和卵巢。ELISA法测血清中FSH（促卵泡生成素），LH（促黄体生成素），E2（雌二醇），T（睾酮），INS（胰岛素）水平；采用试剂盒，按照说明书操作要求检测大鼠血清中TG（甘油三酯）、TC（总胆固醇）、LDL-C（低密度脂蛋白）、HDL-C（高密度脂蛋白）、SOD（超氧化物歧化酶）、MDA（丙二醛）、及Cat（过氧化氢酶）、T-AOC（总抗氧化能力）水平；H&E观察大鼠卵巢病理变化，Masson染色观察卵巢纤维化程度；qRT-PCR检测大鼠卵巢组织中主要抗氧化酶（Cat、Sod2、Gpx3、Mgst1、Gsta4、Sod1、Gsr和Prdx3）、α-平滑肌肌动蛋白（α-SMA）和炎症小体（NLRP3、ASC、caspase-1、IL-1β）的表达水平；Western Blot法检测卵巢纤维化相关蛋白TGF-β1、CTGF、α-SMA蛋白及Smads信号通路相关蛋白p-Smad2、p-Smad3、Smad4和Smad7的表达水平。结果：CeNPs干预增加PCOS大鼠的体重；与PCOS组相比，在PCOS+CeNPs处理组中大鼠动情周期紊乱程度加重；PCOS+CeNPs组T、E2、LH、INS水平升高显著，FSH水平降低显著，且PCOS+CeNPs组以高水平的TC，TG和LDL以及低水平的HDL的表达呈现血脂异常模式；组织学观察显示，CeNPs加重PCOS大鼠的卵巢结构和组织纤维化，以上均成剂量依赖性。此外，qRT-PCR和血清结果显示，CeNPs处理降低了PCOS大鼠的抗氧化能力，加重了PCOS大鼠体内的氧化应激，其显著降低PCOS大鼠卵巢组织主要抗氧化酶和三个血清氧化指标（SOD、Cat、T-AOC）的表达，同时，α-SMA、MDA的表达升高；CeNPs处理还加重了PCOS慢性炎症，PCOS大鼠体内炎症小体表达水平随剂量的增加而增加。蛋白印迹分析显示，CeNPs 显著引起了 PCOS 大鼠中 TGF-β1、CTGF、α-SMA、p-Smad3、p-Smad2和Smad4等纤维化关键蛋白因子表达水平上调，Smad7的表达水平下调。结论：本研究表明，CeNPs通过影响PCOS大鼠血清激素分泌、体内氧化应激和炎症小体表达的水平，诱发了TGF-β1/Smads信号通路的激活加重其卵巢纤维化，并成剂量依赖性。

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关键字 氧化铈纳米颗粒；氧化应激；多囊卵巢综合征；卵巢纤维化；

分类：基础营养研究

橙皮素对来曲唑诱导多囊卵巢综合征模型大鼠的影响

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目的：本文主要研究橙皮素对来曲唑所致多囊卵巢综合征（PCOS）大鼠代谢异常的改善作用。方法：将 40 只 6 周龄的雌性 SD 大鼠随机分为 5 组，每组 8 只，正常组每日灌胃等体积的生理盐水，PCOS 模型组每日灌胃来曲唑-羧甲基纤维素（1% CMC）混悬液（1 mg/kg）；阳性对照组每日灌胃来曲唑-CMC 混悬液（1 mg/kg）+二甲双胍（Met，265 mg/kg）；橙皮素低剂量组每日灌胃等剂量来曲唑-CMC 混悬液（1 mg/kg）+橙皮素（20mg/kg），橙皮素高剂量组每日灌胃等剂量来曲唑-CMC 混悬液（1 mg/kg）+橙皮素（40mg/kg），连续灌胃 28 天。实验期间每 3 天记录一次大鼠体重和血糖，直至试验结束。从给药第 18 天起，于每天同一时间进行阴道涂片，连续十天通过巴氏染色法测定大鼠阴道脱落细胞学的变化并记录观察大鼠动情周期。干预结束后，大鼠禁食 12 小时测量空腹血糖。CO2 麻醉后处死大鼠并收集腹主动脉血 5 mL，摘取卵巢、脂肪组织（肾周、腹部和子宫周）并计算其相对重量（g/bw×100）。试剂盒检测大鼠血清中促卵泡生成激素（FSH）、促黄体生成素（LH）、雌二醇（E2）、睾酮（T）、甘油三酯（TG）、总胆固醇（TC）、丙二醇（MDA）、过氧化氢酶（CAT）、高密度脂蛋白胆固醇（HDL-C）、低密度脂蛋白胆固醇（LDL-C）和胰岛素（INS）水平，并计算 LH/FSH 比值；H&E 染色观察卵巢的病理学结构。结果：H&E 染色结果显示，来曲唑诱导的 PCOS 大鼠卵巢组织呈囊性扩张，囊窦卵泡明显增大，颗粒细胞层减少，黄体组织明显减少。橙皮素治疗过后，大鼠卵泡数目减少，颗粒细胞层厚度增加，卵泡膜细胞减少。PCOS 组的体重、卵巢和内脏脂肪重量较正常组增加，有显著性差异（P<0.05）。橙皮素组的体重、卵巢和内脏脂肪重量较 PCOS 组下降，有显著性差异（P<0.05）。试剂盒检测结果显示：橙皮素降低了 PCOS 大鼠血清中 T、LH/FSH、TC、TG、LDL-C、INS 和 LH 的水平（P<0.01 或 P<0.05），升高了 PCOS 大鼠血清中 E2、FSH、CAT 和 MDA 的水平（P<0.01），但对于 HDL-C 并无明显改善作用。此外，橙皮素还能够改善 PCOS 大鼠葡萄糖耐量（OGTT）的曲线下面积（AUC）（P<0.01）。结论：综上所述，橙皮素可以减轻 PCOS 大鼠体重，改善胰岛素抵抗和卵泡的发育状况，恢复血清性激素水平和脂质状况。

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关键字 橙皮素；多囊卵巢综合征；来曲唑；

分类：基础营养研究

亚精胺对来曲唑诱导多囊卵巢综合征模型大鼠的影响

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目的：本文主要研究亚精胺对来曲唑所致多囊卵巢综合征（PCOS）大鼠代谢异常的改善作用。方法：将 40 只 6 周龄的雌性 SD 大鼠随机分为 5 组，每组 8 只，正常组每日灌胃等体积的生理盐水，PCOS 模型组每日灌胃来曲唑-羧甲基纤维素（1% CMC）混悬液（1 mg/kg）；阳性对照组每日灌胃来曲唑-CMC 混悬液（1 mg/kg）+二甲双胍（Met，265 mg/kg）；亚精胺低剂量组每日灌胃等剂量来曲唑-CMC 混悬液（1 mg/kg）+亚精胺（1 mmol/day），亚精胺高剂量组每日灌胃等剂量来曲唑-CMC 混悬液（1 mg/kg）+亚精胺（3 mmol/day），连续灌胃 28 天。实验期间每 3 天记录一次大鼠体重和血糖，直至试验结束。从给药第 18 天起，于每天同一时间进行阴道涂片，连续十天通过巴氏染色法测定大鼠阴道脱落细胞学的变化并记录大鼠动情周期。干预结束后，大鼠禁食 12 小时测量空腹血糖。CO2 麻醉后处死大鼠并收集其腹主动脉血 5 mL，摘取卵巢、脂肪组织（肾周脂肪、腹部脂肪和子宫周脂肪）并计算其相对重量（g/bw×100）。试剂盒检测大鼠血清中促卵泡生成激素（FSH）、促黄体生成素（LH）、雌二醇（E2）、睾酮（T）、甘油三酯（TG）、总胆固醇（TC）、丙二醇（MDA）、过氧化氢酶（CAT）、高密度脂蛋白胆固醇（HDL-C）、低密度脂蛋白胆固醇（LDL-C）和胰岛素（INS）水平，并计算 LH/FSH 的比值；H&E 染色观察卵巢的病理学结构。结果：H&E 染色结果显示，来曲唑诱导的 PCOS 大鼠卵巢组织呈囊性扩张，囊窦卵泡明显增大，颗粒细胞层减少，黄体组织明显减少。亚精胺治疗过后，大鼠卵泡数目减少，颗粒细胞层厚度增加，卵泡膜细胞减少。PCOS 组大鼠的体重、卵巢和内脏脂肪重量较正常组增加，有显著性差异（$P<0.05$）。亚精胺组大鼠的体重、卵巢和内脏脂肪重量较 PCOS 组下降，有显著性差异（$P<0.05$）。试剂盒检测结果显示：亚精胺降低了 PCOS 大鼠血清中 T、LH/FSH、TC、TG、LDL-C、INS 和 LH 的水平（$P<0.01$ 或 $P<0.05$），升高了 PCOS 大鼠血清中 E2、FSH、CAT 和 MDA 的水平（$P<0.01$），但对于 HDL-C 并无明显改善作用。此外，亚精胺还能够改善 PCOS 大鼠葡萄糖耐量（OGTT）的曲线下面积（AUC）（$P<0.01$）。结论：综上所述，亚精胺可以减轻 PCOS 大鼠体重，改善胰岛素抵抗和卵泡的发育状况，恢复血清性激素水平和脂质状况。

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关键字 亚精胺；多囊卵巢综合征；来曲唑；

分类：基础营养研究

鼠李柠檬素抑制鼻咽癌 CNE-2 细胞裸鼠移植瘤生长及其分子机制研究

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摘要：目的 为研究鼠李柠檬素（Rhamnocitrin）对裸鼠鼻咽癌 CNE-2 细胞皮下移植瘤生长的抑制作用及其分子机制。方法　在裸鼠背部皮下接种浓度为 1×107 个/mL 的 CNE-2 细胞悬液 0.2 mL，建立移植瘤模型。待肿瘤体积>30 mm3 后，将裸鼠随机分为模型组、顺铂组（6 mg/kg）和鼠李柠檬素组（10 mg/kg），顺铂灌胃给药，鼠李柠檬素腹腔注射给药，模型组给予等体积的生理盐水，连续给药 10 天。记录裸鼠的体重变化、肿瘤体积和肿瘤重量，计算肿瘤抑制率；计算脾脏、肝脏和肾脏的脏器指数，并根据试剂盒说明书检测脏器中的丙二醛（Malonaldehyde，MDA）和超氧化物歧化酶（Superoxide dismutase，SOD）水平；苏木精-伊红（H&E）染色观察肿瘤组织病理变化；免疫组化法检测增殖相关因子 PCNA、Ki67 的蛋白表达水平；Western Blot 法检测肿瘤组织 IGF-1R/Akt/ERK 通路相关蛋白的表达水平。

结果　与模型组对比，鼠李柠檬素组的肿瘤体积和肿瘤质量分别降低了 58.06%（P<0.01）和 60.36%（P<0.01），肿瘤抑制率为 60.36%，体重下降趋势有所减缓；H&E 染色结果显示，模型组核大、颜色深染且形状不规则的细胞核明显较多，经过鼠李柠檬素干预后，癌变细胞明显减少；脏器指数及氧化应激指标结果显示，与模型组对比，顺铂组的脾、肝和肾的脏器指数分别下降了 11.23%（P<0.01）、10.81%（P<0.01）和 21.62%（P<0.05），鼠李柠檬素组裸鼠的脾脏指数上升了 15.29%（P<0.01），肝、肾的脏器指数无明显变化。MDA 含量显示，与模型组对比，顺铂组的脾脏、肝脏中的 MDA 水平分别上升了 28.08%（P<0.05）、45.34%（P<0.01），肾脏的 MDA 水平下降了 30.41%（P<0.01），而鼠李柠檬素组主要脏器（脾、肝、肾）中的 MDA 水平分别下降了 33.31%（P<0.05）、12%（P>0.05）和 43.57%（P<0.01）。SOD 含量显示，与模型组对比，顺铂组主要脏器（脾、肝、肾）中的 SOD 水平分别下降了 14.42%（P<0.05）、17.27%（P<0.05）和 18.35%（P<0.05），而鼠李柠檬素组分别上升了 11.27%（P<0.05）、15.31%（P<0.05）和 5.95%（P>0.05）；Western Blot 和免疫组化结果显示，与模型组对比，鼠李柠檬素组肿瘤组织中 IGF-1R/Akt/ERK 通路中的 IGF-1R、p-Akt/Akt、p-ERK/ERK 蛋白表达水平分别降低了 16.52%（P<0.01）、41.25%（P<0.01）和 21.3%（P<0.05），而 Bax/Bcl-2 的表达水平上升了 76.85%（P<0.01），增殖相关因子 Ki67、PCNA 的蛋白阳性表达率分别下降了 27.15%（P<0.05）和 39.59%（P<0.01）。结论　综上所述，鼠李柠檬素可抑制裸鼠鼻咽癌 CNE-2 细胞移植瘤增殖，促进其凋亡，其机制可能与调控 IGF-1R/Akt/ERK 信号通路有关，同时鼠李柠檬素干预可促进裸鼠的免疫应答反应，并对肝、肾有一定的保护作用。

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关键字 鼻咽癌；鼠李柠檬素；IGF-1R/Akt/ERK 通路；增殖；凋亡

分类：基础营养研究

莱菔硫烷通过抑制 ZNF217/Notch 信号通路抑制结直肠癌干细胞

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结直肠癌是世界范围内最常见的癌症之一，尽管在早期诊断和治疗方面取得了一定进展，但结直肠癌患者的预后仍然不太理想。大量研究证实肿瘤干细胞是结直肠癌发生、发展、转移和复发的驱动力量。然而，目前对结直肠癌中涉及的分子机制和关键因素的理解仍然不足以明确结直肠癌的治疗靶点改善结直肠癌患者的预后。莱菔硫烷是一种主要从十字花科蔬菜中提取的具有良好抗癌活性的植物化学物，我们的前期结果发现了其在体外模型中对结直肠癌干细胞的干预作用，然而其对结直肠癌干细胞成瘤性的干预作用及作用机制仍待进一步阐明。ZNF217 是锌指转录因子家族中的一员，在真核生物基因表达中起着重要调控作用。已有研究表明，ZNF217 通过与 DNA 结合，可在转录和翻译水平上调控基因表达和细胞分化。此外，ZNF217 可促进多种癌症的进展，并且可作为癌症预后生物标志物和癌症的治疗靶点。既往研究表明 Notch 信号通路在细胞分化、凋亡和增殖等过程中起着关键作用，并且也可调节结直肠癌干细胞的特性。Notch1 是 Notch 受体家族的一员，已被确定为结直肠癌的潜在治疗靶点。而调控 Notch1 信号的关键因素尚不清楚，为了确定其中相关机制，我们进行了生物信息学分析以评估肿瘤和正常结直肠组织中多种信号通路和生物标志物表达模式，结果发现，ZNF217 在结直肠癌细胞和具有结直肠癌干细胞特性的结直肠癌细胞球中均呈高表达，而 Notch1 与 ZNF217 的表达水平具有明显的相关性，提示了 ZNF217/Notch1 轴在介导结直肠癌干细胞特性中的作用。我们的研究结果显示，ZNF217 的过表达激活了结直肠癌的自我更新能力、结直肠癌干细胞标志物表达（包括 CD133、CD44、Lgr5、EpCAM）和 Notch 信号通路传导。相反，ZNF217 的低表达抑制了结直肠癌的自我更新能力、结直肠癌干细胞标志物表达（包括 CD133、CD44、Lgr5、EpCAM）和 Notch 信号通路传导。双荧光素酶报告基因实验进一步表明，ZNF217 通过靶向 Notch1 激活其表达从而促进 Notch 信号通路激活。敲低 Notch1 后，我们观察到 ZNF217 过表达促进的 Notch 信号传导以及对肿瘤干细胞标志物（包括 CD133、CD44、Lgr5、EpCAM）表达得到逆转。除体外数据外，我们通过裸鼠移植瘤模型验证了莱菔硫烷对结直肠癌干细胞成瘤性的抑制作用，并观察到 ZNF217/Notch1 轴参与其对结直肠癌干细胞的抑制作用。本研究通过体内外干预实验验证了莱菔硫烷对结直肠肿瘤干细胞活性的影响，论述了莱菔硫烷对 ZNF217/Notch1 轴介导的结直肠肿瘤干细胞的抑制作用，从而为结直肠癌提供了新的治疗靶点和策略。

关键字 ZNF217；Notch；结直肠癌干细胞；莱菔硫烷

分类：基础营养研究

芥子酸调控 AMPK/TGF-β1/Smads 信号通路改善 HFD 联合 STZ 诱导的糖尿病小鼠心肌纤维化

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目的 本研究旨在探讨芥子酸通过 AMPK/TGF-β1/Smads 信号通路改善链脲佐菌素（STZ）诱导的糖尿病小鼠心肌纤维化。方法 通过高脂饮食六周（HFD）联合腹腔链脲佐菌素（35 mg/kg BW）建立 2 型糖尿病模型。成模后设有正常组、糖尿病模型组、二甲双胍组（200 mg/kg BW）、芥子酸组（20 mg/kg BW 和 60 mg/kg BW），连续灌胃 4 周，实验期间定时记录小鼠体重及血糖变化。实验结束后记录最终体重，二氧化碳安乐死小鼠，通过腹主动脉取血并采集心脏等脏器，计算心脏指数。通过苏木素-伊红（H&E）染色观察糖尿病小鼠心肌病理改变及马松三色染色（Masson 染色）观察糖尿病小鼠心肌纤维化程度。按照试剂盒说明书检测小数血清中葡萄糖、低密度脂蛋白胆固醇（LDL-C）、高密度脂蛋白（HDL-C）、总胆固醇（TC）、甘油三脂（TG）、丙二醛（MDA）、过氧化氢酶（CAT）、超氧化物歧化酶（SOD）、谷胱甘肽过氧化物酶（GSH-Px/GPX）的水平。采用酶联免疫法检测血清中白介素-1β（IL-1）、白介素-6（IL-6）、白介素-10（IL-10）、肿瘤坏死因子-α（TNF-α）等水平。蛋白质印迹法检测转化生长因子 β1(TGF-β1)、转化生长因子 β1 受体（TGF-βR1）、α-平滑肌肌动蛋白（α-SMA）、 结缔组织生长因子（CTGF）、Smad2、Smad3、Smad4、Smad7、腺苷酸活化蛋白激酶(AMPK)的蛋白表达水平。结果 与空白组相比，模型组小鼠的心脏指数、空腹血糖值、糖耐量值、低密度脂蛋白、总胆固醇、甘油三脂、丙二醛、白介素-1β、白介素-6、白介素-10、肿瘤坏死因子-α 水平明显升高（P<0.05），而高密度脂蛋白、过氧化氢酶、超氧化物歧化酶、谷胱甘肽过氧化物酶水平明显降低（P<0.05）。与模型组相比芥子酸组小鼠的血糖水平、心脏指数明显降低（P<0.05），空腹血糖值、糖耐量值、低密度脂蛋白、总胆固醇、甘油三脂、丙二醛、白介素-1β、白介素-6、白介素-10、肿瘤坏死因子-α 水平降低（P<0.05），而高密度脂蛋白、过氧化氢酶、超氧化物歧化酶、谷胱甘肽过氧化物酶水平明显升高（P<0.05）。组织学观察发现，芥子酸可改善由 HFD 联合 STZ 诱导所造成的小鼠心肌细胞排列无序、肿胀、炎症细胞浸润情况。与空白组相比，模型组 TGF-β1、TGF-βR1、α-SMA、 CTGF、Smad2、Smad3、Smad4 的蛋白表达水平显著升高（P<0.05），而 Smad7、AMPK 水平明显降低（P<0.05）。与模型组相比，芥子酸组 TGF-β1、TGF-βR1、α-SMA、 CTGF、Smad2、Smad3、Smad4 的蛋白表达水平显著降低（P<0.05），而 Smad7、AMPK 水平明显升高（P<0.05）。结论 芥子酸能改善糖尿病小鼠心肌纤维化，其作用可能与调节 AMPK/TGF-β1/Smads 信号通路有关。

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关键字 芥子酸；糖尿病；心肌纤维化；AMPK；TGF-β1/Smads 信号通路

分类：基础营养研究

青天葵总黄酮对人鼻咽癌 CNE-2 荷瘤裸鼠皮下肿瘤的抑制作用

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目的　研究青天葵总黄酮对 BALB/c 裸鼠人鼻咽癌细胞皮下种植模型中 TGF-β1/Erk/MAPK 通路的调控作用。方法　将 BALB/c 裸鼠随机分组（n=7），于每只 BALB/c 裸鼠背部皮下接种 CNE-2 细胞悬液（1.0×107/mL，0.2 mL/只）建立鼻咽癌荷瘤裸鼠模型，每 2 天称量体重和测量肿瘤体积一次。10 天后，模型组（MOD）：灌胃 0.5 wt %羧甲基纤维素（CMC），顺铂组（DDP）：灌胃顺铂（6 mg/kg），青天葵总黄酮低剂量组：灌胃青天葵总黄酮（50 mg/kg，以 0.5 wt % CMC 混悬液配置），青天葵总黄酮高剂量组：灌胃青天葵总黄酮（250 mg/kg，以 0.5 wt % CMC 混悬液配置）。每日按（0.1 ml/10g）标准定时灌胃给药 1 次，连续给药 10 天，实验结束后，CO2 麻醉处死 BALB/c 荷瘤裸鼠，腹主动脉取血。冰上快速分离肿瘤组织并称重，用于后续实验。临床症状观察及肿瘤组织收集，苏木精-伊红染色（HE）行病理判断，免疫组化法(IHC)观察细胞周期调节蛋白-67(Ki67)、增殖细胞核抗原(PCNA)的表达水平。免疫印迹法检测转化生长因子-β1(TGF-β1)、细胞外调节蛋白激酶(Erk)、磷酸化细胞外调节蛋白激酶(p-Erk)、丝裂原活化蛋白激酶(MAPK)、磷酸化丝裂原活化蛋白激酶(p-MAPK)、p-Smad2、Smad2、p-Smad3、Smad3、细胞周期蛋白依赖性激酶 4（CDK4）、细胞周期蛋白依赖性激酶 6（CDK6）、细胞周期蛋白 1（CyclinD1）和细胞周期 G1/S 转变重要转录激活因子（myc）的蛋白表达水平。试剂盒法评估肾脏中尿素氮（BUN）和肌酐（CRE）及肝脏中谷丙转氨酶（ALT）和谷草转氨酶（AST）以及肾脏、肝脏、脾脏中超氧化物歧化酶（SOD）、丙二醛（MDA）、谷胱甘肽过氧化物酶（GSP-PX）和过氧化氢酶（CAT）水平。结果　与模型组相比，高剂量青天葵总黄酮显著抑制荷瘤小鼠肿瘤体积与质量，显著降低 Ki67(55.19%)、PCNA(46.65%)表达水平，提高肾脏、肝脏、脾脏中 SOD 水平(至 3.88 U/mgprot、2.98 U/mgprot、3.71 U/mgprot)，降低肾脏、肝脏、脾脏的 MDA 水平(至 2.19 nmol/mgprot、1.05 nmol/mgprot、2.85 nmol/mgprot)。此外青天葵总黄酮还能降低肿瘤组织中 TGF-β1、p-Erk/ Erk、p-MAPK/MAPK、p-Smad2/ Smad2、p-Smad3/ Smad3、CDK4、CDK6、myc 的蛋白表达水平。结论　青天葵总黄酮体内有明显的抑瘤作用，抑瘤机制可能是降低肿瘤细胞内相关增殖蛋白 Ki67、PCNA 表达，并下调 TGF-β1、p-Erk、p-MAPK、p-Smad2、p-Smad3、CDK4、CDK6、myc 蛋白表达来发挥作用。此外，青天葵总黄酮对肾脏、肝脏、脾脏氧化损伤有明显保护作用。

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关键字 青天葵总黄酮；鼻咽癌；TGF-β1/Erk/MAPK 信号通路；氧化损伤

分类：基础营养研究

矢车菊素-3,5-O-双葡萄糖苷改善五氟尿嘧啶诱导小鼠化疗性肠黏膜炎的效果初探

刘俊阳[1]、王可盈[1]、黄春想[1]、秦晓辉[2]、刘智强[2]、宋子纯[2]、闫传智[2]、宋家乐*[1,3,4]
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目的：探讨矢车菊素-3,5-O-双葡萄糖苷（C35G）对改善五氟尿嘧啶（5-FU）诱导化疗性小鼠肠黏膜炎作用机制。方法：48 只 BALB/c 雄性小鼠（8 周龄）经适应性饲养一周后，称量体重后并随机分为 6 组（8 只/组）。其中 5-FU 组、C35G 预防低、高剂量组（C35G-P50、C35G-P150）、C35G 治疗低、高剂量组（C35G-T50、C35G-T150）在第 1~4 天腹腔注射 5-FU（30 mg/kg），5-FU 组于每日生理盐水灌胃持续 7 天；治疗低、高剂量组分别在第 1 至 4 天进行生理盐水灌胃、第 5 至 7 天进行 C35G（50/150 mg/kg）给药灌胃；预防低、高剂量组分别每日 C35G（50/150mg/kg）给药灌胃，持续 7 天。试验期间，每天观察小鼠体重、食欲、毛发状况、精神状态及粪便排泄情况，并参照 Bowen 指数系统对各组小鼠腹泻情况进行量化评价。末次给药后，CO2 处死小鼠，取血和结肠组织。采用 ELISA 法检测各组小鼠血清中 TNF-α、IL-1β、IL-10、IL-6 水平。苏木精-伊红（H&E）、过碘酸-雪夫（PAS）、阿利新蓝（Alcian Blue）染色观察各组小鼠结肠组织，观察病理变化、杯细胞分布及黏蛋白 2（mucin2，MUC2）的分泌情况。Western blot 法检测结肠中 WNT/β-catenin 通路相关蛋白表达水平。结果：经 5-FU 给药造模后，5-FU 组小鼠体重明显呈下降趋势（P＜0.05），结肠组织较正常组小鼠表现出肠黏膜表面不完整，上皮细胞部分丢失，并伴有明显的炎性细胞浸润。。而 C35G 干预后，C35G 低、高剂量组小鼠体重下降趋势明显减缓，且 C35G 高剂量组小鼠减重幅度相对较小。在腹泻指数方面，5-FU 给药第三天后，除正常组小鼠外，其余各组小鼠均出现不同程度腹泻状况。C35G 低、高剂量组小鼠于第六天开始腹泻状况得到明显改善，且 C35G 高剂量组小鼠腹泻程度改善效果更佳。5-FU 组小鼠结肠组织较正常组小鼠表现出肠黏膜表面不完整，上皮细胞部分丢失，杯细胞及黏蛋白合成与分泌明显减少，并伴有明显的炎性细胞浸润。与 5-FU 组相比，低、高剂量的 C35G 干预能够显著改善 5-FU 所造成的小鼠结肠组织形态结构损伤，肠黏膜相对完整，可明显观察到形态完整的杯细胞及隐窝结构，并促进黏蛋白的合成与分泌，明显缓解 5-FU 造成的小鼠结肠肠黏膜损伤。C35G 干预能显著降低小鼠血清中 TNF-α、IL-1β、IL-6 水平，且升高 IL-10 水平。C35G 能显著提高结肠组织中 WNT/β-catenin 通路相关蛋白（WNT、β-catenin、LGR5、CD44、c-Myc、LRP5）的表达，促进结肠组织细胞的增殖分化与肠道屏障恢复。结论：C35G 对 5-FU 诱导的小鼠化疗性肠黏膜炎具有明显改善作用。

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关键字 矢车菊素-3,5-O-双葡萄糖苷，肠黏膜炎，WNT/β-catenin 通路

分类：基础营养研究

柚皮素调控NLRP3炎性小体对小鼠结肠纤维化的改善作用研究

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目的： 本研究旨在探讨柚皮素在葡聚糖硫酸钠（Dextran sulfate sodium，DSS）诱导的小鼠溃疡性结肠炎（Ulcerative colitis，UC）肠道纤维化的作用机制。

方法：40只6-8周龄C57BL/6J雄性小鼠按体重随机分为正常组、模型组、5-氨基水杨酸组和柚皮素组，每组10只。在适应性喂养7 d后，除了正常组外每组给予2%DSS自由饮水7天诱导小鼠UC模型，正常组与模型组灌胃生理盐水，5-氨基水杨酸组和柚皮素组分别灌胃50 mg/kg5-氨基水杨酸和30 mg/kg柚皮素。实验每天定时观察小鼠的体重、血便和腹泻等临床症状。记录小鼠结肠长度、重量,收集腹主动脉血。比较四组小鼠体重、结肠重量与长度之比、疾病活动指数（Disease activity index，DAI），苏木素-伊红（H&E）染色观察结肠病理组织学变化，阿利新蓝（AB）和过碘酸雪夫（PAS）染色观察结肠黏液层变化，马松(Masson)染色观察结肠纤维化程度。ELISA法测定血清肿瘤坏死因子-α(TNF-α)、白介素(IL)-1β、IL-6和IL-18细胞因子含量和丙二醛(MDA)、超氧化物歧化酶(SOD)水平。Western blot检测结肠组织炎症小体核苷酸结合寡聚化结构域样受体蛋白3(NLRP3)、半胱氨酸蛋白酶1(Caspase-1)、凋亡相关斑点样蛋白(ASC)、IL-1β和纤维化相关蛋白α-平滑肌肌动蛋白(α-SMA)和胶原蛋白Ⅰ型(Collagen Ⅰ)的表达。

结果：本研究发现与空白组相比，模型组小鼠体重降低，结肠长度缩短，DAI评分及组织病理学评分升高（P<0.05），柚皮素干预后显著增高了UC小鼠体重，缓解上述临床症状（P<0.05）。UC小鼠血清中TNF-α、IL-1β、IL-6和IL-18水平显著升高（P<0.05），而柚皮素能减少UC小鼠血清细胞因子TNF-α、IL-1β、IL-6、IL-18和MDA水平（P<0.05）,并升高了SOD水平（P<0.05）。此外，通过病理观察，本研究发现柚皮素能缓解结肠组织炎性细胞浸润和纤维化程度，增加杯状细胞数量和酸性黏蛋白分泌（P<0.05）。Western blot结果显示模型组小鼠结肠NLRP3、Caspase-1、ASC、IL-1β炎症因子和纤维化相关蛋白α-SMA和Collagen Ⅰ表达显著升高（P<0.05），柚皮素处理后显著降低了结肠中NLRP3、Caspase-1、ASC、IL-1β蛋白表达（P<0.05），并且使肠纤维化相关蛋白α-SMA和Collagen Ⅰ的表达显著下降（P<0.05）。

结论：本研究初步证明了柚皮素对肠道纤维化具有改善作用，其作用机制可能与下调NLRP3炎性相关因子，改善结肠炎症和减轻肠黏膜屏障损伤有关。

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关键字 柚皮素;DSS;结肠炎;肠纤维化

分类：基础营养研究

高脂饮食与低剂量 TCDD 联合作用对肥胖易感大鼠胰岛素抵抗的影响

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目的　在整体动物和细胞水平对高脂饮食与低剂量 TCDD 两因素联合作用对胰岛素抵抗（insulin Resistance，IR）产生及作用机制进行探讨。

方法　（1）采用 2×2 析因设计，研究高脂饮食（脂肪供能 40%）与低剂量 TCDD（10ng·kg-1·d-1）联合作用对 10 周龄肥胖易感（obesity-prone，OP）雌性大鼠胰岛素抵抗的影响，四组实验动物分别为：普通饮食无 TCDD 处理组（记为“Cont+TCDD 0”）、普通饮食低剂量 TCDD 处理组（记为“Cont+TCDD 10”）、高脂饮食无 TCDD 处理组（记为“HFD+TCDD 0”）及高脂饮食低剂量 TCDD 处理组（记为“HFD+TCDD 10”）。HOMA 指数判定胰岛素敏感性，油红 O 染色观察肝脏脂肪沉积，酶法测定肝脏超氧化物歧化酶（SOD）和谷胱甘肽过氧化物酶（GSH-PX）的活性。（2）用 0.5 mM 棕榈酸（Palmitic acid，PA）制备体外 3T3-L1 前脂肪细胞 IR 模型，48h 后加入不同浓度（0，0.1nM，1nM，10nM）TCDD 共染毒 24h，用油红 O 染色法观察 3T3-L1 前脂肪细胞分化情况。采用 2×2 析因设计，以 0.5 mM PA 和 10nM TCDD 共同处理诱导分化中的 3T3-L1 前脂肪细胞，ELISA 法检测细胞上清液 TNFα 与 IL-6 水平，蛋白免疫印迹法（Western blot ，WB）检测胰岛素信号通路相关蛋白（p-IRS1、Akt、p-AMPKa 及 Glut4）蛋白表达）。

结果　（1）从第 9 周起 HFD+TCDD 10 组在各时间点体重均大于 HFD+TCDD 0 组，且 HFD 与 TCDD 的交互作用具有统计学意义。实验第 13w Cont+TCDD 0、Cont+TCDD 10、HFD+TCDD 0 及 HFD+TCDD 10 各组大鼠体重分别为：（343.19±14.79）g、（345.16±15.88）g、（365.21±22.72）g 及（378.95±21.51）g，说明高脂饮食与 TCDD 能联合诱导肥胖易感雌性大鼠体重增加。①Cont+TCDD 0、Cont+TCDD 10、HFD+TCDD 0 及 HFD+TCDD 10 各组大鼠内脏脂肪系数分别为：0.1572±0.0061、0.2176±0.0077、0.2635±0.0082 及 0.3347±0.0101；②各组血清 HOMA 指数分别为：1.93±0.12、1.96±0.11、2.51±0.21 及 2.92±0.15；③各组肝脏油红 O 阳性区域比值分别为（1.41±0.23）%、（2.67±0.53）%，（8.07±1. 59）%、（34.10±1.95）%；④各组肝脏 SOD 酶活性分别为：（1.51±0.05）U/mg、（1.43±0.14）U/mg、（1.23±0.07）U/mg 及（0.75±0.13）U/mg；⑤各组肝脏 GPX 酶活性分别为：（1523.00±68.55）U/mg、（1418.00±62.35）U/mg、（1227.00±63.72）U/mg 及（957.00±84.61）U/mg；⑥各组肝脏 MDA 含量分别为（0.95±0.111）mmol/mg、（1.17±0.12）mmol/mg、（1.14±0.15）mmol/mg 及（1.45±0.17）mmol/mg。对上述指标进行交互作用分析提示，高脂饮食与低剂量 TCDD 联合作用使肥胖易感的雌性 SD 大鼠体重、内脏脂肪系数（交互作用 F=5.25，P=0.019）、血清 HOMA 指数（交互作用 F=5.31，P=0.032）、肝脏脂肪积聚（交互作用 F=10.01，P=0.0079）、脂质过氧化物 MDA（交互作用 F=4.68，P=0.027）出现协同增加；肝脏抗氧化酶类 SOD 酶活性（交互作用 F=8.09，P=0.012）和 GPX 酶活性（交互作用 F=5.97，P=0.039）协同降低。（2）3T3-L1 前脂肪细胞 IR 模型结果显示：与只加 0.5 mM PA 组相比，添加 0 0.1nM，1nM，10nM TCDD 组， 分化脂肪细胞内的甘油三酯相对量分别为：0.96±0.09、0.99±0.07、0.65±0.10 ，0.5 mM PA+10nM TCDD 对 3T3-L1 前脂肪细胞分化有明显抑制作用。①对照组、TCDD 10 nM 组、PA 0.5mM 组及 TCDD 10nM+PA0.5mM 组，各组 TNFα 含量分别为：（1.0±0.15）pg/ml、（0.9±0.19）pg/ml、（13.2±1.60）pg/ml 及（45.0±1.35）pg/ml；②各组 IL-6 含量分别为：（1.0±0.18）pg/ml、（4.2±0.19）pg/ml、（15.1±0.85）pg/ml 及（28.3±1.28）pg/ml。③对各组细胞进行胰岛素通路相关蛋白检测的结果表明，TCDD 单独处理除可引起 p-IRS1 表达增加外，对 p-Akt、p-AMPKa 及 Glut4 的表达无影响，但单独 PA 处理可导致 p-Akt、p-AMPKa 及 Glut4 蛋白表达下降、p-IRS1 表达增加。PA 与 TCDD 联合作用则能协同降低 p-Akt、p-AMPKa 蛋白表达，协同增加 p-IRS1 表达，但对 Glut4 的蛋白表达交互作用无统计学意义（P＞0.05）。。

结论　（1）高脂饮食与低剂量 TCDD 联合暴露 13w，能协同增加 OP 雌性大鼠 HOMA 指数，促进 IR；（2）高脂饮食与低剂量 TCDD 联合暴露 13w，能协同增加 OP 雌性内脏脂肪系数、肝脏 MDA 水平、促进肝脏脂质沉积，协同降低肝脏 SOD 和 GPX 酶活性；（3）PA 与 TCDD 联合暴露，能协同

抑制 3T3-L1 前脂肪细胞分化，促进脂肪细胞分泌 TNFα 与 IL-6；（4）PA 与 TCDD 联合暴露，能协同促进 p-IRS1，并进而协同抑制 p-Akt、p-AMPKa 蛋白表达，PA 与 TCDD 可能通过激活 Ikkβ/NF-kB 通路促进 IR 形成。

关键字 胰岛素抵抗；四氯二苯并二噁英；高脂膳食；氧化应激；3T3-L1 前脂肪细胞；肥胖易感

分类：基础营养研究

高脂饮食与低剂量 TCDD 联合作用对肥胖诱导雄性小鼠肝纤维化的影响研究

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目的　肥胖已被证明能增加代谢障碍性脂肪性肝病（metabolic dysfunction-associated fatty liver disease，MAFLD)的发生与发展，2,3,7,8-四氯二苯并对二恶英（2,3,7,8-tetrachlorodibenzo-p-dioxin,TCDD）是持久性有机污染物（Persistent organic pollutants，POPs）二噁英家族中毒性最强的同系物，具有广泛毒性，能导致肝脏氧化应激、炎症反应、纤维化等多种毒性反应，但高脂饮食与 TCDD 两因素联合作用对 MAFLD 的影响还鲜有报道，实际上，目前世界上有很多人同时面临高脂（肥胖）和 POPs 的双重危害，本文拟在整体动物水平对 TCDD 与高脂饮食两因素联合作用对肝纤维化的影响及作用机制进行探讨，其结果可以为解释 MAFLD 患病率快速上升提供实验证据，并给预防 MAFLD 提供有效建议。

方法　（1）采用 2×2 析因设计，研究高脂饮食（脂肪供能 45%）与低剂量 TCDD（1μg-1·kg-1·d-1）联合作用对 10 周龄肥胖易感（obesity-prone，OP）雄性小鼠肝纤维化的影响，4 组 OP 小鼠接受高脂饮食与 TCDD 两因素处理，分别为：①普通饮食无 TCDD 处理组（喂饲正常饲料，简称 ND 组）；②普通饮食+TCDD 1μg-1·kg-1·d-1 处理组（喂饲正常饲料+1μg-1·kg-1·d-1 TCDD 处理，简称 ND+TCDD 组）；③高脂饮食无 TCDD 处理组（喂饲高脂饲料，简称 HFD 组）；④高脂饮食+TCDD 1μg-1·kg-1·d-1 处理组（喂饲高脂饲料+1μg-1·kg-1·d-1 TCDD 处理，简称 HFD+TCDD）。

各组根据有无 TCDD 暴露，分别给予 1μg-1·kg-1·d-1 TCDD 及玉米油每周腹腔注射 1 次，持续 6w（42d）。天狼猩红染色观察肝脏胶原沉积，MASSON 染色观察肝纤维化情况。酶法检测血液生化指标（AST、ALT、FFAs），免疫荧光法检测肝脏活性氧（ROS），q-PCR 法检测肝脏胶原形成（αSMA、Col1a1、Col1a2、Col3a1、Ctgf、TGFβ1、Smad1、Smad2、Smad3）、炎症反应（CD68、TNFα、IL-1β、IL-6、Leptin、CCL2）、氧化应激（Nrf2、NQO1）和脂质代谢（CD36、PPAR、PPAR、Mogat、Scd1、Acaca）等标志性基因的 mRNA 表达。

结果　（1）从第 4 周起 ND 及 ND+TCDD 组体重在各时间段均低于 HFD 及 HFD+TCDD 组）差异具有统计学意义（P<0.05）。（2）ND 组、ND+TCDD 组、HFD 组、HFD+TCDD 组天狼猩红染色于 MASSON 染色阳性得分分别为：1.25±0.07、4.7±0.14、5.05±0.21、3.0±0.14；以及 1.06±0.06、5.55±0.20、4.2±0.14、2.55±0.19。结果显示，TCDD 与 HFD 两因素联合作用能协同抑制肝纤维化，交互作用具有统计学意义（P<0.05）；（3）ND 组、ND+TCDD 组、HFD 组、HFD+TCDD 组肝组织 ROS 荧光染色强度分别为：1.01±0.04、2.14±0.13、1.08±0.78、1.66±0.11。结果显示，TCDD 与 HFD 两因素联合作用能协同 ROS 生成，交互作用具有统计学意义（P<0.05）；（4）ND 组、ND+TCDD 组、HFD 组、HFD+TCDD 组血清 AST 、ALT 酶活力分别为：184±21.6、217.5±18.3、351±35.7、265±22.4；以及 43.0±8.9、78.3±11.2、141.8±21.0、99.1±17.6。结果显示，TCDD 与 HFD 两因素联合作用能协同抑制 AST 升高，交互作用具有统计学意义（P<0.05）；（5）ND 组、ND+TCDD 组、HFD 组、HFD+TCDD 组血清 FFAs 分别为：0.97±0.21、1.80±0.20、1.28±0.08、1.08±0.09，结果显示，TCDD 与 HFD 两因素联合作用能协同抑制 FFAs 升高，交互作用具有统计学意义（P<0.05）；（6）对小鼠肝脏纤维化相关标志基因的 mRNA 表达检测结果显示，TCDD 与 HFD 两因素联合作用能协同抑制 Col1a1、TGFβ1、Smad1 与 Smad2 的 mRNA 表达，交互作用具有统计学意义（P<0.05），而对 αSMA、Col1a2、Col3a1 与 Smad3 mRNA 表达水平的影响，差异无统计学意义（P＞0.05）；（7）对小鼠肝脏炎症通路相关标志基因的 mRNA 表达检测结果显示，TCDD 与 HFD 两因素联合作用能协同抑制 CD68、IL-1β 及 CCL2 的 mRNA 表达，交互作用具有统计学意义（P<0.05），而对 TNFα、IL-6 及 Leptin mRNA 表达水平的影响，差异无统计学意义（P＞0.05）；（8）对小鼠肝脏氧化应激通路相关标志基因的 mRNA 表达检测结果显示，TCDD 与 HFD 两因素联合作用能协同抑制 NrF2 和 NQO1 的 mRNA 表达，交互作用具有统计学意义（P<0.05）。

结论　（1）高脂饮食与低剂量 TCDD 联合暴露 12w（高脂 6w，高脂+TCDD 6w），能协同抑制 OP 雄性小鼠肝脏纤维化的发生；（2）OP 雄性小鼠肝脏纤维化改善可能与其血清 AST、ALT 及 FFAs 指标改善，以及小鼠肝脏 TGFβ1 通路（包括 Smad1/ Smad2）、炎症通路（CD68、IL-1β 及 CCL2）、及氧化应激通路（ROS/NrF2/NQO1）的相关基因的 mRNA 表达均被协同抑制有关。

关键字 肝纤维化；四氯二苯并二噁英；高脂膳食；氧化应激；肥胖易感

分类：基础营养研究

玉木耳多糖对糖尿病小鼠血糖调节及肠道菌群的影响

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摘要：目的　研究玉木耳多糖对 2 型糖尿病小鼠的影响作用，探讨玉木耳多糖的降血糖作用和肠道菌群的相关性，为综合开发玉木耳多糖防治 2 型糖尿病提供理论依据。

方法　以 5 周龄健康雄性 ICR 小鼠为实验对象，适应性饲养一周后，随机挑选 12 只小鼠作为空白对照组（BC），喂基础维持饲料。其余 80 只小鼠作为实验组，以高糖高脂饲养联合腹腔注射 STZ 的方式建立 2 型糖尿病模型。将建模成功的小鼠随机分为阴性对照组（NC）、阳性对照组 PC（二甲双胍）、玉木耳多糖高剂量组 H（400mg/kg）、玉木耳多糖中剂量组 M（200mg/kg）和玉木耳多糖低剂量组 L(100mg/kg)。BC 和 NC 组小鼠每天灌胃同等质量饮用水。共干预 6 周。采用 GC-MS 检测小鼠肠道内短链脂肪酸，高通量测序测定肠道菌群物种组成和丰度。

结果　玉木耳多糖可有效改善糖尿病小鼠多饮、多食、体重减轻等多种症状。玉木耳多糖干预 6 周后，各剂量组小鼠以上症状均有改善，H 组小鼠体重明显增加（P<0.05）。与糖尿病模型组小鼠相比较，玉木耳多糖处理后小鼠血清中血糖含量及血清胰岛素浓度显著降低（P<0.05），胰岛素与受体敏感性增强，胰岛素抵抗显著减少（P<0.01），使胰岛素分泌水平趋于正常对照组。玉木耳多糖可改善糖尿病小鼠血脂异常的症状，血清中 TC、TG、LDL-c 浓度显著降低（P<0.01），HDL-c 含量水平增加（P<0.05）。组织病理学分析可知，玉木耳多糖可改善 T2DM 小鼠肝脏和胰腺组织病理损伤，减少细胞不规则、萎缩、空泡等现象。

玉木耳多糖干预可以改善糖尿病小鼠肠道中短链脂肪酸紊乱的现象，与 BC 组相比，NC 组小鼠粪便中乙酸、丙酸、丁酸、异丁酸、戊酸、异戊酸浓度显著下降（P＜0.05，P＜0.01），经二甲双胍和玉木耳多糖灌胃干预后，阳性组和玉木耳多糖组小鼠粪便中 6 种短链脂肪酸酸浓度相较于 NC 组均有所增加（P＜0.01），且 PC 组、H 组与 BC 组无显著性差异。对小鼠肠道菌群样本的 Alpha 和 Beta 多样性进行 OUT 分析，发现玉木耳多糖可以提高 T2DM 小鼠肠道菌群的丰度，玉木耳多糖剂量梯度中，H 组的效果最为显著（P<0.01）；在门水平、属水平上分析不同小鼠肠道微生物菌落的物种组成，发现 T2DM 的小鼠肠道菌群明显发生紊乱，NC 组小鼠肠道中 Firmicutes 以及 Proteobacteria 丰度升高明显高于 BC 组(P<0.01)，而 Bacteroidot、Actinobacteriota 和 Patescibacteria 丰度则较低；玉木耳多糖干预则下调门水平 Firmicutes 和属水平 Candidatus_Arthromitus 相对丰度，同时上调门水平 Bacteroidetes 和属水平 Lactobacillus 相对丰度，调节优势菌门、优势菌属，改善 T2DM 引起的小鼠肠道菌群紊乱现象。通过多因子联合分析发现，小鼠肠道 OUT 数与 SCFAs、Weight 和 HDC-c 呈正相关（Pearson 相关系数 r>0，P<.05）而与空腹血糖（FBG）、胰岛素（insulin）、胰岛素抵抗指数（HOMA-IR）、TC、TG、LDC-c 等因子呈负相关（Pearson 相关系数 r<0，P<0.05）。

结论　玉木耳多糖对糖尿病有一定的防治效果，且呈现一定的剂量依赖性。玉木耳多糖对肠道菌群及其代谢产物的调节作用很可能是其发挥抗糖尿病作用的机制之一。

关键字 玉木耳多糖；降血糖活性；短链脂肪酸；肠道菌群

分类：基础营养研究

缫丝水通过调控 Nrf2-ARE 信号通路改善老龄大鼠肝脏氧化应激的研究

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摘要： 缫丝水是蚕茧加工成生丝过程中缫丝工序产生的废水，主要成分为丝胶蛋白和蚕蛹蛋白，直接排放易造成水体富营养化，引起严重的环境污染。若能对其进行回收利用，将大大降低生产企业的废水治理成本，具有很重要的环境保护意义。我们的前期研究已发现缫丝水具有显著降脂作用，并调节氧化应激代谢，但其机制尚不完全清楚。**目的** 探讨缫丝水对老龄大鼠肝脏氧化应激的改善作用，初步分析缫丝水能否通过上调核因子 NF-E2 相关因子（nuclear factor ertythroid 2 related factor 2，Nrf2）发挥改善氧化应激的作用。**材料和方法** 采用 16 月龄老龄大鼠，根据血清丙二醛（malonaldehyde，MDA）含量将大鼠分层随机分为 3 个受试剂量组和 1 个阴性对照组，每组 10 只。剂量组分别给予 500、250、125 mg/kg BW 剂量的缫丝水，阴性对照组给予纯水，每天灌胃一次，连续灌胃 30 天。实验结束后，采用化学发光免疫分析法检测各组大鼠肝组织中脂质氧化产物 MDA、蛋白质氧化产物蛋白质羰基、抗氧化物质还原型谷胱甘肽（reduced glutathione，GSH）的含量和超氧化物岐化酶（superoxide dismutase，SOD）、过氧化氢酶（catalase，CAT）、谷胱甘肽过氧化物酶（glutathione peroxidase，GSH-Px）三种抗氧化酶的活性，采用荧光定量 PCR 检测老龄大鼠肝组织 SOD、CAT、GSH-Px、GSH 及 Nrf2 的 mRNA 表达水平，采用 ELISA 检测 Nrf2 核蛋白表达水平。**结果** ①缫丝水高剂量组大鼠肝组织中 MDA 含量显著低于阴性对照组（P<0.05），表明缫丝水能降低老龄大鼠肝组织中过氧化脂质的含量。而缫丝水各剂量组大鼠肝组织中蛋白质羰基和 GSH 含量与阴性对照组相比较均无差异（P>0.05）。②缫丝水高、中剂量组老龄大鼠肝组织中 SOD 酶活力显著高于阴性对照组（P<0.01 或 P<0.05），表明缫丝水能提高老龄大鼠肝组织中 SOD 酶活力。缫丝水高、中、低剂量组老龄大鼠肝组织中 CAT 酶活力均显著高于阴性对照组（P<0.01），表明缫丝水能提高老龄大鼠肝组织中 CAT 酶活力。缫丝水高剂量组大鼠肝组织中 GSH-Px 酶活力显著高于阴性对照组（P<0.05），表明缫丝水能提高老龄大鼠肝组织中 GSH-Px 酶活力。③缫丝水各剂量组老龄大鼠肝组织中 CAT、GSH、 GSH-Px1、Nrf2-1、Nrf2-2、SOD1mRNA 表达水平显著高于阴性对照组，差异有统计学意义（P<0.05 或 P<0.01）。SOD2、SOD3mRNA 表达水平与阴性对照组比较无差异（P>0.05）。④缫丝水老龄大鼠肝组织中高剂量组 Nrf2 核蛋白表达水平显著高于阴性对照组（P<0.05）。**结论** 缫丝水可能通过上调 Nrf2 蛋白表达提高 SOD、CAT 和 GSH-Px 表达水平，提高老龄大鼠肝组织中酶促抗氧化体系，发挥改善氧化应激的作用。

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关键字 缫丝水；氧化应激；Nrf 2；ARE；信号通路

分类：基础营养研究

细胞因子在免疫性血小板减少症防治中的文献计量学分析

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目的：免疫性血小板减少症（immune thrombocytopenia，ITP）是一种由免疫系统介导的复杂自身免疫性疾病，治疗方式有限且治愈难度大，给社会带来沉重的医疗和经济负担。细胞因子在 ITP 发病机制中起着不可或缺的作用，已经成为治疗 ITP 的重要靶点。然而，目前 ITP 细胞因子尚无全面的文献计量学分析，因此本研究旨在用文献计量学的方法探讨近 21 年 ITP 细胞因子领域的研究现状和未来可能的发展方向。

方法：文献计量学是根据出版物原始信息对作者、国家/地区、机构、关键词和参考文献多个方面进行可视化分析，从而获得某个领域中的优质作者、高产国家、高产机构及发展趋势等有效信息。本文从 Web of Science 数据库的核心合集（WoSCC）检索 2002 年—2022 年间有关 ITP 细胞因子的出版物 573 篇，经查重及筛查文献类型，排除 4 篇书籍类型的出版物。通过进一步阅读文献的题目和摘要，排除 27 篇未涉及细胞因子文献和 172 篇非 ITP 文献，最后得到 370 篇有效文献（论著 291 篇，综述 79 篇），利用 VOSviewer、CiteSpace、R 包“bibliometrix”和 Pajek 4 种文献计量工具对这些文献从国家/地区、机构、期刊和共被引期刊、作者和共被引作者、共被引文献及关键词的共现关系等方面进行了文献计量学分析。

结果：在 2002 年—2022 年中，与 ITP 细胞因子相关的出版物数量虽有波动，但基本呈增长趋势。其中，以美国和中国为代表的 52 个国家/地区共发布 370 篇有效文献。706 个机构对有效文献的刊行做出了贡献，其中山东大学、多伦多大学和中国医学科学院是发文数量最多的研究机构。在 206 个发行了有效文献的期刊中，Blood 作为发文量和共被引次数最多的杂志，是该领域中最受欢迎的杂志。在对有效文献做出贡献的 2391 名研究人员中，Ming Hou、Jun Peng 和 Lei Zhang 是发文数量≥10 篇且排名前 3 位的作者，John W. Semple、David J. Kuter 和 Francesco Rodeghiero 是共被引频次最高的 3 位作者。分析该领域的参考文献，发现被引频次最高和爆发强度最大的引文均为“Standardization of terminology, definitions and outcome criteria in immune thrombocytopenic purpura of adults and children: report from an international working group”。 关键词分析显示，Th17 细胞、B 细胞及树突状细胞与其相关的细胞因子在 ITP 中的作用机制是 2002 年—2022 年间的研究热点， ITP 细胞因子相应的受体及其基因是未来的研究趋势。

结论：细胞因子在 ITP 研究中的发文数量呈现快速增长趋势，该领域具有广阔的研究价值和发展前景。在 2002 年—2022 年间，ITP 细胞因子领域的研究主要集中在美国和中国，首要发表在血液学和免疫学的杂志上。且免疫细胞及相关细胞因子的作用机制是该领域近年来的重点课题，细胞因子作为 ITP 的关键靶点，未来仍需更加深入地挖掘其作用特点和机制，并近一步研发出安全有效的精准营养物质，这为 ITP 患者的缓解和治愈带来新希望。ITP 的发病是多种机制共同参与的复杂结果，今后应将个体、器官、组织、细胞和分子层面的各项科研结果有效融合起来，从而有利于整体化的机制研究和成果转化。

关键字 细胞因子；免疫性血小板减少症；文献计量学；CiteSpace; VOSviewer

分类：基础营养研究

关于清咽润喉保健功能动物模型与评价体系的优化

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目的：近年来由于空气质量的恶化、人们工作压力的增大以及不良生活习惯的增多等，咽炎的发病率明显增高，尤其是在过多有害气体环境下工作以及用嗓过多的人群。咽炎病程长、易反复发作等特点已经严重影响了患者的身心健康。既往研究显示，经常食用清咽润喉类保健食品可起到缓解症状、辅助改善体征、预防咽炎发生发展的作用。这也导致近年来市面上出现的清咽润喉保健食品越来越多。虽然目前对于清咽润喉类保健食品所采取的动物实验评价方法都是通过棉球肉芽肿净量、足趾肿胀率以及耳廓肿胀率进行功效评价，但评价指标单一且存在主观性，仅从某一角度评价产品、存在一定的局限性，无法最大程度上反应受试物对动物抗炎作用的影响。因此，本研究拟采用阿司匹林水溶液为阳性物，在既往研究的基础上，增加血液学指标和病理观察等指标，以期针对各项动物实验制定出完善的评价体系；进而建立出更加全面、完善的清咽润喉保健食品的评价方法。方法：实验分为棉球植入实验、足趾肿胀实验和耳肿胀实验。将 40 只 SD 大鼠、20 只 ICR 小鼠分为 2 组，即阳性实验组和模型对照组，每组 10 只。阳性实验组予以阿司匹林灌胃处理，灌胃剂量为 0.10 g/kg；模型对照组予以无菌水灌胃处理，连续灌胃 30 天。观察各组大鼠棉球肉芽肿净量、大鼠足趾肿胀率、小鼠耳廓肿胀率、小鼠脏器系数、大鼠血清炎症指标水平、大鼠棉球肉芽肿组织和小鼠耳廓肿胀组织病理切片。结果：与模型对照组相比，阳性实验组大鼠棉球肉芽肿净量、大鼠足趾肿胀率和小鼠耳廓肿胀率均显著下降，且差异具有统计学意义（$p < 0.05$），提示模型构建成功。小鼠脾脏系数、胸腺系数虽有所改变，但差异无统计学意义（$p > 0.05$）。棉球植入实验大鼠血清中白细胞介素-1α（IInterleukin-1α，L-1α）、白细胞介素-1β（IInterleukin-1β，IL-1β）、白细胞介素-6（ IInterleukin-6, IL-6）、白细胞介素-10（IInterleukin-10, L-10）、环氧化酶-2（ cyclooxygenase 2, COX-2）、前列腺素 E2（prostaglandin E2, PGE2）以及组胺（Histamine, HIS）水平均有不同程度下降（$p < 0.05$）。棉球肉芽肿组织、小鼠耳廓肿胀组织病理结果较模型对照组有所改善，镜下观察可见棉球肉芽肿组织内炎细胞浸润程度减轻、小鼠耳廓皮肤皮脂腺细胞变性和血管扩张发生率以及严重程度均有改善。结论：在大鼠棉球肉芽肿净量、大鼠足趾肿胀率和小鼠耳廓肿胀率指标基础上，增加血清炎症指标和组织病理学观察指标，可以更加客观、具体地评价相关保健食品的清咽润喉功能。

关键字 咽炎；清咽润喉保健食品；功效评价

分类：基础营养研究

桃胶多糖对糖尿病小鼠血糖调节及肠道菌群的影响

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目的：探讨桃胶多糖对糖尿病小鼠的血糖调节及肠道菌群的影响，以及桃胶多糖降血糖作用的可能机制。

方法：采用 ICR 雄性小鼠通过高脂饲料喂养及 STZ 注射诱导建立 T2DM 模型，将造模成功后的糖尿病小鼠，随机分为阴性对照组 NC（超纯水）、阳性对照组 PC（二甲双胍）、桃胶多糖高剂量组 HDG、桃胶多糖中剂量组 MDG、桃胶多糖低剂量组 LDG；同时设置未造模的正常 ICR 雄性小鼠为空白对照组 BC。干预饲养 6 周后，通过 OTGG 实验，血清生化指标测定，采用 HE 染色观察分析肝脏和胰腺析形态变化； 并对小鼠的粪便中短链脂肪酸的检测分析，采用 16SrDNA 技术对肠道菌群测序分析。

结果：经过 6 周干预后，桃胶多糖组 T2DM 小鼠血糖水平显著降低（$p<0.01$）；OTGG 实验也显示了桃胶多糖的保护作用，桃胶多糖干预后小鼠口服葡萄糖 30 min 后血糖水平显著降低（$p<0.01$），PC 组降糖效果最好，其次是 HDG 组。桃胶多糖明显降低了糖尿病小鼠血清中 TC、TG、LDL-c 浓度（$p<0.01$），升高 HDL-c 水平（$p<0.05$）。小鼠胰腺病理学检查显示，桃胶多糖各剂量组都明显改善胰岛细胞的形态不规则、变性、萎缩、坏死、空泡化等情况，其中 PC 组和 HDG 组修复效果最显著；NC 组小鼠表现为肝脏脂肪变性现象，组织间有空泡，在不同剂量的桃胶多糖和二甲双胍干预组后，PC 组和 HDG 组、MDG 组肝脏病变数量减少，但在 MDG 组和 LDG 组小鼠组织切片中仍可见少量脂滴。

桃胶多糖干预显著增加了 T2DM 小鼠肠道的总短链脂肪酸含量（$p<0.01$）。与对照相比，二甲双胍和桃胶多糖干预后，PC 组和桃胶多糖组小鼠粪便中乙酸、丙酸、丁酸、异丁酸、戊酸、异戊酸浓度均有不同程度增加（$P<0.01$，$P<0.05$），表明桃胶多糖可以影响小鼠肠道内短链脂肪酸的含量，且存在一定的剂量效应。在 OTU 水平上，对 6 个实验组小鼠肠道微生物群落进行 Alpha 和 Beta 多样性分析，桃胶多糖和二甲双胍干预显著增加了 T2DM 小鼠肠道菌群的多样性，其中 HDG 组效果在三个剂量中最为显著；在门及属水平上分析小鼠肠道微生物群落结构时发现，桃胶多糖能显著增加 Bacteroidota、Patescibacteria、Actinobacteria、Desulfobacterota、Cyanobacteria 等菌门的相对丰度（$p<0.01$），增加肠道有益菌的丰度，抑制 Proteobacteria 等有害菌门和 Ralstonia 有害菌属的相对丰度（$p<0.01$）；有益菌如 Lachnoclostridium、Lachnospiraceae、Alistipes 等与对 SCAFs、Weight、HDL-c 呈正相关（$p<0.01$），有害菌属如 Ralstonia、Methylobacterium 等与 FBG、Insulin、HOMA-IR、TC、TG、LDL-c 呈正相关（$p<0.01$）。

结论：桃胶多糖对糖尿病小鼠的血糖水平有明显降低作用，可以显著减轻 T2DM 小鼠的胰岛素抵抗（$p<0.01$），增强胰岛素敏感性，加速葡萄糖的代谢，改善胰岛细胞形态和功能；通过影响肠道微生物菌落的变化，增加 Lachnoclostridium 等有益菌属丰度，降低 Ralstonia 等有害菌属丰度，以增加 SCFAs 水平，调节机体代谢循环，影响血糖值、体重、TC、TG、HDL-c、LDL-c、胰岛素水平和胰岛素抵抗等指标，从而改善代谢紊乱，缓解糖尿病及其引发的并发症。

关键字 桃胶多糖；糖尿病；短链脂肪酸；肠道菌群

分类：基础营养研究

肝癌铁代谢异常的分子机制及其对肝癌进展的作用分析

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目的：铁过负荷是肝细胞癌(HCC)的独立诱导因子或辅助因子，然而肝癌组织中的铁含量却显示降低。针对肝癌组织中缺铁的分子机制及对肝癌进展的作用目前尚不明确。肝癌细胞代谢紊乱、代谢重编程是肝癌的重要特征，其显著影响肝癌进展、预后和转归，因此阐明肝癌铁代谢异常的原因具有一定的理论和现实意义。

方法：建立原发性肝癌和原位植入瘤肝癌模型，通过动物实验观察肿瘤铁含量的变化、铁代谢分子的表达，对比分析相关分子表达谱，确定肝癌组织中不是缺铁导致变化的分子，并验证其对调节细胞内铁含量的下游效应。活体成像观察肝癌生长、转移情况；进一步检测细胞内基因蛋白表达、免疫细胞浸润及功能因子表达情况，对肝肿瘤组织内的分子基因表达进行分析。

结果：构建的原发性肝癌和原位植入瘤模型中，肝肿瘤组织铁含量明显降低；检测肿瘤组织中的铁代谢分子，经肝癌细胞与肝癌组织对比分析发现，STEAP3、DMT1 和 SLC46A1 可能是肝癌缺铁的原因，进一步干扰/过表达验证确定 SLC46A1 在肝细胞癌变过程中表达丢失导致肝癌组织缺铁。同时我们观察到小鼠和大鼠体内显像显示缺铁可增加肝癌的肺转移。检测缺铁肝癌细胞内的分子基因表达，发现免疫调节介质 S1P 的转运蛋白 SPNS2 表达上调，利用转录因子活性微阵列验证确定肝肿瘤中经 SP1 转录因子活性增强而明显上调 SPNS2 的表达，向细胞内转运 S1P，降低免疫系统功能，抑制肿瘤组织免疫细胞浸润，增强肿瘤细胞迁移能力促进肝癌转移；除此之外，我们还发现在缺铁肝肿瘤中与血管生成相关的谷氨酰氨基肽酶(ENPEP)表达持续下降。有趣的是，ENPEP 的低表达与肝癌患者预后不良相关，而肿瘤组织中血管生成的生物标志物 CD31 和 CD34 升高；利用转录因子序列分析发现 ENPEP 与 SP1 结合位点丰富，并验证确定肝肿瘤组织中缺铁加强 SP1 因子转录活性，从而降低 ENPEP 表达、增加肝脏肿瘤的血管生成和转移，以非免疫抑制的方式促进肝癌肺转移。

结论：肝癌肿瘤组织内铁含量降低及铁代谢发生改变，血红素铁转运蛋白 SLC46A1 可调控肝脏铁稳态，其在肝细胞癌变过程中表达丢失导致肝癌组织缺铁。肝癌进展过程中，缺铁经免疫抑制和非免疫依赖抑制机制促进肝癌转移。这些结果进一步阐明了肝癌铁代谢异常的分子机制及对肝癌进展的作用，为预防肝癌疾病进展提供新思路。

关键字 铁代谢、SLC46A1、肝细胞癌、SPNS2、ENPEP

分类：基础营养研究

牛乳中原生态与人工添加二十二碳六烯酸的消化特性和生物可及性比较

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目的：牛奶及其制品是一种营养丰富的食品，含有多种人体所需的营养成分，如蛋白质、钙、锌、维生素等，在日常膳食结构中占据重要地位。二十二碳六烯酸（docosahexaenoic acid，DHA）是一种 n-3 多不饱和脂肪酸，对人体的大脑、视力和心血管系统等方面都具有重要作用。DHA 强化牛乳在提供普通牛奶营养价值的同时，还可为机体补充 DHA，然而 DHA 强化牛乳中不同来源 DHA 的生物可利用特性尚不明确，需要进行深入研究分析。本研究旨在探索牛乳体系中原生态和人工添加 DHA 的生物可及性差异，并进一步探究导致该差异的潜在作用机制。方法：用富含 DHA 的微藻粉饲喂奶牛，采乳后经过均质灭菌等流程制备得到原生态 DHA 牛乳制品（原生态 DHA 乳）。另外，向普通牛乳中分别加入富含 DHA 的鱼油和藻油，并经过同样的均质灭菌工艺，制备得到两种人工添加 DHA 的牛乳制品（鱼油 DHA 乳和藻油 DHA 乳）。本研究以上述三种牛乳制品为研究对象，采用标准化 INFOGEST 体外模拟消化系统评估各样品中 DHA 的生物可及性和消化损失率，通过气相色谱和脂质组学等方法分析 DHA 的含量和化学结合形式，使用 pH-stat 自动电位滴定仪测定并计算样品乳的乳脂脂解情况。结果：与人工添加 DHA 相比，牛乳中原生态 DHA 具有更高的生物可及性（鱼油 DHA 乳 62.8%，藻油 DHA 乳 63.4% vs. 原生态 DHA 乳 76.9%，$p \leq 0.01$）和更低的消化损失率（鱼油 DHA 乳 19.2%，藻油 DHA 乳 27.7% vs. 原生态 DHA 乳 18.1%，$p \leq 0.05$）。在 DHA 的化学结合形式方面，相比于鱼油 DHA 乳和藻油 DHA 乳，原生态 DHA 乳中含有更多的磷脂型 DHA（鱼油 DHA 乳 0.3%，藻油 DHA 乳 0.4% vs. 原生态 DHA 乳 10.2%，$p \leq 0.01$）和 sn-2 位 DHA（鱼油 DHA 乳 33.3%，藻油 DHA 乳 42.3% vs. 原生态 DHA 乳 51.2%，$p \leq 0.01$），同时，甘油骨架上 DHA 的相邻酯键位置连接了更少的长链脂肪酸（鱼油 DHA 乳 94.8%，藻油 DHA 乳 92.6% vs. 原生态 DHA 乳 47.7%，$p \leq 0.01$）和更多的饱和脂肪酸（鱼油 DHA 乳 17.8%，藻油 DHA 乳 14.5% vs. 原生态 DHA 乳 46.9%，$p \leq 0.01$）。在乳基质对 DHA 消化吸收的影响方面，在模拟小肠消化过程中，原生态 DHA 乳比鱼油 DHA 乳和藻油 DHA 乳具有更高的游离脂肪酸释放量（鱼油 DHA 乳 163.6 μmol/mL，藻油 DHA 乳 199.0 μmol/mL vs. 原生态 DHA 乳 219.8 μmol/mL，$p \leq 0.01$）以及更快的脂解速率（游离脂肪酸释放的一级速率常数为：鱼油 DHA 乳 0.0427 min^{-1}，藻油 DHA 乳 0.0254 min^{-1} vs. 原生态 DHA 乳 0.052 min^{-1}）。结论：牛乳体系中原生态 DHA 的生物可及性显著优于人工添加 DHA，其作用机制与牛乳内源 DHA 具有更易于消化吸收的化学结合形式以及更低的消化损失率有关。此外，原生态 DHA 乳中乳脂的易消化性亦对其内源 DHA 的高生物可及性具有一定贡献。这项研究为我们提供了有关 DHA 在牛乳中的生物可及性和消化损失率的重要信息。它表明牛乳中内源富集的原生态 DHA 比外源人工添加的 DHA 具有更优秀的消化吸收利用潜力。

关键字 原生态 DHA，人工添加 DHA，生物可及性，化学结合形式，乳脂消化特性

分类：基础营养研究

慢性肾脏病患者味觉改变的 meta 分析和系统性评价

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目的 味觉是人类的重要感官知觉，与食物摄入和进食体验密切相关。随疾病进展和尿毒素蓄积，味觉改变是一种多发但易被忽视的慢性肾脏病不悦症状。本研究将检索国内外文献，就疾病暴露 meta 分析慢性肾脏病患者味觉改变的发生风险，同时整合味觉改变的发生率，综述相关影响因素和伴随症状。

方法 计算机检索中国知网、万方数据库、pubmed、embase 和 web of science 数据库，搜索慢性肾脏病和味觉感知异常相关性的研究，检索时限从建库至 2023 年 1 月 31 日。检索采用主题词与自由词相结合的方式进行。英文检索词包括："Taste Perception" 、 "Taste Threshold"、"Taste Disorders"、 "Dysgeusia" 、"Ageusia"、"Chronic Kidney Disease" 、"Chronic Kidney Failure" 、"Kidney Disease"；中文检索词包括：味觉改变、味觉异常、味觉障碍、味觉感知、味觉阈值、味觉、慢性肾脏病、慢性肾衰竭、尿毒症、透析、终末期肾脏病。根据暴露因素：慢性肾脏病疾病诊断，排除重复发表的文献；非中、英文文献；无法获得全文的文献；会议论文和缺少评估工具或没有报告味觉改变发生的文献，提取以下结局指标：①发生味觉改变；②相关影响因素；③相关伴随症状，根据纽卡斯尔-渥太华量表和美国卫生保健质量和研究机构评价标准并进行发表偏倚风险评估。采用 stata 软件进行资料分析。暴露组和非暴露组风险分析采用比值比（odds ratio，OR）为效应分析统计量，及 95%可信区间（confidence interval，CI）。metaprop 模块进行单组率的 meta 分析。

结果 共 13 个纳入的研究，横断面研究 8 个，病例对照研究 4 个，队列研究 1 个，共 4090 例患者。主观的测评工具根据患者自我报告或口头描述定义味觉改变症状，主要报告为“糟糕的味觉”、“味觉改变”、“味觉异常”、“味觉丧失”、“不舒适的味觉“。客观的测评工具包括 Burghart® 味觉测试试纸、根据浓度梯度调配的味觉刺激测试液。较非 CKD 人群，CKD 组发生味觉改变的比值比 OR=6.23, 95%CI（1.56,25.20）。4090 例患者中发生味觉改变病例 1165 例，总味觉改变发生率为 28%，95%CI（0.19,0.37）。亚组分析结果，eGFR<20ml/min/1.73m2 的患者味觉改变发生率为 34% [95%CI（0.29,0.39）]高于 eGFR≥20ml/min/1.73m2 的患者 18%[95%CI（0.05，0.38）]。使用客观测评工具的味觉改变筛查结果为 41.4%[95%CI（0.032,0.878）]高于使用主观测评工具 25.0%[95%CI（0.18,0.32）]。发展中国家报道 CKD 患者味觉改变发生率为 47%[95CI（0.18,0.77）]高于发达国家报道结果 23%[95CI（0.15,0.31）]。描述性分析结果，年龄与味觉改变有关，年龄越大味觉改变越多，p=0.02。女性患者发生率更高，p<0.05。终末期患者接受透析治疗时间越长，发生味觉改变的人数占比更低，p<0.05。血清蛋白水平、血肌酐水平、甲状腺激素水平在味觉改变患者中更低，血清铁水平更高。蛋白质摄入量减少（-0.04 kcal/kg/d; p = 0.006）、钠摄入量减少（-90 mg/day; p = 0.02）与味觉改变有关；营养不良（p=0.030）、中臂围肌肉含量减少(-0.28 cm; p= 0.05)与味觉改变有关；恶心（p=0.001）、呕吐（p=0.001）、腹泻（p=0.001）、口干（p=0.011）等消化道症状的发生与味觉改变有关；味觉改变与全因死亡率增加有关 HR=1.17,95%CI（1.01,1.37）、与住院率增加有关 IRR=1.03,95%CI（0.94-1.12）。

结论 慢性肾脏病患者发生味觉改变不容忽视疾病暴露风险高，且随疾病进展报告率增加，不同经济水平国家间差异明显。味觉感知与进食、营养、消化等有关，结合主客观测评工具开展临床评估，尤其关注高龄、女性和潜在营养不良人群，可为早期识别味觉改变和开展干预提供帮助。

关键字 慢性肾脏病；味觉改变；meta 分析；系统性评价

分类：基础营养研究

2022 年上海市宝山区 18～64 岁成年居民营养健康知识知晓情况分析

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【摘要】

目的：了解上海市宝山区成年居民营养健康知识知晓率水平，分析居民营养健康知识的影响因素，为营养干预政策制定提供科学依据。

方法：

（1）抽样方法：采用多阶段分层整群随机抽样的方法，全区抽取 3 个街镇，每个街镇抽取 2 个行政村（居委），每个行政村（居委）选取 70 户，每户调查 1 名 18～64 岁的家庭成员。

（2）调查方法：采用国家卫生健康委员会专家审核设计的营养健康知识调查问卷，调查员通过入户面对面调查的方式了解调查对象的营养健康知识水平及相关情况，主要内容包括基本情况、膳食营养知识。

问卷共计 25 道单选题，按满分 100 分赋值，以问卷得分值为判断指标，评分以 75 分为界，≥75 分为营养健康知识合格。数据录入采用 Epidata 软件进行双录入并核对，所得数据采用 SPSS21.0 分析。计量资料用均值±标准差表示，比较采用 t 检验和方差分析；计数资料用百分数表示，比较采用卡方检验。 P＜0.05 表示差异具有统计学意义

结果：

（1）人口学特征：共调查 420 人，回收问卷 420 份，均为有效问卷。男性 210 人，女性 210 人；患慢性病 136 人，未患慢性病 284 人；小学及以下 35 人，初中 79 人，高中/中专/技校 71 人，大专/职大 101 人，本科 125 人，硕士及以上 9 人；医疗卫生行业 46 人，其他健康相关行业 5 人，教育相关行业 31 人，农副食品加工业 26 人，餐饮业 30 人，农林牧渔业 43 人，其他行业 239 人；BMI＜18.5 有 14 人，18.5≤BMI＜24 有 254 人，24≤BMI＜28 有 129 人，BMI≥28 有 23 人；18～24 岁有 42 人，25～34 岁有 104 人，35～44 岁有 122 人，45～54 岁有 56 人，55～64 岁有 96 人。

（2）居民营养健康知识得分情况：本次调查平均得分为 59.75±13.91 分。不同文化程度中，本科学历成绩最高，平均分为 63.01±12.81 分，小学及以下学历成绩最低，平均分为 53.03±16.30 分，不同文化程度的营养健康知识得分差异有统计学意义（F=5.645，P＜0.05）；不同行业中，医疗卫生行业成绩最高，平均分为 64.87±9.16 分，餐饮业成绩最低，平均分为 52.13±12.76 分，不同行业的营养健康知识得分差异有统计学意义（F=4.113，P＜0.05）；不同年龄段，25～34 岁的居民成绩最高，平均分为 62.42±12.97 分，55～64 岁的居民成绩最低，平均分为 54.83±14.80 分，不同年龄段的营养健康知识得分差异有统计学意义（F=4.862，P＜0.05）。不同性别、健康状况、婚姻、BMI 的营养知识得分差异没有统计学意义。

（3）居民营养知晓率情况：本次调查中，成年居民营养健康知识知晓人数为 69 人，总知晓率为 16.4%。25～34 岁知晓率最高，为 22.1%；55～64 岁的居民知晓率最低，为 7.3%。不同年龄组居民知晓率差异有统计学意义（ χ^2 ＝10.321，P＜0.05）。不同文化程度、行业、性别、健康状况、婚姻、BMI 的居民知晓率差异没有统计学意义。

结论:上海市宝山区居民营养健康知识水平整体较低，尤其是年龄段偏大、文化程度较低的居民，需有针对性、多渠道地加强人群的营养知识宣教。

【关键词】营养健康知识；知晓率；成年居民

关键字 营养健康知识；知晓率；成年居民

分类：基础营养研究

膳食纤维通过短链脂肪酸介导的 G 蛋白偶联受体来预防糖尿病肾病

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背景：糖尿病肾病（DN）是糖尿病的主要微血管并发症之一，也是终末期肾病的主要原因。在慢性肾脏疾病（CKD）和糖尿病中，会通过肠道纤维发酵产生短链脂肪酸（SCFA）。膳食纤维与降低 CKD 的炎症和死亡率有关，并且已经提出 SCFAs 来介导这种效应。肠道微生物群及其代谢物，特别是源自肠道微生物纤维发酵的短链脂肪酸，是全身炎症和代谢疾病（包括糖尿病肾病）的新兴治疗靶点。

方法： 为了探索膳食纤维对糖尿病肾病发展的影响，我们使用链脲佐菌素（STZ）诱导野生型 C57BL / 6J 小鼠和基因缺乏编码 G 蛋白偶联受体 GPR43 或 GPR109A 的基因的小鼠的糖尿病。高脂饮食（HFD）联合链脲佐菌素（STZ）腹腔注射。高脂喂养 12 周后，按体重 100mg/kg 的剂量给予 HFD 组小鼠腹腔注射 STZ 诱导 2 型糖尿病小鼠模型,对照组小鼠给予相应剂量的柠檬酸钠缓冲液,一周后检测小鼠的 FBG、GTT、ITT 来鉴定 T2DM 小鼠是否诱导成功。糖尿病小鼠被随机分配到高纤维组，正常食物组或零纤维饮食组。我们使用质子核磁共振波谱进行代谢分析和 16S 核糖体 RNA 测序来评估肠道微生物组。使用 RT-qPCR 测量相关炎性因子、趋化因子、纤维化相关基因的表达，使用 HE 染色观察肾脏形态学变化。在细胞实验中，来自 WT 小鼠的原代 TEC 和足细胞在存在或不存在 SCFAs 的情况下暴露于高葡萄糖或渗透液 12 小时。

结果： 与喂食正常食物或零纤维饮食的糖尿病对照组相比，喂食高纤维饮食的糖尿病小鼠患糖尿病肾病的可能性显着降低，表现出更少的白蛋白尿、肾小球肥大、足细胞损伤、间质纤维化和间质巨噬细胞募集。膳食纤维有益地重塑肠道微生物生态学并改善生态失调，促进普雷沃氏菌属和双歧杆菌属产生 SCFAs 的细菌的扩增，从而增加粪便和全身 SCFAs 浓度。纤维降低了糖尿病肾脏中编码炎性细胞因子、趋化因子和促进纤维化蛋白的基因的表达。膳食纤维可促进 SCFAs 的产生，SCFAs 成为膳食纤维肾保护作用的关键介质。SCFAs 治疗的糖尿病小鼠免受肾病的影响，但在没有 GPR43 或 GPR109A 的情况下则不受保护。在体外，SCFAs 在高血糖条件下抑制暴露于高糖的肾小管细胞和足细胞的炎症反应。

结论： 膳食纤维通过调节肠道微生物群、富集产生 SCFAs 的细菌和增加 SCFAs 的产生来预防糖尿病肾病。可以观察到，膳食纤维是健康肠道微生物群不可或缺的一部分。GPR43 和 GPR109A 对于 SCFAs 介导的针对这种情况的保护至关重要。通过饮食方法针对肠道微生物群的干预措施作为糖尿病肾病的新型肾保护疗法值得进一步研究。

关键字 膳食纤维；糖尿病肾病；新陈代谢

分类：基础营养研究

中国部分孕妇水钠代谢与水合状态研究

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目的：水是生命生存必不可缺的营养物质，是构成机体细胞、组织和器官的重要组成成分，具有维持机体正常渗透压、电解质平衡和调节体温等一系列生理功能。机体获取水分的来源主要包括 3 个途径，即饮水、食物水及内生水；4 个途径排出水分，包括肾脏以尿液的形式、皮肤以汗液蒸发的形式、肠道以粪便的形式和肺部通过呼吸的形式。国内外越来越多研究表明，水合状态与健康关系非常密切，即水摄入量与排出量达到相对平衡时，机体会处于适宜水合状态；饮水不足或水分丢失过多，机体则会处于脱水状态；短时间内摄入大量水，超过肾脏的排出能力，则会导致水中毒。此外，水与钠之间关系也非常密切，钠离子是保证机体正常生理功能和内环境稳态。如今，高盐膳食已经成为全球公认的公共卫生问题，过多盐摄入可能会增加超重、肥胖、高血压、心血管疾病、脑卒中等疾病的发生风险。故本研究旨在观察在自由生活条件下孕妇每日水、钠摄入与排出情况，并分析与水合状态的可能关系。

方法：采用方便抽样，于 2020 年 10~12 月在江苏省丹阳市人民医院进行招募孕妇，按照知情同意的原则，安排孕妇集中居住于酒店，完成为期 3 天的代谢试验。采用称重法、双份饭法记录并收集调查期间内入口的所有食物；对每日食物分别进行匀浆，通过直接干燥法和电感耦合等离子体发射质谱法/光谱法（ICP-MS/OES）测定并计算孕妇每日水、钠、钾、钙、镁等矿物质摄入量。采集孕妇空腹静脉血和 3d24h 尿液，通过 ICP-MS/OES 测定血清和尿样中钠、钾、钙、镁等矿物质，通过冰点渗透压摩尔浓度计测定血清和尿液渗透压。按照 24h 平均尿渗透压将孕妇分为三组，适宜水合状态组：<500 mOsm/kg、中间水合状态组：500~800 mOsm/kg 和低水合状态组：>800 mOsm/kg。采用独立样本 t 检验比较不同水合状态孕妇相关变量之间差异。

结果：共 21 名孕妇完成了 3d 的水代谢试验，其中 13 名孕妇处于适宜水合状态，8 名处于中间水合状态。适宜水合状态组孕妇每日总水、饮料、总液体和白水摄入量均显著高于中间水合状态组（3401>2746、2124>1544、2191>1611、1599>1010，ml/d）；豆浆则相反，P<0.05。孕妇膳食中钠、钾、钙、镁、磷摄入量分别为 3847、3331、993、444 和 1686 mg/d，两组间均未见显著差异，P>0.05。孕妇 24h 尿钠、钾、钙、镁、磷浓度分别 82.47、24.97、2.94、1.40、11.20 mmol/l，适宜水合状态组孕妇尿钠、钾和磷浓度均显著低于中间水合状态组（P<0.05）。两组血清中相关标志物均未见显著差异。

结论：在自由的生活条件下，仅部分孕妇处于适宜水合状态，尿液中水合状态相关生物标志物较血清和食物更敏感。

关键字 水合状态；水代谢；孕妇

分类：基础营养研究

限铁干预防护肝损伤、抵抗肝癌治疗的双向作用观察及机制分析

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目的：机体铁缺乏会导致贫血、免疫力下降等不良后果，但铁螯合剂可被用于治疗铁过载疾病，也因其能够抑制铁死亡而在癌症、细胞损伤、心脑血管疾病等领域得到广泛应用。铁死亡是以脂质过氧化为特征的非凋亡性细胞死亡，与诸多肝脏疾病存在紧密联系。那么限铁干预在肝病防治中具有怎样的影响，其机制是否与铁死亡相关，这些内容尚未阐明且对肝病的预防与治疗具有重要意义。

方法：C57 小鼠喂食缺铁饲料，并用酒精干预模拟轻度肝损伤，二乙基亚硝胺 DEN 模拟重度肝衰竭，探究缺铁饮食对外源性化合物诱导肝损伤的影响；选用 Huh7 和 Hep3B 肝癌细胞系进行培养，给予抗癌药物索拉非尼和铁螯合剂 DFO 进行干预，探究铁缺乏对索拉非尼杀伤肝癌细胞的影响。结合上述实验观察限铁干预在肝病防治中的影响，同时检测与肝病联系密切的铁死亡指标和细胞凋亡相关蛋白，进一步探索影响过程中的潜在机制。

结果：缺铁饲养小鼠的血清铁和肝组织铁含量明显下降，通过肝脏切片的 HE 染色、肝脏-体重比、血清 ALT 和 AST 评估，铁缺乏明显缓解了酒精和 DEN 诱导的肝损伤；而在肝癌细胞中，细胞活性检测显示缺铁削弱了索拉非尼对肝癌细胞的杀伤作用，且补铁后能有效恢复。由此表明，限铁干预在肝病防治过程中的影响存在差异。铁缺乏能够增加肝组织 ADH、ALDH 的活性以及 CYP2E1 的表达，同时抑制肝损伤过程中谷胱甘肽过氧化物酶 GPX4 的减少，并通过谷胱甘肽途径清除脂质过氧化终产物丙二醛，最终缓解外源性化合物诱导的肝损伤。但有意思的是，限铁干预却不改变索拉非尼处理后肝癌细胞的脂质过氧化物、丙二醛、细胞活性氧的含量及 GPX4 的表达，表明其并非通过铁死亡途径影响索拉非尼对肝癌细胞的杀伤作用。通过流式细胞术发现，缺铁减少索拉非尼诱导的细胞凋亡。检测细胞凋亡相关蛋白发现，缺铁联合索拉非尼干预后抗凋亡蛋白 BCL-2 表达升高，其他凋亡蛋白的表达受到抑制。缺铁能使上游的缺氧诱导因子 HIF-1α 表达上调，我们发现抑制 HIF-1α 的表达能有效减轻肝癌细胞因缺铁引起的索拉非尼耐药。因此，限铁干预是通过上调 HIF-1α 的表达以增加抗凋亡蛋白 BCL-2，抑制细胞凋亡从而减轻肝癌细胞受到索拉非尼的杀伤。

结论：缺铁通过上调 GPX4 的表达来抑制铁死亡，从而减轻酒精和 DEN 诱导的肝损伤；但在肝癌细胞中，限铁干预通过增加 HIF-1α 和 BCL-2 的表达，抑制索拉非尼诱导的凋亡从而产生耐药性。综上结果阐明了限铁干预在肝脏疾病中存在正反两面的影响及其相关机制，为肝病的防治措施提供新的思路，也为精准营养干预、靶向缺铁治疗提供了有效的科学依据。

关键字 限铁干预；肝病防治；铁死亡；GPX4；细胞凋亡

分类：基础营养研究

桃胶多糖对酒精性肝损伤的保护机制研究

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目的：结合体内体外实验，评估 PGP 对酒精性肝损伤的保护作用，基于代谢组学技术探究其可能作用的机制，为桃胶多糖的开发应用提供理论支撑。

方法：1.通过水提醇沉法得到 PGP，对其含量及纯度、单糖组成及分子量分布、结构进行检测和分析。评估 PGP 对 DPPH 自由基，羟基自由基和超氧阴离子自由基的清除能力。利用 HL7702 细胞建立体外酒精性肝损伤模型，评价 PGP 对酒精诱导 HL7702 细胞损伤的保护作用。2.选择昆明小鼠，建立体内急性酒精性肝损伤模型。实验动物分为正常组（CG），模型组（M），PGP 低、中、高剂量组和联苯双酯阳性组（Pos）。通过检测小鼠血清中肝功能酶，观察组织病理切片来评估肝损伤程度。从抗氧化、酒精代谢酶、脂质调节和抗炎四个方面评价 PGP 对 AALD 小鼠的保护作用。3.利用高通量液质联用技术对 CG 组，M 组和 PGP 高剂量组小鼠肝脏代谢物进行检测。基于组学手段通过多元统计分析筛选出潜在的差异代谢物，并进行通路富集分析，探讨 PGP 可能作用机制。

结果：1.PGP 提取率为 47.7±1.2%，多糖含量为 92.12±0.85%。PGP 重均分子量（Mw）为 3.68×106，主要由阿拉伯糖、半乳糖、木糖、甘露糖和葡萄糖醛酸组成。其对 DPPH 自由基、羟基自由基和超氧阴离子自由基均有一定的清除能力，IC50 分别为 6.93、6.45 和 0.99 mg/mL。PGP 在 200、400、800、1000 μg/mL 浓度下对酒精诱导的 HL7702 细胞损伤具有保护作用，细胞内 MDA 含量显著下降，SOD 和 GSH 含量均显著上升，ROS 明显减少。2. PGP 能够缓解急性酒精性肝损伤引起的氧化应激、脂质代谢紊乱和炎症。PGP 作用下，小鼠血清中肝损伤标志酶 AST、ALT 和 GGT 活力显著下降；肝脏中抗氧化物质 GSH、CAT、SOD 含量显著上升，脂质代谢指标 MDA 和 TG 含量显著下降、肝脏炎症因子 LPS、TNF-α 和 IL-6 含量显著下降。H&E 和油红 O 结果表明，PGP 能够减少肝脏细胞炎症出现，同时抑制脂滴聚集。3. 在 VIP 值>1，P 值<0.05，FC 值>1.5 或<0.5 条件下，CG 组和 M 组共有 20 个潜在差异代谢物，其中 8 个上调，12 个下调。M 组和 PGP 组共有 18 个潜在差异代谢物，其中 16 个上调，2 个下调。通路富集分析下，CG 组、M 组和 PGP 组共同富集的通路有 D-谷氨酰胺和 D-谷氨酸代谢，丙氨酸、天门冬氨酸和谷氨酸代谢以及精氨酸生物合成这三条通路。PGP 组和 M 组相比，L-谷氨酰胺、L-谷氨酸、L-苯丙氨酸、L-酪氨酸和 LPC 18:1 含量显著上升，PC(16:0/18:1(9Z))含量显著下降。

结论：结合体外细胞实验和体内小鼠实验，结果表明 PGP 能够从抗氧化，脂质调节和抗炎等方面发挥对酒精性肝损伤的保护作用。代谢组学分析结果表明，PGP 通过调节 D-谷氨酰胺和 D-谷氨酸代谢，丙氨酸、天门冬氨酸和谷氨酸代谢，精氨酸生物合成等通路，增强肝脏功能，减缓酒精性肝损伤。

关键字 桃胶多糖；酒精性肝损伤；抗氧化；脂质调节；代谢组学

分类：基础营养研究

Omega-3 对生命早期大脑发育的影响

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欧米伽-3 (omega-3，ω-3) 是一种对生命健康影响极大的多不饱和脂肪酸

它含有三个成员:α-亚麻酸(十八碳三烯酸)，EPA(二十碳五烯酸)， DHA (二十二碳六烯酸)，α 亚麻(ALA)主要含在少数的植物种子里(如亚麻籽、紫苏子、牡丹子等） EPA、DHA 在几种深海鱼中(如鲑鱼、鳕鱼、金枪鱼等）含量较高。

本文是探讨 Omega~3 对生命早期(胎儿，婴幼儿)大脑发育的影响。

人的一生大脑发育有两个发育关键期：第一个关键期：十月怀胎，第二个关键期：0-5 周岁。第一个发育关键期尤为重要，胎儿从第三个月形成第一个大脑母细胞，开始快速分裂增殖，至出生前 140 亿神经元(大脑细胞)已全部分裂增殖完毕。胎儿出生时，体重虽然只有成人的二十分之一，但大脑重量已达到成人大脑重的四分之一。5 周岁幼儿体重只有成人的五分之一，但大脑重量已达成人的 90%。

大脑细胞快速分裂增殖以及树突轴突的形成，需要蛋白质，脂肪及维生素和微量元素。但科学家 50 年的研究证明: 大脑细胞发育和树突轴突（构成神经网络）的发育，所需要的最重要营养素是 Omega~3。即 Omega~3 是大脑细胞分裂增殖的关键物质。

北京大学生命科学学院一项试验表明：喂食缺乏 Omega~3 饲料大鼠，二代仔鼠完成迷宫时间较实验组（ω-3 脂肪酸饲料组）大鼠完成迷宫实验正确反应率明显降低，这一结果表明：缺乏 ω-3 会影响大鼠的大脑发育和智力发育，从而影响其学习能力。电子显微镜观察子代大鼠海马神经元超微结构变化。 Omega~3 组大鼠海马体神经元超微结构与对照组相比，有明显改变。实验组大鼠海马体神经元粗面内质网肥大。

美国田纳西大学儿科研究所做的实验同样说明，Omega~3 对大脑发育的重要性。研究人员将早产儿分成两组：一组喂食不含 Omega~3 的配方奶粉，一组喂食含 Omega~3 的配方奶粉。一周岁时测试两组幼儿的智商，结果喂食 Omega~3 配方奶粉组早产儿智商明细高于对照组。

大脑是决定智商（包括记忆力，思维能力等）的重要因素。而智商是影响孩子未来的重要因素。

上述实验表明：Omega~3 脂肪酸对促进大脑发育有重要影响。

望子成龙，是每个家长的最大期望。不让孩子输在起跑线上，是多数家长的共识，如何让孩子不输在起跑线上呢？多数家长认为，重视对孩子的早期教育，在孩子二、三岁呀呀学语时，就开始让孩子学习数学，语文，就可以让孩子不输在起跑线上。实际上这已经晚了。如果宝宝在娘胎里大脑没发育好，能有好的记忆力和高智商吗？正如一位美国脑科学家说：孩子最初的 1000 天影响孩子的一生。

关键字 Omega-3，生命早期，大脑发育

分类：基础营养研究

黄芪多糖对梗阻性黄疸相关肌肉减少症小鼠动物模型的影响

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目的：探讨黄芪多糖对梗阻性黄疸相关肌肉减少症小鼠动物模型的影响。

方法：将 44 只小鼠随机分为 4 组：空白对照组、假手术组、模型组、黄芪多糖组。观察一般情况，测定体重、抓力、鼠体成分；第 4 周实验结束处死取血清，测量谷丙转氨酶（ALT）、谷草转氨酶（AST）、总胆红素（TBIL）、白蛋白（ALB）；ELISA 法测血清 IL-6、TNF-a；取肌肉，称湿重，HE 染色观察组织学变化，免疫组织化学（IHC）法检测 MuRF1、Atrogin-1 蛋白的表达量，Western Blot 检测小鼠腓肠肌中 MuRF1、Atrogin-1 蛋白表达；取肝脏，HE 染色观察肝脏组织学；取回肠，HE 染色观察回肠组织学。

结果：

1. 模型组结扎术后 1 周内，小鼠机体恶化，毛色枯黄、精神状况差；黄芪多糖组术后 1 周内体重、抓力等下降较多，与模型组相比，随着药物的干预，小鼠的毛色、精神状况、营养指标等均有恢复；术后第 4 周取血清，黄芪多糖组 ALT、AST、TBIL 低于模型组（P＜0.05），ALB 高于模型组。黄芪多糖组 TNF-α、IL-6 低于模型组（P＜0.05）。

2. 体重：模型组和黄芪多糖组术后 1 周体重下降明显，黄芪多糖组随着药物干预，体重呈稳定增长；术后第 3-4 周，黄芪多糖组体重开始明显高于模型组（P=0.011）。

3. 抓力：模型组和黄芪多糖组抓力在术后 1 周下降明显，术后 2 周开始，黄芪多糖组抓力大于模型组（P＜0.05），此趋势维持至实验结束。

4. 鼠体成分

4.1 瘦体重：模型组、黄芪多糖组瘦体重在术后 1 周下降，黄芪多糖组术后 2-4 周呈增长趋势，瘦体重高于模型组（P＜0.05）。

4.2 脂肪：模型组脂肪在术后 2 周内下降明显，黄芪多糖组在 2-4 周增长速度大于模型组；术后第 3-4 周，黄芪多糖组脂肪质量高于模型组，比较有显著的差异（P＜0.05）。

5. 腓肠肌称重：取腓肠肌，黄芪多糖组腓肠肌体积大于模型组。称量腓肠肌湿重，黄芪多糖组大于模型组（P＜0.001）。

6.小鼠腓肠肌组织学变化：模型组肌细胞形态大小不规则，肌纤维变性、萎缩、溶解变多；黄芪多糖组与模型组相比，肌纤维排列相对有序紧密，形态相对规则。

7.IHC 法检测 Atrogin-1、MuRF1 蛋白：黄芪多糖组染色相对较浅，提示黄芪多糖组 MuRF1 蛋白、Atrogin-1 蛋白低于模型组（P＜0.05）。

8 .Western blot 检测 Atrogin-1、MuRF1 蛋白：黄芪多糖组腓肠肌中的 MuRF1 蛋白、Atrogin-1 蛋白表达相对较少（P＜0.05）。

9.小鼠肝脏组织学变化：模型组肝组织结构紊乱，炎性细胞浸润严重，肝小叶和肝细胞索结构不能辨认，肝细胞出现大量坏死；黄芪多糖组的肝细胞变性、坏死相对较少，结构紊乱程度较低，炎性细胞浸润较轻。

10.小鼠回肠组织学变化：模型组小鼠回肠绒毛的长度变短，结构不完整，大量炎症浸润，环形肌层结构疏松紊乱；黄芪多糖组绒毛相对完整，排列相对整齐，肌层较为紧密。

结论：

1.小鼠胆总管结扎 2 周后可形成稳定的梗阻性黄疸相关肌肉减少症模型。

2.黄芪多糖可保护梗阻性黄疸相关肌肉减少症小鼠的肌肉质量和功能，有助于肌肉减少症的治疗。

3.黄芪多糖能够有效改善炎症反应，保护肝脏、回肠的结构和功能，下调 MuRF1 和 Atrogin-1 蛋白的表达。

关键字 梗阻性黄疸；肌肉减少症；黄芪多糖；预后

分类：基础营养研究

EPA 和 DHA 对高脂喂养条件敲除骨骼肌 IL-6 小鼠体成分和血脂水平的影响

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目的　探究 EPA 和 DHA 对高脂喂养条件敲除骨骼肌 IL-6 小鼠体成分和血脂水平的影响，并分析二者对体成分和血脂水平的调节作用与骨骼肌 IL-6 的关联。

方法　委托赛业（苏州）生物科技有限公司构建并获得 5 对雄性条件敲除骨骼肌 IL-6 的纯合小鼠和雌性 IL-6flox/flox 纯合小鼠，将二者按雌雄比例为 2:1 或 1:1 进一步配繁。将所得子代于 3~4 周龄时留取一定的耳组织，并采用琼脂糖凝胶电泳技术对小鼠进行基因型鉴定。筛选子代为 IL-6flox/flox 和 Myf5-cre 基因双阳表达的雄性小鼠（条件敲除骨骼肌 IL-6 小鼠）作为研究对象。适应性喂养至 8 周龄时，将所得雄性小鼠随机分为高脂组（HFD）、高脂 EPA 和 DHA 干预组（n=8~10），各组增设同窝 IL-6flox/flox 雄性小鼠作为阴性对照（n=8~10）。HFD 组小鼠喂以供能比为 45%的高脂饲料，而高脂 EPA 和 DHA 干预组在高脂饲料中添加一定配比的 EPA 或 DHA，以使得各小鼠在喂以高脂饲料基础上补充 410mg/kg.BW 的 EPA 或 DHA。干预 16 周后采用 Hologic 双能 X 线骨密度仪检测小鼠体成分。随后麻醉处死小鼠并收集血清和腓肠肌组织，采用酶法检测各组小鼠血清中的总甘油三酯（TG）、总胆固醇（TC）、低密度脂蛋白胆固醇（LDL-C）、高密度脂蛋白胆固醇（HDL-C）和游离脂肪酸（FFA）水平。同时采用 western blot 技术对小鼠的骨骼肌 IL-6 蛋白表达水平进行检测，以进一步验证骨骼肌 IL-6 的敲除效率。

结果　各干预组小鼠腓肠肌 IL-6 蛋白表达水平较同窝阴性对照小鼠显著降低（$P<0.05$），表明骨骼肌 IL-6 已被成功敲除。与 HFD 相比，EPA 和 DHA 显著降低对照小鼠的体脂率并上调瘦体重比率。当条件敲除肌源性 IL-6 后，HFD 与 EPA 干预组小鼠的体脂率高于各自的阴性对照小鼠，而瘦体重比率较各自的阴性对照小鼠的低（$P<0.05$）。此外，与 HFD 相比，EPA 对体脂率的抑制作用以及对肌肉率的上调作用在条件敲除骨骼肌 IL-6 后消失，而 DHA 干预在敲除肌源性 IL-6 后依然显著降低小鼠体脂率和升高瘦体重比率，且与阴性对照小鼠无显著差别（$P>0.05$）。血脂水平结果显示，条件敲除骨骼肌 IL-6 后 HFD 组小鼠的 TG、TC、LDL-C 和 FFA 水平显著高于其阴性对照小鼠，而补充 EPA 和 DHA 后均能有效逆转这一现象（$P<0.05$）。即当条件敲除肌源性 IL-6 后，与 HFD 相比，EPA 和 DHA 依然有效降低血清 TG、TC、LDL-C 以及 FFA 水平，且与各自阴性对照小鼠相比均无明显差别（$P>0.05$）。

结论　（1）条件敲除骨骼肌 IL-6 会显著上调小鼠的体脂率并增加小鼠的血脂水平。（2）EPA 改善高脂喂养小鼠体成分的作用依赖于骨骼肌 IL-6，而 DHA 对体成分的改善作用与骨骼肌 IL-6 无关。（3）EPA 和 DHA 对高脂喂养小鼠的血脂水平具有显著的改善作用，并且在敲除骨骼肌 IL-6 后依然存在。

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关键字 EPA；DHA；骨骼肌 IL-6；体成分；血脂

分类：基础营养研究

经 EPA 和 DHA 干预后的 C2C12 肌管细胞对 3T3-L1 脂肪细胞脂质代谢基因相对表达量的影响

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目的：探讨不同浓度二十碳五烯酸（EPA）或二十二碳六烯酸（DHA）干预后的 C2C12 肌管细胞对 3T3-L1 脂肪细胞脂质代谢基因相对表达量的影响。

方法：用含 2%马血清的培养液诱导 C2C12 细胞成为肌管细胞，分别采用 50、100、200、400 μM 的 EPA 或 DHA 处理 C2C12 肌管细胞 24 h，并用 MTT 检测细胞毒性，采用无毒性的干预浓度进行后续实验；同时用鸡尾酒法诱导 3T3-L1 细胞成为成熟的脂肪细胞，将干预后的肌管细胞与成熟脂肪细胞于 transwell 中共培养 24h，用 RT-qPCR 法检测脂质分解基因 ATGL、HSL；脂质氧化基因 PGC-1α、SCD-1、CPT-1、UCP-1；脂质合成基因 ACC、SREBP-1 的相对表达量。

结果：浓度为 50、100、200、400 μM 的 EPA 或 DHA 干预肌管细胞均未出现明显的细胞毒性（P>0.05），各浓度均可用于后续实验。用经 EPA 干预后的肌管细胞与成熟脂肪细胞共培养后发现，脂质分解基因方面，各干预浓度下成熟脂肪细胞 ATGL 基因的相对表达对比对照组均有显著性升高（P<0.05 或 P<0.01 或 P＜0.001），HSL 基因的相对表达只有在干预浓度为 100μM 时较对照组有显著性升高；脂质氧化基因方面，PGC-1α 基因在各干预浓度均较对照组有显著性升高，并且其相对表达量呈梯度上升趋势（P<0.05 或 P<0.01 或 P＜0.001），SCD-1 基因的相对表达在干预浓度为 100μM 时较对照组有显著性升高（P<0.05），CPT-1 基因的相对表达量在各干预浓度干预肌管细胞并共培养后较对照组均没有显著性差异，UCP-1 基因的相对表达则在干预浓度为 400μM 时较对照组有显著性升高（P<0.01）；脂质合成基因方面，干预浓度为 50/100/400μM 时 ACC 基因相对表达量较对照组有显著性升高（P<0.05 或 P<0.01），SREBP-1 基因的相对表达量只有在干预浓度为 100/400μM 时较对照组有显著性升高（P<0.05 或 P<0.01）。用 DHA 干预后的肌管细胞与成熟脂肪细胞共培养后发现，脂质分解基因方面，ATGL 基因的相对表达量在干预浓度为 200μM 时较对照组有显著性升高，HSL 基因的相对表达量在各干预浓度均较对照组没有显著性差异；脂质氧化基因方面，PGC-1α 基因表达在各干预浓度均较对照组有显著性升高（P<0.001），在干预浓度为 50μM 时，SCD-1 基因的相对表达较对照组有显著性升高（P<0.01），CPT-1 基因的相对表达量在各干预浓度均较对照组没有显著性差异，UCP-1 基因的表达在干预浓度为 100μM 时较对照组有显著性升高（P<0.01）；脂质合成基因方面，ACC 基因的相对表达量在所有干预浓度均较对照组没有显著性变化，SREBP-1 基因在干预浓度为 50/100μM 时较对照组有显著性降低（P<0.05 或 P<0.01）。

结论：经 EPA 和 DHA 干预后的肌管细胞均可增强成熟脂肪细胞脂质分解和脂质氧化，EPA 干预后的肌管细胞可增强脂肪细胞的脂质合成，而 DHA 的作用相反，干预后的肌管细胞可一定程度降低脂肪细胞的脂质合成。

关键字 DHA， EPA，C2C12 肌管细胞，3T3-L1 脂肪细胞，脂质代谢

分类：基础营养研究

中国育龄女性基于骨代谢的游离和生物可利用 25-羟基维生素 D 阈值探讨以及与代谢综合征的关系

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目的：维生素 D，一种激素类营养素，在维持钙磷平衡和骨骼健康方面起着关键作用，其骨外健康效应也一直备受关注。因此，准确评估机体维生素 D 营养状况至关重要。血清总 25-羟基维生素 D[25(OH)D]是公认的评估机体维生素 D 营养状况的客观指标，但游离激素假说认为，游离和生物可利用的 25(OH)D 能更好地反映维生素 D 的生物活性。目前多采用甲状旁腺激素（parathyroid hormone, PTH）达到最大抑制和平台期时的总 25(OH)D 水平定义维生素 D 缺乏阈值，也有研究以骨转换标志物（bone turnover markers, BTMs）探讨该阈值。但针对中国人群尤其是育龄女性的类似较少且结论不一。因此，本研究旨在确定中国育龄女性游离和生物可利用 25(OH)D 的分布特征，以 PTH 和 BTMs 估计其阈值，根据这些阈值分析其与代谢综合征（metabolic syndrome, MetS）风险的关系，并评估这两种活性形式的维生素 D 的潜在优势。**方法**：首先，利用具有全国代表性的“2015 年中国成人慢性病与营养监测”数据和血液样本库（n=1505，女性，18-45 岁）进行横断面研究。收集人口社会学信息、生活行为习惯、疾病史和体格检查数据，测量血清总 25(OH)D、维生素 D 结合蛋白、白蛋白、PTH 和 BTMs[包括骨钙素、1 型胶原羧基端肽 β 特殊序列（β-CrossLaps of type 1 collagen containing cross-linked C-telopeptide, β-CTX）和 1 前原胶原氨基端前肽（procollagen type 1 N-terminal propeptide, P1NP）]等骨代谢相关指标和生化指标，通过总 25(OH)D、维生素 D 结合蛋白和白蛋白计算游离和生物可用 25(OH)D，分析三种形式 25(OH)D 与 PTH 和 BTMs 的阈值关联，通过多变量 logistic 回归分析不同 25(OH)D 水平和 MetS 风险之间的关系。然后，对 39 名育龄女性（18-47 岁）采用 400IU/d（n=14）和 800IU/d（n=25）的维生素 D3 补充剂分别干预 16 周，观察并评估补充维生素 D 后 25(OH)D 增加与 PTH 和 BTMs 的关联。**结果**：在横断面研究中，三种形式的 25(OH)D 具有相似的分布特征，且游离和生物可利用的 25(OH)D 与总 25(OH)D 有很好的相关性。分别对三种形式 25(OH)D 调整相关混杂因素，以 PTH、骨钙素、β-CTX 和 P1NP 预测的总 25(OH)D 界值分别为 14.19（和 18.03ng/mL）、15.14ng/mL、14.79ng/mL 和 15.08ng/mL。仅针对 P1NP 发现了游离和生物可利用 25(OH)D 的界值（分别为 3.47 pg/mL 和 1.66 ng/mL）。调整混杂因素后，总 25(OH)D < 15.14 ng/mL 与高密度脂蛋白胆固醇（high-density lipoprotein cholesterol, HDL-C）降低略有关联[OR=1.371（0.991-1.899）]；较高水平的游离和生物利用 25(OH)D 均为 HDL-C 降低的保护因素，OR 分别为 0.770（0.621-0.956）和 0.772（0.622-0.958）。干预研究结果表明，尽管游离和生物可利用 25(OH)D 对维生素 D 补充的响应比总 25(OH)D 更快，但 PTH 和 BTMs 对总 25(OH)D 的反应比对游离或生物可利用 25(OH)D 更灵敏。**结论**：在中国育龄女性中，总 25(OH)D 与 PTH 和三种 BTMs 均存在阈值效应关系，但游离和生物可利用 25(OH)D 仅与 P1NP 存在阈值效应关系。活性形式的 25(OH)D 阈值可用于 HDL-C 降低的风险评估，但根据三种形式 25(OH)D 在阈值效应和 MetS 风险关联分析，以及维生素 D 补充后 PTH 和 BTMs 对 25(OH)D 变化的反应，没有发现游离或生物可利用 25(OH)D 的优越性。

该干预研究已在 http://www.chictr.org.cn（ChiCTR2200058290）注册。

关键字 游离 25-羟基维生素 D；生物可利用 25-羟基维生素 D；甲状旁腺激素；骨转换标志物；阈值；代谢综合征

分类：基础营养研究

妊娠糖尿病母乳中低聚糖的变化及其对肠道菌群的调控作用

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研究目的：妊娠期糖尿病是妊娠期发生的一种全身性代谢紊乱疾病，其发病率呈逐年上升趋势。众所周知，母乳是婴儿营养的主要来源，富含婴儿生长发育所需的所有营养成分。同时，母乳喂养对于妊娠糖尿病母亲和婴儿均具有一定的保护作用。然而，由于患妊娠期糖尿病母亲的母乳喂养率和喂养时间较短以及母乳成分的改变，会直接影响新生儿的肠道细菌，并对婴儿的长期生长发育产生影响。母乳中的低聚糖可作为益生元，会促进婴儿肠道有益细菌的生长，进而有助于婴儿的整体健康。本研究系统地对比了患有妊娠期糖尿病的母亲与健康母亲母乳中 8 种代表性低聚糖含量及后代肠道菌群组成的差异，并探讨妊娠期糖尿病母乳低聚糖对婴儿肠道菌群的影响。研究结果将为妊娠期干预提供理论支持和指导，以帮助减少妊娠期糖尿病对母婴健康的不良影响。

研究方法：利用 MALDI-TOF 对妊娠糖尿病和健康妈妈母乳初乳和成熟乳种低聚糖进行定性分析；利用 UPLC-QqQ-MS/MS 对妊娠期糖尿病与健康妈妈初乳以及成熟乳中 8 种低聚糖进行绝对定量；利用 16SrRNA 对妊娠期糖尿病妈妈与健康妈妈后代的肠道菌群进行分析；利用斯皮尔曼相关性探讨妊娠期糖尿病母乳低聚糖对婴儿肠道菌群的调控作用。

研究结果：本研究共鉴定到 56 种低聚糖，其中健康妈妈母乳 49 种，妊娠糖尿病妈妈 39 种。健康妈妈初乳中 2'-FL、LNT、LNnT、 α 3'-GL 和 6'-SL 的含量明显高于妊娠期糖尿病妈妈的初乳。同时，健康妈妈成熟乳中 DSL、 α 3'-GL、LNnT、3-FL 的含量显著高于妊娠期糖尿病母亲的成熟乳。在进一步探究婴儿肠道菌群组成时发现，健康妈妈的婴儿肠道内的有益菌的丰度更高，例如乳杆菌属，经粘液真杆菌属。而妊娠期糖尿病妈妈的婴儿肠道内的条件致病菌或促炎类细菌的丰度更高，例如志贺氏菌属，副拟杆菌属。妊娠期糖尿病妈妈初乳中的多数低聚糖与短双歧杆菌存在正相关，比如 2'-FL 与长双歧杆菌、植物乳杆菌呈正相关。妊娠期糖尿病妈妈成熟乳中的多数低聚糖与长双歧杆菌均存在正相关，比如 α 3'-GL 与短双歧杆菌呈显著正相关。

研究结论：妊娠期糖尿病妈妈与健康妈妈母乳中低聚糖含量是有差异的，这可能是由于妊娠期糖尿病会对合成母乳低聚糖的糖基转移酶及乳腺糖苷酶活性造成影响，进而改变不同哺乳期母乳中低聚糖的含量；同时，妊娠期糖尿病会影响婴儿肠道菌群的稳态。妊娠期糖尿病母乳中低聚糖在某种程度上会促进婴儿肠道内有益菌的增殖。

关键字 妊娠期糖尿病、泌乳期、低聚糖、肠道菌群

分类：基础营养研究

核黄素缺乏介导的 MAPKs 信号通路调控成骨细胞功能的机制研究

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目的：骨质疏松症已经成为影响我国中老年人健康状况和生活质量的主要疾病之一，膳食营养因素对骨质疏松症的发生发展具有显著影响，但目前其具体作用机制与信号通路尚不明确。本研究拟通过不同核黄素浓度的培养基作用于成骨细胞，探寻其对成骨细胞功能的影响，及 MAPKs 通路在其中的具体作用机制。本研究将有助于探索核黄素在人类健康与疾病过程中的新作用，并为骨质疏松症营养综合干预提供理论依据。

方法：本实验采用 MC3T3-E1 细胞，采用含有 L-抗坏血酸和 β-磷酸甘油的 α-MEM 培养液进行诱导分化，以含不同核黄素水平的培养液（0 nmol/L，6 nmol/L，12 nmol/L，24 nmol/L，48 nmo/L）进行培养，利用 CCK-8 检测细胞增殖能力；利用 Western blot 检测成骨分化特异性因子 Runx 和 Osterix 的蛋白表达水平；通过 ALP 活性检测及茜素红染色检测其对 MC3T3-E1 的早晚期成骨分化的作用。为了明确核黄素营养水平与 MAPKs 通路的关系，采用不同核黄素浓度的培养基作用于成骨细胞，利用 MAPKs 家族的三个主要因子 ERK1/2，p38 MAPK 以及 JNK 的磷酸化激活情况来判断 MAPKs 通路在其中的作用。

结果：与对照组相比，核黄素缺乏对 MC3T3-E1 诱导分化的成骨细胞的增殖具有抑制作用，且随着核黄素浓度增加，成骨细胞活力增强。核黄素缺乏可特异性激活 ERK1/2 和 p38 MAPK 通路抑制成骨细胞功能，而不能激活 JNK 通路；培养基核黄素浓度达到 6 nmol/L 时，ERK1/2 和 p38 MAPK 的磷酸化激活情况恢复至正常水平。与对照组相比，核黄素缺乏组的成骨特征性转录因子 Runx2 和 Osterix 的蛋白表达水平显著降低；ALP 活性也显著下降；茜素红染色结果表明，矿化结节的数量明显减少。然而，随着培养基核黄素浓度升高，Runx2 和 Osterix 的蛋白表达水平，矿化结节的数量逐渐恢复至正常水平；ALP 活性也显示出相同趋势。培养基核黄素浓度达到 48 nmol/L 时，成骨细胞相关功能指标与对照组相比无显著性差异。

结论：核黄素缺乏明显抑制成骨细胞增殖，通过 ERK1/2 和 p38 MAPK 通路调节 Runx2 和 Osterix 的表达，抑制钙化结节的形成，从而抑制成骨细胞的功能。

关键字 核黄素缺乏，MAPKs 通路，成骨细胞

分类：基础营养研究

EPA 经调节骨骼肌 IL-6 改善高脂饲喂小鼠胰岛素抵抗

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目的：探讨膳食补充多不饱和脂肪酸 EPA 是否经调节骨骼肌 IL-6 改善高脂饲喂小鼠机体胰岛素抵抗。

方法：将雄性 8 周龄特异性敲除骨骼肌 IL-6 以及同窝对照的 C57BL/6J 小鼠均随机分为高脂组和高脂 EPA 干预组，每组 8-10 只。其中高脂组饲喂高脂饲料（脂肪供能比为 45%），高脂 EPA 干预组饲喂添加适量 EPA（410 mg/kg.BW，对应于成人每日摄入 EPA 2g）的高脂饲料（脂肪供能比为 45%）。所有小鼠在标准 SPF 级动物房饲养和干预，期间小鼠自由摄食和饮水，每周定期称量小鼠体重和饲料消耗。待干预 15 周后，行口服葡萄糖耐量实验（OGTT）和腹腔注射胰岛素耐受实验（IPITT）检测小鼠葡萄糖耐量和胰岛素耐受情况。干预 16 周后，麻醉小鼠取血并离心收集血清，检测空腹血糖以及空腹胰岛素含量，并计算胰岛素抵抗指数；分离小鼠腓肠肌组织，并通过蛋白质印迹实验检测小鼠腓肠肌组织 IL-6 蛋白表达情况。

结果：在高脂饲喂下，骨骼肌 IL-6 基因敲除小鼠较同窝对照小鼠体重显著增加（$P<0.01$）。与高脂组相比，膳食补充 EPA 可显著降低同窝对照小鼠体重（$P<0.05$），但不能有效降低基因敲除小鼠体重（$P>0.05$）。各组小鼠摄食量无显著差异（$P>0.05$）。骨骼肌 IL-6 基因敲除小鼠腓肠肌组织 IL-6 蛋白表达水平较同窝对照小鼠显著降低（$P<0.05$），表明基因敲除小鼠骨骼肌 IL-6 基因敲除成功。膳食补充 EPA 可显著上调同窝对照小鼠腓肠肌 IL-6 蛋白表达（$P<0.05$），但不影响基因敲除小鼠腓肠肌 IL-6 蛋白表达（$P>0.05$）。OGTT 结果显示，膳食补充 EPA 可降低同窝对照小鼠葡萄糖曲线下面积（$P=0.089$），但对基因敲除小鼠葡萄糖曲线下面积无明显改善（$P>0.05$）；IPITT 结果显示，膳食补充 EPA 可显著降低同窝对照小鼠葡萄糖曲线下面积（$P<0.05$），但未能降低基因敲除小鼠葡萄糖曲线下面积（$P>0.05$）。此外，在高脂饲喂下，骨骼肌 IL-6 基因敲除小鼠空腹血糖较同窝对照小鼠显著增加（$P<0.05$）。膳食补充 EPA 可显著降低同窝对照小鼠空腹血糖（$P<0.05$），但不能有效降低基因敲除小鼠空腹血糖（$P>0.05$）。与空腹血糖结果类似，膳食补充 EPA 可降低同窝对照小鼠血清胰岛素含量（$P=0.082$），但对基因敲除小鼠血清胰岛素含量无明显影响（$P>0.05$）。经计算胰岛素抵抗指数，结果发现，在高脂饲喂下，骨骼肌 IL-6 基因敲除小鼠胰岛素抵抗指数较同窝对照小鼠升高，但差异无显著性意义（$P>0.05$）。膳食补充 EPA 可显著降低同窝对照小鼠胰岛素抵抗指数（$P<0.05$），但不能有效降低基因敲除小鼠胰岛素抵抗指数（$P>0.05$）。

结论：膳食补充 EPA 可通过调节骨骼肌 IL-6 改善高脂饲喂小鼠机体胰岛素抵抗，但具体机制仍需进一步研究。

关键字 EPA，高脂饲喂，骨骼肌 IL-6，胰岛素抵抗

分类：基础营养研究

富铁膳食通过肝特异性 miR-122 调控分子网络导致非酒精性脂肪性肝病的作用和机制分析

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目的：富铁膳食逐渐成为引起肝脏铁过负荷的重要因素，包括我们调查研究在内的军、地营养调查均发现军人和居民膳食铁摄入量是标准的 2 倍以上，营养流行病学研究表明富铁膳食与非酒精性脂肪性肝病存在相关性，然而其作用和机制尚未阐明，这对预防非酒精性脂肪性肝病、开发治疗新策略具有重要意义。

方法：通过动物实验观察富铁膳食对小鼠肝脏脂代谢的影响，检测脂肪变性、脂质过氧化、肝脏炎症、肝脏损伤和纤维化情况；通过抗氧化干预观察氧化应激机制在富铁膳食导致非酒精性脂肪性肝病中的作用；基于我们团队前期原创发现富铁膳食下调肝脂代谢关键分子 miR-122，我们构建了 miR-122 基因敲除小鼠，并采用 miR-122 agomir 和 miR-122 rAAV8 进行回补，以观察明确 miR-122 在富铁膳食导致非酒精性脂肪性肝病中的作用。进一步采用代谢组学和转录组学技术，分析富铁膳食引起肝脂代谢紊乱的代谢产物变化和调控分子网络。

结果：长期富铁膳食导致小鼠肝脏铁过负荷并出现炎症反应和脂质蓄积、血脂升高。而抗氧化剂维生素 E、槲皮素、原花青素干预对肝脏炎症、肝脏脂质蓄积、脂质过氧化无明显改善，表明非氧化应激机制可能发挥关键作用。有意思的是，抗氧化剂对铁过负荷下调 miR-122 无保护作用，而我们发现铁过负荷通过激活泛素连接酶 TRIP12 降解转录因子 YY1，从而下调肝细胞核因子 HNF4α 及下游 miR-122 表达。在 miR-122 敲除小鼠中富铁膳食未能进一步加重肝脏脂肪蓄积，而 miR-122 回补可显著改善富铁膳食引起的肝脂肪变性。值得注意的是，富铁膳食联合 miR-122 敲除导致肝脏脂质过氧化指标显著升高，且出现明显的肝纤维化；回补 miR-122 后肝脏脂质过氧化损伤、肝纤维化缓解。代谢组和转录组检测显示，富铁膳食和 miR-122 敲除的差异代谢产物和差异表达基因富集通路主要包括脂肪酸生物合成、脂肪酸代谢、脂肪酸氧化。miR-122 敲除引起脂质代谢酶、脂肪酸去饱和酶、脂肪酸氧化酶表达活性显著升高。

结论：富铁膳食下调 miR-122，使脂质合成酶及脂肪酸氧化还原酶表达升高，在铁过负荷条件下进一步激活这些酶的活性，导致肝脏脂质合成增多以及脂肪酸过氧化，进而引起肝脏脂肪变性和脂质过氧化损伤。这些结果进一步阐明了富铁膳食导致肝脏脂代谢紊乱的非氧化应激机制，解释了抗氧化药物的不足，为防治非酒精性脂肪性肝病提供新靶点新途径。

关键字 富铁膳食；非酒精性脂肪性肝病；miR-122；脂质代谢；脂质过氧化

分类：基础营养研究

高脂饮食诱导的肥胖对 SD 大鼠肾脏及其线粒体氧化应激的影响

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研究背景：肥胖相关的肾脏损伤已成为一种流行疾病，但其损伤程度和具体机制尚未明确。肾脏是机体重要的代谢器官，需要大量能量维持身体的新陈代谢，线粒体稳态对维持肾脏代谢活性和正常功能至关重要。

研究目的：观察和研究高脂饮食诱导的肥胖对 SD 大鼠肾脏功能及肾脏线粒体氧化应激的影响。

研究方法：5 周龄 SPF 级雄性 SD 大鼠随机分为普通对照组（CON 组）和高脂饮食组（HFD 组），每组各 15 只，分别使用普通维持饲料和 45%高脂饲料，自由饮食。饲喂 8 周后，高脂饮食组筛选肥胖大鼠，检测血清中肌酐、尿素和胱抑素 C 水平，以及尿蛋白、尿微量白蛋白和 α1 微球蛋白水平。采用 HE 和 PAS 染色检测大鼠肾脏病理变化，透射电镜观察肾脏和线粒体超微结构，ELISA 法检测肾脏线粒体膜电位、超氧化物歧化酶（SOD）和丙二醛（MDA）水平，免疫组织化学和 Western blot 法检测肾脏线粒体抗氧化应激关键蛋白过氧化物酶体增殖激活受体 γ 共激活因子 1α（PGC1α）和解偶联蛋白 2（UCP-2）的表达水平。

研究结果：与普通对照组相比，肥胖大鼠的血清肌酐和胱抑素 C 水平明显升高（P＜0.05），尿蛋白、尿微量白蛋白和尿 α1 微球蛋白水平显著高于对照组（P＜0.05），提示肥胖可引起肾小球滤过功能显著降低；病理结果显示，肥胖大鼠肾小球形态、数量正常，未见肾小球硬化、肿大，足突完整，无明显病理改变，高脂饮食组肾小管上皮细胞轻中度变性，部分肾间质血管扩张淤血，灶性坏死，部分肾小球稍增大，足细胞足突发生融合消失，类圆形截面线粒体数量增多，线粒体基质和嵴电子密度降低，提示肥胖引起肾小球滤过屏障结构异常，进而引起滤过功能下降。进一步分析发现，与普通对照组相比，肥胖大鼠肾脏的线粒体膜电位和 SOD 水平显著降低（P＜0.05），MDA 水平显著升高（P＜0.05），提示线粒体氧化应激水平显著提升；同时，与普通对照组相比，肥胖大鼠线粒体 PGC1α 和 UCP-2 阳性细胞数量和蛋白表达水平显著降低（P＜0.05），提示肾脏线粒体抗氧化应激水平显著下降。

研究结论：高脂饮食诱导肥胖可引起 SD 大鼠肾脏滤过功能异常，主要表现为尿蛋白和血肌酐水平升高，还可导致肾脏线粒体的密度降低和氧化应激水平升高。

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关键字 高脂饮食；大鼠；肾脏；线粒体

分类：基础营养研究

不同能量构成模式的热量限制膳食对肥胖大鼠腹股沟脂肪组织转录组和血清代谢组的影响

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目的：探讨不同能量构成模式的热量限制（CR）对肥胖大鼠腹股沟脂肪组织基因表达及血清代谢物水平的影响。

方法：以高脂饲料（D12451，脂肪供能比 45%）喂养 10 周，建立大鼠肥胖模型。造模成功后继续随机分组为对照组（ND-AL），高脂模型组（HF-AL）、低脂热量限制组（LF-CR，CR 结合 10% 脂肪供能比饲料喂养）、中脂热量限制组（MF-CR，CR 结合 36% 脂肪供能比饲料喂养）和高脂热量限制组（HF-CR， CR 结合 46%脂肪供能比饲料喂养），各组大鼠蛋白质摄入相同。干预 10 周，观察体重、脂肪组织系数变化；检测血清总胆固醇（TC）、甘油三酯（TG）、高密度脂蛋白胆固醇（HDL-C）、低密度脂蛋白胆固醇（LDL-C）、空腹血糖（FBG）、空腹胰岛素（FINS）、餐后血糖值和血糖曲线下面积（AUC）；^{1}H NMR 检测血清代谢组并使用 OPLS-DA 分析；观察脂肪组织 H&E 染色切片；转录组测序检测腹股沟脂肪组织转录水平并使用 WGCNA 分析。

结果：

1、不同 CR 组大鼠体重、肾周脂肪系数、白色脂肪细胞大小均显著低于 HF-AL 组（P<0.05）。LF-CR 组大鼠 TC、TG、餐后 30 min 血糖值和 AUCG 显著低于 HF-AL 组（P<0.05）。HF-CR 组大鼠腹股沟脂肪系数较 HF-AL 组显著降低。

2、腹股沟脂肪转录组发现潜在枢纽基因为 *UBA52*，该基因参与泛素介导的蛋白水解，HF-CR 组 *UBA52* 表达量对比其他 CR 组有显著升高的趋势。

3、ND-AL 组与 HF-AL 组的代谢模式存在显著差异（P<0.05），HF-AL 组与 HF-CR 组的代谢模式存在显著差异（P<0.05）。其他 CR 组与 HF-AL 组血清代谢模式无差异（P >0.05）。HF-AL 组与 ND -AL 组的差异代谢物中乳酸、β-葡萄糖等上调，瓜氨酸、乙酸下调。HF-CR 组与 HF-AL 组的差异代谢物中瓜氨酸、乳酸等上调，柠檬酸盐、β-葡萄糖等下调。差异代谢物富集在精氨酸合成、糖酵解/糖异生等通路。

4、*UBA52* 表达量与血清中乳酸、TG 含量均呈正相关，*UBA52* 是乳酸与 TG 之间关系中的中介变量。

结论：不同能量构成模式的 CR 干预有类似的减重效果，低脂热量限制干预还可同时改善大鼠糖脂代谢，高脂热量限制干预降低脂肪组织重量效果更佳。热量限制干预可能通过影响血清乳酸水平以及大鼠腹股沟脂肪 *UBA52* 表达量，从而影响血清中 TG 水平。

关键字 肥胖，热量限制，宏量营养素，转录组学，代谢组学

分类：基础营养研究

铁死亡在炎症性肠病中的研究进展

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炎症性肠病（IBD）包括溃疡性结肠炎（UC）和克罗恩病（CD），是一种特发的累及回肠、结肠、直肠的慢性复发性疾病，其主要临床症状包括腹泻、腹痛，甚至血便。铁死亡（Ferroptosis）相较于一般的坏死、凋亡、自噬等其他类型的细胞死亡，是一种铁离子依赖的、以脂质过氧化产物和活性氧的积累为特点的非典型的细胞死亡方式。其形态学表现为线粒体皱缩，膜密度增加，外膜破裂等。该过程受到包括铁代谢、脂质代谢、GSH 的耗竭等调控。铁死亡参与到多种疾病中，包括缺血/再灌注引起的肾、肝损伤、神经毒性和退行性疾病、癌症等。已有研究证实，铁死亡参与到炎症性肠病的发生与发展过程中，本文将对铁死亡的机制在炎症性肠病中的作用进行综述，为疾病的早期诊断、有效治疗和提早预防等提供新的依据。

1 铁死亡概述

1.1 铁稳态与铁死亡

机体中的铁是脂质过氧化物积累和铁死亡发生所必须的物质，主要以铁离子的形式存在，参与到细胞中的诸多生理功能，包括氧气的运输和储存、线粒体呼吸、DNA 复制和细胞信号传递等。铁的摄取、排出、储存等都会影响铁死亡的敏感性。

1.2 脂质过氧化与铁死亡

铁死亡是以脂质过氧化产物和活性氧(ROS)的积累为特点的一种新型细胞死亡形式，其发生与氧化应激密切相关。脂质过氧化是指 PUFAs 链经过一系列的酶促或非酶促氧化反应，最终形成脂质活性氧。

1.3 氨基酸代谢与铁死亡

铁死亡的主要特征是由细胞外半胱氨酸摄取抑制和 GPX4 功能失活引起的，由 System Xc-/GSH/GPX4 轴调节，过程中导致 PUFA 的消耗和脂质活性氧（L-ROS）的积累。

2 铁死亡与炎症性肠病的关系

2.1 铁代谢与 IBD

早期研究表明，IBD 的临床症状包括缺铁和因出血和吸收不良引起的贫血，严重影响个人健康。临床上已使用口服铁来改善患有缺铁性贫血的 IBD 患者，然而，过量摄入铁会导致肠道铁超载，导致活性氧产生失调并干扰肠道微生物群，这可能加剧 IBD 的疾病。

2.2 脂质过氧化与 IBD

铁死亡是一种由铁依赖性脂质过氧化引起的调节性细胞坏死，参与到众多疾病的病理过程中。脂质过氧化引起的铁蓄积和活性氧（ROS）的积聚被认为是铁死亡的关键触发因素。

2.3 氨基酸代谢与 IBD

GSH 缺乏是铁死亡的一个关键特征。GSH 可以直接清除 ROS，从而增强细胞抗氧化能力，保护胃肠道免受慢性炎症。然而，升高的 ROS 可以促进 GSH 的消耗并减少 GSH 的合成。

关键字 铁死亡；炎症性肠病；铁代谢；脂质过氧化；谷胱甘肽

分类：基础营养研究

维生素 D 通过抑制 ACSL4 介导的铁死亡缓解溃疡性结肠炎

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目的：随着环境和人们生活方式的改变，流行病学研究表明，溃疡性结肠炎（Ulcerative Colitis，UC）的发病率以平均每年 2.4%~18.1%的速度逐年递增，且呈现全球性分布。UC 作为一种慢性、复发性炎症性肠病，已被证实会导致比健康人群更高的结肠癌发生风险[1]，因此寻找有效的治疗 UC 的方法是临床关注的重点。维生素 D（Vitamin D，VD）作为一种脂溶性维生素，能够上调相关蛋白的表达，降低肠粘膜渗透性，从而维持肠道屏障的完整性[2]；此外 VD 还可以通过影响免疫细胞进而发挥抗炎作用[3,4,5,6,7]，增强固有免疫从而减轻 UC 损伤。有研究表明，缺乏 VD 会增加 UC 发生的风险[8]。我们实验室前期已经证实额外补充 VD 可通过调控焦亡通路来改善 UC，本研究主要探索 VD 在治疗 UC 中的其他潜在机制，为治疗 UC 提供新的见解。

研究方法：选取 18 只体重在 20-25g 之间的 6 周龄雄性野生型 ICR 小鼠，分为 6 组：Con、VD、Fer-1、DSS、DSS+VD 和 DSS+Fer-1 组，过程中，监测相关指标。体外实验选取 HCT116 人结肠癌细胞，通过 RT-PCR、Western blot 以及相关试剂盒检测 VD 对脂多糖 (Lipopolysaccharide，LPS) 诱导 HCT116 细胞 UC 模型中炎症和氧化应激相关指标的影响；给予 Fer-1，检测 UC 模型中铁死亡相关指标的变化；检测转染 ACSL4+/+质粒的细胞相关基因的表达。

结果：1、CCE 预处理十四天后，DSS+VD 组较单纯 DSS 组，小鼠体重下降及结肠组织损伤有所缓解，DAI 和 CMDI 评分有所下降，炎症（COX-2, IL-6）和氧化应激（MDA，MPO）相关指标有所改善。2、VD 预处理后，与 LPS 组相比，LPS+VD 组细胞的 SOD1 表达水平上升，COX-2，IL-6，MDA，MPO 表达水平下降。3、给予 Fer-1 铁抑制剂后，DSS+Fer-1 组比 DSS 组小鼠体重下降及结肠组织损伤有所改善；4、给予 VD 后，DSS+VD 组中铁和 GSH 含量较 DSS 组有所变化；5、HCT116 细胞在 ACSL4 基因过表达后，VD 减轻炎症、抑制铁死亡的作用受到抑制。

结论：1、VD 能够缓解 UC 模型中的炎症损伤和氧化应激;2、Fer-1 能够改善 UC 模型中炎症因子和铁死亡相关蛋白的表达;3、VD 通过抑制 ACSL4 蛋白，缓解 UC 中的炎症损伤和铁死亡现象。

关键字 维生素 D；维生素 D 受体；溃疡性结肠炎；铁死亡

分类：基础营养研究

维生素 E 琥珀酸酯诱导的胃癌细胞内质网应激在自噬和凋亡中作用的研究

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目的：明确内质网应激（ERS）在维生素 E 琥珀酸酯（VES）激活人胃癌 MKN28 细胞自噬和凋亡中发挥的作用。

方法：体外培养人胃癌 MKN28 细胞，不同剂量（5，10，15，20 μg/mL）VES 处理细胞 24 小时后，Western blot 检测 ERS 标志物葡萄糖调节蛋白 78（glucose regulated protein 78, GRP78)、C/EBP 同源蛋白（C/EBP homologous protein, CHOP），自噬标志物微管相关蛋白 1 轻链 3（microtubule associated protein1 light chain 3, LC3）、Beclin-1 和凋亡相关蛋白半胱氨酸天冬氨酸蛋白酶-3（Caspase-3）的表达情况。3 mmol/L 4-苯基丁酸（4-phenylbutyric acid，4-PBA）抑制 ERS，设置对照组、4-PBA 组、衣霉素（Tunicamycin，TM）组、VES 组、VES+4-PBA 组，Western blot 检测 CHOP、GRP78、LC3、Beclin-1 和 Caspase-3 的表达情况，同时流式细胞仪检测各组的细胞凋亡率。

结果：随着 VES 作用剂量的上升，ERS、自噬和凋亡相关蛋白表达均有所增加，且在 20 μg/mL VES 组达到峰值。20 μg/mL VES 组 GRP78、CHOP 的表达较对照组显著增加（均 $P<0.001$）；20 μg/mL VES 组 Beclin-1 的表达、LC3Ⅱ/LC3Ⅰ的比值较对照组 Beclin-1 的表达、LC3Ⅱ/LC3I 的比值显著增加（均 $P<0.001$）；20 μg/mL VES 组 C-Caspase-3/Pro Caspase-3 的比值较对照组显著增加（$P<0.01$）；抑制 ERS 后，VES+4-PBA 组的 GRP78、CHOP，Beclin-1 的表达及 LC3Ⅱ/LC3I，C-Caspase-3/Pro Caspase-3 的比值较 VES 组明显降低（$P<0.05$）。凋亡率检测结果显示，与对照组相比，TM 组、VES 组凋亡率显著升高（均 $P<0.05$）；与 VES 组相比，VES+4-PBA 组的细胞凋亡率显著降低($P<0.05$)。

结论：VES 可激活人胃癌 MKN28 细胞发生 ERS，诱导胃癌细胞发生自噬和凋亡，且 ERS 可促进 VES 诱导的凋亡和自噬的发生。

关键字 维生素 E 琥珀酸酯；内质网应激；凋亡；自噬；胃癌细胞

分类：基础营养研究

草果乙醇提取物对 T2DM 大鼠肾损伤作用的研究

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目的 通过高糖高脂联合链脲佐菌素（Streptozotocin, STZ）诱导的 2 型糖尿病（Type 2 diabetes mellitus, T2DM）大鼠模型探究草果乙醇提取物对 T2DM 大鼠肾脏损伤的保护作用。方法 适应性饲养 1 周的 42 只 6 周龄 SD 雄性大鼠，随机分成正常对照组（n = 8）和高糖高脂组（n = 34）。分别给予普通和高糖高脂饲料，饲养 4 周后，高糖高脂组腹腔注射 STZ，正常对照组腹腔注射等量柠檬酸缓冲液。后将诱导成功的 T2DM 大鼠随机分成 T2DM 模型组、草果组（100 mg/kg）、二甲双胍组（100 mg/kg），随后进行 6 周的干预实验。记录干预后大鼠的体重和肾脏脏器系数；对肾脏组织形态学改变进行 HE、油红 O 染色、PAS 染色和 Masson 染色观察；测定肾功能指标血清胱抑素 C（Cystatin C, CYS-C）、肌酐（Serum creatinine, SCR）、尿素氮（Blood urea nitrogen, BUN），血清脂肪因子脂联素（Adiponectin, ADP）和瘦素（Leptin, LEP）。结果 干预后，草果组大鼠的肾脏脏器系数低于 T2DM 模型组，差异具有统计学意义（P < 0.05）。HE 染色、油红 O 染色、PAS 染色和 Masson 染色结果显示，与正常对照组相比，T2DM 模型组大鼠肾小球形态异常，基底膜增厚，系膜区增宽，胞浆空泡化、肾组织中脂质、糖原和胶原纤维沉积明显增多。与 T2DM 模型组相比，草果组大鼠肾小球形态正常，系膜区稍许增宽，肾组织中脂质、糖原和胶原纤维沉积减少。草果组和二甲双胍组大鼠血清 CYS-C、SCR 和 BUN 的含量均低于 T2DM 模型组（P < 0.05）。此外，草果组和二甲双胍组大鼠血清 ADP 的含量高于 T2DM 模型组（P < 0.05）。结论 草果乙醇提取物能够缓解 T2DM 大鼠体重减轻和肾脏肥大，改善肾脏肾小球和肾小管组织形态、脂质沉积，减轻 T2DM 大鼠肾脏损伤。

关键字 草果 乙醇提取物 2 型糖尿病 肾损伤

分类：基础营养研究

空间营养——从三维角度重新审视营养学问题

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随着我国居民膳食结构和生活方式的改变，营养相关疾病已成为国家亟待解决的重大公共卫生问题。因此，探讨营养相关疾病的发病机制、研发有效的营养学干预手段具有重要意义。我们认为，未来的营养学研究除应重视营养物质的质与量、种类、搭配、适宜人群和摄入时序等要素外，还应重点关注其空间分布的问题。一方面，营养素在机体内分布不均，使细胞器、细胞和器官的分子构成和功能迥异，其分布异常与疾病互为因果关系；另一方面，常规口服摄入方式可能使部分营养物质机体空间分布不合理，效果欠佳、有待优化。因此，我们提出“空间营养”研究理论，旨在探讨营养物质机体空间分布异常与疾病的相互作用并阐明其分子机制，并从宏观和微观角度纠正其空间分布异常、优化其分布，以期为营养相关疾病的防治提供新的膳食危险因素、分子靶点和营养学干预手段。

基于该理论，课题组开展了一系列研究：

1. n-3 多不饱和脂肪酸（n-3 PUFAs，n-3）缺乏促进糖尿病肾病（DN）进展：n-3 构成生物膜结构、发挥重要生理功能。既往研究聚焦 n-3 补充的健康效应，然而其缺乏对疾病的影响鲜有报道。我们发现 n-3 缺乏可显著促进小鼠 DN 进展。肾脏转录组测序发现 n-3 缺乏诱导 Dgkh 基因显著低表达，敲低 Dgkh 可引起足细胞损伤，揭示 n-3 缺乏是 DN 进展的重要机制，提示 Dgkh 可能是 DN 的重要保护性基因。我们拟深入探讨 Dgkh 在 DN 中的作用，并探讨 n-3 缺乏程度对 n-3 补充干预 DN 患者效果的影响，有望为 DN 提供新的分子机制和 n-3 干预的参考依据。

2. n-3 空间优化分布对糖尿病及其并发症的干预作用：研究发现，相比于胃造口和小肠造口，从结肠造口注入 n-3 降糖效果更佳，提示结肠是 n-3 的优化分布场所。我们分别构建了基于偶氮、虾青素和膳食纤维的 n-3 结肠靶向递送系统，与口服单纯 n-3，或 n-3 与虾青素/膳食纤维的混合物相比，对于糖尿病和 DN 的改善效果更佳。结肠巨噬细胞极化异常参与糖尿病及其并发症的发生发展。n-3 参与线粒体膜组成，维持其流动性，抑制活性氧过度生成。我们发现 n-3 缺乏导致巨噬细胞极化异常、线粒体功能受损，n-3 补充可逆转这一现象。因此在上述结肠靶向递送系统基础上进一步构建了 n-3 巨噬细胞及其线粒体靶向载体，以期获得更优效果。

综上，空间营养理论进一步完善了营养科学理论体系，对于阐释营养相关疾病发病机制和研发新型营养学干预手段具有重要理论价值和指导意义。

关键字 空间营养；营养物质；营养素；分布异常；优化分布；靶向递送

分类：基础营养研究

我国育龄女性维生素 K 营养评价指标参考范围的建立

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目的：维生素 K 是人体必需的脂溶性维生素，其在促进凝血、维持骨骼健康和预防动脉粥样硬化等方面的健康效应日益受到关注。然而，目前尚无公认的指标和相应的参考范围来评估不同人群的维生素 K 营养状况。本研究旨在建立中国健康育龄女性维生素 K 营养评价指标的参考范围，为维生素 K 营养评价提供依据。方法：本研究共纳入 631 名健康育龄女性（18-49 岁）作为参考人群，所有受试者均来自 2015-2017 年中国成人慢性病和营养监测（CACDNS）。选择文献报道较多的一系列可用于维生素 K 营养状况评价的指标进行检测，采用液相色谱-串联质谱（LC-MS/MS）检测血清中维生素 K（VK1、MK-4 和 MK-7）的浓度，采用酶联免疫吸附试验（ELISA）测定评估维生素 K 营养状况的其他常用指标，包括羧化不全骨钙素（ucOC）、骨钙素（OC）、基质 Gla 蛋白（MGP）、非磷酸化未羧化 MGP（dp-ucMGP）和维生素 K 缺乏诱导蛋白 II（PIVKA-II），计算羧化不全骨钙素比例（%ucOC）。通过计算参考人群中维生素 K 评价指标的 P2.5-P97.5 区间获得参考范围。结果：血清中 VK1、MK-4 和 MK-7 的参考范围分别为 0.21-3.07 ng/mL、0.02-0.24 ng/mL 和 0.12-3.54 ng/mL。ucOC、%ucOC、dp-ucMGP 和 PIVKA-II 的参考范围分别为 1.09-2.51 ng/mL、5.80-22.78 %、2.69-5.88 ng/mL 和 3.98-8.40 ng/mL。结合各项指标的参考范围及其生理意义，提出可用于评估亚临床维生素 K 缺乏的界值如下：VK1<0.21 ng/mL，MK-7<0.12 ng/mL，ucOC>2.51 ng/mL，%ucOC>22.78 %，dp-ucMGP>5.88 ng/mL，PIVKA-II>8.40 ng/mL。结论：本研究建立的健康育龄女性维生素 K 营养状况评价指标的参考范围可用于评估该人群的营养和健康状况。

关键字 维生素 K；营养状况；参考范围；育龄女性

分类：基础营养研究

基于网络药理学联合 16s rDNA 高通量测序技术分析一种复合配方植物提取粉对小鼠肠道菌群的影响

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目的：本研究旨在通过网络药理学联合 16s rDNA 高通量测序技术分析一种复合植物提取粉对 DSS 诱导的急性炎症损伤小鼠肠道菌群的影响。

方法：从 TCMSP 数据库、UniProt 数据库和 SwissTargetPrediction 数据库筛选主配方原料车前子、马齿苋、谷氨酰胺和萝卜硫苷的活性成分和作用靶点。通过 Genecards 数据库获取抗炎和免疫调节的基因靶点，分别取活性成分与抗炎或免疫调节的基因靶点交集进行蛋白质互作网络分析。使用 Cytoscape 软件构建“活性成分-潜在作用靶点”网络和 PPI 网络，获取显著性靶点。通过 metascape 数据库对显著性靶点进行 GO 功能富集分析与 KEGG 通路富集分析。实验选用 35 只 BALB/C 小鼠，随机分配为空白组(n=5)、模型组(n=15)、给药组(n=15)。给药组连续灌胃植物粉溶液 44 天，其余组给予等剂量蒸馏水；模型组和给药组在第 15 天用 DSS 灌胃建模，持续 7 天，空白组给予等剂量蒸馏水。在第 0、14、23、30 和 44 天收集各组小鼠粪便，用 16S rDNA 高通量测序技术分析各组小鼠肠道菌群。

结果：1）筛选得到植物粉活性成分 17 个，包括具有抗炎和免疫调节活性的槲皮素、花生四烯酸等；活性成分作用靶点 210 个，与抗炎、免疫调节活性的交集靶点分别为 126、69 个，经过 PPI 网络图分析得到对应的显著性靶点分别为 21、13 个；KEGG 分析获得与抗炎、免疫调节活性相关通路分别为 136、111 条。2）通过 Illumina Miseq 测序共获得优化序列 1656571 条，操作分类单元(OTUs)537 个，测序深度已基本覆盖到样品中所用的物种。β 多样性分析结果表明第 23 天后给药组和空白组的肠道菌群结构相似；组间差异分析表明，在属水平上，第 23 天给药组相较于空白组 Lactobacillus 等丰度下降，而 Turicibacter、Faecalibaculum 丰度增加；而 23 天后给药组的 Lactobacillus 丰度整体随时间增加，而 Turicibacter、Faecalibaculum 丰度降低。

结论：网络药理学表明植物粉通过多成分、多靶点、多通路实现抗炎和免疫调节功能。动物模型实验表明植物粉可能通过增加益生菌 Lactobacillus 丰度，降低 Turicibacter、Faecalibaculum 丰度来改善小鼠肠道菌群结构，发挥抗炎活性。

关键字 复合植物提取粉；网络药理学；16s rDNA 高通量测序；肠道菌群

分类：基础营养研究

铁营养状况生物标志物研究进展

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目的：全球铁缺乏的疾病负担近年来虽已有改善，但仍然是低中发展水平国家主要的疾病负担之一，且和多种慢性疾病的发生发展相关。由于传统经典的生物标志物会存在检测结果不明确，易受炎症状态、年龄、昼夜节律干扰等影响，最近的研究也开始探索能反应机体铁营养状况且更为合适有益的潜在标志物。本综述基于目前的研究，讨论了铁营养状况生物标志物的进展，以期为将来的相关研究提供更多方向。

方法：在 Pubmed、Web of science 及知网等国内外数据库进行全面的文献检索，对铁的生物学作用、铁营养状况失衡、目前可用于评价铁营养状况的经典生物标志物及潜在标志物进行概述。

结果：1）骨髓铁仍然是目前机体铁营养状况的金标准，但由于痛苦、具有侵入性和高成本的临床操作，仅适用于某些复杂病例及需要精细设计的实地调差；2）血清铁、铁蛋白、转铁蛋白、总铁结合力及锌原卟啉易受炎症等的干扰，一般在临床分析时组合使用或用于计算其他综合的铁状态相关指数；3）可溶性转铁蛋白受体、转铁蛋白饱和度及可溶性转铁蛋白受体-铁蛋白指数相对受炎症影响小，更适用于炎症高发或者慢性疾病人群铁营养状况的诊断；4）铁调素、网织红细胞血红蛋白含量、红细胞铁酮及粪便铁作为潜在的铁生物标志物，目前还在研究阶段，结果不成熟，但都有各自的优势和应用前景。5）多组学（基因组学/蛋白质组学/代谢组学）逐渐应用在铁-机体相互作用及铁代谢机制的研究上，也许能在未来几年确定新的铁调节途径帮助铁营养状况的诊断。

结论：机体铁营养状况的金标准仍然是骨髓铁，但鉴于其有创及高成本的临床操作，实际应用非常受限。其余一些经典的铁生物标志物不同程度受到类似炎症、年龄、昼夜波动等因素的影响，但也有各自更为合适的应用场景。能充分判断铁营养状况的生物标志物还远远不够完善，随着高通量技术的快速进步，多组学（基因组学/蛋白质组学/代谢组学）技术也许可以帮助我们进一步的挖掘和探索这些潜在的标志物。

关键字 铁营养状态；生物标志物；多组学

分类：基础营养研究

高 LYRM4-AS1 表达与胶质瘤患者的不良预后和免疫相关

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目的：本研究旨在通过生物信息学分析探索 LYRM4-AS1 在胶质瘤中的预后价值，及其参与的分子机制。

方法：从 TCGA 数据库中收集具有临床信息的 RNA-seq 数据。以胶质瘤组织中 LYRM4-AS1 表达中位数为临界值，将患者分为高表达组和低表达组，使用 DESeq2 R 包鉴定差异表达基因（DEGs）。使用 clusterProfiler R 包对 DEGs 进行基因本体论（GO）和京都基因和基因组百科全书（KEGG）功能富集分析，使用 STRING 数据库进行蛋白质-蛋白质相互作用（PPI）网络分析。通过 clusterProfiler R 包进行基因集富集分析（GSEA）。利用 GSVA R 包进行单样本基因集富集分析（ssGSEA），分析 24 种免疫细胞的免疫浸润，以及 LYRM4-AS1 与神经胶质瘤中免疫细胞生物标志物以及免疫检查点之间的相关性。最后，采用 Kaplan-Meier 方法构建了生存曲线，利用 Cox 回归分析分析独立危险因素。采用 pROC 包绘制受试者工作特性（ROC）分析图。

结果：研究发现 LYRM4-AS1 在多形性胶质瘤、结肠癌、食道癌、肝细胞癌等多种肿瘤中显著高表达。在胶质瘤中 LYRM4-AS1 具有较高的分辨效能（AUC=0.939，95%可信区间[CI]= 0.930-0.949）。LYRM4-AS1 表达在 WHO 分级（P<0.001）、IDH（P <0.001）、1p/19q（P <0.001）和年龄（P <0.001）等不同临床病理特征中具有显著差异。Kaplan-Meier 曲线显示，高表达 LYRM4-AS1 组的总生存期（OS，P <0.001）、疾病特异性生存期（DSS，P <0.001）和无进展区间（PFI，P <0.001）比低表达 LYRM4-AS1 组更差，该分子是胶质瘤患者 OS 的独立危险因素。富集分析显示 LYRM4-AS1 与 P53 信号通路、NOTCH 信号传导、JAK_STAT 信号通路等有关。ssGSEA 分析表明，Th2 细胞、巨噬细胞、aDC（活化 DC）和嗜中性粒细胞与 LYRM4-AS1 表达呈显著正相关（P <0.001），且与 PDCD1、CD274、CTLA-4、LAG-3、TIGIT 和 HAVCR2 呈显著正相关。

结论：研究结果表明，LYRM4-AS1 的高表达与胶质瘤患者生存期较差有关。其表达水平与胶质瘤的免疫浸润和免疫检查点相关，可被视为胶质瘤的潜在预后生物标志物。

关键字 LYRM4-AS1， 胶质瘤， 预后， 免疫， 生物信息学分析

分类：基础营养研究

鉴定氧化应激相关基因作为结直肠癌的预后分子标志物

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目的：

肿瘤分子生物学表明氧化应激与结直肠癌之间密切相关。本研究拟从氧化应激相关基因出发，利用公共数据库分析鉴定结直肠癌中氧化应激相关的预后分子标记物，为结直肠癌的预后预测、营养干预提供新靶点和理论依据。

方法：

从 TCGA 数据库下载结直肠癌 RNAseq 数据并收集临床资料，利用 R 软件分析结直肠癌组织中差异表达和预后相关的基因。利用 GeneCards 数据库氧化应激相关基因。使用 R 软件进行 GO 和 KEGG 分析。使用 LASSO 回归和 Cox 回归方法构建预后风险评分模型。最后根据风险评分将结直肠癌患者分为高、低风险组，分析结直肠癌患者生存资料，绘制 Kaplan-Meier 曲线以评估分子标志物的预后价值。

结果：

设定|log2-flod change (FC)|>2.0 以及 P<0.05 为阈值，分析得到结直肠癌组织中差异表达基因 2124 个，预后相关基因 174 个。将差异表达基因、预后相关基因和氧化应激基因取交集，共得到 40 个编码基因。通过 GO 和 KEGG 分析，发现 40 个基因主要在白细胞介素 7 介导的信号通路、基因沉默等通路显著富集（P<0.05）。使用 LASSO 回归分析得到 13 个与氧化应激相关的预后分子，分别为 TYR、CYP26A1、LIN28A、H2AC4、REG3A、H2BC10、H3C11、DEFA5、SEMA3E、WIF1、NKX6-3、CLCA4、TTC29。利用单因素 Cox 回归分析发现，CYP26A1(HR= 1.434, P= 0.004)、SEMA3E(HR= 1.416, P= 0.02)和 NKX6-3(HR: 1.197, P= 0.01)是结直肠癌患者预后独立危险因素。K-M 曲线分析发现，高风险组结直肠癌患者具有更差的预后（HR=2.32,P<0.001）。

结论：

本研究鉴定出的基于氧化应激相关的结直肠癌预后分子标志物具有一定的预后价值，有望成为结直肠癌潜在的营养干预靶点。

关键字 氧化应激、营养干预、结直肠癌、生物信息学

分类：基础营养研究

脑卒中炎症相关关键分子的筛选与鉴定

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目的：

本研究利用公共数据库分析鉴定脑卒中中炎症相关的预后分子标记物，为脑卒中的预后预测、营养干预提供新靶点和理论依据。

方法：

从 GEO 数据库中下载脑卒中表达谱数据集，利用 R 包 limma 分析差异表达基因。从 GeneCards 数据库下载炎症相关基因集。使用 R 软件包 clusterProfiler 对脑卒中和炎症相关的差异基因进行 GO 和 KEGG 富集分析，STRING 数据库进行蛋白质-蛋白质互作网络（Protein-Protein interaction，PPI）分析，并利用 Cytoscape 软件筛选 hub 基因。利用 miRTarBase、miRWalk、TRRUST 和 DGIdb 数据库进行 hub-miRNA、hub-转录因子（transcription factor，TF）、hub-drugs 互作网络分析，最后使用 CTD 数据库进行 hub genes 和 TF 的 Disease Ontology 分析。

结果：

筛选 GEO 中脑卒中患者血液表达谱数据集 GSE58294 和 GSE22255，设定|log2-flod change (FC)|>0.5 以及 P<0.05 为阈值。GSE58294 中共得到了 3384 个差异表达基因，而 GSE22255 中共得到了 57 个差异表达基因。从 GeneCards 数据库下载炎症相关的编码基因 9693 个，与以上两个数据集差异表达基因取交集，得到脑卒中中炎症相关的差异表达基因 11 个。富集分析结果显示 11 个基因基因主要富集在 Influenza A、IL-17 signaling pathway、NF-kappa B signaling pathway 等生物学通路中。利用 Cytoscape 软件中 cytoHubba 插件 Degree、MNC、EPC、DMNC 和 MCC 五种算法依次筛选网络中前 5 个发挥至关重要作用的 hub 基因，取并集后得到 7 个 hub 基因，分别为 SOCS3、ZFP36、PTGS2、IL1B、CXCL8、DUSP1、ATF3。网络分析发现，与 7 个 hub 基因相关的 miRNA 有 61 个，相关 TF 有 83 个，并发现 169 个小分子可以调节 hub 基因。最后对 hub 基因和 TF 相关的疾病取交集共得到 64 种疾病，其中包括：Neoplasms、Pathologic Processes、Glioma 等

结论：

本研究鉴定出的炎症相关脑卒中分子标志物具有一定的研究价值，有望成为脑卒中潜在的营养干预靶点。

关键字 脑卒中、炎症、营养干预、生物信息学

分类：基础营养研究

基于网络药理学探究酸枣仁对肝癌营养干预作用机制

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目的：

通过网络药理学分析探究酸枣仁中起关键作用的活性成分和肝癌营养干预的关键靶点，通过基础实验酸枣仁关键活性成分对肝癌细胞营养干预的作用与机制。

方法：

利用 TCMSP 数据库（https://tcmsp-e.com/tcmsp.php）检索酸枣仁中活性成分，通过 SwissTargetPrediction 数据库（http://www.swisstargetprediction.ch/）和 BATMAN-TCM 数据库（http://bionet.ncpsb.org.cn/batman-tcm/）分析活性成分的分子靶点。通过 GeneCards 数据库（https://www.genecards.org/）筛选肝癌的相关靶点。通过 Cytoscape 软件构建酸枣仁活性成分与分子靶点网络图，并绘制核心靶点拓扑网络，对活性成分分子靶点和疾病基因交集靶点进行 GO 功能与 KEGG 通路富集分析，最后使用筛选到的活性成分对 HepG2 肝癌细胞和 LO2 肝正常细胞进行干预，使用 CCK8 方法检测活性成分对细胞活性的影响，Annexin V/PI 染色法检测细胞凋亡，PI 染色法检测细胞周期。

结果：

通过网络药理学分析筛选得到酸枣仁活性成分 33 个，活性成分靶点 61 个；通过 Cytoscape 软件筛选酸枣仁中发挥关键作用的活性成分，共得到 12 个活性分子；将肝癌靶点与活性成分靶点取交集共得到靶点基因 38 个；将 38 个靶基因进行 GO 和 KEGG 通路分析发现主要作用于 cAMP 信号通路、调节炎症反应等信号通路。细胞增殖实验发现，在相同剂量下，酸枣仁活性成分皂苷 B 可抑制 HepG2 活性，并呈现剂量依赖性，但是对 LO2 无影响（P＜0.05）。使用 40、80、120 μM 皂苷 B 处理，发现随浓度增加 HepG2 细胞凋亡程度呈增加趋势，细胞周期发生 G2/M 期阻滞，而对 LO2 无影响（P＜0.05）。

结论：

研究发现酸枣仁皂苷 B 为酸枣仁中的主要活性成分，其可诱导肝癌细胞凋亡并发生细胞周期阻滞，以上实验结果提示酸枣仁皂苷 B 有望成为新型肝癌营养干预分子。

关键字 酸枣仁、营养干预、肝癌、网络药理学

分类：基础营养研究

基于生物信息学方法筛选高脂饮食诱导的肥胖内脏脂肪的关键通路和 hub 基因

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背景及目的：肥胖作为威胁全球健康的公共卫生问题，是许多代谢性疾病的基础。高脂饮食是导致肥胖的主要不良生活方式之一，可导致脂肪组织功能失调尤其是内脏脂肪，从而造成全身慢性低度炎症状态和代谢紊乱。造成肥胖内脏脂肪功能异常的机制复杂，阐明涉及肥胖内脏脂肪病理生理改变的重要途径和基因可以为肥胖机制研究提供理论依据。基因表达谱分析与生物信息学相结合已成为研究各种疾病中重要信号通路和基因的常用有效方法。本研究基于多个数据集的生物信息学分析，探索肥胖内脏脂肪的潜在生物学途径和 hub 基因。

方法：从 GEO 数据库下载高脂饮食喂养 16 周的野生型小鼠附睾脂肪的微阵列基因数据集 GSE61839、GSE63198 和 GSE111412。筛选出 GSE61839 和 GSE63198 中正常饮食组和高脂饮食组之间重叠的差异表达基因（Overlapping differentially expressed genes, ODEGs）进行 GO、KEGG 富集分析并构建 PPI 网络。利用 Cytoscape 软件筛选出 ODEGs 中的 hub 基因。在 GSE111412 中验证富集的重要途径和 hub 基因。此外，用 60%脂肪供能高脂饲料喂养 16 周构建肥胖小鼠模型，通过 qRT-PCR、Western Blot 和免疫组化进一步验证相关通路和 hub 基因，并检测小鼠的血脂、空腹血糖和炎症因子水平。

结果：在 GSE61839 和 GSE63198 之间共筛选出 469 个 ODEGs，其中上调的 ODEGs 有 380 个，下调的 ODEGs 有 89 个。GO 和 KEGG 分析显示，上调的 ODEGs 在 Toll 样受体信号通路、B 细胞受体信号通路和趋化因子信号通路中显著富集。下调的 ODEGs 在代谢途径和紧密连接通路中富集，但无显著性差异。在 ODEGs 的 PPI 网络中筛选出 5 个 hub 基因（Tyrobp、Rac2、Itgb2、Tlr2 和 Ptprc）。这些主要途径和 hub 基因在 GSE111412 和肥胖小鼠模型的内脏脂肪中得到验证。此外，肥胖小鼠体重、血清甘油三酯、总胆固醇、游离脂肪酸和空腹血糖以及炎症因子水平显著升高。肥胖内脏脂肪中脂肪细胞体积增大，巨噬细胞浸润形成的冠状结构也显著增加，纤维化明显。

结论：高脂饮食诱导内脏脂肪重塑，引起脂肪发生扩张、炎症和纤维化，进而导致机体血脂、血糖和血清炎症水平增加。鉴定出的 hub 基因主要与免疫细胞浸润相关，可能被用作抗肥胖的生物标志物。

关键字 肥胖；高脂饮食；内脏脂肪组织；生物信息学分析；炎症；趋化因子；纤维化

分类：基础营养研究

S-腺苷同型半胱氨酸通过 JNK 信号通路促进氧-葡萄糖剥夺诱导的 b.End3 细胞凋亡

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Objectives: The current study aimed to elucidate the role of SAH in pathogenesis with ischemic stroke, especially in apoptosis.

Methods: OGD models were constructed in b.End3 cells, the SAH was accumulated by adding 3-DZA. The apoptosis rate of b.End3 cells was assayed by flow cytometry assay, and apoptotic-related proteins were measured by Western blot.

Results: The cell survival, damage and death were increased after SAH accumulation, while reductions were detected in the group treated with SP600125. Bcl-2 expression was decreased, the apoptosis rate and pro-apoptotic proteins expression as well as the ratio of pJNK/JNK was increased in response to SAH accumulation. Interestingly, the blocking of JNK signaling pathway reversed the effects exerted by SAH on the apoptosis rate, the expression of apoptotic-related proteins.

Conclusions: SAH could lead to cell damage and apoptosis after ischemic stroke, and the activation of this process was mediated by JNK signaling pathway.

关键字 S-adenosyl homocysteine, Apoptosis, JNK signaling pathway

分类：基础营养研究

响应面优化超声辅助提取春生田头菇多糖及抗氧化研究

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目的：为探究洞庭湖地区湿地独有的特色芦苇食用菌春生田头菇粗多糖提取方法及抗氧化性。能够在易于操作的基础上利用超声手段辅助提取，以期使用较为稳定、成熟的方法最大化提取该菌菇的多糖有效成分并测定抗氧化活性，为高效利用春生田头菇和深入开发春生田头菇多糖功能性食品提供参考。方法：以洞庭湖区特色芦苇食用菌春生田头菇为提取原料，以多糖提取率为评价指标，采用超声辅助热水醇沉法进行提取，以液料比、超声提取（时间、功率）、热水浸提（温度、时间）为单因素条件进行实验，确定需进一步优化条件，采用 Box-Behnken 试验设计响应面法优化提取春生田头菇粗多糖的工艺条件，并考察春生田头菇粗多糖对 DPPH·自由基、ABTS+·自由基的清除能力。结果：结合实际情况，确定最佳提取工艺条件为料液比 1:50（g/ml）、超声提取时间 20min、提取功率 150W、热水浸提温度 80℃、浸提时间 4h。结论：本研究采用超声辅助热水浸提法提取春生田头菇粗多糖及研究提取的粗多糖的体外抗氧能力。在单因素试验基础上利用 Box-Behnken 试验设计原理，运用 Design-Expert 8.0.6 Trial 软件进行分析，建立了提取提取春生田头菇粗多糖的回归模型，由该模型优化得出提取最佳工艺条件。前期笔者经过多次的水提法进行提取实验，粗多糖提取率均最大不超过 4.6%，由此可见增加超声这一步骤后，提取效率明显提升，使得多糖提取率显著增加，比常见以热水浸法提取率要高，该方法提取工艺简单，是一种有效提取春生田头菇粗多糖的方法。此文，通过粗多糖抗氧化活性，随着其浓度的增加，其对 DPPH·自由基以及 ABTS+·自由基清除作用增强，说明具有一定的体外抗氧化能力。因此所得春生田头菇粗多糖进过进一步纯化后可用于食品，药品，保健品等产品中，具有广阔的市场发展前景和社会效益。该研究只是对春生田头菇粗多糖的初步研究，实验主要是考察超声辅助提取对粗多糖提取率的影响和简单的抗氧性比较，由于目前提取手段多元化，有必要在下一步的研究中进一步研究超声辅助酶法、微波提取等新工艺，进一步增加多糖提取效率。同时对粗多糖进行纯化，以期更加全面、准确的的了解春生田头菇多糖的结构、功效等。

关键字 超声，响应面，提取，春生田头菇，粗多糖，抗氧化

分类：基础营养研究

复合维生素补充剂在模拟高原缺氧环境下对大鼠运动能力的提升作用

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目的：针对我高原官兵微量营养素缺乏对作训能力的制约现状，我们在模拟高原缺氧大鼠模型中，研究高浓度复合维生素补充剂对运动能力的提升作用。方法：在模拟海拔 6000m高原环境的低压舱中建立急进高原缺氧大鼠动物模型；复合维生素补充剂包括维生素 A、维生素 D、维生素 E、维生素 C、维生素 B1、维生素 B2、维生素 B3、维生素 B6、维生素 B12 和叶酸，剂量分别为平原浓度（RDA）、10 倍 RDA 和 100 倍 RDA；实验分为 6 组，平原组和高原缺氧组各 3 组；通过游泳力竭实验测定复合维生素补充剂对平原和模拟高原环境下大鼠的游泳力竭时间，力竭运动后骨骼肌糖原和血乳酸含量的作用。结果：在平原，不同维生素补充剂组游泳运动的力竭时间基本相同（P>0.05）；进入模拟海拔 6000m 高原 24h 后，游泳运动力竭时间显著少于平原组（P=0.0141）；在高原，10 和 100 RDA 维生素补充剂组与 RDA 组相比，游泳运动力竭时间明显延长（P<0.001），但 10 和 100 RDA 补充剂组之间无统计学差异（P>0.05）。进入模拟海拔 6000m 高原 24h 后，大鼠静息状态下骨骼肌糖原含量显著高于平原静息组；无论在平原还是高原，游泳力竭运动均可显著降低大鼠腓肠肌糖原含量，但高原力竭组大鼠骨骼肌剩余糖原含量显著高于平原组（P<0.05）；在高原，与 RDA 剂量组相比，补充 10 和 100 倍 RDA 维生素，游泳力竭运动时骨骼肌剩余糖原含量显著降低（P<0.05），但两组间无显著差异（P>0.05）。进入模拟海拔 6000m 高原 24h 后，大鼠静息状态下血乳酸含量显著升高；无论是在平原还是高原，游泳力竭运动均可使大鼠血乳酸含量升高，但高原组力竭时血乳酸含量显著低于平原组（P<0.0001)。在高原，游泳力竭运动时，与 RDA 剂量组相比，补充 10 和 100 倍 RDA 维生素，血乳酸含量轻微上升（无统计学显著差异），且 10 和 100 倍 RDA 维生素组之间也无显著差异（P>0.05）。结论：在高原缺氧环境下，高剂量维生素补充剂明显延长大鼠游泳运动力竭时间，维生素补充后骨骼肌剩余糖原含量显著下降，但对血乳酸含量影响较小。综上，在急性高原缺氧环境下，高剂量复合维生素补充剂可能通过动员骨骼肌糖原含量改善大鼠运动能力。

关键字 复合维生素补充剂; 高原；缺氧；运动力竭时间；肌糖原

Category: Public Nutrition & Health

Focus Group Discussion among teachers about practice in Nutrition Balance Diet Guidelines and Barriers to apply

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Background and Objectives:

Non-communicable diseases currently dominate the world. Indonesia currently has balanced nutrition guidelines which are expected to be applied in the prevention of non-communicable diseases. This study aims to obtain information about balanced nutrition practices and barriers experienced by teachers in implementing nutrition balance guidelines.

Methods

Focus Groups Discussion (FGD) was conducted with a group of teachers at a public school in Makassar City. There were 11 participants. We used structured questions based on nutrition balance guidelines and probed practices and barriers to doing so. Nutrition balance guidelines including 10 main messages.

Results:

Nutrition balance guidelines practices carried out by teachers such as consuming vegetables, only once a day, consuming side dishes that are prepared simply such as fish or tempeh, not consuming a variety of staple foods which are only dominated by rice, skipping breakfast, not consume 2 litres water a day, and doing simple physical activities, such as homework and walk to a certain place. Barriers to not practicing balanced nutrition properly are limited time, so they don't have time to prepare vegetables or other side dishes, breakfast is not a habit, so it is difficult to do it, respondents afraid to go to the bathroom frequently because drink too much, and respondent don't have time to do physical activity.

Conclusions:

Teachers applied nutrition balance guidelines only partially. It is necessary to provide education about the importance of implementing nutrition balance guidelines so that respondents are willing and able to fully implement nutrition balance guidelines.

Key words Nutrition Balance Guidelines, staple food, skipping breakfast.

Category: Public Nutrition & Health

How neoliberalism shapes dietary practices and results in the increase of non-communicable diseases and extension of existing social inequality in the Philippines

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Evidence suggests that traditional diets are transiting to more industrial diets in many countries, including the Philippines. Many features and negative consequences of neoliberalism and neoliberal diets, such as the transnational corporate-controlled food supply and value chains, the increasing consumption of industrial foods, high consumption of additives such as sugar, salt, and oil, increasing incidence rates of non-communicable diseases, and extension of existing inequality have also been observed in the Philippines. To better understand the phenomenon, this paper utilizes the theory of neoliberalism and neoliberal diets as the conceptual tool to explore the mechanism of the shift of diets in the Philippines and how it results in the increase of non-communicable diseases and extension of existing social inequality. This paper briefs the theory tradition of neoliberalism and neoliberal diets and use the evidence in the Philippines to argue that neoliberalism has created the shift of diets, resulted in higher incidence rates of non-communicable diseases, and extended existing social inequality in the Philippines since the early 1980s. The conclusion is that neoliberal food policies and neoliberal diets are the causes of the increase of non-communicable diseases and the extension of existing social inequality in the Philippines. The government should be blamed for the negative consequences caused by neoliberalism and neoliberal diets rather than only blaming victims. A reflection should also be explored to consider what role the government should play to control social inequality and NCDs caused by neoliberal food policies and neoliberal diets.

Key words nutrition transition; non-communicable diseases; neoliberalism; industrial diets; social inequality; the Philippines

Category: Public Nutrition & Health

Unhealthy food promotion on television to Sri Lankan children: The forgotten threat to the obesity pandemic

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Introduction: The promotion of unhealthy food, particularly high in fat, salt, and sugar (HFSS), is a significant risk factor for obesity. However, restricting such promotion is often overlooked. We assessed the exposure of Sri Lankan children to food promotion on television as part of a multi-country study in Asia.

Methods: Food advertisements streamed on three television channels popular among Sri Lankan children were analysed over 432h (18h/day between 0600-0000 on 4 weekdays and 4 weekend days). A tool developed based on the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS) and the World Health Organisation (WHO) Nutrient Profile Model for South-East Asia Region (SEARO) was used to classify food as healthy/unhealthy based on nutrition threshold values.

Results: Of the total 23716 advertisements aired, 6824 were on food promotion. Children, on average, were exposed to ~17 food advertisements per hour (i.e. four every 15 minutes), of which over half (56.4 %) were on unhealthy foods according to the WHO-SEARO model. A third of these were aired during children's peak viewing time. Of the 289 food products advertised, 141 (48.7 %) were HFSS products, whereas 16 products (5.5%) were high in all three HFSS components. Notably, 42 (14.5%) products had insufficient nutrition information to classify as healthy/unhealthy.

Conclusion: Children in Sri Lanka are widely exposed to unhealthy food promotion, particularly for HFSS products, through television. This has a direct negative effect on their lifelong dietary behaviour contributing to obesity and emphasizes the urgent need for implementing stringent policies restricting unhealthy food promotion to children.

Key words Children; high in fat, salt and/or sugar HFSS; Promotional techniques; Unhealthy food promotion

Category: Public Nutrition & Health

Factors Associated with Nutritional Status among Adolescents in a Post-disaster Area

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The nutritional status of adolescents and their influencing factors in post-disaster areas is rarely carried out because it is not a priority group compared to other vulnerable groups such as children and pregnant women. This study aimed to identify the nutritional status of adolescents and related factors so that they can be used as input for adolescent nutrition interventions strategy in post-disaster areas.

A cross-sectional study was conducted on 395 adolescents aged 15-17 years living in a post-disaster area in Palu City, Indonesia, from August 2021 to October 2021. Adolescents who attended the four schools most affected by major disasters in 2018 were taken randomly. Nutritional status is measured anthropometrically with body mass index by age. Several other variables collected were household expenses, household size, family type, mother's education and nutrition literacy, adolescents' age and gender, nutritional literacy, school, body image, the influence of friends and parents, constructs that shape eating behavior as well as physical activity and food security. Analysis was performed by logistic regression with a p-value of 0.05.

The percentage of severely thinness and thinness is 11.6%, while overweight and obese are 10.65%. Adolescent nutritional status is associated with gender, interactive nutrition literacy, body image, and water intake. Boy, who have a lower interactive nutrition literacy score below average, want to be fatter, and have low water intake tend to have thinner nutritional status compared to normal nutritional status. Conversely, adolescents with high interactive nutrition literacy scores want to be thinner, and have higher water intake tend to be overweight and obese compared to normal nutritional status.

Malnourist is a public health problem, including adolescents in post-disaster areas. An effective strategy is needed to overcome the problem of malnourishment in adolescents, especially in food-vulnerable areas such as post-disaster areas.

Key words adolescents, nutritional status, post-disaster area

Category: Public Nutrition & Health

Sociodemographic Factors Influencing Ultra-Processed Food Consumption among Korean Adults

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Background and objectives: Global dietary patterns have changed significantly, from conventional, home-cooked meals to modern diets, including packaged and processed foods. In Korea, the fast food and processed food markets are experiencing growth; however, there is a lack of research on the epidemiological characteristics of Koreans' consumption of ultra-processed foods (UPF). Therefore, this study aimed to investigate the difference in UPF intake according to sociodemographic status in Korean adults.

Methods: This study used data from the 2010~2018 Korea National Health and Nutrition Examination Survey, a nationally representative cross-sectional survey, and a total of 35,082 Korean adults aged 19 years and older were included for analyses. Individuals' UPF intakes were estimated using 24-hour recall data and a NOVA food classification system.

Results: The average percent of energy intake from UPF significantly increased from 18.8% in 2010 to 24.6% in 2018 (p-trend <0.0001). When comparing UPF consumption based on sociodemographic characteristics, it was found that UPF intake was higher among men, current smokers, and alcohol consumers compared to their counterparts (all p<0.01). We also observed that younger age groups demonstrated a higher UFC consumption rate (19-39 years: 29.7%, 40-64 years: 21.3%, 65+ years: 16.3%, p<0.0001). Furthermore, individuals residing in single-person households showed higher UPF intake than those living with families (25.2% vs. 23.4%, p=0.0012).

Conclusions: This study reveals a steady rise in UPF consumption among Korean adults. Unhealthy lifestyles, such as smoking and alcohol consumption, and living alone were associated with higher UPF consumption. Considering the low nutritional value of UPF, efforts are needed to enhance the dietary quality of Korean adults with high levels of UPF intake.

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Key words ultra-processed foods, NOVA classification system, Korea National Health and Nutrition Examination Survey,

Category: Public Nutrition & Health

Poor Health Status and Unhealthy Dietary Practices as Determinants of Overweight and Obesity in Primary Health Care Workers

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Background and Objectives: Overweight and obesity are global health concerns linked to nutrition and lifestyle choices. Health care workers (HCW) are crucial as advocates and role models for healthy living, have been found to have a high prevalence of overweight and obesity in previous studies. However, there is a lack of comprehensive research investigating the specific factors associated with these conditions among HCW. This study aimed to determine the prevalence of overweight and obesity and its associated factors among Malaysian HCW.

Methods: A cross-sectional study was conducted among 487 primary health care workers (HCW) at selected public health clinics in Selangor, Malaysia, utilizing a cluster sampling approach. Data were collected using online survey questionnaire. Binary logistic regression analysis was conducted to determine the factors that contributed to overweight and obesity of the HCW.

Results: The prevalence of overweight and obesity among HCW was 50.4% (mean BMI: 26.33±8.79kgm^{-2}), almost nine times higher than the underweight prevalence of 5.7%. Binary logistic regression analysis revealed self-reported poor health status (OR=3.159, 95%CI:1.884–5.299; p=0.012), consistent dinner skipping (OR=2.291, 95%CI:1.204–4.359; p=0.012), frequent consumption of ultra-processed foods (UPF; OR=3.231, 95%CI:1.513–6.898; p=0.002), and exceeding recommended carbohydrate intake (OR=3.798, 95%CI:1.114–12.948; p=0.033) were contributed with overweight and obesity.

Conclusions: A significant proportion of HCW in Malaysia are affected by overweight and obesity. Unhealthy dietary practices, such as skipping dinner, consuming high amounts of UPF, and consuming excessive portions of carbohydrate-rich foods, emerged as prominent risk factors for overweight and obesity among HCW. To address this pressing concern, there is a clear need for a comprehensive workplace nutrition and health management programme that emphasizes practical nutrition education for HCW. By equipping HCW with the necessary nutrition knowledge and skills, they can improve their overall health status and become effective advocates for public health promotion.

Key words health care workers, overweight, obesity, dietary practices, weight management

Category: Public Nutrition & Health

The mapping of household food insecurity and its associated factors among women in Pahang, Malaysia.

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Background and objectives: Food insecurity is a public health problem that receives attention at the global to the individual level. Thus, this study aimed to determine the household food insecurity and its related factors as well as to map the household food insecurity.

Method: A cross-sectional study was conducted in selected urban and rural area in Kuantan. It involved 110 participants which were purposely selected among households with women age (19-49 years). The FIES was used to measure the level of food security, socio-demographic and food access information was collected by using a questionnaire. In addition, the home coordinates of the participants were obtained through the smart phone WhatsApp application within 5 metre radius and geocoded to produce a visual map. The spatial relationship between household food insecurity and its associated factors was overlaid by using the Geographic Information System (GIS) software.

Results: A total of 42 (38.2%) households were mild food insecurity, seven (6.4%) were moderate food insecurity while one (0.9 %) with severe food insecurity. The household income [Adj OR: 19.33(95% CI;2.41, 154.95; p=0.005], mother’s working status [Adj OR: 3.92 (95% CI; 1.40, 10.97; p= 0.009]and mother’s marital status [Adj OR: 11.68 (95% CI; 1.17, 115.97; p= 0.036] were associated with household food insecurity. For the distribution of household food insecurity, the digital map produced by GIS showed that the household location is dispersed both in urban and rural areas. Those who were food insecure were found to be significantly associated with affordability to buy food and food delivery services.

Conclusion : The result warrants the need for further investigation. Health intervention programs should include food security into consideration based on its adverse implications towards public health.

Key words food insecurity, factors, mapping, GIS,

Category: Public Nutrition & Health

How Nutritious Are Children's Packaged Foods in Thailand: An Analysis of Newly Launched Products From 2016 to 2021

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Background: Utilization of marketing strategies on ‘children’ food packaging has an impact on children's decision-making, preferences, and dietary behaviors. Previous studies revealed that food products designed for children were characterized by high levels of fat, salt, sugar, and ultra-processing. This study aims to analyze newly released children’s products marketed in Thailand.

Methods: ‘Children’ product was a product having any marketing element targeting children (i.e. having a specified age range; using characters or celebrities, and fun or fantasy themes) on the front-of-package label. The nutrient composition of newly launched ‘children’ products marketed in Thailand from 2016-2021 was extracted. Data were retrieved from the Mintel Global New Products Database. Nutritional quality was evaluated by (1) healthfulness intensity, assessed by the proportion of eligible products bearing for Healthier Choice logo; and Health Star Rating (HSR); (2) processing’s degree, evaluated by the NOVA classification; (3) adherence to the recommendation for children, based on the criteria of the WHO Nutrient Profile Model for the South-East Asia Region (WHO SEA).

Results: A total of 290 products were included, most of which were sugary foods. Regarding healthfulness level, one-seventh (14.5%; n=42) was eligible to bear the Healthier Choice symbol, most (77.2%; n=224) scoring HSR<3.5 stars, with the highest proportion grading in both HSR 1 and 1.5 stars (14.1%; n=41). Besides, most (96.9%; n=267) were ultra-processed (NOVA 4) with a high number of ingredients and additives used. All of the analyzed products incorporate marketing elements aimed at children on their packaging. However, a majority (92.1%) fail to meet the children marketing's standards set by the WHO SEA

Conclusions: This study's results indicate that a considerable portion of children’s packaged foods in Thailand lacks a satisfactory nutritional profile. There is a need for measures aimed at enhancing nutritional quality and regulating marketing activities specifically targeting children on the packaging of such products.

Key words child-oriented food; food marketing; nutrition labeling; nutrition quality; Thailand

Category: Public Nutrition & Health

OPT Plus MApp: Development and Pretesting of a Mobile Application on Operation Timbang Plus – Nutrition Assessment for Under-Five Filipino Children

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Background and objectives: Operation *Timbang* Plus is an annual project in which all children 0-59 months old in the Philippines are weighed and measured in height to identify those malnourished. The data are recorded via a Microsoft Excel-based tool. Hence, using laptops in data collection is preferred. If none is available, the pen-and-paper method is used, thus reducing efficiency and increasing the risk of error. The study aims to (1) develop OPT Plus MApp, a mobile application that will serve as an alternative means of data collection for Operation *Timbang* Plus, and (2) pretest its usability.

Methods: A qualitative methodology with a design-based approach was used. Interviews with experts and target users, a process documentation, and a survey using the System Usability Scale were conducted.

Results: With the validation of experts from the National Nutrition Council, the University of the Philippines, and the Parañaque City Nutrition Committee, OPT Plus MApp was developed. Half of the pretesters (50%) find that OPT Plus MApp is easy to use, consistent, and has well-integrated functions. More than half (67%) can perceive that using the mobile application can be learned quickly. Ultimately, all pretesters (100%) feel very confident in using OPT Plus MApp and want to continue using it.

Conclusions: OPT Plus MApp is of value to the continued conduct of Operation *Timbang* Plus. The study shows that the target users are likely to adopt the new mobile application. From a broader perspective, the study also supports the potential of mobile technology in public health, especially in addressing the challenge of sustainable rapid data collection.

OPT Plus MApp (AVP): bit.ly/OPTPlusMApp_AVP

Key words mobile application, nutrition assessment, under-five children

Category: Public Nutrition & Health

Association between Eating Habits and Mental Health Status of Healthcare Shift Workers

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Background and Objectives

Working in shifts in a challenging environment of healthcare exposes healthcare shift workers to unhealthy lifestyles that may impact their mental health. This study sought to assess the association between healthcare shift workers' eating habits and mental health status.

Methods and Study Design

The sampling frame includes healthcare shift workers around Klang Valley, Malaysia. Eating habits and mental health status of the participants were assessed using the Malay Version of the Dutch Eating Behaviour Questionnaire (DEBQ) and the Depression, Anxiety, Stress Scale-21 (DASS-21). Pearson's $\chi 2$ and simple and multivariable binary logistic regression models were constructed following the Hosmer-Lemeshow approach to determine the potential association between the parameters.

Results

A total of 413 healthcare shift workers were recruited in this study. Overall, 40.7% of participants had one or more symptoms of depression, anxiety, or stress. The majority of the subjects obtained low scores for the emotional eating domain (86.9%). Whereas, 78.0% and 63.4% of the respondents obtained high scores for external eating and restrained eating respectively. This study demonstrated that emotional and external eating habits among healthcare shift workers are associated with increased odds of having a poor mental health status (OR = 2.25; 95% CI: 1.1 - 4.4; OR = 2.32; 95% CI: 1.3 - 4.2) respectively. Further analyses found that those categorized as emotional and external eaters are associated with two times increased odds of having anxiety (OR = 2.09; 95% CI: 1.2 - 3.7); (OR = 1.77; 95% CI: 1.1 - 3.0).

Conclusions

In conclusion, most of the shift workers in this study were categorized as having external and restrained eating habits. Despite only 13.9% of the shift workers being emotional eaters, their poor eating habit is associated with poor mental health status specifically anxiety.

Key words Shift workers, eating habits, psychosocial well-being, mental health, quality of life

Category: Public Nutrition & Health

The double burden of malnutrition among under-five children's mothers: A cross-sectional study in the slums of Dhaka, Bangladesh

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Abstract:

Background and objectives: The double burden of malnutrition (DBM) inevitably results from dietary transition. As well as undernutrition, the prevalence of overweight and obesity among women is also a rising problem in Bangladesh. We sought to estimate the prevalence and factors associated with the double burden of malnutrition (underweight, overweight/obesity) among mothers who have children less than 5 years of age residing in the slums of Dhaka city.

Methods: A cross-sectional quantitative study was conducted in Dholpur and Korail slum from Dhaka, Bangladesh. A total of 424 under-five children mothers were included in this study. The primary outcome variable was underweight and overweight/obesity compared to normal weight as the reference category, measured by the mother's body mass index (BMI) followed by dividing body weight (kg) by total height squared (m2). Descriptive and multivariate logistic regression analyses were conducted to identify the factors associated with both the underweight and overweight/obesity.

Results: The overall prevalence of underweight and overweight/obesity was respectively 13.4% and 45.3% among under-five children's mothers living in slums of Dhaka city and both were high in 20-29 years mothers. Those who were more than 3 times pregnant (AOR=4.8, 95% CI: 1.2- 18.3) and severely food insecure (AOR=2.4, 95% CI: 1.1- 5.4) respectively were more underweight. And those mothers from high-income families (AOR=2.7, 95% CI: 1.3 - 5.9) who delivered their children by c-section (AOR=0.4, 95% CI: 0.2-0.7) were more overweight/obese.

Conclusion: In Bangladesh slum areas, DBM was also a concerning number. The Ministry of Health of Bangladesh should consider these findings (i.e.; food insecurity, pregnancy frequency, mode of delivery, etc.) to create and execute health programs for the double burden of malnutrition among under-five children's mothers.

Key words Double burden of malnutrition, Under-five children's mothers, Slum, Bangladesh

Category: Public Nutrition & Health

Risk of Incident Chronic Kidney Disease in Metabolically Healthy Obesity and Metabolically Unhealthy Normal Weight

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Studies have reported inconsistent results about the risk of incident CKD in people with metabolically healthy obesity (MHO). We designed this systematic review and meta-analysis to evaluate the risk of developing CKD in people with MHO and metabolically unhealthy normal weight (MUNW). We used a predefined search strategy to retrieve eligible studies from multiple databases up to October 1st, 2022. Random effects model meta-analyses were implied to estimate the overall hazard ratio (HR) of incident CKD in obesity phenotypes. Compared to the Metabolically healthy normal weight (MHNW), the mean differences in cardiometabolic and renal risk factors in MHO, MUNW, and metabolically unhealthy obesity (MUO) were evaluated. 8 prospective cohort studies, including approximately 5 million participants with a median follow-up ranging between 3 and 14 years, were included in this meta-analysis. The overall HR for developing CKD was 1.42 in MHO, 1.49 in MUNW, and 1.84 in MUO. Compared to MHNW, the mean eGFR and HDL were significantly lower, and LDL, blood pressure, blood glucose, and triglycerides were higher in MHO and MUNW. In conclusion, MHO and MUNW are not benign conditions and pose a higher risk for incident CKD. Obesity, whether in the presence or absence of metabolic health, is a risk factor for CKD.

Key words Obesity, Nutrition, Metabolic syndrome, eGFR, Metabolic health, Chronic kidney disease

Category: Public Nutrition & Health

Associations between dietary diversity and dyslipidemia among Japanese workers: A cross-sectional study

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Abstract

Background and objectives: The present study aims to determine the associations between dietary diversity and the risk of dyslipidemia in Japanese workers.

Methods: The participants were 1025 men and 369 women aged 20 to 63 living in Tokushima Prefecture. Dietary intake was assessed using a food frequency questionnaire, and dietary diversity score (DDS) was determined using the Quantitative Index for Dietary Diversity. Dietary patterns that a correlation matrix for 17 food groups was assessed using principal component factor analysis. Three components were determined healthy, western, and sweetener patterns. Dyslipidemia was diagnosed fulfilled at least one of the following conditions: hypertriglyceridemia, high-LDL-cholesterol, low-HDL-cholesterol, high-non-HDL-cholesterol, and having a history of dyslipidemia. The multivariable logistic regression was used to calculate the odds ratios (OR) and 95% confidence intervals (CIs) for dyslipidemia according to the tertile of DDS after controlling for age, education, smoking habits, drinking habits, physical activity, BMI, and energy intake. Furthermore, we calculated the association between dietary diversity score and dyslipidemia with additional adjustments for each dietary pattern to assess the effects of specific dietary patterns.

Results: There was an inverse association between DDS and dyslipidemia among all participants; OR (95% CI) in Tertile 3 was 0.66 (0.48 - 0.91), p for trend = 0.017. The similar inverse association between DDS and dyslipidemia was found in additional adjustment for the western pattern (p for trend = 0.039) and the sweetener pattern (p for trend = 0.013), though its association was disappeared after adjustment for the healthy pattern.

Conclusions: The diversity in the diet was associated with a lower risk of dyslipidemia in Japanese workers.

Key words Dietary diversity, dietary pattern, dyslipidemia, Japanese workers, cross-sectional study

Category: Public Nutrition & Health

Sugar-sweetened beverages consumption increases the risk of metabolic syndrome in adults: Consistent and robust evidence from an umbrella review

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Background and objectives: Sugar-sweetened beverages (SSBs) are potential modifiable risk factors for reducing the risk of metabolic syndrome (MetS); however, there is a lack of an umbrella review that robustly synthesizes the evidence. This review aims to synthesize the evidence linking habitual SSBs intake with MetS in adults, emphasizing the need for policy and regulatory actions.

Methods: PubMed and Scopus databases were comprehensively searched for relevant meta-analyses of prospective studies up to February 2023. Two authors independently conducted the screening for eligibility, data extraction, and quality assessment. The outcome of interest was MetS in adults, encompassing its component conditions. This review was registered with PROSPERO (CRD42023402549).

Results: Of the 16 eligible meta-analyses identified, 30 summary estimates were obtained for the impact of SSBs consumption on obesity, type 2 diabetes, hypertension, and MetS. Seven were rated as 'High' methodological quality, with the rest classified as 'Moderate' and 'Low' quality, consisting of three and six references, respectively. A comparison of the highest and lowest levels of SSBs consumption revealed an increased risk of 18% (95% CI: 13% to 24%), 12% (95% CI: 11% to 14%), 29% (95% CI: 25% to 32%), and 29% (95% CI: 7% to 52%) for obesity, hypertension, type 2 diabetes, and MetS, respectively. Consistently, the findings from dose-response analyses are in agreement with and corroborate the existing evidence that SSBs are a significant risk factor for the development of MetS and its related conditions. Noticeably, the quality of evidence was predominantly deemed as highly suggestive and convincing. Moreover, consensus on specific criteria to identify studies related to SSBs in literature searching was lacking, and most primary studies were conducted in developed countries and Europe.

Conclusions: Our findings suggest that more rigorous and targeted policy interventions are warranted to curtail SSBs consumption to alleviate the global burden of MetS.

Key words Sugar-Sweetened Beverages, Drinks, Adult, Umbrella Review, Metabolic Syndrome, MetS, Hypertension, Obesity, Hyperlipidemia, Type 2 Diabetes

Category: Public Nutrition & Health

Do the malnourished children food secure? Findings from rural household in Malaysia

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Abstract: Food insecurity is a prevalent occurrence in Malaysian households. Nevertheless, there was a paucity in statistics pertaining the relationship between household food security status in malnourished and well-nourished children. **Objectives**: The aims are: 1) to determine the household food security status and its relationship in malnourished and well-nourished children, 2) to assess the nutrient consumption in malnourished and well-nourished children aged 6 to 60 months. **Methodology**: Approximately 52 malnourished children (cases) and 50 well-nourished children (controls) participated in a community-based case-control study in Kuala Langat, Selangor. The age, gender, and residence location of the case group individuals were matched to those of the control group. The Food Security Survey Module (FSSM) was used to measure household food security for a family. A three-days 24-hour diet recall (2 weekdays and 1 weekend) were completed upon estimating nutrients consumption through daily food intake in both groups. **Results**: Descriptively, more than two-third of the case (76.9%) and control (76.0%) groups were ranked as food secure, while 23.1% (cases) and 24.0% (controls) struggled with food insecurity. Statistically, a chi-square test revealed that there was no significant relationship ($p=0.876$) detected on household food security status among cases and controls. However, some nutrients namely energy, carbohydrate, protein, fat, calcium, vitamin A and zinc were significantly lower in malnourished children as compared to well-nourished children ($p<0.05$). **Conclusions**: Household food security status was not significantly related to malnourished and well-nourished children. Despite that, malnourished children had lower levels of several nutrients than children who were adequately fed.

Key words household food security, malnutrition, undernutrition, nutrient consumption, young children

Category: Public Nutrition & Health

Problematic States in Opioid Users (PSOU)

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According to the Center of Disease Control, National Center for Health Statistics dataset, there has been a six-fold increase in overdose deaths among all men and women from the years 2000 to 2017, as well as billions of dollars lost in economic value when estimating losses in workforce contribution and costly rehabilitation services.

The present validates a new clinical questionnaire, designed to identify problematic psychological/psychiatric issues among substance users that may complicate addiction if unrecognized in treatment. The questionnaire focuses on 15 psychological issues that appear over-represented in the addicted population, to the point where they may be considered dual-diagnosis vulnerabilities. The 15 subscales include the following: Depressive feelings, Anxious feelings, History of childhood maltreatment, History of childhood neglect, History of conduct disorder, Disordered attention spectrum, Hyperactive spectrum, lmpulsivity/sensation seeking traits, Post-trauma states, Moodiness spectrum, Socially anxious states, Pessimistic thinking, Resentful thinking, lsolative and introverted styles and Chaotic states.

Using a correlation analysis, 15 statistically valid psychological questionnaires across the scientific literature were evaluated and compared to this study' s experimental questionnaire, the Problematic States in Opioid Users (PSOU) questionnaire. Data were gathered from an outpatient methadone assisted treatment program in the United States. Forty-eight male and female subjects were tested, mostly of Caucasian descent. All participants took both the validated and unvalidated questionnaires for comparison, blind to which tests were validated vs experimental.

Results demonstrated that the PSOU was a statistically valid questionnaire to represent the intended psychological constructs of interest in 14 out of 15 of the proposed substance-abuse vulnerabilities tested. That said, the PSOU may be a helpful screener for clinicians to gain a wealth of clinical data about psychological vulnerabilities that may specifically complicate addition, all within one convenient measure that is less time-intensive and more accessible than the current standard within addiction intake assessment.

Key words Pearson Correlation, Addiction, Opioid Abuse, Testing, Screening, Assessment

Category: Public Nutrition & Health

中国西北地区胃癌患者血液代谢与肠道菌群的关系

The relationship between blood metabolism and gut microbiota in gastric cancer patients in the northwest region in China

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Introduction: Gastric cancer (GC) is one of the main causes of cancer mortality worldwide, including in China. It is certain that there is a link between blood metabolism and gut microbiota, but it is not yet clear what gut microbial disorders can affect the blood metabolism level of gastric cancer patients.

Objectives: This study aimed to examine the relationship between blood metabolism and gut microbiota in gastric cancer patients living in the northwest region in China.

Methods: The hospital-based study finally included eighty-eight gastric cancer patients and eighty-eight healthy individuals from Gansu Province, divided into gastric cancer group and control group. Stool samples were collected from all subjects and the gut microbiota was analyzed using whole-metagenome shotgun sequencing. Serum samples were collected from all subjects and serum metabolites were analyzed using liquid chromatography-mass spectrometry (LC-MS). Using bioinformatics methods for combined analysis to explore the relationship between blood metabolism and gut microbiota in gastric cancer patients in the northwest region in China.

Results: The study found that gastric cancer patients had gut microbiota disorders ($P < 0.05$) compared to the healthy group, reflected in alpha and beta diversity. Specifically, in the comparison of different bacterial genera, there was a significant proliferation of related species of Clostridium in the intestines of gastric cancer patients. Compared with healthy group, the abundance of Clostridium in the intestines of cancer patients was higher ($P < 0.05$), such as Hungatella, Clostridium_perfringens and Clostridium_symbiosum. In addition, cancer patients had significant blood metabolic disorders ($P < 0.05$), which were mainly related to the AMPK, FoxO, mTOR and PI3K-Akt signaling pathways.

Conclusion: There were differences in blood metabolism between gastric cancer patients and healthy individuals in the northwest region in China, which were related to gut microbiota.

Key words gastric cancer, blood metabolism, gut microbiota, the northwest region in China

Category: Public Nutrition & Health

Associations between Quality of Plant-Based Diet and Risk of New-onset Cardiometabolic Diseases in Chinese Adults: findings from a prospective cohort study

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Aims: To investigate the long-term associations between quality of plant-based diet and risk of new-onset cardiometabolic diseases (CMDs), including type 2 diabetes mellitus (T2DM), myocardial infarction (MI) and stroke in Chinese adults.

Methods: Adults (N=14,581) from the China Health and Nutrition Survey (1997-2015) without CMDs and cancer at baseline were included. Dietary intake data were collected with 3-day consecutive 24-h dietary recalls and food-weighing methods. Quality of plant-based diet was assessed by overall, healthful and unhealthful plant-based diet indexes (PDI, hPDI and uPDI). CMDs were identified by validated self-reported questionnaires. Cox proportional hazard regression model was used for statistical analysis.

Results: During a mean follow-up of 10 years, a total of 1047 new-onset T2DM, 280 new-onset MI and 404 new-onset stroke cases were identified. Adherence to plant-based diet, as reflected by higher PDI scores, was associated with decreased risk of new-onset T2DM (Q5 vs Q1: HR=0.33; 95%CI:0.25-0.44). Adherence to healthy plant-based diet, as reflected by higher hPDI scores, was inversely associated with risk of new-onset T2DM (Q5 vs Q1: HR=0.75; 95%CI:0.61-0.92) and MI (Q5 vs Q1: HR=0.62; 95%CI:0.42-0.94). Adherence to healthy plant-based diet, as reflected by higher uPDI scores, was positively associated with risk of new-onset T2DM (Q5 vs Q1: HR=2.13; 95%CI:1.70-2.67), MI (Q5 vs Q1: HR=5.75; 95%CI:2.52-13.08) and stroke (Q5 vs Q1: HR=5.83; 95%CI:2.81-12.12) (all P-trend<0.05). Age and baseline hypertension significantly modified the associations between plant-based diet quality and risk of new-onset T2DM or stroke (all P-interaction<0.05).

Conclusions: Adherence to healthy plant-based diet was protective in the prevention of CMDs, while adherence to unhealthy plant-based diet was a risk factor for CMDs in Chinese adults. Dietary guidance should consider whether to include quality of plant-based diet aimed at reducing CMD risk in Chinese adults.

Key words plant-based diet; cardiometabolic diseases; type 2 diabetes mellitus; myocardial infarction; stroke

Category: Public Nutrition & Health

Status of fruits and vegetable consumption and factors associated with inadequate FAV consumption among Bangladeshi adult males aged 20-59 years

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Background and objectives: Bangladesh is experiencing an epidemiological shift with rising noncommunicable diseases (NCDs). Inadequate fruit and vegetable (IFAV) intake is a key risk factor. This study aims to investigate the prevalence of IFAV consumption and associated factors in Bangladeshi males aged 20-59 years.

Method: This study used data from the 2018-19 Bangladesh Food Security and Nutrition Surveillance Round, which enrolled 4,917 men from 82 rural, non-slum urban, and slum clusters across 8 administrative regions. IFAV consumption was defined as less than five servings or less than 400gm of FAV per day. Poisson regression with robust variance was conducted to identify factors associated with IFAV, and crude and adjusted prevalence ratios with 95% CI were calculated.

Results: The weighted prevalence of IFAV consumption was 83.01 %. On Poisson regression analysis we found that participants aged 50-59 years {Adjusted prevalence ratio (APR):1.04, 95% CI: 1.01, 1.06}; currently married (APR: 0.05, 95% CI: -0.00, 0.12), who were living in non-urban slum areas (APR: 1.1,95% CI: 1.07,1.12); and Slum areas (APR: 1.1,95% CI: 1.08,1.13); Muslim (APR: 1.06, 95% CI: 1.04, 1.09), living in Barishal (APR: 0.96, 95% CI: 0.94,0.99), Chittagong (APR: 0.93, 95% CI: 0.91,0.95), Mymensingh (APR: 0.65, 95% CI: 0.62,0.67), Khulna (APR: 0.84, 95% CI: 0.82,0.86), Dhaka (APR: 0.90, 95% CI: 0.88,0.92), Sylhet (APR: 0.95, 95% CI: 0.92,0.97) divisions; obese (APR: 0.96, 95% CI: 0.93, 0.99); and spending >7hours sedentary time (APR: 1.04, 95% CI: 1.02,1.06) had significantly higher prevalence of IFAV consumption.

Conclusion: More than 80% of adult male in Bangladesh are consuming lower amounts of fruits and vegetables than the recommendation of WHO. IFAV consumption was more frequently found in older people, less physically active and obese people. Public health interventions should be implemented to ensure adequate consumption of FAV in this targeted age group to prevent NCDs.

Key words Adult male, Fruits and vegetable consumption, Bangladesh

Category: Public Nutrition & Health

Unhealthy food consumption among men aged 20-59 years in Bangladesh: a nationally representative cross-sectional survey

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Background and objectives: Unhealthy food consumption is a major public health concern due to its adverse health consequences. We assessed unhealthy food (savory and fried snacks, SFS; sweets; and sugar-sweetened beverages, SSBs) consumption and identified factors associated with this consumption among men aged 20-59 years in Bangladesh.

Methods: Data from the Bangladesh Food Security and Nutrition Surveillance Project (2018-2019) was utilized. We interviewed 4917 men (20-59 years) from 82 sentinel sites selected through multistage cluster sampling from eight divisions. A structured questionnaire was used to collect data. Descriptive analysis and Poisson regression with robust variance were carried out to report prevalence and adjusted prevalence ratio (APR).

Results: The weighted prevalence of weekly SFS, sweets and SSBs consumption was 57.8%, 75.1%, and 77.3%, respectively. Age 20-29 years was associated with SFS (APR: 1.40, 95% CI: 1.28, 1.53) and sweets (APR: 1.06, 95% CI: 1.02, 1.12) consumption but not with SSBs consumption. SFS and SSBs consumption were associated with non-slum urban and slums residence. SFS, sweets, and SSBs consumption were associated with higher secondary and above education (APR: 1.28, 95% CI: 1.17, 1.39; APR: 1.18, 95% CI: 1.13, 1.25; APR: 1.11, 95% CI: 1.0, 1.15, respectively); highest wealth quintile (APR: 1.10, 95% CI: 1.02, 1.19; APR: 1.08, 95% CI: 1.03, 1.13; APR: 1.04, 95% CI: 1.00, 1.09, respectively) and being current smoker (APR: 1.10, 95% CI: 1.05, 1.15; APR: 1.05, 95% CI: 1.02, 1.09; APR: 1.16, 95% CI: 1.13, 1.18, respectively). Diabetes was associated with lower APR (0.8, 95% CI: 0.73, 0.88) for SSBs consumption only.

Conclusions: We found a high prevalence of SFS, sweets, and SSBs consumption among 20-59 years old men in Bangladesh. Several socio-demographic, behavioral and clinical factors were associated with unhealthy food consumption. These factors should be considered while designing and implementing interventions to reduce unhealthy food consumption.

Key words Savory and fried snacks (SFS) , sweets, Sugar-sweetened beverages (SSBs), adult men, Bangladesh

Category: Public Nutrition & Health

Associations of Dietary structure with Gut Microbiome in Children: A Cross-Sectional Multi-Omics Study

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Abstract

Background: Diet has been recognized as a key modifier of the gut microbiome that can affect microbiome development and function, largely due to its influence on the control of food intake and metabolism. However, there are still few studies in Chinese children that have thoroughly investigated the functionality of the human gut microbiome and its relationship to dietary behavior.

Objective: This cross-sectional study was designed to explore the relationship on the metabolic health, gut microbiome and systemic metabolome in children, in Northwest China, with different dietary structure.

Design: Plant-based diet indexes (PDIs) replacing the dietary structure were calculated using a validated FFQ and were correlated with metagenomic profiles of fecal samples and metabolomics of blood or fecal samples from 88 children aged 5.26±5.43 years.

Results:

There is no difference in the richness and diversity between high scores PDI and low scores ones. In genus level, the relative abundance of Prevotella, Akkermansia, and Coprobacillus were increased in high-PDI group; and in low-PDI group, the relative abundance of Roseburia, and Fusicatenibacter were increased. Metagenomic showed high-PDI group led to increased levels of the fibre-degrading Prevotella copri and Eubacterium hallii and of genes for complex carbohydrate degradation linked to butyrate metabolism, in addition, low-PDI group rich in protein metabolites, like L-Valine, L-Phenylalanine and L-Alanine. While the low-PDI group was significantly associated with the relative abundance of Coprococcus spp., Ruminococcus gnavus, and significantly occurred in bile acid pathways, such as glycohyodeoxycholic acid, cholic acid fermentation, both fecal and blood metabolites, compared with the high group.

Conclusion:

There was a marked difference in gut microbiota and metabolic activity between the plant-based and animal-based diets. In particular, we observed a significantly different abundance of fermentation and blood products associated with protein and fat intakes in plant-baesd group. Microbial composition may partially explain inverse associations between high-score group and abdominal fat accumulation.

Key words dietary structure, PDI, gut microbiota, children, Multi-omics.

Category: Public Nutrition & Health

The double burden of malnutrition among 20-59 years old men in Bangladesh: evidence from a nationally representative survey

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Background and objectives: Bangladesh has a high rate of malnutrition, as well as an increasing trend of overweight and obesity. However, little is known about the factors linked to these conditions in men aged 20 to 59 years, the age group between adolescence and senescence. We assessed the double burden of malnutrition (DBM) and the associated factors in men aged 20-59 years.

Methods: We utilized data from the Bangladesh Food Security and Nutrition Surveillance Project (2018-2019) that used a multistage cluster sampling approach across eight divisions of Bangladesh. Asian BMI cut-offs were applied to categorize the nutritional status of XXXX men recruited from 82 clusters. The weighted prevalence of underweight and overweight/obesity were calculated. Poisson regression with robust variance was used to determine crude and adjusted prevalence ratios (APR) with a 95% confidence interval (CI).

Results: The weighted prevalence of underweight and overweight/obesity was 15.1% and 33.9%, respectively. Prevalence of underweight was found higher among males aged 20-29 years (18.7%), living in slums (16.8%), living in Mymensingh division (22.7%), with no education (19.3%), and in the lowest wealth quantile (17.0%). The prevalence of overweight/obesity was higher among men aged 30-39 years (39.6 %), living in non-slum urban areas (49.4 %) and living in Rangpur division (43.8 %), with ⩾12 years of schooling (67.5 %), and in the highest wealth quantile (59.8 %). The factors associated with underweight were age, place of residence, marital status, education level, wealth status, and any tobacco use. On the other hand, place of residence, division of residence, education, wealth status, any tobacco use, sedentary time, duration of television watching, waist circumference, and self-reported hypertension were associated with overweight/obesity.

Conclusions: The DBM is a public health concern for Bangladesh. Interventions aimed at reducing DBM can focus on modifiable factors of DBM identified in this study.

Key words Double burden of malnutrition, overweight, obesity, adult men, Bangladesh

Category: Public Nutrition & Health

Associations of Dietary Preferences with Gut Microbiome in Children: A Cross-Sectional Multi-Omics Study

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Abstract

Background: Diet has been recognized as a key modifier of the gut microbiome that can affect microbiome development and function, largely due to its influence on the control of food intake and metabolism. However, there are still few studies in Chinese children that have thoroughly investigated the functionality of the human gut microbiome and its relationship to dietary behavior.

Objective: This cross-sectional study was designed to explore the relationship on the metabolic health, gut microbiome and systemic metabolome in children, in Northwest China, with different dietary structure.

Design: Plant-based diet indexes (PDIs) replacing the dietary structure were calculated using a validated FFQ and were correlated with metagenomic profiles of fecal samples and metabolomics of blood or fecal samples from 88 children aged 5.26±5.43 years.

Results:

There is no difference in the richness and diversity between high scores PDI and low scores ones. In genus level, the relative abundance of Prevotella, Akkermansia, and Coprobacillus were increased in high-PDI group; and in low-PDI group, the relative abundance of Roseburia, and Fusicatenibacter were increased. Metagenomic showed high-PDI group led to increased levels of the fibre-degrading Prevotella copri and Eubacterium hallii and of genes for complex carbohydrate degradation linked to butyrate metabolism, in addition, low-PDI group rich in protein metabolites, like L-Valine, L-Phenylalanine and L-Alanine. While the low-PDI group was significantly associated with the relative abundance of Coprococcus spp., Ruminococcus gnavus, and significantly occurred in bile acid pathways, such as glycohyodeoxycholic acid, cholic acid fermentation, both fecal and blood metabolites, compared with the high group.

Conclusion:

There was a marked difference in gut microbiota and metabolic activity between the plant-based and animal-based diets. In particular, we observed a significantly different abundance of fermentation and blood products associated with protein and fat intakes in plant-baesd group. Microbial composition may partially explain inverse associations between high-score group and abdominal fat accumulation.

Key words dietary structure, PDI, gut microbiota, children, Multi-omics.

Category: Public Nutrition & Health

Associations between inflammatory potential of diet and risk of new-onset cardiometabolic diseases and all-cause mortality: findings from a nationwide prospective cohort study

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Aims: To investigate the long-term associations between dietary inflammatory index (DII) and risk of new-onset cardiometabolic diseases (CMDs), including stroke, type 2 diabetes mellitus (T2DM) and myocardial infarction (MI), and all-cause mortality in Chinese adults free from CMDs at baseline in a nationwide prospective cohort study.

Methods: Adults (N=14,581) from the China Health and Nutrition Survey (1997–2015) were included in the current analysis. Dietary intake data were collected with 3-day consecutive 24-h dietary recalls and food-weighing methods. DII was calculated with validated methods. CMDs were identified by validated self-reported questionnaires. Cox proportional hazard regression model was used for statistical analysis.

Results: During a mean follow-up of 10 years, a total of 404 new-onset stroke, 1047 new-onset T2DM, 280 new-onset MI cases and 1244 death cases were identified. A pro-inflammatory diet, as reflected by relatively higher DII scores, was positively associated with increased risk of stroke (Q5 vs Q1: HR = 1.86; 95%CI: 1.23-2.80), T2DM (Q5 vs Q1: HR = 2.04; 95%CI: 1.58-2.64), MI (Q5 vs Q1: HR = 1.75; 95%CI: 1.07-2.85) and all-cause mortality (Q5 vs Q1: HR = 1.68; 95%CI: 1.33-2.14) (all P-trend < 0.01). Age and sex significantly modified the association between DII and T2DM risk, and sex significantly modified the association between DII and MI risk (all P-interaction < 0.05). Higher DII was associated with increased risk of T2DM and MI in male rather than female participants.

Conclusions: With the use of DII, we reported long-term positive associations between a pro-inflammatory diet and increased risk of new-onset stroke, T2DM and MI and all-cause mortality in Chinese adults free from CMDs at baseline. These findings contribute to the current literature suggesting consideration of whether DII should be utilized as an effective tool for improving diet quality and CMDs prevention in Chinese population.

Key words dietary inflammatory index; cardiometabolic diseases; stroke; type 2 diabetes mellitus; myocardial infarction; all-cause mortality; Chinese population

Category: Public Nutrition & Health

Dietary Variety Score and Related Factors of Older Adults after the Great East Japan Earthquake in the Coastal Area of Fukushima Prefecture

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Background and objectives

This study examined older adults Dietary Variety Score (DVS) and related factors in the coastal area in Fukushima nine and a half years after the Great East Japan Earthquake (GEJE).

Methods

Data were collected from 65- to 84-year-old residents and 1,297 participants via a questionnaire from October to November 2020 in Soma city of Fukushima Prefecture. There were 1,133 respondents (response rate of 87.4%), excluding 76 who gave incomplete responses, and 1,057 people were included in the analysis (effective response rate of 81.5%). The Dietary Variety Score (DVS) measures food intake diversity. Information was collected about the respondents' weekly intake of ten food groups (meat, seafood, eggs, milk, soybean products, green and yellow vegetables, seaweeds, fruits, potatoes, fats and oils). The score ranged from 0 to 10 points, with higher values indicating a larger variety of food intake. Firsty univariate analysis was conducted to examine the relationship between the DVS and all other variables. Secondly a multivariate regression analysis was conducted.

Results

The mean (standard deviation) of DVS was 3.23 (2.48), 3.56 (2.55) in women and 2.83 (2.34) in men with a significant difference. Using multivariate regression analysis, the factors related to a low DVS were inability to chew certain foods, difficulties resting while asleep, male gender, living alone, rack of satisfaction with dietary habits, limited social networks, young, and junior high school education level or lower.

Conclusions

DVS among the older adults in coastal areas of Fukushima Prefecture was low nine and a half years after the GEJE. In order to raise the DVS, it is important to continue oral support, social network creation, and health support.

Key words disaster; older adults; dietary variety score (DVS); Fukushima

Category: Public Nutrition & Health

岩藻多糖通过去甲基化改善糖尿病小鼠认知功能障碍

Fucoidan improves cognitive dysfunction in diabetic mice through demethylation

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Background: Fucoidan has a potential protective effect on diabetes-induced neuronal apoptosis. AMP-activated kinase (AMPK) and mitochondrial tricarboxylic acid cycle homeostasis are important for neuroprotection. AMPK and Krebs cycle metabolites regulate 5-hydroxymethylcytosine (5hmC) by acting on 10-11 translocases. Therefore, we hypothesized that Fucoidan could improve cognitive dysfunction in diabetic mice by inhibiting diabetes-associated neuronal apoptosis by upregulating 5 hmC in the brain of diabetic mice.

Methods: Sixty 8-week-old C57 BL/6 J mice were randomly divided into 5 groups (n = 10): normal control group (CON), diabetes group (MOD), metformin group (MTF), Fucoidan dose group (FC50), Fucoidan medium-dose group (FC100) and Fucoidan high-dose group (FC200), conduct behavioral tests, tunel staining, and western blot experiments for verification.

Results: Fucoidan improved the long-term memory ability and exploration ability of diabetic mice, decreased the apoptosis rate of neurons in the cerebral cortex of diabetic mice, and significantly increased the expression levels of 5 hmC, TET 2 and P-AMPKα/AMPKα in the cerebral cortex of mice. Decreased (succinate fumarate)/alpha-ketoglutarate ratio.

Conclusion: Fucoidan up-regulates 5 hmC by activating AMPK and maintaining tricarboxylic acid cycle homeostasis, inhibiting neuronal apoptosis and improving cognitive function in diabetic mice.

Key words Diabetes, cognitive dysfunction, fucoidan, demethylation, behavior.

Category: Public Nutrition & Health

Difference between mother's perception about their under-five children's nutritional status from the anthropometry derived nutritional status: a Cross-sectional study in the slums of Dhaka, Bangladesh

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Background and Objectives: Maternal misperceptions, about their child's nutritional status may have implications for timely health-care seeking. Very limited evidence exists on this issue in the context of Bangladesh. We aimed to assess the difference between mothers' perceptions of their children's nutritional status and the nutritional status determined by anthropometry along with the factors associated with varied perception.

Method: A Cross-sectional study was conducted in the two large urban slums in Dhaka city corporation. A total of 437 mother-children (under age five) dyads were included in the final analysis. Mothers' varied perception about their children's nutritional status was recorded if mother's opinion of their children's nutritional status differed from the measured nutritional status (underweight and overweight). Descriptive analysis and logistic regression were done to report findings.

Results: Forty-six percent of mothers had varied perceptions; 37% underestimated their children's nutritional status and 9% overestimated it. The two significant associated factors behind the mothers' varied perceptions were: "the child does not want to eat" (AOR=3.77; 95% CI: 2.35 to 6.05; p<0.001) and "the child feels light when I carry" (AOR=4.09; 95% CI: 2.01 to 8.34; p<0.001). In addition, the odds of having a varied perception were found to be higher for households with an average monthly income of 10000 to 14999 BDT (AOR=2.41; 95% CI: 1.17 to 4.99; p<0.05).

Conclusion: About one in two mothers' perceptions about their children varied from the anthropometry-derived status. Health education on appropriate ways to understand the nutritional status of the children is required for early identification and care seeking.

Key words under-five children, nutrition, maternal perception, Bangladesh

Category: Public Nutrition & Health

Improving the Quality of the Operation Timbang Plus in the Philippines

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Operation Timbang Plus (OPT Plus) is the annual routine child growth assessment that aims to locate malnourished children for referral to appropriate services in all barangays in the Philippines. However, various studies have identified issues with data quality and conducting OPT Plus. In response, the National Nutrition Council and UNICEF Philippines commissioned a project to develop the OPT Plus data quality audit protocol and update the implementing guidelines. The project involved a desk review and fieldwork in selected cities and municipalities in Samar, Northern Samar, and Zamboanga del Norte provinces. Results showed gaps in actual practice compared to the 2012 OPT Plus Implementing Guidelines, and recommendations were made to improve OPT Plus implementation. The project team updated the electronic OPT Plus tool and developed the data quality check to integrate the OPT Plus process with the five quality dimensions of accuracy, completeness, reliability, usefulness, and timeliness. The draft implementing guidelines was reviewed at the local and national levels, pretested, and pilot tested before finalization and printing of the manual of procedures and other materials. Results of the initial national, local, and roll-out training showed that 70 supervisors and 359 OPT Plus members completed the training, with 48 supervisors and 157 OPT Plus members qualified for the highest level of certification. The new OPT Plus Guidelines will be adopted in the whole country in 2023-2024.

Key words OPT Plus, Growth Monitoring, Data Quality, Implementing Guidelines, Philippines

Category: Public Nutrition & Health

Hygienic assessment of school-age children's nutrition

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Background and objectives: Nutrition is a constant factor that is important for the growth, development and health promotion of children and adolescents. The proper nutrition is one of the factors constantly acting throughout the ontogenesis, on which the successful education of the child, his resistance to adverse environmental factors and health condition. The purpose of the work is a hygienic assessment of school-age children nutrition in Aktobe.

Methods: Investigation design: cross sectional study.

The study involved 457 children (girls and boys) aged 10 to 14 years. Nutrition is studied using an assessment questionnaire (FFQ_KZ). The results obtained were included in the FETA program and applied to statistical processing by the SPSS 25.0 program. The study population was calculated with 95% confidence intervals (CI) and Q1, Q3, mean, median (Me).

Results: According to the energy value, the diet of adolescents was below the norm for boys and girls. In boys and girls, the energy content of food is low, i.e. on average 1762.7 (± 395.7) kcal, correspondingly, in girls on average 1712.3 (± 407.2) kcal, normally 2400 kcal, p< 0.011.in the daily diet, the protein content was 70.3; the normal indicator is 60-80 g.

The protein content in the daily diet is 70.3; the normal indicator is 60-80 g. Fat content 90.07. under normal conditions 90-100g. Carbohydrate content 318.6. under normal conditions 350-500g. The calcium index is 908.1, the norm is 1200mg, that is, 291.9 mg below the norm. Iron is 13.3, normally 15-20mg. The sodium index is 137.2, normally 400 mg.

Conclusions: In the nutrition of children aged 10-14, the indicators of macroelements and vitamins correspond to the norm and micronutrients revealed a deficiency the Ca index is 908.1 [692.1; 1032.7], which is 291.9 mg lower in the study participants.

Key words proper nutrition, macronutrients, micronutrients, nutritional frequency, eating behavior

Category: Public Nutrition & Health

Promoting Healthy Eating Behavior in a Store Using Causal Inference

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Background and Objectives:

Developing effortless and sustainable healthy eating behavior is a public health challenge. This study examines the effect of nudge-based interventions on consumers' eating behavior in stores using fast thinking (point-of-purchase advertising) and slow thinking (remembering target products).

Methods:

Nutritious product advertisements were placed in a Tokyo store, and a month-long intervention was conducted to assess customers' impressions of the advertisements and their attributes after purchasing the products. Based on the difference-in-differences design, we compared the nudged products with products that had the same sales slope over the last three months to exclude the effect of trend. We estimated the period of the intervention effect by calculating the monthly ratio of target product sales. We also examined the background details (sex, age, education, and average lunch budget) of the customers who received interventions in our analysis from January 2019 to February 2023 (total number of customers: 48,000).

Results:

Sales increased by 68% despite the bad weather and insufficient replenishment of products. The effects of health advertising and target product-based interventions lasted up to eight months before external factors were applied. About 70% of customers were repeat customers. In terms of sex, 10.5% of the clients were men and 89.5% were women. In terms of age, their average age was 40. Regarding education, 15% of them were high school or junior high school graduates. As for the average lunch budget, 20% spent less than 500 yen.

Conclusions:

The significant increase in sales could not be attributed to advertising alone; remembering target products, which requires slow thinking, might have helped retain the products in the consumers' memory, making the advertisement self-serving and promoting continuous purchases.Furthermore, the possible effects of interventions should be considered, as they may vary depending on the customers' background and external factors.

Key words Nudge, Indifferent Health, Eating Behavior, Intervention, Causal Inference

Category: Public Nutrition & Health

Understanding the association between depression and anxiety w.r.t nutrient intake: A systematic review of studies across the life span

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2.

Background and objectives: The current systematic review was conducted to understand the relationship and interaction between nutrition and mental health across the lifespan. Methods: The search adhered to PRISMA guidelines. Around 851 relevant articles published between January 2000 till 15th September 2021 were identified by systematic online search from 6 electronic databases (PubMed, PsycInfo, Science Direct, MEDLINE, Scopus and Google Scholar). Results: Thirty one studies that assessed the intake of wholesome diets, dietary components and used standardized measures of dietary assessments as well as aspects of mental health were finally included as per the inclusion criteria. The American Dietetic Association Quality Criteria Checklist for Primary Research (2016) and the European Micronutrient Recommendations Aligned Network of Excellence scoring system was used to assess the quality of articles in a 2 step process. The heterogeneity between study definitions of dietary and internalizing symptomatology variables precluded formal meta-analysis. A narrative synthesis of the findings from the included studies was performed. The results of the review suggest that healthy eating pattern, including green leafy vegetables and fresh fruits, polyunsaturated fatty acids, like alpha-linoleic acid and minerals like magnesium positively impact mental health across the life span, starting from the prenatal period where it has implications not only for the mental health of the mother but also for mental development and cognition of her offspring. Further, childhood meal patterns (especially high reliance on nutrient poor and HFSS foods) have an impact on the future health of the adolescents as mental health disorders start appearing around this age. Conclusions: While clearly, diet is not the only determinant of mental health, attention towards a balance dietary pattern has long term implications for mental well-being.

Key words depression, anxiety, nutrient intake, diets

Category: Public Nutrition & Health

Serum 25(OH)D, sun exposure behaviors, sun exposure questionnaire, sun exposure score
Sun exposure questionnaire to estimate vitamin D status in young adults

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Background and objectives : Cutaneous synthesis upon sunlight exposure is considered the main source of vitamin D for humans. The use of a sun exposure questionnaire is the low cost method to assess vitamin D status in a community setting. However, there is no validated published questionnaire to assess sun exposure in Sri Lankan population. The aim of this study was to develop and validate a sun exposure questionnaire to use as a tool to assess vitamin D status in young adults.

Methods : A total of 75 young adults (males = 37, females = 38) aged 18 - 44 years were recruited from a rural setting in Sri Lanka. Sun exposure behaviors were identified using a sun exposure questionnaire which included questions on sun exposure duration, skin exposure area during both weekdays and weekend days, clothing habits, nature of occupation (indoor or outdoor), mode of traveling, skin colour, sun avoidance, and use of sunscreen. Serum 25(OH)D concentration was measured using an Enzyme Linked Immunosorbent Assay. The sun exposure questionnaire was analyzed using a scoring system to get a Sun Exposure Score (SES).

Results : The nature of the occupation (p=0.021), duration of sun exposure (p=0.003), sun avoidance (p=0.050) and skin exposure area during weekdays (p=0.019) and weekend days (p =0.043) were significantly associated with serum 25(OH)D concentration. Accordingly, a sun exposure questionnaire was developed by considering the factors that were significantly associated with serum 25(OH)D concentration.

Conclusion : The sun exposure questionnaire, which gathered information on the nature of occupation, sun exposure duration, sun avoidance behave, and skin exposure area, can be used as a tool to estimate the vitamin D status of young adults.

Key words Keywords: Serum 25(OH)D, sun exposure behaviors, sun exposure questionnaire, sun exposure score

Category: Public Nutrition & Health

Advertising of Unhealthy Food and Beverages on Ghanaian Television Channels: A Cross-Sectional Study

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Background and Objective: Among adults and children, food advertising is associated with increased preference, purchase requests, and intake. Given their vulnerability, children's exposure to unhealthy food and beverage advertising is thus acknowledged as a violation of their rights. We assessed the extent and nature of food and beverage advertisements on Ghanaian television channels.

Methods: Three of the most viewed free-to-air television channels with nationwide coverage were included. Television programming were videotaped on eight randomly selected days (four weekdays and four weekends) from 06.00 to 24.00 hours between February and April 2020. A total of 54 hours of television programming were recorded on each day (18 hours per channel). Food advertisements were identified, and content analysis was conducted. Food advertisements were categorized according to the healthiness of the foods advertised (non-core – less healthy foods, core, and miscellaneous). The NOVA system was used to classify food products according to industrial processes

Results: A total of 999 food and beverages ads were identified, representing 22.4% of the total ads documented. Most food ads broadcast noncore products (58.3%). The proportion of noncore food ads was higher on weekdays (66.7%) with an average of 11.4 per hour, and also during peak viewing time (59.2%). The most frequently advertised non-core food was sugar sweetened drinks (43.5%). Noncore foods contributed the highest proportion of all food advertisements containing promotional characters (65.4%) and premium offers (58.3 %). Using the NOVA classification, over 57.4% of all advertised food products were classified as Ultra-processed foods.

Conclusions: The findings indicate a high exposure of the Ghanaian population to unhealthy food advertising on Television channels. Further studies are needed to monitor exposure to unhealthy food advertising on TV and other communication channels.

Key words Food advertising, television, exposure, children, obesity

Category: Public Nutrition & Health

Ethical Acceptability Of Child-Directed Food Marketing On Ghanaian Television

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Background And Objectives: Misleading advertisements, when directed at vulnerable populations such as children, have ethical and public health implications. This study characterises and examines the Truthfulness, Authenticity, Respect, Equity, and Social Responsibility (TARES) of Ghana-based Television (TV) food advertisements.

Methods: Secondary data - 24-hour nationwide recordings of food advertisements from three TV channels popular among children in Ghana were obtained from a project that aimed to characterise children's school food environment (the MEALS4NCDs project). Content analysis was used to characterise the food advertised in terms of healthiness and level of processing using the International Network for Food and Obesity/NCDs Research Monitoring and Action Support (INFORMAS) and NOVAS classification systems. The messages in the advertisements were transcribed verbatim and examined for ethicality using the TARES Framework. TARES assesses communication accountability and establishes ethical boundaries for persuasive messages.

Results: 84 unique advertisements were identified of which 4 out of every 10 were directed at children. Sugar-Sweetened Beverages (16.7%) and alcoholic drinks (13.1%) were the most advertised products. Fruits/vegetables were never advertised. These products were promoted in contexts such as lifestyle (22.6%), social/friendship (21.4%), family (17.9%), or in association with celebrities (21.4%). Per NOVA, half of the food advertised was characterized as ultra-processed, and 6 out of 10 were deemed unhealthy based on INFORMAS. In terms of ethicality, a third of advertisements verbally and visually exaggerated the properties of their products, while over half of advertisements omitted to provide information on the content of potentially health-harming nutrients (sugar, salt, and fat). Over 90% of advertisements did not demonstrate willingness to take social responsibility for the negative health outcomes.

Conclusion: Four in ten TV food advertisements were directed at children and promoted primarily food characterized as unhealthy and ultra-processed. These foods were advertised with minimal information on health-risk nutrients and in manners considered deceptive.

Key words Food advertisement, Nutrition, TV, Ethicality

Category: Public Nutrition & Health

Awareness And Self-Reported Consumption Of Sugar-Sweetened Beverages Among Ghanaian Residents

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Awareness And Self-Reported Consumption Of Sugar Sweetened Beverages Among Ghanaian Residents

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Background and Objectives: Consumption of sugar-sweetened beverages is a major contributor to the rising rates of obesity, diet-related non-communicable diseases, and other health conditions globally. This study assessed the awareness, and consumption of sugar-sweetened beverages among Ghanaians.

Methods: The study was cross-sectional in design, and involved a total of 7,800 Ghanaian residents. Participants were adults aged ⩾18 years living in Ghana at the time of data collection. Data was collected using an online self-administered questionnaire. Descriptive statistics were analyzed to measure awareness of, and self-reported sugar-sweetened beverage consumption.

Results: About 37% of respondents reported rarely consuming sugar-sweetened beverages whereas 6% consumed SSBs at least daily. About 70% of respondents were very concerned about obesity and non-communicable diseases in Ghana, especially among children. A vast majority (90.5%) of respondents knew that too much sugar consumption is linked to several health problems. Specifically, 77.7% of the the respondents were aware that sugar-sweetened beverages are a major contributor to the obesity problem in Ghana. Furthermore, 74.8% indicated it is very important for the Government of Ghana to take steps that discourage the consumption of sugar-sweetened beverages.

Conclusion: The findings of this study show the high awareness of negative health outcomes associated with sugar-sweetened beverages among the Ghanaian residents.

Key words Sugar-Sweetened Beverages, Non-Communicable Diseases, Consumption, Awareness, Ghana

Category: Public Nutrition & Health

An Analysis of Food Provisioning Policies and Programmes in Government Basic Schools in Ghana

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School food policies and programmes can create environments that support healthy dietary behaviours. In Ghana and other low- and middle-income countries, little is known about the "nutritional" quality of such programmes. This paper identifies, describes, and evaluates the "nutritional" quality of a food provisioning programme implemented in government basic schools in Ghana.

We conducted a literature review and in-depth interviews with key stakeholders to identify existing policies and programmes. Two independent reviewers evaluated identified policies and programmes against a list of quality indicators under 5 domains: Standards for Provided Foods/Beverages (SFP); Standards for Competitive Foods/Beverages (SCF); Wellness Promotion and Food/Beverage Marketing (WPFM); Water, Sanitation, and Hygiene (WASH); and Implementation, Accountability, Monitoring, Evaluation, and Communication (IAMEC). Reviewers assigned a score of 0 if the indicator was absent, 1 if it was present but was described using vague words that limit enforcement, and 2 if it was described using clear language that strengthens enforcement. We determined average comprehensiveness (percentage of indicators present) and strength (percentage of indicators assigned a score of "2") scores for each domain and across all domains.

The relevant food provisioning interventions included in this study were the national school feeding policy and its associated programme. The characteristics of these included their application to provided foods, availability of implementation support and monitoring framework, and lack of clear nutrition standards. Together, the policy and programme average scores (comprehensiveness, strength) were (SFP: 24%, 10%), (SCF: 0%, 0%), (WPFM: 0%, 0%), (WASH: 50%, 0%), and (IAMEC: 50%, 17%). Overall comprehensiveness and strength scores were 21% and 7% respectively.

Our findings highlight weak overall policy and implementation environment in schools in Ghana; key areas needing improvement include appropriate nutrition standards, including standards for competitive foods/beverages and marketing within the school environment, wellness promotion, and strengthening oversight actions to ensure effective implementation.

Key words School food policy, school food programme, school food environment, nutrition standards, Ghana

Category: Public Nutrition & Health

Factors Affecting the Longitudinal Change in Vegetable Intake of Remote Island Residents in Japan

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〔Background and objective〕 A previous survey data showed that the vegetable intake of residents in a remote island in Shimane prefecture, Japan, was lower than that of the whole prefecture. This study aims to examine the factors that influence the longitudinal change in vegetable intake of the remote island residents.

〔Method〕 Data from surveys (lifestyle questionnaire and food frequency questionnaire) conducted in Nishinoshima town, a remote island in Shimane prefecture, at the time of formulating the health promotion plan (2014) and the mid-term evaluation (2021) were used. Data of 149 men and women aged 20 to 79 years who responded to both surveys were included in the analysis. Paired t-test or Wilcoxon signed rank test was used to compare subject attributes and vegetable intake at the two time points. A multiple regression analysis was used to examine the factors that influenced the change in vegetable intake between 2014 and 2021.

〔Results〕 A significant decrease in vegetable intake was observed between 2014 and 2021 (mean±SD=-18.4±7.7g, p=0.019). A multiple regression analysis showed that the decrease in vegetable intake was significantly small or even increased in people with "longer years of vegetable cultivation," "eating Japanese-style balanced diet," "having knowledge of appropriate dietary intake," and "not attending regular health examinations," e.g., the vegetable intake increased by 7.8g in people who knew appropriate dietary intake in both years and decreased by 40.9g in those who did not know in both years (p=0.005); that increased by 29.2g in people who had not attended regular health examination in both years and decreased by 24.0g in those who had in both years (p=0.044).

〔Conclusion〕 The implementation of the Japanese-style balanced diet may contribute to an increase in vegetable intake. Future issues include increasing the number of people who know the appropriate dietary intake and devising ways to conduct health examinations.

Key words Vegetable intake, Japanese-style balanced diet, Remote Island, Nutritional knowledge

Category: Public Nutrition & Health

Gender differences in obesity indicators among university students from Shanxi Normal University, China

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Background and Objectives: The university students in China has been suffered from the increasing prevalence of obesity. Multiple obesity indicators were developed to determine the prevalence of obesity among individuals in a variety of settings. The present study aimed to determine the prevalence of obesity using multiple obesity indicators, as well as to compare the gender differences in across these indicators.

Methods: A total of 185 university students were recruited from the Modern College of Humanities and Sciences, Shanxi Normal University in this cross-sectional study. The height, weight, waist circumference, body fat percentage of the students were measured and their BMI and waist-to-height ratio were calculated. Independent t-test and chi-square test were conducted to compare the gender differences across all the obesity indicators.

Results: More than half (51.4%) of the students were classified as overweight and obesity through BMI. On the other hand, the prevalence of abdominal obesity among the university students using waist circumference and waist-to-height ratio as obesity indicators were 36.8% and 35.7%, respectively. As for percentage of body fat, 41.1% of the students were classified as obesity. Significant differences were observed across all the obesity indicators between male and female students ($p < 0.05$), whereby female students generally had lower prevalence of obesity across all the obesity indicators compared to male students.

Conclusions: Obesity is a serious problem among the university students in China as the prevalence of obesity can be as high as 41.1%. Male students were found to be more prevalent in obesity issue compared to female students. Effective intervention should be formulate to improve tackle the emerging obesity problem among the university students.

Key words University students, obesity, BMI, waist circumference, percentage of body fat

Category: Public Nutrition & Health

Association between dietary factors and depression in late adulthood

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Background/Objectives: Depression is the most common mental illness in Korea. There are various factors related to the depression, and diet are one of the important factors. This study was conducted to confirm the association between dietary factors and depression in late adulthood.

Methods/Study design: The research subjects were 528 people, including 286 depressed group (DG) and 286 healthy control group (HG), among 2,594 adults aged 65 or older through the raw data of the 2016 and 2018 Korea National Health and Nutrition Examination Survey (KNHANES). All data in this study were analyzed using the IBM SPSS Statistics 26 program. The chi-square test or t-test was used for variable comparison. The association between dietary factors and depression was analyzed by applying binary logistic regression analysis. Differences were considered statistically significant at $p<0.05$.

Result: DG showed significant differences from HG in demographic characteristics, health behaviors, and chronic diseases. Frequency of breakfast intake and eating out, supplement intake rate, awareness of nutrition label and execution rate were significantly lower in DG than in HG. Food security, Index of Nutrition Quality (INQ) and nutrient intake ratio (NIR) were also significantly lower in DG than in HG. To confirm the risk of depression by dietary factors, demographic characteristics, health behaviors, and chronic diseases were adjusted. As a result, the risk of depression increased 3.115 times (95% CI, 1.150-8.438) in moderate or severe food insecurity compared to food security. INQ and NIR did not affect the risk of depression.

Conclusion: Low income can cause food insecurity, which has been found to be highly associated with depression. Therefore, it is suggested that providing food assistance to low-income individuals is necessary not only for physical health but also for mental health.

Key words KNHANES, depression, dietary factors, late adulthood

Category: Public Nutrition & Health

Food insecurity among people residing in underprivileged areas of South Delhi during COVID-19 pandemic

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Title of the article: Food insecurity during Covid-19 pandemic among people residing in underprivileged areas of South Delhi

Background: The components of food insecurity (accessibility, availability, and affordability of food) were adversely affected due to the lockdown caused by the coronavirus pandemic.

Objective: The study's objective was to evaluate the level of household food insecurity experienced by residents of South Delhi's impoverished neighbourhoods during the COVID-19 lockdown.

Study Plan: From July 2020 to October 2020, mother/ caregivers of low-birthweight children participated in the current study. Their household food insecurity was evaluated using the Household Food Insecurity Access Scale (HFIAS). Descriptive analysis was used to evaluate the data. In order to measure sociodemographic characteristics and food insecurity, proportions and frequencies were utilised. The distribution of households in terms of the various difficulties they faced during the lockdown was examined using the Chi-square test. At a p-value of 0.05, the results were declared to be significant.

Results: As a result of the pandemic, 64.5% of households experienced food insecurity, with the majority of these households experiencing moderate food insecurity (46.4%) and a minor percentage experiencing severe food insecurity (7%). This populace experienced worry and uncertainty about food supply as a result of the fight against coronavirus and the consequent quarantine that was imposed. The majority of respondents said they had restrictions on the types of food they could eat. Food insecure households had more difficulties during the lockout than food-secure ones did.

Conclusion: Extensive evidence-based studies are required to comprehend the causes of food insecurity and identify solutions during such unprecedented times.

Key words Food security, Covid-19, lockdown, Indian, coronavirus

Category: Public Nutrition & Health

Effects of Fermented Rice Consumption in Metabolic Health of Older Adults: A Comparative Study in India

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Background: Fermented Rice is the most common breakfast item eaten by the greatest number of people in India. The effect of fermented food in metabolic risk factors are still unknown to many of us. This study intended to find out the association of fermented rice intake and developing metabolic disorders.

Objective: It will be one of the first phase papers to establish the relationship to elaborate the role of fermented rice in metabolic health because there hasn't been much research has been done yet. The purpose of this study is to determine whether eating fermented rice every day improves metabolic health.

Methodology: This retrospective study was conducted in order to compare two groups of people's daily dietary consumption of fermented rice and their metabolic health. Fermented Rice Group (FRG) refers to the group that consumes fermented rice daily(n=38), whereas Control Group (CG) refers to the group that does not consume fermented rice on a regular basis(n=38). All the risk factors according to NCEP ATP III guideline are measured, like- waist circumference, fasting blood glucose etc. and compare the data using SPSS and R statistics.

RESULT: Out of all the risk factors waist circumstances (p=0.017), Triglyceride (p=0.034), Total Cholesterol (0.010) and Low Density Lipo-Protein(p=0.013). Body Composition Analysis also gave significant differences.

Conclusion: Our finding showed that intake of fermented rice had substantial protective effect with regard to some of the risk factors

Key words Fermented rice, Metabolic Syndrome

Category: Public Nutrition & Health

Using Context-Relevant Research, Evidence-Informed Advocacy, And Scholar Activism To Valorize, And Increase Demand For Healthy Food Policy: Lessons From Ghana

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Abstract

Background and objectives

Amidst high burden of infectious diseases, undernutrition, and micronutrient deficiencies, non-communicable diseases (NCDs) are predicted to become the leading cause of death in Ghana by 2030. Across the globe, NCDs are driven to a large extent by unhealthy food environments. The initiative herein presented, aimed to contribute to addressing the challenge through public health policy measures. However, data poverty and policy inertia presented important challenges. This paper shares a lower-middle-income country's experience of how a public interest coalition used context-relevant research, evidence-informed advocacy, and scholar activism to valorize and increase demand for healthy food policy in Ghana.

Methods: To address data poverty, the coalition generated relevant contextual evidence, curated the evidence, and availed the evidence to Ghanaian food environment actors (including policymakers, researchers, and civil society). The coalition responded to policy inertia through advocacy and scholar activism.

Results: This food activism intervention in Ghana has contributed to informed discourses about food systems, food environments, food ethics, food security, food policy, food democracy, and food justice. The evidence-informed advocacy and scholar activism have valorized and increased demand for a double-duty food-based policy bundle. The policies (comprising marketing regulations, front-of-pack nutrition labelling, food-related health taxes, and public food procurement policy) are currently being developed by a coalition of government agencies, academia, and civil society.

Conclusions: The assessments, evidence, engagements, and advocacy show that to improve the Ghanaian food environments, fit-for-local purpose double-duty policies, as well as strong leadership and accountability, are required. The engagements and advocacy have also led to a national recognition that the development and implementation of the policies will make unhealthy diets unattractive and unavailable, while making healthier diets available, and attractive.

Key words Food environments, double-duty policy bundle, advocacy, accountability, Ghana

Category: Public Nutrition & Health

Creating Healthy Food Environments in Universities

Rajshri Roy*
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Background: University food environments are important factors that can influence the dietary behaviours of young adult students. Roy et al's research has aimed to explore and understand the university food environment, and its impact on university students' food purchasing behaviours, preferences, opinions, and dietary intake. Her research has also evaluated the effectiveness of food environment interventions on their dietary behaviour.

Methods: The studies employed mixed methods such as systematic literature reviews, food environment audits, dietary assessments, surveys, ethnography, interviews, and quasi-experiments. The studies were conducted in large urban university campuses in Australia, New Zealand, and China.

Results: Taste, followed by price and then health are leading determinants of food purchasing behaviours among university young adults. The research has revealed that university food environments are dominated by unhealthy food options, with a limited availability of healthy food choices. Vending machines within university campuses have been found to be stocked predominantly with unhealthy foods and drinks. However, food environment interventions such as promoting healthy food options, providing nutrition education, and reducing the availability of unhealthy food options, have been found to be effective in improving young adult students' dietary behaviour. Particularly energy labelling, price-reduced healthy meals, healthier vending machines, labelling healthy food items on menus with symbols and social marketing campaigns increased the purchase of healthier options among university students.

Conclusions: The findings suggest that the university food environment has a significant impact on young adult students' dietary behaviour. The implementation of food environment interventions such as promoting healthy food options, providing nutrition education, pricing strategies, healthier vending machines, and food labelling is critical in creating healthier food environments in university settings. This is important for promoting healthier dietary behaviours among young adults and improving their overall health and well-being.

Key words university food environment, young adults, dietary behaviour, food environment interventions

Category: Public Nutrition & Health

Translating an evidenced based obesity prevention home visiting program into a self-guided web-based platform using a co-design approach: The Healthy Beginnings program

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Background and objectives: The Healthy Beginnings Trial was the world's first RCT to effectively impact obesity related behaviours in the first two years of life delivered through home visits. However, this was costly and not a feasible approach to scale up. Delivering health programs digitally is increasing as it's convenient and accessible, however very few consider cultural responsiveness or health literacy. This study aims to translate, develop and test the feasibility of the Healthy Beginnings program through a web-based platform specifically supporting families with low English proficiency.

Methods: This is a two-phased study. Phase 1 included 5 sub-studies that guided the development of the web-based program. 1a) systematic assessment of websites targeting healthy lifestyle behaviours for the first year of life; 1b) social media mapping of parent forums on child health behaviours; 1c) National-wide survey exploring parents internet usage of health information (N=500); 1d) Co-design workshops with English (n=20), Arabic (n=10) and Mongolian (n=10)-speaking parents; and 1e) Co-design workshops with health professionals (n=10). Phase 2 will include testing the program's feasibility.

Results: Few websites addressing infant behaviours are high quality, don't address health literacy or cultural responsiveness (Study 1a). The most commonly discussed topic on parenting forums is 'feeding difficulty' (Study 1b). Families from CALD backgrounds frequently use the internet for health information and significantly favoured videos (p=0.003) as a feature (Study 1c).Further, studies 1d and 1e, consumers and health professionals provided various feedback on content, branding and interactive tools to be made available on the web-based platform.

Conclusions: There is a need for web-based platforms supporting families with child health behaviours in the first year of life developed through a culturally responsive and health literacy lens. Involving consumers and health professionals in a co-design approach is necessary to addresses barriers they experience accessing online health information.

Key words Obesity prevention, digital health, health promotion, child health

Category: Public Nutrition & Health

一项针对澳大利亚学龄前儿童肥胖风险的为期 2 年的电话干预随机对照试验研究

A randomised controlled trial of a 2-year telephone-based intervention targeting obesity risk of pre-school aged children in Australia

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Background: There has been limited evidence of effectiveness of telephone-based intervention in reducing obesity risk for children. This study aimed to determine effects of a 2-year telephone-based intervention on body mass index (BMI) and eating habits among pre-school aged children.

Methods: We conducted a pragmatic randomised controlled trial (RCT) with 662 mother-child dyads in Sydney Australia 2019-2022. The intervention included 5 staged nurse-led telephone support calls to mothers to promote healthy eating and physical activity for children from ages 2 to 4 years. The outcomes included eating habits, screen time and height/weight for BMI at ages 3, 4 and 5 years. The data were collected via the computer-assisted telephone interviewing system using a mother self-reported standardised tool. We compared the outcomes between the groups using longitudinal data analysis based on the intention to treat principle.

Results: There were 537 (81%), 491 (74%) and 405 (61%) mothers having completed the follow-up assessments at ages 3, 4 and 5 years respectively. The intervention had a significantly lower mean BMI of 15.90 (SD 2.55) kg/m2 than the control 16.20 (SD 2.44), a difference of -0.30 (95%CI: -0.59 to -0.01), P=0.039. This effect was particularly stronger among low income families with -0.57 (95%CI: -1.05 to -0.10), P=0.018. Children in the intervention group were more likely not to have fast food [29% vs 23%, AOR 1.63 (95%CI: 1.01 to 2.65)] or eat in front of the TV [77% vs 65%, AOR 2.65 (95%CI: 1.57 to 4.67)] compared with the control.

Conclusions: The 2-year telephone-based intervention was effective in reducing BMI and increasing healthy eating habits of pre-school aged children. The effects of the telephone-based intervention could be sustained over a 12 months period. Telephone-based support has a great potential in reducing obesity risk in pre-school aged children, particularly among children from low income families.

Key words randomised controlled trial, telephone-based intervention, obesity risk and pre-school aged children

Category: Public Nutrition & Health

Father’s capability to save the future: Insights from haor areas of Bangladesh

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Background and Objectives: Maternal and child survival is one of the core dimensions of child growth in haor areas of Bangladesh that are subject to heavy floods. Men, as husbands or fathers, are primarily responsible for arranging health care for women in haor areas. We intend to understand what contextual factors underlie a father’s capability to secure safe delivery.

Methods: A qualitative study employing a participatory approach was conducted with the parents having children less than two years of age. The study areas included Derai, Baniachang, and Ashtagram subdistricts that are dominated by varying depths of haors. In the first round, eight focus group discussions (FGD) and eight in-depth interviews were conducted with the parents using specific interview guides with open-ended questions. The interview guides were developed using the capability framework for child growth model. In the second round, 17 focus group discussions were facilitated with the parents using visual tools to validate the emerging findings from the first round.

Findings: Fathers' capability to save the lives of mothers and children was primarily hindered by their late entry into health facilities. This was caused by a lack of resources such as a nearby well-equipped health facility, money, transportation, and skilled health care services, as well as by a range of societal and environmental factors such as lack of communication between the spouses, fear of cesarean delivery, reliance on God, seasonal calamities, and poor infrastructure. Women’s autonomy to seek health care by themselves was affected by their lack of access to financial resources, the availability of women-friendly social arrangements for health care, and their gendered roles restricted to indoor activities.

Conclusion: The findings highlighted the importance of addressing socially constructed gendered differences in improving women’s autonomy, which can be taken into account in designing context-specific nutrition-sensitive programs and policy instruments for haor.

Key words Child Growth, Capability Approach, Haor, Future

Category: Public Nutrition & Health

DETERMINANTS OF CHILD MALNUTRITION: EMPIRICAL EVIDENCE FROM RURAL AND URBAN INDIA

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Background and objectives

Child health is a vital sign of a healthy society. Being home to two-thirds of malnourished children, the prevalence has recently risen across India. In this study, an attempt has been made to determine the effects of each of the components of malnutrition on both rural and urban populations.

Methods

Children aged 0-59 months with malnutrition Z-score cut off < - 2 Standard Deviation were selected from the National Family Health Survey－4&5 data. The indicators of malnutrition are chosen, focusing on child food intake, maternal factors and immunisation and infections in both rural and urban areas. Panel regression and biplot analysis are used to identify the characteristics and determinants of childmalnutrition in Indian states. Boxplots are used to visualise the distribution of malnutrition.

Result

Wasting and underweight are closely related, with stunting more prevalent in urban and rural areas. Biplot analysis indicated that, Gujarat has the highest rate of underweight, while Bihar, Maharashtra, Jharkhand, and Uttar Pradesh have higher rates of multiple indices of malnutrition. Kerala, Sikkim, Tamil Nadu, Uttarakhand and Punjab have better health indices in urban and rural areas. Panel regression analysis indicated, that mothers' literacy (α=0.05), anthropometry (Body Mass Index < 18.5kg/m^2) (α=0.01) and children with fever or symptoms of acute respiratory infection (α=0.1) are the underlying factors of underweight both in urban and rural areas. Similarly, mothers' anthropometry (α=0.05) and children with fever or symptoms of acute respiratory infection (α=0.05) influenced wasting. Further, obese mothers' (α=0.01) is identified as the primary reason for child stunting in both rural and urban India.

Conclusion

Child malnutrition has to be eliminated from the grassroots level which is determined by factors viz.,mothers' literacy, body mass index, and acute respiratory infection. Analysis based on place of residence will be more beneficial in identifying who has the absolute burden of malnutrition.

Key words Malnutrition, India, Urban-rural, Underweight, Wasting

Category: Public Nutrition & Health

Vitamin D status and its determinants in young adults

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Background and objectives : Vitamin D deficiency is a common, public health problem in many countries including Sri Lanka. It is important to identify vitamin D status and its determinants when planning intervention programmes to improve the vitamin D status. However no recent studies have been conducted in Sri Lanka to identify vitamin D status and its determinants in young adults. This study aimed to identify vitamin D status and factors associated with vitamin D status among young adults in a selected area of Sri Lanka.

Methods : A total of 75 young adults ranging in age from 18 to 44 years were recruited from a rural setting in Sri Lanka by stratified random sampling. Socio-demographic information, physical activity, dietary intake, and anthropometric data were gathered. Three-day diet diaries were used to gather the dietary intake and computer software was used to identify the vitamin D intake. Serum 25(OH)D concentration was measured using an Enzyme-Linked Immunosorbent Assay.

Results : The mean serum 25(OH)D concentration of the participants was 19.87 ± 7.27 ng/mL. The prevalence of vitamin D sufficiency, insufficiency, and deficiency was 39% (n=29), 53% (n=40) and 8% (n=6), respectively. Vitamin D status was associated with gender (p= 0.01), where the mean serum 25(OH)D concentration for males (22.19 ± 8.42 ng/mL) was higher than for females (17.61 ± 5.09 ng/mL). Age (p=0.013) and vitamin D intake (p=0.032) showed significant positive associations with serum 25(OH)D concentration. Body Mass Index, ethnicity, religion, monthly income, education level, alcohol, and tobacco use were not significantly associated with serum 25(OH)D concentration.

Conclusion : More than half of the young adults were vitamin D deficient and or insufficient. The vitamin D status of young adults was influenced by age, gender, and vitamin D intake.

Key words Keywords: Serum 25(OH)D, young adults, determinants, vitamin D status

Category: Public Nutrition & Health

Contributing Factors to Nutritional Status among Thai Children Aged 7-12.9 years - SEANUTS II Thailand

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Background and objectives: Double burden malnutrition with increasing child over-nutrition is a significant public health problem in low- and middle-income countries. This study identified factors associated with both extremes of malnutrition.

Methods: Data were analyzed from 1084 Thai children aged 7-12.9 years (557 boys, 527 girls) who participated in the South East Asian Nutrition Survey II (SEANUTS II) Thailand. Nutritional status employed WHO BMI-for-age references and was classified into thinness, overweight, obesity, and normal weight. Multivariate-adjusted multinomial logistic regression was performed to determine factors associated with both malnutrition extremes compared to normal weight children.

Results: Children of low birth weight were more likely to be thin (adjusted OR, AOR: 3.47, 95% CI: 1.48, 8.14), while those born to obese mothers were less likely to be thin (AOR: 0.45, 95% CI: 0.21, 0.93). Children with low energy intake or from households with low monthly incomes were less likely to be overweight (AOR: 0.48, 95% CI: 0.27, 0.86; AOR: 0.48, 95% CI: 0.24, 0.95). Maternal and paternal obesity were positively associated with being overweight (AOR: 2.12, 95% CI: 1.34, 3.36 and AOR: 2.03, 95% CI: 1.27, 3.24). Girls were less likely to be obese than boys (AOR: 0.58, 95% CI: 0.37, 0.90). Children with low energy intakes were also less likely to be obese (AOR: 0.49, 95% CI: 0.29, 0.82). Lower physical activity, longer screen time, and maternal and paternal obesity were all positively associated with obesity (AOR: 2.03, 95% CI: 1.08, 3.82; AOR: 1.89, 95% CI: 1.17, 3.04; AOR: 2.99, 95% CI: 1.95, 4.58; and AOR: 1.95, 95% CI: 1.27, 3.01, respectively).

Conclusions: Child nutritional status at birth and parental nutritional status contributed to under- and over-nutrition in older children. Balance between energy intake and expenditure as well as household income are important ecological factors contributing to overweight and obesity.

Key words Overweight, obesity, thinness, children aged 7-12.9 years

Category: Public Nutrition & Health

Norovirus titers in symptomatic and asymptomatic children under 5 years old with malnutrition in Surabaya, Indonesia

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Norovirus (NoV) infection are second most frequent agent causing gastroenteritis in malnutrition children under 5 y.o. NoV can be detected in both symptomatic and asymptomatic children. However, in which threshold virus titer that could manifest to symptoms is not well understand. This study aimed to compare the NoV titer in symptomatic and asymptomatic children under 5 y.o. with malnutrition in Surabaya, Indonesia. Stool samples of symptomatic children (SC) were collected in Soerya Mother and Child Hospital, Surabaya. Meanwhile, samples from asymptomatic children (ASC) were collected in Semampir Subdistrict, Surabaya. One-step PCR GI & GII detection kit ver.2 was used to identify NoV. Genogroup-specific primer and probes were used for norovirus titers determination using RT-qPCR. The virus titers were then presented in RNA copies/g stool. We identified 54 and 32 NoV positive samples from SC and ASC group. In SC group, the minimum virus titers for GII genogroup that observed was 7.5 x 102 copies/g stools, while in ASC group was 5.2 x 103 copies/g stools. The minimum virus titer of GI genogroup was 7.5x101 and 7.6x102 for SC and ASC. The titers difference between both group was remarkable for GII genogroup (SC median (IQR)=3x104(7.4x105), ASC median (IQR)=9.5x103 (5.3x103), p-value=0.035), but not for GI genogroup. The minimum virus titer of SC group was lower of ASC for both NoV genogroup. This finding indicated that virus titer was not the major factor for symptom manifestation in NoV infection. Our finding was in line with former studies that reported no association between virus titers, symptom manifestation, and malnutrition, even though proinflammatory cytokines concentration were positively associated with the titers. According to our study, norovirus titers did not determine the clinical manifestation of the infection. Further study is needed to confirm the difference of proinflammatory cytokines concentration in SC and ASC with norovirus infection.

Key words Norovirus, symptomatic, asymptomatic, malnutrition, children, virus titers

Category: Public Nutrition & Health

Changing food consumption patterns and macronutrient intakes in ASEAN region

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Background and Objectives: Most ASEAN countries continue to face a double burden of malnutrition with a growing prevalence of overweight and obesity alongside key nutrient deficiencies and inadequacies. Economic growth and urbanization have contributed to nutrition transitions across the region. The aim of this study is to review the dietary patterns among general adult populations in ASEAN region, with a focus on macronutrient quality.

Methods and Study Design: ASEAN countries Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, were included in this study. Dietary intake information including food consumption data and macronutrient intakes were extracted from nationally representative nutrition survey reports and publications including policy documents and journal articles, in English, from 2000 to 2021 (latest survey).

Results: Chronic energy deficiency is prevalent in Vietnam, Philippines, Indonesia, and Cambodia with more females being energy deficient than males. While staple foods such as rice still provide the majority of calories in diet, there is a shift towards lower carbohydrate consumption and higher fat and protein, specifically animal protein, in Singapore, Malaysia, Brunei, Indonesia, Thailand, and Vietnam. Fish, meat, and eggs are the main sources of protein intake, while total fat consumption (vegetable oils and animal fat) has shown a steady increase across the region over time. Polyunsaturated fatty acids and omega 3 consumption fall short of global average, except for Singapore and Malaysia; and high intake of added sugars and salt, and low consumption of dietary fiber are common in all countries.

Conclusions: This study highlights key dietary shifts among ASEAN countries, from diets high in carbohydrates to increased animal proteins and fats, indicating a deviation from traditional diets. Further research is needed to explore ways to achieve balanced diets despite such shifts, taking into account factors such as socio-economic, affordability and dietary preferences.

Key words dietary patterns, ASEAN, macronutrients, dietary shifts

Category: Public Nutrition & Health

Characteristics and Potential Applications of the “ARIGATO (Gratitude) Recipe Collection” Developed in Disaster-Affected Areas

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【Introduction and Objective】

After the Great East Japan Earthquake, TAF and its local partners held cooking classes in Tohoku region with 54,434 participants. In 2021, TAF published an “ARIGATO (Gratitude) Recipe Collection” with recipes from the cooking classes to thank the project stakeholders and to support independent local efforts to hold classes. Recipes are set nutritional value with consideration for health at a low cost. It included 109 recipes (for 36 meals) and useful tips on safety and hygiene precautions. The number of copies distributed exceeded 53,000. This study aims to evaluate the participants reported outcome.

【Methods】

Questionnaire survey by web research method was conducted anonymously in December 2022. The participants consisted of 213 belonging to local governments and dietary improvement promotion groups who were local partners or expressed interest in the recipe collection. The items of the questionnaire include the following: basic attributes, participant satisfaction, Net Promoter Score (NPS).

【Results】

The survey was completed by 114 respondents (54% response rate). Those who responded “very satisfied” or “satisfied” accounted for 95.1% of the total respondents. Regarding the experience of using the recipe collection, 83.3% of the respondents answered “Yes” to the question “Did you show or tell someone about it?” The NPS for the likelihood of recommending the collection to friends, acquaintances, and family was 42.1 (>0).

There were free comments described potential applications in a variety of situations, such as during disasters, cooking classes in the community, and as a useful dietary aid for the elderly, single adults, and busy people.

【Conclusions】

There was a high level of satisfaction with the recipes. The NPS was also positive. The recipe book is useful as a communication tool and hoped that its use will continue to expand to various regions in the future.

Key words Cooking class, Local community, Disaster, Nutrition, Recipe

Category: Public Nutrition & Health

增加海洋鱼类摄入有助于降低中国成年人双心病患病风险

Increased intake of marine fish contributed to a lower odds of comorbid depression and coronary heart disease in Chinese adults

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Background and objective: Population-based epidemiology evidence to date has supported that high-fish intakes are beneficial in attenuating depression or coronary heart disease (CHD). Nevertheless, the benefits for comorbid depression and CHD (DCHD) remain unclear. The aim of this study was to investigate the relationship between marine-derived fish intake and DCHD in Chinese adults.

Methods: We conducted a cross-sectional study of 1,099 Chinese adults aged 25–95 years living in Taizhou, Zhejiang. Fish intake was assessed by using a validated food frequency questionnaire (FFQ), while depression status was diagnosed by hospital anxiety and depression scales (HADS), with HADS scores ≥ 8 indicating a prevalent depression. Fish intake were categorized into three tertiles: ≤ 1 time/week (low), 2-6 times/week (moderate), and ≥ 7 times/week (high). Primary measurements were the prevalent depression comorbidity with CHD, presented as multivariate-adjusted odds ratios (ORs) with 95% confidence intervals (CIs) comparing the highest with the lowest category of fish intake.

Results: A total of 932 participants who completed the FFQs were analyzed, 194 (20.82%), 583 (62.55%) and 106 (11.37%) were diagnosed with depression, CHD and DCHD, respectively. Participants at the highest tertiles of fish intake have a lower odds of DCHD compared with those at the lowest (OR= 0.355, 95%CI: 0.198, 0.638), with 49% reductions in odds of DCHD for per one-tertiles (3 times/week) increase in fish intake (OR = 0.511, 95% CI:0.363, 0.716). The multivariate-adjusted ORs were 0.355 (95% CI: 0.221, 0.569) for depression and 0.727 (95% CI: 0.471, 1.123) for CHD, respectively. No significant interactions with DCHD were found between fish intake and age, gender, lifestyle factors and concurrent diseases.

Conclusions: Higher intake of fish was associated with a lower odds of DCHD, especially with depression. Such findings highlight that increased intakes of marine fish may offer a psychosomatic benefit in primary prevention of DCHD in Chinese adults.

Key words Fish, Depression, Coronary heart disease, Chinese

Category: Public Nutrition & Health

Development of a Food Logging and Nutrition Assessment Approach for a Dietary App Targeting Adults in China

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Backgrounds and objectives:

Dietary mobile applications (apps) collect dietary information to be able to generate personalized dietary recommendations. Compared to 24h dietary recall and food frequency questionnaires, the dietary diversity indicator (DDI) may better fit consumer usage based on its simplicity compared to other food quality indicators involving collection of complex quantitative information. This study aims to develop a DDI, fit for a consumer-grade dietary app targeting Chinese adults.

Methods:

A DDI composed of 12 food groups was developed according to the dietary diversity principle in the Chinese Dietary Guideline. Dietary data in China Health and Nutrition Survey (CHNS) 2009 and 2011 were analyzed to identify common consumed foods and explore association between DDI with nutrient intake adequacy for 21 nutrients. A DDI considering both number of food group and allocated weights to each food group according to nutrient contribution was subsequently developed to estimate probability of nutrient inadequacy based on dietary diversity.

Results:

A total of 70,609 dietary records from two waves of CHNS were included. Defined as consumed by 1% or above in the dietary recalls, 943 commonly consumed foods were identified and categorized into 12 food groups. To reach nutrient adequacy for the 21 nutrients (protein, vitamin A, thiamin, riboflavin, niacin, folate, vitamin B6, vitamin B12, biotin, choline, vitamin C, calcium, phosphorus, potassium, magnesium, iron, zinc, selenium, carbohydrates, fiber and phytosterol), the minimal number of food groups consumed is 8 (out of 12) with the contribution of each food group specified. The Pearson's correlation between the developed DDI score and the actual nutrient adequacy was higher than 0.5 for 16 of the 21 nutrients assessed.

Conclusions:

The simplicity of the DDI approach and its reasonable correlation to probability of nutrient adequacy render it a promising user-friendly solution for dietary App in China.

Key words Digital Nutrition, Food logging, Probability of nutrient inadequacy, Dietary assessment, Dietary diversity

Category: Public Nutrition & Health

Association of Serum Carotenoids and Various Fruit and Vegetable Intakes on All-Cause Mortality: The Mikkabi Study

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Background and Objectives: Consumption of fruits and vegetables rich in carotenoids is a major component of a healthy diet. The aim of this study is to determine the association of serum carotenoids and consumption of various vegetables and fruits on all-cause mortality.

Methods: We used data from the Mikkabi study initiated in 2003. Participants who gave informed consent for long-term follow-up were included in the analysis. Dietary intake was estimated by a validated food frequency questionnaire. Serum carotenoids and food intake were log-transformed to improve normality and analyzed as continuous variables. The frequency of consumption of each vegetable and fruit was asked on an 8-point scale and analyzed on three levels: less than once a week (reference), 1-2 times a week, and more than 3 times a week. Endpoints were identified by Vital Statistics and Long-Term Care Insurance data. Hazard ratios and 95% confidence intervals were obtained by Cox regression analysis adjusted for age, sex, smoking, alcohol intake, exercise, body mass index, and total energy intake.

Results: During the 10,194 person-years of follow-up for 838 participants, a total of 71 deaths were identified. Low hazard ratios for all-cause mortality were observed for serum beta-carotene (hazard ratio 0.41, 95% confidence interval 0.25-0.68) and total carotenoids (0.53, 0.31-0.91). Green and yellow vegetable intake (0.69, 0.34-1.01) and total vegetable and fruit intake (0.59, 0.34-1.02) were marginally and inversely associated with all-cause mortality. The frequency of intake of many vegetables and fruits was inversely associated with all-cause mortality, with tomatoes, carrots, broccoli, and grated radish showing significant inverse associations.

Conclusions: Abundant fruit and vegetable intake was associated with lower all-cause mortality, as in previous studies. Tomatoes, carrots, and broccoli may be good sources of carotenoids for the Japanese diet.

Key words Carotenoids, Vegetable, Fruit, Mortality, Cohort study

Category: Public Nutrition & Health

Dietary intake status in Chinese infants: findings from interim data analysis in Bone And MicroBiOme Onset (BAMBOO) study

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Background and objectives. The Bone And MicroBiOme Onset (BAMBOO) study is an ongoing observational cohort study conducted in Tianjin, China, aiming to determine age-appropriate trajectories for microbiome maturation and bone development from 0-3 years, and to identify the influence of dietary factors on these processes. This analysis is to assess dietary intakes of infants 0- 12m using a subset data.

Methods. Infants who met the inclusion criteria were invited to join the study at Tianjin Women and Children's Health Center. The participants were recruited into 2 groups. Subjects in group 1 and 2 were recruited at birth and 6m, and will be followed up to 12m and 36m, respectively. The recruitment started in September 2021 and was completed in February 2023. In total 1380 children were recruited, 690 in each group. Dietary intake information is being collected by 3-day food diary starting from 4m of age. Nutrient intakes are being calculated using Chinese Food Composition database, complemented by pack labels and literature reviews.

Results. Dietary intake data of the first 100 subjects recruited in each group were analyzed. We found that the prevalence of exclusive breastfeeding was 60% at 4m and decreased to 15% at 6m. Eighty percent of 6-month-old infants consumed complementary foods with an average age of introduction at 5.4m. Compared to the recommendations, the percentages of infants with excessive Vitamin A intake were high, especially in infants aged 9-12m (70%), whereas the intakes of iron and zinc were low among infants aged 6-12m.

Conclusions. Results from interim data analysis showed an excessive intake of Vitamin A and low intakes of iron and zinc compared to recommendations, especially in children aged 6-12m which coincided with the introduction of complementary foods. Consistent with previous observations, these findings underscore the importance of nutritional education and guidance in weaning process.

Key words Early life nutrition; microbiome; bone health

Category: Public Nutrition & Health

Serum branched-chain amino acids and cardiovascular health events in Chinese community-dwelling older people in Hong Kong: a prospective cohort study

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Background and Objectives: The role of branched-chain amino acids (BCAA) in the development of cardiovascular disease remains controversial, with limited studies having been conducted among older adults. We aimed to investigate the association between serum BCAA and cardiovascular health events in Chinese community-dwelling older adults.

Methods and Study Design: This study was based on the Mr. OS and Ms. OS (Hong Kong) cohort, a community-based prospective cohort study. Serum BCAA (isoleucine, leucine and valine) was measured at baseline in 2,994 participants aged above 65 years. The primary outcome was incident cardiovascular health event, including overall cardiovascular disease (CVD), coronary heart disease (CHD), stroke and CVD death. Cox regression was used to evaluate the associations between serum BCAA and incident cardiovascular health events with hazard ratios (HRs) and 95% confidence intervals (CIs).

Results: We ascertained 298 incident CVD events up to 7 years of follow-up and 258 CVD deaths up to 14 years of follow-up. Serum BCAA was positively associated with risks of CVD (HR: 1.26; 95%CI: 1.04, 1.52; P=0.018) and CHD (HR: 1.28; 95%CI: 1.02, 1.61; P=0.034) for per SD of ln-transformed serum BCAA in older women, but not for stroke (HR: 1.28; 95%CI: 0.93, 1.77; P=0.128). Similar results were found for leucine and isoleucine, but not for valine. However, adjusting for history of diabetes attenuated the association between serum BCAA with CVD. No association between serum BCAA and incident CVD event was found for older men. In addition, there was no association between serum BCAA and CVD mortality.

Conclusions: Higher serum levels of total BCAA, leucine and isoleucine were associated with increased risk of incident CVD event in Chinese community-dwelling older women.

Key words branched-chain amino acids; isoleucine; leucine; cardiovascular disease; cardiovascular event; older adults.

Category: Public Nutrition & Health

Effect of Changes in Dietary Fiber on Lipid Profile of Obese Adults in Indonesia.

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Background and objectives: Increasing dietary fiber intake is believed to reduce the risk of obesity. This study aimed to analyze changes in dietary fiber on lipid profiles of obese adults in Indonesia.

Methods: Data was generated from the cohort study of non-communicable disease risk factors in Bogor City, Indonesia. The total number of subjects was 138 adults newly diagnosed with obesity in 2014 and 2016. A 24-hr recall and FFQ were used to take consumption data, while lipid profile data was collected by calorimetric enzymatic method. Data were analyzed using Generalized Estimating Equation (GEE).

Results: Total dietary fiber intake in the beginning was 9.6 g and increased to 10.8 g in the end of the observation. Consumption of vegetables, fruits, cereals, and nuts increased by 152.6 g, 64.1 g, 69.3 g, 4.3 g consecutively. At first, 52.2% of the subjects had lipid profile disorders (if one indicator out of four experiences high/low), and towards the end, 58% did. There were inclining percentage of people who had high levels of total cholesterol (13%), triglycerides (9.5%), and LDL (0.7%), whereas HDL remained stable. While waist circumference (WC) and carbohydrate were unaffected ($p>0.05$), age and occupation type had a significant impact on total cholesterol ($p<0.05$). In contrast, triglyceride was influenced by gender, occupation, and protein intake ($p<0.05$) and other factors namely age, education, behavior factors, WC, BMI and carbohydrate were not ($p>0.05$). Age and WC ($p>0.05$) had an impact to LDL, but education, occupation, WC, emotional mental disorder, BMI and protein and carbohydrate did not ($p>0.05$). HDL were influenced by gender and BMI ($p>0.05$), while education, occupation, emotional mental disorder, BMI, protein and carbohydrate intake were not affected ($p>0.05$).

Conclusions: The change in dietary fiber was not associated with the lipid profile since their intake was less than the minimum requirement (25 g).

Key words Dietary Fiber, Obesity, Lipid Profile

Category: Public Nutrition & Health

Dairy Consumption at Breakfast in Children from the South-East Asian Nutrition Surveys II (SEANUTS II): Associations with Nutrient Intake

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Background and Objectives: Children require adequate nutrient intake for their rapid biological and physical growth, and breakfast containing dairy is an important meal to provide sufficient nutrients. This study investigated the prevalence of dairy consumption at breakfast among South-East Asian children and explored its association with nutrient intake at breakfast and throughout the day.

Methods: Using the Malaysian dataset of the South-East Asian Nutrition Surveys II (SEANUTS II), 2438 Malay children aged 2 to 12 years were included. Questionnaires and a one-day 24-hour recall were used to collect data on sociodemographic and nutrient intakes. Descriptive analysis and Wilcox's robust tests with robust post-hoc tests were used for data analysis.

Results: Only 38% of children consumed dairy at breakfast, with younger children more likely to consume dairy than older children ($P<0.001$). Additionally, ~80% of children who had breakfast did not meet the recommended daily dairy intake of two servings per day, with an average intake of 0.5 servings per day. Children in all age groups consuming dairy at breakfast had a significantly higher intake of calcium and vitamin D at breakfast compared to those who did not ($P<0.001$). Moreover, breakfasts with dairy were associated with better overall quality of daily diet, as reflected in higher daily intakes of several important nutrients, including vitamin A, B1, B2, B12, C, β-carotene, iron, calcium, potassium, and phosphorus ($P<0.001$).

Conclusions: The findings of this study highlight the importance of promoting dairy consumption at breakfast among children in South-East Asia to improve nutrient intake at breakfast and in the overall diet, indicating that breakfast is an important meal contribution to the overall quality of diet. More information about children in Thailand, Indonesia, and Vietnam will be included in future analysis.

Key words Dairy, breakfast, children, nutrient intake, South-East Asia

Category: Public Nutrition & Health

Prevalence of Micronutrient Deficiencies, Anemia, and Nutritional Status among Thai Children Aged 4-12 Years - SEANUTS II Thailand

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Background and objectives: Micronutrient deficiencies (MNDs) and anemia can affect child growth and development, as well as other vital physiological functions, and can be present among undernourished children. This study assessed micronutrient status, prevalence of MNDs, and anemia among Thai children aged 4-12 years by their nutritional status.

Methods: Weight and height were measured and nutritional status was determined using WHO BMI-for-age growth references. Blood samples were collected from 631 children who participated in the South East Asian Nutrition Survey II (SEANUTS II) Thailand. Hemoglobin (Hb), biochemical micronutrient status, namely, ferritin, soluble transferrin receptor (sTfR), C-reactive protein, α-1-acid glycoprotein, vitamins A, B12, and D, and zinc were assessed.

Results: Overweight/obese children had significantly higher Hb concentration than normal weight children ($P < 0.05$), and significantly higher vitamin A concentration than normal weight and thin children ($P < 0.05$). In contrast, vitamin B12 concentration in overweight/obese children was significantly lower than in thin and normal weight children ($P < 0.05$). While mean ferritin and sTfR were not significantly different among groups, prevalence of all stages of iron deficiency (inclusive of those below cutoff for ferritin and above cutoff for sTfR) was highest among overweight/obese children, followed by thin children, and lowest among normal weight children. However, up to one-fifth of normal weight children had iron deficiency. Deficiencies of vitamins A, D, and B12, and zinc were low with no significant differences by nutritional status.

Conclusions: The findings suggest that overweight/obese children are at a higher risk of iron deficiency compared to normal weight and thin children, despite having higher concentrations of Hb and vitamin A. However, the prevalence of other MNDs did not differ significantly by anthropometric status. These results highlight the importance of targeted screening interventions for iron deficiency in overweight/obese children.

Key words Micronutrient deficiencies, nutritional status, Iron, Vitamin D, Zinc

Category: Public Nutrition & Health

Review of nutrient profiling systems supporting food policies in Asian and Pacific low- and middle-income countries

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Background and objectives: Micronutrient deficiencies, undernutrition, and overweight/obesity are prevalent in low- and middle-income countries. Nutrient profiling systems, initially developed to help reduce diet-related chronic diseases prevalence in Western countries, could be one solution to promote nutrient-dense foods in Asia. Our aim is to review nutrient profiling systems supporting low- and middle-income countries food policies in South-Asia and East-Asia and Pacific, and their relevance considering local nutritional challenges.

Methods: Food policies implemented in low- and middle-income countries were identified from the World Cancer Research Fund' s NOURISHING database, WHO' s GINA database, and the Global Food Research Program' s food policy maps. Prevalence of undernutrition, overweight/obesity and three micronutrient deficiencies plus summary exposure to twelve dietary risk factors were extracted from UNICEF, WHO, and World Bank datasets, NCD Risk Factor Collaboration results and the Global Burden of Disease study.

Results: Among 48 Asian and Pacific low- and middle-income countries, 15 countries used nutrient profiling systems to support nutrition policies, either for sugar and sweetened beverages taxation purposes or front-of-pack labelling. Three schemes were implemented in South and East Asia: the Healthier Choice logo in Thailand, China, Indonesia, and Malaysia which included thresholds for sugars, sodium, fats, dietary fibers and at least one micronutrient, except in China; the Traffic Light labels in Sri Lanka focusing on sugars, fats, and salt; and the Sangkap Pinoy Seal in the Philippines highlighting products fortified with iron, vitamin A and iodine. Of the 15 countries using nutrient profiling systems, five are facing a double burden of malnutrition. Dietary iron deficiencies are prevalent in most countries and vitamin A deficiencies are widespread across the Pacific islands.

Conclusions: Nutrient profiling systems encompassed both macro- and micronutrients in Indonesia, Malaysia, and Thailand which helps promote nutrient dense food and tackle regional nutritional challenges.

Key words Asia; nutrient; profiling; malnutrition; policy

Category: Public Nutrition & Health

Trends in cardiovascular disease and diabetes mortality attributable to BMI and fasting plasma glucose in Asia from 1990 to 2019

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Background and objectives: Asia faces many challenges in cardiovascular diseases (CVD) and diabetes mellitus (DM) prevention and treatment as continent with largest population being susceptible to these diseases and has worse outcomes. Hence, we aimed to analyze temporal trends in mortality from CVD and DM attributable to high Body-Mass-Index (BMI) and fasting plasma glucose (FPG) in Asia from 1990 to 2019.

Methods: We used Global Burden of Diseases Study 2019 database for Asia from 1990 to 2019. Joinpoint regression analysis was used for trend estimations and annual percent change (APC) was reported. We calculated weighted- average (AAPC) as summary measure of CVD and DM mortality trends from 1990 to 2019.

Results: Asian mortality rate of CVD and DM from high FPG was found higher compared to BMI in both 1990 and 2019. However, annual increase in DM mortality attributable to high BMI was found higher compared to FPG (4.8% vs 2.4%). Similarly, CVD mortality attributable to high BMI (AAPC=3.0) was higher than FPG (AAPC=2.5). High BMI and FPG caused mortality from both CVD and DM changed annually at higher rate in males compared to females from 1990 to 2019. From mid-1990s to the mid-2000s, an increasing trend of high BMI attributable to mortality from CVD (APC=3.6) and DM (APC=5.6) was observed. An increasing trend in high FPG attributable to mortality from CVD was found in early 2000s (APC=5.3) whereas DM was during mid-1990s (APC=3.0). During 2010s, high BMI attributable to DM (APC=4.9) and CVD (APC=3.2) mortality increased persistently.

Conclusions: We found rate of changes in mortality caused by high FPG was higher compared to BMI for CVD and DM, however, high BMI showed increased APC compared to FPG in Asian region. Therefore, eating balanced diet and being physically active should be encouraged to address and mitigate metabolic risk factors' effects.

Key words Body-Mass-Index; Cardiovascular disease; Diabetes Mellitus; Fasting Plasma Glucose; Joinpoint regression analysis

Category: Public Nutrition & Health

What Is the Evidence for Dietary-Induced DHA Deficiency in Human Brains?

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Background

Docosahexaenoic acid (DHA) is a major constituent of neural and visual membranes and is required for optimal neural and visual function. DHA is derived from food or by endogenous synthesis from α-linolenic acid (ALA), an essential fatty acid. Low blood levels of DHA in some westernised populations have led to speculations that child development disorders and various neurological conditions are associated with sub-optimal neural DHA levels, a proposition which has been supported by the supplement industry.

Method

This review searched for evidence of deficiency of DHA in human populations, based on elevated levels of the biochemical marker of n-3 deficiency, docosapentaenoic acid (22:5n-6).

Results

Three scenarios/situations were identified for the insufficient supply of DHA, namely in the brain of new-born infants fed with high-linoleic acid (LA), low-ALA formulas, in cord blood of women at birth who were vegetarians and in the milk of women from North Sudan. Twenty post-mortem brain studies from the developed world from adults with various neurological disorders revealed no evidence of raised levels of 22:5n-6, even in the samples with reduced DHA levels compared with control subjects.

Conclusions

Human populations most likely at risk of n-3 deficiency are new-born and weanling infants, children and adolescents in areas of dryland agriculture, in famines, or are refugees, however, these populations have rarely been studied. This is an important topic for future research

Key words docosahexaenoic acid (DHA); human; brain; deficiency of DHA; alpha-linolenic acid (ALA); de-ficiency of ALA; docosapentaenoic acid (22:5n-6); vegetarian; vegan

Category: Public Nutrition & Health

Development and Validation of a Food Frequency Questionnaire for Chinese Immigrants Living in Italy: the CHINT Study

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Background and objectives

Immigrants often substitute their traditional healthy diet with foods typical of the host country, that may increase risk of cancer and other chronic diseases. No validated instruments are available to assess the diet of Chinese immigrants in Italy. As part of the CHINT study on risk factors for cancer in the Chinese community of Milan, Italy, we are developing a food frequency questionnaire (FFQ) specific for Chinese immigrants to Italy/Europe.

Methods

The FFQ development includes: (a) a list of foods/dishes eaten; (b) food preparation/cooking methods and condiment use; (c) method for assessing portion sizes; (d) method for estimating energy and nutrient content. For (a) and (b) the starting-point is the Taizhou-FFQ which will be modified based on an Italian validated FFQ (It-FFQ) and findings of a dietary survey on Chinese immigrants in Milan. For (c), each food item is associated with portion size photographs (from It-FFQ) or other portion size indicators. New photographs will be obtained and validated for items not present in It-FFQ. For (d) Italian and Chinese food composition tables will be harmonized and in-house software applied to estimate the energy and nutrient content of each food item. The FFQ will be validated by comparison with a three-day food diary compiled by Chinese volunteers.

Results

The prototype FFQ has 120 food items, 17 cooking/preparation methods, and 15 condiment regimens. Testing on volunteers aims to reduce the number of food items, cooking methods and condiment regimens. Compilation time (food frequency only) is ~35 minutes; we aim for an FFQ, assessing both frequencies and portion sizes, that is compiled in <30 minutes.

Conclusions

We are developing the first validated FFQ in Europe to assess diets in Chinese immigrants. The FFQ will be important for monitoring and assessing nutritional status and risky behaviours in this important population.

Key words Dietary assessment; Food frequency questionnaire; Chinese immigrants, Cancer prevention.

Category: Public Nutrition & Health

Sleep Quality and its associated factors among postmenopausal women in Malaysia

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Poor sleep quality among postmenopausal women is gaining its attention not only because of its widespread prevalence, but also attributed to its' associations with unfavorable physical, psychological and cognitive changes. While it is more recognised in other populations, studies on sleep quality among postmenopausal women are relatively scarce in Malaysia. This study aimed to identify related factors of poor sleep quality among postmenopausal women which can provide a normative framework for efficient intervention in the future. A total of 304 postmenopausal women were recruited, with pre-tested questionnaires were used to obtain information on socio-demographic, anthropometric parameters, lifestyle behaviours (dietary quality and acidity, drinking behaviour of alkaline water, physical activity), presence of depression, anxiety and stress. Presence of metabolic syndrome and its components were ascertained among the respondents while sleep quality and its components were assessed using Pittsburgh Sleep Quality Index questionnaire. Poor sleep quality was prevalent with close to two-third of the respondents were poor sleepers and less than 15% had sleep duration more than 6 hours per day. With more than 80% had sleep latency, sleep insufficient and experienced sleep disturbance, these were corresponding with 70% of the women experienced daytime dysfunction. A total of 50-70% of the respondents were depressed, anxiety and stressed. In the hirarchy logistic regression analysis, high percentage of body fat, elevation of low density lipoprotein, triglycerides and fasting plasma glucose were associated with poor sleep quality. Postmenopausal women who were depressed, anxiety and stressed were 1.85, 1.62 and 1.60 times more likely to be poor sleepers. On the other hand, postmenopausal women who consumed low acidity diet and alkaline water had better sleep quality and longer sleep duration. This study provides important insights on modifiable factors that should be considered in the formlation of appropriate intervention to address sleep problem among postmenopausal women.

Key words Sleep Quality, Sleep Duration, body fat percentage, lipid profile, diet acidity

Category: Public Nutrition & Health

The effects of cigarette smoking and alcohol drinking on salty taste preference, based on Korean Community Health Survey 2010–2017

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Background/OBJECTIVES: Excessive sodium intake, smoking, and alcohol consumption are risk factors for multiple diseases, and the combination of these risk factors may have stacking effect. The study was designed to examine whether smokers and drinkers were more likely to have higher salty preferences and enjoy foods with more salt.

Methods: This study analyzed data from two four-year Korean Community Health Survey cycles (2010–2013 and 2014–2017) based on more than 16 million Koreans. The respondents' preferences for salty foods (specifically, their salt intake levels, whether they add salt or soy sauce to foods served on the table, and whether they dip fried foods in salt or soy sauce) and the odds ratio (OR) of the preference were examined among smokers and drinkers when adjusted for gender, age, body mass index (BMI), educational level, household income, marital status, and cigarette smoking or alcohol consumption status.

Results: Cigarette smoking and alcohol consumption were correlated with salty food. The adjusted odds ratios (AORs) for smokers who reported "Very high" and "High" salt intake levels were 2.09 (95% CI: 1.90–2.30) and 1.41 (95% CI: 1.38–1.44) ($P < 0.001$), and the AOR for drinkers were2.50 (95% CI: 2.26–2.77) and 1.52 (95% CI: 1.48–1.55) ($P < 0.001$). Cigarette smokers and alcohol drinkers also prefer adding salt or soy sauce or dipping fried foods in soybean more than non-smokers and non-drinkers based on the adjusted model. In addition, people who smoke and consume alcohol reported a more significant stacking effect regarding salty taste preference.

Conclusion: This large population-based study found that both smoking and alcohol consumption were associated with salty taste preferences. This can lead to excessive sodium intake, triggering the development of multiple disease processes.

Key words cigarette smoking, alcohol drinking, sodium, food preferences

Category: Public Nutrition & Health

Composition of 24-hour movement behaviour and its association with adiposity in Malaysian school children

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Background and Objectives

A healthy balance of movement behaviours, namely physical activity (PA), sedentary behaviour (SB) and sleep, is important for health, growth, and body composition of children. However, the combined effect of these movement behaviours on body fatness in children, particularly in Asian populations, is not well understood. This study aims to investigate time-use composition of 24-hour movement behaviour of Malaysian school children and its association with different indicators of adiposity.

Methods and Study Design

A total of 383 children (57% girls) with an average age of 9.7 years (±1.6 years), who participated in the South East Asian Nutrition Surveys II (SEANUTS II) Malaysia were included in this study. The children were asked to wear a tri-axial accelerometer on their non-dominant wrist for seven consecutive days to record their light PA (LPA), moderate-to-vigorous PA (MVPA), SB, and sleep duration. Based on data obtained from weight, height, and bio-impedance analysis, several indicators of adiposity were calculated, including body mass index-for-age (zBMI), waist circumference (WC), waist-to-height ratio (WHtR), body fat percent (BF%), and fat-mass index (FMI).

Results

On average, children spent the most time being sedentary (45% of their daily time), followed by sleeping (33%), LPA (17%) and MVPA (5%). The composition of movement behaviours was significantly associated with zBMI, WC, WHtR, BF% and FMI ($p<0.001$) using compositional regression analyses. Relative to other movement behaviours, spending more time in MVPA was negatively associated with all indicators of adiposity, except for zBMI.

Conclusions

The overall composition of movement behaviour was significantly associated with adiposity among Malaysian school children. Encouraging more MVPA relative to other behaviours could be an effective strategy for promoting healthy weight and preventing obesity among children.

Key words movement behaviour, time use, physical activity, sedentary behaviour, sleep, obesity, children

Category: Public Nutrition & Health

Estimation of Iron Bioavailability at the Indonesian Girl's Diet

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Background and Objectives: Adolescent girls are prone to iron deficiency anemia caused by consuming foods with low bioavailability of iron. There is no a national information the estimation of iron bioavailability among the Indonesian's girls. So, this study was to estimate iron bioavailability in adolescent girls aged 10-18 years in Indonesia. Methods and study design: The study used secondary data from the Indonesian Food Consumption Survey (IFCS) with a national cross-sectional study design included 11,766 adolescent girls. A 24 hours food recall was collected and the iron bioavailability using Du et al reference. Results: Mean daily intake of iron in subject is 10±7 mg/day and intake of heme iron (4±6 mg/day) is lower than non-heme iron (6±4 mg/day). The bioavailability of iron is only 9,7±0,8%, so the amount of iron absorbed is 1±1,5 mg/day. None of the adolescent girls in this study had an iron bioavailability greater than 15%. Cereals and processed foods (45,7%), fish and seafood (16,6%), nuts and processed foods (11,0%), meat and processed foods (6,2%), and also vegetables and processed foods (6,0%) are the food groups that contribute the most to total iron intake. Conclusions: The iron bioavailability among adolescent girls was lower compared to the Indonesian's iron RDA.

Key words Adolescent girls, Food consumption, Iron bioavailability, Iron intake

Category: Public Nutrition & Health

Spatiotemporal variations in mean height of 17-year-old students in 47 Japanese prefectures from 1974 to 2019

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Background and objectives: Mean height is an important indicator of nutritional status of populations. Although mean height has been studied across countries and territories over time, less is known about the trends and variations across subnational units. The objective of this study was to examine mean height of adolescents across 47 prefectures in Japan since the 1970s.

Methods: We used published data on prefectural mean height of 17-year-old students in Japan from the cross-sectional School Health Surveys implemented annually in 1972–1976 and 1979–2021. We linearly interpolated missing values in a few years and smoothed data by unweighted centered five-year moving averages. We quantified inequalities in prefectural mean height using the range and the coefficient of variation. We applied the k-means algorithm to group prefectures by mean height between 1974 and 2019.

Results: The median (range) of prefectural mean height was 168.6 cm (3.8) for boys and 156.1 cm (3.9) for girls in 1974. It then increased before plateauing at 170.9 cm (2.9) for boys and 158.0 (2.3) cm for girls in the late 1990s. Mean height was consistently lower in southwest prefectures and higher in prefectures in the Greater Tokyo Area and from the south-central area to the north-western area facing Eurasia in the main island. Both the range and the coefficient of variation stayed constant after the late 1980s, following rapid increases of mean height in the prefectures that originally had the lowest means.

Conclusions: Mean adolescent height increased and disparities between prefectures decreased over time, but the progress has been slow in the past few decades. A comprehensive policy framework is necessary to address diverse factors affecting variations in the physical growth of adolescents at the subnational level.

Key words mean height; adolescents; School Health Survey; inequalities; spatiotemporal analysis

Category: Public Nutrition & Health

Social Determinant of Food Variety Scores (FVS) among Public University Students in Peninsular Malaysia

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Background and objectives: Healthy diet can be measured by the variety of food intake. However, the quality of food intake might be influenced by the expenditure on food. This study aims to identify the food variety scores (FVS) and determinants among public university students in Peninsular Malaysia.

Methods: Multistage random sampling was used to select respondents from public universities in Peninsular Malaysia. A total of 427 undergraduate students completed a self-administered questionnaire at four randomly selected public universities in Peninsular Malaysia. The questionnaire consisted of information concerning demographic and socioeconomic backgrounds, food security status, meal expenditure, and food frequency questionnaire (FFQ) among university students. Frequency, chi-square, and logistic regression were used to analyse the variables.

Results: Mean age of respondents was 21.6 years, and 60.9% of the respondents were food insecure. Both genders spent about RM 300.00 ± 110.00 monthly on food. The mean of FVS was 88.52 ± 48.22. Meal expenditure ($x^2 = 11.326$) was associated with low FVS. Respondents who allocated less than 67.98 USD (300.00 MYR) per month for food doubled the likelihood of having a low FVS (AOR= 2.326, 95% CI: 1.486-3.642).

Conclusions: A well-balanced diet includes a wide variety of foods. However, about two out of three students have lower FVS. It is possible to have a wide variety of food if the respondents have more money to spend on food. Further studies needed to determine the cost of a healthy diet among university students. Since a healthier diet help students perform better academically.

Key words meal expenditure; food variety scores; diet quality; food security; university students

Category: Public Nutrition & Health

Exploring Determinants of Successful Weight Losers in Use of a Smartphone Healthcare Application: Secondary Analysis of a Randomized Clinical Trial

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Interventions using smartphone healthcare applications have gain popularity recently and can be one of available and effective weight loss methods. However, it is currently unknown which factors of app usage and participants characteristics lead to successful weight loss. We analyzed baseline participants' characteristics and app usage over 3 months from 72 Japanese adults with overweight and obesity who were assigned to the intervention group of a previous weight loss trial. In the intervention groups, participants were asked to use an application that could provide nutritional advice by artificial intelligence (AI) for three months. A logistic regression analysis identified the following as the significant predictors of successful weight loss: participants who were male (OR 0.15; p = 0.017), walking faster (OR 4.88; p = 0.012), had a family medical history (OR 14.00; p=0.003), fewer dietary input in the first 2 weeks (OR 0.27; p=0.027) and more mood input in the first 2 weeks (OR 15.54; p=0.047). These results can help us to determine the characteristics of people who use smartphone application to successfully lose weight and we can apply these factors to our future healthcare app.

Key words smartphone application; nutrients advice; successful weight loss; predict factor

Category: Public Nutrition & Health

Changes in Fast Food Consumption among Peninsular Malaysian Primary Schoolchildren Over the Course of a Decade

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Background and objectives: Nutrition transition has accelerated children's adoption of unhealthy dietary patterns, including fast food consumption. Frequent consumption of fast food has been linked to higher risk of non-communicable diseases. This study aimed to investigate the changes in consumption of fast food at restaurants, by socioeconomic status over a decade.

Methods: A total of 1370 and 1425 children, representing 2.43 million and 2.31 million children aged 6-12 years from Peninsular Malaysia, participated in the South East Asian Nutrition Surveys, SEANUTS I (2009/2010) and SEANUTS II (2019/2020), respectively. Socioeconomic characteristics, including age, sex, residential region, living area, ethnicity, and household income, as well as fast food consumption pattern, were assessed through questionnaires. Changes in fast food consumption were determined by complex samples Pearson chi-square tests.

Results: Overall, only 7.5% of children consumed fast food at least once a week in 2010; however, the proportion tripled (22.6%, $p<0.001$) after a decade. Fast food consumption was doubled in East Coast, tripled in Central and Southern, and quadrupled in Northern. Consumption of fast food among children living in rural areas increased by five times (3.9% to 19.6%, $p<0.001$) and their urban counterparts consumption increased by 3 times (8.2% to 23.7%, $p<0.001$). Older children (10.00-12.99 years) quadrupled the consumption (6.8% to 29.3%, $p<0.001$), while it doubled among younger children (6.00-9.99 years) from 8.1% to 17.1% ($p<0.001$). Children from high-income group demonstrated a doubling in fast food consumption (12.1% to 22.5%, $p<0.05$), while those in middle-income group tripled (8.1% to 21.6%, $p<0.001$), and low-income group quadrupled (5.6% to 24.0%, $p<0.001$).

Conclusions: Increment in fast food consumption occurred across all socioeconomic groups over the past decade. Further investigation is needed to understand the motivation behind fast food consumption, which can in turn contribute to effective intervention development and policy planning.

Key words Children, Fast Food Consumption, Malaysia, Socioeconomic Status

Category: Public Nutrition & Health

Food and Nutritional Preferences among Tourist: A case study in Bali, Indonesia

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Background: Bali is one of the popular tourist destinations in Indonesia with all its potential. The receding pandemic provides the potential for the creation of a new tourism trend, especially in food and nutritional tourism. Indonesia, with its abundant tourist destinations, needs to look at this potential by creating unique and healthy attractions for tourists. This study aims to define tourist food and nutritional preferences in Bali, Indonesia.

Methods: This was employed a cross-sectional design with a total sample of 274. The participants were tourists visiting Bali and were recruited from various tourist centers, such as Kuta and Sanur beaches. Dietary preferences were collected through a modified and validated questionnaire, while nutritional preferences were collected using a food frequency questionnaire (FFQ)

Result: The study found that more females were domestic tourists, while more males were international tourists. Family-oriented tourism was more common among international tourists, while domestic tourists preferred to travel with friends. Both local and international tourists were not commonly vegan, vegetarian, or pescatarian. International tourists had allergies to eggs and nuts, while local tourists had allergies to fish. International tourists had a more diverse daily intake of energy sources, plant and animal proteins, vegetables, and fruits than domestic tourists. Tourists preferred snack and fruit-based foods over meat and fish during their travels.

Conclusion: It can be concluded that tourist food and nutritional preferences can be developed into a new type of tourism supported by nutritious food with significant potential. The potential of fruits in Indonesia to be processed into healthy snacks as tourist provisions is highly feasible.

Key words Food preferences, nutritional preferences, tourist

Category: Public Nutrition & Health

Factors Associated with Developmental Delay among Urban Poor Children in Malaysia

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Background and objectives: Developmental delays among young children have significant implications on their future health, academic performance, and socio-economic outcomes, particularly children from urban poor households. This cross-sectional study aimed to determine the associations between socio-demographic, nutritional, parental, and environmental factors with developmental delay among urban poor children aged 2 to 5 years old.

Methods: 480 children (girls=56.9%, mean age=3.32 years) recruited from public low-cost flats in Kuala Lumpur, Malaysia using multistage sampling method. Mothers completed a self-administered questionnaire regarding sociodemographic background, parenting style, mother's depressive symptoms, breastfeeding practices, food insecurity and home environment. Children's developmental delay was measured using the Ages and Stages Questionnaire Third Edition (ASQ-3). Anthropometric measurements of both mothers and children were measured.

Results: This study found that 61.2% of the children had developmental delay, with girls (64.1%) reporting higher rates of developmental delay than boys (57.5%). Binary logistic regression results showed that being a girl (AOR=1.557, 95% CI=1.045 – 2.320, p=0.030), overweight/obesity (AOR=2.327, 95% CI=1.025 – 5.280, p=0.043), not working mothers (AOR=1.784, 95% CI=1.205 – 2.641, p=0.004), larger household size (AOR=1.552, 95% CI=1.091 – 2.433, p=0.048), mothers with depressive symptoms (AOR=1.574, 95% CI=1.047 – 2.365, p=0.029), and food insecurity (AOR=1.986, 95% CI=1.331 – 2.962, p=0.001) increased the likelihood of developmental delay in children. However, higher scores in the physical environment (AOR=0.832, 95% CI=0.716 – 0.966, p=0.016) and variety in experience domains (AOR=0.846, 95% CI=0.722 – 0.992, p=0.039) of the Early Childhood Home Observation for Measurements of Environment (HOME) Inventory were associated with a lower likelihood of developmental delay.

Conclusion: This study highlights the need for early identification and monitoring of developmental status of urban poor children. Interventions targeting the children who are overweight and obese, mothers' depressive symptoms, food insecure households, and providing developmentally appropriate stimulating activities may improve child developmental status and reduce inequality.

Key words urban poor children; developmental delay; young children; food insecurity; home environment

Category: Public Nutrition & Health

Optimizing Food-Based Dietary Recommendations for Urban Poor Undernourished Children in Malaysia Using Linear Programming Approach

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Background and objectives: Poor diet quality may contribute to undernutrition, especially among young children from low-income households during the COVID-19 pandemic. To address this issue, affordable and healthy local food-based dietary recommendations (FBR) are needed. This cross-sectional study aimed to develop affordable and realistic FBR to improve dietary adequacy of urban poor undernourished children aged 24 to 47 months old from low-income households in Seremban district, Malaysia. **Methods:** Weekly food consumption of 85 undernourished children were obtained using a non-consecutive 3-day 24-hour dietary recall. FBR were developed by linear programming (LP) approach using WHO Optifood software. **Results:** Inadequate intakes of niacin, vitamin B6, folate, vitamin B12, calcium, and zinc were found. Folate was identified as the absolute problem nutrient, while vitamins B6, B12, C, iron, and zinc were challenging to achieve even when the diet was optimized. Full cream milk, chocolate malted milk, cornflakes, chicken egg, and orange were the top five locally available nutrient-dense foods that would fill these nutrient gaps. The developed FBR were 3 servings/day of grains (of which 1 serving/day of cornflakes), 1 serving/day of fruits (of which 3 servings/week of vitamin C-rich fruits and 3 servings/week of papaya), 2 servings/day of dark green leafy vegetables, 2 servings/day of meat, fish and eggs (of which 1 serving/day of eggs), 1 serving/day of legumes, nuts and seeds, and 1 serving/day of dairy products. **Conclusion:** These findings suggest that a healthy, balanced and affordable FBR should be implemented to improve nutrient adequacy at a minimum cost of the undernourished children in low-income households.

Key words linear programming, local food-based dietary recommendations, Optifood, key problem nutrient, undernourished children

Category: Public Nutrition & Health

Linear Regression Analysis of Dietary Nutrients and Obesity Using NHANES Data

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Background and objectives: Obesity has turned into a worldwide epidemic often associated with unhealthy food intake and lifestyle. Obesity and overweight lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. Waist circumference (WC) has been widely used to assess the abdominal obesity. The purpose of this study was to assess the associations of individual nutrients with WC as well as the metabolic syndrome (MS) in the 1999 - 2014 National Health and Nutrition Examination Surveys (NHANES).

Methods: Data of 12,284 participants aged 18 and above were extracted from NHANES. MC is defined according to NCEP ATPIII (National Cholesterol Education Program Adult Treatment panel III) criteria. Linear regression analyses stratified by gender were performed on a nutrient-by-nutrient basis. Each nutrient was first adjusted for total caloric intake by the residual method, followed by the regression adjusted for age, race, education, poverty to income ratio, and physical activity. P values were Benjamini-Hochberg corrected for false discovery rate to maintain an alpha level of 0.05 for analyses.

Results: After adjusting the confounders, there were some gender differences of the association between nutrients and waist circumference and metabolic syndrome. For the metabolic syndrome, females negatively demonstrated associations with fiber, magnesium, vitamin E, B2, B6 (p=1.76E-04 to 3.74E-04), while males showed the associations with the total and food folate (p=2.64E-04 and p=5.88E-04). For waist circumference, both males and females showed negative association with fiber (p=2.88E-04 and p=6.67E-06), and positive association with sodium and PFA20:4 (p=1.12E-05 to 1.58E-09). Males also demonstrated positive association with other fat including total fat, saturated fat, monounsaturated fat and cholesterol as well as protein (p=2.40E-05 to 3.24E-07), and negative association with vitamin A, E, C and K, as well as carbohydrate (p=7.17E-04 to 3.93E-09).

Conclusions: Nutrients are associated with WC and MS in a gender-differentiated manner.

Key words obesity, nutrients, linear regression, waist circumference, metabolic syndrome

Category: Public Nutrition & Health

Prevalence of anemia and iron deficiency anemia in various hemoglobin type patterns among Thai children aged 4-12 years

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Background and objectives: Globally, hemoglobin (Hb) disorders are common hereditary hemolytic anemias. While anemia and iron deficiency anemia prevalence have been reported in other Thai age groups, this study provides the prevalence rates of anemia and iron deficiency anemia (IDA) of various hemoglobin patterns among Thai children aged 4 to 12 y.

Methods: Blood samples were collected from 635 children who participated in the South East Asian Nutrition Survey II (SEANUTS II) Thailand. Complete blood count and serum ferritin, soluble transferrin receptor (sTfR), C-reactive protein, ∝-1-acid glycoprotein were analyzed. Hemoglobin typing was performed by electrophoresis.

Results: Participants were classified into eight groups by Hb pattern, mean corpuscular volume, mean corpuscular hemoglobin (Hb), and red cell morphology. Sixty percent of children had Hb disorders, the most common being ∝-thalassemia 1 trait (20.0%) and Hb E trait (19.2%). Only 2.5% and 2.0% had β-thalassemia trait or Hb E homozygous, respectively. Anemia prevalence was highest in the Hb E homozygous group (69.2%), followed by the β-thalassemia trait (37.5%), ∝- thalassemia 1 trait (11.8%), and Hb E trait (8.2%) groups, and lowest in the normal Hb type group (1.6%). IDA prevalence determined by ferritin and/or soluble transferrin receptor was significantly higher in the Hb E homozygous (53.8%), β-thalassemia trait (20.0%), and ∝-thalassemia 1 trait (5.6%) groups compared to the normal Hb type group (0.4%) ($P<0.05$).

Conclusions: Although homozygous Hb E and β-thalassemia trait are relatively uncommon, they require attention because of the high prevalence of IDA. IDA is not a significant problem in the general population, including normal Hb type, ∝-thalassemia 1 trait, and Hb E trait. These findings provide valuable insights into anemia and IDA prevalence in different Hb types among Thai children, which can provide valuable guidance for effective treatment.

Key words iron deficiency anemia, ferritin, hemoglobin, soluble transferrin receptor, thalassemia

Category: Public Nutrition & Health

Body Image Perception and Nutritional Status in 10-12-year-old Thai Children - South East Asian Nutrition Survey II (SEANUTS II) Thailand

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Background and objectives: Body image reflects a person's perceptions and feelings about their physical appearance as well as their nutritional status, which can affect children's health as adults. This study investigated the prevalence of body image dissatisfaction and its association with nutritional status among 10-12-year-old Thai children.

Methods: This study encompassed 540 children (278 boys and 262 girls) who participated in SEANUTS II Thailand. Body image perception was assessed using seven boys or girls figure silhouettes ranging in size from very thin to obese. Children selected the silhouette they believed was most similar to their own and the silhouette they most desired. Discrepancy between the actual figure and the ideal figure represented body image dissatisfaction. Height and weight were measured and nutritional status was determined using WHO BMI-for-age growth references. The association between body image dissatisfaction and nutritional status was assessed using the Chi-squared test.

Results: The prevalence of body image dissatisfaction was 77.4%. A high percentage of body image dissatisfaction was found among 59.2% of girls and 51.8% of boys who wanted a thinner body figure than their own, while 22.1% of girls and 21.9% of boys wanted a larger body figure. BMI status was significantly associated with body image dissatisfaction ($P < .001$). Overweight/obese children (>90%) had greater body image dissatisfaction than children of normal weight (69.2%). Body dissatisfaction and desire for a thinner body were more frequent among boys and girls with a higher BMI.

Conclusions: The proportion of children with body image dissatisfaction was high, especially among girls, and associated with sex and nutritional status. Overweight/obese children had a higher proportion of body image dissatisfaction. Programs to promote a healthy weight and healthy eating habits should be implemented among children to prevent eating disorders and other health-related concerns.

Key words Body image, Body image dissatisfaction, Nutritional status, Body mass index

Category: Public Nutrition & Health

Infant and Young Child Feeding Practices in Thai Children Aged 6-23 Months - SEANUTS II Thailand

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Background and objectives: Infant and young child feeding (IYCF) practices are important for the growth and nutritional status of children under 2 years old. This study aimed to determine percent compliance regarding IYCF practice indicators among children aged 6 to 23 months, as well as to compare percent compliance among children aged 6-8 months, 9-11 months, and 12-23 months.

Methods: The study comprised 738 Thai children (370 boys and 368 girls) aged 6 to 23 months who participated in the South East Asian Nutrition Survey II (SEANUTS II) Thailand. Compliance with key IYCF practice indicators (i.e., ever breastfed, minimum acceptable diet, and other indicators) were computed according to WHO-UNICEF (2021) definitions. Kruskal Wallis test and Pearson Chi-Squared test were used to test statistical differences among age groups.

Results: Overall, children aged 6-23 months had a low prevalence of stunting, wasting, underweight, overweight, and obesity, while 95% of children were ever breastfed (EvBF). As for complementary feeding, compliances with minimum dietary diversity (MDD), minimum acceptable diet (MAD), and egg and/or flesh food consumption (EFF) were higher in children aged 9-11 months and 12-23 months compared to among children aged 6-8 months (66.9% and 72.1% vs. 35.3%, $P < 0.001$; 61.3% and 67.1% vs. 33.6%, $P < 0.001$; 90.6% and 95.9% vs. 59.7%, $P < 0.001$, respectively). Additionally, the percentage of vegetable or fruit consumption among children aged 9-11 months and 12-23 months was higher than among children aged 6-8 months (84.5% and 84.9% vs. 66.4%, $P < 0.001$).

Conclusions: The prevalence of EvBF was high in children, while the prevalence of MDD, MAD, EFF and vegetable or fruit consumption were higher among older children. IYCF indicators can be used as background information for improving children's diets to optimize their growth and development.

Key words Infant and young child feeding, IYCF practices, breastfed, breastfeeding, SEANUTS

Category: Public Nutrition & Health

Correlates of metabolic syndrome in middle-aged and older Chinese adults in Malaysia

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Background and objectives: Metabolic syndrome (MetS), is defined as a cluster of metabolic disorders, covering central obesity, hypertension, dyslipidemia and disturbed glucose metabolism, and it has significantly increased risk of chronic diseases and healthcare burden worldwide, including in Malaysia. Thus, the main objective of the study was examining the non-modifiable and modifiable dietary and lifestyle factors on the MetS risk among 230 community-based middle-aged Chinese adults and elderly Kelantan, Malaysia.

Methods: Numerous measurement procedures such as socio-economic and health status, anthropometry and body composition assessments by DXA device, dietary intake pattern, and lifestyle behavioral practices, blood biochemical markers were conducted. The classification of MetS risk was determined based on the new revised international joint consensus criteria.

Results: The prevalence of MetS was 19.6%, with males had higher MetS prevalence than females. Multivariate logistic regression analyses showed that age, gender, BMI and daily moderate-to-vigorous physical activity (MVPA) levels were significant independent determinants on the MetS risk, after full adjustments for all potential known biological, dietary and lifestyle confounding factors. MetS risk was increased with increase age of ⩾60 years (Adjusted OR: 2.27) males (Adjusted OR: 2.18), higher BMI levels (Adjusted OR: 4.02) and daily MVPA factor (Adjusted OR: 0.39). Higher BMI and MVPA were emerged as significant independent modifiable lifestyle factors, whereby participants with overweight and obese, and lower daily MVPA levels of <1hour had increased MetS risk than those with lower normal BMI and higher MVPA levels.

Conclusions: Modifiable BMI and lifestyle practices such as high daily active physical activity levels decrease the risk of MetS. Thus, effective dietary and lifestyle intervention strategies should emphasize to reduce the risk of metabolic syndrome disorder with aging in order to prevent the risk of cardiometabolic disease risks.

Key words Metabolic syndrome (MetS), dietary, lifestyle, cardiometabolic health, older adults

Category: Public Nutrition & Health

Combined exposure to multiple essential metals and cadmium at early pregnancy on GDM: a prospective cohort study

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Background and Objectives: The association between prenatal exposure to essential metals and gestational diabetes mellitus (GDM) is poorly understood. This study aims to examine the associations between serum calcium (Ca), iron (Fe), zinc (Zn), copper (Cu), magnesium (Mg) and cadmium (Cd) concentrations in early pregnancy and GDM risk in Chinese pregnant women.

Methods and Study Design: A total of 1168 pregnant women were included in this prospective cohort study. The concentrations of serum metals were measured using polarography method before 14 gestational weeks and an oral glucose tolerance test was conducted at 24–28 gestational weeks. Binary logistic regression analysis and restricted cubic spline were applied to evaluate the association between serum individual metal and GDM. Bayesian kernel machine regression (BKMR) and weighted quantile sum (WQS) regression were used to assess the associations between mixed metals exposure and GDM risk.

Results: The mean concentrations of Zn (124.65 vs. 120.12 μmol/L), Fe (135.26 vs 132.21 μmol/L) and Cu (23.33 vs. 23.03 μmol/L) in the GDM group were significantly higher than those in the control group. Single-element modeling results suggested second and fourth-quartile maternal Zn and Fe concentration, third and fourth-quartile Cu concentration and fourth-quartile Ca concentration were associated with an increased risk of GDM, compared to first-quartile values. Restricted cubic spline analysis showed U-shaped and non-linear relationships between Cd and GDM. According to the BKMR models and WQS analyses, a six metals mixture was significantly and positively associated with the risk of GDM, but the individual effects were all attenuated. Additionally, Cd, Zn and Cu contributed the most strongly to the association.

Conclusions: Serum Zn, Cu, Fe and Ca exposure during early pregnancy showed a positive association with GDM in the individual evaluation. The multiple-evaluation showed high levels of metals mixture, particularly Cd, Zn and Cu, may promote the development of GDM.

Key words Metals; Gestational diabetes mellitus; Mixed exposure; Zinc; Copper; Cadmium

Category: Public Nutrition & Health

The association between anthropometric status and child eating behaviour among preschool children aged 2-4 years in some rural areas in Umuahia South Local Government Area of Abia State, Nigeria.

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Introduction and objective: Eating behaviour at the childhood level plays a pivotal role in the overall health, and eating rate could also contribute to the outcome of the nutritional status of an individual. The study was focused on the association between anthropometric status and child eating behaviour.

Methodology: Purposive sampling method was used to identify 290 households with preschool children, however, 256 of the households consented to participate in the study and their children aged 2-4years were recruited across the study areas using purposive sampling method. The caregivers were interviewed on the eating behviour of their children using a semi-structured child eating behaviour module, and anthropometric measurement of the children were taken. WHO Anthro-software for child growth standard was used to categorize anthropometric status of the preschool children, while correlation was performed to determine association between variables under study, and $P < 0.05$ was significant.

Results: Mean comparison of child eating behaviour by gender showed significant difference ($P < 0.05$) between male and female children in their eating behaviour with respect to enjoyment of food and satiety responsiveness. Some (26.6%, 20.7% and 16.4%, respectively) of children were wasted, stunted and underweight. A significant association ($P < 0.05$) was observed between body mass index-for-age and food fussiness behaviour of the children. There was also a significant difference ($P < 0.05$) between weight-for-age and food fussiness behaviour of the children.

Conclusion: The study showed that child eating behaviour may have contributed to the anthropometric status of the children, however, differences in their eating behviours by gender was observed.

Key words Child Eating Behavior, Preschool Children, Anthropometric Status

Category: Public Nutrition & Health

Demand for nutritious lunch and its influencing factors for medical personnel in a hospital in Deyang, China: a cross-sectional study

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Background:

A great number of research works have showed that the unhealthy dietary behavior of medical personnel is very prominent. There is an urgent need to provide healthy food for medical personnel to promote their health. This study aimed to investigate the demand of medical personnel in a hospital in Deyang, China for nutritious lunch and its influencing factors, and to provide reference for the introduction of nutritious lunch.

Methods: Cross-sectional survey of medical personnel in a hospital in Deyang, China using an anonymous online questionnaire via special survey website. The questionnaire consisted of demographic characteristics questions, specific questions on health related factors and questions about nutritious lunch requirements. Multivariate logistic regression model was constructed to determine the influencing factors of demand for nutritious lunch.

Results: A total of 458 medical personnel (58 males and 400 females) aged 20–56 years (mean ± SD: 30.84 ± 6.92years) were included. Of the medical personnel, 14.1% were overweight or obesity (BMI≥24kg/m2). A total of 336 (73.4%) medical personnel indicated they would choose a nutritious lunch if it was offered. And overweight or obesity medical personnel preferred to choose high-fiber and low-fat nutritious lunch (P=0.000), were willing to pay more for a nutritious lunch (P=0.004) and were more likely to refer to the nutrition label (P=0.003). The multivariate logistic regression analysis showed that department, number of meals per day, lunch place and exercise frequency were significantly associated with the demand for nutritious lunch among medical personnel.

Conclusion: In China, the medical personnel are facing a great deal of overtime work and generally showing unhealthy dietary behaviors. In our study, medical personnel showed strong demand for nutritious lunch. Therefore, there is an urgent need to provide nutritious lunch for medical personnel to promote their health.

Key words Medical personnel; Unhealthy dietary behavior; Nutritious lunch

Category: Public Nutrition & Health

坚果摄入与认知能力变化之间的关联在认知衰退风险人群中的研究

Nut consumption and changes in cognitive performance in a population at risk of cognitive decline

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6. more

Background and objectives: Tree nuts and peanuts (henceforth, nuts) are nutrient-dense foods rich in neuroprotective components, thus their consumption could benefit cognitive health. However, evidence to date is limited and inconsistent regarding the potential benefits of nuts for cognitive function. Therefore, the aim of this study was to prospectively evaluate the association between nut consumption and 2-year changes in cognitive performance in older adults at cognitive decline risk.

Methods: 6,630 participants aged 55-75 years (mean age 65.0±4.9 years, 48.4% women) with overweight/obesity and metabolic syndrome, completed a validated semi-quantitative food frequency questionnaire and a comprehensive battery of neuropsychological tests at baseline and after a 2-year follow-up. Composite cognitive scores were used to assess global, general, attention, and executive function domains. Nut consumption was categorized as <1, ≥1 to <3, ≥3 to <7, and ≥7 servings/week (1 serving=30 g). Multivariable-adjusted linear regression models were fitted to assess associations between baseline nut consumption and 2-year cognitive changes.

Results: Nut consumption was positively associated with 2-year changes in general cognitive function (p-trend <0.001). Compared to participants consuming <1 serving/week of nuts, those categorized as consuming ≥3 to <7 and ≥7 servings/week showed more favorable changes in general cognitive performance (β z-score [95% CI]= 0.06 [0.00,0.12] and 0.13 [0.06,0.20], respectively). No significant changes were observed in the multivariable-adjusted models for other cognitive domains assessed.

Conclusion: Frequent nut consumption was associated with smaller decline in cognitive performance over a 2-year period in older adults at risk of cognitive decline. Further prospective cohort studies and randomized clinical trials to verify our findings are warranted.

Key words cognition, cognitive decline, nuts, older people, unsaturated fatty acids

Category: Public Nutrition & Health

Study on lactose intolerance in Mongolia

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Background: The population of Mongolia has a high genetic predisposition for lactose intolerance. However due to relatively high consumption of milk and dairy products, especially fermented dairy products, the symptoms were not that severe. In recent years, the decrease in the consumption of dairy products by Mongolian citizens was more evident in the urban population, especially in school-aged children.

Methods: In this study, a total of 421 school children under the age of 18 and 253 people over the age of 18 voluntarily participated. The participants filled out a questionnaire to evaluate their symptoms, their background, and their eating habits in terms of milk and dairy products.

Results: About 55% of the children who participated in the study did not show symptoms of lactose intolerance, while the remaining 45% already had them. On the other hand, about 95% of adults surveyed have already developed symptoms of lactose intolerance. When looking at the relationship between milk and dairy products and age, elementary school children's daily consumption was the highest, while senior students said that they consumed it several times a week. This kind of repetition was also the case for adults, who showed that with age, the regular consumption became less stable, and the cause of symptoms reduced their use.

Conclusion: It was determined that all participants of the study lacked knowledge about lactose, and the frequency of consumption of milk and dairy products was low, and so the effects of unpleasant symptoms on the body were directly related to this. The affected persons tend to reduce their dairy and thus calcium intake. It is concluded that in the future, these factors should be taken into careful consideration when conducting a similar study of lactose intolerance representing the population of Mongolia.

Key words Lactose intolerance, Nutrition, Survey, Healthy habits, Mongolia

Category: Public Nutrition & Health

Serum 25-hydroxy Vitamin D in Thai Children and Its Relation to Ultraviolet Exposure, Vitamin D Intake, and Body Mass Index

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Background and objectives: Adequate vitamin D levels in blood improve bone health and may reduce cardiovascular disease, hypertension, type I diabetes, cancer, and infections. Few studies, however, have reported the impact of ultraviolet (UV) exposure on serum 25-hydroxyvitamin D [25(OH)D] production in children. Consequently, this study assessed serum 25(OH)D in Thai primary school children and its relation to UV exposure, dietary vitamin D intake, and body mass index.

Methods: This cross-sectional study was based on results from the South East Asian Nutrition Survey II (SEANUTS II) Thailand. Data were collected from 401 children aged 6-12 y from January to December 2020. Serum 25(OH)D levels were assessed by Liquid Chromatography with tandem mass spectrometry. UV exposure was determined by polysulphone film badges and dietary vitamin D intakes by 24-hour dietary recall. Body mass index was also assessed for all children.

Results: The children had a median (P25, P75) serum 25(OH)D of 76.9 (63.2, 93.1) nmol/L; UV exposure of 0.7 (0.5, 0.9) SED/day; dietary vitamin D intake of 3.6 (2.0, 5.6) μg/day; and a body mass index for age Z-score of -0.0 (-1.0, 1.3). Most children (94.5 %) had sufficient vitamin D levels (≥ 50 nmol/L). After controlling for covariates in multiple linear regression analysis, the results showed that low serum 25(OH)D levels were associated with females, older children, and low UV exposure.

Conclusions: Consistent sun exposure and regular consumption of vitamin D-rich foods should be promoted among young children to maintain healthy vitamin D levels in the blood.

Key words vitamin D, 25(OH)D, ultraviolet exposure, children, SEANUTS II

Category: Public Nutrition & Health

基于机器学习的高中生隐性饥饿风险预测模型
Prediction of Hidden Hunger in High School Students Based on Machine Learning

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Background and Objectives: Hidden hunger is the presence of multiple micronutrient deficiencies associated with various diseases, such as diabetes, cardiovascular disease, and cancer. According to statistics, more than two billion people worldwide suffer from hidden hunger, yet there is still a lack of effective prediction methods. Machine learning is a scientific discipline that focuses on how computers learn from data, which has been widely used in the medical field and has achieved satisfactory results. In this study, we aimed to build an accurate model for predicting the risk of hidden hunger among high school students using machine learning algorithms based on the subjects' demographic characteristics, nutritional awareness levels, and lifestyle habits.

Methods and Study Design: We used a multistage stratified whole-group random sampling method to select 9,038 high school students in 11 cities of Anhui Province, China, for a questionnaire survey and assessed their risk level by the Hidden Hunger Assessment Scale. Then, we used Random Forest, Support Vector Machine, XGBoost, Deep Learning, and Decision Tree algorithms to build the risk prediction models. Furthermore, we validated the models' reliability using 587 samples from Bengbu city. In addition, we presented the top ten important factors affecting hidden hunger among high school students based on the obtained prediction model.

Results: Random forests had the most powerful predictive capability among the five algorithms, with AUC = 0.758, sensitivity = 0.743, and specificity = 0.613 in the real external validation set. We found that the frequency of eating fruits, paying attention to nutritional balance in daily life, satisfaction level of the daily diet, level of nutrition awareness, mother's literacy level, frequency of eating coarse grains, place of origin, and father's literacy level were the ten most important factors.

Conclusions: We developed an accurate and effective model for predicting the risk of hidden hunger among high school students.

Key words Hidden Hunger; Machine Learning; Micronutrients.

Category: Public Nutrition & Health

玛琅女模特的肥胖饮食和瘦身对身体的不满
Fat Diets and The Skinny on Body Dissatisfaction of Female Models in Malang

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Female models often feel unsatisfied with their body shape because of social pressure that requires assumption is a thin body shape and low body weight. Most of female models go on a diet in their daily life because they still feels dissatisfied with their body. The research intended to analyses fad diets, nutritional status, and body dissatisfaction of female models in Malang. The research design was cross-sectional in 52 female models aged 18－25 years who were selected by simple random sampling. The data of fad diets used in the questionnaire, nutritional status data using BMI method and body dissatisfaction using questionnaire BSQ. Data analysis used the chi-square test. The participants of this research showed the fad diets (70%), had a skinny at high level (27%), skinny at mild level (48%), and normal (25%) of nutritional status, and experienced of body dissatisfaction (77%). There was a significant (p=0.028) correlation between fad diets and body dissatisfaction (r = 0.279), and also there was a significant correlation (p=0.05) between the skinny level and body dissatisfaction (r = 0.25). This research finding that the female models who exposed by fad diets and skinny level caused by the body dissatisfaction of body distortion among female models. Female models are has the potential to do fad diets due to body dissatisfaction, even with a skinny level condition among standard size models.

Key words Fad diets, Skinny level, Body dissatisfaction, Female models

Category: Public Nutrition & Health

中国农村人群水果蔬菜的摄入量与2型糖尿病风险的剂量-反应关系研究

The dose-response relationship of fruit and vegetable intake and risk of type 2 diabetes: The Henan Rural Cohort Study

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Background and Objectives: Fruit and vegetable have been demonstrated to be of benefit in reducing the risk of various chronic disorders including obesity, stroke, and cardiovascular disease. However, findings regarding the relationship between fruit, vegetable and type 2 diabetes are contradictory. This study was designed to examine the association between fruit and vegetable intake and the risk of type 2 diabetes and to further evaluate the dose-response relationship.

Methods and Study Design: A total of 38798 adults were recruited from the Henan Rural Cohort Study. Fruit and vegetable intake was assessed by a validated food-frequency questionnaire. Logistic regression and restricted cubic splines analysis were conducted to calculate the odds ratio for type 2 diabetes relative to fruit and vegetable intake in multivariate models and investigate the dose-response relationship.

Results: Higher intake of fruit or combined fruit and vegetable was in connection with a lower risk of type 2 diabetes, after adjusting for multiple confounders. After analyzing the dose-response relationship, we found that the odds of type 2 diabetes decreased significantly with fruit consumption between 250 and 540g/day or both fruit and vegetable intake between 600 and 1500 g/day. Fruit individually and combined fruit and vegetable intake were negatively associated with type 2 diabetes risk in all subgroups. And that the negative correlation between fruit consumption and type 2 diabetes was more pronounced in non-current smokers and non-current drinkers.

Conclusions: High intake of fruit alone or combined fruit and vegetable is related to a reduced risk of type 2 diabetes. Individuals who consume 250-540g/day of fruit or 600-1500g of both fruit and vegetable appear to benefit most in reducing their risk of diabetes.

Key words Fruit, vegetable, dose-response, type 2 diabetes, Chinese

Category: Public Nutrition & Health

晚期早产儿的蛋白质需求模型分析

Modeling Protein Requirements for Late Preterm Infants

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Background Late preterm infants (LPT) are those born at $34^{0/7}$-$36^{6/7}$ weeks of gestation. Dietary protein intake of LPT cannot simply follow other newborns. However, dietary protein requirements remains unclear for LPT. **Objectives** This review aimed to model dietary protein requirements for LPT. **Methods** This review searched PubMed, Cochran, CNKI, Wanfang database to collect data on protein requirements for preterm and low birth weight infants and adopted INTERGROWTH-21st to obtain the appropriate birth weight for preterm infants at $34^{0/7}$ - $36^{6/7}$ weeks of gestation. And the protein requirements for LPT is set to based on appropriate growth velocity based on Intergrowth-21st. Only AGA subjects were included in the study. **Results** The estimates of dietary protein requirements for LPT suggested that the protein requirements for AGA at 34, 35 and 36 weeks of gestation to achieve optimal body weight at term were respectively 3.2-3.5g/kg/d, 2.9-3.1g/kg/d and 2.6-2.9g/kg/d,which had no significant difference between boys and girls. With advancing of gestational age and birth weight increasing, the dietary protein requirements for LPT showed a decreasing trend. **Conclusions** The estimated protein requirements for LPT are 2.6-3.5g/kg/d ,which may provide a basis for estimation of the better feeding patterns and amounts for obtaining appropriate proteins. However, the results of this review are modelled, so further studies are needed to test the suggested value.

Key words Late preterm infants; Dietary protein; Gestational age; Intrauterine growth rate; Weight gain

Category: Public Nutrition & Health

西方化饮食模式及脂质谱与正常体重型腹型肥胖的关联

The associations of a westernized dietary pattern, lipidomic profiles, and normal weight central obesity

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Background and Objectives: Etiological factors and biological mechanisms of abdominal adiposity accumulation are still not clear. We aim to evaluate the associations of dietary patterns with normal weight central obesity (NWCO), and explore “dietary pattern-lipids-NWCO” correlation patterns.

Methods and Study Design: The present study was a sub-study based on the baseline data and blood samples from the Regional Ethnic Cohort Study in Northwest China (RECS). NWCO was defined as normal body mass index (18.5-25 kg/m^2) but central obesity (waist circumference ≥90 cm for men or ≥80 cm for women). Dietary intake frequency of 28 major food items for individuals with NWCO (n=150), or propensity score-matched normal weight controls (n=150) were collected by food frequency questionnaire. A total of 1246 serum lipids were quantified by high-coverage-targeted lipidomics. Dietary patterns were derived by factor analysis. Conditional logistic regression was used to assess the associations of dietary patterns and lipidomic profiles with NWCO, and linear regression was used to evaluated the associations between related dietary patterns and lipidomic profiles. Pearson’s correlation test was used to explore correlation patterns between β estimates of “dietary patterns-lipids” and ORs of lipids-NWCO associations.

Results: Three dietary patterns were identified, and a westernized dietary pattern (characterized as high intakes of sugar-sweetened-beverages and meat but low intakes of fresh vegetables, fruits, and nuts) showed robust positive association with NWCO. A positive correlation pattern of “westernized dietary pattern-lipidomic profiles-NWCO” was observed (r =0.528, P <0.001). In the perspective of lipid classes, the correlations for glycerolipids (r =0.539, P <0.001) and sphingolipids (r =0.505, P <0.001) were stronger than others.

Conclusions: The “dietary pattern-lipidomic profiles-NWCO” correlation may shed some fresh insights into the role of circulating lipids, especially for glycerolipids and sphingolipids, in the association between dietary pattern and NWCO risk.

Key words normal weight central obesity, dietary pattern, lipidomics, obesity phenotypes

Category: Public Nutrition & Health

老年人中医体质和握力的相关性研究

Study on the correlation between TCM constitution identification and grip strength measurement in the elderly

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Abstract **Objective** To explore the correlation between traditional Chinese medicine constitution and grip strength in the elderly. **Methods** The traditional Chinese medicine physical constitution identification data and the grip strength data of elderly people participating in community physical examination were collected from 2018 to 2019. The correlation between the results of physical identification and the results of grip strength measurement was analyzed. **Results** A total of 546 elderly patients were included, including 213 males and 333 females, and basic information such as age, height, weight and disease status were collected. The left hand grip strength and right hand grip strength of the elderly (65-89 years old) and the longevity period (≥90 years old) were different, and the difference was statistically significant (P<0.001); The left hand grip strength of the elderly with Yang deficiency was lower than that of other deficiency, and the difference was statistically significant (P all<0.001); The grip strength of Peaceful quality was higher than that of other constitutions, and the difference was statistically significant (compared with phlegm-dampness quality, Yin deficiency quality, Yang deficiency quality, blood stasis quality and Qi-deficiency quality, P<0.001; Comparison of peaceful quality and characteristic quality, P<0.05; Comparison of hygrothermal and calm quality, P<0.05); Yang deficiency can be used as a key indicator to predict the probability of disease in the elderly (P<0.05). **Conclusion** There is a correlation between traditional Chinese medicine constitution and grip strength in the elderly. Peaceful quality are protective factors to maintain muscle strength, Yang deficiency is a risk factor for muscle strength loss, and Yang deficiency can predict the probability of disease in the elderly. It is inferred that physical conditioning and grip strength training can improve the grip strength of patients, reduce the probability of disease and improve the quality of life of the elderly.

Key words TCM constitution identification; Muscle function; grip strength; Correlation; the elderly

Category: Public Nutrition & Health

遵守中国饮食指南宝塔(2022)饮食、饮食炎症潜力与健康相关生活质量的性别关联:中国人群的证据

Gender-specific association of Chinese food guide pagoda (2022) diet, diet inflammatory potential and health-related quality of life: evidence from Chinese population

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Background and Objectives: Diet was one of the most important factors influencing health status which had relatively great differences between China and Western countries. The role of it in promoting health still has not been elucidated clearly. This study aimed to explore the association between pattern of Chinese food guide pagoda, diet inflammatory potential and health-related quality of life by gender.

Methods: Totally 103,596 participants (mean age, 53 years; 61% women) recruited from the baseline survey of the Regional Ethnic Cohort Study in Northwest China were included. Lifestyle information was collected through a baseline questionnaire. The 12-Item Short Form Survey (SF-12) was used to assess participants' physical component score (PCS), which ranged from 0 to 100.

Results: In total population, after multivariate-adjusted, following Chinese food guide pagoda and anti-inflammatory foods were significantly associated better PCS (ß, 0.515, 95% CI, 0.460 –0.570; ß, 0.071, 95% CI, 0.048 –0.094, respectively) and pro-inflammatory foods was significantly associated less PCS (ß, -0.103, 95% CI, -0.131 – -0.075). In men, following Chinese food guide pagoda and anti-inflammatory foods were significantly associated better PCS (ß, 0.572, 95% CI, 0.484 –0.660; ß, 0.186, 95% CI, 0.150 –0.222, respectively). The association between pro-inflammatory foods and PCS was not statistically significant. In women, following Chinese food guide pagoda was significantly associated better PCS (ß, 0.486, 95% CI, 0.416 –0.556) and pro-inflammatory foods was significantly associated less PCS (ß, -0.166, 95% CI, -0.202 – -0.130). The association between anti-inflammatory foods and PCS was not statistically significant.

Conclusions:

Adherence to the Dietary Pagoda Guidelines for Chinese residents can help improve the physical component of quality of life for Chinese adults. Moreover, for better health statue, men should increase their intake of anti-inflammatory foods, and women should pay more attention to controlling intake of pro-inflammatory foods.

Key words Health-related quality of life, Chinese food guide pagoda, Inflammatory potential, Anti-inflammatory, Pro-inflammatory Foods

Category: Public Nutrition & Health

夜宵和早餐对成年人肥胖的影响：基于社区自然人群纵向研究
Skipping breakfast and night eating and 4-year changes in weight and waist circumference in Chinese adults

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Background and objective: The association between individual dietary components or dietary patterns and weight gain has been well-documented, but the effects of specific eating behaviors, such as skipping breakfast and night eating, were less evaluated with mixed results.

Methods: In the current longitudinal study, included were 48,150 Chinese adults (mean age: 50.1 ± 13.9 y) who were free of diabetes, cardiovascular diseases, and cancer in 2014, when information on dietary intake and the presence of night-eating behavior and skipping breakfast was collected via questionnaires. Weight and waist circumference (WC) were measured repeatedly in 2016 or 2018, and the association between night eating and/or skipping breakfast and annual changes in weight and WC were evaluated using the generalized estimating equation method.

Results: During the 4-year follow-up, among people who had both of two eating behaviors, weight increased 0.52 kg (95%CI: 0.42, 0.62) per year and WC increased 0.40 cm (95%CI: 0.26, 0.54) per year after adjusting for potential covariates, compared with the normal eating behaviors group. The association might be attenuated in women and more pronounced in people with higher BMI at baseline, lower diet quality, regular physical activity[D1] [MOU2] , insomnia disorder, dyslipidemia, impaired fasting glucose, and hypertension (P-interaction < 0.001 for all).

Conclusion: Skipping breakfast and/or night eating is a predictive factor of weight and WC gain in adults even after adjusting for energy intake and diet quality. These associations were particularly pronounced among people with chronic status[D3] [MOU4] , and further highlighted that mealtime was an independent risk factor for obesity in addition to energy intake, diet quality, and exercise.

Key words Obesity; Longitudinal study; Eating behavior; Skipping breakfast; Night eating

Category: Public Nutrition & Health

成人饮食摄入活的微生物与慢性便秘之间的关系

Association between dietary intake of live microbes and chronic constipation in adults

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Background: Chronic constipation (CC) is a common gut health problem. Probiotics are known to benefit gut health, but the direct impact of live dietary microbes is lacking evidence.

Obiectives: This study aimed to investigate the relationship between dietary intake of live microbes and CC.

Methods: Using data from the National Health and Nutrition Examination Survey (NHANES) 2005-2010, we identified a total of 11,170 adult participants who completed both the 24-hour face-to-face dietary recall and bowel health questionnaire. CC was defined according to Bristol stool form scale. We categorized" food into 3-level: low, medium, and high based on their estimated live microbial contents. Additionally, we analyzed combined data for the medium and high categories (MedHi). Multivariate regression models were constructed to assess the association between dietary intake of live microbes and CC.

Results: In the weighted sample, we found that prevalence of age-adjusted CC was 7.06% (95% CI: 6.45-7.67). Female sex (OR = 2.55, 95% CI: 2.04-3.18), Non-Hispanic Black (OR = 1.72, 95% CI: 1.34-2.22), Mexican Americans (OR = 1.64, 95% CI: 1.22-2.22), and depression (OR = 2.17, 95% CI: 1.54-3.05) were positively correlated with CC. Higher education (OR = 0.53, 95% CI: 0.43-0.66), obesity (OR = 0.61, 95% CI: 0.50-0.75), higher income (OR = 0.60, 95% CI: 0.50-0.71), higher alcohol intake (OR = 0.68, 95% CI: 0.54-0.87), higher caffeine intake (OR = 0.63, 95% CI: 0.51-0.77), and higher MedHi intake (OR = 0.67, 95% CI: 0.53-0.85) were negatively correlated with CC. After controlling for confounders, a significant inverse association was observed between dietary live microbes consumption and CC.

Conclusion: In conclusion, our findings suggest that a high dietary live microbes consumption may have a protective effect against CC. However, further prospective studies are required to comprehensively assess whether live microbes consumption can effectively reduce the occurance of CC.

Key words Live dietary microbes; Chronic constipation; NHANES

Category: Public Nutrition & Health

代谢相关脂肪性肝病患者饮酒与死亡风险的关联：来自英国生物银行的研究

Association of Alcohol Consumption and Mortality Risk in Patients with Metabolic Dysfunction-Associated Fatty Liver Disease: a UK Biobank Study

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Abstract

Background

The optimal alcohol consumption recommendation for patients with metabolic dysfunction-associated fatty liver disease (MAFLD) remains unclear, particularly concerning different alcoholic beverages.

Objective

The aim was to evaluate the association between alcohol consumption and mortality in patients with MAFLD.

Methods

We conducted a study using data from the UK Biobank, including 110,459 individuals with MAFLD. Hepatic steatosis was defined as a fatty liver index ≥60. Participants were categorized into four groups based on alcohol consumption (non-drinkers: ≤1 drinks/week; light drinkers: >1 and ≤14 drinks/week for men, >1 and ≤7 drinks/week for women; moderate drinkers: >14 and ≤21 drinks/week for men, >7 and ≤14 drinks/week for women; excessive drinkers: >21 drinks/week for men, >14 drinks/week for women; 14 grams pure alcohol for each drink). All-cause and cause-specific mortality were obtained from National Death Registries up to 12 November 2021. Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs), adjusting for potential confounders.

Results

During a median follow-up of 12.6 years, there were 8,183 deaths recorded including 1,803 cardiovascular disease (CVD) related deaths, 4,034 deaths from cancer, and 376 deaths due to liver disease. Compared to non-drinkers, the fully adjusted HRs (95% CI) for light total alcohol drinkers were 1.00 (0.89, 1.13) for all-cause mortality, 0.97 (0.74, 1.26) for CVD mortality, 1.08 (0.90, 1.28) for cancer mortality, and 1.29 (0.63, 2.66) for liver disease mortality. Regarding wine consumption, the fully adjusted HRs (95% CI) for light drinkers were 0.84 (0.80, 0.88) for all-cause mortality, 0.79 (0.71, 0.88) for CVD mortality, 0.89 (0.83, 0.96) for cancer mortality, and 0.98 (0.77, 1.25) for liver disease mortality.

Conclusions

Among patients with MAFLD, light total alcohol consumption was not significantly associated with a higher risk of all-cause or cause-specific mortality, while light wine consumption was associated with lower risks of all-cause, CVD, and cancer mortality.

Key words Metabolic dysfunction-associated fatty liver disease; alcohol consumption; mortality risk; UK Biobank; hepatic steatosis

Category: Public Nutrition & Health

膳食多样化评分评价中国不同母乳喂养状态下6-23月龄儿童的有效性

Validity of Dietary Diversity Score for Children aged 6-23 Months modified by breastfeeding status in China

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Background: Dietary diversity score (DDS) is a core indicator for evaluating the adequacy of dietary micronutrients intake for children aged 6-23 months. Little information is available for assessing the validity of DDS for children aged 6-23 months in different breastfeeding status in China.

Objectives: To validate DDS for evaluating micronutrients intake of children aged 6-23 months with different breastfeeding status in China.

Methods: This was a cross-sectional study and 570 children aged 6-23 months were included. The 24h test weighing method and weighted dietary record method were used to measure breastmilk intakes and other food intakes, respectively. DDS was calculated by using dietary record according to WHO standard questionnaire method. Multiple linear regression was used to analyze the association between DDS and the mean nutrient density adequacy ratio (MNDAR).

Results: Compared with DDS of 5, MNDAR was lower in the groups with DDS of 2 and 3 ($P<0.05$), no difference was detected between the group with DDS of 4, 6 and 7 ($P>0.05$) for breast-fed (BF) and non-breast and non-formula fed (NBNFF) children. The median of MNDAR in the group with DDS of 2, 3, 4, 5, 6, and 7 was 0.835, 0.777, 0.832, 0.870, 0.904 and 0.910 for BF children, and 0.617, 0.732, 0.838, 0.859, 0.932 and 0.930 for NBNFF children, respectively. However, DDS was not relate to MNDAR for mix-fed and formula-fed children.

Conclusions: MNDAR was greater for children aged 6-23 months in China with "DDS>=5" than those "DDS=2 or 3" in the group with BF and NBNFF. However, the relationship did not exist in the children with any formula-fed.

Key words Dietary diversity score, Nutrient density, breastfeeding status, infants and young child, China

Category: Public Nutrition & Health

孕妇血清维生素 K1 和 MK-4 水平与妊娠并发症及新生儿结局的关联

Associations of maternal serum vitamin K1 and MK-4 levels in pregnant women with pregnancy complications and neonatal outcomes

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Background and Objective

Vitamin K is a fat-soluble vitamin that includes vitamin K1 (phylloquinone, PK) and vitamin K2 (menaquinones, MK, MK-n). We aimed to explore the associations between serum vitamin K1 and MK-4 levels with pregnancy complications and neonatal outcomes.

Methods and Study Design

In this cross-sectional designed study, a total of 831 pregnant women with informed consent from Binzhou were enrolled. Serum levels of vitamin K1 and MK-4 were detected by LC/MS/MS. Information of the onset of gestational diabetes (GDM) and other complications in pregnant women, and clinical information of newborns were collected. Multifactorial logistic regression was used to analyze the correlations between parameters.

Results

After controlling for potential confounders, serum vitamin K1 levels were negatively associated with the risk of pregnancy-induced hypertension (PIH) and GDM, with OR (95% CI) of 0.36 (0.20, 0.63) and OR (95% CI) of 0.54 (0.34, 0.87) in the highest compared to the lowest quartile, respectively. Serum MK-4 levels was negatively associated with the risk of PIH, with OR (95% CI) of 0.29 (0.15, 0.56) in the highest versus the lowest quartile. In addition, maternal serum vitamin K1 levels were negatively associated with preterm birth and the risk of neonatal bilirubinemia, with OR (95% CI) of 0.29 (0.17, 0.50) and 0.45 (0.27, 0.76) in the highest compared to the lowest quartile. Maternal serum vitamin MK-4 levels were negatively correlated with preterm birth with OR (95% CI) of 0.40 (0.23, 0.70) in the highest compared to the lowest quartile.

Conclusions

In pregnancy women, serum vitamin K1 were negatively associated with the risk of PIH, GDM, preterm birth, and neonatal bilirubinemia. Serum MK-4 levels were negatively associated with the risk of PIH and preterm birth. The findings provided reference for guiding pregnant women to consume vitamin K.

Key words Vitamin K; pregnant women; pregnancy complications; neonatal outcomes

Category: Public Nutrition & Health

慢性肾脏病患者血清25-羟基维生素D浓度与全因和病因特异性死亡率的关系

Association of Serum 25-Hydroxyvitamin D Concentrations With All-Cause and Cause-Specific Mortality among Individuals With Chronic Kidney Disease

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Background: The evidence regarding vitamin D status and mortality among people with chronic kidney disease (CKD) is scarce.Objective: We aimed to examine the association of serum 25-hydroxyvitamin D [25(OH)D] concentrations with all-cause and cause-specific mortality among adults with CKD.Methods: In this prospective cohort study, we included patients with CKD from the U.S. National Health and Nutritional Examination Survey (NHANES) 2001–2018. Death outcomes were ascertained by linkage to National Death Index records through 31 December 2019. The weighted Cox proportional hazards models were used to estimate hazard ratios (HR) and 95% CIs for all-cause and cause-specific mortality.Results: Among the 5,327 patients with CKD from NHANES 2001-2018, the weighted mean (95% CI) level of serum 25(OH)D was 72.5 (71.7, 73.3 nmol/L), and 30.7% had deficient vitamin D (<50 nmol/L). During 18,769 person-years of follow-up, 893 deaths were documented, including 333 CVD deaths, 134 cancer deaths, 17 kidney disease deaths, and 263 other-cause deaths. Compared with participants with 25(OH)D <25 nmol/L, the multivariate-adjusted HRs and 95% CI for participants with 25(OH)D >75 nmol/L were 0.46 (0.29, 0.72) for all-cause mortality, 0.40 (0.20, 0.77) for CVD mortality, 1.01 (0.20, 2.47) for cancer mortality, 0.10 (0.03, 0.34) for kidney disease mortality, and 0.59 (0.30, 1.16) for other-cause mortality. In the fully adjusted model, we observed a 12% reduced risk of all-cause mortality and a 12% reduced risk of CVD mortality per 10 nmol/L increment of 25(OH)D level in patients with CKD.Conclusion: Higher serum 25(OH)D levels were significantly associated with lower all-cause and cause-specific mortality in patients with CKD. These findings suggest that elevated serum 25(OH)D concentration might benefit CKD patients with vitamin D deficiency.

Key words chronic kidney disease; serum 25-Hydroxyvitamin D; mortality; National Health and Nutrition Examination Survey

Category: Public Nutrition & Health

膳食宏量营养素摄入量与心血管疾病风险和死亡率：前瞻性队列研究的系统综述和剂量效应荟萃分析

Dietary macronutrient intake and cardiovascular disease risk and mortality: a systematic review and dose-response meta-analysis of prospective cohort studies

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Background: Many epidemiological studies have evaluated the intake of macronutrients and the risk of mortality and cardiovascular disease (CVD).Objective: To examine and quantify the potential dose-response association of dietary macronutrient intake with CVD morbidity and mortality. Methods: Prospective cohort studies from PubMed, Embase, and CENTRAL was conducted, which reported associations of macronutrients (protein, fat, and carbohydrate) with all-cause, CVD, cancer mortality, or CVD events. Multivariable relative risks (RR) were pooled and heterogeneity was assessed.Results: Results of 124 prospective cohort studies were included in the systematic review and 101 in the meta-analysis. During the follow-up period of 2.2 to 30 years, 506,086 deaths and 79,585 CVD events occurred among 5,107,821 participants. High total protein intake was associated with low CVD morbidity (RR 0.88, 95% confidence interval 0.82 to 0.94), while high total carbohydrate intake was associated with high CVD morbidity (1.08, 1.02 to 1.13). For fats, a high intake of total dietary fat was associated with a decreased all-cause mortality risk (0.92, 0.85 to 0.99). However, this effect was not observed in cause-specific mortality; Saturated fatty acid (SFA) intake was only associated with cancer mortality (1.10, 1.06 to 1.14); Both monounsaturated fatty acid (MUFA) and Polyunsaturated fatty acids (PUFA) intake was associated with all-cause mortality (MUFA: 0.92, 0.86 to 0.98; PUFA: 0.91, 0.86 to 0.96), CVD mortality (MUFA: 0.89, 0.84 to 0.95; PUFA: 0.95, 0.91 to 0.998) and cancer mortality (MUFA: 0.95, 0.91 to 0.99; PUFA: 0.94, 0.89 to 1.00).Conclusion: Existing evidence suggested that protein intake was associated with decreased risk of CVD morbidity, while carbohydrate intake was associated with an increased risk of CVD morbidity. High total fat intake was associated with a low risk of all-cause mortality and this effect was different in an analysis stratified by the type of fat.

Key words macronutrient intake; cardiovascular disease; mortality; meta-analysis

Category: Public Nutrition & Health

血浆和尿液代谢组学与基因组学整合分析揭示结直肠癌潜在干预靶点

Systematic investigation of plasma and urinary metabolites to discover potential interventional targets for colorectal cancer

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Background and objectives: Metabolic alterations have been reported to be associated with colorectal cancer (CRC). We aimed to identify plasma and urinary metabolites related to CRC risk and elucidate their mediator role in the associations between modifiable risk factors and CRC.

Methods: Metabolite quantitative trait loci (mQTLs) were derived from two published genome-wide association studies (GWASs) on plasma and urinary metabolome, and summary-level data were extracted for 651 plasma metabolites and 209 urinary metabolites. Genetic associations with CRC were obtained from a large-scale GWAS meta-analysis (100,204 cases; 154,587 controls) and the FinnGen cohort (4,957 cases; 304,197 controls). Mendelian randomization (MR) and colocalization were performed to evaluate the causal role of metabolites on CRC. Druggability evaluation was employed to prioritize potential therapeutic targets. Multivariable MR and mediation estimation were conducted to elucidate the mediating effects of metabolites on the associations between modifiable risk factors and CRC.

Results: Collectively, the current study identified 30 plasma metabolites and four urinary metabolites for CRC. Genetically predicted higher levels of 22 plasma metabolites and two urinary metabolites and decreased levels of eight plasma metabolites and two urinary metabolites were associated with an increased risk of CRC ($P<1.16\times10^{-5}$). Three CRC-related metabolites (sphingomyelin, lactose, mannose) could be modulated by drug interventions. Nine CRC-related metabolites could be affected by 13 modifiable factors (two dietary factors, two gut microbial taxa, five lifestyles, four body measurement factors), and these metabolites mediated the effect of modifiable risk factors (Actinobacteria, BMI, waist-hip ratio, fasting insulin, smoking initiation) on CRC.

Conclusions: This study identified the key plasma and urinary metabolites associated with CRC and elucidated their mediator role in the associations between modifiable risk factors and CRC, which provided new insights into the etiology and potential therapeutic targets for CRC and the etiological pathways of modifiable environmental factors with CRC.

Key words Colorectal cancer; Metabolite biomarker; Metabolome-wide Mendelian randomization; Modifiable risk factor; Drug target

Category: Public Nutrition & Health

基于膳食质量问卷DQQ的低负担膳食质量指标与中国健康饮食指数的比较：2011年中国健康与营养调查结果

Comparison of low-burden diet quality indicators calculated from Diet Quality Questionnaire with Chinese Healthy Eating Index: Results from China Health and Nutrition Survey 2011

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Background: The Chinese Healthy Eating Index (CHEI), calculated from 24-hour dietary recalls, can reflect good adherence to the 2016 Dietary Guidelines for Chinese, however, it is difficult to conduct in a large-scale population survey. Diet quality indicators at low cost and with low technical expertise requirements are urgently needed. The Diet Quality Questionnaire (DQQ) for China is developed based on the framework of Global Diet Project, which takes only five minutes to administer using “yes/no” questions on 29 food groups. To validate whether a suite of low-burden indicators based on the DQQ correlates with the CHEI, and also to understand the relationships of these indicators with different nutritional status.

Methods: Based on the China Health and Nutrition Survey (CHNS) in 2011, dietary data of 14124 participants (aged ≥ 7 years) were categorized into 29 food groups to calculate the Minimum Diet Diversity for Women (MDD-W), Global Dietary Recommendations (GDR) score, and DQQ score; the CHEI was also calculated. Trend tests, spearmen correlation analysis, and logistic regression analysis were used to examine whether three indicators based on DQQ outperform or align closely with CHEI.

Results: The proportion of the population meeting the MDD-W and the median value of the GDR score and DQQ score increased along with the increment of tertiles of CHEI (all $P_{trend}<0.001$). MDD-W correlated moderately ($r_s=0.51$, $P<0.001$) and GDR score correlated weakly ($r_s=0.40$, $P<0.001$) with CHEI. The DQQ score was also moderately correlated with CHEI ($r_s=0.60$, $P<0.001$), while strong correlations were found for women ($r_s=0.61$, $P<0.001$) and children ($r_s=0.62$, $P<0.001$). The GDR score, DQQ score, and CHEI were fairly associated with lower odds of abdominal obesity.

Conclusion: The DQQ score aligns closely with the CHEI, indicating the DQQ score derived from 29 food-group data could be a useful indicator of diet quality in a wide scope of the Chinese population.

Key words Diet quality; diet quality questionnaire; minimum diet diversity for women, global dietary recommendations score; Chinese healthy eating index

Category: Public Nutrition & Health

海产品摄入量与心血管疾病发病和死亡的关联研究

Association of seafood consumption with cardiovascular disease among adults in Qingdao, China

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Background and Objectives: The relationship between seafood consumption and cardiovascular disease is controversial, and studies have not considered competing risk events. Our study examined the association between a full range of seafood consumption and cardiovascular disease incidence and mortality on the basis of the Qingdao Diabetes Prevention Program.

Methods and Study Design: We followed up 5285 participants without cardiovascular disease at baseline until December 31, 2021. Cardiovascular disease cases and deaths were identified through record linkage with the Qingdao Cardiovascular Disease Surveillance System and the Qingdao Death Registry, respectively. Information on seafood consumption was obtained using a food frequency questionnaire. We used the Cox proportional hazard model and the competing risk model to evaluate the association between all types of seafood consumption and cardiovascular disease incidence and mortality.

Results: During a median follow-up of 11.4 years, 122 cardiovascular disease cases and 75 deaths occurred. After adjustment for potential confounders, compared with nonconsumers, seafood consumption of 300–500 and >500 g/week was associated with a lower risk of cardiovascular disease incidence [hazards ratio and 95% confidence interval: 0.51 (0.28–0.94) and 0.46 (0.25–0.85), respectively]. However, seafood consumption of >500 g/week had a significantly lower risk of cardiovascular disease mortality [subdistribution hazard ratio and 95% confidence interval: 0.39 (0.17–0.93)], but insignificant in other groups.

Conclusions: Seafood consumption of 300–500 and >500 g/week was associated with a lower cardiovascular disease incidence and mortality. Our findings provide evidence of the recommendations of the 2022 Dietary Guidelines for Chinese residents and may guide the promotion of strategies for cardiovascular disease prevention.

Key words Seafood consumption; Cardiovascular disease; Incidence; Mortality; Cohort study.

Category: Public Nutrition & Health

饮酒对中国2型糖尿病患者血糖控制的影响

The association of alcohol drinking with glycemic control among type 2 diabetic patients in China

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Objective

To investigate the association between alcohol drinking and glycemic control among adult patients with type 2 diabetes (T2D) in regional China.

Methods

In this cross-sectional survey conducted in Nanjing municipality of China in 2018, adult T2D patients were randomly selected from urban and rural communities. The outcome variable was glycemic control status ("controlled well" or "not controlled") based on assessment criteria recommended by the Guideline for the Prevention and Treatment of Type 2 Diabetes Mellitus in China. The explanatory measure was alcohol drinking ("heavy drinking", "mild/moderate drinking" or "no drinking"). Mixed-effects regression models were employed to estimate odds ratios (ORs) and 95% confidence interval (95%CI) for examining the associations of alcohol drinking with glycemic control among T2D patients.

Results

Totally, 5663 adult T2D patients were included in the analysis. The glycemic control rate was 39.8% (95%CI 38.5, 41.1) for overall participants, while 41.2% (95%CI 39.7%, 42.7%), 43.9% (95%CI 38.9%, 48.8%), and 34.1% (95% CI 31.5%, 36.7%) for non-drinkers, mild/moderate drinkers, and heavy drinkers, respectively. After adjustment for potential confounders and community-level clustering effect, heavy and mild/moderate alcohol drinkers were at 0.76 (95%CI=0.66, 0.89) and 1.04 (95%CI=0.87, 1.28) times odds to have glycaemia under control than non- drinkers among overall participants. Furthermore, when stratified separately by gender and use of anti-diabetes agents, the scenario within men, either regular or irregular users of anti-diabetes agents was the same as that for overall participants, while the association between alcohol drinking and glycemic control became non-significant among women.

Conclusions

Mild/moderate alcohol drinking was not associated with glycaemia control, but heavy-drinking might have a negative effect on glycemic control among urban and rural T2D patients irrespective of the status of anti-diabetes agent use in regional China. This study has important public health implications regarding the precision intervention on patients' glycaemia control for community-level T2D management.

Key words Alcohol drinking, glycemic control, type 2 diabetic patients, community-level, Chinese

Category: Public Nutrition & Health

儿童期和幼儿期接触饥荒对成年后慢性肾病的影响

Effects of childhood and infancy exposure to famine on chronic kidney disease in adulthood

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Objective: Chronic kidney disease (CKD) is an increasing contributor to the global disease burden. Malnutrition caused by early exposure to famine can seriously affect the body in adulthood. We aimed to assess whether exposure to famine in infancy and childhood during the Chinese famine of 1959-1962 was associated with abnormal glomerular filtration rate (eGFR) and risk of CKD.

Subjects and methods: A total of 2937 individuals from the Qingdao Diabetes Prevention was included in the current study. They were divided into infant exposed group (1956-1958), child exposed group (1950-1955) and non-exposed group (1963-1971) according to their birth year during the famine period. The estimate glomerular filtration rate was calculated using the Chronic Kidney Disease Epidemiology Collaboration equation（SKD-EPI）. CKD was defined as eGFR is less than 90 mL/min / 1.73 m2.Logistic regression model was used to evaluate the assocaition between famine exposure in early life with prevalence of CKD in adult, adjusting for potential covariates.

Results: The prevalence of CKD in non-exposed group, infant exposed group and child exposed group was 5.1%, 9.7% and 13.6%, respectively. Adjustment for residential areas, BMI, diabetes, hypertension and total cholesterol, the association between famine exposure and eGFR did not alter substantially. Exposure to infant and child famine was associated with 1.68 (OR=1.68, 95CI%[1.10,2.56]) times and 2.49(OR=2.49,95CI% [1.73,3.58]) times for prevalence rate of CKD than nonexposed group, respectively. In the sensitivity analysis, exposure to infant and child famine was associated with 1.98 (OR=1.98, 95CI%[1.54,2.54]) times and 2.53(OR=2.53,95CI% [2.02,3.18]) times for prevalence rate of CKD than nonexposed group, respectively.

Conclusions: Our findings suggest that acute nutritional deficiencies caused by famine exposure in early life are a risk factor for eGFR decline in adulthood, especially in fancy and childhood.Thus,timely identification and intervention can prevent residents suffer from chronic kidney disease (CKD) in the future life.

Key words Famine exposure; Chronic kidney disease ; Adulthood ; Cross-sectional study

Category: Public Nutrition & Health

中老年人机体虚弱、昼夜节律综合征与心血管疾病之间的相关性：一项纵向研究

Association between physical frailty, circadian syndrome and cardiovascular disease among middle-aged and older adults: A longitudinal study

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Background: Physical frailty (PF) and circadian syndrome (CircS) are proposed as novel risks for cardiovascular disease (CVD), but little attention is paid to their combined impact on CVD. This study aimed to investigate the association of PF, CircS and CVD in middle-aged and older adults.

Methods: The sample comprised 8512 participants aged at least 45 years from the China Health and Retirement Longitudinal Study (CHARLS) 2011. PF was examined by the physical frailty phenotype scale. CircS was assessed by the components of the International Diabetes Federation (IDF) MetS plus short sleep duration and depression. The cut-off for CircS was set as ⩾4. CVD was defined as the presence of physician-diagnosed heart disease and/or stroke. A total of 6176 participants without CMM recruited from CHARLS 2011 and were followed up in 2018.

Results: The prevalence of CVD in total populations, neither CircS or PF, PF alone, CircS alone and both CircS and PF were 13.0%, 7.4%, 15.5%, 17.4%, and 30.2%, respectively. CircS was more likely to be PF [OR (95%CI): 2.070 (1.732~2.472)] than those without CircS. Both CircS alone [OR (95% CI): 1.954 (1.663~2.296)], and coexisting CircS and PF [3.508 (2.739~4.494)] were associated with CVD. Longitudinal analysis showed that individuals with both CircS and PF (HR: 1.716, 95%CI: 1.314~2.240) and CircS alone [1.520 (1.331~1.737)] were more likely to have new onset CVD than neither CircS or PF peers.

Conclusion: PF and CircS together are associated with higher CVD risk, which provided new evidence for a strong relation that warrants attention to assessing PF and CircS and in community to promote healthy aging.

Key words physical frailty; circadian syndrome; cardiovascular disease; middle-aged and older adults

Category: Public Nutrition & Health

血糖代谢状态与脑宏观和微观结构的关联

Associations of glucose metabolism status with brain macro- and microstructure

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Background: Evidence linking glucose metabolism status with brain macro- and microstructure is limited and inconsistent.

Objective: To investigate the associations of glucose metabolism status with brain macro- and microstructure in a large population-based study.

Methods and Study Design: This study enrolled 29,251 participants from the UK Biobank. Glucose metabolism status was classified into normal glucose metabolism, prediabetes, type 2 diabetes with HbA1c <7%, and type 2 diabetes with HbA1c ≥7%. Brain macrostructural metrics, including volumes of total and subcortical gray matter, white matter, white matter hyperintensity, cerebrospinal fluid, and brain stem, were measured by 3T brain magnetic resonance imaging. Brain microstructural metrics, including fractional anisotropy and mean diffusivity in white matter tracts, were measured by diffusion tensor imaging. Multivariable linear regression models were used to estimate β values and 95% confidence intervals (CIs).

Results: After multivariable adjustment including demographic and lifestyle factors, medical history, and total intracranial volume, compared with participants with normal glucose metabolism status, those with prediabetes had smaller gray matter volume and most of the subcortical gray matter volumes, and atrophy of total and subcortical gray matter was more pronounced in those with type 2 diabetes (all P-trend <0.05, FDR corrected). For brain microstructure, participants with prediabetes had lower fractional anisotropy values in commissural fibers (β [95% CI]: -0.04 [-0.08, -0.003]). Global and tract-specific microstructural abnormalities of white matter were observed in participants with type 2 diabetes, especially for type 2 diabetes with HbA1c ≥7%, except for fractional anisotropy values in projection fibers (all P-trend <0.05, FDR corrected).

Conclusions: People with prediabetes were associated with brain macro- and microstructural abnormalities, and those with type 2 diabetes were more strongly associated with small gray matter volumes (total and subcortical), and disruption of white matter integrity. These findings suggest that interventions for hyperglycemia at an earlier stage may help to protect brain health.

Key words prediabetes, type 2 diabetes, white matter, gray matter, brain integrity

Category: Public Nutrition & Health

糖尿病和非糖尿病人群长期服用钙补充剂与心血管疾病和死亡风险的前瞻性关联

Associations of Habitual Calcium Supplementation with Risk of Cardiovascular Disease and Mortality in Individuals with and without Diabetes

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Background: Experimental studies suggested that supplemental calcium, but not dietary calcium could abruptly increase blood calcium levels, which may be harmful for cardiovascular health. While the association between calcium supplements and cardiovascular disease (CVD) risk in the general population is debatable, evidence is scarce among people with diabetes who are at higher risk of both abnormal calcium metabolism and CVD.

Objectives: To prospectively examine associations of habitual calcium supplementation with CVD events and mortality in individuals with and without diabetes.

Methods: The main analysis included 434,374 participants from the UK Biobank. Cox proportional hazards regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs). Interactions of calcium supplementation with diabetes status were tested on multiplicative and additive scales.

Results: Over median follow-up of 8.1 and 11.2 years, 26,374 incident CVD events and 20,526 deaths were documented, respectively. After multivariable adjustment, habitual calcium supplementation was significantly associated with higher risks of CVD incidence (HR: 1.34 [95%CI:1.14, 1.57]), CVD mortality (HR: 1.67 [95%CI: 1.19, 2.33]), and all-cause mortality (HR: 1.44 [95%CI: 1.20, 1.72]) in participants with diabetes, whereas no significant association was observed in participants without diabetes (HR: 0.97 [95%CI: 0.92, 1.03] for CVD incidence; HR: 1.05 [95%CI: 0.90, 1.23] for CVD mortality; HR: 1.02 [95%CI: 0.96, 1.09] for all-cause mortality). Significant multiplicative and additive interactions were found between habitual calcium supplementation and diabetes status on risks of CVD events and mortality (all P interaction<0.01). In contrast, no significant interactions were observed between dietary or serum calcium and diabetes status.

Conclusions: Habitual use of calcium supplements was significantly associated with higher risk of CVD events and mortality in people with diabetes, but not in people without diabetes. Further studies are needed to balance potentially adverse effects of calcium supplement against likely benefits, particularly among patients with diabetes.

Key words calcium supplements; diabetes; cardiovascular disease; mortality; prospective study

Category: Public Nutrition & Health

健康生活方式与 MAFLD 及其亚型发病风险的研究：东风-同济队列

Associations of combined lifestyle factors with MAFLD and specific subtypes in middle-aged and elderly Chinese adults: The Dongfeng-Tongji Cohort Study

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Background and Aims: Metabolic dysfunction-associated fatty liver disease (MAFLD) is the crucial pathogenesis for intra-hepatic and extra-hepatic diseases, especially in elderly adults, while lifestyle management is the modifiable cost-effective measure for MAFLD prevention. In this study, we aimed to evaluate the association of combined lifestyles with the risk of overall MAFLD and its specific subtypes.

Approach and Results: We conducted a longitudinal study of 23408 middle-aged and elderly individuals (mean age 61.7 years and male 44.5%) recruited in China from 2008 to 2018. Combined lifestyle score (range 0-6) was evaluated by body mass index, smoking, drinking, diet, physical activity, and sleep. Logistic regression models were used to calculate ORs for the risks of overall MAFLD and the specific subtypes, adjusting for demographic, common comorbidities, and metabolic biomarkers. Compared with individuals whose lifestyle score of 0-2 (poor), the ORs (95% CIs) of those with the most favorable lifestyle score of 5-6 (ideal) were 0.62 (0.57-0.68) for overall MAFLD, 0.31 (0.28-0.34) for overall MAFLD with overweight and obesity, 0.97 (0.75-1.26) for MAFLD with diabetes, and 0.56 (0.51-0.62) for MAFLD with metabolic dysregulation (MD). Additionally, the risks of improvement in lifestyle score were associated with lower risk of overall MAFLD (ORs, 0.76; 95%CI, 0.68-0.86), MAFLD with overweight and obesity (ORs, 0.72; 95%CI, 0.63-0.81), and MAFLD with MD (ORs, 0.49; 95%CI, 0.43-0.55).

Conclusions: Our findings suggest that adherence to combined healthy lifestyles was associated with lower risks of overall MAFLD, particularly in individuals with overweight or obesity and MD.

Key words lifestyle, MAFLD, BMI, lifeatyle improvement

Category: Public Nutrition & Health

生命早期双酚 A 暴露联合断乳后高脂饮食对子代小鼠肠道菌群的影响探究

Effect of Early life Bisphenol A Exposure combined with Post-weaning High Fat Diet on gut microbiota of mice

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Purpose

The gut microbiota plays an important role in children's growth and health. However, harmful factors will affect the colonization and development of gut microbiota, including bisphenol A (BPA) and high-fat diet (HFD). Both have nonnegligible effects on gut microbiota, however, the combined effect remains unclear. Thus, we aimed to investigate the combined effect of BPA and HFD on gut microbiota.

Methods

In this study, C57BL/6J mice were exposed to 50 μg or 500 μg BPA/kg body weight (bw)/day from day 6 of pregnancy to the end of lactation. The weaned offspring were randomized to be given HFD and normal diet. Fecal samples were collected at weeks 3, 5, and 13 from offspring mice. 16S rRNA gene sequencing was performed to assess the richness and diversity of gut microbiota. LEfSe evaluated taxonomic composition differences.

Result

In 3 weeks, the lower Shannon and the Chao 1 index indicated a reduction in the α diversity of gut microbiota (P: 0.002~0.004). But no significant association was observed in different BPA doses. In 5 weeks, the Shannon and the Chao 1 index in the BPA group were increasing (P: 0.001~0.071). In 13 weeks, compared with the control group, low-dose BPA exposure caused a lower Shannon index (P=0.009). BPA exposure caused a down-regulation in α diversity. PCOA analysis revealed a distinct gut microbial composition for each group (P<0.05). Analysis of LEfSe revealed that the abundance of beneficial bacteria (lactobacillus , Limosilactobacillus reuteri and Muribaculum) increased after 2 weeks of feeding HFD. But in 13 weeks, the abundance of opportunistic pathogen (lleibacterium, coriobacteria and acinetobacterota) increased in the BPA exposure groups.

Conclusion:

Early-life BPA exposure will not increase the susceptibility of offspring gut microbiota to the adverse effects of long time HFD. But short period exposure of HFD in early life have a positive effect on gut microbiota.

Key words BPA, High fat diet, Combined effect, Gut microbiota

Category: Public Nutrition & Health

膳食脂肪摄入与结直肠癌发生风险的研究进展

Research progress of the relationship between dietary fat intake and colorectal cancer

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Objective

Colorectal cancer (CRC) is one of the most common malignancies threatening human health worldwide. High fat intake has been frequently reported to be involved in CRC development. However, the relationships between different types of dietary fats and CRC remain unclear. This study aimed to investigate the association between different types of dietary fatty acids and the risk of CRC.

Methods

This study reviewed the available literature including prospective cohorts and case-control studies, and summarized the scientific evidence regarding associations of specific dietary fatty acid intakes with the risk of CRC.

Results

Multiple large cohort studies showed that the consumption of saturated fatty acids (SFAs), monounsaturated fatty acids (MUFAs), and polyunsaturated fatty acids ((PUFAs) was not significantly associated with CRC risk. Some studies found that seafood-derived n-3 PUFAs were negatively related to CRC risk, while total fat and palmitoleic acid were positively related to CRC risk. The association between fatty acids and CRC risk might be modified by different factors including sex, region, and food patterns.

Conclusion

SFAs, MUFAs and PUFAs intakes were not associated with the risk of CRC, whereas seafood-derived n-3 PUFAs might decrease the risk of CRC. Further large prospective studies and clinical trials involving more countries and races are warranted to confirm the association between dietary fat intake and CRC.

Key words colorectal cancer; fatty acid; diet

Category: Public Nutrition & Health

老火汤的摄入与慢性病、抑郁的关系

Habitual Cantonese Slow-Cooked Soup consumption is associated with diagnosed non-communicable diseases but inversely associated with depression.

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Objective

In Guangzhou, the prevalence of non-communicable disease (NCDs) is low but increasing rapidly in the past four decades. With recent research on the health effects by a unique diet tradition of Cantonese Slow-Cooked Soup (CSCS) consumption with nourishing ingredients and Chinese herbs cooked for long time coming to popular, the research has gotten a lot of attention. However, the association between NCDs and CSCS is in a controversy.

Methods

A total of 18,280 Cantonese aged over 15 years (mean age 49.36 years old, female vs. male 1:0.83) completed Guangzhou community-level health related survey in 2013-2014. We measured components of diagnosed NCDs (hypertension, type 2 diabetes, dislipidemia, gout), mental health (depression) and metabolic results (waist circumference, blood pressure and fasting blood glucose). Eating habits were evaluated by a frequency questionnaire. Cooking hours for CSCS was investigated as well.

Results

There was 69.2% among surveyed sample reported having a CSCS consumption habit, 36.2% reported they consumed CSCS twice a week, and half consumed CSCS cooked for 2-3 hours. Logistic regression model and general linear regression showed that having a CSCS consumption habit were positively associated with dislipidemia (OR: 1.36,95% CI:1.04,1.78) and gout (OR: 2.31, 95% CI: 1.13, 4.70), but associated with depression negatively (OR: 0.94, 95% CI: 0.93, 0.97). Consumption frequency was found to be a risk factor to waist circumference (OR:1.26, 95% CI: 1.12,1.42). Consuming CSCS cooked for less hours was a protective factor to gout (OR:0.70, 95% CI: 0.52,0.94), but a risk factor to depression (OR:1.02, 95% CI: 1.01,1.03), systolic blood pressure (OR:1.57, 95% CI: 1.26,1.96) and diastolic blood pressure(OR:1.43, 95% CI: 1.24,1.64).

Conclusion

Habitual CSCS consumption is associated with diagnosed NCDs but inversely associated with depression. It is important to educate Cantonese to modify their CSCS consumption habits.

Key words Cantonese Slow-Cooked Soup, NCDs, Depression, Association

Category: Public Nutrition & Health

红细胞膜多不饱和脂肪酸对中老年人骨骼肌流失的影响：一项前瞻性纵向研究

The Impacts of Erythrocyte Membrane Polyunsaturated Fatty Acids on the Skeletal Muscle Loss in Middle-aged and Older Adults: A Prospective Longitudinal Study

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Background

Polyunsaturated fatty acids may have a vital role in maintaining skeletal muscle mass in aged population.

Objective

This study aims to examine the longitudinal association between erythrocyte membrane polyunsaturated fatty acids and the skeletal muscle index, over an average follow-up period of 6.5 years, in a Chinese middle-aged and elderly population.

Methods and Study Design

A total of 1507 participants with mean age of 57.4 years were included in this study. skeletal muscle mass was determined by Dual-energy X-ray Absorptiometry and skeletal muscle index was calculated subsequently. Cis polyunsaturated fatty acids concentration of erythrocyte membrane were detected using Gas-liquid chromatography. Restricted cubic spline was used to evaluate the single effect of polyunsaturated fatty acid on skeletal muscle index and Bayesian Kernel Machine Regression was applied to assess the joint effect of polyunsaturated fatty acids on skeletal muscle index.

Results

Full adjusted restricted cubic spline showed a negative relationship between certain types of polyunsaturated fatty acids including C18:2n-6, C20:4n-6, C22:4n-6, C22:5n-3, total n-6 and total polyunsaturated fatty acids (P: <0.001 - 0.019) with skeletal muscle index decline. Besides, a U-shaped association was observed for other types of polyunsaturated fatty acids (C20:2n-6, C22:6n-3, and total n-3 polyunsaturated fatty acids) (P: 0.001 - 0.011). The ratio of n-6 to n-3 polyunsaturated fatty acids and linoleic acid to α-linolenic acid also exhibited a U-shaped association with skeletal muscle index decline (P: 0.029 - 0.042), with the minimum predictive values observed at a ratio of 3.73 and 123.90, respectively. Besides, full adjusted Bayesian Kernel Machine Regression showed a negative joint effect of total polyunsaturated fatty acids on skeletal muscle index decline, but no significant joint effect was observed for total n-6 or total n-3 polyunsaturated fatty acids.

Conclusion

A greater erythrocyte membrane polyunsaturated fatty acids concentration at baseline may help to reduce the loss of skeletal muscle mass in Chinese middle-aged and elder people during aging.

Key words longitudinal; polyunsaturated fatty acids; skeletal muscle; middle aged; the elderly

Category: Public Nutrition & Health

广州市社区人群膳食质量与血脂的关联性分析

Relationship between dietary quality, determined by CHEI score, and blood lipids in Guangzhou community: A cross-sectional analysis in adults over 30 years old

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Background and aim: Higher quality dietary patterns such as Dietary approches to stop hypetension and Mediterranean dietary patterns have been protectively associated with blood lipids profile.

This study examined whether healthy Chinese dietary pattern, which differ from dietary patterns derived from Western areas, are associated with blood lipids profile among Guangzhou community population.

Methods: A cross-sectional study. Fasting lipid profile were measured, Dietary quality was determined by Chinese Health Eating Sore(CHEI). The CHEI sore was computed based on a 79-item food frequency questionnaire.

Results: Female, Non-smoker, retired person, those with lower average income and those undertaking regular physical activity were more likely to have higher CHEI scores. Every unit increase in total CHEI sore was significantly and inversely associated with triglyceride [-0.069:(-0.082,-0.004)] after adjusting for socio-demographic and lifestyle groups. Score of tubers [-0.043:(-0.136,-0.003)], dark vegetables [-0.064:(-0.107,-0.020)], fruits [-0.019:(-0.039,-0.002)] and eggs [-0.081:(-0.120,-0.041)] were also found to significantly and inversely associated with triglyceride even after adjusting for confounders. while total CHEI score was not significantly associated with Total cholesterol, High density lipoprotein cholesterol, Low cholesterol density lipoprotein cholesterol after adjusting for confounders. Score of whole grains [0.015:(0.003,0.067)] and dairy products [0.021:(0.013,0.029)], nuts and seeds [0.018: (0.010,0.026)], fish and sea foods [0.014:(0.004, 0.023)], cooking oil [0.006: (0.000, 0.012)] and sodium [0.011:(0.000,0.021)] were positively associated with High density lipoprotein cholesterol. While higher sore of grains and cereals [-0.082:(-0.121, -0.042)], vegetables [-0.031:(-0.061, -0.001)], dark vegetables [-0.038:(-0.066, -0.011)] and eggs [-0.030:(-0.055, -0.004)] were associated with lower low density lipoprotein cholesterol level.

Conclusion:These results suggest that higher dietary quality may contribute to better blood lipids profile.

Key words Dietary quality; Chinese Health Eating Index; Blood lipids profile; cross-sectional study;

Category: Public Nutrition & Health

高海拔地区藏族成年人体脂分布与糖尿病风险因素的关联

Association between body fat distribution and diabetes risk factors in Tibetan adults living in high altitude areas

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Background: Body fat distribution had significant impacts on metabolic diseases and the impacts may differ across populations in diverse geographical locations. However, research on this topic was scarce among the Tibetan population residing in the Tibetan Plateau of China, where the average altitude exceeds 2800 meters.

Objectives: This study aimed to examine the association between body fat distribution and diabetes risk factors in Tibetan adults living in high altitude areas, Qinghai, China.

Methods and Study Design: This was a cross-sectional observational study, in which 852 Tibetan adults were included in the analysis. Social-demographic data was gathered by researchers with oral questions. Self-reported ethnicity was used for inclusion. Physical measurements were made by trained staff using calibrated instruments. Dual-energy X-ray absorptiometry (DXA) was used to assess human body fat composition. Compositional data analysis (CoDA) was employed to investigate when total fat mass is constant, the contribution of variation of body fat in different regions, including gynoid fat, android fat, arm fat, and other fat depots to glycated hemoglobin A1 (HbA1c) %, fasting plasma glucose (FBG), and homoeostatic model assessment insulin resistance equation (HOMA-IR) z score changes.

Results: Displacement of equivalent fat mass from android, arm, and other regions into gynoid fat was associated with decreases in HbA1c%, FBG, and HOMA-IR z scores in men and women across subgroups living in 2800 and 4300 meters. Specifically, displacing 1 kg of android fat into gynoid fat was associated with a 0.243, 0.232, and 0.145 decrease in z scores of HbA1c%, FBG, and HOMA-IR among Tibetan adults in Qinghai, respectively.

Conclusions: Gynoid fat was negatively associated with HbA1c%, FBG, and HOMA-IR in Tibetan adults, indicating a protective effect for diabetes risk factors, whereas adiposity in android, arm, and other regions had adverse effects.

Key words body fat distribution, DXA, diabetes, CoDA, high altitude

Category: Public Nutrition & Health

血清维生素D与肌肉减少型肥胖的关系:新型体成分模型的应用
Association of serum vitamin D with sarcopenic obesity: Application of novel body composition models

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Objective Sarcopenic obesity (SO), which has been considered adverse body phenotypes, was defined an individual have both high adiposity and low muscle mass. There may be higher health-related risks for individuals with SO than those with obesity or sarcopenia alone. However, there is no consensus on the definition of SO, and the relationship between SO and vitamin D is unclear. We aimed to explore the association between SO defined by dual energy X-ray novel body composition models and vitamin D status.

Methods 9515 participants above 18 years from 2011 - 2018 National Health and Nutrition and Examination Survey were included in the study. SO was defined by three different novel body composition models (FM/FFM model, TrFM/ASM model and body composition phenotype model). Multinomial logistic regression models and restricted cubic splines were used to analyze the association of vitamin D status and SO.

Results SO was associated with vitamin D deficiency which was a risk factor for SO (OR [95%CI] = 2.37 [1.61 - 3.47], 2.17 [1.48 - 3.17], 2.22 [1.51 - 3.25]). In TrFM/ASM model, vitamin D inadequacy (OR [95%CI] = 1.69 [1.02 - 2.80]) and deficiency (OR [95%CI] = 3.64 [2.13 - 6.22]) were both related to SO after adjusting for all covariates. In body composition phenotype model, vitamin D inadequacy (OR [95%CI] = 1.50 [1.17 - 1.92]) and deficiency (OR [95%CI] = 1.85 [1.48 - 2.33]) also were both related to SO. Additionally, a nonlinear correlation between vitamin D levels and SO in FM/FFM model was also observed (P = 0.0021).

Conclusions There was an association between SO and vitamin D deficiency. The relationship between SO and vitamin D inadequacy was also found in TrFM/ASM model and body composition phenotypes model, which means serum vitamin D needs to be maintained at an adequate level to reduce the potential risk of SO.

Key words Sarcopenic obesity, Body composition, Vitamin D, Dual energy X-ray

Category: Public Nutrition & Health

中国人群的两个队列中与吸烟相关的微生物特征及其与脂肪分布的联系

Distinct microbial signatures associated with cigarette smoking and their links to fat distribution in two Cohorts from Chinese populations

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Background and Objective: The associations of fat distribution with smoking and gut microbiota are not well understood. In this study, we aimed to examine these associations in male Chinese populations.

Methods: We included 2,783 male participants from the WELL-China Cohort and 1,336 male participants from the Lanxi Cohort. Fecal samples were collected between 2015 and 2019 and analyzed using 16S rRNA sequencing. Fat distribution were measured using the dual energy X-ray absorptiometry (DXA). We used the QIIME2 analysis pipeline to identify the associations between smoking status and gut microbiota, and the MaAsLin analysis to identify the distinct microbes in different smoking status. Multivariable linear regression and logistic regression models were applied to investigate the associations between the identified gut microbiota (smoke-microbiota index) and fat distribution.

Result: Cigarette smoking was significantly associated with microbial overall structure ($p<0.05$). Moreover, the smoking-related microbiota identified gut microbiota (smoke-microbiota index) was positively correlated with central obesity, assessed by waist circumference and waist-to-hip ratio and, android fat-related variables from DAX, including trunk fat percentage, trunk-to-legs fat ratio, android fat percentage, and android-to-gynoid fat ratio, but inversely correlated with gynoid fat, such as gynoid fat percentage and legs fat percentage ($p<0.01$). In both cohorts, we observed these results consistently.

Conclusion: Our study suggests that cigarette smoking might play a role in alteration of the gut microbial profile and contribution to central obesity in men. These findings highlight the potential role of the gut microbiome in smoking-related obesity and provide new insights into the harmful effects of smoking.

Key words cigarette smoking, gut microbiome, 16S rRNA, fat distribution, obesity

Category: Public Nutrition & Health

肠道微生物在昼夜节律紊乱引发相关代谢紊乱疾病中的影响
The Effects of Gut Microbiota on Metabolic Disorders Induced by Circadian Rhythm Disturbance

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Along with the rapid development of society, unhealthy lifestyle, such as high-calorie diet, irregular eating and sleeping patterns lead to circadian rhythm disorder of people. Circadian clocks, alignling behavioral and biochemical processes with the 12 h day/12 h night cycle to help the body adapt to periodic changes in the environment, plays an important role in metabolism. By contrast, rhythm disorder can lead to obesity and metabolic disorders. As an important participant in nutrient absorption, gut microbiota undergoes diurnal compositional and functional oscillations that affect metabolic homeostasis. Unhealthy lifestyle not only disturbs central and peripheral circadian rhythms, but also changes the normal composition of intestinal microbiota and their secretion of metabolites. Ultimately, all of these changes lead to metabolic disorders. For example, shift work and chronic jet lag disturb the circadian clock. Mimicking the jet lag situation in mice for 8 weeks, study shows that jet lag mice featured an abrogation of bacterial rhythms on nutrients metabolism with a reduced number of oscillating bacterial taxonomic units. The time-shifted mice also exhibited enhanced weight gain and exacerbated glucose intolerance as compared to mice maintained on normal circadian rhythmicity. Giving the Time Restrict Feeding (TRF), the light-phase-fed group shows that most cycling OTUs appeared a phase shift of about 12 h upon modification of feeding times and maybe directly connected with obesity. Moreover, High-fat diet (HFD) introduce abnormal composition of intestinal microbiome and oscillating rhythm. With the microbiome changing, the diurnal oscillation of associated metabolites such as short chain fatty acid (SCFA) butyrate、unconjugated bile acids will also change and influence metabolism. SCFA trigger the release of GLP-1(colon), leptin (fat) and insulin (pancreas). These hormones, along with short-chain fatty acids, enter the systemic circulation and interact with skeletal muscle to influence lipid, carbohydrate, and protein metabolism.

Key words unhealthy life style; gut microbiota; circadian rhythm; metabolic disturbance; obesity

Category: Public Nutrition & Health

中老年人群饮食来源的B族维生素摄入量与睡眠质量的关联性研究

Intake of B vitamins and sleep quality in middle-aged and older adults: the HealthyDance study

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Background: The B vitamins are known as cofactors involving the enzymatic reactions in the conversion process of serotonin to melatonin, a hormone that supports healthy sleep. However, data directly linking these B vitamins intake from dietary sources to sleep quality are sparse.

Objectives: To examine the association of the intake of B vitamins with sleep status in middle-aged and older adults.

Methods and Study Design: We performed a cross-sectional study with participants from the HealthyDance study, a cohort of community-dwelling adults aged ≥45 years who frequently participated in square dance at baseline. Nutrient intake was obtained through a validated food frequency questionnaire. The lowest quintile was used as the reference category. Sleep quality was assessed using the Pittsburgh sleep quality index standard questionnaire. Multivariable logistic regression was performed to assess the relationship between dietary B vitamins consumption and sleep quality.

Results: A total of 2333 participants (mean age 62.3±6.2, 89.9% females) were included in this study, and the prevalence of poor sleep quality was 33.6%. Compared with the lowest quintile group of dietary B vitamins intake, the highest quintile group had a lower prevalence of poor sleep quality. After adjustment for potential confounders, a higher intake of total B vitamins (odds ratio [OR] for highest vs. lowest quintile: 0.68, 95% confidence interval [CI]: 0.51-0.90, p for trend <0.05), VB6 (OR for highest vs. lowest quintile: 0.59, 95% CI: 0.44-0.79, p for trend <0.05), VB12 (OR for highest vs. lowest quintile: 0.62, 95% CI: 0.46-0.85, p for trend <0.05), folate (OR for highest vs. lowest quintile: 0.59, 95% CI: 0.44-0.79, p for trend <0.05) were associated with a lower odds of poor sleep quality.

Conclusions：A higher intake of dietary B vitamins was associated with better sleep quality in Chinese middle-aged and older adults.

Key words B vitamins, diet, sleep quality, the HealthyDance study

Category: Public Nutrition & Health

從專業角度提升穀類的營養價值及應用

Improve the Nutritional Value and Application of Cereals from a Professional Perspective

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In the Lancet 2019 Global Burden of Diseases report, ″too less whole grain intake″ is a dangerous dietary factor, with more than 2 million deaths associated with it. This shows, it is really important to promote the concept of whole grain health, for this purpose to develop related products to enhance its nutritional value and provide them for use by the general public.

Using organic brown rice and rice bran to design different types of products considering their nutritional content. In addition to the three major nutrients, learn more about the special ingredient γ- Oryzanol. The first-generation product ″Brown Rice Extract″, which means that it is rich in 65% of the essential nutrients of brown rice, so that ordinary people can eat it for breakfast or snacks. Then improve the nutritional content of rice bran, which has a balanced amino acid composition, and lysine is 41% higher than that of white rice. The design single package contains 4.7 grams of dietary fiber, providing a daily recommended amount of fiber 20 %. Another product still uses the protein complementation. Psyllium seed is added to provide different types of dietary fiber, and a snack suitable for patients is developed-comprehensive grain powder.

After promoting the products, the sales volume of comprehensive grain flour was 1170 boxes, “Brown Rice Extract” 425 packets. The rice bran product ″Excellent Base “Super” was launched and has been used by hundreds of people, with a total of 13,192 packs sold. In addition, more than 1,600 packets of comprehensive cereal flour are used in the hospital every month.

Inadequate intake of whole grains is a global problem. It is hoped that products developed from grains can be professionally enhanced in their nutritional value and application.

Key words Professional perspective, cereals, nutritional value.

Category: Public Nutrition & Health

城镇化藏族成年人的炎症相关饮食模式和肥胖风险：一项纵向研究

Inflammatory-Related Dietary Patterns and Obesity Risk in Urbanized Tibetan Adults: A Longitudinal Study

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Objective: The alarmingly growing prevalence of obesity and its complications pose a tremendous burden of non-communicable diseases (NCDs) on individual and public healthcare systems worldwide. Diet plays an important role in modulating inflammatory response and development. We aimed to identify inflammatory-related dietary patterns (DPs) and explore their associations with obesity among urbanized Tibetan adults.

Methods: Between 2018 and 2022, 1826 subjects were enrolled using an open cohort design, and 514 of them were followed up in 2022. Height, weight and waist circumference were measured and used to define overweight, general obesity and central obesity, respectively. DPs were derived using reduced rank regression based on a 41-item Food Frequency Questionnaire using high-sensitivity C-reactive protein and prognostic nutritional index as inflammatory response variables. Altitude levels were classified as either high or ultra-high. Mixed effect models were used to determine the associations.

Results: Two dietary patterns (DPs) were identified in this study. DP-1 was characterized by high consumption of sugar-sweetened beverages, savory snacks, and poultry, and low intake of tsamba. DP-2 was characterized by high intake of poultry, pork, animal offal, and fruits, and low intake of butter tea. Participants in the highest tertiles (T3) of both DPs had increased risks of overweight and obesity (DP-1: OR=1.37, 95% CI: 1.07, 1.77; DP-2: OR=1.48, 95% CI: 1.18, 1.85) compared to those in the lowest tertiles (T1). Moreover, participants in T3 of DP-2 had an increased risk of central obesity (OR=2.25, 95% CI: 1.49, 3.39) compared to those in T1. Subgroup analyses revealed that the positive association between DP-1 and overweight/obesity risk was only observed in high altitude, while no such effect was observed for DP-2.

Conclusions: Inflammatory-related DPs were associated with increased risks of overweight, obesity, and central obesity.

Key words Keywords: inflammatory-related dietary patterns; reduced rank regression; overweight and obesity; central obesity; Tibetan Plateau

Category: Public Nutrition & Health

胰岛素抵抗的经验性饮食指数和经验性膳食炎症模式与代谢相关脂肪肝的关联研究

Associations of empirical dietary index for insulin resistance and empirical dietary inflammatory pattern with metabolic dysfunction-associated fatty liver disease

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Background and objectives: Insulin resistance and inflammation play a pivotal role in the development of metabolic dysfunction-associated fatty liver disease (MAFLD), while the role of insulin-resistant or pro-inflammatory diet in MAFLD remains unclear. The aim of the study was to investigate the associations of dietary index and pro-inflammatory dietary pattern with MAFLD.

Methods: Our study included participants from the Lanxi urban cohort and the Gongshu district of WELL-China cohort. Fatty liver was diagnosed by abdominal ultrasound scan. Empirical dietary index for insulin resistance (EDIR) and empirical dietary inflammatory pattern (EDIP) were derived using reduced rank regression to identify food groups most predictive of homeostatic model assessment for insulin resistance (HOMA-IR), C-reactive protein (CRP) and white blood cells (WBC) in these two cohorts. Odds ratios (ORs) and 95% confidence intervals (CI) were estimated using logistic regression. The above analyses were performed for each cohort separately.

Results: Of the 2,296 participants in the Lanxi urban cohort, 841 (36.6%) were diagnosed with MAFLD. The EDIR was comprised of eight food groups: three were positively associated with HOMA-IR and five were inversely associated. The EDIP was comprised of eight food groups: three were positively associated with CRP and WBC and five were inversely associated. The multivariable-adjusted ORs for participants in the highest tertile, compared to those in the lowest tertile, were 1.51 (95% CI: 1.05-1.27, P_{trend} = 0.003) for EDIR and 1.59 (1.31-1.94, P_{trend} < 0.001) for EDIP. Moreover, the effects were stronger among individuals aged 50 years or older. The observed results can be validated in the Gongshu district of WELL-China cohort.

Conclusions: People with higher adherence to EDIR and EDIP were associated with increased risk of MAFLD in two independent cohorts. Our findings suggested insulin resistance and inflammation may be a potential mechanism linking dietary patterns and MAFLD.

Key words dietary pattern; insulin resistance; inflammation; metabolic dysfunction-associated fatty liver disease; reduced rank regression

Category: Public Nutrition & Health

北京市儿童青少年酒类广告的暴露程度及广告营销策略
Exposure Of Children and Adolescents to Alcohol Advertising on Television in Beijing, China

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Background and Objectives

Evidence suggests that children and adolescents exposed to alcohol advertising are at a higher risk of early initiating alcohol use and consuming more alcohol. This study aimed to explore the extent and nature of television alcohol advertising to children and adolescents in Beijing, China.

Methods and Study Design

We selected the five most popular television channels among children and adolescents aged 3-18 years in Beijing, including two channels for general audiences and three for children and adolescents. Television broadcasts were recorded for eight randomly selected days over three months, excluding public holidays and school holidays, between October 19, 2020, and January 17, 2021. Recordings were done from 6:00 am to 00:00 am each day. The collected data were coded and analyzed using the International Network for Food and Obesity/Non-communicable Diseases Research, Monitoring and Action Support protocol.

Results

Of the 13,864 advertisements recorded in 720 hours of recorded programming, 321 (2.32%) were alcohol advertisements, and 5,055 (36.46%) were food and non-alcohol beverage advertisements. All alcohol advertisements were from two channels for general audiences, which promoted spirit alcohol brands or products. The two general audience channels displayed an average of 32 and 7 alcohol advertisements per day, respectively. During peak viewing times, each channel aired about two to three times as many alcohol advertisements per hour as other times ($P<0.001$). All alcohol advertisements used persuasive marketing strategies, with brand benefit claims (95.64%) being the most commonly used strategy, followed by advercation (73.21%).

Conclusions

Children and adolescents may still be highly exposed to alcohol advertising on television in Beijing, despite restrictions on the number of alcohol advertisements by the Advertising Law and the Regulation on Broadcasting of Radio and Television Advertisements. Urgent action is required to enact and enforce regulations to protect children and adolescents from alcohol advertising on television.

Key words Advertising; Alcohol; Children and adolescents; Television; Persuasive marketing

Category: Public Nutrition & Health

不同体重状况和体脂分布的儿童血浆代谢物变化
Variations in Plasma Metabolites in Children with Different Weight Statuses and Body Fat Distributions

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Objectives: This study aimed to examine the variations in plasma metabolites among Chinese children aged 6 - 11 years with different weight statuses and body fat distributions.

Methods: This cross-sectional study enrolled 426 healthy children, comprising 185 girls and 241 boys. The subjects' weight statuses were categorized as underweight, normal weight or overweight/obese based on body mass index. Dual-energy X-ray absorptiometry was used to determine body fat content and regional fat distribution. Plasma metabolites were analyzed using targeted metabolomic technologies.

Results: A total of 200 metabolites were accurately quantified. 27 differential metabolites were identified in participants of different weight status with variable importance in the projection value greater than 1 and false discovery rate adjusted p value less than 0.05. Furthermore, we used least absolute shrinkage and selection operator regression with internal validation to discover 18 metabolites that were associated with body mass index. After adjusting for potential covariates and multiple test correction, multiple linear regression analyses revealed that methylmalonic acid, l-glutamine, glycine, erythorbic acid, and acetylglycine were all negatively associated with body mass index, body fat content, and regional body fat distribution (β: -8.59×10^{-1} - -5.55×10^{-5}, p_{FDR}: < 0.001 - 0.042). Conversely, pyroglutamic acid, l-valine, l-tyrosine, l-leucine, l-glutamic acid, l-carnitine, l-alanine, and isovalerylcarnitine were all positively related with the above mentioned measures (β: 8.78×10^{-5} - 1.55, p_{FDR}: < 0.001 - 0.043). In Kyoto Encyclopedia of Genes and Genomes analysis, the top five significantly enriched pathways included “Phenylalanine, tyrosine and tryptophan biosynthesis”, “D-Glutamine and D-glutamate metabolism”, “glycine, serine and threonine metabolism”, “phenylalanine metabolism”, and “Alanine, aspartate and glutamate metabolism”.

Conclusions: Certain plasma metabolite concentrations are related to body mass index and body fat distribution. These metabolic signatures present novel intervention approaches to improve weight status in children.

Key words Plasma metabolites; Weight status; Body mass index; Body fat distribution; Children

Category: Public Nutrition & Health

性别认知对中国大学生健康膳食行为的影响：基于潜类别分析

The Impact of Gender Perceptions on Healthy Dietary Behaviors among Chinese University Students: A Latent Class Analysis

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As China enters the second phase of the nutrition transition, the "triple burden" of malnutrition (insufficient caloric intake, micronutrient deficiencies, and excessive nutrient intake leading to overweight and obesity) emphasizes the need to understand dietary behavior patterns. This study re-examines the factors influencing healthy dietary behavior among Chinese people from a gender roles perspective, offering a unique insight compared to previous research focusing on individual nutritional knowledge, economic status, and environmental factors.

Using 2020 data from local university students in Shanghai, this study employs a Latent Class Analysis (LCA) model based on students' consumption frequency of 20 food items, categorizing their dietary behavior into omnivorous, health-conscious, and picky eating groups. It also analyzes the influence of gender roles and other factors on students' adoption of these three dietary patterns by sex.

Contrary to previous findings that men are less likely to engage in healthy behavior, women are more prone to picky eating. Female students with more traditional gender role beliefs are less likely to adopt healthy dietary patterns. The societal and cultural emphasis on a slim figure for women and their internalization of this expectation may significantly contribute to traditionally-minded female students deviating from healthy diets.

The university stage is crucial for establishing healthy behaviors. To promote healthy diets, attention must be given to the impact of socio-cultural factors on dietary patterns while advocating for gender equality in society.

Key words Healthy dietary behaviors; Gender perceptions; Chinese university students; Latent Class Analysis; Sociocultural factors

Category: Public Nutrition & Health

多组学联合分析沙棘熊果酸对饮食肥胖小鼠肠道菌群及代谢产物的影响

Multivariate analysis of the effext of seabuckthorn usolic acid in intestinal flora and metabolities in obese mice

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Objective This study aims to explore the relationship between intestinal flora and metabolites of Mongolian obese children. Methods Mongolian children in Tongliao, Inner Mongolia were selected as obese group and 15 children with normal weight were selected as normal group. The fecal samples of two groups of children were collected, the intestinal microbes were detected by 16S rDNA technique, and the diversity and difference of intestinal flora between the two groups were analyzed. The metabolites with obvious differences between the two groups were screened by liquid chromatography-mass spectrometry, and the enrichment analysis pathway was predicted.Results The relative abundance of Bacteroides and Firmicutes in feces of obese children was lower than that of normal children ($P<0.05$), while Actinomycetes and Proteobacteria were higher than that of normal children ($P<0.05$). There were significant differences between obesity group and normal group in 7 dominant genera ($P<0.05$), among which 4 genera were down-regulated and 3 genera were up-regulated. Here were differences among 12 metabolites ($P<0.05$), the contents of 6 metabolites such as tyrosine and 4- hydroxyproline decreased, while the contents of 6 metabolites such as ribolactone and 4- cholestene -3 ketone increased.After the analysis of differential metabolites enrichment, it was found that the changes of metabolic pathways mainly focused on the synthesis of steroid hormones, phenylalanine, tyrosine and tryptophan.According to the correlation analysis between different bacteria and different metabolites, Alistipes was negatively correlated with 4-cholesterin-3 ketone, Bacteroides and Alistipes with citrulline, Blautia with ribonucleic acidlactone, and Pseudobutyrivibrio with 4-cholesterin-3 ketone were positively correlated. Conclusion There are differences in the structure of intestinal flora and fecal metabolic spectrum between normal-weight and obese Mongolian children, and the changes of metabolic pathways mainly focus on the synthesis of steroid hormones, phenylalanine, tyrosine and tryptophan, while citrulline, 4-cholestene-3 ketone and riboselactone may become biomarkers of obesity in Mongolian children.

Key words Mongolian children; Obesity; Intestinal flora; Metabonomic

Category: Public Nutrition & Health

不同膳食模式和代谢综合征及其组分的关系：基于一项中国藏族成人的队列研究

Association between dietary patterns and metabolic syndrome and its components: a cohort study of Tibetan adults in China

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Background: Little is known about the longitudinal association between dietary patterns (DPs) and metabolic disorders in Tibetans who live in high-altitude areas.

Methods: We constructed the first open cohort with 1832 Tibetan adults. The Food frequency questionnaire survey and anthropometric and biomarker measurements were used in 2018 and in 2022. Factor analysis was conducted to identify major DPs. The mixed-effect model was used to examine the associations between DPs and metabolic syndrome (MetS) and its components.

Results: The MetS prevalence was 30.1% (32.3% in men and 28.3% in women). Three different DPs were identified: modern DP (pulses, poultry, offal, and processed meat), urban DP (vegetable, refined grain, beef/mutton, and eggs), and pastoral DP (Tibetan cheese, tsamba, butter/milk tea, and desserts). Participants within the third tertile of the urban DP had a 3.42-fold (95% CI 1.65-7.10) higher risk of MetS than those with the 1st tertile. Modern DP was positively associated with elevated blood pressure (BP) and elevated triglycerides (TAG) while it was inversely associated with low HDL-C (OR 0.71, 95%CI 0.56-0.90). The urban DP was associated with a higher risk of low HDL-C (OR 2.36, 95%CI 1.83-3.04), but a lower risk of impaired fasting blood glucose (FBG). The pastoral DP was a risk factor for impaired FBG (OR 1.42, 95%CI 1.06-1.90), but protective against central obesity (OR 0.57, 95%CI 0.35-0.92) and elevated BP (OR 0.64, 95%CI 0.43-0.96).

Conclusion: Among Tibetan adults, DPs were associated with MetS and its components. Urban DP is the risk factor of MetS. Tailored intervention should be implemented.

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Key words blood pressure; blood glucose; dietary pattern; high altitude; lipids; metabolic syndrome; obesity; Tibetans

Category: Public Nutrition & Health

中文版儿童饮食行为问卷的验证及其与学龄前儿童肥胖的关联
The Chinese version of the Child Eating Behavior Questionnaire: validation, and association with obesity in preschool children

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Objective: The study aims to evaluate the construct validity of the Chinese CEBQ in preschoolers and explore the relationships between eating behaviors and obesity.

Method: Parents of 3-6-year-old children completed the Chinese version of the CEBQ, obtained through a translation-back-translation process, to evaluate preschool children's eating behaviors. The construct validity was tested using confirmatory factor analysis (CFA). Multiple linear regression and logistic regression were employed to assess the relationships between eating behaviors and anthropometric indicators.

Results: The modified 8-factor model showed an acceptable fit with comparative fit index = 0.900, Tucker - Lewis index = 0.884, root mean square error of approximation = 0.058, and standardized root means square residual = 0.069. Logistic regression revealed that preschoolers with higher scores in enjoyment of food (OR = 1.751, 95% CI = 1.130-2.757, P = 0.014), desire to drink (OR = 1.485, 95% CI = 1.040-2.126, P = 0.029), and food responsiveness (OR = 1.934, 95% CI = 1.289-2.945, P = 0.002) showed a significantly higher risk of overweight and obesity. The opposite relationships were found in satiety responsiveness (OR = 0.467, 95% CI = 0.312-0.684, P < 0.001), slowness in eating (OR = 0.352, 95% CI = 0.245-0.491, P < 0.001), and emotional undereating (OR = 0.623, 95% CI = 0.435-0.877, P = 0.008).

Conclusion: This study presented an acceptable fit for the Chinese CEBQ based on the CFA and showed correlations between eating behaviors and obesity, which provided a reasonable tool to assess the eating behaviors of preschoolers in China.

Key words preschool children; overweight and obesity; CEBQ; Chinese version; CFA

Category: Public Nutrition & Health

糖尿病患者叶酸代谢物与慢性肾脏疾病的关系:NHANES 2011-2018 数据集分析

Relationship of folate metabolites with chronic kidney disease in diabetic patients: A Cross-sectional analysis of the NHANES 2011-2018 dataset

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Abstract:

Background: There were many studies explored the relationship between folate and health while the effects of folate on the diabetes mellitus patients are still not clear. This study aims to explore the possible effect of the metabolites of folate on CKD in diabetic patients.

Methods: Anthropometrics data of diabetic patients from 2011 to 2018 were collected from NHANE database. Ordinal logistic regression was used to determine the potential effect of the metabolites of folate on the severity of CKD. The spearman correlation was used to identify the relationship between the total folate intake and the amounts of metabolites of folate. The receiver operating characteristic (ROC) curve analysis was performed to determine the optimal cut-off value for reduced estimated glomerular filtration rate (eGFR).

Results: Among the 2,542 diabetic patients analyzed in this study, 1774 (69.79%) were clinically diagnosed stage I and II patients of CKD. Univariate and multivariate analyses showed that high concentration of 5-mTHF (5-Methyltetrahydrofolate) is associated with the decreased severity of CKD and unmetabolized folic acid/folate, while high Mefox is associated with the increased severity of CKD ($P<0.05$). Intake of total folic acid and folate can increase the amount of those four metabolites. The ROC of eGFR showed that Mefox had the highest AUC (0.798).

Conclusions: Several metabolites of folate are significantly associated with the severity of CKD in diabetic patients. Self-reported folate supplementation is associated with a higher 5-mTHF concentration in these patients compared to other metabolites detected in these patients.

Key words Chronic kidney disease, diabetes, folate, folate metabolites

Category: Public Nutrition & Health

超加工食品消费与2型糖尿病患者心血管疾病风险的关联：英国生物银行的调查结果

Association of ultra-processed food consumption with risk of cardiovascular disease among individuals with type 2 diabetes: Findings from the UK Biobank

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Background and Objectives: Among patients with diabetes, who have modified nutritional behavior and a higher risk of cardiovascular disease (CVD), the influence of ultra-processed foods (UPFs) on CVD remains unknown. To evaluate the association between UPF intake and the risk of CVD among individuals with type 2 diabetes (T2D) and further examine the potential biological pathways linking the association.

Methods and Study Design: This study included 5,405 participants with T2D providing at least one 24-h dietary recall from the UK Biobank study. UPFs were defined using the NOVA classification, which is widely used to classify foods based on the degree of processing. Incident CVD was ascertained through self-report, primary care records, hospital in-patient records, and death register records. Multivariable cox proportional hazards regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for CVD outcomes. Mediation analyses were used to estimate the mediating effects of 14 biomarkers relating to renal function, lipid profile, inflammation, blood pressure, and body weight.

Results: During a median of 11.7 years of follow-up, 1,089 incident CVD events occurred, including 829 coronary heart disease (CHD), 225 stroke, and 310 heart failure events. In the multivariable-adjusted models, a 10% increase in the proportion of UPFs was associated with higher hazards of overall CVD (HR: 1.10; 95% CI: 1.04, 1.15), CHD (HR: 1.10; 95% CI: 1.04, 1.16), heart failure (HR: 1.14; 95% CI: 1.05, 1.25), but not stroke (HR: 1.01; 95% CI: 0.90, 1.12). Cystatin C, HDL-C, apolipoprotein A, C-reactive protein, and body mass index collectively explained 26.9% (12.8%, 48.5%) of the association between UPF intake and overall CVD.

Conclusions: Higher UPF intakes were associated with increased hazards of CVD among individuals with T2D, and the associations were partly mediated through worsening biomarkers of renal function, lipid metabolism, inflammation, and body weight.

Key words Cardiovascular disease; Mediation; Metabolic biomarkers; Type 2 diabetes; Ultra-processed foods.

Category: Public Nutrition & Health

代谢综合征人群中膳食纤维摄入量与心脏代谢性疾病的关联：前瞻性研究

Association of dietary fiber intake and cardiometabolic disease in metabolic syndrome populations: A prospective study

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Objective: Dietary fiber is known to have protective effects against obesity, type 2 diabetes, cardiovascular disease and the metabolic syndrome. In this study, we investigated whether dietary fiber intake and its changes in the gut microbiome associated with the risks of having cardiometabolic disease in metabolic syndrome populations.

Participants: The present study included 2296 participants with metabolic syndrome from the Well-China cohort study, and 1172 participants with metabolic syndrome from the Lanxi cohort study. Over an average 3.9 year follow-up period, we detected 117 and 113 individuals with onset of cardiometabolic disease from the Well-China cohort and Lanxi cohort, respectively.

Results: In the fully adjusted models, a higher dietary fiber intake was associated with decreased onset of cardiometabolic disease (fiber intake ≥ 7.39: HR, 0.62; 95%CI, 0.42-0.92) in Well-China cohort, although no significant association was found in Lanxi cohort (HR, 0.6; 95%CI, 0.27-1.35). Meta-analysis of Well-China and Lanxi cohorts showed that, compared with lowest fiber intake group, the higher group had 38% lower risk of having cardiometabolic disease (HR, 0.62; 95%CI, 0.43-0.88). In microbiota analysis, the fiber related microbiota score, which implied high dietary fiber intake caused changes of gut microbiome, was inversely associated with cardiometabolic disease morbidity (P trend=0.017) in Well-China cohort.

Conclusions: Our results suggest that in metabolic syndrome populations, higher fiber intake could significantly reduce cardiometabolic disease risks, and fiber related microbiota changes also associated with lower risk of having cardiometabolic disease.

Key words Keywords: dietary fiber; cardiometabolic disease; gut microbiota; metabolic syndrome

Category: Public Nutrition & Health

江苏省居民营养健康知识知晓率调查情况及影响因素分析

The awareness rate of nutrition and health knowledge and its influencing factors in Jiangsu Province, China

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Background and Objectives: China has both undernutrition and overnutrition, and chronic diseases aggravated by unreasonable diets, which are largely caused by the low level of nutrition and health literacy of individuals. This study was aimed to grasp the knowledge level of nutrition and health in Jiangsu Province and provide scientific basis for nutrition intervention policy formulation.

Methods: A multi-stage sampling method was adopted to select research objects in 13 cities of Jiangsu Province. The descriptive statistic was used to illustrate the characteristics of nutrition and health knowledge level of Jiangsu residents. And logistic regression applied to explore its influencing factors.

Results: A total of 4683 people joined the investigation on the awareness rate of nutrition and health knowledge from Mar 2021 to Jun 2021 were included. The total health awareness rate was 23.89%, among which the qualified rate of the food hygiene part was higher (73.03%), the qualified rate of the food selection part and the dietary guideline part was lower (11.94% and 17.17%). Southern and central areas of Jiangsu are higher than northern areas. It was associated with sex, age, and education level. Conclusions: Nutrition and health knowledge training especially for food choices and dietary guideline part for the 35-49 age group in northern areas should be strengthened.

Key words nutrition and health knowledge; characteristics; influencing factors

Category: Public Nutrition & Health

全孕期持续高水平体力活动与早产风险的关联：中国医科大学出生队列研究

Sustained high-level physical activities throughout pregnancy and the risk of preterm birth: China Medical University Birth Cohort Study

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China Medical University

Abstract

Objectives: Physical activity (PA) during pregnancy is a potentially modifiable risk factor to prevent preterm birth (PTB). However, whether a sustained high level of PA across three trimesters protects women from PTB remains unclear. This study aimed to examine the protective association of a sustained high level of PA throughout pregnancy with PTB.

Methods: This observational study was based on the China Medical University Birth Cohort Study, in which 1538 women were included during early pregnancy and three follow-ups were conducted. PA was assessed for each trimester via the Pregnancy Physical Activity Questionnaire (PPAQ). PTB was diagnosed from medical records, while subtypes were diagnosed by experienced gynecologists. The protective association of a sustained high level of PA throughout pregnancy with PTB was assessed by multivariable logistic regression models.

Results: In the final analysis, the incidence of PTB, iatrogenic preterm birth (IPTB), and spontaneous preterm birth (SPTB) was 12.03%, 9.17%, and 2.86%, respectively. A higher prenatal cumulative physical activity score (the number of trimesters that the intensity of maternal physical activity is in the highest tertile) across three trimesters significantly correlated with a lower risk of PTB (a score of 3 vs. a score of 0: OR = 0.24; 95% CI: 0.11–0.54, **P** for trend <0.001) and IPTB (a score of 3 vs. a score of 0: OR = 0.23; 95% CI: 0.09–0.59, *P* for trend <0.001) in a dose-response-dependent manner, but not with a lower risk of SPTB.

Conclusions: Women with sustained high levels of PA across pregnancy were at the lowest risk of PTB and IPTB. These results support the American College of Obstetricians and Gynecologists' guideline and further highlights the importance of sustained PA to PTB.

Key words Preterm birth; Physical activity; Birth cohort; Iatrogenic preterm birth; Spontaneous preterm birth

Category: Public Nutrition & Health

孕期体力活动与胎儿生长发育的关联：中国医科大学出生队列研究

Trimester-specific association of physical activity during pregnancy with fetal growth in the China Medical University Birth Cohort Study

Jiajin Hu*,Yanan Ma,Ming Sun,Ningyu Wan,Borui Liu,Xiaochuan Wang,Lu Zheng,Zhe Yang,Deliang Wen
China Medical University

Objectives: Fetal growth disorders adversely affect pregnancy and later-life outcomes. We aimed to examine the trimester-specific association of physical activity during pregnancy with fetal growth, as this association has not been established.

Methods and Study Design: We analyzed 1526 mother-neonate pairs participating in the China Medical University Birth Cohort. The Pregnancy Physical Activity Questionnaire (PPAQ) was used to assess the physical activity status of women during each trimester. Small for gestational age (SGA) and large for gestational age (LGA) were defined according to the INTERGROWTH-21st birthweight standards and estimated fetal weight (EFW) was based on ultrasound measurements.

Results: Overall, 99/1526 (6.5%) and 773/1526 (50.7%) newborns were SGA and LGA in the present study. Higher total physical activity throughout pregnancy was associated with a lower risk of SGA (odds ratio [OR]: 0.63, 95% confidence interval [CI]: 0.40-0.98, *P* for trend: 0.039). We detected a negative correlation between physical activity in the second trimester and SGA (OR: 0.58, 95% CI: 0.34-0.995, *P* for trend: 0.046) after adjusting for all covariates. Physical activity in the second trimester was also negatively correlated to fetal growth restriction (FGR; EFW below the 10th percentile) (OR: 0.45, 95% CI: 0.25-0.81, *P* for trend: 0.007).

Conclusions: Our results suggested that the second trimester is a sensitive window for the effect of physical activity on fetal growth. Higher levels of physical activity during that window were associated with a lower risk of SGA and FGR during the second trimester.

Key words Fetal growth; Physical activity; Small for gestational age; Large for gestational age; Estimated fetal weight

Category: Public Nutrition & Health

汉族和蒙古族膳食模式与糖尿病风险的关联差异：一项中国横断面研究

Han and Mongolian Differences in Dietary Patterns and Risk of Diabetes: Evidence from A cross-sectional study in China

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Objectives: This investigation aimed to identify the main dietary patterns among Han and Mongolian populations in China and explore the relationships between these patterns with diabetes and its components.

Methods and Study Design: This cross-sectional survey was conducted in Fuxin city, Liaoning Province, China, in 2021. 2,862 participants were recruited to assess dietary intake using a semiquantitative food frequency questionnaire (FFQ). Dietary patterns were identified using principal components analysis. Multivariable logistic regression was applied to investigate the associations between dietary patterns and diabetes. To quantify the magnitude of mediation, we estimated the proportion of the association between dietary patterns and diabetes mediated by obesity.

Results: Four dietary patterns were identified in total participants: “Meat Pattern,” “Protein-sweets pattern,” “Traditional Chinese pattern,” and “Staple food pattern.” In all populations, the protein-sweets pattern was associated with a lower risk of diabetes (P for trend: 0.046). The traditional Chinese pattern was positively associated with the risk of diabetes (OR: 3.88, 95%CI: 2.79-5.38). For the staple food pattern, a negative correlation was observed with the risk of diabetes (OR: 0.26, 95%CI: 0.19-0.36). In the stratified analysis, the protein-sweets pattern was negatively associated with diabetes only among the Han (OR: 0.64, 95%CI: 0.48-0.99). The traditional Chinese pattern and the staple food pattern were associated with diabetes among both Han and Mongolian. Moreover, BMI mediated the association of the protein-sweets pattern (Proportion mediated: 9.58%) and traditional Chinese pattern (Proportion mediated: 3.51%) with diabetes. Waist circumference (Proportion mediated: 17.54%) and abdominal obesity (Proportion mediated: 11.24%) mediated the association of the traditional Chinese pattern with diabetes.

Conclusions: We suggested that the meat pattern and the traditional Chinese pattern should be reduced in both Han and Mongolian populations while they should all follow the staple food pattern more often. For the Han, the protein-sweets pattern may also reduce diabetes risk.

Key words Dietary patterns; Diabetes; Han; Mongolian

Category: Public Nutrition & Health

嗜热链球菌 MN-ZLW-002 通过脑肠轴介导减轻 APP/PS1 小鼠的认知功能障碍

Live and heat-inactivated Streptococcus thermophilus MN-ZLW-002 mediate the gut-brain axis alleviating cognitive dysfunction in APP/PS1 mice

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Aim: To explore the possibility of using *S. thermophilus* MN-ZLW-002 to regulate the gut-brain axis and improve cognitive function in mice. **Methods:** Wild-type mice and the APP/PS1 mice were divided into the control, model, the low-dose live probiotics treatment (AL) group, the high-dose live probiotics treatment (AH) group, the low-dose heat-inactivated probiotics treatment (IL) group, and the high-dose heat-inactivated probiotics treatment (IH) group treated with steriled saline, 8.33×10^9 CFU/kg.bw/d or 1.67×10^{10} CFU/kg.bw/d live or heated-inactivated *S. thermophilus* MN-ZLW-002. After intervention 3 months, mice were subjected to behavioral tests. **Results:** Compared with the model groups, the AH and IH groups had shorter latencies of Morris water maze on the test day ($p<0.05$). Compared with the control group, the model and AL groups had higher Shannon index ($p<0.05$). Compared with the control group, the AL group had a higher Simpson index ($p<0.05$). Compared with the control group, the model, AL and IL groups had significantly higher levels of astrogliosis ($p<0.05$). In contrast, compared to the model group, the AH group had a significantly lower level of astrogliosis ($p<0.05$) . Compared with the control group, the AL and IL groups had significantly higher IL-6 levels in the serum ($p<0.05$), while the model, AH, AL, IH, and IL groups had significantly lower LPS levels in the serum ($p<0.05$). **Conclusion:** These results indicated that different forms and doses of the same strain, S. thermophilus MN-002, can partly improve cognitive functions in the AD model mice via the gut-brain axis.

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Key words Brain function, gut microbiota, probiotics

Category: Public Nutrition & Health

天津地区孕期膳食与母乳低聚糖含量的相关性分析

Vitamins, vegetables and metal elements are positively associated with breast milk oligosaccharide composition among mothers in Tianjin, China

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Background: Human milk oligosaccharides are a group of breast milk carbohydrates that do not exist in conventional foods, but exert pivotal benefits for breastfed infants. The influence of maternal diet, on breastmilk Human milk oligosaccharides composition has not been well characterized.

Objectives: We investigated associations between dietary nutrient intake and Human milk oligosaccharides concentrations in a general pregnant and postpartum population.

Methods: A total of 385 breast milk samples from 277 mothers were collected. Baseline maternal characteristics and dietary patterns were collected using food frequency questionnaires. Six different Human milk oligosaccharides were detected in mothers' milk at 5 different postpartum stages: 2′-fucosyllactose, 3-fucosyllactose, lacto-N-tetraose, lacto-N-neotetraose, 3′-sialyllactose and 6′-sialyllactose. Secretor phenotype was assigned based on 2′-FL concentrations in milk samples. Nutrient intake was calculated from the food frequency questionnaire data based on a food composition table, and the correlation between nutrients and Human milk oligosaccharides were analyzed using a linear mixed-effects model with stage and secretor type as the random effect.

Results: Out of 82 dietary nutrients analyzed, there were 13 principal components identified by principal component analysis after energy adjustments using the residual method. The linear mixed-effects model identified plant nutrients, vitamins and vegetables as positive predictors of 3-FL level; the principal components representing vitamins are positive predictors for 2′-FL level and the sum of 2′-FL and 3-FL; tocopherol and metal elements are positive predictors for 3′-SL level; and metal elements is a positive contributor for the sum of all the 6 Human milk oligosaccharides; milk and lactose intake is a positive predictor of LNT levels and the sum of LNT and LNnT.

Conclusions: Vegetables, vitamins and metal elements are dietary components positively associated with Human milk oligosaccharides concentrations. This is the first study to report the potential benefits of dietary intake of vegetables, vitamins and metal elements for enhancing Human milk oligosaccharides.

Key words Human milk oligosaccharides; diet; vegetable, vitamin, nutrients

Category: Public Nutrition & Health

多层面干预中父母和儿童依从性对肥胖相关结局的影响:一项整群随机对照试验

The Effects of parent and child Compliance on Obesity-related Outcomes in a Multifaceted Intervention: A Cluster Randomized Controlled Trial

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Background and Objectives Compliance is important for obesity intervention studies, but there were few studies evaluating compliance. This study is to analyze the influence of parent and child compliance on the obesity-related outcomes of children.

Methods and Study Design The study participates were from a cluster randomized clinical trial (the Diet, ExerCIse and CarDiovascular hEalth (DECIDE)-Children study) conducted in three socioeconomically distinct Chinese areas. The study included 684 student-parent pairs in the intervention arm. Parental compliance was recorded in the mobile App background. Children's compliance (diet and exercise behavior scores, 35 times in total) was recorded in the "Behavior Monitor" of the mobile App. Group-based trajectory models were applied to draw distinct compliance trajectories. Linear mixed models were used to estimate the effect of compliance on obesity-related outcomes (anthropometric and physical fitness indicators).

Results The highest quartile of parents' compliance had a significant reduction in children's body mass index (BMI) (β: -0.30, 95% CI: -0.49, -0.12) , BMI Z score (β: -0.13, 95% CI: -0.20, -0.05), waist circumference (β: -1.02, 95% CI: -1.73, -0.31), body fat percentage (BF%) (β: -0.77, 95%CI: -1.48, -0.07), and improvement in physical fitness compared to the lowest quartile. Children's compliance improved only children's BF% (β: -0.78, 95%CI: -1.49,-0.08) but promoted most measures of physical fitness. Joint models showed that the effect of parental and children's compliance were independent, high compliance of both parents and children had the most significant impact on BF% reduction (β: -1.09 95% CI: -1.75, -0.43), and fitness improvement (Run: β: -3.29, 95% CI: -6.03, -0.55. Jump: β: 2.79, 95% CI: 0.08, 5.51. Rope: β: 7.35, 95% CI: 2.49, 12.20).

Conclusions Parental compliance and children's own compliance had independent effects on childhood obesity-related outcomes, suggesting the importance of comprehensive obesity intervention.

Key words Obesity; Intervention; Compliance; Children; Parent

Category: Public Nutrition & Health

营养干预结合运动指导对体脂率超标人群减脂效果的影响

Effect of nutritional intervention combined with exercise instruction on fat loss in people with excess body fat percentage

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Objective: To study and analyze the effect of nutritional intervention combined with exercise guidance on fat loss and changes in body composition in people with excessive body fat percentage.

Methods: A total of 46 medical staff with excessive body fat rate and body composition measured in the Department of Nutrition of our hospital in September 2022 were selected as the research objects. The intervention was based on nutrition science and exercise guidance, supplemented by staged energy restricted diet for two months. Body weight, total body water (TBW), protein, minerals, body fat mass (BFM), limb fat mass, trunk fat mass, fat-free mass (FFM), limb fat free mass, trunk fat free mass, skeletal muscle mass (SMM), percent body fat (PBF), body mass index (BMI), basal metabolic rate (BMR), waist-hip Ratio (WHR), obesity degree (OD), appendicular skeletal muscle mass index (SMI), fat-free mass index (FFMI), fat mass index (FMI), and Inbody health score (IS) were evaluated before and after intervention, and assessed the intervention effect.

Results: After the intervention, TBW, minerals, FFM, trunk fat-free mass, BMR and IS were significantly higher than those before the intervention ($P < 0.05$), and BFM, PBF, limb fat mass and FMI were significantly lower than those before the intervention ($P < 0.05$). There were no significant differences between the other body composition indexes.

Conclusion: Nutritional intervention and exercise guidance for medical staff with excessive body fat percentage can effectively reduce fat, improve their basal metabolism, increase muscle mass, and improve their overall health status. In addition, it also provides a feasible reference method for improving the health status of people with excessive body fat rate, which may be worthy of wide dissemination.

Key words body fat percentage, fat loss, nutritional intervention, exercise guidance, restricted diet

Category: Public Nutrition & Health

高密度脂蛋白与心脑血管疾病风险关联在糖尿病与非糖尿病患者中的差异

Differences in HDL-related Coronary Heart Disease Risk between Individuals with and without Diabetes

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Background: High-density lipoprotein (HDL) could lose its atheroprotective functions (e.g., reverse cholesterol transport, anti-inflammation) in the presence of diabetes. We sought to examine associations of HDL cholesterol (HDL-C) and HDL particle (HDL-P) subclasses with risk of coronary heart disease (CHD) stratified by diabetes.

Methods and Study Design: We included 393 516 participants (20 691 diabetes and 372 825 non-diabetes) with HDL-C measurements, and a subset of 108 071 (5730 diabetes and 102 341 non-diabetes) participants with HDL-P measurements from UK Biobank. Restricted cubic splines cooperated with Cox model were used to estimate associations of HDL with CHD.

Results: During a median follow-up of 13.0 years, 3398 (16.4%) and 24 772 (6.6%) incident CHD events occurred among diabetes and non-diabetes, respectively. HDL-C showed inverse association with CHD among non-diabetes, whereas a U-shaped association among diabetes. Compared to individuals with normal HDL-C (40th - 60th percentile, 1.32 - 1.51 mmol/L), those in the top percentile (95th, >2.16 mmol/L) had lower CHD risk among non-diabetes (Hazard Ratio, 0.79; 95% confidence interval, 0.73-0.86), but higher risk among diabetes (1.38, 1.02-1.88). As for HDL-P, there was an inverted U-shaped association for very large HDL-P and a linear and negative association for large HDL-P among non-diabetes; however, among diabetes, linear and positive association was found for very large HDL-P, and null association for large HDL. Inverse associations were found for medium HDL-P and small HDL-P both in diabetes and non-diabetes.

Conclusions: Very high HDL-C levels were associated with lower CHD risk in individuals without diabetes, but higher risk in patients with diabetes. Furthermore, smaller HDL-P was negatively, whereas very large HDL-P was positively associated with CHD risk in patients with diabetes.

Key words Coronary heart disease, diabetes, high-density lipoprotein cholesterol, high-density lipoprotein subclasses, cohort study.

Category: Public Nutrition & Health

夹江叠鞘石斛马铃薯代餐粉的研制及血糖生成指数研究

Study on the development of meal replacement powder of Dendrobium chryseum in jiajiang with potato and its glycemic index

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Background Type 2 diabetes has become an important public health problem all over the world. For the prevention and treatment of type 2 diabetes, it is a research hotspot to select high quality carbon water and effective natural products as raw materials for the development of low GI meal substitute powder. **Objective** In this study, we made full use of the hypoglycemic effect of *Dendrobium chryseum* in jiajiang and the high-quality carbohydrate characteristics of potatoes to develop a low-GI meal substitute powder. **Method** On the basis of the previous research on the main components and functions of *Dendrobium chryseum* in Jiajiang and related pre-experiments, taking sensory score and estimated glycemic production index (Expected glycemic index, eGI) as the core evaluation index, single factor and response surface experiments were used to further optimize the development process of meal substitute powder of *Dendrobium chryseum* in Jiajiang with potato, and its GI value and quality were determined and evaluated according to the national standard. **Results** The best technological formula of a group of meal replacement powder of *Dendrobium chryseum* in jiajiang with potato was obtained, and it was confirmed that it was a low GI food, and its quality evaluation met the food safety. **Conclusion** A low GI meal substitute powder (GI value 43.88) was successfully developed with *Dendrobium chryseum* in Jiajiang as the characteristic raw material. The quality of the product meets the standard of the food substitute food group stipulated by the Chinese Nutrition Society, and the substitute meal powder has good solubility, freeze-thaw stability and wet sinkability, and has a good potential for market development.

Key words Dendrobium chryseum; Meal replacement powder; Process optimization; GI value; quality evaluation

Category: Public Nutrition & Health

体质指数在无糖饮料与打鼾关联中的中介效应分析

Mediating effect of body mass index on the association between sugar-free beverage and snoring

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Background and Objectives: Dietary factors and obesity have been associated with snoring. This study aims to investigate the association between sugar-free beverages and snoring, and to explore the potential mediating effect of body mass index z score on the association in Chinese school-age children.

Methods and Study Design: In 2021, a school-based project named "Evaluation and Monitoring on School-based Nutrition and Growth in Shenzhen" was conducted among a total of 5153 primary and secondary school students in Shenzhen. The study included students from grade 4 to grade 12 who were also under 18 years. Multivariate logistic regression analysis was used to evaluate the association between sugar-free beverages and snoring. The mediating effect of body mass index z score on the association was also explored by using the bruceR package in R software(version 4.2.3).

Results: The prevalence of snoring in children and adolescents in Shenzhen was 28.3% (921/3260), and the median consumption of sugar-free beverages was 16.67 ml/d. The odds ratio of snoring in tertile 3 of sugar-free beverages intake was 1.21 (95% confidence interval: 1.01-1.45) compared to tertile 1. A mediating effect of body mass index z score was found on the association between tertile 3 of sugar-free beverages intake and snoring when compared to tertile 1. The proportion of the mediating effect in the total effect was 18.4%.

Conclusions: Habitual high-dose consumption of sugar-free beverages could increase the risk of snoring, and the body mass index may partially mediate the association. Thus, it is crucial to restrict the consumption of sugar-free beverages and to control the development of obesity in the prevention and management of snoring and related diseases.

Key words Sugar-free beverage; Body mass index; Obesity; Snoring; Mediating effect

Category: Public Nutrition & Health

南极磷虾油改善肥胖小鼠的肌肉衰减

Krill oil attenuates obesity-induced skeletal muscle atrophy in mice

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Background: Obesity is associated with skeletal muscle mass loss and physical dysfunction, leading to other clinical problems and poor quality of life. Krill oil (KO), a novel source of dietary n-3 long-chain polyunsaturated fatty acids mainly bound to phospholipids, has shown to be beneficial in ameliorating obesity and obesity-induced metabolic syndromes. However, the effect of KO on obesity-induced skeletal muscle atrophy is still unclear. Methods: The male C57BL/6J mice were fed a high-fat diet (HFD) for 12 weeks to induce obesity, and then were intragastric administration with 400 mg/kg·bw KO once a day for an additional 6 weeks. Results: The results showed that KO treatment reduced body weight, fat accumulation and serum pro-inflammatory cytokines in HFD-induced obese mice. Importantly, KO treatment attenuated obesity-induced skeletal muscle atrophy, as evidence by preserving skeletal muscle mass, average myofiber cross-sectional area and grip strength in HFD-fed mice. KO administration also mitigated obesity-induced ectopic lipid deposition and inflammatory response in skeletal muscle. Additionally, KO treatment decreased phosphorylation of NF-κB p65 and increased phosphorylation of FoxO3a, and then down-regulated MAFbx and MuRF1 protein levels in skeletal muscle from HFD-fed mice. The results also manifested that KO administration improved obesity-induced impaired muscle protein synthesis via activating PI3K/Akt pathway. Furthermore, KO treatment enhanced muscle mitochondrial biogenesis in HFD-induced obese mice via activating PGC-1α pathway. Conclusions: Collectively, KO might be developed as a potential supplement or therapeutic agent for the prevention and treatment of obesity-induced skeletal muscle atrophy.

Key words krill oil; obesity; skeletal muscle atrophy; inflammation; protein turnover; mitochondrial biogenesis.

Category: Public Nutrition & Health

美国卫生保健从业者的大便失禁与食品不安全之间的关系：2005-2010 年全国健康和营养检查调查分析

The relationship between bowel leakage and food insecurity in United States Health Care Practitioner(HCP): an analysis of 2005-2010 National Health and Nutrition Examination Survey

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This study aimed to investigate the association between fecal incontinence and food insecurity using a nationally representative sample of US HCP. Our another aim was to examine the role of diet by assessing dietary differences between participants with and without fecal incontinence and between food-insecure HCP with and without fecal incontinence.This study analyzed data from the NHANES, a nationale series of cross-sectional health surveys. Fecal incontinence was defined as accidental leakage of stool within the last 30 days. Food insecurity was assessed using the household food security measure created by the US Department of Agriculture. Dietary data from the NHANES dietary interviews titled “Individual Foods, First Day” and “Individual Foods, Second Day,” which estimate the foods and drinks consumed in the preceding 24 hours, were pooled. The association between fecal incontinence and food insecurity was analyzed using logistic regression after controlling for patient characteristics.805 HCP were included, representing the all US HCP,and 30.3% had fecal incontinence. There was no significant difference in diet between HCP with and without fecal incontinence ($p>0.05$). Food-insecure HCP in the overall sample reported higher carbohydrate and sugar intake and lower fiber and alcohol intake (all $P<0.05$). Among food-insecure HCP, those with fecal incontinence had higher calorie and total fats intake than those without fecal incontinence; there was no significant difference in other dietary components ($p>0.05$). There was a significant association between food insecurity and fecal incontinence, such that HCP with food insecurity had higher odds of fecal incontinence after adjusting for patient characteristics and diet (odds ratio, 1.73; 95% confidence interval, 1.14－2.56; $P=0.005$).Food insecurity was associated with fecal incontinence even after accounting for diet. Understanding the role of social determinants of health in fecal incontinence symptomatology and treatment is important to potentially alleviate symptom burden and improve the quality of life in at-risk populations.

Key words bowel leakage;fecal incontinence;food insecurity;social determinants of health

Category: Public Nutrition & Health

COVID-19 感染前后中国人群营养补充剂摄入的调查研究

Intake of nutrient supplements in Chinese population: Comparison between before and after COVID-19 infection

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Background

A nutritional supplement is taken by mouth and usually contains one or more dietary ingredients. Intake of supplements is common health behaviors nowadays. However, a rare study unfolded the differences of nutritional supplement intake including the types and amount before and after COVID-19 infection. This study investigated the nutrient supplements intake differences before and after the COVID-19 infected in Chinese population.

Methods

This cross-sectional study recruited 1,380 participants between January 1st to February 20th, 2023 (i.e., the late stage of the COVID-19 pandemics). Demographics (i.e., age, gender, marital status, educational level, co-morbidity, smoking and drinking habits, nutrients supplements intakes habits) and nutrition status (measured by Mini-Nutrition Assessment-Short Form, MNA-SF) were collected through online professional questionnaire link. COVID-19 symptoms were assessed by COVID-19 Symptoms Index (CNI)1 which has been validated. Paired T test was used to compute the group difference.

Results

Of those 1,380 respondents, only 1,000 (72.5%) were analyzed because for they had been infected by COVID-19. The average age was 36.1 (SD 6.0), and only 6.5% of them were hospitalized during infection. The prevalence rate of nutrient supplements intakes before COVID-19 infection was 43.7%, and vitamin C (34.2%), probiotics (30.5%), calcium (30.3%), multiple vitamins and mineral supplements (27.2%) were the top 4 micronutrients before COVID-19 infected. All nutrient supplements (i.e., vitamin C (t=12.06), vitamin B (t=10.31), vitamin D (t=10.10), multiple vitamins and mineral (t=10.43), protein powder (t=9.00), probiotics (t=10.00), Coenzyme Q10 (t=7.36), Fish oil (t=7.88), calcium (t=10.61), Zinc and selenium (t=8.24); $p<0.001$) were significantly increased after our participants have infected by COVID-19.

Conclusion

Although currently little evidence that high-dose nutrient supplements of micronutrients will cure or speed up recovery of COVID-19, Chinese population were prone to intake more kinds and dosage of nutrient supplements during COVID-19 infected.

Key words Nutrients supplements; COVID-19 infection; Chinese population

Category: Public Nutrition & Health

关于工作场所员工健康生活方式状况评估的预试验研究

Assessment of healthy lifestyle behaviours in workplace employees: A pilot study

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Background: Evidence shows that about 80% of cardiovascular disease and one-third of cancer deaths can be prevented by healthy lifestyle behaviours. Workplaces play a unique role in promoting healthy lifestyle for employees.

Objectives: This pilot study aimed to assess the status quo of lifestyle behaviours among workplace employees and provide baseline for the following health promotions in the workplace.

Methods: The study was conducted in a steelworks in Xiangtan city of Hunan Province in February 2023. Thirty workers were randomly selected as participants. A questionnaire including demographic information and lifestyle behaviours was interviewed and body weight and height were measured by trained researchers. Healthy Lifestyle Index Score (HLIS) composed of five components (smoking, alcohol consumption, physical activity, healthy diet and Body Mass Index (BMI)) was calculated to comprehensively assess the employee's lifestyle status.

Results: The mean age was 38.7 ± 7.0 years and 63.3% were males. Workers in the production workshops (blue-collars) and in the office (white-collars) accounted for 63.3% and 36.7%, respectively. The mean overall HLIS score (total score: 0-20) was 12.94 ± 3.49 , while the component scores were 4.49 ± 3.21 for smoking (total score: 0-7), 4.22 ± 0.70 for alcohol consumption (total score: 0-4.6), 1.30 ± 0.93 for physical activity (total score: 0-2.6), 1.38 ± 0.98 for diet (total score: 0-2.8) and 1.55 ± 1.04 for BMI (total score: 0-3). Women scored higher than men (15.60 vs 11.39, $p < 0.001$). No significant difference of HLIS was found between age groups (<40 vs ⩾40 years old: 12.97 vs 12.88, $p = 0.951$) or work types (white-collars vs blue-collars: 13.33 vs 12.71, $p = 0.644$).

Conclusions: Workplace employees had a medium healthy lifestyle index score and health promotion was still needed, especially on smoking, physical activity, healthy diet and BMI.

Key words Lifestyle behaviours; Healthy lifestyle index score; Workplace employees

Category: Public Nutrition & Health

中国成年居民膳食模式与血清尿酸关系的研究

Association between dietary patterns and serum uric acid among Chinese adults

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Objective: The present study aimed to identify dietary patterns and explore their associations with serum uric acid among Chinese adults.

Method: There were 10505 adults aged 18 and older from the China Health and Nutrition Survey (CHNS) in 2018. Dietary patterns were identified using factor analysis of data from consecutive three 24 h dietary recalls. Blood samples were collected in the morning after an overnight fast. Serum uric acid (UA) was measured in third-party laboratories.

Results: We identified four dietary patterns: traditional northern (high intakes of wheat and other cereals), modern pattern (high intakes of milk, fruits and cakes), traditional southern (high intakes of vegetables, legume, pork and rice), and meat pattern (high intakes of poultry, fish, organ meat and other meat). The traditional northern pattern was inversely associated with UA (β=-9.91; 95% CI -11.42, -8.39; P<0·0001). The traditional southern pattern was significantly associated with higher UA (β=1.97; 95% CI 0.24, 3.69; P=0.0252). The meat pattern was positively associated with UA (β =6.81; 95% CI 5.24, 8.38; P<0·0001).

Conclusions: We identified three dietary patterns that are significantly associated with UA. This information is important for developing interventions and policies addressing hyperuricemia prevention among Chinese adults.

Key words dietary patterns, serum uric acid, adults

Category: Public Nutrition & Health

加工红肉和未加工红肉与非酒精性脂肪肝风险的相关性：一项系统评价和剂量反应 meta 分析

Association between processed and unprocessed red meat consumption and the risk of non-alcoholic fatty liver disease: A systematic review and dose-response meta-analysis

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Objection: Our meta-analysis was aimed at determining the association between red meat consumption and the risk of Non-alcoholic Fatty Liver Disease (NAFLD), as well as the dose-response association.

Methods: A systematic search of CENTRAL, Pubmed, Embase, web of science and Scopus was conducted from inception to February 2022 with relevant keywords. All observational studies reported were included if the exposure of interest was red meat consumption, the outcome of interest was the risk Non-alcoholic Fatty Liver Disease (NAFLD), and odds ratios (ORs) or risk ratios were provided or could be calculated. Random-effects meta-analysis were used to pool the effect sizes. Linear and non-linear dose response were performed to estimate the dose-response relationships between red meat intake and NAFLD risk.

Results: A total of 10 studies were included in this review. The meta-analysis indicated that there was a significant association between red meat (OR=1.25; 95% CI:1.08 to 1.44; I 2=79.4%, p＜0.001), processed red meat(OR=1.20, 95%CI: 1.04 to 1.37; I 2=34.9%, p=0.162) and unprocessed red meat (OR=1.36, 95%CI: 1.04 to 1.78; I 2=83.0%, p=0.001) with the risk of NAFLD. Moreover, in the dose-response analysis, we found a significant linear dose-response association between processed red meat intake and NAFLD. Each 25-gram increment of processed red meat intake per day was associated with a 11.1% higher risk of NAFLD (OR: 1.11 95%CI: 1.01 to 1.22, p=0.029), and a non-linear association between unprocessed meat intake and NAFLD (p=0.003 for non-linearity).

Conclusion: Our findings suggested that red meat, both processed and unprocessed, has a positive association with the risk of NAFLD and contributes to a significantly increased risk of developing incident NAFLD even when taken in small amounts.

Key words red meat; processed red meat; unprocessed red meat; incidence; non-alcoholic fatty liver disease

Category: Public Nutrition & Health

高糖饮料饮食引起的2型糖尿病的全球趋势和预测

Global trend and prediction of type 2 diabetes mellitus attributable to diet high in sugar-sweetened beverages

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Background:

The evidence of global trends in the burden of type 2 diabetes mellitus (T2DM) attributable to diet high in sugar-sweetened beverages (SSB) remains limited. We aimed to provide a comprehensive estimation of the global trend of T2DM attributable to diet high in SSB, and associations with age, period, and birth cohort between 1990 and 2019.

Methods:

We retrieved age-standardized disability adjusted life years (DALY) rates and mortality rates estimates from the Global Burden of Disease Study 2019. We reported the annual percentage change in DALY and mortality rates of T2DM attributable to diet high in SSB, globally and stratified by sex and sociodemographic index. Age-period-cohort modeling was used to assess the associations between age, period, and birth cohort and T2DM. Moreover, we predicted DALY rate and mortality rates of T2DM attributable to diet high in SSB by running Nordpred age-period-cohort analysis.

Results:

In 2019, age-standardized T2DM-related DALY attributable to diet high in SSB was 1.13 (95% UI: 0.99-1.27) per 100,000 population, and DALY rates increased from 1990 to 2019 (0.95% annually); while the age-standardized mortality rates fluctuated during this period. Women generally had lower DALY and mortality rates than men. The countries with a high sociodemographic index had the highest age standardized DALY rate, whereas countries with a low sociodemographic index had the highest age-standardized mortality rate in 2019. There was the increased DALY rate with age group. Increasing period and cohort risks for DALY rate were generally found, indicating deterioration in DALY rate. The overall DALY rate and mortality rates are predicted to increase 24.75% and 3.02% from 2020 to 2044, respectively.

Conclusions:

The global burden of T2DM attributable to diet high in SSB is a growing health problem. Action is needed to enhance the prevention of T2DM attributable to diet high in SSB.

Key words type 2 diabetes mellitus; sugar-sweetened beverages; disability adjusted life years; mortality

Category: Public Nutrition & Health

运动、睡眠和帕金森病关系的队列研究

Physical Activity and Sleep Pattern in Relation to Incident Parkinson’s Disease: A Cohort Study

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Background: How physical activity (PA) and different sleep traits and overall sleep pattern interact in the development of Parkinson’s disease (PD) remain unknown.

Objective: To prospectively investigate the joint associations of PA and sleep pattern with risk of PD.

Methods: Included were 339,666 PD-free participants from the UK Biobank. Baseline PA levels were grouped into high, medium and low levels according to guidelines recommendations. Healthy sleep traits (chronotype, sleep duration, insomnia, snoring, and daytime sleepiness) were scored from 0 to 5 and were categorized into “ideal sleep pattern” (≥3 sleep scores) and “poor sleep pattern” (0-2 sleep scores).

Results: During a median of 11.8 years of follow-up, 1,966 PD events were identified. The PD risk was lower in participants with high level of PA (HR=0.73; 95 % CI: 0.64, 0.84) compared to those with low level of PA, and participants with ideal sleep pattern also had a lower risk of PD (HR=0.78; 95% CI: 0.69, 0.87) compared to those with poor sleep pattern. When jointly investigating the combined effect, participants with both high PA and ideal sleep pattern had the lowest risk of incident PD (HR= 0.55; 95 % CI: 0.44, 0.69), compared to those with low PA and poor sleep pattern; notably, participants with high PA but poor sleep pattern also gained benefit on PD risk reduction (HR= 0.74; 95 % CI: 0.55, 0.99).

Conclusion: Individuals with both high PA level and ideal sleep pattern had the lowest PD risk.

Key words Parkinson's disease, Sleep, Physical activity

Category: Public Nutrition & Health

应对压力能力不足可导致女性膳食质量下降

Insufficient capacity to cope with stress leads to a decreased dietary quality in female

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Backgrounds and objectives: Previous studies had found the effects of stress on eating behaviors. The aim of this study was to explore the effects of perceived stress on dietary quality by genders in Chinese adults.

Methods: The subjects aged 18~59 years were from the China Health and Nutrition Survey. Perceived stress was assessed by 10-item perceived stress scale (PSS-10) with a score ranging 0-40. Dietary quality was evaluated by Chinese Dietary Guidelines Index(CDGI) ranging 0-110. With community regarded as level 2, and individual as level 1, two-level mixed effect model was used to analyze the effects of PSS-10 score on CDGI, and two-level mixed effect structural equation modeling was used to explore the effects of distress factor score and coping stress factor score on dietary quality respectively.

Results: This study involved in 2515 males and 3165 females. The CDGI significantly varied among different communities with 43.74 for males and 46.14 for females averagely. 20.17% for males and 22.64% for females of the total variations of CDGI derived from communities ($P_{males}<0.001$, $P_{females}<0.001$). After adjusting for confounders, there were no effects of PSS-10 score, distress factor score and coping stress factor score on CDGI in males. After adjusting for confounders, CDGI in the highest tertile of PSS-10 score group was 1.64 lower than that in the lowest tertile group in females ($P=0.001$). The distress factor score was not associated with CDGI (standardized $\beta=-0.164$, $P=0.488$), while the coping stress factor score was significantly negative with CDGI (standardized $\beta=-0.834$, $P<0.001$) in females. CDGI in the highest tertile of coping stress factor score group was 4.36 lower than that in the lowest tertile group ($P<0.0001$).

Conclusions: There was no association between perceived stress and dietary quality in males. The perceived stress, especially the insufficient ability to cope with stress, was negatively associated with dietary quality in females.

Key words perceived stress, dietary quality, distress, coping stress capacity, structural equation modeling

Category: Public Nutrition & Health

壳聚糖和壳寡糖减轻高蛋白饮食诱导的大鼠便秘并调节其血清代谢产物

Chitosan and chitosan oligosaccharide alleviate high-protein-diet-induced constipation and regulate serum metabolites in rats

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Background and Objectives: The prevention and treatment of constipation is a need for worldwide public health. It has been reported that high-protein-diets (HPDs) could increase the gastrointestinal burden and lead to constipation. The present study was designed to explore the improvement of chitosan (CTS) and chitosan oligosaccharides (COS) on constipation induced by HPDs.

Methods and Study Design: Male SD rats were divided into: (1) normal control (Blank group), (2) 5% CTS diet (CTS group), (3) 5% COS diet (COS group), (4) 50% WPI diet (WPI group), (5) 5% CTS and 50% WPI diet (CTS+WPI group), and (6) 5% COS and 50% WPI diet (COS+WPI group) for 2 days.

Results: The results of in vivo experiments fully proved that CTS and COS could effectively relieve constipation and regulate the serum metabolites in rats as indicated by LC-MS/MS analysis, especially during COS treatment. Furthermore, short-chain fatty acids (SCFAs), as major metabolites of CTS and COS fermentation by gut microbiota, were also promoted to alleviate HPD-induced constipation. In addition, CTS and COS could decrease the concentration of ammonia in serum and down-regulate the levels of H2S and indole.

Conclusions: In summary, the present study revealed that CTS and COS could produce SCFAs, ameliorate the development of HPD-induced constipation in rats, recover the levels of metabolites, and improve metabolic pathways. The present study provides novel insights into the potential role of CTS and COS in treating HPD-induced constipation.

Key words Chitosan, Oligosaccharide, High-protein-diet, Constipation, Metabolites, SCFAs

Category: Public Nutrition & Health

膳食摄入一碳代谢相关营养素，叶酸代谢相关基因多态性与宫颈病变严重程度的相关性

Correlation of dietary intake of one-carbon metabolism-related nutrients, genetic polymorphisms involved in folate metabolism with severity of cervical lesions

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Objective The present study aimed to analyze the associations between the severity of cervical lesions and dietary one-carbon metabolism-related nutrients, and explored the interaction between these nutrients and genetic polymorphisms involved in folate metabolism related to cervical lesions. Method The study was composed by 35 women presenting low-grade squamous intraepithelial lesion (LSIL), 35 participants presenting high-grade squamous intraepithelial lesion (HSIL) and 35 women with cervical squamous cell carcinoma (CSCC). Dietary intakes were evaluated using a semi-quantitative 75-item food frequency questionnaire through face-to-face interviews. To analyze the joint implications of genes involved in folate metabolism, we calculated genetic risk score (GRS). Ordinal logistic regression analysis were used to evaluate the association. Results After adjusting for potential confounding factors, ordinal regression analyses revealed a significant association between higher intake of folate (OR: 0.406, 95% CI: 0.180, 0.914), Vitamin B6 (OR: 0.406, 95% CI: 0.183, 0.901) and the severity of cervical lesions, compared with low nutrients consumption. However, there were no significant associations between cervical lesions severity and the dietary intake of vitamin B12, methionine, betaine, total choline, and methyl-donor index. As for the choline subgroups, it showed that free choline intake was inversely correlated with the severity of cervical lesions ($P < 0.05$). Conversely, the relationship for sphingomyelin, phosphatidylcholine, phosphocholine, glycerol phosphoryl choline were not observed (all $P > 0.05$). A Stratified analysis by genetic risk score (GRS) showed that the protective effects of folate, Vitamin B6, free choline, phosphocholine on cervical lesions were more evident for individuals with the lower frequency of genetic polymorphisms involved in folate metabolism. Conclusion Increased intakes of folate, vitamin B6 and free choline are independently associated with a lower risk of cervical lesions. Genetic polymorphisms involved in folate metabolism might modify the inverse associations between one-carbon metabolism-related nutrients and the severity of cervical lesions.

Key words dietary intake, cervical lesions, cervical cancer, one-carbon metabolism, gene polymorphism

Category: Public Nutrition & Health

中国成年人视屏时间与脑卒中的关系：中国健康与营养调查数据分析

Association Between Screen Time and Stroke Among Chinese Adults: Analysis of the Data from China Health and Nutrition Survey

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Background and Objectives: We aimed to explore the independent associations of screen time and the risk of stroke among Chinese adults based on the China Health and Nutrition Survey (CHNS).

Methods and Study Design:

Data on Chinese adults aged > 40 years from CHNS in 2004-2009 were selected. 4587 individuals were included in 2009, including screen time and the risk of stroke. Simultaneously, we traced the previous screen time to 2004 for those with outcome measures in 2009 (n=2100). Basic information, lifestyle and screen behavior were obtained through face-to-face interviews and self-completed questionnaire. Anthropometric data collected included blood pressure, body weight, height, hip circumference, waist circumference. Fasting blood was obtained for measurements of lipid and glucose levels. Cross sectional analysis and cohort analysis were both performed using multivariate logistic regression.

Results: Of all participants, 3004 (65.49%) participants spent more than 2 hours per day on screen time. Taking the men who spent less than 2 hours on screen per day as reference, the crude OR of the high risk of stroke was 1.53 (95% CI = 1.20-1.96) for the men who spent 2-3 hours per day on screen and 2.37 (95% CI = 1.79-3.16) for the men who spent more than 3 hours per day on screen. This difference remained significant after adjusting for age, smoking, the education level, energy intake and physical activity. No association was observed among women. However, in the cohort analysis with screen time in 2006 as the independent variable, the association between screen time and stroke risk was found both in men (OR, 1.97 [95% CI, 1.26-3.10]) and women (OR, 1.47 [95% CI, 1.01-2.13)]).

Conclusions: We found that the high screen time was associated with an increased stroke risk, which was pronounced in men, warranting a universal need to limit screen time in order to improve health.

Key words screen time; stroke; sedentary behavior; energy intake; physical activity

Category: Public Nutrition & Health

拟微球藻多糖通过调节肠道屏障功能改善酒精性肝损伤

Nannochloropsis polysaccharides ameliorate alcoholic liver injury via modulation of intestinal barrier function

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The aim of the present study was to investigate the mechanism of Nannochloropsis polysaccharides (NPS) on preventing alcoholic liver disease (ALD). C57BL/6J mice were fed a liquid alcohol diet to induce ALD and treated with NPS (200 mg/kg.bw and 400 mg/kg.bw) for 5 weeks. NPS treatment significantly attenuated alcoholic liver injury in mice model. The proportion of gram-negative bacteria and lipopolysaccharides levels were significantly lower in NPS group than in model group. The abundance of Akkermansiaceae and Lactobacillaceae were higher in NPS group than in model group, whereas the abundance of Prevotellaceae was lower in NPS group than in model group. NPS protected against ethanol-induced gut leakiness by upregulating tight-junction proteins expression. Furthermore, NPS intervention inhibited body inflammation by upregulating the expression of Fmo5 and PPAR-α to further downregulating the expression of NF-κB. The present results revealed that NPS alleviated the alcoholic liver injury might via mediating the gut-liver axis.

Key words Nannochloropsis polysaccharides, alcoholic liver injury, intestinal barrier, gut flora, Fmo5

Category: Public Nutrition & Health

夜间食模式和体脂之间的关系 中国大学生
Association between Night Snacking Patterns And Body Fat Among Chinese College Students

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Abstract

Background: Night snacking may result in significantly lower lipid oxidation and increased adiposity. College represents a key transition to adulthood for many adolescents, but there are associated concerns about health and behaviour. There is growing evidence suggests that a potential association between the timing of energy intake and obesity and college students may consume poor quality diets. Night snacking is relatively common among Chinese college students.

Objectives: Nighttime snacking has been identified as a risk factor for metabolic syndrome and obesity. The purpose of this study was to investigate the association between post-dinner snacking and body fat.

Methods and Study Design: College students were recruited through posters and Apps in this cross-sectional study. A questionnaire was used to assess nighttime snacking patterns, reasons, and food choices, while body composition analysis was performed to measured body fat. Multiple linear regression analysis was conducted to examine the association between nighttime snacking and body fat percentage.

Results: Half of the students reported consuming night snacks once or twice a week, with hunger being the most common reason cited. The majority of these snacks consisted of fruits and dairy products. Multiple linear regression models demonstrated that frequency of night snacking was a significant determinant of body fat, indicating a direct association between consumption of such snacks and risk for obesity. Conclusions: Reducing intake of night snacks should be considered as one of the strategies to combat overweight and obesity among college students.

Key words Night snacking food types Body fat Obesity College students

Category: Public Nutrition & Health

鱼油使用与糖尿病患者慢性肾病风险的关联

Association between fish oil use and the risk of chronic kidney disease among diabetic patients

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Background and Objectives

Evidence regarding whether fish oil is associated with the onset of chronic kidney disease (CKD) in diabetes was limited. The aim of this cohort study was to investigate the association between fish oil use and the risk of developing CKD among patients with diabetes, and further detect the mediation effect of blood biomarkers.

Methods and Study Design

In this prospective cohort study, we included 24,497 patients with diabetes from the UK Biobank. Cox proportional hazards regression models were conducted to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for CKD risk, with rate advancement period (RAP) calculated to quantify and communicate the impact of fish oil on the risk. In addition, we also used mediation analysis to assess the mediating role of biomarkers.

Results

Among 24,497 patients with diabetes from the UK Biobank, 7,122 individuals reported habitually taking fish oil supplements. 3,533 CKD cases occurred during a median of 12.2 years of follow-up. In the fully adjusted model, the use of fish oil supplements was significantly and inversely associated with the incidence of CKD (HR: 0.90; 95% CI: 0.83-0.97), which was mediated by the plasma levels of hemoglobin A1c (HbA1c), high-density lipoprotein cholesterol (HDL-C) and c-reactive protein (CRP). Participants who used fish oil supplements showed the same risk of CKD events as fish oil non-users approximately 3 years later.

Conclusions

Our findings support the beneficial role of fish oil use in preventing CKD among patients with diabetes, which may be mediated by plasma levels of HbA1c, HDL-C and CRP.

Key words diabetes; kidney disease; fish oil; follow-up; UK Biobank

Category: Public Nutrition & Health

睡眠时间短是不规律的早餐导致超重/肥胖的主要原因

Short sleep duration is the main reason for irregular breakfast to cause overweight/obesity

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To evaluate association between the duration of sleep and the regularity of breakfast and overweight/obesity, among graduate students. A total of 1178 students were identified from a survey in Qingdao city, China. We used body mass index (BMI), waist circumference (WC), and waist-to-hip ratio (WHR) to define overweight/obesity levels. Chi-square test, Pearson correlation test, and logistic regression were applied to test association among overweight/obesity, sleep duration, sleep onset time, and breakfast regularity. Pittsburgh sleep quality index was used to assess the overall sleep quality of the study subjects. Mediation effect and Sobel test were used to analyze the effect of sleep duration on breakfast regularity and overweight/obesity. Only 34.1% of the population ate breakfast every day, and eating breakfast 1-3 times per week was associated with a higher risk of overweight/obesity (BMI: OR=2.183, 95%CI: 1.369,3,481; WC: OR=2.101, 95%CI: 1.232,3,583; WHR: OR=2.108, 95%CI: 1.331,3,337). The effects of all types of Usual Breakfast Consumption Frequency on overweight/obesity were fully mediated by sleep duration ($p<0.05$). In particular, the subjects exercised outdoors more than five times per week slept longer ($p<0.05$). It was found that the effect of regularity of breakfast on overweight/obesity was mediated by the duration of sleep, and the effects of frequency of outdoor exercise per week were different according to Sobel test ($p<0.05$).

Key words students, overweight, obesity, sleep duration, breakfast

Category: Public Nutrition & Health

吃早餐与抑郁：DII 的中介作用

Eating Breakfast and Depression: The Mediating Role of Dietary Inflammatory Index

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Background: Depression is a significant, pervasive, global public health problem, associated with many factors, such as diet, social factors, and lifestyle habits. Dietary Inflammation Index (DII) was calculated to compare the inflammatory potential of different population diets. Few studies have focused on the relationship between eating breakfast, DII and depression.

Objective: We aimed to evaluate the association between eating breakfast, DII and depression, and to verify the mediating role of DII on the effect of eating breakfast on depression.

Methods: 21,865 participants from the National Health and Nutrition Examination Survey (NHANES) from 2007 to 2018 were included in this study. Binary logistic regression and mediated effect analysis were conducted to analyze the associations between eating breakfast, DII and depression. Dietary inflammation was divided into pro-inflammatory diet and anti-inflammatory diet according to the DII.

Results: Both pro-inflammatory diet and skipping breakfast were risk factors for depression. After adjusting for covariables, compared with participants reporting breakfast in both recalls, reporting breakfast in one recall had a higher OR 95%CI (1.54(1.20, 1.98)) of depression. These associations in stratified analysis and sensitivity analysis without cardiovascular diseases (CVD) and diabetes were robust. DII mediated the association between eating breakfast and depression, the proportion of participants who reported breakfast in one recall and no recall was 26.15% and 26.67%, respectively.

Conclusions: Skipping breakfast may increase the risk of depression by raising DII. And our study supported the essential role of regular breakfast and the anti-inflammatory diet in reducing the risk of depression.

Key words dietary inflammatory index; eating breakfast; depression; mediating effect; NHANES

Category: Public Nutrition & Health

江苏省中老年人在外就餐情况及与血压的关系研究

Study on the relationship between eating out and blood pressure among middle-aged and elderly people in Jiangsu Province

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Background: With the development of economy and the improvement of people's living standards, the proportion of people eating out in Jiangsu province has increased significantly, and eating out has gradually become a common dietary behavior of residents. Eating out often reduces the quality of diet and increases the risk of overweight, obesity and chronic diseases.

Methods: A total of 2771 samples were collected in chronic diseases and nutrition monitoring in Chinese adults in 2015, the survey subjects were selected by multi-stage cluster random sampling. Personal questionnaires on chronic diseases and nutrition were collected by inquiry survey, and blood pressure was measured by electronic sphygmomanometer.

Results The percentage of people aged 45-59 eating out was higher than people aged over 60. The percentage of male eating out is higher than female. Urban residents eat out more than those in rural areas. Residents in southern Jiangsu have a higher rate of eating out than those in other areas. The highly educated, high-income, the more often eat out. The prevalence rate of hypertension in people over 45 years old eating out was higher than the non-eating out group. The systolic blood pressure and diastolic blood pressure of those aged 60 years or older who ate out were higher than those of the non-eating out group. The diastolic blood pressure of those aged 45-59 years was higher than that of the eating out group. Eating out is a risk factor for high blood pressure.

Conclusion The proportion of middle-aged and elderly residents eating out increases in Jiangsu province, and the prevalence of hypertension is higher among those who eat out. Measures and policies should be utilized to help middle-aged and elderly people to make healthier choices with health education.

Key words Eating out; Hypertension; Middle-aged and elderly people

Category: Public Nutrition & Health

中国成人衰老过程中膳食炎症与认知功能下降的关系：一项20年的前瞻性研究

Dietary inflammation and decline of cognitive function during aging in Chinese adults: a 20-year prospective study

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Background and Objectives: Few studies have assessed the longitudinal effects of dietary inflammation on cognitive function in Chinese adults. The aims of this study are firstly to describe the changes of cognitive function along with age, and then identify the effects of dietary inflammation on the changes of cognitive function.

Methods and Study Design: The subjects of this study derived from the China Health and Nutrition Survey, who participated in at least 3 waves between 1997 and 2018. Dietary inflammation index(DII) was used to assess the dietary inflammation. Cognitive function was evaluated objectively from four domains which were immediate memory, delayed memory, attention and calculation, with a total score ranging 0-4. Given the hierarchy of repeated measurements, three-level random slope models were used to analyze the effects of DII on cognitive function score and on the change of it.

Results: 1930 adults aged 55 to 79 years were involved in this study, with an average follow-up of 3.7 years. The cognitive function score had a linear declined trend along with age, and significantly varied among different communities (P<0.001) and individuals (P<0.001), with an average of 2.46 points. After adjusting for gender, education, smoke, energy supply-require ratio, hypertension, diabetes mellitus, myocardial infarction, stroke and urbanization index, both of the rate of decline in cognitive function scores with age (P=0.001), and the negative impact of DII on cognitive function score (P=0.010) significantly varied among different communities. For every 10 years of age increase, the cognitive function score decreased by 0.32 points (P<0.001). The cognitive function score in the highest tertile of DII was averagely 0.06 points lower than that of the lowest tertile group (P=0.041).

Conclusions: The cognitive function had a declined trend during aging in Chinese adults, and dietary inflammation was associated with decreased cognitive function.

Key words diet, inflammation, cognitive function, prospective, aging

Category: Public Nutrition & Health

美国老年人中内脏脂肪指数与认知能力的关系

The association between visceral adiposity index and cognition in U.S. elderly people

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Background and Objectives: The associations between visceral adiposity and cognition remain controversial. We aimed to explore the association of visceral adiposity index (VAI) and cognition among elderly people.

Methods and Study Design: A total of 1100 eligible participants (≥60 years of age) of the National Health and Nutrition Examination Survey (NHANES) 2011-2014 were included. Logistic regression analyses with enter method were conducted to examine the associations between VAI and the prevalence of low cognitive performance. The marginal impact of VAI on cognitive function was calculated by stratified analysis according to sex, education levels and diabetes condition.

Results: After adjustment for the potential confounding factors, the weighted multivariate adjusted ORs (95% CI) of low cognitive performance in DSST cognitive decline were 0.51 (0.28, 0.93) for the second quartile and 0.37 (0.16, 0.87) for the highest quartile versus the lowest quartile of VAI (P for trend=0.0556). Higher VAI was associated with better cognition after multivariable adjustment in men (ORQ4 vs. Q1 0.34, [95%CI 0.14-0.82]) but not in women. The positive association between VAI and global cognitive scores was only found in participants with higher education level (ORQ4 vs. Q1 0.40, [95%CI 0.16-0.97]). And the weighted multivariate adjusted ORs (95% CI) of low cognitive performance were 0.19(0.04-0.91) for the highest quartile versus the lowest quartile of VAI among people with diabetes.

Key words visceral adiposity index, cognition, obesity, NHANES

Category: Public Nutrition & Health

新型冠状病毒疫情对全球儿童青少年膳食习惯的影响：系统综述与 meta 分析

The impact of the COVID-19 pandemic on the dietary habits of children and adolescents worldwide: A systematic review and meta-analysis

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Background: COVID-19 pandemic indirectly affects health by affecting dietary behavior according to the economy and food availability. The dietary habits formed during childhood and adolescence could have long-lasting effects on dietary habits and health in adulthood.

Objectives: We aimed to perform a systematic review and meta-analysis to compare the change in dietary behaviors during and before the COVID-19 pandemic.

Methods and Study Design: We conducted a comprehensive search of studies published up to April 17, 2023, on PubMed, Embase, and Web of Science. The cohort studies comparing the dietary behaviors among the population aged 5–24 years during and before the COVID-19 pandemic were included. Two reviewers independently extracted data and assessed the quality of the studies. A meta-analysis was performed, and mean difference (MD) or standard mean difference (SMD) with 95% confidence intervals (CIs) were used to present the dietary behavior change for continuous data. For categorical data, risk ratios (RRs) and 95% CIs were calculated to assess the probability of having a particular dietary behavior during the COVID-19 pandemic. Studies with low heterogeneity were estimated using a fixed-effects model; otherwise, the random-effects model was applied.

Results: A final of 41 studies were selected for inclusion. The risk of insufficient intake of fruits or vegetables was lower (RR=0.90, 95% CI: 0.85 to 0.95) among young adults aged 20–24 years during the COVID-19 pandemic, and their alcohol consumption decreased (SMD=-0.22, 95% CI: -0.41 to -0.03). However, the risk of binge drinking increased (RR=1.20, 95% CI: 1.03 to 1.39) among adolescents.

Conclusions: Our study found that the COVID-19 pandemic has led to changes in dietary habits among adolescents and young adults. Specifically, increased binge drinking among adolescents is a concerning trend that requires further attention. Long-term cohort studies are necessary to monitor the lasting effects of the pandemic on dietary behaviors, particularly among adolescents.

Key words COVID-19, dietary habits, adolescents, young adults, meta-analysis

Category: Public Nutrition & Health

新加坡华人中星球健康饮食，基因风险与认知障碍的关联

Adherence to the planetary healthy diet, genetic risks, and cognitive impairment in Chinese adults living in Singapore

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Background and objective:

To explore the association between the planetary healthy diet (PHD) and cognitive impairment among Chinese adults, and to further evaluate whether the APOE ε4 allele could modify this association.

Methods:

The cohort study included 16,736 individuals from the Singapore Chinese Health Study. Dietary intakes were collected using a 165-item semiquantitative food frequency questionnaire at baseline (1993–1998). The continuous PHD score was developed based on intakes of 14 food components. Cognitive impairment was ascertained by the Singapore-modified Mini-Mental State Examination at follow-up 3 visits (2014–2016). A subset of 9,313 participants were evaluated for APOE genotypes. Logistic regression models were used to estimate the odds ratios (ORs) and 95% confidence intervals (CIs), with adjustment of potential confounders.

Results:

We identified 2,397 (14.3%) cases of cognitive impairment among 16,736 participants. Compared to participants in the lowest quintile of PHD score, the multivariable-adjusted OR and 95% CI of cognitive impairment for participants in the highest quintile were 0.72 (0.62, 0.83) (P-trend <0.001). Each 1-SD increment in the PHD score was associated with an 11% lower risk of cognitive impairment (OR: 0.89, 95% CI: 0.85, 0.93). Of the 9,313 participants with APOE genotyping data, 1,399 (15.0%) carried the APOE ε4 allele. Each 1-SD increment in the PHD score was associated with a 11% lower risk of cognitive impairment in participants without the APOE ε4 allele (OR: 0.89, 95% CI: 0.83, 0.96), but not in participants carrying the APOE ε4 allele (OR: 1.04, 95% CI: 0.89, 1.23; P-interaction =0.043).

Conclusions:

This study suggested that adherence to the PHD pattern in midlife was inversely associated with the late-life risk of cognitive impairment in Chinese adults. Additionally, there was a significant interaction between the APOE ε4 allele and the PHD pattern, and the association was significant in participants without the APOE ε4 allele, but not in APOE ε4 allele carriers.

Key words the EAT-Lancet planetary healthy diet, the APOE ε4 allele, cognitive impairment, Chinese adults, cohort

Category: Public Nutrition & Health

糖尿病和糖尿病前期患者中服用鱼油补充剂与冠心病发生风险的关联：一项前瞻性队列研究

Association of Fish Oil Supplementation with Risk of Coronary Heart Disease in Diabetes and Prediabetes Individuals: A Prospective Cohort Study

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OBJECTIVE:

Evidence on whether and how dietary fats protect against coronary heart disease (CHD) among individuals with impaired glucose metabolism remains unclear. We aim to examine the association of habitual fish oil supplementation with incident CHD among patients with prediabetes and diabetes.

RESEARCH DESIGN AND METHODS:

Overall 47,663 participants with prediabetes and 22,146 with diabetes were enrolled from UK Biobank and followed up until the end of 2020. Individuals diagnosed with CHD or cancer at baseline were excluded. Habitual use of fish oil was assessed by repeated questionnaires. Cox proportional hazard models were applied to calculate hazard ratios (HRs) and 95% confidence intervals (CIs).

RESULTS:

During a mean follow-up of 10.9 years, 4304 and 3294 CHD cases were documented among prediabetes and diabetes patients, respectively. After full adjustment, the multivariable-adjusted HRs (95% CI) of CHD were 0.91 (0.85-0.98) and 0.87 (0.80-0.95) for users of fish oil supplements compared with non-users among the participants with prediabetes and diabetes, respectively. We also observed that the protective association of fish oil use with CHD risk was significantly mediated by serum C-reactive protein (CRP) levels among prediabetes individuals and cholesterol of very-low-density lipoprotein (VLDL-C) among diabetic patients at baseline. The inverse associations were consistent in the analyses stratified by potential confounders.

CONCLUSIONS:

Fish oil supplementation was associated with lower subsequent CHD risk which was mainly mediated by lowering inflammation and VLDL-C among adults with prediabetes and diabetes, respectively. Our findings support the beneficial role of habitual use of fish oil supplements in preventing CHD among individuals with impaired glucose metabolism.

Key words fish oil supplement, coronary heart disease, diabetes, prediabetes

Category: Public Nutrition & Health

中老年人肌肉减少症和体圆指数与心血管疾病的关系：一项来自CHARLS的队列研究

Associations of sarcopenia and body-roundness index with cardiovascular disease among middle-aged and older adults: A longitudinal study from CHARLS

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Aim: The aims of this study were to explore the relationships between sarcopenia, BRI and CVD among elderly adults in China and to determine whether coexistence of sarcopenia and high BRI was associated with a significantly heavier health burden..

Methods: The study used three waves of data from the China health and retirement longitudinal study (CHARLS) in 2011, 2015 and 2018. A total of 6152 participants aged 45 or above were classified into the following groups: neither sarcopenia or high BRI, sarcopenia only, high BRI only, and both sarcopenia and high BRI. Sarcopenia was defined according to the Asian Working Group for Sarcopenia 2019 criteria. CVD was defined as the presence of physician-diagnosed heart disease, diabetes and/or stroke. The associations of BRI and sarcopenia with CVD risk were explored using Cox proportional hazards regression models.

Study Design: prospective cohort study.

Results: During the 7 years follow-up, 2385 cases (38.8%) with incident CVD were identified. Longitudinal results demonstrated that compared to neither sarcopenia or high BRI, high BRI only (HR:1.22, 95%CI: 1.09, 1.37), and both sarcopenia and high BRI (HR: 1.49, 95%CI: 1.08, 2.07) were associated with higher risk of CVD. In the subgroup analysis, individuals with both sarcopenia and high BRI were more likely to have new onset stroke (HR: 1.93, 95%CI: 1.12, 3.32) and increased risk of multimorbidity (HR: 2.15, 95% CI: 1.14, 4.04).

Conclusions: Coexistence of sarcopenia and high BRI was associated with higher risk of CVD. Early identification and intervention for sarcopenia and BRI not only allows the implementation of therapeutic strategies, but also provides an opportunity to mitigate the risk of developing CVD.

Key words Sarcopenia; Body-roundness index; BRI; Cardiovascular disease; CHARLS.

Category: Public Nutrition & Health

孕前植物性膳食模式与妊娠期糖尿病风险的前瞻性队列研究

The association between plant-based dietary patterns and risk of gestational diabetes mellitus in the China Birth Cohort Study-Xi'an

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Background and Objectives

Evidence on plant-based dietary patterns in relation to glucose homeostasis among pregnant women remain sparse. We prospectively examined the association of plant-based dietary patterns before pregnancy with gestational diabetes mellitus (GDM) risk and blood glucose levels.

Methods and Study Design

3,476 pregnant women aged 18 years and older prior to 15^{+6} weeks of gestation from the China Birth Cohort Study-Xi'an were included. Four plant-based dietary patterns (overall plant-based diet index [PDI], healthful PDI [hPDI], unhealthful PDI [uPDI], and pro-vegetarian diet index) were calculated based on 18 food groups from a validated food frequency questionnaire. GDM was ascertained through the 75-g 2-h oral glucose tolerance test in the mid-pregnancy. Log-binomial or modified Poisson regression models were used to estimate the relative risks (RRs) and 95% confidence intervals (95%CIs) for GDM across plant-based diet categories. Regression coefficients (β) and 95%CIs were reported for the association of plant-based diet index with fasting blood glucose (FBG), 1-h postload blood glucose (PBG) and 2-h PBG.

Results

613 participants developed GDM during the subsequent pregnancy. In multivariable-adjusted analyses, participants in the highest tertile of PDI had 28% lower risk of GDM compared with those in the lowest category (RR:0.72, 95%CI:0.60-0.87; P_{trend}=0.001). The risk of GDM significantly decreased by 11% for each SD increment of PDI. A similar pattern of association with GDM was also observed for hPDI and pro-vegetarian diet. A higher uPDI was not associated with an increased risk of GDM (RR:1.18, 95%CI:0.95-1.46; P_{trend}=0.14). Moreover, higher PDI reduced level of FBG, 1-h PBG and 2-h PBG, whereas hPDI and pro-vegetarian diet decreased FBG and 1-h PBG levels only.

Conclusions

Greater adherence to plant-based diet was associated with lower risk of GDM. Our findings provide evidence that considering the quality of plant foods is important for the prevention of GDM.

Key words cohort study; dietary patterns; gestational diabetes mellitus; plant-based diet index; pro-vegetarian diet index.

Category: Public Nutrition & Health

膳食指南依从性与认知功能的相关性研究

The correlation between dietary guidelines compliance and cognitive function

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Objective: The objective of this study was to investigate the associations between dietary guidelines compliance and cognitive function and mild cognitive impairment in middle-aged and elderly Chinese.

Methods: The data of this study based on the Lifestyle and Healthy Aging of Chinese Square Dancer Study. According to the Chinese Food Guide Pagoda (2022), the compliance dietary pagoda score was constructed, with the score ranging from 0 to 45 points. A battery of neuropsychological tests including Auditory Verbal Learning Test, Verbal Fluency Test, Digit Symbol Substitution Test, and Trail Making Test-B were used to assess the cognitive function, and the overall Z-scores reflected the overall cognitive function. MCI was determined according to the Petersen criteria. Multiple linear regression analysis and logistic regression analysis were used to evaluate the association between dietary guidelines compliance and cognitive performance.

Results: A total of 2263 participants aged 55 and above were included, with a mean age of 63.38±5.03 and a mean compliance dietary pagoda score of 31.08±5.56. In the fully adjusted model, compared with the lowest quartile, the highest quartile was associated with better overall cognitive function, with the linear partial regression coefficients (95%CI) of 0.19 (0.12, 0.26). The highest quartile was also associated with a 33% lower odds of mild cognitive impairment prevalence (odds ratio, OR=0.67, 95% CI: 0.47, 0.96), and a 5-point increment in score was associated with a 12% lower odds of mild cognitive impairment (OR=0.88, 95% CI: 0.78, 0.98, P=0.025).

Conclusion: In this study, higher compliance dietary pagoda score was associated with better cognitive function and a lower odds of mild cognitive impairment. The results showed that higher dietary guidelines compliance was associated with better cognitive performance.

Key words The Chinese Dietary guidelines; Cognitive function; Mild cognitive impairment; Middle-aged and elderly people

Category: Public Nutrition & Health

肥胖易感和肥胖抵抗人群的肠道微生物特征：来自大型社区队列研究的结果

Gut microbial features of the obesity-prone and obesity-resistant participants: results from a large community-based cohort study

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Background and Objectives

Despite living in the same environment, some people are at risk of obesity while others remain thin. In this study, we investigated whether the gut microbiota is different in people who are obesity prone (OP) and obesity resistant (OR).

Methods and Study Design

The present study included 118 participants from the Lanxi cohort study. Total energy intake and physical activity were categorized as high, medium and low. Those with a BMI < 24 kg/m 2 in the low physical activity and high energy intake groups were defined as the OR group (n=48). Those who were overweight/obese in the high physical activity and low energy intake groups were defined as the OP group (n=70). Fecal samples were subjected to 16S rRNA profiling to assess the gut microbiota of participants in the OP and OR groups.

Results

The overall composition of the gut microbiota at the phylum level showed a decrease in the abundance of Bacteroidetes and an increase in Proteobacteria in the OP group compared to the OR group. Alpha diversity showed no significant differences between the two groups. Principal Coordinate Analysis (PCOA) based on Unifrac distance showed that there were significant differences between the two groups (p=0.018). LEfSe analysis showed that Pseudescherichia and Enterobacter were relatively more abundant in the OP group at the genus level, and Caproicibacter, Flintibacter and Phocaeicola were relatively more abundant in the OR group. Metabolism-related pathways, including lipid metabolism, amino acid metabolism and energy metabolism, were increased in the OR group according to PICRUSt2 analysis.

Conclusions

Our results suggest that significant differences in gut microbiota composition were observed between the OP and OR groups, and the credible predominant differential flora may provide a new method to prevent weight gain or promote weight loss.

Key words Obesity-prone; obesity-resistant; gut microbiota; energy intake; physical activity

Category: Public Nutrition & Health

正常体重肥胖的肠道菌群改变及这种变化对心血管代谢健康的影响：结果来源于两个独立的队列研究

Alteration in the gut microbiota of normal weight obesity and its impact on cardiometabolic health: results from two independent cohort studies

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Background: Evidence regarding the association of gut microbiota with normal weight obesity (NWO) and its impact on cardiometabolic diseases (CMD) is scarce. We aim to investigate alterations in the gut microbiota of the NWO and evaluated whether this alteration influenced cardiometabolic health in two independent cohorts.

Methods: This study included 3620 and 1847 adults from Wellness Living Laboratory (WELL)-China and Lanxi cohorts, respectively. NWO was defined as normal body mass index (BMI) but increased body fat percentage (BFP). The gut microbiota of stool samples was detected by 16S rRNA gene sequencing. We evaluated the relationship between microbiota dysbiosis (diversity, relative abundance, and predicted pathway) and NWO. We constructed the healthy microbiome index (HMI) and examined its association with CMD. Finally, we assessed the correlation between dietary and lifestyle factors and NWO-related genera. These analyses were independently conducted in above two cohorts.

Results: Participants with NWO had decreased gut microbial richness and altered overall composition, compared to the normal weight lean (NWL) group. After adjusting for potential confounders, nine and fourteen gut microbial genera were significantly associated with NWO in WELL-china and Lanxi cohorts, respectively. Seven genera: Clostridia_UCG-014, Christensenellaceae_R7_group, Coprococcus, Fusobacterium, Ruminococcus gnavus, Phascolarctobacterium, and Ruminococcus torques overlapped in both two cohorts. The novel-created HMI significantly decreased the risk of hypertension, dyslipidemia, and metabolic syndrome, OR (95%CIs) was 0.92 (0.85-0.99), 0.87 (0.81-0.94) and 0.89 (0.80-0.98) respectively. Moreover, we found the genera that were favorable for NWO were consistently correlated with healthy dietary and lifestyle factors in two independent cohorts.

Conclusions: In these two independent cohorts, we found gut microbiota dysbiosis among participants with NWO and this alteration play a role in the pathogenesis of CMD. Our results highlighted the potential for specific gut microbiota to alter fat

distribution and further improve cardiometabolic health in participants with normal BMI but higher disease risk.

Key words Normal weight obesity; Body fat percentage; Gut microbiota; Cardiometabolic diseases

Category: Public Nutrition & Health

减盐行为干预对血压和尿钠的影响：随机对照试验的荟萃分析
Effects of a salt reduction behavioral intervention on blood pressure and urinary sodium excretion: a meta-analysis of randomized controlled trials

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Hypertension is one of the most common cardiovascular diseases and excessive sodium intake is a major risk factor. Many studies aiming at measures to reduce salt intake, such as integrated lifestyle interventions and health education, are currently available, but the effectiveness of studies of behavioral interventions based solely on salt reduction is unclear. This meta-analysis investigated the effects of a behavioral intervention based on salt reduction on blood pressure and urinary sodium excretion.

A search of the published literature was conducted using the Cochrane Central Register of Controlled Trials, EMBASE, PubMed and Web of Science. Study and intervention characteristics were extracted for the descriptive synthesis and study quality was assessed. As a result, a total of 4634 participants were represented in ten studies including 3763 adults and 871 children. Interventions included the provision of salt restriction spoons or devices, salt reduction education, self-monitoring devices for urinary sodium, and salt reduction cooking classes. Meta-analysis results showed that the salt reduction behavioral intervention significantly reduced SBP (-1.17 mmHg, 95%CI -1.86 to -0.49), DBP (-0.58 mmHg, 95%CI -1.07 to -0.08) and urinary sodium excretion (-21.88 mmol/24 hours, 95%CI -32.12 to -11.64).

The results found that behavioral change interventions based on salt reduction can reduce salt intake levels and low blood pressure levels. However, interventions require other salt reduction interventions in combination.

Key words salt; behavioral intervention; blood pressure; urinary sodium excretion; meta-analysis

Category: Public Nutrition & Health

学生饮食行为与超重肥胖的关系：一项横断面研究

The relationship between dietary behavior and overweight and obesity among students: a cross-sectional study

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Background and Objectives: The epidemic of overweight and obesity in children and adolescents has been an important public health problem worldwide. We conducted this study to investigate the prevalence of overweight and obesity among students in Ningbo, and to explore the relationship between the students' dietary behavior and overweight and obesity.

Materials & methods: A population-based cross-sectional study of school-aged children was conducted. A total of 7299 students have been recruited. The height and weight of the participants were measured, and a questionnaire was used to investigate their dietary behavior. Logistic regression models were used to investigate the relationship between dietary behavior and overweight and obesity. Age, gender, area, grade, sleep duration, and physical activity were adjusted in the multivariate regression models.

Results: The rates of overweight and obesity among students in Ningbo are 16.14% and 9.88%, respectively. The results showed that the frequency of eating breakfast and consuming fried food, fresh vegetables, and fruits was not significantly associated with overweight (P>0.05). Regular consumption of sugary beverages was found to be associated with a higher risk of overweight compared to students who never consumed (OR=1.256, 95% CI: 1.023-1.542, P=0.029). Then, the research indicated that skipping breakfast was considered a risk factor for obesity (OR=2.102, 95% CI: 1.087-4.065, P=0.027). After adjusting for age, gender, area, and grade and continuing to adjust for sleep duration and physical activity, the results showed that students who eat fried food at least once a day have a higher risk of obesity (OR=1.494, 95% CI: 1.050-2.125, P=0.026; OR=1.516, 95% CI: 1.065-2.158, P=0.021, respectively).

Conclusion: Regular consumption of sugary beverages was a risk factor for overweight. Frequent consumption of fried food and skipping breakfast can be a marker for identifying obesity in students.

Key words overweight; obesity; dietary behavior; students; risk factor

Category: Public Nutrition & Health

农村成年人饮食频率与二型糖尿病的关联：一项大规模的横断面研究

Association between meal frequency and type 2 diabetes mellitus in rural adults: a large-scale cross-sectional study

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Background: Diet frequency may potentially influence metabolic health. However, general population-based evidence on the association between meal frequency and type 2 diabetes mellitus (T2DM) remains limited and inconclusive. Thus, this study aimed to investigate the association between meal frequency and T2DM in rural area.

Methods: A total of 29,405 qualified participants were enrolled from the Henan rural cohort study. Data on meal frequency were collected through a validated face-to-face questionnaires survey. The distribution of total weekly meal frequency in the analyzed sample ranged from 14-21 times/week. So, total weekly meal frequency was divided into three groups of 14-15 times/week, 16-20 times/week, and 21 times/week. Then the breakfast, lunch, and dinner frequency were classified into 0-2 times/week, 3-6 times/week, and 7 times/week. Logistic regression models were utilized to explore the association between meal frequency and T2DM. Stratified analyses of different gender, age, BMI, smoking status, drinking status, high-fat diet, high-salt diet, vegetable and fruit intake were performed to estimate the robustness of the results.

Results: Compared with 21 times per week meal frequency group, the adjusted odds ratios (ORs) and 95% confidence intervals (95%CIs) were 0.75 (0.58, 0.95) and 0.70 (0.54, 0.90) for 16-20 times/week group and 14-15 times/week group, respectively. For the analysis of the three meals, significant associations were only found between dinner frequency and T2DM. Compared with 7 times per week dinner group, the ORs(95%CIs) were 0.66 (0.42, 0.99) and 0.51 (0.29, 0.82) for the group with 3-6 times/week and 0-2 times/week. Additionally, stratified analyses showed a significant association between meal frequency and T2DM among participants with healthy habits.

Conclusions: Reduced meal frequency especially dinner frequency was associated with lower prevalence of T2DM, which suggests that an adequate reduction in meal frequency per week may have a role in decreasing the risk of T2DM.

Key words Meal frequency; Dinner frequency; Type 2 diabetes; Rural population; Stratified analysis.

Category: Public Nutrition & Health

基于随机对照研究的川菜系中国心脏健康膳食成本分析

Does a modified antihypertensive Sichuan diet cost more? Analysis from the Chinese heart-healthy diet trial

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Background and Objectives: Adherence to a healthy diet like DASH is important to the prevention and control of hypertension. But high-quality healthy diets can be more expensive, which could act as a barrier. Thus, this study aims to determine whether the Chinese heart-healthy diet (Sichuan cuisine version) (CHH diet-SC) is more expensive than the conventional Sichuan diet, and explore the nutrients that mainly affect the cost of Sichuan diet .

Methods and Study Design: The cuisine-based Chinese heart-healthy diet (CHH) study is a multicenter, parallel-group, single-blinded, randomized feeding trial to evaluate the efficacy in lowering blood pressure of the CHH diet. The present study analyzed the cost of the 4-week intervention diets in Sichuan center representing the southwestern China of the CHH diet study based on the actual intakes of daily meals and retail food prices collected during the trial. Ridge regression analysis was performed to explore the most important nutrients in determining the diet cost.

Results: The CHH diet-SC was more expensive than the control diet (￥27.87±2.41 vs￥25.18±2.79, P<0.001), and the incremental cost-effectiveness ratio for 1 mm Hg SBP reduction was ￥0.32. The amount and expenditure of dairy products, fruits, soybeans and nuts, whole grains and mixed beans were higher of the CHH diet-SC compared to the control diet (P<0.001). Vitamin B_1, vitamin B_6, vitamin C, magnesium, and phosphorus were positively correlated with the cost of Sichuan diet (P<0.05).

Conclusions: The CHH diet-SC derived from Sichuan cuisine for lowering blood pressure cost more than conventional Sichuan diet, partly due to the high intake and expenditure of specific food groups. Nutrients including vitamin B_1, magnesium and phosphorus were strongly correlated with the cost of Sichuan diet, which could be a direction to further implement to reduce the cost of CHH diet-SC.

Key words diet; CHH diet; food costs; monetary costs; Sichuan cuisine

Category: Public Nutrition & Health

同型半胱氨酸在甜菜碱与代谢综合征关联中的作用

The role of plasma homocysteine on the association between serum betaine and metabolic syndrome

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Background and Objective

Previous studies have explored associations between betaine and metabolic syndrome, but few have considered the effects of homocysteine on them. Our objective was to explore the associations among betaine, homocysteine and the risk of metabolic syndrome.

Methods

This cross-sectional study included 2129 residents aged 40 to 80 years in the Guangzhou Nutrition and Health Study. Serum betaine and plasma homocysteine concentrations was determined by high-performance liquid chromatography-tandem mass spectrometry. The diagnosis of metabolic syndrome was ascertained according to the criteria of International Diabetes Federation. Logistic regression models were used to estimate odds ratios (ORs) and 95% confidence intervals (95% CIs). Mediation analysis was used to explore the possible role of homocysteine on the associations between betaine and metabolic syndrome.

Results

Serum betaine levels were negatively associated with the prevalence risk of metabolic syndrome. Compared with participants in the bottom quartile of serum betaine, those in the highest tercile had lower risk of metabolic syndrome, with an adjusted OR of 0.62 (95% CI: 0.48－0.79). In terms of the components of metabolic syndrome, higher serum betaine levels were associated with the better waist circumference, systolic blood pressure, diastolic blood pressure, fasting blood glucose, triglyceride and high-density lipoprotein cholesterol levels. Mediation analysis found that plasma homocysteine mediated the association between serum betaine and metabolic syndrome. Betaine reduced the risk of metabolic syndrome (β = －0.100, P < 0.001) and the levels of blood pressure, fasting blood glucose and triglyceride, with the mediation of lowering plasma homocysteine.

Conclusions

Serum betaine was negatively associated with the risk of metabolic syndrome with the mediation of lowering plasma homocysteine.

Key words betaine, homocysteine, metabolic syndrome, mediation analysis

Category: Public Nutrition & Health

营养支持促进糖尿病足溃疡的愈合：案例研究

Nutritional Support Improves the Healing of Diabetes Foot Ulcers: A Case Report

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Diabetic foot ulcers (DFUs) are the most striking complications of diabetes mellitus. In this case we report a 63-years-old man who has had type 2 diabetes and liver cirrhosis for many years. The patient presented left DFUs of grade III. He has received standard wound care including infection control and surgical debridement from podiatric surgeons in the past three months. Nevertheless, the DFUs were not improved. The patient's serum albumin (ALB) and prealbumin (PAB) were very low, 22.5 g/L and 110 mg/L respectively. While total bilirubin (TBIL) was 48.76 μmol/L, indicating the occurrence of hypoalbuminemia probably due to liver cirrhosis and inflammation. Therefore, optimizing the patient's nutritional status is an essential part of the wound care. We use Beaulab® SCP marine fish compound peptides, a patent-pending blend of purified short peptides (Average M.W. 500 Dalton, Tekwon Ltd.), for enteral nutritional support to promote wound healing process. Results showed that after two weeks' nutritional intervention with 0.4g/kg/d SCP, the PAB level increased significantly to 230 mg/L. The level of TBIL dropped back to 20.16 μmol/L. Granulation tissue formation was observed in the third week. At the end of the fourth week the ulcer constriction was obvious. After two months, the patient's DFUs was nearly completely healed. Previously, we reported that orally administered SCP notably downregulated uncontrolled inflammatory responses, and conferred substantial protection from endotoxin-induced acute hepatic damage. (Wang et al. J Food Biochem 2021; 45: e13618). Compared with other protein nutrients, the purified compound peptide SCP, in addition to serving as a more efficient nitrogen source, directly participating in protein metabolism and correcting malnutrition in patients with liver cirrhosis, may also reduce inflammation by modulating immune responses, thereby promote wound healing.

Key words Diabetic foot ulcers; Fish oligopeptides; Liver cirrhosis; Nutritional support

Category: Public Nutrition & Health

中国成人对食药物质的知信行：一项在线横断面调查

Knowledge, attitudes, and practices (KAP) regarding food-medicine dual-purpose substances(FMS) among adults in China: a cross-sectional online survey

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Objective: To evaluate the KAP related to FMS among adults in China, so as to provide the basis for both perfect related regulations and to provide people with scientific advice on FMS consumption.

Methods: Participants were invited through a convenience sampling strategy in 2020. A cross-sectional online survey on FMS perception and consumption was conducted via the Wenjuanxing e-questionnaire platform, which consist of basic social-demographic information of the respondents and KAP on FMS.

Results: A total of 2815 respondents were recruited for this study. 72.65% of the respondents realized that there was a clear list of FMS , yet only 18.44% knew the specific quantity of FMS . Respondents' identification of FMS showed an accurate response rate of 22.74% . Educational level was the factor associated with participants' knowledge of FMS . In terms of current level of knowledge of FMS , scores of 6 and above were over 70.00%, and their confidence in FMS-related knowledge scored 6 and above was around 80.00% by self-assessment . Supermarkets, e-commerce platforms, pharmacies had become the main ways for respondents to buy FMS. The concerns of the respondents were 43.76% for quality, 16.64% for contain FMS ingredients, 15.14% for the price, etc. when buying FMS. Among the FMS they had ever consumed, the two most frequently consumed FMS are yam (35.27%) and wolfberry (15.89%).40.6% of consumers hope that the government can increase publicity and conduct more popular science activities, 18.29% hope that the government can strengthen supervision .

Conclusions: The substantial knowledge of FMS among adult respondents in China wasn't optimistic, yet they expressed positive attitudes towards knowing and consuming FMS, and there is a high need for labeling and consumption. There is a desire to strengthen the research and policy promulgation on FMS , actively popularize FMS and guide residents to consume FMS scientifically.

Key words FMS; KAP; Consumption; Food labels

Category: Public Nutrition & Health

1岁婴幼儿25羟维生素D水平及影响因素
Analysis of 25(OH)D Levels and Influencing Factors in 1-Year-Old Infants and Toddlers in Wuxi, China

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Objective: To investigate the 25(OH)D levels in 1-year-old infants and toddlers and analyze the influencing factors.

Methods: A total of 441 infants and toddlers who underwent physical examinations in the Child Health Department of Wuxi Maternal and Child Health Hospital from January 2016 to June 2018 were collected as research subjects. Relevant data information during pregnancy and after childbirth was collected using a questionnaire survey, and information at the time of the infants' birth was collected through the maternal and child health system. Finger blood samples were collected to measure serum 25(OH)D concentrations, and statistical analysis was performed using SPSS 20.0 software.

Results: The survey found that the 25(OH)D concentration in 1-year-old infants and toddlers in this region was 66.48 ± 19.17 nmol/L. Univariate analysis showed that there were statistically significant differences in factors such as infant gender, maternal history of diabetes, whether vitamin D was supplemented during the first trimester of pregnancy, whether the child had been ill within 1 year, 1-year-old weight, and maternal 25(OH)D concentration during pregnancy ($P<0.05$). Multivariate logistic regression analysis revealed that the occurrence of illness within 1 year (OR=0.598, 95% CI: 0.343~0.998), 1-year-old weight (OR=0.841, 95% CI: 0.841~0.998), and serum 25(OH)D concentration during pregnancy (OR=0.854, 95% CI: 0.804~0.912) were influencing factors for serum 25(OH)D concentration in 1-year-old infants and toddlers.

Conclusion: Serum 25(OH)D concentrations in infants and toddlers within 1 year may be influenced by their own illnesses, weight, and maternal serum 25(OH)D levels during pregnancy.

Key words Infants and toddlers; 1-year-old; influencing factors; logistic analysis

Category: Public Nutrition & Health

膳食质量不佳与中国40岁及以上成年人的精神障碍症状有关：一项基于全国人群的横断面研究

Suboptimal diet quality is associated with mental symptoms among adults aged 40 years and over in China: a nationwide population-based cross-sectional study

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ObjectivesIn previous studies, dietary patterns have been linked to mental symptoms. However, few studies have examined the association of overall dietary quality with anxiety and depressive symptoms in the Chinese population. The study aimed to assessed the relationship between dietary quality and anxiety and depression symptoms among Chinese adults over 40 years.Methods

Between 2017 and 2019, a population-based, cross-sectional survey was carried out in China based on the National Cohort of Esophageal Cancer (NCEC). Uniformed and laptop-based questionnaires collected the demographic characteristics and food data. Additionally, anxiety and depression symptoms were measured using the Generalized Anxiety Disorder seven and the Patient Health Questionnaire nine. The dietary quality of the adults was evaluated using the revised Diet Balance Index 2016 (DBI-16).Results

73737 eligible participants were recruited for this study over the survey period. 17.6% and 13.7% of residents suffer from anxiety and depression symptoms, respectively. The DBI-16 indicates that participants with anxiety or depression symptoms had a higher level of inadequate food intake (LBS) and unbalanced food intake (DQD) than those without anxiety or depression. Specifically, they were more likely to have an inadequate intake of cereals, meat products, fish/shrimps, eggs, vegetables, fruits, and soybean products ($p<0.05$). The logistic regression models showed LBS and DQD were positively linked with anxiety and depression symptoms, and the correlation increases as inadequate intake and unbalanced dietary levels grow. On the contrary, excessive food intake (HBS) was significantly negatively correlated with symptoms of anxiety and depression. Moreover, a one-score increase in diet variety was associated with 8% lower odds of anxiety and 6% lower odds of depression symptoms, respectively.Conclusion

The overall diet quality of adults aged 40 years and over in China is poor. Dietary imbalance, inadequate intake of plant foods and low dietary diversity may increase anxiety and depressive symptoms.

Key words Chinese diet balance index-16; dietary quality; anxiety; depression; dietary diversity

Category: Public Nutrition & Health

性别和肥胖影响全氟烷基物质与肌肉质量之间的关系：NHANES 2011-2018

Sex and obesity influence the relationship between Perfluoroalkyl Substances and Muscle Mass: NHANES 2011-2018

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Abstract: Per- and polyfluoroalkyl substances (PFAS) are a characteristic group of endocrine-disrupting compounds, predominantly ingested through food and water. The association between PFAS exposure and obesity has been substantiated currently, however, available data regarding their effects on muscle mass remain insufficient. To investigate the effects of PFAS exposure on muscle mass, we performed a cross-sectional analysis of data from 1029 adolescents and 3274 adults in the National Health and Nutrition Examination Survey (2011-2018). Muscle mass was measured by Dual-energy X-ray Absorptiometry, and seven PFAS compounds in serum were quantitatively analyzed using online solid-phase extraction high-performance liquid chromatography-tandem mass spectrometry. Weighted multiple linear regression and weighted quantile sum (WQS) regression models were used to examine the relationship between PFAS exposure and muscle mass index(MMI, kg/m^2) while stratifying for age, sex, and obesity. Regression analyses demonstrated an inverse relationship between PFAS exposure and muscle mass after adjusting for potential covariates. Adults with higher serum concentrations of Perfluorodecanoate (PFDeA), perfluorooctanoate (PFOA), and perfluorooctane sulfonate (PFOS) accumulated less muscle mass (eg, -0.172 [95% CI: -0.275, -0.070] kg/m^2 of total muscle mass per doubling of PFOS). These correlations were particularly pronounced in adult females and obese subjects, displaying significant negative associations in the lower extremity, right arm, trunk, and entire body muscle, such as in adult females (eg, -0.259 [95% CI -0.417, -0.102] per doubling of kg/m^2 PFOS) and obese individuals (eg, -0.405 [95% CI -0.623, -0.187] kg/m^2 per doubling of PFOS). The outcomes of WQS regression analyses were consistent with weighted linear regression analyses. Our study suggests that exposure to PFAS, either individually or in combination, is associated with decreased muscle mass at specific body sites, with sex and obesity serving as influencing factors. Therefore, reducing PFAS to an appropriate level may contribute to minimizing the health risk caused by PFAS.

Key words Perfluoroalkyl and poly-fluoroalkyl substances; Muscle mass; Weighted quantile sum; Endocrine disrupting chemicals; Obesity

Category: Public Nutrition & Health

老年人细胞内水分与身体总水分的比例与肌肉力量和躯体功能的关联——一项横断面研究

Association of the ratio of intracellular water to total body water with muscle strength and physical performance in older adults-a cross-sectional study

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Abstract:

Background and Objectives: The ratio of intracellular water to total body water, which is positively associated with muscle strength and physical performance in older adults, has attracted broad attention. Nevertheless, it is unclear whether the positive association of the ratio of intracellular water to total body water with muscle strength and physical performance is attributed to improvements in muscle mass or muscle quality. This study aimed to analyze whether the ratio of intracellular water to total body water was associated with muscle strength and physical performance, independent of muscle mass.

Methods and Study Design: This cross-sectional study recruited 401 adults aged ≧60 years in four communities in Luzhou City, China, from January to August 2020. Appendicular skeletal muscle mass and the ratio of intracellular water to total body water were measured using a bioelectrical impedance analysis device. Muscle strength was measured by hand grip strength; physical performance was assessed by gait speed. Multivariate linear regression was adopted to analyze association of the ratio of intracellular water to total body water with muscle strength and physical performance.

Results: The ratio of intracellular water to total body water was inversely correlated with age, frailty and sarcopenia, positively associated with HGS and gait speed whether adjusted for age, sex, and appendicular skeletal muscle mass. Among subjects stratified by appendicular skeletal muscle mass, those who had a higher ratio of intracellular water to total body water had significantly greater muscle strength and physical performance in both sexes.

Conslusions: The ratio of intracellular water to total body water has a positive association with muscle strength and physical performance, independent of ASM. This could provide an approach to muscle quality assessment and an innovative idea for improving prediction models of muscle strength and physical performance.

Key words intracellular water; muscle strength; physical performance; muscle quality; sarcopenia

Category: Public Nutrition & Health

武汉地区绿化、空气污染和居住饮食环境对妊娠期体重增加的影响:一项横断面研究

Contribution of Greenness, Air pollution, and Residential Food Environment to Excess Gestational Weight Gain: A Cross-sectional Study in Wuhan, China

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Objectives: We aimed to explore the association of greenness, air pollution, and residential food environment exposures with EGWG, and estimate their combined effects on EGWG.

Method: This population-based on a cross-sectional study of 51,507 pregnant women with individual-level residential address data in the Wuhan Maternal and Child Health Management Information System. Multiple urban environmental exposures, including residential greenness, air pollution, and residential food environments, were investigated in this study. Generalized linear mixed regression models were utilized to explore the relationships between greenness, air pollution, and residential food environmental exposure, and EGWG; and the combined effects were further estimated by cluster analysis and principal components analysis (PCA).

Result: In single exposure models, Each IQR increase in NDVI500-m was associated with a 2.6% (95% CI: 0.8-4.3) lower odds for EGWG. We only found a significant association between convenience store density within the 250m buffer zone (OR=1.029 and 95% CI: 1.005,1.054) and EGWG. In terms of air pollution, SO2, PM10, and PM2.5 were significantly associated with a higher prevalence of EGWG and higher gestational weight gain (GWG), with (OR=1.162 and 95% CI: 1.116,1.209; OR=1.120 and 95% CI: 1.084,1.157; OR=1.172 and 95% CI: 1.141,1.205, respectively) per IQR increase; Higher levels of NO2, CO and O3 were associated with lower prevalence of EGWG, with (OR=0.950 and 95% CI: 0.908,0.995; OR=0.927 and 95% CI: 0.900,0.954; OR=0.946 and 95% CI: 0.918,0.976, respectively) per IQR increase.Compared to healthy urban environment clusters, clusters with high levels of air pollution, high-density residential food environment and low levels of residential greenness were associated with higher odds of EGWG (OR=1.104, 95% CI: 1.025, 1.188).

Conclusion: This study emphasizes that exposure to high levels of air pollution, high-density residential neighborhood food environments, and low levels of residential greenness is a neighborhood obesogenic environment for pregnant women.

Key words Keywords: Greenness; Air pollution; Residential food environment; Excessive gestational weight gain;

Category: Public Nutrition & Health

COVID-19 大流行下的冷链食品： 中国的供应和管理现状
Cold-chain Food under the COVID-19 Pandemic: Current Supply and Management in China

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The coronavirus disease 2019 (COVID-19) pandemic has started a new epoch in the world. Although the rate of COVID-19 infection via contaminated cold-chain food is low, current studies indicate cold-chain food provides a suitable environment for the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) for long-time survival and long-distance spread globally, which poses as a threat to public health, especially in China. We summarized recent new regulations/guidelines issued for cold-chain foods in China and analyzed the results of SARS-CoV-2 nucleic acid testing on the surface of a considerable number of cold-chain foods and their internal or external packaging, with the aim of exploring the risk of cold-chain foods being contaminated with SARS-CoV-2, combined with the import trades and local demand to analyze new challenges, possibilities, and countermeasures for food safety management. We found that appropriate regulatory measures in China have contributed to reducing the risk of virus transmission from cold-chain food, ensuring food safety and economic development but have also potentially impacted import trade and consumption of certain food categories, with aquatic products being the most severely affected in a short time duration. Food safety management and distribution of cold-chain food have been improved. However, long-term impacts should be further assessed.

Key words SARS-CoV-2; COVID-19; cold-chain food; food safety; China

Category: Public Nutrition & Health

血清 25-羟基维生素 D 与中老年女性缺血性脑卒中复发的关联性研究

Association between serum 25-hydroxyvitamin D and recurrent ischemic stroke in middle-aged and elderly women

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Background and Objectives: Evidence for the association between vitamin D and risk of recurrent ischemic stroke remains limited. Thus, we aimed to assess the association between serum 25-hydroxyvitamin D (25(OH)D) level and risk of recurrent ischemic stroke in middle-aged and elderly women (age ⩾45 years) with a history of ischemic stroke, and to identify the optimal 25(OH)D level in relation to lowest recurrent ischemic stroke risk.

Methods and Study Design: Data from the nationwide prospective United Kingdom Biobank were used for analyses. Primary outcome was time to first ischemic stroke recurrence requiring a hospital visit during follow-up. We used Cox proportional hazards regression model with restricted cubic splines to explore 25(OH)D level in relation to recurrent ischemic stroke. The dose-response relationship between 25(OH)D and recurrent ischemic stroke risk was also estimated, taking the level of 10 nmol/L as reference.

Results: A total of 512 participants (mean age: 60.1 years) with a baseline ischemic stroke were included for analyses. There were 16 (3.1%) recurrent ischemic stroke events documented during a mean follow-up of 7.7 years. Using Cox proportional hazards regression model with restricted cubic splines, a quasi J-shaped relationship between 25(OH)D and risk of recurrent ischemic stroke was found, where the lowest recurrent ischemic stroke risk lay at the 25(OH)D level of approximate 60 nmol/L. When compared with 10 nmol/L, a 25(OH)D level of 60 nmol/L was significantly associated with a 50% reduction in the recurrent ischemic stroke risk (hazard ratio = 0.50, 95% confidence interval: 0.31 - 0.80).

Conclusions: Based on data from a large-scale prospective cohort, we found a quasi J-shaped relationship between 25(OH)D and risk of recurrent ischemic stroke with the lowest risk at around 60 nmol/L. These results may provide some insights into the optimal vitamin D status recommendation for recurrent ischemic stroke prevention.

Key words vitamin D; recurrent ischemic stroke; 25-hydroxyvitamin; middle-aged and elderly women; stroke prevention

Category: Public Nutrition & Health

辅食添加时间与随后腹泻发生风险的关联

Association between the timing of complementary foods introduction and subsequent infant diarrhea

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Objective: We aimed to explore the associations of complementary foods (CF) introduction timing with subsequent infant diarrhea and its duration.

Methods: This study embedded in Tongji Maternal and Child health Cohort (TMCHC) study. The information on CF introduction and infant diarrheal illness was collected at 6 and 12 months postpartum. Infants were assigned to three groups: 1) <5 months of age (n=723), 2) 5-5.9 months of age (n=2292), and 3) ≥6 months of age (n=2111) according to the timing of CF introduction. The incident of diarrhea was limited to the diarrhea occurred after the CF introduction. Cox regression models were used to estimate the HRs (95%CIs) of infant subsequent diarrhea according to timing of CF introduction. Logistic regression models were used to estimate the ORs (95%CIs) of infant recent diarrhea (occurred within 1.5 months following the introduction of CF), later diarrhea (occurred after 1.5 months of the introduction of CF), and diarrhea duration according to timing of CF introduction.

Results: A total of 5126 infants were involved in the final analysis. The prevalence of diarrhea among infants was 16.8%. When compared to infants in ≥6 months group, the aHR was 1.46 (95%CI: 1.14-1.87) for <5 months group and was 1.25 (95%CI: 1.03-1.52) for 5-5.9 group after adjustment for potential confounders. The results remained significantly when outcome was limited in recent diarrhea (aOR: 1.98; 95% CI: 1.41-2.77 for <5 months group; aOR: 1.87; 95% CI: 1.33-2.63 for 5-5.9 group). Both infants in <5 months group and 5-5.9 months group were had increased risk of diarrhea lasts less than 7 days (aOR: 1.73; 95% CI: 1.17-2.55 for <5 months group; aOR: 1.35; 95% CI: 1.00-1.84 for 5-5.9 months group).

Conclusion: Introducing complementary foods before the age of 6 months is associated with an increased risk of infant diarrhea in the short term.

Key words complementary foods; infant diarrhea; diarrhea duration; infant diarrhoea; diarrhoea duration; TMCHC

Category: Public Nutrition & Health

中国30岁以上妊娠妇女孕期增重与新生儿出生体重过重的关系

Maternal age-specific association between gestational weight gain and large infant birthweight in Chinese women aged 30 years and older

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Background and objectives: The relationship between excessive gestational weight gain and large infant birthweight has been documented in numerous studies, however, such evidence is scarce in women with older age, which is already a risk factor for adverse perinatal outcomes including large infant birthweight. Considering that the number of women who delay childbearing until or beyond 30 years has increased after the relaxation of the one-child policy, this study aimed to investigate the maternal age-specific association between gestational weight gain and large infant birthweight in Chinese women older than 30.

Methods and study design: A prospective cohort including 19,854 mother-child dyads was conducted in Southwest China between 2019 and 2022. Logistic regression was performed to assess the association of gestational weight gain above and below the 2009 Institute of Medicine guidelines with macrosomia and large-for-gestational-age, stratified by maternal age (31-34 years and ≥35 years).

Results: In both maternal age groups, excessive and insufficient gestational weight gain was associated with increased and decreased odds of large infant birthweight, respectively. After stratified by pre-pregnancy body mass index, the protective effect of insufficient gestational weight gain on large infant birthweight was not observed in overweight/obese women aged 31-34 years. Moreover, among overweight/obese women, the impact of excessive gestational weight gain on the risk of macrosomia (odds ratio, 95% confidence intervals: 31-34 years 2.72, 1.89-4.02; ≥35 years 1.59, 1.13-2.27) and large-for-gestational-age (odds ratio, 95% confidence intervals: 31-34 years 2.18, 1.68-2.88; ≥35 years 1.71, 1.30-2.25) was stronger in women aged 31-34 years.

Conclusions: The association between gestational weight gain and large infant birthweight might differ according to maternal age, and more attention should be paid to women aged 31-34 years. Maternal age should be considered when establishing pregnancy weight guidelines or nutritional plans.

Key words gestational weight gain, older maternal age, body mass index, macrosomia, large-for-gestational-age.

Category: Public Nutrition & Health

中国人群正常体重肥胖与糖尿病风险增加有关:一项前瞻性队列研究

Normal weight obesity is associated with increased risk of diabetes in Chinese people: a prospective cohort study

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Background and Objectives

While several studies have linked normal weight obesity (NWO) and diabetes, the association between them remains controversial. We aimed to evaluate the risk of developing diabetes in Chinese population with NWO.

Methods and Study Design

This 3-year population-based cohort study was based on the China Health and Nutrition Survey(CHNS). A total of 7410 subjects who participated in both 2015 and 2018 wave of CHNS, and without diabetes in 2015 were included. Body fat percentage (BF%) was measured by bioelectrical impedance analysis. NWO was defined as subjects with a normal BMI (18.5-23.9 kg/m2) and an excess BF% (≥ 24% in men; ≥ 33% in women).

Results

Of 7410 individuals, 2874 individuals were normal weight non-obese (NWNO), 802(10.8%) were NWO, 652 were overweight non-obese (OWNO), and 3082 were overweight obese (OWO). During a follow-up of 3.0 years, 499 (6.7%) individuals developed diabetes. Multiple Cox regression analyses indicated that, compared with NWNO people, the adjusted hazard ratios (95% CI) of diabetes in NWO, OWNO and OWO people were 1.592(1.156-2.193), 1.599(1.141-2.242) and 1.889(1.514-2.357), respectively. When stratified by gender and age, NWO was associated with an increased risk of diabetes only in male and people 65 and above. In addition, we found an adjusted dose-response association(P=0.0013) between BF% and risk for diabetes in male with a normal BMI using restricted cubic spline functions.

Conclusions

Chinese people with NWO are at increased risk of developing diabetes, especially in men and people aged 65 years and older. Dose-response association between BF% and risk of diabetes remain even when BMI is normal.

Key words normal weight obesity; body fat; diabetes; Chinese people; cohort study

Category: Public Nutrition & Health

人群减盐干预模式探索-中国疾控中心Resolve减盐项目

Exploration of the implementation mode of population salt reduction interventions——China CDC-Resolve Salt Reduction Program

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Background and Objectives: The cooking salt of Chinese residents has declined, but sodium intake has increased, salt intake is still much higher than the recommended <5 grams per person per day. Salt reduction is a cost-effective chronic disease intervention but there is still a lack of salt reduction intervention mode that are in line with China's national conditions and can be promoted.

Methods and Study Design: By summarizing the effective salt reduction interventions applicable to key places (communities, enterprise and public institution, schools, canteens/restaurants, supermarkets, etc.) and key populations in these places, based on the SHAKE strategy, the concept of healthy supportive environment construction and the CHLA platform, the research team developed the intervention implementation mode in each place and carried out pilot application in Hunan and Zhejiang Province to evaluate the feasibility and replicability of these interventions.

Results: “3.2.1 mode” for community salt reduction, “Culture-LAKE mode” for enterprise and public institution salt reduction, “CLASS mode” for school salt reduction, 4S mode for canteens/restaurants salt reduction and “CNS mode” for supermarket salt reduction were developed. Based on the implementation mode, the salt reduction interventions of communities, enterprise and public institutions, schools including advocacy, distribution tools, training and lectures, on-site activity and other activities were successfully carried out in eight districts/counties (Wuling, Hanshou, Shigu, Qiyang in Hunan Province, Liandu, Yunhe, Luqiao, Tiantai in Zhejiang Province), canteens/restaurants and supermarkets salt reduction interventions were carried out in four of eight above districts/counties. National team also carried out comprehensive publicity. A series of technology plans, materials, standardized training courseware and an association standard “Behavior guidelines for salt reduction at home” were developed from this study.

Conclusions: Carrying out population salt reduction measures based implementation mode for various places is acceptable and it can provide a basis and reference for national promotion and implementation of salt reduction activities.

Key words Salt Reduction; Implementation mode; Health Education; Supportive Environment

Category: Public Nutrition & Health

机器学习方法识别柑橘类水果摄入的生物标志物和与生化指标之间的关系：非靶向代谢组学研究

Machine learning identifying biomarkers of citrus fruit intake and its association between biochemical indicators: an untargeted metabolism analysis

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Background Citrus fruits is one of the most popular fruits all around the world. With the increase in citrus fruit production and the advancement of storage and processing technology, citrus fruits have become an important source of dietary nutrition for the Chinese people. Citrus fruits are rich in many beneficial phytochemistry substances, such as proline betaine, limonin, pectin, etc., as well as vitamin A, C and E and various mineral elements. Among them, there are more than 170 antioxidant nutrients, which are natural antioxidants. In addition, consuming citrus fruits can also reduce the risk of developing cancers and has anti-inflammatory effects.Objectives Identifying specific metabolites of citrus fruit consumers, and explore the association between these metabolites and biochemical indicators in order to explain the health effect of consuming citrus fruit in metabolomic level.Methods and study design The population was from China Health and Nutrition Survey 2015, 500 participants from Hunan and Guizhou was completed dietary survey and collected serum sample, of which 126 reported having citrus fruits recently during the research. Untargeted metabolomic analysis of serum was using Ultrahigh Performance Liquid Chromatography-Mass Spectrum(UPLC-MS).We conducted three machine learning methods to identify the specific metabolites between citrus fruit consumers and non-consumers. Then we use Pearson partial correlation analysis with covariate correction to discover the association between metabolites and biochemical indicators.Results We have identified 16 metabolites including β-cryptoxanthin(OR=1.43, 95%CI=1.04-2.06) , proline betaine(OR=1.66, 95%CI=1.27-2.23) and N-methylhydroxyproline(OR=1.27, 95%CI=1.04-1.61) are differential metabolites between citrus fruit consumers and non-consumers. β-cryptoxanthin is possitively correlated with HDL-C and nagatively correlated with Triglycerides and high-sensitivity C-reactive protein(hs-CRP). Proline betaine and N-methylhydroxyproline are positively correlated with hs-CRP.Conclusion β-cryptoxanthin , proline bataine and N-methylhydroxyproline are possibaly biomarkers of citrus fruit intake. The health effect of consuming citrus fruit may associated with metabolic pathways interactions of these metabolites.

Key words Citrus fruit, Consumer, Biochemical indicator, Machine learning, Metabolomics

Category: Public Nutrition & Health

新冠疫情期间家庭饮食、家庭环境、父母焦虑与儿童营养状况的关系

the Relationship Between Family Diet, Family Environment, Parent Anxiety and Children`s Nutrition Status during the COVID-19 Pandemic

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The COVID-19 prevention measures during the pandemic changed the weight of children and the family environment. Both malnutrition and obesity existed among children. The study aimed at analyzing the nutritional status of Chinese children and the relationship with the family diet, family environment, and parental anxiety during the COVID-19 pandemic to provide a basis for further intervention.

7645 primary and secondary school students from five schools in Chengdu, China, and their parents were included in this study. Changes in the family’s diet and condition of frailty, overweight, and obesity of children during the two waves of follow-up surveys were assessed using paired chi-square tests. The effects of changes in family diet during the outbreak on the nutrition status of children were analyzed using multiple logistic regression, analysis of the effects of family environment and parental anxiety on childhood obesity using generalized estimation models.

The prevalence of frailty and obesity decreased from 11.64%and 11.60% in wave 1 to 4.96% and 10.50% in wave 2, and the rate of overweight increased from 13.11%in wave 1 to 13.73% in wave 2. Children whose families reduced consumption of staple foods during the COVID-19 were more likely to be frail, and families increased consumption of sugary drinks, take-out or meal delivery services, living in towns, family environmental barriers, and parental anxiety were risk factors for overweight obesity. Mother's education level in middle and high school and low age were protective factors for overweight obesity.

The physical environment of the family, the emotions of family members, and children's perceptions of the family's soft environment can influence children's eating behaviors, children's nutritional intake, and frailty and obesity in children under public health emergencies, and family-based dietary interventions may be effective. Parents can increase consumption of healthy foods and improve the family environment, which improve their growth.

Key words Children's Nutrition Status, Family Diet, Family Environment, Parent Anxiety, COVID-19 Pandemic

Category: Public Nutrition & Health

妊娠期体重增加模式及其对新生儿出生体重的影响：一项基于人口的队列研究

The pattern of gestational weight gain and its effects on neonatal birth weight: a population-based cohort study

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Background

Inappropriate gestational weight gain (GWG) is associated with poor birth outcomes in newborns. The purpose of this study was to investigate weight gain in different gestational periods and the gestational weight gain (GWG) pattern in relation to the risk of delivering LGA and SGA infants.

Methods

A prospective cohort of 3175 pregnant women was made in the analyses. Odds ratio (OR) and 95% confidence intervals of delivering SGA and LGA births in relation to gestational weight during different stages were evaluated via logistic regression analysis. Potential trajectories of maternal weight and GWG were identified by trajectory analysis. The relationship between different trajectory groups and the risk of delivering LGA and SGA babies was analyzed by logistic regression.

Results

Excess weight gain in the second and third trimesters increase the risk of delivering LGA infants (OR=1.896, P<0.001; OR=1.491, P=0.001). Excess weight gain in the second trimester was a protective factor for delivering SGA infants (OR=0.632, P=0.021). Three distinct weight trajectories were identified, and the moderate and high GWG were risk factors for LGA (OR=1.497, P=0.005; OR=2.952, P<0.001) and protective factors for SGA (OR=0.433, P<0.001; OR=0.325, P=0.001), respectively. Four distinct trajectories were identified and two growth models were founded as risk factors for the appearance of LGA (OR=2.613, P=0.000; OR=4.419, P=0.000), but only an increase in the second half of pregnancy was a protective factor for the appearance of SGA (OR=0.418, P=0.004).

Conclusions

The results show that it is best to maintain appropriate weight gain during the second trimester of pregnancy, which minimizes the occurrence of adverse birth outcomes.

Key words Gestational weight gain, Pattern, PROCTRAJ, Large for gestational age, Small for gestational age.

Category: Public Nutrition & Health

产前微量营养素补充是否对子代血压有益?基于中国西部农村随机对照试验的14年随访研究及一项meta分析

Whether antenatal micronutrient supplementation having benefit on offspring blood pressure? A 14-year follow-up of a randomized controlled trial in China and meta-analysis

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Objectives

Antenatal micronutrient supplementation improves birth outcomes, which has been shown to be associated with offspring blood pressure (BP). We aimed to examine the effects of antenatal micronutrient supplementation on adolescent BP.

Methods

We followed adolescents born to women who participated in a cluster randomized, double-blinded controlled trial of antenatal micronutrient supplementation conducted between 2002 and 2006. All pregnant women from each village in two rural counties in western China were randomized to take a daily capsule of folic acid (FA), folic acid plus iron (IFA), or multiple micronutrients (MMN). We assessed adolescent systolic and diastolic BP using validated electronic sphygmomanometer in 2016, which were then transferred into BP percentiles by adolescent age and height. We examined the effects of antenatal micronutrient supplementation on adolescent BP percentiles using generalized estimation equation. In addition, a meta-analysis was conducted after identifying similar trials that followed offspring and assessed their BP.

Results

Among 4488 singleton births eligible for long-term follow-up, 2118 (47.2%) adolescents aged 10-14 were followed, with 59.1% being male and a mean age of 11.71 (SD, 0.87) years. After adjusting for covariates, the MMN relative to FA group was associated with a 2.71 (95% CI -5.13, -0.28) point and a 2.56 (95% CI -4.99, -0.13) point lower systolic and diastolic BP percentile, respectively. The similar association was observed when comparing MMN to IFA. The corresponding adjusted mean differences were -1.32 (95% CI -4.13, 1.49) and-1.64 (95% CI -4.14, 0.86) points for systolic and diastolic BP percentile, respectively. In the meta-analysis including four trials with 5903 offspring, although the similar benefits of MMN relative to FA or IFA were observed, all the confidence intervals crossed the null point.

Conclusions

Antenatal micronutrient supplementation may exert some benefits on offspring blood pressure. Individual patient data meta-analysis should be pursued for addressing possible confounding and heterogeneity and identifying modifiers.

Key words Antenatal micronutrient supplementation, offspring Blood pressure

Category: Public Nutrition & Health

美国成年人血清脂肪酸模式与抑郁的关联性研究：基于 NHANES 数据

Association of Serum Fatty Acid Pattern with Risk of Depression in U.S. Adults: Analysis of NHANES 2011-2012

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Background: Exposure to different concentrations of fatty acids (FAs) may have an impact on depression. However, previous studies using individual FAs may not reflect the performance of mixtures of various fatty acids, and the associations of FA patterns with depression remain unclear.

Method: We conducted the cross-sectional analysis in 792 adults aged 18 years and older with available serum FAs and depression screening data in National Health and Nutrition Examination Survey (NHANES) 2011–2012. Serum concentrations of thirty FAs were measured using gas chromatography-mass spectrometry. Depression was assessed using the Patient Health Questionnaire-9. Principal component analysis was used to derive serum FA patterns. The relatedness between serum FA patterns and the risk of depression in the whole population and different subgroups was tested using survey-weighted logistic regression.

Results: Four serum FA patterns were identified. Individuals in the high tertile of 'high EPA and DHA; low DTA and DPA' pattern score had 0.46 (95% CI: 0.22, 0.93) lower odds of developing depression compared to individuals in the lowest tertile after adjusting for confounders. The risk of depression was increased in the population with the highest tertile of 'low capric acid and lauric acid; high GLA and SDA' pattern (OR: 2.45, 95% CI: 1.24, 4.83). These associations were vastly different when analyses were stratified by sex, race, body mass index status, age levels, smoking status and alcohol use. The other serum FA patterns were not significantly associated with depression risk.

Conclusions: Serum FAs patterns were related to depression, and the associations were different between subgroups and relied on specific FAs patterns.[1] [2] These findings may have important implications for using the co-administration of multiple FAs as a mitigation measure against depression in specific populations.

Key words fatty acids; depression

Category: Public Nutrition & Health

基于出生队列的母亲孕期体重状态对子代在出生时、学龄期及青少年早期体格发育影响研究

Longitudinal associations between maternal gestational weight and physical growth at birth, mid-childhood and early adolescence: a birth cohort

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Background and Objectives

Maternal adiposity during pregnancy has been identified as predictors of offspring physical growth. We aimed to explore whether this relationship has changed over time.

Methods and Study design

We used a birth cohort data from a randomized controlled trial of antenatal micronutrient supplementation in rural western China (ISRCTN08850194). Maternal weight and height were collected during the first, second and third trimester, and weekly weight gains during second and third trimester were calculated and classified following the Institute of Medicine recommendation. Offspring length/height and weight were standardly assessed at birth, mid-childhood (age 7-10 years) and early adolescence (age 10-14 years), which were then converted into z-scores (length-/height- and body mass index-for-age and sex z score) using the INTERGROWTH-21st and WHO growth standards, respectively. We conducted generalized linear models to examine the associations of maternal weight status during pregnancy with BAZ and HAZ at birth, mid-childhood and early adolescence, respectively, with adjustments for common covariables.

Results

A total of 586 mother-offspring pairs were analyzed and most are boys (60%). Per kg/m2 increase of maternal BMI during first trimester was associated with offspring higher BAZ. The adjusted mean differences (aMD) were 0.06 (95% Confidence Interval [CI] -0.004, 0.12) at birth, 0.07 (95% CI 0.03, 0.11) at mid-childhood, and 0.11 (95% CI 0.06, 0.17) at early adolescence. In addition, maternal excessive weight gain during second and third trimester was associated with higher HAZ at birth, mid-childhood and early adolescence. The corresponding aMD was 0.15 (95% CI -0.24, 0.54), 0.27 (95% CI 0.002, 0.55) and 0.48 (95% CI 0.21, 0.75), respectively.

Conclusions

Maternal adiposity during pregnancy had long-lasting impacts on offspring BAZ and linear growth, and the association strength tended to become stronger as they grow older.

Key words birth cohort, gestational weight, physical growth, longitudinal association

Category: Public Nutrition & Health

老年人手机使用、社会支持、健康老龄化和抑郁的关系
Mobile Phone Usage, social support, Attitude to Aging, and Depressive Symptoms among Older Adults

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Background: Little is known about mobile phone problem use (MPPU) among older adults. This study investigated critical factors affecting MPPU and filled the gap between social support and MPPU in older people.

Methods: A cross-sectional study was conducted in community (n = 376) with questionnaires of Multidimensional Scale of Perceived Social Support (MSPSS), Geriatric Depression Scale (GDS-15), Attitudes to Aging Questionnaire (AAQ) and Mobile Phone Problem Use Scale (MPPUS).

Results: 80.9 % of older people used smartphones and spend less than three hours on mobile phone per day. MPPU was affected by social support (β = 0.16, P = 0.041), AAQ-psychosocial loss (β=1.11, P<0.001), AAQ-psychological growth (β = 0.51, P = 0.021), GDS-15 (β = 0.56, P = 0.036). The relationship between social support and MPPU was partially mediated by attitudes to psychosocial loss and physical change.

Conclusion: Almost half of older adults have MPPU. Positive social support may weaken depressive symptoms and physical change, which may increase MPPU in turn.

Key words mobile phone problem use; attitudes to aging; social support; depressive symptoms; older adults

Category: Public Nutrition & Health

中国西南地区 18-75 岁居民食品安全相关行为的横断面研究
Food safety-related practices among residents aged 18-75 in Southwest China: A cross-sectional study

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Objectives: Good food safety practices are essential to minimizing food-borne diseases. The present study explored the food safety-related practices of residents during the early phase of COVID-19 in Southwest China and its impact factors.

Methods and study design: Residents aged 18-75 years from Guizhou, Yunnan, Sichuan, and Chongqing, China, were included in our study. The convenience sampling method was used to select participants, and face-to-face surveys were adopted in households and communities to collect data. Descriptive statistics for all survey questions, including sociodemographic characteristics of respondents and weighted percentages were obtained and the log-binomial regression was used to assess the influencing factors of food safety-related practices.

Results: Overall, 7,848 respondents from four regions were involved. The food safety-related practices were poor between males and females, whereas the former performed poorer practices than the latter (70.5% vs. 68.0%, respectively). Paying attention to nutrition labels when shopping for prepackaged foods was the worst practice. Age, ethnicity, region, occupation, education level, and income were demonstrated as the impact factors of food safety-related practices. In addition, compared to males, women were more likely to acquire relevant knowledge from social media, family members/friends, books/newspapers/magazines, experts, and food sales staff ($p < 0.05$). However, no statistical difference in gender was observed for channels to obtain relevant knowledge from radio/TV.

Conclusion: Men had poorer food safety-related practices than women in Southwest China. Findings indicate that future food safety education should adopt different strategies for different populations, especially for men. The mainstream media in improving food safety practices needs to be applied further in the near future.

Key words food safety-related practices; Southwest China; gender; residents

Category: Public Nutrition & Health

维生素D3改善青少年游泳运动员血清25羟维生素D水平的研究

Vitamin D3 Enhanced Serum 25(OH)D without Physical Performance in Adolescent Swimmers

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Objective To investigate the effect of vitamin D supplementation on serum 25(OH)D and muscle strength in adolescent swimming players. Methods 42 swimming players (n=42, age=12.85±2.15), were randomly divided into vitamin D3 supplementation group (VDG, n=23) and placebo control group (CG, n=19). VDG took 800 IU vitamin D3 drops per day, and CG supplemented the same dose of corn oil capsules. The experiment lasted for 4 weeks. Before and after the intervention, the VD nutritional indicators (serum total 25(OH)D, parathyroid hormone, blood calcium, blood phosphorus), physical fitness indicators (height, weight, body composition), and muscle strength indicators (muscle mass, grip strength, back strength, vertical jump, standing long jump) were measured. Results （1）After 4 weeks of VD3 supplementation, the VDG serum 25(OH)D concentration was significantly higher than pre-experiment (47.86±10.76 VS 65.32±14.34, *P<0.01*), the CG also was significantly higher than pre-experiment (47.26±11.70 VS 52.20±12.56, *P<0.01*). The change of VDG serum 25(OH)D concentration was significantly higher than CG (4.94±4.15 VS 17.45±10.12, *P<0.01*). （2）The boys and girls back strength increased significantly in both groups(*P<0.05*, *P<0.01*), the fat mass of VDG boys was significantly higher than pre-experiment (*P<0.01*); the muscle mass and fat mass of CG girls were significantly higher than pre-experiment (*P<0.01*, *P<0.05*). （3）Boys serum 25(OH)D concentration was significantly negatively correlated with parathyroid hormone (r = -0.530, *P<0.01*), and significantly positively correlated with grip strength, back strength, and standing long jump (r = 0.333, *P=0.04*, r = 0.528, *P<0.01*, r = 0.499, *P<0.01*); girls serum 25(OH)D is significantly positively correlated with inorganic phosphorus (r = 0.452, *P<0.01*), positively correlated with muscle mass and back strength (r = 0.314, *P=0.05*, r = 0.332, *P=0.05*). Conclusion Four-weeks VD3 supplementation (800 IU/d) can improve the nutritional level of vitamin D in young swimmers. We found that serum 25(OH)D concentration is positively correlated with back muscle strength of adolescent swimmers.

Key words swimming players; vitamin D; nutritional status; muscle strength; adolescent

Category: Public Nutrition & Health

中国老年人群维生素D缺乏和认知功能改变的前瞻性研究

The longitudinal association between vitamin D deficiency and cognitive changes in Chinese older adults

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Background and Objectives: with the acceleration of human aging, the prevalence of dementia is increasing year by year. The aim of this study was to explore the association between vitamin D deficiency (VDD) and cognitive changes in community-dwelling elderly population.

Methods and Study Design: in March 2016, community-based elderly over 65 years old were selected. The serum level of 25-hydroxyvitamin D was determined by liquid chromatography-tandem mass spectrometry. VDD is defined as less than 20 ng/mL. All subjects completed the health status questionnaire. Wechsler Adult Intelligence Scale-Revised in China was used to assess cognitive function at baseline and interview. A linear mixed effects model was used to study the association between baseline VDD and cognitive change.

Results: In total, 866 participants were included in our study, with a mean duration of 3 years. VDD was markedly associated with lower full intelligence quotient (FIQ) (β:-3.355, 95% confidence interval [CI]:-4.165,-2.545), verbal intelligence quotient (VIQ) (β:-3.420, 95%CI:-4.193,-2.647), performance intelligence quotient (PIQ) (β:-2.610, 95%CI:-3.683,-1.537), comprehension (β:-0.630, 95%CI:-1.022,-0.238), information (β:-0.354, 95%CI:-0.699,-0.008), arithmetic (β:-1.065, 95%CI:-1.228,-0.902), digit span (β:-0.370, 95%CI:-0.547,-0.192), vocabulary (β:-0.789, 95%CI:-1.083,-0.493), picture completion (β:-0.391, 95%CI:-0.761,-0.022), block design (β:-0.412, 95%CI:-0.697,-0.127), picture arrangement (β:-0.542, 95%CI:-0.909,-0.174) and object assembly (β:-0.492, 95%CI:-0.818,-0.165) than those with adequacy.

Conclusions: A higher frequency of VDD was associated with lower scores of FIQ, VIQ, PIQ and subtests on memory and executive function.

Key words vitamin D deficiency, cognitive function, dementia, cohort study, older adults

Category: Public Nutrition & Health

膳食硒摄入对心血管疾病的影响： 基于中国健康与营养调查（CHNS）数据的回顾性队列研究

Effect of dietary selenium intake on cardiovascular disease: A retrospective cohort study based on China Health and Nutrition Survey (CHNS) data

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Background: The effect of dietary selenium (Se) on cardiovascular disease (CVD) is inconclusive.

Objectives: We aim to examine the association between dietary Se intake and CVD risk in Chinese adults.

Methods and Study Design: This retrospective cohort study included adults aged above 20 in the China Health and Nutrition Survey (CHNS) were followed up from 1991 to 2011 (N = 16,030). Dietary data were retrieved from CHNS, and a three-day, 24-h recall of food intake was used to assess the cumulative average intake of dietary Se, which was divided into quartiles. The Cox proportional hazards model was adopted to analyze the relationship between dietary Se intake and incident CVD risk.

Results: A total of 663 respondents developed CVD after being followed up for a mean of 9.9 years (median 9 years). The incidence of CVD was 4.3, 3.7, 4.6, and 4.0 per 1000 person-years across the quartiles of cumulative Se intake. After adjusting all potential factors, no significant associations were found between cumulative Se intake and CVD risk. No interactions were found between Se intake and income, urbanization, sex, region, weight, and hypertension and CVD risk.

Conclusion: We found no association between dietary selenium (Se) on cardiovascular disease (CVD).

Key words Dietary selenium intake; Cardiovascular disease; Effect; China; Nutrition survey

Category: Public Nutrition & Health

不吸烟的二型糖尿病成年人每天咖啡的摄入量与新发心血管疾病的关联

Coffee consumption and incidence of cardiovascular diseases in never-smoking adults with type 2 diabetes mellitus

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Background and Objectives: The associations between coffee consumption and risk of different cardiovascular outcomes in type 2 diabetes mellitus remain unclear. We aimed to explore the relationships of coffee consumption with total and separate cardiovascular diseases (CVD) in individuals with type 2 diabetes mellitus who were never smokers to eliminate confounding by smoking.

Methods and Study Design: We included 9964 participants from UK Biobank who were free of CVD or cancer at baseline. Participants were categorized as 4 groups according to daily coffee intake (0, 0.5-1, 2-4, ⩾5 cups/day). Multivariable cox regression models were used to assess the relationships between coffee consumption and incidence of total CVD as well as coronary heart disease (CHD), myocardial infarction (MI), stroke and heart failure (HF) individually.

Results: During a median 12.7 years of follow-up, 1860 incident cases of total CVD were identified. Compared with participants who reported never consumption of coffee, those who reported 2-4 cups/day of coffee consumption had lower incidence of total CVD (hazard ratio [HR] 0.82, 95% confidence interval [CI] 0.73-0.93), CHD (HR 0.84, 95% CI 0.73-0.97), MI (HR 0.73, 95% CI 0.57-0.92), HF (HR 0.65, 95% CI 0.52-0.81), and possibly stroke (HR 0.79, 95% CI 0.58-1.07). Even higher coffee consumption of ⩾5 cups/day was associated with a lower risk of HF but not other CVD outcomes.

Conclusions: Among never-smoking individuals with type 2 diabetes mellitus, moderate coffee consumption of 2-4 cups/day was associated with a lower risk of CVD, with no adverse associations for even higher consumption.

Key words coffee consumption, cardiovascular diseases, never-smoking, type 2 diabetes mellitus, prospective studies.

Category: Public Nutrition & Health

不同糖代谢人群中血清硒水平与血脂的关联

Association between serum selenium levels and serum lipids among people with different diabetes status

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The impact of diabetes status on the relationship between serum selenium and lipids remains unclear. To examine whether the association between serum selenium and lipids is affected by diabetes status. A total of 4417 adults from the National Health and Nutrition Examination Survey (2011-2016) were included in this study. Serum selenium levels were measured by inductively coupled plasma dynamic reaction cell mass spectrometry. Serum total-cholesterol and triglyceride were measured enzymatically. Serum high-density lipoprotein cholesterol was measured by immunoassay, and low-density lipoprotein cholesterol was calculated by the Friedewald equation. Multiple linear regression models were used to estimate the association between serum selenium levels and lipid levels among adults with different diabetes status. The mean (standard deviation) serum selenium level in the study population was 130.53 (0.61) μg/L. Serum selenium was positively associated with TG and LDL-C among subjects with normal glucose metabolism but not among subjects with diabetes or prediabetes (*P* for interaction<0.05). In the population with normal glucose metabolism, comparing the highest with the lowest tertiles of serum selenium levels, the β coefficients (95% CIs) were 33.65 (19.40, 47.90) for TG and 18.01 (8.53, 27.48) for LDL-C, respectively. Additionally, higher serum selenium was associated with increased TC among subjects with normal glucose metabolism and prediabetes, but not among subjects with diabetes (*P* for interaction<0.001). In the population with normal glucose metabolism and prediabetes, comparing the highest with the lowest tertiles of serum selenium levels, the β coefficients (95% CIs) were 21.55 (12.11, 30.98) and 12.63 (3.49, 21.77) for TC, respectively. No significant associations were observed between serum selenium and HDL-C among any subgroup stratified by diabetes status. In US adults, the association between serum selenium and lipids was affected by diabetes status. More studies are needed to confirm our findings.

Key words selenium; diabetes status; lipids; interaction; NHANES.

Category: Public Nutrition & Health

蛋白凝胶的质构调控与 IDDSI 分类

Texture regulation of protein gels and their IDDSI classification

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This project modulated the structure of casein micelle (CM) network units and further modulated its3D network structure. The qualitative properties of macroscopic gels were detected to obtain the desired IDDSI Level classification. In details, gels with identical components but differentiated textural properties were successfully constructed by a mild enzymatic reaction in which Ca^{2+} modulates the structure of the gel network building units (i.e., casein micelles) and thus influences their interactions. variation in Ca^{2+} addition induced the generation of different three-dimensional network structures, including a fine chain gel network with many irregular fracture structures and a coarse chain gel network composed of larger casein micelle aggregates fused into a coarse-chain gel network, resulting in gel textural properties ranging from soft to firm to soft, in accordance with IDDSI Level 4 and 5. Among them, the fine chain-like and more broken network structures have weak textural properties, corresponding to the weaker IDDSI Level, while the coarse chain-like network structures have improved mechanical properties, corresponding to the stronger IDDSI Level. This is because Ca^{2+} connects adjacent micelles by forming calcium bridges between the carboxyl groups of glutamate and aspartate attached to casein micelles and promotes micelle aggregation. However, the formation of excessive calcium bridges and aggregation of micelles reduces the site of κ-CN cleavage by ginger protease, which affects the formation of curd. In addition, the addition of calcium chloride affects the activity of ginger protease. We hope that the protein gel model designed in this experiment will provide relevant reference values for the continuous optimization or quantitative analysis of the IDDSI framework, and establish and develop objective/standard measures and measurable specifications related to the description of IDDSI levels (which are now rather limited), thus helping the food industry to manufacture safe, reliable and high-quality texture-modified foods for clinical studies.

Key words CM gel; ginger protease; TGase; external aqueous phase gelation O/W emulsion gel; IDDSI

Category: Public Nutrition & Health

在控制经济因素的条件下探讨影响儿童生长发育的社会决定因素：一项基于观察性研究的 Meta 分析

Association of social determinants of health in guanxi growth and development: a meta-analysis and meta-regression controlling for economic factors

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Background and Objective Despite significant improvements in global medical care and population health, differences in development rates have led to inevitable health inequalities in child growth and development. We aimed to investigate whether the social determinants of health had impact on children's overweight, obesity or anemia at different economic levels.

Methods Observational studies from January 1980 to October 2022, reporting information on dietary intake, parental education level, or nutrition policy and measuring overweight, obesity, or anemia in children, were identified in PubMed, Web of Science, Scopus, etc., with two independent reviewers extracting data and assessing risk of bias. Meta-regression and random effects models were used to examine the effect of these factors on rates of overweight, obesity, or anemia, controlling for economic factors such as GNI, GDP.

Results From 28,935 identified studies, 194 met the inclusion criteria. Meta-regression showed that economic factors was an interaction in the association between milk intake and childhood anemia, between parental education level and children's overweight and/or obesity and anemia (*P*s<0.05). Meta-analysis of the results found that the protective effect of fruit and/or vegetable and negative effect of sugar-sweetened beverage with childhood overweight and obesity were observed in low- and middle-income countries, whereas the protective effect of nutrition policy implementation and the negative effect of parental education were found only in high-income countries/regions. Meanwhile, the association of nutrition policy, milk and dietary iron supplement intake on children anemia was observed only in countries with lower economic levels.

Conclusions The study found that social determinants of health have varying effects on child growth and development in countries with different economic statuses, providing insight into the complex relationship between these factors and childhood health.

Key words Children; Social determinants of health; Overweight; Obesity; Anemia; Economic factor

Category: Public Nutrition & Health

孕妇唾液碘浓度与碘营养状况及甲状腺功能的关系

Salivary iodine concentration in pregnant women and its association with iodine status and thyroid function

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Purpose: This study aimed to clarify the relationship between salivary iodine concentration (SIC) and indicators of iodine nutritional status and thyroid function during pregnancy, to investigate whether salivary iodine can be applied to the evaluation of iodine nutritional status in pregnant women, and to provide a reference basis for establishing a normal range of salivary iodine values during pregnancy.

Methods: Pregnant women were enrolled in the Department of Obstetrics, the people's hospital of Yuncheng Country, Shandong Province, from July 2021 to December 2022. Saliva, urine, and blood samples were collected from pregnant women to assess iodine nutritional status, and venous blood was collected to determine thyroid function.

Results: A total of 609 pregnant women were included in the study. The median SIC was 297 μg/L. SIC was positively correlated with SUIC ($r = 0.46$, $P < 0.0001$), 24-h UIC ($r = 0.30$, $P < 0.0001$), 24-h UIE ($r = 0.41$, $P < 0.0001$) and EII ($r = 0.52$, $P < 0.0001$). Pregnant women with a SIC < 176 μg/L had a higher risk of insufficient iodine status (OR = 2.07, 95% CI: 1.35 - 3.19) and thyroid dysfunction (OR = 2.71, 95% CI: 1.18 - 6.21) compared to those with higher SIC. Those having SIC > 529 μg/L were more likely to have excessive iodine status (OR = 2.82, 95% CI: 1.81 - 4.38) and thyroid dysfunction (OR = 3.04, 95% CI: 1.36 - 6.78) than those with lower SIC values.

Conclusion: SIC is associated with urinary iodine concentration and thyroid function in pregnant women. SIC < 176 μg/L was associated with an increased risk for iodine deficiency and hypothyroxinemia, while SIC > 529 μg/L was related to excess and thyrotoxicosis. SIC can be used as a reference indicator for evaluating the iodine nutrition status of pregnant women.

Key words pregnant women, salivary iodine concentration, iodine nutritional status, thyroid function

Category: Public Nutrition & Health

儿童含糖饮料消费行为与肥胖相关研究进展

Research progress on the relationship between sugar-sweetened beverages consumption behavior and obesity in children

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Objective: To summarize the influence mechanism of Sugar-sweetened beverages (SSBs) on childhood obesity and provide policy suggestions for the prevention and control of childhood obesity. Methods: A systematic literature analysis was conducted on the cross-sectional studies, cohort studies, intervention studies, mathematical model studies and public policy studies on the mechanism of childhood obesity caused by SSBs at home and abroad. Results: SSBs is a major and intervenable factor leading to childhood obesity. There is a dose-effect relationship between children's SSBs consumption behavior and obesity, obesity-related indicators and diseases, and the behavior is associated with future obesity status. Conclusions: Direct intervention on SSBs can reduce the incidence of obesity, and increasing the tax on SSBs has a certain effect, but on the whole, the existing intervention strategies have not achieved the expected effect, and it is urgent to form effective intervention programs and research evidence.

Key words Children, Sugar-sweetened beverages, Consumption behavior, Obesity, Relationship

Category: Public Nutrition & Health

中国预包装食品反式脂肪酸含量分析
Trans fat content of pre-packaged foods in China

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Objective: high intake of trans fat increases the risk of coronary heart disease and mortality while the presence of trans fat in the food supply of China is unknown. This study aims to investigate the trans fat content of pre-packaged foods in China.

Methods: this cross-sectional study used data of FoodSwitch China project, which collected nutrients and ingredients information of pre-packaged foods from supermarkets and retail stores during 2017 to 2020. The presence of trans fat in ingredients and content in nutrition information panels(NIP) were analyzed according to 14 food groups. Products containing specific (any hydrogenated edible oils) and non-specific (vegetable fat, margarine, vegetable cream, processed cream, shortening, creamer and cocoa butter substitute) ingredients were identified as indicative of trans fat .

Results: of the 73,885 products, the percentage of products with specific and non-specific trans fat ingredients were 1722(2.3%) and 5675(7.7%) with 6249 (8.5%) containing either specific or non-specific trans fat, and 16.6% products reported trans fat value in NIP, of which 437(0.6%) reported the value other than zero with the median of 0.6 g/100g (Q1,Q3: 0.5, 1.0). The top five food groups with high trans fat presence were bread and bakery products (3194, 30.8%), confectionary (849, 15.9%), non-alcoholic beverages (714, 11.5%), convenience food (342, 10.7%) and dairy products (440, 7.9%).

Conclusion: trans fat ingredients were found in less than one tenth of pre-packaged foods in China, but the presence in bread and bakery products was detected in over three tenths of the products. No more than one fifth of pre-packaged foods reported trans fat content values. Improvements in nutritional labelling and regular surveillance of trans fat presence would be needed to restrict the use of industrially produced trans fats.

Key words trans fat, trans-fatty acids, hydrogenation, pre-packaged food

Category: Public Nutrition & Health

中国儿童青少年正向发展状况与健康相关行为和体重状态关系的队列研究

Linkages of Positive Youth Development Attributes with Health-related Behaviors and Longitudinal Weight Status: A Cohort Study among Chinese Children

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Background and Objectives: Positive youth development has been associated with health risk and promoting behaviors and may establish trajectories of risk for obesity. This study aims to investigate the effects of positive youth development on health-related behaviors and longitudinal weight status among Chinese children.

Methods and Study Design: Data were collected from Wave I (from December 2019 to January 2020) and Wave III (June 2021) of the Chengdu Positive Child Development Survey (n=8473, mean age: 11.4±2.3 years at baseline). Positive youth development attributes (cognitive-behavioral competence, prosocial attributes, positive identity, and general positive youth development qualities) were assessed by Chinese Positive Youth Development Scale at each wave. Anthropometric measurements were performed by professional medical workers. Health-related behaviors including sugar-sweetened beverage consumption, physical activity and screen time were collected by questionnaire at baseline. Linear regression and Generalized Estimating Equations model were used to analyze the associations between these observed measures.

Results: After adjusting for gender, baseline age, paternal education level, monthly household income and residency, higher scores on positive youth development attributes were related to lower sugar-sweetened beverage consumption (β: -0.29~-0.47), more physical activities (β: 0.08~0.12) and less screen time (β: -0.23~-0.36) at wave I (all P<0.001). Longitudinally, cognitive-behavioral competence (β=-0.035, P=0.003), positive identity (β=-0.023, P=0.02) and general positive youth development qualities (-0.040, P<0.001) were negatively associated with body mass index z-scores after adjustment for potential covariates. Furthermore, higher scores on positive identity (odds ratio: 0.95, 95% confidence interval: 0.92-0.99) and general positive youth development qualities (odds ratio: 0.95, 95% confidence interval: 0.90-0.99) predicted lower risk of overweight/obesity.

Conclusions: This study proved that children with greater positive youth development attributes tended to select healthier behaviors. Additionally, positive youth development programs might be implemented to prevent overweight/obesity among Chinese children.

Key words positive youth development, health behaviors, weight status, children

Category: Public Nutrition & Health

白藜芦醇对血脂异常人群血小板功能的改善作用及其量-效关系研究

Resveratrol supplementation attenuates platelet function in a dose-dependent manner in subjects with dyslipidemia

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Background

Dyslipidemia, as an important risk factors of cardiovascular disease, induces platelet hyperreactivity that is linked to thrombosis. Resveratrol, a natural polyphenol, has been proven to attenuate platelet hyperreactivity in animals and in vitro. However, the effects of resveratrol on platelet function in subjects with dyslipidemia are still unknown yet.

Objective

This study aims to investigate the efficacy and dose-dependent effects of resveratrol on platelet function in subjects with dyslipidemia.

Methods

In a randomized, double-blind, placebo-controlled trial, 114 eligible subjects with dyslipidemia were recruited and randomly assigned to placebo (n=28), 100 mg/day (n=30), 300 mg/day (n=30), 600 mg/day (n=26). At baseline, 4 weeks and 8 weeks, venous blood samples of volunteers were subjected to blood biochemical parameters and platelet function tests.

Results

Compared with placebo group, resveratrol supplement did not significantly change the blood lipid, blood glucose, oxidative stress and inflammation levels ($P > 0.05$). However, compared to the placebo group, individuals who received 600 mg/day resveratrol for 8 weeks showed significant inhibition in ADP-induced platelet aggregation (-8.12 ± 2.06%), the expression of P-selectin (-8.70 ± 0.97%), the activation of GPⅡbⅢa (-12.95 ± 1.52%), platelet oxidative stress (ROS: -9.95 ± 1.00%, Mitochondrial membrane potential: 11.78±2.06%) and PS exposure (-3.68 ± 1.03%) levels ($P < 0.05$). Moreover, there were linear dose-response relationships between resveratrol and the attenuation of platelet function in subjects with dyslipidemia after 8-week intervention (P for trend < 0.05). In addition, significantly negative correlations were observed between the change in ADP-induced platelet aggregation ($r = -0.185$) or P-selectin expression ($r = -0.188$) and the change in HDL-C in subjects with dyslipidemia after 8-week intervention ($P < 0.05$).

Conclusions

Resveratrol supplementation attenuates platelet function in a dose-dependent manner, and taking 8-week supplementation with 600 mg of resveratrol can reduce platelet function in subjects with dyslipidemia.

Key words resveratrol, dyslipidemia, platelet function, dose-response relationship

Category: Public Nutrition & Health

吸烟、饮酒和抑郁对牙周病的独立和联合效应

Independent and Combined Effects of Smoking, Drinking and Depression on Periodontal Disease

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ABSTRACT

Background: Periodontitis is a complex chronic inflammatory disease associated with health-related behaviours such as smoking, excessive drinking and depression.

Objectives: This research aimed to investigate the independent and combined effects of smoking, drinking and depression on periodontal disease.

Methods: Data from the National Health and Nutrition Examination Survey (2009-2014) were analyzed in this study. Respondents included in the analysis were ⩾30 years old who completed the oral health-periodontal examination, Smoking-Cigarette Use Questionnaire, Alcohol Use Questionnaire, and Patient Health Questionnaire. The logistic regression models were used to analyze the independent effects of smoking, drinking and depression on periodontitis. The adjusted multiplicative and additive interaction models were established to examine the interaction between influencing factors.

Results: Participants with smoking behavior and depression had 58% higher risk of developing periodontitis than those without, particularly in elderly men. A dose-dependent J-shape relationship was identified in the association between drinking-depression interaction and periodontitis. When exposed to depression, heavy drinkers (>56 g/d) had an increased risk of periodontitis (odds ratio [OR]: 1.94, 95% confidence interval [CI]: 1.05 to 3.58), whereas low drinkers (<14 g/d) had a decreased risk (OR: 0.55, 95% CI: 0.30 to 0.99).

Conclusions: These results suggest that depression has an interactive effect on periodontitis occurrence between smoking and alcohol consumption behaviors. The combined effect of smoking and alcohol consumption significantly elevated the occurrence of periodontitis. Policies aimed at healthy behaviours and mental health may be beneficial for our periodontal health.

Key words periodontitis, depression, smoking, alcohol drinking, interaction effect

Category: Public Nutrition & Health

中国成年人鸡蛋摄入与总脑血管疾病发病风险的前瞻性关联

The Prospective Associations of Egg Consumption with the Risk of Total Cerebrovascular Disease Morbidity among Chinese Adults

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Abstract:

Background: Studies investigating the relationship between egg consumption and the risk of cerebrovascular disease (CED) have yielded inconsistent results. This study evaluated the association between egg consumption and the risk of CED among Chinese adults.

Methods: Data were obtained from China Kadoorie Biobank, Qingdao. A computerised questionnaire was used to collect information regarding egg consumption frequency. CED events were tracked through linkage with the Disease Surveillance Point System and the new national health insurance databases. Cox proportional hazards regression analyses were used to evaluate associations between egg consumption and CED risk controlling for potential confounders.

Results: After a median follow-up of 9.2 years, 865 and 1083 CED events among men and women, respectively, were documented. At baseline, More than 50% of participants consumed eggs daily, and 6.2% of participants consumed eggs at most once a month. Higher consumption of eggs (>7 days/week) was significantly associated with CED risk (hazard ratio [HR] = 0.81, 95% confidence interval [CI]: 0.67–0.98), but this association was moderated in a multiadjusted model (HR = 0.83, 95% CI: 0.69–1.01). Among men, a 28% lower risk of CED was observed in those who consumed eggs at a higher frequency (HR = 0.72, 95% CI: 0.55–0.95) after adjustment for age, gender, education level, marital status, household income, alcohol consumption status, smoking status, daily food consumption, diabetes at baseline, metabolic equivalent of energy task hours per day, body mass index, and family history of stroke. However, no association between egg consumption and CED were identified in women.

Conclusion: Higher frequency of egg consumption was associated with a lower risk of total CED events among men but not women in Chinese adults. The beneficial effect on women warrants further investigations.

Key words Chinese; prospective study; egg; cerebrovascular disease

Category: Public Nutrition & Health

中国中老年人群休闲活动与轻度认知障碍的关系

Association between leisure activity and mild cognitive impairment in middle-aged and older Chinese population

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Objectives: To investigate the associations between leisure activities and mild cognitive impairment (MCI) in the middle-aged and older Chinese population.

Methods: This was a cross-sectional study of a nationally representative sample of 2,712 adults aged 45 years or over who participated in the Lifestyle and Healthy Aging of Chinese Square Dancer Study (HealthyDance Study). According to Petersen's criteria, MCI was assessed by the combinations of different cognitive domains using a set of neuropsychological tests, i.e., the Huashan Auditory Verbal Learning Test (AVLT), the Verbal Fluency Test (VFT), the Digit Symbol Substitution Test (DSST), and the Trail Making Test B (TMT-B). Leisure activities are classified as lower diversity level (types≤3) and higher diversity level (types >3). The associations between the type and diversity level of leisure activities and MCI and cognitive domains (episodic memory, language fluency, attention, executive ability) were investigated by using logistic regression and multiple linear regression.

Results: Among the 2712 participants (mean age 62.1 years; 9.9% male) in this study, 59.1% had higher diversity level of leisure activities, and 13.8% were reported MCI. After adjusting for age, gender, demographics, lifestyle factors, health status, BMI, and disease, compared to the lower diversity level group, higher diversity level of leisure activity was associated with lower odds of MCI (OR = 0.86, 95% CI: 0.79, 0.95). Social organized activities (OR = 0.72, 95% CI: 0.56, 0.91), and reading books or newspapers (OR = 0.68, 95% CI: 0.53, 0.88) were negatively associated with the odds of MCI. Participation in outdoor activities and reading books or newspapers were associated with four cognitive domains.

Conclusion: These results provide some evidence that higher diversity levels of leisure activities, participating in social organization activities, and reading books or newspapers may be associated with reduced the odds of MCI.

Key words leisure activity; mild cognitive impairment; cognitive function; cognitive domains

Category: Public Nutrition & Health

1991-2018 年中国成年人超重肥胖的时空分布及 BMI 的相关影响因素分析

Geographic differences in overweight and obesity prevalence and factors associated with BMI among adults in China, 1991-2018

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BACKGROUND: Overweight and obesity are collectively emerging as a major public health problem in China. The main objectives of this study were to investigate the spatial heterogeneity of overweight and obesity prevalence, as well as the associations between various factors and BMI among adults in China from 1991 to 2018.

METHODS: We used data on 94,277 adults aged ≥ 18 y recorded between 1991 and 2018 from the China Health and Nutrition Survey, an ongoing cohort study. Inverse distance weighted (IDW) interpolation mapping, which provided geographical information on the prevalence of overweight and obesity, was conducted with ArcGIS Pro. Using panel data random-effects models, we analyzed a variety of factors associated with BMI.

RESULTS: We found that the prevalence of overweight and obesity increased over time, and the spatial distribution of overweight and obesity varied across provinces. The regions with the highest prevalence of overweight and obesity were estimated to be all of Shandong and all of Beijing. Middle-aged adults, men with low physical activity (PA), men with high education status, women with low education status, adults living in urban areas, and adults with middle or high income status were the groups significantly associated with a high BMI.

CONCLUSION: The sociodemographic and geographical heterogeneity of BMI, overweight and obesity suggest that more effective and unique interventions are needed to address this public health issue.

Key words adult, overweight, obesity, BMI, geographic information system

Category: Public Nutrition & Health

不同形态膳食碘的代谢动力学研究

Study on the metabolic kinetics of different forms of dietary iodine

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Objective: To investigate the metabolic kinetics of different forms of dietary iodine, including the absorption and metabolism of potassium iodide and kelp iodine, in order to correctly assess individual iodine nutritional status.

Methods: A total of 20 healthy volunteers meeting the enrollment criteria, were recruited for a cross-over design intervention study. The trial was conducted under strict dietary intake control conditions, including four stages of interventions and sample collection: 1. Basic Dietary Stage: Low-iodine diet, iodized salt replacement via non-iodized salt, elimination of high-iodine ingredients, and replacement of daily drinking water with pure water; 2. Iodine Intervention Stage I: 5ml of fasting venous blood, 1200μg iodine potassium iodide, and 1000μg iodine kelp administered orally at breakfast, along with 2-3ml of postprandial venous blood and urine collection over time; 3. Basic Dietary Stage: Same as stage 1; 4. Iodine Intervention Stage II: 1700μg iodine kelp and 600μg iodine potassium iodide orally administered at breakfast time, otherwise identical to stage I. Each stage of feces was marked with a red card and collection of red-stained feces was discontinued.

Results: Approximately 1200 μg of KI-form iodine was ingested, with a resultant peak serum iodine ion concentration of 40.96±5.34 μg/L after 0.5-1 hour. However, with ingestion of 1700 μg of kelp-form iodine, serum iodine ion concentration slowly increased to its peak (9.10±1.68 μg/L) at 4-12 hours, and the peak concentration was lower than that of the same-dose KI intervention. The apparent digestibility of KI and kelp iodine was 94.5% and 48.4%, respectively.

Conclusion: Seaweed has a high iodine content and undergoes processes such as digestion and absorption, resulting in a lower peak serum iodine level compared to the same dose of KI intake. Therefore, seaweed is an ideal dietary source of iodine. The structure of the paragraph has been made clearer and more rigorous.

Key words Iodine, kelp, potassium iodide

Category: Public Nutrition & Health

微生物群疗法对非酒精性脂肪肝患者的肝酶、血脂和炎症的疗效：一项随机对照试验的系统回顾和荟萃分析

Efficacy of microbiota-therapy on liver enzymes, lipid profile, and inflammation in patients with non-alcoholic fatty liver: a systematic review and meta-analysis of randomized controlled trials

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Introduction There is a contradictory in microbiota-therapy, including probiotics, prebiotics, and synbiotics, to improve condition of patients with nonalcoholic fatty liver disease (NAFLD). Objective This review was to evaluated the effect of microbiota-therapy on liver enzymes, inflammation and lipid levels in individuals with NAFLD.

Method Using Pubmed, Embase, Cochrane, and Web of Science to search all articles on prebiotics, probiotics, or synbiotics supplementation for the treatment of patients with NAFLD up to December 2022.

Result The result of microbiota-therapy showed that it had an overall favorable effect on AST, ALT, HDL, hs-CRP and TNF-α. Nevertheless, the outcomes of various therapies were clearly different. Supplementation with probiotics significantly lower AST (SMD = -0.40; 95% CI: -0.57, -0.22) and ALT (SMD = -0.66; 95% CI: -0.97, -0.36) irrespective of study population, intervention period and sample size, while it was more beneficial effect on Asians (SMD = 0.23; 95% CI: 0.08, 0.37) and sample size > 40 (SMD = 0.20; 95%CI: 0.07, 0.32). Prebiotic supplementation had a lowering-effect on LDL (SMD = 0.56; 95%CI: -0.97, -0.15), TC (SMD = -0.64; 95%: -0.64; 95%CI: -1.06, -0.23), hs-CRP (-0.46; 95%CI: -0.81, -0.11). Synbiotics had a unique reduction effect on Asians (SMD = -0.36; 95%CI: -0.58, -0.13) for GGT. Regardless of research population, intervention duration, and sample size, three of the aforementioned interventions can reduce TNF-α (probiotics: SMD = -1.30; 95%CI: -2.24, -0.36; prebiotics: SMD = -0.75; 95%CI: -1.32, -0.18; synbiotics: SMD = -1.22; 95%CI: -1.92, -0.51).

Conclusion Overall, microbiota-therapy had a positive effect on lessening liver enzymes, lipid profiles, and inflammatory cytokines in patients with NAFLD. Of note, Probiotics and synbiotics were mainly lowering-effect on liver enzymes, while prebiotics were on serum lipids and anti-inflammation. Patients from Asia who take prebiotics or probiotics can improve their serum lipids levels.

Key words nonalcoholic fatty liver disease, microbiota-therapy, liver function, lipid profiles, inflammation factors, meta-analysis

Category: Public Nutrition & Health

坚持终止高血压膳食模式与中老年人骨质疏松症风险的关联研究

Adherence to the Dietary Approaches to Stop Hypertension (DASH) dietary pattern and osteoporosis risk in the Chinese elderly

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Summary This study examined the relationship between the Dietary Approaches to Stop Hypertension (DASH) and bone mineral density (BMD) /risk of osteoporosis among elderly Chinese adults. Adherence to the DASH dietary pattern was significantly and positively correlated with bone health.

Purpose The purpose of this study was to examine associations between the DASH dietary pattern and bone health outcomes in Chinese elders, to verify whether higher adherence to the DASH was associated with better bone health in elderly populations.

Methods A total of 839 Chinese adults aged 50 years and above participated in this cross-sectional study. BMD at calcaneus was measured via ultrasonic bone densitometer. A semiquantitative food frequency questionnaire (FFQ) was used to assess the usual dietary intake in the past 12 months. The DASH score was calculated based on energy-adjusted intakes of nine dietary components, including whole grains, beans, vegetables, fruits, dairy, red meat, total fat, sodium, and sugar-sweetened beverages.

Results In postmenopausal women, DASH score was significantly and positively correlated with BMD T-score after controlling potential covariates (β: 0.027 ± 0.012, P = 0.031) in multivariable linear regression models. In binary logistic regression analysis, male participants in the highest tertile of DASH score had lower risk of osteoporosis than those in the lowest tertile (odds ratio = 0.499; 95% confidence interval, 0.262 - 0.951; P = 0.035) after adjusting potential covariates.

Conclusion Adherence to the DASH dietary pattern appeared protective of bone health in Chinese elderly adults.

Key words dietary pattern, bone mineral density, osteoporosis, elderly populations, Chinese

Category: Public Nutrition & Health

美国成年人营养模式和营养素与血脂异常的相关性：2011-2018年国家健康和营养检查调查（NHANES）数据

Correlation of nutrient patterns and nutrients with dyslipidemia in US adults: data from the National Health and Nutrition Examination Survey (NHANES) 2011-2018

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Background & aims: Dietary interventions are essential for preventing dyslipidemia. The relationship between nutrient patterns, nutrient intake, and the risk of dyslipidemia has only been partially studied. The purpose of this study was to examine the relationship between nutrient patterns and nutrients on dyslipidemia.

Methods: The study screened 7,269 participants from the National Health and Nutrition Examination Survey from 2011 to 2018. The average of 24-hour recalled dietary data for two days was selected, and six nutrient patterns that were independent of each other were extracted from 29 dietary nutrients through principal component analysis. And then, factor loadings of nutrients greater than 0.4 from nutrient patterns that were negatively correlated with the risk of dyslipidemia were selected. Multifactor logistic regression models were developed to evaluate the association of nutrient patterns and nutrients with dyslipidemia risk.

Results: Twenty-nine nutrients were downscaled to extract six principal components by principal component analysis. After adjustment for a variety of covariates, participants in the high fiber-high vitamin-mineral nutrient pattern were related to lower dyslipidemia risk (OR = 0.853; 95% CI, 0.743 - 0.980), and a significant nonlinear negative association of vitamin B1 (OR = 0.688; 95% CI, 0.551-0.860) and vitamin E (OR = 0.987; 95% CI, 0.976 - 0.998) intake with dyslipidemia was observed.

Conclusion: Named as the second principal component of the high-fiber, high vitamin-mineral nutrient pattern, which was negatively associated with dyslipidemia. Vitamins B1 and E were significantly negatively associated with dyslipidemia.

Key words Dyslipidemia, NHANES, logistic regression, Nutrients, Nutrient patterns

Category: Public Nutrition & Health

饮水量影响正常生活条件下的运动大学生体成分：一项横断面研究

Habitual Water Intake Impacted the Body Composition of Young Male Athletes in Free-Living Conditions: A Cross-Sectional Study

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The study aimed to explore the associations between water intake and body composition, and to investigate the differences of body composition among young male athletes. A cross-sectional study was conducted among 111 young male athletes in Beijing, China. Total drinking fluids (TDF) and water from food were assessed by a 7-day, 24-hour fluid intake record questionnaire and duplicate portion method, respectively. The osmolality of 24-hour urine and blood samples were tested. The body composition was tested with a bioelectrical impedance analyzer (BIA) twice at 5 minutes interval. According to the recommendations of total water intake (TWI) and TDF of China, participants were divided into two groups, respectively. Pearson's correlation coefficients were performed to determine the relationship between water intake and body composition. A total of 109 subjects completed the study. TDF and TWI were positively correlated with total body water (TBW), intracellular water (ICW) and extracellular water (ECW), respectively ($r=0.230$, $p=0.016$; $r=0.234$, $p=0.014$; $r=0.242$, $p=0.011$; $r=0.275$, $p=0.004$; $r=0.243$, $p=0.011$; $r=0.243$, $p=0.011$). The TBW/BW was positively associated with TDF percentage of body weight (TDF/W), water from food percentage of body weight and TWI percentage of body weight (TWI/W), respectively ($r=0.267$, $p=0.005$; $r=0.217$, $p=0.024$; $r=0.316$, $p=0.001$). Participants achieved the recommendation of TDF had 0.9kg, 0.5% higher ICW and TBW/BW than those who did not, respectively (all $p < 0.05$); with the FFM and TBW tended higher ($p=0.051$; $p=0.050$). Those met the recommendation of TWI had 1.1 kg, 0.6kg and 1.7kg higher ICW, ECW and TBW than their counterparts, respectively (all $p < 0.05$). Moderate associations were found between water intake and body composition. Participants met the recommendation of TWI or TDF had better distribution of body composition than their counterparts. Habitual water intake affected the body composition among athletes in free-living conditions.

Key words Body composition; total water intake; total drinking fluids; association; hydration status; young athletes

Category: Public Nutrition & Health

中国社区老年人群肌少症患病率及其与膳食炎症指数的相关性研究

Prevalence of Sarcopenia and Association with the Dietary Inflammatory Index in Chinese Community-Dwelling Older Adults

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Background: Dietary-induced inflammation is potentially associated with sarcopenia. Nevertheless, few studies have investigated the structure of the inflammatory diet and its correlation with muscle function and performance in both the upper and lower limbs. This study was performed to explore the association of the dietary inflammatory index (DII) with sarcopenia and its diagnostic parameters. Methods: We conducted a cross-sectional survey on a sample of 551 Chinese community-dwelling older adults selected through multistage cluster sampling from three districts in Shanghai. DII scores were calculated using a validated food frequency questionnaire. Sarcopenia and its diagnostic parameters were determined based on the definition set by the Asian Working Group on Sarcopenia (AWGSOP). Results: The mean age of study participants was 71.31 ± 4.71 years. The prevalence of sarcopenia in the cohort was 12.4%. Older adults in the highest DII quartile had a 3.294 times increased risk of sarcopenia compared to those in the lowest quartile (OR Quartile4vs1:3.294, 95%CI: 1.205, 9.010, p-trend: 0.004) after adjusting for confounding factors. Additionally, a more pro-inflammatory diet was associated with lower appendicular skeletal muscle index (ASMI) (OR Quartile4vs1: 3.112, 95%CI: 1.297, 7.468, p-trend: 0.005), a higher 5-times sit-stand test time score (OR Quartile4vs1: 4.166, 95%CI: 1.451, 11.962, p-trend: 0.014), and lower gait speed (OR Quartile4vs1: 2.576, 95%CI: 1.111, 5.972, p-trend: 0.041) after adjusting for confounding factors. However, there was no significant association between DII, handgrip strength, and SPPB score in either the unadjusted or adjusted model. Conclusion: This study found that the association between consuming a more pro-inflammatory diet and sarcopenia in Chinese community-dwelling older adults was mainly due to underlying low intakes of dietary energy, protein, and anti-inflammatory foods, and not due to the high intake of pro-inflammatory foods. Meanwhile, DII was highly correlated with lower limb muscle strength and performance compared to upper limb muscle strength.

Key words Dietary inflammatory index; Sarcopenia; Muscle mass; Muscle performance; Community-Dwelling; Older adults

Category: Public Nutrition & Health

双酚A对中老年人死亡的有害影响可能通过抗炎饮食得到改善

Exploring the mitigating effect of anti-inflammatory diet on the deleterious effect of bisphenol A on mortality in middle-aged and older adults

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Accumulating evidence linked bisphenol A (BPA) exposure with several diseases and even premature death. We aimed to evaluate the association between BPA exposure and mortality in middle-aged and older adults from a large national cohort, and to explore whether an anti-inflammatory diet can mitigate the deleterious effect of BPA on mortality. A cohort study including 8142 adults was conducted. Of these, 4143 (50.2%) were men, with a weighted average age of 55.9 years. Urinary BPA was measured by the on-line solid phase extraction, coupled to high performance liquid chromatography and tandem mass spectrometry. Dietary Inflammatory Index (DII) score was calculated based on 28 available kinds of food parameters. Cox proportional hazards regression models were applied to calculate the hazard ratios (HRs) and 95% confidence intervals (CIs) for all-cause, cardiovascular disease (CVD), and cancer mortality. After 75927 person-years of follow-up (median, 9.3 years; maximum, 17.1 years), BPA exposure and DII score were independently associated with all-cause mortality. The fully-adjusted HR (95% CI) in the high versus low levels of BPA was 1.33 (1.05-1.70) for all-cause mortality, and the anti-inflammatory versus pro-inflammatory category of DII was 0.70 (0.56-0.87). There was no significant interaction between BPA and DII (p=0.200). However, an indication of combined effect was found that, participants in subgroups with low BPA exposure and concurrently with anti-inflammatory category of DII score had 53% significantly lower all-cause mortality. Our findings highlight the importance of continuously monitoring cycles of BPA exposure, and its long-term adverse effects on health, even though the government had restricted its use nowadays. Besides, we provided a new perspective against the adverse health effect induced by BPA exposure, that future studies could explore the offset impact of other healthy dietary patterns on the deleterious effect of BPA on health outcomes.

Key words bisphenol A, Dietary Inflammatory Index, mortality

Category: Public Nutrition & Health

1989-2018 年中国学龄儿童心血管健康全国和区域性变化趋势
National and regional trend in cardiovascular health among Chinese school-aged children during 1989 to 2018

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Background The updated metrics of “Life’s Essential 8 (LE8)” in quantifying cardiovascular health (CVH) status were released, whiles its distribution in Chinese children has not be reported.

Objectives To assess the national distribution of Chinese school-aged children’s CVH status by LE8 scores and their temporal changes over time.

Methods Participants who aged between 7 and 19 years from 11 waves (1989-2018) of the China Health and Nutrition Survey were included. Scores of overall CVH and each LE8 metrics were calculated individually. Temporal changes were assessed with geographic regions, the causal relationship between health behaviors and health factors over time were built with cross-lagged panel models.

Results 21921 participants (52.6% boys) with data of at least four CVH components were included in the present analysis, the mean age was 13.0 (standard deviation, SD: 3.6) years. The overall CVH score remained stable in most regions with slight increased by 0.38 (95% CI: 0.29, 0.46; P<0.001) for every 5 years. Decline of diet score during 2004-2008 led to the decline in BMI score during 2009-2013 with the coefficient of 0.190 (95% CI: 0.030, 0.351; P=0.021), while decline of BMI score during 2004-2008 led to decline in sleep health during 2009-2013 with the coefficient of 0.089 (95% CI: 0.010, 0.168; P=0.027).

Conclusions Chinese school-aged children and adolescents are generally of moderate CVH status, but mutual influences existed between CVH metrics. Interventions on diet may be the priority for promoting overall CVH in the future.

Key words Cardiovascular health; School-aged children; Temporal change; China Health and Nutrition Survey

Category: Public Nutrition & Health

农村成年人戒酒与高尿酸血症的关联

Association of abstinence with risk of hyperuricemia in rural Chinese adults

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Objectives: Alcohol drinking can cause hyperuricemia (HUA), but few studies have explored abstinence's health effects, particularly the abstinence duration on HUA. This study aimed to evaluate the associations of abstinence with HUA in rural Chinese adults.

Methods: This was a cross-sectional analysis of 38,855 participants (15,371 men and 23,484 women) using the baseline data (2015–2017) from the Henan Rural Cohort Study. A questionnaire survey collected information on alcohol consumption patterns. Multivariate logistic regression analyses were used to evaluate the associations of type of alcoholic beverages, abstinence status and abstinence duration with HUA, respectively. Restricted cubic spline models were applied to visualize the dose-response trend of HUA risk with increasing abstinence duration.

Results: 3,978 cases of 38,855 participants were identified with HUA. Total alcohol intake, including beer, liquor and rice wine intake was significantly associated with the increased risk of HUA, especially for men. Compared with drinkers, abstainers and nondrinkers presented the lower ORs (95%CIs) of 0.686 (0.676, 0.844) and 0.718 (0.649, 0.793) for HUA. Furthermore, the adjusted ORs (95%CIs) for those abstainers with <5, 6-10 and ⩾11 years duration was 0.868 (0.693–1.073), 0.753 (0.519–1.092) and 0.717 (0.517–0.990), respectively. In addition, the risk of HUA decreased with the increasing years of abstinence duration (P for trend <0.05) and negative linear dose-response associations were observed. Abstainers with⩾11 years duration showed the lowest risk of HUA (OR, 0.669; 95%CI, 0.484–0.924).

Conclusion: Abstainers were associated with a reduced risk of HUA compared with current drinkers. Moreover, increasing abstinence duration could be beneficial for preventing HUA. Therefore, for those people who are currently drinking or have been drinking in the past, quitting alcohol in time and sticking to it will help reduce risk of HUA.

Key words Drinking status; Abstinence duration; Hyperuricemia; Alcoholic beverages; Rural adults

Category: Public Nutrition & Health

中国老年人孤独、独居与心血管疾病的关系

Loneliness, living alone and risk of cardiovascular disease among older adults in China

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Abstract

Aims: The aim of this study was to assess the association of loneliness and living alone with cardiovascular disease (CVD) among community-dwelling elderly individuals in China.

Methods: We conducted a longitudinal analysis on 3661 participants aged over 65 years from the latest 2014 and 2018 waves of the Chinese Longitudinal Healthy Longevity Survey (CLHLS). Cox proportional hazards models were used to assess the associations of loneliness and living alone with CVD risk, with adjustment for related confounding factors.

Results: A total of 616 incident CVD cases were identified during follow-up. Participants who reported feeling lonely experienced a 36% increased risk of developing CVD after adjustment for sociodemographic characteristics, lifestyle factors, and baseline health status (adjusted hazard ratio (HR): 1.36, 95% confidence interval (CI): 1.08–1.71; Ptrend = 0.011). In contrast, no significant association was observed between living alone and CVD risk. Subgroup analyses showed that among those individuals who lived alone, often feeling lonely doubled the risk of CVD compared to never being lonely (HR: 2.03, 95% CI: 1.15–3.59; Ptrend = 0.01).

Conclusions: Loneliness was positively associated with CVD risk independent of multiple traditional factors. Older individuals who feel lonely, especially living alone in the meantime should be the focus of CVD prevention and intervention.

Key words cardiovascular disease, loneliness, living alone, elderly, China

Category: Public Nutrition & Health

血清白蛋白水平对老年居民癌症死亡风险的影响
Impacts of Serum Albumin on Risk of Cancer Mortality among Elderly Residents

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Background and Objectives: Many studies have indicated that serum albumin is associated with many health outcomes. Therefore, we aimed to explore the relationship between serum albumin levels and the risk of cancer mortality.

Methods and Study Design: Data from the National Health and Nutrition Examination Survey (1999-2018) was used in this cohort study. The main exposure in this study was serum albumin level, and the main outcome was cancer mortality. This cohort study applied Restricted Cubic Spline to explore the possibly nonlinear association between serum albumin level and the risk of cancer mortality. Cox proportional hazards regression model was used to evaluate the hazard ratio (HR) and 95% confidence interval (95% CI).

Results: A total of 10,555 American elderly residents [mean (standard deviation) age, 71.06 (8.19) years; 5292 (50.14%) females] were included in the current analysis. After a median follow-up of 8.33 years, 827 of the participants died of cancer. Restricted Cubic Spline analysis showed a significant nonlinear correlation between serum albumin and cancer death ($P < 0.05$). Compared with the group with serum albumin $\geq$ 45 g/L, the risk of cancer death increased by 183.1% (HR=2.831, 95%CI: 1.755-4.568) and 64.8% (HR=1.648, 95%CI: 1.307-2.078) in participants with serum albumin of < 35g/L, and 35-39 g/L, respectively. No significant association was found in the group with serum albumin level of 40-44 g/L.

Conclusions: Low serum albumin levels can increase the risk of cancer death in older adults. Ensuring appropriate serum albumin levels is beneficial for older adults.

Key words Serum albumin; Mortality; Cancer; Elderly; Hazard ratio

Category: Public Nutrition & Health

身体圆度指数与结直肠癌发病风险的关系:一项横断面研究

The association between the body roundness index and the risk of colorectal cancer: a cross-sectional study

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Background: Obesity, especially visceral fat, is a risk factor for colorectal cancer (CRC). Body roundness index (BRI) is an emerging anthropometric index that can better assess body fat and visceral fat level. But no study has evaluated the association between BRI and the risk of colorectal cancer.

Objectives: To investigate the association between BRI and the risk of CRC in adults.

Methods and Study Design: This study included 53,766 participants from the National Health and Nutrition Examination Survey (NHANES). They were divided into two groups according to the presence or absence of CRC. Logistic regression was used to analyze the association of BRI and the risk of CRC. Stratified analyses showed significant association between BRI and CRC risk in different populations. The receiver operating characteristic (ROC) curve calculated the area under the curve (AUC) and cut-off values of different anthropometric indicators for predicting CRC risk.

Results: Participants with CRC had higher BRI than normal and the risk of CRC increased significantly with the increase of BRI (P-trend< 0.001). The association remained significant after adjustment for all covariates (P-trend =0.017). In stratified analyses, CRC risk increased with the increase of BRI, especially among those who were inactive (Q3vsQ1, P=0.019, Q4vsQ1, P=0.005), overweight (Q3vsQ1, P=0.029, Q4vsQ1, P=0.014) or obese (Q3vsQ1, P<0.001, Q4vsQ1, P<0.001). ROC curve analysis showed that BRI was superior to body weight, body mass index (BMI), waist circumference (WC) and waist-to-height ratio (WHtR) in predicting the risk of colorectal cancer.

Conclusions: BRI is significantly and positively correlated with the risk of CRC, especially in inactive participants with BMI > 25.

Key words body roundness index; abdominal obesity; visceral fat; colorectal cancer; anthropometric index;

Category: Public Nutrition & Health

高龄社区人群血清白蛋白水平与心血管死亡风险的关系

Association between Serum Albumin and Risk of Cardiovascular Death in Advanced-age Community Population

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Background and Objectives: Increasing researches have reported that low admission serum albumin relates to high in-hospital and long-term mortality. However, few studies have evaluated the association between serum albumin levels and risk of cardiovascular death in advanced-age community population.

Methods and Study Design: We analyzed data of 3487 advanced-age (≥ 75 years) and community-dwelling Americans from National Health and Nutrition Examination Survey (1999-2018). This cohort study examined the association between serum albumin and risk of cardiovascular death via Restricted Cubic Spline and Cox proportional hazards regression model.

Results: During a median follow-up period of 6.58 person-years, 828 cardiovascular deaths occurred. Results of Restricted Cubic Spline demonstrated a nonlinear association between serum albumin and risk of cardiovascular death ($P < 0.05$). In Cox proportional hazard regression model, we adjusted for demographic characteristics, smoking, alcohol consumption, body mass index, history of hypertension, diabetes mellitus, high cholesterol, cardiovascular diseases (congestive heart failure / coronary artery diseases / stroke), respiratory diseases (asthma / emphysema / chronic bronchitis), and cancer. Compared with serum albumin of 40-44 g/L, hazard ratio of cardiovascular mortality was 2.132 (95%CI: 1.322-3.441, $P < 0.05$), 1.305 (95%CI: 1.100-1.547, $P < 0.05$) and 0.880 (95%CI: 0.719-1.077, $P > 0.05$) in those with serum albumin of < 35g/L, 35-39 g/L, and ≥ 45 g/L, respectively.

Conclusions: Advanced-age community population is worthy of close attention when serum albumin is lower than 40 g/L, due to the higher risk of cardiovascular death.

Key words Serum albumin; Death; Cardiovascular diseases; Aged; Hazard ratio

Category: Public Nutrition & Health

人工神经网络模型结合饮食因素预测非酒精性脂肪性肝病的风险

An artificial neural network model combined with dietary factors to predict the risk of nonalcoholic fatty liver disease

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Background: Available evidence indicates that the risk of NAFLD is strongly related to dietary factors. However, no studies have used an ANN model combined with dietary factors to predict the risk of NAFLD. This study aimed to develop an ANN model combined with dietary factors to predict the risk of NAFLD in American adults.

Methods: Data from the NHANES 2007–2014 were used. The eligible subjects were randomly divided into a training set and a validation set at a ratio of 7:3. We developed the prediction model in three stages. First, the training set was used to identify a set of predictors of NAFLD risk through logistic regression analysis. Second, an ANN was established to predict NAFLD risk by using the training set. Finally, ROC curve analysis was used to evaluate the model's accuracy using training and validation sets.

Results: Individuals with NAFLD in the training set included 901 males and 803 females. The logistic regression models found that the ORs (95% CIs) of NAFLD for the highest quartile of plant-derived dietary retinol intake (OR=0.75, 95%CI: 0.57 to 0.99) were inversely associated with NAFLD risk compared to the lowest quartile of intake by adjusting for potential confounders. A three-layer back propagation neural network model with 10, 7 and 1 neurons in the input layer, hidden layer and output layer, respectively, was selected as the optimal prediction model in neural network analysis. The area under the ROC curve was 0.874 for the training set and 0.883 for the validation set. NAFLD was present if the probability of incidence was greater than 0.388. The accuracy, sensitivity, specificity, and Youden index indicated that the performance of the ANN model was successful and valuable.

Conclusion: The present study shows that the ANN model based on individual diet information could be applied to predict NAFLD risk in American adults.

Key words NAFLD; dietary factor; ANN; prediction model; NHANES

Category: Public Nutrition & Health

妊娠早期血清金属水平与胎儿第一年 BMI 轨迹的关系：前瞻性队列研究

Association of serum metals in early pregnancy with BMI trajectory of infants during the first years: a prospective study

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Background and Objectives: The association between prenatal exposure to essential metals and postnatal growth patterns is poorly understood. This study aims to explore the joint effects of mixed exposure on infant growth during the first year and assess the proportion of the partial effect for each metal.

Methods and Study Design: The concentrations of serum metals of pregnant women were measured using polarography method before 14 gestational weeks. The BMI trajectory based on data from subject’s infants BMI available at age 0, 1, 6 12 months. In total, BMI of 407 infants were included in the trajectory analyses. Binary logistic regression analysis and restricted cubic spline were applied to evaluate the association between serum individual metal and BMI trajectory. Bayesian kernel machine regression (BKMR) and weighted quantile sum (WQS) regression were used to assess the associations between mixed metals exposure and BMI trajectory.

Results: We coded distinct trajectories as a categorical variable and named them based on their visual appearance: normal-light gain, normal-light loss, low-moderate gain and normal-moderate gain. No significant difference was noted among the four groups in terms of maternal serum metal concentrations. The OR for the Normal-moderate gain group of serum Zn concentrations as compared to the Normal-light gain group was 8.42 (95% CI: 1.04, 68.23, P=0.04). Relative to the Normal-moderate gain trajectory, being in the Normal-moderate gain trajectory was associated with the lower serum Cu concentrations (OR=0.03, 95% CI: 0.01, 0.30, P=0.02). No statistically significant difference was found in the mixed exposure model, but the individual effect revealed a significantly positive association between serum Zn and Normal-moderate gain trajectory, and a significantly negative association between serum Cu and Normal-moderate gain trajectory.

Conclusions: Offspring born to mothers with higher serum Zn and lower Cu concentration at early pregnancy experiencing rapid BMI growth during the first year.

Key words Metal; BMI trajectory; Mixed metal exposure; Zinc; Cupper

Category: Public Nutrition & Health

母乳、母血和脐带血中神经节苷脂 GM3 和 GD3 的含量分析：来自中国队列研究的结果

Profiling of ganglioside GM3 and GD3 concentration in human milk, maternal plasma and cord plasma: Results from a Chinese cohort study

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Background

Gangliosides are benefit to cognitive and immune development of infants. However, data on gangliosides in human milk, maternal and cord plasma among Chinese are limited.

Objectives

This study aimed to investigate the concentration and composition of ganglioside GM3 and GD3 in human milk, maternal and cord plasma, and to explore potential factors affecting human milk ganglioside concentration.

Methods

This study is part of the Maternal Nutrition and Infant Investigation study, involving 921 cross-sectional participants who provided human milk samples from 0-400 days of lactation, and 136 longitudinal participants who provided maternal plasma, cord plasma, and colostrum, transitional, and mature milk from 0-45 days postpartum.

Results

The concentration of human milk GM3 increased (from 2.29±1.87 to 13.93±4.82 μg/mL) and GD3 decreased (from 17.94±6.41 to 0.30±0.50 μg/mL) during lactation (P<0.05). Consistent results were observed in cross-sectional and longitudinal participants. GM3 was higher in maternal (13.82±3.51 μg/mL) and cord plasma (12.55±3.24 μg/mL) compared with GD3 (1.58±0.49 μg/mL, and 2.05±0.62 μg/mL). Correlation coefficients between maternal and cord plasma for GM3 and GD3 were 0.30 and 0.35, respectively (P<0.001). The content of ganglioside with very long chain fatty acids (≥20 carbons) was higher in human milk than that in plasma. Lactating women with lower pre-pregnancy BMI and higher plasma GD3 also had a higher level of GD3 in colostrum (P<0.05).

Conclusions

We observed higher levels of GD3 in colostrum and transitional milk, followed by a downward trend in the prolonged lactation period, whereas an opposite trend was found in GM3. GM3 was also the predominant ganglioside in maternal and cord plasma. There were positive correlations between maternal and cord plasma gangliosides. Our results supplement current Chinese data on human milk ganglioside and add evidences to ganglioside transmission between mothers and infants.

Key words GM3, GD3, human milk, maternal plasma, cord plasma

Category: Public Nutrition & Health

肠道共生菌对葡聚糖硫酸钠诱导的肠道炎症的影响及作用方式的差异

Differences in the effects and action modes of gut commensals against dextran sulfate sodium-induced intestinal inflammation

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Inflammatory bowel disease (IBD) is a complex relapsing inflammatory disease in the gut and is driven by complicated host-gut microbiome interactions. Gut commensals have shown different functions in IBD prevention and treatment. To gain a mechanistic understanding of how different commensals affect intestinal inflammation, we compared the protective effects of 6 probiotics (belonging to the genera Akkermansia, Bifidobacterium, Clostridium, and Enterococcus) on dextran sulfate sodium (DSS)-induced colitis in mice with or without gut microbiota. Anti-inflammatory properties (ratio of interleukin (IL)-10 and IL-12) of these strains were also evaluated in an in vitro mesenteric lymph nodes (MLN) co-culture system. Results showed that four probiotics (belonging to the species Bifidobacterium breve, Bifidobacterium bifidum, and Enterococcus faecalis) can alleviate colitis in normal mice. The probiotic strains differed in regulating the intestinal microbiota, cytokines (IL-10, IL-1β and interferon (IFN)-γ), and tight junction function (Zonulin-1 and Occludin). By constrast, Akkermansia muciniphila AH39 and Clostridium butyricum FHuNHHMY49T1 were not protective. Interestingly, B. breve JSNJJNM2 with high anti-inflammatory potential in the MLN model could relieve colitis symptoms in antibiotic cocktail (Abx)-treated mice. Meanwhile, E. faecalis FJSWX25M1 induced low levels of cytokines in vitro and showed no beneficial effects. Therefore, we provided insight into the clinical application of probiotics in IBD treatment.

Key words Gut commensals; Dextran sulfate sodium (DSS) colitis; Intestinal barrier; Immunoregulation

Category: Public Nutrition & Health

两歧双歧杆菌 FJSWX19M5 通过减轻肠道屏障损伤，促进 treg 分化来缓解 2,4,6- 三硝基苯磺酸(TNBS)诱导的慢性结肠炎

Bifidobacterium bifidum FJSWX19M5 alleviated 2,4,6-trinitrobenzene sulfonic acid (TNBS) chronic colitis by mitigating gut barrier injury and increasing Tregs

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Probiotics have been evaluated as alternative approaches to preventing relapse of Crohn's disease (CD). Previously, we observed strain-specific anti-inflammatory properties of Bifidobacterium bifidum in 2,4,6-trinitrobenzene sulfonic acid (TNBS) acute colitis models. In this study, we further assessed the effects of several B. bifidum strains on colonic damage, fibrosis, inflammatory factors, intestinal metabolic profiles, and peripheral regulatory T cells (Tregs) in the context of TNBS chronic colitis in mice. These results indicated that B. bifidum FJSWX19M5, but not FXJWS17M4, ameliorated body weight loss, reduced colonic shortening and injury, decreased markers of gut inflammation, and rebalanced colonic metabolism in TNBS-treated mice. FJSWX19M5 supplementation also promoted Treg cell differentiation and intestinal barrier restoration compared to other strains. The co-culture of B. bifidum strains and mesenteric lymph node cells from TNBS-treated mice showed that those strains with anti-colitis could induce higher IL-10 levels and a lower ratio of IL-22/IL-10 and IL-17/IL-10 when compared to those strains that were not protective. Furthermore, heat-killed B. bifidum cells also function well but exhibit a reduced alleviating effect on CD-related symptoms. These data imply that specific B. bifidum strains or their lysates may be the current therapeutic alternatives for CD

Key words Bifidobacterium bifidum; chronic colitis; gut barrier; Treg; metabolic disorder

Category: Public Nutrition & Health

险资医院 MDT 构建及体重管理（超重和肥胖）相关研究
Deputy senior title

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Overweight or obesity is caused by environmental and genetic factors, and is an important risk factor of type 2 diabetes, dyslipidemia, hypertension, cancer and other diseases.Scientific and reasonable weight management is the basic treatment for the prevention and control of overweight or obesity and related chronic diseases.Establish standardized management workflow to make overweight or obesity prevention strategies and weight management procedures more scientific, standardized and easy to implement.

Key words insured hospital, weight management (overweight and obesity), MDT construction.

Category: Public Nutrition & Health

MDT construction and related research on weight management (overweight and obesity) in insured hospitals

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Overweight or obesity is caused by environmental and genetic factors, and is an important risk factor of type 2 diabetes, dyslipidemia, hypertension, cancer and other diseases.Scientific and reasonable weight management is the basic treatment for the prevention and control of overweight or obesity and related chronic diseases.Establish standardized management workflow to make overweight or obesity prevention strategies and weight management procedures more scientific, standardized and easy to implement.

Key words insured hospital, weight management (overweight and obesity), MDT construction.

Category: Public Nutrition & Health

老年恶性肿瘤肌少症发生率及影响因素分析

Incidence of sarcopenia in elderly patients with malignant tumor and its influencing factors

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Objective To explore the incidence and related factors of sarcopenia in elderly patients with malignant tumor, so as to provide reference basis for the prevention of its occurrence and development. Methods A total of 466 patients with malignant tumors were recruited from five hospitals in Jilin Province from January 2020 to March 2021, according to the diagnostic criteria of the European Working Group on Sarcopenia in Older People, they were divided into two groups: sarcopenia group (n=170) and non-sarcopenia group (n=296). The body composition of patients was measured by body composition analyzer, and the related serum indicators were detected by automatic biochemical analyzer. Binary Logistic regression analysis was used to analyze the risk of sarcopenia. Results The incidence of sarcopenia in elderly malignant tumors was 36.48% (170/466). The age of patients with sarcopenia was older than non-sarcopenia patients (P<0.01), while body mass index (BMI), abdomen circumference, arm circumference, arm muscle circumference, basal metabolic rate, body fat percent, body water index, protein index, minerals index, serum total protein, serum albumin, serum prealbumin, serum high density lipoprotein cholesterol, serum uric acid was lower than non-sarcopenia patients (P<0.05). After adjustment for age, sex and BMI, multivariate Logistic regression analysis showed that abdomen circumference and arm circumference were positively correlated with sarcopenia (P<0.05), while body water index, protein index, minerals index, serum prealbumin, serum high density lipoprotein cholesterol were negatively correlated with sarcopenia (P<0.05). Conclusion The incidence of sarcopenia in elderly patients with malignant tumors is high. Maintaining appropriate content of body water, protein, minerals, serum prealbumin and serum high density lipoprotein cholesterol has a positive protective effect on patients with malignant tumor sarcopenia.

Key words Old age; Malignant tumor; Sarcopenia; Incidence; Influencing factors

Category: Public Nutrition & Health

母亲叶酸增补与膳食叶酸摄入与出生性别比及不同性别新生儿出生体重的关联

Maternal folic acid supplementation and dietary folate intake in relation to sex ratio at birth and sex-specific birthweight in China

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Abstract

Background and Objectives: It has been evidenced that prenatal folic acid supplements could reduce neural tube defects. However, the effect of folic acid supplementation, dietary folate, and total folate intake on sex-specific birth outcomes remain unclear. This study aimed to explore the association of periconceptional folic acid supplement, dietary folate, and total folate intake with the sex ratio at birth and sex-specific birthweight.

Methods: Data were from a cross-sectional survey conducted between August and December 2013 in Northwest China. 7318 infants and their mothers were recruited using a stratified multistage random sampling method. Folic acid supplements (400μg/d) were collected via a retrospective in-person interview. Dietary folate were assessed by a validated food frequency questionnaire. Information on birth outcomes, including birth sex and birth weight were abstracted from the Medical Certificate of Birth. Generalized linear models were used to estimate the relative risks (RRs) or difference with 95% confidence intervals (CIs).

Results: No associations and dose-response of folic acid supplement, dietary folate, and total folate intake during periconceptional period with male births were observed, whereas women with folic acid supplement during pre- and post-conception was in relation to an increased male birthweight of 55.3(9.1 to 101.4) g compared to non-users, the total folate intake during the early pregnancy was linked with increased male (upper vs lower tertile: b=43.0, 95%CI: 8.2 to 77.8 g, Ptrend=0.016) and female birthweight (upper vs lower tertile: b=50.4, 95%CI:13.5 to 87.2; Ptrend=0.008).

Conclusions: The results suggested that the periconceptional folic acid supplement and total folate intake had no association with sex ratio at birth but might increase male birth weight.

Keywords: folic acid; dietary folate; sex ratio at birth; sex-specific birthweight.

Conflict of interest:No conflicts of interest.

Key words folic acid; dietary folate; sex ratio at birth; sex-specific birthweight.

Category: Public Nutrition & Health

晚餐-晚睡时间间隔大于 3 小时可降低 2 型糖尿病的风险：一项大规模横断面研究

Dinner-bedtime interval larger than 3 hours decreased the risk of type 2 diabetes mellitus: a large-scale cross-sectional study

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Objective Glucose metabolism was impacted by circadian disruption. Dinner-bedtime interval was an accessible indicator to reflect the alignment between eating time and circadian clock. We aimed to investigate the association of DBI with type 2 diabetes mellitus.

Methods A total of 7676 adult subjects from the Henan Rural Cohort were included. Their demographic information including dinner time and bedtime was collected. Fasting venous blood samples were collected for biochemical determinations. Logistic regression incorporated with restricted cubic spline model was applied to evaluate the association between DBI and T2DM. Furthermore, linear regression model was applied to evaluate the correlation between DBI and fasting insulin level. In addition, the mediating effect of BMI on the correlation between DBI and fasting insulin was also estimated.

Results DBI was significantly associated with T2DM (adjusted OR: 0.910, 95% CI: 0.845-0.979, P = 0.012). DBI shorter than 3 hours was a risk factor of T2DM while that longer than 3 hours was a protective factor of T2DM (adjusted OR: 0.773, 95% CI: 0.648-0.921, P = 0.004). Furthermore, DBI was positive correlated with fasting insulin (P = 0.012). The coefficient was highest for people with prediabetes (adjusted β: 0.887, 95% CI: 0.118, 1.657, P = 0.026). In addition, body mass index (BMI) showed a significant partial mediating effect on the correlation between DBI and fasting insulin (β: 0.06, 95% CI: 0.02-0.10, P = 0.004), which accounted 22.2% the total effect. **Conclusion** DBI larger than 3 hours is recommended for people to improve fasting insulin levels and to prevent T2DM, especially for those with prediabetes.

Key words type 2 diabetes mellitus; circadian disruption; dinner timing; bedtime

Category: Public Nutrition & Health

林县食管发育不良人群营养干预试验的37年随访结果——随机临床试验

Long-term effect of nutrition intervention in the Linxian Dysplasia Nutrition Intervention Trial using 37 years follow-up data: a randomized clinical trial

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Background: We aimed to offer short-term and long-term nutrition intervention effects using 37 years follow-up data. Methods: The Linxian Dysplasia Population Nutrition Intervention Trial was a randomized, double-blind, placebo-controlled trial with 6 years of intervention and 31 years of follow-up. The Cox proportional hazard model was used for analysis. Subgroup analyses were conducted in age and gender subgroups and 31 years follow-up was divided into the early and late periods. Results: 37 years results didn't indicate any effect on cancers or other diseases mortality. In the first 15 years, the intervention increased the risk of cerebrovascular disease death in the female subgroup (HR=1.29, 95%CI:1.00-1.68). In the age<55 subgroup, intervention decreased the risk of death for gastric cancer (HR=0.65, 95%CI:0.43-0.97) and other disease (HR=0.58, 95%CI: 0.35-0.97), but increased cerebrovascular disease death risk (HR= 1.94, 95%CI:1.34-2.80) as well as heart disease (HR= 1.76, 95%CI:1.11-2.81). In the age≥55 subgroup, the intervention decreased the risk of deaths from heart disease (HR =0.76, 95%CI:0.58-0.99). There weren't any significant results in the late 15 years. Comparing demographic characteristics of subjects died in the two periods, the later died subjects were more female, higher in education level, lower in smoking rate, younger and more with mild degree of esophageal dysplasia. Conclusions: Long-term follow-up indicated no effect of nutrition on deaths among esophageal squamous dysplasia population. Short-term results varied across gender and age subgroups. Subjects died in later stage had more protective factors than the previous, contributing to the obvious effect of the intervention in early stage.

Key words cohort study, esophageal squamous dysplasia, nutrition intervention trial, upper gastrointestinal cancer,risk factors

Category: Public Nutrition & Health

细颗粒物长期暴露与高血压风险：膳食模式的修饰效应

Long-term exposure to fine particulate matter and risk of hypertension : the modifying effect of dietary patterns

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National Institute of Nutrition and Health, Chinese Center for Disease Control and Prevention

Background and Objectives: Studies have shown that nutritional supplements could reduce the adverse effects induced by air pollution. However, whether dietary patterns modify the association of long-term exposure to fine particulate matter (PM2.5) and its constituents with hypertension defined by the 2017 ACC/AHA guideline has not been evaluated.

Methods and Study Design: We included 47,501 adults aged 18~79 years from Chinese Nutrition and Health Surveillance (CNHS) 2015-2017. PM2.5 and five constituents were estimated by satellite-based random forest models. Dietary approaches to stop hypertension (DASH) and alternative Mediterranean diet (AMED) scores were calculated for each participant. Interactions between dietary patterns and air pollution were examined by adding a multiplicative interaction term to logistic models.

Results: Long-term exposure to PM2.5 and its constituents was associated with an increased risk of hypertension and stage 1-2 hypertension. DASH and Mediterranean diets significantly modified these associations, as individuals with higher DASH and AMED scores had a significantly lower risk of air pollution-related hypertension and stage 1-2 hypertension (P-int < 0.05). For each IQR increase in PM2.5, participants with the lowest DASH and AMED quintiles had hypertension risk with ORs (95%CI) of 1.20 (1.10, 1.28) and 1.19 (1.09, 1.29), whereas those with the highest DASH and AMED quintiles had lower risks with 0.98 (0.91, 1.05) and 1.04 (0.97, 1.11). Stratified analysis found modification effect was more prominent in the < 65 years age group. Consuming more fresh vegetables, fruits, whole grains, and dairy can reduce the risk of hypertension caused by PM2.5 and its constituents.

Conclusions: Dietary patterns rich in antioxidants can reduce long-term exposure to PM2.5 and its constituents-induced hypertension defined by the 2017 ACC/AHA guideline, especially in young and middle-aged individuals. Compared to the Mediterranean diet, the DASH diet offers superior dietary guidance to prevent stage 1 hypertension caused by air pollution.

Key words diet; fine particulate matter; PM2.5 constituents; hypertension; interaction

Category: Public Nutrition & Health

中国成年人体脂百分比和2型糖尿病患病风险的纵向关联：来自中国健康与营养调查的证据

Longitudinal relationship between body fat percentage and risk of type 2 diabetes in Chinese adults: Evidence from the China Health and Nutrition Survey

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Objective: Body fat percentage (BF%) might be an alternative index of obesity which is the major risk factor for developing type 2 diabetes (T2D). We aim to longitudinally evaluated the relationship between BF% and risk of T2D.

Methods: A sample of 5595 adults aged 18-65 who participated in two waves of China Health and Nutrition Survey (CHNS 2015 and 2018) was analyzed. Two level mixed-effects modified Poisson regression with robust estimation of variance stratified by sex was used to evaluate the risk ratios (RRs) for T2D according to quintiles of BF%, and the curves of receiver operating characteristic (ROC) were plotted to identify the optimal total and trunk BF% cut-offs for predicting an increased T2D risk.

Results: In males, compared with subjects in the first quintile of total BF%, those in the third (RR = 2.03, 95% CI 1.09-3.79), fourth (RR = 2.56, 95%CI 1.46-4.48), and fifth (RR = 2.16, 95%CI 1.22-3.82) quintile had higher risk of T2D after adjusting for all potential confounders (p-trend < 0.001). For females, the RR (95% CI) was 1.92 (1.14, 3.24) in the fifth quintile (p-trend = 0.014). Males and females with a trunk BF% greater than 25.5% and 34.4% (≥ quintile 4), respectively, were at significantly increased risk of T2D (p-trend = 0.001). Besides, the optimal cut-off values of total and trunk BF% were 21.9% and 25.2% for males, and 36.7% and 30.3% for females, respectively.

Conclusions: The incident risk of T2D significantly increased over specific level of total and trunk BF% in both Chinese males and females, and the optimal BF% cut-off values were valuable for clinical application of BF% based on sex difference, which may be a cost-effective implementation for prevention and treatment of T2D in China.

Key words Body fat percentage, Cut-off points, Type 2 diabetes, Obesity, China

Category: Public Nutrition & Health

维生素受体基因多态性对中国人群高血压和二型糖尿病共病易感性的影响:基因与高甘油三酯血症和腹部肥胖的交互作用

The influence of VDR polymorphisms on the HTN and T2DM comorbidity susceptibility in Chinese: interactions with hypertriglyceridemia and abdominal obesity

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Zhengzhou University

Abstract: Objective Synergistic interactions of gene-environment risk factors are probably thought to raise the odds of HDC. The current investigation mainly focuses on the relationship between VDR variations and the interaction with hypertriglyceridemia and abdominal obesity on HDC risk.

Methods A whole of 1364 individuals had been covered in this cross-sectional study. Logistic regression models were used to appraise the associations between the VDR gene (rs3847987 rs2239179, rs739837, and rs2228570) or environmental factors (obesity and dyslipidemia) and HDC susceptibility. Additive interaction model was applied to evaluated the interaction effect between gene and environmental factors on HDC risk.

Results The consequences indicated that rs3847987 and rs739837 were meaningfully associated with an increased HDC susceptibility after adjusting for potential risk factors (OR=1.972, 95% CI: 1.043-3.730 and OR=1.412, 95% CI: 1.029-1.937). We also found that overweight/obesity, abnormal WC or WHR, and abnormal levels of TC and TG all could increase the risk of HDC. Beyond environmental factors, these data also point to a meaningful additive interaction effect between rs3847987 and hypertriglyceridemia (SI: 2.367, 95% CI: 1.106-5.065) and between rs3847987 and abnormal WHR (SI: 1.964, 95% CI: 1.137-3.392) on HDC susceptibility.

Conclusion This study supplied novel proof that the interaction of the VDR gene polymorphisms and hypertriglyceridemia or abdominal obesity had combined and additive effect on HDC susceptibility.

Key words VDR polymorphisms; Hypertension; Type 2 diabetes; Comorbidity; Hypertriglyceridemia; Abdominal obesity

Category: Public Nutrition & Health

自闭症谱系障碍儿童的血液和头发铜水平：基于病例对照研究的荟萃分析

Blood and hair copper levels in children with autism spectrum disorder：A meta-analysis based on case-control studies

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The association between copper levels and autism spectrum disorder (ASD) has been a controversial topic. This study investigated relationship between copper levels and ASD. The following databases are searched until April 2022: Pubmed, EMBASE, Web of Science, and Medline. Combined effect size standardized mean differences (SMD) and 95% confidence intervals (95%CI) were calculated with Stata 12.0. In this meta-analysis, 29 case-control studies were included, which included 2504 children with ASD and 2419 healthy controls. The copper levels in hair (SMD: -1.16, 95% CI: -1.73~-0.58) was significantly lower in ASD children than healthy controls. Copper may be one of important causal factor in the etiology of ASD.

Key words Copper; ASD; Children; Meta-analysis

分类：公共营养与健康

海口市 380 名孕妇饮水行为及水合状态与体成分相关性研究

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目的 调查妊娠期间女性饮水行为及水合状态和体成分，比较不同孕期饮水行为及水合状态的差异，分析水合状态与体成分指标之间的关系，有助于进一步修订《中国居民膳食营养素参考摄入量》中的妊娠期间女性适宜水摄入量。方法 采用横断面研究设计，在海口市某医院妇产科招募产检且符合纳排标准的孕妇 380 人。利用在《7 天 24 小时饮水记录表》，让研究对象使用统一定制 300ML 玻璃水杯准确详细记录研究对象饮水行为，同时在产检当天（第 8 天）收集晨尿进行水合状态调查和使用人体脂肪测量仪进行体成分的测量。采用 Kruskal-Wallis H 检验比较调查对象的孕早、中、晚期饮水行为及水合状态指标的差异。采用 Kruskal-Wallis H 检验比较同一孕期不同 BMI 水平、不同饮水量水平及不同水合状态调查对象饮水行为及水合状态指标的差异。采用 Jonckheere-Terpstra 检验分析饮水量及水合状态指标在不同饮水量水平组及水合状态组间变化的趋势。采用 Spearman 相关性分析检验孕早、中、晚期饮水量与水合状态指标的相关性。以尿液渗透压＜500 mOsm/kg 为适宜水合状态分组依据，使用 ROC 曲线检验每日饮水量及白水饮用量作为孕妇适宜水合状态判断指标的可行性。结果 孕早、中、晚期每日饮水量的中位数分别为 1339mL、1490mL、1525mL，且三者之间的差异具有统计学意义（H=109.663，P<0.005）。孕早、中、晚的白水饮水量的中位数分别为 1227mL、1386mL、1451mL，且三者之间差异具有统计学意义（H=131.233，P<0.001）。调查对象孕早、中、晚期每日奶及奶制品饮用量中位数分别为 61mL、63mL、57mL，三者之间无统计学差异（P>0.05）。调查对象孕早、中、晚期每日饮料饮用量中位数分别为 29mL、30mL、32mL，且三者之间的存在统计学差异（H=18.360，P=0.001）。调查对象孕早（61mL，H=415.018）、中（74mL，H=779.622）、晚期（81mL，H=225.584）早餐前每日饮水量明显低于其他时间段，差异具有统计学意义（P<0.001）。调查对象孕早（578mL，H=174.392）、中（602mL，H=272.825）、晚期（ 614mL，H=264.712）就餐时饮水量均低于非就餐时饮水量，差异有统计学意义（P<0.001）。

Spearman 相关性分析结果显示，调查对象的每日饮水量和白水饮用量与尿液渗透压在孕早、中、晚期均呈负相关（饮水：rs=-0.566，P<0.001；rs=-0.404，P<0.001；rs=-0.410，P=0.002；白水：rs=-0.702，P<0.001；rs=-0.384，P<0.001；rs=-0.325，P=0.016）。海口市孕妇孕早、中、晚期适宜水合状态的每日饮水量临界值分别为 1347.0mL、1460.7mL 及 1650.0mL（P 均<0.001），曲线下面积分别为 0.817、0.704、0.712，灵敏度分别为 0.875、0.887、0.667，特异度分别为 0.696、0.504、0.889。结论 调查对象每日饮水量随孕期逐渐升高，白水是孕期最主要的饮品类型，调查对象孕期早餐前饮水量均低于其他时间段，非就餐时饮水量高于就餐时,应当注意各时间段的水分的补充，尤其是起床后；不同水合状态组调查对象的每日饮水量、白水饮用量、体脂率、身体水分率均存在差异。

关键字 海口市；孕妇；体成分；水合状态

分类：公共营养与健康

膳食模式与代谢综合征

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背景：代谢综合征在中国的患病率日益攀升，不健康的膳食是首要原因。然而，中国人群膳食模式和代谢综合征相关的研究仍然缺少直接关联。因此，本研究进行了系统综述与荟萃分析，探索中国人群膳食模式与代谢综合征。

方法：PubMed, EMBASE, the Cochrane Library, Scopus, Web of Science, 知网、万方数据库进行了系统的搜索，研究纳入了截止 2023 年 4 月份，中国人群中膳食模式和代谢综合征的观察性研究。荟萃的结果[Odds ratio (OR)] 及其相应的 95%置信区间通过随机效应模型进行分析。异质性和发表偏移也进行评估计算；并根据研究的特征进行了分层分析。

结果：17 项横断面或病例对照研究被纳入进来。根据所报道的膳食模式的因子权重的相似性，可以发现有 4 个主要的膳食模式。相比高分位和低分位，植物膳食与代谢综合征的风险负相关 OR (95% CI) = 0.75 (0.63, 0.90)。传统膳食模式则与代谢综合征有一定负相关的趋势，但不显著[OR (95% CI) = 0.92 (0.84, 1.02)]，但分层分析的结果发现负相关关系在中国东南区域显著存在。与之相反，动物膳食与代谢综合征的发病正相关[OR (95% CI) = 1.34 (1.21, 1.45)] ，西方膳食模式与代谢综合征的发病也是正相关[OR (95% CI) = 1.22 (1.09, 1.34)]。

结论：我们的研究发现遵循膳食模式，以及传统膳食模式，尤其是基于中国东南地区的膳食模式，与代谢综合征风险降低有关，而动物膳食模式与西方膳食模式则与更高的代谢综合征风险有关。

背景：代谢综合征在中国的患病率日益攀升，不健康的膳食是首要原因。然而，中国人群膳食模式和代谢综合征相关的研究仍然缺少直接关联。因此，本研究进行了系统综述与荟萃分析，探索中国人群膳食模式与代谢综合征。

方法：PubMed, EMBASE, the Cochrane Library, Scopus, Web of Science, 知网、万方数据库进行了系统的搜索，研究纳入了截止 2023 年 4 月份，中国人群中膳食模式和代谢综合征的观察性研究。荟萃的结果[Odds ratio (OR)] 及其相应的 95%置信区间通过随机效应模型进行分析。异质性和发表偏移也进行评估计算；并根据研究的特征进行了分层分析。

结果：17 项横断面或病例对照研究被纳入进来。根据所报道的膳食模式的因子权重的相似性，可以发现有 4 个主要的膳食模式。相比高分位和低分位，植物膳食与代谢综合征的风险负相关 OR (95% CI) = 0.75 (0.63, 0.90)。传统膳食模式则与代谢综合征有一定负相关的趋势，但不显著[OR (95% CI) = 0.92 (0.84, 1.02)]，但分层分析的结果发现负相关关系在中国东南区域显著存在。与之相反，动物膳食与代谢综合征的发病正相关[OR (95% CI) = 1.34 (1.21, 1.45)] ，西方膳食模式与代谢综合征的发病也是正相关[OR (95% CI) = 1.22 (1.09, 1.34)]。

结论：我们的研究发现遵循膳食模式，以及传统膳食模式，尤其是基于中国东南地区的膳食模式，与代谢综合征风险降低有关，而动物膳食模式与西方膳食模式则与更高的代谢综合征风险有关。

关键字 dietary pattern; metabolic syndrome; Chinese; meta-analysis

分类：公共营养与健康

我国五城市老年人饮水与排尿行为的现况研究

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目的：调查我国五城市老年人饮水行为与排尿行为现状并分析其相关性，为制定我国老年人水适宜摄入量提供基础数据，为改善老年人饮水与排尿行为的策略提供参考，从而促进老年人形成健康饮水与排尿习惯。

方法：在广州、合肥、济南、南昌和太原五个城市通过网络平台发布广告招募调查对象，共招募了 557 名 60-79 岁老年人参与调查，所有调查对象均签署知情同意书。采用《一般情况问卷》了解调查对象的性别、年龄、受教育程度、经济状况等信息；采用经过验证的《7 天 24 小时饮水记录表》由调查对象完整记录一周内每天各时段的饮水量、饮水时间与饮水种类；采用经过验证的《7 天 24 小时排尿记录表》测量调查对象的每天排尿的具体时间、排尿冲动和尿液颜色等。本次调查将调查对象尿液分为四个颜色：很浅，浅黄，黄色，深黄，当尿液颜色为黄色或深黄时，认为存在脱水风险；当调查对象白天排尿>7 次认为存在排尿次数过多的问题。使用 R 4.2.2 进行统计分析，计数资料采用频数及百分比描述，符合正态分布的计量资料采用均数（标准差）的形式表示，非正态分布的计量资料采用中位数（四分位间距）描述。组间差异的检验，分类变量使用卡方检验，正态分布的连续变量使用方差分析，非正态分布的连续变量则使用 Kruskal-Wallis 秩和检验。构建 logistic 回归模型分析排尿次数过多与每日饮水量的关系，检验的显著性水平为 0.05。

结果：共有 518 名调查对象完成了调查，完成率为 93.0%。调查对象每日饮水量的中位数为 1538ml，男性每日饮水量的中位数为 1550ml，女性每日饮水量的中位数为 1532ml，差异无统计学意义($p=0.623$)。55.2%（286 人）调查对象出现饮水不足现象，男性饮水不足人数显著高于女性（男：65.1%, 149；女：47.4%, 137）($p<0.001$)。调查对象每日排尿次数的中位数为 7 次，且男性、女性每日排尿次数的中位数均为 7 次。56.4%（292 人）调查对象出现排尿次数过多现象（男：55.9%, 128；女：56.7%, 164），差异无统计学意义($p=0.601$)。调查对象每日尿液颜色出现黄色及以上次数，0 次的有 161 人(31.1%)，1 次的有 184 人(35.5%)，2 次的有 88 人(17.0%)，3 次及以上的有 85 人(16.4%)。每日饮水量每增加 100ml，出现排尿次数过多的可能性增加 0.13 倍，差异有统计学意义($OR=1.13$，$p<0.001$)。

结论：调查对象每日饮水量未达到我国成年居民水适宜摄入量比例较高，其中男性饮水不足人数高于女性。调查对象尿液颜色深，出现黄色次数较多，存在脱水风险。排尿次数与每日饮水量存在关联，每日饮水量增加可能导致排尿次数过多的风险。后续应对老年人如何进行科学饮水进行健康宣教，帮助老年人形成健康的饮水行为与排尿行为。

关键字 老年人；饮水行为；排尿行为

分类：公共营养与健康

孕妇孕期蛋白质摄入与后代 2 岁身高关系的前瞻性队列研究

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目的：生命早期 1000 天是指从怀孕到后代出生后的 2 岁，该阶段的生长发育影响一个人长期的健康走向，也是一个强有力的预测指标。孕期蛋白质营养与“生命早期 1000 天”密切相关。然而，目前研究多集中于孕期蛋白质营养与出生体重及其相关结局的关系。针对孕期蛋白质摄入情况影响后代出生后的生长状况的研究有限。因此，本研究旨在探讨孕期蛋白质摄入与后代早期生长的关系，为孕期合理营养及促进儿童早期的正常发育提供新思路。

方法：基于前瞻性的队列研究，评估孕期膳食蛋白质摄入情况并探究孕期膳食蛋白质摄入对其 2 岁幼儿生长的影响。研究对象来自“同济母婴健康队列”，在孕期通过面对面调查的方式收集基础信息，采用食物频率调查问卷对孕中期的蛋白质摄入量进行评估。通过电话随访收集后代 2 岁时体格生长的数据和生活方式。观察的主要结局指标为 2 岁后代的身高、年龄别身高 Z 评分和发育迟缓的风险。2 岁时的年龄别身高 Z 评分根据世界卫生组织性别和年龄特定生长标准计算。发育迟缓定义为年龄别身高 Z 评分< - 2。通过分段线性回归模型、多元线性回归模型和多元 Logistic 回归模型分析孕期蛋白质摄入与结局的关系。

结果：本研究最后共纳入 1232 对自愿参加的母子对。孕中期平均蛋白质摄入量为 1.29 g• kg $^{-1}$• d $^{-1}$。在调整了后代生活方式和父母基本特征的混杂因素后，研究发现随着孕妇孕中期膳食总蛋白摄入量的增加，后代 2 岁身高和年龄别身高 Z 评分均呈先上升后下降的趋势。其中，当孕中期蛋白质摄入 <1.01 g• kg $^{-1}$• d $^{-1}$时，蛋白质摄入量每增加一个单位 (per g•kg $^{-1}$• d $^{-1}$)，后代 2 岁身高增加 4.52cm (95% CI: 0.42 ~ 8.62)，当孕中期蛋白质摄入>1.01 g•kg $^{-1}$• d $^{-1}$时，蛋白质摄入量每增加一个单位 (per g•kg $^{-1}$• d $^{-1}$)，后代 2 岁身高减少 2.20cm (95% CI: -3.23 ~ -1.18)。孕中期蛋白质摄入与后代年龄别身高 Z 评分之间也存在类似的关系。当孕中期蛋白质摄入 < 1.01 g•kg $^{-1}$• d $^{-1}$时，后代年龄别身高 Z 评分随孕期蛋白质摄入的增加而增加 (per g•kg $^{-1}$• d $^{-1}$: β = 1.49, 95% CI: 0.23 ~ 2.76)，当孕中期蛋白质摄入 > 1.01 g•kg -1•d -1 时，后代年龄别身高 Z 评分随孕期蛋白质摄入的增加而降低 (per g•kg $^{-1}$• d $^{-1}$: β = -0.54, 95% CI: -0.87 ~ -0.21)。然后，我们将孕中期蛋白质摄入量分为三分位，通过多元 Logistic 回归发现，与最低分位数相比，发育迟缓的风险在第二分位数时下降 (OR = 0.39, 95% CI: 0.08, 1.85)，在最高分位数时上升(OR = 1.00 ,95% CI: 0.23, 4.35)。虽然没有观察到显著结果，但孕期蛋白质摄入与发育迟缓的风险可能存在非线性的趋势。

结论：孕妇孕中期膳食蛋白质摄入量对后代 2 岁的身高存在阈值效应。

关键字 蛋白质摄入，妊娠，前瞻性研究，生命早期 1000 天，身高

分类：公共营养与健康

营养指导及运动干预对非酒精性脂肪肝人群的影响

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非酒精性脂肪肝（Nonalcoholic fatty liver disease，NAFLD）是一种肝脏疾病，其特点是肝细胞内积聚了过多的脂肪。这种疾病在我国已成为最为常见的慢性肝病之一，也是导致健康体检中肝功能异常的主要原因之一。NAFLD 的发病率逐年上升，它严重威胁着国民的健康和社会的发展。它不仅仅停留于脂肪堆积的阶段，如果得不到及时控制和治疗，还可能进展为更为严重的脂肪性肝炎，甚至引发纤维化、肝硬化和肝癌等并发症。这些并发症对患者的生命安全和生活质量造成极大的影响。为了解决 NAFLD 带来的问题，许多研究关注于营养指导和运动干预在 NAFLD 人群中的影响。营养指导可以帮助患者调整饮食结构，减少摄入高脂肪和高糖分的食物，增加摄入富含纤维素和抗氧化剂的食物，以降低肝脏脂肪积聚和改善肝功能。运动干预则可以通过增加身体活动量、促进脂肪代谢和改善心血管健康来减轻 NAFLD 的病情。本文主要研究了营养指导及运动干预对非酒精性脂肪肝（NAFLD）人群的影响。通过探索合理的饮食结构和运动方案，为 NAFLD 的预防和治疗提供重要的科学依据**目的**　研究营养指导及运动干预对非酒精性脂肪肝（ NAFLD）人群的影响。**方法**　选取 2020 年 11-12 月东莞市清溪医院职工体检发现 NAFLD56 例，根据自愿参与原则随机数字表法分为观察组 26 例和对照组 26 例。对照组给予常规口头宣教干预，观察组在此基础上进行营养指导、运动干预并在微信平台的进行饮食运动打卡。主要做法：1）成立消除脂肪肝项目管理小组，项目管理小组由营养师、公卫医生组成，主要负责对每个人的健康状况进行评估、制定个性化的减重、饮食、运动干预计划。（2）建立微信交流群，营养师每天在微信群发营养运动相关知识。（3）建立打卡软件，项目管理组专人负责每天追踪、监督打卡情况，营养师定期对成员饮食、运动情况进行点评并督促改进。（4）营养指导。要求各成员在平衡膳食的基础上，适当调整各类营养物质的摄入，避免不良饮食行为，建立健康饮食习惯，超重人员达到减重目的。（5）运动指导。项目组每周选取 2 天早晨的时间，空腹进行集中锻炼，快走 1 小时。没时间参与的队员每天利用自己的空闲时间，根据个人运动喜好自行进行锻炼，由于医院群体工作均比较忙，加之处于疫情期间，指导大家每天在室外坚持中等量的有氧运动的同时，适当配合每周进行 2-3 天的抗阻运动和 2 天以上的柔韧性运动。确保每周 3-5 天的有氧运动，每次有 30 分钟以上中等强度运动。9 个月后，比较两组，肝脏脂肪衰减数值及 BMI 变化情况。**结果**　试验结束后，两组人员肝脏脂肪衰减数值及 BMI 干预后均降低（ P＜0.05）；干预后组间相比，观察组肝脏脂肪衰减数值及 BMI 显著降低（ P＜0.05），且观察组人员肝脏脂肪衰减数值和 BMI 趋良。**结论**　同时实施营养指导及运动干预 NAFLD 人群，可加速该人群的肝脂肪衰减，降低体重指数，提高其健康水平。　　作者简介：孙小金，主任护师，注册营养师,工作单位：广东省东莞市清溪医院，Email:1830099626@qq.com

关键字　非酒精性脂肪肝；健康教育；营养指导；运动干预

分类：公共营养与健康

糖化血红蛋白在妊娠期糖尿病检验中的应用价值

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糖化血红蛋白在妊娠期糖尿病检验中的应用价值

摘要：目的　分析中国新疆地区孕妇妊娠期糖尿病(gestational dia betes mellitus，GDM)筛查中应用糖化血红蛋白与空腹血糖联合检测的效果。方法　2020 年 4 月－2023 年 5 月，将乌鲁木齐市妇幼保健院行 75 g 口服葡萄糖耐量试验（OGTT）且确诊为妊娠期糖尿病患者（孕 24～28 周）409 例作为糖尿病组，以同期体检健康孕妇 409 例作为对照组，收集患者资料，检测患者糖化血红蛋白水平，并使用 ROC 曲线分析空腹血糖检测联合糖化血红蛋白检测在筛查妊娠期糖尿病中的使用价值。结果　糖尿病组患者糖化血红蛋白、空腹血糖、服糖后 1h 血糖、2h 血糖水平均明显高于对照组（P＜0.05）;ROC 曲线结果显示，糖化血红蛋白检测妊娠期糖尿病的曲线下面积为 0.662（0.625-0.699），其灵敏度、特异性分别为 0.403、0.834；空腹血糖检测妊娠期糖尿病的曲线下面积为 0.852（0.824-0.879），其灵敏度、特异性分别为 0.643、1；联合检测妊娠期糖尿病的曲线下面积为 0.856（0.829-0.883），其灵敏度、特异性分别为 0.68、0.949。结论　妊娠期糖尿病检验中糖化血红蛋白具有较高应用价值，能够有效识别妊娠期糖尿病，适用于妊娠期糖尿病筛查，便于跟踪了解妊娠期糖尿病患者病情变化，为个体化治疗提供指导，促进血糖控制效果的提升。

创新点：妊娠期首次发生或发现糖耐量异常的情况即为妊娠期糖尿病，2021 年在新疆地区 GDM 发病率约为 7.4%。近年来，随着诊断标准及检验技术不断进步，已不断提高妊娠期糖尿病的检出率。妊娠期糖尿病所引起的母婴并发症较为严重，多项研究显示，采取有效的干预措施、及时发现妊娠期糖尿病可有效改善母婴预后。因此，有效筛查妊娠期糖尿病的方法一直为临床关注的热点及重点。空腹血糖检测为临床早期诊断糖尿病的一种常用方法，但是单独使用这种检测方法效果并不理想。糖化血红蛋白≥6.5%为临床诊断糖尿病的一种确切方法，在临床治疗及判断预后中发挥重要作用。本研究对妊娠期糖尿病患者使用糖化血红蛋白联合空腹血糖检测，并分析其临床使用效果。本研究缺陷仅针对我国新疆乌鲁木齐市孕期妇女，其他地域人群有待验证。本研究采用的糖化血红蛋白是 OGTT 检测后的单次体检数据，未能考虑到糖化血红蛋白水平波动情况。

关键词：妊娠期糖尿病；糖化血红蛋白；临床检验

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关键字 关键词：妊娠期糖尿病；糖化血红蛋白；临床检验

分类：公共营养与健康

乌鲁木齐市孕妇营养素养现况及对妊娠结局的影响研究

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摘要：目的　调查新疆乌鲁木齐市孕妇营养素养现况并分析其对妊娠结局的影响,为预防和减少孕期相关疾病及不良妊娠结局的发生、维护母婴健康、完善母婴保健策略提供建议。方法　依据纳入标准选择 2021 年 4 月-2023 年 5 月乌鲁木齐市妇幼保健院门诊建卡并进行常规孕检且计划在该院分娩的 1777 名孕妇作为研究对象,面对面问卷调查法调查其营养素养现况,再结合妊娠结局资料,分析孕妇母婴健康素养现况对妊娠结局的影响。结果　乌鲁木齐市城乡孕妇对母婴营养素养测评内容的总体得分率为 39.5%，其中“二手烟会危害胎儿”的正答率(89.2%)最高,“纯母乳喂养能满足几月龄内婴儿”的正答率(6.0%)最低；城镇孕妇的得分及格情况(69.4%)高于农村孕妇(18.5%),随孕产期的后移孕妇母婴健康素养各部分测评内容的及格率和正确率均呈上升趋势(P＜0.05)。乌鲁木齐市城乡孕妇均对偏向生活常识类母婴健康知识的知晓率明显较高,最高知晓率为89.2%;偏向生理指标类的内容知晓率最差,最低知晓率为 13.2%。年龄、文化程度、职业、年收入以及孕妇本人希望的分娩方式是影响乌鲁木齐市孕妇母婴营养素养水平的因素(P＜0.05),其中文化程度、职业和年收入是重要的影响因素。大多数孕妇具备良好的学习意愿和利用卫生资源的主动性,但仅 23.1%的孕妇听过孕妇课程,且参与比例随孕次增加而下降。从获取母婴保健知识的途径来看,孕妇最期望的途径是健康讲座和健康咨询,其次是健康教育传播材料。孕妇母婴健康素养状况对妊娠结局的影响产妇产检次数、分娩方式、剖宫产原因、是否母乳喂养、产后第一次成功喂母乳时间、是否妊娠合并贫血、产后有无出血、新生儿体重以及有无合并疾病均与自身母婴健康素养水平有相关关系(P＜0.05)。结论　1.整体上乌鲁木齐市孕妇母婴营养素养处于较低水平,知识层面以生活类常识掌握为主,而对于影响母婴健康的生理类知识掌握较少且不系统，并表现出城镇优于农村。2.影响母婴健康素养水平的因素有年龄、文化程度、职业、年收入以及孕妇本人希望的分娩方式,其中文化程度、职业和年收入影响程度更大。3.孕妇母婴营养素养水平与产检次数、分娩方式、剖宫产原因、是否母乳喂养、产后第一次成功喂母乳时间、是否妊娠合并贫血、产后有无出血、新生儿体重以及有无合并疾病均存在相关关系,整体提高母婴健康素养水平,能够有效避免和减少不良妊娠结局的发生。4.现有卫生资源配置、健康教育针对性、孕产期卫生服务方式均存在不完善之处。

关键词：孕妇; 母婴营养素养；现况调查；妊娠结局；影响因素

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关键字 孕妇; 母婴营养素养；现况调查；妊娠结局；影响因素

分类：公共营养与健康

膳食炎症指数与妊娠期糖尿病的关联研究

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（1） 背景：孕期炎症反应与妊娠期糖尿病（gestational diabetes mellitus, GDM）发生关系密切，膳食炎症指数（dietary inflammatory index, DII）是基于既往文献中“食物/营养成分与六种炎症标志物关系”开发出的一种评估人群饮食潜力的评分工具，DII 分数越高说明饮食促炎潜能越大。目前仅少量研究探索了 DII 与 GDM 的关系，饮食炎症对 GDM 的影响尚存在争议，未来还需要在不同地区开展更多相关研究。（2） 目的：本研究的目的是调查和评估妊娠中期妇女的饮食炎症潜能（通过 DII 测量），并探讨 DII 与 GDM 之间的关系，以期为 GDM 的医学营养治疗提供更丰富的理论支撑。（3） 方法：本研究采用病例对照研究设计，在湖南省妇幼保健院和长沙市妇幼保健院纳入 2022 年 3 月至 7 月期间，126 名 24～28 周诊断为 GDM 的妇女和 134 名同期健康孕妇。研究人员使用食物频率问卷收集受试者在过去一个月的饮食摄入频次及饮食摄入量，并使用 DII 评估研究对象饮食的炎症潜能。在数据分析过程中，采用二元 Logistic 回归分析饮食与 GDM 的关系。（4） 结果：孕妇经能量调整的膳食炎症指数（energy adjusted dietary inflammatory index, EDII）中位数是-2.30，均值是-2.02，其中 EDII 小于 0 的人占 89.7%说明孕妇饮食整体处于抗炎状态。根据四分位数法，将研究对象 EDII 分为 4 组分别是 Q1（≤ -2.95）、Q2（-2.95, -2.30）、Q3（-2.30, -1.35）、Q4（> 1.35），病例组和对照组孕妇的 EDII 四分位数分布具有统计学差异（P < 0.05）。以 EDII 四分位数分组为自变量，是否患 GDM 为因变量做二元 Logistic 回归分析，结果显示，在调整了年龄（岁）、孕周（周）、孕前 BMI（kg/m2）、产次（次）、被动吸烟后，Q4 组孕妇（EDII > 1.35）发生 GDM 的风险是 Q1 组（EDII ≤ -2.95）的 4 倍（OR: 4.00; 95%CI: 1.53, 10.49）。（5） 结论：本研究表明，较高的 DII 评分，对应于更具促炎潜力的饮食，与更高的 GDM 风险相关。因此，在孕期避免促炎饮食，可能是预防 GDM 的有效饮食策略。饮食炎症是 GDM 的一个危险因素，改善饮食质量的干预措施可以考虑包括一种旨在降低慢性全身炎症的饮食成分，以预防 GDM。然而，中国女性 DII 和 GDM 之间的关系仍有待于在更大的人群中证明。（5） 结论：本研究表明，较高的 DII 评分，对应于更具促炎潜力的饮食，与更高的 GDM 风险相关。因此，在孕期避免促炎饮食，可能是预防 GDM 的有效饮食策略。饮食炎症是 GDM 的一个危险因素，改善饮食质量的干预措施可以考虑包括一种旨在降低慢性全身炎症的饮食成分，以预防 GDM。然而，中国女性 DII 和 GDM 之间的关系仍有待于在更大的人群中证明。（5） 结论：本研究表明，较高的DII 评分，对应于更具促炎潜力的饮食，与更高的 GDM 风险相关。因此，在孕期避免促炎饮食，可能是预防 GDM 的有效饮食策略。饮食炎症是 GDM 的一个危险因素，改善饮食质量的干预措施可以考虑包括一种旨在降低慢性全身炎症的饮食成分，以预防 GDM。然而，中国女性 DII 和 GDM 之间的关系仍有待于在更大的人群中证明。

关键词: 妊娠期糖尿病;饮食炎症; 膳食炎症指数; 孕期

关键字 gestational diabetes mellitus (GDM); dietary inflammation; dietary inflammatory index (DII); pregnancy

分类：公共营养与健康

慢性病多病的流行状况和聚类模式及其时间变化的研究

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研究目的：

慢性非传染性疾病是全球最大的健康和发展挑战之一，其防治已成为全球卫生议题中的优先事项。本研究旨在分析美国成人慢性病多病的流行情况和管理现状以及影响因素，探究多病聚类模式，为我国的慢性病管理工作及政策制定提供相关线索。

研究方法：

数据来源于2009-2020年美国健康与营养调查项目，共12826人（≥20岁）纳入研究。根据血液检查等多种结果定义了9种慢性病，多病定义为同时患有两种及两种以上慢性病。计算慢性病多病的年龄标准化患病率，使用Poisson回归模型探究患病率的影响因素，采用线性回归模型进行患病率的趋势检验，通过观察/期望探究多病组合的患病分布，利用基于组间平均连接法和Yule’s Q法的系统聚类分析识别多病模式。统计学检验的显著性水平设置为0.05，数据处理与分析均由Stata 17.0软件完成。

研究结果：

1.基本特征

男性占比49.9%，患有0种、1种、两种及两种以上慢性病的人分别占比14.9%、35.8%、和49.3%。

2.多病流行状况

2009-2010年到2017-2020年多病患病率呈现上升趋势（2009-2010：39.8%；2017-2020：44.2%，P<0.001）。受教育程度越高和收入越高，多病患病率越低。多病患病率随着疾病数量增加而降低。多病的人群中老年人数较多，男性多于女性，已婚、非西班牙裔黑人、高中以下、中等收入、有医疗保险、过去吸烟、重度饮酒、超重、肥胖的人数较多，中心性肥胖的人数较少。

3.多病影响因素

老年（PR：2.18；95%CI：1.85-2.56）、超重（PR：4.86；95%CI：3.78-6.26）、肥胖（PR：5.99；95%CI：4.51-7.96）、有医疗保险者（PR：1.30；95%CI：1.09-1.55）是多病的危险因素。高学历（多病：PR：0.90；95%CI：0.82-0.98）则可以降低多病风险。

4.多病组合患病状况

不同年份疾病对中，患病率前三名依次为高血压+超重肥胖（2009-2010：28.98%；2017-2020：32.17%）、糖尿病+超重肥胖（2009-2010：12.59%；2017-2020：13.46%）、高血压+糖尿病（2009-2010：9.88%；2017-2020：11.18%）。常见的疾病组包括：高血压+超重肥胖+糖尿病、高血压+超重肥胖+冠心病。

5.多病聚类模式

在总体和不同亚组中，分类数为2、3或4时，聚合系数曲线变得陡峭。常见聚类模式：心血管代谢疾病类（脑卒中、高血压、冠心病、糖尿病、恶性肿瘤、超重肥胖、血脂异常）、呼吸系统疾病类（哮喘、慢性阻塞性肺疾病）。

研究结论：

年龄、超重、肥胖、教育程度、收入水平等与多病的发生与发展密切相关。慢性病多病的患病率随年龄的增长而逐步升高，心血管代谢性疾病类、呼吸系统疾病类为常见的多病聚类模式。未来政府需要高度重视多病的管理和预防，寻找多种疾病的共同点，达到异病同治。同时可以深入研究多病的发病机制，制定个性化的防治方案，以最优的方案最大程度减轻我国疾病负担。

关键字 慢性病；多病；流行率；影响因素；聚类模式

分类：公共营养与健康

新疆部分地区6-17岁儿童青少年血清25（OH）D营养状况及影响因素分析

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目的：血清25（OH）D是一种调节机体钙磷代谢、维持血钙平衡的脂溶性维生素，是儿童生长发育必须的重要元素。血清25（OH）D与机体心血管、血糖调节、免疫功能等有关。儿童青少年处于生长发育的关键时期，该阶段生长发育迅速，营养素需求较高，是血清25（OH）D缺乏的高危人群。目前针对新疆地区6 ~17岁儿童青少年的研究较少，本研究对新疆部分区县6~17岁儿童青少年血清25（OH）D营养状况及影响因素进行探讨，为营养改善措施提供科学依据。方法：采用多阶段分层整群随机的方法在新疆3个县（市、区）6-17岁青少年儿童采用多阶段分层整群随机抽样方法选取新疆3个县的儿童进行问卷调查、体格检查、实验室检测和24 h膳食回顾调查法。每个县（市、区）抽取2个街道/乡镇。每个县（市、区）抽取1所高中，其下2个乡镇/街道各抽取1所小学和1所初中，第一个街道/乡镇抽取小学一至三年级和初中一年级；在第二个街道/乡镇抽取小学四至六年级和初中二年级，抽取高中一、二年级，在抽中的年级整群选择 1 个班。小学六个年级各抽28人，初一初二各抽28人。高一高二各抽28人，三个调查点共调查840人。本研究经过中国疾病预防控制中心营养所伦理委员会审查。采用SPSS 26. 0软件进行统计分析。计量资料经正态性检验服从正态分布者以±s描述，多组组间均数比较采用完全随机设计资料的方差分析。计量资料经正态性检验不服从正态分布者以中位数（M）和第25、75百分位数（P25，P75）描述；两组组间比较采用Mann-Whitney U检验，多组组间比较采用Kruskal-Wallis H检验。血清25（OH）D营养水平与影响因素分析采用logistic回归，检验水准= 0. 05。结果：840名调查对象中，血清25（OH）D均值为（18.08±6.12）ng/mL，不同性别（c^2=12.987，P=0.002）、年级（c^2=45.250，P<0.05）、户外活动时间（c^2=14.887，P<0.05）、城乡（c^2=120.994，P<0.05）、采样季节（c^2=213.651，P<0.05）学生的血清25（OH）D水平差异有统计学意义，小麦类（F=4.233，P=0.015）、豆类（F=5.133，P=0.006）、蔬菜类（F=4.532，P=0.011）、水果类（F10.727=，P<0.05）、畜肉类（F=3.203，P=0.041）、小吃甜饼类（F=8.251，P<0.05）、速食食品类（F=4.524，P=0.011）食物的摄入量与学生的血清25（OH）D水平差异有统计学意义。logistic分析显示，女生（OR=1.980，P＜0.001）、农村（OR=8.215，P＜0.001）、初中和高中的学生（OR=8.010、3.054，P＜0.001）、吃小吃甜饼类食物（OR=1.015，P=0.008）是发生血清25（OH）D缺乏和不足的影响因素，采样季节为夏季和秋季（OR=0.261、0.294，P＜0.001）、水果类的摄入（OR=0.998，P=0.021）可以降低发生血清25（OH）D不足的风险。结论：应重点关注女生和高年级学生，支持外出运动，新疆夏季秋季短暂，早晚温差大，外出选择合适时间，必要时可考虑采用血清25（OH）D强化食品或使用营养补充剂。不同地区之间仍可能存在地域和饮食习惯等差异，要获得更加科学、精准的数据，尚需进一步开展更广泛、覆盖面更广的研究。

关键字 血清25（OH）D；影响因素；青少年；膳食

分类：公共营养与健康

饮食中补充 N-3 不饱和脂肪酸对脑卒中防治的研究进展

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1.研究目的：

随着社会水平的不断提高，人们脑卒中发病率越来越高且呈年轻化趋势，它是一种常见的心血管疾病，引起局部的脑功能障碍，不断发展会导致言语障碍、运动障碍、认知障碍等。近年来，膳食结构对于脑卒中风险的影响，越来越受到人们的重视，而 n-3 多不饱和脂肪酸为防治脑卒中的饮食结构调整提供了新的思路，二者之间的相关性成为新的研究热点和临床关注的焦点。

2.研究方法：

本文通过文献资料，逻辑分析法，比较法等方法对近年来国内外关于膳食结构中 N-3 的补充对脑卒中的防治的相关文献进行梳理，阐述其进展并就两者的研究方向提出新的观点。

3.研究结果：

3.1. n-3 多不饱和脂肪酸与心脑血管

N-3 多不饱和脂肪酸的 ALA（α-亚麻酸）主要存在于植物类食物中，进入身体后会转化成 EPA 或 DHA 被人体吸收，但转化率低，转化速度慢。EPA 和 DHA 主要来自海洋动物，海鱼的 DHA 含量大于淡水鱼。n-3 脂肪酸能够活化血管细胞，使血管恢复弹性，并修复破损的血管壁，同时，还可以有效降低血液粘度，加速血液流通，快速调节高密度脂蛋白、低密度脂蛋白、甘油三酯和胆固醇。美国国家医学科学院（NIH）认为 n-3 脂肪酸能降低血小板聚集，阻止血管黏附分子的表达，并能刺激血管内壁内皮细胞使之放松，从而有效调节血压。研究显示，n-3 脂肪酸可以降低血液中血小板的凝集性，避免因血液粘稠而引起的心脑血管疾病。脂肪酸可以降低血液中血小板的凝集性，避免因血液粘稠而引起的心脑血管疾病。

3.2. n-3 多不饱和脂肪酸与缺血性脑卒中

缺血性脑卒中是最常见的亚型，约占所有卒中人数 80% 以上。研究结果表明，EPA、DHA 摄入量与缺血性卒中发生率之间呈反比关系。缺血性卒中亚型的分析显示 EPA 和 DHA 摄入与腔隙性梗死之间也呈相反关系。在 Venø 等人的研究中，当比较摄入量的最高四分位数与最低四分位数时，总 n-3 脂肪酸、EPA 和 DHA 的高摄入量与大动脉粥样硬化引起的缺血性卒中发生率较低具有统计学显著相关性。N-3 脂肪酸能抑制血栓性疾病、维持正常血压，抑制脑出血发病，减少脑血栓的形成，改善脑细胞的供氧，减少脑细胞的死亡，平衡机体的正常代谢，维护机体各器官的功能，减少各种疾病甚至癌症的发生。另外，我国居民饮食也在改变。

4.小结与展望

综上所述，N-3 多不饱和脂肪酸通过改善血管内皮、血脂、及胆固醇来降低心脑血管疾病的发病风险，同时 n-3 脂肪酸还能够减少炎症细胞因子的产生，以及增加内皮依赖性血管舒张。另外，EPA 的抗氧化活性和亲脂性可以抑制胆固醇形成，抑制炎症和血栓形成。本文就 n-3 多不饱和脂肪酸与脑卒中特别是缺血性脑卒中的作用进行论述，尽管其对脑卒中的作用还没有统一的理论证明，也存在争议，但诸多的研究也表明 N-3 脂肪酸对缺血性脑卒中存在显著的效果。因此未来的研究应致力于阐明 n-3 脂肪酸对于脑卒中的治疗作用和机制，以及其他成分比如镁、维生素 k、维生素 D 的作用。

关键字 脑卒中；N-3 多不饱和脂肪酸；防治

分类：公共营养与健康

冷应激蛋白 Cirbp 通过 PPARγ-PGC1α-UCP-1 信号通路抑制前脂肪细胞 3T3-L1 成脂分化

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摘要 近年来，随着人们生活水平的提高，营养过剩与久坐不动的生活方式相结合，导致全球肥胖人数迅速增长，目前约有 20 亿人超重或患有肥胖症，然而其发生还与许多严重的并发症有关，包括代谢综合征，糖尿病、心脑血管疾病、癌症，以及激素紊乱等，肥胖已成为一项亟需解决的重大公共卫生问题。肥胖是由于能量的摄入超过能量的消耗，最终导致体内过多的脂肪量，且在体内的分布异常，我们前期研究发现慢性间歇性冷暴露可以减轻动物体重，降低体脂率及改善动物胰岛素抵抗情况及血糖代谢水平，且经冷暴露后，冷应激蛋白 Cirbp 在动物白色脂肪、棕色脂肪、肝脏中持续表达，因此研究有效减少脂肪生成的方法可能对防治肥胖具有重要意义，且 Cirbp 可能在脂肪生成过程中发挥重要作用，这可能为临床防治肥胖提供一个新的实验室依据。 目的：探讨低温干预对前脂肪细胞 3T3-L1 成脂分化过程的影响，并观察冷应激蛋白 Cirbp 在其中的作用机制。方法：利用鸡尾酒法诱导前脂肪细胞 3T3-L1 向成熟脂肪细胞分化，将细胞培养于 37℃或 32℃温和低温环境，并在诱导过程中给与 FFA 干预模拟高脂饮食。实验共分为 4 组：常温组（Con 组）、低温干预组（Cold 组）、高脂组（FFA 组）、低温高脂组（FFA+cold 组）；细胞培养过程中镜下观察细胞诱导分化过程的形态变化；油红 O 染色观察经温和低温培养细胞内脂质累积情况；诱导分化结束后收取细胞，检测细胞内 TG 累积情况；利用分子对接技术，验证冷应激蛋白 Cirbp 与 PPARγ 的相互作用关系；Western blotting 和 q-PCR 检测棕色脂肪组织 Cirbp、PPAR-γ、C/EBPα、PGC-1α、UCP-1 等信号分子表达情况。结果：显微镜下观察到温和低温培养能显著抑制前脂肪细胞 3T3-L1 向成熟脂肪细胞分化；油红 O 染色结果显示，与 Con 组相比，FFA 组细胞内脂滴累积显著增加，然而温和低温培养能显著减少细胞内脂滴的累积；TG 检测结果显示，FFA 干预能显著增加细胞内甘油三酯含量，然而经温和低温培养，脂肪细胞内 TG 含量显著降低；通过分子对接获得 Cirbp 与 PPARγ 的结合构象，结果提示其二者能够稳定结合从而产生相互作用，Cirbp 可能参与到脂肪生成的过程；Western blotting 和 q-PCR 结果显示，与 Con 组相比，FFA 组 Cirbp、PPAR-γ、C/EBPα 表达增高，PGC-1α、UCP-1 表达下降（P <0.05）；与 FFA 组相比，FFA+cold 组脂肪细胞中 Cirbp、PPAR-γ、C/EBPα 表达下调，PGC-1α、UCP-1 表达上调（P <0.05）。结论：低温可能是通过激活 Cirbp，影响 PPAR-γ-PGC-1α-UCP-1 信号通路的表达变化从而抑制对前脂肪细胞 3T3-L1 向成熟脂肪细细胞分化过程产生影响，减少成熟脂肪细胞的生成。

关键词：肥胖；前脂肪细胞 3T3-L1；冷应激蛋白 Cirbp；脂肪生成

关键字 肥胖；前脂肪细胞 3T3-L1；冷应激蛋白 Cirbp；脂肪生成

分类：公共营养与健康

菲律宾刺参硫酸软骨素对膳食诱导肥胖小鼠的预防作用及其作用机制的研究

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目的：海洋中蕴含着丰富的天然生物资源，是开发功能性食品成分的巨大宝库。海参富含硫酸多糖，合理补充海参硫酸多糖可以改善饮食引起的肥胖。硫酸软骨素是一类硫酸化的酸性粘多糖，由 D-葡萄糖醛酸(GlcA)和 N-乙酰-D-氨基半乳糖(GalNAc)通过 β-1,3 糖苷键连接成二糖重复单元构成，平均分子量为 73kDa。目前已有研究表明直链构象的菲律宾刺参硫酸软骨素(FCS-Pg)具有降低高脂饮食诱导肥胖小鼠体重的功效。肠道是脂肪消化吸收的主要器官，影响机体的能量平衡。越来越多的研究聚焦于抑制肠道脂肪代谢的角度开发减肥药物。本研究基于海参硫酸软骨素的负电荷性质，旨在进一步通过 FCS-Pg 作用于肠道调节脂质代谢的角度去挖掘 FCS-Pg 预防高脂饮食导致肥胖的作用机制，为海参硫酸多糖的产业化利用提供理论依据。

方法：40 只 6-7 周雄性 C57BL/6 小鼠，适应性喂养一周后，随机分为 5 组：(1)正常对照组(N)；(2)高脂模型对照组(HFD)；(3)奥利司他阳性药物组(O)，20mg/kg/d；(4)FCS-Pg 低剂量组(FCS-Pg-L)，20mg/kg/d；(5)FCS-Pg 高剂量组(FCS-Pg-H)，80mg/kg/d。N 组饲喂 10%低脂饲料，其他各组均饲喂 45%高脂饲料，高脂饲料配比为：蛋白质 19.4%，碳水化合物 35.6%，脂肪 45.0%。N 组与 HFD 组用蒸馏水灌胃，其余各组用溶于蒸馏水的不同干预物灌胃。分组时称量原始体重，此后每周称重一次并记录摄食量，10 周后，所有小鼠禁食 12h 后处死，收集血清、脂肪、肠道等组织，称重后放置于-80℃冰箱。采用生化法检测血清中 TC、TG、LDL-C、HDL-C 水平与粪便中 TG 水平；采用 HE 染色观察各组小鼠脂肪细胞变化；采用 Western blot 检测小肠脂质代谢相关蛋白(CD36、L-FABP、DGAT1、DGAT2、MTP)与脂肪组织米色化与脂质代谢相关蛋白（UCP1、PGC1a、ATGL、HSL）表达水平；采用 16S RNA 高通量检测小鼠的肠道菌群。

结果：高、低剂量 FCS-Pg 均显著降低了肥胖模型小鼠的体重（P＜0.05）。FCS-Pg-H 组白色脂肪重量与 HFD 组相比显著降低，且 FCS-Pg-H 组显著降低相关炎性因子（P＜0.05）。脂肪组织 HE 染色结果表明，与 HFD 组相比，高、低剂量 FCS-Pg 组小鼠白色脂肪细胞面积显著减小。Western blot 结果显示，与 HFD 组相比，FCS-Pg-H 显著降低小肠中 CD36、L-FABP、DGAT1、DGAT2、MTP 蛋白的表达（P＜0.05），表明 FCS-Pg-H 可以通过抑制脂肪酸的转运和甘油三酯合成相关蛋白来抑制脂质的吸收与积累。与 HFD 组相比，FCS-Pg-H 组在白色脂肪组织中 p-HSL /HSL、ATGL、UCP1、PGC1α 的蛋白表达量显著升高（p＜0.05），提示 FCS-Pg 可能促进白色脂肪产热的增加。通过对粪便中 TG 的检测发现，O 组与 FCS-Pg-H 组粪便 TG 含量相较 HFD 组显著增高（P＜0.05），证明 FCS-Pg-H 可以促进小鼠脂质的排出。二代高通量测序发现，与 N 组相比，HFD 组小鼠的拟杆菌门（Bacteroidetes）相对丰度显著降低（P＜0.05），而 FCS-Pg-H 组小鼠肠道菌群丰度得到一定恢复，菌群组成与 N 组趋近。

结论：FCS-Pg 具有预防小鼠肥胖的作用，可以改善肠道菌群紊乱，调节小肠脂质代谢与脂肪组织产热。

关键字 硫酸软骨素；多糖；肥胖；脂代谢

分类：公共营养与健康

间歇性冷暴露 CIC 对高脂膳食小鼠脂肪生成的影响

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目的：《中国居民营养与慢性病状况报告(2020 年)》指出，我国居民超重肥胖问题不断凸显，有超过一半的成年人超重或肥胖，并且 6-17 岁、6 岁以下儿童青少年超重肥胖率分别达到 19%和 10.4%，因此超重与肥胖已成为我国最严重的公共卫生问题之一。肥胖的特征是体内脂肪堆积过多，增加糖尿病、高血压、心脑血管疾病等多种代谢相关疾病的发生风险，严重影响我国居民的健康水平和生活质量。研究表明，低温环境暴露可改善肥胖症等相关代谢性疾病，可能是通过激活棕色脂肪组织、动员分解白色脂肪组织，从而成为一种潜在有效的肥胖干预手段，但其作用机制仍然不清。本文通过高脂膳食诱导小鼠的肥胖模型，同时给予慢性间歇性冷暴露(Chronic intermittent cold exposure, CIC)干预，明确 CIC 对脂肪生成和代谢的影响，并进一步探讨其可能的分子机制，从而为肥胖的防治提供参考依据。

方法：利用 60%高脂膳食喂养建立小鼠的肥胖模型，32 只 5 周龄 C57BL/6 雄性小鼠随机分为四组：正常对照组（Con 组）、CIC 组（间歇性冷暴露，4 ℃，4 小时/天）、HF 组（60%高脂纯化饲料喂养）、HF+CIC 组（60%高脂纯化饲料喂养，同时 4 ℃，4 小时/天），每周测量体重，持续干预 16 周，麻醉处死取小鼠血清、白色脂肪组织和棕色脂肪组织等进行后续检测。

结果：同 HF 组相比，HF+CIC 组小鼠在给予低温暴露后能显著降低小鼠的体重增加和体脂率；同时能够有效改善小鼠的葡萄糖耐受能力，提高胰岛素敏感性；降低 IL-1β、IL-6 和 TNF-α 水平从而改善高脂诱导的小鼠的炎症水平。同 HF 组相比，HF+CIC 组小鼠白色脂肪组织重量及含量减少，棕色脂肪组织重量及含量显著增加，表明 CIC 干预能逆转高脂诱导的白色脂肪组织生成并激活棕色脂肪组织。同时在小鼠的白色脂肪组织和棕色脂肪组织中，CIC 能显著降低高脂膳食诱导的脂肪生成相关转录因子过氧化物酶体增殖物激活受体 γ(PPARγ)、CCAAT 增强子结合蛋白 α（C/EBP α）的 mRNA 及蛋白表达；显著增加冷应激蛋白 Cirbp（冷诱导的 RNA 结合蛋白，cold inducible RNA binding protein，Cirbp）、过氧化物酶体增殖物激活受体 γ 辅助激活因子(PGC-1α)、解偶联蛋白-1(UCP-1)的 mRNA 及蛋白表达。

结论：CIC 能有效减轻高脂诱导的肥胖小鼠的体重，改善小鼠葡萄糖耐受力和胰岛素敏感性、降低小鼠炎症水平、减少白色脂肪组织生成、激活棕色脂肪组织，对脂肪生成过程及代谢产热产生影响，从而逆转高脂诱导的肥胖脂肪生成，改善高脂诱导的肥胖相关的代谢紊乱，这些可能同激活冷应激蛋白 Cirbp 及 PPARγ-PGC-1α-UCP-1 信号通路有关，从而为治疗肥胖等代谢疾病提供了新的思路。

关键字 肥胖；间歇性冷暴露；冷诱导的 RNA 结合蛋白；脂肪生成

分类：公共营养与健康

槲皮素对 BPA 致子代鼠肝脏损伤保护作用研究

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目的：双酚 A（Bisphenol A, BPA）是一种典型的环境内分泌干扰物，一般用于制造聚碳酸酯塑料和环氧树脂，广泛存在于日常生活环境中，包括一些食品和饮料罐、塑料瓶和医疗设备等。BPA 可在人体多种生物样本中检出，包括血清、尿液、胎盘、母乳等，提示人群广泛暴露于 BPA。由于胎儿期是个体各器官系统发育的关键时期，对不良环境因素暴露尤为敏感，而 BPA 可通过胎盘屏障造成宫内暴露，可能导致胎儿近期及远期健康风险。因此，孕期 BPA 暴露对子代健康的影响受到广泛关注。槲皮素（Quercetin，Q）作为一种常见的天然黄酮类化合物，广泛存在于洋葱，山楂等各种日常膳食中，具有抗炎、降血脂、降血压、抗肿瘤、抗氧化等广泛的药理作用和多种生物学活性。因此，本研究旨在明确孕前开始给 SD 母鼠灌胃 BPA 对子代雄性大鼠体重以及肝脏脂质累积的影响，同时探讨植物活性成分槲皮素在干预母鼠后是否会对雄性子鼠肝脏脂质累积起到一定的改善作用。

方法：选取 15 只 SPF 级健康雌性 SD 大鼠（12 周龄，性成熟）随机分为 3 组：对照组、BPA 组、BPA 联合槲皮素（BPA+Q）组，每组 5 只。自母鼠孕前两周分别进行灌胃处理，BPA 组大鼠使用 BPA 溶液（1μg/kg/d）灌胃，BPA+Q 组同时给予 BPA 溶液(1μg/kg/d)与槲皮素溶液(1.2mg/kg/d)进行灌胃，对照组则使用等体积生理盐水灌胃，持续干预至哺乳期结束（产后 3 周）。实验期间每隔一天测量母鼠及仔鼠体重。鉴别子代性别，将子代雄鼠麻醉处死后取血清进行 Elisa 测定脂代谢相关指标，留取肝脏组织进行石蜡切片及 HE、油红染色，提取肝脏蛋白进行后续 western blot 检测 PPARγ、FASN、ACC 等蛋白表达，使用 qPCR 检测相关 mRNA 水平。

结果：与对照组相比，BPA 组子代雄鼠出生体重明显增加，BPA+Q 组体重有所下降，此现象一直持续到实验结束。断乳后第三周，BPA 组子代雄鼠肝脏重量以及血清中 TG 含量明显增高（P<0.01），BPA+Q 组肝脏重量以及血清中 TG 含量有所下降（P <0.01）。油红 O 结果表明，BPA 组子代雄鼠的肝脏组织出现明显的脂滴增多且变大的现象，H&E 结果染色显示 BPA 组子代雄鼠肝细胞内脂肪空泡增多增大，且经槲皮素处理后有所减轻。PCR 结果显示，与对照组相比，孕期暴露 BPA 会导致脂代谢相关基因乙酰辅酶 A 羧化酶（ACC）、过氧化物酶体增殖物激活受体 γ（PPARγ）、硬脂酰辅酶 A 去饱和酶 1(SCD1)、CCAAT/增强子结合蛋白 α（CEBPα）、脂肪酸合成酶（FASN）、固醇调节元件结合蛋白（SREBP）、转录因子过氧化物酶体增殖物激活受体 γ 共激活因子 1-α（PGC1α）mRNA 表达升高（P<0.05）。WB 结果显示，槲皮素逆转了 BPA 引起的子代雄鼠肝脏脂肪生成相关调控因子 FASN、ACC-1、PPARγ、SCD1 的上调表达水平（P <0.01）。

结论：母鼠孕期及哺乳期暴露较低剂量 BPA 可导致子代雄鼠的体重以及脂肪合成相关调控因子表达增加，而槲皮素对 BPA 诱导的肝脏脂质累积情况有一定的改善。这对探索槲皮素预防产前 BPA 暴露对子代肥胖的发生有重要的意义。

关键字 孕期；BPA 暴露；槲皮素；脂质累积

分类：公共营养与健康

赶黄草总黄酮对铁超载大鼠肝脏功能 及 DMT 1、TfR 1 基因表达的影响

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摘要　目的：通过观测血清转氨酶活力、氧化应激状态、病理切片及二价金属离子转运蛋白 1（DMT 1）、转铁蛋白受体 1（TfR 1）的基因表达量，研究赶黄草总黄酮对铁超载大鼠肝损伤的影响。方法：以含水乙醇加热回流提取赶黄草，并利用聚酰胺柱色谱纯化制备赶黄草总黄酮。选择八周龄 SPF 级雄性 SD 大鼠 40 只，适应性喂养一周后随机均分为正常对照组、铁超载模型组、赶黄草总黄酮低、中、高剂量干预组（赶黄草总黄酮剂量分别为 25、50、100 mg/kg·d）。除正常对照组腹腔注射等体积生理盐水外，其他实验组前两周按照 50 mg/kg·bw、后两周按照 100 mg/kg·bw 的剂量隔天腹腔注射右旋糖酐铁，同时赶黄草总黄酮低、中、高剂量干预组灌胃相应赶黄草总黄酮水混悬液，正常对照组灌胃等体积生理盐水。实验过程中，观察大鼠生长状况，连续给药 4 周后处死，取大鼠血清及肝脏，肝脏进行普鲁士蓝染色观察大鼠肝脏组织病理结构变化，血清检测丙氨酸氨基转移酶（ALT）、天门冬氨酸氨基转移酶（AST）、超氧化物歧化酶（SOD）、谷胱甘肽过氧化物酶（GSH-Px）活性水平以及丙二醛（MDA）含量。采用逆转录-聚合酶链反应（RT-PCR）法检测大鼠肝脏组织 DMT 1、TfR 1mRNA 表达水平。结果：（1）普鲁士蓝染色显示：与对照组相比，铁超载模型组肝细胞结构色素沉积严重，赶黄草总黄酮低、中、高剂量干预组肝细胞结构色素沉积也比较严重，但程度较模型组轻。（2）血清生化指标检测结果显示：与对照组相比，模型组血清 SOD、GSH-PX 活性显著降低（P<0.01），ALT 活性、MDA 含量显著升高（P<0.05），AST 活性略升高但差异无统计学意义；与模型组相比，赶黄草总黄酮干预组血清 SOD、GSH-PX 活性均显著升高（P<0.05），且呈现一定剂量反应关系，高剂量组血清 ALT 活性、MDA 含量显著降低（P<0.05），低、中剂量组略降低，但差异无统计学意义，干预组血清 AST 无明显变化。（3）RT-PCR 结果显示：与对照组相比，模型组 DMT 1、TfR 1 基因表达量均显著下调（P<0.05）；与模型组相比，赶黄草总黄酮干预组 DMT 1、TfR 1 基因表达量均显著上调（P<0.05），且呈现一定剂量反应关系。结论：赶黄草总黄酮能够改善铁超载引起的大鼠肝脏铁沉积，降低血清转氨酶活力，改善氧化应激状态，抑制机体铁吸收的能力，从而对铁超载导致的肝脏损伤起到保护作用，其作用机制之一可能是：在机体铁超载时，赶黄草总黄酮通过抑制二价金属离子转运蛋白 1 和转铁蛋白受体 1 的表达，减弱转铁蛋白－转铁蛋白受体摄铁途径的铁摄取，进而减少铁的吸收，抑制过量的铁向胞内转运，减轻由铁超载导致的肝脏损伤。

关键字 赶黄草；总黄酮；铁超载；肝损伤；保护作用

分类：公共营养与健康

孕早期甘油三酯水平与妊娠期糖尿病关系的前瞻性队列研究

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摘要：目的　探究中国新疆地区孕妇孕早期甘油三酯水平与妊娠期糖尿病(gestational diabetes mellitus，GDM)的关系。方法　连续纳入2022年1月－2023年4月加入乌鲁木齐市妇幼保健院出生人口队列的孕早期孕妇，调查其基本人口学特征、生活行为方式等资料，并对研究对象的孕早期甘油三酯水平、口服葡萄糖耐量试验(oral glucose tolerance test，OGTT)结果进行随访。首先使用logistic回归分析模型分析孕早期甘油三酯水平对GDM的影响，进一步采用限制性立方样条来呈现甘油三酯水平与GDM的非线性关系。结果　共纳入434名孕妇，单因素分析结果显示，孕早期低甘油三酯水平与高甘油三酯水平的GDM发病率、FPG、OGTT 1h血糖、OGTT 2h血糖均存在统计学差异（P<0.05）；在调整了混杂因素后，孕早期高甘油三酯水平（甘油三酯≥1.03mmol/L)增加了GDM的发生风险(OR=1.89，95%CI:1.21~2.96);孕早期甘油三酯水平每升高0.1mmol/L，FPG、OGTT 1h血糖、OGTT 2h血糖水平分别升高0.15mmol/L(95%CI:0.11~0.21)、0.17mmol/L(95%CI:0.11~0.26)、0.11　mmol/L(95%CI:0.08~0.17);限制性立方样条结果显示，随着孕早期甘油三酯水平升高，GDM的发生风险逐渐升高。结论　甘油三酯是影响GDM发生的独立危险因素，孕早期甘油三酯检测在GDM防控中具有重要的应用价值，能有效预测GDM的发生，对于孕早期妇女在预防不良妊娠结局方面有一定的价值。当孕早期甘油三酯≥1.03mmol/L时应引起足够的重视，必要时可给予干预，以防治GDM的发生，减小GDM对孕产妇及围产儿健康的影响，促进母婴健康。

创新点：目前认为妊娠期糖尿病的发生与胰岛素抵抗、遗传、生活方式、环境等因素有关，不同国家、不同民族、不同地区GDM的发生率也有所不同，2021年文献记录的GDM在新疆地区GDM发病率约为7.4%。与既往研究相比，本研究阐明了新疆乌鲁木齐市孕早期妇女甘油三酯与GDM的关系，为孕早期 GDM 高危人群进行干预提供依据。另有研究证实，GDM患者在妊娠早期即存在胰岛素抵抗，推测孕早期甘油三酯水平较高反应机体可能存在的胰岛素抵抗，从而为预测 GDM 提供依据。本研究缺陷仅针对我国新疆乌鲁木齐市孕期妇女，其他地域人群有待验证。本研究采用的甘油三酯是孕早期的单次体检数据，未能考虑到甘油三酯水平波动情况。综上所述，孕早期甘油三酯水平升高是GDM发病的危险因素，可为临床早期筛查 GDM 高危人群并干预提供帮助。

关键词：妊娠期糖尿病；孕早期；甘油三酯水平；口服葡萄糖耐量试验

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关键字 妊娠期糖尿病；孕早期；甘油三酯水平；口服葡萄糖耐量试验

分类：公共营养与健康

菊粉抑制肠神经胶质细胞炎症改善 2 型糖尿病及其机制的研究

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研究目的：本研究拟探讨菊粉是否能够通过调节肠道菌群及其代谢产物，抑制肠神经胶质细胞(enteric glial cells, EGCs)的炎症反应，从而达到改善 2 型糖尿病(type 2 diabetes mellitus, T2DM)的效果，并探究其可能的机制，从而进一步评估 EGCs 在代谢性疾病中的作用，为相关疾病的防治提供理论支持，在 T2DM 的预防、护理及治疗等方面提供新的思路和方法。

研究方法：采用 C57BL/6 小鼠，通过高脂喂养结合腹腔注射链脲佐菌素（streptozotocin, STZ）建立 T2DM 模型。按分组给予不同的饲料，测定体重和尾静脉血糖，进行胰岛素耐量试验和体成分分析。通过组织切片观察结肠炎症，Elisa 测定血清脂多糖（lipopolysaccharide, LPS）和肿瘤坏死因子 α（tumor necrosis factor alpha, TNF-α）水平；利用 16S rDNA 测序分析肠道菌群，以此为基础预测其 KEGG 功能，通过质谱分析对每组小鼠结肠内容物中的短链脂肪酸浓度进行检测；测定短期饲喂高脂饲料小鼠结肠胶质纤维酸性蛋白（glial fibrillary acidic protein, GFAP）和炎症因子的水平，证实 EGCs 激活和结肠炎症之间的关系；结肠黏膜下神经丛 EGCs 免疫荧光染色和 western blot 测定小鼠结肠 NF-κB 通路的活化，炎症因子和 mRNA 的表达；利用粪菌移植实验，进一步证实了菊粉抑制 T2DM 小鼠结肠炎症主要通过肠道菌群和代谢产物的调控来完成；用棕榈酸和 LPS 在体外培养 EGCs 引起胰岛素抵抗和炎症，用动物实验所得短链脂肪酸的浓度进行干预，免疫荧光染色观察 NF-κB 向细胞核转位的情况，用 western blot 测定通路相关蛋白；通过加入短链脂肪酸受体拮抗剂 GLPG0974 进一步证实丁酸对 EGCs 炎症的抑制作用。

研究结果：1. 菊粉可改善胰岛素抵抗和炎症。进食菊粉的 T2DM 小鼠体重下降、肾周白色脂肪减少，胰岛素敏感性增加，糖化血清蛋白水平降低。同时，进食菊粉的 T2DM 小鼠结肠长度有所恢复，结肠炎症表现得到缓解，外周循环中 LPS 和 TNF-α 水平降低；2. 菊粉可逆转 T2DM 小鼠肠道菌群紊乱，降低拟杆菌门与厚壁菌门比值，缩小 *Colidextribacter*、*Rikenellaceae*_RC9_gut_group、*Clostridia*_UCG_014、*Muribaculaceae*、*Lachnospiraceae*_NK4A136_group、*Alloprevotella* 等数种微生物与对照组之间的丰度差距，并且使乙酸、丁酸浓度回升；3. T2DM 小鼠结肠炎症由 EGCs 异常激活引起，菊粉能够通过抑制 T2DM 小鼠 EGCs 中 IKKβ/NF-κB 通路激活，减少 IL-1β、IL-6、TNF-α 表达。粪菌移植试验的结果证实菊粉抑制 EGCs 炎症的机制与调节肠道菌群及其代谢产物相关；4. 菊粉的代谢产物丁酸能够抑制 EGCs 中 NF-κB 发生核转位，从而发挥抗炎作用。

结论：高脂饮食联合 STZ 诱导的 T2DM 小鼠结肠炎症状态与 EGCs 异常活化、IKKβ/NF-κB 通路激活密切相关，而在饲料中添加菊粉则可以通过逆转肠道菌群失调、升高结肠中短链脂肪酸浓度抑制结肠炎症，并在减轻 T2DM 小鼠胰岛素抵抗及炎症等方面发挥有益作用。

关键字 2 型糖尿病；菊粉；肠神经胶质细胞；炎症；肠道菌群；短链脂肪酸；NF-κB

分类：公共营养与健康

西南地区石油钻井工人健康状况和膳食营养情况调查及干预研究

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摘要：

目的 了解西南地区石油钻井工人健康状况及膳食营养情况，探究健康教育和改变食堂供餐模式等干预措施对改善钻井工人健康状况的有效性。

方法 采用方便抽样方式选取西南某石油钻井公司 4 个钻井队进行调查，抽取 171 名钻井工人为研究对象。在干预开始前和结束后分别进行一次膳食调查和体检数据采集，膳食调查使用 3d 食物称重法和 24h 膳食摄入回顾法，体检数据指标包括 BMI、收缩压、舒张压、血脂、血总胆固醇、空腹血糖、血尿酸和肝脏 B 超。使用 SPSS25.0 统计软件对录入数据进行统计描述，计量资料用均数±标准差（x±s）表示、分类资料用频数和构成比 N（%）表示，连续变量的比较采用 t 检验、构成比的比较采用卡方检验分析。检验水准 α=0.05。

结果 （1）干预前钻井工人膳食模式不平衡，畜禽肉类食物摄入量过高，蔬菜类、蛋类食物摄入不足，水产品类、奶类、水果类食物摄入严重不足；能量摄入超标，脂肪摄入量严重超标，钠摄入过量。干预后钻井工人膳食模式有所改善，但水产品类、奶类、水果类食物仍摄入不足，脂肪和钠摄入过量。（2）干预前 BMI 和收缩压分别为 24.95±3.46 kg/m^2和 128.31±15.99 mmHg，高血脂、高血胆固醇、高血糖、高血尿酸和脂肪肝检出率分别为 36.84%、30.41%、20.47%、35.67%和 36.84%；干预后 BMI 和收缩压分别为 24.19±3.08 kg/m^2和 125.64±13.08 mmHg，高血脂、高血胆固醇、高血糖、高血尿酸和脂肪肝检出率分别为 26.32%、19.88%、8.19%、19.30%和 29.24%，检测指标值和慢性病的检出率均有所降低，差异具有统计学意义（P<0.05）。部分干预对象的 BMI 等指标数据相较于干预前降低，但仍处于代谢性疾病的发病危险范围以内。（3）通过健康教育、改善生活区环境、改变食堂膳食模式等干预措施，钻井工人行为和生活方式发生变化，早餐食用率明显提高，吸烟人数和用烟数量相较于干预前减少，差异具有统计学意义（P<0.05）。

结论 石油钻井工人的慢性病危险因素包括职业有害因素、工作环境和生活习惯等，同时由于其健康认知不足，导致该职业群体慢性病高发，严重危害身体健康。经过干预前后的膳食调查及体检报告分析，西南地区石油钻井工人超重肥胖率和高血压等多种慢性病的患病率较高，与其膳食模式不平衡、行为和生活习惯较差存在一定相关性，通过健康教育和膳食干预，石油钻井工人的健康认知明显提高，膳食模式和行为逐步改善和转变，慢性病检出率有所降低。提示干预措施有效，应加强健康教育，提倡合理营养，改善石油钻井工人的健康状况。

关键字 石油钻井工人；膳食调查；健康状况；健康教育

分类：公共营养与健康

上海市某高校大学生膳食营养素摄入与超重肥胖的关联性分析

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目的 探讨上海市大学生膳食营养素摄入与超重肥胖的关系，为预防超重和肥胖的膳食指导提供科学依据。

方法 选取上海市某高校 928 名大学生为调查对象，采用食物频率法调查其在过去一年的食物摄入情况，利用中国食物成分表，计算各类食物组和营养素的摄入量；采用问卷调查法获得研究对象的基本信息及与超重肥胖的可能相关因素（包括性别、年龄、日常身体活动水平、饮食习惯等）；采用统一的体格测量方法获得身高和体重信息，计算身体质量指数，根据中国成人超重与肥胖诊断标准将研究对象分为正常组和超重肥胖组。使用 R 4.2.0 统计软件进行统计分析，采用基于二分类资料的带有 logit 函数的多元 logistic 回归模型分析大学生膳食营养素摄入与超重肥胖的关系。以是否超重肥胖作为因变量，各类食物组和营养素摄入量作为自变量（分类变量，按照四分位数分层）纳入模型。研究调整既往报告的潜在混杂因素，包括年龄、性别、日常身体活动水平等。以 $p<0.05$ 表示具有统计学意义。

结果 本次调查共回收 861 份有效问卷，其中男性 403 人，女性 458 人，超重和肥胖率分别为 15.5%和 4.30%。调整性别、年龄和日常身体活动水平后，每日膳食总能量水平从低到高的四分位区间 Q1-Q4 的超重肥胖率依次为 10.3%、22.0%、22.8%和 25.5%，与每日膳食总能量水平的最低四分位数区间样本人群相比，第二和第三个四分位区间组的超重肥胖的发生风险显著升高（OR（95%CI），Q2：Q1：1.97（1.15-3.38）；Q3：Q1：1.82（1.06-3.14））。在食物组摄入方面，调整了性别、年龄、日常身体活动水平和每日膳食总能量后，与含糖饮料摄入量的最低四分位数区间组相比，第三和最高四分位区间组的超重肥胖的发生风险显著升高（OR（95%CI），Q3：Q1：1.71（1.03-2.84）；Q4：Q1：1.71（1.00-2.93））。与最低四分位数区间组比，精制谷物类摄入量的第二个四分位区间组的多因素校正 OR（95%CI）为 1.69（1.00-2.86），粗粮类摄入量的第二个四分位区间组的多因素校正 OR（95%CI）为 0.61（0.37-1.01）。在营养素摄入方面，调整了性别、年龄、日常身体活动水平和每日膳食总能量后，烟酸摄入量的最高四分位区间组与最低四分位区间组相比，超重肥胖的发生风险显著降低（OR（95%CI），0.43（0.19-0.96））。调整上述混杂因素后，维生素 B1 摄入有降低超重肥胖发生风险的趋势，但无统计学意义（OR（95%CI），Q4：Q1：0.45（0.18-1.10））。

结论 上海市大学生的每日膳食总能量摄入量、含糖饮料摄入量、精制谷物类摄入量与超重肥胖的发生风险呈正相关，烟酸摄入量水平与超重肥胖的发生风险呈负相关，粗粮类摄入和维生素 B1 摄入有降低超重肥胖发生风险的趋势。

关键字 大学生；膳食营养素；能量；超重与肥胖

分类：公共营养与健康

基于简化营养成分信息的健康食物选择助推策略

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目的　我国居民选择高脂、高盐、高糖食物很容易引起超重、肥胖症、糖尿病等慢性非传染性疾病的发生，已成为威胁健康的危险因素，超重或肥胖症人数已达 2 亿，糖尿病患者人数已达 9240 万，发病率呈现逐年上升的趋势，这与长期膳食结构不均衡和油盐糖摄入过多密切相关，带来重大公共健康挑战，因此有必要了解日常饮食中食物的营养成分含量，进而做出健康的食物选择决策，但由于人们对营养标签信息的使用和理解与其受限教育水平、对营养知识的掌握不足和对健康饮食的关注不够存在密切关系，同时传统营养标签的直观性较差，并未对公众关注营养标签信息和选择健康食物产生显著影响。本文对简化营养成分信息的相关助推策略进行综述，探讨其实施过程和对于促进健康食物选择的效果，为我国推进预包装食品营养成分表改进在“健康中国行动”之“合理膳食行动”的落实过程中的改善公众营养提供参考。

方法 本文使用"助推"、"简化营养成分信息"、"食品包装正面标识"作为中文关键词，使用“nudge”、“Simplifying nutritional labelling information”、“Front-of-package labels”作为英文关键词检索查阅中国知网、维普、万方、谷歌学术、PubMed、Web of Science 等数据库中的论文。

结果　我国一直沿用的是提高营养标签知晓率的传统策略，效果却有限，采取助推策略的核心是行为改变，目的是使用更不令人察觉的干预策略引导个体食物选择行为向预期方向改变，由于只是对事物本身做了微小的改变，不至于引起消费者的反感，甚至很多消费者可能都没意识到变化时就已做出了健康的食物选择，而简化营养成分信息就是这样的助推策略，整体可以分为三大类。第一类是信息型，对营养成分表中的一种或多种营养素信息进行总结，常用的是采用参考摄入量占比图示的形式。第二类是评价型，对食品营养质量做出评价，例如在饮料包装上加入警告性标签（说明摄入该食品与某些疾病风险升高相关）和解释性标签（推荐摄入某些食品），发现人们对含糖饮料的偏好有所降低同时促进了对健康饮品的选择；优化营养标签信息的表现形式，设计可视化营养标签，使用红绿灯的颜色表示某种营养成分含量高低。第三类是混合型，在传统的营养成分表右侧既添加表示营养成分含量的条形图又使用红绿灯的颜色以此更好地吸引公众注意力，降低消费者对于不健康食品的选择。

结论　采取简化营养标签信息的助推策略有助于提高公众对于营养标签信息的关注度，进而利于促进健康的食品选择，可以为营养促进工作提供参考。

关键字 简化信息、营养标签、健康食物选择、助推干预策略

分类：公共营养与健康

Akt/FoxO3a/Atg7 功能障碍加重肥胖引发的肌肉萎缩机制研究

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目的：Atg7 在骨骼肌肌少症病人患病初期激活，本研究旨在探究肥胖时 Atg7 在骨骼肌中的激活机制，探究 Atg7 在肥胖引发的肌萎缩中的关键作用及 Atg7 促进肥胖引发肌萎缩的机制。

方法：本研究采用高脂饮食诱导的肥胖小鼠模型、Atg7 敲除小鼠的腓肠肌组织模型和棕榈酸联合 Atg7 干扰 C2C12 细胞模型并收集了肥胖和正常体重受试者的腓肠肌组织，探究 Atg7 在肥胖引发的肌萎缩中的关键作用。

结果：

高脂饮食诱导的肥胖小鼠模型的实验结果显示，饲喂 HFD 的小鼠腓肠肌重量、肌肉指数、腓横截面积和肌纤维数量明显低于饲喂 ND 的小鼠。同时，HFD 组的小鼠肌肉的握力和耐力也出现了显著的下降，这与 HFD 对肌肉形态和横截面积的影响结果是一致的。小鼠腓肠肌中肌蛋白降解的关键抑制剂 Akt 在给小鼠喂食 HFD 20 周后发生了显著的失活，MyHC 明显减少；小鼠腓肠肌 FoxO3a 显示被显著激活(p-FoxO3a 与 FoxO3a 的比值出现降低)。小鼠腓肠肌中的 TRIM63 出现显著增加，与 FoxO3a 活性增加一致。同时，Atg7 及其下游的 LC3 在腓肠肌中的表达显著增加。在棕榈酸的刺激下，过表达或敲低 FoxO3a 结果显示，Atg7 的 mRNA 和蛋白水平的升高与 FoxO3a 水平的变化呈正相关关系。结合时间过程研究结果分析，我们认为 HFD 饮食引起的 Akt 活化损伤诱导了 FoxO3a 的转录活性，从而增加了 Atg7 的转录水平。肥胖患者的腓肠肌组织中的 Atg7 和 TRIM63 的阳性表达明显升高，p-Akt 水平与非肥胖患者相比出现了明显的降低，这与动物实验的结果一致。敲除 Atg7 可减轻 HFD 诱导的腓肠肌横截面积和肌纤维数量的减少，同时也可以减轻 HFD 引起的小鼠肌肉耐力和力量的丧失；HFD 诱导的小鼠的肌蛋白降解的变化显示，敲除 Atg7 可增加 p-FoxO3a 和 FoxO3a 的比例，导致 HFD 小鼠的 TRIM63 蛋白表达降低 67%。因此，抑制腓肠肌 Atg7 可改善胰岛素抵抗，增加 p-Akt 和 Akt 的比值，从而增加 MyHC 的表达。Akt 敲低促进了棕榈酸诱导的肌肉蛋白降解通路(FoxO3a/TRIM63)的激活并可抵消 Atg7 敲除引起的肌蛋白降解抑制，包括 MyHC 降低和 FoxO3a/TRIM63 激活增加。Akt 磷酸化抑制剂 MK2206 处理 Atg7 敲低的 C2C12 细胞，发现 Akt 磷酸化的抑制也可以抵消 Atg7 敲低引起的肌蛋白降解的抑制。GST-Pull down 实验的 结果显示，Atg7 与 Akt 之间存在直接的相互作用。综合免疫荧光实验、细胞质-膜分离实验和免疫共沉淀结果，得出棕榈酸刺激的 Atg7 通过结合其 c -末端结构域抑制 PDK1 和 PDK2 激活 Akt。

结论：脂质诱导的 Akt 信号的抑制可促进肌肉细胞中 foxo3a 介导的 Atg7 水平的转录水平；Akt/FoxO3a/Atg7 调控回路的功能障碍导致 FoxO3a 的正反馈循环激活，从而加剧肥胖引发的肌萎缩。

关键字 肥胖，脂肪毒性，胰岛素抵抗，肌萎缩，Atg7, FoxO3a, Akt

分类：公共营养与健康

中青年男性 HIV 感染者低骨骼肌质量的相关因素分析

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目的　随着抗逆转录病毒疗法（antiretroviral therapy, ART）的陆续应用和不断发展，人类免疫缺陷病毒（human immunodeficiency virus，HIV）感染者的寿命有了显著延长，其预期寿命更为接近普通健康人群，预后得到了较为明显的改善。肌少症是一种近几年兴起的新生疾病，尤其在老年人以及恶病质患者中最为常见，与较差的生活质量密切相关。由于 HIV 患者的食欲和肠胃消化吸收功能较差，常并发贫血、胰岛素抵抗等相关疾病，而且艾滋病感染者（PLWH）在整个患病疾病过程中都存在着慢性免疫激活和炎症，这些因素的存在可能与 HIV 感染者的肌少症发生发展密切相关。研究显示，在各个年龄段中，中年群体的 HIV/AIDS 人群感染率最高，25-34 岁的成年人中 HIV 感染和 AIDS 患者占比分别为 30.69%和 22.58%。这部分中青年男性 HIV 患者尽管未到老年期，并没有受到年龄因素的影响，但因长期的 HIV 病毒感染、抗逆转录药物的使用、以及疾病严重程度等因素的影响，这一群体也正在受肌少症的困扰，降低其后期生存质量。本研究以中青年男性 HIV 感染者为研究对象，探究该人群有关低骨骼肌质量的相关因素，以期为其肌少症的预防或减缓其发展提供相关参考依据。

方法　以在某医院进行免费抗艾滋病病毒治疗的 HIV 患者做为研究对象，对其进行问卷调查、躯体体成分分析、体格测量以及血液生化指标检测。以四肢骨骼肌肌肉质量之和除以身高平方计算骨骼肌肌肉质量指数，根据亚洲骨骼肌减少症工作组（AWGS）有关肌肉减少症的诊断标准，将男性骨骼肌质量指数(skeletal muscle mass index, SMI)≤7 kg/m2 定义低骨骼肌质量指数组，计算该人群低骨骼肌质量的患病率并对相关因素进行分析。

结果　研究纳入的 140 例中青年男性 HIV 患者的平均年龄为 38.8 岁，平均骨骼肌质量指数为 8.14 kg/m2，其中低 SMI 者 12 人（8.6%），低 SMI 组平均 SMI 6.64 kg/m2, 并且低 SMI 组的体重、身体质量指数以及臀围均低于对照组。Logistics 回归分析结果显示抗逆转录病毒治疗持续时间【OR=12.93，95%CI（2.239~122.454），P =0.010】是低 SMI 的危险因素；身体质量指数>19.7【OR=0.009，95%CI（0.001~0.061），P <0.001】、血红蛋白>141.5g/L【OR=0.126，95%CI（0.015~0.669），P =0.025】是低 SMI 的保护因素。

结论　中青年男性艾滋病病毒感染者的抗逆转录病毒疗法的治疗时间、身体质量指数和血红蛋白含量与其低骨骼肌肌肉质量指数有关，随着抗逆转录病毒药物用药时间的延长，中青年男性 HIV 患者的骨骼肌质量指数可能降低。需针对这些危险因素对中青年男性艾滋病病毒感染者进行及时干预，改善用药组合或者用药方案，缓解其因骨骼肌质量减少而引起的低生活质量。

关键字 肌少症；HIV；影响因素分析；骨骼肌质量指数；横断面调查

分类：公共营养与健康

了解新疆两地区6~24月龄婴幼儿钙，铁，镁，锌，铜等矿物质水平，探讨6~24月龄婴幼儿微量元素水平对生长发育水平的相关性，为新疆地区6~24月龄婴幼儿生长发育改善的公共卫生政策提供数据及理论依据。

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目的：了解新疆两地区6~24月龄婴幼儿钙，铁，镁，锌，铜等矿物质水平，探讨6~24月龄婴幼儿微量元素水平对生长发育水平的相关性，为新疆地区6~24月龄婴幼儿生长发育改善的公共卫生政策提供数据及理论依据。方法：采用简单随机抽样方法，选取于2021年1月~2021年12月新疆医科大学第一附属医院、和田墨玉县妇幼保健院儿童保健科进行健康体检的788名6~24月龄婴幼儿作为研究对象，通过问卷调查收集性别、月龄、出生状况、居住地，测量身高、体重、血红蛋白等指标，依据《WHO儿童生长发育标准》计算身长对体重Z值（WHZ）、年龄对体重Z值（WAZ）、年龄对身高Z值（HAZ）并评价6~24月龄婴幼儿生长水平，采用多通道原子吸收光谱法，检测婴幼儿血清中钙，铁，镁，锌，铜等矿物质水平，采用多因素回归模型分析婴幼儿血清微量元素与生长发育水平的相关性。结果：被调查婴幼儿中，城乡婴幼儿血清缺钙率比较严重，分别高达84.38%、67.60%，其次血清缺铁率比较严重，分别高达42.75%、40.40%，788名检测血清微量婴幼儿中，不同性别钙元素和铜元素水平差异有统计学意义（P<0.05）；不同月龄组钙、铁和锌元素水平差异有统计学意义（P<0.05），随着年龄的增加，婴幼儿血清铁和锌元素水平升高；不同地区钙、铁、镁和铜元素水平差异有统计学意义（P<0.05）；。Person相关性分析结果显示，HAZ和WAZ与婴幼儿全血钙和铜元素存在显著负相关（P<0.05），相关系数分别为-0.082、-0.101和-0.088、-0.089；WHZ与镁元素存在显著负相关（P<0.05），相关系数r=-0.080；Hb与血清铁、镁和锌元素存在显著正相关（P<0.05），相关系数分别为0.451、0.095和0.089，其中与铁相关性较其他元素高，钙和铜元素存在显著负相关（P<0.05），相关系数分别为-0.284和-0.144。多重线性回归分析结果显示，在HAZ的多种线性回归分析中，模型复相关系数R=0.136，R2=0.012，检验模型得F=2.959，P<0.05，一定范围之内，血清铜浓度偏高的婴幼儿HAZ水平反而低；用WAZ作为因变量建立的回归模型，模型复相关系数R=0.131，R2=0.011，检验模型得F=2.750，P<0.05；本研究数据范围内，血清钙和铜对WAZ影响均未达到显著水平（P>0.05）；用WHZ作为因变量建立的回归模型，模型复相关系数R=0.110，R2=0.006，检验模型得F=1.902，P>0.05，一定范围之内血清铜浓度偏高的婴幼儿WHZ水平反而低；用Hb作为因变量建立的回归模型，模型复相关系数R=0.521，R2=0.272，说明逐步的模型中，所有自变量解释Hb的27.2%的变异，检验模型得F=56.373，P<0.05。由表可知，最终钙和铁进入HAZ的回归方程，结果显示，一定范围之内，血清钙浓度高的婴幼儿Hb水平反而低，相反一定范围之内，血清铁的浓度越高，婴幼儿Hb水平越高（P<0.05）；结论：婴幼儿血清微量元素与婴幼儿生长发育水平密切相关，因此，应重视加大婴幼儿科学喂养宣传力度，培养家长科学喂养行为，提升婴幼儿辅食质量，定期体检并检测其血清微量元素水平，从而改善其生长发育水平，促进婴幼儿生长发育。

关键字 婴幼儿；微量元素；生长发育水平

分类：公共营养与健康

北京城区哺乳期妇女膳食质量评价及与产后抑郁症的相关性研究

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目的 产后抑郁症（postpartum depression, PPD）是女性在产后出现明显的抑郁症状或典型的抑郁发作，是一种女性常见的精神障碍性疾病，给产妇本身、家庭及社会造成巨大危害。健康的饮食营养对保持良好的心理健康起到重要作用。妇女妊娠、哺乳营养需要量大，产后营养的恢复不良，或产后营养的过度补充，都容易造成哺乳期妇女的营养不良。本研究通过对北京城区产后 6 个月产妇膳食及抑郁状况的调查，运用哺乳期膳食平衡指数（DBI-L）评价膳食质量，分析膳食因素与 PPD 的相关性，为 PPD 抑郁预防及干预、妇女健康保障工作的开展提供相关理论依据。

方法 以 2019 年 6 月-7 月期间在北京城区 6 家社区卫生服务中心登记的 401 名产妇为研究对象，从孕产妇保健手册及社区母子健康档案收集一般情况和围产信息。在产后 6 个月的随访中，收集当前婴儿喂养及产妇的照护状况，采用爱丁堡产后抑郁量表（EPDS）获取 PPD 相关信息，采用膳食频率法（FFQ）收集哺乳期妇女膳食情况，运用 DBI-L 评价膳食质量。 计数资料以频数（百分比）进行描述，采用 χ2 检验进行分析；DBI-L 各分值用 M（25th，75th）表示，样本的 M 差异比较用 Mann-Whitney 检验进行统计学分析。采用 Logistic 回归分析膳食质量与 PPD 的相关性。

结果 401 名产后 6 个月哺乳期产妇 PPD 患病率为 26.40%。产后妇女中膳食总体平衡性（DQD）得分中位数为 21（16, 26），77.56%产妇膳食不均衡；摄入过量（HBS）得分中位数为 8（4,16），摄入不足（LBS）得分中位数为 10（7,14），食物摄入过量（65.84%）和摄入不足（41.15%）的问题同时存在。各类食物中，谷薯类 59.07%的产妇摄入过量；畜禽肉类 76.06%的产妇摄入过量；蛋类 65.59%的产妇摄入过量。而蔬菜、水果摄入达到推荐者仅占 26.93%、33.92%，奶类达到推荐摄入量者仅占 16.71%。与正常产妇相比，PPD 产妇的膳食总体平衡性更差（P=0.001），低度和重度膳食不均衡者占比较高（ χ2 =28.389，P<0.001）。PPD 产妇中度和高度摄入过量的比例更高（ χ2 =23.672，P<0.001），低度和重度摄入不足者占比同样更高（ χ2 =17.116，P=0.002）。各类食物中，PPD 产妇蔬菜水果摄入显著低于非 PPD 产妇（P<0.01）；谷薯类的摄入则显著高于非 PPD 产妇（P<0.01）。二元 logistics 回归分析结果显示，与较适宜的 HBS 相比，产妇膳食摄入过量（中度摄入过量 OR=5.855，95%CI：2.647-12.950；高度摄入过量 OR=5.928，95%CI: 2.510-14.00）与 PPD 的发生相关；与较适宜的 DQD 相比，中高度的膳食总体不平衡（OR=7.924，95%CI：2.777-22.61）与 PPD 的发生相关。调整年龄、文化程度和家庭月收入，以及进一步调整是否有准备的怀孕、宝宝健康状况和产妇照护状况的 PPD 相关社会因素后，以上相关性依然存在。

结论 北京城区产后六个月的妇女膳食存在不平衡现象，且与 PPD 相关。应针对膳食相关危险因素加强干预，预防和减少 PPD 的发生。

关键字 产后抑郁；膳食质量；膳食平衡指数；哺乳期产妇

分类：公共营养与健康

南极磷虾油对地塞米松诱导的 C2C12 肌管萎缩的干预作用研究

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目的 糖皮质激素类药物地塞米松（dexamethasone，Dex）是用于治疗炎症的常见药物，长期使用会导致一系列的副作用，如发生肌肉衰减，严重影响患者生活质量和疾病预后。研究表明，Dex 引起的肌肉衰减与线粒体功能紊乱密切相关。Dex 可诱导活性氧水平上升，扰乱线粒体融合和裂解之间的动态平衡，导致线粒体网络的破碎、数量减少和功能受损，最终导致肌肉组织的萎缩和功能受损。线粒体既是活性氧产生的主要位点，也是活性氧攻击和损伤的主要靶点，线粒体功能紊乱和氧化应激之间的恶性循环加剧肌肉衰减。腺苷酸活化蛋白激酶（AMP-activated protein kinase，AMPK）是体内的能量代谢感受器，在调节骨骼肌线粒体功能和氧化应激中发挥关键作用，可通过影响骨骼肌的线粒体质量控制和改善氧化应激来调节线粒体功能。南极磷虾油（Krill oil，KO）是从南极磷虾中提取的富含磷脂型 ω-3 长链多不饱和脂肪酸和虾青素等多种生物活性物质的新型功能性油脂，具有广泛的生物学功能。研究发现，ω-3 长链多不饱和脂肪酸、虾青素和磷脂等对肌肉衰减症的防治具有积极作用。但 KO 能否改善 Dex 引起的肌肉衰减尚不清楚。本研究考察了 KO 对 Dex 诱导的 C2C12 肌管萎缩的干预作用，并围绕线粒体稳态深入探讨其分子机制，以期为探寻有效防治肌肉衰减症的营养干预措施提供科学依据。

方法 将 C2C12 细胞分化为肌管后，利用 20 μM Dex 刺激 24 h，建立 Dex 诱导的 C2C12 肌管萎缩模型，并采用梯度剂量的 KO 进行干预。利用 MyHC 免疫荧光染色观察 C2C12 肌管形态；利用 DHE 染色测定肌管活性氧水平；利用 Seahorse 细胞能量代谢分析仪检测细胞线粒体呼吸功能和细胞能量代谢；利用 ATP 检测试剂盒检测肌管细胞内的 ATP 水平；利用共聚焦技术观察肌管线粒体数量形态、线粒体活性氧、膜电位和线粒体自噬水平；利用 qRT-PCR 和 Western blotting 技术检测相关基因 mRNA 和蛋白水平的变化，并通过 siRNA 转染技术深入探讨 KO 干预 Dex 诱导的 C2C12 肌管萎缩的分子机制。

结果 KO 可有效抑制 Dex 诱导的 C2C12 肌管直径减少；KO 干预可显著抑制 Dex 诱导的肌管活性氧水平的上升；KO 干预可改善 Dex 诱导的肌管线粒体数量下降和形态结构紊乱，恢复线粒体呼吸功能，提高 ATP 水平，提高线粒体膜电位并维持线粒体质量控制；KO 可激活 AMPK 信号通路，使用 AMPK siRNA 转染肌管细胞后，KO 对肌管萎缩的保护作用被显著抑制，并失去维持线粒体稳态功能。

结论 南极磷虾油可通过激活 AMPK 信号通路维持线粒体稳态，进而改善 Dex 诱导的 C2C12 肌管萎缩。

关键字 地塞米松；肌肉衰减；南极磷虾油；C2C12 细胞；线粒体稳态；AMPK

分类：公共营养与健康

肠道菌群介导高纤黑麦干预的不同健康效应

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目的

黑麦富含膳食纤维。既往研究提示摄入高纤黑麦食品可以调节机体的代谢水平和肠道微生物环境，然而目前黑麦食品的长期干预实验较少，且对黑麦作用的核心机制及影响代谢途径的研究仍然有限。因此，研究黑麦与肠道菌群互作对机体糖脂代谢过程的影响具有重要意义。研究表明肥胖与非肥胖人群肠道菌群图谱不尽相同，高纤黑麦干预对其健康效应并不一致，基于个体肠道菌群探究膳食纤维的干预效果势在必行。本研究探讨无高纤谷物摄入习惯人群在长期摄入发酵黑麦全麦食品后，代谢过程的宏观表型和微观途径的变化，并且基于肥胖/非肥胖亚组，探究不同个体在黑麦干预后代谢网络应答的不同。

方法

本项目采用随机平行对照研究设计，将 182 名正常体重或肥胖者随机分为发酵黑麦（FRB）组或精制小麦（RW）组，持续干预 12 周。在基线、干预后第 12 周收集空腹血、粪便样本。通过 16S rRNA 检测肠道菌群，通过 UPLC-QTOF/MS 和 UPLC-MS/MS 检测血清非靶向代谢组学和靶向胆汁酸组。在 R 软件中通过 Single SparCC 算法绘制每个受试者的肠道微生物网络，运用 Lasso 回归分析 Single SparCC 网络图谱预测肥胖/非肥胖，以及代谢水平变化的准确度；基于每个节点的连接数计算高纤黑麦干预后引起的 Single SparCC 网络改变关键节点。通过 MixOmics、Tax4Fun2 包在 R 软件中结合非靶向代谢组学、靶向胆汁酸组、肠道菌群进行多组学通路分析。

结果

1. 高纤黑麦干预后 FRB 和 RW 组受试者的体重、脂肪和 BMI 水平未发生显著变化。

2. 在肥胖受试者中，高纤黑麦干预会引起高 C 反应蛋白（hs-CRP）显著降低，其对脂代谢指标总胆固醇（TC）、低密度脂蛋白胆固醇（LDL-C）和甘油三酯（TG）没有显著影响。在正常体重者中，高纤黑麦显著降低受试者 TC、LDL-C 和 TG 水平，而 hs-CRP 保持不变。

3. 基于每个受试者的 SparCC 个性化肠道微生物网络可以预测个体的 BMI 水平和代谢变化情况。在肥胖受试者的 SparCC 网络图谱中，肠道菌群 *Lachnospiraceae* 是关键的共同丰度基因组之一，其相对丰度和血清 LDL、hs-CRP 水平呈负相关。

4. 在肥胖受试者中，干预后血清牛磺鹅去氧胆酸（TCDCA）显著增加，与 *Lachnospiraceae* 丰度呈负相关。

5. 基于非靶向代谢组、胆汁酸代谢组、肠道菌群的多组学联合分析显示，在肥胖受试者中，高纤黑麦干预引起的变化主要集中在精氨酸代谢通路。

结论

高纤维黑麦食品的长期摄入可调节机体代谢的宏观表型和微观通路，其在肥胖或非肥胖人群中的健康效应不同，在肥胖人群中降低炎症反应更为显著，而在正常体重人群中降低血脂的效应更为显著，可能与 *Lachnospiraceae*、TCDCA 以及精氨酸代谢的协同调控有关。

关键字 营养与代谢，膳食纤维，肠道菌群

分类：公共营养与健康

女性病态性肥胖患者腹腔镜袖状胃切除术后减重效果的预测研究

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目的：肥胖作为严重威胁人类健康的慢性非传染性疾病之一，其患病率正以较快的速度逐年增长。根据世界肥胖联合会（WFO）的最新发布的《世界肥胖地图 2023》显示，2020 年全球约有 9.88 亿人（5 岁以上）肥胖，肥胖人口占总人口的 14%，女性的肥胖率高于男性。病态性肥胖即 BMI≥30 kg/m^{2}且伴有糖尿病、心肺疾病等基础病或 BMI>33 kg/m^2。其临床疗法为减重手术，有数据显示：减重手术在治疗病态性肥胖的基础上，利于 T2DM 患者的病情控制。而腹腔镜袖状胃切除术（Laparoscopic sleeve gastrectomy, LSG）是临床中应用范围较广的减重手术，具有并发症少、手术相关操作简单和减重作用显著等优势，被普遍用于合并高血压或糖尿病等患者的减重治疗中。因此，本研究旨在探讨 LSG 治疗女性病态性肥胖患者早期术后疗效及其预测因素。同时，构建女性病态性肥胖患者 LSG 术后发生减重不足的预测模型，为尽早识别影响减重不足的危险因素及高危患者，通过针对性地提供指导意见、干预，减少术后减重不足的发生，达到预期治疗效果。

方法：采用回顾性研究设计，病例来源为 2018 年 8 月—2021 年 6 月在山东省某三甲医院减重外科实施 LSG 的女性病态性肥胖患者，根据严格的纳入、排出标准，376 名女性病态性肥胖患者纳入本研究。收集的资料包括患者一般信息、实验室检查、医学影像学检查报告等，随访通过定期复查、微信、电话方式等，了解所有患者术后 1 个月、术后 3 个月、术后 6 个月、术后 12 个月的减重情况等临床资料。采用单因素分析筛选减重效果的影响因素，采用多因素 Logistic 回归分析影响减重效果不足的危险因素并构建风险预测模型，通过 Hosmer-Lemeshow 拟合优度检验和受试者工作特征（ROC）曲线对其效果进行综合评价。

结果：1. 按照患者术后 1 年的多余体重减轻率（EWL%）进行分组， EWL%＜50%为减重失败组（n=35），术前平均 BMI 为 47.51±7.39；EWL%≥50%为减重成功组（n=342），术前平均 BMI 为 39.98±6.80。

2. 在单因素分析：术后 1 年减重失败组和减重成功组在不同空腹胰岛素水平（p=0.041）、空腹 C 肽（p=0.001）、HOMA-IR（p=0.038）、同型半胱氨酸（p＜0.001）、总胆固醇（p=0.012）、BMI（p＜0.001）、腰围（p＜0.001）、臀围（p＜0.001）、呼吸紊乱指数 RDI（p=0.014）、脂肪百分比（p=0.018）、是否患有维生素 D 缺乏（p=0.021）中差异具有统计学意义，以上因素可作为减重效果的影响因素。

多因素 Logistic 分析：将单因素分析中有统计学意义（p＜0.1）的变量纳入多因素 logistic 回归分析，年龄（OR=0.943；p=0.031），空腹血糖（OR=0.856；p=0.017），同型半胱氨酸（OR=0.937；p=0.002），BMI（OR=0.925；p=0.003），臀围（OR=0.959；p=0.022），高血压（OR=0.162；p=0.011），维生素 D 缺乏（OR=0.287；p=0.004）是 LSG 术后女性患者减重失败的独立预测因素，并得到效果预测模型：

Y=16.929-0.058×年龄-0.156×空腹血糖-0.065×同型半胱氨酸-0.078×BMI-0.042×臀围-1.823×高血压-1.249×维生素 D 缺乏

3. 模型的综合评价：Hosmer-Lemeshow 拟合优度检验结果显示模型的预测概率和实际概率比较，差异无统计学意义（p=0.457）；logistic 风险预测模型结果显示准确率为 90.2%，ROC 曲线下面积为 0.621，95%*CI* 为 0.510-0.733。

结论：LSG 是改善病态性患者肥胖的有效手段，本研究构建的 Logistic 多因素预测模型在女性病态性肥胖患者术后一年减重效果的预测上具有较好的判别能力，可用于对 LSG 术后减重不足风险的预测。

关键字 袖状胃切除术；女性病态性肥胖；减重效果；logistic 回归分析；风险预测模型

分类：公共营养与健康

包头市蒙古族肥胖儿童肠道菌群结构及粪便短链脂肪酸含量研究

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目的对内蒙古包头市 7～13 岁不同体质指数儿童的肠道菌群结构及其主要代谢产物 SCFAs 进行分析，了解蒙古族肥胖儿童和正常体重儿童肠道菌群的结构组成及代谢产物中短链脂肪酸的含量，为蒙古族儿童肥胖防治工作提供新的思路、途径及一定的理论依据。

方法采用随机整群抽样选取 346 名内蒙某地 7～13 岁蒙古族儿童为研究对象，再从中随机选取肥胖儿童和正常儿童的粪便样本各 30 完成本次实验，纳入标准严格按照同年龄同性别 1∶1 进行匹配。对随机选取肥胖组和正常组的儿童无菌采集粪便样本，-80℃冰箱保存备用；采用试剂盒法提取肠道菌群总 DNA，后用 Nano Drop 2000 紫外微量分光光度计进行浓纯度的检测，-20℃保存备用；粪便基因组总 DNA Illumina Miseq 测序；对常见菌属做绝对定量，标准菌株提取 DNA 后用不同特异性引物分别进行常规 PCR 反应，之后电泳、割胶回收备用，再 SYBR Green 嵌合荧光法进行肠道优势菌的实时荧光定量 PCR 实验；气相色谱法测定粪便样本中乙酸、丙酸、正丁酸等短链脂肪酸的含量。数据结果用 SPSS17.0 软件进行统计学分析，P<0.05 差异有统计学意义。

结果包头市蒙古族肥胖儿童肠道菌群的多样性和丰富度均低于正常组（P<0.05）；肥胖组和正常组的肠道菌群门水平均以拟杆菌门和厚壁菌门的相对丰度较高（P<0.05），变形菌门和放线菌门的相对丰度较低（P<0.05）；其中正常组拟杆菌门的相对丰度为 53.11%，厚壁菌门的相对丰度为 42.94%；肥胖组拟杆菌门的相对丰度为 50.46%，厚壁菌门的相对丰度为 44.40%；正常组变形菌门的相对丰度为 2.90%，放线菌门的相对丰度为 0.90%；肥胖组变形菌门的相对丰度为 3.89%，放线菌门的相对丰度为 1.15%；肥胖组和正常组的共同优势菌属有 17 种，其中优势菌属水平以假丁酸弧菌、RuminococcaceaeUCG-014 在肥胖组的丰度更高（P<0.05），拟杆菌属、Parasutterella、双歧杆菌在肥胖组的丰度更低（P<0.05）；肥胖组拟杆菌属及双歧杆菌属的数量低于正常体重儿童（P<0.05）；SCFAs 的含量经比较在正常组与肥胖组间差异明显，其中异丁酸、正戊酸、异戊酸在正常体重组的含量极低接近于未检出，乙酸、丙酸、正丁酸的结果显示肥胖组高于体重正常组（P<0.05）。

结论不同的饮食结构可以对肠道菌群起到一定作用，肠道微生态环境的多样也使得个体间在消化和代谢食物时释放和吸收的能量有所差异，蒙古族肥胖儿童肠道菌群的结构组成及短链脂肪酸含量与正常儿童相比均有所改变，提示肠道菌群结构变化可能与肥胖有关。

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关键字 肥胖 肠道菌群 短链脂肪酸

分类：公共营养与健康

个性化营养减肥干预对肥胖合并高血压患者血压、BMI、血糖和脂质代谢的影响

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目的：探讨个性化营养减重干预对肥胖合并高血压患者血压（BP）、体重指数（BMI）和糖脂代谢的影响。方法：选取2022年1月—2022年12月在成都市温江区人民医院收治的110例肥胖合并高血压患者，随机分为对照组和观察组，每组55例。均予以常规降压药物治疗，对照组同时予以基础饮食、运动干预，观察组同时予以个体化营养减重干预，均持续3个月，比较治疗前、治疗1个月、治疗2个月和治疗3个月后降压药的剂量和数量、血压、BMI和糖脂代谢指标的变化，以及干预期间不良事件的发生率。结果：干预期间降压药物的剂量、数量和不良事件发生率无显著差异（P>0.05）。观察组与对照组治疗前、治疗1个月后、治疗2个月后、治疗3个月后的BMI、空腹血糖（FBG）、甘油三酯（TG）、总胆固醇（TC）、低密度脂蛋白胆固醇（LDL-C）、高密度脂蛋白胆固醇（HDL-C）比较，采用重复测量设计的方差分析。结果：①不同时间点的 BP、BMI、FBG、TC、TG、LDLC和HDL-C在不同时刻之间存在差异（P<0.05），观察组与对照组之间的TC、TG、LDL-C和HDL-C有差异（P<0.05），其中观察组的BP、BMI、FBG、TC、TG和LDL-C水平低于对照组，而观察组的HDL-C水平高于对照组。②观察组和对照组的血压、BMI、FBG、TC、TG、LDL-C和HDL-C的变化趋势存在差异（P<0.05），这比传统的干预效果要好。③两组治疗期间不良事件发生率比较，差异无统计学意义（P >0.05），两组降压药物剂量及数量比较，差异无统计学意义（P >0.05）。结论：个体化营养减重干预可降低肥胖合并高血压患者的BP、BMI，调节糖脂代谢，且不良事件不会显著增多，相较于常规干预作用更大。

目的：探讨个性化营养减重干预对肥胖合并高血压患者血压（BP）、体重指数（BMI）和糖脂代谢的影响。方法：选取2022年1月—2022年12月在成都市温江区人民医院收治的110例肥胖合并高血压患者，随机分为对照组和观察组，每组55例。均予以常规降压药物治疗，对照组同时予以基础饮食、运动干预，观察组同时予以个体化营养减重干预，均持续3个月，比较治疗前、治疗1个月、治疗2个月和治疗3个月后降压药的剂量和数量、血压、BMI和糖脂代谢指标的变化，以及干预期间不良事件的发生率。结果：干预期间降压药物的剂量、数量和不良事件发生率无显著差异（P>0.05）。观察组与对照组治疗前、治疗1个月后、治疗2个月后、治疗3个月后的BMI、空腹血糖（FBG）、甘油三酯（TG）、总胆固醇（TC）、低密度脂蛋白胆固醇（LDL-C）、高密度脂蛋白胆固醇（HDL-C）比较，采用重复测量设计的方差分析。结果：①不同时间点的 BP、BMI、FBG、TC、TG、LDLC和HDL-C在不同时刻之间存在差异（P<0.05），观察组与对照组之间的TC、TG、LDL-C和HDL-C有差异（P<0.05），其中观察组的BP、BMI、FBG、TC、TG和LDL-C水平低于对照组，而观察组的HDL-C水平高于对照组。②观察组和对照组的血压、BMI、FBG、TC、TG、LDL-C和HDL-C的变化趋势存在差异（P<0.05），这比传统的干预效果要好。③两组治疗期间不良事件发生率比较，差异无统计学意义（P >0.05），两组降压药物剂量及数量比较，差异无统计学意义（P >0.05）。结论：个体化营养减重干预可降低肥胖合并高血压患者的BP、BMI，调节糖脂代谢，且不良事件不会显著增多，相较于常规干预作用更大。

关键字 个性化营养减重干预；肥胖；高血压；体质指数；糖脂代谢

分类：公共营养与健康

中国居民坚果消费情况调查分析

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目的：了解我国居民对坚果营养价值和健康效益认知及消费情况，为促进健康政策的制定及坚果市场的发展奠定基础。方法： 以网络调研的形式，于 2023 年 3 月 23 日-4 月 6 日，开展消费者调研。调研范围覆盖全国 30 多个省份及地区，共回收有效问卷 3046 份。调研内容涵盖对坚果的营养特点、健康效益、推荐摄入量等的认知状况，以及坚果的食用频率、食用场景、购买偏好等消费情况。结果：（一）坚果认知态度调查分析结果：①调查对象对坚果的基本营养特点知晓率仅 21.3%；46-60 岁人群对坚果认知相对更高为 28.4%，19-25 岁最低为 16.5%；性别、地区、收入等对认知的影响无显著差异。②对坚果富含营养素知晓率仅为 11.3%。③对《中国居民膳食指南》推荐坚果摄入量的知晓率为 25.4%。（二）坚果消费行为调查结果:①有超过 80%的调研对象的坚果食用频率在每周 1-2 次及以上，而不吃坚果的人群仅为 3.8%，各地区、性别间坚果食用频率不存在太大差异性；26-45 岁人群坚果食用频率明显高于其他人群；学历越高或者随着收入的增加，坚果食用频率明显增高。②与《中国居民膳食指南（2022）》坚果推荐摄入量（50-70g）对比，被调查人群中，每周坚果摄入量低于 50g 的占 45.3%，超过 70g 占 44.8%；18 岁以下人群及 60 岁以上人群摄入不足的占比较其他人群高，分别为 94.1%、81.8%。③坚果消费类型的选择则呈多元化，喜欢混合型纯坚果、单品带壳坚果、每日坚果的消费者分别为 30.0%、29.2%及 24.4%，而喜欢风味坚果的人群仅为 1.7%。④坚果消费场景结果表明，消费者最喜欢在看电视时吃坚果（80.8%），其次是工作学习的休息时间（71.9%）、聚会聊天时（66.2%）以及看电影时（60.6%），同时，有一定比例的调研对象选择了在旅途中、三餐前后以及健身前后吃坚果。⑤坚果购买频率与花费调查结果表明，几乎每周购买坚果的消费者占 24.1%，有 46.1%的消费者每次购买坚果的花费在 100 元以上。⑥消费者购买坚果时主要考虑的因素是“品质”（75.8%）、“营养价值（73.8%）”及“色泽口味”（70.8%）。；吃坚果主要原因是坚果营养价值高、有助于增强免疫力、有助于心血管健康。结论：我国居民对坚果特点和营养价值以及坚果推荐摄入量的了解存在明显不足。坚果消费趋于日常化，但大部分消费者存在坚果摄入不足或摄入过多的情况。从购买坚果关注的因素来看，消费者更关注品质与营养价值，但不同人群坚果购买频率及花费差异较大，坚果消费呈多元化趋势，如何针对不同的消费需求，有针对性的开发坚果产品，将成为坚果市场发展的新方向。

关键字 关键词：坚果；消费行为；调查；

分类：公共营养与健康

包装食品正面标签—“Nutri-score”的国际应用、证据及效果评价

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3. 中国营养学会

目的：为了引导消费者在购买时选择更健康的食品，法国于2017年基于英国食品标准局营养分析系统，并根据食品消费与慢性病风险之间关联的现有证据开发了一种营养分析方法，据此推出了5色包装食品正面标签（FOPL）—“Nutri-Score”。本文介绍了“Nutri-Score”开发的科学依据、基本算法、实施效果，并总结分析相关验证研究，探讨“Nutri-Score”对我国未来发展FOPL的可借鉴性，以期为我国建立相关的营养素度量法模型提供参考建议和技术支持。

方法：通过PubMed、Web of Science、中国知网、万方等数据库以及国家和国际政府机构的网站进行文献检索与本文研究问题相关的文献，分析文献资料和各相关政府机构的文章和报告。运用定量分析法对来自相关国家关于“Nutri-Score”在营养知识、标签态度、消费行为方面的有效性证据和相关健康科学证据进行整理、分析，并用定性分析法对其深入剖析，综合依据我国实际情况进行评价。

结果：通过对国际科学期刊上大量“Nutri-Score”的科学研究分析发现，Nutri-Score在消费者和公共卫生方面具有有效性和实用性。对比利时、瑞士以及德国自 2018 年起“Nutri-Score”相关数据的分析表明，“Nutri-Score”在区别食品营养质量，指导健康饮食方面均表现出了较好效果；此外，对葡萄牙、西班牙、希腊以及荷兰四个国家采用“Nutri-Score”前后购买实验研究进行对比分析，发现各国消费者的购买方式均得到了良性改善。“Nutri-Score”在营养知识、标签态度、消费行为方面均有良好效果，具体表现在可以帮助消费者更好的理解食品标签信息，积极促进消费者标签的使用意识，改善人们选择食品的方式，提高消费者选择食品的营养质量；同时，“Nutri-Score”在健康科学证据中表现为较高的FSAm-NPS评分，反映了较差的饮食质量，食用评分较差的食物更容易引起相关非传染性慢性病（如心血管疾病、Ⅱ型糖尿病、癌症、神经退行性疾病）。

结论：简单、易于理解的包装正面标签是一种有效的公共卫生工具，不仅可以提高消费者识别更健康食品的能力，更能保证消费者能够在知情的情况下选择更健康的食品，同时还能鼓励制造商制定更符合健康标准的产品配方。因此，在我国未来制定具体的包装食品正面标签（FOPL）时，可考虑借鉴“Nutri-Score”的分析方法，科学的选取若干有代表性的限制性营养成分（如脂肪、钠等）和推荐性营养成分（蛋白质、膳食纤维等），以此对我国包装食品进行全面的营养评价，改善居民的食品消费模式，提升国民营养健康水平。

关键字 Nutri-Score；包装正面营养标签；营养评分；营养质量

分类：公共营养与健康

孕妇尿碘中位数适宜范围下限值的研究：基于一项队列研究

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目的：国际推荐的孕妇尿碘适宜范围下限值是根据孕妇碘的生理需要量推导而来，并无直接来源于人群流行病学调查的数据支撑，且国内外研究提示在当前全球碘营养适宜的大背景下，现有国际推荐的尿碘中位数适宜范围下限值可能相对较高，为此，开展母婴队列研究，通过调查佛山顺德（碘缺乏地区）不同妊娠期妇女碘营养状况与甲状腺功能情况，明确不同尿碘浓度下（Urinary iodine concentration，UIC）孕妇甲状腺功能、甲状腺功能异常率和新生儿体格的变化趋势，以获得孕妇尿碘中位数适宜范围下限值；

方法：预调查结果显示顺德区碘盐覆盖率>90%、水碘 8.8μg/L，根据《碘缺乏地区和适碘地区的划定》（WS/T669-2020）标准，划分为碘缺乏地区；选择广东医科大学顺德妇女儿童医院（佛山市顺德区妇幼保健院）产科门诊开展妊娠期妇女碘营养的横断面调查，采集一次性随机尿检测 UIC，空腹静脉血测定游离三碘原氨酸（Free triiodothyronine, FT3）、游离甲状腺激素（Free thyroxine, FT4）和促甲状腺素（Thyroid stimulating hormone，TSH）；随访至分娩，采集分娩信息，测量出生身长、体重和头围，并计算生长发育 Z 评分，于出生后 72h 内采集新生儿足跟血以检测 TSH；

结果：2021 年 7 月至 2023 年 1 月，共纳入 1464 对佛山市顺德区孕妇-新生儿。孕妇尿碘浓度为 117 (62, 186) μg/L，根据现有国际推荐标准，整体处于碘缺乏状态，尿碘低于 150μg/L 的孕妇占比 63.7%；孕妇总体甲状腺功能异常率为 6.3%；孕妇 UIC、FT4 随孕期进展而降低，不同孕期 FT3、TSH 无明显差异（P>0.05）；仅在孕妇尿碘为 125-250μg/L 时，孕妇 UIC 与 TSH、FT3、FT4 的相关性未见统计学意义（P>0.05），仅见孕妇尿碘 150-249μg/L 时，孕妇 UIC 与 TSH 呈负相关（r=-0.127, P=0.037）；采用非线性回归模型拟合限制性立方样条发现：孕妇尿碘在 125μg/L 时，孕期 TSH 水平出现低值（3.3mIU/L）（P<0.001）。随访至分娩，男、女新生儿各 789 和 675 例，平均分娩孕周为 38.5±1.3 周，新生儿 TSH 水平为 0.93 (0.28, 1.60) mIU/L，疑似罹患新生儿甲状腺功能减退的有 18 例（1.2%）。未发现新生儿 TSH 与孕期 UIC、TSH、FT3、FT4 间存在相关性（P>0.05）。纳入分娩孕周、新生儿性别、分娩方式，以孕期尿碘 UIC 为自变量，分别以新生儿生长发育 Z 评分及足跟血 TSH 为因变量，采用非线性回归模型进行分析，拟合得到地限制性立方样条结果显示：孕妇尿碘在 125μg/L 时，新生儿年龄别头围 Z 评分最高且最接近 0（P<0.001），其他指标变化未见统计学意义（P>0.05）。

结论：佛山市顺德区孕妇整体处于碘缺乏状态。非线性回归分析结果显示孕期 UIC 在 125~149μg/L 时，孕妇促甲状腺素最低，新生儿年龄别头围 Z 评分最高且最接近 0，提示当前国际推荐的尿碘适宜范围下限值对于中国碘缺乏孕妇相对较高，本研究推荐使用 125μg/L 作为孕妇尿碘中位数适宜范围下限值。

关键字 孕妇；新生儿；尿碘中位数；适宜范围下限值；限制性立方样条

分类：公共营养与健康

海藻酸盐的食用安全性系统综述研究

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目的：国内外多个官方组织或机构虽将海藻酸盐纳入食品添加剂范畴，并确认其作为无需制定每日允许摄入量（Acceptable Daily Intake， ADI），但目前仍有人群试食试验发现海藻酸盐会造成便秘、腹泻、腹胀、排气等胃肠道不良反应，动物实验研究也发现其对肠道、肾脏、膀胱、前列腺等脏器有影响，但这些研究年代久远或毒理学指标不全，缺少系统的食品毒理学研究，并且未对海藻酸盐在食品领域中的应用作出量化，即未制定人群的可耐受最高摄入量（Tolerable Upper Intake Level, UL）。因此，本研究通过收集动物和人体经口摄入海藻酸盐的中英文文献，了解海藻酸盐对生物体安全、功能及代谢的影响，为制定其 UL 及食品添加量提供依据。

方法：从中国知网、万方数据库、维普网、Pubmed、Web of science、Embase 等中英文数据库中以海藻酸、海藻酸盐、海藻酸钠、海藻酸钾；海藻酸铵、海藻酸钙、丙烷-1，2-二醇海藻酸盐作为检索词系统检索，人工筛选并通过参考相关文献整理分析检索结果。

结果：本研究共检索到文献 137816 篇，通过去重以及纳入排除标准人工筛选后，剩余 92 篇文献，其中涉及人群研究 24 篇，动物研究 68 篇。动物研究中发现，当大鼠摄入海藻酸盐剂量达到 13.5g/kg.bw 时会引起动物排便量增多，肠道、肾脏、前列腺、膀胱等发生病理性改变。人群研究结果显示，经口摄入的海藻酸盐的剂量从 312.5 mg/d 到 45 g/d 不等，最长持续时间为 12 周，剂量为 45 g/d。虽表明经口摄入海藻酸盐具有较高的安全性，但仍发现经口摄入海藻酸盐会导致便秘、腹泻、腹胀、排气等胃肠道等不良反应，并且考虑到人群研究结果缺少客观且完整的毒理学指标。因此，暂不以人群研究的结果设置海藻酸盐的 HOI/OSL（Highest Observed Level/Observed Safe Level， HOI/OSL）。根据本研究所纳入的动物研究设计的合理性、科学性以及相关毒理学指标的完整性，考虑将 Idota 等所设剂量作为未观察到有害作用剂量（No Observed Adverse Effect Level, NOAEL）。Idota 等以分别将海藻酸钠和海藻酸钙均以 10 %的添加量拌入大鼠饲料中，饲喂 2 周。组织病理学结果显示，大鼠摄入海藻酸钠后肾脏盆腔上皮细胞中矿物质沉积，沉积物周围可见上皮细胞增生，肾髓质或乳头状上皮中也可见矿物质沉积。但大鼠摄入海藻酸钙后各脏器均未见异常，提示肾脏的病理变化与钠的摄入有关。因此，按大鼠每日摄食量为其自身体重的 8 %推算出海藻酸钙的剂量为 8.0 g/kg.bw/d，故动物的海藻酸盐 NOAEL 应大于 8.0 g/kg.bw/d。

结论：依据目前的动物研究及人群数据，动物的海藻酸盐 NOAEL 应大于 8.0 g/kg.bw/d，但现有数据尚不足以推导 UL 值。

关键字 海藻酸盐；系统综述；食用安全性；可耐受最高摄入量

分类：公共营养与健康

母乳源植物乳杆菌 FN029 预防小鼠特应性皮炎的作用和机制

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母乳源植物乳杆菌 FN029 预防小鼠特应性皮炎的作用和机制

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目的：特应性皮炎（AD）的发生可能与婴儿肠道菌群的异常定植和免疫耐受发育延迟有关。益生菌可以通过调节肠道菌群的组成和演替影响宿主免疫细胞的功能。植物乳杆菌 FN029 是一株分离自母乳的潜在益生菌。本研究旨在探讨植物乳杆菌 FN029 干预对小鼠 AD 症状和免疫反应的影响，以及进一步验证植物乳杆菌 FN029 在 AD 预防中的作用和机制。

方法：将在本地动物房繁育的 60 只 3 周龄的 BALB/C 小鼠随机分为正常对照组（CON，灌胃 PBS）、模型组（AD，灌胃 PBS）、AD+FN029 组（灌胃植物乳杆菌 FN029）、AD+WC 组（灌胃魏斯氏菌 FN015）、AD+LC 组（灌胃干酪乳杆菌 FN016）、AD+LGG 处理组（灌胃鼠李糖乳杆菌 LGG，阳性对照组），自由地给予食物和水。分组后开始连续益生菌灌胃处理 40 天，益生菌灌胃剂量为 1×10^{9} CFU 只/天。同时，对特应性皮炎模型对照和益生菌处理组的小鼠诱导 AD，即在第 31~40 天对右耳涂抹钙泊三醇（MC903），连续 10 天,左耳涂抹无水乙醇作为对照。期间每日测量耳朵厚度并做湿疹评分。第 41 天麻醉处死小鼠并收集小鼠各种组织，进行耳朵组织学分析、肠系膜淋巴结调节性 T 细胞分析、小鼠血浆和耳组织细胞因子分析和小肠派伊尔结 RNA 测序分析。

结果：补充植物乳杆菌 FN029 相比较与 AD 模型组显著减轻了钙泊三醇诱导 AD 的严重程度评分（$p<0.05$），其效果优于 LGG、魏斯氏菌 FN015 和干酪乳杆菌 FN016。与 AD 组相比，FN029 组显著降低了特应性皮炎小鼠的耳厚（$p<0.01$）。FN029 组耳朵肥大细胞和嗜酸性粒细胞的数量相较 AD 组显著降低（$p<0.01$）。流式细胞术分析显示，FN029 干预显著提高肠系膜淋巴结调节性 T 细胞的含量（$p<0.05$）。小肠派伊尔结 RNA 测序的约束主坐标分析结果表明，FN029 组小鼠的基因表达谱明显偏离 AD 组，更接近 CON 组。与 AD 组比较，FN029 主要激活了派伊尔结视黄醇代谢信号通路、PI3K-AKT 信号通路和 MAPK 信号通路等，显著抑制了 PD-L1 表达与 PD-1 检查点通路等。

结论： 断奶后补充植物乳杆菌 FN029 对小鼠特应性皮炎有预防作用，可减轻小鼠特应性皮炎的病理严重程度，显著抑制 AD 症状，如皮肤肿胀和炎性细胞浸润，其效果优于鼠李糖乳杆菌 LGG、魏斯氏菌和干酪乳杆菌。其作用机制可能与调节肠道菌群，促进脾脏中 $CD4^{+}$ $CD25^{+}$ $Foxp3^{+}$ T 细胞增殖、激活视黄醇代谢信号通路介导的免疫耐受发育有关。该研究为应用植物乳杆菌 FN029 预防婴幼儿特应性皮炎提供了依据。

关键词：特应性皮炎、植物乳杆菌、肠道菌群、调节性 T 细胞、视黄醇代谢、免疫平衡

关键字 特应性皮炎、植物乳杆菌、肠道菌群、调节性 T 细胞、视黄醇代谢、免疫平衡

分类：公共营养与健康

血清 25-羟基维生素 D 水平与高尿酸血症及代谢综合征的相关性分析

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目的：既往研究表明维生素 D 在代谢紊乱的发生和发展中发挥着重要的作用，但目前维生素 D 与尿酸的关系存在较多争议，本文旨在探讨成年人群中维生素 D 水平与血尿酸及代谢综合征(MetS)的关系。

方法：基于广州市某医院 2015-2020 年体检人群，本研究共纳入 4228 名 20 岁以上成年人群，所有研究对象均收集年龄、性别，身高、体重和腰围，并采集空腹血样，检测血压、血脂、血糖、尿酸和超敏 C 反应蛋白等相关指标，按《中国高尿酸血症与痛风诊疗指南（2019）》诊断标准〔正常嘌呤饮食状态下，非同日 2 次空腹血尿酸水平＞420μmol/L（成年人，不分男女）即为高尿酸〕统计高尿酸血症患病率；按国际糖尿病联合会 2009 年提出的诊断标准统计 MetS 的患病率；采用高效液相色谱法测定基线血样中血清 25-羟维生素 D〔25(OH)D〕的水平；采用单因素和多因素的 Logistic 回归模型分析血清 25(OH)D 浓度与高尿酸血症及 MetS 患病风险之间的关系。

结果：在 4228 名成年研究人群中，共有 1354 人患有高尿酸血症，患病率为 32%，共有 1538 人患有 MetS，患病率为 36.4%。按照血清 25(OH)D 水平分为 VD 充足组(≥75 nmol/L)，VD 不足组(50～75 nmol/L)，和 VD 缺乏组(<50 nmol/L)，各组人数分别为 818 人（19.3%）、1843 人（43.6%）和 1567 人（37.1%）。

在调整年龄、性别、吸烟、饮酒和体重指数等混杂因素后，多因素的 Logistic 回归模型分析显示血清 25(OH)D 水平与高尿酸血症患病风险呈正相关（P-trends <0.05）；将血清 25(OH)D 浓度进行五分位分组，各组血清 25(OH)D 的中位数分别为 35.0 nmol/L 、46.5 nmol/L、56.0 nmol/L 、66.0 nmol/L 和 86.0 nmol/L，相对于最低五分位组，血清 25(OH)D 最高五分位组高尿酸血症的患病风险增加了 40.3%，且具有显著统计学意义（P=0.006）；按性别分层后，多因素分析显示血清 25(OH)D 与高尿酸血症患病的正相关关联在女性中更为明显（P=0.005），女性中相对于最低五分位组，血清 25(OH)D 最高五分位组高尿酸血症的患病风险增加 108.5%；而在男性中血清 25(OH)D 与高尿酸血症患病的关联则无统计学意义。

多因素的 Logistic 回归模型分析还显示血清 25(OH)D 水平与 MetS 的患病风险呈负相关(P-trends <0.05)，相对于最低五分位组，从低到高各组 MetS 患病风险 ORs (95% CIs)分别为 0.86(0.70，1.05)，0.78(0.64，0.96)，0.70(0.57，0.86)， 0.79(0.64，0.96)。除此之外，多因素分析结果显示有高尿酸血症者患 MetS 的风险是尿酸正常者的 2.14 倍（P<0.001），且高尿酸血症和 MetS 的患病均与超敏 C 反应蛋白水平升高有关（P<0.01）。

结论：我们的结果表明，较高水平的血清 25(OH)D 可以降低中国成人代谢综合征的患病风险，却与高尿酸血症患病风险升高有关且这一关联在女性中更为明显。因此，需要更多的人群研究进一步验证血清 25(OH)D 与血尿酸的关系，也亟需基础研究探讨血清 25(OH)D 与血尿酸关系的发生机制，为制定适宜的维生素 D 推荐摄入量提供更为全面的证据。同时，结果还提示高尿酸血症和代谢综合征的患病均与超敏 C 反应蛋白介导的炎症反应有关。

关键字 血清 25-羟基维生素 D，高尿酸血症，代谢综合征，超敏 C 反应蛋白

分类：公共营养与健康

全球包装正面警告标签现状、分析与挑战

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目的：预包装食品正面标识已经被确定为各国应对不健康饮食环境的重要公共卫生策略之一，包装正面警告标签是消费者识别与慢性非染性疾病相关的目标营养素效果最好的正面标识，目前正在美洲及亚洲的一些国家广泛实施；然而，由于每个实施包装正面警告标签的国家选择的目标营养素、阈值以及标签形式等各方面均有所不同，导致包装正面警告标签之间存在差异，此外，政策制定者制定有效实施所需的法律指导也较为有限。本文拟详细描述包装正面警告标签的立法背景及架构、标签的实施效果以及利益相关者在包装正面警告标签推行过程中的作用，以帮助支持政策制定者制定和实施最佳实践、循证的包装正面警告标签。

方法：为了阐明包装正面警告标签作为影响消费者食品选择的公共卫生干预措施的重要性，通过系统地文献检索，以及浏览谷歌和政府网站等方式，提取了实施包装正面警告标签的国家、政策发布年份、发布部门和关键内容的信息；以及检索到的文献的标题、作者、发表日期、期刊、相应的方法学细节（参与者、干预/条件、主要和次要结果）；同时，利用系统动力学和 SWOT 分析等方法，深入剖析包装正面警告标签发展影响因素间的相互作用关系，以及各国包装正面警告标签发展的机会和挑战，提出关键发展步骤和战略建议。

结果：包装正面警告标签可以迅速吸引消费者的注意力，为他们提供易于理解的信息，了解影响他们健康的过量目标营养素的含量，从而有效地改变人们的购买决定。目前，许多国家正在实施以及考虑采纳包装正面警告标签作为其解决肥胖和与饮食相关的非转染性疾病的综合性政策之一。然而，食品行业在包装正面警告标签推行实施期间，通过实施广泛的企业政治实践，来推迟或拒绝其实施。因此，大多数推行包装正面警告标签的国家通常是采取多方利益相关者协同合作，通过循证方法构建具有科学性的营养素度量法模型以及包装正面警告标签，并由政府部门制定符合其国情的指导性资料，严格规范包装正面警告标签的申请程序和审核流程。同时，包装正面警告标签的制定和实施需配以完整的监测和评估体系，以确保合规和执行、持续改进及按需及时调整。

结论：包装正面警告标签的发展和实施受到诸多因素和利益相关者的影响，本文基于全球角度，通过系统地文献检索，归纳总结了包装正面警告标签的实施细则，标签的实施效果以及利益相关者在标签实施中的作用，为决策者制定和实施包装正面警告标签提供了证据支持；同时，就未来各国制定、推行以及如何维持包装正面警告标签的长期有效提出了具体建议。

关键字 包装正面警告标签，营养素度量法，预包装食品，营养政策

分类：公共营养与健康

针对五仁养生粥的功效的研究

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题目：针对五仁养生粥的功效的研究

目的：为了研究公众养生所需营养，针对五仁养生粥对其营养进行分析，研究其对于公众养生所起到的作用，从粥的历史出发，系统地阐述了五仁养生粥和其他养生粥的不同，并深入研究五仁养生粥原材料，做法及其养生作用。

方法：从粥的历史出发，系统地阐述了五仁养生粥和其他养生粥的不同，对五仁养生粥原材料进行分析，在专业角度对其营养价值，所含能量等进行分析

结果：

关于粥的来源，最早记载于《周书》中：“黄帝蒸谷为饭，烹谷为粥”，说明黄帝发明了蒸和煮两个做饭方法，其中把谷物进行烹煮的方法就是粥。

与之不同，还有另一种说法。陈元朋在《粥的历史》一书中认为粥来自于底层百姓生活。他认为，粥的出现，可能源自有人对水与米偶尔配比失误的意外发明。

粥在我国的历史源远流长，是我国人民代代传承下来的一种饮食方式，影响着我们的日常生活。

随着粥的品种增加，粥的用途也有不断的延生，不仅用于果腹充饥，还用于治病养生。中国的粥有记载从 2500 年前开始用作药用。中国注重养生，经医学家多方研究后，形成了中国独特的食疗法，用五谷杂粮进行食补，将粥品入药。

花生仁历来有长生果的美称，含有丰富的脂肪、卵磷脂、维生素 A 、 B、E 以及钙、磷、铁等元素。

杏仁有止咳平喘、降胆固醇、减肥等功效

核桃仁富含优质蛋白质，对预防动脉硬化、高血压、冠心病有非常有益。

南瓜籽仁含有丰富的蛋白质、维生素 E 、叶酸、铁、锌，不饱和脂肪酸等多种营养成份，

黑芝麻含有丰富的油脂和纤维素、有补血、益气等功效。

做功精良的五仁养生粥，它的食材全部采用植物种子，吸天地之灵气，聚大地之精华，并应用了道家的养生理念，它最大的功效就是能改善肠胃、增强肠蠕动、保护胃黏膜。食品检验检测报告结果显示，它的营养成份的数据，在同类食品中是最高、最佳的。

它最大的功效就是能改善肠胃、增强肠蠕动、保护胃黏膜。食品检验检测报告结果显示，它的营养成份的数据，在同类食品中是最高、最佳的。

结论：“民以食为天，食以粥为先”五仁养生粥是在传统粥的基础上，集百家之长，不断改进、优化、升级、调配而成。它的横空出世是对中国千百年来粥文化的一次革命。必将对现代人类文明产生一定影响。是一款缓解生活压力，适应快节奏生活的标配食品。科学养生，合理配餐，成为健康永恒的主题。五仁养生粥对于公共营养有极其重要的意义，由于其对于公众的适配性，对大部分人群都可以起到其他产品无法替代的作用。

关键字 养生粥，五仁，功效

分类：公共营养与健康

职业人群健康生活方式状况分析

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目的　生活方式因素会影响居民慢性病的发生和发展，职业人群作为社会发展的中坚力量，其健康水平直接关系到人类的发展进程。本研究旨在分析我国不同行业职业人群健康生活方式特征，为职业人群改善生活方式提供科学依据。

方法　于2022年4月1日至5月31日期间，通过采用方便抽样的方法利用微信公众号、微信群等互联网平台发放问卷开展网络调查。以合理膳食、不吸烟、不过度饮酒、适当身体活动、充足睡眠、不久坐和健康体重等7个指标建立职业人群生活方式得分，健康膳食分为合理膳食和良好的饮食习惯，两者均满足的1分，其他生活方式满足一项的1分，满分7分。采用卡方检验比较不同职业人群健康生活方式及膳食特征并进行两两比较，用Bonferroni法调整两两比较检验水准。

结果　共收到有效应答问卷2353份，男女比例为1.26:1，年龄以18-30岁人群为主（1279人，占55.1%），互联网、医疗卫生和政府事业单位、贸易、金融行业人数占比依次为22.5%、14.5%、14.2%、12.4%，另有36.4%其他行业人员。职业人群健康生活方式得分为3.08±1.38分，其中，医疗卫生和政府事业单位人群健康生活方式得分为3.79±1.28分，高于其他行业人群（P均＜0.05）。职业人群生活方式均不健康的人有47人（2.0%），同时满足4项以上健康生活方式的人数不足一半（860 人，36.5%），满足所有健康生活方式的仅 9 人（0.4%）。职业人群不吸烟、健康体重、不过量饮酒、充足睡眠、健康膳食、不久坐和身体活动达标率依次为80.7%、64.3%、48.9%、43.3%、26.3%、24.1%和20.7%，其中不同职业人群健康膳食（ χ^2=12.734, P=0.026）、不吸烟（ χ^2=15.788, P=0.007）和不过量饮酒（ χ^2=26.899, P＜0.001）达标率存在统计学差异，计算机人群健康膳食达标率最低（22.9%），贸易行业人群吸烟率最高（23.4%），计算机（52.0%）和金融（62.0%）行业人群过量饮酒率高于医疗卫生和政府事业单位（41.5%）。不同职业人群膳食摄入的差异主要是每日饮水量、进食早餐频率以及控油控盐习惯，金融行业人群每日饮水量低于医疗卫生和政府事业单位行业人群（P<0.01），计算机行业人群控盐情况低于金融、贸易、医疗卫生和政府事业单位人群（P均<0.05），计算机行业人群控油情况低于金融、医疗卫生和政府事业单位行业人群（P 均<0.01），医疗卫生和政府事业单位人群几乎每天吃早餐比例高于计算机、金融、贸易等行业人群（P均<0.05）。

结论　职业人群健康生活方式有待提高，应重点关注膳食、久坐和身体活动，加强饮食指导、减少久坐、增加身体活动。不同职业人群健康生活方式存在差异，计算机行业人群是饮食和生活方式干预的重点。

关键字 职业人群，生活方式，健康膳食，达标率

分类：公共营养与健康

微量营养素补充对慢性阻塞性肺病患者肺功能和免疫水平的改善作用：一项随机对照试验的系统综述和 Meta 分析

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目的：慢性阻塞性肺疾病（chronic obstructive pulmonary disease，COPD，简称慢阻肺）可导致持续性的、进行性的气流阻塞。患者较易出现多种微量营养素的缺乏，微量营养素缺乏可能加重患者的通气功能障碍，使免疫功能下降，增加急性加重次数，从而影响患者的生命质量。因此，微量营养素补充在 COPD 的防治中起着至关重要的作用。本研究通过系统综述和 Meta 分析证明微量营养素单独或多种混合补充对慢性阻塞性肺病 COPD 患者肺功能及相关临床指标具有改善作用。

方法：截止到 2023 年 3 月，由 2 名研究者采用独立双盲的方式检索了 PubMed、Cochrane Library 和 Web of Science 三个数据库，检索词包括“慢性阻塞性肺病”、“微量营养素”、“膳食补充剂”、“维生素”、“矿物质”和“随机对照试验”等。文献纳入标准如下：（1）受试者为符合条件的研究中诊断为 COPD 且年龄在 18 岁及以上的患者；（2）研究类型为随机对照试验（RCTs）；（3）研究涉及膳食补充的各种微量营养素（包括维生素和矿物质）改善慢性阻塞性肺病患者的临床指标或结局。排除标准为：（1）动物实验和细胞实验；（2）干预物为非微量营养素的其他随机对照试验；（3）叙述性综述、会议摘要、案例系列和未在同行评议期刊上发表的研究。使用 STATA 11.0 软件进行效应量合并、敏感性分析、亚组分析和发表偏倚分析，评估微量营养素补充对 COPD 患者肺功能和 T 细胞亚群水平的影响。通过改良版的 Jadad 评分量表评价文献质量。分别提取对照组和干预组在基线和终点的相关结局指标的平均值和标准差（*SDs*），通过终点的结局指标和终点与基线的差值说明同一个合并效应结果，根据提取的不同数据，我们选择了组合效应指标：包括加权平均差（*WMD*）、标准化平均差（*SMD*）、比值比（*OR*）和 95%置信区间（95% *CI*）。

结果：本研究共纳入 49 篇文献，其中 24 篇为高质量文章，25 篇为低质量文章。有 39 篇文献纳入 Meta 分析，结果显示：1）补充维生素 D 可显著提高 FEV1%（$WMD_{差值}$: 6.39, 95% *CI:* 4.59, 8.18, $P < 0.01$; $WMD_{终点}$: 7.55, 95% *CI*: 5.86, 9.24, $P < 0.01$）和 FEV1/FVC%（$WMD_{差值}$: 6.88, 95% *CI*: 2.11, 11.65; $WMD_{终点}$: 7.64, 95% *CI*：3.18, 12.10, $P < 0.001$）水平，亚组分析显示研究对象所在的地域差异可能是造成效应量异质性较高的原因。此外，维生素 D 补充还能使 COPD 急性加重发生率降低（$OR_{终点}$: 0.36, 95% *CI*: 0.24, 0.54, $P < 0.05$)），并提高 T 细胞亚群水平，包括 CD3+%、CD4+%、CD8+%和 CD4+/CD8+%（P 均< 0.01）。2）复合营养物素干预可以有效提高 FEV1% （$WMD_{差值}$: 8.38, 95% *CI*: 1.89, 14.87, $WMD_{终点}$: 7.07, 95% *CI*: -0.34, 14.48）和 FEV1/FVC%（$WMD_{差值}$: 7.58, 95% *CI*: 4.86, 10.29, $WMD_{终点}$: 6.00, 95% *CI*: 3.19, 8.81）水平。3）补充维生素 C 和维生素 E 对 COPD 患者肺功能指标均无显著影响（P 均>0.05）。

结论：本研究认为在 COPD 患者中补充维生素 D 和复合微量营养素可能对肺功能有一定的改善作用，并可以有效调节淋巴细胞亚群的比例。因此，对 COPD 患者适当补充微量营养素有利于稳定患者的病情，恢复通气功能。

关键字 微量营养素，慢性阻塞性肺疾病，随机对照试验，Meta 分析

分类：公共营养与健康

社区居民服用钙剂的规范性研究

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目的：钙是人体必需的营养素，占人体的1.5%-2%，主要集中在牙齿、骨骼等组织，只有少量存在于细胞外液，软组织等部位，人体中的钙99%沉积在骨骼和牙齿中。《中国居民膳食指南》建议，每天的钙摄入量应在800mg，而防治骨质疏松的话应在1000-2000mg，哺乳期的妈妈推荐量是1000mg。世界卫生组织中指出，饮食中钙质摄取不足的女性，每天应额外补充 1500-2000mg 钙质。人体内如果缺乏钙元素，首先对骨质健康产生影响，而且随着年龄的增长，人体骨骼中的钙质不断流失，患骨质疏松的概率也将不断加大。其次当体内的钙质流失时，身体中的钙含量变得不足，容易导致贫血、产前高血压综合征、缺钙水肿及乳汁分泌不足等。近年来，补钙已逐渐成为社区居民的共识，越来越多的人认识到补钙的重要性。但是，社区居民服用钙剂的规范性尚不清楚，本研究旨在通过横断面调查了解社区居民服用钙剂的规范性以及影响因素。

方法：2022年12月——2023年3月，采用便利抽样的方法，利用电子问卷对318名社区居民进行调查，共发放问卷318份，回收有效问卷318份，主要收集调查对象的年龄、性别、学历等基线资料，钙剂服用的规范性以及影响因素。为探寻调查对象对钙剂服用的规范性，本问卷主要采用卡方检验对社区居民钙剂服用规范性的影响因素进行分析。

结果：1. 高达 98.74%的社区居民认为钙对人体健康重要，但仅有 36.48%的居民有补钙习惯，偶尔补钙者占45.60%，没有补钙习惯者占17.92%；2. 社区居民曾检测过骨密度者占比仅为22.01%，77.99%的社区居民未检测过骨密度；3. 77.04%的社区居民主观认为缺乏就补钙，13.84%的受身边人的影响补钙，5.03%的居民是出于好奇心理从而补钙，4.09%的居民并不清楚补钙原因；4. 根据钙剂说明书上的剂量按时服用占60.38%，不按照钙剂说明书服用者占39.62%，其中感觉缺钙时就服用、平时不服用者占30.82%；5.50%的居民在购买钙补充剂时会同时购买有促进钙吸收的产品，27.99%的居民不会在购买钙补充剂时会同时购买促钙吸收的产品，22.01%的居民偶尔会购买。6. 男性与女性服用钙剂的规范性之间存在差异（$P<0.05$），女性根据钙剂说明书上的剂量按时服用者占比（64.68%）明显高于男性（48.19%）（$P<0.05$）；7. 学历为本科及以上的社区居民和学历为本科以下的社区居民对服用钙剂规范性无明显差别（$P>0.05$），同时两者之间补钙习惯也无明显差别（$P>0.05$）。

结论：社区居民认为钙对人体健康重要，主观认为缺乏就补钙者和补钙不规范者占有很高比例，部分社区居民对补钙原因以及钙补充剂的认识并不清楚，社区居民服用钙剂的规范性可能受性别影响但并不受学历影响。

关键字 钙；规范性；横断面调查；社区居民

分类：公共营养与健康

中国中老年人营养状态与高血压发病风险 关联的回顾性队列研究

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摘要：目的　对中国中老年人进行回顾性队列分析，探讨营养状态与高血压发病之间的关系，为今后高血压的预防与控制提供理论基础。方法　基于中国老年健康与家庭幸福调查（Chinese Longitudinal Healthy Longevity and Happy Family Study, CLHLS-HF）中2011~2012年、2014年和2017~2018年的数据，选取基线未患高血压且有完善信息的514例中老年人（年龄≥45岁）作为研究对象，采用由血清白蛋白和体重损失计算的老年营养风险指数（Geriatric Nutrition Risk Index, GNRI）进行营养状态的评估并根据随访结果进行分析。非正态分布的计量资料采用中位数（QR）表示，组间比较采用Kruskal - Wallis H非参数检验；定性资料采用频数（构成比）描述，采用检验进行组间比较。采用Cox比例风险回归模型探讨营养状态及不同营养不良严重程度与高血压发病风险的关联，并计算风险比（HR）及其95%置信区间（95%CI）。为进一步探讨营养不良严重程度对高血压发病的影响，将GNRI按照正常营养组、轻度营养不良组、中重度营养不良组纳入Cox模型进行分析并进行趋势检验。同时，采用限制性立方样条回归来探索GNRI与高血压发病风险的潜在非线性关系。此外，根据性别、年龄、教育水平、居住地、吸烟状况、饮酒状况、运动状况、收入水平、BMI进行了亚组分析并进行交互作用分析。结果　基线时共纳入514例参与者，中位年龄为79.00（19）岁；281名（54.7%）参与者为男性，233名（45.3%）为女性。基线时，117例受试者（22.76%）为中重度营养不良，135例受试者（26.26%）为轻度营养不良，262例受试者（50.98%）为正常营养。在2012年至2018年随访期间，有294（57.2%）名研究对象新发高血压，其中，基线中重度营养不良组58（49.57%）人发生高血压；基线轻度营养不良组70（51.85%）人发生高血压；基线正常营养组166（63.36%）人发生高血压。多因素Cox回归分析结果显示，GNRI每增加1个单位，高血压发生风险增加3%（HR=1.03，95%CI：1.01~1.05）。不同GNRI分组与高血压发病风险结果显示，与中重度营养不良组相比，正常营养组高血压发病风险增加61%（HR=1.61，95%CI：1.11~2.32）。限制性立方样条回归显示，在控制混杂因素后，GNRI与高血压发病风险存在显著的线性关系（P非线性=0.54）。进一步按潜在风险因素对GNRI与高血压发病之间的关联进行分层分析。在运动状况分层中，运动人群GNRI与高血压发病的关系更为敏感；而在BMI分层中，BMI≥21kg/m2的人群GNRI与高血压发病的关系中更为敏感。GNRI 和高血压发病之间的关联在居住地为农村的参与者中更为显著（校正 HR=1.04，95%CI：1.02-1.06，P交互=0.04）。结论　GNRI升高可能与中国中老年人群高血压发病风险增加有关。为了降低高血压发病的风险，可以从GNRI定义的营养状态等方面考虑，通过在正常范围内降低ALB水平和增大体重损失来实现。

关键字 老年营养风险指数；高血压；回顾性队列研究

分类：公共营养与健康

孕期碘和双酚类化合物混合暴露对甲状腺状态的影响

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目的：双酚 A 及其替代物暴露和异常碘营养状态都是甲状腺功能异常的危险因素。通过食物和饮用水经口暴露都是二者的主要暴露途径，二者共同暴露时可能存在交互效应，但鲜有研究关注二者共同混合暴露后的交互作用及其对甲状腺的影响。因此，本研究旨在探讨孕期碘和双酚类化合物混合暴露对甲状腺的影响。

方法：从上海市孕妇碘营养状况及子代生长发育的大型出生队列中纳入 162 名研究对象，分阶段多次在不同孕期收集受试者的尿液，使用液液萃取-超高效液相色谱串联质谱法检测尿液中的 6 种双酚类化合物（Bisphenols，BPs）：双酚 A（BPA）、双酚 B（BPB）、双酚 C(BPC)、双酚 S(BPS)、双酚 F(BPF)和双酚 AF(BPAF)的含量。若双酚类似物的浓度低于检测限（LODs），则其值被设为 LOD 除以 2 的平方根；同时使用肌酐校正来控制不同尿量的影响。采用砷铈催化分光光度法测定孕妇尿碘水平并进行肌酐校正，以尿碘水平评估孕妇碘营养状态。考虑到双酚类化合物较短的半衰期，为准确评估孕妇孕期的内暴露水平，本研究利用同一受试对象多次尿液样本中 BPs 的平均检出浓度评估孕妇孕期内暴露水平。同时，我们从母亲身上获取了 5 毫升的静脉血，分离出血清后使用自动化发光免疫分析仪（Cobas e 602; Roche）检测了促甲状腺激素、总三碘甲状腺原氨酸、总甲状腺素、游离三碘甲状腺原氨酸、游离甲状腺素、甲状腺过氧化物酶抗体和甲状腺受体抗体水平，并利用 Bayesian Kernel Machine Regression（BKMR）和 Quantile G-computation Models 两种混合暴露模型探究孕妇孕期碘和 6 种双酚类化合物共同暴露对甲状腺激素和抗体的影响。我们通过运行马尔可夫链蒙特卡罗（Markov Chain Monte Carlo）采样器进行了 10,000 次迭代来拟合模型。

结果：研究结果表明，6 种双酚类化合物中，BPA 的检出率最高，达 90.36%。即使是检出率最低的 BPB，检出率也达到 77.29%。经过肌酐校正后，BPA 的暴露浓度最高，其次为 BPC，6 种双酚类化合物（BPA, BPB, BPC, BPS, BPF 和 BPAF）的几何均数分别为 3.03, 0.24, 2.66, 0.36 ,0.26 和 0.72 μg/g 肌酐。BKMR 模型发现双酚类化合物和低碘混合暴露后妇女血清游离三碘甲状腺原氨酸和游离甲状腺素呈增加趋势；混合物暴露浓度和甲状腺过氧化物酶自身抗体阳性风险呈 U 型剂量-反应关系。在对双酚类化学物之间的交互效应进行研究时，研究发现 BPF 与 BPB; BPC 和 BPAF 对甲状腺自身抗体阳性风险具有协同效应。

结论：本研究双酚 A 及其替代物的检出率较高；双酚类化合物与碘共暴露对甲状腺健康有不良影响。即使暴露于较低水平的双酚类化合物，缺碘孕妇依然存在甲状腺抗体阳性增加的风险。

关键字 双酚、碘、混合暴露、甲状腺

分类：公共营养与健康

依托互联网+的医学营养治疗模式对超重肥胖及代谢相关指标改善的研究进展

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【目的】超重肥胖已成为威胁全球健康的公共卫生问题。生活方式干预是超重肥胖人群体重管理的基础干预方式之一，包括膳食的选择及搭配、饮食习惯的调整以及运动管理等，其效果显著、成本相对较低且不易反弹。传统的营养减重门诊只能通过线下定期随访患者，无法及时参与到患者的日常生活及饮食中，减重效率相对较低，效果与患者对饮食方案的理解及依从性有很大的关系。随着互联网技术的发展和普及，互联网+医疗健康服务应运而生。本文在查阅相关文献的基础上，总结分析了依托“互联网+”的医学营养治疗模式对超重/肥胖患者肥胖相关指标及代谢性相关指标改善的研究进展，为超重肥胖及代谢相关慢性病的多维化管理提供新的理论依据。

【方法】在 PubMed、MEDLINE、CNKI 中国知网、维普、万方等中英文数据库，以“互联网+”、“医学营养治疗”、“体重管理”、“营养管理”、“健康改善”等为关键词进行系统检索，检索时限为 2013 年 1 月至 2022 年 12 月。根据纳入和排除标准筛选文献、提取资料，分析其特点及对肥胖、代谢性相关指标改善的效果。

【结果】依托“互联网+”的医学营养治疗模式目前主要分为两大类：一是通过智能手机端软件平台（如微信群等）、短信、定期随访电话等渠道的伴随式管理与患者进行互动沟通，二是通过网站、电子邮件、社交论坛等对患者进行目标及行为提醒；前者管理人员与患者进行互动反馈，后者患者接受被动反馈；反馈内容多为针对患者本人饮食及生活方式的个性化反馈。多项研究表明，“互联网+”在医学营养治疗中的应用一方面可有效促进超重肥胖患者减轻体重、身体质量指数、体脂率、内脏脂肪面积及腰围，另一方面对高危人群和患者的空腹血糖、糖化血红蛋白、血压、甘油三酯及总胆固醇等代谢性指标也具有一定的改善作用，且通过“互联网+”进行干预的频率越高，效果相对越明显。但是目前已有研究多为针对干预组和对照组的观察性研究，且干预周期多在 6 个月以内，尚缺乏长期的效果研究及针对干预结束后的前瞻性跟踪随访研究，其对肥胖相关指标及代谢性相关指标改善之后的长期维持作用尚不明确。

【结论】基于互联网+的医学营养治疗模式在短期内可有效改善超重/肥胖患者肥胖相关指标及代谢性相关指标，具有一定的可行性，值得在临床进一步推广应用。

关键字 互联网+　医学营养治疗　超重肥胖　代谢

分类：公共营养与健康

陕西省某高校大学生手机屏幕时间与体成分的相关性研究

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摘要：目的　了解陕西省某高校在校大学生手机屏幕时间（Screen Time of Mobil-phone,STOM）与体成分健康现状，探索分析其相关性，为后续生活方式的干预和体质健康的改善提供数据资料和理论依据。方法　采用随机整群抽样的方法于 2021 年 11 月-2022 年 2 月于陕西省某高校抽取在校大学生，根据研究对象纳入排除标准最终纳入 594 名学生，研究对象均知情同意。使用自编问卷经过专家小组讨论修订，通过网络问卷的形式调查学生的一般情况和手机使用情况，采用 MPIQ 手机依赖量表量表（KMO 值 0.875，Bartlett 球形检验的 P<0.001）评估学生的手机依赖情况。采用 RGZ-160 身高体重测量仪测量学生的身高，使用人体成分分析仪（InBody-270），根据生物电阻抗原理（BIA）对大学生体成分进行测量，并收集学生体成分数据。使用 Excel 软件进行数据整理，采用 SPSS26.0 软件对数据进行统计分析，计量资料以（±s）表示，两组间比较采用秩和检验，计数资料组间比较采用 2 检验，检验水准 α=0.05，P＜0.05 表示差异具有统计学意义。结果　本研究的 594 名研究对象中，男生 163 名（27.4%），女生 431 名（72.6%），营养专业 135 人（22.7%），非营养专业 459 人（77.3%），平均年龄为（19.78±1.27）岁。学生 STOM ＞2h 占比为 52.9%，男生 43.6%，女生 56.4%，差异有统计学意义（P＜0.05）。学生的手机依赖度总体较高 MPIQ 评分为（34.05±9.101 分），MPIQ 量表得分主要集中在在 25-32 分（男生 35.6%，女生 42.0%）。男生主要使用手机聊天（32.3%）、打游戏（26.4%）和查阅资料（23.4%），女生主要使用手机聊天（32.5%）、查阅资料（21.5%）和追剧（19.6%），男女生之间差异有统计学意义（P＜0.05）；男女生使用手机时间段主要分布在 20:00-0:00（男生 32.5%，女生 37.3%），0:00-4:00 时间段也存在使用手机的现象（男生 5.1%，女生 3.6%）。有 20.9%的学生 BMI 超过正常范围（BMI≥24kg/m2），且男生比例高于女生（P＜0.05），67.3%的大学生存在隐性肥胖（男性 PBF＞20%，女性 PBF＞28%），42.4%的大学生存在中心性肥胖（男性 WHR＞0.9，女性 WHR＞0.85），在 PBF 和 WHR 中女生肥胖的检出率要高于男生。在不同性别中 STOM 与按照标准分类后的 BMI 等指标的差异性存在统计学意义（P＜0.05）；女生中营养专业与非营养专业在 TBW、SMM、PBF、等体成分指标的差异具有统计学意义（P＜0.05）；对 STOM 和体成分指标进行相关性分析，发现 STOM 与 TBW、Protein、Minerals、SMM 呈现负相关（P＜0.05）。结论 该校在校大学生 STOM 偏长，手机依赖度较高，体成分指标处于亚健康状态，超重肥胖问题不容忽视，STOM 对体成分健康具有一定的影响，需要进一步对该校在校大学生进行营养健康知识教育，并对其生活方式进行指导和干预，对于学生体质健康的改善具有积极意义。

关键词：大学生；手机屏幕时间；超重肥胖；体成分

关键字 大学生；手机屏幕时间；超重肥胖；体成分

分类：公共营养与健康

魔芋葡甘露聚糖包埋重结晶型抗性淀粉结构和消化性对小鼠血糖反应和短期饱腹感的影响

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目的：高饱腹感食物有助于减少食欲和食物摄入量以控制体重，并且可能是预防肥胖的有效饮食策略。碳水化合物是主食的重要组成部分，而抗性淀粉(RS)作为一种特殊类型的碳水化合物，不仅可以满足人们的食欲，还可以发挥调节餐后血糖的生理作用。魔芋葡甘露聚糖（KGM）在胃肠道中具有较高的吸湿性、膨胀性和黏性，可抑制食欲和增强饱腹感。本课题旨在研究魔芋葡甘露聚糖与重结晶型抗性淀粉复合物（KRS3）的结构和消化特性对健康小鼠餐后血糖反应及其短期饱腹感的影响，揭示 KRS3 增强饱腹感的机制。后期为 II 型糖尿病和肥胖人群设计高饱腹感食品配料提供科学依据，在 II 型糖尿病和肥胖等代谢性疾病的预防和调控方面将提供理论基础。

方法：以糯玉米淀粉为原料，酶解脱支的糯玉米淀粉在 50℃下重结晶获得 RS3 样品，再与 KGM 均质复合且成膜后得到 KRS3 样品，并探究不同浓度 KRS3（0.1%KRS3, 0.3%KRS3, 0.5%KRS3）的结构和理化性质差异，同时进行与饱腹感相关性质如质构、粘度等测定，最终利用 BALB/c 小鼠模型，探究不同浓度 KRS3 对其餐后血糖反应与短期饱腹感的影响及其作用机制。

结果：KRS3 具有较高的耐酶解性，其慢消化淀粉和抗性淀粉含量占 75%以上，能够维持小鼠的餐后血糖水平且不会导致其快速反应上升。与 RS3 相比，KRS3 的峰值糊化温度保持在 110° C，说明其有良好的耐热性，其次 KRS3 的溶胀力和表观粘度增加，能够减缓小鼠的胃排空率和肠推进速率，同时降低小鼠的摄食量，增强其短期饱腹感。流变学结果也表明，KGM 和 RS3 分别形成的 0.3%KRS3 和 0.5%KRS3 是典型的弱凝胶体系，很可能在胃中形成凝胶，这与肿胀力增加的结果相对应。C57BL/6J 小鼠各组餐后血糖水平均呈现先升高后降低的趋势，相比之下，0.5%KRS3 组在 60min、90min 和 120min 后血糖水平明显下降，且波动较大。4h 累计摄食量可表示短期饱腹感，与给予生理盐水的空白对照组相比，各实验组 4 h 的累计摄食量均显著降低，其中 0.5%KRS3 组小鼠的摄食量最低。10 h 的累积摄食量反映了 KRS3 样品对第二餐摄食量的影响，即长期饱腹感。0.3% KRS3 和 0.5% KRS3 组在 10h 时的累积摄食量减少，表明 KRS3 的摄入可以抑制下一餐的食欲，具有持续的饱腹效应。

结论：RS3 与 KGM 复合形成的 KRS3 的具有耐热稳定性且具有较高的膨润力和黏度，同时 KRS3 会减慢胃排空和肠推进速度并增强饱腹感，其次 KRS3 摄入后相对稳定的血糖波动有助于饱腹感的产生。RS3 与 KGM 联合可作为开发低血糖、高饱腹感抗性淀粉基食品的新途径，为肥胖和糖尿病的预防提供了基础。

关键字 抗性淀粉，餐后血糖，抗消化，饱腹感

分类：公共营养与健康

HMB 促进去卵巢小鼠超负荷诱导的骨骼肌蛋白质合成

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目的 女性进入更年期或因卵巢切除等因素导致雌激素水平降低，往往伴随着肌肉质量和力量的下降，由此引起的肌少症成为影响女性健康和生活质量的重要原因。抗阻力量训练和蛋白质及氨基酸补充是改善及预防肌肉丢失的有效方式。HMB 是亮氨酸的活性代谢产物，能促进蛋白质合成并减少蛋白质分解，从而增加机体力量，延缓肌肉疲劳，也有助于减轻老年人肌肉萎缩。有研究表明，补充必需氨基酸，特别是 β-羟基-β-甲基丁酸(HMB)对于肌少症的预防和治疗具有积极影响。对于低雌激素条件下，HMB 联合抗阻训练是否能促进骨骼肌蛋白合成及改善肌肉质量，故此本研究在去卵巢小鼠模型的基础上，采用腓肠肌远端腱切术方案模拟抗阻训练建立小鼠骨骼肌肥大模型，探讨补充 HMB 对去卵巢小鼠骨骼肌肥大的影响及其可能机制，为改善绝经期女性骨骼肌质量提供实验依据。方法 本研究以 16 只雌性小鼠（8 周龄）为研究对象，对其进行双侧卵巢切除术。一周后手术切断右后肢单侧腓肠肌远端肌腱，造成超负荷骨骼肌肥大模型（Overload，Ovld 侧），另一侧进行假手术（Sham 侧）。造模完成后，将 16 只小鼠随机分为两组（各 8 只）：对照组和 HMB 组。HMB 补充采用灌胃方式，灌胃剂量为 0.5 g / kg 体重，每天 1 次，对照组小鼠灌胃等量生理盐水，共干预一周，干预前后测量小鼠体重与体成分，干预 1 周后取材，处死前 18 小时给小鼠腹腔注射嘌呤霉素 0.04 μmol/g 体重。取左、右侧后肢跖肌称重，并液氮速冻，放置于-80℃冰箱保存待测。通过蛋白质印迹法检测小鼠跖肌肌组织中 mTOR、S6、Akt 蛋白及其磷酸化水平的表达和蛋白质合成率。结果 实验结束后，小鼠体重组间差异无统计学意义，组内小鼠 Ovld 侧跖肌质量与 Sham 侧相比均显著性增加（P<0.05）。与对照组相比，HMB 组干预后体脂降低但无显著性差异，但 HMB 组 Ovld 侧跖肌质量显著增加（P<0.05）。蛋白质印迹结果显示，小鼠组内 Ovld 侧跖肌组织中 p-mTOR/mTOR、p-S6/S6、p-Akt/Akt 比值均比 Sham 侧增加，但仅在 HMB 组中 p-mTOR/mTOR、p-S6/S6 比值显著性增加（P<0.05）。与对照组相比，HMB 组同侧肌肉 p-mTOR/mTOR、p-S6/S6、p-Akt/Akt 比值均增加，但仅有 p-mTOR/mTOR、p-S6/S6 有显著性差异（P<0.05）。小鼠组内 Ovld 侧跖肌组织中蛋白质合成率均增加，但仅在 HMB 组中显著性增加（P<0.05）。与对照组相比，HMB 组同侧跖肌组织中蛋白质合成率均显著性增加（P<0.05）。结论 腓肠肌远端腱切术能够有效促进去卵巢小鼠骨骼肌肥大，而且补充 HMB 能进一步促进骨骼肌肥大，并提高蛋白质合成率，其机制可能与 HMB 促进去卵巢小鼠骨骼肌中蛋白质合成相关信号蛋白的表达有关。

关键字 HMB；去卵巢动物模型；骨骼肌肥大；蛋白质合成率

分类：公共营养与健康

中国北方地区母血、脐带血以及母乳中维生素 A 的含量研究

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目的 维生素 A 是人体必需脂溶性维生素，参与包括视觉发育、胚胎发育、免疫系统功能、中枢神经系统的形成等许多重要的生理过程，对于维持生长发育十分重要，尤其对于孕产妇和新生儿的健康具有特殊的意义。然而，维生素 A 缺乏仍然是一个较为严峻的公共卫生问题，也是我国孕妇存在的主要营养问题之一。由于受到饮食习惯的影响，我国北方地区妇女在妊娠期患有维生素 A 缺乏的风险更大。因此，本研究通过调查我国北方地区天津、长春、兰州三个城市产妇的静脉血（即母血）、脐带血及其分娩后不同泌乳阶段母乳中维生素 A 的含量，了解我国北方地区孕妇维生素 A 缺乏症的患病情况，分析母乳中维生素 A 含量随泌乳时间的变化趋势并探讨母血与脐带血以及与母乳中维生素 A 含量的相关性，以期为我国孕妇和乳母的膳食推荐以及婴幼儿配方食品的研发提供数据支持。

方法 在天津、长春、兰州三个北方城市招募健康足月产孕妇，通过问卷调查的方式收集产妇的人口统计学信息及分娩信息等，在分娩时采集母血和脐带血并在其泌乳期收集初乳（0～7 天）、过渡乳（7～14 天）和成熟乳（40～45 天），血浆及母乳均分装后避光保存在-80℃冰箱直至检测。使用高效液相色谱仪配紫外检测器对血浆及母乳中维生素 A 的水平进行检测。

结果 共招募到 86 对健康母婴，其中天津 26 对、长春 30 对以及兰州 30 对。天津市母血、脐带血以及初乳、过渡乳、成熟乳中的维生素 A 含量分别为 304.61（245.85，434.65）、158.54（118.61，194.74）、537.00（377.50，820.35）、207.66（138.41，272.65）、95.00（63.50，159.25）μg/L；长春市母血、脐带血以及三阶段乳中维生素 A 的含量分别为 267.52（201.97，368.11）、144.97（131.76，164.81）、674.33（504.22，869.98）、231.95（164.56，310.80）、101.00（64.38，155.00）μg/L；兰州市母血、脐带血以及三阶段乳中的维生素 A 含量分别为 335.58（291.21，390.35）、145.96（120.04，166.01）、748.55（638.55，945.85）、231.01（157.02，331.83）、109.00（62.50，168.00）μg/L。母血、脐带血以及三阶段母乳中维生素 A 水平在三个地区间均无显著性差异（P 均＞0.05）。三个地区母乳中的维生素 A 含量均在初乳中最高，随泌乳时间的延长而逐渐下降（P 均＜0.05）。北方地区产妇母血中维生素 A 水平与其产次呈正相关（r=0.230，P＜0.05），过渡乳与成熟乳中的维生素 A 水平均与年龄呈正相关（r=0.358，P＜0.05；r=0.219，P＜0.05），未发现脐带血及初乳与分娩因素之间的相关性（P 均＞0.05）。北方地区产妇维生素 A 缺乏症的患病率为 15.12%，仅在患有维生素 A 缺乏症的孕妇中发现初乳与母血中的维生素 A 含量存在正相关性（r=0.676，P＜0.05）。

结论 母乳中维生素 A 含量随泌乳时间延长而逐渐下降。当母体维生素 A 含量处于较低水平时，初乳中的维生素 A 含量随母血中维生素 A 含量的降低而降低。目前，我国北方地区孕妇的维生素 A 缺乏情况值得重视。

关键字 维生素 A；母血；脐带血；母乳；中国北方

分类：公共营养与健康

中国成人膳食支链氨基酸摄入状况评价

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目的　研究中国成人居民膳食支链氨基酸（BCAAs）摄入状况，评价其摄入水平与平均需要量、安全摄入量及肌肉健康建议摄入量之间的关系。

方法 本研究数据来自中国成人慢性病与营养监测（2015），将具有完整膳食资料的18岁及以上成人作为研究对象，分析调查对象每日膳食 BCAAs 摄入量，计算过程经过复杂抽样加权处理，并根据《中国居民膳食营养素参考摄入量（2013 版）》平均需要量（EAR）进行评价。同时根据文献中膳食BCAAs占食物蛋白比例和欧洲临床营养与代谢学会给出的老年人膳食蛋白质摄入推荐范围，评价中国成人及老年人膳食BCAAs摄入水平是否符合肌肉健康摄入要求。

结果　2015年中国成人膳食BCAAs平均摄入水平是10.81克/天，男性11.80克/天，女性9.79克/天。本研究中膳食BCAAs占食物蛋白平均比例为19.4%，验证了文献中膳食BCAAs占膳食蛋白质的15%～20%。考虑到老年人肌肉质量损失和肌肉衰减发病风险，欧洲临床营养与代谢学会给出的建议是健康老年人每日蛋白质摄入为1.0-1.2克/千克体重。根据《中国居民膳食营养素参考摄入量（2013版）》，目前缺乏BCAAs的推荐摄入量，依据2007年WHO/FAO/UNU各人群必需氨基酸平均需要量和安全摄入量的推荐，结合中国成人参考体重，计算获得BCAAs的EAR男性18-49岁为5.61克/天，50-64岁为5.53克/天，65-79岁为5.36克/天，80岁以上为5.10克/天，女性18-49岁为4.76克/天，50-64岁为4.93克/天，65-79岁为4.72克/天，80岁以上为4.34克/天。BCAAs的安全摄入量男性18-49岁为7.01克/天，50-64岁为6.91克/天，65-79岁为6.69克/天，80岁以上为6.38克/天，女性18-49岁为5.95克/天，50-64岁为6.16克/天，65-79岁为5.90克/天，80岁以上为5.42克/天。与2015年中国成人膳食BCAAs的摄入水平进行比较，摄入最低的80岁以上人群组膳食BCAAs摄入平均水平为8.78克/天，也高于BCAAs的平均需要量和安全摄入量。因此，2015年中国成人膳食BCAAs的摄入水平高于BCAAs的平均需要量和安全摄入量。

中国老人膳食BCAAs摄入水平分层计算后男性50-64岁11.58克/天，65-79岁10.06克/天，80岁以上9.88克/天，女性50-64岁9.77克/天，65-79岁8.70克/天，80岁以上8.01克/天。根据欧洲临床营养与代谢学会给出的建议，推算保持肌肉健康膳食BCAAs的摄入建议范围为男性50-64岁9.75-15.60克/天，65-79岁9.45-15.12克/天，80岁及以上9.00-14.40克/天，女性50-64岁8.70-13.92克/天，65-79岁8.33-13.32克/天，80岁及以上7.65-12.24克/天。经过对比中国成人膳食BCAAs摄入平均水平位于保持老年人肌肉健康的建议摄入范围内。

结论：中国成人和老年人膳食BCAAs摄入平均水平高于BCAAs的平均需要量和安全摄入量，但处于保持老年人肌肉健康的建议摄入范围内。BCAAs健康效应和不良效应得出的摄入量建议范围可能存在矛盾，未来BCAAs推荐摄入量的制定应综合考虑年龄、性别和生理状况等个体特异性。

关键字 成人；老年人；支链氨基酸；EAR；肌肉健康

分类：公共营养与健康

母乳源格氏乳杆菌预防小鼠高脂血症和胰岛素抵抗的研究

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目的：高脂血症与胰岛素抵抗的发生与高脂饮食引起的肠道菌群紊乱关系密切，靶向肠道菌群的益生菌具有潜在调节糖脂代谢异常的作用。格氏乳杆菌 FN036 是来自母乳的潜在益生菌。本研究旨在评价格氏乳杆菌 FN036 预防高脂饮食诱导的小鼠高脂血症和胰岛素抵抗的效果，并探究其作用机制。

方法：将 6 周龄 C57BL/6J 小鼠分为 4 组，每组 10 只：正常饮食组（CON）、高脂饮食组（HFD）、格氏乳杆菌 FN036 干预组、格氏乳杆菌 BNR17 处理组（阳性对照组）。益生菌的灌胃量为 1×109 CFU/天。每周称量小鼠的摄食量和体重，干预 8 周后对小鼠进行口服葡萄糖耐量实验（OGTT），干预期共为 9 周。在第 9 周小鼠禁食 12 小时后麻醉，摘除眼球收集血液，然后断颈处死。采集小鼠的肝脏、肠和脂肪并保存在-80℃冰箱中，制作肝脏和脂肪组织切片并进行后续分析。

结果：第 9 周时，FN036 和 BNR17 干预组的小鼠体重（$p<0.05$）均显著低于 HFD 组。FN036 干预组的小鼠血糖水平（$p<0.05$）、OGTT 血糖曲线下面积（$p<0.05$）和胰岛素抵抗指数（$p<0.05$）显著低于 HFD 组和 BNR17 阳性对照组（$p<0.05$），这表明 HFD 组小鼠血糖调节能力失衡，葡萄糖耐量受损，补充 FN036 可以得到明显缓解。FN036 干预组的小鼠血浆总胆固醇水平（$p<0.05$）、甘油三酯（$p<0.05$）和低密度脂蛋白的水平（$p<0.05$）显著低于 HFD 组和 BNR17 阳性对照组（$p<0.05$）。FN036 干预组的小鼠血浆白细胞介素-6（$p<0.05$）、肿瘤坏死因子-α（$p<0.05$）、连蛋白（$p<0.05$）、超敏 C 反应蛋白（$p<0.05$）和脂多糖的水平（$p<0.05$）显著低于 HFD 组。小鼠的脂肪和肝脏切片显示，HFD 组 H&E 染色的肝脏切片可见炎性细胞浸润和脂质空泡化，附睾脂肪面积明显增大，FN036 的干预可以显著降低脂肪细胞的面积（$p<0.05$）。肝脏 RNA 测序分析结果显示，FN036 处理组相比 HFD 组抑制了脂肪酸延长通路，主要抑制了该通路丙二酰辅酶 A、长链 3-羟基丙二酸辅酶 A、长链反式-2,3-脱氢酰辅酶辅酶 A 基因 mRNA 的表达，从而抑制长链脂肪酸的合成。与 HFD 组相比，FN036 干预显著激活了促进 4-甲基蔗糖酯、3-酮-4-甲基酵母甾醇基因 mRNA 的表达，从而促进初级胆汁酸的生物合成通路。

结论：格氏乳杆菌 FN036 预防了高脂饮食引起的小鼠肥胖和高脂血症，效果与格氏乳杆菌 BNR17 相当。格氏乳杆菌 FN036 可以缓解高脂饮食导致的小鼠糖耐量受损，发挥了预防胰岛素抵抗的作用，效果优于格氏乳杆菌 BNR17。格氏乳杆菌 FN036 的代谢调节作用机制可能与促进肝脏胆汁酸的合成、促进葡萄糖转运、抑制代谢性内毒素血症和抑制长链脂肪酸的合成有关。本研究为应用格氏乳杆菌 FN036 来预防高脂血症和胰岛素抵抗提供了依据。

关键字 格氏乳杆菌、高脂饮食、胰岛素抵抗、高脂血症

分类：公共营养与健康

白藜芦醇联合运动在高脂饮食致大鼠认知功能异常中的作用机制

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目的：当前，以高脂饮食（high fat diet, HFD）为代表的高热能饮食已成为普遍存在的一种膳食模式。大量研究揭示，高脂饮食可促进脑组织中的神经炎症损伤、氧化应激、细胞凋亡等病理生理过程，进而扰乱神经元功能。本研究旨在观察运动联合白藜芦醇（R）能否改善高脂饮食诱导的 SD 大鼠海马自噬-溶酶体异常，进而探讨运动联合 R 能否调节自噬异常及其对认知功能的影响，为高脂饮食导致认知功能障碍研究提供新的研究思路。方法：4 周龄雄性 SD 大鼠高脂饮食喂养 28 周，从第 19 周开始，向干预组饲料中添加白藜芦醇，同时开始游泳训练，总共干预 9 周。采用 Morris 水迷宫实验检测大鼠的空间学习和记忆能力；利用 HE 染色观察各组大鼠皮层结构的病理改变情况；利用 Nissl 染色检测损伤情况和数量；RT-qPCR 和 Western blot 检测大鼠海马组织中神经发育分子（SIRT1 和 BDNF）、学习记忆调节分子（PSD95 和 GAP43）以及自噬-溶酶体通路相关分子（P62、LC3、Beclin-1、TFEB、LAMP）的 mRNA 和蛋白表达水平。结果：体重结果表明，与对照组相比，HFD 组大鼠体重明显增加（P<0.05），HFD+R 组大鼠体重有所降低（P<0.05），HFD+R+SW 组大鼠体重更一步降低（P<0.05）。血脂结果表明，与对照组相比，高脂饮食 SD 大鼠 TC、TG、LDL-C 的水平明显增加，HDL-C 的水平降低，运动联合白藜芦醇降低高脂饮食 SD 大鼠 TC、TG、LDL-C 的水平，增加 HDL-C 的水平。定位航行实验结果表明，HFD+R+SW 组的逃避潜伏期较 HFD 组和 HFD+R 组缩短，HFD 组所需时间最长（P<0.001；P<0.01；P<0.05）。空间探索实验结果表明，HFD+R+SW 组和 HFD+R 组大鼠在目标象限中的停留时间百分比低于 HFD 组（P<0.05；P<0.01）。第一次上台所需时间 HFD+R+SW 组较 HFD 组明显缩短，HFD 组较对照组明显增加（P<0.01；P<0.05）。同时 HFD+R+SW 组和 HFD+R 组大鼠穿越平台次数多与 HFD 组（P<0.01；P<0.05）。HE 染色结果表明，对照组大鼠神经细胞结构完整，未见明显的病理学改变；HFD 组大鼠神经细胞排列紊乱，细胞水肿；HFD+R+SW 组和 HFD+R 组神经细胞结构较 HFD 组完整，水肿有所改善。尼氏染色实验结果表明，与对照组相比，HFD 组海马 CA1 区及皮层神经元着色较浅尼氏小体较少，排列松散，细胞间距增大，部分细胞肿胀和破裂，细胞轮廓模糊；HFD+R+SW 组观察到皮层神经细胞排列更加紧密，细胞大小正常，结构完整，细胞轮廓清晰，神经元和尼式小体数量较 HFD 组增多。HFD 可下调大鼠海马中神经发育（PSD95 和 GAP43）、学习记忆调节（SIRT1 和 BDNF）自噬溶酶体（Beclin-1、TFEB、LC3II、LAMP1）相关蛋白和 mRNA 的表达，促进 P62 蛋白和 mRNA 的表达。而 HFD+R 和 HFD+R+SW 能够有效改善 PSD95、GAP43、SIRT1、BDNF、Beclin-1、TFEB、LC3II、LAMP1 蛋白以及 mRNA 的降低，减少 P62 的表达。结论：1. HFD 暴露可通过抑制 SD 大鼠海马自噬-溶酶体通路诱导认知功能障碍。2. 白藜芦醇联合运动能够通过调节自噬溶酶体通路有效改善 HFD 对认知功能的损伤。

关键字 高脂饮食；白藜芦醇；SIRT1；运动；认知功能

分类：公共营养与健康

GABA 经 SP1/miR-29a 途径调控 AD 模型小鼠脂肪组织 LPL 表达的作用机制研究

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目的： 阿尔茨海默病（AD）是一种神经系统退行性疾病。脂蛋白酯酶（LPL）是脂类代谢的关键酶，其与 AD 密切相关。组蛋白去乙酰酶（HDACs）、组蛋白乙酰基转移酶（HATs）介导组蛋白乙酰化修饰。γ-氨基丁酸（GABA）是一种功能性食品因子，前期研究发现，GABA 通过抑制 HDACs 拮抗 AD，miR-29a 在 HDACs 调控 LPL 表达中发挥重要的介导作用。在体外研究中我们还发现，人神经母细胞瘤（SH-SY5Y）细胞 miR-29a 表达随 Aβ 处理浓度的增加呈“U”型变化，而 HDACs 表达逐渐增多，表明仅 HDACs 难以诠释 miR-29a 表达的变化，调控 miR-29a 表达的具体分子机制还有待探明。随着组蛋白 H3 尾部甲基化水平的增加，组蛋白甲基转移酶（HMTs）能够募集 HATs 复合物，提示组蛋白甲基化修饰的发生对于促使组蛋白乙酰化具有重要作用。特异性蛋白 1（SP1）是 SP1/Krüppel 样转录因子家族成员之一，生物信息学分析发现 SP1 可结合于 miR-29a 的启动子区域。基于上述，本研究探讨了在 AD 中 SP1 能否通过招募 EHMT1/2 发生组蛋白甲基化修饰，进而募集 P300（具有 HATs 活性），同时解除 HDACs 的去乙酰化作用，促使组蛋白乙酰化，最终使 miR-29a 表达先下降后上升。

方法： 采用 5 月龄 APP/PS1 双转基因 AD 模型小鼠、不同浓度 Aβ 处理的小鼠脂肪前体细胞（3T3-L1 细胞系），研究 GABA 对 LPL、miR-29a、SP1、P300、EHMT1/2 表达水平及组蛋白乙酰化水平、组蛋白甲基化水平的影响。利用体外培养的 3T3-L1 细胞，采用 siRNA 技术和 ChIP 方法分析 GABA 是否通过调控 P300、EHMT1/2 进而经 SP1/miR-29a 途径调节 AD 脂肪组织 LPL 表达。

结果：1、AD 模型小鼠脂肪组织 LPL 表达水平、H3K9 乙酰化水平降低（P＜0.01）；miR-29a 水平、H3K9 甲基化水平以及 EHMT1/EHMT2、P300、SP1 表达水平升高（P＜0.05）。GABA 可拮抗 AD 模型小鼠的上述改变。2、随着 Aβ 浓度的增加，LPL 表达水平、H3K9 甲基化水平先升高后降低，miR-29a 水平、H3K9 乙酰化水平先降低后升高，EHMT1/EHMT2、P300 及 SP1 表达水平逐渐升高，差异均有统计学意义（P＜0.05）。与对照组相比，0.5μM Aβ 处理的细胞 LPL 表达水平升高、miR-29a 水平降低，2μM Aβ 处理的细胞 LPL 表达水平降低、miR-29a 水平升高，0.5μM 或 2μMAβ 处理的细胞 EHMT1/EHMT2 表达及 H3K9 甲基化水平升高，P300 表达水平升高、H3K9 乙酰化水平降低，SP1 表达水平升高，差异均有统计学意义（P＜0.05 或 P＜0.01）。与 Aβ（0.5μM）组相比，Aβ（2μM）组和 GABA+ Aβ（0.5μM）组细胞 LPL 表达水平降低、miR-29a 水平升高，Aβ（2μM）组细胞 EHMT1/EHMT2 表达及 H3K9 甲基化水平升高，GABA+Aβ（0.5μM）组细胞 EHMT1/EHMT2 表达及 H3K9 甲基化水平下降，Aβ（2μM）组细胞 P300 表达水平升高、H3K9 乙酰化水平降低，GABA+Aβ（0.5μM）组细胞 P300 表达水平降低、H3K9 乙酰化水平升高，Aβ（2μM）组细胞 SP1 表达水平升高，GABA+Aβ（0.5μM）组细胞 SP1 表达水平降低，差异均有统计学意义（P＜0.05 或 P＜0.01）。与 Aβ（2μM）组相比，GABA+Aβ（2μM）组细胞 LPL 表达水平升高、miR-29a 水平降低、EHMT1/EHMT2 表达及 H3K9 甲基化水平降低、P300 表达水平降低、H3K9 乙酰化水平升高、SP1 表达水平降低，差异均有统计学意义（P＜0.05 或 P＜0.01）。3、与 control 组相比，siRNA-SP1 组细胞 miR-29a 表达增多，LPL 表达降低，差异有统计学意义（P＜0.01）；siRNA-P300 组细胞 miR-29a 表达降低，LPL 表达升高，差异有统计学意义（P＜0.01）；siRNA-EHMT1/EHMT2 组细胞 miR-29a 表达升高，LPL 表达降低，差异有统计学意义（P＜0.01）。4、与 IgG 组相比，SP1 抗体组在 miR-29a 启动子区域的富集水平升高（P<0.01）。与对照组相比，沉默 P300 组的 miR-29a 启动子区域 H3K9 乙酰化水平降低（P<0.01），沉默 EHMT1/2 组的 miR-29a 启动子区域 H3K9 甲基化水平降低（P<0.01）。

结论： GABA 可通过调控 EHMT1/2 及组蛋白甲基化水平、P300 及组蛋白乙酰化水平进而经 SP1/miR-29a 途径调节 AD 模型小鼠脂肪组织 LPL 的表达。

关键字 阿尔茨海默病；γ-氨基丁酸；脂蛋白酯酶；miR-29a

分类：公共营养与健康

对香豆酸与乳铁蛋白联合干预对认知障碍的改善 作用及其机制研究

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目的：

以 APP/PS1 小鼠（3 月龄）为模型，探讨对香豆酸（p-Coumaric Acid，CA）和乳铁蛋白（Lactoferrin，Lf）单独或联合干预对 AD 模型小鼠认知障碍的改善作用及其机制；探讨 CA 和 Lf 对认知障碍的改善作用是否具有协同作用；探讨 β 淀粉样蛋白病理学、tau 蛋白病理学、突触可塑性、炎症等在上述干预中的可能作用；探讨肠道菌群、短链脂肪酸在上述病理学中的可能作用。

方法：

将 40 只 4 月龄 APP/PS1 小鼠分成 4 组：模型组、对香豆酸（CA）组、乳铁蛋白（Lf）组、CA+Lf 联合干预组，同时以年龄匹配的同窝野生型 C57 小鼠作为对照，连续灌胃干预 8 周，通过行为学实验对小鼠的学习记忆能力进行评估；HE 染色观察小鼠脑组织病理构的改变，刚果红染色观察小鼠脑组织 Aβ 沉积情况；Western Blot 检测海马中 β 淀粉样蛋白病理学、tau 病理学等的相关蛋白表达；ELISA 试剂盒检测前额叶皮质中 Aβ1-42 和血清中炎症因子的含量。

结果：

CA 与 Lf 联合干预对 APP/PS1 小鼠学习记忆能力的影响：①Morris 水迷宫定位航行实验中，各组小鼠逃逸潜伏期逐渐缩短；空间探索实验中，与野生型小鼠相比，模型组小鼠目标象限停留时间、游泳距离和穿越平台次数显著下降，CA 和 Lf 干预后上述指标显著升高，联合干预组目标象限停留时间和游泳距离几乎恢复至野生型小鼠水平。②旷场实验中，APP/PS1 小鼠中央区路程和中央区滞留时间显著缩短，CA 和 Lf 干预后有改善的趋势但并无显著性差异。③筑巢实验中，APP/PS1 小鼠筑巢评分显著下降，各干预组均显著改善小鼠的筑巢行为，且联合干预组的改善效果显著优于 Lf 组。④HE 和刚果红染色结果显示，APP/PS1 小鼠神经元细胞形态改变，细胞核呈现固缩深染，皮质区和海马区出现淀粉样斑块沉积，CA 和 Lf 单独或联合干预均有不同程度的改善。⑤APP/PS1 小鼠血清中 TNF-α、IL-6 水平显著升高，CA+Lf 联合干预后 TNF-α 水平显著下降。

CA 与 Lf 联合干预对 β 淀粉样蛋白病理学、tau 蛋白病理学和突触可塑性的影响：与正常对照组相比，模型组海马 APP、PS1、BACE1、p-tau 表达量增加，IDE、PSD95 表达量降低，联合干预后显著下调 APP、PS1、BACE1、p-tau 的表达，显著上调 PSD95 的表达。

CA 与 Lf 联合干预对肠道菌群和短链脂肪酸的影响：肠道菌群 α 多样性方面，与正常对照组相比，模型组 Chao 指数、Shannon 指数略下降，Faith-pd 指数无明显变化，Lf、联合干预组 Shannon 指数和 Faith-pd 指数显著升高。β 多样性方面，NMDS 分析中，模型组与正常对照组仅有小部分重合，CA、Lf 和联合干预组与正常对照组存在部分重叠。菌群组成方面，在门水平上，厚壁菌门、拟杆菌门、变形菌门、放线菌是各组的优势菌。与正常对照组相比，模型组拟杆菌丰度下降，变形杆菌和放线菌丰度升高，各干预组可降低拟杆菌和放线菌的丰度但无显著性差异。各干预组可增加 APP/PS1 小鼠总短链脂肪酸的分泌，包括乙酸、丁酸和丙酸。

结论：

CA 与 Lf 联合干预可改善 APP/PS1 小鼠的学习记忆功能，通过抑制 Aβ 沉积和 tau 磷酸化、改善突触可塑性、调节肠道菌群来改善认知障碍。

关键字 对香豆酸；乳铁蛋白；认知障碍；肠道菌群

分类：公共营养与健康

社区居民补钙方式及钙剂选择偏好的调查研究

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目的　钙是人体必需的矿物质之一，是构成骨骼的重要元素，参与维持重要的人体生理过程，人体要有足够的钙才能维持血钙的平衡和骨骼的生长，缺钙则会对人体健康产生多种危害。补钙已经成为社区居民重要的保健共识以及日常生活习惯之一。但是，社区居民补钙的方式及钙剂选择的偏好尚不清楚。为此，本研究旨在通过横断面调查了解不同性别、不同学历社区居民的补钙方式及钙剂选择的偏好，为不同类型钙剂的研发、市场推广以及营销策略的确定提供数据支持。

方法　2022 年 12 月-2023 年 02 月，采用便利抽样的方法，利用电子问卷对 318 名社区居民进行调查，回收问卷 318 份，有效问卷 318 份，有效问卷回收率 100%，主要收集调查对象的年龄、性别、学历、居住地等基线资料，同时收集研究对象补钙方式及钙剂选择偏好方面的信息，主要采用卡方检验分析社区居民补钙方式及钙剂选择偏好的影响因素。

结果　1.在选择补钙方式方面，社区居民选择通过日常饮食补钙者占 48.11%，选择钙片补钙者占 32.7%，选择补钙营养品者占 17.92%；2.在钙剂选择偏好方面，社区居民首选钙剂为葡萄糖酸钙者占 35.53%，选择碳酸钙者占 27.67%，选择醋酸钙者占 3.46%，不知道、不清楚以上三种钙剂区别者占 33.33%；3.社区居民在购买补钙产品时，影响选择钙剂的因素主要为补钙产品的功能占 27.9%、补钙产品的疗效占 27.7%、补钙产品的品牌占 18.7%、补钙产品的价格占 17%、补钙产品的包装占 8.6%。4.社区居民选择日常饮食、钙片、补钙营养品和其他补钙方式在男女之间均无统计学差异（P＞0.05）；5.　社区居民选择葡萄糖酸钙、碳酸钙、醋酸钙等钙剂在男女之间均无统计学差异（P＞0.05）；6.　不同学历社区居民选择通过日常饮食、钙片、补钙营养品和其他补钙方式之间差异有统计学意义（P＜0.05），专科及以下学历社区居民主要选择钙片作为补钙方式，本科及研究生学历社区居民主要选择日常饮食作为补钙方式；7. 社区居民选择葡萄糖酸钙、碳酸钙、醋酸钙等钙剂在不同学历社区居民之间均无统计学差异（P＞0.05）。

结论 社区居民补钙方式主要为日常饮食、服用钙片以及补钙营养品；社区居民选择的钙剂主要为葡萄糖酸钙和碳酸钙；补钙产品的功能和疗效是社区居民选择补钙产品的考虑因素；男性和女性居民在补钙方式的选择上无区别；专科及以下学历社区居民主要选择钙片为补钙方式，本科及研究生学历社区居民主要选择日常饮食为补钙方式。

关键字 补钙方式；钙剂选择的偏好；横断面研究；社区居民

分类：公共营养与健康

社区居民对益生菌产品的偏好调查研究

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目的：益生菌是在适当摄取下会对机体产生有益作用的一类活性微生物，目前全球益生菌市场规模约达462亿美元，居民消费益生菌的占比逐年提高。但是社区居民对益生菌产品的偏好尚不清楚。本研究旨在通过横断面调查了解不同性别、不同年龄段的社区居民对于益生菌产品的偏好，为益生菌的研发、市场推广以及营销策略的确定提供数据支持。

方法：2022年12月——2023年1月，采用便利抽样的方法，利用电子问卷对299名社区居民进行调查，回收问卷299份，有效问卷299份，有效问卷回收率100%，主要收集调查对象的年龄、性别、学历、居住地等基线资料以及对益生菌产品的购买偏好及其影响因素等。

结果：1. 53.85%的社区居民服用过益生菌，居民在购买益生菌产品时，35.44%的人偏好选择酸奶等含益生菌的乳制品并购买，32.82%的人偏好选择乳酸菌等益生菌饮料，12.79%的人偏好购买益生菌类保健品，10.32%的人偏好选择购买益生菌类药品，8.63%的人偏好选择益生菌类食品；2.男性与女性对于选择何种类型的益生菌产品购买偏好差异无统计学意义（P＞0.05）；3.不同年龄段的社区居民选择购买乳酸菌等益生菌饮料差异有统计学意义（P＜0.05），与其他年龄段相比，18-45岁与46-60岁的社区居民偏好选择乳酸菌等益生菌饮料；4.不同年龄段的社区居民偏好选择益生菌类药品之间差异有统计学意义（P＜0.05），与其他年龄段相比，18岁以下和46-60岁的居民偏好选择益生菌类药品。不同年龄段的人对于选择购买酸奶等含益生菌的乳制品、益生菌类保健品和益生菌类食品差异均无统计学意义（P＞0.05）；5.家里是否有未成年儿童对于社区居民选择购买乳酸菌等益生菌饮料差异有统计学意义（P＜0.05），没有未成年儿童的社区居民（34.15%）比有未成年儿童的社区居民更愿意选择购买益生菌饮料（22.67%）（P＜0.05）。6.家里未成年儿童的年龄段对社区居民选择购买酸奶等含益生菌的乳制品差异有统计学意义（P＜0.05），与其他未成年儿童相比，0—6岁未成年儿童和7—12岁儿童的家长偏好选择酸奶等含益生菌的乳制品。

结论：社区居民选择的益生菌主要为酸奶等含益生菌的乳制品、乳酸菌等益生菌饮料以及益生菌类保健品和菌类药品；18-45岁与46-60岁的社区居民更偏好选择乳酸菌等益生菌饮料；18岁以下和46-60岁的居民偏好选择益生菌类药品；家里没有未成年儿童的社区居民比有未成年儿童的社区居民更愿意选择购买益生菌饮料；0—6岁未成年儿童和7—12岁儿童的家长更偏好选择酸奶等含益生菌的乳制品。

关键字 社区居民；横断面研究；益生菌；产品偏好

分类：公共营养与健康

魔芋多糖调节过度训练下小鼠肠道菌群及运动表现的量效关系研究

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研究目的：本研究旨在探讨魔芋多糖（konjac glucomannan, KGM）对过度训练引起的肠道菌群失调的调节作用及运动表现的促进作用的不同剂量与效应之间的关系，为运动员以 KGM 作为运动营养补充剂提高运动表现提供理论基础。

研究方法：将 7-8 周龄的 30 只 C57BL/6 雄性小鼠随机分成 5 组，每组 6 只。使用标准饲料（AIN-93G）饲养，空白对照组与过度训练组进行无菌水喂养，干预组将 KGM 以不同浓度添加至饮用水中。适应性喂养 7 天后开始进行 6 周的干预。

各组处理如下：（1）空白对照组：无运动干预，无 KGM 补充；（2）过度训练组（Overtraining，OT）：过度训练，无 KGM 补充；（3）KGM High，KH：过度训练+KGM 高浓度（5.00 g/L）；（4）KGM Moderate,KM：过度训练+KGM 中浓度（2.50 g/L）；（5）KGM Low,KL：过度训练+KGM 低浓度（1.25 g/L），添加 KGM 的饮用水，每两天进行更换，干预时间 6 周。

所有小鼠在进行干预或运动表现测试前均在跑台上进行 5 天的适应性运动，跑台速度为 10 m/min， 训练时间 10 min/day。

过度训练方案如下：（1）第 1 周，60%力竭速度（exhaustion velocity, EV），30 min/day，1 组/day; 组间恢复时间 24 h;（2）第 2 周，60% EV，坡度 14%，45 min/day，1 组/day; 组间恢复时间 24 h;（3）第 3 周，60% EV，坡度 14%，60 min/day，1 组/day; 组间恢复时间 24 h;（4）第 4 周，70% EV，坡度 14%，60 min/day，1 组/day; 组间恢复时间 24 h;（5）第 5 周，75% EV，坡度 14%，75 min/day，1 组/day; 组间恢复时间 24 h;（6）第 6 周，75% EV，坡度 14%，75 min/day，2 组/day，组间恢复时间 4 h。

研究结果：

（1） 在最后一次训练后第三天测定血浆中肌酸激酶（CK）活力、游离血红蛋白（FHb）和尿素氮（BUN）浓度。

与对照组相比，OT 组的 CK 活力显著升高，不同浓度 KGM 均可使 CK 活力得到显著降低，且 CK 活力随着 KGM 浓度的升高而呈现显著降低趋势；OT 组的 FHb 浓度显著提升，不同浓度 KGM 均可显著降低使 FHb 浓度得到显著降低，其中 KM 组较 KH、KL 组降低更加明显。；OT 组血清中 BUN 浓度显著降低，这可能与机体蛋白合成超量恢复有关，而仅 KH 组 BUN 浓度与过度训练组相比显著升高。

（2） 与对照组相比，OT 组的肠道总长度增加，小肠与大肠的长度也均有显著增加。补充不同浓度的 KGM 均可减少由过度训练所引起的肠道长度增加；OT 组小鼠的微生物组成和代谢功能产生不良表现，如结肠炎症浸润，运动成绩降低。KM 较 KH、KL 组相比，结肠炎症显著降低。

（3） OT 组小鼠粪便中乙酸、丙酸、丁酸浓度和总短链脂肪酸的浓度显著增加，但不同浓度的 KGM 补充均未显著增加某个或总短链脂肪酸的浓度。另一方面，过度训练增加了血清中乙酸、丁酸和总短链脂肪酸浓度，KH 组乙酸、丙酸和总短链脂肪酸浓度显著增加。

（4） 与对照组相比，OT 组小鼠的最大瞬间上肢握力显著降低，补充 KGM 可显著提高小鼠的最大瞬间上肢握力，其中 KM 组较 KH、KL 组增加的更为明显。与对照组相比，OT 组的最长跑步时间显著下降，补充 KGM 可使最长跑步时间显著增加，其中 KH 组相比 KH、KL 组增加更多，并超过对照组最长跑步时间。

研究结论：对小鼠进行过度训练干预可对其肠道菌群结构和功能及运动表现产生负面影响，不同浓度的 KGM 补充对这些负面影响产生不同程度的调节作用，具有更高浓度的 KGM 的调节效果一般更为显著。这为 KGM 调节人体因运动而失调的肠道菌群结构及功能和提高运动表现提供了应用依据。

在该实验中还发现，机体对于 KGM 的消化和利用能力似乎存在着一个阈值，这为膳食补充 KGM 的合适剂量范围提供参考。

关键字 过度训练；魔芋多糖；肠道菌群；运动表现；抗疲劳

分类：公共营养与健康

碘过量对大鼠骨重建作用机制的研究

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目的：本研究旨在明确长期碘过量对骨重建的作用机制，通过观察长期碘过量大鼠骨重建的改变，探索高碘摄入对成骨细胞与破骨细胞特异性基因转录水平的影响，明确碘过量对骨代谢的影响，为我国全民食盐加碘（Universal Salt Iodization, USI）政策科学、长久的实施提供数据参考。

方法：选取一月龄 Wistar 大鼠，雌雄各半，按体重、性别随机分为碘适宜组（NI）、50 倍碘过量组（50HI）和 100 倍碘过量组（100HI），每组 40 只。各组大鼠食用适碘饲料（碘含量为 296.1±7.9μg/kg），分别饮用不同碘浓度（7.6μg/L、10045μg/L、20295μg/L）的去离子水进行干预。干预至 1、5、9 月时对各组大鼠进行碘代谢实验，采用砷-铈催化分光光度法测定大鼠 24 小时尿碘浓度（24-h UIC）。碘干预至 6、12 月时处死大鼠，采用 ELISA 方法测定大鼠血清中骨钙素（OC）水平；采用 TRAP 染色观察破骨细胞形态；采用盐酸四环素与钙黄绿素荧光双标记法计算各组大鼠矿物质沉积率（MAR）；采用实时荧光定量 PCR 方法（RT-PCR）检测各组大鼠成骨细胞中人 Runt 相关转录因子 2（RUNX2）、骨钙素（OCN）与破骨细胞中基质金属蛋白酶-9（MMP-9）、组织蛋白酶 K（CtsK）的转录水平。

结果：

（1）NI 组、50HI 组和 100HI 组的大鼠的 24-h UIC 分别为 278.20 (157.30, 524.10) μg/L、14722.00 (14094.00, 16460.00) μg/L 及 37585.00 (17160.00, 46084.00) μg/L 。50HI 组和 100HI 组的大鼠的 24-h UIC 明显高于 NI 组，以 100HI 组最高（$P<0.05$），适碘组与各高碘组大鼠的尿碘水平间倍数关系基本与碘摄入水平间倍数关系平行，尿碘水平随着碘摄入剂量上升而上升，大鼠碘过量干预效果良好。

（2）高碘干预至 12 个月时，各组大鼠血清骨钙素水平均没有统计学差异（$P>0.05$），对大鼠进行雌雄分组后，雌性大鼠骨钙素水平有统计学差异（$P<0.05$），雄性大鼠骨钙素水平无统计学差异（$P>0.05$）。

（3）TRAP 染色显示 NI 组可见形态不规则、巨大、多核的破骨细胞，胞浆染色呈砖红色。随着碘摄入增加，破骨细表现为 TRAP(+)多核细胞数量减少，其中雌性大鼠变化较明显。

（4）高碘干预至 12 月时，与 NI 组相比，50HI 组和 100HI 组大鼠双标记线间距变窄，MAR 明显下降（$P<0.01$），且盐酸四环素、钙黄绿素标记线呈现弥散的状态，出现明显的断裂。

（5）与 NI 组相比，50HI 组和 100HI 组大鼠成骨细胞中 RUNX2 与 OCN 转录水平明显上调，差异具有统计学意义（$P<0.01$）；50HI 组和 100HI 组破骨细胞中 MMP-9 与 CtsK 转录水平明显上调，与 NI 组相比差异具有统计学意义（$P<0.01$）。

结论：

长期碘摄入过量影响成骨细胞与破骨细胞的活性，导致大鼠骨矿化能力障碍，抑制大鼠成年期的正常骨重建，尽管机体代偿性上调成骨细胞与破骨细胞的转录水平与活性，依然无法纠正长期碘过量造成的骨骼改变，最终造成机体骨重建受抑制。提示长期碘过量可导致内分泌型骨质疏松，应对碘过量引发的骨代谢改变予以重点关注。

关键字 碘过量；骨代谢；骨重建

分类：公共营养与健康

碘过量对大鼠股骨关节软骨及生长板的影响

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摘要

目的：本研究旨在了解碘过量对大鼠股骨关节软骨及生长板的影响，探讨碘过量对骨发育、骨代谢及骨关节疾病的影响及作用机制，为碘过量相关疾病的防治工作提供理论依据。

方法：选用断乳 1 个月的 Wistar 大鼠作为研究对象，雌雄各半，按体重、性别随机分为适碘组（NI）、5 倍高碘组（5HI）、10 倍高碘组（10HI）、50 倍高碘组（50HI）与 100 倍高碘组（100HI），每组 40 只，给予不同组别大鼠不同剂量高碘饮水复制碘过量模型。饲养期间，定期检测各组大鼠尿液碘含量及体重、身长等生长发育指标；然后分别在饲养 6 个月、12 月时股动脉取血后处死大鼠，收集大鼠血液、甲状腺、股骨和关节软骨等生物样本。采用化学发光法测定大鼠血清游离三碘甲状腺原氨酸（Free Triiodothyronine,FT_3）、游离甲状腺素（Free Thyroxine,FT_4）及敏感促甲状腺激素（Sensitive Thyroid Stimulating Hormone,sTSH）水平；采用放射免疫分析法测定血清三碘甲状腺原氨酸（Triiodothyronine,T_3）、甲状腺素（Thyroxine,T_4）；测量股骨长度及骨密度，HE 染色观察股骨软骨生长板及关节软骨的病理改变。

结果：

（1） 与 NI 组相比，随着碘摄入量增加，各 HI 组大鼠尿碘水平成倍增加（$P<0.05$）；

（2） 大鼠饲养 6 个月时，各 HI 组雄性大鼠血清 sTSH 水平较 NI 组有升高趋势，但无统计学差异（$P>0.05$）；大鼠饲养 12 个月时，各 HI 组雄性大鼠血清 sTSH 水平较 NI 组有不同程度升高，而 FT_4 水平不同程度降低（$P<0.05$）；

（3） 与 NI 组相比，各 HI 组大鼠甲状腺出现多形性变化，部分个体表现为滤泡明显增大，胶质储留；随着碘摄入量增加和时间的增长，大鼠甲状腺组织增生更加严重，滤泡结构消失；

（4） 各 HI 组大鼠股骨骨骺生长板出现异常，表现为增殖细胞数目减少，肥大细胞层次增多，软骨钙化不良；并且与 NI 组相比，各 HI 组关节软骨出现异常，表现为各层软骨细胞排列紊乱，潮线断裂、不清晰；

（5） 大鼠饲养 6 个月时体重、身长及股骨长度虽然在 HI 组出现降低趋势但是无统计学差异（$P>0.05$），仅 12 个月时，10HI 组雄性大鼠股骨长度出现降低，且差异具有统计学意义（$P<0.05$）；大鼠饲养到 6 个月时各组大鼠股骨骨密度间无明显差异（$P>0.05$），但是 12 月时 5HI、10HI 组雄性大鼠股骨骨密度降低，差异具有统计学意义（$P<0.05$）。

（6） 大鼠饲养到 6 个月时，各 HI 组雄性大鼠生长板厚度与 NI 组相比降低（$P<0.05$）；大鼠饲养到 12 个月时，雌性大鼠中 50HI、100HI 组股骨生长板厚度与 NI 组相比降低（$P<0.05$）。

结论：碘过量可引起股骨生长板组织形态异常改变、厚度降低，导致长骨发育及代谢异常，增加骨性关节炎的患病风险，并且这种病理改变会随着碘摄入剂量的增加及时间的增长而加重。应该加强对人群碘营养状况及碘摄入过量人群骨关节疾病相关指标的监测，避免碘过量。

关键字 碘过量；Wistar 大鼠；甲状腺功能；生长板；关节软骨

分类：公共营养与健康

不同碘水平下大鼠唾液碘及唾液腺中 NIS 变化的研究

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目的：本研究通探讨不同碘水平下大鼠唾液碘的变化规律，并以唾液腺中的钠碘转运体（NIS）作为切入点，对唾液腺中碘转运机制进行初步探索，为以后唾液腺中碘调控机制的深入研究提供实验思路与参考。

方法：选取断乳后 4~6 周龄的 Wistar 雌性大鼠 40 只，体重 70~120g。在适应性喂养 1 周后，将 40 只 Wistar 雌性大鼠按体重随机分为碘缺乏组（LI）、碘适宜组（NI）、50 倍高碘组（50HI）和 100 倍高碘组（100HI），每组 10 只。各组大鼠均使用低碘饲料喂养，抽检饲料平均的含碘量为 46.72± 6.83 μg/kg，饲料中的其他营养素充足。将 KI 作为碘补充剂，通过饮水的方式对大鼠进行不同剂量碘水平的干预。LI 组、NI 组、50HI 组和 100HI 组大鼠的饮用水中碘离子的浓度分别为 0μg/L、325μg/L、18700μg/L 和 37450μg/L。按照每只大鼠每日的饮水量为 30mL、进食量为 20g 以及大鼠处于碘适宜状态时每日所需碘摄入量为 6~9μg，计算 LI 组、NI 组、50HI 组和 100HI 组大鼠具体的每日总碘供给量分别为 1μg/d、7.5μg/d、375μg/d 和 750μg/d。对各组大鼠进行碘代谢实验，使用代谢笼收集各组大鼠的 24h 尿液，记录尿量并将收集的 24h 尿液倒入 5mL 的离心管保存。按照 100 微升（μl）/100g 体重腹腔注射配制好的毛果芸香碱溶液，使用移液枪吸取大鼠口腔中分泌的洁净唾液，放入 2mL 的离心管中，至大鼠停止大量分泌唾液后停止收集。条件喂养 12 周后，麻醉大鼠取出大鼠的唾液腺组织。采用电感耦合等离子体质谱法（inductively coupled plasma mass spectrometry, ICP-MS）测定 24 小时尿碘浓度（24h-UIC）和随机唾液碘浓度（SIC）。使用 Western Blot 方法测定四组大鼠的唾液腺中钠碘转运体蛋白（NIS）的表达。

结果：

（1）各组大鼠的 24h 总碘摄入量之间的差异有统计学意义（P<0.001）。LI 组、NI 组、50HI 组和 100HI 组的 24h-UIC 分别为 22.082 μg/L（14.94 μg/L,46.07 μg/L）、198.97 μg/L（149.89 μg/L,254.39 μg/L）、6858.64 μg/L(（5105.92μg/L,8694.83μg/L）、13101.43μg/L（10039.36 μg/L,16817.34 μg/L），各组间的差异有统计学意义（P<0.01）。各组尿碘浓度中位数与碘摄入量呈正相关关系，这表明本次动物实验的模型造模成功。

（2）各碘组大鼠的随机唾液碘浓度与 24h-UIC 差异性分析：LI 组、NI 组、50HI 组和 100HI 组大鼠的随机唾液碘浓度在数值上均低于 24h-UIC（P均<0.001）。

（3）各碘组大鼠的随机唾液碘浓度与 24h-UIC 相关性分析：LI 组的随机唾液碘浓度与 24h-UIC 之间无相关关系（r=0.214, P=0.050）；NI 组、50HI 组和 100HI 组的随机唾液碘浓度与 24h-UIC 之间均呈正相关关系（r=0.424, P<0.001; r=0.441, P<0.001; r=0.426, P<0.001）。

（4）各组大鼠 NIS 蛋白表达：在颌下腺中，与 NI 组相比，LI 组 50~55kDa 与 75~115kDa NIS 蛋白表达均显著增加（P<0.05），50HI 组的 50~55kDa NIS 蛋白、100HI 组的 50~55kDa NIS 蛋白和 75~115kDa NIS 蛋白显著下降（P<0.05），100HI 组 NIS 蛋白的表达量低于 50HI 组（P<0.05）。在腮腺中，分子量为 50~55 kDa 的 NIS 蛋白表达量在四个组之间有差异（F=4.258，P<0.05），50HI 组、100HI 组低于 LI 组（P<0.05），100HI 组低于 NI 组（P<0.05）。

结论：不同碘水平下，大鼠的唾液碘水平在数值上均低于 24h 尿碘浓度，NI 组、50HI 组和 100HI 组大鼠的 SIC 与 24h-UIC 之间呈正相关关系。大鼠可通过自身的代偿作用调节唾液腺中碘的转运，碘缺乏能够提高钠碘转运体（NIS）的表达，碘过量时能够减低 NIS 的表达。

关键字 大鼠；尿碘；唾液碘；唾液腺；钠碘转运体

分类：公共营养与健康

碘过量对大鼠骨组织和结构的影响

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目的：本研究旨在通过探究碘过量对大鼠成骨细胞与破骨细胞的影响；以及骨结构变化关系与力学功能的变化，明确碘过量对骨健康的影响为高碘防治工作提供理论依据。

方法： 选取新生的 Wistar 大鼠（断乳 1 个月）为研究对象，雌鼠和雄鼠各占 50%，遵循随机化原则，按性别、体重分为对照组（NI）、5 倍高碘组（5HI）、10 倍高碘组（10HI）、50 倍高碘组（50HI）与 100 倍高碘组（100HI）。饲养周期为 12 个月，分别在实验开始的第 1 个月、5 个月及 9 个月，采用代谢笼收集大鼠 24h 尿液，测定尿碘含量。在饲养 6 个月和 12 个月时行股动脉取血，分离血清，采用偶氮胂法测定血清钙、采用磷钼还原法测定血清磷、并采用 ELISA 方法测定血清中骨钙素（BGP）水平。处死的大鼠，剥离股骨，做三点弯曲力学实验，同时做股骨 Von kossa 染色，分别进行骨组织计量学测定和类骨质分析。做 TRAP 染色，观察破骨细胞形态，探究高碘摄入对破骨细胞活性的影响。

结果：

（1）与 NI 组相对比，随碘摄入量的增加，HI 组大鼠尿碘含量成倍增加（$P<0.05$）。

（2）大鼠饲养到 6 个月时，各 HI 组与 NI 组钙磷水平差异不大，5HI、10HI、50HI、100HI 血清钙磷均有不同程度的升高趋势，但与 NI 组均无统计学差异（$P>0.05$）。大鼠饲养到 12 个月时，各 HI 组与 NI 组钙磷水平差异较小，经检验各组血清钙磷均有降低趋势，且均无统计学差异（$P>0.05$）。比较 6 个月与 12 个月摄入不同碘剂量组大鼠血中的钙含量，雄性大鼠除 5HI 组外差异均有统计学意义（$P<0.05$），雌性大鼠仅 NI 组与 10HI 组差异有统计学意义（$P<0.05$）。6 个月与 12 个月不同剂量组大鼠血中磷含量的比较，雄性大鼠均无统计学差异（$P>0.05$），雌性大鼠则 100HI 有统计学差异（$P<0.05$）；12 个月时，各组大鼠血清骨钙素水平均没有统计学差异（$P>0.05$），雌雄分组雌性大鼠组有统计学差异（$P<0.05$）。

（3）大鼠饲养到 6 个月和 12 个月时，各 HI 组与 NI 组的大鼠各指标相对比，股骨直径间差别均无统计学意义（$P>0.05$）；胫骨最大挠度间的差异亦均无统计学意义（$P>0.05$）；最大载荷间差异均无统计学意义（$P>0.05$）；股骨最大应力差异无统计学意义（$P>0.05$）。

（4）骨形态计量学检验，各组间骨小梁百分比与成骨细胞百分比均有统计学差异（$P<0.05$）。

（5）TRAP 染色显示 NI 组可见形态不规则、巨大、多核的破骨细胞，胞浆染色呈砖红色。雌性大鼠多于雄性大鼠。10HI 组起，破骨细胞开始出现变化，表现为 TRAP(+)多核细胞数量减少。在 50HI、100HI 组，以上改变尤其明显，TRAP(+)多核细胞数量少，雌性大鼠变化较明显，雄性变化趋势不明显。

结论：1. 碘摄入过量可导致股骨应力下降，脆性增加。2.碘摄入过量可影响成骨细胞与破骨细胞活性，长期碘过量可导致骨质疏松，增加骨折风险。

关键字 碘过量 Wistar 大鼠 骨结构 成骨细胞 破骨细胞

分类：公共营养与健康

血脂异常人群中饮用红茶与高血压的关联

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目的：高血压是心血管疾病的主要危险因素，以往研究表明饮用红茶能够有效降低血压。既往研究大多数是在血脂正常的人群中开展，然而高血压患者常常合并血脂异常，二者之间存在相互促进的关系。因此，本研究旨在血脂边缘性升高者中，探讨红茶的饮用频率与血压的关联。

方法：调查对象为116名血脂异常[3.4 ≤ 低密度脂蛋白胆固醇(LDL-C) < 4.9 mmol/L, 5.18 ≤ 总胆固醇（TC）< 7.2 mmol/L 及1.7 ≤ 甘油三酯（TG）< 5.6 mmol/L]，未经临床诊断为高血压且年龄在18至70岁的西安市居民。使用电子血压计测量右上臂血压三次，每次间隔两分钟，计算三次血压的平均值用于分析。采用基于Redcap的在线问卷系统收集食物的摄入频率信息。参与者被要求回答过去12个月里包括红茶在内的12大类食物的摄入频率[每周至少摄入4次，每周摄入1至3次，每月摄入小于等于4次，和从不或很少摄入(参照组)]。连续型变量的组间差异比较采用方差分析，分类型变量的组间差异比较采用确切概率法。采用一般线性模型计算收缩压和舒张压在不同红茶摄入频率组的矫正均数，并检验组间剂量效应趋势，调整的协变量包括年龄，性别，吸烟，饮酒，文化程度及体质指数。

结果：总体而言，10.3%和50.0%的参与者分别报告了每周至少4次饮用红茶和从不饮用。全体参与者的基线血脂水平包括LDL-C、TC和TG的均值（mmol/L）及标准差分别为3.95 (0.62)、5.81 (0.76)和2.48 (1.23)，其中LDL-C和TC在不同的红茶摄入频率组间没有显著差异（*P*值分别为0.684,0.447），而TG在组间存在差异（*P*=0.014）。参与者的主要基线特征如年龄、性别、婚姻状况、体质指数、受教育水平，吸烟状况和饮酒状况在不同的红茶摄入频率组间没有显著差异（*P*均>0.05）。在全体参与者中，红茶饮用频率越高收缩压越低，趋势性*P*=0.011。特别在年龄大于等于45岁者中，红茶摄入频率由低到高所对应的矫正后的血压(mmHg)均值及95%CI依次为129.8 (117.3,142.4),128.2 (112.6,143.7),124.4 (111.4,137.3),115.7 (99.3,132.0)，趋势性*P*=0.032。在全体参与者中舒张压与红茶饮用频率间未观察到显著关联，趋势性*P*=0.131。根据胆固醇水平的中位数分层后，在LDL-C<3.94 mmol/L和TC<5.72 mmol/L的参与者中观察到红茶饮用频率越高收缩压（趋势性*P*分别为0.003，0.006）和舒张压（趋势性*P*均为0.008）越低；而在血脂较高分组中，红茶饮用频率与收缩压（趋势性*P*分别为0.583，0.354）和舒张压（趋势性*P*分别为0.688，0.818）均未观察到显著关联。

结论：在血脂边缘性升高且未诊断高血压者中，较高的红茶饮用频率与较低的血压相关，在年龄较高、血脂较低个体中更为明显。

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关键字 红茶；血压；血脂异常

分类：公共营养与健康

青岛市儿童青少年肥胖与血压水平的研究

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目的比较山东省青岛市中国学生体重指数(BMI)和体重指数(BF)不同的儿童和青少年的血压水平。方法本研究共有 5274 名 7 ~ 18 岁学生(男生 2674 名，女生 2600 名)参加。测量所有受试者的身高、体重、肱三头肌、肩胛下肌和血压，并计算 BMI。超重和肥胖的患病率是根据 2007 年世界卫生组织参考临界值得出的。使用公式计算脂肪量(FM)和无脂肪质量(FFM) ，FM (kg) =% FM × 体重(kg)/100 和 FFM (kg) = 体重(kg)-FM (kg)。相对较高的血压状态被定义为收缩压(SBP)和/或舒张压(DBP)≥95 百分位的年龄和性别。结果 SFT ≥ P85 的儿童、青少年 BMI 各项指标(体重正常、超重、肥胖)均高于 SFT < P85 的儿童、青少年(p < 0.01)。当 BMI 和 SFT 合并时，SFT ≥ P85 组肥胖(男性 38.4% ，女性 29.2%)和 SFT < P85 组正常体重(男性 16.4% ，女性 14.1%)的相对高血压患病率最高和最低。

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关键字 体重指数，皮褶厚度，血压，肥胖，体脂率(BF) ，青少年

分类：公共营养与健康

碘过量对大鼠骨小梁结构和骨量的影响

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目的：本研究旨在明确碘过量对骨小梁结构和骨量的影响，完善碘过量对骨代谢作用的相关数据，为碘营养与骨代谢研究提供科学依据。

方法：选取体重在120~140g的Wistar大鼠，雌雄各半，按体重、性别随机分为四组：适碘组（NI）、50倍碘过量组（50HI）与100倍碘过量组（100HI），每组40只。各组大鼠均食用适碘饲料，分别饮用不同碘含量（7.6μg/L、10045μg/L、20295μg/L）的去离子水进行干预。干预期间监测各组大鼠的体重。在干预至1、5、9月时进行碘代谢实验采集各组大鼠24小时尿液，采用砷-铈催化分光光度法测定24小时尿碘浓度（24-h UIC）。干预至6月和12月时处死大鼠，并采集各组大鼠的血清、甲状腺组织及股骨。采用化学发光免疫法测定各组大鼠血清游离三碘甲腺原氨酸(FT3)、游离甲状腺素(FT4)及灵敏促甲状腺激素(sTSH)；采用双能X射线骨密度检测仪测定大鼠股骨骨密度（BMD）；采用HE染色观察甲状腺与骨小梁病理改变。

结果：

（1）在干预期间，各组大鼠体重先呈现稳定上升趋势，随着月龄增长，各组大鼠体重增长速度逐渐减缓，当体重增长到一定程度时，各组大鼠体重趋于稳定。

（2）在干预期间NI 组、50HI 组和 100HI 组的大鼠的24-h UIC之间存在明显差异（$P<0.05$）；50HI 组和 100HI 组的大鼠的24-h UIC明显高于NI组，100HI 组的大鼠的24-h UIC明显高于50HI组（$P<0.05$）。

（3）在干预期间，50HI 组和 100HI 组的大鼠FT3、FT4水平与NI组间差异均无统计学意义（$P>0.05$）。干预至 12月时，50HI 组和 100HI 组雄鼠的FT4含量显著低于NI组雄鼠（$P<0.01$）。50HI 组和 100HI 组雄鼠的sTSH含量显著高于NI组雄鼠（$P<0.01$），呈现明显的甲状腺功能减退。

（4）甲状腺HE染色结果显示，NI组大鼠甲状滤泡结构完整，大小正常；50HI 组和 100HI 组大鼠甲状腺形态出现多型性改变，表现为滤泡增生，部分个体出现了滤泡融合、胶质潴留，并且随着干预剂量和时间的上升，滤泡增生更加明显，上皮细胞空泡增多，提示TSH刺激征象。

（5）各月龄的碘过量组大鼠股骨骨密度与NI组相比，差异无统计学意义（$P>0.05$）；干预至6月时，随着碘摄入量增加，雌性、雄性大鼠的股骨BMD均出现了减低趋势。随着干预时间的延长，50HI 组和 100HI 组大鼠的股骨BMD出现了减低趋势。

（6）干预至6月时，碘过量组骨小梁稀疏变细，出现扭曲、断裂，50HI组和100HI组出现明显的骨小梁排列杂乱无章，骨髓腔内造血细胞数量下降，脂肪空泡增多；干预至12月时，骨小梁形态学改变明显加剧，缺损更加严重。

结论：

长期碘摄入过量引起大鼠甲状腺功能减退，导致骨量与骨骼微结构均发生异常改变，提示长期碘过量可导致内分泌型骨质疏松，应对碘过量引发的骨代谢改变给予高度重视。

关键字 碘过量；骨代谢；骨密度；骨小梁

分类：公共营养与健康

超重和肥胖儿童高尿酸血症的相关危险因素分析

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目的：在超重肥胖儿童中进一步探索高尿酸血症的危险因素，并根据此研究提出预防因素。方法：选取 2022 年 6 月至 2022 年 8 月的来本院临床营养科就诊的儿童为研究对象。收集体重、腰围、臀围、体脂肪率、内脏脂肪面积，并测量研究对象的尿酸、总胆固醇、甘油三酯、高密度脂蛋白胆固醇和低密度脂蛋白胆固醇水平。结果：一共纳入 40 名研究对象，其中超重 5 人，肥胖 35 人。患高尿酸血症和不患有高尿酸血症的人群相比，患高尿酸血症的人年龄更大，且患有脂肪肝的人数也更多。Logistic 回归分析显示高尿酸血症与脂肪肝独立相关。

结论：在我们的研究中发现超重和肥胖的儿童和青少年中内脏脂肪面积和脂肪肝与与高尿酸血症显著相关。

[关键词]：超重；肥胖；高尿酸血症；危险因素

随着社会经济的提高，我国的饮食结构和生活方式发生了巨大的改变，儿童的超重和肥胖的发生率也在逐步上升。《中国儿童肥胖报告》中指出，2014 年我国城市 7 -18 岁男生超重肥胖检出率已经达到 28.2%%，女生达到 16.4%，农村男生达到 20.3%，农村女生达到 12.8%。与非超重儿童相比，超重、肥胖儿童高尿酸血症发生率明显增高。而高尿酸血症可导致痛风，并与心脏代谢疾病的风险增加相关。在超重肥胖儿童中进一步探索高尿酸血症的危险因素，并提出预防因素是很有必要的。

1.资料与方法

1.1 一般资料：

选取 2022 年 6 月至 2022 年 8 月的来本院临床营养科就诊的儿童为研究对象。筛选超重、肥胖的儿童，自愿参加本次研究，年龄范围为 5-18 岁的 40 例儿童作为研究对象。研究对象都为男性，其中超重 5 例，肥胖 35 例。

1.2 方法

经统一培训的调查员采用问卷调查的方式收集研究对象的基本信息。经统一培训的医护人员利用卷尺测量研究对象的身高，利用 Inbody 测量其体重、腰围、臀围、体脂肪率、内脏脂肪面积。

抽取研究对象的空腹血，然后检测其总胆固醇（total cholesterol,TC）、甘油三酯(triglyceride,TG)、高密度脂蛋白胆固醇(high density lipoprotein cholesterol, HDL-C)、低密度脂蛋白胆固醇 (low density lipoprotein cholesterol, LDL-C)水平。

利用 B 超对研究对象的上腹部进行检查，诊断其是否患有脂肪肝。

1.3 诊断标准: （1）尿酸≥420μmol/L，则定义为高尿酸血症[2]；（2）超重、肥胖[3]:依据《中国学龄儿童青少年超重、肥胖筛查体重指数值分类标准》进行判断;（3）高 TC 血症：TC≥5.18 mmol/L;高 TG 血症：TG≥1.13mmol/L(6～9 岁)、TG≥1.47mmol/L(10～19 岁)；低 HDL-C 血症 HDL-C≤1.04mmol/L；高 LDL-C 血症 LDL-C≥3.37mmol/L[4]。

1.4 统计学方法

采用 SPSS 25 统计软件进行数据分析。连续性变量利用均数和标准差进行描述，利用两独立样本 t 检验，分类变量利用用频数和构成比（%）描述，利用卡方检验。将患有高尿酸血症的结局定义为 1，未患有高尿酸血症的定义为 0，使用非条件 logistic 回归模型分析一些因素（年龄、肥胖程度、每周运动时长、脂肪肝、高 TC 血症、低 HDL-C 血症、高 LCD-C 血症、高 TG 血症）与高尿酸血症的关联，并估算其优势比（odds ratio，OR）和 95%置信区间（confidence interval，CI）。

关键字 超重，肥胖，高尿酸血症，危险因素

分类：公共营养与健康

大学生 NAFLD 的营养与运动干预

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目的：NAFLD 在年轻人群中的估计患病率从 2007 年至 2010 年期间的 17.8%上升到 2015 年至 2018 年期间的 28.7%。NAFLD 的防治和治疗方法主要是通过改变饮食和体育锻炼来控制体重。本研究拟在筛查为非酒精性脂肪性肝病（non-alcoholic fatty liver disease,NAFLD）的大学生中开展调查。探讨 hPVG（限制红肉/加工肉，富含绿色植物和木酚素）对 NAFLD 的有效性。关注青年人肝脏代谢风险，为 NASH 和肝纤维化的饮食与运动预防提供依据。

方法：计划实施 3 个月的饮食干预随机对照试验，在此期间，提供每日膳食。问卷和临床测量以及运动量的统一控制在干预过程中同时进行。纳入标准：1、研究对象为安徽医科大学本部和安徽医学高等专科学校在籍预防医学专业的大学生；2、年龄在 18~24 岁之间；3、以前没有参与过相似调研活动的；4、腹部肥胖（腰围（WC）：男性>102cm，女性>88cm）；5、NAFLD 诊断标准：符合《非酒精性脂肪性肝病防治指南（2018 年更新版）》。排除标准：1、习惯性饮酒（≥20g/d）或有心肌损伤史（定义为肌酐磷酸激酶水平>参考上限（≥600 IU/L）的 3 倍和慢性病毒性肝病（如乙型或丙型肝炎））的前瞻性受试者被排除在外；2、有过量饮酒史：男性饮酒折合乙醇量＞30g/d，女性＞20g/d；3、有服用促脂肪生成相关药物超过 3 个月（即胺碘酮、丙戊酸钠、甲氨蝶呤、他莫昔芬和皮质类固醇）需排除。样本量的确定依据 CAP（主要结局指标之一）干预前后变化，使用 G.Power3.1 进行样本量计算。对照一项在中国开展的 NAFLD 相关的 RCT 所得出干预前后 CAP 变化情况，计算其效应量（Effect Size）约为 0.56。取 α 值为 0.05，（1-β）值为 0.9，计算出所需样本量为每组 15 人，共 45 人。取脱落率为 20%，共需招募志愿者约 57 人。参与者按照“1：1：1”的概率被随机分配到 (A) 健康饮食、(B) 普通植物型饮食或 (C) “健康植物”型饮食组中，三组均进行体力活动干预。使用体成分测量仪和 Fibroscan 等相关仪器收集数据及生物标本后进行分析，与基线期的数据进行比较并得出结果。

结果：FibroScan 基于超声的振动控制瞬时弹性成像的仪器可用于检测肝脏硬度值以及脂肪含量，其用于定量检测肝脏脂肪含量的指标称为受控衰减参数(controlled attenuation parameter，CAP)。CAP 值≥293 db／m 考虑为肝脏重度脂肪变性(S3),260≤CAP 值<293 db／m 考虑为肝脏中度脂肪变性(S2)，238≤CAP 值<260 db／m 为肝脏轻度脂肪变性(S1)，CAP 值<238 db／m 考虑为肝脏无明显脂肪变性(S0)。三组受试者经 Fibroscan 测量的 CAP 指数较基线期均有所改善。其中“健康植物”型饮食组改善效果最显著。

结论：富含植物性多酚、红肉/加工肉类含量较低的植物性饮食，可能是改善非酒精性脂肪肝的有效干预措施。

关键词：非酒精性脂肪肝；植物性饮食；大学生；随机对照试验

关键字 非酒精性脂肪肝；植物性饮食；大学生；随机对照试验

分类：公共营养与健康

上海市 8-10 岁学龄儿童碘营养状况与考试成绩关系研究

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目的：根据上海市近十年的人群碘营养状况监测结果显示，8 至 10 岁儿童的尿碘浓度中位数自 2011 年后一直维持在适宜水准范围内逐年上升，尤其 2017 年人群中尿碘浓度超过 200μg/L 的比例为 43.8%，为六年内最高，提示部分人群可能存在碘过量的危险。同时，越来越多的研究指出碘过量和碘缺乏一样，也会损伤儿童大脑发育导致智力损伤。本研究通过收集 2021 年 8 至 10 岁儿童碘营养状况和考试成绩等资料，分析碘营养状况与考试成绩之间关系。

方法：本次研究采用多阶段分层随机法抽样，上海 16 个行政区均参与本次调查，每个区按方位划分 5 个抽样片区，在每个片区各随机抽取 1 个街道（镇），在每个街道（镇）各随机抽取 1 所小学，每个小学抽取 40 名 8-10 岁非寄宿学生。采集每个观察对象的日间随机尿液样本以及家中食用盐样本，并通过问卷的方式收集碘营养状况相关资料与上一学期期末统考成绩资料，同时每所学校的食堂食用盐样本也被一并收集。所有尿样本和盐样本都送往上海市市疾控中心以及各区疾控中心实验室测定碘浓度。我们使用 SPSS21.0 对不同碘营养组的学生考试成绩差异进行数据分析。

结果：本次研究共纳入 3213 位学龄儿童，所有儿童的尿液样本和家庭户盐样本均被收集并检测，上海市 8-10 岁儿童尿碘浓度为 195.4（122.0，285.8）μg/L，其中尿碘浓度超过 200 ug/L 的人群占 48.8%。上海市家庭户碘盐覆盖率为 60.3%，家庭户碘盐碘浓度为 21.51±9.30mg/kg，学校食堂碘盐覆盖率为 82.5%，学校食堂碘盐碘浓度为 25.29±3.40 mg/kg。考试成绩问卷共回收 3011 份，分析结果显示，在语文、数学和英语考试中，适宜碘营养组的学生都比过量碘营养组的学生取得了更好的成绩（P<0.001）。在调整了 BMI，城市区域，性别等影响因素后，多元 logistic 回归结果显示相对于适宜碘营养组，过量碘营养组的学生在语文、数学和英语考试中都不容易取得“A”（b=-0.346, P<0.001;b=-0.255, P=0.002; b=-0.329, P<0.001）。

结论：我们的研究结果显示 2021 年度上海市 8 至 10 岁儿童的碘状况是适宜的，但其水平几乎接近上限值，这表明上海市人群碘摄入量存在过量的风险。目前上海市家庭户盐碘覆盖率较低，但是考虑到实际的碘营养状况，以后我们可能不再需要强调碘盐的强制覆盖。碘过量可能会损伤儿童智力发育，从而造成他们在学习过程中表现不佳导致语文、英语和数学考试成绩偏低。我们应当加强碘过量的宣传与监测，防止人群碘过量情况加剧对儿童正常身心发育造成不利影响。

关键字 尿碘浓度，盐碘浓度，智力，考试成绩，学龄儿童

分类：公共营养与健康

LPL 基因多态性、血脂水平与 AD 的相关性研究

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目的：阿尔茨海默症（AD）是一种以记忆认知功能障碍为特征的中枢神经系统退行性病变，发病涉及多基因。载脂蛋白 E（APOE）具有调节胆固醇代谢和运输的功能，胆固醇代谢、转运的改变与多种神经退行性疾病的病理有关。APOE 被认为是 AD 的主要风险因子。血脂是血清中的总胆固醇（TC）、甘油三酯（TG）和类脂等的总称。血脂不溶于水，需与特殊的蛋白质即载脂蛋白结合形成脂蛋白才能溶于血液，被运输至组织进行代谢。脂蛋白分为:乳糜微粒、极低密度脂蛋白、中间密度脂蛋白、低密度脂蛋白（LDL-C）和高密度脂蛋白（HDL-C）。APOE 对血脂水平影响的研究结果并不一致，APOE 能否通过血脂途径影响 AD 有待证实。脂蛋白脂酶（LPL）是脂代谢的关键酶，LPL 基因的遗传和变异可能会影响其活性，进而影响脂质代谢。研究发现 LPL 基因多态性（SNPs）与非华裔人群罹患 AD 的风险有关，但在中国汉族人群未见相关报道。本研究通过检测 AD 患者和对照人群的血脂水平以及 APOE 和 LPL 的 SNPs，探索了血脂水平、LPL 和 APOE 的 SNPs 与 AD 风险因素之间的内在关联，研究结果可为 AD 的早期风险筛查提供参考。

方法：本研究纳入 2020 年 7 月至 2022 年 12 月于辽宁省金秋医院住院治疗的 AD 患者 180 例，根据性别、年龄(±10 岁)与病例组匹配、无 AD 家族史，选取对照人群 180 例。收集所有受试者的年龄、性别、身高、体重、吸烟史、饮酒史、AD 家族史、疾病史（糖尿病、高血压、心脏病、肿瘤）情况。清晨空腹用 EDTA 抗凝管采集静脉血 4mL，提取 DNA，采用 TaqmanTM 探针方法检测 LPLrs285、LPLrs320、LPLrs328 和 APOE 基因型。通过 Hardy-Weinberg 平衡检验、卡方检验分析 LPL、APOE 的 SNPs、血脂水平与 AD 的相关性。

结果： 1、年龄、性别、吸烟、饮酒在 AD 患者和对照人群之间的分布均无统计学差异（P>0.05）；AD 患者合并糖尿病的检出率高于对照人群（P<0.05）2、与对照人群相比，AD 患者血中 TC、TG、LDL-C 水平升高（P＜0.01），HDL-C 水平降低（P＜0.01）。AD 患者中 APOE4 表型的人群 TC 和 LDL-C 水平高于 APOE2 表型（P＜0.05）；对照人群中 APOE4 表型的人群 LDL-C 水平高于 APOE2 表型（P＜0.05），HDL-C 水平低于 APOE2 表型（P＜0.05）；携带 LPLrs285TT 基因型的 AD 患者和对照人群，TG 水平均高于 LPLrs285CC 基因型（P＜0.05）；携带 LPLrs285TT 基因型的 AD 患者 HDL-C 水平比携带 LPLrs285CC 基因型的患者低（P＜0.05）。3、AD 患者中携带 APOE4 的频率高于对照人群，携带 APOE4 人群的 AD 发病风险可增加 2.742 倍（OR=2.742，95% CI=1.756-4.282，P＜0.01）。在 LPLrs285 位点，基因型分布有统计学差异（P=0.000），携带 CT、TT 基因型患 AD 的风险分别是携带 CC 基因型的 1.444 倍、3.344 倍；在 LPL rs328 位点，基因型分布有统计学差异（P=0.045），携带 CT、TT 基因型患 AD 的风险分别是携带 CC 基因型的 1.456、2.651 倍。

结论：AD 患者易合并糖尿病。APOE4 是 AD 的危险因素，可能通过升高 TC 和 LDL-C 水平影响 AD 的发生；LPLrs285 位点的 SNP 与血脂水平相关，可能通过调控 TG、HDL-C 水平影响 AD 的发生；LPLrs285 和 LPLrs328 的 SNPs 与 AD 相关，LPLrs320 与 AD 患病风险无统计学关联。

关键字 阿尔茨海默病；脂蛋白脂酶；载脂蛋白 E；单核苷酸多态性

分类：公共营养与健康

2022 年上海市宝山区 8~10 岁儿童碘营养状况分析

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摘要：

目的:了解上海市宝山区 8~10 岁儿童碘营养状况，为碘缺乏病防治提供依据。

方法：2022 年 3 月至 5 月，采用多阶段分层单纯随机抽样方法，在宝山区按东、西、南、北、中 5 个方位各抽取 1 个乡（镇、街道），每个乡（镇、街道）抽取 1 所村小学校，每所小学抽取 40 名 8~10 岁儿童（男女各半），采集随意 1 次尿样及家中食用盐盐样。按照标准 GB/T 13025.7-2012《制盐工业通用试验方法碘的测定》测定食盐中的碘含量。按照标准 WS/T107-2006《尿中碘的砷铈催化分光光度测定方法》测定尿液中的碘含量。

结果:

1.调查对象基本特征

本次参与调查人数共计 200 人，其中男童 100 名，女童 100 名。8 岁儿童 63 名，9 岁儿童 67 名，10 岁儿童 70 名。男童平均身高为 139.28±8.46 cm，平均体重为 36.43±12.60 kg；女童平均身高为 138.35±8.47 cm，平均体重为 32.51±7.25 kg。170 人自大型超市购买家中食用盐，占总人数 85%。8 岁儿童中，语文成绩不小于 80 分有 55 人，占 8 岁儿童总人数 87.30%；数学成绩不小于 80 分有 57 人，占 8 岁儿童总人数 90.48%；英语成绩不小于 80 分有 56 人，占 8 岁儿童总人数 88.89%。9 岁儿童中，语文成绩不小于 80 分有 53 人，占 9 岁儿童总人数 79.10%；数学成绩不小于 80 分有 56 人，占 9 岁儿童总人数 83.58%；英语成绩不小于 80 分有 62 人，占 9 岁儿童总人数 92.54%。10 岁儿童中，语文成绩不小于 80 分有 64 人，占 10 岁儿童总人数 91.43%；数学成绩不小于 80 分有 59 人，占 10 岁儿童总人数 84.29%；英语成绩不小于 80 分有 60 人，占 10 岁儿童总人数 85.71%。2.8~10 岁儿童家中食用盐盐碘检测情况

本次调查检测 8~10 岁儿童家中食用盐盐样共 200 份，食用非碘盐儿童数占 58.50%（117/200），食用碘盐儿童家中盐碘中位数为 24.7 mg/kg；合格碘盐食用率<90%。男童家中食用盐盐碘平均含量为 10.07±12.28 mg/kg，女童家中食用盐盐碘平均含量为 9.86±12.25 mg/kg。8 岁儿童家中食用盐盐碘平均含量为 10.12±12.28 mg/kg，9 岁儿童家中食用盐盐碘平均含量为 10.68±10.45 mg/kg，10 岁儿童家中食用盐盐碘平均含量为 9.20±12.19 mg/kg。性别和年龄与儿童家中食用盐盐碘含量均无统计学差异（P> 0.05）。

3.8~10 岁儿童自身尿碘检测情况

本次调查检测 8~10 岁儿童尿样共 200 份，尿碘中位数为 183.2 μg/L（四分位间距 125.6~309.6 μg/L）。采集尿样前 24h，8~10 岁儿童均未吃过富碘食物如海带、紫菜、海苔、虾米等。男童尿碘平均含量为 220.31±129.30 μg/L；女童尿碘平均含量为 244.11±148.71 μg/L，性别与儿童自身尿碘含量差异有统计学意义（F=4.052，P<0.05）。8 岁儿童尿碘平均含量为 260.43±149.14 μg/L；9 岁儿童尿碘平均含量为 236.36±138.27 μg/L；10 岁儿童尿碘平均含量为 202.84±127.40 μg/L。年龄与儿童自身尿碘含量无统计学差异（P> 0.05）。

4.8~10 岁儿童家中食用盐盐碘与自身尿碘关联性分析

儿童食用盐碘含量与自身尿碘含量未见相关（R= 0.004， P > 0.05）。

结论:宝山区 8~10 岁儿童合格碘盐食用率低于 90%，但儿童尿碘水平达到碘缺乏病消除标准，且尿碘含量与性别有关，儿童总体处于碘营养适宜水平。

关键字 碘营养；尿碘；盐碘；儿童

分类：公共营养与健康

铅、镉、汞混合暴露对老年人群轻度认知障碍的影响

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目的：轻度认知障碍（Mild cognitive impairment, MCI）是多种神经退行性疾病的前驱阶段，发病机制复杂且尚不明确，早期识别环境危险因素是延缓或阻止其发展的关键。重金属铅（Plumbum, Pb）、镉（Cadmium, Cd）、汞（Mercury, Hg）均是已知的神经毒物，在环境和食品中普遍存在。然而，既往关于重金属暴露对老年人群认知功能损伤的研究多侧重于单一元素，忽略了多种元素同时暴露可能导致的效应叠加或协同作用。同时，由于重金属在人体内长期的生物蓄积效应，重金属暴露对多种老龄化疾病发生发展的影响不容忽视。本研究旨在探索典型有毒重金属 Pb、Cd、Hg 混合暴露对老年人群 MCI 的影响，分析各元素的贡献程度，为发现环境潜在危险因素，制定和实施老年人群认知障碍预防策略提供理论基础和数据支持。

方法：在上海市多个社区卫生服务中心招募前来体检的 60 岁以上普通老年人群，完成社会人口学信息问卷和蒙特利尔认知评估量表（Montreal cognitive assessment, MoCA）调查。MoCA 量表是国内外临床和研究中筛选轻度认知障碍的首选量表，具有良好的灵敏度和可靠性。该量表总分值为 30 分，总评分在 26-30 分视为正常，评分<26 分提示认知功能障碍，评分越低认为认知损伤程度越深。采集调查对象晨尿、全血样本，使用电感耦合等离子体质谱仪检测晨尿和全血中的 Pb、Cd、Hg 浓度。使用多元线性回归模型检验单一重金属暴露对认知障碍的影响。粗模型仅纳入尿液或血液的重金属浓度；矫正模型在粗模型的基础上调整个体因素（年龄、性别、BMI）和社会因素（家庭收入、教育程度、婚姻状况、吸烟、饮酒）。使用加权分位数和回归（Weighted Quantile Sum Regression, WQSR）探究三种重金属影响认知功能的混合暴露效应，并分析各重金属的贡献程度。统计分析由 SPSS 22.0（IBM，USA）和 R（版本：3.5.0）共同完成，P<0.05 判定为具有统计学意义。

结果：本研究共纳入具有有效调查问卷并完成生物样本采集的对象 972 名，平均年龄 70.6 岁，男性占比 41.4%。调查对象全血中 Pb、Cd、Hg 平均浓度为 22.03、0.98、2.55 μg/L，尿液中平均浓度为 17.35、2.15、5.63 μg/g 肌酐。调查对象 MoCA 量表平均分 25.7，低于 26 分的老年人群占比 37.0 %。回归模型结果显示老年人群血液及晨尿中 Pb、Cd 浓度与 MoCA 量表评分呈显著负相关（P<0.05）。矫正协变量因素后，老年人群晨尿中 Pb 和 Cd 浓度与 MoCA 量表评分的负相关性仍然显著（P<0.05）。WQSR 分析发现，老年人群重金属混合暴露与 MoCA 量表评分结局具有显著负相关，三种重金属的贡献依次为 Pb>Cd>Hg。

结论：老年人群重金属 Pb、Cd、Hg 混合暴露与认知水平存在显著负相关，且各元素间存在协同作用，重金属 Pb 暴露对认知水平的影响最为突出。

关键字 重金属；混合暴露；老年人群；轻度认知障碍

分类：公共营养与健康

上海市 18-64 岁居民营养健康知识知晓率现况调查

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目的 合理膳食对健康至关重要，研究显示，2017 年全球因膳食风险导致死亡人数占死亡总人数的 22%，改善饮食可以潜在地预防全球近五分之一的死亡，不良饮食习惯与一系列慢性疾病有关，并且可能是全球所有国家非传染性疾病死亡的主要原因。尽管目前国民营养健康状况明显改善，但仍然面临营养不足和营养过剩并存、因不合理膳食导致的慢性病负担加重等问题。根据社会认知理论，知识是改变行为的重要因素之一，营养知识水平是合理膳食行为的重要影响因素，营养教育可以提高营养知识，从而改善饮食行为，促进健康。为了解居民营养健康知识水平，发现和分析居民存在的营养健康知识短板，本研究于 2021 年 3-5 月开展了上海市 18-64 岁常住居民营养健康知识知晓情况调查，为营养干预政策的制定提供依据。

方法 本调查于 2021 年开展，采用分层随机抽样法抽取 6518 名上海市 18-64 岁居民。将调查对象按性别、年龄、文化程度、职业、地区进行分组。采用由中国疾病预防控制中心营养健康所统一设计的调查问卷及评分标准对居民营养健康知识知晓率及影响因素进行调查，以入户调查方式，由调查员面对面询问并帮助填写选项。问卷包括基本情况和营养健康知识两部分。基本情况包含性别、年龄、文化程度、职业等信息。营养健康知识问答包括膳食推荐（4 题，30 分）、食物与营养素（5 题，21 分）、营养与疾病（5 题，22 分）、食物选择（5 题，19 分）和食品安全（1 题，8 分）5 个方面，共 20 道题目，满分 100 分，得分≥75 分为知晓，<75 分为不知晓，营养健康知识知晓率定义为得分≥75 分的人数占总调查人数的百分比，营养健康知识调查各知识维度得分率计算公式为：得分率=该知识维度平均分/该知识维度满分×100%。

结果 本次研究共调查上海市 16 个区 18-64 岁居民 6518 人，其中男性 3199 人（49.08%），女性 3319 人（50.92%），调查对象的平均年龄为 38.44±12.18 岁。上海市 18-64 岁居民的营养健康知识得分平均为 68.43±12.82 分，知晓率为 35.78%。其中女性平均分（t=-5.04，P<0.001）和知晓率（x^2=14.06，P<0.001）均显著高于男性，不同年龄组（F=15.02，P<0.001；x^2=23.46，P<0.001）、不同文化程度分组（F=191.45，P<0.001；x^2=210.29，P<0.001）、不同职业分组（F=99.17，P<0.001；x^2=224.12，P<0.001）以及不同地区分组（F=22.11，P<0.001；x^2=44.61，P<0.001）的平均得分和知晓率差异均有统计学意义。营养健康知识调查各知识维度得分率范围为 61.21%-85.75%，其中食物选择得分率最低（61.21%），食品安全得分率最高（85.75%）。影响因素分析结果显示，女性（OR=1.13，95%CI 1.02-1.25）和高中及以上文化程度（OR=1.68-2.85）的居民营养健康知识知晓情况比较好，年龄在 18-34 岁（OR=0.69-0.74）、从事非医疗卫生机构行业的人员（OR=0.46-0.70）和生活在非城市中心地区（OR=0.74-0.81）的居民营养健康知识知晓情况较差。

结论 上海市 18-64 岁居民的营养健康知识知晓率为 35.78%，仍有较高上升空间。应加强营养知识相关宣传特别是食物选择，今后营养指导与干预应重点针对男性，受教育程度较低人群，食品、餐饮行业及其他健康相关产业从业人员及农村地区人员等，致力于提高居民营养健康知识知晓率，改善人群总体健康状况。

关键字 营养健康知识 知晓率 影响因素 营养指导与干预

分类：公共营养与健康

补充大豆异黄酮对血压的影响：一项随机对照试验的 Meta 分析

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目的：大豆异黄酮是一种植物雌激素， 许多实验和临床试验表明其具有潜在的心血管保护作用，然而对血压的影响目前证据显示结果不一致。因此，我们通过 meta 分析探究补充大豆异黄酮对收缩压（SBP）和舒张压（DBP）的影响。

方法：截至 2023 年 4 月 1 日，我们通过 PubMed、Embase 和 Cochrane Library 数据库进行了系统的文献检索，严格按照纳入和排除标准对检索结果进行人工筛选，提取结果数据并制定研究基本信息表格。采用 Stata 14.0 软件对结局指标收缩压和舒张压进行 meta 分析。使用随机效应模型或固定效应模型计算加权平均差（WMD）和 95%置信区间（CI）。使用 GRADE 分级标准方法对证据质量进行评估。通过漏斗图及 Egger 's 检验评价 meta 分析发表偏倚，敏感性分析评估合并结果的稳定性。根据受试者健康状况、年龄、性别、所在地区和大豆异黄酮摄入剂量进行亚组分析。

结果：本研究共纳入 26 项随机对照试验，共涉及 1985 名参与者。研究结果显示，与安慰剂组参与者相比，补充大豆异黄酮组参与者的收缩压（27 项研究结果; 加权平均差：-1.38 mmHg; 95% CI，-2.61 至-0.15 mmHg）、舒张压 （27 项研究结果; 加权平均差：-0.94 mmHg; 95% CI，-1.77 至-11.0 mmHg）降低幅度更大。根据干预持续时间对研究进行分层，在干预时间≥6 个月时，补充大豆异黄酮组参与者较安慰剂组参与者的收缩压（项研究结果; 加权平均差：-2.13 mmHg; 95% CI，-3.83 至-0.43 mmHg）、舒张压（14 项研究结果; 加权平均差：-2.05 mmHg; 95% CI，-3.33 至-0.77 mmHg）降低更明显，然而干预时间＜6 个月，两组干预对参与者收缩压及舒张压的影响没有显著差异。亚组分析结果显示，在高血压前期的参与者中，补充大豆异黄酮组的参与者收缩压（17 项研究结果; 加权平均差：-1.84 mmHg; 95% CI，-3.39 至-0.29 mmHg）显著降低。在大豆异黄酮剂量<80 mg/d 和≥50 mg/d 的亚组中，补充大豆异黄酮组参与者与安慰剂组参与者相比降低收缩压（11 项研究结果; 加权平均差：-2.06 mmHg; 95% CI，-4.06 至-0.06 mmHg）和舒张压（11 项研究结果; 加权平均差：-1.88 mmHg; 95% CI，-3.32 至-0.44 mmHg）的作用更大。在女性和年龄≥50 岁的亚组中，补充大豆异黄酮组参与者较安慰剂组参与者降低收缩压（22 项研究结果; 加权平均差：-1.80 mmHg; 95% CI，-3.15 至-0.44 mmHg）（23 项研究结果; 加权平均差：-1.47 mmHg; 95% CI，-2.78 至-0.15 mmHg）和舒张压（22 项研究结果; 加权平均差：-1.09 mmHg; 95% CI，-2.01 至-0.17 mmHg）（23 项研究结果; 加权平均差：-1.07 mmHg; 95% CI，-1.95 至-0.19 mmHg）作用更为显著。总体而言，大部分研究显示低偏倚风险，结果指标在 GRADE 分级标准方法评估中显示低质量。

结论：本项随机对照试验的 meta 分析表明，补充大豆异黄酮可显著降低收缩压和舒张压，主要作用在较长时间（≥6 个月）。未来需要开展大型、高质量的试验，以明确大豆异黄酮消费在血压管理中的益处和机制，也可能需要考虑超重、肥胖和高血压患者的相关性。

关键字 大豆异黄酮、膳食营养素、血压、高血压、meta 分析

分类：公共营养与健康

四川省居民食品安全风险认知调查研究

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摘要：目的　了解当前四川省居民对食品安全相关风险的认知及对目前食品风险交流的需求现状，并提出应对措施，促进四川省食品安全风险交流。方法　借鉴欧盟 EFSA 风险认知调查，结合四川省居民饮食特点，自行设计调查问卷，采用网络问卷调查法对四川省居民对食品安全相关风险的认知情况、食品安全信息渠道及需求情况进行问卷调查。问卷内容包括：四川省公众主要关注的食品问题，对此考察了公众对假冒伪劣产品、非法添加剂等 14 类食品安全问题的关注度；公众对基本食品安全常识的认知情况，选择了食品全程控制理念、零风险、食品安全标准、食品添加剂等的安全性等方面作为考察内容；公众食品安全行为，针对公众购买食品优先考虑的因素、对问题食品采取的措施等行为进行了解；公众获取信息的主体及渠道；五为公众对政府食品安全风险信息交流工作的满意度，主要针对政府食品安全信息交流的“及时性”、“透明性”、“便利性”和“针对性”进行满意度评价。调查结果以 excel 表格形式收集，并使用 SPSS 28.0 版进行数据分析，采用方差分析、c2 检验、t 检验等方法，P<0.05 表示差异有统计学意义。结果　共纳入 492 个调查对象，调查对象食品安全基础常识的正确率为 59.76%，调查对象文化水平越高，正确率越高；59.96%的调查对象表示自己对食品相关法律不太了解；调查对象关注度最高的食品安全问题为食物中毒问题（88.01%），其次为过期/临期食品（86.79%）、假冒伪劣产品（86.70%）；大多数调查对象表示在购买食品时优先考虑食品安全因素，其中月收入和是否有医学背景两个因素会影响调查对象食品安全行为的选择；51.22%的调查对象表示在遇到问题食品时不会采取维权措施，其中女性维权意识比男性弱，且呈现年龄越大维权意识越弱的趋势；调查对象获取食品安全信息的主要渠道是新闻网站（75.20%）及社交网络（72.15%），但对社交网络的信任度不高（24.39%）；调查对象获取食品安全信息最信任的渠道为新闻门户（73.58%）和政府网站（60.57%），但只有 45.33%的调查对象表示会在政府网站获取食品安全信息。调查对象对我省风险交流工作总体较为满意，其中风险信息交流的针对性满意度相对最低，为 65.65%。　结论　四川省居民对食品安全关注度较高，但对食品安全知识的了解度一般，维权意识和行为习惯一般。应该进一步加强食品安全知识的普及，增强公众常获取食品安全信息渠道的可信度，对关注度较高的食品安全问题针对性地开展风险交流，完善食品安全风险交流体系。

关键字　食品安全；风险认知；风险交流；四川省

分类：公共营养与健康

门诊及住院婴儿555例母乳成分特点分析

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目的：分析母乳成分的变化，为进行乳母膳食及婴儿喂养指导提供依据。方法：收集2017年12月至2022年12月安徽省儿童医院门诊及住院婴儿母乳样本，进行母乳成分检测及数据比较分析，以P＜0.05为差异具有统计学意义。结果：母乳成分与乳母的生产方式、生育婴儿的性别及婴儿早产或足月无关（P＞0.05），母乳含水量与生育年龄有关（P＜0.05），不同泌乳阶段的母乳中脂肪、蛋白质、碳水化合物、能量、含水量、脱脂干物质、密度、矿物质以及冰点都具统计学意义差异（P＜0.05）。初乳、过渡乳、成熟乳中脂肪、蛋白质含量均低于母乳营养素含量变化参考值。结论：母乳成分与泌乳阶段有关，脂肪含量及乳汁冰点温度随泌乳阶段变化而逐渐上升，蛋白质、碳水化合物、脱脂干物质、密度则随泌乳阶段的改变逐渐降低。乳母应增加脂肪、蛋白质及碳水化合物的摄入。

母乳作为婴儿最理想的食物，不但可以满足6月龄内婴儿几乎全部的生长发育需求，在6月龄后添加辅食的基础上，母乳仍可作为婴幼儿重要的营养和能量来源。母乳中营养物质多样而成分复杂，除包括蛋白质、脂肪、碳水化合物、维生素、矿物质外，还富含多种生物活性物质，且比例适当易于消化吸收。但是在不同乳母之间，甚至同一乳母的不同泌乳阶段，母乳成分存在一定差异性，且探讨母乳成分与研究婴幼儿膳食营养素摄入量密切相关，既有助于开展乳母膳食及婴儿喂养指导，也有助于提高母乳喂养率。本文对安徽省儿童医院门诊及住院婴儿收集到的555例母乳样本进行成分分析，分析结果报告如下。

1.研究对象：选取的对象为2017年12月至2022年12月来我院进行母乳成分分析的555位乳母，并取得乳母知情同意，记录其年龄、生产方式，以及婴儿的性别、胎龄、出生日期等基本信息。乳母无特殊饮食习惯，无重大传染性疾病及精神疾病等情况，母乳为产后10月龄以内，婴儿为纯母乳喂养或混合喂养。

2.样本采集：采取口头告知乳母母乳采集方法的方式，要求采用电动或手动吸奶器收集单侧乳房全部乳汁至一次性塑料储奶瓶中，保证当次吸乳前2h内未进行吸乳。母乳吸出后放于4℃冰箱冷藏，并于当天采用冷链运输至我院临床营养科，登记相关信息，将样本置于4℃冰箱冷藏并于24h内检测。

3.成分分析：DP-1000母乳分析仪，采用数字化超声波精密分析技术，可快速检测母乳中各种成分的含量。该母乳分析仪除可进行脂肪、蛋白质、碳水化合物、能量这几项常见检测项目外，还可检测母乳的含水量、脱脂干物质、密度、矿物质和冰点。检测前需将样品充分摇匀，并于常温下放置样品使其温度保持在15-25℃之间。

4.统计学分析：应用SPSS 23.0软件进行数据分析。符合正态分布的资料分析结果以（$\bar{x}\pm s$）表示，两组之间比较采用独立样本t检验，多组之间比较采用多因素卡方检验；非正态分布资料采用秩和检验，以中位数和四分位间距描述。均以P＜0.05为差异具有统计学意义。

关键字 母乳，检测，成分

分类：公共营养与健康

含糖饮料摄入与年轻女性脱发的关联性研究

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目的：女性型脱发（female pattern hair loss, FPHL）和休止期脱发（telogen effluvium, TE）是女性群体中最常见的两种非瘢痕性脱发类型，表现为掉发量增加以及毛发稀疏，对患者的生活质量和身心健康产生负面影响。近年来，我国女性脱发患病率逐年上升并且出现年轻化趋势。有研究表明，高血糖饮食可能是 FPHL 和 TE 的危险因素。然而，关于含糖饮料（sugar-sweetened beverages, SSBs）和女性脱发状况的证据十分有限。本研究旨在通过横断面调查初步探讨含糖饮料摄入频率和摄入量对中国青年女性脱发状况的影响。

方法：本研究以 2022 年 1 月到 4 月开展的一项横断面调查中 1169 名成年女性（年龄为 18~45 岁）为研究对象。每位参与者都完成了一份关于生活方式、情绪状态、饮料摄入情况、脱发严重程度和膳食摄入情况的在线问卷。其中，饮料摄入情况使用 15 项饮料摄入量问卷 （15-item Beverage Intake Questionnaire, BEVQ-15）进行调查；脱发严重程度使用亚洲女性掉发视觉量表（Hair Shedding Visual Scale for Asian Women, HSVS-A）进行分级；具体脱发类型结合自我评估的拉发测试（pull test）结果进行区分。并通过二元 Logistic 回归模型分析含糖饮料摄入与女性脱发状况的关系。为了确定回归模型的稳健性，我们排除了具有其他已知的脱发危险因素的参与者进行敏感性分析。

结果：本研究共纳入正常参与者（HSVS-A ≤ 3）958 人，过度脱发患者（HSVS-A > 3）211 人，包括 80 名 TE 患者（拉发测试阳性）和 131 名 FPHL 患者（拉发测试阴性）。二元 Logistic 回归结果显示，含糖饮料的摄入频率和摄入量都与过度脱发显著相关。在调整其他影响因素后，相比从不饮用含糖饮料的参与者，频繁（>7 次/周）和大量（1000 毫升/周）饮用的参与者脱发风险分别增加 1.25 倍（OR=2.25, 95% CI: 1.32-3.83）和 1.22 倍（OR=2.22, 95% CI: 1.28-3.85）。对不同饮料类型的亚组分析显示，只有普通软饮料和含糖茶饮料两组显著增加脱发风险，人工甜味剂饮料（artificial sweetener beverages, ASBs）与总体脱发情况无显著相关性。此外，我们分别对两种脱发类型进行了二元逻辑回归分析，发现过度摄入含糖饮料与 TE 和 FPHL 风险增加都有显著相关性；较大量（>500 毫升/周）饮用人工甜味剂饮料会增加 TE 风险(OR=1.90, 95% CI: 1.08-3.35），但较频繁（>3 次/周）饮用人工甜味剂饮料对 FPHL 有保护作用(OR=0.37, 95% CI: 0.15-0.94)。在没有已知脱发危险因素的人群中进行回归分析的结果显示，过度饮用含糖饮料（>7 次/周）依然会显著增加脱发风险（OR=2.47, 95% CI: 1.22-5.03)。

结论：对于每周含糖饮料摄入超过 7 天或 1000 毫升的年轻女性，有较高的风险发生脱发。这种影响在没有其他脱发危险因素的人群中仍然存在。但是人工甜味剂饮料摄入对于年轻女性脱发的影响仍需进一步证实。我们希望本研究能够帮助年轻女性认识到含糖饮料对于脱发的影响从而降低含糖饮料消费。

关键字 含糖饮料，脱发，女性

分类：公共营养与健康

肌少症老年女性血清氨基酸靶向代谢组学的病例对照研究

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介绍：2022 年上海市老年人口占比达到了 18.7%，远超国际老龄化社会的标准，肌肉减少症是威胁老年人健康最常见的疾病之一，上海市 65 岁以上老年人的肌少症患病率高达 19.37%。相较于膳食营养和运动干预，探索外周氨基酸浓度可以更好地指导肌少症的预防工作。本项目通过观察受试者的整体血清氨基酸营养水平，分析患有肌少症的社区老年女性的氨基酸代谢特点，寻找生物标志物。

方法：在上海市黄浦区和普陀区的社区招募 65-75 岁的老年女性进行病例对照研究，将 SARC-f 问卷初筛得分≥4 分并符合 AWGS2019 诊断标准的受试者纳入肌少症组，健康对照组则按年龄±1 岁进行匹配，每组各 50 名。采集受试者空腹血，通过超高效液相色谱串联质谱（UPLC-MS）的氨基酸靶向代谢组学方法寻找两组之间的代谢差异物，经 KEGG 通路分析寻找显著富集的代谢通路。并运用食物频率问卷法收集受试者的膳食摄入情况，使用 SPSS21.0 对两组受试者的能量及营养素摄入、不同食物种类的摄入情况进行数据分析。

结果：肌少症组受试者摄入的能量、蛋白质和优质蛋白均较低（$P < 0.05$），钠较高（$P < 0.05$）；体重、骨骼肌质量、BMI、非恶性甲状腺疾病患病率、受教育程度也较低（$P < 0.05$），其余与健康对照组无明显差异。我们的项目最终确定了 4 种存在差异的氨基酸，其中肌少症组的精氨酸（$P < 0.001$）和胱氨酸（$P = 0.003$）含量较对照组有所下调，这与膳食摄入的食物种类分析所得的结果相呼应，表现为肌少症组对富含精氨酸的畜禽类和水产品类以及富含胱氨酸的菌藻类和坚果类的摄入量较低；而谷氨酸（$P = 0.025$）和牛磺酸（$P = 0.001$）含量有所上调，这与食物营养补充之间的相关性较弱。本项目共发现了 8 条显著富集的代谢通路，均与谷氨酸有关，其中精氨酸生物合成（$P < 0.001$）、精氨酸和脯氨酸代谢（$P = 0.003$）、氨酰基-tRNA 生物合成（$P = 0.05$）与精氨酸有关，此外还有氮代谢（$P = 0.015$）、丙氨酸、天门冬氨酸和谷氨酸的代谢（$P = 0.015$）、牛磺酸和次牛磺酸代谢（$P = 0.021$）、丁酸代谢（$P = 0.038$）、组氨酸代谢（$P = 0.041$）。

结论：我们的研究综合分析了氨基酸靶向代谢组学结果和膳食摄入情况，得出老年女性中低水平的精氨酸和高水平的谷氨酸与肌少症的较高风险有关，这对早期识别肌少症具有优势，可以作为生物标志物，为今后的预防提供新的思路。我们的研究排除了性别可能造成的差异，为肌少症的代谢组学研究补充了中国的数据，且提供了更具本土化的膳食建议，提示肌少症患者应更多地摄入富含精氨酸和胱氨酸的食物，补充来源于动物性食物的优质蛋白。

关键字 肌少症，代谢组学，氨基酸，老年女性

分类：公共营养与健康

能量代谢、组蛋白甲基化与阿尔茨海默病关系的研究进展

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阿尔茨海默病（Alzheimer’ s disease, AD）是一种起病隐匿、病程缓慢且不可逆的神经退行性疾病，目前尚无法治愈，其病理特征主要是细胞外 β-淀粉样蛋白沉积形成老年斑和细胞内 tau 蛋白异常磷酸化形成神经元纤维缠结。AD 发病机制复杂，存在多种假说，主要包括 β-淀粉样蛋白级联假说、神经纤维缠结假说、炎症假说及胆碱能神经元假说等。根据 AD 发病群体的特点，可分为家族型和散发型 AD，按照发病时间不同又可分为早发型和晚发型 AD。晚发型 AD 主要以散发型为主，占 AD 发病总数的 90%以上。能量代谢在机体中扮演重要角色，有研究表明晚发型 AD 是一种体内代谢紊乱所致的疾病，糖代谢（葡萄糖摄取减少、胰岛素抵抗、糖基化修饰降低、酮体代谢受损）、脂质代谢（载脂蛋白 E4 和固醇调节元件结合蛋白 2 水平升高、髓系细胞触发受体 2 和 ATP 结合盒转运体 A 家族水平降低）、氨基酸代谢（谷氨酸、γ-氨基丁酸、谷氨酰胺、丝氨酸水平降低）等多种能量代谢途径失调，尤其是线粒体（能量代谢的关键调节因子）功能障碍可能与大脑中 AD 病理变化和疾病症状的严重程度有关。反之，AD 的病理改变也能影响能量代谢的稳态。组成核小体核心区域的组蛋白可在相关酶的作用下发生不同的修饰，其中组蛋白赖氨酸甲基转移酶类（KMTs）和组蛋白赖氨酸去甲基酶类（KDMs）分别介导组蛋白的甲基化和去甲基化。组蛋白（赖氨酸）甲基化修饰是一个主动调控及可逆的过程，也与能量代谢密切相关，其复杂性体现在修饰位点多样性以及同一个修饰位点可被不同程度地甲基化。根据甲基化位点的不同，H3 和 H4 的赖氨酸甲基化可调节转录激活和抑制，其中组蛋白 H3 第 4 位赖氨酸（H3K4）以及 H3K36、H3K79 甲基化修饰主要参与基因激活，H3K9、H3K27 和 H4K20 甲基化修饰主要与转录抑制有关，而在同一位点上的赖氨酸可以被单甲基化、双甲基化和三甲基化。KMTs 和 KDMs 可通过对组蛋白上不同位点的赖氨酸进行修饰，影响突触可塑性、β-淀粉样蛋白形成和清除、tau 蛋白过度磷酸化、神经炎症、氧化应激及自噬等过程中的相关基因的转录活性，进而参与 AD 的发病进程。以线粒体为核心的能量代谢异常通过调节相关酶活性、影响中间产物代谢等途径影响组蛋白甲基化，而组蛋白甲基化又可参与机体的能量代谢调节。引起 AD 病理变化的各种因素如缺氧、高活性氧水平、钙超载等以及 AD 病理特征本身也会在一定程度影响能量代谢和组蛋白甲基化。综上，能量代谢、组蛋白甲基化与 AD 之间相互制约、相互调节。

关键字 阿尔茨海默病；能量代谢；组蛋白甲基化；神经退行性疾病

分类：公共营养与健康

移动健康在围绝经期及绝经后女性骨健康膳食运动干预中的研究现状及应用前景分析

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骨健康是围绝经期及绝经后女性重要健康问题，女性进入围绝经期后，体内雌激素水平波动性下降，易导致低骨量和骨质疏松症。在我国 40 岁~49 岁，50 岁~59 岁和 60 岁以上女性中，骨质疏松的患病率分别为 4.3%、16.5%和 45.9%，低骨量率分别为 31.4%、47.9%和 44.1%。中国女性因骨骼肌肉疾病导致的健康生命年损失达到全部 DALY 的 7.8%。在骨骼健康密切相关的因素中，虽然年龄、遗传等因素是无法改变的，但是与骨骼健康密切相关的膳食与运动等因素，是可以通过健康管理来改善的。但是，实际上，在钙的摄入量等与骨骼健康密切相关的因素上，我国成年居民的消费并不足够。在我国 18~59 岁女性中每日钙摄入量仅为 311.6mg，低于推荐量 800mg，在 60 岁以上女性中，每日钙摄入量仅为 313.8mg，低于推荐量 1000mg。与骨骼健康密切相关的健康行为方面还有较大的改进空间。为应对我国老年女性庞大的骨健康相关问题的重大需求问题，有必要建立可推广的科学的适合我国围绝经期及绝经后女性骨健康管理模式。传统健康管理因为人力物力限制，对人群慢性病管理作用有限。移动健康管理具有应用广、便利性高、交互性强等优势，在慢性病预防与控制方面逐渐开始发挥重要的作用。近年来，我国出台了一系列促进移动健康发展的政策文件，为开展广泛的移动健康研究提供政策支持。在过去，移动健康管理针对的人群通常为青年，解决的健康问题主要围绕科学减重、血压与血糖控制和心理健康等。目前，移动健康在骨骼健康领域还缺乏有效的尝试，有限的使用移动健康管理手段的骨健康干预也多局限于对行为指标的改善，而缺少对骨代谢指标全面的评估，并且研究设计、实施与评价的科学性也有待进一步完善。与骨骼健康密切相关的干预措施主要包括膳食干预及运动干预等，“互联网+”智能健康管理中的移动设备的应用为各种骨健康促进手段提供了更多方便可用的形式，如：线上的科普推送、饮食与膳食打卡、社群交流等，因此可以认为智慧健康管理在骨健康改善方面具有巨大的应用潜力。探索一种适合我国中老年女性的基于移动健康的骨健康膳食运动干预模式，以解决我国围绝经期及绝经后女性骨健康相关的健康问题，顺应智慧助老的国家政策，具备较强的可推广性与应用价值。并且，在此基础上，探索线上线下相结合的方式进行该人群的骨骼健康管理，充分发挥传统线下健康管理与线上健康管理的优势，也许对改善我国围绝经期及绝经后女性骨骼健康有重要意义。

关键字 移动健康；智能健康管理；骨质疏松症；骨健康；围绝经期及绝经后

分类：公共营养与健康

中国 18~79 岁成人膳食 B 族维生素摄入与高血压的关系

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目的　分析中国 18~79 岁成人膳食 B 族维生素摄入情况，并探索膳食 B 族维生素摄入与高血压的关系。

方法　基于中国居民营养与健康状况监测（2015-2017）数据，经过数据清洗，排除个人基本信息、生活方式、体格测量与实验室检测存在缺失、能量摄入异常者（< 500 kcal 或> 5,000 kcal）、近 2 周内服用降压药物者以及既往患有冠心病和脑卒中者后，最终共纳入 51,533 名 18~79 周岁的中国成人（男性 23,892 人，女性 27,641 人）。对于高血压患病情况，将收缩压≥ 140 mmHg 和（或）舒张压≥ 90 mmHg 者定义为高血压。通过 64 项食物频率问卷调查研究对象过去 12 个月的膳食情况，并通过各食物（组）的食用频率（每日/周/月/年）和单次平均摄入量（g/次）计算日均摄入量。结合食物成分表（USDA，Standard Reference 28）计算研究对象的 DASH 膳食（Dietary Approach to Stop Hypertension）评分以及过去一年中维生素 B_1（硫胺素）、B_2（核黄素）、B_3（烟酸）、B_6、B_{12}和叶酸的日均膳食摄入量，并分别对其以五分位法进行分组。使用经性别、年龄和 BMI 调整的 Spearman 相关分析对膳食 B 族维生素与收缩压和舒张压的相关性进行初步检验，通过多变量调整的二分类 Logistic 回归探索膳食 B 族维生素摄入与高血压的关系，而后根据性别进行分层分析。

结果　在所研究的中国 18~79 岁成人中，共有 16,438（31.9%）人被定义为高血压，其中男性 8,362 人，女性 8,076 人。Spearman 相关分析结果显示，膳食 B 族维生素与收缩压和舒张压均呈负相关，且具有统计学显著性。经过调整性别、年龄、体质指数、城乡、南北方、教育程度、家庭人均年收入、婚姻状况、吸烟、二手烟暴露、过量饮酒、身体活动水平、静态行为时长、睡眠时长、一年内健康体检、高血压家族史、DASH 评分、能量和钠摄入量后，Logistic 回归分析结果提示，与各 B 族维生素摄入量最低分位组（Quintile 1，Q1）比较，最高分位组（Quintile 5，Q5）对高血压患病均有保护作用（维生素 B_1：OR = 0.81，95% CI 0.72 ~ 0.92，$P_{趋势}$ = 0.0002；维生素 B_2：OR = 0.79，95% CI 0.72 ~ 0.87，$P_{趋势}$ < 0.0001；维生素 B_3：OR = 0.77，95% CI 0.69 ~ 0.87，$P_{趋势}$ < 0.0001；维生素 B_6：OR = 0.80，95% CI 0.70 ~ 0.87，$P_{趋势}$ < 0.0001；叶酸：OR = 0.90，95% CI 0.81 ~ 0.99，$P_{趋势}$ = 0.0411；维生素 B_{12}：OR = 0.80，95% CI 0.74 ~ 0.86，$P_{趋势}$ < 0.0001）。分层分析结果提示，男性中各 B 族维生素摄入量与高血压均呈负向关联（维生素 B_1：OR = 0.74，95% CI 0.62 ~ 0.87，$P_{趋势}$ = 0.0003；维生素 B_2：OR = 0.80，95% CI 0.70 ~ 0.91，$P_{趋势}$ = 0.0004；维生素 B_3：OR = 0.71，95% CI 0.60 ~ 0.83，$P_{趋势}$ < 0.0001；维生素 B_6：OR = 0.69，95% CI 0.59 ~ 0.80，$P_{趋势}$ < 0.0001；叶酸：OR = 0.86，95% CI 0.74 ~ 0.99，$P_{趋势}$ = 0.0737；维生素 B_{12}：OR = 0.85，95% CI 0.77 ~ 0.94，$P_{趋势}$ = 0.0006）；女性中维生素 B_2、B_3、B_{12}摄入量与高血压呈负向关联（维生素 B_2：OR = 0.80，95% CI 0.69 ~ 0.91，$P_{趋势}$ = 0.0007；维生素 B_3：OR = 0.83，95% CI 0.70 ~ 0.98，$P_{趋势}$ = 0.0023；维生素 B_{12}：OR = 0.74，95% CI 0.67 ~ 0.82，$P_{趋势}$ < 0.0001），而维生素 B_1、B_6、叶酸与高血压的负向关联未见统计学显著性（维生素 B_1：OR = 0.89，95% CI 0.74 ~ 1.07，$P_{趋势}$ = 0.0543；维生素 B_6：OR = 0.88，95% CI 0.75 ~ 1.02，$P_{趋势}$ = 0.0148；叶酸：OR = 0.91，95% CI 0.78 ~ 1.06，$P_{趋势}$ = 0.129）。

结论　在中国 18~79 岁成人中，B 族维生素与高血压的患病风险呈负向关联，且在男性中的保护效应更显著。结果提示，通过改善中国成人 B 族维生素的膳食摄入水平，可能有助于高血压的预防。未来应通过纵向研究或者随机对照试验进一步加以验证。

关键字　成人；高血压；维生素 B；膳食摄入

分类：公共营养与健康

广东省 2002-2015 年成年居民膳食结构和营养素摄入情况分析

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目的：了解广东省成年居民膳食结构和营养素摄入状况和变化，为指导广东居民合理膳食和营养干预提供科学依据。

方法：选取 2002 年“广东省居民营养与健康状况调查”和 2015 年“广东省居民慢性病与营养调查”成年居民作为研究对象，分析 3 天 24 膳食调查和调味品称重调查数据，结合中国食物成分表，分析评价广东省居民膳食结构、营养素摄入水平和变化。结果：广东省成年居民平均每标准人日谷薯类摄入量为 270.9 克，谷薯类摄入量在膳食指南的推荐范围内（250-400 克），与 2002 年比较，谷薯类摄入量下降了 65.4 克；其中，薯类摄入量为 26.2 克，低于推荐量（50-150 克），但比 2002 年增加了 12.2 克；杂豆和全谷物摄入量为 9.1 克，也远远低于推荐量（50-150 克）的下限，但比 2002 年的摄入量增加了 3.4 克。蔬菜和水果的摄入量分别为 294.2 克和 58.7 克，蔬菜摄入量接近推荐值（300-500 克）的下限，水果摄入量仅为推荐（200-350 克）下限的 16.8%，与 2002 年比较，蔬菜摄入量增加了 15.7 克，水果摄入量增加了 1.0 克。2015 年动物性食物摄入量为 236.3 克，超出了推荐（120-200 克）上限，与 2002 年比较，动物性食物摄入量增加了 26.0 克。2015 年奶类及其制品的摄入量为 18.0 克，仅为推荐量下限（300 克）的 6.0%，与 2002 年相比，奶类及制品增加了 1.2 克。2015 年食用油摄入量为 46.8 克，高于推荐（25-30 克）上限，食盐摄入量为 8.1 克，超出推荐值（＜5 克），与 2002 年相比，食用油增加了 12.3 克，食盐则下降了 1.4 克。2015 年脂肪供能比占 40.8%，超过推荐（20%-30%）的上限，与 2002 年比较，脂肪供能比上升了 9.3 个百分点。2015 年每标准人日能量摄入量为 2046.0kcal，比 2002 年降低了 222.9kcal；脂肪、碳水化合物、蛋白质的摄入量分别为 93.2 克、230.2 和 73.7 克，与 2002 年比较，脂肪摄入增加了 12.0 克，蛋白质和碳水化合物则分别下降了 3.3 克和 63.2 克；视黄醇当量、维生素 C 和维生素 E 的摄入量分别为 663.4μgRE、108.1mg、28.6mg，为推荐量的 118.4%、127.1%、204.3%；钙、钾、钠、镁、铁的摄入量分别为 427.8mg、1744.3mg、5311.4mg、269.3mg 和 21.8mg，为推荐量的 65.7%、48.4%、265.6%、96.2%和 243.2%。

结论：广东居民食物摄入多样，每日膳食种类包括谷薯类、蔬菜、水果、奶类等，主食以大米为主，符合岭南人的饮食习惯。13 年来，广东居民蔬菜、水果和奶类摄入有所增加，食盐摄入量有所下降，但膳食结构仍然存在不合理的地方，谷薯类食物下降过快，动物性食物和食用油摄入过高，而蔬菜、水果和奶类摄入不足，导致脂肪供能比过高。建议政府加大对营养改善资金的投入，积极出台相关政策，将营养改善融入各项公共卫生政策中；按照《健康中国行动》和《国民营养计划》的要求，结合广东省居民膳食营养存在的问题，因地制宜开展“合理膳食”行动；加大营养宣传和干预，结合中国居民膳食指南和平衡膳食宝塔，引导居民建立合理的膳食习惯。

关键字 膳食结构、广东居民、营养调查、营养素

分类：公共营养与健康

天津市居民高盐饮食对死亡及期望寿命的影响研究

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目的　有明确证据表明，高钠摄入与许多健康问题有关，包括高血压、心血管疾病、肾病和胃癌等。定量评估居民高盐饮食相关的死亡和期望寿命损失非常重要，为政府推动减盐相关决策提供数据支持。

方法　基于全球疾病负担（Global Burden of Disease，GBD）框架模型，研究利用2015年天津市成人慢性病与营养监测调查人群数据，膳食调查是在连续的2个工作日和1个休息日，通过家庭调味品称重、在家就餐人次登记和个人膳食回顾收集膳食信息，将称重获得的家庭调味品消费量按家庭成员能量摄入的比例分配至个人，结合个人3 d 24 h膳食回顾获得的其他食物消费量，以中国食物成分表（2004年版）为依据，计算出个人膳食钠摄入量。按模型要求研究人群≥25 岁，最终共 1 781 例纳入膳食钠摄入量分析。相关疾病死亡数据来源于天津市死因监测系统，共38453例。与高盐饮食有关的疾病包括：缺血性心脏病（ICD10:I20-I25）；其它心脏病，包括风湿性心脏病（I01,I02.0,I05-I09），主动脉瘤（I71），心内膜炎、心肌炎和心肌疾病（I33,I40,I42），房颤、周围神经病及其它循环系统疾病等（I48,I73,I70.2,I00,I02.9,I27-I28不包括I27.1,I30-I32（不包括I31.2,I31.3）,I34－I39,I47,I70.8,I72,I77-I80,I82-84,I86-I98,G45）；缺血性卒中（I63），出血性卒中（I61），慢性肾病（E10.2、E11.2、E12.2、E13.2、E14.2、I12-I13.9、N02-N08.8、N15.0、N18-N18.9）和胃癌（C16-C16.9、D00.2、D13.1、D37.1）。按比较风险评估理论来估算归因于高盐饮食的相关疾病死亡的归因分值（Population Attribution Fraction， PAF）、归因死亡人数和期望寿命损失情况。正态分布的计量资料采用均数和标准差（M±SD）表示，两独立样本的均数比较采用t检验；计数资料采用率（%）表示。数据分析采用IBM SPSS 19.0和Office Excel 2013。

结果：2015年天津市25岁及以上人群膳食钠摄入量为（5 920.44±3 615.65）mg/d，天津市因高盐饮食导致的死亡为5576例，占全部相关死亡人数的14.50%，其中男性人数为2874例，女性为2602例。高盐饮食导致的相关疾病死亡例数占比依次是缺血性心脏病（50.47%）、缺血性卒中（28.23%）、出血性卒中（14.59%）和胃癌（2.90%）、慢性肾病（2.44%）等。高盐饮食导致天津市居民期望寿命减少1.01岁。其中男性期望寿命减少1.00岁，女性期望寿命减少1.04岁。造成期望寿命减少的疾病顺位分别是：缺血性心脏病（0.54岁）、缺血性卒中（0.27岁）、出血型卒中（0.13岁）、慢性肾病（0.02岁）和胃癌（0.02岁）等。

结论 天津市居民食盐摄入量较高，是世界卫生组织推荐食盐摄入量的将近3倍。如果将钠摄入量降至世界卫生组织推荐摄入水平，将有超过5500人可避免因高盐饮食带来的相关死亡风险。高盐饮食给天津市居民带来沉重的疾病负担，它是导致心脑血管疾病、慢性肾病和胃癌死亡重要的危险因素。应积极开展有效的综合减盐干预，开展成本效果评价并为政策决策提供参考。

关键字 高盐饮食 人群归因分值 期望寿命

分类：公共营养与健康

孕期膳食炎症指数与出生体重的关联：一项前瞻性队列研究

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摘要：目的 前瞻性地评估膳食炎症指数（dietary inflammation index, DII）和出生体重之间的关联及其性别特异性，为指导孕期合理膳食提供科学依据。 方法　采用前瞻性研究设计，选取2018年3月至2022年9月进入同济出生队列（Tongji Birth Cohort, TJBC）的孕妇作为研究对象，在至少完成一次膳食调查的孕妇中，进一步根据纳入排除标准，最终纳入2586名孕妇。经过培训的调查员在基线时通过问卷调查收集孕妇的基本资料。采用经过验证的半定量食物频率问卷（Food frequency questionnaire, FFQ）收集孕妇孕期膳食摄入信息，并通过膳食分析软件计算人均日能量和营养素摄入量。作为反应膳食整体炎症潜能的工具，DII在妊娠人群种的使用得到了验证。本研究采用26种营养素用于计算DII评分。DII的开发基于大量的文献检索，通过分析膳食摄入与6种常见的炎症指标的相关性，为每种膳食组分赋予不同的权重分数。DII得分为负分，表示膳食组分具有抗炎能力；DII得分为正分，表示膳食组分具促炎能力。数值的绝对值大小则代表膳食组分促/抗炎潜能越大。新生儿的基本资料，如性别、出生体重、出生孕周等信息通过医疗记录获得。根据标准临床界值定义出生体重相关指标，包括低出生体重（low birth weight, LBW）、巨大儿、小于胎龄儿（small for gestational age, SGA）和大于胎龄儿（large for gestational age, LGA）。共收集到2142对母婴的完整资料。采用方差分析方法分析不同DII得分下孕妇的社会人口学特征，及营养素和食物的摄入情况。采用修正的Poisson回归和多元线性回归模型分析DII与上述出生结局的关系。多变量调整的模型中调整的混杂因素有年龄、孕前体质量指数、文化程度、教育水平、产次、家族糖尿病史、吸烟、饮酒、锻炼习惯、孕期增重和孕周等。进一步按照婴儿性别进行分层分析，在模型中加入分层因素与DII得分的交互项，对交互项进行检验。 结果 2586名孕妇的平均DII得分为-0.17 ±1.00，总体得分范围在-4.06到4.03之间。到追踪到的结局中，有121例（6.97%）SGA新生儿，244例（14.05%）LGA新生儿，92例（5.29%）巨大儿，和55例（3.16%）LBW新生儿。将DII得分作为连续性变量或按DII得分进行三分位数分组分析，调整模型中均未发现DII与出生体重的关联。性别分层分析的结果显示，DII得分越高（膳食更具促炎潜能），孕妇分娩SGA和LBW男婴的风险增加，而对女婴无影响。相对危险度（relative risk, RR）和95%置信区间（confidence interval, CI）分别为1.33（1.05-1.68）和1.87（1.07-3.27）。性别与DII得分存在交互作用，相应的 P 值分别为0.020和0.011，差异有统计学意义。 结论 孕妇孕期较高的DII得分，即膳食具有较强促炎能力，与SGA或LBW有关，且该关联存在性别差异。减轻母亲膳食炎症潜能可能改善胎儿出生结局，减轻相应的医疗负担。

关键字 膳食炎症指数；出生体重；炎症；队列研究

分类：公共营养与健康

社区居民对益生菌功能偏好的调查研究

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目的　益生菌被定义为“经适量服用后有益于宿主健康的活微生物”。益生菌广泛存在于自然界中，可以通过发挥多种功能促进人体健康和防治疾病。近年来，随着益生菌的功能不断增加、耐药性病原菌增多，社区居民对药物天然替代品需求不断增加，益生菌已成为促进健康和疾病防治的重要手段之一，在临床工作中已被广泛应用。但是，社区居民对益生菌功能的偏好至今尚不清楚。本研究旨在通过横断面调查了解社区居民对益生菌功能的偏好，为益生菌产品的开发以及市场推广提供数据支持。

方法　2022 年 12 月—2023 年 02 月，采用便利抽样的方法，利用电子问卷进行调查，共发放问卷 299 份，回收有效问卷 299 份，主要收集调查对象的年龄、性别、学历等基线资料、益生菌的功能偏好以及影响因素，调查研究对象对益生菌的了解和使用情况，主要采用卡方检验分析社区居民对益生菌功能偏好的影响因素。

结果　1.　社区居民对益生菌非常了解者占 4.35%，比较了解者占 24.75%，基本了解者占 46.49%，仅初步了解者占 22.07%，完全不了解者占 2.34%；2. 认为有必要长期使用益生菌者占 20.07%，认为可以阶段性使用益生菌者占 66.89%，认为出现症状时才会使用者占 13.04%；3.　社区居民倾向于采用益生菌提高免疫力（21.80%）、治疗便秘（18.06%）、保护口腔去除口气（14.43%）、治疗腹泻（14.33%）、合理降低体重（11.71%）、缓解疲劳和抗抑郁（9.69%）；4. 男性和女性对益生菌功能的偏好存在差异（P＜0.05），男性（55%）采用益生菌治疗腹泻者占比高于女性（42%）（P＜0.05），女性（76%）采用益生菌提高免疫力者占比高于男性（65%）（P＜0.05）。男性和女性采用益生菌治疗便秘、保护口腔去除口气、增加孕妇及婴儿免疫力、合理降低体重、缓解疲劳抗抑郁占比之间无统计学差异（P＞0.05）；5.　不同年龄段的社区居民对益生菌功能的认知存在差异（P＜0.05），18-45 岁的社区居民认为采用益生菌可以缓解疲劳抗抑郁（93.33%），46-60 岁的社区居民认为采用益生菌治疗腹泻（65.21%），60 岁以上的社区居民认为采用益生菌可以增加孕妇及婴儿免疫力（100%），不同年龄段的社区居民采用益生菌治疗便秘、保护口腔去除口气、合理降低体重占比之间无统计学差异（P＞0.05）；6.　曾患胃肠疾病者、正患胃肠疾病者以及未患胃肠疾病者对益生菌治疗腹泻、便秘的功能偏好无统计学差异（P＞0.05）。

结论　社区居民对益生菌了解者占比相对较低，社区居民主要采用益生菌提高免疫力、治疗便秘、保护口腔去除口气以及治疗腹泻；男性倾向于采用益生菌治疗腹泻，女性倾向于采用益生菌提高免疫力；不同年龄段社区居民对益生菌功能的认知存在差异，18-45 岁的社区居民认为采用益生菌可缓解疲劳抗抑郁，46-60 岁的社区居民认为采用益生菌可治疗腹泻，60 岁以上的社区居民认为采用益生菌可增加孕妇及婴儿免疫力；是否患胃肠疾病对社区居民的益生菌功能偏好无影响。

关键字 社区居民；益生菌；功能偏好；横断面研究

分类：公共营养与健康

中国老年人的主要饮食模式与16种疾病患病风险的关联

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摘要：目的 在大样本下分析中国老年人的主要饮食模式，探讨主要饮食模式与16种常见老年疾病的关联，为老年疾病的饮食干预提供一定的指导。**方法** 本研究以中国老年健康影响因素跟踪调查(CLHLS)2018年的横断面数据为基础，应用CLHLS数据库中记录的13种类型的食物（新鲜水果、新鲜蔬菜、肉、鱼、蛋、豆制品、盐渍蔬菜、糖、大蒜、奶制品、坚果制品、蘑菇或藻类、茶）和16种常见的老年疾病（高血压、糖尿病、心脏病、中风或心血管疾病、呼吸系统疾病、青光眼、前列腺肿瘤、胃或十二指肠溃疡、帕金森病、关节炎、癫痫、胆囊炎或胆石症、风湿或类风湿病、慢性肾炎、子宫肿瘤和肝炎）调查中国老年人主要的饮食模式以及主要饮食模式与疾病的关联。采用描述性统计的方法描述参与者的基本特征，计量资料采用中位数(四分位数)表示，计数资料采用频数(构成比)表示。主成分分析法用于提取中国老年人群的主要饮食模式，碎石图用于展示主要成分的初始特征值。二元逻辑回归用于分析中国老年人主要饮食模式与16种常见老年疾病的关联，将性别、居住地、年龄、教育程度、职业、婚姻状况、BMI、自评生活质量、喝水种类、饮水来源、饮酒、吸烟状况、运动状况、体力劳动、社交活动、精力、口味作为数据分析时的协变量，建立三个回归模型以尽可能地消除协变量对患病的影响。森林图用于展示饮食模式得分与疾病患病风险的关系。**结果** 主成分分析结果显示，中国老年人群有四种主要的饮食模式，分别为蛋-奶制品饮食模式、盐渍蔬菜-坚果制品饮食模式、新鲜蔬菜-新鲜水果饮食模式、鱼-肉饮食模式。经三个模型调整后，二元逻辑回归模型的结果显示，蛋-奶制品饮食模式得分升高，会使老年人患老年人患心脏病(OR= 1.112)、中风或心血管疾病(OR= 1.115)、呼吸系统疾病(OR= 1.103)、青光眼(OR= 1.267)、前列腺肿瘤(OR= 1.155)、帕金森病(OR= 1.275)的风险上升(P<0.05)；盐渍蔬菜-坚果制品得分的升高，会使老年人患高血压(OR= 1.063)、心脏病(OR= 1.024)、子宫肿瘤(OR= 1.426)的风险上升，患风湿病或类风湿病(OR= 0.861)的风险降低(P<0.05)；新鲜蔬菜-新鲜水果饮食模式得分升高，会使老年人患心脏病(OR= 0.984)的风险降低(P<0.05)；鱼-肉饮食模式得分升高，会使老年人患心脏病(OR=0.878)、中风或心血管疾病(OR=0.865)的风险降低，患风湿病或类风湿病(OR= 1.246)的风险上升(P<0.05)。**结论** 中国老年人的患病情况与其主要饮食模式相关，本研究可从饮食干预的角度为老年疾病的预防与管理提供一定的指导。

关键字 饮食模式；老年疾病；中国老年人；主成分分析法；二元逻辑回归模型

分类：公共营养与健康

中国成人坚持健康膳食模式与 2017 年 ACC/AHA 指南定义的高血压风险的相关性

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目的：分析在中国成人坚持终止高血压膳食（DASH）和替代性地中海膳食（AMED）与 2017 年 ACC/AHA 指南定义的高血压风险的关系，并评估膳食模式中各组成成分对其保护效应的相对贡献。

方法：数据来自 2015-2017 年中国居民营养与健康状况监测。排除不符合要求的研究对象，共 47501 名 18-79 岁成人纳入分析。采用食物频率问卷收集膳食数据，采用电子血压计测量血压值。根据 2017 年 ACC/AHA 指南，将收缩压（SBP）/舒张压（DBP）≥130/80 mmHg 定义为高血压，并将高血压分为一期高血压（SBP/DBP：130-139/80-89 mmHg）和二期高血压（SBP/DBP≥140/90 mmHg）。使用 DASH 评分（新鲜蔬菜、水果、乳制品、全谷物、豆类及坚果、红肉及制品、钠）和 AMED 评分（新鲜蔬菜、水果、全谷物、豆类及坚果、鱼类、红肉及制品、单不饱和脂肪酸与饱和脂肪酸比值、酒精）定量描述研究对象对膳食模式的依从性。按照性别分层，依据研究对象各种膳食成分（酒精除外）的平均摄入量或比例的五分位数对其赋 1 至 5 分。根据适宜酒精摄入量推荐值对将酒精摄入量分为五组并进行赋分。使用多重 logistic 回归模型评估膳食模式与高血压、一期高血压和二期高血压风险之间的关系，并对潜在的社会人口学特征、行为生活方式、健康状况、固体燃料使用和高血压家族史等混杂因素进行调整。通过交替从总评分中减去一个成分后调整完整模型中相同的混杂因素以及相应的减去的膳食成分，估计减去的总得分(评分总分每 25%增量)与不同等级高血压风险的关联强度。计算减去一个膳食成分后的总分的效应估计值相对于原始总分效应估计值的变化百分比，从而评估 DASH 和 AMED 评分各膳食成分的相对贡献。由于在去掉一个成分后得分范围会缩短，为确保可比性，将 DASH 和 AMED 的回归系数分别乘以 25/29 和 29/33，然后再对它们取指数以校正为 35 和 40 分制。

结果：研究对象中男性占 46.6%，平均年龄为 50.4±13.1 岁，城市居民占 41.2%，高血压患病率为 56.8%，其中一期高血压占 46.5%。DASH 和 AMED 评分与不同等级高血压风险之间呈显著负相关（P 趋势<0.05）。与最低五分位数（Q1）相比，DASH 评分的最高五分位数（Q5）对高血压、一期高血压和二期高血压风险的 0.78（0.73~0.83）、0.82（0.75~0.89）和 0.72（0.66~0.78），AMED 评分的 Q5 的 OR（95%CI）分别为 0.91（0.85~0.97）、0.91（0.84~0.98）和 0.91（0.84~0.99）。DASH 评分与高血压的关联强度高于一期高血压而低于二期高血压，而 AMED 评分对不同等级高血压风险的保护作用相似。对于 DASH 评分，乳制品对高血压的保护效应的相对贡献最高（69.1%），其次是水果（33.3%）、豆类及坚果（30.9%）、钠（23.5%）、全谷物（17.3%）、蔬菜（13.6%）和红肉及其制品（8.6%）。DASH 评分的各膳食成分对一期和二期高血压保护效应的相对贡献与高血压相似。对于 AMED 评分，当红肉及其制品和 MUFA/SFA 比值被排除时，AMED 评分对高血压（-26.5%和-14.7%）、一期高血压（-23.1%和-7.7%）和二期高血压（-27.9%和-14.0%）风险的保护作用反而上升。对高血压和二期高血压保护作用贡献率前三位的膳食成分为豆类及制品（73.5%和 74.4%）、水果（58.8%和 65.1%）和鱼类（55.9%和 65.1%）。对一期高血压保护作用贡献率前三位的膳食成分为豆类及坚果（80.8%）、水果（57.7%）和全谷物（42.3%）。

结论：中国成年居民坚持 DASH 和 AMED 膳食与 2017 年 ACC/AHA 指南定义的高血压风险呈负相关，DASH 膳食的保护效应优于 AMED 膳食，乳制品是 DASH 膳食降压作用的主要膳食组成。

关键字 DASH 膳食；地中海膳食；高血压；保护效应

分类：公共营养与健康

膳食营养素与脑血管疾病发生发展的研究进展

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目的：膳食营养素是维持健康的重要因素，在人体内具有复杂的相互作用和调节关系，缺乏或过量都会影响人体健康。合理摄入膳食营养素对人体健康至关重要。特别是在预防和控制脑血管疾病方面起着重要的作用。脑血管疾病是指脑部血管受到病理性损伤，导致脑内血流受到影响的一类疾病，它是导致残疾甚至死亡的主要原因。在预防和控制脑血管疾病方面，膳食营养素的作用具有重要的意义。本研究旨在综述影响脑血管疾病发生发展的膳食营养素，进而为脑血管疾病的预防和控制提供科学的理论依据。

方法：本研究采用文献综述法，对中国知网（CNKI）、PubMed 和 Web of Science 等知名科学数据库近年来影响脑血管疾病的膳食营养素的相关研究进行总结分析，主要为病例对照研究。

结果： 通过查阅大量文献，脑血管疾病的发生发展受到多种膳食营养素的影响。首先，一些食物可以降低患脑血管疾病的风险，如蔬菜、水果、全谷类食物、坚果、豆类、植物油、发酵乳制品和咖啡等。这些食物中含有丰富的维生素、矿物质、抗氧化剂等膳食营养素，这些营养素可以减少炎症反应和氧化应激，同时可以有效地改善身体的免疫系统，提高身体的抵抗力，从而预防脑血管疾病发生。此外，研究发现从饮食中获得的 ω-3 脂肪酸能够有效地减少脑血管疾病和中风的风险。其次，过多的饱和脂肪酸、盐和糖的摄入可能会增加患脑血管疾病的风险。高热量、高脂肪、高盐、高糖以及过度加工的食物会导致肥胖、高血压、高胆固醇等疾病，这些疾病可能增加脑血管疾病和中风的风险。因此，应尽量避免过多的饱和脂肪酸、盐和糖的摄入。此外，有研究发现缺乏维生素 B6、B12 和叶酸可能会增加中风的风险，而钙、镁、钾、铁、锌等矿物质和微量元素的摄入可能与降低脑血管疾病风险有关。因此，对于预防和控制脑血管疾病来说，饮食中合理摄入各种膳食营养素至关重要。除此之外，膳食营养素和脑血管疾病之间的关系还需要进一步的探究，从而全面地揭示膳食营养素与脑血管疾病的关系。

结论：综上所述，膳食营养素对预防和控制脑血管疾病至关重要。在饮食中，应合理摄入有益的营养素，特别是富含 ω-3 脂肪酸和抗氧化剂的食物，同时要避免过多的饱和脂肪酸、盐和糖的摄入，进而有效地预防和控制脑血管疾病的发生和发展。

关键字 膳食营养素；ω-3 脂肪酸；脑血管疾病；中风

分类：公共营养与健康

北京市 10-12 岁不同体质水平学生与能量平衡相关行为的关系研究

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研究目的：随着经济、生活方式的急剧转变，儿童青少年的不良饮食行为普遍存在，从而导致体质健康出现不同程度下降，尽管国家出台多项相关政策，有效扭转学生体质的下滑态势，但在身体机能、身体素质等方面的测试结果仍不容乐观。第八次全国学生体质调研显示，我国学生体质达标优良率为 23.8%，较之以往虽呈现上升趋势，但距离《2023 健康中国》中对于学生体质的行动目标（体质优良率要到 60%及以上）仍然存在较大差距。因此，学生体质的提高仍然是我国以及社会重点关注的问题。体质除了受先天遗传影响之外，后天的环境因素也贡献着重要作用，由于先天遗传不易发生改变，在近年来，学者们逐渐将影响学生体质的相关因素聚焦到后天环境因素，尤其是在能量平衡方面。能量平衡是指能量摄入和能量消耗的动态平衡状态，机体的能量平衡被打破，会影响机体的能量代谢，进而引起身体形态等指标发生改变，影响学生的体质健康。在欧洲，体质与能量平衡之间的研究较为丰富，主要进行的是能量平衡相关行为（EBRB）的研究，相关研究发现 EBRB 与学生体质健康密切相关，不良的 EBRB 易导致肥胖、体质下降等体质问题出现，且 EBRB 具有显著的地域性、集群性特点。10-12 岁年龄阶段是身体生长发育的关键时期，更是生活习惯养成的关键时期，对未来体质健康和行为习惯均能产生深远影响。因此，本研究从“能量平衡”角度出发，研究不同体质水平学生与能量平衡相关行为的关系，并找出影响北京市小学生体质达标优良率的关键行为因素。

研究方法：按照按照分层随机抽样方法从北京市八个城区抽取 16 个小学（城乡各半），除去问卷填写不完整和特殊情况不能进行体质测试的学生之外，共 1082 名学生。依据《国家学生体质健康标准》规定进行体质测试，根据体质总分评定其体质等级。问卷采用 Maartje M van Stralen 等人在《EuropeaN Energy balance Research to prevent excessive weight Gain among Youth (ENERGY) project: Design and methodology of the ENERGY cross-sectional survey》中编制的学生问卷，通过 Brislin 翻译回译模式，并咨询专家意见进行修改，最终确定问卷。数据经 Excel 统计，并转入到 spss26.0 统计软件。

研究结果：1.在 EBRB 方面，北京市 10-12 岁优良组学生饮料行为、早餐行为、身体活动行为和视屏行为均显著优于及格以下组学生（P＜0.05）。2.北京市 10-12 岁学生体质总分与饮料行为和视屏行为之间存在极显著负相关关系（r=-0.08 r=-0.14），与早餐行为、身体活动行为之间存在极显著正相关关系（r=0.12 r=0.15）。3.以 EBRB 为自变量，以体质总分为因变量进行逐步线性回归分析显示，学生体质总分受早餐行为、身体活动行为、视屏行为显著影响（R2=0.235 F=21.095 P＜0.05），身体活动行为（B=0.161）对体质影响最大。

研究结论：1.较好的 EBRB 更有利于北京市学生体质达到优良等级。2.EBRB 与体质之间密切相关，其中身体活动行为是影响北京市小学生体质达到优良的最关键行为因素。

关键字 体质 能量平衡相关行为 影响因素

分类：公共营养与健康

武汉市 2019 年 18 岁及以上居民饮酒行为现状及趋势分析

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目的　了解武汉市 18 岁及以上成年人饮酒率、日均酒精摄入量、不同饮酒种类和过量饮酒、危险饮酒及有害饮酒、醉酒等不良行为，并就 2019 年和 2006 年人群饮酒率进行对比分析，为相应的干预措施提供科学依据。方法　采用分层抽样法抽取武汉市 38 个社区街道（乡镇）参加此次调查，使用《中国慢性病及其危险因素监测问卷》开展调查，通过食物频率法（FFQ）收集调查对象的饮酒频次和饮酒量信息，分析武汉市成年居民在调查前 12 个月不同性别、地区、年龄和文化程度饮酒状况。结果　本次调查共纳入 5892 户 10253 名常住居民，武汉市 18 岁及以上成年人饮酒率为 21.91%，男性（34.14%）高于女性（11.45，P＜0.05），随着文化程度的增加，饮酒率增高（P＜0.05）。根据《中国居民膳食指南（2016 年版）》标准，武汉市成年居民过量饮酒率为 26.74%；依据世卫组织（WHO）标准，武汉市成年居民危险饮酒率和有害饮酒率分别为 7.72%和 12.29%。在饮酒者中，每天至少一次饮酒率为 37.6%，醉酒率为 17.68%，日均酒精摄入量的 P50（P25，P75）为 6.86g （1.39g，30.08g），饮酒类型主要是高度白酒（31.82%）、啤酒（26.30%）、低度白酒（25.57%），其次为米酒（10.00%）、葡萄酒（5.78%），黄酒饮用比例最低，为 0.52%。回归模型分析结果发现：男性、远城区、年龄在 65 岁及以上与每天饮酒呈正相关，大专及以上文化程度与每天饮酒呈负相关（P 均＜0.05）。男性高度、低度白酒和啤酒饮用率、日均酒精摄入量均高于女性，女性葡萄酒和米酒饮用率高于男性，中心城区高度白酒、葡萄酒和米酒饮用率均高于远城区，65 岁及以上年龄段白酒饮用率较高，饮酒者日均酒精摄入量随年龄的增长而增加。在过量、有害及危险饮酒、醉酒等不良饮酒行为方面，男性和远城区居民的不良饮酒行为比例更高，随文化程度的增加，过量、有害及危险饮酒率降低，但醉酒率呈增加趋势，并且除醉酒率随着年龄上升呈下降趋势外，其他不良饮酒行为均随着年龄的增加而呈上升趋势。上述各指标在其不同人群特征之间的差异均具有统计学意义（P＜0.05）。与 2006 年相比，2019 年人群饮酒率有所上升，升高了 17.17%，男性略有下降，但女性饮酒率升高了 269.35%，同时，中心城区 2019 年饮酒率有所上升（上升了 31.45%），远城区则下降了 12.19%，且各个年龄组饮酒率均比 2006 年高，年龄组间趋势相近，在 25-44 岁年龄组饮酒率最高，其后随年龄增加饮酒率呈下降趋势，但 18-24 岁年龄组饮酒率最低。结论　武汉市 18 岁及以上居民饮酒率呈上升趋势，男性和远城区居民饮酒率、饮酒量较高、不良饮酒行为较突出，女性和 65 岁及以上老年人的饮酒率及不良饮酒行为增幅较大，应针对不同人群持续开展有针对性的限酒干预措施。

关键字 成人；饮酒；监测

分类：公共营养与健康

MicroRNA-34a/组蛋白乙酰化修饰在 GABA 拮抗 2 型糖尿病模型小鼠脂肪组织 IRS-1 表达降低中的作用

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目的：糖尿病是一种以高血糖症为主要特征的自身免疫、代谢和遗传疾病，其中以 2 型糖尿病（Type 2 diabetes, T2DM）居多。肌肉和脂肪等外周组织的胰岛素抵抗（Insulin resistance, IR）是 T2DM 的主要发病因素。胰岛素受体底物-1（Insulin receptor substrate-1, IRS-1）是传递胰岛素信息的重要介质。研究发现 IR 和 T2DM 患者脂肪组织和肌肉中 IRS-1 表达均有下降。γ-氨基丁酸（Gamma-aminobutyric acid, GABA）是一种广泛存在于自然界的非蛋白质氨基酸，在哺乳动物中，GABA 主要存在于脑内，在脂肪等外周组织中也有存在。GABA 同时也是一种功能食品因子，作为膳食补充剂在国际上广泛应用。研究表明 GABA 可上调 IRS-1 的表达，改善 IR，但 GABA 调控 IRS-1 的分子机制尚不清楚，补充 GABA 能否上调 T2DM 脂肪中 IRS-1 的表达亦有待证实。组蛋白去乙酰化酶（Histone deacetylases, HDACs）可通过催化组蛋白去乙酰化抑制相应基因转录。有研究显示 IRS-1 表达受 HDAC2 调控，HDAC2/3 高度同源且与 T2DM 发病密切相关。另有研究报道 GABA 具有抑制 HDACs 的作用，因此，GABA 可能通过抑制 HDAC2/3 上调 IRS-1 的表达。然而，GABA 抑制 HDAC2/3 的具体分子机制尚不明确。我们通过生物信息学预测与 HDAC2/3 相关的小 RNA（microRNA，miRNA），其中 miR-34a 的表达可被 GABA 上调。我们还发现 miR-34a 的启动子区域可能与转录因子 CCAAT/增强子结合蛋白 α（CCAAT/enhancer binding protein alpha, CEBPα）结合，表明 CEBPα 可以上调 miR-34a 的表达。本研究结合体内、体外实验探讨了 GABA 能否通过 CEBPα 而上调 miR-34a，进而抑制 HDAC2/3 表达，最终拮抗 T2DM 中 IRS-1 表达的降低。

方法：使用高脂饮食联合链脲佐菌素建立 T2DM 模型小鼠。将 T2DM 模型小鼠随机分为 T2DM 组和 T2DM+GABA 组，同时设立对照组和 GABA 组，每组 8 只。对照组和 T2DM 组饮用蒸馏水，GABA 组和 T2DM+GABA 组饮用含 2‰GABA 蒸馏水。喂养 4w 后，隔夜禁食后处死小鼠，取腹周脂肪组织。采用实时荧光定量 PCR（Quantitative Real-time PCR，qRT-PCR）、蛋白免疫印迹（Western Blot，WB）法分析脂肪组织 IRS-1、HDAC2、HDAC3、miR-34a 及 CEBPα 表达水平的变化。体外培养小鼠脂肪前体细胞（3T3-L1 细胞系）。以 20 mM 的葡萄糖处理的 3T3-L1 细胞为 T2DM 模型细胞，用 10 nM GABA 进行干预。qRT-PCR、WB 法分析 IRS-1、HDAC2、HDAC3、miR-34a 及 CEBPα 表达水平的变化。沉默 3T3-L1 细胞 CEBPα，同时设立对照组，qRT-PCR 法分析 miR-34a 表达水平的变化。miR-34a-5p 模拟物（Mimic）和抑制剂（Inhibitor）分别处理 3T3-L1 细胞，同时设立对照组，qRT-PCR、WB 法分析细胞 HDAC2/HDAC3 表达水平的变化。沉默 3T3-L1 细胞 HDAC2 或 HDAC3 ，同时设立对照组，qRT-PCR、WB 法分析 IRS-1 表达水平的变化。

结果：1. 与对照组相比，T2DM 组小鼠脂肪组织 IRS-1、miR-34a 及 CEBPα 表达降低（P<0.01），HDAC2 和 HDAC3 表达升高（P<0.01）；与 T2DM 组相比，T2DM+GABA 组小鼠脂肪组织 IRS-1、miR-34a 及 CEBPα 表达升高（P<0.01），HDAC2 和 HDAC3 表达降低（P<0.01）。2. 与对照组相比，葡萄糖处理的 3T3-L1 细胞 IRS-1、miR-34a 及 CEBPα 表达降低（P<0.01），HDAC2 和 HDAC3 表达升高（P<0.01）；GABA 可逆转葡萄糖处理的 3T3-L1 细胞的上述改变。（P<0.01）。3. 沉默 CEBPα 基因的 3T3-L1 细胞 miR-34a 表达降低（P<0.01）。4. miR-34a 模拟物处理的 3T3-L1 细胞 HDAC2、HDAC3 表达降低（P<0.01），miR-34a 抑制剂处理的 3T3-L1 细胞 HDAC2、HDAC3 表达升高（P<0.01）。5.沉默 HDAC2 基因的 3T3-L1 细胞 IRS-1 表达升高（P<0.01）；沉默 HDAC3 基因的 3T3-L1 细胞 IRS-1 表达升高（P<0.01）。

结论：GABA 可通过 CEBPα 上调 miR-34a，进而抑制 HDAC2/3 表达，拮抗 T2DM 模型小鼠脂肪组织 IRS-1 表达的降低。

关键字 2 型糖尿病；胰岛素抵抗；胰岛素受体底物-1；microRNA-34a；CCAAT/增强子结合蛋白 α；γ-氨基丁酸

分类：公共营养与健康

北京市学龄儿童膳食质量与代谢综合征的相关性

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目的 探讨北京市学龄儿童膳食质量与代谢综合征（metabolic syndrome, MetS）及其组分的相关性，为学龄儿童 MetS 的科学防治提供参考依据。

方法 本研究数据来源于北京市 2019 年中小学生营养与健康状况监测项目，该项目采用多阶段分层整群随机抽样的方法，共抽取北京市七个区 3460 名一、三、五和七年级的学龄儿童作为研究对象，其中 966 人参与完整的详细膳食调查。采用经专家论证后的自拟问卷采集调查对象及其看护者的一般人口学特征等基本信息，通过 3 天 24 小时膳食回顾法和称重法采集膳食数据，通过体格及实验室检查收集体格和血清学指标数据。采用中华医学会儿科学分会 2012 年制订的中国儿童青少年 MetS 诊断标准对 MetS 及其组分进行判定，利用中国儿童青少年膳食指南指数（the Chinese Dietary Guideline Index for Children, CDGI-C）进行膳食质量评价，采用 t 检验、非参数检验、多因素 Logistic 回归模型等分析北京市学龄儿童膳食质量与 MetS 及其组分的相关性。

结果 北京市 2019 年学龄儿童 MetS 检出率为 3.9%。各代谢组分检出率最高的是中心性肥胖（24.6%），其次为血压偏高（21.0%），高血糖、高甘油三酯（triglyceride, TG）及低高密度脂蛋白胆固醇（high density lipoprotein cholesterol, HDL-C），检出率分别为 7.8%、7.4%和 5.3%。北京市学龄儿童 CDGI-C 评分为（59.19±11.09）分，男女生分别为 58.82 和 59.56 分，不存在统计学差异（P>0.05）。与 6~10 岁儿童（60.45 分）相比，10~14 岁儿童的 CDGI-C 评分（57.79 分）较低（P<0.05）。城区儿童 CDGI-C 评分为 60.61 分，高于郊区儿童的 58.19 分（P<0.05）。单因素分析显示，MetS 儿童的 CDGI-C 总分、全谷物及杂豆和深色蔬菜比例评分更低（P<0.05）；中心性肥胖儿童的 CDGI-C 总分、全谷物及杂豆、深色蔬菜比例和水果评分更低（P<0.05）；血压偏高儿童的全谷物及杂豆得分和深色蔬菜比例得分偏低，但水果和坚果得分更高（P<0.05）；高血糖儿童有更低的全谷物及杂豆、深色蔬菜比例和坚果得分，但有更高的奶及奶制品和油得分（P<0.05）；低 HDL-C 儿童有更低的全谷物及杂豆得分（P<0.05）。校正年龄、性别、地区、主要看护者文化程度、家庭人均年收入、总能量摄入等潜在混杂因素后，分析发现全谷物及杂豆得分较高与 MetS 风险较低相关（OR=0.84，95%CI：0.70~0.99）；深色蔬菜得分较高与 MetS（OR=0.76，95%CI：0.63~0.93）和高血糖（OR=0.76，95%CI：0.65~0.89）风险较低相关；坚果得分较高与高血糖的存在程度较低有关（OR=0.86，95%CI：0.75~0.99）。

结论 北京市学龄儿童在一定程度上遵守《中国学龄儿童膳食指南（2022）》，但其膳食质量仍处于整体偏低的水平。较高的膳食质量得分与较低的 MetS 和中心性肥胖检出率相关。全谷物及杂豆、深色蔬菜和坚果摄入增加是 MetS 或其组分的保护因素，提高对膳食指南的依从性有助于预防学龄儿童代谢性疾病的发生。

关键字 学龄儿童；膳食质量；代谢综合征

分类：公共营养与健康

HDAC2 对 LRP6 表达的调控及其在 γ-氨基丁酸拮抗阿尔茨海默病中的作用机制研究

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目的：阿尔茨海默病（AD）是一种以记忆和认知功能障碍为主的中枢神经退行性病变。目前AD发病机制尚不明确，大脑皮质和海马中β淀粉样蛋白（Aβ）沉积是AD的早期病理特征，Aβ在脑内异常聚集进而对神经元和突触的破坏作用是诱发AD患者记忆和认知功能缺陷的关键环节。突触后致密蛋白95（PSD95）与突触功能密切相关，但其在AD海马中呈低表达。因此，上调AD脑中PSD95的表达有望成为防治AD的重要靶点之一。Wnt/β-catenin信号能够上调PSD95表达，且与突触可塑性密切相关。然而，低密度脂蛋白受体相关蛋白6（LRP6）介导的Wnt/β-catenin通路在AD患者的脑中受到抑制。据报道，上调LRP6的表达可以增强AD中Wnt/β-catenin信号通路，上调PSD95的表达。另有研究显示，Wnt/β-catenin信号通路可受到组蛋白乙酰化修饰的调控，但具体机制尚不明确。HDAC2是一种组蛋白去乙酰化酶，与AD关系密切，HDAC2能否通过调节LRP6进而影响Wnt/β-catenin信号通路尚不清楚。γ-氨基丁酸（GABA）是哺乳动物大脑中最重要的抑制性神经递质，同时也是一种功能性食品因子，具有抑制HDAC2作用。前期研究证实GABA具有抗AD作用。本研究通过体内、体外实验，探讨了GABA是否通过抑制HDAC2而调控LRP6的表达，进而增强Wnt/β-catenin信号、上调PSD95表达，最终延缓AD的发病进程。

方法：将4月龄APP/PS1双转基因AD模型小鼠随机分成AD、AD+GABA组，野生型小鼠分为WT、WT+GABA组。每组10只，雌雄各半。AD+GABA、WT+GABA组小鼠饮用含0.1% GABA蒸馏水，AD、WT组小鼠饮用蒸馏水。干预6个月后，采用旷场实验对各组小鼠进行行为学测试。小鼠经麻醉后处死，取脑组织。疏磺素T染色法检测海马组织Aβ沉积情况；采用实时荧光定量聚合酶链式反应(RT-qPCR)和免疫印迹(WB)实验分析海马组织HDAC2、LRP6、β-catenin和PSD95表达水平的变化。体外培养人神经母细胞瘤细胞系(SH-SY5Y细胞)，以20uM的Aβ处理SH-SY5Y细胞，用20nM GABA进行干预，同时设立对照组，用RT-qPCR、WB法分析HDAC2、LRP6、β-catenin和PSD95表达水平的变化。转染小干扰RNA(siRNA)沉默SH-SY5Y细胞HDAC2基因，同时设立对照组，用RT-qPCR、WB法分析细胞LRP6、β-catenin和PSD95表达水平的变化。转染siRNA沉默SH-SYSY细胞β-catenin基因，同时设立对照组，用RT-qPCR、WB法分析细胞PSD95表达水平的变化。

结果：1.旷场实验结果显示，与WT组相比，AD组小鼠直立次数、修饰次数及移动距离减少(P<0.01或P<0.05)；与AD组相比，AD+GABA组小鼠直立次数、修饰次数及移动距离增多(P<0.01或P<0.05)。2.AD组小鼠海马组织Aβ斑块个数较WT组增多(P<0.01)；AD+GABA组小鼠海马组织Aβ斑块个数较AD组减少(P<0.01)。3.与WT组相比，AD组小鼠海马组织LRP6、β-catenin和PSD95表达降低(P<0.01)，HDAC2表达升高(P<0.01)；与AD组相比，AD+GABA组小鼠海马组织LRP6、β-catenin和PSD95表达升高（P<0.01)，HDAC2表达降低(P<0.01)。4.与对照组相比，Aβ处理组SH-SY5Y细胞LRP6、β-catenin和PSD95表达降低(P<0.01)，HDAC2表达升高(P<0.01)；GABA干预可逆转上述改变。5.siRNA沉默HDAC2基因后，SH-SY5Y细胞中LRP6、β-catenin和PSD95表达升高(P<0.01)。6.siRNA沉默β-catenin基因后，SH-SY5Y细胞中PSD95表达降低(P<0.01)。

结论：GABA拮抗AD的作用机制可能与其抑制HDAC2，进而上调LRP6、增强Wnt/β-catenin信号传导、上调PSD95表达有关。

关键字 阿尔茨海默病；突触后致密蛋白95；Wnt/β-catenin信号；低密度脂蛋白受体相关蛋白6；组蛋白去乙酰化酶；γ-氨基丁酸

分类：公共营养与健康

合理膳食 食养是良医

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营养学是一门研究人体所需营养物质的摄取和代谢过程的科学。在这方面，我们需要知道几个基本概念：1、营养素：指人体需要的具有营养的食物组成成分，主要包括碳水化合物、蛋白质、脂肪、维生素、矿物质和水等。2、热量：指物质所释放的能量，通常用卡路里（Cal）表示，也称为热能。3、能量供给：不同营养素的热量不同，对于健康成人，蛋白质、碳水化合物和脂肪的热量比例约为15∶55∶30。

正确的饮食习惯至关重要。良好的饮食习惯，可以有效预防营养不良和各种慢性疾病，并改善身体和心理健康水平。基于此，我们以下列的建议来实现此目标：1、多吃绿叶蔬菜 此类食物含有丰富的维生素和矿物质，并且含有很少的热量和脂肪。切记不要油炸或加工烹饪，新鲜的蔬菜可以最大限度地保留营养素。2、减少饮食摄入糖分 过多糖分的摄入不仅容易导致肥胖，而且还会导致各种慢性疾病的发生。3、控制肉类摄取量 水产品、豆类及其制品等可作为营养素来源选项，提供丰富的蛋白质，同时对健康也有很好的保护作用。4、避免过多地摄入盐分 过多的盐分会增加血压，导致心血管疾病的发生。5、充分摄取膳食纤维 膳食纤维可以促进肠胃消化，帮助排便，切记多吃水果和蔬菜等含有膳食纤维的食物。此外，还可以选择全谷类食物和粗细不一的杂粮面食等。

以上是基于营养学的一些科学饮食建议。如果我们能在生活中做到这些，就能够更有利于提高身体健康和心理健康水平。

有些人在饮食上存在偏食的倾向，为了保持健康，使得他们需要调整食品组合以达到平衡的营养摄入，下面是一些常见的偏食人群和对应的饮食调整方案：

1、儿童偏食：儿童的偏食较为常见，原因可能是口感、视觉上的厌恶或成长过程中的变化等。在这方面，建议鼓励孩子尝试几次不同种类的食物，因为口感和味道都需要适应；同时，可以将食物加工切成小块，增加食欲；必要时亦可在孩子的饮食中加入维生素等营养素，确保孩子得到足够的营养。

2、素食主义者：素食者应该尽量平衡蛋白质和其他必需营养素的摄入量。膳食蛋白质如果来自于谷类蛋白、奶制品，容易减少蛋白质的不足，同时还要充分摄取矿物质、维生素等营养素。建议出外就餐时向厨师咨询和营养师对话，确保膳食组合的科学合理性。

3、习惯性偏食：习惯性偏食倾向者应该逐渐改变其饮食习惯，尝试组合多样化的膳食。在进餐时，可以多尝试一些新的菜肴，不要限制自己的口感，带着开放的心态，让自己张开口腔去探索多样的美食世界。

正确的饮食习惯对人类的健康有着深远的影响。我们应该更加注重营养学知识的普及，不断学习和探索科学饮食技巧，提高自己的饮食品质和生活品质，使自己健康快乐地度过每一天。

关键字 营养学科普，饮食习惯，科学饮食

分类：公共营养与健康

素食对儿童发育状况影响的研究

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目的 探究素食对儿童发育的影响以及影响儿童素食选择的因素。

方法 随机抽取西安市672名6月龄～6周岁的儿童为研究对象，其中素食儿童64人，非素食儿童608人。调研人员按照“素食儿童营养健康状况研究与随访调查”问卷对儿童家长进行访谈调查、评估。调查数据标准化处理后，一人录入另一人监督核对录入数据库，采用SPSS19.0进行统计分析。符合正态分布特征计量资料采用T检验或方差分析检验，计数资料或等级资料等非连续数据检验或HK检验；当计数资料理论频数小于1，则采用Fisher’s确切概率法进行检验。检验水准 α 值设为0.05，P<0.05为有统计学意义。

体格发育指标包括身高（长）、体重、BMI指数和头围；智力发育指标包括大动作、精细动作、适应能力、语言和社交行为等；身体素质指标包括是否易患感冒和感冒治愈途径；儿童素食选择影响因素主要包括儿童家庭情况（父母婚姻状况、父母文化水平和家庭月均收入三个因素）、父母个体特性（父母民族、是否有宗教信仰、宗教信仰类型和母亲饮食结构）及父母素食认知（素食营养、素食是否影响智商、素食优点和素食缺点）等三个方面共11个因素。

结果 （1）素食儿童与非素食儿童身高（长）、体重和BMI存在明显差异，但头围无显著差异；素食儿童身高（长）评价结果为正常最多，而非素食儿童身高（长）评价分布更均匀；素食儿童体重评价为偏轻人数占比最大，非素食儿童体重评价为轻、偏轻、正常、偏重和重的人数占比更加均匀；素食儿童BMI指数评价结果为正常最多，且没有评价结果为肥胖的结果，而非素食儿童BMI指数评价分布均匀；（2）素食儿童在智力水平、精细动作和大动作方面与非素食儿童存在明显差别，但素食儿童在适应能力、语言能力和社交行为评价方面与非素食儿童无显著不同；素食儿童智力评价的项目完成数（3项）小于非素食儿童的项目完成数（4项）；大部分素食儿童不能完成相应的大动作或精细动作，但大部分非素食儿童可以（3）素食儿童在是否易患感冒评价方面与非素食儿童有明显不同，但在感冒治愈途径无明显不同；（4）父母有宗教信仰、父母对素食的认知对儿童素食选择有影响；父母婚姻状况，文化水平、家庭月收入和民族对儿童素食选择影响不显著。

结论 素食儿童与非素食儿童在体格发育（身高（长）、体重、BMI指数）、智力发育（智力评分、大动作、精细动作）和身体素质（是否易患感冒）方面存在明显差异；儿童素食及素食类型的选择受到父母个体特性和父母对素食认知等因素的影响。

关键字 儿童素食、体格发育、智力发育、身体素质

分类：公共营养与健康

南京市餐饮从业人员健康素养调查研究与影响因素分析

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目的：了解江苏省南京市餐饮从业人员健康素养现状并对其进行分析研究，为更好地开展营养健康餐厅建设提供理论依据。**方法：**在南京市餐饮从业者中，通过多阶段分层整群随机抽样选取 325 名人员进行线上问卷调查。调查内容包括个人基本信息、健康素养具备情况及其影响因素等部分，健康素养调查内容主要涵盖传染病预防、安全生产与急救、基本医疗与保健、慢性病预防等相关内容。采用 SAS 9.42 软件进行数据的整理、清洗和统计分析，通过采用二分类单因素、多因素 Logistic 回归分析方法，对健康素养的独立影响因素进行分析，并对影响因素可能存在的剂量反应关系进行趋势检验。**结果：**被调查餐饮从业者健康素养的平均知晓率为 71.8%，其中健康基本知识与理念、健康态度与生活方式行为、健康技能的平均知晓率分别为 75.8%、65.5%、72.6%。健康态度与生活方式行为中，餐饮从业人员参加体检和规律参加体育锻炼的比例均较低，分别为 11.7%和 15.7%；在健康技能方面，餐饮从业人员获取营养相关资格证书的比例较低，仅为 11.7%。被调查对象健康素养整体的具备率为 21.2%，其中健康基本知识与理念、健康态度与生活方式行为和健康技能等 3 个健康素养分类的具备率分别为 41.9%、15.7%和 8.0%。通过单因素 Logistic 回归分析，发现在不同性别、不同年龄组、不同文化程度、不同婚姻状况、不同家庭平均月收入和 BMI 分级等因素中，文化程度的不同，对健康素养具备率的影响具有明显的统计学差异，其 OR 值为 1.90（95% CI：1.28～2.62）。以性别、年龄、家庭月平均收入和 BMI 分级为调整因素进行多因素 Logistic 回归分析，发现文化程度仍为餐饮从业人员健康素养具备率的单独影响因素，其健康素养水平随文化程度升高而明显增高；与初中及以下学历相比，高中/中专、大专和本科及以上的 OR 值分别为 5.2（95% CI：1.12～24.12）、9.59（95% CI：2.02～45.44）和 13.87（95% CI：2.90～66.22），Pfor trend＜0.000 1。**结论：**南京市餐饮从业人员的健康素养水平较低，特别是健康技能。应加强健康教育，普及健康素养相关知识和技能，促进餐饮从业人员健康素养的全面提升；与此同时，还应全面提升烹饪类专业人才培养标准，推动我国健康餐厅的发展，提升在外就餐人员的健康水平，助力健康中国战略的实施。

关键字 餐饮从业人员；健康素养；营养调查

分类：公共营养与健康

Sp1/ATP9B 调节突触素表达在 γ-氨基丁酸拮抗 AD 中的作用机制研究

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目的：阿尔茨海默病（AD）是一种以认知功能障碍为主要临床表现的神经退行性疾病，发病机制尚未阐明。突触素（SYP）是一种与突触囊泡相连的磷酸蛋白，与突触可塑性和认知功能关系密切。研究发现 AD 患者海马部分区域 SYP 水平下降，而海马与认知功能密切相关，故上调 SYP 表达对于改善 AD 认知具有重要意义。P4 型 ATP 酶是一类能够主动转运生物膜磷脂的翻转酶，其中多个亚型被报道在 AD 脑中表达降低，并与 SYP 表达的调控有关，而 ATP9B 作为Ⅱ类 P4 型 ATP 酶在 AD 中表达是否降低尚未见报道，其是否调控 SYP 的表达亦有待证实。转录因子特异性蛋白 1（Sp1）在 AD 脑中呈高表达，我们通过生物信息学分析发现 Sp1 可结合于 ATP9B 的启动子区域。Sp1 主要通过募集蛋白质复合物参与基因的转录调控，蛋白质复合物的性质决定 Sp1 是一个激活因子还是抑制因子。组蛋白乙酰转移酶（HATs）和组蛋白去乙酰化酶（HDACs）介导组蛋白乙酰化修饰，二者分别激活和抑制下游基因的转录。然而，Sp1 是否通过募集 HDACs 而非 HATs 进而下调 ATP9B 尚待证实。在 HDACs 多个亚型中，HDAC2 与 AD 的关系最为密切。功能食品因子 γ-氨基丁酸（GABA）被证实具有拮抗 AD 和抑制 HDAC2 作用。因此，本研究探讨了 GABA 能否通过抑制 HDAC2 经 Sp1 调节 AD 脑中 ATP9B 表达，进而调控 SYP 表达。

方法：1. 将 4 月龄 APP/PS1 双转基因 AD 模型小鼠随机分为 AD、AD+GABA 组；同窝出生的 C57BL/6 野生型小鼠随机分为 WT、WT+GABA 组。每组雄、雌鼠各 5 只。AD+GABA、WT+GABA 组小鼠饮用含 0.1% GABA 蒸馏水，AD、WT 组小鼠饮用蒸馏水。6 个月后，采用 T 迷宫自发交替实验测试小鼠认知功能，再将小鼠麻醉后处死取海马组织，采用 qRT-PCR 和 Western Blot 法检测海马 SYP、ATP9B、Sp1、p300、HDAC2 表达水平。2. 体外培养人神经母细胞瘤（SH-SY5Y）细胞，以终浓度为 20 nM 的 GABA 预处理细胞，3 h 后加入终浓度为 20 μM 的 Aβ，24 h 后收取细胞，采用 qRT-PCR 和 Western Blot 法检测 SYP、ATP9B、Sp1、p300、HDAC2 表达水平。利用体外培养的 SH-SY5Y 细胞，采用 siRNA 技术和 ChIP 方法分析 Sp1 是否通过募集 HDAC2 而非 p300 进而调节 ATP9B、SYP 表达。

结果：1. T 迷宫自发交替实验结果显示，GABA 可拮抗 AD 模型小鼠交替作业正确率的降低（P<0.05）。与野生对照组相比，AD 组小鼠海马组织 SYP、ATP9B 表达水平下降（P<0.01），Sp1、p300、HDAC2 表达水平升高（P<0.01）；GABA 可逆转 AD 模型小鼠的上述改变。2. 与对照组相比，Aβ 组细胞 SYP、ATP9B 表达水平下降（P<0.05），Sp1、p300、HDAC2 表达水平升高（P<0.01）；GABA 可逆转 Aβ 组细胞的上述改变。沉默 ATP9B 的 SH-SY5Y 细胞 SYP 表达水平降低（P<0.01）。沉默 Sp1 的 SH-SY5Y 细胞 ATP9B、SYP 表达水平升高（P<0.01）。沉默 p300 的 SH-SY5Y 细胞 SYP、ATP9B 表达水平未见改变（P>0.05），Sp1 表达水平降低（P<0.05），HDAC2 表达水平升高（P<0.01）。沉默 HDAC2 的 SH-SY5Y 细胞 SYP、ATP9B 表达水平升高（P<0.01），Sp1、p300 表达水平未见改变（P>0.05）。Sp1 抗体组 ATP9B 启动子区域 Sp1 的水平高于 IgG 组（P<0.01）。与对照组相比，沉默 HDAC2 的 SH-SY5Y 细胞 ATP9B 启动子区域 H3K9 乙酰化水平升高（P<0.01），ATP9B 启动子区域 Sp1 的水平未见改变（P>0.05）。

结论：Sp1 能够募集 HDAC2 而非 p300 从而调控 ATP9B；GABA 可通过下调 HDAC2 而使 Sp1 对 HDAC2 的募集减少，进而调控 ATP9B/SYP 表达，改善 AD 模型小鼠的认知功能。

关键字 阿尔茨海默病；γ-氨基丁酸；突触素；磷脂翻转酶；组蛋白乙酰化

分类：公共营养与健康

中小学生含糖饮料消费与家庭饮食行为相关性研究

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目的：儿童肥胖已成为重大公共卫生问题，其中含糖饮料（sugar-sweetened baverages，SSBs）的摄入作为一种可改变的生活方式选择，在肥胖形成的过程中发挥了重要的作用。中小学生含糖饮料消费与个人因素（心理、口味偏好等）、人际因素（父母、同伴、老师等对含糖饮料的态度）、环境（家庭、学校、社区等）中含糖饮料的可及性及社会因素（饮食文化、食品广告）有关，从家庭和父母影响的角度进行干预可能比针对个人因素和社会因素更重要。有研究发现通过干预家庭饮食环境可以减少儿童含糖饮料饮用的可能性，提示儿童含糖饮料摄入与家庭饮食存在相关性，但相关研究较少。本研究拟在新冠大流行居家隔离期间消除学校与人际等因素对中小学生的影响的情况下，探究含糖饮料消费与家庭饮食行为的相关性，从家庭饮食角度为中小学生含糖饮料消费的干预提供参考依据。方法：采取整群分层随机抽样方法，抽取成都市五所学校6884名中小学生，采用问卷调查方式收集其基础人口学资料及饮食模式、食物消费变化，使用单因素卡方检验和多因素logistic回归进行统计分析。结果：（1）新冠疫情居家期间中小学生含糖饮料消费减少率为54.4%。（2）单因素卡方分析显示除性别、民族外，年龄、年级、购买食品及用餐习惯改变、食物消费量改变对含糖饮料消费行为差异均具有统计学意义（χ^2=47.512，23.004，7.441，194.608，171.456，260.431，514.928，576.74，903.025，897.192，1279.548，P＜0.05）。（3）多因素logistic回归分析显示，在家里做饭吃频率（β=0.444，P=0.013）、在家烘焙频率（β=0.679，P＜0.01）、蔬菜消费量（β=-0.788，P＜0.01）与含糖饮料消费行为呈负相关，主食消费量（β=1.135，P＜0.01）、水果消费量（β=0.720，P＜0.01）与含糖饮料消费行为呈正相关。结论：家庭饮食行为与含糖饮料消费行为存在相关关系。调整家庭饮食行为，为干预青少年含糖饮料消费、降低肥胖发生率提供简单易行途径。

关键字 新冠疫情居家期间；中小学生；含糖饮料；饮食行为；肥胖

分类：公共营养与健康

硒蛋氨酸通过肠道菌群及其代谢产物拮抗呕吐毒素诱导的肠道氧化应激

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背景：呕吐毒素（Deoxynivalenol，DON），是一种国内外谷类粮食作物中污染极为广泛的霉菌毒素，可导致厌食、肠道微生态紊乱和免疫力下降。肠道是呕吐毒素造成毒性作用的主要靶器官。硒（Se）是一种必需微量元素，在人与动物体内具有广泛的生物学功能。硒在食品中有两种存在形式：有机硒、无机硒。有机硒毒性更小、生物利用度更高。硒蛋氨酸为有机硒主要代表物质。近年的研究表明适量添加硒尤其是有机硒可以减弱 DON 对淋巴细胞增殖的抑制，保护细胞免遭氧化损伤，改善受损淋巴细胞的免疫功能。目前，通过添加硒蛋氨酸干预 DON 诱导的肠道氧化应激鲜有研究。

目的：研究添加 DON 后肠道菌群结构和代谢产物的变化以及添加硒蛋氨酸后对 DON 的干预作用；

方法：①体内试验：DON 污染的饲料。7 周龄小鼠随机分为 4 组，分别进行基础饲粮饲喂（对照组）、基础饲粮+DON 饲喂组（DON 组）、基础饲粮+有机硒组和基础饲粮+有机硒+DON 组（DON+Se 组，有机硒为硒蛋氨酸），连续饲养 40 天。②在第 40 天采血检测细胞内超氧化物歧化酶（SOD）、谷胱甘肽过氧化物酶（GSH-PX）、活性氧（ROS）、丙二醛（MDA）和血清二胺氧化酶（DAO）水平。③40 d 屠宰后迅速取出分离出十二指肠、空肠、结肠、盲肠及其内容物，制作组织切片，测定肠道内环境等。将盲肠、结肠内容物样品送至北京诺禾致源科技股份有限公司进行测序。测定盲肠、结肠食糜中肠道菌群代谢产物 SCFAs 的含量。

结果：1、根据小鼠空肠病理切片显示：DON 组的小鼠肠道粘膜充血、水肿、轻度糜烂、无溃疡；杯状细胞中度减少；炎症细胞浸润达黏膜肌层；黏膜弥漫性出血；呈点状异型增生；DON+Se 组的小鼠肠道粘膜充血、水肿、未出现溃疡；杯状细胞轻度减少；炎症细胞浸润局限在固有层或隐窝基底部；黏膜点状出血；无异型增生。

2、从小鼠肠道抗氧化性能来看：与 DON 组相比，DON+Se 组可显著增加细胞内 SOD、GSH-PX 水平，降低 ROS、MDA 和 DAO 水平。

3、从小鼠短链脂肪酸和肠道菌群方面来看：与 DON 组相比，DON+Se 组可显著增加乙酸、丙酸的含量和厚壁菌门的相对丰度，如：norank_f__Muribaculaceae，降低拟杆菌门的相对丰度，如：Alistipes。

结论：硒蛋氨酸可以通过改变肠道菌群丰度及影响其代谢产物来减轻 DON 诱导的肠道氧化应激。

关键字 呕吐毒素；硒蛋氨酸；肠道菌群；氧化应激

分类：公共营养与健康

营养素富集食物指数的研究进展

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目的：营养素富集食物指数(Nutrient-Rich Food Index，NRF)是营养素度量法的一种。营养素度量法是一种根据营养素组成对食物进行分类和排名的方法。了解NRF指数的构建过程及应用现状，为NRF指数的改良及应用提供参考依据。

方法：通过文献检索的方式，从中国知网、万方数据知识服务平台、维普数据库、PubMed、Embase检索NRF指数相关文献，总结目前NRF指数的构建方法、不同NRF指数间的差异以及NRF指数的应用情况。

结果：NRF指数能科学、直观地评价食物的营养价值，并给出一个连续的评分。NRF指数地开发遵循营养分析的科学准则，并伴随着广泛的测试和验证。NRF指数的构建包括六个要素：1、营养素的选择：通常包括推荐性营养素和限制性营养素两个部分。推荐性营养素包含宏量营养素、维生素、矿物质。宏量营养素一般为蛋白质和膳食纤维。限制性营养素通常包含脂肪、糖和钠。2、计算基础的选择：NRF指数的计算可以基于100Kcal、100g或1RACC(reference amounts customarily consumed)。3、参照的营养素标准：通常参照各个国家的参考摄入量。4、分析算法：包括加权和未加权两种算法。5、极值的处理：为了防止一种营养素的过量摄入无法弥补另一种营养素的摄入不足，一般设置营养素的参考日摄入量百分比的上限为100%。6、验证：NRF指数的验证通常通过分析与其他指数的相关性来完成，例如HEI-2015、膳食炎症指数等。NRF指数的应用非常广泛，1、可用于评估单个食物、食物组、零食、膳食的营养价值；2、识别负担得起的食物；3、预测健康结局；4、评价食物浪费、饮食相关的环境影响、健康饮食态度等。不同人群饮食习惯和营养素需求不同，因此每个人群应建立不同的NRF指数。在NRF指数创建过程中，应在客观标准的基础上选择营养素的数量及种类，避免主观选择种类和纳入的营养素数量过多或过少。且在选择营养素参考日摄入量标准时应根据人群进行改变。除此之外，NRF指数创建后应利用大样本人群进行验证研究。

结论：NRF指数的创建已经有一套标准的步骤，且应用十分广泛。不同人群应创建不同的NRF指数。

关键字 NRF指数 营养素度量法 营养素富集食物指数

分类：公共营养与健康

纳豆红曲片在脑卒中余生风险高危人群中的应用

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目的：探究纳豆红曲片在脑卒中余生风险高危人群中的应用效果

方法：依据《中国中青年人群脑卒中余生风险评估量表》，制定纳入标准为：年龄30~70岁之间，之前未使用过纳豆红曲片调理者，TCD检测报告检测血流异常者提示异常，且以下8项中至少满足3项

①高血压:血压≥140/90 mm Hg 或正服药治疗。

②房颤或瓣膜性心脏病史。

③吸烟:每天至少吸 1 支，持续1 年以上。

④高血脂:甘油三酯≥2. 26 mmol/L，或总胆固醇≥6. 22 mmol/L，或低密度脂蛋白胆固醇≥4. 14mmol/L，或高密度脂蛋白胆固醇 ＜ 1. 04 mmol/L。

⑤糖尿病。

⑥缺乏锻炼:每周锻炼 ＜3 次，每次 ＜30 min。

⑦肥胖:体重指数(BMI)≥26 kg/m 2 ，或腰围男性＞85cm，女性＞80cm

⑧脑卒中家族史:3 代以内有脑卒中史。

选择50名研究对象，给予纳豆红曲片，每日2次，每次5片，剂量88000FU/天，持续8周。

分别于干预前后收集研究对象的基线数据（包括生活习惯调查，如吸烟、饮酒、体力活动等，以及身体测量相关数据，如身高、体重、BMI、腰围等），生化指标（总胆固醇、三酰甘油、高密度脂蛋白胆固醇、低密度脂蛋白胆固醇、空腹血糖、餐后2小时血糖、HOMA-IR、同型半胱氨酸、D-2聚体、C反应蛋白等相关指标），影像学检查（TCD检测等），比较纳豆红曲片干预前后对于脑卒中余生风险高危人群的效益。

采用epidata v3.1进行数据录入，数据进行双录入核对，最终以EXCEL形式进行汇总。数据分析采用SPSS22.0软件进行，对比纳豆红曲片（NSK-SD)在脑卒中余生风险高危人群中的效果。

结果：纳豆红曲片在心脑血管高危人群的实际应用证明纳豆红曲片在抗血小板、抗凝、降压、降脂、降低CRP等方面的具有一定的效果，可以降低他们的心脑血管疾病疾病发生的风险，在临床研究相关的实验检查指标中有体现。

结论：纳豆红曲片适用于心脑血管障碍及高血脂、高血压、动脉硬化、冠心病人群，可降低脑卒中余生风险高危人群脑卒中发生的风险。

关键字 纳豆；红曲；脑卒中；风险；高危

分类：公共营养与健康

医联体构建中的营养健康干预实践与思考

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目的 通过本地公立医院牵头推行城市医联体网格化布局，在医联体推进工作过程中高度重视营养与健康生活方式干预，提升基层医联体单位成员慢病预防及干预的知识与技能，以提升不同人群营养与健康干预效果，减少慢病发生、并发症、以及复发加重风险，提高生命质量为目标，探索城市医联体建设中营养与健康生活方式干预可行性开展的方式方法。

方法 先后以糖尿病前期人群超重肥胖干预试点为切入点，制定相关干预方案及流程，通过优质医疗资源下沉，营养专家深入基层 1 年，建立全科医学培训体系中的营养与健康干预培训、开展基层营养与健康相关知识与技能培训、指导营养干预实操技能，以提升医联体单位成员整体营养与健康相关知识与干预技能。利用互联网技术，进行线上指导与沟通交流，根据需求开展不同形式的互动活动，科普义诊等，共享最新营养与健康干预知识与信息，联通中国营养学会、省营养学会等诸多营养与健康平台资源，联合学术团体，结合当地居民特点及医疗服务能力，在基层医疗机构多种形式与方法推进营养与健康干预，线上线下相结合，医院-社区-家庭协力，有效提升居民不同人群的健康意识，提升人群营养与健康知识与技能。

结果 营养与健康干预效果成效显著，营养与健康干预案例入选湖北省慢病综防示范优秀案例第一卷。开展过程中培养的营养与健康干预人员梯队，在社区服务中发挥着传帮带的作用，开展的营养与健康干预扶贫项目被评选为第一名。医联体单位的慢病防治干预综合能力得到提升，真正将慢病管理干预的营养与健康生活方式干预落到实处，多个社区卫生服务中心受到省市级表彰，多名个人受到省市级表彰。

结论 我国城市医联体仍然处在实践探索阶段，医联体单位成员对营养与健康干预的需求和实际工作中的知识与技能储备严重失衡，公立医院在医联体支援管理中，需要重视营养与健康管理相关人力、财力、物力、信息和技术等资源的支援，提升基层卫生机构营养与健康干预的服务能力，可以有效提升整体服务评价水平。

关键字 医联体；营养；健康；干预

分类：公共营养与健康

采用先验法和后验法探究上海郊区成人的膳食模式与代谢综合征的关联

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【目的】代谢综合征（metabolic syndrome, MetS）被认为是最严重的非传染性慢性疾病之一。膳食在 MetS 的发生、发展及恶化中扮演着至关重要的作用。因此，本研究旨在探究中国上海郊区成人的膳食模式与 MetS 之间的关联。【方法】数据来源于 2017 年 5 月至 2017 年 9 月期间复旦大学公共卫生学院在上海郊区建立的成人队列和生物样本库（the Shanghai Suburban Adult Cohort and Biobank, SSACB）研究。纳入松江区中山街道 20~74 岁且在上海居住半年以上者，共 5426 名研究对象完成问卷调查、食物频率问卷调查（food frequency questionnaire, FFQ）、体格测量和生物样本的采集。利用 FFQ 估算研究对象 29 类食物组的平均摄入量，包括大米及其制品、小麦及其制品、新鲜蔬菜等。采用先验法归纳研究对象不同的膳食模式，同时采用后验法计算两种膳食模式评分，包括终止高血压膳食模式（Dietary Approaches to Stop Hypertension, DASH）和地中海膳食模式（Mediterranean Diet, MD）。Logistic 回归模型探究各膳食模式与 MetS 之间的关联。【结果】研究对象 MetS 的患病率约为 22.47%。先验法研究结果显示：研究对象共确定五种不同的膳食模式，分别命名为“高蛋白”膳食模式、“谷物和蔬菜”膳食模式、“粗粮和豆制品”膳食模式、“零食和饮料”膳食模式、“乳制品和水果”膳食模式。与对照相比，摄入更多的“乳制品和水果”和“粗粮和豆制品”膳食模式对 MetS 具有保护作用，OR 及 95%CI 值分别为 0.81（0.66，0.98）和 0.74（0.61，0.91）（P<0.05）。而后验法研究结果显示：研究对象的 DASH 评分为 1.48（SD：1.14），MD 评分为 3.93（SD：1.59）。在 DASH 和 MD 中均未观察到与 MetS 的显著相关性。【结论】本研究结果表明，摄入较多的水果、杂粮和豆制品与人群较低的 MetS 患病率有关；而在我国上海郊区人群中未观察到 DASH 和 MD 与 MetS 的显著相关性，需进一步探索。

关键字 代谢综合征；先验法膳食模式；后验法膳食模式；横断面研究

分类：公共营养与健康

发展中国家慢病预防的营养干预实践——35 年随访体会

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尊敬的组委会：因为随访时间长，结果较多，具体摘要内容请参见附件第 2 页

OJECTIVE: Update the association between multivitamin (MVM) supplementation and total or cause-specific-mortality in a population with a high prevalence of undernutrition in China.

METHODS: 3318 persons aged 40－69 years with esophageal squamous dysplasia were assigned to receive daily MVM supplementation (Centrum) or a placebo for 6 years and were followed for 29 years.

RESULTS: MVM supplementation did not affect total or cause-specific mortality as a whole. Subgroup analyses showed significant reductions in heart disease and cerebrovascular disease mortality in older men; lower risks of esophageal/cardia cancer mortality in younger men and moderate/severe dysplasia.

PROSPECT: Linxian Trial Follow-up is still ongoing. It has played an important role in early diagnosis and treatment in China's clinical practice and having certain positive significance for chronic diseases prevention, especially in Asia developing countries.

关键字 慢病预防 营养干预 长期随访 复合维生素矿物质

分类：公共营养与健康

云南省特有少数民族成年人维生素 D 营养状况分析

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目的 了解云南省特有少数民族成人维生素 D 营养状况，为政策制定提供数据支持。

方法 在 2016-2020 年，按第六次全国人口普查的年龄和性别构成，抽取 7 个云南省特有少数民族（独龙族、基诺族、景颇族、德昂族、阿昌族、布朗族、普米族）中随机抽取 100 名成人(≥18 岁)作为调查对象(男女比例 1:1，18～44 岁、45～59 岁和 60 岁以上者分别占 40%、30%、30%)；其中，独龙族、普米族属于高海拔地区，基诺族、景颇族、德昂族、阿昌族、布朗族为低海拔地区；独龙族、普米族、德昂族为高纬度地区，其余几个少数民族属于低纬度地区。因普米族与其他项目结合开展，按比例增加了 100 名调查对象，最终有效样本量为 792 人。开展问卷调查并采用质谱法进行血清 25-羟基维生素 D 检测。

结果 所调查的人群维生素 D 总体平均水平为 27.88±7.59ng/mL。维生素 D 平均水平在性别、年龄、文化程度、BMI、季节、民族、海拔和纬度间的分布有统计学差异(P 均小于 0.05)。 维生素 D 充足（≥30ng/ml）、不足（≥20ng/ml 但<30ng/ml）和缺乏率（<20ng/ml）分别为 38.8%，46.7%和 14.5%。不同性别、年龄、季节和民族的调查对象的维生素 D 营养状况存在统计学差异（P 均小于 0.05），其中女性不足及缺乏率（70.2%）高于男性（52.4%），年龄越大，不足及缺乏率越高（69.1%），夏季正常率（45.3%）远高于秋季（27.8%），独龙族（82.0%）及普米族（67.1%）的不足率及缺乏率相对较高。多因素 Logistic 回归分析结果显示，女性(OR=2.375，P<0.001)、秋季(OR=17.905，P<0.001)、普米族（OR=1.049，P=0.008）、BMI≥28.0（OR=2.925，P=0.021）人群更容易出现维生素 D 不足或缺乏。结论 云南特有少数民族成人中维生素 D 不足和缺乏较为普遍，特别是女性和居住于高纬度地区的独龙族和普米族等人群更应注意维生素 D 营养情况的监测。建议当地社区、医疗机构等加强健康教育宣传及指导，提高成年人健康意识，引导他们重视自身营养状况。同时，建议个人根据自身情况加长户外锻炼时间、适度防晒，合理膳食，必要时可补充维生素 D 复合剂，以降低维生素 D 缺乏率。

关键字 维生素 D；少数民族；成年人；营养状况

分类：公共营养与健康

营养配餐在某团餐企业中的应用实践研究

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近年来，随着经济发展，国民营养健康状况明显改善，但营养相关疾病等问题仍然多发，不健康饮食是引起肥胖、心脑血管疾病、糖尿病及其他代谢性疾病和肿瘤的危险因素。所以，提倡合理膳食，推进健康饮食，有助于降低肥胖、糖尿病、高血压、脑卒中、冠心病等疾病的患病风险。

作为影响大群体消费者，提供后勤保障的团餐企业，膳食的合理与否，对就餐群体的饮食营养和健康状况起着关键和直接的作用。

团餐即团体膳食，是一种为群体消费者提供集体就餐服务的餐饮模式。团餐具有饮食产品需求量大、经营范围相对固定、价格水平较低、消费时间集中而短暂等诸多特点，在追求健康、时尚、便捷的大众化餐饮消费时代，具有一定的发展优势。目前国内大多数团餐企业仍然存在餐饮技术人员营养知识技能缺乏，企业在营养配膳方面的开发和研究力度不够，对不同人群的营养和健康需求了解不到位的现状。因此，对于团餐企业，开展健康烹饪模式与营养均衡的配餐推广显得尤为重要。

营养配餐是集营养学、烹饪学、食品加工技术等为一体的崭新的餐饮模式，是在传统的中式烹饪基础上的发展、创新。针对人群营养知识缺乏、科学选择食物、合理搭配膳食能力不足的问题，推广应用营养配餐，对于增强人群身体素质，提升营养储备，预防慢性非传染性疾病的发生和发展，起着至关重要的作用。

文章第一部分对团餐企业营养配餐具体工作实践进行了阐述，分别从定期开展健康知识讲座和饮食健康知识宣传、针对团餐企业餐饮管理人员和厨师开展系统的营养配餐知识培训、定期开展内部营养配餐技能比拼考核三方面对营养配餐工作进行实践，充分提高人员健康意识，提升人员配餐工作专业技能。

文章第二部分主要阐述营养配餐应用中应注意的问题，如食品安全问题、烹饪加工问题、口味与营养的平衡问题等。

文章第三部分为团餐企业营养配餐实施成果，通过一系列工作实践，企业团餐食堂菜品烹饪形式发生变化，餐饮人员营养素质和能力也具备一定提升，营养配餐工作得到进一步深化和完善。

关键字 营养配餐 团餐 应用实践

分类：公共营养与健康

儿童青少年睡眠时长与父母睡眠时长关系的研究

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目的 探究儿童青少年睡眠时长与父母睡眠时长间的关系。方法 采用多阶段分层的整群随机抽样方法，2015 年在 15 个省份中（黑龙江、辽宁、江苏、山东、河南、湖北、湖南、广西、贵州、北京、上海和、重庆、陕西、浙江和云南），每个省份随机抽取 2 个城市和 4 个县城（根据当地的经济发展水平和人口特征等因素选择城市和县城），从每个城市再随机抽取 2 个街道和 2 个郊区村，每个县抽取 1 个县政府所在地的居委会，再随机抽取 3 个自然村；从抽取的调查点随机抽取 20 户家庭参与调查，调查户的家庭成员均参加调查。选择提供完整睡眠信息的 6-17 岁儿童青少年作为研究对象，调查问卷收集研究对象的一般人口学资料、健康相关行为和睡眠信息。定性资料采用 χ2 分析，定量资料采用 t 检验，子女和父母睡眠时长间的关系采用 logistic 回归分析。结果 本研究共纳入 1222 名儿童青少年，其中男孩 668 人，女孩 554 人，平均年龄 11.41±3.74 岁，平均睡眠时长为 8.69±1.09h/d。不同年龄组儿童青少年年龄、父亲年龄、母亲年龄和子女睡眠时长分布有差异，差异具有统计学意义。子女是否达到推荐水平睡眠以及城乡在不同年龄组分布中有差异，差异具有统计学意义。调整混杂因素后，与父亲睡眠时长达到推荐水平的子女相比，父亲睡眠时长不足时其子女发生睡眠未达到推荐水平的可能性增加，是父亲睡眠充足子女的 2.83 倍（95%CI：1.80-4.43）。调整混杂因素后发现，与母亲睡眠时长达到推荐水平的子女相比，母亲睡眠时长不足时，其子女发生睡眠未达到推荐水平的可能性增加，是母亲睡眠充足子女的 2.86 倍（95%CI：1.65-4.95），母亲睡眠时长超过推荐水平时，其子女发生睡眠不达标的风险性降低，其 OR 值为 0.64 (95%CI：0.43-0.95)。结论 儿童青少年睡眠时长未达到推荐水平的比例较高，父母与儿童青少年睡眠时长关系密切，并且存在年龄差异，父母应加强对自身睡眠时长管理，促进儿童青少年保持充足的睡眠。分年龄组分析发现，低年龄组儿童青少年与父母睡眠时长间的关系未发生改变，高年龄组青少年中仅发现父亲睡眠不足会增加子女睡眠不足的风险，其 OR 值为 2.81 (95%CI：1.42-5.56)。

关键字 父母；儿童；青少年；睡眠时长

分类：公共营养与健康

公共营养政策的实践： 社区营养研究的探讨

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公共营养是指政府、社会组织和个人通过制定和实施营养政策，改善人民的营养状况和 促进健康的行为。公共营养的实践旨在确保人类得到充分、均衡和适宜的营养，从而减少人们患病的风险和提高生活质量。公共营养政策不仅是国家重要的战略之一，同时也是全球卫生领域的热门话题。

社区营养研究是公共营养政策的重要组成部分，它是通过在社区居民中进行营养干预来评估公共营养政策的效果，为公共营养政策制定和调整提供科学的依据。社区营养研究的目的是评估社区居民的营养状况和健康状况，确定社区居民的营养素摄入水平、饮食行为和营 养健康知识，为公共营养政策的制定提供参考依据，它是密切结合实际生活，以人类社会生活中某一限定区域内各种人群为总体，从宏观上研究解决其合理营养与膳食的有关理论、实践和方法学的边缘学科。

社区营养的研究方法包括饮食调查、体重指数测定、血液生化指标分析等。同时也可进行社会营养监测，对社会人群现状制约因素如自然条件、经济条件、文化条件等进行动态观察、分析和预测，用于制订社会人群营养发展的各项政策和规划来进行长期营养监测，规划效果评价性监测对已制定的政策和规划，监测人群营养指标的变化。同时及时报警和干预监测目的在于发现、预防和减轻重点人群的短期变化，例如控制和缓解区域性、季节性和易发人群性某种营养失调的出现等。

研究结果表明，通过公共营养政策的实施，社区居民的营养状况得到了显著的改善。例如，研究表明，在某些营养素缺乏的地区，针对特定的缺乏问题实施公共营养政策能够有效地改善居民的营养状况。同时，公共营养政策的实施还能够降低慢性疾病的发病率，例如心血管疾病、肥胖等慢性病。

总之，公共营养政策是改善居民营养状况和健康水平的有效途径。通过社区营养研究的评估，可以制定更加精准的公共营养政策，并促进居民养成健康的饮食行为和生活方式， 从 而降低慢性疾病的发生率， 提高人民群众的生活质量。因此，社区营养研究在公共营养政策的制定和实施中具有不可或缺的地位。

关键字 关键词：公共营养；社区营养；研究方法；

分类：公共营养与健康

营养科普：保证高质量，寻求新突破

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在人的一生中，从胚胎期起到生命终止，人体无时无刻不需要营养，人的生长发育、健康水平、劳动能力和寿命长短都与营养密切相关。因此，合理营养是保健防病工作中最基本、最重要的一环。

当前，营养科普作为我国卫生健康事业发展的重要内容，应该得到广泛关注。然而，目前我国的营养科普工作仍有较大进步空间，不少群众对健康合理营养知识仍知之甚少。随着人们生活水平的提高，人民群众对营养科普知识的个性化需求与日俱增。因此，如何在信息时代背景下，促进营养知识的科学普及，提升大众的健康素养，是需要我们进一步探究并付出实际行动的。

本文从当前营养科普的发展现状入手，通过文献查找、随机访问与问卷调查这三种主要的方式了解当前营养科普工作的长处与不足，分析其中存在的问题，并提出相应的解决策略。

通过调查研究，我们发现如今部分营养科普内容缺乏严谨性和专业性，内容相对片面，甚至有传播错误的健康营养知识的现象存在，无法促进全面营养科普的终极目标。其次，营养科普的对象主要是非专业的群众，但现实生活中，不少营养科普过于重视知识专业性，忽略了受众的认知水平，不够通俗易懂，不能吸引受众。还有，当前营养科普途径相对单一、内容也多为灌输式解说，非常乏味。

针对以上几个问题，我们也提出了相关解决方案。首先，国家相关部门要注重当前各类营养科普途径手段传播信息的科学性与严谨性，以专业知识为主要依据，加大整治传播错误知识的现象。其次，营养科普的创作内容要以受众群体的需求为导向，确保内容的实用性和通俗性。同时，要拓宽科普的呈现形式，依托多媒体技术，通过生动形象的形式来最大程度地吸引受众群体关注。当然，还要注重解决营养行业目前面临着人才短缺的问题，培养更多的具备相关技能和知识的营养人才。

总之，在全面推进健康中国建设的环境下，营养科普更需要在保证高质量的前提下，与时俱进、突破创新，从根本上提高营养科普的影响力与受众面，全面提升社会群众的健康营养水平。

关键字 关键词：营养科普；发展；不足；新媒体

分类：公共营养与健康

浅析学龄前儿童营养不良的研究现状、影响因素及膳食指导

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浅析学龄前儿童营养不良的研究现状、影响因素及膳食指导

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【摘要】 营养不良是指由于一种或一种以上营养素的缺乏或过剩所造成的机体健康异常或疾病状态，通常分为营养不足和营养过剩两大类。由于学龄前儿童普遍存在着不合理的膳食结构和饮食习惯，带来了营养不良的诸多问题，包括能量过剩、脂肪添加糖摄入过量等营养过剩问题和维生素、矿物质微量营养素摄入不足引起的营养缺乏诸如问题。随着社会经济的迅猛发展和人民生活水平的不断提高，世界儿童营养与健康状况得到显著改善，学龄前儿童的生长发育状况也相应得到改善,营养不良的发生率降低,发育迟缓、消瘦以及贫血等问题的发生率逐渐下降，但与此同时营养过剩如超重、肥胖等的发生率呈现出不断上升的趋势。本文通过对国内外学者针对中国3-6周岁学龄前儿童营养状况的研究成果进行了综合性的分析，概述了学龄前儿童营养不良的国内外现状及其对机体健康的影响，总结了学龄前儿童营养不良的影响因素，全文主要从以下几个方面进行详细概述：膳食结构、饮食习惯、身体活动、生命早期营养、家庭因素和社会因素，并分别从国家、社会、家庭三个角度讨论了学龄前儿童膳食指导的措施方法。学龄前儿童营养不良不仅会影响儿童正常的生长发育和生活学习，还将会影响机体多个系统功能的正常运转，如内分泌系统、免疫系统和心血管系统等的正常运转，还会损害儿童的心理健康和学习认知能力，同时还会增加成年后肥胖、糖尿病、心血管疾病等各种慢性病的患病风险，进而影响整个社会经济的发展。本文旨在引起国家、社会和家庭对学龄前儿童营养问题的密切关注，任何一个因素单独作用都不可能取得预期的效果，需要在综合性的多元治理框架下探讨学龄前儿童营养状况改善的方案，从国家、社会和家庭三个方面共同发力，为学龄前儿童的合理膳食、均衡营养提供参考，形成良好的外部生长环境，保障其健康成长。

【关键词】 学龄前儿童；营养不良；研究现状；影响因素；膳食指导

关键字 学龄前儿童；营养不良；研究现状；影响因素；膳食指导

分类：公共营养与健康

城市化水平与脑卒中的关系：基于限制性立方样条分析

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目的：探讨我国不同地区城市化水平与成年人脑卒中风险的关联，为脑卒中预防关口前移提供依据。

方法：选取 2018 年“中国健康与营养调查”中有完整的脑卒中疾病史的 40 岁及以上成年居民作为研究对象。以是否有医生诊断的中风或一次性缺血发作定义脑卒中。利用包含 12 项指标的“城市化指数”综合评估社区城市化水平。采用 Logistic 回归模型结合限制性立方样条分析，校正年龄的影响后，分别探讨城市化水平与我国成年男性和成年女性脑卒中风险的剂量-反应关系。

结果：共有 6072 名男性（平均年龄 59.0 岁）和 6710 名女性（平均年龄 59.3 岁）纳入分析，其中男性脑卒中患病数为 159 人，女性脑卒中患病数为 102 人。利用 SAS 宏程序%RCS_Reg，在城市化指数得分第 5、35、65、95 百分数处 4 个节点，拟合限制性立方样条模型，判断脑卒中风险随城市化水平增加的变化趋势。结果显示，在男性研究者中，城市化水平与脑卒中风险之间的整体关联和非线性关联均有统计学意义（$P<0.05$），以城市化水平第 5 百分位数（43 分）为参考，城市化指数得分在 60 到 90 分之间与脑卒中风险呈“倒 U 型”关系，且脑卒中风险均高于参照水平。城市化指数得分在 60~75 分时，随着城市化水平上升，男性脑卒中风险逐渐增加；城市化指数得分在 75 分时，脑卒中风险最高；城市化指数得分在 75~90 分时，随城市化水平增加，男性脑卒中风险逐渐下降；当城市化指数低于 60 或高于 90 时，城市化水平与男性脑卒中风险的关联无统计学意义。在女性研究者中，以城市化水平第 5 百分位数（43 分）为参考，城市化水平与脑卒中风险之间呈现近似“S 型”曲线，但其整体关联和非线性关联均无统计学意义（$P>0.05$）。

结论：城市化水平与我国 40 岁及以上成年男性的脑卒中风险有关，当城市化水平处于中-高阶段（即城市化指数得分在 60~90 分之间）时，城市化水平与男性脑卒中风险呈“倒 U 型”关系。研究未发现城市化水平与我国成年女性脑卒中风险之间存在统计学关联。

关键字 城市化；脑卒中；限制性立方样条

分类：公共营养与健康

含糖饮料摄入频率和高尿酸血症的相关性分析

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目的 本研究旨在探讨中国成年居民中含糖饮料摄入频率与高尿酸血症的关系。

方法 利用2018年中国慢性病及危险因素监测数据，该调查在全国31个省(自治区、直辖市)的298个监测点按照多阶段分层整群抽样的方法选择调查对象，以面对面问卷调查的方法收集调查对象的人口学特征和主要慢性疾病患病情况，并通过食物频率表采集碳酸饮料、果汁饮料、酒精、蔬菜、水果、红肉等摄入频次和摄入量等信息，采用重组尿酸氧化酶法测定血尿酸。根据含糖饮料摄入频次将研究对象分为四组：不喝、每周<1次、1~6 次/周、≥1次/天，高尿酸血症定义为血尿酸水平>420umol/L。对数据进行复杂加权后，多因素logistic回归分析含糖饮料摄入频率和高尿酸血症患病风险的关联。

结果 以实际完成调查且测量数据完整的178 547名成年居民作为研究对象，血尿酸浓度为(321.1±92.8) umol/L，高尿酸血症患病率为14.0%。血尿酸水平和高尿酸血症患病率均随碳酸饮料和果汁饮料摄入频率的增加而增加，差异有统计学意义(P<0.0001)。调整年龄(18~40/40~60/60~)、教育程度(小学及以下/初中/高中、中专、技校/大专及以上)、吸烟(是/否)、肥胖(是/否)、高血压(是/否)、糖尿病(是/否)、血脂异常(是/否)、肾功能异常(是/否)、酒精摄入量(从不饮酒/少量饮酒/过量饮酒)、蔬菜水果摄入不足(是/否)、红肉摄入过多(是/否)、服用膳食补充剂(是/否)等混杂因素后，与不喝碳酸饮料组相比，每周<1次(OR=1.13,95%CI：0.96~1.34)和≥1次/天(OR=1.34,95%CI：0.92~1.95)的研究对象的高尿酸血症患病风险差异无统计学意义，1~6次/周(OR=1.52,95%CI：1.30~1.77)的研究对象的高尿酸血症患病风险增大；与不喝果汁饮料组相比，每周<1次(OR=1.05,95%CI：0.88~1.25)、1~6次/周(OR=0.89,95%CI：0.76~1.05)、≥1 次/天(OR=1.19,95%CI：0.82~1.74)的研究对象的高尿酸血症患病风险差异无统计学意义。碳酸饮料摄入频率与年龄的交互作用差异有统计学意义(P=0.0151)。

结论 每周摄入1~6次碳酸饮料与高尿酸血症患病风险增大有关，果汁饮料摄入频率与高尿酸血症患病风险差异无统计学意义。

关键字 含糖饮料；高尿酸血症；关联分析

分类：公共营养与健康

2018 年中国 15 省（自治区、直辖市）60 岁以上老年人骨骼肌质量状况分析

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目的 描述 2018 年中国 15 省（自治区、直辖市）老年人骨骼肌质量人群和地区分布特征。方法 利用 2018 年“中国健康与营养调查”数据，采用问卷调查法收集个人基础资料如性别、年龄、教育程度、收入水平和居住地等。通过体格测量获得身高和体重等资料。使用 TANITA BC-601 型体成分测量仪通过生物电阻抗法测量四肢和躯干肌肉质量。选取十五省有完整数据的 60 岁以上老年人作为研究对象，共计 4,816 人（男性 2,228 人，女性 2,588 人）。分析不同性别、年龄、受教育水平、经济水平、城乡、地区和 BMI 分组的老年人骨骼肌质量分布差异特征。根据亚洲肌衰征工作组（Asian working group of sarcopenia, AWGS）推荐的标准判断人群低肌肉质量的百分比。按体质指数将老年人体重分为 3 组：消瘦组（<18.5 kg/m2）、正常组（≥18.5 且<24 kg/m2）和超重肥胖组（≥24 kg/m2）。结果 2018 年中国 15 省（自治区、直辖市）60 岁及以上老年人中，男性四肢骨骼肌质量和全身肌肉质量的中位数（四分位间距）分别为 22.4(5.2)kg 和 47.3(8.5)kg，高于女性的 15.3(2.5)kg 和 34.9(4.8)kg。在不同特征人群中，躯干肌肉质量占比最大，占比超过 50%。下肢肌肉质量次之，占比约为 35%。上肢肌肉质量最小，占比约为 10%。与各自对照组比较，男性、80 岁及以上组、小学及文盲组，低收入水平组，农村组和西部地区老年人低肌肉质量比例更高，分别为 11.1%、15.2%、10.8%、12.5%、11.0%和 13.9%。与超重肥胖组相比，体重正常组老年人低肌肉质量比例更高，为 16.5%，消瘦组老年人低肌肉质量比例最高，达到 58.3%。结论 2018 年中国 15 省（自治区、直辖市）老年肌肉质量和低肌肉质量比例分布存在明显的地区和人群差异。消瘦老年人更加需要关注低肌肉质量的问题。

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关键字 老年人；体质指数；肌肉衰减

分类：公共营养与健康

河北省男性及女性大学生四季水合状态比较分析

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【研究目的】描述男性与女性中国大学生四季水合状态分布情况，并探索与分析其潜在影响因素。

【研究方法】采用已通过信度及效度验证的饮水调查问卷，分别于春、夏、秋、冬四个季度，对 79 名河北大学生开展四次饮水行为调查。每季度调查期间，采集留存其 3 日晨尿及 24 小时尿样，测得研究对象晨尿及 24 小时尿液渗透压等水合状态指标值。采用 SPSS26 软件进行统计学处理分析，对分类变量采用卡方检验，结果以百分比表示。

【结果】分别以晨尿渗透压和 24 小时尿液渗透压为水合状态评价指标，如表 1 所示，男性与女性大学生四季总体水合状态均有显著差异（P＜0.001）。以晨尿渗透压为评价指标，四季合计有 43.4%大学生处脱水状态，男性与女性大学生夏（P＜0.001）、秋（P=0.005）两季水合状态分布存在显著差异，两季男性脱水比例均高于女性。以 24 小时尿渗透压为评价指标，四季合计脱水与中间水合状态大学生比例分别为 22.5%和 53.8%，发现男性与女性大学生夏（P=0.005）、秋（P=0.012）、冬（P=0.08）三季水合状态分布均存在显著差异，同样呈现男性水合状态逊于女性的趋势。调整研究对象体质量指数（body mass index, BMI）及 7 日饮水量，作 Enter 法线性回归分析，四季整体及分季节回归结果如表 2 及表 3 所示。性别在四季整体及分季节分析中，均为晨尿渗透压及 24 小时尿渗透压的显著影响因素，其中，女性大学生回归系数为负，提示相较于男性，女性大学生倾向具有更低的晨尿及 24 小时尿渗透压，即更优的水合状态。7 日平均饮水量亦为水合状态的积极影响因素。反之，随 BMI 增长，大学生晨尿及 24 小时尿渗透压整体呈现上升趋势，提示较高的 BMI 对水合状态或存在负面影响。

【结论】本研究发现男性全年整体水合状态不及女性。男性与女性大学生水合状态差距在夏、秋两季尤为显著。一年之中，男女大学生平均水合状态在夏季和秋季也较不乐观。本研究结果提示，应关注男性大学生水合状态，并鼓励大学生养成全年，尤其是夏、秋两季，足量饮水、规律饮水的良好习惯。后续可就与大学生四季水合状态差异相关的内、外环境因素展开研究与探索。

关键字 水；水合状态；饮水；大学生

分类：公共营养与健康

嘉兴市2022年养老机构老年人营养状况及其影响因素分析

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摘要：目的　分析嘉兴市养老机构老年人的营养状况及其影响因素。 方法　　采用分层整群随机抽样的方法对嘉兴市7个县（市、区）各抽取1家养老机构，运用微型营养评估问卷（mini nutritional assessment, MNA）对养老机构≧60岁的老年人进行营养不良风险筛查，运用单因素和多因素Logistic回归模型进行影响因素分析。　结果　　按照研究对象的纳入标准，共有373名研究对象参与调查。其中，男性197名，占52.82%，女性176名，占47.18%；年龄以80~89岁组所占比重最高，占50.40%，70~79岁、≧90岁和60~69岁组各占24.40%、16.09%和9.12%。有56.84%的研究对象患有心脑血管疾病，13.94%的研究对象患有代谢综合征，患有精神心理疾病、肝肾疾病、消化性溃疡、呼吸系统疾病等不良健康状况的比例均在10%以下。运用MNA问卷评估，营养状况良好者256名，占68.63%，存在营养不良风险者117名，占31.37%。单因素Logistic回归分析结果显示：性别、年龄、养老机构属性、是否患有老年综合征、是否患有衰弱、是否患有消耗性疾病、是否患有消耗性溃疡、身体活动能力，以及神经心理问题等因素与老年人营养不良有统计学意义（P<0.05）。多因素回归分析结果显示：年龄80~89岁组和≧90岁组营养不良的风险分别是60~69岁组的5.48倍（95%CI:1.36~22.07）和9.14倍（95CI:2.03~41.14）；民办公助养老机构的老年人出现营养不良的风险是公建公营老年人的0.19倍（95%CI:0.07~0.52）；具备独立外出能力的老年人出现营养不良的风险是需卧床或长期坐着者的0.01倍（95CI:0.00~0.07）；未罹患消化性溃疡的老年人出现营养不良风险是罹患人群的0.39倍（95CI:0.16~0.98）。结论　　养老机构老年人营养不良风险筛查结果显示，存在营养不良风险的老年人所占比重较高。其中，高龄、长期卧床和罹患消化性溃疡的老年人营养不良的风险更高。

关键字 养老机构；老年人；营养状况；影响因素

分类：公共营养与健康

不同营养状况下儿童青少年体脂分布与血压偏高的关联：一项基于人群的研究

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Background: To investigate the associations between body fat distribution and high blood pressure (HBP) in children and adolescents with different nutritional status.

Methods: Logistic regression was conducted to relate the risk of HBP and quartiles of fat indicators of various body fat distribution. Trend analysis was performed to explore the dose-response relationship between HBP risk and regional fat distribution.

Results: In non-overweight, HBP was significantly associated with body fat distribution for every interquartile increase in girls. Specifically, we found that the ratio of T/L and A/G were significant predictors of HBP in overweight boys, with ORs of 8.24 (95%CI: 3.00, 22.61) and 2.78 (95%CI: 1.27, 6.09), respectively.

Conclusions: Higher quartiles of body fat distribution were positively associated with HBP risk in non-overweight girls, whereas for boys, T/L and A/G fat mass could be more associated with HBP risk.

关键字 body fat distribution, high blood pressure, Dual-energy x-ray absorptiometry imaging, nutritional status, children and adolescents

分类：公共营养与健康

COVID-19 封锁与儿童青少年超重/肥胖之间的关系：一项系统评价和 meta 分析

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目的：在新的冠状肺炎流行期间，由于各国的社会限制，包括学校关闭，公共场所和休闲中心，儿童和青少年的日常生活在疫情发生之前发生了很大变化。儿童和青少年的 COVID-19 封锁与超重/肥胖之间的关系尚不清楚。本研究的目的是评估新型冠状病毒肺炎封控对儿童和青少年超重/肥胖的影响。

方法：搜索以下数据库直至 2022 年 8 月：Pubmed，Web of Science 和 EMBASE。使用搜索词“COVID-19”，“封锁”或“COVID-19 封锁”和“肥胖”或“超重”。本荟萃分析是用 Stata 12.0 进行的。每项研究的第一作者、出版年份、城市、受试者年龄范围、样本大小、禁闭时间、样本量、体重测量方法都被提取出来。本研究中包括的所有研究都通过纽卡斯尔渥太华量表进行评估。并计算合并效应大小 OR 和 95%CI，以探讨 COVID-19 肥胖与儿童超重肥胖之间的关系。本荟萃分析根据研究类型、体重测量方法进行了亚组分析。通过使用 Begg 检验，对发表偏倚进行了评估。

结果：在这项荟萃分析中，我们在 Pubmed，EMBASE 和 Web of Science 数据库中检索了 2144 篇文章。然后根据纳入和排除标准，排除重复和不相关的文献，最后纳入了 23 项观察性研究，其中包括 67198 名儿童和青少年。年龄从 0 到 19 岁不等。研究分布在以色列、德国、波兰、意大利、印度、约旦、法国、西班牙、美国、韩国、克罗地亚、埃及、阿拉伯和中国。COVID-19 的封控时间从 15 天-5 个月不等。研究中涉及的体重测量方法是直接测量或由父母自我报告的体重。在 COVID-19 封锁期间，儿童和青少年的 BMI（SMD：0.23，95%CI：0.12-0.34）比大流行前明显增加。研究发现，COVID-19 封锁期与超重和肥胖的合并 OR（95%CI）值为 1.23（1.10-1.37）和 1.22（1.04-1.44）。

结论：目前的荟萃分析显示，COVID-19 封锁与超重/肥胖风险之间存在正相关关系。

关键字 新冠；儿童青少年；超重；肥胖

分类：公共营养与健康

岩藻糖基转移酶 2 基因多态性与哺乳期妇女的母乳菌群相关性分析

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目的：母乳中除了含有婴幼儿所需的营养成分，还有大量生物活性物质，如母乳菌群、母乳低聚糖、免疫因子等，研究表明岩藻糖基转移酶 2（fut2）基因对母乳低聚糖有一定影响，但 fut2 基因与母乳菌群是否有相关性的研究较少。基于此本研究通过分析西北某地区母乳菌群构成情况，以探讨分泌型与非分泌型母乳菌群是否存在一定差异。

方法：依托某西北母婴队列，收集产后 42 天成熟母乳样本，提取母乳 DNA，对 fut2 基因单核酸多态性（SNP）分析，判断 fut2 基因类型。同时对采集的母乳通过 16SrRNA 二代测序，对母乳中微生物的多样性进行分析，对比不同基因型母乳菌群构成情况。

结果：1 通过对 fut2 含有 rs601338，rs1047781 和 rs60266261 位点基因片段测序后，发现 61 位乳母的 rs601338 和 rs60266261 均无突变；仅在 rs1047781 位点处有 A/T 突变情况，其中 17 位为 AA 基因型， 33 位为 AT 基因型，11 位为 TT 基因型，基因多态性分布符合哈迪温伯格平衡，非分泌型即 TT 基因型，其余为分泌型。

2 母乳样本菌群测序分析结果显示，母乳中细菌多样性较为丰富，共检测出 29 门、68 纲、181 目、344 科、656 属、746 种。在门水平，变形菌门（45%）、厚壁菌门（18%）、拟杆菌门（10%）相对丰度较高；属水平，肠杆菌属（7.04%）、埃希氏菌属（4.59%）、不动杆菌属（3.30%）、假单胞菌属（2.52%）、芽孢杆菌属（2.48%）、鞘脂菌属（2.46%）、链球菌属（2.42%）、葡萄球菌属（2.14%）相对丰度较高。

3 分泌型和非分泌型母亲母乳菌群差异分析结果显示，分泌型与非分泌型两组母乳菌群的 α 多样性与 β 多样性均无显著性差异（$P>0.05$）；对婴幼儿有明确健康促进作用的双歧杆菌属在分泌型母亲母乳菌群中的相对丰度低于非分泌型（0.3% vs 0.5%，$P>0.05$），乳杆菌属在分泌型母亲母乳菌群中的相对丰度高于非分泌型（0.7% vs 0.1%，$P>0.05$），但在两组中均未见显著差异。非分泌型组中异常球菌门 Deinococcota 的相对丰度显著高于分泌型组（0.2% vs 0.002%，$P<0.05$），在属水平，29 个菌属在两组间有差异（$P<0.05$），但这些菌属丰度极低。

结论：母乳菌群构成在一定程度上受到 fut2 基因类型影响，但关键菌属双歧杆菌属与乳杆菌属无显著影响。

关键字 母乳；岩藻糖基转移酶 2；SNP；母乳菌群；关联分析

分类：公共营养与健康

基于文献计量的孕前体质指数与儿童肥胖研究态势分析

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目的 生命早期不良因素的暴露可诱导机体代谢功能的变化，进而引起机体肥胖发生。研究认为成年期肥胖的发生发展与胎儿宫内生长发育情况有关。在以往的调查研究中，结果发现生命早期相关因素（孕妇体重增加）与儿童超重肥胖发生显著相关，会影响胎儿和婴幼儿的生理功能，进而可能导致儿童超重肥胖的发生。因此本研究探讨孕前体质指数与儿童肥胖的研究态势，梳理该领域的近 10 年的研究动态及热点，对孕妇孕前体质指数与儿童肥胖相关领域研究进行系统综述和趋势展望，分析研究主题的热点变化，为后续研究提供参考。 方法 本文以“((Prepregnancy body mass index OR Maternal obesity) AND (childhood obesity))”作为关键词，检索 PubMed 数据库中相关文献，时间限定为 2013 年 1 月至 2022 年 12 月，语种限定为 English。采用文献计量学方法关于妇孕前体质指数与儿童肥胖研究进行文献分析及大数据挖掘。 结果 检索获得有效文献 1670 篇，分析发现该领域年度发文量不断增加，2021 年达到年发文量顶峰 218 篇，其中在该领域发文量最多的国家是 United States of America（697 篇，41.74%），而发文量最多的研究机构为 university of california，刊载文献量最多的期刊是 Int J Obes (Lond)（73 篇），该领域产出文献最多的作者是 Fionnuala M Mcauliffe、Karen J Campbell，迄今为止一共发表 16 篇文献，检索文献中关键词出现频率最多的为 obesity，childhood obesity，pregnancy，overweight，children，最多的关联基因为 INS（351 篇）。 此外，本研究还列出 30 篇推荐文献。 结论 该领域研究正处于快速上升阶段，研究内容随着时间的推移不断深入，虽然目前相关机制尚不清楚，但孕妇孕前肥胖均与儿童肥胖发生风险有关，需要引起关注。

关键字 孕期体质指数；孕前肥胖；儿童肥胖；研究态势；文献计量学

分类：公共营养与健康

基于家庭的分餐现场干预试验效果评价

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研究背景：合餐饮食是我国长久以来的饮食习惯，也存在诸多弊端。而目前国内并没有关于家庭分餐行为实施效果评估的数据。本研究旨在通过在家庭中开展现场干预试验，评估干预效果，为今后家庭分餐相关科普宣教提供数据依据。

方法：采用招募的方式，共纳入196组家庭，开展现场干预试验。调查员对家庭原始就餐方式通过访谈形式进行记录。由调查员向家庭成员介绍分餐模式，并让其选择一种进行实践。向分餐家庭提供相应的分餐工具。每个家庭记录一周内家庭成员三餐就餐方式，要求包括早餐、中餐、晚餐各两顿（其中含工作日和休息日）。并记录实际操作过程中的问题和建议。记录食物种类、估重、烹饪方式、分餐形式和方式。由家庭成员采用文字和视频双录入方式对分餐情况进行记录，填写家庭干预实验记录表。在实验结束后半个月、一个月、两个月分别进行调查问卷随访。每次完成随访问卷的人数不少于总人数的90%。

结果：原始就餐模式中，56.1%的家庭采用合餐制，家庭采取主要合餐偶尔分餐的比例占36.2%，有15组家庭就餐方式是主要分餐偶尔合餐。随访调查结果显示，随着时间的推移，采取分餐的家庭数持续减少，在分餐后的半个月、1个月和2个月后，仍在采取分餐制的家庭分别占75.0%、56.6%和51.5%。而一开始不愿意分餐的23组家庭中，在分餐试验结束的半个月、一个月及二个月后，分别有16组、12组和9组家庭一直在保持分餐。半个月之后，87.8%受访者表示关注营养膳食的搭配， 75.0%受访者关注或接受营养健康宣传，70.9%受访者表示会关注有关“分餐制” 新闻资讯。分餐试验1个月后对于各种资讯的关注都略有下降，关注膳食营养搭配、关注或接受营养健康宣传和关注“分餐制”知识的分别下降了 5.7%、7.1%和 5.1%。Logistics 回归分析，分餐半个月后，家庭成员中有15周岁以下未成年和做饭成员关注分餐消息是影响分餐的有利因；分餐1个月后，城市家庭是影响分餐的有利因素；分餐2个月后，家庭中有15岁以下未成年人和城市地区是分餐的有利因素。

结论：分餐现场干预试验对公众建立分餐健康行为起到一定的促进作用。被干预者在分餐现场干预实验中体会到了分餐带来的好处。在今后家庭分餐的推广中，关于分餐的宣传需要加大力度和频次，除此之外，对重点人群，如家庭主厨人员、女性、有未成年人家庭等应开展有针对性的信息投放。

关键字 分餐；家庭；现场干预实验；

分类：公共营养与健康

黑茶的抗病毒效应

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目的 阐明黑茶的抗病毒作用及其机制。方法 黑茶是中国特有的茶叶品种，加工过程中的关键工艺渥堆使黑茶具有独特的品质、活性成分，具有多种生物功能。检索相关文献，分析黑茶特殊化学成分和抗病毒作用。结果 黑茶经渥堆发酵后茶褐素、没食子酸、槲皮素、咖啡碱、他汀类物质等含量升高，而儿茶素等多酚物质含量低于新鲜茶叶。体外实验、动物试验及人体干预研究表明黑茶具有抗多种病毒效应：（1）通过流行病学调查发现，喝茶可以降低新型冠状病毒感染的风险，所以推测茶叶对新冠肺炎传播存在潜在预防作用，可能机制是黑茶提取物如槲皮素可以抑制蛋白质的功能以缩短病毒的生命周期，通过与新型冠状病毒主蛋白酶 3CL 和血管紧张素转化酶 2 的活性位点结合而作为新型冠状病毒抑制剂。(2) 在人体干预中观察到黑茶提取物有预防流感感染的作用，可能的机制是没食子酸盐和茶色素可有效抑制流感病毒 H1N1-UI182、H1N1-PR8、H3N2 和 H5N1 的复制，没食子酸盐还可降低流感病毒感染后炎性细胞因子、趋化因子和干扰素（IFN-α 和 IFN-γ）的 mRNA 表达水平。(3) 在体外试验中观察到黑茶提取物具有抗乙型肝炎病毒（HBV）的能力，黑茶提取物显著减少了细胞上清中产生的 HBV DNA、细胞内核心颗粒中包裹的 DNA 以及乙型肝炎 E 抗原（HBeAg）的分泌，显著降低细胞内活性氧水平，抑制 HBV mRNA 的表达。(4) 在细胞实验中观察到没食子酸盐对人乳头瘤病毒（HPV）感染具有抵抗能力，没食子酸盐通过降解癌蛋白及上调其相关肿瘤抑制基因，使细胞周期紊乱介导细胞凋亡，阻断分化角质形成细胞中的病毒复制，抑制了广泛参与炎症介质生成的酶和激酶如蛋白酶、加氧酶和蛋白激酶。 (5) 在体外实验中观察到黑茶具有很好的抗人体免疫缺陷病毒（HIV）的活性，黑茶提取物可以抑制 HIV 诱导细胞形成合胞体，有效抑制跨膜蛋白六螺旋束形成和人体免疫缺陷病毒 1 型（HIV-1）包膜蛋白介导的细胞融合，还可抑制 HIV-1 逆转录酶活性。结论 黑茶含有独特的活性成分，可以抵抗多种病毒，如冠状病毒、流感病毒、肝炎病毒、人乳头瘤病毒、人体免疫缺陷病毒等等，其特殊的活性成分可作为开发功能食品和营养药品的有前途的物质。

关键字 黑茶；活性成分；抗病毒

分类：公共营养与健康

澳门中学生膳食中能量和各营养素摄取量及其相关因素研究

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【目的】通过对澳门中学生进行膳食中营养素摄取量调查，了解该群体对能量、产能营养素、维生素和矿物质的摄取状况，并根据研究结果分析该群体可能存在的相关问题，提出营养教育和对策上的建议。

【方法】本研究利用横断面描述性研究方法进行。研究对象为 2020/2021 学年度澳门中学生，以方便抽样和分层随机整群抽样取得样本，并利用食物频率调查问卷作研究工具，回收后的有效问卷根据研究对象对各种食物的摄入量和食物成分表计算出能量和各营养素摄取水平，依据膳食营养素参考摄入量进行评估。

【结果】男生和女生的身体质量指数属正常的人数比例分别为 55.2%和 64.4%，男生过重和肥胖的比例达 27.9%，而女生亦有 17.8%。与膳食营养素参考摄入量比较，小于 14 岁男生组别中的日均能量摄入量比推荐水平高 300kcal，而各年龄组别女生的能量摄入均普遍过低。女生于各年龄组别的日均碳水化合物摄入量均比膳食营养素参考摄入量中可接受范围略低，而膳食纤维摄取则各组别的男女生皆不能满足适宜摄入量 25g。蛋白质方面，男生的摄取量均超过推荐摄入量的 60g。脂肪方面，小于 14 岁男生组别中的日均脂肪摄入量比膳食营养素参考摄入量的可接受范围稍高。总体脂溶性维生素 A 和 D、水溶性维生素 B_6和叶酸及矿物质钙、碘摄取不足，磷则摄取过高。

【结论】澳门中学生属过重和肥胖的男生和女生人数比例分别高达 28%和 18%。男生中，小于 14 岁组别中的日均能量摄入过多，蛋白质摄入量同时也超过推荐摄入量的两倍，是能量摄取过多的主因，脂肪摄入量亦稍高。女生方面，各组别均呈现能量摄取不足的情况，主要是由于碳水化合物摄入量偏低所致。建议澳门中学生应多关注自己所属年龄层的能量和各营养素的摄入量需求，维持健康平衡的膳食模式及正确良好的饮食行为，应多吃蔬菜类和水果类来增加膳食纤维和各种维生素及矿物质的摄取，以蛋类、奶及奶制品作为优质蛋白质和钙的来源，并适量摄取海带和紫菜来满足碘的需要量。

关键字 澳门中学生；食物频率调查问卷；膳食营养素参考摄入量；身体质量指数；推荐摄入量

分类：公共营养与健康

青少年营养与健康分析

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摘要：目的 分析我国青少年的营养失衡问题对青少年健康的影响。方法 通过介绍我国青少年的营养状况，如：一、青少年营养摄入量偏低；二、钙、铁、锌普遍缺乏；三、维生素 A、维生素 B2 摄入不足。分析影响青少年营养不良的因素，包括 1.食物供给不足 2.不良的饮食习惯。结果 最后，解决青少年营养均衡问题：1.营养均衡的原则 1）充足的能量 2）丰富的蛋白质 3）矿物质 2.合理营养搭配 建议：①供给充足的蛋白质、能量、各种营养素：进入中学，青少年课程会增多，学生用脑强度加大。此外，中学生活比较丰富，会使身体能量消耗大，为了适应生长发育的需要。青少年要科学、合理、营养的进食。 ②要有充足的饮食补钙：进入青春期，身高会获得快速地增长，主要表现为长骨的生长。此时，骨骼的发育需要有充足的钙补充。进入青春期，青少年需摄入 1200 毫克的钙元素。奶、奶制品、虾皮含有丰富的钙物质，因此，青少年需多吃一些奶制品。 ③注意进食的规律：大家都知道，合理的进食规律才能满足身体发展的需要，早餐尤为重要。早上起来，我们应该按时吃早餐，因为早餐与前一天的晚餐间隔时间有点长，经过一夜，我们的胃已经排空，此时如果我们不及时吃早餐，我们就会感觉到饥饿、头晕、没有力气，血糖会很低。一旦出现这样的情况，上班或是学习都会效率不高，学生上课会注意力不集中，学习效率不高，工作的人工作效率也不高。为此，我们要按时的吃早餐，既要吃好又要吃饱。结论 进入青少年期间，孩子正处于快速生长发育的阶段，此时身体需要各种营养元素。这个期间，青少年营养失衡会产生一些负面的影响，最初可能影响不是很明显，但是随之时间的久远，营养失衡会对人体产生严重的影响，会出现一些营养性的疾病。我们要依据青少年生长发育的特点以及生理发生的变化进行合理的膳食，实物种类、餐次、各种营养素比例都要合理的安排，合理、营养的膳食才能满足青少年生长发育的需要，才能健康成长。为此，我们需重视青少年营养与健康，积极采取措施改进青少年营养不良的问题。

关键字 青少年；营养；健康；影响.

分类：公共营养与健康

中国儿童经常消费的七类预包装食品钠含量分析

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目的：钠摄入过多会增加高血压、中风、肥胖等多种疾病的风险，对儿童的伤害可能会持续到成年，对健康造成长期影响。中国成人和儿童的钠摄入量均高于推荐钠摄入量上限。从预包装零食中摄入的钠已成为儿童重要的钠来源之一。本研究旨在分析中国儿童经常食用的七类预包装零食的钠含量，为促进儿童零食的健康选择提供建议。

方法：七大类预包装零食包括：乳制品及制品、面包及焙烤制品、坚果和种子、膨化食品、加工肉类和鱼类产品、加工水果 和蔬菜产品和植物性蛋白质食品（面筋、辣条、豆腐干、兰花豆、蚕豆等）。数据来自食先知中国 2017-2020 年数据库。采用英国红绿灯标准评估各类食品钠含量处于低（绿灯）、中（黄灯）、高（红灯）水平的比例。计算每类食物消费每份的钠含量，以及在 4-6 岁、7-10 岁和 ≥ 11 岁人群中每份钠摄入量占推荐每日最高钠摄入量的百分比。

结果：七大类食物组共包括 35498 种预包装食品，钠含量中位数从高到低依次为：植物性蛋白质食物（1125 mg）、加工肉类和鱼制品（1100 mg）、膨化食品（523 mg）、坚果和种子（292 mg）、 面包和烘焙产品（222 mg）、乳制品和产品（65 mg）以及加工水果和蔬菜产品（44 mg），其中属于绿色水平的占 30.2%、黄色水平占 37.6%、 红色水平 32.1%。绿色比例高的前三类食品分别为乳制品（71.7%）、加工果蔬（59.1%）、坚果和种子（35.7%）； 黄色：面包和烘焙产品(70.8%)、膨化食品 (49.8%) 以及坚果和种子 (41.5%)； 红色：加工肉类和鱼类产品（85.7%）、植物蛋白食品（81.9%）和膨化食品（40.2%）。 每份食用量的钠摄入量中位数占 11 岁及以上儿童每日推荐钠摄入量的比例前三位分别是植物性蛋白质食品（28.1%)、加工肉类和鱼类产品（16.5%）和膨化食品（10.5%）。平均每份（50g）植物性蛋白质食物的钠摄入量占推荐钠摄入量的百分比在 4-6 岁组为 46.9%，7-10 岁组为 35.2%。

结论：中国儿童经常食用的七类预包装零食的钠含量存在较大差异，植物蛋白食品、加工肉类和鱼类产品以及膨化食品的钠含量都较高。食用每份预包装零食，可提供每日钠摄入量的 10%以上，年龄越小的儿童比例越高。有必要采取措施引导儿童和家庭选择健康零食。

关键字 钠；预包装食品；零食；儿童

分类：公共营养与健康

甘油三酯葡萄糖指数与脑卒中患病风险的现况分析

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目的：脑卒中已经成为威胁我国国民健康的主要慢性非传染性疾病之一。甘油三酯葡萄糖（TyG）指数作为胰岛素抵抗的替代指标，简单有效、经济直观，被认为与许多疾病有关，如心血管疾病、脑血管疾病。但现有研究关于 TyG 指数与脑卒中患病的关系仍不明确。

方法：本研究采用多阶段分层整群抽样的方法，抽取长春市年龄为 35-75 周岁的常住居民，并对其进行问卷调查和体格检查。采用多因素 logistic 回归模型探究 TyG 指数与脑卒中的关系，并使用限制性立方样条的方法分析二者是否存在剂量反应关系。

结果：（1）调查对象的基本情况：本研究共调查了 7374 名常住居民，其中男性 3219 人（43.65%），女性 4155 人（56.35%），性别比为 1：1.29；60-75 岁的有 3328 人（45.13%）；4656 人（63.14%）的文化水平为中学及以下；年收入＜5 万元的有 6690 人（90.72%）；有 6612 人（89.67%）目前处于在婚同居状态，3078 人（41.74%）从事站立为主的职业；吸烟者和饮酒者分别有 1492 人（20.23%）、286 人（3.88%）。（2）调查对象脑卒中的患病情况：7374 名调查对象中，脑卒中患者 241 名，非脑卒中患者 7133 名，脑卒中的患病率为 3.27%。60-75 岁、年收入≥5 万元、职业以坐立为主、饮酒者、高血压患者、糖尿病患者、有服药史和脑卒中家族史的人群更容易患脑卒中；脑卒中患者的腰围、身体质量指数、收缩压、舒张压、心率较非脑卒中人群更高。（3）TyG 指数与脑卒中患病风险的关系：TyG 指数 Q1、Q2、Q3 和 Q4 组脑卒中的患病率分别为 2.44%、3.10%、3.30%和 4.23%。二元 logistic 回归模型显示在未调整的模型中，高 TyG 指数的 Q4 组患脑卒中的风险是 Q1 组的 1.77 倍（OR=1.77，95%CI [1.22-2.57]，P_{trend}=0.003）；在经过模型 1、2 和 3 的调整后，仍显示高 TyG 指数的 Q4 组患脑卒中的危险度最高，分别为 Q1 组的 1.94、1.68 和 1.59 倍。使用限制性立方样条拟合 TyG 指数与脑卒中患病率之间的关系，发现二者之间尚不存在剂量反应关系（P>0.05）。亚组分析显示，在女性、60-75 岁、不吸烟和不饮酒的人群中，TyG 指数越高，脑卒中患病的风险越高。

结论：TyG 指数与脑卒中的患病有关，且较高的 TyG 指数会增加脑卒中患病的风险。

关键字 甘油三酯葡萄糖指数；脑卒中；关联性分析；Logistic 回归模型；

分类：公共营养与健康

乳制品和乳蛋白摄入与中老年人骨骼肌质量的关联性研究

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【目的】一般从30岁开始，人体肌肉量便会以每年1%-2%的速度衰减。本文将对国内外关于乳制品摄入与老年人骨骼肌质量（SMM）的关系研究进行综述，以期为指导老年人预防肌肉衰减提供科学依据。

【方法】对知网、万方、Pubmed和EBSCO数据库中2002-2022年间的中英文文献进行主题词检索。中、英文检索词分别为“牛奶/乳制品”、“老年/中老年”和 “骨骼肌/肌肉/肌肉衰减”；“elder/older/senior adults/aged”、“dairy”和“muscle/sarcopenia”。

【结果】共检索到中英文文献226条，根据内容相关度手动筛选至22条。一项队列研究对4412名肌肉质量正常的韩国中年人进行了12年的追踪调查，发现高乳蛋白摄入量与低SMM指数（SMI）的发生风险呈负相关（p=0.029）。男性饮用牛奶≥1次/天显著降低了低SMI的发生风险（p=0.023）（So E, et al. 2020）。

中老年人饮奶或乳蛋白摄入对SMM的积极作用在临床研究中得到了验证。Hanach等对8项高质量随机对照研究进行系统综述，发现乳蛋白干预显著提高了中老年人四肢SMM（0.84 kg; 95% CI=0.01~0.26，P=0.04）（Hanach NI,et al.2018）。一项在墨西哥老人中开展的随机单盲临床试验中，每天补充210克乳清干酪（含乳蛋白18克），12周后老人的四肢SMM显著增加，而维持常规饮食习惯的对照组则有所下降(Mateo H.A, et al.2014)。Chanet等也得到了相一致的结果（Chanet, A. et al.2017）。另一项研究则发现12周的高蛋白乳饮料干预可使活动性良好的老年人显著增强抗阻训练中骨骼肌的最大力量（Huschtscha Z, et al.2021）。

乳蛋白对肌肉质量的积极影响可能与其促进肌蛋白合成有关。多项研究发现老年人在接受乳清蛋白干预后，混合肌肉蛋白合成速率显著提升（Chanet, A.et al.2017; Borack, MS, et al.2016; Coker, RH, et al.2012）

【结论】乳制品或乳蛋白摄入对提高中老年人SMM、减缓SMM随年龄增加的下降趋势具有积极作用，提示长期乳制品摄入可作为减缓中老年人肌肉衰减进程的有潜力的营养策略。

关键字 乳制品，乳蛋白，中老年，骨骼肌，肌肉衰减

分类：公共营养与健康

新冠肺炎流行期间的营养调节的重要性

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综上所述，均衡充足的饮食营养对于人体的免疫体统很重要。炎症反应是免疫系统功能的重要组成部分，否则，病原体将难以消除。特别是这次疫情发现此种新型冠状病毒所引起的疾病，患者临床症状参差不齐，从无症状感染者、轻度上呼吸道症状到严重肺炎，甚至急性呼吸窘迫综合征(ARDS)或死亡。由于 SARS-CoV-2 感染引起的全身免疫过度激活，细胞因子过度和延长，形成细胞因子风暴，导致了患者肺部的严重的免疫损伤和多器官功能衰竭这在严重的新冠肺炎患者中尤为显著。严重新冠肺炎患者的细胞因子 IL-2、IL-7、IL-10 GSCF、IP 10、MCP-1、MIP1A 和 TNF-a 明显升高，具有细胞因子风暴的特征(70)。当 SARS-CoV-2 感染机体时，炎症反应起抗病毒作用，但由于反应不平衡而形成的强细胞因子风暴对患者有很大的损害。因此，针对这些促炎细胞因子和趋化因子的干预可能有助于减轻不利的炎症反应。有效地抑制细胞因子风暴对预防新冠肺炎患者病情恶化、挽救患者生命至关重要，对危重病人的治疗和降低死亡率具有重要意义。

此处我只是简单列举各类营养素对人类健康的影响，不够全面，有一定局限性。主要是想说明均衡营养对免疫系统和人类健康的重要性。强调了最佳营养状态对于减轻炎症和氧化应激的重要性。通过控制营养不足和促进足够的营养状况来实现增强新冠肺炎危机期间的人体免疫系统，这可能会改善感染阶段的免疫反应(71)。在新冠疫情全球爆发的情况下，尤其是经济水平低下、人口众多的国家，老人和儿童的营养状况和免疫能力让人担忧，因为他们通常会存在营养不良的状况，特别是儿童。卫生条件差也是造成新冠病毒播散和易感性的一方面。应加强这部分人群的营养供给和卫生宣传。总之，充足而均衡的营养以保证自身免疫力的强度，是人体主动积极抵抗新冠病毒的关键。我们不仅要在日常生活中保持健康的饮食习惯，在感染新冠病毒后的治疗阶段，医疗机构也应配备营养指导医生，调节患者的饮食，让其有优质的饮食摄入，除了被动使用药物治疗外，还应通过饮食调动患者自身免疫系统的积极性，以主动抵抗病毒。

关键字 新冠肺炎 营养

分类：公共营养与健康

学生餐膳食营养评估指数的建立

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目的：为填补对现有学生餐客观标准评价的空白，建立《学生餐营养指南》、《中国居民膳食指南（2022）》、《健康食堂建设管理规范》的学生餐膳食营养评估指数 ，并利用学生餐膳食营养评估指数评价实际情况中的学校食堂套餐的膳食质量，验证学生餐膳食营养评估指数的有效性。

方法：依据《学生餐营养指南》、《中国居民膳食指南（2022）》、《健康食堂建设管理规范》等来筛选条目，参考国内外儿童青少年健康营养评分体系，构建了用于评价一周、一日和一餐学生餐的膳食营养质量的方法。经过两轮专家函询后，形成最终版的学生餐膳食营养评估指数体系。利用其他适用于儿童青少年的膳食指数和本指数评价实际情况中的学生餐膳食质量，比较评分的拟合程度和统计学差异，评价学生餐膳食营养评估指数的实际应用效果。

结果：以日为单位的学生餐膳食营养评估指数包括 3 个大类，17 个评价指标。分别为足量摄入类：全谷物和杂豆、蔬菜类总量、深色蔬菜占比、水果类总量、大豆及其制品摄入量、奶及奶制品总量、钙、维生素 A、膳食纤维、食物种类；适量摄入类：谷薯类、蛋类总量、鱼禽畜肉类总量；限制摄入类：红肉比例、烹调油总量、食盐总量、添加糖总量。在平均每日的膳食营养评估基础上，增加 6 个周评估条目：水产品、坚果一周供应总量；菌藻类、动物肝脏、油炸食品、烟熏和腌制肉类一周供应次数。学生餐早餐、午餐或晚餐的膳食营养评估指数以营养素为主，结合食物组，早餐共纳入 11 个条目，午/晚餐共纳入 18 个条目。利用中国 7~ 17 岁儿童青少年膳食指南指数与学生餐膳食营养评估指数，选取实际学校中营养师搭配的全天 17 套食谱和 1 套非营养师搭配的食谱进行评分，两者评分结果的相关系数为 0.69，呈中度相关，折线图趋势一致；t 值为 0.008，有统计学差异。

结论：利用学生餐膳食营养评估指数评估现有的学生餐得出的结论符合实际情况，能够一定程度上反映出学生餐的质量，且一餐、一日、一周的评分体系能更为全面地评价现有的学生餐供餐情况，具有一定的应用价值。

关键字 学生餐；膳食营养评估指数；学生营养

分类：公共营养与健康

陇西地区人群膳食营养调查分析

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摘要：目的 了解陇西地区居民膳食营养状况及不同特征人群的分布情况，总结发现该地区人群膳食结构中存在的问题，提出相应意见建议，为促进陇西地区人群健康发展提供科学依据。方法 于2021年11月至2021年12月，采用随机抽样的方法对当地296名居民通过膳食频率调查表对过去半年的膳食摄入情况进行问卷调查，采用Epi Data3.1录入数据，采用Excel2016和SPSS25.0对数据进行整理分析，收集基本资料以及膳食摄入水平。结果 陇西地区居民膳食摄入不均衡，谷薯类、蔬菜类、水果类、水产类、蛋类、坚果、豆制品和奶类摄入量均为城市高于农村，差异有统计学意义（P<0.05或P<0.01或P0.001）。城市人群蔬菜和水果摄入量约为乡村人群摄入量的2倍。乡村人群杂粮摄入量（25.34±42.91 g·d-1）比城市人群杂粮摄入量高（24.02±29.76 g·d-1），差异有统计学意义（P<0.05）。薯类、杂粮、蔬菜、水果、畜禽肉类、水产、蛋类、坚果、豆制品和奶类摄入量均呈女性高于男性的趋势。与《中国居民膳食宝塔（2016）》推荐摄入量相比，谷薯类、蔬菜、畜禽肉类、豆制品和坚果的人均摄入量高于推荐值，蛋类的人均摄入量基本符合推荐摄入量，而水果、水产和奶类的人均摄入量低于推荐值。不同地区人群在蔬菜、水果和奶类摄入不足的情况普遍存在。其中，农村人群蔬菜摄入不足（85.80%，145/169）、水果摄入不足（77.56%，159/205）和奶类摄入不足（69.35，181/261）的比例均远高于城市（14.20%，24/169）、（22.44%，46/205）和（30.65%，80/261）。女性豆类摄入过量的比例（76.32%，87/114）和坚果摄入过量的比例（75.79%，72/95）均高于男性（23.68%，27/114）和（24.21%，23/95）。结论 陇西地区居民膳食结构不够合理，各类食物摄入量不均衡，谷薯类食物摄入量偏高，蔬菜、水果、蛋奶和水产类的摄入量偏低，农村居民和男性膳食摄入不均衡问题较为突出。建议适当减少谷薯类食物，增加蔬菜、水果、蛋奶和水产类的摄入。定期对民众开展营养健康教育，引导居民形成正确的膳食消费理念。

关键字 陇西地区 膳食营养 调查分析

分类：公共营养与健康

妊娠期妇女维生素 D 缺乏通过下调 FOXP3 表达影响婴儿湿疹发生的出生队列研究

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目的：近年来，维生素 D 与过敏性疾病发生之间的潜在联系引起了越来越多的关注。目前，关于产前孕妇维生素 D 水平对婴儿湿疹影响的流行病学和机制研究有限，结论仍有争议。因此，本研究拟探究孕妇维生素 D 缺乏的流行情况及其对婴儿湿疹的影响，并进一步探讨调节性 T 细胞（Treg）在此过程中发挥的作用。

方法：在中国沈阳招募了 219 对母子。在孕中晚期进行问卷调查，并采集空腹静脉血，在分娩时收集脐带血和胎盘样本，儿科医生对 1 年内婴儿湿疹的发病情况进行了跟踪调查。实验室检测了孕妇血清 25(OH)D3 的浓度，脐带血中 Treg 转录因子 FOXP3 基因表达，以及胎盘中 Treg 转录因子 FOXP3 和 PI3K/AKT/mTOR 信号通路的蛋白表达。根据我国《人群维生素 D 缺乏筛查方法（WS/T 677-2020）》，将孕妇分为三组：维生素 D 缺乏（VDD）、维生素 D 不足（VDI）和维生素 D 充足（VDS）。

结果：孕妇血清 25(OH)D3 的平均浓度为（16.14±8.12）ng/ml，VDD 和 VDI 的报告率分别为 35.6%和 28.3%，仅有 36.1%的孕妇维生素 D 充足。孕妇维生素 D 缺乏和不足与婴儿湿疹发生的风险较高有关（VDD：OR=2.619，95%CI=1.093-6.275；VDI：OR=2.557，95%CI=1.098-5.954）。脐带血中 FOXP3 基因表达水平较高的婴儿发生湿疹的风险显著降低（OR=0.006，95%CI=0.001-0.562），且孕妇血清 25(OH)D3 水平与脐血中 FOXP3 基因的表达呈正相关（rs=0.438，P<0.05）。进一步研究显示，与 VDS 妇女相比，VDD 妇女胎盘中的 FOXP3 蛋白表达减少（P<0.05）。并且随着孕妇维生素 D 水平的降低，胎盘中 PI3K、p-AKT、AKT、p-mTOR 和 mTOR 蛋白的表达逐渐上调（P<0.05）。

结论：我们的研究表明，妊娠期妇女维生素 D 水平低会增加 0-1 岁婴儿湿疹的发生风险，这可能与脐血中 FOXP3 基因表达下调和胎盘中 FOXP3 蛋白表达减少有关。而 VD 缺乏对 FOXP3 蛋白表达的影响可能与胎盘中 PI3K/AKT/mTOR 信号通路的上调有关。

关键字 维生素 D，婴儿湿疹，孕妇，调节性 T 细胞

分类：公共营养与健康

基于差异化地域膳食模式下的心血管健康状况评价研究

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目的　评价不同膳食模式下老年人的心血管健康（cardiovascular health, CVH）状况，并探讨人口经济学特征对其的影响。方法　选取2018年中国健康与营养调查中4299名60岁及以上的老年人作为研究对象，采用聚类分析对膳食模式进行分析，并利用美国心脏协会2022年发布的心血管健康“生命八要素”的定义评价老年人CVH，最后利用多项logit模型分析人口经济学特征对CVH的影响。结果　本研究经聚类分析获得三类膳食模式。模式1以小麦、其他谷物、薯类和豆类摄入较高为主；模式2以水产品和蔬菜水果摄入较高为主；模式3以稻米和畜禽肉摄入较高为主。该人群CVH总得分为68.50，睡眠和血压为最高和最低得分（85.85和37.64）；模式1和模式2的总得分略高。有16%~18%的老年人达到高等CVH，75%左右为中等CVH,三类模式CVH高中差等的分布差异无统计学意义（p=0.29）,女性、较低年龄组和大学及以上学历者处于高等CVH的人数占比高于男性、高年龄组和较低受教育者。三类模式中均有50%以上的人存在3~4个理想指标，仅在模式1中有0.2%的人8个指标均达到理想状态。多项logit分析显示，模式2的老年人存在6~8个理想指标是模式1的1.81倍（95%CI=1.33-2.47）;女性存在6~8个理想指标是男性的3.42倍（95%CI=2.57-4.54）；大学及以上学历者存在6~8个理想指标是小学及以下学历者的1.99倍（95%CI=1.24-3.19）；70岁及以上者存在6~8个理想指标比60~69岁组降低了35%（OR=0.65,95%=0.49-0.87）;高收入人群存在6~8个理想指标比低收入人群降低了31%（OR=0.69,95%=0.47-1.00）。结论　我国老年人心血管健康状况总体处于中等水平。女性、较低年龄组、大学及以上学历者和低收入人群心血管健康状况更好，以水产品、蔬菜和水果摄入较高为特点的膳食模式更易具备较多的理想CVH指标。应针对重点人群及得分较低的健康因素，采取针对性的干预措施，促进心血管健康状况的改善。

关键字　老年人　膳食模式　心血管健康　生命八要素　人口经济学因素

分类：公共营养与健康

持续性餐后状态对 CLOCK/BMAL1 通路的调节在 2 型糖尿病发生中的作用及其机制

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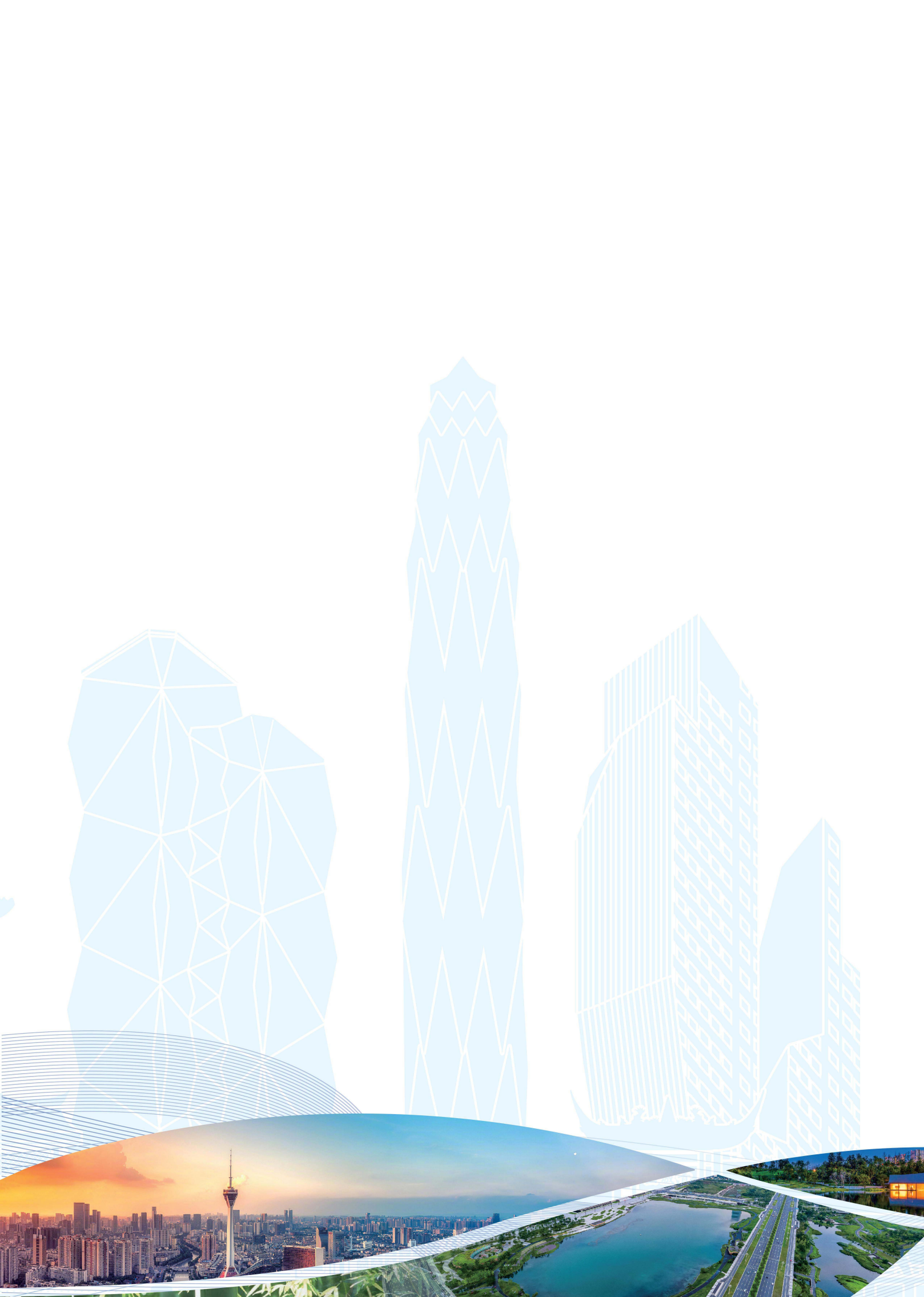
目的：饮食行为习惯被普遍认为与 T2DM 发生有密切的关系，因此探讨“持续性餐后状态”在 T2DM 发生的作用及其机制。方法：1 本研究将 KKAy 小鼠饲养在严格的人工模拟昼夜循环的环境中，随机分为三餐组和多餐组。每 6 天检测小鼠体重和空腹血糖变化情况。实验结束时每隔 4 小时处死小鼠，取外周组织，运用 RT-PCR 方法检测节律基因，以及肝脏中糖脂代谢相关基因 mRNA 的表达水平；WB 技术检测不同时间点的小鼠肝脏中节律蛋白 DBT 和 TIM 的含量；采用免疫组化法检测 Nampt 蛋白在肝脏中的表达水平。2 CCK8 法检测 GSK-3β 抑制剂 LiCL 处理大鼠肝细胞后各组细胞的活性。将细胞分为对照组和实验组，实验组细胞用最适浓度的 LiCL 干预 20 小时后，用 RT-PCR 技术检测两组细胞中节律相关基因的表达水平；WB 技术检测在干预后三个不同时间点细胞中节律蛋白 Bmal1 的表达情况。结果：1 进行到 30 天时三餐组和多餐组小鼠的体重均显著增加（P<0.05），且多餐组的体重要明显高于三餐组（P<0.05）。但是两组之间血糖无显著差异（P>0.05）。与 30 天时相比，实验结束时（60 天）三餐组和多餐组小鼠的体重和血糖均显著增加（P<0.05），多餐组的体重和血糖都要明显高于三餐组（P<0.05）。2 两组小鼠肝脏中生物钟基因的表达均具有良好的节律性，而且对于同一个基因，两组动物的表达模式基本相似；骨骼肌中 Bmal1 基因的表达峰值都在早晨进食后出现，且多餐组的表达量高于三餐组，基因 Per2 和 Per3 在整个周期内的表达模式相似；肝周脂肪中多餐组 Per1 和 Per2 的节律性增强，而且多餐组 Pers 家族 3 个基因的表达峰值均在凌晨出现，与 Cry1 在一个周期内的表达模式相似；胰腺中同一个基因在两个组内的表达模式相似，且多餐组的峰值要高于三餐组。3 Nampt 蛋白主要位于细胞质中，视野区域内阳性细胞占比在 75%以上，最终得到的是弱阳性表达；在多餐组，T2DM 小鼠肝脏中 DBT 和 TIM 蛋白的表达量都要高于正常小鼠。4 当 LiCl 浓度 15mM 和 20mM 时，细胞中 GSK3-β 蛋白的表达量明显降低，LiCl 抑制效果明显（P<0.05）；与对照组相比，实验组 Bmal1、Cry2、Rev-erbα、Per1 和 Per2 的表达量明显增加（P<0.05）。结论：昼夜节律时钟和糖脂代谢相互作用的失调增加了疾病的风险。

关键字 持续性餐后状态；昼夜节律；生物钟；基因表达