



Abstracts of the V Congress of the Spanish Federation of Nutrition Food and Dietetics Societies (FESNAD) & LXXV Congress of the Galician Pediatrics Society (SOPEGA)

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Guest Editors

Dr. Alfredo Martínez and Dr. María Dolores Mesa and the Scientific Committee of the Congress

Welcome letter

It is our pleasure and honor to invite you to the 5th Congress of the Spanish Federation of Nutrition, Food and Dietetic Societies (FESNAD) and the 75th SOPEGA Congress, which will take place in Santiago de Compostela from November 13th to 15th, 2025, returning to an in-person format.

The theme of the meeting is **"The Right Path: Nutrition, Health and Sustainability."** We believe this is a highly timely and relevant topic. Unhealthy lifestyles, among which poor diet plays a significant role, are linked to the main current causes of morbidity and mortality, as well as to major negative environmental changes. In this regard, the decline in adherence to traditional healthy diets, such as the Atlantic and Mediterranean diets, has been identified as a major factor contributing to the high prevalence of overweight and/or obesity from childhood onwards, negatively impacting health in the short, medium, and long term. Moreover, it is increasingly associated with social vulnerability and is a reflection of "hidden hunger." For all these reasons, coordinated action from all social stakeholders is essential for its prevention.

Our scientific societies, united within this Federation, must show "the way" through an integrated approach toward improved individual nutritional health and environmental well-being. In this context, Santiago de Compostela, the final destination of the Camino, established in the 9th century as one of the most important pilgrimage routes in Europe, is the perfect setting for this event.

We hope to create a scientifically rich program and that the 5th FESNAD Congress will serve as a forum for discussion and exchange, helping us to strengthen the synergies among the member societies and to define the guidelines to follow along this "path." We have chosen the **City of Culture of Galicia**, a bridge between history and modernity, as the venue for the event, and we are confident it will provide the perfect backdrop. We, along with Santiago de Compostela, a welcoming city, a place of reunion, full of historical and artistic heritage, home to excellent Atlantic cuisine, and where rain becomes art (though we trust the Apostle will bless us with good weather), look forward to welcoming you.

Warm regards,

Dra. Rosaura Leis

President of the Organizing Committee

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Disclosure Statement

The abstracts included in this supplement were reviewed and selected by the Scientific Committee of the Spanish Federation of Nutrition, Food and Dietetic Societies. The committee has no conflicts of interest in connection with the congress and the selection of abstracts.

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PLENARY LECTURE

The Dark Matter of Nutrition: A Look into the Future

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Abstract: During the last century, most nutrients and their biological functions were discovered. Nutritional research focused on identifying nutrients and the effects that their deficiency has on intermediary metabolism, growth, maintenance, and the development of cells and tissues. The studies carried out led to the formulation of recommended dietary allowances for each nutrient, covering 95% of individuals in a healthy population, thereby eradicating multiple deficiency diseases such as pellagra, beriberi, scurvy, etc. Likewise, during the golden decades of metabolism (1930-1970), most of the metabolic pathways through which we obtain energy and use nutrients were discovered. At the end of the last century, many scientists thought that nutrition was a mature science with an uncertain future. In 2003, when the human genome was cracked, many expected it would unlock the secrets of disease. But genetics explained only about 10% of the risk; the other 90% lies in the environment, and diet plays a huge part. Today, the genomic era technology has provided powerful new tools, enabling scientists to shift from the traditional reductionist approach of investigating the effects of a single nutrient on a biological system to a much broader approach that allows them to explore the molecular effects of one or more nutrients on entire biological organisms.

Matter makes up about 31% of the total amount of matter and energy in the universe. About 20% of the total matter is made of regular (or baryonic) matter, which includes stars, galaxies, atoms, and life, while about 80% is made of dark matter, whose mysterious nature is not yet known but may consist of some as-yet-undiscovered subatomic particles. Analogous to the unseen matter in astronomy, "the dark matter of nutrition" refers to the vast number of unstudied biochemical compounds in food that are largely unknown to traditional nutritional science and databases. These compounds, which significantly outnumber the recognized "essential nutrients," are estimated to be hundreds of thousands in number and are being identified and studied using foodomics and computational tools to understand their full impact on human health and disease. Foodomics is an emerging field that combines techniques like genomics, proteomics, and metabolomics to understand the complex interactions between food and the body at a molecular level. Indeed, the foodome describes the entire set of food-derived components and their complex interactions within the body, including these "dark matter" compounds. Computational tools are being developed to use artificial intelligence to predict the functions of these compounds by identifying structurally similar known compounds.

Evidence suggests that more than 139,000 chemicals in food together modulate a large number of human proteins. Approximately 2000 of these food molecules are currently used as drugs. Thus, there is an enormous pool of chemicals with subcellular roles that remain unknown, and this pool may serve as the starting point for future therapies. While food composition focuses on nutrients, these "dark matter" compounds constitute the vast majority of what we eat. For years, nutrition has often been framed in simple terms: food as fuel and nutrients as the body's building blocks. Thus proteins, carbohydrates, fats and vitamins – about 150 known chemicals in total – have dominated the picture. But our diet delivers more than 26,000 compounds, with most of them still uncharted. Many of these unknown compounds may play crucial roles in disease prevention or progression, influencing everything from genetic expression to the gut microbiome. Examples of "dark matter" can be found in human milk, where more than 3000 peptides have been identified, most of them with unknown functions, and in plants, where many amino acids, proteins, bioactive compounds and microRNAs have been identified that can influence immune function and gene expression.

The study of this "dark matter" could lead to new drugs, improved crop resilience, and enhanced food properties. Moreover, understanding ancient diets like the Mediterranean diet can help to explain the complex effects of our diets, especially those containing many ingredients beyond basic vitamins and proteins. In addition, the study of the dark matter of nutrition can contribute to appropriately evaluating the exposome, as it is the sum of all environmental, dietary, and lifestyle exposures an individual receives throughout their life, from conception to death, and their impact on health.

Conflict of interest: The author declares no conflicts of interest.

Keywords: Dark matter of nutrition, exposome, foodomics, genomics, human milk, metabolomics, microbiome.

SYMPOSIA

Symposium 1: Healthy nutrition and cardiovascular risk in primary care

S1-01

Updating knowledge in healthy nutrition

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Abstract: This lecture provides an updated perspective on healthy nutrition with a primary focus on cardiovascular health. The session addresses how diet remains one of the most powerful tools to prevent and manage cardiovascular diseases, which continue to be the leading cause of death worldwide.

The lecture highlights that research now emphasizes overall dietary patterns rather than single nutrients. The Mediterranean and DASH diets are presented as the strongest models for cardiovascular prevention, both encouraging high intakes of fruits, vegetables, legumes, nuts, whole grains, and healthy fats such as olive oil and fatty fish. At the same time, they limit red and processed meats, refined carbohydrates, added sugars, and excess saturated fats. Consistent evidence shows that adherence to these dietary patterns improves blood pressure, lipid balance, systemic inflammation, and overall cardiovascular outcomes.

A special focus is given to fats. Current recommendations stress replacing saturated fats with sources of mono- and polyunsaturated fats, such as nuts, seeds, and plant oils. The lecture reinforces that industrially produced trans fats should be completely avoided, as they strongly increase cardiovascular risk. Recent findings also indicate that dietary cholesterol itself has weaker associations with blood cholesterol than previously assumed, shifting the focus toward fat quality.

The value of dietary fiber and plant-based compounds is also discussed. Higher fiber intake supports better blood glucose control, lowers hypertension, and promotes gut microbiome health. In addition, antioxidants and polyphenols from fruits and vegetables confer anti-inflammatory and vascular benefits.

The importance of limiting sodium intake to under 2 grams daily and reconsidering alcohol consumption is emphasized, as the latest evidence shows that no alcohol intake is the safest option for cardiovascular protection.

Finally, the lecture advocates for sustainable and personalized nutrition strategies. Individual genetic and cultural factors should shape dietary recommendations, while adopting plant-forward diets also ensures environmental benefits. The session encourages empowering individuals with realistic and culturally sensitive tools to achieve sustainable cardiovascular health.

Conflict of interest: The author declares no conflicts of interest.

Key words: Nutrition, healthy, cardiovascular diseases / prevention & control, mediterranean diet, dietary fats.

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S1-02

The central influence of nutrition on cardiovascular risk stratification and reduction

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Background and aims: Cardiovascular diseases (CVD) remain the leading cause of global mortality. Among modifiable risk factors, nutrition plays a pivotal role and represents one of the most impactful interventions. Evidence is continually evolving from a single-nutrient focus towards the assessment of whole dietary patterns. This abstract aims to synthesize the current scientific evidence on the impact of dietary patterns on the primary and secondary prevention of CVD, providing a practical approach for the family medicine setting.

Methods: A comprehensive narrative literature review was conducted across major databases (PubMed, Scopus, Cochrane Library). The analysis included landmark randomized controlled trials (e.g., PREDIMED, DASH), large-scale prospective cohort studies, and the most recent clinical practice guidelines from international scientific societies, such as the European Society of Cardiology (ESC) and the American Heart Association (AHA).

Results: The evidence consistently supports the superiority of dietary patterns over focusing on individual nutrients. Patterns such as the Mediterranean Diet and the DASH (Dietary Approaches to Stop Hypertension) diet have been shown to significantly reduce the incidence of major cardiovascular events, all-cause mortality, and improve risk profiles. These patterns are characterized by a high intake of fruits, vegetables, legumes, whole grains, fish, and unsaturated fats (extra virgin olive oil, nuts), and a low intake of red and processed meats, refined sugars, and trans fats. Their benefits are mediated through the modulation of key

factors, including hypertension, dyslipidemia, insulin resistance, and systemic inflammation.

Conclusion: The adoption of evidence-based, healthy dietary patterns is a cornerstone of cardiovascular risk management. Family physicians are strategically positioned to translate this scientific evidence into practical, individualized, and culturally sensitive dietary counseling, thereby promoting sustainable behavioral change in patients to reduce the global burden of CVD.

Conflict of interest: The author declares no conflicts of interest.

Key words: Cardiovascular risk, nutrition, dietary patterns, prevention, Mediterranean diet, lifestyle medicine.

S1-03

How to convey information and change habits in primary care consultations

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Abstract: The importance of diet and physical activity as modifiable factors for chronic non-communicable diseases and cardiovascular risk is well known. Their relevance to family physicians is evident in their field of practice.

The aim of this session is to teach how to implement advice on diet and physical activity in a Primary Care practice to change unhealthy habits and achieve positive self-care outcomes with patient-centered health education. Translating this scientific evidence into clinical practice is a challenge for family physicians. Therefore, the psychological aspects that could help induce a change in habits toward healthier behaviors and increase the likelihood of success in implementing these recommendations will be reviewed.

The goal is to make consultations more effective in motivating patients and changing behaviors by organizing the dialogue so that each person "models" their attitude according to their values and interests, providing positive arguments for change, and explaining why and how to make a change. The use of motivational interviewing in Primary Care as a brief intervention is supported in studies for the control of high blood pressure, dyslipidemia, obesity, sedentary lifestyle, and the promotion of physical activity in Primary Care.

Conflict of interest: The author declares no conflicts of interest.

Key words: Diet, health, guidelines, cardiovascular disease

Symposium 2: Immunonutrition in the study of health and sustainability

S2-01

Immune bioactives from breast milk

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Abstract: The immunoglobulin profile of breast milk changes during lactation, and while secretory IgA is crucial, other immunoglobulins (Ig) also have relevant functions. Maternal, sampling, and methodological factors are crucial for Ig quantification. Furthermore, there is a gap in knowledge about Ig levels, especially of IgG isotypes, and even more during the breastfeeding transition period. There is also interest in understanding the influence of various maternal factors, both environmental (exposome) and maternal. Furthermore, it is necessary to understand the effect of conservation treatments in breast milk banks and their impact on bioactives.

The latest studies from our research group show the existence of different immunotypes in breast milk, which are detected only during the transition from colostrum to mature milk. Furthermore, our clinical and preclinical data have demonstrated how dietary components, along with immune factors present in breast milk, are crucial in modulating immune and microbial development in offspring and reducing infections. However, the mother's primiparous or non-primiparous status can also influence Ig composition. Finally, ultra-high-pressure homogenization appears to be a feasible alternative for preserving bioactive factors in donated milk while maintaining its microbiological safety profile.

Overall, further research should be performed in this field in order to better understand the milk production biology, impact on the descendance and its conservation.

Conflict of interest: The author declares no conflicts of interest.

Key words: Breast milk, immunoglobulin, IgA, diet.

S2-02

Role of the microbiota in the development of the immune system in childhood

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Abstract: Development of the immune system occurs mainly in the first three years of life, coinciding with antigenic exposure in environments such as preschools. This explains the high frequency of viral and bacterial infections at this stage, affecting the respiratory and intestinal tracts, where immune cells find antigens. Promoting a strong immune system during this period can reduce the risk of allergies, infections and autoimmune diseases.

Gut microbiota plays a crucial role in the development, training, and modulation of immune responses. From birth, it acts as an essential contributor to preserving intestinal immune homeostasis, facilitating recognition of aggressive agents, production of mediators, and defense against pathogens, preventing their adhesion to the mucosal membranes. 70–80% of immune cells are found in gut, underscoring its importance in both nutrition and body defense. Gut microbiota contributes to immune balance by determining which agents should be tolerated and which ones trigger an immune response. This process is especially important for the maturation of the immune system in the first years of life. Interactions between the diverse microbial communities are fundamental to this process.

A balanced gut microbiota supports the function and development of a child's immune system. Gut colonization occurs in parallel with the maturation of the immune system. Alterations in bacterial colonization patterns are associated with an increased risk of developing certain diseases, including allergies, whose prevalence continues to increase in children and young people. Therefore, optimizing early gut colonization may be an opportunity to support optimal health during the first years of life and influence future health.

Conflict of interest: The author declares that they have no conflicts of interest.

Key words: Immune system, gut microbiota, childhood.

S2-03

State-of-the-art on the role of the gut microbiota and eating pattern in anorexia nervosa

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Abstract: Nowadays, the gut microbiota is considered as a relevant player in the regulation of the individual's metabolic status and, thus, the risk of metabolic disorders. Anorexia nervosa (AN) is a mental illness that manifests with exaggerated body image concern and feeding behavior alterations leading to severe undernourished states. scientific evidence already

exists on the participation of the microbiota as a causative or intervening factor involved in AN onset and/or maintenance. Early research showed that AN patients microbiota composition might be deviated so as to provide superior nutrient conversion and energy yield from food sources (secondary alteration). However, other reports have found results suggestive of sparsity of fiber fermentative bacteria (*Roseburia* and *Faecalibacterium*), increased mucin-degrading organisms (*Akkermansia muciniphila*) and even increased Proteobacteria potentially able to induce autoantibodies towards the anorexigenic neuropeptide α -melanocyte-stimulating hormone (α -MSH). Neuropeptides and gastrointestinal peptides involved in appetite control respond to microbiota composition shifts. Fermentation-derived metabolites (e.g. SCFA) can modulate de enteroendocrine function in the gut and influence GLP-1 and PYY secretion, among others. The effects of the alterations of the gut microbiota on the expression of appetite-regulating molecules, such as NPY, GABA or indol-3-propionic acid have been reported in a mouse model of anorexia or in AN patients. Little is known about how the duration and severity of imposed dietary changes might affect the microbiota composition in AN patients or their perdurability following renourishment. Despite marked differences among individual patients' diets according to the diagnostic subtype, the duration of the eating disorder and others, a lesser frequency of high-carbohydrate and high-fat foods in usually observed, with protein and fiber intake relatively preserved. During nutritional therapy, hyper-caloric diets are used in advanced stages of renourishment. Preliminary results from the ongoing PSYNIGED study, regarding classification of dietary patterns and relationship with appetite-regulating peptides will be presented.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Anorexia nervosa, gut microbiota, appetite-regulating peptides, dietary pattern.

S2-04

Entomophagy and immunonutrition: scientific evidence and sustainable perspectives

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Background and aims: Anthropoentomophagy, the human consumption of insects, encompasses nearly 2,000 species considered suitable for human intake. It is increasingly recognized as a promising alternative protein source, offering

both nutritional value and environmental sustainability, and is shaping the future of food systems.

To analyze recent scientific evidence on the impact of edible insect consumption on immune function, highlighting their nutritional and functional properties.

Methods: A literature review was conducted using MEDLINE via PubMed and Web of Science, focusing on the past five years. The search included terms such as edible insects, nutritional value, and immunomodulatory effects. Selected studies comprised in vitro assays, in vivo research in animal models, and human studies.

Results: Edible insects show considerable nutritional variability depending on species, life stage, diet, and origin. Some of them contain over 70% protein in dry matter, along with unsaturated fatty acids, vitamins, minerals, bioactive compounds, and chitin, which may modulate immune responses. The in vitro study of bioactive peptides on species like *Tenebrio molitor*, *Gryllobates sigillatus*, and *Schistocerca gregaria* reveal antioxidant and anti-inflammatory effects, including inhibition of lipoxygenase and cyclooxygenase-2. Peptides from *Bombyx mori* enhance splenocyte proliferation, while *Protaetia brevitarsis* proteins activate macrophages and reduce LPS-induced inflammation in RAW264.7 cells. In animal models of chronic arthritis, insect-derived glycosaminoglycans lower C-reactive protein and modulate proinflammatory cytokine levels. Chitin stimulates eosinophils, macrophages, and IL-4/IL-13-expressing T cells. However, despite these benefits, allergens like tropomyosin may pose risks, especially for individuals who are allergic to shellfish or other invertebrates.

Conclusion: Edible insects offer a valuable source of high-quality protein and bioactive compounds with immunomodulatory potential. Evidence from in vitro and in vivo studies supports their role in immune regulation and inflammation control. While promising for sustainable nutrition, allergenic risks, especially due to tropomyosin, must be considered to ensure safe integration into human diets.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Edible insects, immunonutrition, bioactive compounds, sustainable protein, food allergy risk.

Symposium 3: Hot topics in infant nutrition

S3-01

Current recommendations on bottle preparation in healthcare settings: pros and cons

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Abstract: The preparation of infant bottles in hospitals represents a critical safety process, particularly in fragile patients such as preterm newborns, low-birth-weight infants, or immunocompromised children. The main risks identified are microbiological contamination, dosage errors, and misadministration to the wrong patient. Despite advances, clinical practice remains highly variable. In Spain, a recent multicenter survey showed that nearly 70% of hospitals do not reconstitute formula with water $\geq 70^{\circ}\text{C}$, 37% do not store prepared feeds at $< 5^{\circ}\text{C}$, and almost one in five lack dedicated preparation rooms, instead relying on nursing stations or other non-specific areas. This situation highlights a gap between formal recommendations and routine practice, with direct implications for patient safety.

At the international level, different organizations have published specific guidelines for healthcare facilities. In general, the use of ready-to-feed formulas is recommended for hospitalized patients, especially for the most vulnerable, since they are sterile and minimize the risk of contamination. When powdered infant formula is used, WHO/FAO advises reconstitution with water $\geq 70^{\circ}\text{C}$, rapid cooling, strict refrigeration, and control of storage times, together with aseptic technique and full traceability. In the United Kingdom, the NHS and the British Dietetic Association provide detailed guidance on dedicated areas, quality control, and labeling. In the United States, both FDA and CDC emphasize immediate use or refrigeration of prepared formula and strict adherence to manufacturer instructions, while professional organizations (AWHONN, Academy of Nutrition and Dietetics) highlight the value of centralized preparation rooms, unit dosing, and barcode scanning systems. Finally, in hospital design, the Facilities Guidelines Institute (FGI) recommends specific preparation rooms with a clean-to-dirty workflow.

Taken together, these recommendations aim to reduce variability, improve traceability, and ensure maximum microbiological safety. Their implementation clearly improves patient safety and family confidence, although it requires investment in infrastructure, trained personnel, and organizational culture.

Conflict of interest: The author declares no conflicts of interest.

Key words: Infant formula, Reconstitution, Ready-to-feed, Food safety, Pediatrics.

S3-02

Complementary feeding and allergy prevention: Current evidence

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Abstract: Over the past few decades, the prevalence of food allergy has risen markedly, leading to a substantial shift in nutritional recommendations for complementary feeding. Evidence from the Learning Early About Peanut (LEAP) and Enquiring about Tolerance (EAT) trials demonstrates that early introduction of peanut and egg, between 4 and 6 months of age with subsequent regular consumption, significantly reduces the risk of allergy. This effect was observed both in high-risk infants, particularly those with moderate to severe atopic dermatitis, and in the general population. For other allergenic foods such as cow's milk, wheat, fish, and tree nuts, the evidence is less consistent. Some studies indicate that early and sustained exposure to cow's milk proteins may decrease the incidence of allergy, although findings are heterogeneous. In the case of tree nuts, the evidence remains insufficient and results from ongoing trials are awaited. Multifood studies, such as PreventADALL, support the idea that early dietary diversification can decrease overall allergy risk, though the degree of benefit appears to vary by food type.

Additionally, recent studies also highlight the influence of diet diversity in the first year on the later prevention of allergy, showing that increasing diet diversity between 6 and 9 months of age is a protective factor against the development of food allergies during the first decade of life.

Current international guidelines recommend the introduction of peanut and egg between 4 and 6 months of age, advise against unnecessary delays in the introduction of other allergens and emphasize the importance of maintaining regular ingestion once introduced. However, significant practical barriers remain, including parental concerns about adverse reactions, safety issues, and poor adherence to protocols. Addressing these limitations will be essential to effectively translate evidence into clinical practice to try to reduce the burden of food allergy in childhood.

Conflict of interest: The author declares no conflicts of interest.

Key words: Complementary feeding, food allergy prevention: early allergen introduction, dietary diversity.

S3-03

Functional ingredients in infant formulas

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Background and aims: Human milk (HM) is the gold standard for infant nutrition, offering not only essential nutrients

but also a complex array of bioactive compounds that support immune development, neurodevelopment, and gut health. The objective of this presentation is to explore the role and impact of functional ingredients in infant formulas (IF), aiming to mimic the benefits of HM when breastfeeding is not possible.

Functional Ingredients in Infant Formulas: These functional ingredients are included in the protein, lipid and carbohydrate fractions of the IF composition. These are some of the most studied to date:

Proteins: α -lactalbumin, lactoferrin, osteopontin, and milk fat globule membrane (MFGM) proteins contribute to immune modulation, nutrient absorption, and antimicrobial activity.

Oligosaccharides: Human milk oligosaccharides (HMOs) promote the establishment of a healthy microbiota, reduce infections, and support gut and brain development. Simpler prebiotics like fructo-oligosaccharides (FOS) and galacto-oligosaccharides (GOS) are also used, with beneficial effects on gut microbiota, and stool consistency among others

Lipids: β -palmitate improves calcium absorption, stool consistency, and bone mineralization. MFGM lipids support neurodevelopment and immune function.

Apart from these nutrients, IF also includes members of the biotic family as functional ingredients. Probiotics, prebiotics, synbiotics, and postbiotics are being studied for their roles in gut health and immunity. Promising, evidence is still emerging, but it is not strong enough to recommend their routine use.

Conclusions: Breast milk is the optimal nutrition for infants in the first 6 months of life. One of the key benefits of HM is the inclusion of substances whose function goes beyond mere nutrition. These substances are referred to as 'functional ingredients'. The introduction of different functional components into IFs has demonstrated beneficial effects on neurological development, infection prevention, bone metabolism, stool consistency, and the composition of the intestinal microbiota, among others.

Conflict of interest: The author has received speaker fees from various baby food companies (Mead-Johnson, Nestlé, Danone, Ordesa, Ferrer, Hero, Alter). He also serves on advisory boards for baby food companies (Danone, Mead Johnson, Hero, Nestlé).

Key words: Human milk, infant formula, functional ingredients, gut microbiota, immune function.

Symposium 4: Evidence from PREDIMED, EPROBES, and CORALS in the prevention of obesity and diabetes

S4-01

Importance of the Mediterranean diet in diabetes prevention: The PREDIMED studies

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Abstract: PREDIMED-Plus is a 8-year, multicenter, randomized, parallel-group, single-blinded, lifestyle intervention trial aiming to assess the effects of an intensive weight-loss intervention with an energy-reduced MedDiet (erMedDiet) and physical activity (PA) promotion (Intervention group) vs a control MedDiet group for the primary prevention of cardiovascular disease (stroke and myocardial infarction) and cardiovascular death. A total of 6784 participants from 23 centers in Spain were randomized to the trial. Eligible participants are men and women aged 55–75 years, without a documented history of CVD at enrolment, with overweight/obesity, and disclosing at least three components of the metabolic syndrome. Predimed-Plus has demonstrated that compared to ad libitum MedDiet recommendations, the intensive lifestyle intervention with an erMedDiet and PA promotion has beneficial effects on weight loss, waist circumference, insulin resistance, glycated hemoglobin and other cardiovascular risk factors after one year of intervention, reduced total and visceral fat and attenuated age-related losses of lean mass after 3-years of follow-up. Recently, the results in relation to diabetes prevention have been reported in those participants free of diabetes at baseline. Beneficial effects on bone density, renal function, telomere length, gut microbiota profile, metabolism and cognition have been also reported. If these adiposity and metabolic benefits were maintained over 8 years, we hypothesize that the PREDIMED-Plus lifestyle program might provide benefits in terms of the incidence of cardiovascular events and other secondary endpoints related to obesity and metabolic syndrome.

We intend to showcase: 1) the interest that the project has generated among the international community, 2) the current status of the trial, 3) the key milestones achieved, 4) the main scheduled publications evaluating the effect of the interventions, 5) the most important subprojects awarded until now, especially those related to OMICs sciences, and, 6) future collaboration opportunities at the national and international level.

Conflict of interest: The author declares no conflicts of interest.

Key words: Predimed-plus, cardiovascular disease, diabetes, obesity, Metabolic syndrome, Mediterranean diet.

Lifelong obesity prevention through early identification of risk factors, prognosis, and intervention: advances in the EPROBES project

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Abstract: Obesity is one of the main population health threats worldwide, with a sustained increase in prevalence over the last decades and a constellation of co-morbidities that seriously hamper individual wellbeing and life-expectancy. Despite major research efforts, obesity treatments have proven of limited efficacy. Thus, effective prevention strategies are essential to avoid the full spectrum of metabolic complications of overweight during the life-course.

Adult obesity is rooted on early maturational events, including pathophysiological and psychological determinants occurring during the gestational, infantile and/or adolescent periods, which globally remain ill defined. Identification of such early pathogenic mechanisms and markers of metabolic disease is key for active prevention and personalized management of body weight disorders later in life. Of note, pathogenic mechanisms and susceptibility to obesity are seemingly gender-dependent, but this aspect remains underexplored and may compromise effectiveness of preventive measures and treatments tackling obesity and its complications.

eprObes (for early Prevention of Obesity) is a multidisciplinary, patient-centered project, involving clinical studies targeting different maturational windows, coupled with cognitive, mental health, life-style and behavioral studies, as well as mechanistic analyses in suitable preclinical models, whose major aim is to define effective strategies for active prevention of obesity during the life-course, with particular focus on early developmental events, from prenatal (including peri-conceptional) to pubertal periods, and determinants of feeding behaviors. Multi-omics studies and integral analysis of eprObes data, assisted by bioinformatic technologies and artificial intelligence, will permit definition of tailored preventive measures and life-style interventions, at key maturational periods, to avoid excessive body weight gain and lifetime metabolic complications in both sexes.

Conflict of interest: The author declares that no conflicts of interest.

Key words: Childhood obesity, metabolic disease, puberty, multiomics, artificial intelligence, life-style, behavioral studies.

S4-03

Understanding modifiable risk factors for childhood obesity: Experience from the CORALS project

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Background and aims: Childhood obesity develops from behavioral and environmental determinants emerging in the first years of life, in addition to non-modifiable factors. CORALS (Childhood Obesity Risk Assessment Longitudinal Study) is a Spanish multicenter cohort initiated 5 years ago with a planned 10-year follow-up. Children were enrolled at 3–6 years of age. The general aim of CORALS is to identify modifiable risk factors associated with excess adiposity and cardiometabolic alterations.

To synthesize CORALS evidence on early determinants: diet, eating behaviors, physical activity/sedentary behavior, sleep and screen time and discuss implications for prevention.

Methods: Prospective multicenter cohort of ~1,500 children recruited across seven Spanish cities. Standardized assessments include anthropometry, blood pressure, routine blood tests, and parent-reported questionnaires. Dietary intake is assessed using the COME-Kids Food & Beverage Frequency Questionnaire (F&B-FQ), and adherence to the Mediterranean diet with MED4CHILD, both instruments have been validated within the cohort. Eating rate is measured with specific scales. Physical activity and sedentary behavior are captured by questionnaires and, in ~50% of participants, by accelerometry. Sleep and screen time were assessed by questionnaires.

Results:

Eating rate: Faster eating was associated with greater adiposity, higher blood pressure, and lower adherence to the Mediterranean diet.

Six healthy habits score (Mediterranean diet adherence, exclusive breastfeeding for 6 months, eating slowly, limiting

screen use to ≤ 2 h/day, adequate sleep, and regular physical activity): higher adherence was associated with lower odds of overweight/obesity and a more favorable cardiometabolic profile (waist circumference, fat mass index, systolic blood pressure, and glucose).

Ultra-processed foods (UPF): Higher UPF intake was associated with greater adiposity, substituting UPF with minimally processed foods was linked to improvements in BMI z-score, fat mass, and glucose levels.

Mediterranean diet: Greater adherence was associated with healthier body composition.

Physical activity and sedentary behavior: Questionnaire and accelerometry data showed that approximately two thirds of the cohort met recommendations for moderate-to-vigorous physical activity, sedentary time was higher at weekends.

Screen time and emotional-behavioral health: More screen time was associated with poorer scores on emotional-behavioral questionnaires, sleep attenuated and partially mediated this association. Replacing 30 min/day of screen time with 30 min/day of sleep was associated with improvements in emotional-behavioral outcomes.

Conclusion: Findings highlight concrete priorities for early prevention of childhood obesity: encourage slower eating, replace ultra-processed foods with minimally processed alternatives, reinforce adherence to the Mediterranean dietary pattern, increase physical activity, particularly at weekends, and prioritize sufficient, high-quality sleep. CORALS also provides validated tools (COME-Kids and MED4CHILD) to support screening and follow-up in pediatric populations. Next steps include completing the 10-year longitudinal follow-up and integrating multi-omics approaches.

Conflict of interest: The author declares no conflicts of interest.

Key words: Childhood obesity, modifiable risk factors, eating rate (speed of eating), mediterranean diet, ultra-processed foods, physical activity, sleep, screen time, early childhood, cohort, CORALS.

Symposium 5: Current controversies in infant nutrition

S5-01

Arachidonic acid and DHA supplementation in very premature infants

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Abstract: We used ¹³C natural variation of dietary lipids to study the bioavailability of LCP supplements in infants.

We studied 33 preterm infants. Twelve infants received standard of care (SOC) without LCP supplements and 21 infants received LCP supplements. 10 of the supplemented infants received a Standard dose (StdSup) of supplement consisting of Arachidonic acid (ARA) 120 and Docosahexanoic acid (DHA) 60 mg/kg, 11 received the high dose (HiSup) ARA 160 and DHA 80 mg/kg. Supplementation started as soon as enteral nutrition was tolerated and continued until 36 weeks corrected age (CA). Plasma phospholipids (PL) were measured by gas-chromatography and Isotope-Ratio MassSpectrometry.

The ¹³C content of LCP supplements was different from the baseline infant plasma lipids (-12.7 vs -29.0 for ARA and -11.2 vs -28.0 for DHA).

There were no differences at baseline among the study groups. At 36 weeks CA, mol% PL-ARA HiSup was significantly higher than in the StdSup and both supplemented groups were higher than SOC, mol% of PL-DHA HiSup was higher than in the StdSup and of SOC, StdSup did not reach a statistically significant difference with SOC.

Supplement incorporation into PL at study end was 55.7 ± 12.9 vs 59.1 ± 15.5 ($p=0.127$) and 42.3 ± 11.1 vs $48.3 \pm 15.5\%$ ($p=0.054$) for ARA and DHA in StdSup and HiSup respectively.

LCP supplementation containing both ARA and DHA produced higher plasma PL-DHA and PL-ARA. The ¹³C study showed that at 36 weeks CA from 40 to 60% of PL-LCP derived from the supplement.

Conflict of interest: The author declares no conflicts of interest.

Key words: Carbon 13, natural abundance, fatty acids, ARA, DHA, supplementation, plasma lipids

S5-02

Energy drinks in children and adolescents

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Background: Energy drinks are considered a dietary supplement and often make various health claims, such as improving physical performance or cognitive function. According to a 2013 report by the EFSA, 68% of European adolescents

aged 10–18 consume stimulant drinks. In Spain, according to data published in the recent 2023 Survey on Alcohol and Drugs in Secondary Education (ESTUDES), 37.7% of adolescents aged 12–13 and 47.7% of those aged 14–18 consume these beverages. A law to regulate the consumption of energy drinks by minors in Spain is under development, with Galicia becoming the first region to approve a bill banning sales to minors under 16 in 2026, according to a press release dated July 29, 2025.

Aims: To emphasize the effects of stimulant drinks in adolescence health.

Results: Stimulant drinks are wrongly called energy drinks. Both children and families have little information about the implications of consuming these types of stimulant drinks. Most exceed 32 milligrams of caffeine per 100 g. Some brands add other substances that also contain caffeine, such as guarana, are not considered in the calculation of doses. Several common ingredients found in energy drinks, such as taurine, guarana, and ginseng, lack comprehensive safety data, leading to regulatory scrutiny. Moreover, consuming these highly sweetened beverages encourages a preference for this flavor and shifts our food choices toward a desire to consume more sugar.

Conclusion: Childhood and adolescence are critical periods to get lifestyle habits that can influence long-term health. Health experts and organizations warn of the risks of energy drink consumption, especially during adolescence, due to their high caffeine and sugar content, which can cause health problems such as obesity, disbiosis, anxiety, sleep problems, and arrhythmias. Pediatricians recommend zero consumption of this type of beverage for children under 18 years of age.

Conflict of interest: The author declares no conflicts of interest.

Key words: Health promotion, childhood obesity.

S5-03

Evaluation of current practical guidelines for the diagnosis and treatment of childhood obesity

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Background and aims: Childhood obesity is one of the main threats to public health worldwide, with short- and long-term clinical, social, and economic implications. And the predictions for the future are not encouraging, as some estimates suggest that 254 million children worldwide between the ages of 5 and 19 will be obese. Its distribution is not homogeneous, and prevalence rates vary considerably between countries and regions, influenced by multiple structural, socioeconomic, and cultural determinants.

Despite the enormous impact that obesity has on the health of children and adolescents, no guidelines for the identification, assessment, treatment, and prevention of obesity in children and adolescents have been published for more than 10 years. In the last two years, two new guidelines have been published. On the one hand, the American Academy of Pediatrics (AAP) published the “Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Obesity” in 2023. A few months ago (2025), the Obesity Canada initiative, after publishing the Guidelines for the Management of Obesity in Adults last year, published the Clinical Practice Guideline on Childhood Obesity in Canada.

These developments undoubtedly highlight the impact that both, the severity of the disease and the emergence of new pharmacological treatment strategies have had on the obesity landscape in children and adolescents.

Methods: A review will be conducted of the two most recent guidelines published on the treatment of obesity in children and adolescents, analyzing the key points of each in terms of the methods of identification and diagnosis, the assessment of children and adolescents with obesity, and the therapeutic approaches proposed.

Results: The Canadian guidelines (Canada) and those of the American Academy of Pediatrics (AAP) on the management of obesity in children and adolescents recognize obesity as a complex, chronic, and stigmatized disease. Both promote the use of person-centered language and consideration of the social determinants of health.

We can identify the common and differential aspects of both guidelines in the following areas:

1.- Methodological and emphasis differences:

- Canada: Developed using the rigorous GRADE approach and the active participation of people with lived experience of obesity to prioritize outcomes and estimate minimum important differences, differing from the AAP methodology. Its scope is limited exclusively to the management of obesity.
- AAP: Emphasizes the need for immediate and intensive treatment without “watchful waiting” once obesity has been diagnosed. Covers both overweight and obesity.

2. Assessment of comorbidities and approach:

- Canada: Recommends a comprehensive assessment using the “4Ms for Obesity Assessment” framework (Metabolic, Mechanical, Mental Health, Social Milieu).
- AAP: Recommends annual BMI screening for all children aged 2 to 18 years (Key Action Statements-KAS) (evidence-based). In addition, comprehensive assessment of comorbidities should be performed concurrently with obesity treatment (KAS 2, KAS 4). For children aged 10 years and older with obesity, lipid abnormalities, glucose metabolism, and liver function should be evaluated. For those aged 2 to 9 years with obesity, lipid evaluation may be considered.

3. Behavioral and psychological interventions:

- Both: Consider Intensive Health Behavior and Lifestyle Treatment (IHBLT) (nutrition, physical activity, psychology, technology) as the foundation of treatment.
- Canada: Strongly recommends these interventions for children up to 18 years of age, observing a small beneficial effect on depression, anxiety, and BMI Z-score (BMI-Z).
- AAP: Strongly recommends them for children aged 6 years and older and may consider them for children aged 2 to 5 years. The most effective treatment includes 26 hours or more of face-to-face, family-based, and multicomponent contact over 3 to 12 months. The AAP also emphasizes motivational interviewing to engage patients and families.

4. Pharmacotherapy:

- Both: Suggest considering pharmacotherapy as an adjunct to IHBLT for adolescents.
- Canada (12+ years): Suggests glucagon-like peptide-1 receptor agonists (GLP-1RAs, such as semaglutide) and biguanides (metformin). Discourages the use of lipase inhibitors (orlistat).
- AAP (12+ years): Recommends offering GLP-1RAs (such as liraglutide) and biguanides (metformin), and mentions other agents such as phentermine, topiramate, and phentermine/topiramate combination, but these are not authorized for the treatment of childhood obesity in Europe.

5. Metabolic and bariatric surgery:

- Both: Recommend considering surgery for adolescents with severe obesity.
- Canada (13+ years): Suggests sleeve gastrectomy (SGL) and Roux-en-Y gastric bypass (RYGB), noting their substantial effects on quality of life and BMI, although with risks of adverse events.
- AAP (13+ years with severe obesity): Recommends referral to specialized multidisciplinary pediatric centers for evaluation. Emphasizes that LSG and RYGB are effective and safe.

Both guidelines highlight the need for further research on the long-term effects of treatments, the heterogeneity of effects in different patient subgroups, and the optimal components of interventions.

Conclusion: The Canadian and AAP guidelines represent a significant advance in the understanding and treatment of childhood obesity. By framing obesity as a chronic disease and advocating for early, intensive, multidisciplinary treatment within a “comprehensive care” framework, they provide crucial guidance for healthcare professionals, families, and policymakers. The emphasis on shared decision-making, addressing health inequalities, and promoting self-management skills underscores a compassionate and holistic approach to this complex public health challenge. Continued research is essential to fill existing knowledge gaps and further refine evidence-based strategies for prevention and treatment throughout the lifespan.

Conflict of interest: The author declares no conflicts of interest.

Key words: Childhood obesity, adolescents, prevention, diagnosis, treatment, comorbidity, multicomponent interventions, pharmacotherapy.

S5-04

Cardioprotective effects extra virgin olive oil riche in bioactive compounds in children with hypertension. The MEDKIDS Study

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Abstract: Arterial hypertension is one of the main risk factors in the development of cardiovascular diseases. This condition, characterized by a sustained increase in blood pressure in the arteries, has a high global prevalence. Elevated blood pressure in childhood has been shown to increase the risk of hypertension and metabolic syndrome in adulthood. Therefore, it is essential to control and prevent it from early stages. Although effective pharmacological treatments exist, prevention through lifestyle and dietary changes is a key strategy to reduce its incidence. In this context, the Mediterranean diet, particularly virgin olive oil, has shown numerous beneficial effects on cardiovascular health. The present study evaluates the effects of a six-month nutritional intervention with three types of virgin olive oils in children and adolescents with untreated primary hypertension. These oils have the same fatty acid profile but differ in their concentrations of phenolic compounds and triterpenic acids, which are minor components of olive oil that have demonstrated positive effects on hypertension.

In addition to analyzing the impact on blood pressure, the study examines cardiovascular risk biomarkers, endothelial function biomarkers, metabolic syndrome, inflammation, oxidative stress, and the antioxidant defense system. It also evaluates the fatty acid composition of erythrocyte membranes, dietary intake, and physical activity levels.

The results show a decrease in systolic blood pressure and antioxidant enzyme activity in children who consume the oil enriched with phenolic compounds. On the other hand, a higher presence of cardiovascular risk and inflammation biomarkers (sE-selectin, IFN- γ , and TNF- α) was observed in the control group after the intervention, suggesting a potential protective effect of the minor olive oil compounds on children's cardiovascular health.

However, more studies are needed to ascertain the molecular mechanisms of bioactive compounds present in extra virgin olive oil.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Children, hypertension, extra virgin olive oil, bioactive compounds.

Symposium 6: Advances in the diagnosis and treatment of obesity as a chronic metabolic disease: A perspective from translational research to clinical implementation

S6-01

Morphofunctional diagnosis of chronic adipose metabolic disease

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Background: Chronic Adipose Metabolic Disease (EMCA, by its Spanish acronym) is a condition characterized by an excess of dysfunctional adipose tissue that drives metabolic, inflammatory, and hormonal disturbances. Classical diagnosis based on body mass index (BMI) has important limitations: it does not differentiate lean mass from visceral and subcutaneous fat, nor does it evaluate muscle function. A beyond-BMI approach proposes incorporating morphofunctional assessment (MFA) to more precisely characterize body composition and the functional status of the patient.

Objective: To describe the principles, tools, and clinical relevance of morphofunctional diagnosis in EMCA and its utility for risk stratification, treatment individualization, and monitoring of disease evolution.

Conceptual Foundations

- Limitations of BMI: it neither distinguishes excess fat from increased muscle mass nor localizes adipose depots.
- Concept of MFA: integration of body-composition and functional parameters to obtain a more precise phenotypic profile.
- Precision-medicine perspective: enables personalization of nutritional and therapeutic interventions.

Morphofunctional Diagnostic Tools:

1. Bioelectrical Impedance Analysis (BIA) and Phase Angle (PhA)
 - Indicator of cellular integrity and body cell mass.
 - Associated with cardiometabolic risk and inflammatory status.
 - Complemented by bioelectrical impedance vector analysis (BIVA) to characterize fluid distribution and fat-free mass.
2. Nutritional Ultrasound®
 - Measurement of muscle thickness and cross-sectional area (particularly of the rectus femoris) and distribution of adipose tissue.
 - Assessment of fat infiltration and muscle echogenicity as indicators of tissue quality.
3. Functional Markers
 - Handgrip strength (dynamometry) to estimate functional capacity.

• Physical-performance tests (e.g., walking tests, chair-stand test).

4. Associated Biochemical Markers

• Lipid profile and markers of insulin resistance.

Clinical Applications:

- Metabolic phenotyping: distinguishes patients with elevated BMI but preserves muscle mass from those with sarcopenic obesity.
- Prognosis: MFA enables stratification of cardiovascular risk, frailty risk, and metabolic complications.
- Therapeutic monitoring: tracks changes in muscle mass and adipose-tissue quality after dietary, pharmacological, or surgical interventions.
- Early intervention: detects functional decline before significant anthropometric changes occur.

Conclusion: Morphofunctional diagnosis in EMCA represents a step forward beyond a BMI-only approach, offering an integrated view of body composition and function. Its implementation may optimize prognosis and personalize therapy in line with precision medicine. Future research should focus on validating specific criteria, standardizing methods, and developing predictive models.

Conflict of interest: The author declares no conflicts of interest.

Key words: Chronic adipose metabolic disease, morphofunctional assessment, body composition, phase angle, bioelectrical impedance, nutritional ultrasound®, dynamometry, sarcopenia, sarcopenic obesity, precision medicine.

S6-02

Molecular diagnosis of chronic adipose metabolic disease: The potential role of extracellular vesicles

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Background and aims: In investigating molecular mechanisms of obesity, extracellular vesicles (EVs) secreted by metabolic organs participate in interactions that exacerbate this pathological condition. Having established the autocrine function of EVs secreted by pathological adipocytes (*obesosomes*), our objective is to investigate interactions between metabolic organs (white, brown adipose tissue, and liver) via their respective EVs: *obesosomes*, *heatosomes*, and *steatosomes*.

Methods: EVs were isolated by ultracentrifugation from pathological cell cultures (obese adipocytes and hepatocytes with steatosis), and from whole adipose tissue (subcutaneous

and visceral) obtained from individuals with obesity during bariatric surgery for functional interaction assays. The protein content of EVs from healthy and steatotic hepatocytes was analyzed using SWATH-MS proteomics. Brown adipocytes were activated with cAMP to obtain *heatosomes*. Subsequently, insulin sensitivity and gene expression in lipid and glucose metabolism were analyzed by immunodetection and real-time PCR.

Results: EVs from steatotic hepatocytes induced insulin resistance (IR) in healthy hepatocytes. Analysis of these vesicles revealed biomarkers for fibrosis, steatohepatitis, metabolic dysfunction-associated steatotic liver disease (MASLD), and hepatocellular carcinoma. EVs secreted by adipose tissue from individuals with obesity induced IR and alterations in glucose and lipid metabolism in healthy hepatocytes. This pathological effect depended on the donor patient's clinical status, with vesicles from visceral tissue being most harmful. Functional assays with EVs secreted by brown adipocytes activated with cAMP demonstrate beneficial effects when interacting with obese adipocytes

Conclusion:

EVs facilitate intra- and inter-organ communication between tissues involved in obesity by exerting effects that exacerbate the disease. Conversely, *heatosomes* secreted by activated brown adipose tissue may play a beneficial role against obesity and its comorbidities.

Conflict of interest: The author declares no conflicts of interest.

Key words: Obesity, metabolic tissues, cell-tissue communication, extracellular vesicles, insulin resistance, MASLD, brown adipose tissue.

S6-03

The gut-brain axis: Keys to new pharmacological therapies for obesity

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Abstract: Obesity has emerged as a significant public health challenge, necessitating a comprehensive understanding of the mechanisms governing intake, satiety, and metabolism to develop effective therapeutic interventions. The gut-brain axis, mediated through hormonal, neural, and microbiota signals, presents novel therapeutic opportunities in this domain. Recent years have witnessed a substantial increase in research aimed at elucidating the relationship between

the gut-brain axis and obesity, focusing on the mechanisms of gut-brain communication, the role of enteric hormones, and the effects of pharmacological agents such as GLP-1 agonists, GIP, and novel dual agonists. These investigations encompass both animal models and human clinical trials. The findings suggest that gut-brain communication not only regulates appetite and satiety but also influences energy metabolism and pharmacological treatment responses. Furthermore, innovative molecules and techniques, such as direct microbiota manipulation and intranasal treatments, are demonstrating promising outcomes. These emerging strategies pave the way for more personalized and effective approaches in obesity treatment. In conclusion, recent advancements underscore the gut-brain axis as one of the most promising avenues for the development of novel drugs and therapies for obesity.

Conflict of interest: The author declares no conflicts of interest.

Key words: Obesity, gastrointestinal hormones, gut-brain axis.

S6-04

New guidelines in nutritional therapy for obesity

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Background and aims: Obesity is recognized as an epidemic with high prevalence, characterized as a complex, chronic, recurrent, and incurable condition.

This position paper aims to update the Consensus on evidence-based nutritional recommendations for the prevention and treatment of overweight and obesity in adults. It serves as a useful tool for healthcare professionals in addressing the dietary management of these conditions.

Methods: The team of experts established a strategy and methodological aspects for this consensus. Key points included defining the manuscript's focus, identifying high-impact recommendations, setting general topics, formulating specific questions, and choosing a common methodology for elaboration.

Results: The document discusses various dietary approaches for obesity treatment, including the Mediterranean diet, Atlantic diet, vegetarian diet, DASH diet, modified-nutrient diets (low-carb), very low-calorie diets (VLCD), ketogenic diets, and high-protein diets. It highlights that while initial benefits may be observed based on macronutrient distribution, these differences often disappear in the long term, making adherence the fundamental determinant of

long-term weight loss. Rapid weight loss is associated with better long-term maintenance.

Conclusion: Weight loss should be achieved through a balanced hypocaloric diet combined with physical exercise and lifestyle changes, ensuring long-term success under medical supervision. A varied, healthy, and balanced diet within the Mediterranean context, along with intense physical activity, is crucial. The effectiveness of new foods and supplements must be scientifically proven. Ultimately, the best strategy for weight loss and maintenance is individualized, considering patient preferences, clinical characteristics, and lifestyle.

Conflict of interest: The author declares no conflicts of interest.

Key words: Dietary guidelines, obesity.

Symposium 7: Precision nutrition in the digital age: Innovative intervention trials

S7-01

Fasting vs. calorie restriction for healthy aging: ENSATI study

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Background and aims: Healthy aging is a multifactorial process influenced by genetic, environmental and behavioral determinants. Biological age, beyond chronological age, determines the dynamics and status of the aging process and is assessed by molecular markers that reflect the functional state of the organism. In this context, nutritional strategies such as fasting and caloric restriction have emerged as promising interventions to modulate these markers and promote healthy aging. This paper aims to compare the effects of fasting and caloric restriction on body composition and muscle mass preservation, as well as to present the design and current status of the ENSATI study, an innovative clinical trial in the field of precision nutrition.

Methods: An exploratory review of the scientific literature on the different types of fasting -intermittent fasting, alternate-day fasting and prolonged periodic fasting- and their impact on anthropometric and muscular parameters is presented. We also describe the ENSATI study, a randomized clinical trial evaluating the effect of an intervention based on intermittent fasting versus continuous caloric restriction in middle-aged adults. Inclusion criteria, intervention protocol,

primary objectives (biological age estimated by epigenetic and biochemical markers) and secondary objectives (body composition, adherence, quality of life), as well as the current status of recruitment and follow-up are detailed.

Results: The exploratory review reveals that different types of fasting can induce improvements in body composition, especially in fat mass reduction, with variable effects on muscle mass depending on the type of fasting and the clinical context. As for the ENSATI study, the recruitment process has been completed and is in the active follow-up phase. Preliminary data show good adherence to the intervention and a positive response in terms of acceptance by the participants.

Conclusion: Fasting, in its different modalities, represents a viable and potentially effective nutritional strategy to promote healthy aging. The ENSATI study will contribute to clarify its comparative impact versus continuous calorie restriction, providing evidence in the framework of precision nutrition. The integration of molecular biomarkers and digital tools in the trial design reinforces its innovative character and clinical applicability.

Conflict of interest: The author declares no conflicts of interest.

Key words: Intermittent fasting, caloric restriction, healthy aging, biological age, body composition, precision nutrition, clinical trial, ENSATI.

S7-02

Network-based characterization of gut microbiome structure and function in response to a gluten-free diet in celiac disease

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Background: Non-responsive celiac disease (NRCD) affects a significant proportion of patients, between 10% and 30%, who continue to experience symptoms despite adhering to a strict gluten-free diet (GFD). This variability in response is a major clinical and therapeutic challenge, as no interventions currently target the mechanisms involved in this inadequate response to GFD. In recent years, several studies have shown that the gut microbiome differs among subgroups of celiac patients according to their clinical manifestations and symptoms, suggesting an active role of the microbiome in the persistence of symptoms after GFD.

It is well documented that CD patients present intestinal dysbiosis, characterized by a decrease in beneficial species

such as those of the *Bifidobacterium* genus and an overabundance of proinflammatory groups, a profile that may even precede diagnosis and persist after gluten withdrawal. Since diet is one of the main modulators of the human microbiome composition, it is reasonable to assume that GFD not only directly affects the host but also influences bacterial metabolic activity. Therefore, it is essential to delve deeper into the interaction between host genetics, GFD, and gut microbiota, especially considering that specific dietary patterns lead to the production of metabolites—both microbial and human, with potential impact on intestinal function.

In this context, we explored the structure and function of intestinal microbial communities in NRCD patients using systems biology approaches, focusing on microbial co-occurrence networks as a tool to visualize and interpret functional relationships among microorganisms. This analysis was complemented by an exhaustive profiling of the intestinal metabolome, with the aim of identifying alterations associated with symptom persistence and contributing to a holistic understanding of the NRCD phenomenon. The findings show that clinical heterogeneity in NRCD is linked to dysbiotic functional interactions and specific metabolic profiles, highlighting the need for personalized intervention tools. Based on this framework, the CD3DTech-CM project was designed to translate this knowledge into a technological platform capable of identifying, modeling, and validating precision nutrition strategies in these patients.

Methodology: The initial study included 39 adult patients with NRCD, all with confirmed adherence to a GFD for at least 12 months. Participants were clinically evaluated and categorized according to the severity of their persistent gastrointestinal symptoms using validated scales. Fecal samples were collected for metagenomic and metabolomic analyses. Based on microbial profiles, co-occurrence networks were constructed, allowing assessment of the ecological architecture of intestinal communities in terms of connectivity, modularity, resilience, and identification of functional patterns associated with symptom severity. Integrated analysis of omics and immunological data enabled the establishment of correlations between microbial structure, intestinal metabolism, and persistent inflammation.

Results: A multiple factor analysis of 99 clinical, demographic, inflammatory, and mucosal integrity variables identified two distinct patient clusters. Cluster 1, labeled “low-symptom,” exhibited lower levels of symptoms and inflammatory markers. Cluster 2, labeled “high-symptom,” showed elevated scores on self-reported symptom questionnaires, increased inflammatory markers, and greater intestinal permeability.

Dietary intake assessment of micro- and macronutrients between the two groups showed adequate intake percentages

(above 80%) for most vitamins. However, vitamin D intake was low (74% and 39% adequacy compared to dietary reference values (DRV) for each cluster; $P < 0.05$). Adequacy percentages for zinc, iron, and calcium were around 60% of DRV, with no significant differences between groups. Diet quality in both NRCD groups was moderate, as indicated by a Healthy Eating Index (HEI) near 50% (Cluster 1: 55% vs. Cluster 2: 53%; $P = \text{ns}$). Regarding macronutrient intake, both groups had similar levels of fat, carbohydrates, and simple sugars. However, protein contribution to total energy intake was lower in Cluster 2 patients.

Next, we comprehensively explored microbial community structure using sparse inverse covariance estimation and model selection techniques to construct co-occurrence networks. Topological properties of microbial networks revealed distinct ecological dynamics. Treated, asymptomatic celiac patients exhibited more complex, cohesive, and resilient communities, with a higher number of connections, a high proportion of cooperative interactions (95.4%), and a dense network of keystone taxa (11 key species). In contrast, networks of NRCD patients, whether mild or severe, were more fragmented, less stable, and showed fewer keystone taxa crucial for maintaining community structure. These structural differences were also reflected in functional profiles. Metabolomic analysis identified 36 differential metabolites between NRCD groups, many related to key amino acid metabolism and oxidative stress pathways, such as glutamate, mannitol, and indolylactic acid. Two microbial species, *Anaerostipes hadrus* and *Lawsonibacter asaccharolyticus*, were specifically associated with relevant metabolic pathways (glutamate, lysine, arginine, and glutathione), with correlations differing by symptom group.

Clear associations were established between fecal metabolite levels and gastrointestinal symptom severity. Compounds such as glutamate, glycerate, mannitol, and indolylactic acid correlated with diarrhea, nausea, and digestive discomfort, predominating in patients with more severe NRCD.

These results provide evidence that functional analysis of the microbiome, not only its composition, is essential for understanding clinical heterogeneity in NRCD. Furthermore, they lay the foundation for developing more personalized diagnostic and therapeutic tools focused on microbial ecosystems.

Based on this conceptual framework, we have launched the CD3DTech-CM project (*High-throughput screening platform for precision nutrition in Non-Responsive Celiac Disease through 3D organ models and systems biology*), funded by the Comunidad de Madrid (TEC-2024/BIO-167). This project aims to build a technological platform for personalized nutraceutical screening in NRCD patients, combining

omics analyses, computational models, and advanced cell culture systems.

CD3DTech-CM is structured around four specific objectives:

1. Multimodal characterization of NRCD patients, integrating clinical phenotypes, omics data (microbiome, metabolome, transcriptome), and nutritional profiles.

2. Multiscale and in silico modeling using artificial intelligence and systems biology to predict response to personalized nutraceuticals, based on diet–microbiome–immune system interactions.

3. Development of intestinal organoids and gut-on-chip systems, representative of NRCD patients, to functionally validate nutraceutical effects on the intestinal barrier and microbial ecosystem.

4. Integration and validation of a high-throughput screening platform, capable of prioritizing combinations of functional ingredients with therapeutic potential in NRCD. This project combines basic and applied science to advance toward precision nutrition in celiac disease, with potential applications to other intestinal pathologies with immunological and microbiological components.

Conclusions: Study results provide evidence that persistent symptoms in NRCD patients are associated not only with microbial compositional alterations but, more importantly, with disruptions in the functional and ecological structure of the gut microbiome. Through an integrative approach combining clinical, nutritional, microbial, immunological, and metabolomic data, two clusters of patients were identified with clearly differentiated profiles in terms of symptoms, inflammation, intestinal permeability, and microbial network organization.

Co-occurrence network analyses demonstrated that asymptomatic patients' intestinal ecosystems were more complex, resilient, and functional, while symptomatic patients showed fragmentation, loss of keystone species, and increased instability. These differences were reflected in fecal metabolic profiles, with metabolites such as glutamate, mannitol, and indolylactic acid associated with greater clinical severity. The identification of differential metabolic pathways and taxa provides new opportunities for developing targeted diagnostic and therapeutic tools.

As a result of this conceptual framework, the CD3DTech-CM project (*High-throughput screening platform for precision nutrition in Non-Responsive Celiac Disease through 3D organ models and systems biology*), funded by the Comunidad de Madrid (TEC-2024/BIO-167), has been launched to develop a personalized nutraceutical screening platform integrating computational models, omics analyses, and 3D cell cultures. This approach will allow progress toward precision nutrition in NRCD, with potential application to other inflammatory intestinal diseases.

Conflict of interest: The author declares no conflicts of interest.

Key words: Microbiome, celiac disease, gluten-free diet, co-occurrence networks, metabolomics, precision nutrition, organoids, gut-on-chip, systems biology.

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More information on the project at the official CD3DTech-CM website: www.cd3d.tech

S7-03

Precision nutrition in the clinical setting: Mentoring project

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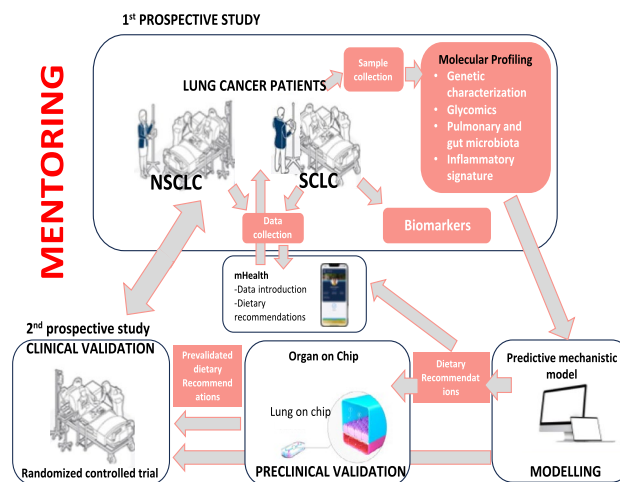
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Background and aims: Malnutrition is a major burden of disease in large part of the population and, in particular, in vulnerable population groups and people with specific medical conditions. Lung cancer patients represent a highly vulnerable population facing reduced quality of life (QoL), comorbidities, and a lack of specialized dietary recommendations, with existing personalized nutrition initiatives being limited in scope. The MENTORING project seeks to confront these challenges by developing a comprehensive precision nutrition model to improve the well-being, treatment outcomes, and, potentially, the survival rates of lung cancer patients.

MENTORING (acronym for Unveiling malnutrition and metabolic changes in lung cancer patients: setting the basis for precision nutrition models) comprises a consortium of six distinguished research centers known for their excellence namely: i) IMDEA Nutrition, Spain, ii) The German Cancer Research Centre (Germany), iii) University of Parma (Italy), iv) Max Planck Institute for Dynamics of Complex Technical Systems of the Max Planck Society (Germany), v) Instituto de Investigação e Inovação em Saúde (Portugal), and vi) Hospital Infanta Sofia (SERMAS, Regional Health Services, Madrid, Spain).

The ultimate goal of MENTORING is to enhance patients' nutritional, metabolic, and immunological status, improve their overall QoL, increase treatment efficacy, and potentially enhance their survival rates. The project will span 48 months from 2024 until late 2028.

Methodology and Perspectives: MENTORING will address the lack of diet recommendations to lung cancer patients by utilizing a precision nutrition holistic approach, encompassing genetic profiling, anthropometry, biochemistry, omics analysis (such as glycomics, proteomics, gut- and lung metagenome characterization, and metabolomics), modelling nutritional deficiencies and systemic meta-inflammation to provide personalized diet recommendations to patients suffering from two major types of lung cancer, Small Cell Lung Cancer (SCLC) and Non-Small Cell Lung Cancer (NSCLC), for the improvement of their metabolic health and, ultimately, their QoL. The scheme of the proposed outcomes is pictured in the graphical abstract:



The four main challenges can be summarized in the following points:

- To perform a prospective study, including patient recruitment of two different cohorts, summing up to more than 150 patients,
- Massive sample and data collection, followed by a series of omics assays and the selection of biomarkers for evaluating the effect of nutritional status on lung cancer patients.
- To develop an integrative computational model based on the patient's data, including nutritional status, anthropometry, biochemistry, complete hemogram, inflammatory profile, genetics, lifestyle, omics analysis (mainly glycome, metabolomics, proteomics, and pulmonary) and gut microbiome). This model will provide lung cancer patients with fully personalized nutritional and lifestyle recommendations, assisted by remote monitoring by healthcare professionals via a user-friendly digital platform.

• Validation through an intervention clinical study: This will be achieved through randomized testing and comparing the results of the precision nutrition-based dietary recommendations with general dietary advice.

The outcomes of the MENTORING project will manifest as a pioneering approach to personalized nutrition for lung cancer patients. Through meticulous research, we will formulate precision nutrition-based recommendations to empower individuals in their fight against lung cancer.

To pursue their objectives, Mentoring is integrated within a network of eight related projects conforming the Precision Nutrition of the Pathfinder Challenge program of European Union.

The project is still in their starting phases, with the first twenty patients been recruited at the time of writing, the full potential of the initiative being expected for the two-three next years.

Conflict of interest: The author declares no conflicts of interest.

Key words: Precision nutrition, lung cancer, computational modelling, omics analysis, clinical studies.

S7-04

Integration of nutritional omics and artificial intelligence for precision nutrition

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Background and aims: Precision nutrition aims to provide individualized dietary recommendations by integrating genomic, metabolomic, and microbiome data with phenotype, exposome, lifestyle and clinical variables and markers. Artificial intelligence (AI) offers novel tools to examine and combine complex, multidimensional datasets, improving prediction models, designing clustering classifications and devising translational strategies. This presentation seeks the integration of Omics and AI as a multi-pathway towards providing precision health care and personalized nutritional interventions

Methods: A synthesis and description of current evidence on nutritional omics (genomics, transcriptomics, metabolomics, and microbiomics) combined with AI-based approaches, including machine learning models will be reported. Special attention will be given to predictive algorithms devoted to computational nutritionally oriented

dietary recommendations, obesity trait classification and metabolic machine learning based prescriptions. Additional resources covering multi-omics approaches and AI applications in personalized nutrition will be also shown to encompass the methodological advances, novel biomarkers featuring and therapeutic target disentangling.

Results: Emerging evidence suggests that integrating omics with AI as well as the identification of molecular biomarkers of dietary response is permitting early diagnoses and predictive prognoses besides the stratification of populations, and the optimization of dietary advice. AI-driven models overcome traditional statistical methods in predicting metabolic outcomes when maintained with high-dimensional omics data. For instance, integration of genomic and microbiome profiles with phenotype and exposome data supported in machine learning algorithms has improved prediction and categorization capacities of metabolic responses to specific foods and diets. The translational potential of these approaches in designing sustainable, individualized, population and global strategies for precision nutritional management and metabolic health offer outstanding wellbeing benefits. Such practices can improve risk stratification, optimize nutritional treatments, and guide tailored dietary recommendations towards healthier metabolic outcomes.

Conclusion: The convergence of nutritional omics with AI is accelerating the development of precision nutrition. Challenges remain in data harmonization, ethical use, and clinical translation, but the integration of these disciplines holds promise for the translational implementation of preventive and therapeutic precision nutrition within dynamic participative, preventive, prescriptive and personalized pipelines.

Conflict of interest: The authors declares no conflicts of interest.

Key words: Precision nutrition, integrative nutriomics, artificial intelligence, machine learning.

S7-05

Machine learning for glyco-type characterization in non-diabetic individuals

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Background and aims: Postprandial glycemic response varies significantly among individuals, limiting the effectiveness of generalized nutritional recommendations. Continuous glucose monitoring (CGM) enables real-time

capture of this variability, opening the possibility of developing personalized predictive models through artificial intelligence techniques. The main objective of this study is to analyze glycemic response at an individual level, classify it into clinically relevant patterns ("glucotypes"), and predict the response to nutritional interventions in order to improve medical-nutritional counselling.

Methods: CGM records from 154 patients belonging to the ENSATI cohort were used. A computational tool was developed to extract multiple variables related to trend, dispersion, and morphology of glycemic peaks. Through time series analysis and clustering algorithms, individual glycemic profiles were classified. To compensate for limited data availability, synthetic data were generated with a cosine similarity greater than 0.75 compared to real profiles, ensuring robustness in model validation.

Results: The tool allowed the identification of differentiated glycemic patterns across individuals, providing detailed information on the response to food intake throughout the day, and associate them with relevant clinical characteristics. This classification enables patient stratification into groups with potential clinical utility for the personalization of nutritional interventions.

Conclusion: The proposed model represents an advance in the personalized analysis of CGM, with the ability to extract clinically valuable variables, predict glycemic response patterns, and associate them with specific clinical profiles. This tool could be useful not only for patients with undiagnosed diabetes, but also for those with prediabetes, impaired fasting glucose, or individuals with metabolic risk factors, facilitating the individualization of lifestyle habits and nutritional recommendations.

Conflict of interest: The author declares no conflicts of interest.

Key words: Continuous glucose monitoring (CGM), glucotype, artificial intelligence, clustering, machine learning, personalized nutrition, glycemic prediction, synthetic data.

S7-06

Challenges and solutions of nutritional interventions

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Background and aims: The development of nutritional intervention studies is crucial for establishing causal relationships between diet and health. However, their design and execution face multiple challenges that can compromise

the validity and reproducibility of the findings. This work explores the main methodological challenges and proposes innovative solutions to improve the quality and reliability of research in the field of nutrition.

Challenges: Among the methodological challenges, biases in data collection (subjective and partial data, inaccurate assessment of dietary intake, environmental factors that interfere with measurements, etc.) are the most notable.

Solutions: The integration of new biomarkers, continuous monitoring, -omic technologies, and big data analysis, together with the application of artificial intelligence tools, are essential strategies for the future of nutritional intervention studies.

Conclusions: Overcoming the challenges in nutritional research requires a multidisciplinary approach that combines rigorous study methodology with advanced technologies. This will not only improve the quality of studies but also accelerate the transition of nutrition to a more precise science applicable to public health.

Conflict of interest: The author declares no conflicts of interest.

Key words: Precision nutrition, nutritional intervention studies, continuous monitoring, -omics, big data.

Symposium 8: New challenges (or approaches) in the nutritional treatment of pediatric patients

S8-01

Challenges in pediatric patient nutrition: Mediterranean diet and EVOO

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Abstract: The Mediterranean diet has gained increasing recognition in pediatrics as an evidence-based nutritional model that promotes both immediate and long-term health outcomes in children and adolescents. Characterized by a high intake of fruits, vegetables, whole grains, legumes, nuts, and especially olive oil, moderate consumption of fish and dairy products, and limited intake of red meat and processed foods, this dietary pattern provides a balanced and nutrient-rich approach to pediatric nutrition^{1,2}.

Extra virgin olive oil (EVOO), the hallmark of the Mediterranean diet, is rich in monounsaturated fatty acids and bioactive compounds such as polyphenols and tocopherols. These confer anti-inflammatory and antioxidant properties, contributing to improved lipid metabolism, reduced

oxidative stress, and enhanced insulin sensitivity in children^{3,4}. Its incorporation into pediatric diets has been shown to support growth, immune function, and cardiovascular protection.

However, in high-income countries, the traditional Mediterranean dietary pattern has been progressively replaced by eating habits characterized by a high intake of ultra-processed foods, refined sugars, and saturated fats, combined with increasingly sedentary lifestyles. This shift has been strongly correlated with the rising incidence of childhood obesity, metabolic syndrome, and other non-communicable diseases (NCDs) such as type 2 diabetes and hypertension^{1,2}. The abandonment of the Mediterranean diet, driven by globalization, urbanization, and aggressive marketing of ultra-processed products, has eroded its protective role against these conditions. Pediatric populations are particularly vulnerable, as dietary behaviors established in early life tend to persist into adulthood, perpetuating the burden of NCDs^{2,3}.

From a clinical perspective, pediatricians should not only promote adherence to the Mediterranean diet, with EVOO as the preferred lipid source, but also emphasize the importance of reducing ultra-processed food consumption and encouraging physical activity. Integrating nutritional counseling into routine pediatric care is critical to counteract obesogenic environments and restore the Mediterranean lifestyle as a culturally adaptable and sustainable model. In summary, preserving the Mediterranean diet in pediatric populations is essential to mitigate the global epidemic of childhood obesity and related NCDs^{4,5}.

Conflict of interest: The author declares no conflicts of interest.

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S8-02

Challenges in approach malnutrition in patients with oropharyngeal dysphagia

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Abstract: One of the most complex challenges in pediatric care is the management of malnutrition in children with oropharyngeal dysphagia. This issue significantly impacts quality of life and childhood development, requiring a multidisciplinary and precise approach due to the difficulty in early identification and treatment. Also is significant the important nutritional risk that dysphagia entails at a crucial stage for growth and development. The challenge lies in the fact that symptoms can be subtle and masked by other conditions, which delays appropriate intervention.

One of the main challenges is diagnostic assessment, which must be thorough and tailored to the pediatric patient's particularities. Consultation evaluation by specialists, including observation of intake, screening tests, etc., is essential, along with functional tests such as videofluoroscopy, fees and ultrasound are helpful, although their accessibility may be limited. Additionally, the variability in clinical presentation demands personalized profiles and frequent reviews of the child's development, feeding, and growth status. Early detection is crucial to prevent the progression of malnutrition, which can have irreversible consequences on growth, cognitive functions, and motor development.

Treatment, on the other hand, should involve dysphagia rehabilitation therapies, food texture modifications, and in some cases, nutritional interventions such as supplementation or alternative feeding methods. However, one of the greatest obstacles lies in achieving an efficient multidisciplinary consensus, including pediatricians, speech therapists, nutritionists, and therapists, to ensure a comprehensive and effective approach.

Finally, emphasize the importance of continuous training for healthcare professionals and caregivers, as well as promoting policies for early detection and specialized care. Only through these measures can the prevalence of malnutrition be reduced and the quality of life for these children improved, fostering healthy development within the context of a complex condition like oropharyngeal dysphagia.

Conflict of interest: The author declares no conflicts of interest.

Symposium 9: Nutrition and women's health: Challenges and opportunities based on evidence

S9-01

Nutritional recommendations for women: scientific evidence throughout the life cycleAna María López-Sobaler¹

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Nutrition is a fundamental pillar of women's health, which is characterized by physiological stages with specific needs. From adolescence to old age, women have specific nutritional needs, with critical periods that necessitate consideration to ensure optimal health, prevent chronic diseases, and enhance quality of life.

The food choices of women are the result of a complex interaction with the 'food environment. This environment includes eating habits acquired since childhood, food accessibility and availability, socioeconomic and educational factors, prevailing food trends, and social pressure related to body image.

Nutrient monitoring during the female life cycle is crucial to ensure optimal health and prevent deficiencies. Calcium is essential for maintaining bone mass and preventing osteoporosis. Iron is crucial during childbearing years to support the body's increased demand for oxygen. Folate is vital during the preconception and pregnancy period to prevent neural tube defects in offspring. Vitamin B₁₂ and D deficiencies are increasingly prevalent, and their intake should be prioritized. Choline is indispensable during pregnancy and breastfeeding to support maternal and infant health. Protein intake is crucial during growth, pregnancy, and ageing to maintain bodily functions.

While general dietary guidelines may offer nutritional guidance for the general population, they may not be suitable for all women depending on where they are in their life cycle. Guidelines aimed at women should emphasize the adoption of a healthy diet, with a particular focus on foods exhibiting high nutritional density, enabling them to meet the specific nutritional demands inherent to each stage of a woman's life, whilst ensuring the maintenance of optimal body weight.

Personalization according to age, physiological status and context is key to optimal health throughout the life cycle. It is imperative to raise awareness among women about critical nutrients, thereby enabling them to identify foods rich in these nutrients and encouraging their inclusion in the diet in adequate amounts according to individual needs.

Conflict of interest: The author declares no conflicts of interest.

S13-02

Nutrition in pregnancy and fetal programming: impact on postnatal developmentVictoria Arijal Val¹

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Abstract: There is growing evidence from both preclinical and clinical studies demonstrating that nutrition during the fetal period and early neonatal stage has a decisive impact on neurological development across the lifespan. The role of maternal nutritional factors in fetal development has been extensively documented and is supported by the fetal programming hypothesis, which posits that alterations in intra-uterine nutrient supply induce developmental changes that may have long-lasting effects on health and predisposition to disease in adulthood.

Environmental factors during the periconceptional and prenatal stages are critical for the formation and maturation of the central nervous system. Although neurodevelopment remains sensitive to external influences during the postnatal period, the fetal stage represents a critical window of vulnerability, characterized by rapid brain growth, profound structural changes, and increased metabolic and nutritional demands. In this context, exposure to external stimuli—whether beneficial or adverse—exerts a more significant impact than at other stages of the life course. The neurobehavioral effects of such exposures depend on the timing, dosage, and duration of nutrient provision or deprivation.

In recent decades, research has highlighted the influence of multiple maternal environmental factors on neurodevelopment, from birth through adolescence. While all nutrients are required for brain function, certain macronutrients and micronutrients are particularly critical during early developmental stages, including proteins, polyunsaturated fatty acids, iron, folates, zinc, iodine, vitamin B₁₂, and vitamin D. The importance of maternal exposure timing is explained by the heterogeneous nature of regional brain development and the unequal distribution of nutritional deficiencies across populations.

Within this framework, current studies aim to determine the optimal nutrient requirements during pregnancy and to establish maternal care strategies that ensure adequate nutritional status and overall health. Such interventions are essential to promote healthy neurodevelopment and to mitigate the risk of neurological alterations and chronic diseases later in life.

Conflict of interest: The author declares no conflicts of interest.

Nutritional status and cardiometabolic risk in menopause: evidence and dietary approach

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Me but rather on its quality and composition cardiovascular health. The decline in circulating estrogens during this transition induces profound metabolic and vascular alterations that substantially increase the risk of cardiovascular disease, the leading cause of morbidity and mortality in this population. Key mechanisms include the preferential accumulation of abdominal adiposity, elevation of blood pressure, deterioration of the lipid profile (characterized by increased total cholesterol and low-density lipoproteins and decreased high-density lipoproteins), insulin resistance, and the establishment of a chronic low-grade inflammatory state. Collectively, these factors contribute to the higher prevalence of metabolic syndrome and, consequently, to a marked rise in atherosclerotic risk after menopause.

Within this context, dietary intervention emerges as a cornerstone for prevention and management. Robust evidence supports the benefits of both the Mediterranean and the DASH dietary patterns, which have been shown to improve blood pressure, serum lipids, endothelial function, and markers of oxidative stress. The Mediterranean diet, rich in fruits, vegetables, legumes, olive oil, fatty fish, and nuts, has been consistently associated with a lower incidence of cardiovascular events and reduced visceral adiposity. Similarly, the DASH diet, emphasizing the intake of vegetables, whole grains, and low-fat dairy products along with sodium restriction, has demonstrated efficacy in lowering blood pressure and reducing overall cardiovascular risk.

Complementary recommendations include limiting simple sugars, saturated fats, and sodium, while ensuring adequate intake of omega-3 fatty acids, dietary fiber, and antioxidants, as well as maintaining a healthy body weight. Adequate protein intake is also essential to preserve lean mass and basal metabolic rate, thereby contributing indirectly to cardiometabolic health.

Finally, growing attention has been directed toward personalized nutrition. Genetic background, gut microbiota composition,

physical activity levels, and sleep quality are among the factors that modulate dietary responses. Incorporating these determinants into clinical practice may enable the development of tailored and more effective nutritional strategies to mitigate cardiovascular disease burden in postmenopausal women.

Conflict of interest: The author declares that they have no conflicts of interest.

Symposium 10: Nutrition and development and prevention of childhood obesity

S10-01

Importance of breakfast during childhood

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Background and aims: Breakfast has traditionally been considered one of the most important meals of the day, especially in childhood. Several studies have shown that eating breakfast is associated with a better dietary profile, cognitive performance, and weight control. However, recent evidence suggests that it is not only important whether or not to consume breakfast, but also the different breakfast patterns that exist and the quality of it. The aim of this research is to review the current evidence on breakfast in childhood and to present new research perspectives based on the identification of dietary patterns and breakfast quality.

Methods: A narrative review of recent scientific literature on children and adolescents has been conducted, including cross-sectional and longitudinal studies. Preliminary results on the identification of breakfast patterns using principal component analysis (PCA) are also presented.

Results: The prevalence of daily breakfast consumption is high during childhood, although it decreases significantly during adolescence. Evidence confirms that children who consume breakfast tend to have a healthier overall diet and a better macro- and micronutrient profile than those who skip it. However, it has also been observed that certain breakfast patterns may be associated with poorer health outcomes, in contrast to healthier patterns.

Conclusion: The current discussion should not focus solely on the frequency of breakfast, or whether or not to consume breakfast, but rather on its quality and composition.

Identifying breakfast patterns and evaluating them with tools such as the breakfast quality index will allow for a better understanding of its role in children's health and to design more effective interventions for obesity prevention and the promotion of healthy habits from childhood.

Conflict of interest: The author declares no conflicts of interest.

Key words: Breakfast consumption, children, breakfast patterns, breakfast quality.

S10-02

Eating behavior in children: determining factors and consequences

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Background and aims: Eating behavior in children is shaped from birth and influenced by a combination of biological, environmental, and social factors. Early feeding practices, such as breastfeeding and the method of introducing complementary foods, play a crucial role in the development of these behaviors. These practices impact appetite

regulation and food preferences, contributing to dietary intake patterns that can influence the risk of obesity.

To examine the determinants of eating behaviour in children and the subsequent impact on food consumption and obesity.

Methods: This review is based on data from the Childhood Obesity Risk Assessment Longitudinal Study (CORALS), which involved children aged 3-6 years from seven Spanish cities. The study used the Children Eating Behavior Questionnaire (CEBQ) to assess eating behaviors and the COME-Kids Food and Beverage Frequency Questionnaire to evaluate dietary intake. Additional literature on the psychosocial, environmental, and biological determinants of eating behavior was also reviewed.

Results: Parenting styles and socio-economic status significantly influenced eating behaviors, with authoritative parenting and higher maternal education linked to healthier habits. Children with longer breastfeeding duration exhibited higher enjoyment of food and lower food fussiness. Methods like Baby-Led Weaning (BLW) correlated with greater food enjoyment and lower fussiness. In addition, higher scores on enjoyment of food were associated with increased intake of healthy foods, whereas high food responsiveness and emotional overeating were linked to higher obesity risk.

Conclusion: Understanding the determinants of eating behavior in children is crucial for developing effective interventions to promote healthy eating habits and prevent obesity. Early feeding practices, parenting styles, and socio-economic factors play significant roles in shaping these behaviors. Future research should continue to explore these relationships longitudinally to better inform public health strategies.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Eating behavior, children, obesity.

S10-03

Impact of diet-related factors on the genetic risk of obesity in children

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Background: Childhood obesity is a major public health concern worldwide, which is partly determined by genetic predisposition, yet environmental influences, particularly eating-related traits, also play a significant role. Compared with adults, children may be less exposed to obesogenic environments, highlighting the need to better understand how genetic and dietary factors interplay in early life stages.

Objective: This scoping review aimed to synthesize all the available literature on childhood obesity, genetics, and eating-related traits.

Methods: A systematic search was conducted in MEDLINE, EMBASE, and Web of Science to identify studies evaluating the relationship between genetic risk, childhood obesity and eating-related factors in children and adolescents.

Results: A total of 48 publications were retrieved. Of these, 27 examined interactions between genetic susceptibility and dietary intake, 12 assessed differences in eating-related traits between carriers of risk and non-risk obesity alleles, 8 applied mediation models, and 1 was an intervention study. Evidence from these studies indicates that adherence to healthy dietary patterns may attenuate the impact of genetic risk on childhood obesity. On the other hand, eating behaviors partly explain a substantial amount of the genetic susceptibility to obesity during childhood.

Conclusion: Diet emerges as a potential modifier of genetic risk, while it may also represent a trait shaped by genetic predisposition through eating behaviors in childhood. Future research should jointly assess dietary factors and eating behaviors in the context of genetic susceptibility to better clarify their role in the obesity pathway.

Conflict of interest: The author declares no conflicts of interest.

Key words: Childhood obesity, genetics, gene–diet interaction, eating behaviors, dietary factors, mediation.

S10-04

Factors associated with spontaneous remission of overweight and obesity in Spanish children

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Background and aims: BMI normalization in children with early rapid weight gain (RWG) without receiving intervention and subsequent BMI z-score changes are not well understood. Using the Spanish CALINA cohort, we aimed: (1) to identify predictors of attaining normal weight at 7 years among children with rapid weight gain (RWG) at 12 months, and (2) to investigate predictors of being in the highest quartile of BMI z-score (BAZ) increase between 6 and 7 years.

Methods: CALINA initially included 1609 newborns from Aragón, Spain. At age 7, 406 children provided complete anthropometry, diet, accelerometry, and socioeconomic data. Among 111 RWG children, 45 (40.5%) attained normal weight at 7 years. In the full 7-year cohort (n=406), we examined predictors of being in the top quartile ($\geq p75$) of Δ BAZ between 6–7 years. Candidate predictors were weight-for-height (WHZ) at 12 months, parental education, sex, diet quality index (DQI), physical activity (PA), and weekly screen time. Logistic regression models were applied.

Results: In RWG children, higher WHZ at 12 months (OR=0.58, 95%CI: 0.37–0.90) and lower parental education (OR=0.49, 95%CI: 0.25–0.94) significantly reduced the odds of attaining normal weight at 7 years in univariate analyses. In multivariable models, associations were attenuated. In the full cohort (n=406), no predictors reached significance for Δ BAZ $\geq p75$, though trends were seen for baseline BAZ (OR=0.78, p=0.19) and PA (not meeting recommendations, OR=2.07, p=0.11). The natural adiposity rebound at this age may partly explain the lack of strong predictors.

Conclusion: Early adiposity and parental education emerged as the main predictors of BMI normalization after RWG, while no clear predictors were found for short-term BMI changes at 6–7 years.

Conflict of interest: The author declares no conflicts of interest.

Key words: Childhood obesity, rapid weight gain, BMI normalization, socioeconomic status, adiposity rebound, cohort study.

S10-05

Co-creation to build healthy futures: preventing obesity from childhood onwards

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Abstract: The World Health Organization estimates that 38.2 million children under the age of five are overweight or obese, reflecting the magnitude of the problem and the need for effective monitoring systems and comprehensive prevention strategies. Healthy eating is a fundamental pillar of proper growth and development, as well as playing a key role in preventing malnutrition. However, limited availability of adequate food and the consolidation of unhealthy dietary patterns contribute to both micronutrient deficiencies and the sustained increase in obesity and chronic non-communicable diseases. In this context, the transition to a healthy and sustainable dietary pattern could contribute significantly to reducing premature morbidity and mortality. The development of obesity in children and adolescents is influenced by multiple factors. Various cross-sectional and longitudinal studies have shown that regular consumption of sugary drinks increases the risk of obesity, while daily moderate physical activity helps control body fat mass. Conversely, the negative influence of sedentary behavior on the development of obesity is widely documented.

Despite this evidence, the interventions implemented to date have significant limitations. One of the main challenges is ensuring adherence to programs and the sustainability of the benefits achieved in the long term. Furthermore, the limited participation of children and families in the design and development of these interventions reduces their relevance and impact, which limits the effectiveness of the strategies implemented.

For all these reasons, childhood obesity must be considered a public health priority. It is essential to develop comprehensive prevention strategies that encourage lifestyle changes from a social, family and community perspective, with the aim of promoting healthy and sustainable eating habits and encouraging adherence and maintenance of long-term achievements.

Conflict of interest: The author declares no conflicts of interest.

Key words: Obesity, prevention, youth participation action research (YPAR), children, adolescent

Symposium 11: Nutritional education and training strategies

S11-01

Technology and nutritional training in diabetes: development and effectiveness evaluation of SMARTCLOTH

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Background and aims: Dietary self-management remains a significant challenge for people with diabetes. SMARTCLOTH is a tangible, low-literacy digital tablecloth designed to guide portioning (rations system) and the plate method, calculate energy and macronutrients on the spot, and automatically log intakes to a web/app diary. The aim is to validate its usability and clinical effectiveness in real-world care.

Methods: SMARTCLOTH integrates embedded micro-scales, a digital display, simple controls, and a wireless connection, built with lightweight, waterproof, and food-safe materials. Development followed an iterative, human-centered design process informed by focus groups with patients and clinicians.

The ongoing study is a quasi-experimental, interrupted time-series trial with a control group, conducted in Primary Health Care centers in Córdoba. Thirty-five devices were produced for deployment. Participants are consecutively recruited and allocated to intervention ($n \approx 60$) or control ($n \approx 120$) groups. The intervention lasts six weeks, with assessments conducted both at baseline and at the end of the intervention. Primary outcomes are HbA1c and adherence to dietary recommendations, secondary outcomes include usability, acceptability, and cardiometabolic profile.

Results: Functional prototypes have been produced and distributed in Primary Health Care. The real-world trial is currently underway, with patients and nurse educators actively using the devices. Preliminary feedback highlights strong acceptance, intuitive usability, and high engagement of both professionals and patients. The short intervention period will provide robust evidence on usability and effectiveness in improving glycemic control and dietary adherence.

Conclusion: SMARTCLOTH integrates validated educational strategies into a simple, easy-to-use device that helps people with diabetes strengthen their dietary self-management. Its real-world deployment is expected to clarify short-term clinical impact and guide future large-scale evaluations.

Conflict of interest: The author declares no conflicts of interest.

Key words: Diabetes mellitus, diet therapy, nutritional education, human-centered design, usability, digital health, primary care.

S11-02

Postbariatric surgery education

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Abstract: Obesity is a complicated chronic disease, and monitoring a patient who has undergone bariatric surgery requires a comprehensive approach to avoid complications and achieve the goals we set. To this end, the professionals involved in this task must understand the patient's profile as completely as possible, addressing it holistically, in order to conduct effective follow-up and re-evaluate the patient for at least five years in our dedicated nutrition consultations after bariatric surgery. Professionals must also be familiar with and knowledgeable about all the resources and strategies to be able to appropriately and positively approach this type of patient.

The objectives proposed for this type of surgery are focused on achieving healthy and gradual weight loss, preserving muscle and bone mass, as well as maintaining healthy eating and exercise habits throughout their lives. Improve pathologies associated with obesity and ultimately achieve health and lifestyle goals.

Keywords such as accompaniment, support, supervision, motivation, education, and training are essential in this process, which undoubtedly begins in the preoperative phase and even in the patient's contemplative phase. The Deliberative Model, positive reinforcement, and developing skills to overcome obstacles

Conflict of interest: The author declares no conflicts of interest.

S11-03

Nutritional management in patients with amyotrophic lateral sclerosis

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Background: Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease affecting upper and lower motoneurons, with a mean survival of 2–5 years. Oropharyngeal dysphagia is a frequent complication, leading to aspiration pneumonia and malnutrition, increasing

healthcare resources, hospital length of stay, and caregiver burden.

Aims: Describe the clinical pathway developed at OSI ARABA for the management of ALS, with a focus on its multidisciplinary approach. Special emphasis on nutritional assessment, early dysphagia screening, and individualized nutritional interventions, highlighting the role of the case manager, physiotherapist, speech therapist, rehabilitation specialist, pulmonologist, and specialized nursing staff. Diagnostic tools (EAT-10, MECV-V, FEES, videofluoroscopy) and nutritional support devices (special cups, thickeners, oral supplements, gastrostomy) are presented, focusing on appropriate use and complication prevention.

Methods: Oral communication supported by a PowerPoint presentation.

Results: Early identification of dysphagia prevents major complications such as aspiration pneumonia and malnutrition. A multidisciplinary approach ensures comprehensive care for patients and their families. Nutritional assessment, systematic screening, and continuous follow-up improve the quality of care delivered. Ongoing professional education and emotional support for patients and caregivers are also essential.

Conclusion: Implementation of a structured clinical pathway enhances quality of life and facilitates a dignified end of life for ALS patients. Nutritional status is a key factor in disease progression. Clear communication regarding the use of nutritional support devices, particularly gastrostomy, reduces stress and promotes adherence, making it a cornerstone of patient management.

Conflict of interest: The author declares no conflicts of interest.

Key words: Nutritional care, ALS, Clinical pathway, Gastrostomy, Dysphagia, Enteral nutrition.

Symposium 12: The power of the senses in food decisions

S12-01

Tastes and smells that decide: the role of taste and smell in food decisions

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Abstract: When we talk about food, nutrition and health, we refer to the nutrient composition of food and its metabolic consequences. However, this relationship overlooks

other aspects of food, such as food intake, that go beyond physiological and metabolic aspects, such as those related to the fact that food is also an aesthetic, cultural and social phenomenon. This "neglect" has contributed to the fact that recommendations based on physio-metabolic aspects have not been successful. This has led in recent years to consider eating habits, values and feelings, and their hedonic character. Thus, the « pre-swallowing» nutritional culture seems to emerge. In this context, some questions arise, such as whether the social environment in which people eat, the fact of eating in company or the enjoyment, familiarity and authenticity of food contribute to health. There is a renewed interest in how production methods affect the taste and texture of food, how these are modified by different culinary techniques, how the brain interprets the sensory signals that tell us about the palatability of a food, or how the texture and taste of the food we eat can be manipulated and improved. We will study how taste and smell and the brain construct, flavor, in which texture and trigeminal sensations play a particularly important role in determining it, determine the choice of certain foods and eating behavior, and food intake. We will also study the interaction of these sensory qualities with each other and with other modalities. This would be concerted in the design of food, menus that would provide tastes, smells, textures, aimed at food acceptance and healthy eating behaviors.

Conflict of interest: The author declares no conflicts of interest.

Key words: Gastronomy, chemical senses, taste, odor, flavor, food intake, food acceptability, food behavior.

S12-02

The power of vision in food decision-making: perception and visual health

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Abstract: Vision plays a crucial role in food choice and dietary preferences. The visual appearance of food generates expectations regarding its taste, quality, and nutritional value even before consumption. Attributes such as color, shape, gloss, and overall appearance function both as an evolutionary alert system and as elements of attraction and conscious selection. Over time, humans have developed innate mechanisms that support the identification of safe foods, helping to avoid colors and flavors that may signal toxicity or danger.

Among visual attributes, color is one of the primary sensory factors influencing food preference. Bright colors are typically associated with freshness and palatable flavors, whereas dull or faded tones may indicate spoilage or low quality. The brain establishes specific associations between colors and expected flavors, and when these visual expectations do not match the actual taste, a form of sensory incongruence arises, often resulting in an unpleasant experience. Shape and presentation also modulate food-related decisions. A well-presented food item not only conveys higher perceived quality but can also influence the perception of flavor, texture, and aroma. In this way, vision contributes to the anticipation of the overall sensory experience, shaping expectations that affect the global appreciation of food.

Nevertheless, the visual appeal of food may be further shaped by cultural trends, advertising, and traditions, which motivate the selection of certain products and the rejection of others. Vision thus operates as an initial filter that facilitates the identification of safe and attractive foods, enhances the pleasure derived from eating, and contributes to the construction and consolidation of dietary preferences.

Conflict of interest: The author declares no conflicts of interest.

Key words: Visual function, ocular health, dietary decision-making, dietary preferences.

Symposium 13: Disease-related malnutrition

S13-01

Nutritional assessment and coding of malnutrition risk with NANDA: Development of an automated clinical form

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Background and aims: Disease-related malnutrition (DRM) negatively affects recovery and quality of life in both hospital and community settings. This study, conducted by the Nursing and Dietetics Group of the Murcia Region, comprising five expert nutrition nurses from different hospitals, reviews current evidence on nutritional and morpho-functional assessment for DRM diagnosis. The objectives are to: 1) identify evidence-based practices, 2) develop an automated clinical form in Selene using NANDA-NOC-NIC terminology for malnutrition risk coding, and 3) enhance comprehensive patient care in DRM.

Methods: A systematic review was performed in PubMed, EMBASE, Cochrane, BVS, IBECS, and CuidenPlus (2015–2024), selecting 12 high-quality studies on nutritional and morphofunctional assessment. Clinical guidelines were evaluated using AGREE II, and indicators were assessed with AIRE, ensuring methodological rigor. An automated form was designed in Selene, integrating screening, diagnosis, intervention, and follow-up parameters, standardized with NANDA-NOC-NIC. Validation was carried out through a modified Delphi consensus with experts.

Results: Findings highlight the effectiveness of GLIM and ESPEN criteria for DRM diagnosis, underscoring the importance of morphofunctional assessment (e.g., muscle strength, sarcopenia). Gaps in interdisciplinary standardization were identified. The Selene form, incorporating NANDA diagnoses (e.g., *Risk for Malnutrition*), NOC outcomes (e.g., *Nutritional Status*), and NIC interventions (e.g., *Nutrition Management*), optimizes documentation and care continuity across clinical settings.

Conclusion: Integrated assessment improves early DRM diagnosis. The Selene automated form, based on NANDA-NOC-NIC, standardizes malnutrition risk coding in the Murcia Region and enhances care quality. Future large-scale implementation and validation are recommended.

Conflict of interest: The author declares no conflicts of interest.

Key words: Disease-related malnutrition, nutritional assessment, NANDA-NOC-NIC, automated form, Selene.

S13-02

Enteral nutrition: care and attention when oral nutrition is not possible

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General objective: To update and strengthen the knowledge of nursing staff in the safe, effective, and evidence-based management of enteral nutrition in both hospital and community settings.

Specific objectives:

1. Recognize the indications for enteral nutrition in hospitalized and outpatient patients.
2. Identify the different types of tubes and devices used in the administration of enteral nutrition.
3. Apply safe administration and monitoring techniques, minimizing risks and complications.
4. Detect and prevent the most frequent errors in clinical practice related to enteral nutrition.

5. Identify the most common complications associated with this type of nutritional support.

6. Manage hygiene and infection-prevention protocols associated with device handling.

7. Assess the role of nursing in the comprehensive follow-up of patients receiving nutritional support.

8. Promote patient and family/caregiver education and support in the home management of enteral nutrition.

Methodology: The presentation will be delivered orally and supported by visual media (PowerPoint).

- Introduction (welcome and topic presentation)
- Types of access for this type of nutritional support (selection of access route)
- Care of these devices
- Most common complications and their management
- Importance of continuity of care across different health-care settings

Conclusion:

- Enteral nutrition should be considered the first alternative route of nutrition when oral feeding is not possible.
- Knowledge of the different devices for this nutritional support is crucial for planning care and preventing complications.
- Continuity of care is essential to avoid fragmenting patient management and ensure comprehensive care.

Conflict of interest: The author declares no conflicts of interest.

Key words: Enteral nutrition, care, continuity of care.

S13-03

Involvement of microminerals in the risk of malnutrition Inés Rivas Fernández¹

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Background and aims: Deficiencies of essential trace minerals, particularly iron, zinc, iodine, selenium, and copper, are a major determinant of malnutrition, often described as “hidden hunger.” These deficiencies impair growth, cognitive development, and immune function, increasing susceptibility to infections and predisposing chronic diseases. The aim of this presentation is to review the role of trace minerals in the risk of malnutrition and disease, highlighting the usefulness of serum analysis as a biomarker in both clinical and public health settings.

Methods: A narrative literature review was conducted focusing on the physiological and clinical roles of key trace minerals, their deficiencies and excesses, and their interactions with toxic metals. Special attention was given to serum analysis and advanced techniques such as inductively

coupled plasma mass spectrometry (ICP-MS) as tools for nutritional diagnosis and monitoring.

Results: Iron deficiency remains the leading cause of anemia worldwide, with major consequences for maternal-child health and cognitive performance. Zinc deficiency is linked to growth retardation and higher rates of infectious morbidity, while iodine deficiency causes thyroid dysfunction and irreversible neurodevelopmental damage in early life. Selenium and copper deficiencies compromise immune function and cardiovascular health. Concomitant exposure to toxic metals (lead, cadmium, arsenic, mercury) further disrupts mineral metabolism, aggravating malnutrition and increasing the risk of chronic, neurodegenerative, and neoplastic diseases.

Conclusion: Trace mineral deficiencies are a critical determinant of malnutrition and represent a bridge between undernutrition and increased disease risk throughout the life course. Serum analysis emerges as a strategic tool for early detection and for guiding supplementation, fortification, and reduction of toxic metal exposure.

Conflict of interest: The author declares no conflicts of interest.

Key words: Trace minerals, malnutrition, micronutrient deficiency, public health, serum biomarkers.

Symposium 14: Feeding the years, nourishing life

S14-01

A matter of age, a matter of health: Powerpenia and fragility

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Abstract: Functional trajectories throughout the life cycle, especially during the last decades of life, are an aspect that is receiving more and more attention from researchers in different areas of knowledge. The age at which different deficits begin to appear in the physiological systems with respect to their maximum potential, or when one begins to move towards a state of fragility/disability, will depend greatly on the lifestyles (physical exercise, nutrition, etc.) of the person. Sarcopenia (loss of muscle quantity and quality)

and frailty (accumulation of deficits with age, sedentary lifestyle...) are two entities that often overlap and share various aspects that have caused controversy and discussion. However, the fact that both share one aspect, reduced physical functionality, is not in doubt. Compared to those who consider that sarcopenia is a clinical manifestation of frailty and those who advocate that frailty is due to sarcopenia, there is still no consensus. During this conference we will try to review the evolution and different definitions of both terms, trying to analyze how common sarcopenia is among the frail and the different possibilities that have been studied in this regard, trying to focus on the functionality of the muscle, above its quantity. During the study of the functionality of older people, one variable has emerged above all others during the last decade, muscle power. Currently, there is a growing consensus that the decrease in losses in muscle power (*powerpenia*) from middle age and throughout human aging will definitively determine the different functional trajectories of older people, with physical exercise and adequate nutrition (i.e. protein intake) being determining factors in their maintenance. Hence, the World Health Organization in what it has officially called the “*Decade of Healthy Aging (2020-2030)*” has included “functional ability” as a key aspect to achieve this goal.

Conflict of interest: The author declares no conflicts of interest.

Key words: Aging, frailty, sarcopenia, physical function, powerpenia

S14-02

New techniques for the early detection of malnutrition: Nutritional ultrasound scanning

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Background and aims: Loss of body mass, or sarcopenia, is an aspect of undernutrition that decreases mobility, increases the risk of fractures and is associated with cardiorespiratory and cognitive pathologies. It increases premature mortality and is costly to the health care system in economic terms. Early diagnosis is crucial for older adults, so our aim was to compare the usefulness of thigh ultrasound with other anthropometric markers of body composition and malnutrition in a cohort of people over 70 years of age.

Methods: Sample (N=374) collected in Public Health Care Homes for the Elderly in Madrid. Anthropometry (height, weight, perimeters, skinfolds, Body Mass Index, muscle areas). Dynamometry, Mini Nutritional Assessment (MNA),

blood biochemistry and ultrasound scan of the thigh with sonophy C10H system. Ultrasound measurements: medial vastus femoris and rectus femoris thickness, adipose tissue, vertical and horizontal maximum of the vastus femoris and rectus medius, rectus femoris area and pennation angle. ROC curves were applied to determine the prognostic value of different ultrasound measures for the diagnosis of malnutrition by other protocols such as MNA, total protein values, albumin levels, among others.

Results: The prevalence of malnutrition was high. According to anthropometric variables such as calf circumference, between 30% (women) and 45% (men) exhibited very low values. Between 50 and 66% of participants, showed dynamometric values below the 10th percentile. Regarding MNA 70% were classified as malnourished or at risk. However, according to BMI, 6 out of 10 were overweight, indicating a problem of sarcopenic obesity. The largest areas under the ROC curve in the diagnosis of hypoproteinaemia (albumin < 2.9 g/dl or total protein < 5.9 g/dl) corresponded to pennation angle (AUC: 0.828–0.920) and maximum rectus femoris length (AUC: 0.070–0.076).

Conclusion: Quadriceps ultrasound is a simple tool that has good agreement with the conventional diagnosis of malnutrition due to loss of muscle mass and protein.

Conflict of interest: The author declares no conflicts of interest.

Key words: Body composition, muscle mass, malnutrition in the elderly, thigh ultrasound.

S14-03

Metabolic flexibility in the face of chronic pathology

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Background: Metabolic flexibility, defined as the body's ability to efficiently alternate between fat and carbohydrate oxidation depending on nutrient availability and energy demands, is considered a cornerstone of metabolic health^{1,2}. Its deterioration, known as metabolic inflexibility, is associated with insulin resistance, mitochondrial dysfunction, alterations in body composition, and an increased risk of chronic diseases. In the context of aging, maintaining adequate metabolic flexibility is crucial for preserving physical functionality, preventing frailty, and promoting greater longevity with quality of life. Furthermore, this adaptive capacity serves as a protective bridge against chronic pathologies

such as obesity, type 2 diabetes, cardiovascular diseases, and other metabolic alterations that often develop concurrently³. Several factors -including mitochondrial status and function, fat distribution (particularly visceral fat accumulation), muscle mass, and the inflammatory state- condition the body's ability to modulate the use of energy substrates⁴. Although clinically relevant, its evaluation is not yet widely incorporated into medical-nutritional practice, despite the availability of accessible tools such as indirect calorimetry at rest or during exercise⁵, along with indirect analytical markers of insulin resistance (e.g., TyG index) and indicators of inflammation.

Mechanisms and determinants: At the cellular level, mitochondrial health plays a decisive role. Abundant and functional mitochondria enable efficient oxidation of fatty acids and carbohydrates, optimizing ATP production while minimizing the generation of reactive oxygen species⁶. With aging, mitochondrial biogenesis tends to decline, reducing oxidative capacity and favoring the accumulation of intramyocellular lipids, which contributes to insulin resistance. Insulin resistance, in turn, limits substrate switching, favoring a rigid metabolism centered on glucose oxidation and reducing fat mobilization and utilization. This phenomenon is further aggravated by increased visceral adiposity, a metabolically active tissue that promotes low-grade chronic inflammation and worsens insulin sensitivity⁷. This same pathophysiological pathway connects metabolic inflexibility with the development and progression of chronic diseases such as diabetes, metabolic syndrome, and cardiovascular disorders.

In body composition, both the preservation of muscle mass and the reduction of total adiposity -particularly visceral fat- are key determinants. Skeletal muscle serves as a major sink for glucose and is a critical tissue for fat oxidation during fasting and exercise. Sarcopenia and sarcopenic obesity, conditions frequently observed in older adults, combine low muscle mass with excess fat, markedly reducing metabolic flexibility and increasing the risk of metabolic and chronic diseases⁸.

Relevance in healthy aging and chronic disease prevention:

Optimal metabolic flexibility in advanced age is associated with:

- Improved glycemic control and reduced risk of type 2 diabetes.
- Greater functional capacity and resistance to fatigue.
- Preservation of muscle mass and strength.
- Lower visceral fat accumulation and, consequently, reduced systemic inflammation.
- Higher adaptability to dietary and physical activity changes, facilitating preventive or therapeutic interventions.

• Decreased risk and progression of chronic diseases such as obesity, metabolic syndrome, and cardiovascular disorders^{3,9}.

Strategies including resistance and endurance training, moderate caloric restriction, diets rich in high-quality foods (vegetables, fruits, legumes, fish, unsaturated fats), and circadian rhythm optimization has been shown to improve both mitochondrial function and insulin sensitivity¹⁰, directly enhancing metabolic flexibility. In individuals with established chronic diseases, these interventions may not only improve metabolic parameters but also slow disease progression.

Clinical evaluation: Indirect calorimetry is the reference technique for assessing energy expenditure and estimating macronutrient oxidation through the respiratory quotient¹¹. Values close to 0.7 indicate predominant fat oxidation, whereas values approaching 1 reflect predominant carbohydrate oxidation. Its use at rest provides an estimate of basal metabolic flexibility, while its application during exercise reveals substrate-switching capacity in response to increased energy demand. These measurements can be complemented by body composition assessment using DXA or advanced bioimpedance, as well as analytical markers such as the TyG index, HOMA-IR, and inflammatory parameters. In patients with chronic diseases, particularly obesity and diabetes, this integrated approach becomes even more relevant, as it enables monitoring of intervention efficacy and anticipation of risk.

Conclusions: Metabolic flexibility emerges as an integrative marker of metabolic health, with direct implications for the prevention and management of chronic diseases associated with aging, such as obesity, type 2 diabetes, metabolic syndrome, and cardiovascular disease. Its maintenance depends on the interplay between mitochondrial health, insulin resistance, and body composition. Routine evaluation in clinical nutrition and medical practice, incorporating tools such as indirect calorimetry and body composition analysis, would enable the design of more personalized and effective interventions.

In the context of healthy aging, promoting habits that preserve muscle mass, reduce visceral adiposity, and optimize mitochondrial function not only enhances metabolic flexibility but also contributes to prolonging active life and functional independence. Investing in its assessment and improvement should be considered a priority in preventive medicine and clinical nutrition in the 21st century.

Conflict of interest: The author declares no conflicts of interest.

Key words: Metabolic flexibility, aging, mitochondria, insulin resistance, sarcopenia, chronic disease prevention.

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Symposium 15: Healthy aging: Challenges and opportunities in the 21st century

S15-01

Aging: A physiological process distinct from disease

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Background and aims Aging is a biological process that, until recently, occurred rarely in humans and was virtually unknown in the animal world. Only the existence of protected environments has allowed its presence, since in the natural, unprotected environment, aging does not exist or is very short-lived. One of the characteristics of this process is the appearance of certain relevant changes that, taken together, lead to deleterious modifications in the ability to adapt to environmental changes, unlike what occurs in the maturation stages of development. These changes entail a predisposition to certain diseases. This has led some groups to postulate that aging is a disease in itself.

Methods and Results The typical characteristics of aging, postulated by Leonard Hayflick more than half a century ago, already showed that aging and disease are distinct things. Since then, evidence has been accumulating from

different fields of knowledge, including epidemiology, physiology, clinical studies, and therapeutics, which have delved into this perspective. While several of the changes inherent to aging coincide with some of the processes associated with certain diseases, some diseases, few but common in older adults, with special emphasis on so-called chronic diseases (diabetes, vascular diseases, degenerative diseases, dementia), have come to be considered diseases caused by aging. A school of thought, known as Geroscience, has even emerged that promotes the "curing" of aging as a way to prevent all these diseases. This view, in the opinion of the speaker, distorts reality and generates confusion and can delay the approach to the real problems posed by disease, its diagnosis, and its treatment in older adults, traditionally and successfully addressed by Geriatric Medicine.

Conclusions: Aging and disease are distinct entities, although they may share some of their mechanisms and frequently occur in the same individual. Consequently, they must be addressed separately.

Conflict of interest: The author declares no conflicts of interest.

Key words: Aging, disease, geriatric medicine, geroscience.

Symposium 16: Keys to well-being at all stages of life

S16-01

Nutritional optimization during the climacteric: The crucial role of proteins

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Abstract: The climacteric is defined as a phase in a woman's life that marks the transition from reproductive to non-reproductive life. This transition is characterized by significant endocrine changes that have substantial effects on a woman's body composition, cardiometabolic health and quality of life.

Among the nutritional strategies available to optimize health at this stage, adequate protein intake emerges as a key factor. Proteins play a crucial role in protein synthesis and the maintenance of muscle mass, actively contributing to the prevention of sarcopenia. Furthermore, they are also necessary for the maintenance of the bone matrix, and in the presence of sufficient calcium and vitamin D, they promote its absorption and improve bone density. The high thermogenic effect and satiating capacity of these substances make them useful in the context of weight control.

The protein requirements during the climacteric period exceed the conventionally recognized levels. The characteristic hormonal changes and increase in inflammatory factors promote protein catabolism, which increases the need for a higher protein intake, without affecting energy requirements. Consequently, a modification in the macronutrient composition of the diet is imperative to ensure sufficient energy intake in each circumstance. The intake of essential amino acids, with leucine being of particular importance, is essential for the promotion of muscle protein synthesis. The distribution of protein throughout the day, with approximately 20-25 g/meal, has been shown to optimize muscle protein synthesis and improve appetite control.

Nutritional optimization during the climacteric requires a personalized and comprehensive nutritional approach. In addition to leading an active lifestyle, it is important to ensure an adequate protein intake of optimal quality. This should be achieved within the context of an adequate and sufficient diet in energy and other essential nutrients.

Conflict of interest: The author declares no conflicts of interest.

Key words: Climacteric, protein, women's health, nutritional optimization.

S16-02

Nutritional strategies and protein during the first 8.000 days of life

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Abstract: Adequate protein intake during childhood and adolescence is critical for supporting growth, development, and overall health. From birth until 18 years of age, protein requirements vary according to rapid changes in body composition, metabolic demands, and developmental milestones. Proteins provide essential amino acids that are indispensable for tissue accretion, neuromuscular development, and immunological function. During infancy, breast milk or formula supplies the primary source of high-quality protein with balanced essential amino acids. As complementary feeding begins, dietary diversification should ensure the provision of sufficient protein to meet increasing needs.

Protein quality is determined not only by total intake but also by amino acid composition and digestibility. Animal-derived proteins, such as those from dairy, eggs, and lean meats, generally provide a complete amino acid profile and exhibit high digestibility, thereby serving as efficient sources to meet physiological demands. In contrast, plant-based proteins often present lower digestibility and may lack one or more indispensable amino acids, particularly lysine, methionine, or tryptophan. Nevertheless, with appropriate combinations, such as legumes with cereals, plant sources can collectively achieve adequate amino acid balance. This consideration is particularly relevant in populations where vegetarian or predominantly plant-based diets are common. Recommendations emphasize aligning intake with age-specific requirements, typically ranging from 1.5 g/kg/day in early infancy to approximately 0.8–1.0 g/kg/day in late adolescence. Beyond meeting quantitative needs, dietary guidance should prioritise diversity of protein sources to secure adequate intake of essential amino acids and to support long-term health. Encouraging both animal and plant proteins, while considering cultural and dietary preferences, promotes nutritional adequacy. Future research should continue to refine protein recommendations by integrating data on growth trajectories, body composition, and the emerging role of plant-based diets in pediatric nutrition.

Conflict of interest: The author declares no conflicts of interest.

Keywords: Protein intake, amino acids, animal and plant proteins, nutritional requirements, growth and development.

S16-03

High performance nutrition: Protein protocols for elite athletes

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Abstract: A good diet influences sports performance, as it promotes an optimal state of health, supports prolonged and high-quality training, and accelerates recovery processes.

The protein requirements of athletes are higher than those of less active people, due to the increased muscle breakdown during intense exercise and the need to repair and build new muscle cells. The exact protein needs vary depending on the type of exercise (endurance, strength, power), the intensity and duration of training, and the daily energy and carbohydrate intake, but in general, it is recommended that athletes

consume 1.2–2.2 g of protein per kg of body weight per day, compared to 0.8–1 g/kg/day in sedentary individuals.

It is advisable to distribute protein intake throughout the day (20–25 g per main meal) and to consume a combination of carbohydrates and protein after exercise, since this combination improves recovery, increases muscle protein synthesis, and promotes the repair of cellular damage caused by physical activity.

According to their origin, proteins are divided into animal (from meat, fish, seafood, eggs, milk, and dairy products) or plant-based (legumes, cereals, nuts, vegetables, and fruits). Both should be consumed in the proper proportion. The World Health Organization (WHO) recommends consuming 2/3 plant-based proteins and 1/3 animal-based proteins. In certain situations, protein supplements can be very useful. For example, after exercise, fast-absorbing proteins promote quicker recovery, they can also be used to enrich meals with low protein content, as is often the case with some breakfasts, or to help meet daily intake goals, such as in the form of a shake before bed, among other cases.

Supplements do not replace a varied and balanced diet. The priority is always to meet requirements through food.

Conflict of interest: The author declares no conflicts of interest.

Symposium 17: Child nutrition: health programming in the first 1000 days

S17-01

First 1000 days: opportunity to modulate the development of the microbiota-gut-brain axis

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Abstract: Infant gut microbiome development begins at birth, reaching an adult-like state by 12–36 months, a critical neurodevelopmental window paralleling immune maturation^{1,2}. Gestational exposures, maternal microbiome, and early-life factors, including delivery mode, diet, antibiotics, maternal stress, and environment, shape infant microbiome trajectories with lifelong implications through the “microbiota–gut–brain axis”^{3–5}. Microbial metabolites, neurotransmitters, and immune signals reach the CNS via

the vagus nerve, systemic circulation, and HPA axis, influencing microglia, astrocytes, glial signaling, and synaptic development. These interactions regulate hippocampal development, neuroinflammation, neurogenesis, myelination, microglial maturation, and blood-brain-barrier (BBB) integrity, directly linking early microbiome composition, particularly within the modifiable 0–3 years developmental window, to cognitive and behavioral outcomes^{2,6–9}.

Disruptions to microbiome-brain signaling contribute to neurodevelopmental, psychiatric, and neurodegenerative disorders. Dysbiosis increases gut permeability, driving pro-inflammatory cytokines (TNF- α , IL-1 β , IL-6) across the BBB, triggering neuroinflammation and altered neurotransmission. This process is implicated in ASD, ADHD, anxiety, depression, Alzheimer's and Parkinson's diseases. In mice, ASD-like behaviors induced by dysbiosis can be reversed through colonization or microbial metabolites, highlighting therapeutic potential (2,9). Although germ-free models highlight microbiome roles in brain structure, immune function, behavior, and memory, multi-omics approaches are needed to define normal development, dysbiosis, and optimal intervention windows^{2,13,14}.

During the postnatal period rapid microbiome diversification in infancy shows sex-specific effects, while nutrition strongly influences microbial composition and its impact on brain development^{1,10–11}. This highlights the importance of diet in early life^{1,4,8}. Aberrant colonization in early life is linked to atopy, diabetes, inflammatory bowel disease, necrotizing enterocolitis, obesity, ASD, and neurodegeneration, with premature infants particularly vulnerable due to microbiome-immune-brain axis dysfunction predictive of brain injury¹². The first three years represent a sensitive window for intervention, where strategies such as fecal microbiota transplant (FMT), probiotics, or psychobiotics may prevent neurodevelopmental and neuropsychiatric disorders.

Conflict of interest: The author declares no conflicts of interest.

Key words: Microbiota-gut-brain axis", early nutrition, probiotics, neurodevelopment, immune system development, neuropsychiatric disorders

Microbiome, celiac disease, gluten-free diet, co-occurrence networks, metabolomics, precision nutrition, organoids, gut-on-chip, systems biology.

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S17-02

Early factors that influence body composition in childhood

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Background and aims: The first 1,000 days of life represent a critical period in the programming of growth and body composition. Modifiable prenatal factors (maternal body mass index, gestational weight gain, smoking or epigenetics) and postnatal factors (type of feeding or rapid weight gain) influence adiposity and fat-free mass during childhood. The aim of this study is to analyze the impact of these early factors on the development of obesity and on body composition parameters at later ages.

Methods: Data from cohorts (CALINA and others) with follow-up from birth to 6–8 years are presented, together with a review of the evidence on early programming. Prenatal and postnatal factors (maternal BMI, smoking, birth weight, type of feeding, postnatal rapid growth) and body composition variables at different ages were evaluated.

Results: High maternal pre-pregnancy weight and excessive gestational weight gain increase the risk of later adiposity. Infant feeding practices, particularly exclusive breastfeeding during the first 4 months, are associated with weight and BMI trajectories up to 6 years of age. Rapid postnatal weight gain significantly mediates this relationship. Regarding lean mass, birth weight, parental nutritional status, and rapid weight gain are also associated with an increase in fat-free mass.

Conclusion: Early programming phenomena determine adiposity and lean mass at later stages. Obesity prevention strategies should take maternal and neonatal factors into account, promote breastfeeding, and encourage appropriate postnatal growth to ensure a healthy balance in body composition during childhood.

Conflict of interest: The author declares no conflicts of interest.

Key words: First 1,000 days, early programming, breastfeeding, rapid weight gain, childhood obesity, lean mass.

S17-03

Complementary feeding. Response to the WHO position

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Background and aims: Complementary feeding (CF) represents a critical period within the first 1,000 days of life, essential for growth, metabolic programming, and future health. The World Health Organization (WHO) has recently updated its guidelines on CF, addressing aspects such as prolonged breastfeeding, the use of animal milk, the appropriate age for food introduction, dietary diversity, and the role of nutritional supplements. The aim of this presentation is to critically analyze these recommendations and assess their applicability in the European clinical context, with particular emphasis on the position of the Nutrition and Breastfeeding Committee (CNyLM) of the Spanish Association of Pediatrics (AEP).

Methods: The updated WHO recommendations (2023) were reviewed, based on systematic reviews and meta-analyses available up to 2021. A comparative analysis was conducted with recent scientific evidence as well as with guidelines from ESPGHAN and the CNyLM.

Results: WHO recommendations include continuation of breastfeeding during the second year of life, use of animal milk as an alternative to follow-on formulas, introduction of CF at six months, promotion of dietary diversity, restriction of unhealthy foods and beverages, and context-specific use of supplements. However, much of the supporting evidence is of low or very low certainty. The CNyLM supports exclusive breastfeeding until six months and CF introduction between 4–6 months, discouraging routine use of follow-on formulas in children over one year of age. Moreover, it stresses the importance of adapting guidelines to social determinants of health and local epidemiological contexts.

Conclusion: WHO guidelines are a valuable tool for pediatric counseling, however, their application requires

contextualization and professional supervision. The introduction of animal milks in children under 12 months of age, continued breastfeeding in the second year of life, and the age at which CF is introduced is questionable in our context. These recommendations need to be individualized.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Complementary feeding, Breastfeeding, WHO guidelines, Pediatrics, Infant nutrition.

Symposium 18: Scientific gastronomy: from nutritional evidence to healthy culinary art

S18-01

Functional nutrition and gastronomy: the power of well-chosen foods

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Currently, in contemporary nutrition, healthy nutrition has been approached from a biomedical perspective, through dietary patterns that include restrictions along with the inclusion of foods or food ingredients with a function beyond adequate nutrient intake, known as functional foods. The latter refers to the presence in foods of functional nutrients that are known to provide benefits in various physiological processes related to health and disease. In addition, functional foods contain biologically active compounds that play an important role in processes involved in the origin of disease, such as inflammation or biological oxidation. This has come to be called functional nutrition. However, in order to select healthy foods and build healthy eating habits, we cannot forget other pre-ingestive aspects of food. The act of eating is not only about satisfying hunger and attending to our physiological needs, but is also a social, cultural, relational, and pleasurable act. Therefore, we cannot separate the purely physiological aspect from the sociocultural and hedonic aspect of food, represented by gastronomy. Therefore, there is a growing effort to encourage the population to follow a healthy diet by combining foods with an adequate nutritional profile with functional components that, in turn, have attractive organoleptic properties that allow them to be selected rather than rejected. The aim is to ensure that the sensory properties of the functional foods and food ingredients on offer (appearance, taste, smell, texture, etc.) are attractive in the gastronomic act of eating. The functionality of food must

be paired with its gastronomic value, and this involves cooking, creativity, and culinary knowledge. Therefore, this post- and pre-ingestive approach to functional nutrition is directly linked to culture, culinary techniques, and gastronomy from a holistic perspective.

S18-02

Quality, safety, and pleasure: The three pillars of scientifically-grounded gastronomy

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Quality, Safety, and Pleasure: The Three Pillars of Scientifically-Grounded Gastronomy, define that modern gastronomy transcends what is just mere artisanal craft because it evolves toward a discipline deeply improved through scientific understanding. This approach breaks down culinary excellence into three fundamental interdependent pillars supported by strict scientific research into each. The premier pillar equals quality. Through a scientific lens is the redefinition of this pillar. Objective biochemical as well as physical properties of raw materials are included here, moving beyond any subjective perception. This includes assessing terroir effects on flavor and harvesting properly to keep phytochemicals intact. It also involves using food material science for texture plus structure perceptions. Scientific tools quantify, regulate, and raise quality throughout the food chain. Safety, the second pillar, is consumption's non-negotiable base after all. Biological (e.g., pathogen growth kinetics), chemical (e.g., toxin formation), also physical hazards are controlled through scientific principles. This involves one's comprehension of just the microbial ecology of some foods plus applying all the principles of thermal death time curves in pasteurization, yet predictive microbiology is utilized for the establishing of safe shelf-life and storage conditions so ensuring that food is not only just enjoyable though also quite harmless. The third pillar, Pleasure, studies the neurogastronomic mechanisms that are exploring the dining experience. It investigates how flavor is a multisensory integration of taste, aroma, texture, along with visual presentation. Each of these factors is processed in the brain via retro-nasal olfaction, rheology, and tribology. Culinary techniques can be optimized for maximized hedonic response as demonstrated by research into umami receptors, taste perception's psychophysics, and the Maillard reaction. In conclusion, synergy of these three pillars forms a robust framework for a truly modern, innovative, and trustworthy gastronomy.

Conflict of interest: The author declares no conflicts of interest.

Symposium 19: Bioactive amines in food: Dangerous or powerful?

S19-01

Biogenic amines in foods: The what and how of their presence, significance and interest

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Abstract: Biogenic amines are compounds that can be found in a wide variety of foods, mainly formed through the decarboxylation of amino acid precursors by microbial enzymes. Consequently, in almost all protein-rich foods, or those containing free amino acids and subjected to conditions favoring microbial activity, the accumulation of biogenic amines can occur, particularly in microbiologically spoiled products or fermented foods. However, their levels strongly depend on multiple factors. In perishable foods, temperature and storage time are among the most critical variables, as they promote the growth of potentially aminogenic microorganisms. In addition, processing steps such as fish evisceration or poor hygiene in raw materials and preservation practices are also decisive contributors. In fermented products, besides the aminogenic potential of starter cultures, undesired activity from contaminant microorganisms in raw ingredients may further contribute to biogenic amine accumulation. Other parameters such as pH, oxygen availability, food ingredients, and preservation methods also modulate the aminogenesis process.

Biogenic amines are relevant from both food safety and quality perspectives. The main health concerns are associated with histamine, which may cause histamine intoxication and, in individuals with impaired intestinal metabolism of this amine, histamine intolerance. Beyond their toxicological implications, biogenic amines also serve as hygienic–technological biomarkers. Given their microbial origin, they have traditionally been used to assess the hygienic quality of perishable foods, since their significant accumulation often occurs before the onset of sensory spoilage. Moreover, their thermal stability makes them more reliable indicators than microbial counts, which can be reduced or inactivated during processing.

In this presentation, data will be provided on biogenic amine contents in foods, the main factors influencing their accumulation, and their safety and technological significance. In addition, control measures aimed at reducing their occurrence will be discussed.

Conflict of interest: The author declares no conflicts of interest.

Key words: Biogenic amines, food safety, histamine, fermented foods, control measures.

S19-02

Histamine intolerance: a new risk for an old danger

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Abstract: Histamine is present in a wide range of foods in highly variable concentrations, which are the main exogenous source of this compound. It is primarily formed through the decarboxylation of histidine by bacterial L-histidine decarboxylase. Foods with potentially high histamine levels include: a) microbiologically altered products, such as fish and meat, or processed foods stored under inadequate hygienic conditions; and b) fermented products, where fermenting bacteria may also have aminogenic activity.

Although histamine has important physiological functions in the body, excessive intake through food can cause histamine intoxication, typically presenting in outbreaks with short incubation periods, mild to moderate symptoms and spontaneous recovery within hours. Despite extensive study, questions remain regarding the variable histamine levels in foods triggering outbreaks and the heterogeneity of adverse effects.

In contrast, histamine intolerance results from impaired intestinal degradation due to reduced diamine oxidase (DAO) activity, leading to plasma accumulation and a wide range of nonspecific gastrointestinal and extraintestinal symptoms. Unlike intoxication, these can occur in susceptible individuals even after consuming foods with normal or low histamine levels. Currently, the main management strategy is a low-histamine diet, while supplementation with exogenous DAO has recently been proposed as a complementary approach to improve intestinal histamine degradation.

While interest in histamine intolerance has considerably grown in recent years, more scientific evidence is still required to help define, diagnose and clinically manage this condition. In this conference, a glance on histamine intoxication will be performed, as well as the analysis of some uncertainties historically associated to histamine intoxication outbreaks that may be better explained by the existence of interindividual susceptibility to ingested histamine. Moreover, an updated review on histamine intolerance will

be delivered, mainly focusing on its etiology and the existing diagnostic and treatment strategies.

Conflict of interest: The author declares no conflicts of interest.

Key words: Histamine, food intolerance, histamine intolerance, diamine oxidase (DAO) enzyme, low-histamine diet, DAO supplementation.

S19-03

Polyamines: Forgotten bioactive components?

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Abstract: Polyamines, putrescine (PUT), spermidine (SPD), and spermine (SPM) are a group of aliphatic molecules that are ubiquitously distributed in all living organisms. In humans, polyamines are involved in various biological processes, notably in cell proliferation and differentiation, cell and gene protection, and autophagy activation. In addition to their physiological functions, polyamines possess potent antioxidant properties, which help mitigate oxidative damage to lipid membranes, nucleic acids, and proteins. These attributes are particularly important in reducing lipid peroxidation, a key factor in deterioration of nutritional quality, flavor, and shelf life of food and the development of chronic inflammatory diseases. Lipid oxidation plays a central role in the development of numerous chronic diseases, such as atherogenesis, and contributes to various vascular complications associated with diabetes and aging. Evidence suggests that increasing polyamine intake may have beneficial effects on human health, including a reduced risk of age-related chronic conditions such as cardiovascular diseases and metabolic syndrome, neurodegenerative motor disorders and dementias. Moreover, a higher intake of dietary polyamines has been associated with a significant reduction in the risk of dementia, Alzheimer's disease and vascular dementia in people over 60 years of age.

In this sense, the objective of this conference is to explore and communicate the emerging evidence on the health-promoting effects of dietary polyamines, in the context of aging and age-related diseases. This presentation will focus on the antioxidant properties of polyamines and their potential to mitigate the progression of lipid oxidation, both in biological systems and in food matrices. By consolidating current scientific findings, we aim to contribute to the understanding of polyamines as functional antioxidant components in foods and to support the development of nutritional strategies that promote healthy aging.

Conflict of interest: The author declares no conflicts of interest.

Key words: Polyamines, spermidine, healthy aging, antioxidant activity.

Symposium 20: Advances in research on child nutrition.

S20-01

The importance of assessing pubertal development in child and adolescent nutrition studies

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Background and aims: Pubertal maturation represents a critical biological and psychological period of the life span. Accelerated physical growth, appearance of secondary sexual characteristics, initiation of menarche or spermatarche mark the critical events throughout pubertal maturation. Body composition and their changes during puberty are risk factors for a variety of common, multifactorial adult diseases, including cardiovascular disease, diabetes mellitus, obesity and osteoporosis.

Methods: The main methodological issues in research on puberty are in determining when it begins, how it progresses and how it should be measured. Tanner maturation stage assessed by a trained clinician is considered “gold standard” and a reliable measure. Tanner stages are based on pubic hair development for boys and girls, breast development for girls and genital development for boys. The stages progress from pre-puberty (stage 1), through puberty (stages 2–4) to post-puberty (stage 5). During puberty, changes occur in weight, height and body composition but also in biochemical parameters such as alkaline phosphatase activity, leptin, insulin, IGF1 and sex-steroid hormones levels.

Results: During puberty, the main components of body composition (total body fat (TBF), fat free mass (FFM), bone mineral content (BMC)) all increase and considerable sexual dimorphism exists. Earlier pubertal timing and faster pubertal tempo (pace of progression through puberty) might be associated with increased body mass index (BMI) later in life. There is a clear sexual dimorphism in circulating concentrations of leptin, with girls having higher serum concentrations of leptin than boys before, during and after puberty, even after the greater adiposity in females is taken into account. Cross-sectional studies have shown that puberty is

linked to a reduction in insulin sensitivity with a reduction in insulin sensitivity by approximately one-third.

Conclusion: Nutritional research studies in childhood must take into account the influence of pubertal status, distinguishing between the different developmental milestones. All these changes are related not only to specific nutritional requirements but also to changes in body composition and in the cutoff points for the different variables studied.

Conflict of interest: The author declares that she has no conflicts of interest.

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Key words: Puberty, body mass index, body composition, children, total body fat, fat free mass, bone mineral content, insulin, leptin

S20-02

Lifestyles associated with the development of childhood obesity

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Background: It is estimated that by 2035 at least 2 out of 5 children aged 5 to 19 will be overweight, increasing their risk of cardiometabolic diseases and becoming obese adults. Despite the influence of genetic, environmental, and socio-ecological factors, there is a direct relationship with a modifiable lifestyle.

Objective: To study environmental risk factors in order to identify children and adolescents at risk of developing obesity, so that effective prevention and intervention can be implemented from an early age.

Methods: Spanish GENOBX and PUBMEP cohorts. 1,699 children and adolescents (821 boys and 878 girls), of whom 1,107 are prepubertal and 592 are pubertal. Assessment of lifestyles, socioeconomic status, anthropometric parameters and body composition, and metabolic biomarkers.

Results: The educational level of mothers is associated with children obesity. Most children (70,3%) show low or moderate adherence to the Mediterranean diet. Participants with healthy eating pattern, related to older age and higher Body Mass Index (BMI), show less abdominal fat and better metabolic health than those who consume more sugar and processed foods, regardless of their weight. Metabolically healthy prepubertal children are more active. HOMA- Insulin Resistance (HOMA-IR) and high blood pressure at this stage is a high risk factor for developing Metabolic Syndrome (MetS) in adolescence, when physical activity (PA) time also decreases (30% Light PA, the major contributor). The group with the highest adherence to PA but medium adherence to dietary recommendations has the lowest fat mass and tendency towards lower IR and higher HDL-c. The most inactive children cluster sleeps the least during the week and show worse metabolic biomarkers.

Conclusions: Low physical activity, poor diet and sleep hygiene are risk factors for the development of obesity and its comorbidities. The transition from prepuber to puber is a critical stage. Social determinants of health must be evaluated as soon as possible to prevent obesity.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Overweight, obesity, physical activity, food patterns lifestyle.

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S20-03

Effect of a Mediterranean lifestyle intervention on body composition in preschoolers. Meli-Pop Study

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Background and aims: Obesity in children is a public health problem worldwide. Therefore, it is necessary to implement preventive measures aimed at reducing the prevalence of this disease, as well as its associated complications. The aim is to assess the efficacy of an intervention during early childhood, based on the promotion of a Mediterranean dietary pattern and regular physical activity, compared with a control group, on body fat composition after one year of follow-up.

Methods: The current project is a randomized controlled multi-center clinical trial, in a cohort of children aged 3 to 6 years at baseline. At baseline, children had a body mass index (BMI) < the equivalent of 30 kg/m² in adults, and at least one of the parents had a BMI >25 kg/m². The clinical trial has two arms and was performed in Primary Health centers in 3 Spanish cities: Córdoba, Santiago de Compostela and Zaragoza. The control group received the usual care from healthcare professionals. The intervention group received education on Mediterranean lifestyle (Mediterranean diet and physical activity promotion), combined with the provision of extra-virgin olive oil and fish, to be consumed at least 2 times per week. Physical activity sessions were also offered for free to the children (3 sessions of 60 minutes of moderate-vigorous physical activity per week). Body fat composition and cardio-metabolic markers were measured at baseline and after 12 months of follow-up.

Results: We contacted 1.500 families and 246 accepted to have a 1st examination and enter the run-in period. 206 finally accepted to participate in the trial and were randomized (96 control and 110 intervention, 103 boys and 103 girls). 170 children completed the follow-up period (75 control and 95 intervention). In those completing the protocol, BMI, BMI z-score, fat mass index, and fat mass index z-score changes were significantly lower in the intervention than in the control group, but only in girls. There were no significant results for other body composition indices or in boys.

Conclusion: The intervention promoting Mediterranean lifestyles was effective in terms of BMI, BMI z-score, fat mass index, and fat mass index z-score, but only in girls. More efforts should be deployed in boys to sustain the intervention for a longer time.

Conflict of interest: There are no conflicts of interest.

Keywords: Childhood obesity, lifestyle habits, Mediterranean diet, randomized clinical trial.

S20-04

Physical activity among preschoolers participating in an intervention study on Mediterranean lifestyles. Meli-Pop study

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Background: Childhood is a critical period to get lifestyle habits that can influence long-term health. A combination of physical activity (PA), active lifestyle habits, balanced sleep patterns, and limited screen time can be relevant to prevent cardiovascular diseases and improve health. Specifically, structured, supervised PA and extracurricular sports promote healthy behaviors and can prevent obesity and supports motor, cognitive, and social development.

Aims: To analyze the intensity and duration of PA and to assess changes in body composition, active lifestyle habits, participation in extracurricular sports, screen time, and sleep patterns in preschool children at risk of developing obesity after one year of a multidimensional intervention focus in promoting the Mediterranean lifestyle and PA.

Methods: The MELI-POP study is a multicenter, randomized controlled trial conducted in Spain with children at risk of obesity (RCT, ID: NCT04597281). Eligible participants were children aged 3 to 6y with normalweight/overweight, and with at least one parent having a BMI of 25 kg/m² or higher, without any condition causing overweight. The intervention promoted a Mediterranean diet and structured physical PA, including two weekly supervised sessions and lifestyle education. PA levels were measured by accelerometry, while questionnaires assessed sleep, screen time, and extracurricular sports participation. The control group (CG) without intervention received standard care without specific guidance in nutrition or PA.

Results: 135 children completed the 12-month follow-up. BMI and BMIz-score showed significant group×time interactions, favoring the intervention group (IG). Light PA was preserved in the IG but declined in controls. Sports club participation significantly increased in the IG although sleep duration slightly decreased in this group on weekdays. Screen time rose in both groups by time, with no significant differences between them.

Conclusion: A 12-month intervention in preschoolers maintained moderate PA, boost organized sports participation, and lower screen time, suggesting early comprehensive programs can avoid sedentary habits.

Conflict of interest: The author declares no conflicts of interest.

Key words: Health promotion, exercise, childhood obesity, sports, sedentary behavior.

Symposium 21: New advances in microbiota modulation

S21-01

Probiotics: Where do we come from? Where are we going?

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Abstract: In recent years, the field of probiotics has experienced significant growth, with scientific and clinical advances leading to the development and commercialization of various products. At the same time, demand for probiotics has increased among consumers who are increasingly aware of the close relationship between microbiota and health. Unfortunately, some companies have taken advantage of this situation to apply the term "probiotic" to products that lack adequate quality and/or whose purported benefits lack scientific evidence. Current regulations classify probiotics as nutritional supplements and, as such, they should not be used for the prevention or treatment of diseases, a fact that is not fulfilled in practice.

During the last decade, the interest for novel therapies containing live microorganisms as active substance(s) has emerged with the aim to prevent or cure diseases in human beings. The European Directorate for the Quality of Medicines and Health Care (EDQM), the European Medicines Agency (EMA, EU) and the Food and Drug Administration (FDA) codified these biotherapies as Live Biotherapeutic Products (LBPs). While these innovative products offer healthcare opportunities, they also represent a challenge for developers who need to set the most suitable designs for non-clinical and clinical studies in order to demonstrate a positive benefit/risk ratio through the very exigent quality, safety, and efficacy data that are expected by the drug competent authorities.

Conflict of interest: The author declares no conflicts of interest.

Key words: Probiotics, live biotherapeutic agents, health.

Symposium 22: Physical activity and sport, specific markers in food and nutrition

S22-01

Nutrition and sports performance: What the evidence says about key dietary strategies

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Background and aims: Nutrition is a cornerstone of athletic performance, with diverse dietary strategies proposed to optimize energy availability, recovery, and adaptation. The objective of this consensus was to summarize the scientific evidence on the most popular nutritional approaches in sport, identifying their benefits, limitations, and practical applications.

Methods: A narrative review was conducted, summarizing the main findings of the most relevant dietary strategies currently used by athletes (high-carbohydrate, low-carbohydrate, ketogenic, intermittent fasting, plant-based, paleolithic diets, and carbohydrate periodization).

Results: High-carbohydrate diets remain the most robustly supported approach for endurance performance, whereas low-carbohydrate and ketogenic diets enhance fat oxidation but may compromise exercise economy and high-intensity performance. Intermittent fasting shows potential benefits for body composition and endurance adaptations, although evidence in elite athletes is limited. Plant-based diets, when well planned, do not impair strength or endurance and may even improve cardiovascular health, although attention to critical nutrients is essential. Paleolithic diets may improve body composition and metabolic health but lack strong evidence for direct performance enhancement. Carbohydrate periodization emerges as a flexible and effective strategy, allowing athletes to combine the metabolic adaptations of low-carbohydrate training with the performance benefits of high-carbohydrate availability in competition.

Conclusion: No single dietary strategy is universally optimal. The evidence highlights the importance of individualization according to sport type, training phase, and athlete characteristics. Nutrition professionals play a crucial role in tailoring these approaches, ensuring both performance and health are preserved.

Conflict of interest: The author declares no conflicts of interest.

Key words: Sports nutrition, athletic performance, carbohydrate, ketogenic diet, intermittent fasting, plant-based diet, dietary strategies.

S22-02

Low-carbohydrate diets in sports: Fad or science applied to performance?

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Abstract: Low-carbohydrate (LC) diets have the objective of inducing metabolic adaptations that enhance fat oxidation and minimize dependence on muscle and liver glycogen as source of energy during exercise, all this through modulation of signaling pathways involved in mitochondrial biogenesis, increasing the expression of fatty acid transporters and increasing the reserve of intramuscular triglycerides, which act as an immediate source of energy during exercise, especially at submaximal intensities.

In endurance athletes, long-term low-carb diets maintain glycogen storage and utilization like high-carb diets, while significantly increasing fat oxidation. However, this greater fat reliance raises energy costs and reduces efficiency, potentially hindering performance in high-intensity efforts. Still, benefits like reduced fat mass and improved glycemic control suggest their potential use in pre-season or body composition-focused phases.

However, LC diets can limit the ability to perform multiple high-intensity repetitions and decrease power output in strength and power sports. Although no significant decrease in maximum strength is observed if protein intake is adequate (≥ 1.6 g/kg/day), the ability to maintain performance throughout repeated sessions may be compromised.

In team sports, LC diets have shown decreases in total work performed, as well as alterations in anabolic hormones and bone remodeling parameters increasing the risk of injury or long-term bone health alterations, especially in young populations.

In conclusion, scientific evidence remains heterogeneous, with small sample sizes, varying protocols, and few long-term studies. Supplementation or consumption of foods rich in key micronutrients should be considered. Adaptation to a low-carb diet may be challenging in hot environments due to changes in thirst sensation and water retention, so hydration and thermal control strategies should be optimized. Individualized monitoring is essential, assessing body composition, biochemical and hormonal responses, and subjective performance perception.

Conflict of interest: The author declares no conflicts of interest.

S22-03

Iron, health, and performance: What has changed in the last decade?

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Background and aims: Iron deficiency is among the most prevalent nutritional disorders in female athletes, with

reported rates of up to 60%. Iron is critical for oxygen transport, hemoglobin and myoglobin synthesis, and energy metabolism, all of which directly influence physical performance. A decline in iron stores, even in the absence of clinical anemia, can impair endurance, delay recovery, and reduce competitive capacity.

This lecture aims to review the most recent scientific evidence on iron deficiency in athletes, focusing on its physiological mechanisms, the influence of exercise, and the role of nutrition and supplementation in prevention and management.

Main Findings: The literature indicates that iron deficiency can reduce aerobic performance and endurance capacity by approximately 3–4%. Management strategies vary with severity, but nutritional interventions are fundamental at all stages. Supplementation is especially valuable in specific scenarios, and recent evidence highlights the regulatory role of hepcidin in iron metabolism.

Conclusion: Iron deficiency is a significant limiting factor for sports performance in female athletes, particularly in endurance sports. Properly prescribed and monitored supplementation has been shown to improve aerobic capacity and physical performance, whereas its effects on strength and power remain less clear. These findings underscore the importance of regular nutritional monitoring, periodic assessment of serum ferritin, and individualized supplementation strategies as essential components of both athlete health care and high-performance support.

Conflict of interest: The author declares no conflicts of interest.

Key words: Iron deficiency; athletes; sports performance; supplementation; endurance.

Symposium 23: Present and future of the dairy sector in the three pillars of nutrition

S23-01

Nutritional composition of dairy products: Macronutrients. Importance of the milk matrix

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Background and aims: Milk is one of the most important sources of nutrients, containing a good balance of macronutrients: proteins, fats and carbohydrates, in similar proportions. This allows it to meet the nutritional needs of the body in different physiological states. Milk proteins are considered to be of very high biological quality compared

to plant proteins based on their amino acid composition and bioavailability. In addition, bioactive peptides have documented health benefits which, together with calcium, contribute to regulating body weight and controlling hypertension. While the consumption of milk fat has been controversial in recent decades, the latest evidence suggests that whole milk products should be consumed as they contain bioactive fatty acids, such as short- and medium-chain fatty acids (from C4 to C10) as well as medium triglycerides, which have been shown not to increase cardiovascular risk in healthy individuals when included in the milk matrix and a part of a balanced diet. Furthermore, the phospholipids and sphingolipids in the milk fat globule membrane (MFGM) offer benefits in preventing cognitive decline during ageing.

Conclusion: Dairy products are considered one of the pillars of nutrition thanks to their nutritional value.

- Their wide variety of nutrients makes them very complete foods.
- Their composition makes them suitable for different diets and people with different nutritional requirements.
- They contain a high number of bioactive and functional ingredients that provide health benefits.

Conflict of interest: The author declares no conflicts of interest.

Key words: Milk, bioactive peptides, functional lipids, milk matrix, prevention of chronic diseases, MFGM.

S23-02

Nutritional composition of dairy products: Micronutrients

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Background: Dairy products are nutritionally valuable foods, because in a moderate energy content they provide appreciable amounts of numerous nutrients. However, in recent years there has been a proliferation of messages that have associated their consumption with an increased risk of suffering from numerous diseases, what has led to a gradual decrease in their presence in the diet. Therefore, the objective of this study is to analyze the composition of dairy products, which contribute to the average diet, paying attention to its content in micronutrients. The methodology used was a literature review on this subject.

Results: The ANIBES study, which includes data from a representative sample of the Spanish population (n = 2009) aged 9–75 years, shows that 53.1% of calcium, 32.2% of vitamin B₂, 26.1% of phosphorus, 22.6% of vitamin D, 15.7% of magnesium, 9.5% of vitamin B₁, 9.4% of vitamin B₆ and 9.4% of

niacin in the diet come from dairy products. The insufficient supply of dairy products is highlighted in several studies conducted in Spain. At international level some studies (USDA, 2020-2025) point out that several nutrients are taken in quantity less than the recommended and among them there are three (calcium, vitamin D and potassium) that they are considered to be nutrients of public health interest because their low consumption has been associated with negative health effects. These data point to the importance of improving calcium intake (and its main source: milk and dairy products) to approximate the recommended diet.

Conclusion: It is necessary to demystify the errors that relate the consumption of dairy with suffering from various pathologies and try to approximate the consumption recommended (2-4 rations/ day) to achieve a nutritional and health benefit.

Conflict of interest: Member of the Scientific Committee of InLac (Dairy Interprofessional Organization)

Key words: Milk, dairy products, calcium, riboflavin, micronutrients, health.

S23-03

Dairy products and health status

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Abstract: Milk and dairy products have been used in human nutrition for more than 80 centuries and are included in most international nutrition guidelines. Those products contribute significantly to meeting nutritional needs for protein, calcium, magnesium, phosphorus, potassium, zinc, selenium, vitamin A, riboflavin, vitamin B12, and pantothenic acid. The contribution of milk and dairy products as a source of calcium in Western countries is particularly noteworthy.

It is likely that many of the beneficial effects of milk and dairy products are due to interactions between nutrients, and not just the action of each one separately. Due to the high nutrient density of these foods, they are key to meeting the high nutrient demands of pregnancy and lactation and infancy and childhood. In addition, the consumption of dairy products in elderly individuals helps reduce the risk of frailty, thereby decreasing the risk of sarcopenia and vertebral fracture.

The current scientific evidence indicates that total dairy consumption, total yogurt consumption (and its different subtypes), and total milk consumption are associated with a lower risk of developing metabolic syndrome. Furthermore, consumption of whole milk products is not associated with the incidence of the syndrome. Likewise, numerous cohort follow-up studies indicate that dairy products, especially yogurt and fermented dairy products, as well as low-fat dairy products, play a significant role in the prevention of type 2 diabetes mellitus. Moreover, several meta-analyses indicate that total dairy consumption does not negatively affect the risk of CVD and, moreover, appears to have a subtle protective effect. Also, it is associated with a lower risk of mortality and serious cardiovascular events. Finally, consumption of total dairy products and total milk is associated with a lower risk of developing colorectal cancer (CRC) in all locations and with a lower risk of bladder cancer.

Conflict of interest: The author declares no conflicts of interest.

Key words: Cancer, cardiovascular diseases, health, dairy products, metabolic syndrome, milk, type 2 diabetes mellitus.

Symposium 24: New horizons in milk consumption and food safety

S24-01

Perspectives on A2A2 milk and its effects on human health

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Abstract: Milk contains several components, such as bioactive peptides, lactoferrin, casomorphins, and lactalbumins, which have amply demonstrated their antioxidant and anticancer properties. Milk and dairy products are included as basic and fundamental foods in the Atlantic diet, a diet that we at USC have been protecting and promoting since the first international congress on the diet was held in 2003.

Regarding the environmental aspect, its carbon footprint is among the lowest of traditional diets (e.g., similar to the Mediterranean diet), with a value of less than 4.0 kg of CO₂ equivalent per person per day for a standard daily intake of 2,500 kcal, indicating that it is one of the least polluting. It also has a nutritional index that exceeds 550, among the best for traditional and healthy diets. However, numerous

articles continually comment on the problems associated with the dairy sector, which is suffering from an almost permanent crisis, resulting in its typically low profitability and, despite the quality of the product, the number of farms is decreasing year after year.

But why is this overall decline occurring among the Spanish population? Among several important causes of abandoning milk consumption is the high percentage of the population who perceive themselves as lactose intolerant. A recent study by our research team indicates that many people self-diagnose themselves as lactose intolerant when in reality they are not, since the symptoms they report, although similar, are not actually the same because the causes that lead to one situation or the other are different.

Therefore, how can we contribute to alleviating these problems not only associated with the sector but also those of the population who want to continue drinking milk? By acting on and avoiding one of its possible causes: the presence of a peptide called β CM7 derived from the hydrolysis of β -casein in milk type A1/A1.

Milk casein represents 80% of total milk proteins, and of all caseins, β -casein accounts for 37%. It should also be noted that the protein profile of cow's milk depends on genetic makeup and not on diet. The mutation that promotes the appearance of type A1 is very recent, as we will discuss later. We have previously discussed the presence of bioactive compounds in milk. There are other bioactive components generated by proteolysis in our digestive system, which are involved in numerous biochemical processes, interacting with our organs at a systemic level, many of them beneficial, but others originating from different variants of β -casein are not.

Specifically, one of them, β -casomorphin-7 (β CM7), is implicated in the development or enhancement of various gastrointestinal, neurological, and cardiovascular effects that are negative for human health, especially when there is altered intestinal permeability.

Not all caseins are the same. The gene encoding β -casein synthesis is the CNS2 gene. ITS EXPRESSION results in its corresponding types of β -casein, for which 13 different allelic variants have been described (A1, A2, A3, B, C, D, E, F, G, H1, H2, I, and J). Of these, the A1 and A2 alleles are the most common, and their differences will give rise to what we now know as "A2 milks." This allelic differentiation will greatly influence the final quality of the product, as well as its impact on human health and its technological properties.

The A1 version of β -casein has a histidine at position 67 that allows cleavage, releasing a 7-amino acid chain called and previously described as β CM7, triggered by the action of the enzyme Dipeptidyl peptidase IV (DPPIV). In the case of the A2 version of β -casein, it has a proline at position 67

instead of a histidine, which protects this anchor from peptidase activity and therefore prevents its release. Likewise, an increase in the content of this peptide has been found in raw cow's milk, probably due to the increase in somatic cells (SC). Therefore, in animals with a high somatic cell count, a significant release of β CM7 may occur, revealing its presence directly in the milk before it is processed and ingested. The alteration in intestinal permeability allows β CM7 to pass into the bloodstream and interact with opioid receptors found in the GIT and in the endocrine, immune, and central and peripheral nervous systems. Therefore, its presence in humans will involve interaction with these receptors distributed throughout the body, also exerting negative effects on other parts of the body, such as the cardiovascular, neurological, and endocrine systems. These effects hinder the relationship between cow's milk consumption and its health benefits, which has led part of the human population to seek alternatives to its consumption, regardless of whether or not they have altered intestinal permeability.

Effects of A2 milk on human health: It has been proven that the negative effects of the presence of β CM7 become more evident when the permeability of the intestinal barrier is decreased, as in the case of a woman with a history of breast cancer. In the immature intestine of early childhood, Crohn's syndrome, ulcerative colitis, irritable bowel syndrome, precancerous polyps, colorectal cancer, food intolerances such as lactose intolerance, gastritis, *Helicobacter pylori* infection, or hiatal hernia. The same does not apply to the type of casein produced by A2 β -casein. In fact, the concentration of β CM7 in the intestine was found to be four times higher when produced from A1 β -casein than from A2 β -casein. Furthermore, β CM7 was detected in the blood after digestion of A1 milk, but not after consumption of A2 milk.

Consumption of A2 milk has also been shown to increase the natural production of glutathione, a potent antioxidant with consequent health benefits.

The potential beneficial effects of consuming A2 milk compared to A1 milk are primarily related to allergic responses, oxidative stress, diabetes, cardiovascular health, neurological disorders, sudden infant death syndrome, and the modulation of the gut microbiota, preventing negative alterations in its composition.

Conclusions and Future Perspectives: Although the positive results obtained in animal studies on the health effects of A2 milk have not always been confirmed in humans, there appears to be sufficient consensus regarding the beneficial effects of A2 milk in reducing digestive intolerance associated with the consumption of milk containing A1 β -casein. However, literature reviews on this topic indicate that these are only indications. In the absence of more conclusive evidence, further research is needed. This is of great importance, since a large proportion of consumers who have

stopped drinking milk have done so because conventional milk causes discomfort, and A2 milk can be an affordable alternative to reintroduce that consumption.

On the other hand, it is necessary to increase public awareness about this type of milk and its products, making it necessary to improve its dissemination through marketing campaigns. On another note, we believe it is very interesting to learn how lipidomic studies are allowing us to identify lipid components that appear in A2 milk but not in A1 milk, which provides a novel perspective for understanding the nutritional value and health benefits of consuming A2 milk beyond the effects derived from the presence or absence of β CM7. For example, the α -linolenic acid (W3 of terrestrial nature) content of A2 milk is almost double that of milk with the A1 variant. These types of studies of metabolic pathways involved in the CNS2 gene mutation will help to DEEPEN our understanding of whether A2 milk has a more significant nutritional value.

The economic benefit and product differentiation are already clear, provided that production costs are similar, and that the transition from current production to A2 milk is gradual and does not require excessive investments.

Conflict of interest: The author declares no conflicts of interest.

Key words: A2A2 milk, 7-beta-caseomorphin, dairy products and health.

S24-02

Breastfeeding and probiotics in the early stages of life

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Abstract: Breastfeeding is the main source of nutrition in the first months of life and plays a decisive role in the development of the immune system and in the modulation of the infant's intestinal microbiota. Breast milk contains bioactive components, including oligosaccharides, commensal bacteria, and metabolites, that promote the establishment of a healthy intestinal ecosystem.

Scientific interest in the use of probiotics in early life has increased significantly, given their potential usefulness in preventing dysbiosis, gastrointestinal infections, atopic eczema, and other immune-related conditions.

To review the current evidence regarding the efficacy and safety of probiotic use in breastfeeding mothers and naturally fed infants. Aspects such as modulation of maternal and infant microbiota, improvement of breastfeeding conditions (comfort and prevention and treatment of mastitis), CMPA, eczema and dermatitis, and infant colic will be addressed.

A comprehensive review of the available scientific literature (PubMed, Scopus, Web of Science) on recent clinical trials and meta-analyses on the administration of probiotics in mothers and infants was conducted.

Breastfeeding and early establishment of the microbiota.

Evidence of the safety and efficacy of certain probiotic strains administered in the early stages in relation to:

- Reducing the incidence and duration of acute gastroenteritis.
- Decreasing the prevalence of infant colic.
- Reducing the risk of atopic dermatitis, especially in children with a family history of allergies.
- Prevention of CMPA.
- Improvement of breastfeeding conditions.

Breastfeeding is the optimal and natural strategy for modulating the microbiota and promoting health in the early stages of life.

Probiotics selected and supported by scientific evidence can act as a supplement in certain clinical situations, improving immune maturation and reducing the incidence of common childhood diseases.

Future research should focus on identifying specific strains, optimal doses and administration times, as well as evaluating long-term effects.

Conflict of interest: The author declares no conflicts of interest.

Key words: Breastfeeding, probiotics, microbiota, atopic dermatitis, infant colic.

S24-03

Importance of dairy products in old age and their role in longevity

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Abstract: Dairy consumption in older age is a topic of great relevance to public health and nutritional gerontology, as it promotes healthy aging and prolongs life expectancy in conditions of independence. Dairy products (milk, yogurt, kefir, and cheese) are one of the main sources of calcium, high-quality proteins, phosphorus, B vitamins, and other bioactive compounds, which we will discuss, and can have a beneficial impact on bone, muscle, cardiovascular, and immune health.

Furthermore, with age, the absorption of certain nutrients, such as calcium, is impaired due to the synthesis of less vitamin D in the skin, leading to nutrient deficiencies and anabolic resistance, which requires a higher protein intake to maintain muscle mass.

Dairy Proteins and Muscle Mass Preservation

Milk proteins, composed of 80% casein and 20% whey proteins, contain all the essential amino acids. Leucine, abundant in whey, is especially important because it stimulates the mTOR pathway, triggering muscle protein synthesis. In older adults with anabolic resistance, consuming 25–30 g of protein per meal rich in leucine has been shown to improve muscle mass and strength. For example, whey supplements are widely used in geriatric rehabilitation programs to combat sarcopenia.

Calcium, Phosphorus, and Bone Health: Adequate calcium intake is essential to prevent bone loss and fractures. The phosphorus present in dairy products is equally important, as it is part of bone hydroxyapatite. Prospective studies show that regular dairy consumption is associated with higher bone mineral density in the hips and spine. **Bioactive Milk Peptides:** Some of these peptides have antihypertensive activity by inhibiting the angiotensin-converting enzyme (ACE) inhibitor. Other peptides possess immunomodulatory, antioxidant, and antithrombotic properties. These functions are particularly relevant in old age, where hypertension, chronic inflammation, and cardiovascular risk are more common. Among the relevant peptides is lactoferricin, derived from lactoferrin, a protein present in milk. It inhibits cancer cell growth and promotes apoptosis with anti-inflammatory properties. Some studies suggest that lactoferrin may also modulate the immune response, reduce oxidative stress, and protect against respiratory infections. Casomorphins, opioid peptides found in casein, a protein present in milk, have antiproliferative effects on cancer cells, especially in colon and breast cancer. The suppression of T47D cell proliferation by opioids is achieved through the κ and δ opioid receptors. Finally, alpha-lactalbumin, a peptide present in the protein lactalbumin, has been shown to have antitumor properties.

Probiotics in Fermented Dairy Products: Yogurt and kefir contain beneficial live bacteria, such as *Lactobacillus* and *Bifidobacterium*, which help maintain the balance of the gut microbiota. In older adults, a diverse microbiota is associated with less systemic inflammation, improved glucose metabolism, and better cognitive function.

Milk Fat and Functional Compounds: Milk fat, far from being a simple vehicle, contains phospholipids, sphingomyelin, conjugated linoleic acid (CLA), and short-chain fatty acids, which may exert anti-inflammatory and metabolic effects. Milk fat globule membrane (MFGM) has shown potential benefits for cognitive health and the integrity of neuronal membranes. Relationship between dairy consumption, longevity, and its synergy with physical exercise. Epidemiological studies in long-lived populations, such as those in Okinawa, Sardinia, and Ourense, have observed that the consumption of fermented dairy products is integrated into healthy dietary patterns. For example, the PURE study found that consuming two or more servings of dairy products per day is associated with lower total mortality and a lower incidence of cardiovascular events. To maintain muscle mass, high-impact and resistance exercises should be performed to promote bone health, as well as balance activities to prevent falls.

Conflict of interest: The author declares no conflicts of interest.

Key words: Dairy products, old age, longevity, calcium, phosphorus, bioactive milk peptides, milk fat.

Symposium 25: Omega-3 index as a marker of cardiovascular risk in the Spanish population. The OMEGA-PRED Study

S25-01

Update on primary prevention of CVD: Impact of diet

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Abstract: Clinical practice guidelines help professionals make decisions in their daily practice based on the best available scientific evidence. Healthcare professionals inform patients or their caregivers about diet, a key aspect of cardiovascular risk. Arteriosclerotic disease is directly related to risk factors such as obesity, high blood pressure,

dyslipidemia, and diabetes, all of which are directly linked to unhealthy nutrition.

The best way to reduce the morbidity and mortality associated with these diseases through primary prevention is by promoting a healthy lifestyle, in which diet is the cornerstone, as is avoiding tobacco and achieving a healthy weight. The influence of diet on cardiovascular risk through adequate control of blood pressure, blood lipids, weight, and blood glucose will be presented according to the latest evidence from the clinical guidelines with the greatest scientific impact, in which sustainability promotes a shift to a plant-based dietary pattern.

Conflict of interest: The author declares no conflicts of interest.

Key words: Diet, health, guidelines, cardiovascular disease.

S25-02

Update on Omega-3 and cardiovascular health

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Abstract: After a critical analysis of the strengths and limitations of existing studies, a modest research agenda is proposed in this field, which includes, among other aspects. Better characterization of the type of omega-3 fatty acid, dosage, type of individuals, and other circumstances under which supplementation may yield greater benefits.

An interesting option is a new trial with mixed characteristics of the VITAL and REDUCE-IT trials:

- General population free of cardiovascular disease.
- Low fish consumption / low Omega-3 Index.
- 4 g/day of EPA versus neutral placebo.
- Monitor the Omega-3 Index throughout the trial and adjust the supplement dose based on achieved levels.
- Stratify by race.

Should clinical trials on hard clinical outcomes be conducted with enriched foods in individuals with low fish consumption and/or elevated triglycerides for primary cardiovascular prevention?

This communication reviews the main evidence on the effect of marine-derived omega-3 fatty acids, EPA and DHA, on cardiovascular risk (incidence and mortality from cardiovascular diseases). The review draws on information

from observational epidemiological studies and clinical trials regarding the effects of:

- Consumption of fatty and very fatty fish.
- Dietary intake of EPA and DHA.
- Circulating levels of omega-3 after acute intake (plasma) or longer-term intake (red blood cells).
- Consumption of omega-3 fatty acid supplements at low-medium and high doses (prescription medications).

Conflict of interest: This session has been funded by PULEVA, which manufactures foods enriched with omega-3 fatty acids.

S25-03

Assessment of the omega-3 fatty acids index in the Spanish population: The ‘OMEGAPRED Study’

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Abstract: The omega-3 index is a biomarker that reflects the sum of the percentages of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in red blood cells (RBC), i.e., the omega-3 nutritional status. Interest in this index has increased due to its potential association with cardiovascular and metabolic health. While several studies have assessed the omega-3 index in some countries, no data are available for the Spanish population.

The OMEGAPRED study (“Evaluation of the nutritional status of omega-3 fatty acids and the possible influence of dietary patterns and socioeconomic factors in the Spanish population over 60 years of age”) aims to evaluate the omega-3 index in a group of adults older than 60, and its relationship with cardiometabolic health.

The omega-3 index should be determined in isolated RBC, but obtaining these cells before the fatty acids analysis is time-consuming and makes it difficult to assess the omega-3 status in the population. Nevertheless, fatty acids can also be measured in whole blood using dried blood spots, obtained from a simple finger prick. Although this procedure measures fatty acids present in RBC together with

fatty acids present in plasma (derived from the diet), it does not require RBC isolation, and greatly facilitates sampling. However, this methodology requires statistical correction to eliminate the influences of those lipids present in plasma. Therefore, a second objective of this project is to validate dried blood spot analysis against RBC measurements in the Spanish population by developing regression equations to reliably estimate the omega-3 index from dried blood spots, enabling broader participation and facilitating large-scale nutritional studies.

The omega-3 index appears to be a promising tool for the prevention and monitoring of cardiometabolic risk. Its clinical application could support early detection and provide a more personalized approach to nutritional intervention strategies.

Conflict of interest: The author declares no conflicts of interest.

Key words: Omega-3 index, eicosapentaenoic acid, docosahexaenoic acid, dried spots.

Symposium 26: The microbiome at different stages of life

S26-01

The female genitourinary microbiota: Composition and functions

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Abstract: The vaginal microbiota is modulated by estrogen secretion, which induces mucosal humectation and nutrient availability. Thus, it is scarce before menarche and after menopause, and abundant along the fertile period, especially during pregnancy. About 80% of women are mainly colonized by one of four lactobacilli species during this last period, namely, *L. crispatus*, *L. gasseri*, *L. iners* or *L. jensenii*, allowing their classification into four vaginotypes (I, II, III and V, respectively). Those belonging to vaginotype IV harbor a complex mix of anaerobic bacteria and are more prone to suffer infectious and other illnesses. The lactobacilli extend to the urethra and also protect the urinary tract. Changes in the vaginal microbiota are observed as well during the menstrual cycle, with a nadir of lactobacilli during menses, which allow the transitory predominance of minor vaginal bacteria such as *Gardnerella vaginalis* and *Fannyhessea vaginae*.

Lactobacilli protect the genitourinary apparatus against infections through masking the pathogen epithelial receptors, production of antimicrobials (mainly lactic acid and hydrogen peroxide) and clumping to the invading microorganisms. Lactic acid exerts its antimicrobial effect through acidification of the vaginal environment to pH 4 – 3.5 but also induces tolerogeny to protect spermatozoa from immune attack, and promotes expression of the *zonula occludens* genes, thus increasing the impermeability of the mucosa towards viruses.

Lactobacilli predominance abolition can be the consequence of physiological changes (e.g. menopause) pathogen production of antagonizing molecules (e.g. biogenic amines) and life-style predisposing habits (e.g. vaginal douches) and increment the possibility of illness occurrence. Treatment can be done with topical organic acids or antiseptics and oral or vaginally applied antibiotics and probiotics. The advantage of the last is that they, in addition, regenerate the vaginal environment.

The vaginal colonization by lactobacilli is exclusive of women among mammalian females. This has profoundly influenced human evolution through oestrus abolition and potentiation of social relations, while also allowing bipedation and brain volume increase.

Conflict of interest: The author declares no conflicts of interest.

Key words: Vagina, microbiota, genitourinary, lactobacilli, lactic acid.

S26-02

The intestinal microbiome and aging

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Abstract: Aging is characterized by impaired homeostasis, which increases the risk of morbidity and mortality. The homeostatic systems, the nervous, endocrine, and immune system, experience deterioration with aging, due to chronic oxidative and inflammatory stress. The intestinal microbiota establishes bidirectional connections with these systems that are crucial to their development and function. Thus, these interactions are also essential for maintaining homeostasis and health. During aging, changes in the microbiota occur, including a decrease in diversity and microorganisms with antioxidant and anti-inflammatory properties, as well as an increase in pro-oxidant and pro-inflammatory

bacteria. This age-related imbalance, or dysbiosis, contributes to "oxi-inflamm-aging" and is related to alterations in homeostatic systems and health maintenance. Therefore, the intestinal microbiome has recently emerged as a significant factor in the aging process. Consequently, the ability of lifestyle factors that affect homeostatic systems and the gut microbiota, such as diet, to modulate this process is being studied. A diet rich in antioxidants and anti-inflammatory components positively affects the microbiota and homeostatic systems, decreasing the rate of aging and increasing longevity. Similarly, probiotic use has also been shown to be effective in this context. To determine whether deterioration in the microbiota initiates changes in homeostatic systems during aging or *vice versa*, fecal microbiota transplantation (FMT) is a valuable tool. We have observed that FMT from adults, and especially from long-lived, mice improve the behavioral, immunological, and oxidative-inflammatory states of old animals. These improvements are associated with slowed aging and increased lifespan. Conversely, FMT from old mice to adults causes deterioration of the microbiome and homeostatic systems, as well as increased oxidative-inflammatory stress, accelerated aging and reduced lifespan. In conclusion, the intestinal microbiome appears to play a crucial role in aging and, consequently, in longevity. Nevertheless, further research is needed, in this context, to develop strategies that promote healthy aging.

Conflict of interest: The author declares no conflicts of interest.

Key words: Microbiome, aging, homeostatic systems, diet, probiotics, fecal microbiota transplantation, longevity.

Symposium 27: Adequate hydration, a key element in the Mediterranean Diet

S27-01

Hydration: Quantities, frequency, and beverage typology in Spanish children and adolescents. The EnComCol Study

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Background: Adequate water intake has been defined in the European Union (EU) since 2010 by the European Food Safety Authority (EFSA). EFSA's adequate water intake recommendations, based on water and beverage consumption, range from 2-2.5 liters depending on sex, physiological status, physical activity, and environmental conditions. For children aged 6-11 years, the recommended intake is 1.9-2.1 liters, for adolescents, the recommendations align with those for adults over 18 years: 2-2.5 liters. The 2017 summary publication of recommended dietary intakes for the EU population includes adequate water intake guidelines. It is essential to assess the total beverage consumption of the population to determine whether EFSA requirements are being met.

Objectives:

- To determine whether children (6-11 years) and adolescents (12-17 years) meet EFSA recommendations for water intake.
- To analyze beverage consumption in this population based on the type of school they attend (public, semi-private, private).

Methodology: Review of water intake data from the EFSA Journal and fieldwork conducted in six regions in Spain [Center, n= 200, Northeast, n= 320, South, n= 120, Levant, n= 120, North, n= 120, and Northwest, n= 120), involving a representative sample of n = 500 children and n = 500 adolescents (total n = 1000), segmented by school type. Daily total beverage consumption was recorded, including intake at each meal and before bedtime, with a differentiated assessment of whether participants attended school lunch programs.

Results: Across the total study population, 5024 beverages were recorded, identifying 36 different types. The 10 most frequently reported beverages (water, whole milk with cocoa, whole milk, semi-skimmed milk with cocoa, semi-skimmed milk, milkshakes, liquid yogurt, fresh orange juice, fruit juice, and pineapple juice) accounted for 91.08% of total consumption. Among students attending school lunch programs, 1529 beverages were recorded. The top 10 beverages (water, whole milk with cocoa, whole milk, semi-skimmed milk with cocoa, semi-skimmed milk, milkshakes, liquid yogurt, fruit juice, fermented milk with *Lactobacillus acidophilus* sp., and pineapple juice) represented 93.26% of total consumption, slightly higher than the general population, with minor variations in the last three items.

Beverage types a long the day. Population of 6-17 years old . Total schools			Beverage types a long the day. Population of 6-17 years old . Total schools		
Children 6 to 17 years old			Children 6 to 17 years old		
Global			School cafeteria		
Total schools			Total schools		
Beverage	Total	%	Beverage	Total	%
Water	3036	60.43	Water	908	59.39
Whole milk with cocoa	479	9.53	Whole milk with cocoa	154	10.07
Whole milk	271	5.39	Whole milk	117	7.65
Semi-skimmed milk with cocoa	153	3.05	Semi-skimmed milk with cocoa	42	2.75
Semi-skimmed milk	134	2.67	Semi-skimmed milk	38	2.49
Milkshakes	121	2.41	Milkshakes	37	2.42
Liquid yogourth	90	1.79	Liquid yogourth	35	2.29
Fresh orange juice	79	1.57	Fruit juice	30	1.96
Fruit juice	78	1.55	Liquid fermented milf with <i>Lactobacillus acidophilus</i> sp.	21	1.37
Pineapple juice	70	1.39	Pineapple juice	23	1.50
Orange juice	65	1.29	Fresh orange juice	21	1.37
Liquid fermented milf with <i>Lactobacillus acidophilus</i> sp.	56	1.11	Orange juice	18	1.18
Cola soft drink with sugars	51	1.02	Skimmed milk with cocoa	13	0.85
Milk and fruit juices sof drink	50	1.00	Milk and fruit juices sof drink	13	0.85
Peach juice	42	0.84	Peach juice	11	0.72
Skimmed milk with cocoa	41	0.82	Apple juice	9	0.59
Whole milk with coffe	38	0.76	Cola soft drink with sugars	8	0.52
Skimmed milk	33	0.66	Skimmed milk	6	0.39
Fuit juice soft drink with sugars	23	0.46	Vegetable beverage	6	0.39
Apple juice	22	0.44	Semi-skimmed with coffee	5	0.33
Semi-skimmed with coffee	16	0.32	Whole milk with coffe	3	0.20
Vegetable beverage	15	0.30	Tea soft drink with sugars	3	0.20
Tea soft drink with sugars	13	0.26	Liquid fermented milk with <i>Bifidus</i> sp.	2	0.13
Cola soft drink free sugars	11	0.22	Skimmed milk with coffee	1	0.07
Skimmed milk with coffee	8	0.16	Herbal tea	1	0.07
Herbal tea	8	0.16	Liquid fermented milk kéfir type	1	0.07
Lemon juice	4	0.08	Tea soft drink free sugars	1	0.07
Mineral salts soft drink with sugars	3	0.06	Fuit juice soft drink with sugars	1	0.07
Fruit juice soft drink without added sugars	3	0.06	Cola soft drink free sugars	1	0.07
Whole milk lactose free with/without cocoa	2	0.04	Whole milk lactose free with/without cocoa	0	0.00
Coffee	2	0.04	Coffee	0	0.00
Liquid fermented milk with <i>Bifidus</i> sp.	2	0.04	Lemon juice	0	0.00
Tea soft drink free sugars	2	0.04	Mineral salts soft drink with sugars	0	0.00
Liquid fermented milk kéfir type	1	0.02	Mineral salts soft drink free sugars	0	0.00
Mineral salts soft drink free sugars	1	0.02	Fruit juice soft drink without added sugars	0	0.00
Energydrink	1	0.02	Energydrink	0	0.00
Total	5024	100.00	Total	1529	100.00

Table of total population consumption, total by school type, and for overall and specific consumption among school lunch attendees.

Conclusions: Nutrition education on adequate water intake and daily beverage consumption in children and adolescents, according to EFSA guidelines, is essential. The top 10 reported beverages account for over 90% of total intake, which is considered adequate. For the remaining 10%, targeted interventions based on population group, school type, and time of consumption are needed to increase this 90-93% coverage.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Hydration, beverages, intake, children, adolescents.

S27-02

Hydration and medication

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Background: Just as certain nutrients and dietary components can cause an increase in diuresis or an increase in water needs (diarrhea, loss of thirst sensation, etc.), the administration of drugs can have the same effects in at-risk populations for dehydration such as the pediatric population, the elderly, pregnant and breastfeeding women, but also in groups with various pathologies or those on multiple

medications, exacerbating fluid loss or hindering proper replenishment of fluids.

Some medications have a close relationship with the body's hydration status. Among them, drugs for the treatment of digestive system and metabolic disorders such as metformin, SGLT2 inhibitors, antacids, and laxatives, proton pump inhibitors, drugs for the treatment of cardiovascular system disorders such as diuretics and antihypertensives, non-steroidal anti-inflammatory drugs (NSAIDs), drugs for the respiratory system, etc.

Both the active ingredients and the excipients of the drugs can alter the hydration status of the patients.

Conclusion: The alteration of hydration status will be much more evident in older patients, who have a lower physiological capacity to regulate water balance, and due to the greater dehydrating effect that may arise from the individual effects of each of the medications that are part of their polypharmacy.

Dehydration can have serious consequences as it is directly related to people's thermoregulation capacity.

It is recommended to understand the impact of medications on hydration status, as these interactions should be a basis for pharmaceutical advice in daily care.

Conflict of interest: The author declares no conflicts of interest.

Key words: Nutrient, drug, food-drug Interaction, dehydration, water balance, pharmaceutical advice.

S27-03

Hydration, physical activity and sport in the Mediterranean context.

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Background and aims: Proper hydration is essential for life. During physical activity (PA) and exercise, fluid needs are increased to perform properly and to prevent dehydration, which can impair performance, lead to heat stress, and cause symptoms like fatigue and dizziness, and in extreme cases, to heat stroke and death. The objective of this work is to review and update recommendations.

Methods: Literature review performed in PubMed, Google Scholar, and on web pages of scientific societies.

Results: Consensus exists about the importance of proper hydration strategy, before, during and after PA and exercise.

In hot climates, like the Mediterranean, thermoregulation can be impaired, which implies higher risk of exertional heat stroke. Individual susceptibility is dependent on the interaction of both intrinsic and extrinsic factors, like age, sex, body size, fitness level, acclimatation, medication, drugs, and thermal environment. Authors agree on the importance of being euhydrated at start, to consume beverages containing electrolytes and carbohydrates during exercise. Hyponatremia can occur in long-lasting events, when plain water without sodium is consumed. After exercise, the goal is to replace any deficit. Fruits typical from the Mediterranean region, or cold soups, like gazpacho, are rich in water, antioxidants, magnesium and potassium. Positive effects can go beyond hydration, i.e. preventing post-exercise cellular damage or inflammation.

Conclusion: Hydration during PA and exercise in the Mediterranean region requires a proper and individualized strategy, considering climate circumstances, which starts hours before the activity and lasts until several hours after the event. Mediterranean foods and drinks can be part of the hydration strategy, together with water and sport beverages.

Conflict of interest: The author declares no conflicts of interest.

Key words: Fluid intake, exercise, Mediterranean diet.

Symposium 28: Fish: Health and sustainability

S28-01

Benefits and risks of fish consumption

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Abstract: Fish is an important source of energy, high-quality proteins, fat, vitamins, and minerals. Within lipids, n-3 long-chain polyunsaturated fatty acids (n-3 LC-PUFA), so-called “omega-3 fatty acids, mainly eicosapentaenoic acid (EPA, 20:5 n-3) and docosahexaenoic acid (DHA, 22:6 n-3), play an important role in health promotion and disease prevention. Fishery products are the main source of omega-3 fatty acids in the diet. The nutritional importance of n-3 LC-PUFA derives from their metabolic implications in different physiological and pathological mechanisms.

In contrast to the potential health benefits of dietary fish intake, certain chemical pollutants, namely heavy metals and some organic compounds contained in seafood have emerged as an issue of concern, particularly for frequent fish consumers and sensitive groups of populations. The present review aims to summarize the health benefits and risks of fish consumption.

Omega-3 fatty acids are present in membranes and influence their structure and functions. Indeed, they are key nutrients for growth and maturation during pregnancy and early life. In addition, they are precursors of many anti-inflammatory mediators, i.e., eicosanoids and docosanoids, and modulate the expression of key genes. DHA has a major role in the development of the brain and retina during fetal development and the first 2 years of life, and positively influences neurodevelopment, mainly visual acuity and cognitive functions. n-3 LC-PUFA are also effective in preventing cardiovascular events (mainly stroke and acute myocardial infarction), especially in persons with high cardiovascular risk.

In contrast, there is convincing evidence of adverse neurodevelopmental outcomes in infants and young children associated with methylmercury exposure during fetal development due to maternal consumption of certain fish during pregnancy. Dioxins and polychlorinated biphenyls present in contaminated fish may also pose a risk for both infants and adults. However, for major health outcomes among adults, the vast majority of epidemiological studies have proven that the benefits of fish intake exceed the potential risks, except for a few selected species in sensitive populations.

Conflict of interest: The author declares no conflicts of interest.

Key words: Dioxins, fish health risks, fish, fish health benefits, methylmercury, omega-3 fatty acids, polychlorinated biphenyls.

S28-02

Importance of fish consumption during pregnancy and breastfeeding

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Abstract: A recent study in Spain highlights that only a 25% of pregnant women met the recommendations on fish intake¹. The Spanish Agency for Food Safety (AESAN) recommended that pregnant women avoid consuming some fish types high in mercury. Following the advisory, some pregnant women decreased not only these fish species but also their total fish intake which may affect fetal development. The balance of contaminant risk and nutritional benefit from maternal prenatal fish consumption for child development is clear and already the European EFSA panel (EFSA NDA Panel 2014) and AESAN in Spain recommended the consumption of fish several times a week (NAOS Strategy pyramid) due to its beneficial effects on health. Furthermore, fish is a fundamental part of the Atlantic diet and Mediterranean diet.

Observational large studies as the ALSPAC cohort in UK with 11875 participants² or the Danish Cohort with more than 25000 mother-infant pairs³ reported significant positive associations between maternal fish consumption and measurements of children's neurodevelopment. Despite methyl mercury impairs neurodevelopment⁴ if the fish intake is higher than 2 portions/week versus non fish intake the benefits of the rest of fish compounds may still contribute to improved neurodevelopment in children at 3 years old⁴. In the INMA Spanish birth cohort, despite elevated prenatal exposure to Hg, no detrimental impact on the neurobehavioral function of the children was observed from early childhood to pre-adolescence⁵. Actually, the results on neurodevelopment effect of prenatal mercury consumed are far to be conclusive⁶. In Spain, since 1977, there have been maximum limits of mercury in fishing products established at the national level, and from 2001 were assumed those of the European Union. Dietary fish should be selected from a wide range of species without undue preference for large predatory fish, which are more likely to be contaminated with methylmercury, based on safety considerations. The consumption of small species of oily fish can be consumed without any problem and do not exceed the provisional tolerable weekly intake for methyl mercury and it is essential to cover DHA recommendations during pregnancy estimated at least in 200mg/d. Diet can be complemented with non-oily fish to cover the 3-4 portions/week recommended by AESAN to pregnant women.

LC-PUFA n-3 also have an important role on the fetal immune system programming. A recent Meta-analysis including 31 studies reported an inverse linear association between maternal fish intake and risk of eczema in children; such that every additional 30-gram per week consumption of fish during pregnancy was associated with a 4% reduced risk of eczema⁷. Moreover, prospective epidemiological and dietary intervention studies indicated that "oily fish" consumption or dietary n-3 LCPUFA supplements (equivalent

to a range of 250–500 mg of EPA plus DHA daily) decreased the risk of mortality from CHD and sudden cardiac death in adults (EFSA Panel NDA 2012).

Both fish and seafood provide the recommended amounts of n-3 LCPUFA in most of the European countries and contributes to the needs of other essential nutrients, such as vitamin D, iodine or selenium, which is essential for pregnant women and fetal development.

Conflict of interest: The author declares no conflicts of interest.

Key words: Fish, mercury, pregnancy, prenatal.

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S28-03

Fish consumption and disease prevention

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Abstract: Regular fish consumption is considered a fundamental component of a balanced diet and is associated with a significant reduction in the risk of various chronic diseases. The scientific evidence consistently demonstrates the protective effects on the leading causes of mortality worldwide: cardiovascular disease, cerebrovascular disease, and cancer. Eating at least two servings of fish per week has been linked to a lower risk of cardiovascular events and mortality, especially in individuals with pre-existing cardiovascular disease.¹ The anti-inflammatory and antithrombotic properties, in addition to the improvement in the lipid profile, of long-chain omega-3 fatty acids, which are present in fish, have been identified as the potential mechanisms underlying these benefits.¹

At the brain level, the high lipid content of the brain renders it particularly receptive to the benefits of omega-3 fatty acids. The ingestion of fish has been demonstrated to be associated with a reduced risk of cognitive decline, dementia, and Alzheimer's disease.² Additionally, an inverse relationship has been observed between seafood intake and the risk of depression and stroke.

Regarding cancer, although the evidence is more heterogeneous, protective effects of fish consumption have been identified in several types of tumors, including breast, colon, and liver cancer.³ These benefits are attributed to the immunomodulatory and anticarcinogenic effects of omega-3s, as well as other nutrients present in fish, such as selenium and vitamin D.

A number of additional benefits have been identified, including the prevention of macular degeneration, improved bone health, enhanced kidney function, a reduced risk of autoimmune diseases, and a positive effect during pregnancy.³

The consumption of a minimum of two servings of fish per week is recommended as a cost-effective strategy for the primary and secondary prevention of chronic diseases. This recommendation is supported by public policies that ensure the accessibility and sustainability of fish as a food source.

Conflict of interest: The author declares no conflicts of interest.

Key words: Fish, health, disease, cardiovascular, cancer and dementia.

References:

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S28-04

Importance of fish consumption in children

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Abstract: Children and adolescents are growing and developing organisms. Hence, high biological value protein, long-chain omega-3 fatty acids (LC-PUFAS), vitamins, minerals and bioactive components in fish, help to meet the nutritional recommendations for this period of life. In addition, LC-PUFAS, as EPA and DHA, are difficult for the body to synthesize and must be obtained from the diet, as they are essential for the fetal development and early stages of life. They are involved in the optimal development of the brain and retina, as well as in the regulation of brain function. Thus, some studies have shown greater cognitive development in children of mothers who consumed more fish during pregnancy and breastfeeding.

In children, 3-4 servings of fish per week are recommended, restricting the intake of species with higher methylmercury content in infants, younger children, and pregnant and breastfeeding women, according to the Spanish Food Safety and Nutrition Agency (AESAN) recommendations. It should be noted that current evidence seems to indicate that certain components of fish, such as omega-3 fatty acids and selenium, may have a protective effect against mercury.

However, the EnKid study (2001) observed that more than 50% of children aged 2 to 5 did not consume two servings per week, a trend that continues today, as evidenced by the ESNUI study (2021). Furthermore, this study shows that DHA consumption is up to 4.5 times higher in children aged 1 to 10 who consume enriched milk.

Actions are needed to promote fish consumption as part of a varied diet, starting in the first 8,000 days of life, in pregnant and lactating mothers, and throughout the life cycle.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Fish, omega 3, selenium, neurodevelopment, methylmercury.

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S28-05

The role of fish consumption in healthy ageing

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Background: Nutrition plays a fundamental role in the quality of life of older people. Among the recommended foods, fish has received special attention for its nutritional value and potential beneficial effects that promote healthy ageing.

Fish is characterized by its high content of omega-3 fatty acids, especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which have been associated with various aspects of cardiovascular and brain health. It is also a source of high-quality protein, which is necessary for maintaining muscle mass at this stage of risk of sarcopenia. Furthermore, it provides vitamins such as D and B12, along with essential minerals such as iodine and selenium, which strengthen the immune system and help to maintain bone structure.

Objective: To describe the effects of fish consumption in the elderly population and its effect on healthy ageing.

Methods: Review of scientific evidence in the Pubmed and Embase databases.

Results: Observational studies have shown that people who regularly eat fish have less cognitive impairment and a lower incidence of dementia. Clinical trials highlight the role of omega-3 fatty acids in modulating the inflammatory profile, a key mechanism in the development of chronic diseases. Recent meta-analyses also highlight that frequent fish consumption is associated with a significant reduction in cardiovascular risk and a longer life expectancy. International organizations recommend eating fish two to three times a week. It is advisable to vary the sources of fish and pay attention to possible contaminants such as mercury, which may be present in large species.

Conclusion: The available evidence supports the regular inclusion of fish as an essential part of a balanced diet geared towards healthy ageing.

Conflict of interest: The author declares no conflicts of interest.

Key words: Healthy aging, fish consumption, omega-3 fatty acids, cognition.

S28-06

Eating fish leads us to a more sustainable planet

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Abstract: The main sectors responsible for greenhouse gas emissions are energy generation, transport activities and food production. The latter faces the challenge of transforming all stages of its value chain, from land and sea production to final consumption, with the aim of ensuring food security and sustainability. In this context, SDG12 sets the target for 2030 of moving towards responsible production and consumption, placing special emphasis on reducing energy and

water use in food production, as well as on decreasing food waste.

Several recommendations guide the transition towards systems with a lower carbon and water footprint. These include prioritizing seasonal products, maintaining a balance between local and imported food, promoting sustainable packaging in distribution, and encouraging best practices by ensuring compliance with sustainability standards (i.e. ecolabels).

Within the framework of a balanced diet, fish is considered a key component for advancing sustainable food systems, as reflected in dietary patterns such as the Atlantic and Mediterranean diets. Including fish in the diet three times per week helps maintain the daily carbon footprint at around 3 kg of CO₂ per person, based on an average intake of 2,100 kcal per day. These results can be explained by the low carbon footprint of fish, especially when sourced from artisanal fleets. On average, fish accounts for 15 g of CO₂ per gram of protein consumed, making it one of the most sustainable sources of protein.

Conflict of interest: The author declares no conflicts of interest.

Key words: SDG 12, carbon footprint, sustainable diet

Symposium 29: New uses of myo-inositol to improve insulin response

S29-01

New uses of myo-inositol to improve insulin activity

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Background: Myo-inositol (MI) is a natural compound, considered a type of B-complex nutrient. MI is the most abundant and biologically active isomer of inositol and it is mainly present in fruits, beans, grains, and nuts. It is

precursor of inositol-3-phosphate (IP3) which acts as a cellular messenger within the body, especially in insulin signaling and lipid metabolism. In situations of hyperglycemia, serum glucose competes with MI by reabsorption in the kidney, which increases MI elimination in urine and potentially decreasing MI concentration in tissues. A MI depletion might affect the insulin receptor activity, aggravating the development of diabetes. In recent years, MI has gained attention due to its potential role for the prevention of gestational diabetes mellitus (GDM) but the mechanisms and levels in pregnant women are controversial yet.

Material and Methods: MI concentration was analyzed by spectrophotometry in plasma, urine and placenta of GDM women treated with either diet or insulin in the GDM study in the Virgen de la Arrixaca Hospital (Murcia, Spain). Additionally, the relationships between MI status, glycaemia, insulin receptor pathway in the placenta and neonatal characteristics were also examined.

Results and conclusion: MI concentration in plasma and placenta were decreased at delivery in women with GDM. GDM treatment with insulin tended to normalize maternal MI and insulin cascade, while GDM treated with diet had lower MI values in both plasma and placenta than controls. Pregnant women with diabetes treated with diet could especially benefit from MI supplementation during pregnancy.

Conflict of interest: The authors declare that they have no conflicts of interest.

Part of the observational study was supported by ITF RESEARCH PHARMA SLU (Madrid, Spain).

Keywords: Pregnancy, gestational diabetes, insulin, myo-inositol, glucose.

ORAL COMMUNICATIONS

Oral session 1

O1-01

Perception of insect consumption among university students

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Background: In Mexico, entomophagy or insect consumption dates to pre-Hispanic times, with more than 549 edible species identified. Despite its nutritional, environmental and economic benefits, entomophagy is currently not widely accepted. To understand the factors that condition its acceptance, especially in young populations, is key to promoting its incorporation into the contemporary diet.

Objective: To assess the acceptability of insect consumption and associate it with behavioral variables linked to eating behavior and socio-demographics in university students.

Method: A cross-sectional observational study was conducted among 280 students at the University of Guadalajara. To assess the level of acceptance of insect consumption, the Acceptability of Consuming Insects (ACI) questionnaire (Oliveira-Penedo et al. 2022) was applied, behavioral data on eating behavior and socio-demographic data were obtained. Chi-square and Fisher's tests were used to assess the association between the ACI score with behavioral and sociodemographic variables.

Results: The mean ACI score was 4.1 ± 1.06 , indicating a moderately high interest in entomophagy. Curiosity, nutritional benefits and taste were the main motivations for consuming insects, while disgust, limited access to insect-based products and distrust in their safety were the limiting factors for insect consumption. None of the socio-demographic variables analyzed showed a significant association with ACI.

Conclusions: The results suggest that interest in insect consumption among young people is moderate. Curiosity and nutritional benefits were identified as the main motivating factors for consuming insects. It is important for the food industry to design and formulate insect-based foods that are organoleptically appealing, safe from a safety point of view, sustainable and easily accessible, with the aim of facilitating their integration into the regular diet.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Entomophagy, diet, edible insects, sustainability.

O1-02

Evaluation of the predictive capacity of metabolic syndrome diagnostic methods in a healthy working population by sex

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Background: Metabolic Syndrome (MetS) encompasses a cluster of pathophysiological alterations that increase the risk of cardiovascular disease and type 2 diabetes. Traditionally, its diagnosis has relied on categorical criteria, but more recently, continuous severity scores have been proposed. However, the predictive performance of these methods may vary by sex, warranting a sex-specific analytical approach.

Objective: To determine and compare the predictive capacity of various anthropometric measurements and continuous MetS severity scores in relation to the incidence of MetS in a healthy Spanish occupational cohort, both globally and stratified by sex.

Methods: A longitudinal study was conducted between 2006 and 2019, involving 630 metabolically healthy workers from the Córdoba City Council (Spain). MetS incidence was defined according to the Harmonized Criteria. The predictive performance of anthropometric indicators and severity scores was assessed using Receiver Operating Characteristic (ROC) curve analyses and comparisons of Area Under the Curve (AUC) by sex. Optimal cutoff points were determined using the Youden index.

Results: Over a mean follow-up period of 9.1 years, the incidence density was 11.3 cases per 1,000 person-years. Overall, the waist-to-height ratio (WHtR) emerged as the strongest anthropometric predictor (AUC = 0.821), followed by Body Mass Index (BMI) and waist circumference (WC). In women, however, WC was the most accurate predictor (AUC = 0.909), followed by the Metabolic Syndrome Severity Score (MetSSS) and WHtR. In contrast, among men, body fat percentage (%BF) showed the best performance (AUC = 0.766), followed by BMI and WHtR.

Conclusions: WHtR was the strongest global predictor. Among women, WC showed the highest discriminative capacity, while in men it was %BF. These findings support the implementation of sex-specific screening strategies to enhance early detection of MetS in healthy working populations, thus enabling more accurate and personalized preventive approaches.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Metabolic syndrome, cardiovascular risk, gender prediction, anthropometric indicators.

O1-03

Effect of maternal allergies on intestinal gene expression in 18-month-old children

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Background: Maternal allergy during pregnancy can create an inflammatory environment that may impact immune development in the offspring. Given the close relationship between the intestine and the immune system, transcriptomic analysis of exfoliated intestinal cells in feces may represent a useful non-invasive tool to assess intestinal status in children born to allergic mothers.

Objective: To evaluate the impact of maternal allergy during pregnancy on the intestinal transcriptome of children at 18 months of age.

Methods: Pregnant women from the NELA cohort were classified as allergic (n = 57, based on symptoms and positive prick test) or healthy (n = 58, no symptoms and negative prick test). Considered allergic conditions included rhinitis, conjunctivitis, asthma, dermatitis, food allergy, and/or drug allergy. At 18 months of age, children's fecal samples were collected in RNA-later, and exfoliated intestinal cell gene expression was analyzed using microarrays. Data were processed with Transcriptome Analysis Console software, considering as significant a p-value < 0.05 and a fold change >|1.5|.

Results: Children of allergic mothers showed a progressive increase in the number of differentially expressed genes according to the number of maternal allergies: 39 genes in cases of one allergy, 54 with two allergies, and 176 with three allergies. Having one or more allergies increased the expression of *Metap1* (involved in protein maturation), *Mllt3* (DNA transcription), *Eif2ak2* (innate immune response), *Zranb1* (protein deubiquitination), and *Pnpla7* (a lysophospholipase that generates glycerophosphocholine).

Conclusions: The greater the number of allergies present in the mother, the stronger the impact on the child's intestinal transcriptome, with increased expression of genes involved in immune function and protein maturation.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: Allergy, intestine, transcriptome, genes, children.

O1-04

Disturbed myo-inositol levels in mothers with gestational diabetes and materno-fetal consequences

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Background: Myo-inositol is a nutrient precursor of inositol-3-phosphate, which is involved in the intracellular insulin signaling cascade. Myo-inositol competes with glucose for renal reabsorption, which can alter myo-inositol levels in diabetic patients. However, little is known about serum myo-inositol levels during pregnancy and their materno-fetal consequences, especially in cases of gestational diabetes mellitus (GDM).

Objective: The aim of this study was to quantify myo-inositol levels during pregnancy in GDM women and healthy controls, and to evaluate their potential consequences on the newborns.

Methods: This study included 54 women with GDM and 628 healthy, non-diabetic women (controls) from the NELA

cohort (Murcia, Spain). Plasma myo-inositol levels were analyzed at 24 weeks of gestation and at delivery using spectrophotometry, and their associations with glycemic parameters and perinatal outcomes were evaluated.

Results: Myo-inositol levels increased as pregnancy progressed, being higher at delivery than at 24 weeks of gestation (Healthy: from 9.81 to 19.04 µg/ml, GDM: from 10.06 to 15.80 µg/ml). Although no differences were observed in plasma myo-inositol levels between GDM and healthy women at mid-pregnancy (24 weeks), at delivery, women with GDM had significantly lower concentrations of myo-inositol (GDM: 15.80 ± 1.33 vs Healthy: 19.04 ± 0.36 µg/ml, *P* = 0.041). Finally, maternal myo-inositol levels at delivery were negatively associated with maternal glucose and birthweight z-score (*R* = -0.112, *P* = 0.041).

Conclusions: GDM women have lower circulating levels of myo-inositol at the time of delivery compared to healthy women, which may contribute to impaired insulin response and a higher risk of fetal macrosomia. Dietary supplementation with myo-inositol could be beneficial to improve glycemic control during pregnancy in these women, thereby reducing risks for both the mother and the child.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Gestational diabetes, myo-inositol, glucose, dietary supplementation, z-score.

O1-05

Influence of the MC4R Gene on Energy Balance: Towards Personalized Nutrition in Older Adults. The MyFOOD4Senior Project

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Background: Considering individual genetic variability, body composition, and energy balance facilitates the design of effective and personalized dietary interventions. The C variant of the single nucleotide polymorphism (SNP) rs17782313 in the MC4R gene has been associated with higher body mass index, increased risk of obesity, and greater appetite, making the study of its role in energy balance regulation highly relevant.

Objective: To evaluate the association between rs17782313 genotypes of the *MC4R* gene and energy balance in a healthy population over 65 years of age.

Methods: A total of 120 older adults were genotyped for the *MC4R* rs17782313 SNP. Dietary information was collected using 3-day food record. Two logistic regression models were designed using energy balance as the dependent variable (positive balance vs negative balance). In the first model, the independent variables were the SNP and the energy contribution from macronutrients. In the second model, the SNP and lipid profile were included as predictors.

Results: Of the participants, 69.2% carried the TT genotype, while 30.8% carried the CT or CC genotypes. The mean energy balance was 211.9 ± 462.4 kcal. In the first model, individuals with the CT/CC genotypes had a 63.7% higher likelihood of having positive energy balance compared to those with the TT genotype ($p = 0.044$). In the second model, the SNP remained significantly associated ($OR = 1.68$, $p = 0.037$), and for each 1% increase in energy intake from unsaturated fat, the likelihood of having a positive energy balance increased by 30% ($p = 0.029$).

Conclusions: The CT/CC genotypes and the intake of polyunsaturated fatty acids (PUFAs) are independently associated with a positive energy balance. These findings reinforce the importance of integrating precision nutrition to improve the quality of life in the older population.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: SNP, *MC4R*, energy balance, precision nutrition, diet.

Oral session 2

O2-01

Nutritional ketosis slows obesity-associated epigenetic aging: A novel perspective to mitigate biological aging

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Background: Epigenetic clocks are powerful tools to quantify biological age, providing a more accurate estimate of health status than chronological age. They allow for the identification of risk factors that accelerate aging and the evaluation of therapeutic strategies that may reverse this process.

Objective: To assess whether nutritional ketosis induced by a very low-calorie ketogenic diet (VLCKD) can reduce the epigenetic acceleration of biological aging associated with obesity.

Methods: Biological age was estimated using three epigenetic clocks (Horvath [Hv], Hannum [Hn], and Levine [Lv]) based on leukocyte methylome analysis in patients with obesity following a VLCKD ($n=10$, age=49.3(8.9) years, BMI=34(1.3) kg/m²). Estimated biological ages were compared to evaluating the effect of nutritional ketosis. Correlations were analyzed between epigenetic age, BMI, and metabolic parameters across three timepoints: baseline, maximum nutritional ketosis (after 30 days), and endpoint (after 180 days of the diet).

Results: Analysis revealed a significant deceleration of biological age following the diet, especially at the maximum ketosis (Hv=-3.3(4.0), Hn=-6.3(5.3), Lv=-8.8(4.5)), with sustained effects alongside weight loss at the final timepoint (Hv=-1.1(4.3), Hn=-7.4(5.6), Lv=-8.2(5.3)). Notably, the observed epigenetic age deceleration was positively correlated with reductions in BMI ($p<0.001$), ketonemia levels ($p<0.001$), and improvements in metabolic parameters post-diet ($p<0.05$).

Conclusions: Our findings suggest that nutritional ketosis may be an effective approach to counteract biological aging associated with obesity, paving the way for future research into the applicability of personalized, precision nutritional therapies aimed at promoting healthy aging.

Conflict of interest: The authors declare that they have no conflicts of interest.

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Keywords: DNA methylation, ketone bodies, epigenetic clock, aging.

O2-02

Associations between gut microbiota and cardiometabolic parameters after consumption of cereal-based products in children with overweight or obesity: the MEDKIDS study

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Background: Childhood obesity increases the risk of cardiometabolic diseases and is associated with alterations in gut microbiota composition. Cereal-based products, widely consumed by children, often have poor nutritional profiles, high in sugars and fats and low in fiber. Reformulating these products represents a promising strategy for childhood obesity prevention.

Objective: To evaluate the association between the gut microbiota composition and cardiometabolic parameters in children with overweight or obesity after consuming nutritionally improved versus conventional cereal-based products within a Mediterranean diet context.

Method: A randomized, crossover clinical trial was conducted with two 8-week intervention periods, separated by a 5-week washout. Children aged 6–12 years ($n=34$) with overweight or obesity consumed either nutritionally improved or conventional cereal based-products as part of their usual diet. Improved products had higher fiber (39–49%), lower saturated fats (43–73%) and sugars (39–200%), and included sourdough. Stool and fasting blood samples were collected at the beginning and end of each experimental period. Gut microbiota composition was analyzed by 16S rRNA gene amplification and sequencing (V3–V4 regions, Illumina). Spearman correlations were used to explore associations between microbial genera and biochemical markers, including glucose, insulin, and lipid profiles.

Results: Twenty-five participants completed all four sample collections. After consuming the nutritionally improved cereal-based products, the genus *Odoribacter* was negatively correlated with glucose levels ($p=0.001$), while *Prevotella* was positively correlated ($p=0.035$). HDL cholesterol showed a negative correlation with *Fusicatenibacter*

($p=0.001$), while insulin was positively correlated with *Bacteroides* ($p=0.044$), *Alistipes* ($p=0.041$), and *Parabacteroides* ($p=0.002$). Following the consumption of conventional cereal-based products, LDL cholesterol was negatively correlated with *Bacteroides* ($p=0.034$).

Conclusions: Nutritionally improved cereal-based products were associated with shifts in the gut microbiota and selected metabolic parameters. These findings support the reformulation as a strategy to modulate the microbiota-metabolism axis in childhood. Further analyses are required to contextualize these findings.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Childhood obesity, gut microbiota, cardiometabolic parameters, cereal-based products, dietary intervention.

O2-03

Functional role of extracellular vesicles of breast milk in the biological processes involved in prematurity

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Background: Breast milk (BM) is the earliest form of extra-uterine communication between the mother and the newborn, playing a determining role in their early programming.

Objective: To determine the functional role of BF extracellular vesicles (EVs) in the modulation of immunological, inflammatory, metabolic and neurodevelopmental processes in relation to prematurity.

Method: Prospective, observational, single-center study. A total of 24 mothers (12 per study arm, 1:1, 48 samples of two different stages of lactation – colostrum (CA) and

mature milk (MM)) of very preterm (< 32 weeks) and term (≥ 37 and < 42 weeks) infants were included and followed until 4 weeks post-partum.

Results: Isolation and characterization of EVs from BM was performed to carry out proteomic and transcriptomic analyses in CA and MM. Proteomic analysis revealed a functional role of CA in immune protection and of MM in metabolic processes. TENA, TSP1 and OLFM4, proteins related to immune and inflammatory responses, were increased in CA versus MM, especially in preterm ($p < 0.005$). The modulation of LM differed as a function of gestational age. This effect was more pronounced in preterm CA and term MM. The miRNAs identified in CA are involved in structural functions (growth) and/or neurodevelopment. The miRNA-451a was found to be underexpressed in CA of newborns < 32 weeks ($p < 0.005$).

Conclusions: The particularities of each gestational age are reflected in the content of the EVs of BM, so providing their mother's own milk is the optimal way to meet their specific needs. This is the first study showing a complete functional characterization of BM (proteome, miRNA), unmasking the molecular mechanisms related to EVs signaling and their functional role in relation to prematurity.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Extracellular vesicles, human milk, miRNAs, proteins, prematurity.

O2-04

Influence of infant formula on neonatal acylcarnitine profile and its impact on metabolic screening

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Background: The nutritional composition of infant formula can significantly influence neonatal mitochondrial metabolism, particularly in the β -oxidation of long-chain fatty acids. This may lead to altered acylcarnitine profiles in dried blood spot samples used for newborn screening, occasionally mimicking biochemical patterns consistent with inborn errors of metabolism such as carnitine palmitoyltransferase 1A (CPT1A) deficiency.

Objective: To determine whether specific formula compositions in the neonatal period can induce transient alterations in acylcarnitine profiles, potentially resulting in false-positive screening results suggestive of fatty acid oxidation disorders.

Method: A retrospective observational study was conducted in 55 healthy term neonates exclusively fed with formula from birth. Two groups were defined: NAN Supreme Pro 1 ($n=29$), a formula high in carnitine (13 mg/100 g) and without medium-chain triglycerides (MCT), and a control formula ($n=25$) containing MCT. Forty-seven acylcarnitines were analyzed using tandem mass spectrometry. The CPT1 ratio ($C0/[C16+C18]$) was calculated. Data were analyzed using Shapiro-Wilk test, Student's t-test or Mann-Whitney U, depending on data distribution.

Results: Significant differences were observed in long-chain acylcarnitines: C14:1-OH (0.0615 vs. 0.0440 $\mu\text{mol/L}$, $p=0.0001$), C16:1-OH (0.071 vs. 0.0510 $\mu\text{mol/L}$, $p < 0.0001$), C16 (4.08 vs. 3.06 $\mu\text{mol/L}$, $p=0.0035$), C18-OH and C16-OH ($p < 0.01$), and C18 (1.16 vs. 1.00 $\mu\text{mol/L}$, $p=0.046$). No significant differences were found in free carnitine (29.5 vs. 32.7 $\mu\text{mol/L}$, $p=0.51$) or in the median CPT1 ratio (5.73 vs. 12.32, $p=0.12$), though greater variability was seen in the NAN group. Critically, two NAN-fed neonates exhibited extreme CPT1 ratios (>84), with elevated free carnitine ($>90 \mu\text{mol/L}$) and suppressed long-chain acylcarnitines, mimicking CPT1A deficiency. These profiles normalized after switching to MCT-containing formula without further intervention or clinical symptoms.

Conclusions: The composition of infant formula can transiently distort the neonatal acylcarnitine profile and mimic biochemical signatures of CPT1A deficiency. These findings underscore the need to consider dietary background when interpreting metabolic screening to avoid unnecessary interventions or misdiagnosis.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Acylcarnitines, newborn screening, infant formula, CPT1 deficiency, nutrition.

O2-05

The relationship between movement behaviors and eating behavior profiles: The CORAL Study

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Background: Early childhood is a key period for establishing lifestyle habits, such as eating habits and physical activity, which can play a fundamental role in the development of obesity.

Objective: To analyze the association between movement behaviors and eating behavior profiles in preschool children and to evaluate whether obesity indices moderated this association.

Methods: We included 537 participants (54% girls, aged 3–6 years) from the CORAL study with accelerometer data. Adherence to WHO movement recommendations was assessed, and eating behavior profiles were identified using latent profile analysis, stratified by sex. Associations

between adherence to movement recommendations and eating behavior profiles and their interaction with obesity indices (z-scores: body mass index, body fat percentage and waist circumference) were analyzed using multinomial regressions adjusted for socioeconomic factors.

Results: Three eating behavior profiles were identified in girls (typical, reactive, and avoidant) and three in boys (typical, happy, and selective). In girls, complying with two movement behavior recommendations was associated with a higher probability of being reactive eaters (OR=2.64, 95%CI: 1.54–4.53). In boys, complying with one or two recommendations was associated with a lower probability of being happy eaters (OR=0.43, 95%CI: 0.25–0.72 and OR=0.24, 95%CI: 0.15–0.38, respectively) and selective eaters (OR=0.33, 95%CI: 0.23–0.48 and OR=0.34, 95%CI: 0.24–0.49, respectively). In addition, obesity indices moderated these associations in boys, with negative interactions for happy eaters and positive interactions for selective eaters.

Conclusions: Movement behaviors were differentially associated with eating behavior profiles in childhood. In addition, obesity indices moderated these associations in boys. These results highlight the importance of addressing movement and eating behaviors together from an early age to prevent obesity.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: movement behaviors, eating behaviors, childhood obesity.

Oral session 3

O3-01

Impact of a personalized nutrition intervention on adherence to protein intake recommendations in older adults: MyFood4Senior Project

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Background: Adequate protein intake is essential to preserve muscle mass in older adults. Current recommendations (ESPEN guidelines) establish a minimum intake of 1.0–1.2 g/kg body weight/day in healthy older adults.

Personalized nutrition strategies can support adherence to these recommendations.

Objective/s: To assess the impact of a personalized nutrition education program on protein intake in a population over 65 years of age.

Methods: 120 volunteers over 65 years of age were divided into two groups: a control group, which attended generic monthly lectures on healthy lifestyles, and an intervention group which additionally received a report with personalized nutritional advice based on their nutritional intake, biochemical and genetic data. In both groups, protein intake (g/kg/day) was estimated by means of a 3-day dietary record at baseline and 6 months post-intervention. Participants were then classified according to whether or not they met the recommended protein intake.

Results: On average, all groups reached the recommended intakes, both at baseline and at 6 months, with mean values of 1.13 and 1.05 g/kg/day in the control group, and 1.20 and 1.22 g/kg/day in the intervention group, respectively. In the overall population, 41.2% of participants who did not meet the recommendations at baseline improved their intake following the intervention. When comparing both groups, only 23.1 of non-compliant individuals in the control group adjusted their intake, compared to 52.4% in the intervention group ($p < 0.001$).

Conclusions: The personalized intervention favored greater adherence to protein recommendations among individuals with initially insufficient intake. These findings reinforce support the integration of precision nutrition strategies to encourage adequate dietary habits in the elderly.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Personalized nutrition, older adults, protein intake, nutritional intervention, precision nutrition.

O3-02

Food consumption and adherence to the Mediterranean diet after a Mediterranean lifestyle intervention in pre-schoolers. MELIPOP study

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Background: The Mediterranean diet, within the broader context of regional lifestyles, has been proposed as a preventive strategy against childhood obesity. However, the impact of programs promoting the Mediterranean diet on dietary intake and adherence to the dietary pattern is not clearly known.

Objective: To analyze changes in the dietary patterns of participants in the MELIPOP study after the first year of an intervention based on the promotion of a Mediterranean lifestyle (diet and physical activity), compared to a control group.

Methods: MELIPOP is a multicenter, randomized clinical trial conducted in 3 Spanish cities. A total of 159 preschool children (93 intervention, 66 control) (3–6 years) at risk of developing overweight or obesity due to family history (parental BMI ≥ 25 kg/m²) were analyzed. Consumption of 23 food groups was assessed using the validated COME-Kids questionnaire and adherence to the Mediterranean diet using the validated MED4CHILD questionnaire. General linear models were used for analysis in SPSS.

Results: In the intervention group, the consumption of fish and seafood (34.13 ± 15.37 to 43.61 ± 31.17 g/day) and nuts (3.03 ± 4.56 to 4.61 ± 4.57 g/day) increased, while that of convenience food decreased (23.85 ± 32.46 to 19.36 ± 21.18 g/day). In the control group the consumption of fish and seafood (36.28 ± 19.95 to 35.66 ± 19.16 g/day) and nuts (2.39 ± 3.59 to 2.14 ± 2.68 g/day) decreased, while that of convenience food increased (19.16 ± 23.01 to 26.71 ± 32.70 g/day). There were significant interactions between group and time for the above-mentioned food groups ($p=0.033$, $p=0.018$, $p=0.021$). Adherence to the Mediterranean diet (MED4CHILD) improved in the intervention group and decreased in the control ($p<0.001$).

Conclusions: The MELIPOP intervention improved the consumption of key foods of the Mediterranean diet such as fish and nuts. In addition, it increased overall adherence to the Mediterranean diet in the intervention group relative to the control group.

Conflict of interest: The authors declare that they have no conflicts of interest.

Key words: mediterranean diet, childhood obesity, nutritional intervention, preschoolers, adherence.

O3-03

Selenium nutritional status in a group of young university students: impact on intellectual and cognitive capacity

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Background: Selenium is an essential micronutrient in the synthesis of selenoproteins involved in antioxidant defenses, immune regulation, and thyroid function. Since the brain is sensitive to oxidative stress and vulnerable to the accumulation of free radicals, inadequate intake and deficient levels can negatively affect cognitive functions and abilities.

Objective: To determine selenium intake and serum levels in a group of university students and their impact on cognitive performance.

Method: A study was conducted in 132 university students (18–29 years old) from the University of Castilla-La Mancha (Spain) during 2018–2019. Dietary data were collected using a 4-day food intake log. Once food intake was recorded, selenium intake was calculated using food composition tables (Institute of Nutrition). Serum selenium levels were also determined. The Wechsler Intelligence Scale for Adults-IV was used to assess cognitive function, yielding the Total Intelligence Quotient (TIQ), Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI), and Processing Speed Index (PSI).

Results: The average selenium intake was adequate, although 3.8% of students did not meet the Recommended Intake (RI). While mean serum levels were within the reference range, 34.8% of students had deficiencies. When analyzing serum levels based on intellectual capacity (IQ), it was noted that young people with low-normal intelligence ($IQ < 90$) had lower levels (84.9 ± 16.9 µg/L) compared to young people with high-normal intelligence (93.3 ± 21.4 µg/L) ($IQ \geq 90$) ($p < 0.05$). Lower intake and serum levels were also observed in young people with medium-low scores in ICV (measures reasoning, comprehension and conceptualization), ($ICV < 90$) and in IMT (evaluates nonverbal reasoning and non-perceptual organization) ($IMT < 90$) (89.0 ± 27.3 µg/day, 79.0 ± 10.8 µg/L and 81.8 ± 16.0 µg/L respectively) vs those with medium-high scores ($ICV \geq 90$) ($IMT \geq 90$) (106.7 ± 35.5 µg/day, 92.0 ± 20.7 µg/L and 93.1 ± 20.5 µg/L respectively) ($p < 0.05$ and $p < 0.01$).

Conclusions: The selenium nutritional status can be improved. Identifying young people with inadequate intakes and deficient serum levels is an educational priority, as is improving cognitive performance.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Nutritional status, selenium, cognition, university students.

O3-04

Development and validation of smartcloth-database: A food group system for automated nutritional assessment in diabetes management

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Background: Dietary management is essential for diabetes mellitus care, requiring accurate estimation of macronutrients. Food composition databases (FCDs), such as those included in the international INFOODS network (e.g., BEDCA, USDA-FoodData Central, LATINFOODS), are key tools for dietary planning, though they present limitations in precision and cultural adaptation. SMARTCLOTH-Database is a structured food database designed for the automated calculation of energy and macronutrients in people with diabetes, integrated into an interactive self-management dietary system.

Objective: To design and validate SMARTCLOTH-Database as a tool for automated estimation of energy and macronutrients, based on food groups adapted to the Spanish dietary pattern.

Method: A food database with 20 groups was developed, differentiating between raw and cooked versions, using a statistical model based on key macronutrients (energy, carbohydrates, proteins, and fats). Nutritional values were calculated by weighting foods according to household consumption data in Spain. For validation, 365 simulated daily menus were generated using a software tool applying nutritional rules over the defined food groups. Nutritional values were compared against reference FCDs from the INFOODS network. Agreement was analyzed through intraclass correlation coefficients (ICC) and error metrics (mean, standard deviation, and range of differences).

Results: SMARTCLOTH-Database showed minimal nutritional differences compared to the reference FCDs: <22 kcal, <2 g of carbohydrates, <0.6 g of proteins, and <1.5 g of fats. Clinical concordance was excellent (ICC ≥ 0.75) in most comparisons, especially for carbohydrates and proteins.

Conclusions: SMARTCLOTH-Database is a valid, precise, and adaptable tool for automated nutritional estimation in people with diabetes, with strong potential for integration into digital systems for personalized dietary monitoring and education.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Diabetes, food composition database, nutritional assessment, carbohydrate counting, digital health.

O3-05

Cardiometabolic and lifestyle characteristics of adults participating in a type 2 diabetes community-based screening in Spain: Results from the DigiCare4You study

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Background: Early detection of cardiometabolic risk factors and type 2 diabetes (T2D) is essential to develop effective prevention strategies and reduce the burden on healthcare systems. DigiCare4You study evaluates a T2D community-based screening model integrated into schools and primary healthcare centers (HCC), followed by a digital intervention and community support. The main objective is to identify adults at risk for T2D using a self-reported questionnaire and basic clinical assessment, creating opportunities for lifestyle interventions.

Objective: To describe the cardiometabolic and lifestyle characteristics of the adult population screened in the DigiCare4You study in Spain.

Method: A cross-sectional descriptive study was conducted among adults linked to schools and HCC. 15000 families were contacted, and of those, 2790 adults agreed to participate (mean age 45.6 ± 8.8 years, 62% women). The FINDRISC questionnaire was used to estimate the risk of T2D. Adults with moderate-to-high risk were invited to a second stage screening at HCC (n = 401). Anthropometric data, blood pressure, glucose, HbA1c and lipid profile were recorded.

Results: Of the 2790 adults who completed the first stage screening, 401 completed the second stage screening (n =

401). From them, 26.5% had blood pressure in the hypertensive range ($\geq 140/90$ mmHg), 21% had elevated glucose levels and 30% showed elevated HbA1c. High total cholesterol levels were observed in 57% of the participants. The mean BMI was 28.9 ± 5.1 kg/m², 37% were classified as having overweight (25–29.9 kg/m²) and 38% as having obesity (≥ 30 kg/m²).

Conclusions: These findings demonstrate the feasibility and relevance of implementing T2D community-based preventive screening in schools and HCC to detect adults at high cardiometabolic risk, who could benefit from lifestyle interventions and digital assessment programs.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Diabetes, type 2 diabetes, Europe, intervention, digital assessment.

POSTER COMMUNICATIONS

Poster session 1

P1-01

Nutritional screening using the r-mapp tool in a nursing home

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Background: In recent years, telemedicine has experienced significant growth, facilitated by apps and web-based tools that allow tasks to be performed efficiently and easily. The R-MAPP (Remote Malnutrition APP) combines two validated screening tools: the Malnutrition Universal Screening Tool (MUST) and the Strength, Assistance with walking, Rise from a chair, Climb stairs, and Falls (SARC-F), to detect the risk of malnutrition and sarcopenia without the need for data registration, ensuring ease and safety for both in-person and remote use.

Objective: The objective was to assess the effectiveness and simplicity of R-MAPP in screening for malnutrition and sarcopenia in chronic patients in a nursing home, as well as its usefulness in guiding nutritional interventions.

Method: A total of 45 residents were selected out of 150, based on criteria such as exacerbation of chronic conditions, hospital admissions, weight loss, and changes in food intake. The nutritionist applied the R-MAPP, known for its simplicity and speed, and recorded the results for further analysis.

Results: Among the study participants (25 women and 20 men, with mean ages of 74 and 73 years, respectively), the average weight was 51.6 kg for women and 59.8 kg for men, with an average BMI of 21.2 and 21.9, respectively. The average weight loss was 12.12% in women and 12.45% in men. The most common conditions included Aging/Frailty (32% in women, 35% in men) and Diabetes (24% in women, 20% in men), with lower incidences of cancer and chronic wounds.

Conclusions: Malnutrition and loss of muscle mass can worsen health if not detected in time. Remote use of the MUST is recommended for all patients, and the SARC-F is essential in cases of muscle wasting. The R-MAPP proved to be an effective tool for nutritional screening, enabling tailored interventions through food and supplements.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Malnutrition, sarcopenia, R-MAPP, telemedicine, screening.

P1-02

Protocol for nutritional and frailty assessment in a nursing home

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Background: It is well known that the stage prior to malnutrition is nutritional risk, which, if detected early, can be managed to prevent progression to malnutrition. Therefore, it is necessary to implement a protocol in nursing homes to identify elderly individuals who are frail and at nutritional risk at an early stage.

Objective: To establish a protocol for assessing the nutritional, functional, and psychological status of older adults upon admission to a nursing home, with the aim of proposing appropriate interventions based on the results obtained.

Method: Cross-sectional study conducted on 45 residents during their first week after admission. Inclusion criteria were: age > 65 years and the ability to cooperate. Anthropometric, clinical, functional, social, psychological-cognitive, and nutritional risk aspects were assessed.

Results: The mean age was 81.1 ± 7.8 years (83.2 ± 7 for women and 78.9 ± 8 for men; p -value < 0.001). Regarding anthropometric parameters, the median weight differed between women and men (72 vs 80 kg; p -value < 0.001), as did the BMI (30.3 ± 6.14 in women vs 28.74 ± 4.93 in men; p -value = 0.097). According to the frailty scale, only 5.4% ($n=10$) of the residents showed optimal physical condition

without frailty; 23.7% (n=43) were considered vulnerable, and the remaining 129 residents (70.9%) showed a significant level of frailty: mild frailty 28.6%, moderate frailty 33%, severe frailty 8.8%, and very severe frailty 0.5%. Regarding the MNA, nearly 90% of the residents had some issue related to their nutritional status: 54% (n=95) were at risk of malnutrition, and 34.1% (n=60) were malnourished.

Conclusions: Implementing a protocol for nutritional and functional assessment upon admission to a residential care facility can improve the prognosis and quality of life for individuals with malnutrition, frailty, and cognitive impairment.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Malnutrition, frailty, nutritional assessment, elderly care, screening protocol.

P1-03

The importance of the triad: menopause, microbiota, and osteoporosis

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Background: Osteoporosis is a disease characterized by the loss of bone density and therefore associated with an increased risk of fractures. The exact mechanisms involved in its pathogenesis are not fully understood, although recent studies suggest that intestinal inflammation may be implicated, directly influencing osteoblastic and osteoclastic activity, calcium reabsorption, and may in turn be related to changes in gut microbiota composition caused by the drop in estrogen levels.

Objective: General objective: To conduct a literature review to assess how changes in the gut microbiota associated with the estrogen decline during menopause affect osteoporosis. Specific objectives:

To analyze how hormonal changes during menopause affect the composition of the intestinal microbiota.

To evaluate the influence of the gut microbiota on osteoporosis.

To determine whether the use of probiotics influences the development of osteoporosis and could therefore become part of new therapeutic approaches.

Method: Literature review using PubMed, CINAHL and Scopus to answer the following question based on the PICO format: P (population): women with menopause; I (intervention/exposure): changes in gut microbiota associated with menopause; C (comparison): not applicable; O (outcome): impact on osteoporosis.

Results: After reviewing various studies, a direct relationship was found between the estrogen decline during menopause and changes in gut microbiota (such as alterations in interleukin profiles, decreases in certain bifidobacteria or butyrate), which in turn lead to increased inflammatory processes that appear to directly affect bone health.

Conclusions: The results obtained from the review suggest that reversing intestinal inflammation through the use of probiotics or butyrate could help improve bone health.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Menopause, intestinal microbiota, probiotics, osteoporosis, estrogens.

P1-04

Cardiovascular health score and its relationship with sperm quality in reproductive-aged men: LED-FERTYL study

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Background: Although several lifestyle and cardiovascular risk factors may influence semen quality, scientific evidence in men remains limited.

Objective: To assess the association between the Life's Essential 8 score (a cardiovascular health score) and semen quality parameters in healthy men of reproductive age.

Method: A cross-sectional analysis was conducted using data from 223 participants in the Led-Fertyl study. We evaluated the updated Life's Essential 8 score from the

American Heart Association, which includes four lifestyle factors (healthy diet, adequate physical activity, avoiding smoking and adequate sleep duration) and four health factors (healthy weight and optimal levels of lipids, glucose and blood pressure). The main outcomes were semen quality parameters, including total sperm count, concentration, vitality, motility, and morphology. Multivariable regression models were used to examine the associations between LE8 (as tertiles and a continuous score) and semen quality, adjusting for potential confounders.

Results: Compared to men in the lowest LE8 score tertile, those in the highest had higher sperm concentration ($\beta = 1.11$; 95% CI: 0.12, 2.09), total motility ($\beta = 6.05$; 95% CI: 0.44, 11.65) and progressive motility ($\beta = 5.84$; 95% CI: 0.19, 11.48). Each 10-point increase in the LE8 score was positively associated with total sperm count ($\beta = 0.88$; 95% CI: 0.13, 1.63), sperm concentration ($\beta = 0.45$; 95% CI: 0.03, 0.86), total motility ($\beta = 2.91$; 95% CI: 0.56, 5.26) and progressive motility ($\beta = 3.00$; 95% CI: 0.63, 5.36). Additionally, participants in the highest LE8 tertile were 68% less likely to have an abnormal semen analysis (OR: 0.32; 95% CI: 0.15, 0.67).

Conclusions: The findings suggest that greater adherence to the Life's Essential 8 score is associated with significant improvements in several semen quality parameters and a reduced risk of abnormal semen profiles.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Life's essential 8 (LE8), semen quality, infertility, healthy lifestyle, male reproductive health.

P1-05

Conscious and regenerative nutrition in the current scientific context: A bibliographic review

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Background: Nutrition represents a fundamental pillar in health promotion and chronic disease prevention. In recent decades, innovative approaches have emerged that broaden the traditional perspective on nutrition, including mindful eating and regenerative eating.

Mindful eating focuses on the relationship between the person and the act of eating, promoting mindfulness and recognition of physiological signals of hunger and satiety. On the other hand, regenerative eating involves eating practices that seek to restore ecosystem health through sustainable and healthy systems for humans and the environment.

Objective: To understand and analyze current scientific knowledge related to conscious and regenerative eating through a bibliographic review.

Method: A narrative literature review was conducted in the scientific databases Embase, Cochrane, PubMed and CINAHL. Articles published in the last ten years, in Spanish and English, that addressed conceptual aspects, scientific evidence, and practical applications in health were included.

Results: The review showed that mindful eating has demonstrated positive effects on appetite regulation, reducing eating-related stress, and improving adherence to healthy diets. Several studies indicate that practicing mindfulness during meals can contribute to the prevention of eating disorders and psychological well-being. Regarding regenerative eating, the literature highlights the importance of agri-food systems that promote biodiversity, soil health and reduced environmental impact, all of which impact the nutritional quality of food and consequently, human health.

Conclusions: Conscious and regenerative eating are emerging areas with potential for integration into clinical and community nursing and nutrition practice. Healthcare professionals should stay up to date on these approaches to promote interventions that consider both individual health and environmental sustainability.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Conscious eating, regenerative eating and human health.

P1-06

Education, support, and follow-up: The power of nursing in GLP-1 treatment

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Background: Obesity is a chronic disease with high prevalence, associated with increased morbidity and mortality due to metabolic and cardiovascular conditions. Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have shown efficacy in weight control and metabolic profile improvement. However, their therapeutic success largely depends on treatment adherence, which is influenced by educational, emotional, and professional support factors.

Objective: To analyze the impact of nursing interventions on treatment adherence in patients with obesity receiving GLP-1 receptor agonists.

Method: A literature review was conducted using PubMed, CINAHL, and Embase databases. Studies published within the last 10 years were included. Article selection was performed in two stages: screening of titles and abstracts, followed by full-text review of selected studies. A qualitative synthesis was carried out, identifying nursing interventions related to treatment adherence.

Results: Fifteen studies were included, demonstrating that nurse-led interventions focused on personalized education, continuous follow-up, and psychosocial support improve adherence to GLP-1 RA treatment. These interventions contribute to better clinical outcomes and foster patient empowerment.

Conclusions: Nursing interventions are essential to improving treatment adherence in patients with obesity treated with GLP-1 receptor agonists. It is recommended to enhance nurse training in obesity management and motivational communication techniques, as well as to systematically integrate nurses into multidisciplinary follow-up programs to ensure continuity of care and long-term sustainability of outcomes.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Nurse, support, obesity, GLP-1 receptor agonists, adherence.

Poster session 2

P2-01

Prevention of hepatic steatosis using opuntia extracts in a murine model of metabolic dysfunction-associated fatty liver disease (MAFLD)

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Background: Metabolic dysfunction-associated fatty liver disease (MAFLD) is characterized by excessive accumulation of hepatic fat, which can sometimes be prevented by bioactive compounds present in plants.

Objective: This study aimed to analyze the efficacy of extracts from two *Opuntia* species, rich in polyphenols and betalains, in preventing steatosis and their involvement in hepatic lipid metabolism.

Method: Sixty male Wistar rats were divided into 6 groups and fed a standard (C) or high-fat high-fructose (HFHF) diet, supplemented or not with 25 or 100 mg/kg/day of *Opuntia stricta* var. *dillenii* peel extract (L-OD and H-OD), or *Opuntia ficus-indica* var. *colorada* pulp extract (L-OFI and H-OFI), for 8 weeks. Hepatic triglycerides were measured spectrophotometrically, the degree of steatosis by histological examination, and protein expression of fatty acid transporter protein 2 (FATP2), carbohydrate response element-binding protein (ChREBP), sterol regulatory element-binding protein-1c (SREBP-1c), fatty acid synthase (FAS), and acetyl-CoA carboxylase (pACC/ACC) by Western blot.

Results: The HFHF diet induced hepatic steatosis. In the L-OFI group, hepatic triacylglyceride content was lower than in the HFHF group. There was no effect on the other groups. The HFHF diet did not modify FATP2 expression, but caused a reduction in pACC/ACC ratio and an increase in FAS protein expression, indicating greater de novo lipogenesis. Treatment with *Opuntia* reduced FATP2 expression. L-OFI reduced ChREBP protein expression and showed a tendency towards lower values in SREBP-1c levels ($p=0.06$). Moreover, L-OFI supplementation demonstrated a trend towards higher pACC/ACC ratio ($p=0.08$) and decreased FAS expression. H-OFI increased pACC/ACC, and both L-OD and H-OD groups decreased FAS.

Conclusions: In conclusion, L-OFI supplementation partially prevented steatosis by regulating FATP2 and de novo lipogenesis. OD extract decreased FATP2 expression and improved parameters related to de novo lipogenesis, but this was not sufficient to prevent steatosis.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: MAFLD; steatosis; *Opuntia*; lipid metabolism; de novo lipogenesis.

P2-02

Importance of adequate intake of B vitamins in the cognitive performance of young university students

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Background: B vitamins play an essential role in neuronal function, being critical nutrients during college. Given the increased cognitive demands of the university population, it is important to understand their intake as a measure of improving academic performance.

Objective: To determine the intake of B vitamins in a university group and its relationship with intellectual and cognitive capacity.

Method: A cross-sectional study was conducted in 132 university students (18–29 years old) from the University of Castilla-La Mancha (Spain) during 2018–2019. Dietary data were collected through a 4-day food intake log. Once consumption was recorded, energy and B vitamin intake were calculated using food composition tables (Institute of Nutrition). The Wechsler Intelligence Scale for Adults-IV was used to assess cognition, obtaining the Total Intelligence Quotient (TIQ), Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory (WMI), and Processing Speed (PSI).

Results: The average intake of B vitamins was adequate, except for vitamins B9, B5, B7, and choline, where a high percentage of young people were observed to have inadequate intakes (86.36%, 46.3%, 60.6%, and 80.5%, respectively). When analyzing the association of intake with cognition, students with normal-high intelligence (CIT $\geq$ 90) had higher consumption of vitamins B1, B2, B3, B5, B6, B7 and choline vs students with normal-low intelligence (CIT < 90) ($p < 0.01$ and $p < 0.05$). Also, young people with low average scores in the ICV (measures reasoning, comprehension and conceptualization) and in the IMT (evaluates

nonverbal reasoning and non-perceptual organization) had a lower intake of vitamins B1, B2, B3, B5, B6, B7, phosphocholine and choline vs those with medium-high scores ($p < 0.05$, $p < 0.01$ and $p < 0.001$).

Conclusions: The results suggest that adequate intake of B vitamins is necessary to improve health and cognitive performance.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Intake, B vitamins, cognition, university students.

P2-03

Anti-inflammatory effects of *Opuntia stricta* var. *Dillenii* extract in the prevention of high-fat high-fructose diet-induced obesity and liver steatosis

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Background: Obesity and metabolic dysfunction associated with fatty liver disease (MAFLD) are characterized by excessive fat accumulation, which may result in an inflammation increment. Health beneficial effects have been attributed to products derived from the *Opuntia* cactus due to their content of bioactive compounds such as betalains and phenolic compounds.

Objective: This study aimed to analyze the effect of *Opuntia stricta* var. *dillenii* (OD) peel extract in the prevention of inflammation in adipose and hepatic tissues of rats fed an obesogenic and steatogenic diet.

Method: Rats were distributed into 4 experimental groups and fed either a standard or a high-fat high-fructose diet (HFHF) supplemented or not with OD extract at doses of 25 (ODL) or 100 (ODH) mg/kg/day, for 8 weeks. Protein expression of interleukin-1-beta (IL-1 β) and tumor necrosis factor-alpha (TNF- α) were measured by immunoblotting in both epididymal and subcutaneous adipose tissue and liver.

Results: Expression of NLR family pyrin domain containing-3 (NLRP3) and Caspase-1 were further determined in liver. Opuntia extracts were not able to significantly prevent the body weight increase induced by the diet. Nevertheless, a significant reduction was observed in epididymal fat pad weight in ODH group. Both doses of the extract prevented IL-1 β increased expression caused by the HFHF diet in the subcutaneous tissue, while in the epididymal tissue a reduction of IL-1 β expression was observed only in the ODL group. Regarding the liver, although the extract did not reduce its weight, ODL extract prevented HFHF diet induced NLRP3 and caspase-1 expression increase. Supplementation did not modify TNF- α expression, except for the ODL extract, which showed a trend towards reduced TNF- α values in subcutaneous tissue.

Conclusions: These results suggest that although the high-dose extract was the most effective in reducing epididymal weight, the low-dose extract reduced to a greater extent the expression of inflammatory markers in both subcutaneous adipose tissue and liver.

Keywords: Opuntia, obesity, betalains, phenolic compounds.

P2-04

Impact of three dietary strategies on body composition, metabolic markers, and metabolic syndrome: a pilot study in adults with overweight/obesity

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Background: Obesity is a key risk factor for metabolic syndrome and other cardiometabolic disorders. Diet plays a fundamental role in their prevention and treatment, although the most effective nutritional approach remains under debate.

Objective: To compare the effects of three dietary interventions (Mediterranean diet, low-carbohydrate diet, and high-protein diet) on body composition, metabolic markers, and the presence of metabolic syndrome in adults with overweight or obesity.

Method: A 12-week randomized, controlled pilot clinical trial was conducted with 45 participants allocated to one of the three dietary interventions. A total of 37 individuals

(mean age 47.2 ± 11 years; 70% women) completed the follow-up. Body composition, waist and hip circumference, and biochemical markers including glucose, lipid profile, uric acid, and C-reactive protein were assessed.

Results: The Mediterranean diet group showed greater reductions in body mass index ($\beta = -0.41$; 95% CI: $-0.69, -0.12$; $p = 0.01$) and fat mass percentage ($\beta = -0.27$; 95% CI: $-0.51, -0.04$; $p = 0.03$), as well as an increase in lean mass ($\beta = 0.28$; 95% CI: $0.04, 0.52$; $p = 0.03$), compared to the low-carbohydrate diet. A trend toward lower C-reactive protein levels was also observed ($\beta = -0.46$; 95% CI: $-0.92, 0.00$; $p = 0.06$). The high-protein diet was associated with a significant decrease in uric acid levels ($\beta = -0.47$; 95% CI: $-0.92, -0.02$; $p = 0.05$). Initially, 11 participants had metabolic syndrome, and only 7 retained the condition after the intervention. The Mediterranean diet resulted in the highest number of remissions (5 cases). Although the global analysis was not statistically significant ($p = 0.217$), a favorable clinical trend was noted in this group.

Conclusions: The Mediterranean diet was the most effective intervention for improving body composition and promoting metabolic syndrome remission, also showing potentially beneficial effects on inflammatory biomarkers.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Metabolic syndrome; overweight and obesity; clinical trial; dietary intervention.

P2-05

Yeast declaration in kefir products marketed in Spanish supermarkets

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Background: Kefir is a fermented milk traditionally produced through the symbiotic activity of lactic acid bacteria and yeasts contained in kefir grains. According to the Codex Alimentarius, kefir should include both bacterial and yeast components, which are essential to its distinctive nutritional and sensory properties. However, European labelling regulation (Regulation (EU) No 1169/2011) does not require manufacturers to

specify the microbial species used, which may limit transparency for consumers and health professionals.

Objective: This study aimed to evaluate the presence and declaration of yeasts in kefir products marketed in Spain and to quantify the proportion of products explicitly listing yeasts among their ingredients.

Methods: A descriptive, observational study was conducted including products labelled as kefir and available in Spanish supermarkets. Information was collected from online catalogues and in-store visits, with photographs of labels. A database was compiled covering brand, product characteristics, nutritional information, ingredient lists, yeast declaration, Nutri-Score (when available), origin, and price. The percentage of products declaring yeasts was estimated.

Results: A total of 170 kefir products were identified from the nine leading supermarkets in Spain according to Kantar: Mercadona, Carrefour, Lidl, Grupo Día, Grupo Eroski, Consum Coop., Alcampo, Corte Inglés, and Aldi. In addition, products from eleven regional chains were reviewed. Among all identified products, 11 were non-dairy, 33% were private-label, and 37.6% contained added flavours or fruits. Only about 20%, equivalent to one in five kefir products, declared the presence of yeasts in their ingredient lists, despite yeasts being a defining component of traditional kefir.

Conclusions: These findings reveal a discrepancy between the traditional definition of kefir and current industrial labelling practices. The lack of transparency regarding yeasts may influence consumer perception and professional recommendations. Future regulatory frameworks could benefit from requiring clearer microbial labelling, thereby aligning kefir products with traditional standards and supporting informed consumer choice.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Kefir, yeasts, food labelling, food regulation.

P2-06

Nutritional assessment of flours fortified with edible insects in the Democratic Republic of the Congo

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Background: Child malnutrition is one of the leading causes of mortality in developing countries, particularly in the Democratic Republic of the Congo, where 40% of children under the age of five suffer from chronic malnutrition. Armed conflict, food insecurity, and lack of basic services exacerbate the crisis. The SANTE initiative evaluates the use of flours fortified with edible insects, such as *Cirina forda* (Congo black caterpillar), a species traditionally consumed in the region, as an alternative protein source.

Objective: To analyze and compare the nutritional composition of a fortified flour (FF) containing Congo black caterpillar, used in cases of severe malnutrition, with a control flour (CF).

Method: The FF (composed of 2 parts maize, 1 part soy, ½ part peanuts, and ½ part *Cirina forda*) and the CF (without *Cirina forda*) were analyzed using official methods (AOAC, 2006). These included determination of moisture, ash, crude protein (Kjeldahl), ether extract (Soxhlet), fiber (Neutral Detergent Fiber), total carbohydrates (anthrone method), and vitamin C (liquid chromatography), as well as essential minerals and heavy metals (atomic absorption spectroscopy), amino acids (cation exchange chromatography), and lipid profile (gas chromatography). Comparisons were made using non-parametric tests (SPSS v30).

Results: The FF showed similar protein and fat content, but a higher level of total available carbohydrates (59.27 ± 1.97 g/100 g DM) compared to the CF (54.07 g/100 g DM), as well as a higher total fiber content (12.81 ± 0.19 vs 11.59 ± 0.37). No significant differences were observed in fatty acids, amino acids, vitamin C, or essential minerals. Lead (Pb) and cadmium (Cd) levels remained below the detection limit (0.1 mg/kg).

Conclusions: While the inclusion of edible insects represents a promising strategy to combat child malnutrition, the results suggest that the quantity used was insufficient to produce a clear nutritional impact. It is essential to optimize the

formulation and ensure the product's quality, acceptability, and sustainability.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Child malnutrition, insects, fortification, sustainability

Poster session 3

P3-01

Role of anthropometry by bioelectrical impedance vector analysis in the assessment of nutritional and inflammatory status in pediatric celiac disease after initiation of a gluten-free diet

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Background: In pediatric gastric diseases, changes in body composition occur and anthropometric monitoring becomes a key element in clinical follow-up and complementary techniques such as bioelectrical impedance vector analysis (BIVA) are increasingly used, providing additional parameters such as phase angle (PhA), which reflects cellular integrity and hydration status and has demonstrated prognostic value in the assessment of nutritional and inflammatory states.

Objective: The impact of the gluten-free diet (GFD) on cellular functionality remains underexplored. This study aims to assess the usefulness of BIVA in the evaluation of cellular integrity (Na/K ratio, PhA) and nutritional status (body cell mass, BCM) in children with celiac disease (CD) after 12 months of GFD.

Method: Seventy-nine children (50 with CD, 29 healthy controls) aged 5-14 years were studied. Of the CD patients, 25 were followed prospectively for 12 months after diagnosis and initiation of GFD. Na/K ratio as a marker of cellular integrity and inflammation was assessed by BIVA.

Results: After 12 months on DSG, children with CD showed significant increases in BCM. The Na/K ratio decreased significantly, indicating improved cellular homeostasis.

Conclusions: This study demonstrates that BIVA detects early improvements in cellular integrity (Na/K ratio) in children after 12 months of DSG. The reduction in Na/K ratio may reflect improved Na⁺/K⁺ pump function and restoration of cellular recovery and homeostasis, making it a promising biomarker for monitoring inflammation and cellular recovery. BIVA is emerging as a useful tool to guide individualized long-term treatment.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Bioelectrical impedance analysis, cellular integrity, celiac disease, gluten-free diet; children.

P3-02

Evaluation of plasma cytokines in patients with anorexia nervosa at first-episode. Preliminary analysis of the PSYNIGED study

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Background: Cytokines orchestrate immune activity in response to multiple stimuli. In patients with eating disorders (ED), inconsistent results have been described due to the varying characteristics of the groups studied and the methodologies employed, with the evolution of the disease being a relevant factor.

Objective: To evaluate the concentration of cytokines involved in the inflammatory response in patients with anorexia nervosa (AN) in their first episode in comparison with a control group.

Method: A convenience sample of patients recruited at a specialized unit for ED treatment was studied. Thirty-eight patients with ED (35 females and 3 males) and symptom onset of less than one year and 38 healthy controls recruited from their educational centers, matched for age and sex, were included. The concentration of IL-1β, IL-2, IL-6, IL-10, MCP-1 and TNF-α was measured by immunoassay using Luminex® technology. Both groups were

compared with independent samples t-test and age-adjusted partial correlations (95% alpha error).

Results: Age was 13.6 ± 1.8 y.o. in ED participants and 13.7 ± 1.7 y.o. in controls. BMI Z-score was -1.4 ± 0.9 SD and -0.3 ± 1.3 SD in ED and controls, respectively. The diagnosis of the patients was 50% restrictive AN, 8% purgative AN, 34% atypical AN and 8% unspecified ED. Disease evolution was 5.7 ± 3.2 months. Cytokine values were similar in both groups except for MCP-1 which was significantly higher in patients with ED ($P=0.045$). MCP-1 showed a negative correlation with the Z-score ($r = -0.248$; $P=0.031$) in the total sample studied.

Conclusions: In this sample of patients with short duration anorexia nervosa, cytokine levels do not reflect an overt proinflammatory state. A higher concentration of MCP-1 seems to be related to thinness.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Anorexia nervosa, cytokines, inflammation, thinness.

P3-03

Incorporation of *Tenebrio molitor* in local food preparations to improve child nutrition in the Democratic Republic of the Congo

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Background: Child malnutrition in the Democratic Republic of the Congo (DRC) remains a pressing public health emergency. In response, the FAO promotes edible insects as a sustainable and nutritious alternative. While local species such as *Cirina fforda* and *Rhynchophorus ferrugineus* are already consumed, their farming presents limitations. Therefore, the SANTE initiative explores the use of *Tenebrio molitor*, whose larvae provide 50–65% protein, along with healthy fats, iron, zinc, calcium, and B vitamins, key nutrients in the fight against child malnutrition.

Objective: To develop a culinary proposal that enhances the nutritional profile of homemade meals through the incorporation of *Tenebrio molitor* larvae, using locally available ingredients in the DRC. This proposal targets malnourished children aged 2 to 10 years and aims to be culturally acceptable, easy to prepare, and feasible in low-resource settings.

Method: Recipes were formulated by combining *Tenebrio molitor* with foods such as cassava, peanuts, coconut milk, rice, maize, sweet potato, and plantain. The recipes were adapted for preparation with basic utensils, taking into account infrastructural limitations.

Results: The developed recipes provided between 2 and 9 g of protein per serving. Notable examples include plantain purée (7 g), cassava porridge (8 g), sweet potato (7.5 g), maize (9 g), and oat and banana biscuits (2–3 g per unit). In addition to protein, a significant improvement was observed in iron, zinc, and calcium content, essential for child development.

Conclusions: *Tenebrio molitor* powder in children's diets offers an effective, culturally integrated, and accessible nutritional solution to malnutrition in vulnerable contexts. Its versatility allows for the creation of simple, nutritious dishes adapted to the DRC's culinary traditions, facilitating acceptance and sustainability. This alternative has the potential to improve child nutrition while promoting practices that respect local traditions.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Child malnutrition, *tenebrio molitor*, insects, sustainability.

P3-04

Oleanolic acid attenuates the impact on lipemia of an unbalanced diet in patients with type 2 diabetes. OLTRAD study

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Background: Dietary intervention in patients with Type 2 Diabetes Mellitus (T2DM) is essential to control disease progression and reduce its pathological complications. Oleanolic acid (OA) is a natural component of many foods, including olive oil, and has pharmacological potential against T2DM.

Objective: To evaluate dietary habits of T2DM patients participating in the OLTRAD Study (NCT06030544); to analyze the effect of regular intake of olive oil enriched in OA (equivalent dose 30 mg OA/day) on biochemical and anthropometric parameters; and to study the influence of habitual diet on the action of OA.

Method: 83 patients with T2DM were recruited at the Hospital Virgen del Rocío in Seville and randomly assigned to experimental and control groups. They were followed for 12 months. They completed a food frequency questionnaire, at 0 and 12 months, and a 24h food recall was performed at 6-9 months. Bioimpedance measurement was performed quarterly and venous blood samples were taken for biochemical analysis.

Results: Evaluation of dietary habits revealed that patients did not comply with recommendations established by AESAN (2022). More than 50% patients showed a deficient consumption of fruit, vegetables, cereals and legumes, while 90% consumed excessive amounts of meat and meat products. The nutritional analysis showed that the intake of saturated fats and cholesterol exceeded the maximum recommended limits, and that diets were hypocaloric, hyperproteic and imbalanced in terms of macronutrients, especially among men. A significant association was observed between lipid intake and serum cholesterol and LDL-cholesterol levels. However, OA mitigated the impact of fat intake on LDL-cholesterol level.

Conclusions: It is suggested that OA has a protective effect on the lipid profile of diabetic patients in the context of an unbalanced diet.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Diet, diabetes mellitus, oleanolic acid, olive oil, fats, cholesterol.

P3-05

Beyond diagnosis: the need for nutritional follow-up in women with celiac disease

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Background: Celiac disease (CD) requires a strict and adequate gluten-free diet. Without proper nutritional follow-up, diet quality may be compromised, especially due to excessive consumption of gluten-free ultra-processed products.

Objective: To analyze the dietary adequacy of women with CD at diagnosis and evaluate possible changes after two months on a gluten-free diet.

Method: An observational study was conducted with 10 newly diagnosed women with CD and 7 controls. All completed a three-day dietary record and a validated food frequency questionnaire. Follow-up was carried out two months after diagnosis. Nutritional adequacy to recommendations was assessed using the DIAL software (v3.4.0.9). Consumption of ultra-processed foods was also evaluated according to the NOVA classification.

Results: At diagnosis, CD patients showed more adequate intake ($p<0.05$) compared to the control group in folic acid (70.7% vs. 44.8% RI), vitamin A (106.0% vs. 69.7% RI), vitamin C (249.2% vs. 91.2% RI), vitamin E (110.8% vs. 51.7% RI), potassium (99.4% vs. 62.8% RI), vitamin K (132.75% vs. 69.7% RI), and fiber (23.1 g/day vs. 15.1 g/day). Although not significant, the intake of ultra-processed foods was lower in women with CD compared to controls (2.1 vs. 3.8 servings/day). Specifically, the control group consumed more sauces ($p<0.05$). After two months, a significant decrease ($p<0.05$) was observed in the nutritional adequacy of vitamin B6, phosphorus, and potassium in women with CD.

Conclusions: Initially, CD patients showed better adherence to nutritional recommendations, possibly due to increased awareness at diagnosis. However, after two months, a slight unfavorable trend was observed, which should be confirmed at subsequent time points and highlights the need for continuous and personalized nutritional follow-up.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Celiac disease, gluten-free diet, nutritional adequacy, dietary follow-up, ultra-processed foods.

P3-06

Identification of novel epigenetic marks associated with pediatric obesity and early development of cardiometabolic complications

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Background: Childhood obesity is a growing health challenge worldwide, predisposing children to early-onset metabolic disturbances. Recent studies have highlighted the importance of epigenetic mechanisms, particularly DNA methylation, as potential biomarkers for predicting cardiometabolic risk. The identification of these early markers could be key to informing preventive strategies and interventions during crucial developmental windows.

Objective: To explore epigenetic profiles associated with obesity and cardiometabolic risk parameters in children and adolescents.

Method: We investigated epigenetic profiles in two Spanish pediatric cohorts: (1) a longitudinal discovery population (n= 90) and (2) a cross-sectional validation population (n = 237), both including participants aged 2 to 18 years. Height, weight, and waist circumference (WC) were measured to calculate BMI and WC z-scores. Body composition, including total fat mass, was assessed by Dual-energy X-ray absorptiometry (DXA), and the derived fat mass index (FMI) was calculated. Blood pressure (BP), fasting levels of insulin, glucose, HDL-c, and triacylglycerols (TAG) were measured and z-scores for cardiometabolic traits (BP, HOMA-IR, HDL-c, and triacylglycerols) were computed. Pubertal staging was determined based on Tanner classification. DNA methylation was quantified in leukocytes using the Illumina MethylationEPIC 850K array. Linear models were performed to identify CpG sites associated with adiposity and cardiometabolic risk factors, adjusting for age, sex, center and white cell proportions. **Results:** Our analyses revealed multiple CpG sites displaying differential methylation associated with adiposity traits and early cardiometabolic risk. Of particular note, ABCG1, DMN3, EEFSEC, TINAGL1, and VASN emerged as promising candidates, with the strongest associations observed in pubertal children. These findings highlight the potential utility of epigenetic biomarkers in understanding and potentially predicting early-onset metabolic disturbances in pediatric populations.

Conclusions: These findings shed light on emerging epigenetic markers linked to childhood obesity and the early development of cardiometabolic risk. Early detection and targeted interventions based on epigenetic signatures may help mitigate the progression of obesity-related complications in pediatric populations.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Pediatric obesity, cardiometabolic risk factors, epigenomics and dna methylation.

Poster session 4

P4-01

Towards a scientific definition of servings and portions of dairy products in Spain: consumer relevance and methodology

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Background: The lack of standardization in the definition of food servings and portions can lead to confusion in the field of nutrition. A serving is defined as the standardized amount of food recommended by dietary guidelines to ensure adequate intake, whereas a portion refers to the actual amount consumed or the quantity indicated on food labeling.

Objective: To harmonize the criteria for servings and portions of dairy products in Spain through a comparative analysis of dietary guidelines, industry labeling recommendations, and actual consumption patterns in the population.

Method: Recommended serving sizes were obtained from the Healthy Eating Guide for Primary Care and Community Groups by the Spanish Society of Community Nutrition (SENC) and from the Spanish Food Composition Tables published by the Spanish Nutrition Foundation (FEN). Industry-indicated portion sizes were analyzed using the NUTRIFEN database and a review of nutritional labeling on dairy products. Actual consumption data were drawn from the ANIBES study.

Results: Differences were observed between the recommended serving sizes provided by scientific entities, the portion sizes indicated on product labeling, and the quantities actually consumed by the population. Although some alignment was found for certain dairy products, overall intake remains below both the recommended servings and labeled portions. These discrepancies suggest a misalignment between nutritional recommendations, the food supply, and actual consumption habits.

Conclusions: Establishing a harmonized definition of servings and portions for dairy products could improve nutritional labeling, support consumer education, and allow for more accurate and practical dietary recommendations.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Servings, portions, dairy products, labeling, food consumption.

P4-02

Baby & toddler database: Nutritional composition table of commercial foods for infants and young children marketed in Spain

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Background: The first 1,000 days of life represent a critical window for child development, during which proper nutrition is essential. Despite their wide availability, commercial foods for infants and young children (FIYC) do not always meet nutritional requirements and are often marketed using misleading promotional strategies.

Objective: To develop the Baby & Toddler Food Composition Database, a nutritional composition table of FIYC products marketed in Spain, intended as a support tool for health professionals in assessing dietary quality during early childhood.

Method: A cross-sectional descriptive study was conducted between June and October 2023. A total of 850 products from 42 brands were collected from the nine supermarkets with the largest market share in Spain. Nutritional and labeling information was extracted from product packaging and official websites, and analyzed according to the WHO Nutrient and Promotion Profile Model (NPPM) for the European Region.

Results: A total of 67 brands were identified, resulting in 850 products, which make up the composition table of foods for infants and young children, referred to as the Baby & Toddler Food Composition Database. This tool organizes the products into 8 categories and 23 alphabetically ordered subgroups. Only 23% of products met all WHO nutritional standards.

Sixty percent had excessive sugar content, and 99% of fruit purées would require a front-of-pack sugar warning label.

Conclusions: The Baby & Toddler Food Composition Database is a key tool for dietitians-nutritionists and health professionals. It helps identify nutritional imbalances in commercial products and supports informed dietary planning. The findings highlight the urgent need for stricter regulations on the formulation and marketing of foods intended for children under 3 years of age.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Infant feeding, nutritional composition, dietetics, WHO nutrient profile, regulation of infant foods.

P4-03

Nutritional screening: A key care tool for patients with heart failure

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Background: The association between heart failure (HF) and disease-related malnutrition (DRE) represents a significant challenge for health systems. Although It is one of the leading causes of morbidity and mortality with a high prevalence, DRE is not often identified or adequately approached.

Objective: To examine the cardiology service offered in the public hospitals of the Madrid Health service. To assess whether these services include nutritional screening for the identification of DRE in patients with HF.

Method: The cardiology services portfolio of the hospitals in the network of the Madrid Health Service is explored through the information contained on its websites.

Results: Among the 34 hospitals in the Community of Madrid, excluding Hospital Universitario Niño Jesús due to its exclusive pediatric care, certain differences were identified. Eleven (32%) provide cardiac rehabilitation including feeding tips to prevent cardiovascular events, but no nutritional screening has been performed to assess the nutritional status. Nine (26%) have cardiology services without reference to nutritional screening, six (18%) do not have a cardiology unit and eight (24%) do not have access to the service portfolio.

Conclusions: None of the hospitals reported the use of nutritional screening tools in patients with heart failure at any

time during admission or subsequent consultations. According to recent studies, the treatment of HF and malnourished patients has shown benefits in reducing adverse clinical events, reducing unscheduled readmissions and improving quality of life. These findings underscore the importance of incorporating nutritional screening performed by nurses integrated into the cardiology services portfolio. It would be desirable for those responsible for the health administration to take note of the problem and include nutritional screening in health policy from the first moment of patient care, and more specifically in individuals with cardiovascular disease.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Nutritional screening, heart failure, disease-related malnutrition.

P4-04

Influence of insulin on placental fatty acid transfer in obese pregnant women

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Background: Maternal obesity and gestational diabetes mellitus (GDM) may affect placental transport of omega-3 fatty acids (FA), such as docosahexaenoic acid (DHA), although the underlying mechanisms are not fully established.

Objective: Evaluate the effect of pregestational maternal body mass index (BMI) on serum FA profile at delivery and analyze the relationship between insulin signaling pathway and FA transporters in the placenta.

Method: The FA profile in serum and the placenta was analyzed from pregnant women of the NELA cohort (Murcia, Spain), classified by pregestational BMI: lean (N=266), overweight (N=85), and obese (N=35). The expression of protein involved in the insulin pathway (AKT, phospho-AKT)

and DHA-related FA transporters (MFSD2A, FFAR4, and FATP4) in the placenta was assessed using Western Blot.

Results: Women with overweight and obesity showed higher levels of long-chain omega-6 FA in serum compared to lean women ($P=0.003$). DHA tended to decrease with increasing pregestational BMI, both in maternal serum (lean: $3.17\pm0.05\%$, overweight: $3.11\pm0.08\%$, and obese: $2.88\pm0.15\%$, $P=0.096$) and in the placenta (lean: $6.17\pm0.07\%$, overweight: $6.11\pm0.11\%$, and obese: $5.72\pm0.21\%$, $P=0.103$), although these tendencies disappeared after adjusting for covariates. The phospho-AKT/AKT ratio, an indicator of insulin receptor activity, tended to be lower in the placenta of obese mothers compared to lean women ($P=0.095$) and was positively associated with the transporter MFSD2A in this tissue ($R=0.174$, $P<0.001$). No differences were observed in other studied placental transporters.

Conclusions: Pregnant women with overweight and obesity tended to have a lower percentage of DHA in serum and the placenta compared to lean women. This reduction of placental DHA in mothers with elevated pregestational BMI may be due to increased placental insulin resistance and decreased expression of the transporter MFSD2A, suggesting an insulin-dependent regulation of DHA transfer in the placenta.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Docosahexaenoic acid, obesity, diabetes, AKT, MFSD2A.

P4-05

Association between eating behaviors and dietary patterns derived through principal component analysis (PCA) in children aged 3 to 6 years: CORALS study

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Background: Eating behavior refers to the way of eating, including patterns, habits, and motivations. In childhood, these behaviors begin to consolidate and influence the development of healthy habits. Although there is growing evidence of their association with the intake of specific foods, information on their relationship with overall dietary patterns in children remains limited.

Objective: To analyze the association between the subscales of the Children's Eating Behavior Questionnaire (CEBQ) and dietary patterns identified through principal component analysis (PCA) in boys and girls aged 3 to 6 years participating in the CORALS study.

Method: Cross-sectional analysis of baseline data from the longitudinal CORALS study, including 1,407 Spanish preschoolers (mean age: 4.8 ± 1.0 years). The CEBQ and COME-Kids F&B-FQ questionnaires were administered, the latter grouping 23 food groups. Sex-stratified PCA was performed to identify dietary patterns, and linear regression models were adjusted for sociodemographic variables and total energy intake.

Results: Five dietary patterns were identified for each sex, explaining 36.6% of the variance in boys and 36.1% in girls. The subscales "Enjoyment of food" and "Food fussiness" showed significant and opposite associations with different patterns. In girls, "Enjoyment of food" was positively associated with a pattern characterized by higher intake of vegetables, legumes, and fish. In boys, a negative association was found with a pattern high in sugars and refined cereals, and a positive one with another pattern rich in meat and fish. Overall, more significant associations were identified in boys than in girls.

Conclusions: Eating behaviors showed different associations with dietary patterns according to sex, being more numerous and marked in boys. These findings could guide tailored nutritional interventions from early childhood, considering both eating behavior and the child's sex.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Eating behaviors, dietary patterns, preschoolers, PCA.

P4-06

Changes in red and processed meat consumption and adherence to the Mediterranean diet in adults with cardiovascular risk: results from the CADIMED randomized controlled trial

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Background: Red and processed meats have an unfavorable saturated fatty acid profile that may negatively impact the risk of cardiometabolic diseases (CMD).

Objective: The Cardiovascular Risk Prevention with a Mediterranean Dietary Pattern Reduced in Saturated Fat (CADIMED) study aims to evaluate the effectiveness of a Mediterranean dietary pattern excluding red/processed meats, compared to a control group receiving standard dietary advice, on CMD biomarkers and diet quality after an 8-week intervention. Here we aimed to describe changes in adherence to the Mediterranean diet and red/processed meat consumption following the intervention.

Method: CADIMED is a randomized controlled clinical trial involving 156 adults with untreated dyslipidemia recruited from healthcare centers in Granada, Spain. This preliminary analysis includes 95 participants in which dietary intake was assessed using a food frequency questionnaire and adherence to the Mediterranean diet was measured using the 14-point MEDAS score. Simple linear models were used to estimate changes in dietary parameters and adherence scores.

Results: The analyzed sample (n=95) included 49% men, with a mean age of 52 years (SD11), BMI of 27 (SD4), and LDL-C 148 mg/dL (SD18). The baseline mean intake of red/processed meat was 90 g/day (SD49), with pork (28 g/day, SD11) and cured ham (15 g/day, SD11) being the most consumed types. A significant reduction in total red/processed meat intake was observed in the intervention

group vs control group (-42.5 g/day, 95%CI: -57.1 to -27.9, P<0.0001). Baseline adherence to the Mediterranean diet was moderate to low (MEDAS score 8, SD2), but no significant differences were found between groups at the end of the intervention.

Conclusions: These preliminary analyses indicate low baseline adherence to the Mediterranean diet but a significant reduction in red/processed meat consumption in the intervention group. These changes may potentially impact CMD risk biomarkers.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Saturated fats, cardiometabolic risk, Mediterranean diet, red/processed meat.

Poster session 5

P5-01

Eating behavior profiles and their association with body composition in Spanish preschoolers. CORALS study

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Background: Eating behaviors play a key role in preventing obesity from early childhood. The “Child Eating Behavior Questionnaire” (CEBQ) is a useful tool to assess these behaviors, although approaches focused on individual variables may overlook complex behavioral patterns.

Objective: To explore the association between eating behaviors, assessed through CEBQ subscales and profiles generated via latent profile analysis (LPA), and body composition indicators in Spanish preschoolers.

Method: Cross-sectional data from 1,218 children (aged 3–6 years; 50.3% girls) from the CORALs study were analyzed. Eating behaviors were assessed using the CEBQ, and behavioral profiles were identified through LPA. Associations between individual subscales and profiles with body composition indicators, Body Mass Index (BMI), Fat Mass Index (FMI), Fat-Free Mass Index (FFMI), and Waist Circumference, were examined using multiple linear regression models adjusted for sociodemographic factors, energy intake, physical activity, and sleep.

Results: The “Food Enjoyment” and “Food Responsiveness” subscales were positively associated with adiposity, especially in girls ($\beta=0.72$ and $\beta=0.76$ for BMI; $p<0.001$). In contrast, “Satiety Responsiveness” and “Slowness in Eating” showed negative associations, more pronounced in boys ($\beta=-0.83$ and $\beta=-0.86$ for BMI; $p<0.001$). LPA identified four profiles by sex. Among boys, the “avoidant” profile was associated with lower adiposity (BMI z-score $\beta=-0.61$), and the “receptive” profile with higher adiposity (BMI z-score $\beta=0.38$). Among girls, the “impulsive eaters” were associated with higher adiposity (BMI z-score $\beta=0.75$), and the “disinterested” profile with lower adiposity (BMI z-score $\beta=-0.33$).

Conclusions: Eating behavior profiles were associated with different levels of adiposity depending on sex. This approach captures complex patterns and supports its utility in designing personalized preventive strategies in childhood.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Eating behavior, eating behavior profiles, childhood obesity.

P5-02

Relationship between digestive disorders, dietary restrictions and eating disorders

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Background: Chronic digestive disorders often require prolonged restrictive diets that can reduce dietary variety and quality, favoring the development or worsening of eating disorders (ED), especially in individuals with psychological vulnerability. Moreover, many patients with ED present gastrointestinal symptoms without an evident organic cause, suggesting a bidirectional relationship between both conditions.

Objective: To understand the role of restrictive diets as a possible link between digestive disorders and emerging EDs through a systematic review of the existing scientific evidence.

Method: A systematic review was conducted in PubMed, Embase, Scopus, and ClinicalTrials.gov on original articles published between 2020 and 2024 in English, Spanish, or French. Specific search equations combined terms related to gastrointestinal diseases, including inflammatory bowel disease, celiac disease, irritable bowel syndrome, eosinophilic esophagitis, allergies, and food intolerances, and EDs such as avoidant/restrictive food intake disorder (ARFID), orthorexia, and anorexia nervosa. Filters for language, date, and studies in humans were applied. Inclusion and exclusion criteria were defined to select primary studies with full-text available. After screening abstracts and critically reading the texts, 34 articles were included and assessed using the CASPe tool.

Results: The existing studies, mostly observational, reveal a high prevalence of symptoms compatible with ARFID and orthorexia in patients with digestive disorders, and vice versa. The absence of specific screening tools and integrated protocols limits joint diagnosis and management.

Conclusions: An interdisciplinary approach integrating psychological and nutritional assessments is necessary, requiring validated screening tools and the adoption of combined therapies. This approach could improve detection, treatment, and quality of life for patients.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Digestive disorders, eating disorders, restrictive diets, ARFID, orthorexia.

P5-03

Relationship between serum vitamin D levels and muscle mass in spanish high-performance athletes

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Background: Vitamin D is a fat-soluble steroid hormone that plays a key role in bone and muscle metabolism. In athletes, it is associated with improved physical performance, enhanced immune function, and the prevention of musculoskeletal injuries. While adipose tissue has traditionally been considered the primary reservoir of vitamin D, recent evidence suggests that skeletal muscle also serves as a functional store. This muscle-based reservoir may contribute more effectively to the maintenance of stable serum levels than fat stores, particularly in individuals with high muscle mass.

Objective: To assess the relationship between serum 25-hydroxyvitamin D [25(OH)D] levels and the percentage of muscle and fat mass in Spanish high-performance athletes.

Method: An observational, cross-sectional study was conducted involving 56 high-performance athletes (25 men and 31 women; mean age: 20.25 years) from various sports disciplines. Serum 25(OH)D levels were measured using electrochemiluminescence from fasting blood samples. None of the participants had taken vitamin D supplements for at least one month prior to testing. Body composition was assessed using multi-frequency segmental bioimpedance analysis (InBody 720). Statistical analysis was performed to evaluate correlations between vitamin D levels and both muscle and fat mass percentages.

Results: The mean serum vitamin D concentration was 23.5 ng/mL. Of the total participants, 23 athletes had sufficient levels (>30 ng/mL), while 33 had insufficient levels (<30 ng/mL). No statistically significant correlations were found between 25(OH)D levels and either muscle mass or body fat percentage.

Conclusions: Although no significant relationship was observed, further investigation into the potential role of skeletal muscle in vitamin D metabolism is warranted. Longitudinal or interventional studies could provide deeper insight into this relationship in the context of high physical and athletic demands.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Vitamin D, skeletal muscle, athletes.

P5-04

Evaluation of appetite-regulating peptides in patients with first-episode anorexia nervosa and their relationship with nutritional status. Preliminary analysis of the PSYNIGED study

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Background: A multitude of alterations in neurotransmitters, peptides and hormones, such as appetite-regulating peptides, have been described in eating disorders (ED), but their relationship with nutritional status is not well defined.

Objective: To evaluate various appetite-regulating peptides in patients with anorexia nervosa (AN) in their first episode compared to a control group and their relationship with the malnourished status.

Method: 38 patients diagnosed with AN (35 females and 3 males) with onset of AN symptoms less than one year and 38 age- and sex-matched healthy participants were included (age range 11 – 17 years). Active ghrelin, active GLP-1 and leptin concentrations were measured using an immunoassay with Luminex® technology. Height, weight and arm circumference (AC) measurements were taken, and body mass index (BMI) Z-score was calculated. T-tests or Mann-Whitney tests were used to compare both groups and Pearson's (adjusted for age) or Spearman's test to study correlations between variables, according to the distribution of the data (95% alpha-error for significance).

Results: Ninety-two percent of patients had some subtype of AN and 8% had unspecified ED. Weight, BMI Z-score, AC and leptin were lower in patients than in controls (P<0.001). There were no differences in ghrelin and GLP-1. Positive correlations of leptin with anthropometric parameters were found in both groups (P<0.001). Negative correlations of ghrelin with BMI Z-score and with BC (all P<0.05) were observed in patients. Finally, a positive correlation between GLP-1 and BMI Z-score was found only in the control group (P=0.026).

Conclusions: Leptin and ghrelin stand out for their usefulness as markers of nutritional status in patients with

recent-onset AN, while GLP-1 does not seem to be affected by the nutritional status of the patients.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Anorexia nervosa, nutritional status, leptin, ghrelin, GLP-1.

P5-05

Evaluation of the stability of bioactive compounds and antioxidant activity of freeze-dried red fruits in different storage conditions

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Background: Freeze-drying is an emerging preservation method for fruits and vegetables, which contributes to reducing food waste and promoting sustainability. Red fruits are particularly notable for their profile in bioactive compounds with antioxidant properties, making them promising functional ingredients.

Objective: To assess the antioxidant activity, polyphenol content and vitamin C levels in freeze-dried red fruits over time under different storage conditions.

Method: Freeze-dried samples of strawberry, blueberry and raspberry were analyzed at time 0 and after 12 months of storage under three conditions: (1) conventional packaging at room temperature; (2) nitrogen atmosphere packaging at room temperature; and (3) nitrogen atmosphere packaging at 37 °C. Antioxidant activity, total polyphenol content (TPC) and vitamin C concentration were measured.

Results: Antioxidant activity values did not change between 0 and 12 months in any of the three fruits or under any of the three packaging conditions. TPC values remained constant for blueberry and raspberry, with no differences observed between the three conditions. In strawberry, an increase in TPC value was obtained, especially under condition 2. This could be due to enhanced compound extractability over time. Vitamin C content decreased in all fruits after 12 months. No differences were observed between the storage conditions for blueberry and raspberry. The lowest vitamin C value in strawberry was found in condition 3.

Conclusions: Although vitamin C is more sensitive to degradation over time, freeze-drying effectively preserves antioxidant activity and polyphenol content in red fruits up to

12 months, even under elevated temperature. This suggests that freeze-drying is a promising technique for maintaining bioactivity of red fruits compared to other types of preservation methods.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Red fruits, freeze-drying, antioxidant activity, vitamin C.

P5-06

Does the polyamine intake of lactating women influence polyamine concentrations in breast milk?

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Background: Polyamines are bioactive compounds that play multiple roles in the body. In addition to endogenous synthesis, they are also obtained through food. It has been reported that the polyamine content in human milk can be modified according to the mother's dietary intake. However, further studies are needed to support this hypothesis.

Objective: To estimate the intake of polyamines in lactating mothers at two and four months postpartum and correlate it with the concentration of these bioactive compounds in human milk.

Method: A cohort of 83 lactating mothers was followed during the first four months of postnatal life. At two and four months, a 24-hour dietary recall was conducted using food replicas, and two breast milk samples were collected, corresponding to the beginning (foremilk) and end (hindmilk) of a feeding session. Polyamine intake was estimated based on the data published by Muñoz-Esparza et al. (2021). The determination of polyamine content in human milk was carried out using ultra-high-performance liquid chromatography coupled with fluorometric detection (Latorre-Moratalla et al., 2009).

Results: Total polyamine intake ranged from 22–806 µmol/day at two months and 27–839 µmol/day at four months. Putrescine intake was the highest (114.7 µmol/day; 87.46

μmol/day), followed by spermidine (43.4 μmol/day; 38.6 μmol/day) and spermine (30.8 μmol/day; 28.2 μmol/day) at both time points. At two months, spermine intake showed a positive correlation with its concentration in foremilk ($r = 0.187$, $p = 0.045$).

Conclusions: These results suggest that higher maternal polyamine intake is reflected in greater concentrations in breast milk, particularly spermine. If these findings are confirmed, enriching the maternal diet with polyamines could be a strategy to increase their levels in human milk, thereby benefiting infant health.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Polyamines, human milk, putrescine, spermine, spermidine.

Poster session 6

P6-01

Identification and characterization of fibromodulin in the adipose tissue of children with obesity

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Background: Childhood obesity is associated with an excessive increase in adipose tissue, both subcutaneous (SAT) and visceral (VAT), leading to metabolic alterations. Due to the heterogeneity of these fat depots and their variations by

age and sex, their impact on childhood adipose tissue is not yet fully understood. In the KIDSADIPOSEQ study, gene expression was analyzed in SAT and VAT biopsies from children aged 2 to 14 years. Differentially expressed genes were identified, with particular emphasis on the gene encoding fibromodulin (FMOD), a protein involved in extracellular matrix remodeling. Inadequate remodeling can result in fibrosis, inflammation, and insulin resistance.

Objective: To identify and characterize the FMOD protein in SAT and VAT of children with obesity.

Method: RNA sequencing was performed on 66 SAT and VAT biopsies from 19 girls and 16 boys. Differential expression analysis considered obesity status, depot type, sex, and age. FMOD gene and protein expression levels were also determined in subcutaneous and perigonadal adipose tissue samples from mice fed a standard diet (CD) or a high-fat diet (HFD), using real-time qPCR and Western blot, respectively.

Results: In children with obesity, FMOD gene expression is reduced in SAT. In contrast, in obese mice (HFD), FMOD protein levels increase in SAT. Additionally, in human adipocytes stimulated with TGF-β1, FMOD levels are elevated.

Conclusions: FMOD is differentially expressed in the SAT of children with obesity, as well as in diet-induced obese mice. Its increase in human adipocytes under TGF-β1 stimulation suggests a role in adipogenesis, extracellular matrix remodeling, and potentially in the prevention of fibrosis and metabolic complications associated with obesity.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Obesity, adipose tissue, insulin resistance.

P6-02

The functional power of Soursop (*Annona muricata*): exploring some proteins involved in its mechanism of action against lung cancer

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Background: *Anona muricata* (guanábana, soursop, graviola) is a plant native to the Americas and tropical Africa. This tree produces edible fruits, whose juices and infusions of leaves or branches are used for the treatment of fever, respiratory diseases, malaria, gastrointestinal problems, hepatic, cardiac, and renal affections, high glucose levels, and cancer. A previous study showed that the total ethanolic extract obtained from the pulp of this fruit inhibits the growth of A549 lung cancer cells.

Objective: To explore the effect of the *Anona muricata* pulp extract on proteins involved in the development and progression of lung cancer using the A549 cell line.

Method: Lung adenocarcinoma cells A549 were treated with *Anona muricata* pulp extracts (CI50=6.8±1.3 µg/mL) and exposed for 6, 8, and 24 hours. Proteins were extracted, and the expression level was determined by Western blot assays.

Results: The extract showed a significative inhibitory effect on the expression of β -catenin and ERK, important proteins involved in the Wnt pathway, which is involved in cell proliferation, clone formation, migration and drug resistance capacity; and the MAPK-ERK pathway leading to transcriptional regulation of MYC and cyclin D1, stimulating cell proliferation and tumor formation, respectively.

Conclusions: These results suggest that the *Anona muricata* pulp extract modulates the expression of proteins involved in the development and progression of lung cancer in A549 cells, presenting itself as a promising adjuvant in lung cancer treatment, which should continue to be explored.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: *Anona muricata*, lung cancer, A549, protein expression, Western blot.

P6-03

Optimization of colonic digestion in an in vitro gastrointestinal simulation model using short-chain fatty acids analysis

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Background: The relevance of in vitro studies in nutrition has increased markedly in recent years, due to ethical considerations related to studies on animals or humans. In this context, in vitro digestive models have been developed to reproduce the different stages of the digestive process, saving the ethical implications. One such model is GIDIS, a

dynamic multi-compartmental gastrointestinal simulator in vitro that reproduces the main sections of the human digestive system: the mouth, stomach, small intestine and the three parts of the colon.

Objective: To evaluate the efficacy of the DIGIS digestive model in simulating colonic digestion and maintaining an active and functional microbiota.

Method: Culture medium and a 10% fecal inoculum were introduced into the three colonic sections. The arrival of the intestinal contents was simulated by adding 200 ml of a sterilized solution with 1% inulin, and a continuous flow that allowed the transit of the contents through the colon for 48 hours, during which the system was fed with culture medium, was established. A sample was taken at different times and the procedure was repeated with 5 volunteers. The samples were centrifuged and the supernatant was extracted and analyzed by HPLC.

Results: The results show a notable increase in the total concentration of short-chain fatty acids at the end of the process (947.55 mM at 48 hours vs. 421.18 mM at 10 hours). Specifically, a significant increase in lactic and acetic acid production, stability in propionic acid and butyric acid production were observed after 34 hours

Conclusions: These findings indicate that the microbiota not only remains active in the system, but also responds functionally to inulin. Therefore, GIDIS proves to be an effective and promising tool for the study of colonic digestion.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Gastrointestinal simulator; digestion; SCFAs; optimization; in vitro.

P6-04

Pilot study in mature Spanish women from Madrid

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Background: Aging is a multifactorial process characterized by a multitude of changes, including a deterioration in body composition. Weight gain, along with the redistribution of body fat in the abdominal region, is a prevalent problem during menopause and perimenopause in women. This is associated with an increased cardiovascular and metabolic risk.

Objective: This pilot study aimed to examine the nutrient intake of urban native Spanish women with a medium-high sociocultural level and its relationship with some nutritional-analytical variables

Method: 23 volunteers were recruited for the study in April 2024. Mean age is 46,5±5,6 years. Body weight and height were measured using standardized methods. An anthropometric study was conducted using the Tanita TBF 300 GS to measure body fat. Blood samples were also collected. 3-d FR was performed, and dietary intake was calculated using the DIAL® program. Data were analyzed using SPSS 29.0, significance level $p < 0.05$.

Results: The mean intake of protein and fat exceeded the respective Spanish RDA; the contrary was observed for carbohydrates and fiber intake. This is consistent with the high consumption of fatty meat and low consumption of fruits and vegetables. Concerning micronutrients, low intakes of folic acid, Calcium and Iron, was observed with respect Spanish RDA. Carbohydrates were correlated with serum cholesterol; this is probably responsible for its increase in serum, but Vitamin D was inversely correlated. Folic acid was correlated with atherogenic risk factors ($p < 0.05$), probably because when folate decreased, it increased homocysteine and cardiovascular risk. Finally, the Healthy dietary index (IAS) was inversely correlated with %E of fat % of SFA.

Conclusions: We observed a dietary unbalance in women. The intake of fat, carbohydrates, fiber, folate, calcium, and iron doesn't meet the established recommendations for Spain. The unfavourable lifestyle of the great majority of mature women may have implications for the elderly.

Conflict of interest: The author declares no conflicts of interest.

Keywords: Dietary intake, serum lipids, serum vitamin D, Spanish women, menopause.

P6-05

Nutrition, sustainability, and 3D meat: an evidence-based nursing perspective

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Background: Lab-grown meat, also known as 3D or in vitro meat, is emerging as an alternative to the environmental, ethical, and public health challenges associated with conventional meat production. From a nursing and nutrition perspective, it

is essential to evaluate this food innovation in terms of human health, sustainability, and its role in healthy eating habits.

Objective: To explore, based on available scientific evidence, the effects of 3D meat consumption on human health, environmental sustainability, and nutritional viability.

Method: Literature review of CINAHL, EMBASE, PubMed, and the Cochrane Library (January 2018–April 2025). Systematic reviews, clinical studies, and technical documents in English and Spanish were included. Editorials, opinions, and duplicate studies were excluded.

Results: Of 97 articles, 32 met inclusion criteria. • Nutritional profile: 3D meat can be formulated with improved fatty acids, cholesterol, and micronutrients, although it varies depending on the production method. • Food safety: No known adverse effects have been reported; its controlled production could reduce the risk of zoonoses and contamination. • Sustainability: It has the potential to reduce water consumption and emissions, although its energy impact remains high. • Public perception: Cultural factors and lack of knowledge influence its acceptance. Evidence-based food education can improve understanding and acceptance.

Conclusions: 3D meat represents a promising innovation in the context of sustainable and balanced diets, although further evidence regarding its safety and long-term effects is needed. Nursing and nutrition have a key role to play in providing objective, up-to-date, and unbiased health education to support informed dietary choices.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: 3D meat, food, nutrition, sustainability, human health.

P6-06

Selenium levels in the population of northwest Spain: current analysis

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Background: Selenium (Se) is an essential trace mineral with antioxidant and protective functions against oxidative stress. Its deficiency is associated with an increased risk of chronic diseases, including cancer and immune system deterioration. In northwest Spain, regions such as Galicia exhibit low selenium levels in soils and foods, impacting dietary intake. This situation particularly affects vulnerable populations, exacerbating health complications.

Objective: The objective of this project is to assess selenium levels in the adult population of northwest Spain and propose sustainable strategies to improve their nutritional status.

Method: A cross-sectional study was conducted with 501 healthy adults, aged 18–79 years, in Lugo (Northwest Spain), free from chronic diseases or treatments affecting micronutrient metabolism. Fasting blood samples were collected and processed according to established protocols. Selenium levels were analyzed using inductively coupled plasma mass spectrometry (ICP-MS). Statistical analysis followed the Clinical and Laboratory Standards Institute (CLSI) guidelines. Reference values were established using non-parametric methods, and the influence of sex and age on selenium levels was evaluated using two-way ANOVA.

Results: Of the participants, 54.8% had selenium levels below the adequate threshold ($<60 \mu\text{g/L}$), and 96.0% were below the optimal level for selenoprotein P expression ($<90 \mu\text{g/L}$). The analysis revealed a significant influence of age ($p<0.001$), while sex was found to be non-significant ($p>0.05$).

Conclusions: There is a widespread selenium deficiency in the adult population of northwest Spain, particularly among older individuals. These findings highlight the need to explore sustainable nutritional interventions to improve selenium status, such as adapting local dietary patterns or implementing food biofortification, the effectiveness of which should be evaluated in future studies.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Selenium, deficiency, atlantic diet, public health.

Poster session 7

P7-01

Impact of ketogenic diet therapy on neurocognition and quality of life in pediatric patients

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Background: The ketogenic diet (KD) is an established therapeutic option for pediatric patients with drug-resistant epilepsy, particularly in cases such as Glut1 deficiency syndrome. Beyond its antiepileptic effects, recent evidence highlights the neuroprotective properties of KD. However, the significant lifestyle adjustments required may influence daily life and psychosocial dynamics within the family unit.

Objective: To assess cognitive function, quality of life, and socio-familial dynamics in pediatric patients undergoing ketogenic diet therapy.

Method: A cross-sectional study was conducted involving pediatric patients (aged 2–18 years) with Glut1 deficiency or refractory epilepsy, all under KD and follow-up at a tertiary hospital's Pediatric Metabolic Unit. Caregivers completed two telephone questionnaires: one designed to evaluate perceived changes in cognition and socio-familial interactions since initiating KD (5 questions), and the validated PedsQL Epilepsy Module.

Results: Ten patients were initially enrolled; three were excluded after discontinuing the diet. Among the seven remaining, 100% of caregivers reported increased alertness in the child, 43% noted reduced irritability and improved sleep, and 72% observed enhanced social interaction. Regarding quality of life, 80% acknowledged functional limitations due to epilepsy, though adherence to KD and treatment was high. A significant proportion expressed concerns about the child being alone and noted occasional sadness related to the condition.

Conclusions: Caregivers report improvements in seizure control, cognitive function, and socio-familial relationships following ketogenic diet therapy. These findings underscore the need for comprehensive, validated assessments of health-related outcomes in both patients and caregivers to better understand the broader impact of KD.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Ketogenic diet, quality of life.

P7-02

Personalized educational intervention to improve dietary adherence and nutritional status in adults on hemodialysis: theoretical design and clinical evaluation framework (ADENYD)

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Background: Protein-energy wasting (PEW) and low dietary adherence remain critical issues among patients with end-stage renal disease (ESRD) receiving hemodialysis. Despite guideline recommendations, nutritional interventions are often generalized, poorly integrated, and lack personalized follow-up, limiting their clinical effectiveness. **Objective:** To design a feasible, person-centered educational intervention integrated into routine hemodialysis care, aimed at improving dietary adherence, nutritional status, and perceived quality of life using validated clinical and educational instruments.

Method: This theoretical intervention adopts a pre-post quasi-experimental framework, structured in three sequential phases: baseline assessment (weeks 1–4), individualized educational sessions (weeks 5–8), and adaptive reinforcement (weeks 9–12). Target population includes adults on hospital-based hemodialysis for ≥ 3 months with preserved cognitive function. Tools include the End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ), the Simplified Nutritional Appetite Questionnaire (SNAQ), and the Kidney Disease Quality of Life 36-item survey (KDQOL-36), alongside a 7-day food record, bioimpedance, and routine biochemistry (phosphorus, potassium, albumin). Patients would receive 3–5 tailored sessions (20–30 min) during dialysis, focused on renal diet principles, protein intake, fluid management, and food literacy, supported by visual aids and individual counselling. Clinical and nutritional outcomes would be reassessed at week 12 and at a one-month follow-up (week 16) to evaluate impact sustainability.

Results: The model anticipates improved adherence rates, better nutritional status (e.g., serum albumin and appetite), and enhanced quality of life, based on validated indicators. It is grounded in international evidence, clinically applicable, and adaptable to public health systems without requiring extra resources.

Conclusions: This intervention proposes an ethical, evidence-based, and replicable framework to improve renal nutrition care. By empowering patients and integrating education into dialysis sessions, it supports sustainable, person-centered chronic disease management. Furthermore, it addresses unmet clinical needs by transforming routine care moments into opportunities for meaningful dietary learning, potentially reducing complications and improving long-term outcomes in vulnerable renal populations.

Conflict of interest: The author declares no conflicts of interest.

Keywords: Hemodialysis, nutritional status, dietary adherence, health education, clinical intervention.

P7-03

Health literacy and sustainability in renal nutrition: A person-centered educational proposal aligned with the sustainable development goals (SDGS)

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Background: People undergoing hemodialysis often face complex dietary requirements, reduced autonomy, and limited access to tailored health education. Low nutritional literacy and rigid recommendations contribute to poor adherence and social inequities. Educational strategies adapted to individual needs are essential for sustainable dietary change and patient empowerment.

Objective: To design a personalized, socially inclusive, and sustainability-oriented educational intervention for adults on hemodialysis, aiming to enhance health literacy, dietary adherence, and nutritional autonomy, while aligning with the Sustainable Development Goals (SDGs).

Method: This theoretical design integrates person-centered care and meaningful learning principles into a structured 12-week intervention composed of three stages: baseline assessment, individualized educational sessions, and follow-up reinforcement. The educational content is delivered during dialysis through 3–5 interactive sessions, using visual aids, motivational guides, food literacy materials, and culturally adapted tools. Topics include renal diet principles, protein and fluid intake, food label interpretation, and sustainable food choices. The intervention emphasizes inclusion, autonomy, and accessibility. Evaluation is based on validated instruments: the End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ), the Simplified Nutritional Appetite Questionnaire (SNAQ), the Kidney Disease Quality of Life survey (KDQOL-36), and a 7-day dietary record. No additional infrastructure or budget is required for implementation.

Results: The model aims to improve not only clinical outcomes, but also health literacy, motivation, and empowerment. It addresses barriers related to education, access, and emotional distress. Furthermore, it contributes to SDG 3 (Health), SDG 4 (Quality Education), SDG 10 (Reduced Inequalities), and SDG 12 (Responsible Consumption) by promoting equitable and sustainable dietary practices in chronic care.

Conclusions: This proposal reframes nutrition education as a tool for health equity and sustainability. By promoting critical food literacy and patient autonomy, it fosters

long-term adherence and empowers vulnerable individuals within the healthcare system.

Conflict of interest: The author declares no conflicts of interest.

Keywords: Health literacy, sustainable diet, nutrition education, hemodialysis, social equity.

P7-04

Association between selenium intake and magnetoencephalography measures in non-demented adults with different levels of risk for Alzheimer's disease

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Background: Oxidative stress is known as a risk factor for neurodegenerative diseases. Selenium (Se) intake has been associated with a reduced risk of dementia and Alzheimer's disease (AD), as well as with better performance on cognitive tests in adults. Magnetoencephalography (MEG) is a sensitive and objective tool capable of detecting early alterations linked to pathological processes, particularly within the Default Mode Network (DMN). To date, no studies have examined the relationship between Se intake and brain activity measured by MEG in healthy individuals with different levels of risk for developing AD.

Objective: To analyze the relationship between Se intake and electrophysiological measures in adults with different levels of risk for developing AD.

Method: Selenium intake was assessed in 169 non-demented individuals (112 with a family history of AD [FH+]) using a 3-day dietary record. Participants were categorized into tertiles based on Se intake (Se/1000 kcal). Tertiles of resting-state electroencephalogram alpha relative power in DMN regions were also calculated. Multinomial logistic regression models were used to examine the association between selenium intake and MEG outcomes.

Results: After adjusting for age, sex, physical activity, and smoking, higher Se intake was associated with greater relative alpha power in three analyzed brain regions (the precuneus and both the right and left hippocampus). Among FH+ individuals, the association with alpha power in both hippocampus remained significant. No associations were observed in individuals without a family history of AD.

Conclusions: Higher selenium intake was associated with greater relative alpha power in DMN regions - which are known to be vulnerable in AD- in healthy adults. These findings highlight the potential role of selenium as a modulator of brain activity, particularly in individuals at risk of developing dementia.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Selenium, Alzheimer's disease, cognitive impairment, magnetoencephalography.

P7-05

Lutein and zeaxanthin content in hen eggs based on rearing system

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Background: Lutein and zeaxanthin are carotenoids with significant health benefits, which content in egg yolks can be influenced by the diet and rearing system of hens.

Objective: To determine the concentration of lutein and zeaxanthin in eggs from various commercial classifications.

Method: Lutein and zeaxanthin were extracted from freeze-dried yolks based on the hens' breeding systems (0: organic, 1: free-range, 2: barn, 3: cage) and a special category within type 2 ("corn-fed hens") (two different brands per type). Concentrations ($\mu\text{g/g}$ dry weight) were quantified using high-performance liquid chromatography.

Results: Type 1 (free-range) eggs showed the highest levels of lutein ($21.31 \mu\text{g/g}$) and zeaxanthin ($11.95 \mu\text{g/g}$), attributable to their free access to fresh vegetation. Type 2 (barn) eggs had the lowest levels of both carotenoids (lutein: $6.86 \mu\text{g/g}$; zeaxanthin: $6.39 \mu\text{g/g}$), reflecting limited dietary access. Type 0 (organic) eggs, normally associated with higher content, showed intermediate values (lutein: $14.53 \mu\text{g/g}$; zeaxanthin: $10.68 \mu\text{g/g}$) with notable variability in lutein. Type 3 (cage) eggs presented higher values than type 2 (lutein: $12.29 \mu\text{g/g}$; zeaxanthin: $7.47 \mu\text{g/g}$), suggesting possible dietary supplementation. Eggs from "corn-fed" type 2 hens showed moderate levels and a higher amount of zeaxanthin ($8.94 \mu\text{g/g}$) than lutein ($8.00 \mu\text{g/g}$), consistent with their diet type.

Conclusions: The "free-range" (type 1) rearing system was associated with the highest levels of lutein and zeaxanthin. The influence of hen feed and variability based on the rearing system type on the carotenoid profile is highlighted. This information should reach consumers so they can choose the variety/brand with a higher carotenoid content, especially in special health situations.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Lutein. zeaxanthin. egg yolk. rearing system.

P7-06

Multi-omics signatures and prenatal environmental determinants of early-life blood pressure

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Background: Persistently elevated blood pressure (BP) from childhood to early midlife was strongly associated with an elevated risk of cardiovascular disease in adulthood. These patterns may result from gene-environment interactions mediating their effects through multi-omics dysfunction.

Objective: This study unravels the complex interplay between early-life environmental determinants and multi-omics dysfunction concerning BP trajectories from childhood to adolescence by integrating molecular data profiles, including 36 plasma proteins, 177 serum and 44 urine metabolites, and prenatal environmental exposures.

Method: We leverage childhood multi-omics data and multiple early-life BP measurements taken within the population-based Human Early Life Exposome project, including 502 mother-child pairs from six European countries divided into two subcohorts (North-Western vs. South-Mediterranean Countries). As environmental determinants, we assessed 43 exposures during pregnancy, including chemical, urban, social, and dietary factors. For the integrative analysis of multi-omics data, we applied RGCCA, while effects of environmental determinants on BP were assessed using ExWAS and mixture analysis (BWQS). The discovery subcohort was the North-Western, while the South-Mediterranean was the validation subcohort.

Results: We identified three novel childhood multi-omics signatures, validated in both sub-populations, significantly associated with BP at both timepoints. Inflammatory protein and serum signatures were risk profiles, while a microbiome-related urine signature was protective. As environmental triggers of these signatures, gestational age was a protective factor, lowering the protein signature in the pooled population. In contrast, weight gain during pregnancy in the Northern subcohort, maternal pre-pregnancy BMI, and prenatal exposures to chemicals like PFNA and PFOS in the Mediterranean subcohort were risk factors increasing the protein signature. Dietary factors (dairy and vegetables) were revealed as triggers of the beneficial urine biomarkers signature in the northern subgroup. The mixture analysis revealed combined and potentially synergistic effects of multiple exposures.

Conclusions: Overall, our work identifies early-life risk factors to guide prevention and intervention strategies for mitigating hypertension and its consequences.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Blood pressure, exposome, multi-omics.

Poster session 8

P8-01

The other side of fermentation: Biogenic amines in fermented vegetable products

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Background: In industrialized countries, up to 30% of vegetables are lost during primary production. Fermentation is a process that extends the shelf life of many of these products, representing an increasingly popular option to reduce food waste. However, this same process may increase the content of biogenic amines such as histamine and tyramine, which could pose a health concern for consumers.

Objective: The aim of this study was to analyze the content of biogenic amines in various fermented vegetable products available on the market.

Method: The total biogenic amine content was analyzed in 75 food products divided into seven different categories of fermented vegetables: sauerkraut (n=10), kimchi (n=11), miso (n=12), tempeh (n=7), amazake (n=11), cashew-based cheese analogue (n=13) and kombucha (n=11), using acidic extraction followed by chromatographic determination by UHPLC-FL.

Results: Regarding biogenic amines, closely linked to the decarboxylase activity of contaminant or fermentative microbiota, histamine, putrescine, cadaverine and tyramine were detected in the analyzed products. Sauerkraut showed the highest total levels of biogenic amines (219.4±106.1 mg/kg) and the greatest variability, with an interquartile range (IQR) of 135 mg/kg. In contrast, kimchi, tempeh, miso and cheese analogue had lower concentrations (35.9–112.2 mg/kg) and variability, except for kimchi, which showed an IQR of up to 102 mg/kg. Amazake presented the lowest levels (6.9±11.2 mg/kg) and variability (IQR of 7.4 mg/kg) among all analyzed products, and no biogenic amines were detected in any of the kombucha samples.

Conclusions: Given the growing consumption of these types of foods, these findings highlight the need for greater attention to fermented vegetable products regarding their biogenic amine content.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Biogenic amines, histamine, tyramine, fermented vegetables.

P8-02

Application of the MIRCA tool in the quality management of a human milk bank

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Background: The MIRCA tool (Microbiological Risk of Contamination Assessment tool) is oriented to quality management in different processes such as blood and tissue donation. Donated human milk is going to be regulated by the SOHO (Substances of Human Origin) regulation, which will force to improve traceability, safety and quality controls of milk.

Objective: To apply the MIRCA tool to the process analysis of our human milk bank from the reception of raw milk to its distribution as pasteurized milk, identifying critical points where to apply strategies to improve safety and quality.

Method: Descriptive analysis of the milk bank processes, as well as the environmental conditions in them. The MIRCA tool is applied, evaluating critical points to establish corrective measures to minimize risks.

Results: After applying the tool, 5 critical points were detected. One of the main ones is the hygiene and technique of breast milk extraction by the donors at home. As a strategy for improvement, it is proposed to reinforce the instructions for extraction, conservation and transport, minimizing the number of people present during extraction. In the bank, critical points were detected in the cleaning of equipment and surfaces and in the flow of personnel during pasteurization, with a high risk of microbiological cross-contamination. To solve it, the frequency of microbiological controls on surfaces and environment is increased, and specific documents on cleaning and disinfection validated are created.

Conclusions: The MIRCA tool has proven to be a useful instrument in improving the quality and safety of the processes involved in milk banks, facilitating their transition to the new SOHO regulations. It allows establishing critical points and establishing significant improvement strategies that increase safety in our milk recipients.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Human milk, milk banks, quality, safety, MIRCA.

P8-03

Clavulanic acid and promethazine: aggravating factors for histamine intolerance?

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Background: Histamine intolerance is a disorder of histamine homeostasis, mainly from dietary sources, due to reduced diamine oxidase (DAO) enzyme activity at the intestinal level. The accumulation of histamine in the bloodstream can trigger various gastrointestinal and extraintestinal symptoms. Although commonly used drugs such as promethazine and clavulanic acid (CA) have been identified as potential DAO inhibitors, the scientific evidence is limited, outdated and often lacks thorough experimental validation.

Objective: The aim of this study was to evaluate the inhibitory effect of CA and promethazine, two widely prescribed drugs, on DAO activity using a multidisciplinary approach combining computational and in vitro studies.

Method: To analyze the structure-activity relationship between the enzyme and the drugs, three human DAO 3D structures (PDB ID: 3HI7, 3HIG, and 3HII) and a porcine DAO structure generated by homology modelling were selected. A virtual molecular docking screening was performed to assess binding affinity. In parallel, DAO activity (porcine kidney protein extract) was determined in vitro in the presence of three concentrations of each drug (100, 50, and 10 μ M) by UHPLC-FL. Kinetic parameters (K_m and K_i) and the type of inhibition were characterized.

Results: The computational study predicted that CA interacts with the active site of DAO, while promethazine binds allosterically. The in vitro assays confirmed that CA exerts competitive inhibition and promethazine non-competitive inhibition, consistent with the computational results. Both drugs significantly reduced DAO activity in a

dose-dependent manner, reaching inhibition levels of 65% and 40% at 100 μ M.

Conclusions: These results suggest that administering CA or promethazine could be a potential cause or aggravating factor for histamine intolerance, increasing the number of individuals susceptible to adverse reactions after intake of dietary histamine.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Histamine intolerance, clavulanic acid, promethazine, diamine oxidase, enzyme inhibition.

P8-04

Variability of blood diamine oxidase (DAO) activity: intra- and interday assessment

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Background: Histamine intolerance is a clinical disorder associated with the accumulation of exogenous-origin plasma histamine due to reduced activity of the diamine oxidase (DAO) enzyme. Although serum DAO measurement is used as a complementary diagnostic tool alongside the presence of symptoms in two or more organs or systems, its validity has been questioned due to the lack of consensus on reference values and its possible variations throughout the day.

Objective: The objective is to assess serum DAO activity throughout the day (intraday) as well as across different days (interday) in healthy individuals without symptoms of histamine intolerance.

Method: A multicenter study was conducted with 30 healthy volunteers. Blood samples were collected at three times of the day (fasting, mid-morning, and afternoon) and on three different days. DAO activity was determined using a radioextraction assay method (DAO-REA). Differences were analyzed using a paired Student's t-test.

Results: Mean DAO activity values remained stable during the different times of the day and across several days ($p > 0.05$). However, significant differences were observed between study participants, with values ranging from 5.7 to 45.9 U/mL.

Conclusions: The results indicate that serum DAO activity remains consistent within the same individual, both throughout the day and across different days. However, significant interindividual variability in enzyme levels was observed. Further studies with a larger population sample are needed to confirm these findings.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Histamine intolerance, diamine oxidase, serum DAO, biomarkers, variability.

P8-05

Association between rapid growth and childhood overweight in term-born infants: a systematic review and meta-analysis

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Background: Childhood obesity remains a major global public health concern. Rapid weight gain during the first two years of life has been identified as a potential early risk factor; however, its specific impact in healthy term-born infants with appropriate birth weight for gestational age is not well established.

Objective: To examine the association between rapid growth from birth to two years of age and the subsequent risk of overweight, obesity, and elevated body mass index (BMI) in healthy term-born children.

Method: A systematic review and meta-analysis were conducted in accordance with the PRISMA 2020 guidelines. Eligible studies defined rapid growth as an increase in weight-for-age z-score > 0.67 . Literature searches were performed in PubMed, EMBASE, and Web of Science through March 2024.

Standardized mean differences (SMD) in BMI and odds ratios (OR) for overweight were pooled using random-effects models.

Results: Of 6296 records screened, 8 studies were included ($n = 10337$). Meta-analysis showed that children who experienced rapid growth had significantly higher BMI values (SMD = 0.50; 95% CI: 0.25–0.76; $p < 0.001$) compared to those with normal growth. Moreover, the odds of developing overweight were more than doubled in this group (OR = 2.12; 95% CI: 1.51–2.98; $p < 0.001$).

Conclusions: Healthy term-born infants who undergo rapid growth during the first two years of life are at increased risk of higher BMI and subsequent overweight during childhood. These findings highlight the need for early monitoring of growth trajectories, even in populations traditionally considered at low risk.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Rapid growth, childhood overweight, body mass index, metabolic programming, body composition.

P8-06

Assessment of omega-3 fatty acid intake and its relationship with the omega-3 index in older adults: Preliminary results from the OMEGAPRED study

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Background: Adequate dietary intake of omega-3 polyunsaturated fatty acids (PUFAs), particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), has been shown to offer protective effects against cardiovascular disease. The omega-3 index, defined as the sum of the EPA and DHA percentages in erythrocyte membranes relative to total fatty acids, is a validated biomarker that predicts the risk of cardiovascular mortality.

Objective: To evaluate omega-3 fatty acid intake and its association with the omega-3 index in a sample of 112 older adults.

Method: Omega-3 intake was assessed using a validated food frequency questionnaire. Dietary data were processed using the EvalFINUT[®] software to estimate energy and macronutrient intake, including fatty acid profiles. These values were then compared with established dietary reference intakes and nutritional goals. Fatty acids in whole blood were analyzed by gas chromatography, and the omega-3 index was calculated accordingly and estimated in erythrocytes. Statistical analyses included descriptive statistics and correlation tests between intake and index values.

Results: Participants showed high intakes of total fat, saturated fatty acids, cholesterol, and omega-6 fatty acids, but low intakes of omega-3 fatty acid, in relation with the general nutritional objective. The 88.4% of the participants had an intermediate omega-3 index (4–8%), while only 13% reached the optimal level (>8%). A positive association was found between the omega-3 index and dietary intake of EPA ($r=0.341$ $p<0.001$) and DHA ($r=0.347$ $p<0.001$).

Conclusions: The dietary assessment of omega-3 fatty acids in this sample of older adults reveals insufficient intake and suboptimal omega-3 index levels. Enhancing the consumption of omega-3 fatty acids, particularly EPA and DHA, through diet or supplementation may help improve omega-3 status and increase the omega-3 index. These findings highlight the need for targeted nutritional strategies to enhance omega-3 intake among older adults, which could contribute to a reduced risk of cardiovascular disease.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Omega-3 fatty acids, omega-3 index, eicosapentaenoic acid, docosahexaenoic acid, older adults.

Poster session 9

P9-01

Are serum prealbumin and albumin suitable markers of nutritional risk in hospitalized children and adolescents with eating disorders?

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Background: Serum prealbumin and albumin concentrations have traditionally been considered biochemical markers of malnutrition or nutritional risk. However, their utility in pediatric populations with eating disorders (ED) remains controversial. The aim of this study is to assess the suitability of prealbumin and albumin as markers of nutritional risk in children and adolescents hospitalized with an ED.

Objective: To evaluate whether serum prealbumin and albumin are reliable markers of nutritional risk in pediatric patients admitted for eating disorders.

Method: A prospective, observational, and longitudinal study was conducted including patients under 18 years old hospitalized for an eating disorder, diagnosed according to DSM-5 criteria. Anthropometric and biochemical measurements (serum albumin and prealbumin) were obtained at admission, discharge, and six months post-discharge. Correlations with clinical and anthropometric variables were analyzed. All references to hospitals or cities were omitted to ensure anonymity.

Results: Among 154 patients (90.3 % women, median age at admission 14.7 years old), 131 (85.1 %) had been diagnosed of anorexia nervosa. 18 patients (11.7 %) had serum prealbumin below the reference range at admission; no patient had low albumin. No significant correlation was found between prealbumin/albumin and body mass index (BMI) or weight (Z-score) at any of the three time points. Serum albumin at admission correlated negatively with the duration of the ED ($r = -0.20$, $p = 0.01$), while prealbumin showed a positive correlation ($r = 0.16$, $p = 0.04$). No significant associations were observed with the difference between maximum known weight and admission weight.

Conclusions: Neither prealbumin nor albumin are useful as markers of malnutrition or nutritional risk in children and adolescents hospitalized for eating disorders. Their measurement does not add value to the nutritional assessment or risk estimation of complications during treatment in this population.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Albumin, nutritional risk, eating disorders.

Influence of adherence to the Mediterranean diet on the nutritional status of Spanish schoolchildren with a high genetic predisposition to obesity

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Background: Mediterranean diet has been proposed as a potential modulator of the expression of the obese phenotype, particularly in individuals with a genetic predisposition.

Objective: To analyze the association between adherence to the Mediterranean diet and the nutritional status of schoolchildren with high genetic predisposition to obesity.

Method: From a total of 285 genotyped Spanish schoolchildren aged 6 to 16 years, the 144 with high genetic predisposition to obesity were selected, defined as having a genetic risk score (GRS) above the median(>P50), calculated based on the number of risk alleles present in 32 SNPs previously associated with childhood obesity. Adherence to the Mediterranean diet was assessed using the KIDMED questionnaire, and nutritional status was evaluated using body mass index (BMI), waist-to-height ratio (WHR), and body fat percentage estimated by skinfold thickness.

Results: Among schoolchildren with high genetic predisposition to obesity (n=144), higher adherence to the Mediterranean diet (KIDMED score ≥ 8) was associated with a lower prevalence of abdominal obesity (30.0%) compared to those with low or medium adherence (53.8%) ($p=0.010$). Non-significant trends were also observed toward lower overweight prevalence (17.5% vs. 28.8%) and lower total adiposity (39.0% vs. 51.0%). Regarding specific dietary components, consuming fish ≥ 2 –3 times per week was associated with lower overweight prevalence (23.9% vs. 42.1%; $p=0.007$) and lower adiposity (42.5% vs. 63.2%; $p=0.028$). Daily vegetable consumption was linked to lower adiposity prevalence (40.2% vs. 58.1%; $p=0.034$), and regular use of extra virgin olive oil showed a favorable trend toward lower adiposity (41.9% vs. 76.9%; $p=0.002$), though no significant differences were observed in BMI or abdominal obesity.

Additionally, protective associations were found with daily dairy consumption (overweight: 16.2% vs. 34.2%; $p=0.013$; abdominal obesity: 36.8% vs. 56.6%; $p=0.017$).

Conclusions: Adherence to the Mediterranean diet may partially mitigate the expression of the obese phenotype in schoolchildren with high genetic predisposition, particularly in terms of adiposity and abdominal obesity.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Pediatric obesity, genetic predisposition to obesity, Mediterranean diet, body composition, anthropometry.

P9-03

Relationship between insulin resistance and chronic low-grade inflammation in children with overweight and obesity following a nutritional intervention with improved bakery products. MEDKIDS study

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Background: Chronic low-grade inflammation is associated with the development of insulin resistance, even at early ages. Improving the nutritional quality of foods to be used in dietary interventions may contribute to modulate both processes.

Objective: To analyze the relationship between changes in HOMA-IR and inflammation following an intervention with nutritionally improved bakery products in a pediatric population, compared to a control group.

Method: A randomized crossover-controlled trial was conducted with 8-week intervention periods separated by a 5-week washout. Children aged 6–12 years with overweight or obesity were randomly assigned to two groups: an intervention group (receiving bakery products with increased

fiber and reduced sugars and saturated fats) and control (receiving conventional products). Additionally, adherence to a Mediterranean dietary pattern was promoted in both groups. Pre-post differences were calculated, and correlation analyses were performed between changes in HOMA-IR and an inflammatory index reflecting the combined effect of pro- and anti-inflammatory markers.

Results: HOMA-IR decreased significantly in both groups: intervention (-0.60 ; $p=0.023$) and control (-0.30 ; $p=0.002$), with no significant differences between groups. In the control group, a significant positive correlation was observed between the reduction in HOMA-IR and the decrease in the inflammatory index. In contrast, no correlation was found in the intervention group between changes in HOMA-IR and the inflammatory index.

Conclusions: In the control group, improvement in insulin resistance may be associated with a reduction in inflammation. In the intervention group, the decrease in HOMA-IR appears to be independent of inflammatory changes, potentially linked to direct dietary improvements. These findings highlight the complexity of the relationship between diet, inflammation, and insulin resistance in pediatric nutrition contexts.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Chronic low-grade inflammation, insulin resistance, children, obesity, RCT.

P9-04

Effects of an integrated psychonutrition and physical exercise intervention on metabolic flexibility and body composition in health adults. A pilot study

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Background: Metabolic flexibility is the body's ability to switch between fat and carbohydrate use based on energy demands, typically assessed via the respiratory quotient (RQ) through indirect calorimetry. Impaired flexibility is linked to insulin resistance and changes in body composition. Integrated interventions combining diet, physical activity, and psychonutrition have shown promise in improving these factors.

Objective: To evaluate the effects of a pilot intervention integrating diet, physical exercise, and psychonutrition on

body composition, RQ, and the TyG index as an indirect marker of insulin resistance in young adults.

Method: Ten healthy university faculty members aged 40–65 completed an 8-week intervention including eight psychonutrition workshops, individualized nutritional counseling, and six weeks of supervised physical training. RQ and fat oxidation (Fat%) were measured by indirect calorimetry; Fat and Muscle Indexes (FatIdx, MuscleIdx) by DXA; and the TyG index [$\ln(TG \times G/2)$] as an estimate of insulin sensitivity.

Results: Following the intervention, significant improvements in body composition were observed, with a reduction in fat mass index (FatIdx) ($p=0.002$; $d=1.35$) and an increase in muscle mass index (MuscleIdx) ($p=0.028$; $d=0.83$). Regarding metabolic flexibility, the respiratory quotient (RQ) slightly decreased ($0.827 \rightarrow 0.807$; $p=0.484$; $d=0.20$), while resting fat oxidation increased ($58.8\% \rightarrow 62.7\%$; $p=0.867$; $d=0.13$), though changes were not statistically significant. However, both variables showed strong negative correlations at baseline ($p=-0.994$) and post-intervention ($p=-0.929$), supporting their relevance as indicators of metabolic flexibility. The TyG index showed no significant change ($p=0.395$), though a small effect size ($d=0.24$) suggests a possible clinical trend undetected due to the short duration or small sample.

Conclusions: The intervention improved body composition and showed a trend toward greater metabolic flexibility and resting lipid oxidation, without significant changes in insulin resistance. These results support the need for longer interventions to more rigorously assess their impact.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Metabolic flexibility, body composition, respiratory quotient, insulin resistance, exercise therapy.

P9-05

Impact of front-of-pack labeling (NUTRI-SCORE) on food choices in the general population. Do we really understand the labels?

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Background: Nutri-Score rates the quality of food products using 5 colors and letters based on the Food Standards Agency's nutrient profiling system. When reviewing the literature on its use, contradictory opinions arise regarding its usefulness. However, it is acknowledged that it influences consumer purchasing decisions and shopping patterns.

Objective: The main objective of our study is to assess the level of knowledge and satisfaction of the general population with the Nutri-Score tool.

Method: We conducted a descriptive observational study by collecting variables through an anonymous online survey. The survey included questions on demographic variables and the level of knowledge about the Nutri-Score tool.

Results: A total of 151 responses were collected. The average age was 40 years old (± 12.48), with 63.4% being women, 54% working in healthcare and 58.5% having a university education. About 82% reported being familiar with Nutri-Score, and 34.1% considered it very useful. However, this did not translate into frequent use of the system (12.2% always use it) or significant influence on purchasing decisions (43.9% use it sometimes). On a confidence scale of 1 to 5, it scored an average of 2.83. Additionally, 85.4% believe more education is needed regarding labeling, and 78% believe additional information should be provided on the label. Study limitations include the relatively small sample size compared to similar studies, and the method of data collection, which was anonymous and conducted online.

Conclusions: The surveyed population is familiar with the Nutri-Score system, but only a portion considers it useful. We believe there is a need for greater education on how to correctly interpret labeling and understand the nutritional value of food products.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Nutri-score, labeling, survey.

P9-06

Feeding practices with donated human milk in preterm infants during the neonatal period

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Background: Breastfeeding is crucial for optimal infant nutrition. When unavailable, donated human milk (DHM) from human milk banks (HMB) is the first alternative, especially for very low birth weight (VLBW) and preterm neonates.

Objective: To describe the feeding type during the first 28 days of life in very preterm (<32 weeks of gestation) or VLBW (<1500 g) neonates receiving DHM.

Method: This retrospective descriptive study included 50 very preterm and/or VLBW neonates born between 2019 and 2023, admitted to a tertiary hospital Neonatal Unit, who had received DHM from the hospital's HMB. Collected data included gestational age (GA), birth weight, weight gain, and volumes of breast milk (BM), DHM, preterm infant formula (PIF) during the first 28 days of life. Clinical outcomes reported were bronchopulmonary dysplasia, necrotizing enterocolitis, patent ductus arteriosus (PDA) and nosocomial infections. A regression model assessed the association between hospitalization length and total DHM or PIF volume, adjusting for BW, weight gain, total BM volume, and the four complications.

Results: Among the 50 neonates (48% female), 74% were delivered by cesarean section. Mean GA was 30.0 ± 2.16 weeks and median birth weight was 1306 g (IQR: 342); most neonates had VLBW (72%). Nosocomial infection was the most frequent complication (44%). Median total milk intake over the first 28 days was 5024.5 ml (IQR: 2908.5), with DHM accounting for a median of 3428.5 ml (IQR: 2771.3). Mixed feeding (BM/DHM/PIF) was the most common feeding type (48%), followed by combined BM/DHM (42%). Higher DHM volumes were associated with shorter hospital stays ($p=0.001$), whereas PIF volumes were not ($p=0.723$).

Conclusions: DHM was a major component of early nutrition, highlighting its prioritization over formula. DHM contributed significantly to total milk intake throughout hospitalization and reduced the stay duration. HMBs play a vital role in ensuring human milk access for vulnerable neonates.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Donated human milk, human milk bank, preterm infant, very low birth weight.

Poster session 10

P10-01

Evolution of symptoms frequency and severity related to histamine intolerance through a low-histamine diet and dao enzyme supplementation

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Background: Worldwide data show that over 50% of the population experience headaches, nearly 40% digestive symptoms, around 30% skin complaints, and 15% respiratory manifestations. These symptoms are common and often difficult to manage due to their multifactorial nature. When persist in two or more systems without an organic cause or established diagnosis, histamine intolerance due to diamine oxidase (DAO) deficiency is considered. The main treatment strategy is following a low-histamine diet and/or DAO enzyme supplementation. In literature there exist efficacy studies with this treatment, nevertheless, these studies have some limitations such as the participants number, duration of treatment and most of them only take into account one of the two strategies, not their combination.

Objective: The aim of this study was to evaluate the evolution of histamine related symptoms along three months low-histamine diet and DAO supplementation.

Method: A retrospective study was conducted with 252 patients presenting symptoms in two or more systems suggestive of histamine intolerance. Over three months, participants followed a personalized low-histamine diet with DAO supplementation. Symptoms frequency and severity were assessed at baseline and after treatment using a custom questionnaire.

Results: This study found that most participants (92.5%) presented symptoms in four or more organ/systems. The baseline mean of symptoms/individual was 12.22 ± 3.74 . Gastrointestinal symptoms were the most prevalent (97.2%), particularly bloating, and constipation, followed by neurologicals (86.1%), mainly headache and lack of concentration. After the dietary treatment a significantly decrease of symptoms have been showed ending in a mean of 3.7 ± 1.56 affected systems and 5.33 ± 2.88 symptoms/individual ($p < 0.001$). Moreover, a significant reduction in severity of symptoms was observed across all affected systems, ranging from at least 67.8%.

Conclusions: These results suggest that a low-histamine diet combined with DAO supplementation may effectively reduce the frequency and intensity of symptoms associated with histamine intolerance.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Histamine intolerance, diamine oxidase (DAO) enzyme, histamine intolerance symptoms, low-histamine diet, DAO supplementation.

P10-02

Analysis of the impact of three dietary patterns (plant-based diet, ketogenic diet, and Mediterranean diet) on visceral adipose tissue: systematic review

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Background: Visceral adipose tissue (VAT) is linked to a higher cardiometabolic risk. Reducing it through dietary interventions is a key goal in preventing and treating of non-communicable chronic diseases.

Objective: To evaluate and compare the effectiveness of three dietary patterns, “plant-based diet (PBD), ketogenic diet, and Mediterranean diet (MED)”, in reducing VAT in adults.

Method: A systematic review of studies published between 2020 and 2025 was conducted using the MedLine, WOS, and Cinhal databases. Intervention and observational studies were included if they analyzed the effect of a structured dietary intervention on VAT, assessed through imaging techniques (magnetic resonance imaging, dual-energy X-ray absorptiometry, or computed tomography). Twenty-one studies that met the inclusion criteria were selected.

Results: Ketogenic diet interventions, in their very low-calorie version, showed a rapid reduction in VAT, followed by the Mediterranean diet. The PBD also proved effective in reducing VAT without the need for caloric restriction. The effects varied according on the duration, level of caloric restriction, macronutrient distribution, and presence of bioactive compounds. Some studies explored associated mechanisms such as improved insulin sensitivity or modulation of the gut microbiome.

Conclusions: The dietary patterns analyzed are effective in reducing VAT, with different magnitudes of effect. Hypocaloric diets rich in polyphenols showed the greatest benefits. Personalization of dietary interventions could optimize clinical outcomes, contributing to overall health improvement. In addition, plant-based and Mediterranean diets promote a more environmentally friendly eating model aligned with responsible consumption.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Visceral adipose tissue, plant-based diet, ketogenic diet, Mediterranean diet.

Interdisciplinary training in ICU dysphagia. A multi-center experience to improve early detection

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Background: Oropharyngeal dysphagia in critically ill patients has a prevalence of 20–40% in cases of prolonged mechanical ventilation or tracheostomy. It significantly increases the risk of aspiration pneumonia, malnutrition, reintubation, and prolonged hospital stay. Many centers lack systematic screening protocols and specific training programs.

Objective: To describe the experience of organizing multi-center training sessions on ICU dysphagia with interdisciplinary participation, highlighting their usefulness in raising awareness among professionals, promoting practical training, and encouraging early screening protocols.

Method: Descriptive study of two training sessions held in hospitals from Málaga and Puerto Real. First edition: 20 professionals with basic training. Second multicenter edition: 32 interdisciplinary participants (nursing, physiotherapy, clinical nutrition, physical medicine and rehabilitation). The program included prevalence, pathophysiology, and risk factors of dysphagia in the ICU, along with practical workshops on the volume-viscosity method (MECV). Assessment was conducted through verbal feedback and qualitative impressions.

Results: Most attendees reported not having received formal training in critical dysphagia. The activity was perceived as highly useful, emphasizing the need to establish systematic screening protocols and the importance of a coordinated interdisciplinary approach. There was a strong interest in applying the learning to daily clinical practice.

Conclusions: ICU dysphagia is an underdiagnosed condition with serious consequences. This experience shows that interdisciplinary training is an effective tool to increase professional awareness and improve early detection. Multicenter sessions have a positive impact on clinical practice, promote teamwork, and support the implementation of protocols that ensure safer and higher-quality care.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Dysphagia, ICU, interdisciplinary training, early screening, critical patient.

Controlled donation after circulatory death (CDCD) in neonatology. First experience of a non-transplanting hospital

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Background: In our country, children represent 6% of the patients on the transplant waiting list, while child donors are around 2%. The contribution of newborns is practically anecdotal. Nevertheless, there is room to offer CDCD as part of perinatal palliative care (PPC).

Objective: Our aim is to describe our clinical experience showing the feasibility of CDCD at a hospital without a transplant program.

Method: Review of the clinical records of donor patients and personal interviews with the medical staff involved in the procedure.

Results: A 40+3 weeks old newborn was admitted to our NICU due to severe hypoxic-ischemic encephalopathy. After hypothermia treatment, all medical tests showed a poor neurological prognosis and withdrawal of life-sustaining treatment (WLST) was offered to the family. On day 6, the local transplant coordination team (LTC) was contacted regarding the possibility of a potential CDCD. The family agreed to procedure that took place on 11th day. The external extraction team consisted of: three surgeons, an instrumental nurse, a perfusionist and an external TC (eTC). The local team in two neonatologists and a neonatal nurse, two LTC members, an operating theater nurse, and a perfusionist. After antemortem heparinization, WLST did start. In newborns, circulatory death is confirmed by the absence of blood flow. The functional warm ischemia time was 22 minutes including WLST, sternotomy, division and ligation of the supra-aortic trunks, right atrial and aortic arch cannulation. It was a 5-minute delay between establishing circulatory death and starting of cardiopulmonary bypass. The heart was subsequently declared valid and extraction was performed. A 15-day neonate received donor's heart with satisfactory evolution.

Conclusions: CDCD can be offer to neonates as part of family-centered PPC. Early communication with the LTC is essential. In addition, it is necessary a previous meeting with the external team and TCe for an adequate coordination.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Circulatory death, donation, newborn, palliative care.

P10-05

When the body keeps a secret. Fetus in fetu (FIF) in the neonatal period

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Background: FIF is a rare congenital malformation (1/500,000 live births) resulting from abnormal division of the blastocyst in monozygotic pregnancies, in which a parasitic fetus develops inside its host twin. The most frequent location is in the retroperitoneal region, although it has also been described in the brain, lung, and scrotum, among others.

Objective: To describe our clinical experience in the diagnosis and clinical management of this congenital anomaly.

Method: Observational study from case records of Fetus in Fetu in last 20 years in our center.

Results: Only one case has been recorded. Male newborn at 38+5 weeks from a controlled pregnancy and eutocic delivery. Prenatal ultrasound at 28 showed a retroperitoneal cystic mass confirmed by fetal MRI suggesting fetiform teratoma as the first possibility. At birth, both abdominal ultrasound and MRI identified an anechoic cystic formation with a heterogeneous appearance and foci of calcification sized 6 x 5 x 5.5 cm (TxAPxCC). Suspicion diagnosis of FIF, as the characteristic image of the spine was observed, was done; however, a fetiform teratoma could not be ruled out. Alfafetoprotein (AFP) was slightly increased. Surgical resection was performed at 14 days of life, obtaining a cystic mass compatible with a yolk sac, inside which a fetiform structure was observed. Histological examination confirmed the presence of an amniotic sac and rudimentary umbilical cord, consistent with a diagnosis of FIF. Genetic analysis of the surgical specimen revealed male sex (karyotype 46XY). Subsequent follow-up showed a normal decrease in AFP. The patient is completely asymptomatic, and the 3-month follow-up ultrasound is normal.

Conclusions: FIF is an extremely rare entity that requires differentiation from other lesions, primarily fetiform teratoma. Unlike the latter, which may present a risk of malignant transformation, FIF has an excellent prognosis.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Fetus in fetu, MRI, ultrasound, alfaprotein, teratoma.

P10-06

Metabolomic response to a one-year lifestyle intervention to prevent obesity in children at risk. MELIPOP-DIVERSE studies

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Background: Early metabolic alterations in children with a familial predisposition to obesity may precede the onset of clinical disease and offer valuable targets for prevention. Lifestyle interventions during early life represent an opportunity to modulate metabolic pathways involved in energy homeostasis and fat accumulation.

Objective: To evaluate the effect of a one-year structured lifestyle (diet and physical activity) intervention on the plasma metabolomic profile of children at risk of developing obesity.

Methods: The MELIPOP study included 206 children from which 164 children (mean age 5.05 ± 1.14 years) recruited from Córdoba, Santiago and Zaragoza were included for analysis. Participants were assigned to an intervention group ($n = 95$; 50 boys, 45 girls) or a control group ($n = 69$; 37 boys, 32 girls). Fasting plasma samples were collected at baseline and after 12 months. Targeted metabolomic profiling was performed using four analytical platforms. Linear mixed-effects models were applied to assess changes in metabolite concentrations over time and between groups, adjusting for sex, center and repeated measures.

Results: The lifestyle intervention induced significant changes in the metabolomic profile compared to the control group. Among the most responsive molecules, propionylcarnitine showed a robust and consistent reduction in the intervention group. This metabolite, previously linked to insulin resistance and mitochondrial dysfunction, supports its role as an early marker of metabolic improvement. Additional metabolites also showed differential responses, including chenodeoxycholic acid, phosphatidylcholine-O 44:5, tetradecadienoylcarnitine and L-methionine, suggesting broader impacts of the intervention on bile acid metabolism, lipid remodeling and amino acid regulation.

Conclusions: A one-year structured lifestyle intervention in children at risk of obesity leads to measurable metabolic changes detectable in plasma. Propionylcarnitine and other emerging metabolites may serve as biomarkers of early response and targets for future preventive strategies.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Metabolomics, obesity, dietary intervention, carnitines, pediatrics.

Poster session 11

P11-01

Individualized fortification based on f-tir analysis of breast milk. Eight years of experience in our unit

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Background: Breast milk (BM) is the gold standard for feeding premature infants. To ensure nutritional requirements are met, fortification is usually necessary. In 2017, we began an individualized fortification protocol based on nutritional analysis of BM (from the mother herself and donated) that facilitates the individualized calculation of protein intake and caloric needs of patients.

Objective: To analyze the results of implementing an individualized fortification protocol in the premature population of a Neonatal Unit.

Method: Descriptive observational study including newborns admitted between 2017 and 2025. Serial analysis of breast milk samples administered using F-TIR technology (Foss Milkoscan®). Dietary-nutritional adjustment (fortification) according to nutritional objectives and the patient's clinical condition. Fortification using protein supplements, medium-chain triglycerides (MCT) and dextrinomaltose, individually or in combination (fortifiers supplemented with calcium and phosphorus).

Results: A total of 1,120 analyses (2–10 samples per patient) were included. With the individualized fortification protocol, less protein supplement was required compared to standard fortification, thus reducing complications that can result from protein overload. At 34 weeks of corrected age, patients required a maximum of 0.75 grams of protein per 100 ml, compared to 1 gram/100 ml suggested by standard fortification. No negative influence on the growth curve or the incidence of osteopenia of prematurity was observed in our sample, with alkaline phosphatase levels remaining within the normal range in most patients.

Conclusions: Individualized fortification, an example of personalized medicine, allows macronutrients to be adjusted without negatively affecting the growth curve or the development of metabolic bone disease in premature infants. It has a simple learning curve and its cost is limited to that of the nutritional analyzer available in milk banks.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Breast milk, donated milk, fortification, metabolic bone disease of prematurity, prematurity.

P11-02

Early Z-plasty in the management of cervical cleft

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Background: Cervical cleft is a rare congenital malformation, that represents less than 2% of all anterior cervical defects. It results from an abnormal fusion of the first branchial arches and is primarily diagnosed clinically. Differential diagnosis should include entities such as thyroglossal duct cyst and aplasia cutis.

Objective: To present a clinical case of congenital cervical cleft in order to highlight the significance of early diagnosis and appropriate surgical management to prevent negative outcomes for the patient such as cervical contractures or aesthetic deformities.

Method: We report the case of a full-term newborn, with no relevant prenatal history, born via urgent cesarean section due to fetal distress and maternal preeclampsia. Physical examination revealed micrognathia and a linear erythematous lesion on the anterior midline of the neck, with a fibrous subcutaneous cord, a mamillated protrusion at the superior end, and a blind-ending sinus at the inferior end. Ultrasound imaging demonstrated a 2-mm thick linear fibrous band extending from the chin to the upper border of the sternum, with no thyroid or vascular involvement. At 26 days of life, the patient underwent complete excision of the lesion and underlying fibrous tract, followed by Z-plasty for wound closure.

Results: The postoperative outcomes were excellent, both immediately following the procedure and at the 6-month follow-up. There were no complications such as cervical contractures or functional limitations observed.

Conclusions: Congenital cervical cleft is a rare malformation diagnosed through physical examination. Early surgical excision, preferably in the first few months of life, is an effective approach that prevents potential long-term aesthetic and functional issues, leading to optimal outcomes. The outcomes are particularly favorable when the procedure is performed within the first months of life.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Cervical cleft, Z-plasty, cervical malformation, surgery, micrognathia.

P11-03

Feeding practices in preterm neonates before the implementation of a donor human milk bank in a tertiary hospital

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Background: Breastfeeding is essential in newborn nutrition, particularly for preterm and very low birth weight (VLBW) infants. However, these vulnerable neonates often lack sufficient availability of their own mother's milk. To address this gap, human milk banks (HMBs) are increasingly being implemented.

Objective: To evaluate the clinical characteristics and breast milk (BM) and/or formula intake of very preterm (<32 weeks gestation) and/or VLBW (<1500 g) neonates during the first 28 days of life, to assess the feasibility and need for a HMB prior to its implementation.

Method: This retrospective, descriptive study included 50 very preterm and/or VLBW neonates born between 2017 and 2018 and admitted to a tertiary hospital's Neonatology Unit before the establishment of the HMB in April 2019. Data collected included gestational age (GA), birth weight, weight gain, daily BM and formula intake during the first 28 days, pregnancy or delivery complications and neonatal comorbidities during hospitalization.

Results: Of the 50 newborns included (60% female), 66% were delivered by cesarean section, with preeclampsia and fetal distress contributing to 30% of these cases. Premature rupture of membranes was the most frequent maternal condition (16%). Mean GA was 37.1±2.2 weeks, and median birth weight was 1435 g (IQR: 1410). Most infants (74%) received mixed feeding, 20% formula only, and 6% exclusively BM. Median BM volume was 1014 ml (IQR: 2530), and formula 2451.5 ml (IQR: 5278.6). At discharge, all exclusively BM-fed neonates were between 25th–50th weight percentiles, while formula-fed neonates were more distributed, mainly between 25th–50th (50%) and 50th–75th (30%) percentiles. Common comorbidities included hyaline membrane disease (56%), neonatal jaundice (52%), and nosocomial infections (44%).

Conclusions: Formula was a major nutritional source. This study highlights the need to implement a human milk bank to promote replacing formula with donor milk, ensuring vulnerable neonates have access to human milk when breastfeeding is not possible.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Breast milk, formula milk, preterm birth, low birth weight, neonatal complications.

Alteration of the foveal avascular zone measured by OCT-A in preterm infants and its relationship with neonatal growth

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Background: Premature birth causes embryogenesis in some organs, including the retina, to cease before its complete formation. The size of the Foveal Avascular Zone (FAZ) has been identified as a marker of prematurity and linked to the presence of retinopathy of prematurity (ROP). Our study goes further and attempts to define the role of postnatal growth in these alterations.

Objective: To analyze the characteristics of the FAZ in children born prematurely using optical coherence tomography angiography (OCT-A) and relate them to different perinatal variables.

Method: A cross-sectional observational study included children (4–12 years) with a history of prematurity compared with a full-term control group. Neonatal variables and findings from OCT-A examination were collected, including perimeter, circularity, and area of the FAZ, both in the superficial and deep capillary plexus.

Results: Seventy-one patients (35 preterm) were evaluated. A positive correlation was found between gestational age and the area and perimeter of the FAZ, which was smaller in preterm infants ($p < 0.001$). Greater gestational age showed a larger FAZ size, independently of the degree of ROP (multiple regression), which appears to have a greater influence on FAZ circularity. Another significant finding was the positive correlation ($p < 0.005$) between a larger FAZ size and greater weight gain during the first 15 days of life. This may be connected with the hypothesis that during early neonatal period adequate glucose intake and ATP production could directly influence retinal vascular development. There were no differences in visual acuity between groups.

Conclusions: OCT-A reveals discrepancies in the size of the FAZ between preterm and full-term infants at school age, independently of the presence of ROP. Postnatal growth in the first weeks appears to influence this development. No impact on visual acuity has been observed; however, long-term follow-up is necessary to assess possible effects in adulthood (e.g., macular degeneration).

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: ROP, OCT-A, retina, neonatal growth, prematurity.

Impact of education on inhalation technique in asthmatic children attending the pediatric emergency department

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Background: Asthma exacerbations are one of the most common causes of consultation in pediatric emergency departments, and its effective management relies heavily on proper inhalation technique and appropriate use of a spacer device. However, many children demonstrate errors in device use, which diminishes treatment efficacy, highlighting the importance of health education.

Objective: To determine the level of skill in the use of inhalation devices and spacers among asthmatic children who required inhaled treatment in the pediatric emergency department, and to assess the effect of instruction on correct technique.

Method: A descriptive observational study was conducted in asthmatic patients who required inhaled treatment in the pediatric emergency department during January and February 2025. Inhalation technique (salbutamol) and spacer use were assessed before and after nursing-led instruction using standardized checklists.

Results: A total of 31 patients were recruited; the majority (57%) were between 2 and 10 years old. Three out of four did not bring their own spacer device. Initially, only 42% correctly used the inhaler, and 55% used the spacer appropriately. After receiving instruction, 84% performed both the inhalation technique and spacer use correctly. Among those who initially demonstrated improper technique, 86% showed improvement following the educational intervention.

Conclusions: Most asthmatic children present with deficiencies in inhalation technique and spacer use upon arrival to the emergency department. Additionally, many do not bring their own spacer device. Nursing-led education significantly improves inhalation technique, underscoring the importance of proper instruction to optimize asthma management in emergency settings.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Asthma, health education, inhalation technique, nursing intervention, pediatrics, pediatric emergency department.

P11-06

Breast milk fat content variation and intrauterine growth retardation (RCIU) in preterm

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Background: The RCIU reflects an inadequate nutritional supply and interferes with fetal growth. Low-weight neonates present a long-term risk of metabolic syndrome, obesity and/or diabetes, especially if they present an exaggerated catch-up. Epigenetic changes in placenta could justify it. Maternal milk is the gold standard in postnatal nutrition and reduces the risk of metabolic disease. El RCIU could induce modifications in lactogenesis.

Objective: To analyze the presence of RCIU influencing the composition of the LM of preterm mothers (RNP) with low birth weight.

Method: Longitudinal observational study. Analysis by F-TIR infrared spectroscopy (Foss MilkoscanTM) of the macronutrients and energy value of the mother's milk in three developmental moments (1st, 2nd and 4th week of vision). Two groups, RNP mothers with RCIU (group 1) and RNP mothers without RCIU (group 2).

Results: There are 109 samples from 48 mothers (52 with RCIU). Comparable groups in terms of other variables such as the Body Mass Index (BMI). From the protein content, no statistically significant differences were obtained between groups. In both, a progressive decrease was observed over the course of the weeks. Caloric and fat intake was lower in group 1 in the 3 moments of the study, significantly in the 1st week; 61.6 Kcal/dl (51.9-68.4) and 2.6 gr/dl (1.8- 3.4) in group 1, compared to 69.7 Kcal/dl (64.4-71.3) and 3.8 gr/dl (3.1-4) gr/dl in group 2. The fat content decreased along the primer month in group 2.

Conclusions: The RICU does not seem to modify the protein content of the LM, but it does from fat. A possible adaptive mechanism could exist that would restrict fat intake with the objective of limiting the catch up that is related to long-term metabolic complications.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: RCIU, small for gestational age, human milk, F-TIR analysis, fat.

Poster session 12

P12-01

Accelerated idioventricular rhythm, an infrequent neonatal arrhythmia

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Background: Accelerated idioventricular rhythm (AIVR) is a rare arrhythmia that is generally benign and self limiting. It originates in the ventricle, showing wide QRS complexes with a heart rate not exceeding 10-15% of the baseline heart rate. In the neonatal period a differential diagnosis with potentially serious arrhythmias such as ventricular tachycardia and supraventricular arrhythmias with aberrant conduction should be done.

Objective: To describe our clinical experience in the diagnosis and management of this arrhythmia

Method: Review of medical records of newborn patients with this anomaly.

Results: A full-term newborn admitted to NICU for cardiac monitoring due to a history of fetal arrhythmia (atrial extrasystolia since week 34). ECG showed premature wide QRS complexes with bigeminy/trigeminy conduction and a maximum baseline heart rate of 160 bpm without hemodynamic repercussion. At 5 days of life, a change in cardiac monitoring was observed, alternating periods of sinus rhythm and unsustained episodes of regular monomorphic wide QRS tachycardia at frequencies slightly higher than the previous sinus frequency, lasting less than 1 minute. An echocardiographic study showed no evidence of structural heart disease. Blood tests showed no ionic abnormalities, with TSH in the metabolic screening range within the normal range. The patient remained under continuous monitoring and asymptomatic with a decrease in the number of AIVR episodes without the need for treatment. She was discharged after 12 days with sinus rhythm without ventricular extrasystole documented at the follow-up two weeks after discharge.

Conclusions: AIVR is a rare arrhythmia that poses a diagnostic challenge in neonatology. Although it is considered benign and self-limited in healthy newborns, careful evaluation is necessary to differentiate it from some wide QRS tachyarrhythmias such as ventricular tachycardia or supraventricular tachycardia with aberrant conduction, thus avoiding unnecessary investigations and treatments, as occurred in this patient.

Conflict of interest: The author declares no conflicts of interest.

Keywords: Accelerated idioventricular rhythm (AIVR), neonatal arrhythmia, wide QRS, benign, self-limiting

P12-02

Predictive value of homocysteine in hearing loss. Analysis in a healthy adult population

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Background: Early detection of hearing loss (HL) is vital for the prevention and/or slowing of this condition during adulthood. An insufficient intake of B-group vitamins can contribute to elevated homocysteine (Hcy), a metabolite involved in the methionine cycle. Elevated Hcy levels have been associated with vascular and neurosensory impairments, including HL, particularly in vulnerable populations such as older adults. However, its value as a clinical predictive biomarker for hearing health has not been sufficiently explored.

Objective: To establish a serum Hcy cut-off point from which HL can be predicted in university workers not exposed to occupational noise.

Method: A cross-sectional observational study was conducted with a sample of 245 voluntary male and female participants aged 20 to 65 years. Hearing function was assessed using pure-tone audiometry, following the World Health Organization (WHO) classification. Serum levels of Hcy and folate were measured. Statistical analysis was performed using SPSS v29.

Results: The overall HL prevalence was 20%, and it was significantly and positively associated with serum Hcy levels ($\beta = 0.254$) in a linear regression model adjusted for age, sex, and lipid profile. Hcy showed significant predictive capacity for HL (AUC=0.605; 95% CI: 0.518–0.692; $p=0.017$), with an optimal cut-off point of 9.47 $\mu\text{mol/L}$ (sensitivity: 70.8%; specificity: 51.8%).

Conclusions: Serum Hcy demonstrated a moderate but statistically significant ability to discriminate the presence of HL, with an exploratory cut-off point of 9.47 $\mu\text{mol/L}$. Although these findings should be interpreted with caution, they provide a preliminary basis that could inform future longitudinal studies with greater statistical power.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Homocysteine, hearing loss, cut-off point.

P12-03

Influence of age and diagnostic criteria on the association between biomarkers and hearing loss in workers not exposed to occupational noise

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Background: Hearing loss (HL) in workers not exposed to occupational noise raises questions about underlying biological factors, such as age, potential vascular alterations, micronutrient deficiencies, and the possible role of biomarkers like homocysteine (Hcy) and processes related to oxidative stress or chronic inflammation.

Objective: This study compares two diagnostic criteria for HL: The World Health Organization (WHO) and the American Speech-Language-Hearing Association (ASHA), focusing on the differences they generate in the biochemical and age-related characterization of workers.

Method: A sample of 245 Spanish university workers aged 20–65 years and not exposed to occupational noise was analyzed. Volunteers were classified as controls or with HL according to WHO and ASHA criteria. Auditory function was assessed through pure-tone audiometry. Serum levels of Hcy, vitamin D, and C-reactive protein (CRP), as well as the serum lipid profile, were analyzed. Statistical analysis was performed using SPSS v29.

Results: The prevalence of HL was 19.6% according to WHO and 57.6% according to ASHA. Both criteria showed

a consistent pattern: participants with HL had higher Hcy and LDL-cholesterol levels and lower vitamin D levels. However, only the ASHA criterion revealed significant differences when stratified by age. Among those <40 years, participants with HL showed higher CRP levels ($p=0.029$). In those ≥ 40 years, HL was associated with significantly higher levels of Hcy ($p=0.043$) and CRP ($p=0.012$), and lower vitamin D levels ($p=0.001$). In contrast, using the WHO criterion, only vitamin D levels differed ($p=0.010$).

Conclusions: Age modulates the associations between biomarkers and HL, while the selected classification criterion plays an important role in shaping the results. The ASHA criterion showed greater sensitivity in detecting age-related differences, highlighting the importance of considering both factors in HL research and clinical assessment.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: WHO, ASHA, homocysteine, age, vitamin D.

P12-04

Determinants associated with noise-induced hearing loss in young adult users of personal audio devices

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Background: Excessive use of personal listening devices (PLDs) has emerged as a significant risk factor for noise-induced hearing loss (NIHL) in young adults. In addition to direct auditory damage caused by noise exposure, certain nutritional and anthropometric factors have been suggested to influence auditory health.

Objective: To analyze the relationship between hearing function, cumulative noise exposure from PLDs use, adherence to the Mediterranean diet, body composition, and intake of specific nutrients in young adults.

Method: A cross-sectional pilot study was conducted with 22 young adults (aged 19–27 years). Hearing function was assessed through pure-tone audiometry and classified according to the criteria of the American

Speech-Language-Hearing Association (ASHA). Noise exposure was estimated using the Health[®] app and a specific questionnaire on PLDs use. Body composition was measured by bioelectrical impedance analysis. Dietary habits were assessed using the Mediterranean Diet Adherence Screener (MEDAS) and a three-day dietary record, from which nutrient intake was calculated.

Results: Participants with some degree of hearing loss showed higher cumulative noise exposure ($p=0.051$). Furthermore, greater adherence to the Mediterranean diet and lower body fat percentage were significantly associated with better hearing thresholds ($\beta = -0.398$; $p=0.045$), while lower vitamin K intake ($p=0.020$) was linked to a higher risk of hearing loss.

Conclusions: High noise exposure is associated with an increased risk of hearing impairment in young adults. However, strong adherence to the Mediterranean diet, adequate vitamin K intake, and healthy body composition may exert a protective effect on hearing function.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: hearing loss, Mediterranean diet, noise, vitamin K.

P12-05

Dietary supplementation with Uchuva and Mamey fruit extracts improves DSS-induced ulcerative colitis

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Background: Inflammatory Bowel Disease (IBD), which includes ulcerative colitis, is a chronic and idiopathic condition that affects the intestines and significantly reduces quality of life. Diet plays a key role in the pathophysiology of IBD. Western dietary patterns (high in sugar and fat) are associated with a greater risk of developing the disease, while diets rich in fruits and vegetables have shown protective and immunomodulatory effects. Colombia has abundant fruit resources that remain largely unexplored, including Uchuva (*Physalis peruviana*) and Mamey (*Mammea americana*), both of which contain bioactive compounds with therapeutic potential.

Objective: To evaluate the effect of a preventive dietary intervention using a combination of Uchuva and Mamey fruit extracts on DSS-induced intestinal inflammation in Balb/c mice.

Method: The animal's diet was supplemented with a mixture of extracts (3.6 and 7.2 g fruit/kg/day). Colitis was induced by administering DSS at 2.5% in the drinking water for eight consecutive days. During the dietary intervention, clinical symptoms were monitored, and macroscopic analysis was performed. Biomarkers such as Lipocalin-2 (Lcn-2), reactive oxygen species (ROS), and myeloperoxidase activity (MPO) were quantified. Data was analyzed using one-way ANOVA.

Results: The dietary intervention with fruit extracts showed a protective effect in the mouse model of colitis. Mice given the extracts experienced clinical and visible improvements compared to controls. There was a significant reduction in Lcn-2, a non-invasive biomarker of intestinal inflammation, along with a dose-dependent decrease in DSS-induced oxidative stress. No significant changes were observed in MPO activity.

Conclusions: The antioxidant potential and improvement in clinical outcomes observed in this study highlight these fruit extracts as promising candidates for the development of functional foods aimed at preventing and managing IBD.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Ulcerative colitis, *Physalis peruviana*, *Mammea americana*, oxidative stress.

P12-06

Vasorin regulates adipogenesis in human adipocytes

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Background: Adipose tissue is essential for maintaining metabolic homeostasis, but obesity significantly alters it, leading to serious metabolic conditions. Preliminary data from our group show that the gene encoding vasorin (VASN), a transmembrane protein described as an inhibitor of the TGF- β signaling pathway in vascular cells, is differentially expressed in the visceral adipose tissue of children and adults with obesity.

Objective: To study the function of vasorin in human adipocytes by inhibiting its gene expression.

Method: Human preadipocytes were transfected with a lentivirus containing an sh-RNA, either shRNA-VASN or shRNA-control. The preadipocytes were differentiated into mature adipocytes over 12 days. The degree of differentiation was determined by Oil Red O staining, and gene expression levels of VASN, peroxisome proliferator-activated receptor gamma (PPAR γ), and acetyl-CoA carboxylase α (ACACA) were evaluated by quantitative real-time PCR. On day 12, the cells were treated with TGF β 1 (100 μ M) for 30 minutes. Protein levels (phosphorylated or not) of protein kinase B (PKB, also known as AKT), extracellular signal-regulated kinase 1/2 (ERK1/2), and the main kinase of the TGF- β pathway, smad (2/3), were determined by western blot, in the presence or absence of TGF β 1.

Results: Inhibition of vasorin reduced lipid accumulation as well as gene expression of PPAR γ and ACACA in human adipocytes. Furthermore, incubation with TGF β 1 altered pSMAD and pERK1 levels in sh-VASN cells compared to the control.

Conclusions: Vasorin regulates adipogenesis and metabolism in human adipocytes, which may be mediated by inhibition of the TGF β pathway. These results are very promising for studying healthy adipose tissue expansion and the prevention of fibrosis, inflammation, and insulin resistance

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Obesity, adipose tissue, insulin resistance.

P12-07

Validation of a simple omega-3 index method in a Spanish population over 60 years old: preliminary results

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Background: The omega-3 index is a biomarker reflecting omega-3 fatty acid nutritional status. It is calculated as the sum of the weight percentages of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) relative to total fatty acids in red blood cells (RBCs). Traditionally, this requires whole blood collection and erythrocyte membranes isolation before gas-chromatography analysis. However, less invasive methods using a single drop of capillary whole blood collected via finger prick, deposited onto a specialized filter paper "dried blood spots" (DBS) are emerging for this purpose. OmegaQuant® methodology has been validated to

adapt the DBS omega-3 index estimation through regression models.

Objective: To validate the OmegaQuant® dried blood spot methodology in a Spanish population aged over 60 years.

Method: Whole venous blood was drawn from 51 participants over 60 years old from the OMEGAPRED study (NCT06916455), and EPA and DHA percentages were determined in both RBCs and in DBS using OmegaQuant® methodology. The omega-3 index was then calculated in RBCs and estimated from the DBS results. Spearman bivariate correlations and linear regression models were used to generate preliminary equations for estimating the omega-3 index in RBCs and thus validate the DBS method in this Spanish population.

Results: The analysis showed significant correlations between the RBC omega-3 index and the DBS-estimated index (Spearman's $r=0.633$, $p<0.001$). The proposed preliminary equation for estimating the RBC omega-3 index from the OmegaQuant® DBS data in Spaniards aged over 60 is: $y = 1.523 + 0.819x$.

Conclusions: OmegaQuant® DBS methodology seems to be valid as a simple, minimally invasive approach to assess the omega-3 index in Spanish adults over 60.

Conflict of interest: The authors declare that they have no conflicts of interest.

Keywords: Omega-3 index, EPA, DHA, dried blood spot, elderly population.

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