DNSG 2026

43rd International Symposium on Diabetes and Nutrition

Montbrió de Camp, Tarragona, Spain (June 15th-18th, 2026)

Scientific Programme

WELCOME NOTE

Dear colleagues,

As the 43rd International Symposium on Diabetes and Nutrition, organized by the Diabetes and Nutrition Study Group (DNSG), is about to begin, we are pleased to share with you the nearly final scientific program for this year's meeting, which will take place from June 15–18, 2026, in Montbrió del Camp, Tarragona, Spain.

We are looking forward to an outstanding symposium that will showcase the latest advances in nutrition and diabetes research, provide a forum for rigorous academic discussion, and foster collaboration among clinicians, dietitians, and researchers from around the world.

The scientific program includes plenary lectures, panel discussions, debates, oral communications, and poster presentations, covering a broad range of relevant and timely topics in diabetes, nutrition, and metabolic health.

We look forward to welcoming you to Tarragona for what promises to be an inspiring and scientifically enriching meeting.

Yours sincerely

Prof. Dr. Jordi Salas-Salvadó, Prof. Dr. Nancy Babio, Prof. Dr. Joan M Vendrell – Chair and Co-Chairs of the Organizing Committee

ORGANIZING COMMITTEE

Chair/President of the Organizing Committee:
Jordi Salas-Salvadó, Reus, Spain

Co-Chairs:
Nancy Babio, Reus, Spain
Joan Vendrell Ortega, Tarragona, Spain

DNSG 2026 is organised by:

DNSG – Diabetes Nutrition Study Group - https://dnsg-studygroup.eu/

SCIENTIFIC COMMITTEE

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*Central European Time (CET)

Monday, June 15th, 2026

10:00 –12:30	**REGISTRATION AND LUNCH (11.30 - 12.30)**
12:45 – 13:00	**WELCOME**
	Professor Jordi Salas-Salvadó, Professor Nancy Babio, Professor Joan Vendrell (Spain)
13:00 – 13:30	**SESSION 1 - PLENARY LECTURE**
	Chair: Hana Kahleova (USA), Jordi Salas-Salvadó (Spain)
	Title: Nutrition and diabetes: where we are and where we are going
	Speaker: Frank Hu. Harvard T.H. Chan School of Public Health, Boston, USA
	Discussion (5 minutes)
13:30 – 14:45	**SESSION 2 – RECOGNIZING SARCOPENIC OBESITY AND DIABETES AS CLINICAL PRIORITIES: A JOINT DNSG-ESPEN SESSION**
	Chairs: Anne Marie Aas (Norway), Cyril Kendall (Canada)
13:30 – 13:45	**Title: The epidemiology and mechanisms of sarcopenic diabetes: The who, what, why, and where**
	Speaker: Rocco Barazzoni. University of Trieste, Trieste, Italy
13:45 – 14:00	**Title: Nutritional prevention and management of sarcopenic diabetes**
	Speaker: Gabriele Riccardi, Federico II University of Naples, Naples, Italy
14:00 – 14:15	**Title: Role of diabetes specific formulas in sarcopenic diabetes**
	Speaker: Jeffrey I. Mechanick. Mount Sinai Fuster Heart Hospital, New York, USA
14:15 – 14:20	**OA 1:** Dietary inflammatory index and sarcopenia: a systematic review. Héctor Vázquez Lorente. CIBER and Rovira i Virgili University, Reus, Spain
14:20 – 14:25	**OA 2:** Sarcopenic obesity in type 2 diabetes: Prevalence and metabolic phenotype across handgrip strength classification approaches. Kristin Amundsen. Haukeland University Hospital, Bergen, Norway.
14:25 – 14:45	**Panel discussion** (All speakers)
14:45 – 15:15	**SESSION 3 - SHORT ORAL ABSTRACTS (3 MINUTES)**
	Chairs: Maria Lankinen (Finland), Afroditi Barouti (Sweden)
14:45 – 14:48	**SO1:** Effect of a 1-year lifestyle intervention on plasma short-chain fatty acids and their association with cardiometabolic risk factors: a secondary analysis of the PREDIMED-Plus trial. Adrián Hernández Cacho (Spain)
14:48 – 14:51	**SO2**: Postprandial glucose dynamics from continuous monitoring reveal distinct subtypes of type 2 diabetes. Annalisa Giosuè (Italy)
14:51 – 14:54	**SO3**: Fibromodulin as a regulator of adipose extracellular matrix remodelling in childhood. Francisco Javier Ruiz-Ojeda (Spain)
14:54 – 14:57	**SO4**: Targeting weight loss and blood glucose control with oral sodium butyrate in overweight/obese adults with and without type 2 diabetes: a proof-of-concept randomized controlled trial. Lutgarda Bozzetto (Italy).
14:57 – 15:00	**SO5**: Influence of subcutaneous semaglutide use on diet quality: preliminary insights from a prospective cohort. Jacob Lessard-Lord (Canada)
15:00 – 15:03	**SO6**: Machine learning for glucotype characterization in adults with overweight/obesity without diabetes. Laura Rubio Gordón (Spain)
15:03 – 15:06	**SO7**: Impact of psychometric variables on the maintenance of baseline dietary patterns during an isocaloric, isonutritive lifestyle intervention for patients with type 2 diabetes and NAFLD. Stefan Kabisch (Germany)
	Discussion (9 minutes)

15:15 – 15:45	**ACTIVE COFFEE BREAK 1, POSTER SESSION 1 (PO 1 – PO 12)**

15:45 – 16:15	**SESSION 4 - PLENARY LECTURE**
	Chairs: Joan M. Vendrell (Spain), John Sievenpiper (Canada)
	Title: Endocrine disruptors consumption through diet and diabetes
	Speaker: Angel Nadal. IDIBE & CIBERDEM, Miguel Hernández University, Elche, Spain
	Discussion (5 minutes)

16:15 – 17:25	**SESSION 5 – DIABETES REMISSION AND MEAL REPLACEMENTS**
	Chairs: Ursula Schwab (Finland), Jeffrey Mechanick (USA)
16:15 – 16:30	**Title: Diabetes remission and prevention with traditional diets in Nepal: a community-based, traditional diet study (CoDiaPrem)**
	Speaker: Mike Lean. University of Glasgow, Glasgow, UK
16:30 – 16:45	**Title: Weight loss maintenance after meal replacement therapy.**
	Speaker: Naomi Brosnahan. University of Glasgow, Glasgow, UK
16:45 – 17:00	**Title: Proteomics and cardiometabolic risk prediction in diabetes remission trials**
	Speaker: Naveed Sattar. University of Glasgow, Glasgow, UK
17:00 – 17:05	**OA 3:** Time-restricted eating or partial meal replacement? A randomised crossover trial of dietary strategies to improve glycaemic control in type 2 diabetes. Kate Campbell. University of Otago, Dunedin, New Zealand
17:05 – 17:25	**Panel discussion** (All speakers)

17:25 – 18:35	**SESSION 6 – THE ROLE OF CARBOHYDRATES IN CARDIOMETABOLIC DISEASE: HOW DOES ONE DEFINE HEALTHY CARBOHYDRATE FOODS?**
	Chairs: Laura Chiavaroli (Canada), Dario Rahelic (Croatia)
17:25 – 17:40	**Title: Assessment of glycemic index and load of diets: Development of prediction models and a large global database**
	Speaker: Simin Liu. University of California, Irvine, USA
17:40 – 17:55	**Title: Nutrient density models and novel ratio-based carbohydrate quality metrics**
	Speaker: Adam Drewnowski, University of Washington, Seattle, USA
17:55 – 18:05	**Title: Influence of processing, storage and type of starch on glycemic responses: Implications for pasta, potatoes, rice, and bread.**
	Speaker: Thomas Wolever, University of Toronto, Toronto, Canada
18:05 – 18:15	**Title: Sugars reduction: what to target and what replacement strategies?**
	Speaker: John Sievenpiper. University of Toronto, Toronto, Canada
18:15 – 18:20	**Title: Bridging Science and Innovation: Sweeteners and Dietary Fibers for Cardiometabolic Health**
	Jing Zhou, Ingredion, USA
18:20 – 18:35	**Panel discussion** (All speakers)

18:35 – 19:05	SESSION 7 - SHORT ORAL ABSTRACTS (3 MINUTES)
	Chairs: Haris Dimosthenopoulos (Greece), Stefan Kabich (Germany)
18:35 – 18:38	**SO8:** Effects of low, moderate, and high carbohydrate diets in adults with type 1 diabetes: 6-month results from the DANCE randomized controlled trial. Afroditi Barouti (Sweden)
18:38 – 18:41	**SO9**: Relation of food sources of fructose and adiposity outcomes in adults and children: A systematic review and meta-analysis of prospective cohort studies. Andreea Zurbau (Canada)
18:41 – 18:44	**SO10**: Fasting-induced remission of type 2 diabetes patients is reflected in the plasma proteome. Antonia Zumblick (Germany)
18:44 – 18:47	**SO11**: The development of a logic model integrating behaviour change theories, techniques, and adherence outcomes in a plant-based intensive lifestyle intervention for type 2 diabetes remission. Dayana El Chaar (Canada).
18:47 – 18:50	**SO12**: Association between adherence to dietary fiber intake recommendations and micronutrients intake in a prediabetic population: results from the SEGOVIA Study. Eva Gesteiro (Spain)
18:50 – 18:53	**SO13**: From Control to Remission: Outcomes from REMI-D (REMIssion in Diabetes) Programme in Singapore Primary Care. Pauline Xinying Xie (Singapore)
18:56 – 18:56	**SO14**: Substitution of low- and no-calorie sweetened beverages for sugar-sweetened beverages and cardiometabolic outcomes: A systematic review and meta-substitution analysis of mega-cohort studies of ≥100,000 participants. Tauseef Khan (Canada)
	Discussion (9 minutes)
19:05 – 20:00	***Free time***

20:00	WELCOME RECEPTION AND DINNER
	Location: Pati dels Tarongers

22:00-23:45	**Session Science & Rhythm (young researchers and not-so-young researchers)**
	Chairs: Mike Lean (United Kingdom), Marcela Gonzalez-Gross (Spain)
22:00 – 22:05	**SR1**: Nuts consumption, kidney function, chronic kidney disease and mortality: A systematic review. Josué Alberto Pérez Acosta (Spain)
22:05 – 22:10	**SR2**: Combination of adherence to the Mediterranean diet and ultra-processed food consumption in relation to body composition: Longitudinal analyses in older adults with metabolic syndrome. Airin Chávez Zárate (Spain)
22:10 – 22:15	**SR3**: Serving science to a saturated world: The awareness gap. Vivian Yin (Canada)
22:15 – 22:20	**SR4**: Predictive value of C-Reactive protein/triglyceride-glucose index on the all-cause mortality among middle-aged and older Chinese adults: A prospective cohort study from CHARLS. Lili Zhang (China)
22:20 – 22:25	**SR5**: Glycemic control following a diet high in slowly digestible starch in type 2 diabetic patients. Alexandra Meynier (France)
22:25 – 22:30	**SR6**: Relationship between main phyla of gut microbiota and serum glucose levels among postmenopausal diabetic women living in rural areas of Segovia. Javier Modrego (Spain)
	Discussion (10 minutes)

Tuesday, June 16th, 2026

08:00 – 09:30	SESSION 8 - EMERGING EVIDENCE ON THE HEALTH BENEFITS OF NUTS
	Chairs: Jordi Salas-Salvadó (Spain), John Sievenpiper (Canada).
08:00 – 08:15	**Title: Nut consumption, insulin sensitivity, brain function and cognition.**
	Speaker: Peter Joris. Maastricht University, The Netherlands
08:15 – 08:30	**Title: Effects of nut consumption in prediabetes.**
	Speaker: Anoop Misra. Fortis-C-DOC Centre of Excellence for Diabetes, Metabolic Diseases and Endocrinology, Chirag Enclave, New Delhi, India
08:30 – 08:45	**Title: Nuts, cognitive performance and dementia**
	Speaker: Changzheng Yuan. Zhejiang University, China
08:45 – 09:00	**Title: NUTPOOL world epidemiological study: Preliminary Results**
	Speaker: Marta Guasch-Ferré. Copenhagen University, Copenhagen, Denmark
09:00 – 09:05	**OA 4:** Multi-omics responses to nut intake and cardiometabolic Health. Qi Sun. Department of Nutrition, Harvard T.H. Chan School of Public Health, Boston, USA
09:05 – 09:10	**OA 5:** Evaluation of effects of almond supplementation on executive function and processing speed in middle-aged Asian Indians with prediabetes: An open-label randomized controlled trial. Seema Gulati. Diabetes Foundation, New Delhi, India
09:10 – 09:30	**Panel discussion** (All speakers)
09:30 – 10:00	**SESSION 9 - SHORT ORAL ABSTRACTS (3 MINUTES)**
	Chairs: Søren Gregersen (Denmark), Julio Ramon Plaza Diaz (Spain)
09:30 – 09:33	**SO15:** Participant perceptions of the Portfolio diet program: Mixed-methods analyses within a pragmatic randomized controlled trial for cardiovascular health. Antonio Rossi (Canada)
09:33 – 09:36	**SO16**: Characterization of a plasma metabolomic signature of almonds and its association with intermediate cardiometabolic outcomes in 4 portfolio diet trials. Constança Silva (Canada)
09:36 – 09:39	**SO17**: Nut consumption, cardiovascular disease incidence and mortality: preliminary findings from the NUTPOOL project. Cristina Valle Hita (Denmark)
09:39 – 09:42	**SO18**: Daily peanut consumption enhances cognitive performance in preadolescents within a school-based health program: Results from the PEANUTY Trial. Rosa María Casas Rodríguez (Spain).
09:42 – 09:45	**SO19**: Evaluating the acceptability of the Portfolio diet nutrition education e-module curriculum via a mixed-methods study. Vivian Yin (Canada)
09:45 – 09:48	**SO20**: A DASH-enhanced Portfolio diet program for blood pressure and cardiometabolic risk reduction: Preliminary results on adherence in the SWITCH trial. Zeinab Houshialsadat (Canada)
09:48 – 09:51	**SO21**: What do we know about the causality of the association between moderate alcohol consumption and beneficial effects on ischemic heart disease and diabetes?. Jurgen Rehm (Canada)
	Discussion (9 minutes)
10:00 – 10:30	**ACTIVE COFFEE BREAK 2, POSTER SESSION 1 (PO 13 – PO 25)**

10:30 – 11:45	SESSION 10 - DEBATE 1 – ALCOHOL IN MODERATION YES OR NOT
	Chairs: Gabriele Riccardi (Italy), John Sievenpiper (Canada)
10:30 – 10:50	**Title: Does alcohol in moderation protect?**
	Speaker: Ramon Estruch. Hospital Clinic, Barcelona, Spain.
10:50 – 11:10	**Title: lack of evidence in recommending moderate alcohol consumption**
	Speaker: Jürgen Rehm. Institute for Mental Health Policy Research. Toronto, Canada & University Medical Center Hamburg-Eppendorf, Hamburg, Germany.
11:10 – 11:15	*Replay: Ramon Estruch, Barcelona, Spain*
11:15 – 11:20	*Replay: Jürgen Rehm, Hamburg, Germany*
11:20 – 11:25	**OA 6:** Danish alcohol guideline limits, circulating metabolites, and risk of coronary heart disease and all-cause mortality. Marta Trius-Soler. University of Copenhagen, Copenhagen, Denmark
11:25 – 11:45	**Panel discussion** (All speakers)

11:45 – 12:55	SESSION 11 - POLYPHENOLS AND DIABETES
	Chairs: Knut Mai (Germany), Indira Paz-Graniel (Spain)
11:45 – 12:00	**Title: Polyphenols: what do we know about them?**
	Speaker: Rosa Lamuela. University of Barcelona, Barcelona, Spain
12:00 – 12:15	**Title: Polyphenol intake, insulin resistance and diabetes: Epidemiologic studies**
	Speaker: Aedin Cassidy. Queen's University Belfast, Belfast, UK
12:15 – 12:30	**Title: Diet rich in polyphenols and healthy ageing: Clinical trials**
	Speaker: Ana Rodriguez Mateos. King's College London, London, UK
12:30 – 12:35	**OA 7:** Hydroxytyrosol supplementation improves oxidative and inflammatory status and induce modifications in gut microbiota genus in individuals with prediabetes and overweight. Jara Pérez-Jiménez. CSIC, Madrid, Spain
12:35 – 12:40	**OA 8:** Subtypes of fruits and vegetables and risk of type 2 diabetes: a prospective cohort study from the Malmö Diet and Cancer Study. Emily Sonestedt. Lund University, Malmö, Sweden
12:40 – 12:55	**Panel discussion** (All speakers)

12:55 – 14:00	LUNCH

14:00 – 15:10	SESSION 12 - OMICS SCIENCES, PRECISION NUTRITION AND DIABETES
	Chairs: Ángel Gil (Spain), Andreas Pfeiffer (Germany)
14:00 – 14:15	**Title: GLUCOTYPES: Glucose variability patterns for precision diabetes nutrition**
	Speaker: Jordi Merino. Copenhagen University, Copenhagen, Denmark
14:15 – 14:30	**Title: Human gut microbiome as a key player modulating diet-health associations**
	Speaker: Qi Sun. Harvard T.H. Chan School of Public Health, Boston, USA.
14:30 – 14:45	**Title: Dietary patterns, circulating metabolome and risk of type 2 diabetes**
	Speaker: Liming Liang. Harvard T.H. Chan School of Public Health, Boston, USA.

14:45 – 14:50	**OA 9:** Characterization of a plasma metabolomic signature of almonds and its association with intermediate cardiometabolic outcomes in 4 portfolio diet trials. Meaghan Kavanagh. University of New York, New York, USA.
14:50 – 14:55	**OA 10:** Inflammatory proteomic signals of eGFR difference reveal early metabolic risk for kidney dysfunction. Yifei Lin. Sichuan University, Chengdu, China.
14:55 – 15:10	**Panel discussion** (All speakers)
15:10 –15:40	**SESSION 13 - SHORT ORAL ABSTRACTS (3 MINUTES)**
	Chairs: Sabrina Ayoub-Charette (Canada), Michel Fridén (Sweden)
15:10 – 15:13	**SO22:** Dietary patterns, plasma proteomics, and cognitive trajectories in older adults with metabolic syndrome: evidence from the PREDIMED-Plus cohort. Hernando J. Margara Escudero (Spain)
15:13 – 15:16	**SO23**: Benefits of carob (Ceratonia siliqua L.) liquid concentrate, in modulating glucose metabolism in subjects with prediabetes: A randomized double-blind controlled clinical trial. Ignacio Zaldua Gorostiaga (Spain)
15:16 – 15:19	**SO24**: Coffee, caffeine, cardiovascular disease and mortality. Jesús F. García Gavilán (Spain)
15:19 – 15:22	**SO25**: Metabolic profiles of Mediterranean diet adherence in early childhood: Implication for cardiometabolic risk. Josué Alberto Pérez Acosta (Spain)
15:22 – 15:25	**SO26**: Ultra-processed food consumption and gut metagenomic profiles in Spanish preschool children: A cross-sectional analysis. Julio Ramón Plaza Diaz (Spain)
15:25 – 15:28	**SO27**: HDL-bound microRNAs and acute myocardial infarction incidence in a population-based case-cohort study: HDL function- and insulin resistance-related functional analysis. Montserrat Fitó (Spain)
15:28 – 15:31	**SO28**: Effects of a healthy Nordic diet or a low carbohydrate high PUFA diet on circulating ceramides in type-2 diabetes and prediabetes: secondary analyses of a randomized trial. Thomas Roosdorp (Sweden)
	Discussion (9 minutes)
15:40- 16:40	*Free time*
16:40 – 19:30	**EXCURSION – TARRACO Tour: The great Roman city declared World Patrimonial Heritage**
	Bus departs from hotel Termes Montbrió
	We recommend wearing sport shoes
20:00	**DINNER – ROMAN TARRACO AMPHITHEATER**

Wednesday, June 17th, 2026

08:00 – 08:25	**SESSION 14 - PLENARY LECTURE**
	Chairs: Marta Guasch-Ferré (Denmark), Joan Sabaté (USA)
	Title: The science of plant-based eating: mechanisms.
	Speaker: Hana Kahleova. Physicians Committee for Responsible Medicine, Washington, USA
	Discussion (5 minutes)
08:25 – 09:20	**SESSION 15 - DEBATE 2 – OMEGA-3 FATTY ACIDS IN DIABETES AND CARDIOVASCULAR DISEASE: ARE THEY USEFUL OR NOT?**
	Chairs: Angela Rivellese (Italy), Fredrik Rosqvist (Sweden)
08:25 – 08:45	**Title: The potential benefits of omega-3s for the prevention and treatment of diabetes and cardiovascular disease**
	Speaker: Ursula Schwab. University of Eastern Finland, Kuopio, Finland
08:45 – 09:05	**Title: Omega 3s are not useful for diabetes or cardiovascular disease.**
	Speaker: Francesco Visioli. Università degli Studi di Padova, Padova, Italy
09:05 – 09:10	**OA 11:** Glucose metabolism status modifies the associations between omega-3 concentrations and incident CVD: The Maastricht Study. Elena Tore. Maastricht University, Maastricht, The Netherlands.
09:10 – 09:20	**Panel discussion** (All speakers)
09:20 – 09:45	**SESSION 16 - SHORT ORAL ABSTRACTS (3 MINUTES)**
	Chairs: Stephanie Nishi (Canada), Tauseef Khan (Canada)
09:20 – 09:23	**SO29:** The role of the EAT-Lancet diet in the association between air pollution and cardiometabolic health: a cross-sectional analysis. Jadwiga Anna Konieczna (Spain)
09:23 – 09:26	**SO30**: Longitudinal associations between food biodiversity and cardiometabolic risk in children. Irene Valverde Aguilera (Spain)
09:26 – 09:29	**SO31**: Total and different types of olive oil consumption, gut microbiota, and cognitive function changes in older adults. Jiaqi Ni (Spain)
09:29 – 09:32	**SO32**: The association between ultra-processed food intake and glycaemic, metabolic, and inflammatory parameters in adults with type 1 diabetes. Maarten Soeters (The Netherlands)
09:32 – 09:35	**SO33**: Harmonizing European dietary guidelines for type 2 diabetes prevention: An evidence-based and sustainable model. Marilena Vitale (Italy)
09:35 – 09:38	**SO34**: Plasma per- and polyfluoroalkyl substances (PFAS) and cardiometabolic risk factors in an elderly Spanish population at high cardiovascular risk. Nadine Alkhoury (Spain)
09:38 – 09:41	**SO35**: Assessing a community gardening intervention to lower type 2 diabetes risk in Mississauga. Yumnah Jafri (Canada)
	Discussion (4 minutes)
9:45 – 10:15	**ACTIVE COFFEE BREAK 3, POSTER SESSION 3 (PO 26 – PO 38)**
10:15 – 11:25	**SESSION 17 – THE GOOD, THE BAD AND THE UGLY: FROM THE OUTDATED VISION OF DAIRY PRODUCTS TO CURRENT KNOWLEDGE**
	Chairs: Jordi Salas-Salvadó (Spain), Sabita Soedamah-Muthu (The Netherlands)
10:15 - 10:20	**Title: Introduction**
	Speaker: Jordi Salas-Salvadó. University Rovira i Virgili, Reus, Spain
10:20 – 10:35	**Title: Beyond nutrients: How the yogurt matrix shapes type 2 diabetes risk**

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	Speaker: Jean-Philippe Drouin-Chartier. Université Laval, Quebec, Canada
10:35 – 10:50	**Title: Breaking the fat myth: Full-fat vs. non-fat dairy products in prediabetes** Speaker: Jana Kraft. University of Vermont, Burlington, USA
10:50 – 11:05	**Title: How yogurt and milk differ in postprandial glucose, insulin responses, and metabolite profiles** Speaker: Kathryn Pimentel. Agroscope, Bern, Switzerland
11:05 – 11:10	**OA 12:** Gene-diet interaction between polygenic risk score and yogurt consumption on type 2 diabetes risk: a prospective study in the CARTaGENE cohort. Jacob Lessard-Lord. Université Laval, Quebec, Canada
11:10 – 11:25	**Panel discussion** (All speakers): From evidence to endorsement: Strategies to bridge yogurt science and policy
11:25 – 11:55	**SESSION 18 - SHORT ORAL ABSTRACTS (3 MINUTES)**
	Chairs: Sangeetha Shyam (Spain), Dan Ramdath (Canada)
11:25 – 11:28	**SO36**: More screens, more ultra-processed foods consumption? A longitudinal study in children. Indira Paz Graniel (Spain)
11:28 – 11:31	**SO37**: Dietary choline and betaine intake and cognitive function in older adults with overweight or obesity and metabolic syndrome: a prospective analysis. José María Manzanares Errazu (Spain)
11:31 – 11:34	**SO38**: Long term effects of increased water intake on glucose regulation in adults with elevated copeptin. Juliane Zemdegs (France)
11:34 – 11:37	**SO39**: Effect of replacing sugars-sweetened beverages with soymilk versus cow's milk on liver fat: The Soy Treatment Evaluation for Metabolic health (STEM) randomized trial. Madeline Erlich (Canada)
11:37 – 11:40	**SO40**: Impact of Food Consistency on Postprandial Metabolic Responses in Individuals at Risk of Type 2 Diabetes. Marta Csanalosi Artigas (Germany)
11:40 – 11:43	**SO41**: A bioactive collagen peptides composition modulates postprandial glycemia and hormonal responses in normoglycemic and prediabetic volunteers. Nicolina Virgilio (Belgium)
11:43 – 11:46	**SO42**: Low- and no-calorie sweeteners in guidelines: A global review of public health and clinical practice guidelines. Sabrina Ayoub-Charette (Canada)
	Discussion (9 minutes)
11:55 – 13:00	**SESSION 19 - ULTRA-PROCESSED FOODS (UPF): OPPORTUNITIES, PITFALLS, AND RESEARCH NEEDS**
	Chairs: Nancy Babio (Spain), Simin Liu (USA)
11:55 – 12:10	**Title: Guidelines-based UPF versus minimally processed diet for weight loss: The UPDATE trial** Speaker: Samuel J. Dicken. University College London, London, UK
12:10 – 12:25	**Title: Guidelines-based high versus low-UPF diet for blood pressure: The SWITCH trial** Speaker: Laura Chiavaroli. University of Toronto, Toronto, Canada
12:25 – 12:40	**Title: Epidemiological studies relating ultra-processed food consumption and health: evidence and limitations** Speaker: Jadwiga Konieczna. Institut d'Investigació Sanitària Illes Balears, Palma de Mallorca, Spain
12:40 – 12:45	**OA 13:** Can a dietary pattern high in ultra-processed foods be of high nutritional quality? - Preliminary findings from the NutriQuébec project. Marianne Rochette. Université Laval, Québec, Canada
12:45 – 13:00	**Panel discussion** (All speakers)
13:00 – 14:00	**LUNCH**

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14:00 – 15:10	SESSION 20 – PLANT-BASED DIETS HEALTH AND SUSTAINABILITY
	Chairs: Emily Sonestedt (Sweden), Thomas Wolever (Canada)
14:00 – 14:15	**Title: Food biodiversity and health**
	Speaker: Sangeetha Shyam. Institut de Recerca Biomèdica Catalunya Sud, Reus, Spain
14:15 – 14:30	**Title: Mindful eating with plant-forward nutrition: Connections to cognitive and mental health**
	Speaker: Stephanie Nishi. Toronto Metropolitan University, Toronto, Canada
14:30 – 14:45	**Title: Ultra-processed plant-based products in vegetarian diets: health and sustainability implications**
	Speaker: Joan Sabaté. Loma Linda University, Loma Linda, USA
14:45 – 14:50	**OA 14:** Disentangling complexity: the application of Bayesian networks to identify joint predictors of diet-related greenhouse gas emissions among adults in the NutriQuébec project. Joy Hutchinson. Université Laval, Québec, Canada
14:50 – 15:10	**Panel discussion** (All speakers)

15:10 – 16:00	SESSION 21 - CLINICAL TRIAL UPDATES
	Chairs: Lutgarda Bozzeto (Italy), Cyril Kendall (Canada)
15:10 – 15:20	**Title: PREDIMED-Plus trial.**
	Speaker: Jordi Salas-Salvadó. Rovira i Virgili University (IRB-CatSut/CIBERobn), Reus, Spain
15:20 – 15:30	**Title: CARING STUDY.**
	Hana Kahleova. Physicians Committee for Responsible Medicine, Washington, USA
15:30 – 15:40	**Title: A pragmatic translation of clinical practice guidelines on nutrition therapy for CVD in primary care: Updates on the CHEAP trial**
	Speaker: Laura Chiavaroli. University of Toronto, Toronto, Canada
15:40 – 15:50	**Title: PANIC study**
	Speaker: Aino-Maija Eloranta. University of Eastern Finland, Kuopio, Finland
15:50 – 16:00	**Title: T2D-GENE study**
	Speaker: Maria Lankinen. University of Eastern Finland, Kuopio, Finland

16:00 – 16:15	ACTIVE COFFEE BREAK 4, POSTER SESSION 4 (PO 39 – PO 50)

16:15 – 17:15	SESSION 22 – CLINICAL NUTRITION IN THE DIABETES MANAGEMENT AND ITS COMPLICATIONS
	Chairs: Kirsten Berk (The Netherlands), Rocco Barazzoni (Italy)
16:15 – 16:30	**Challenges of nutritional support in diabetic patients**
	Speaker: Laurence Genton. Hôpitaux universitaires de Genève, Geneva, Switzerland
16:30 – 16:45	**Title: The role of nutraceuticals in diabetes management**
	Speaker: Charilaos Dimosthenopoulos. Laiko General Hospital of Athens, Athens, Greece
16:45 – 17:00	**Title: Nutrition strategies in the MASLD management**
	Speaker: Didac Mauricio. CIBERDEM, Hospital de la Santa Creu i Sant Pau, Barcelona, Spain
17:00 – 17:15	**Panel discussion** (All speakers)

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17:15 – 17:40	**SESSION 23 - DNSG UPDATES**
	Chairs: DNSG Executive Committee Hana Kahleova (Czech Republic / USA) John Sievenpiper (Canada) Cyril Kendall (Canada) Jordi Salas-Salvadó (Spain) Charilaos (Haris) Dimosthenopoulos (Greece)
17:15 – 17:25	**DNSG Clinical Practice Guidelines Update** Jeffrey I. Mechanick. Mount Sinai Fuster Heart Hospital, New York, USA Laura Chiavaroli. University of Toronto, Toronto, Canada
17:25 – 17:35	**DNSG Updates**
17:35 – 17:40	**Invitation to the 44th International Symposium on Diabetes and Nutrition, in Finland – (July 2027).** Ursula Schwab. University of Eastern Finland, Kuopio, Finland.
17:40 – 17:45	**CLOSE OF THE SYMPOSIUM**
	Jordi Salas-Salvadó, Nancy Babio, Joan M Vendrell (Spain)
17:45 – 18:30	**GENERAL ASSEMBLY**
	Chair: Hana Kahleova (Czech Republic / USA)
18:00 – 19:00	**FEEL THE BEAT (SPORT ACTIVITY FOR ALL)**
	Session Leader: Raquel Pedrero-Chamizo (Spain) **Meeting point**: Hotel Lobby. Advisable sport clothes, mandatory sport shoes, water bottle and good vibes
20:30	**GALA DINNER (HOTEL TERMES MONTBRIÓ)**
23:00 – 01:00	Cocktail Tributov: Sala Dalí

Scientific Programme Poster and Science and Rhythm

*Central European Time (CET)

Monday, June 15th, 2026

15:15 –15:45 **ACTIVE COFFEE BREAK 1, POSTER SESSION 1 (PO 1 – PO 12)**

Chairs: Haris Dimosthenopoulos (Greece), Hector Vazquez Lorente (Spain)

PO1: Supplementation with sodium acetate alleviates white adipose tissue and endocrine pancreas dysfunction in high-fat diet fed Wistar rats. Paula Gallardo Villanueva (Spain)
PO2: The effects of stevia on acute endocrine responses and subsequent food intake in men and women with type 2 diabetes mellitus. Corey Scott (USA)
PO3: Ultrasound-assessed abdominal fat distribution and its relation to physical performance in community-dwelling older adults: a cross-sectional study. Claudia Jimenez Ten Hoevel (Spain)
PO4: Effects of a European Food Prescription Program for people with type 2 diabetes and low socioeconomic status: a randomised controlled pilot trial. Kirsten Berk (The Netherlands)
PO5: Investigating effect modification by sex of the Portfolio diet on blood lipids: An individual participant data meta-analysis. Afroditi Barouti (Sweden)
PO6: Healthy Beverage Score and sperm quality parameters in healthy men from the Led-Fertyl Study. Jennifer Estefanía Dávila Córdova (Spain)
PO7: Assessing the impact of tomato juice dosage on blood pressure across office and ambulatory measurements: a randomized trial. Anallely López Yerena (Spain)
PO8: Development of a representative database for dietary glycemic index and load for population surveillance and epidemiological studies across countries in the Mediterranean region. Angela D'Angelo (Italy)
PO9: Postprandial glucose response patterns may guide precision nutrition strategies based on low glycemic index diets in individuals at high cardiometabolic risk. Annalisa Giosue' (Italy)
PO10: PPG signal analysis for non-invasive glucose monitoring using wearables and AI. Antonia Zumblick (Germany)
PO11: The impact of time-restricted eating early and late in the day on actigraphy-estimated and subjective sleep quality in women with overweight and obesity. Bettina Schuppelius (Germany)
PO12: Perception of sucrose solutions ranging in sugar content similar to commercial beverages. Bohdan Luhovyy (Canada)

22:00 – 23:45 **Science & Rhythm (young researchers and not-so-young researchers)**

Chairs: Mike Lean (United Kingdom), Marcela Gonzalez-Gross (Spain)

SR1: Nuts consumption, kidney function, chronic kidney disease and mortality: A systematic review. Josué Alberto Pérez Acosta (Spain)
SR2: Combination of adherence to the Mediterranean diet and ultra-processed food consumption in relation to body composition: Longitudinal analyses in older adults with metabolic syndrome. Airin Chávez Zárate (Spain)
SR3: Serving science to a saturated world: The awareness gap. Vivian Yin (Canada)
SR4: Predictive value of C-Reactive protein/triglyceride-glucose index on the all-cause mortality among middle-aged and older Chinese adults: A prospective cohort study from CHARLS. Lili Zhang (China)
SR5: Glycemic control following a diet high in slowly digestible starch in type 2 diabetic patients. Alexandra Meynier (France)
SR6: Relationship between main phyla of gut microbiota and serum glucose levels among postmenopausal diabetic women living in rural areas of Segovia. Javier Modrego (Spain)

Tuesday, June 16th, 2026

10:00 – 10:30 **ACTIVE COFFEE BREAK 2, POSTER SESSION 2 (PO 13 – PO 25)**

Chairs: Anne-Marie Aas (Norway), Sangeetha Shyam (Spain)

PO13: Dietary lifestyle Interventions for neuropathic pain: Evaluation of the HEALM quality assessment tool. Michael Klowak (Canada)
PO14: Effect of therapeutic treatment with whole grape pomace and separate phenolic fraction on insulin resistance, ectopic lipid accumulation and tissue-specific oxidative damage in a model of murine obesity. Jara Pérez-jiménez (Spain)
PO15: Adherence to the EAT-Lancet diet, plasma metabolomic profiles, and long-term risk of chronic kidney disease: a prospective cohort study. Zhaogui Wu (Sweden)
PO16: Integrated multi-omics signatures to decipher the bioavailability of dietary (poly)phenols and identify phenolic metabotypes to promote cardiometabolic Health. Cristiana Mignogna (Italy)
PO17: Nutritional determinants of type 2 diabetes mellitus in the European Union: A systematic review. Daniela Alejandra Díaz Benavides (Hungary)
PO18: A GLP-1 consumer survey on eating habits, health goals, desired product traits, and unmet needs. Jing Zhou (USA).
PO19: Combined dietary and GLP-1 Intervention for weight reduction in adult Phenylketonuria. Dario Rahelic (Croatia)
PO20: Effect of a sugars-sweetened beverages reduction strategy using soymilk versus cow's milk on blood pressure and kidney health: The Soy Treatment Evaluation for Metabolic health (STEM) randomized trial. Diana Ghidanac (Canada)
PO21: Can metabolomics predict the cardiometabolic response to changes in lifestyle habits?. Élise Gendron (Canada)
PO22: Effect of plant-based foods and (poly)phenol supplementation on gut-microbiota metabolism in participants with overweight or obesity and cardiometabolic risk: a study protocol for a single-blind, parallel and randomised controlled trial. Fabian Lanuza (Chile)
PO23: Food sources and estimated intake of odd-chain-, branched-chain- and very long-chain saturated fatty acids in Sweden. Fredrik Rosqvist (Sweden)
PO24: Polygenic risk score for zinc metabolism is associated with serum zinc concentrations and early glycemic alterations in adolescents. Graziela Biude Silva Duarte (Brasil)
PO25: Precision nutrition with (poly)phenols for cardiometabolic risk prevention: the PRE-CARE-DIET study. Maria Sole Morandini (Italy)

Wednesday, June 17th, 2026

9:45 – 10:15 **ACTIVE COFFEE BREAK 3, POSTER SESSION 3 (PO 26 – PO 38)**

Chairs: Laura Chiavaroli (Canada), Julio Plaza Diaz (Spain)

PO26: Prevalence of sarcopenia and dynapenia and their association with clinical and lifestyle factors in adults with type 1 diabetes Mellitus. María Teresa Zarco Martín (Spain)
PO27: Rethinking ultra-processed foods: Unequal effects on health in people with diabetes. Marilena Vitale (Italy)
PO28: Impact of the morning vs. evening consumption of high-protein meals on the metabolic state of individuals with prediabetes or type 2 diabetes: pilot results of the PROTIME trial. Marina D'Urso (Germany)
PO29: Nut consumption and sperm quality in healthy men: Results from the Led-Fertyl Study. Jennifer Estefanía Dávila Córdova (Spain)
PO30: Diet quality, socio-demographic factors, and type 2 diabetes mellitus in adults across European Countries: Insights from SHARE. Daniela Alejandra Díaz Benavides (Hungary)
PO31: Interactions between a whole food, plant-based diet and the gut microbiome in cardiovascular prevention in heterozygous familial hypercholesterolemia. Jacob Lessard-Lord (Canada)
PO32: Mediterranean diet, gut microbiota, and cognitive decline in older adults with obesity/overweight and metabolic syndrome: a prospective cohort study. Jiaqi Ni (Spain)
PO33: Rosa canina triterpenoids as selective PPARγ modulators improving insulin sensitivity and obesity: from in vivo effects to molecular mechanisms. Joana Relat Pardo (Spain)
PO34: Cardiovascular health on social media: Assessing the Prevalence of Non-Evidence-Based Information. Juan Pablo Gonzalez Rivas (Spain)
PO35: Ultra-processed food intake and associations with dyslipidemia, glycemic control, and gut microbiome in adults with type 1 diabetes in Southern Italy. Jumana Abuqwider (Italy)
PO36: Blood glucose status of pregnant women in the northwest region of China. Li He (China)
PO37: Longitudinal associations between beverage consumption and adiposity in preschool children. Lucía Iglesias Vázquez (Spain)
PO38: Optimal Non-pharmacological Lifestyle Modifications in people with Type 2 diabetes (ON LiMiT): study protocol display. S. Gregersen (Denmark)

16:00 – 16:15 **ACTIVE COFFEE BREAK 4, POSTER SESSION 4 (PO 39 – PO 50)**

Chairs: Maria Lankinen (Finland), Nancy Babio (Spain)

PO39: BMI trajectories, medication use, comorbidities and healthcare service utilization in adults with newly diagnosed type 2 diabetes: a registry-based cohort study. Suvi Koivunen (Finland)
PO40: AI-DAPT: A hybrid modeling approach to unify Interstitial and blood glucose across glycemic states for non-Invasive glucose prediction. Marta Csanalosi Artigas (Germany)
PO41: How ultra-processed foods modulate cardiometabolic risk: A 2X2 factorial randomized control trial protocol. Marianne Rochette (Canada)
PO42: Metabolic low-grade inflammation within clinically normal ranges signals future chronic kidney disease. Yifei Lin (China)
PO43: Protocol for the Nourish 2 Flourish (N2F) pilot trial: a Portfolio diet-based nutrition education and community gardening intervention for type 2 diabetes prevention in Peel, Canada. Vivian Yin (Canada)
PO44: Estimating the effects of Nordic diets on the risk of major adverse liver outcomes: a target trial emulation across two cohorts in Sweden. Michael Fridén (Denmark)
PO45: Prospective associations between ultra-processed food consumption and adiposity and blood pressure in children. Tany Elizabeth Garcidueñas Fimbres (Spain)

PO46: Reduction in dietary Dioxin exposure following a low-fat vegan diet: results from a 16-week randomized trial. Nadine Alkhoury (Spain)
PO47: Implementation of a screening model for type 2 diabetes within the healthcare system: the DigiCare4You study. Guiomar Masip (Spain)
PO48: Association of diabetes with falls and clinical burden among older adults in the Mexican border region: A cross-sectional study. Roxana Elizabeth Ruiz Valenzuela (Spain)
PO49: Early dietary patterns and body composition in preschool children exposed to maternal obesity or gestational diabetes. Sebastian Aberg (Sweden)
PO50: Updating and expanding the evidence for soy heart health claims development: A systematic review and meta-analysis of randomized trials of the effect of soy protein on a comprehensive set of established blood lipids. Sonia Blanco Mejia (Canada)

Oral Communications (OA)

Monday, June 15th, 2026

13:30 – 14:45 SESSION 2 – Recognizing sarcopenic obesity and diabetes as clinical priorities: A joint DNSG-ESPEN session

OA 1 | Oral Communication

Dietary inflammatory index and sarcopenia: a systematic review

Héctor Vázquez-Lorente[1,2,3], Héctor Gil-Vidal[1], Francesc Calabuig-Montroy[1], Ángel Domingo-Martínez[1], Julio Plaza-Diaz[1,2,3,&], Jordi Salas-Salvadó[1,2,3,&]

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[&]Julio Plaza-Diaz and Jordi Salas-Salvadó share the last authorship.

Background: Sarcopenia is a progressive skeletal muscle disorder characterized by declines in muscle mass, strength, and physical performance. Chronic low-grade inflammation is considered a key mechanism in its pathophysiology. The Dietary Inflammatory Index (DII), which quantifies the inflammatory potential of habitual diet, has been suggested to be involved in this pathology.

Objective: To systematically review the evidence on the association between dietary inflammatory potential, assessed using the DII, and sarcopenia prevalence or incidence in adults.

Methods: A systematic search of PubMed, Embase, and Web of Science was conducted between 20 August and 10 September 2025. Original human studies evaluating the association between DII and sarcopenia were eligible. Two reviewers screened records, and three reviewers performed data extraction and risk-of-bias assessment using Joanna Briggs Institute tools. Findings were synthesized qualitatively.

Results: Of 136 records identified, 21 studies were included. Nineteen were cross-sectional, one was case-control, and one was a prospective cohort study. Most studies were conducted in Asia or the United States, and sample sizes ranged from 140 to 155,669 participants. Sarcopenia was assessed using AWGS, FNIH, or EWGSOP criteria. Across community-dwelling older adults, higher DII scores, indicating a more pro-inflammatory diet, were generally associated with greater odds of sarcopenia or probable sarcopenia prevalence, although a few studies reported non-significant associations. Similar patterns were observed in populations with asthma, hypertension, chronic kidney disease, non-alcoholic fatty liver disease, Crohn's disease, type 2 diabetes, and breast cancer survivorship. The prospective cohort study suggested a higher incidence of sarcopenia among men with higher DII scores. All included studies were of moderate-to-high methodological quality, with no risk-of-bias detected.

Conclusions: A more pro-inflammatory diet is associated with poorer muscle health and a higher likelihood of sarcopenia. Causal inference remains limited due to the predominance of cross-sectional studies, outcome definition heterogeneity, and variability in dietary assessment methods.

Keywords: dietary inflammatory index, inflammation, ageing, sarcopenia, older adults.

Funding: The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Conflict of interest: The authors have no conflict of interest to declare.

OA 2 | Oral Communication

Sarcopenic Obesity in Type 2 Diabetes: Prevalence and Metabolic Phenotype Across Handgrip

Kristin Amundsen[1,2], Kristine Godziuk[3], Eirik Søfteland[2], Iren Drage Hjellestad[1], Simon N. Dankel[1,2]

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[2]Department of Clinical Science, University of Bergen, Norway.

[3]Department of Physical Therapy and Rehabilitation Science, University of California San Francisco,

Background: Sarcopenic obesity (SO) is an increasingly recognized phenotype in type 2 diabetes (T2D), diagnosed by elevated adiposity together with low muscle mass and strength. Absolute hand grip strength (HGS) is an accessible test for low strength, but in obesity, HGS can be inflated by greater muscle mass, potentially underestimating SO. Body-size-adjusted HGS could better discern relative low strength, but the optimal criterion in T2D is unclear.

Aims: To compare SO prevalence and clinical phenotype across four SO definitions with different HGS criteria in adults with T2D.

Methods: In a cross-sectional analysis of 118 adults with T2D living in Norway, 91 with elevated body fat percentage [≥25/28/30% (men) or ≥39/40/42% (women) for ages <40/40–59/≥60 years] and low muscle mass (SMM/weight; men <37%, women <28%) were classified with SO under four HGS criteria: absolute HGS (<35.5/<20 kg), HGS/BMI (<1.05/<0.79 kg/kg/m2), HGS/weight (<0.45/<0.33 kg/kg), and HGS below the age- and sex-specific 10th percentile of a Norwegian reference. SO and non-SO were compared by Mann-Whitney U tests and age- and sex-adjusted linear regression.

Results: SO prevalence varied from 4.2% (absolute HGS), 10.2% (HGS <10th percentile), 16.1% (HGS/BMI), to 41.5% (HGS/weight). Of 49 SO cases, 51% were identified exclusively by HGS/weight. After age- and sex-adjustment, insulin resistance was the strongest metabolic feature distinguishing SO under each body-size-adjusted HGS criterion (HGS/BMI $\beta = +1.25$, $p<0.001$; HGS/weight $\beta = +0.83$, $p<0.001$). SO was also accompanied by higher visceral adipose tissue, CRP, and lower phase angle under both criteria; HGS/BMI additionally identified lower albumin and ALT.

Conclusions: The The choice of HGS criterion substantially influences SO prevalence and the clinical phenotype in adults with T2D. HGS/weight was the broadest criterion, identifying an SO phenotype with elevated insulin resistance, visceral adiposity, and inflammation. HGS/weight is a promising criterion for SO diagnosis in T2D, pending validation in larger cohorts.

Keywords: Type 2 diabetes; sarcopenic obesity; handgrip strength

Funding: Dam stiftelsen, Norway; Kostfonden, Sweden; Helse Vest, Norway

Conflict of interest: None.

16:15 – 17:25 SESSION 5 – DIABETES REMISSION AND MEAL REPLACEMENTS

OA 3 | Oral Communication

Time-restricted eating or partial meal replacement? A randomised crossover trial of dietary strategies to improve glycaemic control in type 2 diabetes

K. Campbell[1,2,3], M.C. Peddie[2], E. Iosua[4], A.N. Reynolds[1,3]

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Background: Time-restricted eating (TRE) and partial meal replacement (PMR) are two dietary strategies which can be prescribed by health professionals with minimal nutrition training, however a direct comparison of their impacts on glycaemia has not been conducted.

Aims: To compare the effects of TRE and PMR on glycaemic control and dietary intake in adults with type 2 diabetes (T2D) in Aotearoa New Zealand.

Methods: We conducted a randomised crossover trial in adults with T2D and BMI 25 kg/m^2. TRE involved eating within a nine-hour window ending by 7pm; PMR involved formula replacement of two main meals/day. Interventions were two weeks in duration, separated by a two-week washout. Glycaemic control was assessed using continuous glucose monitoring, and dietary intake via three-day diet records. Following each intervention, we interviewed participants about their experiences.

Results: Thirty-one participants (age 59.7 ± 9.6 years; BMI 37.0 ± 8.9 kg/m2; HbA1c 55.3 ± 14.0 mmol/mol) completed the trial. TRE produced a 5.0% [95% CI 0.6, 9.3] larger improvement in glucose time-in-range (3.9–10.0 mmol/L) than PMR. Improvements were accompanied by greater reductions in 24-hour mean glucose (-0.5 mmol/L [-0.8, -0.1]) and Glucose Management Indicator (-2.1 mmol/mol [-3.8, -0.4]) with TRE than PMR. In contrast, PMR resulted in a -1834 kJ [-2789, -878] greater reduction in self-reported energy intake however no anthropometric differences were observed. Intervention preferences differed according to lifestyle, daily routine, and personal treatment goals.

Conclusions: A diet prescription focused on eating window modification rather than energy restriction with PMR more effectively improved glycaemia over two weeks. It is unknown if the larger energy deficit reported with PMR would lead to greater weight loss-mediated glycaemic improvement over time. Health professionals should consider both clinical impacts and individual circumstances when offering these prescriptions to patients with T2D.

Keywords: type 2 diabetes; time-restricted eating; meal replacement; CGM

Funding: This study was funded by a New Zealand Society for the Study of Diabetes Emerging Researcher Grant (PI Campbell) and the Edgar Diabetes and Obesity Research Centre of the University of Otago.

Conflict of interest: None to declare.

Tuesday, June 16th, 2026

08:00 – 09:30 SESSION 8 - EMERGING EVIDENCE ON THE HEALTH BENEFITS OF NUTS

OA 4 | Oral Communication

Multi-omics responses to nut intake and cardiometabolic health

Guliyeerke Jigeer[1,2], Yang Hu[1], Xiaowen Wang[1], Siyue Wang[1], Kyu Ha Lee[1,3,4], A Heather Eliassen[1,3,5], Andrew T. Chan[6,7], Curtis Huttenhower[4,8], Dong D. Wang[1,5,8], Marta Guasch-Ferré[1,9], Miguel Ángel Martínez González[1,10,11], Miguel Ruiz-Canela[10,11], Estefanía Toledo[10,11], Jordi Salas-Salvadó[11], Robert D. Burk[12], Robert C. Kaplan[12], Martha Daviglus[13], Emma Romaker[14], Josiemer Mattei[1], Kenny Mendoza-Herrera[1], Yanbo Zhang[12], Frank B. Hu[1,3,5], Eric B. Rimm[1,3,5], Mingyang Song [1,3,4,7], Xiang Gao[1,2], Cuilin Zhang[1,15,16,17], Qibin Qi[1,12], Qi Sun[1,3,5,18,*]

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This study systematically integrated data of diet records-assessed data, gut microbiome, plasma metabolome, and cardiometabolic disease incidence in various populations to examine how nut intake influences human health through modulating the gut microbiome and blood metabolome in free-living individuals. Here, we identified distinct microbiome profiles associated with total nut, walnut, and other tree nut consumption, with eight specific gut bacterial species responsive to the intake of nuts. Agnostically-derived species scores reflecting higher nut intake were associated with a significantly lower risk of type 2 diabetes (T2D) in two independent studies. Notably, the species *Maccoyibacter intestinihominis* (i.e., UBA11774 sp003507655), a member of the *Lachnospiraceae* family that showed the strongest and most specific response to nut intake, was associated with a more favorable cardiometabolic biomarker profile and a lower risk of T2D. Furthermore, metabolomic profiles reflecting both nut intake and the nut-related microbial profile strongly predicted lower risks of incident T2D and cardiovascular disease. These findings support the beneficial effects of nut consumption on lowering cardiometabolic disease risk and provide mechanistic insight into potential pathways involving the human gut microbiota and plasma metabolome.

Keywords: Not reported in source file.

Funding: Not reported in source file.

Conflict of interest: Not reported in source file.

OA 5 | Oral Communication

Evaluation of Effects of Almond Supplementation on Executive Function and Processing Speed in Middle-Aged Asian Indians with Prediabetes: An Open-Label Randomized Controlled Trial

Seema Gulati[1,2], Anoop Misra[1,2,3], Rajneesh Tiwari[2], Ravindra M Pandey[4], Meenu Sharma[2]

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[3]*Fortis C-DOC Centre for Excellence for Diabetes, Metabolic Disease and Endocrinology, New Delhi, India*

[4]*All India Institute of Medical Sciences, New Delhi, India*

Background: Prediabetes is increasingly recognized as a stage of heightened risk not only for diabetes but also for early cognitive decline, driven by insulin resistance, oxidative stress, and low-grade inflammation.

Aims: To evaluate the effect of daily almond supplementation on cognitive performance and biochemical markers in middle-aged Asian Indians with prediabetes, who are at high risk for metabolic and cognitive decline.

Methods: This 24-week, open-label, parallel-arm randomized controlled trial was conducted at a tertiary care centre in New Delhi. Sixty adults aged 40–60 years with prediabetes were randomized to an almond group (n=29; almonds providing 20% of daily energy with diet and exercise) or a control group (n=31; isocaloric diet and exercise without almonds). Cognitive function was assessed at baseline and 24 weeks using the Cambridge Neuropsychological Test Automated Battery (CANTAB), covering executive function, memory, attention, processing speed, and working memory. Anthropometry, glycemia, plasma α-tocopherol, thiobarbituric acid reactive substances (TBARS), and high-sensitivity C-reactive protein (hs-CRP) were also measured.

Results: At 24 weeks, the almond group showed significant improvements in executive function (OTS; β = -2.5, 95 % CI: -4.4 -0.6, p = 0.011), and in processing speed (RTI; β = 73.8, 95 % CI: 25.7-122.0, p = 0.003; β = 39.3, 95 % CI: 9.4-69.6, p= 0.011) compared with controls. There were also significant reductions in weight, BMI, waist circumference, fasting and postprandial glucose, HbA1c, and TBARS, along with increased plasma α-tocopherol (all $p < 0.05$).

Conclusions: Six months of almond supplementation improved executive function, processing speed, and overall cognition, and enhanced antioxidant status and glycemic control in Asian Indians with prediabetes. These findings suggest that almonds may provide dual cognitive and metabolic benefits in this high-risk population.

Keywords: Almonds; Cognition; CANTAB; Prediabetes; Asian Indians.

Funding: Almond Board of California, California, USA

Conflict of interest: None

10:30 – 11:45 SESSION 10 - DEBATE 1 – ALCOHOL IN MODERATION YES OR NOT

OA 6 | Oral Communication

Danish alcohol guideline limits, circulating metabolites, and risk of coronary heart disease and all-cause mortality

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[6]Department of Nutrition, Harvard TH Chan School of Public Health, Boston, MA, USA.

Background: In 2022, the Danish Health Authority updated the national alcohol guidelines, introducing the "10–4": a maximum of 10 drinks (120 g alcohol) per week and no more than 4 drinks/day. Alcohol's effects on cardiometabolic health are complex and involve multiple metabolic pathways, yet the metabolomics profiles associated with moderate intake in the absence of binge drinking remain poorly characterized.

Aims: To identify circulating metabolites that distinguish moderate non-binge drinkers from low-drinkers and heavy or binge drinkers. Additionally, we examined the prospective associations between self-reported alcohol intake and incident coronary heart disease (CHD) and all-cause mortality.

Methods: We included 6,784 participants (age 30–60 years) from the Danish population-based Inter99 study. Baseline alcohol intake was categorized: low (0–25 g/week), moderate non-binge (25–120 g/week), and heavy/binge (>120 g/week or ≥5 drinks/day) groups. Metabolomics (LC-MS) was performed on baseline serum from a sex- and age-stratified random subsample (n=3,000). Associations between metabolites (n=167) and alcohol groups were analysed using ANCOVA with post hoc testing based on estimated marginal

means. Incident CHD and mortality were ascertained through national registries; prospective associations were assessed using Cox proportional hazards models (HRs, 95% CIs).

Results: Among 2,487 analyzed participants, 493 (31% males) were low-drinkers; 796 (44% males) moderate non-binge drinkers; and 1,198 (65% males) heavy/binge drinkers. Ethyl-glucuronide was the only metabolite significantly differentiating moderate non-binge versus low-drinkers, displaying a clear dose-response gradient. When stratified by sex, 13 metabolites remained significantly different between heavy/binge drinkers and the moderate non-binge group. Notably, 3-methylglutarylcarnitine levels were significantly lower in heavy/binge drinkers than in the other two groups. Continuous alcohol intake showed a J-shaped association with all-cause mortality in both sexes and with incident CHD in females.

Conclusions: Heavy or binge drinking showed distinct metabolic signatures, whereas moderate non-binge intake was similar to low consumption; ethyl glucuronide reflected dose–response.

Keywords: alcohol, drinking pattern, metabolomics, coronary heart disease

Funding: Research supported by the Danish Cardiovascular Academy, which is funded by the Novo Nordisk Foundation, grant number NNF20SA0067242 and The Danish Heart Foundation. M.T.-S was supported by the Danish Cardiovascular Academy postdoctoral fellowship.

Conflict of interest: No potential disclosures to declare.

11:45 – 12:55 SESSION 11 - POLYPHENOLS AND DIABETES

OA 7 | Oral Communication

Hydroxytyrosol supplementation improves oxidative and inflammatory status and induce modifications in gut microbiota genus in individuals with prediabetes and overweight

Moratilla-Rivera I[1,2], Pérez-Jiménez J[1,3], Ramos S[1,3], Mateos R[1,3], Martín MA[1,3]

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Background: Hydroxytyrosol (HT), the main phenolic compound of extra virgin olive oil, has been associated with cardiometabolic protection. However, evidence from randomized clinical trials using HT as an isolated supplement is still limited, especially in individuals at high metabolic risk. In addition, the potential role of the gut microbiota in mediating HT-related benefits remains insufficiently characterized.

Aims: To evaluate whether daily HT supplementation reduces oxidative stress and inflammation and modulates gut microbiota composition and short-chain fatty acid (SCFA) production.

Methods: A 16-week randomized, double-blind, placebo-controlled, parallel clinical trial was conducted in adults with overweight and prediabetes. Participants were assigned to receive either HT (15 mg/day) or placebo. Blood and fecal samples were collected at baseline and post-intervention to assess oxidative and inflammatory biomarkers, gut microbiota composition by metagenomics, and circulating SCFAs.

Results: Compared with placebo, HT supplementation significantly reduced biomarkers of oxidative damage, including oxidized LDL, 8-OHdG, and protein carbonyls, while preventing decreases in total antioxidant status and glutathione peroxidase activity. Interleukin-6 levels also declined in the HT group, indicating improved inflammatory status. Microbiome analyses showed no significant changes in α- or β-diversity. At the phylum level, both groups exhibited increased Proteobacteria, whereas only the HT group showed a significant reduction in *Euryarchaeota*. At the genus level, HT supplementation increased [*Ruminococcus gnavus*], *Bacteroides*, and *Alistipes*, and decreased *Methanobrevibibacter*, *Monoglobus*, and *Intestinibacter*. LEfSe analysis identified *Lactococcus*,

Paraprevotella, and *Veillonella* as taxa enriched after HT intervention. Plasma total SCFAs increased following HT supplementation, mainly driven by higher acetate concentrations.

Conclusions: HT supplementation improves oxidative and inflammatory status in adults with overweight and prediabetes. These effects are accompanied by genus-level microbiota shifts and increased systemic SCFAs, suggesting a potential microbiota-mediated contribution to the cardiometabolic benefits of HT.

Keywords: Hydroxytyrosol; Prediabetes; Microbiome; SCFAs

Funding: This work was supported by grants Conexión CSIC Enfermedades Metabólicas (COMETA), PID2021-125259OB-I00 and PID2024-155959OB-I00 funded by MICIU/AEI/10.13039/501100011033 and by "ERDF/EU". I.M.-R is the recipient of an FPU contract from the predoctoral program (FPU23/00141) of Spanish Ministry of Science, Innovation and Universities.

Conflict of interest: The study is registered with the International Standard Randomised Controlled Trial Registry (ClinicalTrials.gov; NCT06295913, https://clinicaltrials.gov/study/NCT06295913?intr=Hydroxytyrosol&page=2&rank=14, registered on 20 February 2024).

OA 8 | Oral Communication

Subtypes of fruits and vegetables and risk of type 2 diabetes: a prospective cohort study from the Malmö Diet and Cancer Study

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Background: Higher fruit and vegetable intake has been associated with lower type 2 diabetes (T2D) risk, but evidence regarding specific subtypes remains inconsistent.

Aims: To examine associations between intake of subtypes of fruits and vegetables and incident T2D in a large Swedish prospective cohort.

Methods: We included 24,631 participants (62% women) from the Malmö Diet and Cancer Study without prevalent diabetes at baseline (1991–1996). Diet was assessed using a validated modified diet history method. Intake of fruit and vegetable subtypes were categorized and incident T2D cases were identified through national and regional registers. Cox proportional hazards models were adjusted for age, sex, lifestyle factors, BMI, and dietary confounders.

Results: During a mean follow-up of 18 years, 3,723 incident T2D cases were identified. In fully adjusted models, high intake of green leafy vegetables (≥50 g/day) was associated with lower T2D risk (HR 0.84; 95% CI 0.72–0.98), as was high intake of dried fruits (≥10 g/day) (HR 0.82; 95% CI 0.69–0.98). High intake of cruciferous vegetables (≥50 g/day) was associated with higher T2D risk (HR 1.14; 95% CI 1.01–1.28). Higher berry intake (≥20 g/day) was associated with increased risk overall (HR 1.16; 95% CI 1.01–1.34), with significant interaction by sex; the association was observed in women only. Root vegetable intake showed interaction by sex, with an inverse association in men.

Conclusions: Associations between fruit and vegetable intake and T2D risk differed by subtype and sex. Green leafy vegetables and dried fruits were inversely associated with T2D risk, whereas cruciferous vegetables and berries showed positive associations. These findings highlight the importance of examining specific food subgroups rather than total intake alone.

Keywords: Fruits; Vegetables; Prospective cohort

Funding: Swedish Research Council, Heart and Lung Foundation

Conflict of interest: None

14:00 – 15:10 SESSION 12 - OMICS SCIENCES, PRECISION NUTRITION AND DIABETES

OA 9| Oral Communication

Characterization of a plasma metabolomic signature of almonds and its association with intermediate cardiometabolic outcomes in 4 portfolio diet trials

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Background: Metabolomic signatures provide objective biomarkers of dietary exposure and may help elucidate mechanisms linking diet to cardiometabolic risk. Almonds are among the most consumed tree nuts, yet they are poorly captured by dietary assessment tools. The metabolites associated with almond intake are unknown, and no metabolomic signature of almonds has been associated with cardiometabolic risk factors.

Aims: To characterize a metabolomic signature of almond intake across 4 trials of the Portfolio Diet (P2, P3, P6, PEx) and to assess its association with intermediate cardiometabolic outcomes.

Methods: Plasma untargeted metabolomics was performed using LC-MS. Almond intake (g/day) was derived from weighed 7-day diet records. After data preprocessing and imputation, single-metabolite associations were examined using t-tests and fold-change volcano plots with Benjamini-Hochberg multiple-testing correction. An elastic net model (60% training, 40% testing) was used to construct a multivariate metabolomic signature, which was standardized (z-scores). We assessed associations of almond intake and the metabolomic signature with intermediate cardiometabolic outcomes including anthropometrics, C-reactive protein (CRP), cholesterol, blood pressure, and HbA1c using linear regression models adjusted for age, sex, trial, and non-almond Portfolio diet components.

Results: Our primary study cohort included 224 participants (62% male; mean age 62 years) in the 4 Portfolio Diet trials (follow-up, 1-12 months). Mean [SD] almond intake was 29.1 [26.2] g/day in the intervention arms and 0.9 [5.7] g/day in the control arms. A total of 496 metabolites were assayed. There was substantial metabolomic variation with 130 metabolites (70 increasing and 60 decreasing with intake) significantly associated with almond intake. Some of the strongest single-metabolite associations were seen for pipecolic acid, N- acetylornithine, proline betaine, and CAR 20:4 (increasing with almond intake), and allantoin and sarcosine (decreasing with intake). Elastic net regression identified a metabolomic signature comprising 21 metabolites that was associated with lower body weight, BMI, total cholesterol, LDL-cholesterol, non-HDL-cholesterol, apolipoprotein B, HDL-cholesterol, and systolic and diastolic blood pressure ($P<0.05$). Self-reported almond intake was associated with lower systolic blood pressure ($P<0.05$).

Conclusions: The almond metabolomic signature was robust and outperformed self-reported intake. These findings support the utility of metabolomics-derived biomarkers to assess almond intake and uncover pathways linking almonds to cardiometabolic health. Contribution of the other Portfolio diet components to the signature and its association with improvements in intermediate

cardiometabolic outcomes cannot be ruled out. There is a need for replication of the signature in trials which isolate the effect of almonds.

Keywords: Metabolomics, cardiometabolic risk, almonds, plant-based dietary patterns

Funding: Diabetes Canada, Almond Board of California, Canadian Institute of Health Research (CIHR), Ontario Graduate Scholarship (OGS), Michael Smith Foreign Study Supplement (MSFSS)

Conflict of interest: CS has received support from the Canadian Institute of Health Research (CIHR) Canadian Graduate Scholarship – Master's (CGS-M), Ontario Graduate Scholarship (OGS), Michael Smith Foreign Study Supplement (MSFSS), Faculty of Food Sciences Class Of '69 Nutritional Sciences Award University of Toronto.

OA 10 | Oral Communication

Inflammatory proteomic signals of eGFR difference reveal early metabolic risk for kidney dysfunction

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Background: Chronic low-grade inflammation is a key mechanism linking metabolic dysregulation to kidney dysfunction, but its genetic architecture remains unclear. The difference between cystatin C- and creatinine-based estimated glomerular filtration rate (eGFRdiff) may capture early inflammatory and metabolic risk beyond conventional kidney markers.

Aims: To investigate the shared genetic architecture between inflammatory proteins and kidney function traits, and to assess whether inflammation-related proteomic risk improves early identification of kidney impairment.

Methods: Using UK Biobank (~390,000 participants) and deCODE (~36,000 participants), we analyzed 13 kidney function traits and 839 inflammation-related proteins. We performed genome-wide association analyses, linkage disequilibrium score regression, bidirectional Mendelian randomization, protein-level validation, and proteomic polygenic risk score (PRS) prediction.

Results: eGFRdiff and its derived indices showed substantial heritability and stronger overlap with cardiometabolic and inflammatory pathways than conventional kidney traits. Mendelian randomization identified consistent protein-to-trait effects for several inflammatory proteins, including ALPI, FABP9, INSR, and ABO. These findings were supported by observed protein-trait associations in UK Biobank. Adding inflammation-related proteomic PRS improved prediction of eGFRdiff by 61% beyond demographic factors alone and remained informative after additional adjustment for clinical factors.

Conclusions: eGFRdiff captures a genetically informed inflammatory-metabolic signal relevant to early kidney impairment. Inflammation-related proteomic markers may improve risk stratification at the interface of metabolism, nutrition, and kidney health.

Keywords: chronic kidney disease; inflammation; eGFR difference; proteomics; metabolic risk

Funding: National Natural Science Foundation of China (32471519, 32571690); 1.3.5 Project for Disciplines of Excellence, West China Hospital, Sichuan University

Conflict of interest: None

Wednesday, June 17th, 2026

08:25 – 09:20 SESSION 15 - DEBATE 2 – Omega-3 fatty acids in diabetes and cardiovascular disease: are they useful or not?

OA 11 | Oral Communication

Glucose metabolism status modifies the associations between omega-3 concentrations and incident CVD: The Maastricht Study

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Background: Observational studies consistently report inverse associations between omega-3 polyunsaturated fatty acid concentrations and incident cardiovascular diseases (CVD), but little is known about whether glucose metabolism affects these associations.

Aims: To investigate how the associations between omega-3 concentrations and incident CVD change by glucose metabolism status.

Methods: Longitudinal data from The Maastricht Study were analyzed. Fasting omega-3s were measured at baseline with 1H nuclear magnetic resonance (NMR, in plasma; n=2521, 49.3% men, 59±8y, 38.1% (pre)diabetes) and gas chromatography (GC, in serum; n=879, 48.6% men, 59±8y, 53.6% (pre)diabetes). Glucose metabolism status (normal glucose metabolism (NGM), prediabetes or type 2 diabetes (T2DM)) was assessed based on oral glucose tolerance test and/or glucose-lowering medication use. CVD events were assessed from hospital records or self-reported yearly questionnaires. The associations between omega-3s (main exposures, z-standardized) and incident CVD (outcome) were investigated in adjusted Cox Proportional Hazard regressions stratified by glucose metabolism status. P-value for interaction was set at 0.10.

Results: 365 (14.5%) participants experienced at least one CVD event. Significant interactions between total omega-3s and T2DM were found in both subsets (NMR pint=0.06, GC pint=0.04). There were inverse, non-significant trends between total omega-3s and incident CVD in participants with NGM (NMR HR: 0.91 (0.76, 1.08); GC HR: 0.96 (0.67, 1.37)), but null or positive trends in those with prediabetes (NMR HR: 1.00 (0.76, 1.33); GC HR: 1.45 (1.05, 2.01)) or T2DM (NMR HR: 1.05 (0.88, 1.26); GC HR: 1.20 (0.92, 1.57)). Similar results were found for individual omega-3s.

Conclusions: In this population-based cohort with overall low omega-3 concentrations, glucose metabolism status modified the associations between omega-3s and incident CVD. Inverse trends were found in participants with NGM, while in individuals with (pre)diabetes associations were null or positive. Further research is warranted to better define the effects of omega-3s on incident CVD in individuals with (pre)diabetes.

Keywords: Omega-3 polyunsaturated fatty acids; Incident cardiovascular diseases; Glucose metabolism status; Longitudinal cohort study.

Funding: This project received funding from Dutch Research Council (NWO) under the umbrella of the Partnership Fostering a European Research Area for Health (ERA4Health) (GA N° 101095426 of the EU Horizon Europe Research and Innovation Programme).

Conflict of interest: None

10:15 – 11:25 SESSION 17 – The good, the bad and the ugly: from the outdated vision of dairy products to current knowledge

OA 12 | Oral Communication

Gene-diet interaction between polygenic risk score and yogurt consumption on type 2 diabetes risk: a prospective study in the CARTaGENE cohort

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Background: The protective association between yogurt consumption and the risk of type 2 diabetes (T2D) is well documented. However, whether yogurt consumption can attenuate genetically driven T2D risk remains unknown.

Aims: To evaluate whether yogurt consumption moderates the association between genetic predisposition and T2D risk, and to quantify the interaction on the additive scale.

Methods: This prospective cohort study included 4,474 participants free of T2D at baseline (2012). Baseline yogurt intake was self-reported using a validated food frequency questionnaire (FFQ). DNA samples (n=3,965) were genotyped to calculate a polygenic risk score (PRS) for T2D. Incident T2D cases were identified using administrative databases, from FFQ completion to March 20, 2025. Associations between yogurt intake, PRS, their interaction, and T2D risk were assessed using multivariable-adjusted Cox proportional hazards models.

Results: A total of 543 incident T2D cases occurred over a mean follow-up of 12.0±2.6 years. In multivariable-adjusted analyses, including energy intake and diet quality, each 1-serving/day increment in yogurt was associated with an HR for T2D of 0.73 (95% CI: 0.58–1.00), and each 1-SD increment in PRS with an HR of 1.45 (95% CI: 1.33–1.59). A significant antagonistic interaction between yogurt and PRS was observed on the additive scale (relative excess risk due to interaction = −0.57; [95% CI: −1.34, −0.03]). The attributable proportion due to interaction was −0.37 [95% CI: −0.84, −0.03], indicating that the joint association of high yogurt intake and high genetic risk was 37% lower than the sum of their individual effects expected under additivity.

Conclusions: This study suggests that yogurt consumption is associated with lower T2D risk, across T2D genetic risk, with evidence that this protective effect may be amplified among individuals with high genetic predisposition. These findings support precision nutrition approaches for individuals at elevated genetic risk of T2D.

Keywords: Dairy; Precision nutrition; diabetes

Funding: This study was funded by the Dairy farmers of Canada.

Conflict of interest: JPDC received research funding from Weston Family Foundation.

11:55 – 13:00 SESSION 19 - ULTRA-PROCESSED FOODS (UPF): OPPORTUNITIES, PITFALLS, AND RESEARCH NEEDS

OA 13 | Oral Communication

Can a dietary pattern high in ultra-processed foods be of high nutritional quality? - Preliminary findings from the NutriQuébec project

Rochette M[1,2], Laramée C[1], Lapointe A[1], Charest A[1], Gigleux I[1], Plante C[3], Lemieux S[1,2], Desroches S[1,2], Bélanger-Gravel A[1,4], Carbonneau E[1,2], Lamarche B[1,2]

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Background: There is yet no consensus on whether all ultra-processed foods (UPFs) are concerning for health. Specifically, the extent to which diets high in UPFs, but with an adequate nutrient profile are compatible with overall diet quality remains uncertain.

Aims: This study evaluated if a dietary pattern high in UPFs can be aligned with an overall high diet quality among adults of the province of Québec, Canada.

Methods: Data from 6,334 adults recruited in the NutriQuébec project and having completed 24-h recalls between 2019 and 2025 were used. Participants were categorized into four groups based on consumption of NOVA-classified UPFs (lowUPF or highUPF using the median in %E) and intake of saturated fats (SFA), free sugars and sodium (SFSS, high if above targets for ≥2 nutrients). Diet quality was estimated using the Healthy Eating Food Index (HEFI-2019, /80 points). Data were calibrated for sex, age and region of residence to reflect distribution among the adult Québec population.

Results: After adjustment for covariates, the highUPF/lowSFSS group (9.3% of the total sample, 59.3%E as UPFs) had a mean HEFI-2019 score of 48.9 points (95%CI 47.5-50.3). This score was 4.8 points higher than in the lowUPF/highSFSS group and 9.2 points higher than in the highUPF/highSFSS group, but 5.6 points lower than in the lowUPF/lowSFSS group (all p<0.0001). The highUPF/lowSFSS group had relatively low intakes of sodium (2428mg 95%CI 2234-2622) and SFA (9.3%E 95%CI 8.6-10.1%), but intake of vegetables and fruits (3.6 servings 95%CI 3.2-3.9) was lower than in the lowUPF/lowSFSS and lowUPF/highSFSS groups (-2.5 and -1.2 servings respectively, p<0.0001).

Conclusions: Among adults in Québec, a dietary pattern rich in UPFs with relatively low intake of SFSS is associated with a relatively good diet quality, despite being characterized by lower consumption of vegetables and fruits. This pattern is however quite uncommon in the population.

Keywords: Ultra-processed foods, diet quality

Funding: The NutriQuébec project is supported under the Québec Government's Politique gouvernementale de prévention en santé program. MR received a graduate scholarships from the Fonds de recherche du Québec (FRQ).

Conflict of interest: No potential disclosures.

14:00 – 15:10 SESSION 20 – PLANT-BASED DIETS HEALTH AND SUSTAINABILITY

OA 14 | Oral Communication

Disentangling complexity: the application of Bayesian networks to identify joint predictors of diet-related greenhouse gas emissions among adults in the NutriQuébec project

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Background: The health of humans and the planet are closely interconnected and shifting population dietary habits to a more sustainable dietary pattern would have dual benefits. However, many known and unknown factors contribute to whether someone consumes a sustainable diet, making it challenging to implement interventions that will effectively improve dietary sustainability.

Bayesian networks, a form of artificial intelligence that combine expert knowledge with structure-learning algorithms, could disentangle this complexity.

Aims: The objective of this project was to identify the most important predictors of diet-related greenhouse gas emissions using Bayesian network analysis.

Methods: Data were drawn from the NutriQuébec project, which included adults in the province of Québec, Canada (n=6620). Participants provided information about their dietary habits (up to three 24-hour dietary recalls), health, and sociodemographic characteristics. Diet-related greenhouse gas emissions (GHGE) (kg of CO_2-eq per kg of foods or beverages) were linked with 24-hour dietary recalls. Hill-climbing algorithms were applied to identify Bayesian networks. Predictors of diet-related GHGE were based on 10 characteristics, including self-reported health, income, and education.

Results: The primary predictors of lower diet-related GHGE after 200 bootstrapped replicates included following a plant-based diet, living in a food secure household and higher educational attainment. The network also identified secondary predictors, like age and region of residence, which informed whether someone followed a plant-based diet, educational attainment, and food security status.

Conclusions: Shifting current food intakes to diets that are healthier and more sustainable is urgent. This research suggests that following a plant-based diet, higher educational attainment, and living in a food secure household are key predictors of lower diet-related GHGE among a network of interconnected characteristics. This research provides needed insights to implement targeted interventions that will improve sustainable eating and by extension, human and planetary health.

Keywords: sustainable eating; diet-related greenhouse gas emissions; Bayesian Networks

Funding: Joy Hutchinson received a CIHR Postdoctoral Fellowship and an OBVIA/IVADO Postdoctoral Fellowship. The NutriQuébec Project is funded by the Government of Quebec.

Conflict of interest: No potential disclosures.

Short Oral Communications (SO)

Monday, June 15th, 2026

14:45 – 15:15 SESSION 3 - SHORT ORAL ABSTRACTS (3 MINUTES)

SO 1 | Short Oral Communication

Effect of a 1-year lifestyle intervention on plasma short-chain fatty acids and their association with cardiometabolic risk factors: a secondary analysis of the PREDIMED-Plus trial.

Hernández-Cacho A, Chen Y, García-Gavilán JF, Konstanti P, Belzer C, Vioque J, Corella D, Fitó M, Vidal J, Moreno-Indias I, Ruiz-Canela M, Tinahones FJ, Landberg R, Salas-Salvadó J.

Universitat Rovira i Virgili

Institut de Recerca Biomèdica CatSud

Instituto de Salud Carlos III

Background: In PREDIMED-Plus, an energy-reduced Mediterranean diet combined with physical activity promotion improves cardiometabolic risk in older adults with overweight/obesity and metabolic syndrome, but the contribution of short-chain fatty acids (SCFAs) to these benefits remains unclear.

Aims: To assess whether SCFAs (specifically butyrate [BA], propionate [PA], acetate [AA], and 3-indolepropionic acid [3IPA]) are modified by the intervention and whether they contribute to 1-year improvements in cardiometabolic risk factors, and whether gut microbiota help explain the variation in SCFA–clinical associations.

Methods: This PREDIMED-Plus sub-study included 396 participants assessed at baseline and 1 year. Participants followed either an ad libitum Mediterranean diet (control) or an energy-reduced Mediterranean diet plus physical activity promotion (intervention). We evaluated intervention effects on cardiometabolic risk factors and circulating SCFAs, tested associations between circulating SCFAs and cardiometabolic risk factors, and examined mediation of intervention effects through SCFAs. As exploratory analyses, elastic-net models were used to derive gut-microbiota scores predictive of each SCFA (using CLR-transformed genera), and these scores were tested against cardiometabolic risk factors.

Results: The intervention improved adiposity and insulin-resistance markers at 1 year (BMI, weight, waist circumference, HOMA-IR, insulin, and HbA1c). Among pre-specified SCFAs, the intervention signal was driven primarily by BA, which decreased at follow-up, whereas PA, AA, and 3IPA showed no consistent intervention-related change. Higher BA was consistently associated with worse insulin-resistance and adiposity profiles. Mediation analyses supported partial mediation of the intervention effect on BMI, HOMA-IR, and insulin through BA. Exploratory microbiota-derived scores predictive of 3IPA were also associated with adverse metabolic outcomes, including higher adiposity and insulin resistance markers.

Conclusions: In this PREDIMED-Plus sub-study, circulating BA emerged as the principal SCFA linked to the lifestyle intervention and to metabolic outcomes, partially mediating improvements in insulin resistance and adiposity. Microbiota signatures predictive of 3IPA were additionally associated with worse metabolic profiles, supporting a gut microbiota–metabolite–host axis relevant to cardiometabolic health.

Keywords: PREDIMED-Plus; short-chain fatty acids; butyrate; cardiometabolic risk factors; gut microbiota

Funding: Not applicable

Conflict of interest: Not applicable

SO 2 | Short Oral Communication

Postprandial glucose dynamics from continuous monitoring reveal distinct subtypes of type 2 diabetes

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Background: Optimizing the postprandial glucose response (PPGR) in individuals with type 2 diabetes (T2D) is crucial for improving glycemic control and reducing diabetes-related complications.

Aims: To investigates the shape of PPGR to identify T2D subtypes with pathophysiological heterogeneity.

Methods: Using four-hour CGM data after a standardized breakfast, 100 individuals with T2D were clustered via K-Means based on glucose peak, iAUC0-4h, average positive slopes before (mean rise) and after (mean fall) the peak, and the difference between final and fasting glucose. A subgroup of 50 individuals underwent post-breakfast venous sampling for glucose and insulin measurements. Clinical and metabolic parameters were compared across PPGR clusters using one-way ANOVA.

Results: Three PPGR clusters were identified. Cluster 1 (n=19) showed the highest glucose peak and $iAUC_{0\text{-}4}$h, with glucose levels remaining above baseline 4h post-breakfast. Cluster 2 (n=56) and 3 (n=25) had similarly lower peaks and $iAUCs_{0\text{-}4}$h compared with Cluster 1, with Cluster 2 exhibiting a slower glucose rise and fall than Cluster 3. No significant differences in age, sex, BMI, or diabetes duration was found between the clusters. However, compared to Cluster 3, Cluster 1 showed lower β-cell function (HOMA2-B%: 77.42±25.64 vs. 104.96±43.94), higher insulin resistance (HOMA-IR: 7.94±3.27 vs. 4.84±2.78), and a reduced capacity to compensate through increased insulin secretion, as indicated by a lower Disposition Index: 1.02±0.67 vs. 2.37±1.05 (all $p<0.05$). Cluster 2 did not differ significantly in HOMA2-B% (94.46±31.59) or HOMA-IR (5.99±3.36) from the other clusters, but showed a reduced early postprandial insulin secretion compared to Cluster 3, as indicated by a lower 60-min Insulinogenic index (0.84±0.58 vs. 1.67±1.07, $p<0.05$).

Conclusions: CGM-based dynamic parameters allowed identification of T2D subtypes with similar clinical profiles but distinct degrees of impairment in insulin secretion and sensitivity. This approach goes beyond conventional postprandial metrics and supports the potential of CGM-based profiling to inform precision management strategies in T2D.

Keywords: postprandial glucose response; cluster; CGM; precision nutrition; inter-individual

Funding: No main funding was received for this work.

Conflict of interest: All Authors declare no disclosures.

SO 3 | Short Oral Communication

Fibromodulin as a regulator of adipose extracellular matrix remodeling in childhood obesity

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Background: Childhood obesity is associated with excessive expansion of both subcutaneous (SAT) and visceral (VAT) adipose depots, which compromise normal metabolic homeostasis. When adipose tissue expansion is not properly regulated and extracellular matrix remodeling is inadequate, a cascade of metabolic disturbances ensues, leading to fibrosis, inflammation, and insulin resistance. In a previous study, our research group analyzed the transcriptomic profile of SAT and VAT in children with obesity to uncover underlying molecular mechanisms and identified a differential gene expression profile of fibromodulin (FMOD). This protein, which plays a crucial role in the structural organization of collagen fibers and in cell signaling, may be a key determinant of adipose tissue plasticity and, consequently, of the early development of insulin resistance.

Aims: To identify and characterize FMOD protein levels in SAT and VAT from children with obesity.

Methods: RNA seq was performed on 66 SAT and VAT biopsies obtained from 19 girls and 16 boys. FMOD gene and protein expression levels were determined by quantitative real time PCR and Western blot in differentiated human adipocytes, in the presence and absence of transforming growth factor beta 1 (TGF β1).

Results: Children with obesity showed a significant increase in FMOD gene expression in SAT. In vitro assays confirmed that TGF β1 induces an upregulation of FMOD expression in differentiated human adipocytes.

Conclusions: The differential expression of FMOD in SAT from children with obesity, together with the enhanced FMOD response to TGF β1 in human adipocytes, suggests an important role for this protein in adipose tissue biology and its involvement in early metabolic dysfunction.

Keywords: adipocytes, childhood obesity, fibromodulin

Funding: OBN20PI03/202. Unraveling the pathophysiology of adipose tissue of obese children through next-generation RNA sequencing-KIDSADIPOSEQ

Conflict of interest: Not reported in source file.

SO 4 | Short Oral Communication

Targeting weight loss and blood glucose control with oral sodium butyrate in overweight/obese adults with and without type 2 diabetes: a proof-of-concept randomized controlled trial

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Background: Butyrate is a microbiota-derived short-chain fatty acid linking colonic fermentation to host metabolism, with systemic availability limited by intestinal utilization and first-pass hepatic metabolism. Whether sodium butyrate (NaBut) supplementation might modulate its circulating levels and metabolic effects is unclear.

Aims: The aim of this study is to assess whether oral NaBut supplementation improves body weight and metabolic profile in adults with overweight/obesity with or without type 2 diabetes (T2D).

Methods: In this randomized, double-blind, placebo-controlled, parallel-group trial, 46 adults (23 with T2D), aged 30–70 years and BMI 25–39.9 kg/m², were assigned (1:1) to NaBut (1,875 mg/day) or placebo for 12 weeks, combined with an identical moderately hypoenergetic diet. Anthropometrics, body composition, fasting metabolic parameters, gastrointestinal symptoms, 7-day continuous glucose monitoring (CGM)-derived metrics, and serum short-chain fatty acids (GC/FID) were evaluated at baseline and week 12.

Results: In participants without diabetes, NaBut induced greater reductions in body weight compared with placebo (−7.0±3.0 vs. −3.2±1.6 kg; p=0.001). In participants with T2D, weight changes did not differ between NaBut and placebo; however, NaBut significantly reduced plasma triglycerides (−0.36±0.47 vs. +0.08 ± 0.30 mmol/L; p=0.012) and increased time-in-tight-range (TITR; 70-140 mg/dL) by 9%, independently of weight change. Serum butyrate concentrations increased with NaBut in both cohorts and were associated with weight change in obese people and CGM-derived changes in T2D.

Conclusions: NaBut supplementation supported weight loss in obesity without diabetes. In T2D, NaBut improved triglyceridemia and CGM-derived glycemic control, largely independent of weight change.

Keywords: butyrate, SCFA, body weight, glucose control

Funding: This research was funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3—Call for tender No. 341 of 15 March 2022 of Italian Ministry of University and Research funded by the European Union—NextGenerationEU. Project code PE00000003, Concession Decree No. 1550 of 11 October 2022, adopted by the Italian Ministry of University and Research, CUP E63C22002030007, Project title "ON Foods—Research and innovation network on food and nutrition Sustainability, Safety and Security—Working ON Foods"

Conflict of interest: The authors declare no conflict of interest.

SO 5 | Short Oral Communication

Influence of subcutaneous semaglutide use on diet quality: preliminary insights from a prospective cohort

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Background: Subcutaneous semaglutide (scSEMA) induces weight loss by markedly increasing satiety and creating an energy deficit. It has never been investigated whether scSEMA use affects diet quality beyond lowering total energy intake.

Aims: To assess whether scSEMA use is associated with changes in diet quality, and whether these changes contribute to weight loss beyond reduced energy intake, in individuals with obesity.

Methods: A total of 120 adults (18–70 years) with obesity (BMI ≥ 30 kg/m²) initiating scSEMA and 60 adults with obesity not initiating this medication (control group) will be recruited. Dietary intake will be self-reported at baseline (before scSEMA initiation) and at 3, 6, 9, and 12 months using 24-hour dietary recalls, and diet quality assessed using the Healthy Eating Food Index 2019 (HEFI-2019; 0–80 points), which reflects adherence to Canada's Food Guide. Anthropometry will be measured at the same time points.

Results: To date, 131 individuals have been enrolled, and 72 have completed the 3-month follow-up (n=39 scSEMA users; n=33 controls). At baseline, diet quality was suboptimal and similar in both groups (mean HEFI-2019: 42/80 points). After 3 months, energy intake among scSEMA users decreased by 16.5% (95% CI: −24.5% to −7.6%, P=0.0003), whereas no significant change was observed in the control group (P=0.86; P between groups=0.02). Likewise, body weight decreased significantly among scSEMA users only (−3.9%; 95% CI: −4.7% to −3.1%; P between groups<0.0001). Among scSEMA users, there was no evidence of a 3-month change in total HEFI-2019 score (−0.2; 95% CI: −3.2 to 2.9), nor in subscores reflecting intakes of foods to encourage and foods to limit. Diet quality was not associated with weight change.

Conclusions: Preliminary results suggest that diet quality remains unchanged in the first months of scSEMA therapy and is not associated with weight loss.

Keywords: Semaglutide; diet quality.

Funding: Weston Family Foundation

Conflict of interest: JPDC received research funding from the Dairy farmers of Canada.

SO 6 | Short Oral Communication

Machine Learning for Glucotype Characterization in adults with Overweight/Obesity without diabetes

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Background: Postprandial glycemic responses exhibit substantial interindividual variability, which limits the effectiveness of generalized dietary recommendations. Continuous glucose monitoring (CGM) allows detailed characterization of this variability in real-life conditions and provides an opportunity to develop individualized prediction models using machine learning.

Aims: The main objective of this study is to characterize individual glycemic responses in adults with overweight or obesity without type 2 diabetes under free-living conditions, and to classify them into clinically meaningful glycemic patterns ("glucotypes") to support precision nutrition strategies.

Methods: CGM records from 534 patients (mean age 50.87 years, DS 8.81) with overweight or obesity (mean BMI 33.90 kg/m2, DS 3.82) without type 2 diabetes were analyzed from the baseline assessments of three randomized controlled trials with harmonized glucose monitoring protocols: ENSATI (NCT05880095), EXTREME (NCT05310721), and Tempus (NCT05897073). A computational tool was developed to extract 97 glycemic variables describing peak morphology, variability, and temporal patterns, integrating chrononutrition indicators. Through time series analysis and clustering algorithms, individual glycemic profiles were identified.

Results: The tool allowed the identification of four differentiated glucotypes across individuals, providing detailed information on the glycemic response to food intake throughout the day under free-living conditions. These glucotypes showed marked differences in postprandial peak amplitude, variability, and temporal distribution across the day. Beyond glycemic characteristics, significant differences were also observed across clinical and behavioral variables, including age, lipid profile, physical activity levels, and dietary intake patterns. The predictive model demonstrated robust capacity to classify individuals and to estimate personalized glycemic responses under free living conditions.

Conclusions: The proposed model represents an advance in the analysis of CGM, with the ability to extract clinically relevant metrics, stratify patients into glucotypes, and the prediction of personalized postprandial responses. This tool may support precision nutrition approaches, guide individualized lifestyle interventions, and help identify individuals with impaired glucose homeostasis. Future applications include predicting responses to dietary interventions to improve medical nutritional counseling.

Keywords: Continuous glucose monitoring; glucotypes; machine learning; precision nutrition; glycemic variability.

Funding: This study is funded by MCIN/AEI/10.13039/501100011033 through the "Knowledge Generation Projects" program, within the State Program to Promote Scientific-Technical Research and its Transfer, part of the State Plan for Scientific, Technical and Innovation Research 2021–2023, under the 2021 call (PID2021-125899OB-I00), and the Centro de Investigación Biomédica en Red (CIBER) in the area of Fisiopatología de la Obesidad y la Nutrición (CB22/03/00068). The Tempus Study was additionally supported by Grant PID2022-141506OB-I00 funded by MICIU/AEI/10.13039/501100011033 and by the European Regional Development Fund (ERDF, EU). The Extreme Study received funding from the Junta de Andalucía, Consejería de Transformación Económica, Industria, Conocimiento y Universidades (A-CTS-516-UGR20 to J.R.R.), the Government of Navarra, Departamento de Desarrollo Económico y Empresarial (0011-1365-2021-00070), and the Research Promotion Plan of the Universidad Pública de Navarra to I.L. Additional support was provided by the Spanish Ministry of Universities through FPU predoctoral fellowships (FPU21/01161 to A.C.J. and FPU22/01631 to J.M.A.). JAC-G is funded by a predoctoral fellowship (2023) from the Consejería de Educación de la Comunidad de Madrid. AG-L is supported by a predoctoral fellowship (2024) from the same institution. SD is funded by a 2024 Ayudante de Investigación grant from the Consejería de Educación de la Comunidad de Madrid. This work forms part of a PhD thesis within the Health Science Doctoral Program at the Universidad Rey Juan Carlos. The funding sources had no role in the study design, data collection, analysis, interpretation of data, or the decision to submit the manuscript for publication.

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

SO 7 | Short Oral Communication

Impact of psychometric variables on the maintenance of baseline dietary patterns during an isocaloric, isonutritive lifestyle intervention for patients with type 2 diabetes and NAFLD

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Background: Dietary interventions for the investigation of specific nutrients sometimes require strict maintenance of the baseline dietary pattern, e.g. during isocaloric supplementation. The Hawthorne effect may hinder this maintenance and individual psychological factors could further aggravate this mechanism.

Aims: We investigate, to which extent depressivity, impulsivity and altered eating behavior affect nutrient intake during an isocaloric, isonutritive intervention.

Methods: The NIMROD study included patients with insulin-resistant type 2 diabetes and NAFLD. Persons with clinically apparent eating disorder or severe depression were excluded. Subclinical depressivity, impulsivity and alteration of eating behavior were assessed with Beck's Depression Inventory, the Barratt Impulsivity Score and Pudel's questionnaire on eating behavior. Parallel to the 12-week blinded randomised supplementation with insoluble fiber or placebo, the patients should maintain physical activity and diet. Adherence was monitored with pedometers and food records. We conducted correlation analyses between psychometric variables and dietary changes.

Results: 83 out of 94 patients (age 63±10 years; BMI 31,3±4,9 kg/m²; 48 % women) completed the intervention. During supplementation, all both one nutrient remained constant (daily intake of food-based insoluble fiber: -2 grams). Impulsivity traits and change of fiber intake were directly correlated (r=0,226 / r=0,290; p<0,05), driven by the placebo group (r=0,310 / r=0,404; p<0,05). Restriction and hunger inconsistently and weakly correlated with changes of various nutrients (r=0,226 to r=0,317; p<0,05), again depending on group allocation. Depressivity and dietary changes did not correlate significantly.

Conclusions: Within NIMROD, the Hawthorne effect minutely altered the baseline diet, possibly affected by impulsivity, altered eating behavior and group allocation, even suggesting a potential involvement of the gut-brain axis. Our findings emphasize the justification to exclude patients with severe psychiatric disorders. Future studies might utilize a psychometric assessment in order to define more precise cut-offs for study exclusion, that may further help to minimize confounders for eating behavior.

Keywords: eating behavior, Hawthorne effect, depressivity, impulsivity, adherence

Funding: The NIMROD study was funded by the Wilhelm Doerenkamp Foundation (Chur, Switzerland) and received non-financial support by J. Rettenmaier & Soehne, Rosenberg, Germany.

Conflict of interest: Stefan Kabisch and the Charité working group received project funding, non-financial support and travel reimbursements from J. Rettenmaier & Soehne for fiber studies in the past as well as study funding and travel reimbursements for the present NIMROD project by the Wilhelm Doerenkamp Foundation.

18:35 – 19:05 SESSION 7 - SHORT ORAL ABSTRACTS (3 MINUTES)

SO 8 | Short Oral Communication

Effects of low, moderate, and high carbohydrate diets in adults with type 1 diabetes: 6-month results from the DANCE randomized controlled trial

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Background: The long-term effects of low-carbohydrate diets in type 1 diabetes (T1D) management remain unexamined.

Aims: To investigate the effect of three diets with different carbohydrate content on insulin requirements, metabolic control and glycemic variability in adults with T1D.

Methods: The DANCE (Diabetes ANd CarbohydratEs) study was a three-arm parallel randomized controlled trial (1:1:1) with a duration of six months. Men and women >20 years with T1D duration >1 year were randomized to one of three diets: a traditional diabetes diet with higher carbohydrate content [50-60% of total energy intake (TEI)], a moderately low-carbohydrate diet (30-40% TEI), or a low-carbohydrate diet (15-20% TEI; ≥50 g/day). The primary outcome was change in insulin requirements. Secondary outcomes included continuous glucose monitoring (CGM) metrics and other markers of metabolic control.

Results: Of the 102 participants included in intention-to-treat analyses [median age 49 (IQR 35, 60) years, 53% women and diabetes duration 24 (15, 34) years], 86 (84%) completed the 6-month intervention. Insulin requirements decreased by 0.07 IU/kg (95% CI −0.11, −0.03) and 6 IU/day (95% CI −9, −3) after the low-carbohydrate diet compared with the diet with higher carbohydrate content. The low-carbohydrate diet increased time in range by 10% (95% CI 5, 15), decreased time above range by 12% (95% CI 7, 17), and decreased SD of sensor glucose by 0.3 mmol/L (95% CI 0.03, 0.53) compared with the higher-carbohydrate diet. There were no differences in HbA1c, lipids or ketone level changes between diet groups. The moderately low-carbohydrate diet did not lead to significant changes compared to the other diets.

Conclusions: A low-carbohydrate diet reduced insulin requirements and improved CGM metrics of glycemic control and variability compared with a higher-carbohydrate diet, with no differences in lipid or ketone levels.

Keywords: type 1 diabetes, low carbohydrate diet, CGM, insulin requirements, randomized controlled trial

Funding: Skandia Research Foundation, Dietary Science Foundation, Swedish Diabetes Association, Nutricia Research Foundation, Margaretha Nilssons Foundation.

Conflict of interest: The authors have no conflict of interest to disclose.

SO 9 | Short Oral Communication

Relation of food sources of fructose and adiposity outcomes in adults and children: A systematic review and meta-analysis of prospective cohort studies

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Background: It is unclear whether food sources of fructose-containing sugars other than sugar-sweetened beverages (SSBs) are associated with increased risk of obesity.

Aims: To assess the relation of food sources of fructose-containing sugars with obesity outcomes.

Methods: We searched MEDLINE, EMBASE and Cochrane Library through August 2025 for prospective studies in adults or children of ≥1-year follow-up. Two reviewers extracted data and assessed risk of bias. The primary outcome was incident overweight/obesity (OW/OB). Secondary outcomes were incident abdominal obesity and change in body weight, BMI Z-score (children only), and waist circumference (WC). Data were pooled using generic-inverse variance (random) and expressed as relative risks (RR) or mean differences (MD) with 95% confidence intervals (CI). The certainty of evidence was assessed using GRADE. (ClinicalTrials.gov, NCT02558920)

Results: We identified 32 adult (n=870,831) and 31 pediatric (n=104,445) cohorts investigating 4 food sources (SSBs, 100% fruit juice, fruit, yogurt). In adults, SSBs were associated with increased OW/OB (1.28, 1.00-1.64) and abdominal obesity (1.14, 1.06 to -1.24) and weight gain (0.56 kg/serving, 0.23 to 0.89) but not WC. 100% fruit juice was associated with weight gain (0.12 kg/serving, 0.02 to 0.22) but not OW/OB, abdominal obesity or WC. Fruit was associated with lower OW/OB (0.87, 0.80 to 0.95), abdominal obesity (0.68, 0.58 to 0.80) and WC (−0.23 cm, −0.33 to −0.13) but not body weight. Yogurt was associated with lower abdominal obesity (0.76, 0.59 to 0.98), body weight (−0.39 kg, −0.58 to −0.19) and WC (−0.22 cm, −0.41 to −0.04), but not OW/OB. In children, SSBs were associated with increased OW/OB (1.20, 1.12 to 1.30) and BMI Z-score (0.03/serving, 0.01 to 0.04). 100% fruit juice was associated with increased OW/OB (1.32, 1.12 to 1.55) but not BMI Z-score. Fruit was not associated with OW/OB or BMI Z-score. The certainty of evidence was generally low.

Conclusions: The relation of fructose-containing sugars with obesity outcomes appears to be mediated by food source. The available evidence provides some indication that SSBs increase while fruit and yogurt decrease adiposity in adults and SSBs increase adiposity in children, with mixed results for 100% fruit juice in both groups. Research is needed for other food sources of fructose-containing sugars.

Keywords: Sugars, obesity, meta-analysis, food sources

Funding: ASN foundation, CIHR, Diabetes Canada, Toronto 3D foundation

Conflict of interest: AZ is a part-time scientist at INQUIS Clinical Research, Ltd., a contract research organization.

SO 10 | Short Oral Communication

Fasting-induced remission of type 2 diabetes patients is reflected in the plasma proteome

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Background and Aims: Type 2 diabetes (T2D) substantially affects the plasma proteome. This study investigates how fasting-induced T2D remission (T2DR) impacts the proteome and identifies proteins characteristic for successful remission, comparing remission achievers (REM) with non-responders (NR).

Methods: 47 obese non-insulin-dependent T2D patients (BMI >27 kg/m2, age 18-80 years) discontinued antidiabetic medication and followed a three-month very low-caloric diet based on total meal replacement. Assessments before and after the fasting period included anthropometry, meal tests, clinical chemistry, and LC-MS/MS-based quantitative plasma proteomics analysis.

Results: Body weight decreased by 15 kg and fasting plasma glucose (FPG) decreased from 168.0 to 122.5 mg/dl. 34 of 47 (72 %) participants achieved T2DR (FPG <126 mg/dl). Proteome analysis on 393 plasma proteins revealed that 156 proteins changed significantly in the REM group, but only 46 in the NR group. Both groups showed highly significant changes in APOA4 (↓, REM: $p<10^{-14}$, NR: $p<0.002$) and APOF (↑, REM: $p<10^{-14}$, NR: $p<10^{-5}$). Additional lipoproteins (APOA1, APOB, APOC3) were significantly downregulated exclusively in the REM group ($p<0.006$, $p<0.0003$, $p<10^{-8}$), but not in NR group (all $p>0.21$). SERPINF1, an adipocyte-secreted factor involved in metabolic inflammation and insulin resistance, showed strong downregulation in both groups (REM: $p<10^{-14}$, NR: $p<0.006$). Afamin and carnosine dipeptidase 1 (CNDP1), both associated with obesity and insulin resistance, decreased only in the REM group (REM: $p<10^{-13}$ and $p<10^{-5}$, NR: both >0.05). In the REM group, exclusively, the anti-inflammatory proteins IL1RAP increased (REM: $p<10^{-6}$, NR: $p>0.34$), and SAA1 decreased significantly (REM: $p<0.003$, NR: $p>0.51$).

Conclusions: The plasma proteome reflects T2DR in patients. Our results demonstrate that changes in proteins related to lipid metabolism proteins, immune regulation and inflammation are characteristic for T2DR. This underlines the interaction between metabolism and immune system in the remission process.

Keywords: Type 2 diabetes; Remission; Proteome

Funding: European Foundation for the Study of Diabetes (EFSD)

Conflict of interest: The Authors declare no conflicts of interests.

SO 11 | Short Oral Communication

The Development of a Logic Model Integrating Behaviour Change Theories, Techniques, and Adherence Outcomes in a Plant-Based Intensive Lifestyle Intervention for Type 2 Diabetes Remission

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Background: Type 2 diabetes (T2D) remission is an emerging therapeutic target. Remission guidelines recommend intensive lifestyle interventions (ILIs) targeting weight loss as a strategy to achieve remission. Behaviour therapies are key for sustaining intervention effects, yet few trials explicitly ground their ILIs in theories and techniques or link adherence measures to clinical outcomes through a testable logic model, limiting the ability to assess drivers of adherence and success.

Objectives: To describe behaviour change technique (BCT) integration underpinning a remission trial and present a logic model linking theoretically-derived adherence measures to clinical outcomes of diabetes remission.

Methods: The REmission of diabetes using a PlAnt-based weight loss InteRvention (REPAIR) trial is a 12-month, parallel, 2-arm randomized trial in 160 adults living with early T2D (<6-years) and obesity on the effect of a plant-based ILI targeting 15% weight loss compared to standard of care on diabetes remission. The ILI includes a 12-week weight-loss phase using total diet replacements and a 40-week weight maintenance phase, including a plant-based dietary intervention using the digital Portfolio Diet Program [PortfolioDiet.app, kickstart package, in-app notifications], structured exercise, and behaviour support curriculum [19-modules over 52-weeks]. Using theories and BCT, intervention components were mapped to targeted behavioural determinants. A logic model was developed depicting the 4 ILI components, with adherence measures operationalizing BCT-targeted behaviours across each component.

Results: The logic model identified 12 adherence measures with 33 corresponding BCTs across the 4 intervention components: diet (4 measures, 10 BCTs), exercise (4 measures, 7 BCTs), curriculum (3 measures, 13 BCTs), and digital program (1 measure, 3 BCTs).

Conclusions: This logic model will allow us to assess which adherence measures and BCT-targeted behaviours are most predictive of clinical outcomes in the REPAIR trial. Results will support the design of scalable and sustainable remission strategies.

Keywords: diabetes remission, logic model, behaviour change techniques, adherence

Funding: Protein Industries Canada (PIC)

Conflict of interest: None

SO 12 | Short Oral Communication

Association between adherence to dietary fiber intake recommendations and micronutrients intake in a prediabetic population: results from the SEGOVIA Study

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Background: Overall diet quality plays a key role in the prevention and progression of prediabetes to type 2 diabetes. Adequate fiber intake has been associated with metabolic benefits, however, its relationship with dietary nutrient density in prediabetic populations remains insufficiently characterized.

Aims: To evaluate the association between adherence to dietary fiber intake recommendations and micronutrient and dietary component intake in a prediabetic population.

Methods: The SEGOVIA Study is a longitudinal, population-based cohort that recruited individuals aged 35-65 years between 2000-2003 in Segovia (Spain). The initial cohort included 900 participants (mean age 55 ± 12 years). A 20-year follow-up (2021–2023) was conducted using a cross-sectional design. Of 632 eligible participants, 406 attended the follow-up visit. For this analysis, only individuals with prediabetes (HbA1c: 5.7–6.4%; n = 120) were included. Dietary intake was assessed using a validated 146-item semi-quantitative food frequency questionnaire. Participants were classified according to fiber intake recommendations (<25 g/day; ≥25 g/day). Statistical analyses included the Kolmogorov-Smirnov for normality and Mann-Whitney U tests ($p < 0.05$).

Results: Participants meeting fiber intake recommendations (69.1%) showed higher micronutrient intake than those who did not (30.9%). They had higher intake of antioxidant vitamins (vitamin C: 347.21 vs 166.06 mg/day; vitamin E: 14.37 vs 7.49 mg/day), B vitamins (folate: 560.07 vs 266.60 µg/day; vitamin B6: 3.49 vs 1.88 mg/day), and minerals related to glucose metabolism (magnesium: 565.71 vs 294.64 mg/day; zinc: 16.91 vs 9.78 mg/day). They also showed a distinct lipid profile, with higher intake of polyunsaturated fatty acids (omega-3: 1.69 vs 0.88 g/day; omega-6: 19.68 vs 9.78 g/day). All differences were significant $p < 0.01$ omega-3 p 0.05.

Conclusions: Adherence to fiber intake recommendations is associated with a more favourable micronutrient dietary profile, suggesting fiber intake may be a useful indicator of overall diet quality in prediabetes.

Keywords: fiber intake, prediabetic population, micronutrients density intake

Funding: This research has received Grants from Instituto de Salud Carlos III (PI21/00838, PI22/01608, PI24/00719), the European Regional Development's funds (FEDER), Sociedad Española de Medicina Interna (SEMI/2019; ACA.C01FEMI19), Gerencia Regional de Salud (SACYL) de la Junta de Castilla-León (GRS 2594/B/22), and the Fundación Científica del Colegio de Médicos de Segovia. R.L.-D has received a grant for the hiring of research assistants from the Community of Madrid, co-founded with the European Social Fund Plus (ESF+) (PEJ-2024-AI/SAL-GL-32368).

Conflict of interest: None

SO 13 | Short Oral Communication

From Control to Remission: Outcomes from REMI-D (REMIssion in Diabetes) Programme in Singapore Primary Care

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Background: Type 2 diabetes (T2DM) remission through intensive weight loss has been demonstrated in clinical trials. REMI-D (REMIssion in Diabetes) is a real-world dietitian-led remission programme implemented in multiple primary care sites in Singapore. Patients enrol into REMI-D for a structured weight management programme that includes Very Low-Calorie Diet (VLCD). This study reports outcomes on remission rate, weight, HbA1c and medication burden.

Aims: To evaluate T2DM remission rates at 6 and 12 months, and identify factors associated with remission.

Methods: Adults with early T2DM were enrolled from Oct'24-Dec'25 into REMI-D led by dietitians and supported by multidisciplinary teams. The intervention included a VLCD phase followed by food reintroduction and maintenance phase over 12 months. Remission status at 6 and 12 months was assessed alongside changes in weight, HbA1c and medication use. Participants were stratified by remission status at 6 and 12 months, and outcomes were compared using descriptive statistics.

Results: Seventy patients with early T2DM were enrolled. 62%(21/34) and 71%(17/24) achieved remission at 6 and 12 months. Participants achieving remission demonstrated significantly greater weight loss than non-remitters at 6 months (−9.82±3.8 kg vs −4.72±3.1 kg; −11.98% vs −6.16%) and 12 months (−8.44±4.2 kg vs −3.15±2.2 kg; −10.58% vs −4.03%). HbA1c reduction was also greater in the remission group at 6 months (−1.21±0.6% vs −0.69±1.1%) and 12 months (−1.35±0.6% vs −0.70±0.8%). Medication burden decreased in both groups at 6 months (−1.20±1.1 vs −1.00±1.1 agents) and 12 months (−0.94±1.1 vs −0.86±0.7). There were no differences between age, sex and ethnicity between remitters and non-remitters.

Conclusions: REMI-D achieved remission rates higher in routine primary care than those reported in landmark trials. Greater weight loss was strongly associated with remission, while clinically meaningful improvements were observed among non-remitters. These findings underscore the importance of careful patient selection and delivery through patients' trusted multidisciplinary primary care team in Singapore.

Keywords: diabetes remission, primary care, VLCD

Funding: None

Conflict of interest: None

SO 14 | Short Oral Communication

Substitution of Low- and No-Calorie Sweetened Beverages for Sugar-Sweetened Beverages and Cardiometabolic Outcomes: A Systematic Review and Meta-substitution analysis of Mega-Cohort Studies of ≥100,000 participants

Tauseef A. Khan[1,2], Sadia Ahmad[1,6], Sabrina Ayoub-Charette[1,2], Laura Chiavaroli[1,2], Vasanti Malik[1,7], Andrea Glenn[7,9], Alan Espinosa[7], Frank B. Hu[7], Walter Willett[7], David Jenkins[1,2,3,4,5], Cyril Kendall[1,2,10], Victoria Miller[11], Andrew Mente[11,12], Hertzel Gerstein[11,13], Alpa V. Patel[14], Marjorie L. McCullough[14], Loïc Le Marchand[15], Erikka Loftfield[16], Rashmi Sinha[16], Fumiaki Imamura[17], Nita Forouhi[17], Salim Yusuf[11], Simin Liu[8], John Sievenpiper[1,2,3,4,5]

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Background: Adverse associations of low- and no-calorie sweetened beverages (LNCSBs) with cardiometabolic outcomes in observational studies disagree with the evidence from randomized trials and may reflect reverse causality and residual confounding. Robust methods are needed to address these sources of bias. Substitution analyses that model the exposure as substitutions of LNCSBs for sugar-sweetened beverages (SSBs) have shown more reliable and biologically plausible estimates that agree with the evidence from randomized trials.

Aims: To conduct a meta-substitution analysis of the association of the substitution of LNCSBs versus water for SSBs with cardiometabolic outcomes in mega-cohort studies.

Methods: We searched MEDLINE, Embase, and Cochrane Library through March 2026. We included prospective mega-cohort studies (n ≥100,000; ≥1-year follow-up) reporting relevant associations with cardiometabolic outcomes adjusted for initial adiposity. We prespecified 3 substitutions: NSBs for SSBs (intended substitution), water for SSBs (standard of care substitution), and NSBs for water (reference substitution). Outcomes included adiposity and cardiometabolic disease incidence and mortality. Direct substitution estimates were used when available; otherwise, meta-substitution was applied (covariance = −0.2). Data were pooled using fixed-effects models. GRADE assessed certainty of evidence.

Results: Seven mega-cohorts (n=1,322,893, 165,452 unique cardiometabolic events) were eligible. LNCSBs for SSBs was associated with lower body weight (3 cohorts; MD −0.12 [−0.13, −0.11] kg/y; high certainty); T2D incidence (6 cohorts; RR 0.94 [0.92, 0.97]; moderate certainty), CHD incidence (3 cohorts; RR 0.86 [0.78, 0.94]; high certainty); CVD mortality (3 cohorts; RR 0.77 [0.70, 0.86]; high certainty); and total mortality (5 cohorts; RR 0.96 [0.93, 0.99]; low certainty). Water for SSBs was associated with lower body weight (MD −0.13 [−0.14, −0.12] kg/y; high certainty) and T2D incidence (5 cohorts; RR 0.96 [0.94, 0.99]; moderate certainty). LNCSBs for water was associated with trivial weight loss (3 cohorts; MD −0.01 [−0.02, −0.003] kg/y; moderate certainty) with no adverse associations.

Conclusions: In agreement with the evidence from randomized trials, analyses of the available mega-cohort studies demonstrate that LNCSBs have the intended benefits without associated cardiometabolic harm when modeling exposures as substitutions. There is a strong indication that the substitution of LNCSBs for SSBs lowers body weight, CHD incidence, and CVD mortality; a good indication that it lowers T2D incidence; and some indication that it lowers total mortality, comparable to the standard of care, water.

Keywords: Low-and no-calorie sweetened beverages, sugar-sweetened beverages, substitution analysis, cardiometabolic disease, prospective cohort studies

Funding: Diabetes Canada

Conflict of interest: TAK discloses receiving research grant funding from Diabetes Canada, the Canadian Institutes of Health Research (CIHR), the Institute for the Advancement of Food and Nutrition Sciences (IAFNS), the National Honey Board (USDA Checkoff Program), and the Toronto 3D Knowledge Synthesis and Clinical Trials Foundation. TAK has received honoraria for speaking engagements and advisory roles from IAFNS, the International Food Information Council (IFIC), the Calorie Control Council (CCC), the International Sweeteners Association (ISA), AmCham Dubai, and the Ontario Maple Syrup Producers' Association (OMSPA). TAK also serves as a paid consultant to the Heartland Food Products Group and as an expert witness in litigation concerning a low-calorie sweetener.

Tuesday, June 16th, 2026

09:30 – 10:00 SESSION 9 - SHORT ORAL ABSTRACTS (3 MINUTES)

SO 15 | Short Oral Communication

Participant Perceptions of the Portfolio Diet Program: Mixed-methods Analyses Within a Pragmatic Randomized Controlled Trial for Cardiovascular Health

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Background: Digital health programs offer a scalable approach to address the implementation gap between evidence-based nutrition interventions for cardiovascular disease and uptake in primary care. The digital Portfolio Diet Program translates the Portfolio Diet. The CHEAP (Coronary Heart Effectiveness Assessment of the Portfolio diet in primary care) trial is a virtual, pragmatic, parallel, 7-year randomized controlled trial in 1,100 adults (70% secondary; 30% high-risk [diabetes+1 risk factor] primary prevention) evaluating the Portfolio Diet Program vs usual care. Program evaluations are needed to inform adaptive trial design and broader implementation.

Aims: To evaluate the acceptability and usability of the digital Portfolio Diet Program for cardiovascular prevention.

Methods: Participants randomized to the Program from the first 3 cohorts (8-10 participants each) will be evaluated over months 0-3 of the trial. The 12-month Program includes the PortfolioDiet.app, 7-day kickstart package, in-app nudges, and 16-session online behaviour change curriculum. Participants completed a mixed-form questionnaire to assess Program acceptability (knowledge, skills, motivation, confidence, and cultural relevance) and usability (mHealth App Usability Questionnaire [MAUQ]) at 1- and 3-month, with focus groups at 3-month. Quantitative data was analyzed descriptively and qualitative data thematically.

Results: In the first 3 cohorts, 28 participants were randomized to the Program; to date, 23 and 20 completed the 1-and 3-month assessments. Preliminary data show strong agreement (52-78% at 1-month; 50-70% at 3-months) that the Program improved knowledge, skills, motivation, and confidence. Agreement was 23% and 47% at 1- and 3-month for cultural relevance. Mean MAUQ scores were 5.8±1.2 and 6.0±1.2, respectively. Focus groups identified 4 main themes: sustainability; motivation; usability; and practicality, with a need for more cultural recipes. These will inform revisions.

Conclusions: Participants at high cardiovascular risk reported high acceptability and usability of the digital Portfolio Diet Program, supporting feasibility and real-world application.

Keywords: digital health, cardiovascular disease, implementation science

Funding: Canadian Institutes of Health Research (CIHR)

Conflict of interest: The presenting author has no disclosures

SO 16| Short Oral Communication

Dietary protein and risk of total and cause-specific mortality: findings from two prospective cohorts

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Background: Current US dietary guidelines encourage higher protein intake, yet the long-term health implications of consuming more energy from protein remain unclear.

Aims: We examined protein intake in relation to total and cause-specific mortality in two large prospective cohort studies.

Methods: Participants included 69,391 women in the Nurses' Health Study (1984–2023) and 42,873 men in the Health Professional's Follow-up Study (1986–2020) without cardiovascular disease, diabetes, or cancer at baseline. Total, plant, and animal protein density were calculated as percentage of energy and assessed using validated food frequency questionnaires every four years. Cox proportional hazards regression was used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs). Restricted cubic splines assessed dose-response relationships with mortality outcomes. Substitution analyses examined the associations of replacing animal protein sources with plant protein sources.

Results: During up to 39 years of follow-up, 50,060 deaths occurred. After multivariable adjustment for lifestyle factors and diet quality, participants in the highest versus lowest decile of total protein density (median 22.3% vs 13.9% energy) had higher risks of total mortality (pooled HR: 1.21; 95% CI: 1.17, 1.25; P-trend<0.001), cardiovascular mortality (pooled HR: 1.32; 95% CI: 1.23, 1.41; P-trend<0.001), and cancer mortality (pooled HR: 1.15; 95% CI: 1.07, 1.23; P-trend<0.001). Dose- response analyses suggested a lower risk between ~8% and 18% of energy from protein, with risk increasing at higher intakes, particularly above 25%. Replacing animal protein sources with plant protein sources, especially nuts, was associated with lower risks of mortality. Animal protein density was positively associated, whereas plant protein density was inversely associated, with mortality outcomes.

Conclusions: Higher protein density was associated with greater risk of total and cause-specific mortality, particularly when protein intake was derived predominantly from animal sources. These findings suggest protein source may be critical when considering recommendations to increase protein intake.

Keywords: protein, mortality, cohort

Funding: The NHS and HPFS cohorts are funded by the NIH.

Conflict of interest: AJG has received funding from the Almond Board of California and the American Heart Association and travel/ Honoraria from the Good Food Institute and the American Diabetes Association.

SO 17 | Short Oral Communication

Nut consumption, cardiovascular disease incidence and mortality: preliminary findings from the NUTPOOL project

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Background: Evidence on nut consumption and non-communicable diseases (NCDs) remains inconclusive, which may reflect methodological heterogeneity and limited population diversity in existing research.

Aims: The NUTPOOL project aims to integrate results from worldwide prospective cohorts to evaluate the associations between nut consumption, NCDs, and mortality using an individual participant data (IPD) meta-analysis (MA) approach. In this analysis, we evaluated the associations between nut consumption and cardiovascular disease (CVD) incidence and mortality.

Methods: The project has two sequential steps. Step 1: Identification of eligible studies through a comprehensive search strategy considering the inclusion criteria of adults with a sample size of over 2,000 participants, more than five years of follow-up, and availability of quantifiable food frequency questionnaires. Step 2: A two-stage statistical analysis comprised cohort-specific multivariable Cox proportional hazards models conducted in accordance with standardized protocols, and centralized inverse-variance-weighted random-effects MA. In this preliminary analysis, 22 of the 27 eligible studies are included.

Results: Of the 17 included studies (501,288 participants; 65,086 CVD cases), each one serving/week increase (one serving = 30g) in total nut consumption was associated with a lower risk of CVD (HR: 0.99; 95%CI: 0.98–0.99; I^2=59.5%) in the fully adjusted model. A pooled HR of 0.92 (95%CI: 0.88–0.97; I^2=25.3%) was also observed when comparing low vs. high nut consumption. Similar associations were observed for CVD mortality (17 studies; 758,791 participants; 150,486 cases). Each one serving/week increment was associated with a lower risk of CVD mortality (HR: 0.96; 95%CI: 0.94–0.98; I^2=89.5%). The association was more pronounced when comparing extreme categories of nut consumption and CVD mortality (HR: 0.84; 95%CI: 0.79–0.89; I^2=12%). Subgroup analyses showed that the associations were particularly significant in American populations and tree nut consumption.

Conclusions: This IDP-MA of worldwide prospective cohorts showed that a higher consumption of nuts is associated with a lower CVD incidence and mortality, supporting the potential cardioprotective role of nuts.

Keywords: Nuts; Cardiovascular disease; Cardiovascular mortality, Meta-analysis, Cohort studies (Include from 2 to 5 keywords)

Funding: The NUTPOOL project has received funding from the International Nut and Dried Fruit Council. Funders have no role in the design or interpretation of results.

Conflict of interest: Jordi Salas-Salvadó is a non-paid member of the International Nut and Dried Fruit Council World Forum for Nutrition Research.

SO 18| Short Oral Communication

Daily Peanut Consumption Enhances Cognitive Performance in Preadolescents within a School-Based Health Program: Results from the PEANUTY Trial

Rosa Casas[1], Anna Tresserra-Rimbau[2,&], Eulàlia Gutiérrez-Alcalde[2], Ramon Estruch[1], Elena Muñoz-Marron[3], Santiago F Gómez[4], Genís Según[4], Emily P. Laveriano-Santos[5], Ana María Ruiz-León[1], Rosa M Lamuela-Raventós[2]

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[&]In loving memory

Background: Optimizing cognitive development during preadolescence is a public health priority. School-based lifestyle interventions are effective strategies, yet their cognitive impact may be further enhanced through targeted nutritional approaches. Peanuts, naturally rich in bioactive compounds, represent a practical and sustainable dietary addition.

Aims: To determine whether incorporating daily peanut consumption into a school-based health program provides additional benefits on cognitive performance in children.

Methods: In this randomized, controlled, parallel-group trial, 83 children aged 10–12 years from primary schools in the Barcelona metropolitan area were allocated to either a control group (school-based program alone) or an intervention group (program plus 25 g/day of roasted peanuts with skin) for six months. Cognitive outcomes were assessed at baseline and post-intervention using validated neuropsychological tests evaluating attention (d2-R), executive function (Stroop), processing speed and working memory (WISC-V), and fluid intelligence (Raven's 2). Emotional status was assessed with the Children's Depression Inventory. Mixed ANOVA models were applied.

Results: Children in the intervention group showed greater improvements than controls in key cognitive domains, including attention (d2-R concentration and accuracy, $p<0.01$), processing speed (WISC-V Coding and Symbol Search, $p<0.05$), and executive function (Stroop, all conditions, $p<0.05$). No effects were observed for working memory, reasoning, or depressive symptoms. Adherence was high (>85%), with no reported adverse events.

Conclusions: A simple, scalable nutritional strategy, daily peanut consumption, significantly enhances specific cognitive functions when integrated into a school-based health program. These findings highlight the potential of combining education and nutrient-dense foods to maximize cognitive benefits during a critical developmental stage.

Keywords: Peanuts; Cognitive enhancement; Children; School-based intervention; Nutrition

Funding: Supported by the María de Maeztu Unit of Excellence (INSA-UB, University of Barcelona; grant CEX2021-001234-M, funded by MICIN/AEI/10.13039/501100011033). CIBEROBN is an initiative of the Instituto de Salud Carlos III, Spain.

Conflict of interest: None.

SO 19 | Short Oral Communication

Evaluating the acceptability of the Portfolio Diet nutrition education e-module curriculum via a mixed-methods study

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Background: The Portfolio Diet, a plant-based eating plan, has shown to be associated with reduced type 2 diabetes (T2D) and cardiovascular risk factors. However, a gap in translating these clinical trial findings into community-level practice exists. Translational tools, including the Portfolio Diet e-module curriculum, were developed to bridge this gap. The curriculum utilizes evidence-based approaches in its design, including the integration of Behaviour Change Theory, which has demonstrated sustained effectiveness of health interventions, and Learning Theory, which has demonstrated strong evidence for effective online learning. However, the comprehensiveness of the curriculum remains to be evaluated.

Aims: To evaluate the acceptability of the 16-session Portfolio Diet e-module curriculum in a multi-ethnic population.

Methods: We will recruit 40 multi-ethnic participants using social media and community health networks within high-risk communities. Participants will evaluate the curriculum using mixed-form questionnaires followed by focus groups. Questionnaires include the validated User Version of the Mobile Application Rating Scale (uMARS) assessment tool scored on a Likert scale from 1-5, where a score of 4 or 5 demonstrates good acceptability. Focus groups will take place via Zoom and are audio recorded. Quantitative data are analyzed descriptively and qualitative data thematically using NVivo. Preliminary

Results: To date, 13 participants have evaluated the curriculum, with a mean score of 4.36 ± 0.83 across uMARS questions, demonstrating good acceptability. Themes identified from focus groups included an increased sense of confidence and motivation to follow the Portfolio Diet and improved skills to apply the Portfolio Diet. Participants found content difficulty varied based on the module topic and their prior knowledge.

Conclusions: This research can highlight a research gap that can improve the effectiveness of intervention design and reduce barriers to health education and access. The curriculum will be implemented across diverse clinical settings, addressing the T2D burden by improving cardiometabolic outcomes and fostering community and health-conscious attitudes in adults at risk for type 2 diabetes.

Keywords: type 2 diabetes prevention; Portfolio Diet; nutrition education; knowledge translation

Funding: Novo Nordisk Network for Healthy Populations. Canadian Institutes of Health Research.

Conflict of interest: No disclosures

SO 20 | Short Oral Communication

A DASH-enhanced Portfolio Diet Program for Blood Pressure and Cardiometabolic Risk reduction: Preliminary results on adherence in the SWITCH trial

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Background: Hypertension is the top modifiable risk factor for cardiovascular disease (CVD), with higher prevalence in those with type 2 diabetes (T2D). Clinical practice guidelines recommend various plant-based dietary patterns targeting specific risk factors, including the Dietary Approach to Stop Hypertension (DASH) diet for blood pressure (BP) and the Portfolio diet for low-density lipoprotein-cholesterol (LDL-C). Integrating key elements of these diets may enhance CVD risk reduction. The SWITCH (Substitution of high With low ultra-processed soy protein foods In a guideline-based diet inTervention for Cardiometabolic Health) trial is a 3-arm, parallel, 12-week randomized trial in 300 adults with hypertension, obesity, and 50% with T2D evaluating a DASH-enhanced Portfolio Diet Program compared to standard of care. To inform adaptive trial design, early evaluations of dietary adherence are needed.

Aims: To assess adherence to a DASH-enhanced Portfolio Diet Program for BP and CVD risk reduction in adults at high CVD risk.

Methods: Participants randomized to receive either the Portfolio Diet Program (PortfolioDiet.app, kickstart package, in-app nudges, behavior change curriculum), enhanced with 10 servings/day of vegetables and fruit (key DASH diet components) (intervention; n=200), or standard of care (control; n=100) completed 7-day dietary records at baseline and 12-week. Adherence was assessed using the 25- point Portfolio Diet Score (PDS) and servings of vegetables and fruit.

Results: Of 12 participants randomized and completed the 12-week study to date, 8 received the intervention and 4 received the control. Participants are 54.6±12.5y, 67% female, 67% Caucasian, with BMI 32.1±4.5kg/m² and systolic/diastolic BP 133/83mmHg at baseline. Three participants have T2D (HbA1c 7.1±1.3%). The PDS was 3.35±4.13 at baseline and 14.90±5.4 at 12-week in the intervention, corresponding to 60% adherence, and 2.57±2.04 at baseline and 2.43±3.05 at week 12 in the control. The intake of vegetables and fruit was 0.7serving/day at baseline and 5.4servings/day at 12-week in the intervention, corresponding to 54% adherence.

Conclusions: Findings will inform modifications to the digital DASH-enhanced Portfolio Diet Program to drive adherence and greater CVD risk reduction.

Keywords: Adherence, blood pressure, cardiovascular disease, implementation

Funding: Heart and Stroke Foundation of Canada, SNI Global with funding from United Soybean Board

Conflict of interest: None.

SO 21 | Short Oral Communication

What do we know about the causality of the association between moderate alcohol consumption and beneficial effects on ischemic heart disease and diabetes?

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Background: Most cohort studies find a beneficial effect of light to moderate alcohol consumption on ischemic diseases; the most recent meta-analyses found also a potential beneficial effect of moderate consumption on diabetes for females.

Aims: To determine causality of this beneficial effect

Methods: Systematic review of cohort studies and Mendelian Randomization (MR) studies

Results: Contrary to cohort studies, MR studies find no beneficial effect. However, most of the MR studies were not designed to detect curvilinear relationships. Still, no MR study was able to corroborate the beneficial effect for ischemic heart disease or ischemic stroke. As a result, we are faced with contradictory results of cohort studies vs. MR studies.

Conclusions: As both types of studies are by nature ecological, we need to work on better designs to decide about the causality of the apparent beneficial effect.

Keywords: alcohol consumption – beneficial effect – cohort studies – Mendelian Randomization studies

Funding: Canadian Institutes of Health Research, (US) National Institutes of Alcohol Abuse and Alcoholism

Conflict of interest: No potential conflicts of interest to disclose

15:10 –15:40 SESSION 13 - SHORT ORAL ABSTRACTS (3 MINUTES)

SO 22 | Short Oral Communication

Dietary patterns, plasma proteomics, and cognitive trajectories in older adults with metabolic syndrome: evidence from the PREDIMED-Plus cohort

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Background: Healthy dietary patterns have been associated with better cognitive outcomes, whereas unhealthy patterns may increase the risk of cognitive decline (CD). However, the biological pathways linking diet and cognitive trajectories remain unclear. Plasma biomarkers show promise for early detection and as potential intervention markers for CD, although prospective evidence remains limited.

Aims: We aimed to evaluate the association between dietary patterns and cognitive performance over a 6-year follow-up; identify plasma proteomic signatures associated with these dietary patterns; and examine the association between diet-related plasma proteins and long-term cognitive performance.

Methods: This longitudinal study included 458 participants from the PREDIMED-Plus trial (mean age 65 years; 44% women) with overweight/obesity and metabolic syndrome. Cognitive performance was assessed at baseline and at 2-, 4-, and 6-year follow-up using eight validated neuropsychological tests, from which five cognitive domains were derived. Baseline dietary patterns included the energy-reduced Mediterranean diet (erMedDiet), the Dietary Approaches to Stop Hypertension diet (DASH), the Mediterranean–DASH Intervention for Neurodegenerative Delay diet (MIND), and the Dietary Inflammatory Index (DII). Plasma levels of 92 neurology-related proteins were measured at baseline using the OLINK platform. Linear mixed models were used for main analyses.

Results: Over 6 years, higher adherence to the erMedDiet was associated with better language, global cognition, and executive function domains. Higher adherence to the DASH diet was associated with better general cognitive function. The MIND and DII showed no significant associations. Proteomic analyses identified 15 proteins associated with the erMedDiet and 15 with the DASH diet, with seven overlapping proteins. Diet-related proteomic composite scores were significantly associated with better global and executive cognitive function, language (erMedDiet signature), and general cognitive function (DASH signature).

Conclusions: Healthy dietary patterns may influence cognitive trajectories through specific plasma proteomic profiles. These findings suggest that diet-related proteomic signatures could help elucidate biological pathways linking diet and cognition and may serve as potential biomarkers for early CD.

Keywords: Cognition, proteomics, diet, biomarkers.

Funding: This research was supported by Spanish public institutions dedicated to biomedical research, including the CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN) and the Instituto de Salud Carlos III (ISCIII), through the Fondo de Investigación para la Salud (FIS) (PI13/00462, PI16/00501, PI19/00576, and PI23/00220 awarded to Jordi Salas-Salvadó), with co-funding from the European Union. Additional support was obtained from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 847879 (PRIME: Prevention and Remediation of Insulin Multimorbidity in Europe), also awarded to Jordi Salas-Salvadó. Financial support from the Sociedad Española de Endocrinología y Nutrición (SEEN) awarded to Jordi Salas-Salvadó is gratefully acknowledged. Jordi Salas-Salvadó is partially supported by the ICREA Academia programme. Hernando Joaquin Margara-Escudero holds a Contrato Predoctoral de Formación en Investigación en Salud (PFIS FI24/00038). Indira Paz-Graniel is supported by a Sara Borrell postdoctoral fellowship (CD24/00015, Instituto de Salud Carlos III). Additional institutional support was provided by the Agència Catalana de Recerca i Universitats (AGAUR) through grants 2021SGR00336 (to Jordi Salas-Salvadó).

Conflict of interest: Jordi Salas-Salvadó reports that, during the conduct of the trial, virgin olive oil, almonds, and pistachios were provided to pilot study participants as in-kind support by Patrimonio Comunal Olivalero, the Almond Board of California, and American Pistachio Growers, respectively. He also serves, without financial compensation, on the scientific advisory boards of the Danone Institute International and the International Nut and Dried Fruit Foundation. Jordi Salas-Salvadó has received funding from the International Nut and Dried Fruit Foundation to cover travel and accommodation expenses for attending scientific conferences. In addition, he is a member of the international advisory board of the project "Effect of cashew nut supplementation on glycaemic status and lipid profile in type 2 diabetes subjects." Outside the scope of the present work, he has received honoraria for lectures from the Danone Institute Spain and has been awarded institutional grants and in- kind support from the International Nut and Dried Fruit Foundation.

SO 23 | Short Oral Communication

Benefits of Carob (*Ceratonia siliqua* L.) Liquid Concentrate, in Modulating Glucose Metabolism in Subjects with Prediabetes: A Randomized Double-Blind Controlled Clinical Trial

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Background: A 90-day randomized double-blind and placebo-controlled study was conducted to assess the effect of carob (*Ceratonia siliqua* L.) on glucose metabolism in subjects with confirmed prediabetes.

Aims: Benefits of Carob (*Ceratonia siliqua* L.) Liquid Concentrate, in Modulating Glucose Metabolism in Subjects with Prediabetes: A Randomized Double-Blind Controlled Clinical Trial

Methods: The carob liquid extract containing inositols of the carob fruit (D-pinitol, myo-inositol, D-chiro inositol) was administered at a daily dose of 6.66 g, divided into two doses of 3.33 g each. Study variables included glucose- and insulin-related parameters obtained at fasting conditions and during a standard 2-hour oral glucose tolerance test (OGTT) at baseline and after 45 and 90 days of administration of the study products.

Results: The study population included 52 subjects (25 in the experimental group, 27 in the placebo group), 27 men and 25 women, with a mean age of 45.6 ± 13.9 years. Subject that consumed the active product showed statistically significant ($P < 0.0001$) improvements of glycated hemoglobin (HbA1c) and glucose levels as compared with subjects in the placebo group. Fasting serum insulin showed within-group significant decreased in the experimental group, with insulin indexes (HOMAR-R and QUICKI) improving significantly in the experimental group only. In the OGTT, there were significant improvements in the AUC of glucose and insulin, as well as glucose peak in the experimental group only. The product was well tolerated and no adverse effects were recorded.

Conclusions: This exploratory clinical trial confirms the beneficial effect of carob liquid extract in modulating glucose metabolism in subjects with prediabetes, which is a clinically relevant finding in the prevention of transition to overt type 2 diabetes.

Keywords: prediabetes; carob; glucose metabolism; insulin resistance; clinical trial; type 2

Funding: Planttech Biotechnology Spain S.L.

Conflict of interest: None to declare.

SO 24 | Short Oral Communication

Coffee, Caffeine, CVD, and Mortality

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Background: A substantial body of evidence has reported a relationship between coffee consumption, with or without caffeine content, cardiovascular disease (CVD), and mortality. Despite this extensive data, the biological mechanisms underlying metabolic responses to these beverages remain uncertain and warrant further research.

Aims: Our research investigated the links between caffeinated and decaffeinated coffee consumption and CVD risk, and thoroughly analyzed the effects of plasma metabolites resulting from long-term intake.

Methods: The research was based on data from the PREDIMED trial (2003–2010), a prominent Spanish multicenter study focused on cardiovascular prevention. We analyzed data from 1,837 individuals in case-cohort studies. Using LC-MS, we quantified 381 plasma metabolites. Associations between coffee consumption and metabolites were evaluated using adjusted linear regression models. Multi-metabolite scores linked to CVD risk were calculated using Cox regression models, and mediation analysis was used to assess indirect effects.

Results: During an average follow-up of 4.3 years for CVD, we observed a higher risk of cardiovascular and mortality events among consumers of total coffee (HR: 1.77, 95% CI: 1.01–3.08 for CVD; 1.30, 95%CI: 1.00-1.70 for mortality) and caffeinated coffee (HR: 1.45, 95% CI: 1.00–2.12 for CVD; 1.16, 95%CI: 1.02-1.32 for mortality) compared with non-consumers. Decaffeinated coffee showed no significant associations. In plasma, elevated levels of caffeine, AAMU, trigonelline, and proline-betaine were associated with 25%, 36%, 20%, and 17% increases in CVD risk, respectively. Only xanthosine showed a protective inverse association.

Conclusions: Coffee's caffeine content may be associated with an increased risk of adverse health outcomes, including cardiovascular disease, via its active metabolites. Deeper clinical research is needed to mitigate these population risks and to explore long-term strategies for chronic disease prevention.

Keywords: Coffee, caffeine, cardiovascular disease, mortality

Funding: The PREDIMED study received funding from various sources, including NIH grants R01 HL118264, R01 DK127601, and R01 DK102896, as well as the Spanish Ministry of Health (Instituto de Salud Carlos III). The PREDIMED Research Network was funded through 2 specific grants of the Spanish National Institutes of Health Carlos III, RTIC-G03/140 (coordinated by RE) from 2003 to 2005, and RD 06/0045 (coordinated by MAM-G) from 2006 to 2013. Additional funding was provided by the Ministerio de Economía y Competitividad Fondo Europeo de Desarrollo Regional for projects including CNIC-06/2007, CIBER 06/03, PI06-1326, PI07-0954, PI11/02505, SAF2009-12304, and AGL2010-22319-C03-03. The Generalitat Valenciana also contributed through grants ACOMP2010-181, AP-111/10, AP-042/11, ACOM2011/145, ACOMP/2012/190, ACOMP/2013/159, ACOMP/213/165, PROMETEO17/2017, and PROMETEO 21/2021. JS–S., the senior author of this study, expresses appreciation for financial backing from ICREA through the ICREA Academia program.

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

SO 25 | Short Oral Communication

Metabolic Profiles of Mediterranean Diet Adherence in Early Childhood: Implications for Cardiometabolic Risk

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Background: Early-childhood dietary patterns may modulate the circulating metabolome, which may allow early identification of subclinical cardiometabolic alterations.

Aims: To identify plasma metabolomic profiles associated with adherence to Mediterranean diet in children aged 3–6 years and to assess their association with cardiometabolic risk factors.

Methods: Cross-sectional analysis of Childhood Obesity Risk Assessment Longitudinal Study (CORALS) data from schools and health-care centers in seven Spanish cities (2019-2022). 1,136 children were included (mean age 5·0 years [SD 1·1]; 50·6% girls) after exclusions due to medical conditions and incomplete or implausible dietary or metabolomic data. Mediterranean diet adherence was assessed with MED4CHILD (18-item questionnaire). 249 metabolites were quantified by NMR-based metabolomics, and two profiles were derived by sparse partial least squares regression with nested repeated resampling (80%/20% training/testing, 10 splits). A composite cardiometabolic risk score (CMRs) was constructed by summing sex- and age-standardized z-scores for fat-mass index, HDL-cholesterol (x-1), LDL-cholesterol, triglycerides, systolic and diastolic blood pressure, and homeostatic model assessment for insulin resistance. Generalized linear models with false discovery rate (FDR) correction were used to estimate associations between these metabolomic profiles and CMRs.

Results: Metabolites retained in comp1 (n=10) were dominated by VLDL subclass composition ratios, whereas in comp2 (n=18) were dominated by fatty acid indices and LDL-related measures. In fully adjusted models, comp2 was inversely associated with CMRs (β=−0.41; 95%CI: −0.54, −0.28; FDR<0.001), although comp1 showed no association after FDR adjustment (β=0.04; 95%CI: −0.09, 0.17; FDR=0.530). In sensitivity analyses, comp2 remained consistently inversely associated across multiple alternative CMRs definitions, whereas comp1 showed inverse associations for several–but not all–variants.

Conclusions: In Spanish preschoolers, two metabolomic profiles were associated with Mediterranean diet adherence, but only one was consistently related to lower cardiometabolic risk. These profiles may capture biologically meaningful metabolic markers relevant to early-cardiometabolic health, supporting future longitudinal studies.

Keywords: Mediterranean diet; metabolomics; cardiovascular risk score; preschool children

Funding: Funds for the establishment of the CORALS cohort in the first year of the study (2019) were provided by an agreement between the Danone Institute from Spain and the CIBEROBN. This study was partially funded by the METACORALS project (CIBEROBN) and Instituto de Salud Carlos III, (PI24/00711, Nancy Babio). The PROMETEO 21/2021 grant from the Generalitat Valenciana was obtained for the Generalitat de València, Dolores Corella. JSS is partially supported by ICREA under the ICREA Academia program.

Conflict of interest: The authors have no conflict of interest to declare.

SO 26 | Short Oral Communication

Ultra-Processed Food Consumption and Gut Metagenomic Profiles in Spanish Preschool Children: A Cross-Sectional Analysis

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Background: Ultra-processed foods (UPFs) account for an increasing share of children's diets, but their associations with the gut microbiome and early cardiometabolic health remain poorly characterized.

Objective: To examine associations between UPF consumption and gut microbiome composition and function, and to explore whether microbiome features mediate the relationship between UPF intake and a composite cardiometabolic risk (CMR) score in preschool children.

Methods: We conducted a cross-sectional analysis of 1,138 children aged 3–6 years from seven Spanish centers. Dietary, clinical, and stool metagenomic data were collected at baseline. UPF consumption was estimated from food frequency questionnaires using the NOVA classification. Shotgun metagenomic sequencing was used to profile microbial taxa and functional pathways.

Results: Compared with the lowest tertile of UPF consumption, the highest tertile had higher BMI z-scores, fat-mass index, triglycerides, blood pressure, and prevalence of overweight/obesity, together with lower HDL- and LDL-cholesterol concentrations. Alpha diversity was similar across tertiles, whereas beta diversity differed significantly (PERMANOVA R^2=0.003; p=0.003), mainly between tertiles 1 and 3. ANCOM-BC2 identified broad species-level differences, with 48 species differing in tertile 2 versus tertile 1 and 57 in tertile 3 versus tertile 1; 24 taxa overlapped, with slightly more depletions than enrichments at higher UPF intake. Higher UPF consumption was associated with enrichment of *Fusobacterium necrophorum*, *Megamonas hypermegale*, *Prevotella veroralis*, and *Bifidobacterium dentium*, and depletion of *Klebsiella oxytoca*, *Megasphaera* spp., *Citrobacter portucalensis*, and *Prevotella* sp. Rep29. Enriched pathways were mainly related to amino acid, cofactor/vitamin, and nucleotide metabolism, as well as lactose/galactose degradation. In structural equation models, PCoA1/PCoA2 did not mediate the UPF-CMR association (total indirect β=0.003; 95% CI, −0.014 to 0.021).

Conclusions: Higher UPF consumption was associated with consistent taxonomic shifts and altered microbial functional potential in preschool children. These findings support further longitudinal integrative metagenomic-metabolomic studies on early-life UPF exposure and cardiometabolic risk.

Keywords: Ultra-processed foods; NOVA classification; children; shotgun metagenomics; gut microbiome; cardiometabolic risk; ANCOM-BC2; mediation.

Funding: The cohort received funding from the Instituto de Salud Carlos III (ISCIII), through the Fondo de Investigación Sanitaria (FIS), and was co-financed by the European Union through the European Regional Development Fund (ERDF) and the European Social Fund (ESF) under the motto 'A way to make Europe' / 'Investing in your future' [PI24/00711].

Conflict of interest: The authors have no conflict of interest to declare.

SO 27 | Short Oral Communication

HDL-bound microRNAs and acute myocardial infarction incidence in a population-based case-cohort study: HDL function- and insulin resistance-related functional analysis

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Background: HDL function has been associated with cardiovascular risk independently of traditional risk factors and is also closely related to diabetic status. HDL particles can carry microRNAs (miRNAs), which may contribute to the regulation of gene expression linked to HDL functionality.

Aims: Our aim was to investigate the association between HDL-bound miRNAs (HDL-miRNAs) and incident acute myocardial infarction (AMI) using a non-targeted, population-based approach. Additionally, we examined the miRNA signature specifically linked to insulin resistance and diabetes in the functional analysis.

Methods: We conducted a case-cohort study including 247 participants from the REGICOR cohort in north-eastern Spain (51 AMI cases and a random sample of 196 participants, including seven overlapping AMI cases). HDL-miRNAs were isolated from apolipoprotein B-depleted serum and quantified by whole-genome miRNA sequencing. Associations between HDL-miRNAs and incident AMI were assessed using multivariable Cox proportional hazards model. For AMI-associated miRNAs (p-value <0.10), we retrieved their experimentally validated targets from miRTarBase v9.0 and assessed pathway enrichment of these targets via over-representation analysis.

Results: Two HDL-miRNAs were associated with incident AMI after multiple testing correction: miR- 628-3p (HR 1.69, 95% CI 1.30 to 2.19) and miR-28-3p (HR 1.58, 95% CI 1.21 to 2.06). Nine additional HDL-miRNAs were nominally associated with AMI incidence (p-value <0.05), eight with a direct association (miR-93-5p, miR-26b-5p, miR-106a-5p, miR-126-3p, miR-15b-5p, let-7a-5p, let-7e-5p, and let-7f-5p) and one with an inverse association (miR-361-5p). These miRNAs regulate the expression of genes involved in cholesterol efflux and homeostasis (ABCA1, ARL4C, SIRT1, NFKBIA, ANXA2, LRP6), insulin secretion (CRK, HNF4A), insulin signalling and resistance (IRS1, PIK3R2, SLC7A5). A number of these miRNAs are phylogenetically conserved.

Conclusions: In this first population-based study examining the whole HDL-miRNome in relation to AMI incidence, two HDL-miRNAs (miR-628-3p and miR-28-3p) were significantly associated with AMI incidence, while others showed suggestive associations. In addition, a number of these miRNAs regulate the expression of genes involved in cholesterol efflux and homeostasis, insulin secretion, signalling and resistance.

Keywords: Lipoproteins, HDL; MicroRNAs; Myocardial Infarction.

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

SO 28 | Short Oral Communication

Effects of a Healthy Nordic Diet or a Low Carbohydrate High PUFA Diet on Circulating Ceramides in Type-2 Diabetes and Prediabetes: secondary analyses of a Randomized Trial

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Background: Several ceramides have been closely associated with insulin resistance, glycemic control and type-2 diabetes (T2D). We have previously shown that replacing saturated fat with polyunsaturated fat reduced several ceramides. Further, we recently reported in the NAFLDiet trial that a Healthy Nordic Diet (HND) lowered HbA1c compared with usual care and to a low-Carbohydrate diet high in Polyunsaturated fats (LCPUFA).

Aims: The current aim was to investigate the effects of these diets on circulating ceramides in individuals with T2D/prediabetes, and whether ceramides might partly mediate dietary effects on HbA1c.

Methods: The NAFLDiet study was a 12-month, three-arm parallel randomized controlled trial to investigate the effect on liver fat and cardiometabolic risk in 150 adults (median age 65) with T2D (55%) or prediabetes (45%), assigned to HND, LCPUFA or usual care (UC). A general linear model estimated the intention-to-treat effect on ceramide concentrations, and causal mediation analysis was used to estimate whether ceramides could partly mediate dietary effects on HbA1c.

Results: Between-group differences showed statistically significant effects for several ceramide species. Compared to UC, HND reduced several ceramides, including Cer-14:0, Cer-18:0, Cer-22:0 and Cer-22:1 by -8.2% to -25.3%. The LCPUFA diet showed similar but larger effects compared to UC. LCPUFA versus HND showed similar but more attenuated effects. HND, but not LCPUFA, decreased HbA1c compared to UC. We found no significant mediation by ceramides on HbA1c, ranging from 2-53%, with wide confidence intervals covering zero.

Conclusions: Both HND and LCPUFA diets reduced circulating ceramides after 12 months compared to UC, while LCPUFA versus HND had more attenuated effects. Reduction in ceramides did not mediate any of the favorable effect of HND on HbA1c, suggesting other factors are involved in the improvement of glycemic control.

Keywords: Type 2 diabetes, ceramides, Nordic diet; randomized clinical trial

Funding: Grants from Swedish Research Council FORMAS, The Swedish Heart-Lung Foundation, The Swedish Diabetes Foundation, EXODIAB, The Familjen Ernfors Foundation for diabetes research, The Selander Foundation.

Conflict of interest: None to declare.

Wednesday, June 17th, 2026

09:20 – 09:45 SESSION 16 - SHORT ORAL ABSTRACTS (3 MINUTES)

SO 29 | Short Oral Communication

The role of the EAT-Lancet diet in the association between air pollution and cardiometabolic health: a cross-sectional analysis

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Background: Fine particulate matter (PM2.5), black carbon (BC), and nitrogen dioxide (NO_2), as well as diet quality, modulate low-grade systemic inflammation. However, whether diet quality mitigates the adverse cardiometabolic effects of air pollution remains unknown.

Aims: We examined whether adherence to the EAT-Lancet diet, an index integrating health and environmental sustainability, attenuates the adverse cardiometabolic effects associated with long-term air pollution in older adults with overweight or obesity and metabolic syndrome.

Methods: We analysed cross-sectional data (2013-2016) from the PREDIMED-Plus study in Spain. We assigned annual residential air pollution exposure using ELAPSE hybrid land-use regression estimates. Outcomes were fasting glucose, glycosylated hemoglobin, systolic and diastolic blood pressure, triglycerides (TG), high-density lipoprotein (HDL), the triglyceride-glucose (TyG) index, and the TG/HDL ratio. We fitted linear regression models adjusted for age, sex, education, study site and lifestyle factors such as sedentary time, physical activity, alcohol intake and smoking. Effect modification was assessed using interaction product-terms (βi) between air pollutants and the centered 14-food component Stubbendorff EAT-Lancet diet index (0–42 points).

Results: Among 5,458 participants (54–75 years; 47.1% females), higher EAT-Lancet adherence (observed range 12–37 points) attenuated air pollution-lipid markers associations. Effect modification was strongest for BC: higher diet scores weakened associations with log(TG/HDL) (βi = –0.0131, p interaction = 0.020), log(TG) (βi = –0.0098, p interaction = 0.029) and TyG (βi = –0.0115, p interaction = 0.028). Similar but weaker patterns were observed for NO2. No consistent evidence of effect modification was observed for glucose markers or blood pressure.

Conclusions: Higher adherence to the EAT-Lancet diet may attenuate adverse associations of air pollution with lipid-related markers in metabolically vulnerable adults.

Keywords: Air pollution, EAT-Lancet diet, lipid markers, metabolic health, sustainability.

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Conflict of interest: The authors declare no conflict of interest.

SO 30 | Short Oral Communication

Longitudinal associations between food biodiversity and cardiometabolic risk in children

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Background: Childhood obesity remains highly prevalent worldwide and is a major determinant of early cardiometabolic risk. Although diet quality is recognized as a key modifiable factor, increasing attention has been given to food biodiversity (FB), commonly quantified as dietary species richness (DSR), defined as the number of unique edible plant and animal species consumed. FB has been proposed as an independent health predictor, but its relationship with adiposity and cardiometabolic risk in children remains unclear.

Aims: To assess the longitudinal associations between FB and adiposity and cardiometabolic risk markers in the Spanish multicentered cohort.

Methods: Dietary intake was assessed annually using a validated 125-item food frequency questionnaire. FB was quantified as the cumulative average DSR from baseline to 3 years of follow-up. Adiposity and cardiometabolic markers, including blood pressure, HOMA-IR, HDL and LDL-cholesterol and triglycerides, were measured using standard procedures. A standardized Cardiometabolic Risk Score (CRS) was calculated using fat mass index and cardiometabolic markers. Multivariable linear regression models examined associations between cumulative DSR and outcomes at year 3, adjusting for sociodemographic, lifestyle, and maternal factors.

Results: Among 1,023 participants (50% girls), with a mean (SD) age of 4.5 (1.0) years, DSR ranged from 11 to 38 species (median: 26). Overall, 27.9% had overweight or obesity. No associations were observed between DSR and individual adiposity and cardiometabolic markers. However, higher DSR was associated with lower CRS in both minimally adjusted (β [95% CI]: -0.39 [-0.67, -0.11, $p<0.01$]) and fully adjusted models, including diet quality (β [95% CI+: -0.025 [-0.60 to -0.04], $p<0.01$).

Conclusions: Higher food biodiversity was associated with lower overall cardiometabolic risk in Spanish children. Increasing dietary biodiversity in early childhood may support early cardiometabolic prevention.

Keywords: Food biodiversity, dietary species richness (DSR), preschool children, adiposity

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Conflict of interest: The authors have no conflict of interest to declare.

SO 31 | Short Oral Communication

Total and different types of olive oil consumption, gut microbiota, and cognitive function changes in older adults

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Background: Emerging evidence has shed light on the role of the gut microbiota in the interface between diet and brain health. Olive oil, particularly virgin olive oil (VOO), a key component and major fat source in the Mediterranean diet, has exhibited widespread healthful benefits, including improvements in gut microbiota and cognitive health. Despite supportive preclinical findings, human evidence integrating olive oil subtypes, gut microbiota, and cognitive function remains limited.

Aims: To investigate the interplay between total olive oil consumption and its subtypes, gut microbiota, and changes in cognitive function in older adults at high risk of cognitive decline.

Methods: This prospective cohort study included 656 participants aged 55 to 75y (mean age 65.0±4.9y, 47.9% women) with overweight/obesity and metabolic syndrome. At baseline, participants provided stool samples and completed a validated semi-quantitative food frequency questionnaire. Cognitive function was assessed using a comprehensive battery of neuropsychological tests at baseline and after a 2-y follow-up.

Results: Multivariable linear regression models showed that higher consumption of VOO was associated with improved cognitive function over a 2-y follow-up, and a more diverse gut microbiota overall structure at baseline. Conversely, increased consumption of common olive oil is linked to lower alpha diversity of the microbial communities, and accelerated cognitive decline. Mediation analysis suggests that gut microbiota and particularly the *Adlercreutzia*, may serve as a mediator taxon in the association between VOO consumption and positive changes in general cognitive function.

Conclusions: Higher consumption of VOO was associated with cognitive preservation, possibly mediated by favorable alterations in gut microbiota composition. Our study provides novel insights into the complex interplay between different types of olive oil consumption, gut microbiota, and changes in cognitive function. These findings underscore the potential of microbiota-targeted dietary strategies to promote cognitive health in aging populations, though further high-quality and clinical cohort studies are required.

Keywords: olive oil; cognitive function; gut microbiota; mediation; gut-brain axis.

Funding: This work was supported by the official Spanish Institutions for funding scientific biomedical research, CIBER Fisiopatología de la Obesidad y Nutrición (CIBEROBN) and Instituto de Salud Carlos III (ISCIII), through the Fondo de Investigación para la Salud (FIS), which is co-funded by the European Regional Development Fund (six coordinated FIS projects leaded by JSS and JVi, including the following projects: PI13/00233, PI13/00728, PI13/00462, PI14/01206, PI14/ 00696, PI16/00533, PI16/00366, PI16/00501, PI17/01441, PI17/00855, PI19/00017, PI19/00781, PI19/00576, PI20/ 00557, PI21/0046; the Especial Action Project entitled: Implementación y evaluación de una intervención intensiva sobre la actividad física Cohorte PREDIMED-Plus grant to JSS; the Recercaixa (number 2013ACUP00194) grant to JSS; grants from the Consejería de Salud de la Junta de Andalucía (PI0458/2013, PS0358/2016, PI0137/2018); the PROMETEO/ 2017/017 and PROMETEO/2021/21 grants from the Conselleria de Innovación, Universidades, Ciencia y Sociedad Digital from the Generalitat Valenciana; and by NIH grant R01DK127601. This research was also partially funded by the Eat2beNICE/H2020-SFS-2016-2 EU- H2020 European grant, and the Horizon 2020 PRIME study (Prevention and Remediation of Insulin Multimorbidity in Europe; grant agreement #847879). JN is supported by a predoctoral grant from Ministerio de Ciencia, Innovación y Universidades (FPU 20/ 00385). SKN is supported by a postdoctoral fellowship from the Canadian Institutes of Health Research (CIHR, MFE-171207). JSS, the senior author of this paper, was partially supported by ICREA under the ICREA Academia program. None of the funding sources took part in the design, collection, analysis, interpretation of the data, writing the report, or in the decision to submit the manuscript for publication.

Conflict of interest: JSS reports serving on the board of and receiving grant support through his institution from the International Nut and Dried Fruit Council, serving on the board of the Instituto Danone Spain and the International Danone institute. None of the other authors declare competing interests.

SO 32 | Short Oral Communication

The association between ultra-processed food intake and glycaemic, metabolic, and inflammatory parameters in adults with type 1 diabetes

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Background: Type 1 diabetes (T1D) is an autoimmune disease that results in absolute insulin deficiency and requires lifelong self-management. Despite technological advancements in insulin therapy and continuous glucose monitoring (CGM), many adults with T1D continue to struggle to achieve recommended glycaemic targets. Dietary composition, particularly the consumption of ultra-processed foods (UPF), may influence glycaemic control. However, evidence in adults with T1D is currently lacking.

Aims: This study investigated associations between ultra-processed energy intake and glycaemic, metabolic, and inflammatory outcomes in adults with T1D.

Methods: In this cross-sectional analysis, adults with T1D (n = 427) completed validated dietary records, which were used to determine the proportion of total energy derived from UPF according to the NOVA classification. Continuous glucose measurement (CGM) data, blood samples, and anthropometric measures were collected to assess glycaemic, metabolic and inflammatory biomarkers. Multivariable regression models were adjusted for age, sex, diabetes duration, BMI, insulin use, lifestyle factors, and dietary composition.

Results: On average, ultra-processed foods accounted for 53 ± 18% of total energy intake. A higher proportion of UPF. A higher UPF intake was significantly associated with lower time in euglycaemic range (OR for TIR≥70%: 0.59 [0.47-0.72]), greater glucose variability (OR for GCV≤36%: 0.70 [0.56-0.86] and higher glycated hemoglobin (HbA1c; β = 2.07 [0.96-3.19] mmol/mol) per SD UPF increase, independent of confounding variables. Additionally, UPF intake was associated with elevated C-reactive protein (CRP) concentrations. These associations were attenuated after adjustment for potential modifying effects of dietary components, including fibre intake.

Conclusions: Higher consumption of ultra-processed foods was associated with less favourable glycaemic control and higher systemic inflammation in adults with T1D. These findings highlight the potential importance of dietary quality in diabetes management and support the need for interventional studies to clarify causal pathways and inform dietary recommendations.

Keywords: type 1 diabetes mellitus, glycaemic control, ultra-processed food; nutrition

Funding: N.M.J.H. is supported by a Senior Clinical Dekker grant by the Dutch Heart Foundation, Diabetes Foundation Netherlands grant 2020 and a ZONMW-VIDI grant 2023. M.R.S. is supported by a Health-Holland technology-knowledge-innovation grant 2024.

Conflict of interest: N.M.J.H. has received honorarium fees from NovoNordisk and Amarin. M.R.S. has received honorarium fees from Clear.bio, NovoNordisk and Abbott Nutrition.

SO 33 | Short Oral Communication

Postprandial glucose dynamics from continuous monitoring reveal distinct subtypes of type 2 diabetes

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Background: Optimizing the postprandial glucose response (PPGR) in individuals with type 2 diabetes (T2D) is crucial for improving glycemic control and reducing diabetes-related complications.

Aims: To investigates the shape of PPGR to identify T2D subtypes with pathophysiological heterogeneity.

Methods: Using four-hour CGM data after a standardized breakfast, 100 individuals with T2D were clustered via K-Means based on glucose peak, iAUC0-4h, average positive slopes before (mean rise) and after (mean fall) the peak, and the difference between final and fasting glucose. A subgroup of 50 individuals underwent post-breakfast venous sampling for glucose and insulin measurements. Clinical and metabolic parameters were compared across PPGR clusters using one-way ANOVA.

Results: Three PPGR clusters were identified. Cluster 1 (n=19) showed the highest glucose peak and $iAUC_{0\text{-}4}$h, with glucose levels remaining above baseline 4h post-breakfast. Cluster 2 (n=56) and 3 (n=25) had similarly lower peaks and $iAUCs_{0\text{-}4}$h compared with Cluster 1, with Cluster 2 exhibiting a slower glucose rise and fall than Cluster 3. No significant differences in age, sex, BMI, or diabetes duration was found between the clusters. However, compared to Cluster 3, Cluster 1 showed lower β-cell function (HOMA2-B%: 77.42±25.64 vs. 104.96±43.94), higher insulin resistance (HOMA-IR: 7.94±3.27 vs. 4.84±2.78), and a reduced capacity to compensate through increased insulin secretion, as indicated by a lower Disposition Index: 1.02±0.67 vs. 2.37±1.05 (all $p<0.05$). Cluster 2 did not differ significantly in HOMA2-B% (94.46±31.59) or HOMA-IR (5.99±3.36) from the other clusters, but showed a reduced early postprandial insulin secretion compared to Cluster 3, as indicated by a lower 60-min Insulinogenic index (0.84±0.58 vs. 1.67±1.07, $p<0.05$).

Conclusions: CGM-based dynamic parameters allowed identification of T2D subtypes with similar clinical profiles but distinct degrees of impairment in insulin secretion and sensitivity. This approach goes beyond conventional postprandial metrics and supports the potential of CGM-based profiling to inform precision management strategies in T2D.

Keywords: postprandial glucose response; cluster; CGM; precision nutrition; inter-individual

Funding: No main funding was received for this work.

Conflict of interest: All Authors declare no disclosures.

SO 34 | Short Oral Communication

Plasma per- and polyfluoroalkyl substances (PFAS) and cardiometabolic risk factors in an elderly Spanish population at high cardiovascular risk

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Background: Per- and polyfluoroalkyl substances (PFAS) are persistent synthetic chemicals increasingly linked to cardiometabolic dysfunction. However, their joint effects as mixtures remain understudied, particularly in older adults.

Aims: To evaluate associations between plasma concentrations of individual PFAS and PFAS mixtures and cardiometabolic risk factors in older adults with overweight/obesity and metabolic syndrome.

Methods: We conducted a 1-year prospective study including 196 participants (men aged 55–75 and women 60–75) from the Reus center of the PREDIMED-Plus trial. Baseline plasma levels of perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS), and perfluorooctane sulfonic acid (PFOS) were measured using validated UHPLC-MS/MS methods. Associations with cardiometabolic markers -adiposity, blood pressure, lipids, and glucose metabolism- were assessed using multivariable linear regression and quantile g-computation models.

Results: At baseline, participants in the highest tertile of log-transformed PFHxS had higher BMI [β = 1.42 kg/m2; 95 % CI: 0.29 to 2.55]. Those in the highest tertiles of PFOA and PFNA had greater waist circumference [PFOA: β = 2.75 cm; 95 % CI: 0.60 to 4.89; PFNA: β = 4.29 cm; 95 % CI: 2.41 to 6.17]. Diastolic blood pressure was inversely associated with PFOA, both categorically and continuously [β = −3.41 mm Hg; 95 % CI: −6.24 to −0.59; β = −3.36 mm Hg; 95 % CI: −5.96 to −0.75]. Longitudinally, higher PFNA was linked to increases in fasting glucose [β = 11.9; 95 % CI: 0.16 to 23.9], waist circumference [β = 2.23 cm; 95 % CI: 0.96 to 5.42] and inverse association with HDL-cholesterol concentrations [β = −3.11 mg/dL; 95 % CI: −5.69 to −0.53]. PFAS mixture analysis also showed positive associations with fasting glucose (β = 10.4 mg/dL; 95 % CI: 1.82 to 19.2) and HbA1c (β = 0.30 %; 95 % CI: 0.00 to 0.60), mainly driven by PFNA, PFOA, and PFOS.

Conclusions: PFNA, PFOA, and their mixtures were associated with adverse changes in glucose metabolism, HDL-cholesterol, and adiposity in older adults at high cardiometabolic risk. These findings highlight the need to evaluate PFAS mixtures and conduct long-term studies to clarify underlying mechanisms.

Keywords: Per- and polyfluoroalkyl substances (PFAS), cardiometabolic risk, endocrine disrupting chemicals, human biomonitoring

Funding: This study was supported by the official Spanish Institutions for Funding Scientific Biomedical Research, CIBER Fisiopatología de la Obesidad y Nutrición (CIBEROBN) and Instituto de Salud Carlos III (ISCIII), through the Fondo de Investigación para la Salud (FIS), which is co-funded by the European Regional Development Fund led by JS-S: PI19/00576; the Especial Action Project entitled:

Implementación y evaluación de una intervención intensiva sobre la actividad física Cohorte PREDIMED-Plus grant to JS-S; the Recercaixa (number 2013ACUP00194) grant to JS-S. None of the funding sources took part in the design, collection, analysis, interpretation of the data, or writing the report, or in the decision to submit the manuscript for publication. JS-S senior author, gratefully acknowledges the financial support by ICREA under the ICREA Academia program.

Conflict of interest: Not applicable

SO 35 | Short Oral Communication

Assessing a community gardening intervention to lower type 2 diabetes risk in Mississauga

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Background: Type 2 diabetes (T2D) is a chronic disease that elevates the risk of cardiovascular disease and complications such as vision loss and kidney damage. In Peel, Ontario, the prevalence of T2D exceeds the provincial average of 9.8%. Community gardening may support the prevention and management of T2D by improving access to fruits/vegetables and social connection, and when paired with nutrition education, may also increase health literacy. To address T2D in Peel, we implemented a community gardening program in Mississauga that integrated nutrition and T2D education in partnership with the environmental charity Ecosource.

Aims: The aims of this study are to (1) co-design and deliver a community garden program that integrates nutrition education for T2D prevention and management, (2) evaluate the impact of the revised program on select T2D risk factors, and (3) gain insights to refine future environmental health initiatives.

Methods: A 26-week community gardening and nutrition education program was delivered to 25 Peel residents. Program impact on T2D risk factors including dietary quality, community belonging, physical activity, and food security was assessed using questionnaires at baseline, 12 weeks, and 26 weeks. Additional insights were gathered through photovoice, focus groups, and semi-structured interviews.

Results: Thematic analysis of the co-design focus group conducted for aim 1 identified key nutrition education topics to be addressed in the intervention including budget-friendly meal planning, nutrition label reading, healthier takeout or snack food choices, and blood sugar control. With 55% of participants identifying as people of colour, cultural differences in eating habits were also prioritized. Further analysis of intervention outcomes and post- implementation data from aim 2 and 3 is ongoing.

Conclusions: This study contributes to the development of environmental health interventions by identifying program elements that promote community-driven, culturally relevant support for populations at higher risk of T2D.

Keywords: Type 2 diabetes; community gardening

Funding: This project was funded by the Novo Nordisk Network for Healthy Populations (NHP) Catalyst Grant.

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

11:25 – 11:55 SESSION 18 - SHORT ORAL ABSTRACTS (3 MINUTES)

SO 36 | Short Oral Communication

More Screens, More Ultra-Processed Foods consumption? A Longitudinal Study in Children

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Background: Sedentary behaviors and the consumption of ultra-processed foods (UPF) can adversely affect children's cardiometabolic health. However, evidence on the relationship between screen time and UPF consumption in early childhood remains limited.

Aims: To prospectively analyze the association between screen time and UPF consumption in children aged 3–6 years from the Spanish cohort over a three-year follow-up.

Methods: Screen time was assessed using parent-reported questionnaires administered at baseline and after three years of follow-up. Age- and sex-adjusted UPF consumption was estimated from food frequency questionnaires collected at baseline and annually, classified according to the NOVA system. Linear mixed-effects regression models were applied to evaluate the association between trajectories of compliance with WHO screen time recommendations (<2 h/day) (maintained compliance, improved compliance, worsened compliance, or never compliant) and UPF consumption over three years. All models were adjusted for child and maternal key sociodemographic and lifestyle factors.

Results: A total of 1,045 children (50% girls; mean age 4.5 ± 1.1 years) were included in the longitudinal analysis. Mean baseline screen time was 1.8 ± 1.0 h/day. Compared with children who consistently met the WHO screen time recommendations over three years, those who never met the recommendations showed significantly higher UPF consumption after follow-up (mean difference = –32.9 g/day; 95% CI: –62.3, –3.5). Children who improved their compliance did not differ significantly from consistent compliers, while those whose compliance worsened showed a non-significant increase in UPF consumption over follow-up.

Conclusions: Higher and sustained screen time was associated with greater UPF consumption over time. These findings highlight the importance of early promotion of healthy screen time habits as a potential strategy to limit UPF intake in children.

Keywords: Child; screen; snacks; sedentariness; junk food

Funding: Funds for the establishment of the CORALS cohort in the first year of the study (2019) were provided by an agreement between the Danone Institute from Spain and the Centro de Investigación Biomédica en Red de la Fisiopatología de la Obesidad y Nutrición (CIBEROBN). This work was partially funded by the 2024 Intramural Projects Call of the CIBEROBN and by the Spanish government's official funding agency for biomedical research, ISCIII, through the Fondo de Investigación para la Salud (FIS), the European Union ERDF/ESF, 'A way to make Europe'/ 'Investing in your future' [PI24/00711]. At present, funding also includes the Generalitat Valenciana, PROMETEO 21/2021.

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

SO 37 | Short Oral Communication

Dietary choline and betaine intake and cognitive function in older adults with overweight or obesity and metabolic syndrome: a prospective analysis

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Background: Dietary choline and betaine, key one-carbon metabolism nutrients, may help preserve cognitive function during aging, but longitudinal evidence in high-risk populations remains limited and inconsistent.

Aims: To evaluate the longitudinal associations between dietary choline and betaine intake and 2-year changes in cognitive performance across multiple domains in older adults with overweight or obesity and metabolic syndrome.

Methods: This prospective cohort analysis used data from 6,610 community-dwelling adults aged 55–75 years participating in the PREDIMED-Plus trial. Dietary choline and betaine intakes were assessed at baseline, 1 and 2 years using a validated 143-item food-frequency questionnaire, and energy-adjusted cumulative average intakes were computed using the residual method. Cognitive function was measured at baseline and 2 years with eight neuropsychological tests, from which five composite z-scores were derived: global cognition, general cognition, attention, executive function and language. Multivariable linear regression models estimated associations between cumulative choline and betaine intakes and 2-year changes in cognitive composites, adjusting for socio-demographic, lifestyle, clinical factors, adherence to an energy-restricted Mediterranean diet and baseline cognitive performance.

Results: Mean choline intake was 421.8 ± 66.2 mg/day and mean betaine intake 114.1 ± 31.4 mg/day. Each 1 mg/day higher cumulative choline intake was associated with slower decline in attention and beneficial changes in language over two years. Participants in the highest choline tertile showed greater improvements in attention and language compared with those in the lowest tertile. Each 1 mg/day higher betaine intake was associated with more favorable changes in executive function and language, and participants in the highest betaine tertile showed greater improvements in language than those in the lowest tertile. Associations remained robust after excluding participants with baseline MMSE <24.

Conclusions: Higher dietary choline and betaine intakes were associated with modest, domain-specific cognitive benefits over two years in older adults at high cardiometabolic and cognitive risk, suggesting a potential role for these nutrients in supporting cognitive health during aging.

Keywords: Choline; betaine; cognition; older adults; metabolic syndrome.

Funding: This study was funded by Instituto de Salud Carlos III (FIS projects co-funded by the European Regional Development Fund), CIBEROBN, and additional Spanish and European public research grants linked to the PREDIMED-Plus trial.

Conflict of interest: None

SO 38 | Oral Short Communication

Long-term effects of increased water intake on glucose regulation in adults with elevated copeptin

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Background: Plasma copeptin, a stable surrogate of arginine vasopressin, is elevated in individuals with habitual low water intake and associated with cardiometabolic risk. Short-term water supplementation has been shown to reduce both fasting plasma (fp) copeptin and fp-glucose in low water drinkers with elevated copeptin.

Aims: To assess the long-term effects of increased water intake on fp-glucose, fp-copeptin, and cardiometabolic risk markers.

Methods: Single-center, open-label, parallel-group randomized clinical trial conducted in Malmö, Sweden (2018–2025). Adults (20–75 years) with elevated fp-copeptin, urine osmolality ≥600 mOsm/kg, and urine volume ≤1.5 L/day were randomized (1:1) to coached water intake increase (+1.5 L/day) or to maintain habitual intake.

Results: Of 4,846 individuals screened, 797 were randomized and 582 were included in the intention-to-treat (ITT) population. The per-protocol (PP) population comprised 239 participants. The intervention induced expected biological effects, including improved hydration markers and reduced fp-copeptin. No significant reduction in fp-glucose was observed in the overall ITT or PP populations. However, in a predefined PP subgroup without diabetes at baseline (n=206), increased water intake was associated with a modest but statistically significant reduction in fp-glucose at 12 months (between-group Least Squares mean difference −2.14 mg/dL; 95% CI −4.22 to −0.06; p=0.04). Across all populations, changes in fp-copeptin correlated positively with changes in fp-glucose. No significant differences were observed for secondary cardiometabolic endpoints.

Conclusions: In non-diabetic individuals with elevated copeptin, sustained adherence to increased water intake was associated with a modest but statistically significant reduction in fp-glucose, accompanied by reduced fp-copeptin. Although the glucose-lowering effect was not observed in the overall population, our findings highlight a susceptible subgroup, i.e. of non-diabetic individuals with compliance to increased water intake, and support the hypothesis that adequate water intake may modulate glucose homeostasis, potentially via reduced vasopressin release.

Keywords: Hydration; Water; Copeptin; Vasopressin; Glucose regulation

Funding: Danone Research & Innovation, Gif-sur-Yvette, France.

Conflict of interest: SE has received conference fees from Danone Research & Innovation. TV and JZ are full-time employees of Danone Research & Innovation. OM has received a research grant and consultancy fees from Danone Research & Innovation.

SO 39 | Short Oral Communication

Effect of replacing sugars-sweetened beverages with soymilk versus cow's milk on liver fat: The Soy Treatment Evaluation for Metabolic health (STEM) randomized trial

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Background: Liver fat is an early metabolic lesion in cardiometabolic diseases. Sugar-sweetened beverages (SSBs) reduction has emerged as a dominant clinical and public health target for cardiometabolic risk reduction. Low-fat cow's milk is the standard of care caloric replacement for SSBs in nutrition programs. Fortified soymilk is a dairy alternative recognized for its comparable nutritional value and approved heart health claims. Whether it provides similar benefits to cow's' milk is unclear owing to its added sugars content and classification as an ultra-processed food.

Aims: The Soy Treatment Evaluation for Metabolic health (STEM) trial evaluated the effect of replacing SSBs with 2% soymilk vs 2% cow's milk on liver fat in SSBs consumers with obesity.

Methods: STEM is a pragmatic, combined superiority and non-inferiority, 24-week, parallel, 3-arm, randomized trial in adults with obesity consuming ≥1 SSBs/day. Participants were randomized to their usual SSBs; sweetened, fortified 2% soymilk; or 2% cow's milk. The primary outcome was change in intrahepatocellular lipid (IHCL) measured by ^{1}H-MRS at 24 weeks. Hierarchical testing controlled the familywise error rate. Superiority of cow's milk and soymilk to SSBs was assessed first. If superiority was established, then the non-inferiority of soymilk to cow's milk was assessed using a pre-specified margin of 1.5%. (Clinicaltrials.gov NCT05191160)

Results: We randomized 186 participants (57% male; mean [SD] age, 39.9 [11.8] years; BMI, 34.6 [6.1] kg/m², waist circumference, 112.6 [13.8] cm; IHCL, 10.0% [8.2%]; 64.1% metabolic dysfunction-associated steatotic liver disease; SSBs intake, 2.3 [1.3] 12 oz servings/day. Cow's milk (mean difference [95% CI], −1.67% [−3.21% to -0.13%]) and soymilk (−1.96% [−3.42% to −0.50%]) reduced IHCL vs. SSBs at 24 weeks, demonstrating superiority. Soymilk was non-inferior to cow's milk (difference of means [90% CI], 0.003% [−1.427% to 1.434%]).

Conclusions: In adult SSBs consumers with obesity, replacing SSBs with sweetened, fortified 2% soymilk is non-inferior to 2% cow's milk for liver fat reduction over 24 weeks. These data support SSBs reduction guidelines with fortified soymilk as an alternative effective SSBs reduction strategy for improving metabolic health.

Keywords: Liver fat; type 2 diabetes, sugar-sweetened beverages, soymilk, cow's milk

Funding: United Soybean Board through SNI Global

Conflict of interest: Madeline has received funding from the United Soybean Board (the United States Department of Agriculture [USDA] Soy "Check-off" Program), the Toronto 3D PhD Scholarship, the CIHR Canadian Graduate Scholarship Master's Award, and the CIHR Graduate Scholarship Doctoral Award.

SO 40 | Short Oral Communication

Impact of Food Consistency on Postprandial Metabolic Responses in Individuals at Risk of Type 2 Diabetes

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Background: Protein intake induces metabolic responses, including insulin and glucagon secretion, which are influenced by amino acid composition, absorption kinetics and food consistency. Still, the impact of food consistency, particularly on glucagon secretion, is not well understood.

Aim: We aim to characterize the acute metabolic response to milk products with different consistencies in participants at risk of T2D.

Methods: This cross-over RCT included participants with at least two traits of metabolic syndrome, but normal blood glucose levels. Participants underwent three randomized MMTTs with one of the three milk products (all containing 30g of protein) with different consistencies: creamy (curd), mildly firm (acid-set cheese) and firm (sliced cheese).

Results: Four female and two male participants (mean age 55, BMI 31 kg/m²) were included. Fasting glucose and HbA1c were normal. Despite similar postprandial glucose AUC between the products ($p = 0.846$), glucose concentrations after curd peaked at 15min and declined by 30min, at which time significant differences ($p = 0.016$) in glucose values were observed among the three groups, whereas acid-set and sliced cheese showed a later decline (60min). This rapid glucose reduction in curd was accompanied by the fastest and highest insulin peak at 15min. In contrast to curd, acid-set and sliced cheese triggered 30% and 43% lower AUC(bc) insulin secretion, respectively ($p = 0.042$). Glucagon dynamics differed by consistency: curd elicited an early peak at 15 min, while acid-set and sliced cheese exhibited a biphasic response with a larger peak at 120 minutes ($p = 0.016$). Regression analysis showed that insulin AUC decreased significantly with product firmness ($F(1,16) = 4.954$, $p = 0.041$, $R^2 = 0.236$). No significant differences in circulating amino acids were found.

Conclusions: Dairy product consistency modulates postprandial metabolic responses. Softer consistency induced faster glucagon and insulin responses, underscoring the metabolic relevance of food consistency.

Keywords: Milk protein, Food consistency, Risk of T2D

Funding: Forschungskreis der Ernährungsindustrie E.V (FEI)

Conflict of interest: None

SO 41 | Short Oral Communication

A bioactive collagen peptides composition modulates postprandial glycemia and hormonal responses in normoglycemic and prediabetic volunteers

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Background: Managing postprandial glucose and insulin response is crucial for metabolic health. While collagen-derived peptides are emerging as potential modulators of glycemic control, their specific impact on postprandial metabolism has remained largely unexplored.

Aims: This clinical study investigates the impact of a bioactive collagen peptide composition (Nextida GC) on postprandial glucose and hormonal responses in both normoglycemic and prediabetic subjects.

Methods: In a randomized, double-blind, placebo-controlled, crossover trial, 30 healthy participants (12 normoglycemic and 18 with prediabetes; sample size powered for >80%) ingested 10g of Nextida GC or placebo 30 minutes before a standardized, carbohydrate-rich meal (preload phase). Plasma levels of glucose, insulin, C-peptide, total GLP-1, and GIP were assessed during both preload and postprandial phases, along with the gastric emptying rate.

Results: During the preload phase, Nextida GC elevated baseline insulin and incretin levels versus placebo (total GLP-1 and GIP, $p<0.0001$), suggesting a hormonal priming effect. Post-meal, Nextida GC significantly reduced glucose excursion and total insulin response (both iAUC0-180min, $p<0.0001$), achieving glycemic control without a compensatory insulin overshoot. Further, a significant delay in gastric emptying ($p=0.0436$) was observed in the prediabetic subgroup.

Conclusions: This study shows that a bioactive collagen peptide composition can beneficially modulate postprandial metabolism likely via multifactorial mechanisms, including early incretin hormone modulation and delayed gastric emptying, an effect most pronounced in individuals with prediabetes. Critically, these findings demonstrate that this composition can improve glycemic control while simultaneously reducing the postprandial insulin burden, highlighting its potential as a nutritional strategy for supporting metabolic health.

Keywords: GLP-1; glucose management; incretin responses; collagen peptides; nutritional strategy

Funding: Rousselot BV

Conflict of interest: NV and JP are employees of Rousselot BV. For all other authors, there are no conflicts to declare.

SO 42 | Short Oral Communication

Low- and no-calorie sweeteners in guidelines: A global review of public health and clinical practice guidelines

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Background: Despite universal recommendations to reduce added and free sugars, major clinical practice guidelines and public health guidelines are inconsistent in their recommendations of low- and no-calorie sweeteners (LNCS) as part of sugars reduction strategies. The global consensus among guidelines for the use of LNCS remains unclear.

Aims: We conducted a global systematic review of public health and clinical practice guidelines for LNCS.

Methods: We searched for public health dietary guidelines in the Food and Agriculture Organization of the United Nations national dietary guidelines database (https://www.fao.org/nutrition/nutrition-education/food-dietary-guidelines/en/) and clinical practice guidelines in Guidelinecentral.com, supplemented by manual searches. We included all guidelines that provided a mention of LNCS regardless of the age or disease focus of the guideline. Reviewers extracted data on guideline characteristics, assessments/recommendations of LNCS, use of LNCS as sugars replacements, and application of evidence-based frameworks. The direction of LNCS recommendations/assessments was categorized as "for", "against", or "mixed" (Open Science Framework, osf.io/7vpra).

Results: We identified 108 public health guidelines and 320 clinical practice guidelines. Only 36 public health guidelines mentioned LNCS with 47% (k=17) recommending against LNCS, 34% (k=12) recommending for LNCS, and 19% (k=7) providing mixed messages. Only 21 clinical practice guidelines mentioned LNCS (including 6 with a diabetes focus) with 96% (k=20) recommending for LNCS and 4% (k=1) recommending against LNCS. Clinical practice guidelines gave more weight to randomized trials than prospective cohort

studies, whereas the opposite was true of public health guidelines. Clinical practice guidelines consistently made LNCS recommendations in the context of replacement/reduction of sugars (81%; k=17), whereas public health guidelines were mixed (64% did not mention context; 28% as sugar-replacements; 8% mixed recommendations). Where recommendations were made in the context of replacement/reduction of sugars, water was consistently preferred as the standard of care replacement.

Conclusions: Most public health and clinical practice guidelines have not provided guidance on LNCS. Among those guidelines that have provided guidance, clinical practice guidelines are near universal in recommending LNCS for sugars reduction, whereas public health guidelines are highly inconsistent with almost half recommending against LNCS. Harmonization efforts that focus on more uniform application of evidence-based frameworks are needed.

Keywords: sweeteners, cardiometabolic health, sugars

Funding: Diabetes Canada; Calorie Control Council; American Beverage Association

Conflict of interest: SA-C avoids consuming SSBs and NSBs. She has received an honorarium from the international food information council (IFIC) (for a talk on NNS and the microbiome), from the Arkansas Children's Hospital for participation in a "lumping vs. splitting" event), and from the Diabetes and Nutrition Study group of the European Association for the Study of Diabetes for providing technical support at the 2025 international symposium.

Science and Rhythm (SR)

Monday, June 15th, 2026

22:00-23:30 Session Science & Rhythm (young researchers and not-so-young researchers)

SR 1 | Science & Rhythm

Nuts consumption, kidney function, chronic kidney disease and mortality: A systematic review

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Background: Progressive loss of renal function is a global burden that culminates in chronic kidney disease (CKD), which affects roughly 10% of adults worldwide. Nuts are nutrient-dense foods with antioxidant, anti-inflammatory, and lipid-modifying properties, but their specific impact on renal outcomes remains unclear.

Aims: We undertook a systematic review to synthesize current evidence on nut consumption in relation to kidney function and CKD.

Methods: PubMed (MEDLINE) and Embase were searched from 20 August to 10 September 2025 for human studies evaluating nut intake against renal biomarkers or CKD outcomes. Eligible designs were cross-sectional, case-control, cohort, and randomized controlled trials. Two reviewers independently screened records, extracted data, and appraised risk of bias using Joanna Briggs Institute tools; discrepancies were resolved by consensus or a third reviewer. The protocol was registered in PROSPERO (CRD420251144127) and reporting adhered to PRISMA.

Results: Of 883 records screened, seven unique studies met inclusion criteria, encompassing two cross-sectional and six prospective cohort analyses. Nut exposure was evaluated as a discrete food group, within protein-substitution frameworks, as components of plant-based diet indices, or indirectly via nut-related metabolites. Overall, moderate nut intake and substituting red or processed meat with nuts were associated with more favorable renal outcomes, including lower CKD prevalence and incidence. Associations with estimated glomerular filtration rate and other kidney function markers were mixed, and data from high-risk groups or patients with established CKD were limited. The overall certainty of evidence ranged from low to moderate, constrained by heterogeneity in exposure definitions, outcome measures, and populations.

Conclusions: Available data suggest that moderate nut consumption, especially when replacing red and processed meat, may support kidney health. However, most evidence is observational and heterogeneous, limiting causal inference. Large, well-designed prospective studies and randomized trials are warranted to clarify mechanisms, characterize dose–response relationships, and guide dietary recommendations for CKD prevention and management.

Keywords: Nuts; kidney; kidney function; chronic kidney disease.

Funding: None to declare

Conflict of interest: None to declare

SR 2 | Science & Rhythm

Combination of Adherence to the Mediterranean Diet and Ultra-Processed Food Consumption in Relation to Body Composition: Longitudinal Analyses in Older Adults with Metabolic Syndrome

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Background: Increasing consumption of ultra-processed foods (UPF) is displacing healthy dietary patterns such as the Mediterranean Diet (MedDiet), leading to adverse health effects. However, longitudinal evidence on the impact of dietary changes on body composition remains limited.

Aims: To longitudinally assess the combined association of changes in adherence to an energy-restricted Mediterranean Diet (er-MedDiet) and UPF intake with body composition measured using dual-energy X-ray absorptiometry (DXA).

Methods: This longitudinal study included 1456 adults (55–75 years) with metabolic syndrome from the PREDIMED-Plus trial. Adherence to an er-MedDiet was evaluated at baseline, 1 year and 3 years of follow-up using a validated 17-point screener. UPF intake was estimated through a validated 143-item food frequency questionnaire and classified according to NOVA system. Participants were categorized into four groups according to median values of er-MedDiet adherence (low/high) and UPF intake (low/high). Body composition (total fat mass (%), visceral adipose tissue (g), subcutaneous adipose tissue (g), lean mass (%) and lean-to-fat mass ratio) was assessed by DXA at the same time-points. Multivariable mixed-effects regression models were applied to determine the individual and combined associations.

Results: After 3-years, high er-MedDiet adherence combined with low UPF intake was associated with improved body composition, including reduced total fat (β = –0.10 z-score; 95% CI: –0.15, –0.06; p<0.001), visceral fat (β = –0.13; 95% CI: –0.19, –0.07; p<0.001) and subcutaneous fat (β = –0.07; 95% CI: –0.13, 0.00; p<0.041), as well as increased lean mass (β = 0.10 z-score; 95% CI: 0.05, 0.15; p<0.001) and lean-to-fat ratio (β = 0.10; 95% CI: 0.05, 0.15; p<0.001), compared with low er-MedDiet adherence and high UPF intake.

Conclusions: Greater adherence to an er-MedDiet with low UPF intake appears to be an optimal dietary pattern to improve body composition in older adults with metabolic syndrome.

Keywords: Mediterranean Diet; Ultra-Processed Foods; Body Composition.

Funding: This work was supported by the European Research Council (Advanced Research Grant 2014–2019; agreement 340918) and the Spanish National Institute of Health Carlos III (ISCIII), through CIBEROBN and Fondo de Investigación para la Salud, which was co-funded by the European Regional Development Fund (six coordinated FIS projects led by J Salas-Salvadó and J Vidal, including the following projects: PI13/00673, PI13/00492, PI13/00272, PI13/01123, PI13/00462, PI13/00233, PI13/02184, PI13/00728, PI13/01090, PI13/01056, PI14/01722, PI14/00636, PI14/00618, PI14/00696, PI14/01206, PI14/01919, PI14/00853, PI14/01374, PI14/00972, PI14/00728, PI14/01471, PI16/00473, PI16/00662, PI16/01873, PI16/01094, PI16/00501, PI16/00533, PI16/00381, PI16/00366, PI16/01522, PI16/01120, PI17/00764, PI17/01183, PI17/00855, PI17/01347, PI17/00525, PI17/01827, PI17/00532, PI17/00215, PI17/01441, PI17/00508, PI17/01732, PI17/00926, PI19/00957, PI19/00386, PI19/00309, PI19/01032, PI19/00576, PI19/00017, PI19/01226, PI19/00781, PI19/01560, PI19/01332, PI20/01802, PI20/00138, PI20/01532, PI20/00456, PI20/00339, PI20/00557, PI20/00886, and PI20/01158); the Recercaixa (number 2013ACUP00194) grant; ICREA under the ICREA Academia Programme; Agencia Estatal de Investigación (reference CNS2022-135862) grant to D Romaguera; ISCIII through Sara Borrell (CD23/00227) and Miguel Servet projects (CP24/00089) co-funded by the European Union to A Curto and J Konieczna, respectively. None of the funding sources participated in the design, collection, analysis, data interpretation, article writing, or decision to submit the manuscript for publication.

Conflict of interest: The authors have no conflicts of interest to disclose.

SR 3 | Science & Rhythm

Serving science to a saturated world: The awareness gap

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Background: We live in an age of information saturation. We are drowning in data, notifications, headlines, and alerts. Yet, there are studies that show that older adults with type 2 diabetes (T2D), one of the most vulnerable populations, are unaware of free programs designed specifically to help them.

Aims: Today, I want to talk about how we stop serving science to empty chairs. Evidence-based programs exist. Many are federally funded, community-based, and completely free. Even specialized nutritional support exists for complex cases, yet referral pathways are murky. Ironically, patients receive endless junk information online while missing the high-quality, actionable support nearby. Researchers from Black Creek Community Health in Toronto found in their latest study that older black adults with T2D simply didn't know these programs were available. Not that they didn't want them. Not that they couldn't benefit. They just never heard of them. We've solved the problem of offering aid. We haven't solved the problem of making aid known. More noise doesn't mean more clarity. We assume if we just flood people with facts, they'll act. But research shows the opposite. Information overload leads to paralysis, avoidance, and mistrust. We can't assume one channel (a pamphlet, a website, a doctor's brief mention) works for everyone. Delivery must match how real people actually learn: through trusted relationships and repeated, accessible exposure. Older adults managing a chronic condition are already multitasking: medications, appointments, family responsibilities, finances. Adding "find a program" to that list without support is unrealistic. Navigating healthcare systems is not easy. We need to stop pretending a simple brochure solves the problem and start designing access pathways that acknowledge real difficulty.

Conclusions: We're serving gourmet meals of scientific evidence, but we've forgotten to set the table where people actually sit. Information travels through relationships, not just channels.

Keywords: misinformation; type 2 diabetes prevention; community

Funding: Novo Nordisk Network for Healthy Populations.

Conflict of interest: No disclosures.

SR 4 | Science & Rhythm

Predictive Value of C-Reactive Protein/Triglyceride-Glucose Index on the All-cause Mortality among Middle-Aged and Older Chinese Adults: A Prospective Cohort Study from CHARLS

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Background: Chronic inflammation and insulin resistance are recognized to underlie the pathogenesis of metabolic syndrome and manipulate the prognosis. However, their combined predictive value remains understudied in the Chinese aging population.

Aims: This study aimed to investigate the synergistic association of the C-reactive protein/triglyceride-glucose (CRP/TyG) index (CTI) with all-cause mortality among Chinese adults aged over 45.

Methods: A prospective cohort study was conducted using data from the CHARLS database, involving 9,055 participants aged over 45. The CTI was categorized into quartiles (Q1-Q4). Analytical methods included Kaplan-Meier curves, multivariable-adjusted Cox proportional hazards models, restricted cubic splines (RCS), receiver operating characteristic (ROC) analysis, and subgroup analysis.

Results: During the follow-up period, 221 fatalities occurred, and the survival rate decreased from 98.50% to 95.63% ($p<0.001$). Participants in the highest CTI quartile (Q4) exhibited a 3.48-fold higher all-cause mortality risk compared to the lowest quartile (Q1) (HR=3.48, $p<0.001$). RCS analysis demonstrated a significant correlation between CTI quartiles and all-cause mortality ($p<0.001$). ROC analysis indicated that adding CTI to the basic model improved prediction efficacy, with a larger area under the curve (AUC: 0.849 vs 0.829, $p=0.008$), net reclassification improvement (NRI: 0.425, $p<0.0001$), and integrated discrimination improvement (IDI: 0.029, $p=0.017$). Subgroup analysis confirmed the robust association between higher CTI and increased mortality across most strata, with particularly elevated risks in older adults (≥55 years), individuals with cardiovascular disease, and rural residents. Interaction tests revealed that only education level significantly modified this association (p for interaction=0.021).

Conclusions: CTI quartiles increase elevated mortality of Chinese adults aged over 45, driven by CRP/triglyceride/glucose synergy. Targeting these biomarkers may lower mortality of metabolic-aging populations.

Keywords: Metabolic syndrome; C-reactive protein; Triglyceride-glucose index; All-cause mortality; Aging population

Funding: This study is supported by the National Natural Science Foundation of China Youth Program (Grant Number: 82300332) and the Fuwai Hospital Central China Support Fund (Grant Number: ZCK2025317).

Conflict of interest: Ethics statement: The studies were approved by the Peking University Biomedical Ethics Review Committee. The studies were conducted legally.

SR 5 | Science & Rhythm

Glycemic control following a diet high in slowly digestible starch in type 2 diabetic patients

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Background: Carbohydrate quality plays a major role in the management of type 2 diabetes mellitus (T2D). Part of it, starch digestibility is influenced by several factors. Englyst and co-workers defined 3 fractions according to digestibility: Rapidly Digestible Starch (RDS), Slowly Digestible Starch (SDS) and Resistant Starch (RS). High-SDS foods lead to reduced glycemic response (Vinoy et al., 2016). We screened starch digestibility of commercial food products to design diets either High in SDS (H-SDS diet) or Low in SDS (L-SDS).

Aims: The main objective of this study was to demonstrate that consuming a H-SDS diet improves glycemic control in patients with T2D.

Methods: The study was randomized, controlled, parallel study. It evaluated the metabolic impact of H-SDS and L-SDS diets consumed during 12 weeks in 51 subjects with T2D. The glycemic profile was monitored using a Continuous Glucose Monitoring System (CGMS). MAGE, MODD, MIME, glycemia peak and ADRR were calculated. We analysed the correlations between glycemic parameters and starch digestibility and nutrition composition parameters of the diets.

Results: The difference in SDS between H-SDS diet and L-SDS diet was significant (65 g/day with H-SDS and 18 g/day with L-SDS after 3 months; $p<0.0001$). Partial Least Square analysis identified SDS, RDS and Fibers as main factors influencing glycemic profile parameters. When modeling glycemic parameters by Fit Least squares integrating RDS, SDS, Fibers and their interactions, we observed significant effect of SDS, RDS, fibres and SDS^2 (all parameters), RDS^2 (all parameters except MODD), $Fibres^2$ (Glycemia peak and ADRR) and fibresxRDS interaction (MAGE, MODD and ADRR).

Conclusions: H-SDS diet was well-accepted and achievable by subjects. Increasing SDS content in the diet improved glycemic parameters. This type of diet appears as an effective and affordable strategy to manage glycemic control in patients with type 2 diabetes

Keywords: slowly digestible starch, diet, CGMS, Glycemic control, type 2 diabetes

Funding: The study was funded by Mondelez International

Conflict of interest: Alexandra Meynier and Sophie Vinoy are employees of Mondelez International

SR 6 | Science & Rhythm

Relationship between main phyla of gut microbiota and serum glucose levels among postmenopausal diabetic women living in rural areas of Segovia

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Background: Gut microbiota is a complex ecosystem in which the balance among bacterial taxa is essential for host health. Disruptions in this balance have been associated with non-communicable diseases such as obesity and type 2 diabetes.

Aims: To analyse differences in metabolic profile, diet quality, and gut microbiota composition between diabetic and non-diabetic women living in rural areas of Segovia.

Methods: The SEGOVIA Study is a longitudinal, population-based cohort that recruited individuals aged 35-65 years between 2000 and 2003 in Segovia (Spain). A 20-year follow-up (2021-2023) was conducted using a cross-sectional design. Of 632 eligible participants, 406 attended the follow-up visit. For this sub study, 105 postmenopausal women were included. Data collection included diet quality assessed by the PREDIMED questionnaire, metabolic biomarkers (glucose, HbA1c, BMI), and gut microbiota composition at the phylum level by next generation sequencing of 16S rRNA gene. Participants were classified according to prior diagnosis of type 2 diabetes. Group comparisons were performed using the Mann–Whitney U test, and associations were assessed using Spearman's correlation.

Results: Participants had a mean age of 71.67 years, and 22.3% had type 2 diabetes. Diabetic women were older and had higher BMI than non-diabetic women (77.7 vs 69.9 years; 31.54 vs 27.43 kg/m^2; both $p < 0.001$). Non-diabetic women showed higher adherence to the Mediterranean diet (PREDIMED: 8.57 vs 7.36; $p = 0.05$). Serum glucose was positively correlated with *Bacteroidota* phylum ($p=0.044$). In contrast, inverse associations were observed between glucose levels and both *Firmicutes* phylum and the *Firmicutes/Bacteroidota* ratio, although these did not reach statistical significance ($p=0.059$ and $p=0.060$). Diet quality was inversely associated with *Proteobacteria* phylum ($p=0.045$). *Actinobacteriota* phylum relative abundance was significantly lower in diabetic women (0.49% vs 1.59%; $p =0.042$).

Conclusions: In this population of postmenopausal rural women in Segovia, type 2 diabetes and poorer diet quality were associated with selected differences in gut microbiota composition at the phylum level. More research is needed to elucidate bacterial genera and species involved and their relevance in clinical practice.

Keywords: gut microbiota, rural areas, diabetic women

Funding: This research has received Grants from Instituto de Salud Carlos III (PI21/00838, PI22/01608, PI24/00719), the European Regional Development's funds (FEDER), Sociedad Española de Medicina Interna (SEMI/2019; ACA.C01FEMI19), Gerencia Regional de Salud (SACYL) de la Junta de Castilla-León (GRS 2594/B/22), and the Fundación Científica del Colegio de Médicos de Segovia. R.L.-D has received a grant for the hiring of research assistants from the Community of Madrid, co-founded with the European Social Fund Plus (ESF+) (PEJ-2024-AI/SAL-GL-32368).

Conflict of interest: None

Posters (PO)

Monday, June 15th, 2026

15:15 – 15:45 ACTIVE COFFEE BREAK 1, POSTER SESSION 1 (PO 1 – PO 12)

PO 1 | Poster

Supplementation with sodium acetate alleviates white adipose tissue and endocrine pancreas dysfunction in high-fat diet fed Wistar rats

Paula Gallardo Villanueva[1,2,3], Sonia Ramos[1,2], Beatriz González Gálvez[1,3], Paula Moreno Ortega[2], María Ángeles Martín[1,2], Elisa Fernández Millán[1,3]

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Background: Accumulating evidence demonstrates that the gut microbiota contributes to metabolic homeostasis through the production of microbial end-products derived from dietary fiber. Among these, short-chain fatty acids (SCFAs) possess antioxidant and anti- inflammatory properties; however, their effect in modulating key tissues relevant to the pathogenesis of type 2 diabetes (T2D) remains underexplored. This gap in knowledge is especially relevant for insulin sensitivity and pancreatic islet function, processes in which adipose tissue dysfunction and gut microbiota alterations contribute to metabolic impairment.

Aims: Therefore, in this study we assessed the metabolic effects of sodium acetate (NaAc), the most abundant SCFA, in a preclinical rat model of T2D, focusing on its capacity to preserve islet function and improve insulin sensitivity through inter-organ crosstalk between white adipose tissue (WAT) and the endocrine pancreas.

Methods: Wistar rats were fed either a standard diet or a 60% high-fat diet (HFD) for 16 weeks, with or without oral NaAc supplementation (1 g/kg). Glucose tolerance, insulin sensitivity, and in vivo insulin and glucagon secretion were assessed. White adipocyte size and pancreatic islet morphometry were analyzed, and immune cell infiltration was characterized by flow cytometry in WAT and by immunohistochemistry in pancreatic islets. Markers of oxidative stress, endoplasmic reticulum (ER) stress, and inflammation were also quantified by RT-qPCR.

Results: NaAc supplementation improved glucose intolerance and restored insulin sensitivity in HFD-fed rats, partly through the reduction of basal hyperglucagonemia. NaAc attenuated WAT hypertrophy by reducing adipocyte size and decreasing oxidative stress and inflammation. Additionally, NaAc partially reversed the decline in islet density and β-cell relative area induced by HFD, accompanied by lower expression of genes related to oxidative stress, ER stress, and inflammation in pancreatic islets. Finally, NaAc reduced immune cell infiltration in both WAT and pancreatic islets.

Conclusions: These findings highlight a protective role of NaAc on pancreatic islets and WAT in the context of metabolic dysfunction induced by a diabetic state.

Keywords: Nutraceuticals; diabetes and obesity; SCFAs, precision nutrition

Funding: PID2020-116134RB-I00 from MICIU/AEI/10.13039/501100011033; CIBER predoctoral researcher contract in science, technology and innovation (from October 2024); Scientific Network Enfermedades Metabólicas (COMETA) funded by the Consejo Superior de Investigaciones Científicas (CSIC), Spain.

Conflict of interest: The authors declare no potential conflicts of interest.

PO 2 | Poster

The Effects of Stevia on Acute Endocrine Responses and Subsequent Food Intake in Men and Women with Type 2 Diabetes Mellitus

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Background: Stevia is a plant-based nonnutritive sweetener used to reduce intake of added sugars, however, its effect on acute glycemic and appetite regulatory hormone responses is not well studied.

Aims: This study evaluated beverages sweetened with stevia, glucose, stevia + glucose, or water on acute glycemic responses (glucose, insulin and glucagon), appetite regulatory hormone responses [glucagon-like peptide-1 (GLP-1), peptide YY (PYY), and glucose-dependent insulinotropic polypeptide (GIP)], and subsequent energy intake in individuals with type 2 diabetes mellitus (T2DM).

Methods: Healthy individuals with T2DM (n= 23) consumed beverages containing 30 g glucose, stevia (75.6 mg steviol equivalents), 30 g glucose + stevia, or water. Blood samples were collected for 180 min postprandially, then analyzed for serum or plasma glycemic and appetite hormone levels. Energy intake during an ad libitum standard lunch was recorded.

Results: The net incremental area under the curve (niAUC) for serum concentrations of glucose were significantly higher for the glucose (median 3498 min*mg/dL) and glucose + stevia (2029 in*mg/dL) beverages compared to the stevia (-2330 min*mg/dL) and water (-1839 min*mg/dL) beverages ($p<0.001$). The niAUC for plasma insulin followed a similar pattern. The niAUC plasma glucagon, PYY, GIP and GLP-1 and subsequent energy intake did not differ across beverages. The Cmax for glucose, insulin, and GIP were significantly lower for the water and stevia beverages compared to the glucose + stevia and glucose beverages ($p < 0.001$).

Conclusions: Stevia had no significant effects on acute appetite regulatory hormone responses and food intake. Responses to the glucose + stevia and glucose beverages were similar.

Keywords: Stevia; Type 2 Diabetes Mellitus; Non-Nutritive Sweeteners, Glucose, Insulin

Funding: This study was funded by Cargill, Inc.

Conflict of interest: Corey Scott, Patricia Williamson and Thomas Hutton are paid employees of Cargill Inc who markets and manufactures stevia.

PO 3 | Poster

Ultrasound-assessed abdominal fat distribution and its relation to physical performance in community-dwelling older adults: a cross-sectional study

Jiménez-ten Hoevel C[1,2], Nicolás J[1,2], Besora-Moreno M[1,2], Queral J[1,2], Llauradó E[1,2], Valls RM[1,2], Solà R[1,2,3], Pedret A[1,2]

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Background: Ageing is characterized by alterations in body composition, including increased abdominal adiposity and reduced skeletal muscle mass, alongside declines in muscle strength and physical performance, referred to as sarcopenia. However, the role of specific abdominal fat depots in relation to sarcopenia parameters remains poorly understood.

Aims: To assess abdominal fat distribution by ultrasound (US) and explore its association with sarcopenia parameters in community-dwelling young older adults aged (60-74 years).

Methods: This cross-sectional exploratory study (ClinicalTrials.gov: NCT06871384) included 58 participants (67.2% women). Abdominal fat distribution was assessed by US measuring total abdominal fat, visceral adipose tissue (VAT), subcutaneous adipose tissue (SAT), and VAT/SAT ratio. Muscle strength was evaluated using a hand grip dynamometer, muscle mass by BIA and US, and physical performance by gait speed. Linear regression analysis was adjusted by age, sex and physical activity.

Results: Participants were 66.52 ± 4.3 years old, 89.7% (52/58) were non-sarcopenic and 72.4% (42/58) were non-obese. In the overall population, total abdominal fat, VAT and VAT/SAT ratio significantly and positively correlated with handgrip muscle strength (HGS). In contrast, SAT showed a significant inverse correlation with weight-adjusted handgrip strength (HGS/BW) and gait speed (GS). After linear regression analysis, the negative significance was maintained for SAT with HGS/BW and GS. Sex-specific results showed a significant negative linear regression between SAT and HGS/BW and GS, and VAT with HGS/BW, in women.

Conclusions: Ultrasound-assessed abdominal fat depots were associated with muscle strength and physical performance in older adults. Subcutaneous abdominal adiposity showed the most consistent inverse association with relative muscle strength and gait speed, suggesting that abdominal fat distribution may influence functional performance in ageing populations.

Keywords: ultrasound, body composition, subcutaneous fat, visceral fat, sarcopenia

Funding: The WinAging Study (PID223- 1487040B- C22) was funded by MCIN/AEI/10.13039/501100011033 and FEDER, EU.

Conflict of interest: The NFOC-Salut group is a consolidated research group of Generalitat de Catalunya, Spain (2021 SGR 00817).

PO 4 | Poster

Effects of a European Food Prescription Program for people with type 2 diabetes and low socioeconomic status: a randomised controlled pilot trial

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Background: Dietary interventions support type 2 diabetes (T2D) management, yet financial constraints limit the ability of individuals with low socioeconomic status (SES) to follow healthy diets. Food Prescription Programs (FPPs), providing financial support for healthy foods, are promising yet understudied in Europe.

Aims: This study aims to determine the 3-month effectiveness of a FPP on glycemic regulation in adults with T2D and low SES.

Methods: In this 3-month randomised controlled pilot trial, adults with T2D, BMI > 25 kg/m² and low SES living in Rotterdam South, The Netherlands, were assigned to usual dietetic care or FPP. Both groups received three dietitian coaching sessions. The FPP additionally offered weekly plant-based food boxes and educational support. The primary outcome was between-group difference in HbA1c. Secondary outcomes were nutritional intake, metabolic health, quality of life and treatment satisfaction at three and six months (follow-up).

Results: Thirty-five participants (mean age 57.3 ± 11.8 years; 74% female; mean BMI 32.6 ± 6.0 kg/m²,) were included, seventeen received the FPP. The FPP group increased their vegetable consumption (145.0 [85.8-225.0] to 198.4 [142.5-290.0] grams/day; p=0.007) and fruit consumption (88.1 ± 58.1 to 148.1± 107.2 grams/day; p=0.029), alongside reductions in weight (92.0 ± 24.2 to 90.8 ± 24.5 kg, p=0.016), and BMI (33.2 ± 7.9 to 32.7 ± 8.1 kg/m², p=0.0114). No changes were observed in the control group. Between-group differences were found for vegetable intake, quality of life and treatment satisfaction (all p<0.05), but not for HbA1c or medication. At follow-up, the FPP group showed improvements in dietary intake, waist circumference and quality of life, with higher treatment satisfaction than control (p<0.05).

Conclusions: This pilot study shows that a 3-month FPP is feasible and shows promising results in adults with T2D and low SES. Larger trials are needed to determine long-term effectiveness and impact on health equity.

Keywords: Diabetes type 2, low social economic status, food prescription program, produce prescription, glycemic control, quality of life

Funding: This work is supported by: Stichting HarvestCare, Stichting Grote Grutten, Stichting De Verre Bergen, Rotterdam De Boer Op!, the A Team Foundation and Stichting Elise Mathilde Foundation.

Conflict of interest: None

PO 5 | Poster

Investigating effect modification by sex of the Portfolio diet on blood lipids: An individual participant data meta-analysis

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Background: Cardiovascular disease (CVD) is a leading cause of death globally but risk differs by sex. CVD mortality is greater in women than men with disparities in diagnosis and treatment. Traditional risk factors also affect women's risk of ischemic heart disease more. The Portfolio Diet is recommended in international guidelines for dyslipidemia and CVD risk reduction, demonstrating low-density lipoprotein-cholesterol (LDL-C) reductions comparable to statin therapy. However, effect modification by sex remains unexamined.

Aims: To assess whether sex modifies the effect of the Portfolio Diet on LDL-C and other blood lipids.

Methods: Individual participant data (IPD) meta-analysis was conducted following the Cochrane Handbook and PRISMA-IPD guidelines. IPD were obtained from 5 completed trials of the Portfolio Diet. The primary outcome was LDL-C. Secondary outcomes were non-high-density lipoprotein-cholesterol (non-HDL-C), HDL-C, and triglycerides. Missing data were handled using multiple imputation. Treatment effects were estimated using one-stage IPD meta-analysis with linear mixed-effects models adjusted for baseline and age with random effects for trial and treatment-by-trial interactions. Effect modification by sex was assessed using treatment-by-sex interaction terms.

Results: The 5 trials included 663 participants (59±9y, 55% females, BMI 28±4kg/m2, LDL-C 3.9±1.2mmol/L, 12% type 2 diabetes). Data from trials ranged from 4 (n=3) to 24 weeks (n=2). The Portfolio Diet significantly reduced LDL-C (mean difference −0.39 mmol/L; 95% confidence interval, −0.59 to −0.20) and non-HDL-C (−0.49; −0.76 to −0.22). Sex-stratified analyses showed similar LDL-C reductions in females (−0.38; −0.70 to −0.06) and males (−0.40; −0.67 to −0.12), with no evidence of interaction (p-interaction=0.882). No sex interactions were observed for other outcomes.

Conclusions: The Portfolio Diet significantly improves LDL-C and related lipid outcomes, with consistent effects across sexes. These findings support the Portfolio Diet as an effective dietary strategy for CVD risk reduction in men and women.

Keywords: Portfolio Diet; LDL-cholesterol; individual participant data meta-analysis; sex differences; cardiovascular risk

Funding: Henning and Johan Throne-Holst Foundation, Canadian Institutes of Human Research

Conflict of interest: No conflicts of interest to declare.

PO 6 | Poster

Healthy Beverage Score and sperm quality parameters in healthy men from the Led-Fertyl Study

Estefanía Dávila-Córdova[1,2,3], Albert Salas-Huetos[1,2,3], Indira Paz-Graniel[1,2,3], Cristina Valle-Hita[1,2,3], Rashmi Agarwal[1,2,3], Antoni Palau-Galindo[1,2,3], Cristina Mestres-Solà[1,2,3], Michelle M. Murphy[1,2,3], Jordi Salas-Salvadó[1,2,3], Nancy Babio[1,2,3]

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Background: Diet have been associated with sperm quality in observational studies; however, of the potential role of beverage consumption patterns remains limited.

Aims: To evaluate the association between adherence to a healthy drinking pattern, assessed using the Healthy Beverage Score (HBS)) and sperm quality parameters in healthy reproductive age-men.

Methods: A cross-sectional analysis was performed on 213 young men from the Led-Fertyl study. Beverage intake was assessed using dietary questionnaires and summarized through the HBS (range: 7–28), which includes seven components reflecting adequacy (low-fat milk and tea/coffee) and moderation (whole milk, 100% natural fruit juice, artificially sweetened beverages (ASB), sugar-sweetened beverages (SSB), and alcohol). The main outcomes were sperm quality parameters (count, concentration, vitality, motility, and morphology), which measured according to standardized laboratory procedures. HBS adherence was categorized into tertiles (T1 as reference), and associations were analyzed using multivariate linear and logistic regression models, adjusting for main confounders.

Results: Participants in the highest HBS tertile showed higher total sperm count (β=1.88; 95%CI: 0.10, 3.67), total motility (β=6.39; 95%CI: 0.93, 11.85), and progressive motility (β=6.00; 95%CI: 0.41, 11.60) compared to those in the lowest tertile. Similar associations were observed when modeling HBS score as continuous variable; each additional point in the HBS score was associated with a higher total sperm count (β=0.29; 95%CI: 0.03, 0.54), total motility (β=0.92; 95%CI: 0.14, 1.71) and progressive motility (β=0.87; 95%CI: 0.07, 1.68). Modeled substitution analyses suggested that replacing one serving/day of ASB with water was associated with higher motility, alcoholic beverages with higher vitality, and 100% natural fruit juice with lower normal morphology.

Conclusions: Our results suggest that higher adherence to a healthier beverage pattern was associated with a higher total sperm count, and total and progressive motility in this study healthy population.

Keywords: Healthy Beverage Score, beverages, sperm quality, male fertility

Funding: Several sources supported the Led-Fertyl study: the Spanish government's official funding agency for biomedical research, The Carlos III Health Institute (ISCIII), through the Fondo de Investigacion para la Salud (FIS); the European Union ERDF/ESF, 'A way to make Europe'/ 'Investing in your future' [PI21/01447]; and the Diputació de Tarragona (2021/11-No.Exp. 8004330008-2021-0022642). The ISCIII, Spanish Ministry of Health, awarded E.D.-C a Contrato Pre-doctoral de Formación en Investigación en Salud (PFIS FI22/00018) of the Acción Estratégica en Salud program (AES).

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

PO 7 | Poster

Assessing the impact of tomato juice dosage on blood pressure across office and ambulatory measurements: A randomized trial

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Background: Tomato juice (TJ) contains a range of bioactive compounds, including lycopene, carotenoids, vitamin C, and potassium, which have been associated with potential cardiovascular benefits. Nevertheless, evidence on its effects on ambulatory blood pressure monitoring (ABPM) in adults with hypertension (HT) is still scarce.

Aims: To assess the effects of two daily doses of TJ on 24-hour ABPM, short-term BPV, and office BP in older adults with hypertension and elevated cardiovascular risk.

Methods: In this randomized, controlled, crossover dietary intervention, 26 participants (mean age 69.7 ± 3.2 years; BMI 31.4 ± 3.8 kg/m^2) received 200 mL/day (low-dose group, LDG), 400 mL/day (high-dose group, HDG) of TJ, or 200 mL/day of water (control) for 4 weeks per intervention period, with 3-week washout intervals. Systolic and diastolic BP were measured in both office and 24-hour ABPM. Short-term BPV was derived from ABPM, and urinary sodium and potassium were assessed.

Results: The HDG showed significant reductions in ABPM, with the greatest decreases observed in mean 24-hour systolic BP (-12.20 ± 12.49 mmHg) and mean daytime systolic BP (-12.81 ± 10.49 mmHg) in comparison with the LDG and control group. Participants in the LDG showed lower short-term BPV than those in the control condition, particularly for systolic BP, as indicated by lower 24-hour SD ($p=0.033$) and weighted SD ($p=0.011$), and lower nighttime SD for diastolic BP ($p=0.005$). No significant differences in office BP were observed across interventions or in the placebo-corrected comparisons ($p>0.05$). Urinary potassium excretion increased in the HDG (14.36 ± 18.29 mmol/d), reflecting higher potassium intake, while urinary sodium remained unchanged.

Conclusions: TJ exhibits a dose-dependent hypotensive effect on ABPM, with additional benefits on BP variability at lower doses.

Keywords: Hypertension management; tomato-based products; bioactive compounds; Short-Term Blood Pressure Variability; cardiovascular risk

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Conflict of interest: R.M.L.-R. reports personal fees from Cerveceros de España, personal fees, and others from Adventia, Wine in Moderation, Ecoveritas S.A., outside the submitted work. R.E. reports grants from the Fundación Dieta Mediterránea (Spain), and Cerveza y Salud (Spain), and personal fees for given lectures from Brewers of Europe (Belgium), the Fundación Cerveza y Salud (Spain), Pernaud-Ricard (Mexico), Instituto Cervantes (Alburquerque, USA), Instituto Cervantes (Milan, Italy), Instituto Cervantes (Tokyo, Japan), Lilly Laboratories (Spain), and the Wine and Culinary International Forum (Spain), as well as non-financial support for the organization of a National Congress on Nutrition and feeding trials with products from Grand Fountain and Uriach Laboratories (Spain). The remaining authors declare that they have no conflicts of interest.

PO 8 | Poster

Development of a representative database for dietary glycemic index and load for population surveillance and epidemiological studies across countries in the Mediterranean region

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Background: Carbohydrates are the main energy source in the Mediterranean populations. While the quality of carbohydrate-containing foods has been measured using the glycemic index (GI), a representative database of dietary glycemic index (dGI) and load (dGL) - incorporating carbohydrate quantity and quality - is lacking for this region.

Aims: To develop a harmonized Mediterranean database of dGI and dGL for adults participating in national surveys and assess the validity of different methods in determining dGI and dGL by content experts and artificial intelligence (AI).

Methods: Food consumption data were obtained from nationally representative surveys in Croatia, France, Italy, Montenegro, Portugal, and Spain. Three independent approaches were used to assign GI values to foods: an AI-enabled method and manual assignments by two nutritionists. The triad method estimated the correlations between each method and the underlying unknown. Country-specific dGI and dGL were calculated and top dGL-contributing foods identified.

Results: Dietary data of 14,255 participants from seven surveys (all used two 24-hour recalls except Italy [3-day diet record]) were analyzed. Mean age ranged from 45.4 to 57.5 years; BMI from 24.5 to 27.4 kg/m^2; and carbohydrate intake from 182.0 to 256.1 g/day. dGI ranged from 52 in Spain to 58 in Italy (mean 56.3 ± 4.9); dGL ranged from 114.8 in Montenegro to 139.7 in Spain (mean 126.9 ± 27.7). Men had a higher dGI than women (57.4 vs 55.4), whereas women had a higher energy-adjusted dGL than men (127.9 vs 125.6). Across surveys, the top 3 dGL-contributing foods were wheat bread (28%), potatoes (8%), and pasta (6%). The validity coefficients with the underlying unknown were 0.65 for AI, 0.95 for expert A, and 0.94 for expert B.

Conclusions: This Mediterranean dGI and dGL database shows good reliability and validity and may support nutritional surveillance and epidemiological research in populations of that region.

Keywords: glycemic index assignment, dietary glycemic load, carbohydrate quality, Mediterranean region, artificial intelligence.

Funding: This work was partially supported by a pilot award from University of California, Irvine's Global Center for Cardiometabolic Health & Nutrition (CGCHN) and the International Carbohydrate Quality Consortium (ICQC). A.D. was a CGCHN visiting fellow.

Conflict of interest: Artificial intelligence was used as part of the study methodology to assign glycemic index values. The authors take full responsibility for the accuracy, originality, and integrity of the work. A.D., K.D.C, D.D.C, B.Y., S.L declare no conflicts of interest. L.S.A.A. is a founding member of the International Carbohydrate Quality Consortium (ICQC).

PO 9 | Poster

Postprandial glucose response patterns may guide precision nutrition strategies based on low glycemic index diets in individuals at high cardiometabolic risk

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Background: Glycemic index (GI) is a strong predictor of postprandial glucose response (PPGR); however, responses to low-GI diets vary among individuals, highlighting the need for markers of inter-individual variability and targets for precision nutrition.

Aims: To determine whether the real-life CGM-defined PPGR pattern is associated to differential glucose and insulin responses after a 12-week intervention with a high- or low-GI diet in individuals at risk for type 2 diabetes (T2D).

Methods: In the MEDGI-Carb study, 159 participants were classified at baseline according to their CGM-derived PPGR pattern into Cluster A (sharp, rapid, and quickly returning to baseline) and B (slower, less pronounced, but more prolonged). After the dietary intervention, participants consumed a standardized breakfast and lunch consistent with their assigned treatment (high- or low-GI). Postprandial glucose and insulin were measured in plasma samples collected over 240 minutes after both breakfast and lunch. Postprandial metabolic responses within each cluster were analyzed using repeated-measures ANOVA, including time×treatment interactions. The effects of treatment, baseline PPGR Cluster (A vs B), and their interaction (treatment×cluster) were also evaluated using two-way ANOVA.

Results: In Cluster A, postprandial glucose during the 8-hour MGTT was significantly lower in individuals in the low-GI group (n=59) than in those in the high-GI group (n=61), as indicated by significant time×treatment interaction (p=0.001). No significant differences between low- and high-GI groups were observed in Cluster B (p=0.109). Postprandial insulin over the 8-hour MGTT was significantly lower in the low-GI group than in the high-GI group in Cluster A (p=0.001), but not in Cluster B (p=0.453). A significant treatment×cluster interaction was observed for the average post-lunch plasma insulin levels (p=0.027).

Conclusions: The CGM-defined PPGR pattern (sharp, rapid, and quickly returning to baseline) may represent a marker to guide precision dietary interventions with low-GI diets to reduce postprandial glucose excursions and insulin secretion in individuals at risk for T2D.

Keywords: postprandial glucose response; cluster; low-GI diet; postprandial insulin;

Funding: No main funding was received for this work.

Conflict of interest: All Authors declare no disclosures.

PO 10 | Poster

PPG signal analysis for non-invasive glucose monitoring using wearables and AI

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Background: Non-invasive glucose monitoring using wearables has gained significant interest for managing chronic diseases like type 2 diabetes (T2D). Photoplethysmography (PPG) signals are a non-invasive technique for a novel non-invasive glucose monitoring approach, which offer patients a simple, comfortable, and cost-effective way to self-monitor health.

Aims: This study investigates whether PPG signals from smartwatches can be analyzed and used for designing artificial intelligence (AI) solutions for non-invasive glucose monitoring. We aim to establish a method for extracting fiducial points from PPG waveforms, like systolic peaks and dicrotic notches. These are essential for reliable PPG waveform interpretation, which sets the foundation for subsequent blood glucose estimation algorithms.

Methods: In this study adults with and without T2D underwent metabolic testing while wearing a SmarKo smartwatch. Blood samples are collected and analyzed for glucose levels during the test. Simultaneously, the smartwatch records PPG signals at the wrist. After data collection, PPG signals and blood glucose levels are processed and analyzed with the help of the AI-DAPT platform.

Results: AI-DAPT is an ongoing project, where a new state of the art dataset, consisting of PPG signals from smartwatches, is recorded during metabolic tests. A three-stage PPG signal processing pipeline has been established: (1) filtering and cleaning the raw data, (2) signal quality assessment (3) extracting features based on fiducial points like the systolic peak, dicrotic notch and diastolic peak.

Conclusions: So far, our project demonstrates the feasibility of PPG measurements as the key obstacle for later data processing and analysis. The integration of blood glucose data with PPG signals represents a promising approach for the development of non-invasive glucose monitoring algorithms. This technology has the potential to empower individuals to manage their health and enable personalized treatment strategies for diabetes management.

Keywords: PPG; non-invasive glucose monitoring; Type 2 diabetes; wearables; AI

Funding: Horizon Europe Framework Programme (HORIZON)

Conflict of interest: The authors declare no conflicts of interests.

PO 11 | Poster

The Impact of Time-Restricted Eating Early and Late in the Day on Actigraphy-Estimated and Subjective Sleep Quality in Women with Overweight and Obesity

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Background: Time-restricted eating (TRE) is an increasingly popular approach to improve metabolic health. Further research is needed to determine the most effective eating window during the day for TRE. Metabolic disorders are closely linked to sleep disturbances.

Aims: Our aim was to investigate the impact of early TRE and late TRE on sleep quality in obesity.

Methods: The randomized crossover ChronoFast trial included 31 women with overweight and obesity. Of these, 13 had prediabetes and 18 showed a normal glucose tolerance. Following a two- to four-week baseline period, participants were randomly assigned to either two-week early TRE (eating 8 a.m. to 4 p.m.) or two-week late TRE (eating 1 p.m. to 9 p.m.). Both interventions were isocaloric and were separated by a two-week washout phase. Sleep metrics were assessed objectively by blinded actigraphy (ActiGraph wGT3X-BT; ActiGraph, Pensacola, FL, USA) and subjectively using Pittsburgh Sleep Quality Index (PSQI) and self-report of sleep quality. Hunger and satiety were examined using a visual analogue scale (VAS).

Results: Actigraphy revealed no between-intervention differences in changes in sleep metrics, but improvements were observed within early TRE compared with baseline for sleep efficiency ($p = 0.047$), sleep fragmentation index ($p = 0.029$), and awakening length ($p = 0.043$). Individuals with lowest sleep quality at the baseline showed its largest improvements in early TRE. PSQI scores and self-reported sleep quality remained unchanged between and within both interventions. There were no differences in evening hunger and satiety scores between early TRE and late TRE, and no correlations between hunger or satiety and sleep quality.

Conclusions: Early TRE, but not late TRE, improved objectively assessed sleep quality, and these changes were not related to hunger or satiety. Early TRE may be a more effective strategy for improving well-being and sleep-related metabolic health outcomes.

Keywords: Time-restricted eating, Sleep quality, Obesity

Funding: German Research Foundation (DFG)

Conflict of interest: None.

PO 12 | Poster

Perception of sucrose solutions ranging in sugar content similar to commercial beverages

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Background: The consumption of sugar-sweetened beverages (SSB) is associated with increased body mass index and body weight in both children and adults (Nguyen, 2023). The World Health Organization recommends reducing SSB consumption, and Canada's Food Guide suggests replacing sugary drinks with water.

Aims: To evaluate adults' perceptions of 0%, 3%, 6%, 9%, and 12% sucrose solutions. The sugar concentrations were similar to those found in SSBs available from the local grocery stores.

Methods: Fifty-four adults (32 females, 29.8±13.2y, 21 males, 27.8±13.2y) tested blinded samples provided in a random order. The period from the first sip to the end of swallowing was videorecorded, followed by sensory evaluation of the sample. The analysis of facial expressions was performed using Noldus-FaceReader-9. Visual analogue scales (VAS) and 9-point hedonic scales were used to measure sensory intensity and acceptance, respectively. The differences between the samples were assessed using Friedman's test with Dunn's post-hoc analysis.

Results: There was no difference between the samples in facial expressions of happiness, anger, sadness, fear, and disgust ($P>0.05$), whereas surprise was higher after sweetened samples with 12% sucrose, twice that of water ($P<0.05$). Treatment had an effect on perceived pleasantness, taste, flavour, and hedonic perception of sweetness ($P<0.001$), resulting in higher acceptance of treatments with 6-12% sucrose compared to water ($P<0.05$), while there was no difference between sweetened samples (3-12% sucrose, $P>0.05$). There was no effect of treatment on perceived mouthfeel and aftertaste ($P>0.05$). The participants could discriminate the sweetness intensity from 0% to 9% ($P<0.05$) but not between 9% and 12% ($P>0.05$). While there is no difference in facial expressions, the hedonic perception of sweetened samples is higher than that of water, which could drive consumer choice towards SSBs.

Conclusions: the sugar content of commercial beverages can be reduced without compromising consumers' sensory acceptance and emotional perception.

Keywords: Sugar-sweetened beverages, sugar reduction, food sensory evaluation,

Funding: Susan and Russell Boyd Undergraduate Student Research Assistantship to Kate Wall.

Conflict of interest: None

Tuesday, June 16th, 2026

10:00 – 10:30 ACTIVE COFFEE BREAK 2, POSTER SESSION 2 (PO 13 – PO 25)

PO 13 | Poster

Dietary Lifestyle Interventions for Neuropathic Pain: Evaluation of the HEALM Quality Assessment Tool

Michael Klowak[1], Celine Lecce[2], Ranie Ahmed[2], Raesham Mahmood[2], Aquilla Reid[2], Ikeade Adeyinka[2], Rachel Lau[2], Shaleesa Clarke[2], Shveta Bhasker[2], Mariyam Mohammed[2], Katherine Tan[2], Jahmar Hewitt[2], Andrea K Boggild[1,2,3,4]

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Background: "Grading of Recommendations, Assessment, Development and Evaluations" (GRADE) is a widely used approach for evaluating certainty (or "quality") of evidence (COE) in interventional and comparator studies. However, when applied to lifestyle research, design elements intrinsic to such investigations, including, adherence challenges, and difficulty blinding, may lead to the systematic downgrading of otherwise high quality, and robust trials. As a result, ongoing debate has emerged regarding the appropriateness of GRADE as a COE assessment tool for lifestyle interventions.

Aims: To address this limitation, the "Hierarchies of Evidence Applied to Lifestyle Medicine" (HEALM) framework was developed to account for factors intrinsic to lifestyle research that are not fully considered in the GRADE framework. However, it lacks validation against a gold standard assessment tool. Therefore, this study seeks to evaluate and validate HEALM as a COE tool, compared to GRADE, using our previously published "Dietary Lifestyle Interventions for Neuropathic Pain" systematic review.

Methods: Six interventional dietary lifestyle trials for neuropathic pain, several of which were conducted in populations with type 2 diabetes (T2DM), were previously identified and will comprise the evidence base for this validation study. The reported GRADE COE for each article will be compared against novel HEALM assessments, to ascertain its utility.

Results: Across included trials, dietary interventions, including low-fat plant-based diets, demonstrated some statistically significant improvements in neuropathic pain metrics, particularly in populations with T2DM. COE across all trials was moderate, with common sources of bias related to blinding, adherence, and outcome heterogeneity, factors intrinsic to lifestyle research that directly influence GRADE assessments. Consequently, it is hypothesized that the overall COE will be rated as more robust under HEALM than GRADE.

Conclusions: Overall, by directly comparing COE assessment tools, this validation study will inform the appropriateness of GRADE for evaluating lifestyle interventions and the utility of HEALM for interpreting lifestyle evidence in clinical research.

Keywords: diet; lifestyle interventions; neuropathic pain; GRADE; HEALM validation

Funding: Andrea Boggild is supported as a Clinician Scientist by the Departments of Medicine at the University of Toronto and the University Health Network. M. Klowak is supported by the Queen Elizabeth II Graduate Scholarship in Science and Technology and Open Award from the Institute of Medical Science at the University of Toronto.

Conflict of interest: None other than those already listed under "main source of funding".

PO 14 | Poster

Effect of therapeutic treatment with whole grape pomace and separate phenolic fraction on insulin resistance, ectopic lipid accumulation and tissue-specific oxidative damage in a model of murine obesity

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Background: Grape pomace (GP) is a byproduct rich in bioactive compounds, including extractable polyphenols (EPPs) and non-extractable polyphenols (NEPPs). The benefits of GP concerning insulin resistance and obesity have been documented, especially when administered preventively, with a primary focus on EPPs.

Aims: Therefore, the objective of this study was to evaluate grape pomace and its EPPs and NEPPs fractions as treatments for insulin resistance, as well as their association with specific tissue oxidative damage.

Methods: Male Wistar rats were fed a high-fat, high-fructose (HFHF) diet for 14 weeks to induce insulin resistance and obesity. Subsequently, the rats continued on the HFHF diet and received three different supplementations: grape pomace, extract of EPPs, or NEPPs (150 mg total phenolic compounds/kg body weight). IR was assessed using the HOMA-IR. Intrahepatic and intramyocellular triglycerides were quantified. Lipid peroxidation and protein oxidation were measured in liver and muscle tissues, and hepatic glycogen content was determined.

Results: After the intervention, the HFFD + GP group exhibited a partial reduction in insulin resistance (28%, non-significant) and decreased oxidative damage in muscle tissue. The same effect on muscle tissue was observed in the NEPPs group. The most significant effects were observed for the EPPs group: decrease in insulin resistance by 43% ($p < 0.05$) compared to the HFFD group, which correlated with hepatic glycogen levels ($r = 0.60$, $p < 0.05$) and significant decreases in triglyceride accumulation and oxidative stress in muscle tissue ($p < 0.05$), always compared to the HFFD group. Finally, neither GP nor its fractions reduced triglyceride levels or oxidative damage in the liver.

Conclusions: Supplementation with whole GP and its separate fractions of EPPs and NEPPs in a murine modelof obesity decreased oxidative stress in muscle tissue. The most beneficial effects were observed with the EPPs fraction, which additionally induced a significant reduction in insulin resistance, correlated with hepatic glycogen levels, as well as significant decreases in triglyceride accumulation. Further research should explore the underlying mechanistic aspects to support the use of EPPs as an effective ingredient for the modulation of obesity-associated alterations.

Keywords: grape pomace, polyphenols, obesity, insulin resistance

Funding: FOPER-2025-FQU-03833, Fondos Especiales de Rectoría Universidad Autónoma de Querétaro UAQ. México, Quéretaro, Qro.

Conflict of interest: Not reported in source file.

PO 15 | Poster

Adherence to the EAT-Lancet diet, plasma metabolomic profiles, and long-term risk of chronic kidney disease: a prospective cohort study

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Background: The EAT-Lancet diet has been proposed as a sustainable dietary pattern beneficial for both human and planetary health; however, its long-term association with chronic kidney disease (CKD) and underlying metabolic mechanisms remain unclear.

Objectives: To investigate the association between adherence to the EAT-Lancet diet and incident CKD, and to explore metabolomic profiles reflecting this dietary pattern.

Methods: This study comprised 25,672 participants from the Malmö Diet and Cancer cohort. Adherence to the EAT-Lancet diet was evaluated using five established indices. In a subsample (n=803), 991 plasma metabolites were quantified using mass spectrometry. Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for incident CKD. Elastic net regression was employed to derive the metabolomic profiles.

Results: Over a median follow-up of 26.4 years, 2,089 participants developed CKD. Greater adherence to the EAT-Lancet diet was consistently associated with a lower risk of CKD across all indices (all P for trend <0.05), with HRs ranging from 0.76 to 0.86 for the highest versus lowest adherence groups. Metabolomic profiles reflecting dietary adherence were identified, and higher metabolomic profile scores were associated with a lower risk of CKD.

Conclusions: Greater adherence to the EAT-Lancet diet was associated with a lower long-term risk of CKD. Identified metabolomic signatures may serve as objective biomarkers of dietary adherence and provide mechanistic insights into diet-disease relationships.

Keywords: EAT-Lancet diet, chronic kidney disease, metabolomics, cohort study.

Funding: Not reported in source file.

Conflict of interest: Not reported in source file.

PO 16 | Poster

Integrated Multi-Omics Signatures To Decipher The Bioavailability Of Dietary (Poly)Phenols And Identify Phenolic Metabotypes To Promote Cardiometabolic Health

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Background: Modest long-term intake of (poly)phenols has been associated with reduced risk of cardiovascular diseases and type 2 diabetes, although findings remain inconsistent. Inter-individual variability in (poly)phenol absorption, distribution, metabolism, and excretion (ADME), influenced by genetics, microbiome, sex, age, lifestyle and health status, may contribute to these differences.

Aims: Metabolic phenotypes (metabotypes) may explain distinct patterns of phenolic catabolite production.

Methods: The Oral (Poly)phenol Challenge Test (OPCT) study examined (poly)phenol bioavailability by identifying metabotypes and related determinants. A standardised acute intervention, consisting of 3 tablets containing dietary-relevant amounts of 15 (poly)phenol classes, was administered to 300 healthy adults (18-74 y). Participants provided dietary and lifestyle information, underwent anthropometric assessments, and provided clinical data and biological samples (blood, urine, faeces). Urine samples collected 24h after the OPCT were analysed by UPLC-ESI-QqQ-MS/MS to quantify phenolic metabolite excretion, enabling metabotype clustering. Blood was analysed for cardiometabolic markers and genome-wide genotyping. Faecal samples underwent microbial profiling via ITS sequencing. Cardiometabolic risk scores were also calculated. Statistical analyses included several clustering models and other multivariate approaches.

Results: Up to 298 volunteers completed the study. A targeted approach identified over 250 (poly)phenol metabolites, enabling clustering into two metabotypes: low and high-producers of phenolic metabolites. Clusters were primarily driven by gut microbiota composition, with colonic-derived phenolic metabolites being the most discriminant. Main differences between groups emerged in age, sex, anthropometrics, and dietary habits, while the probability of being a high-producer was associated with age and sex. Genome-wide association analysis revealed strong associations between metabotypes and genetic variants, likely affecting (poly)phenol metabolism and bioavailability. The two metabotypes also displayed distinct microbiome profiles at the species level. Associations with cardiometabolic outcomes were further observed.

Conclusions: Individuals metabolise differently due to multiple factors, which may influence their cardiometabolic responses. Metabotyping by phenolic profile in precision nutrition could help tailoring dietary recommendations to prevent cardiometabolic diseases.

Keywords: (poly)phenols; metabotypes; cardiometabolic health; intervention study; bioavailability

Funding: This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 950050, PREDICT-CARE project)".

Conflict of interest: No conflicts of interest.

PO 17 | Poster

Nutritional Determinants of Type 2 Diabetes Mellitus in the European Union: A Systematic Review

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Background: Type 2 diabetes mellitus (T2DM) represents a growing public health burden in the European Union (EU), largely driven by modifiable lifestyle factors such as diet.

Aims: This systematic review aimed to synthesize observational evidence on the associations between nutritional exposures and incident T2DM across the EU-28, with a focus on regional heterogeneity and implications for EU-level nutrition policy.

Methods: The review followed PRISMA 2020 guidelines and was registered in PROSPERO (CRD42020219994). Searches were conducted in different databases (PubMed, Embase, Scopus, Web of Science). Eligible studies involved adults (≥18 years) without T2DM at baseline and assessed dietary exposures in relation to T2DM incidence. Data extraction and methodological quality assessment were performed using the NHLBI tool in Covidence.

Results: 23,437 records were identified, from which 104 observational studies were included. Most included studies were cohort studies (77.9%), primarily conducted in Western, Northern, and Southern Europe. Diets characterized by high consumption of whole and minimally processed foods, such as fruits, vegetables, legumes, whole grains, and fermented dairy, consistently showed associations with lower T2DM risk. In contrast, high intake of red and processed meats, sugar-sweetened beverages, and ultra-processed foods was linked to higher risk. Adherence to Mediterranean or plant-based dietary patterns was associated with lower risk, whereas high animal-protein dietary patterns were detrimental. It emphasizes the importance of dietary quality and patterns over individual nutrients alone, suggesting that holistic approaches to diet are more effective for prevention.

Conclusions: Nutritional determinants play a decisive role in shaping T2DM risk in the EU. Evidence supports prioritizing dietary patterns rich in plant-based and minimally processed foods while reducing ultra-processed and meat-based products. This review is focused on the EU providing tailored region-specific policies are needed to address the T2DM epidemic and guide effective prevention strategies.

Keywords: type 2 diabetes; dietary patterns; Europe

Funding: This study was supported in the form of funding by the funder National Research, Development, and Innovation Fund of Hungary (Research Project No. 143383) awarded to Orsolya Varga.

Conflict of interest: There authors do not have potential conflicts of interest.

PO 18 | Poster

A GLP-1 consumer survey on eating habits, health goals, desired product traits, and unmet needs

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Background: GLP-1 and other agonists-based medications are growing in varieties and ease of use. As the number of GLP-1 users rises, they will eat and drink differently than before. Both medication side effects and acceleration of weight loss trends may change their needs for food and beverages.

Aims: The aim of the survey was to explore what GLP-1 consumers eat and drink, what they look for in food and beverage products, unmet needs, and how health goals influence buying decisions over time.

Methods: Phase 1) 12 online in-depth interviews (30 mins each) with current GLP-1 users; Phase 2) Survey with 900 GLP-1 users (630 current users and 270 lapsed users) in the US.

Results: Most GLP-1 users and the lapsed users reported that they learn about diet/nutrition actively, and adopt healthier habits (e.g., smaller portions and less snacking). Food noise decreases for GLP-1 users, and they reported feeling full faster and eating less overall. Specifically for food and beverage products, GLP-1 users reported increasing consumption of fresh produce and protein, along many with reducing or eliminating sugary foods, soft drinks, and packaged snacks. In addition, products that are nutrient-dense, with gut and metabolic health, and muscle-maintenance benefits, beyond the basic high-protein, low-sugar formulas resonate with these consumers. GLP-1 “Weight-Loss” users are also interested in breakfast meals, ready-to-eat meals and veggie blends, whereas Diabetic users are also interested in “friendly” bread options. For Diabetic users, reducing sugar is their top priority, followed by smaller portions that feel satisfying, and indulgence that are metabolically healthy.

Conclusions: GLP-1 users adopt healthier eating habits, with demand for food and beverage products that offer gut and metabolic health benefits beyond the basic high-protein, low-sugar formulas. Diabetic users expressed different product choices and nutritional priorities compared with weight-loss users.

Keywords: consumer survey, GLP-1 users, eating habits, health goals, products

Funding: Ingredion Incorporated.

Conflict of interest: Jing Zhou and Antonina Guest are both employees of Ingredion Incorporated.

PO 19 | Poster

Combined Dietary and GLP-1 Intervention for Weight Reduction in Adult Phenylketonuria

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Background: Obesity is increasingly observed in adults with phenylketonuria (PKU). Weight loss can be challenging because lifelong low-protein dietary treatment may promote energy-dense food choices, while overly restrictive weight reduction may increase catabolism and destabilize phenylalanine (Phe) control. Continuous dietitian support may help deliver a safe hypoprotein hypocaloric plan and reduce the risk of obesity-related chronic complications (e.g., type 2 diabetes).

Aims: We report longitudinal anthropometric and biochemical outcomes in a woman with PKU and obesity managed with structured dietary education and sustained dietitian support, with adjunct GLP-1 receptor agonist therapy.

Methods: A retrospective review of routine outpatient data was performed in a female with PKU (born 2001). Serial measurements of weight, BMI, fat mass (kg and %) and blood Phe (mg/dL) were extracted from December 2020 to January 2026. The patient received education and continuous counselling by a dietitian to implement a low-protein hypocaloric diet consistent with PKU management (meal planning, distribution of natural protein/Phe, and adherence support). Anti-obesity pharmacotherapy included liraglutide (January 2024) and semaglutide (May 2025).

Results: From 2020 to 2026, body weight decreased from 109.5 to 96.1 kg (−13.4 kg; −12.2%) and BMI from 35.0 to 30.7 kg/m² (−4.3). Fat mass decreased from 52.1 to 43.6 kg (−8.5 kg) and fat percentage from 47.6% to 45.3%. Thirteen blood Phe measurements were available (mean 4.78 mg/dL; range 3.0–6.8 mg/dL), remaining within the European guideline target range for individuals aged ≥12 years (120–600 µmol/L, approximately 2–10 mg/dL).

Conclusions: In this case, continuous dietitian support enabling a hypoprotein hypocaloric approach combined with GLP-1 therapy was associated with clinically meaningful reductions in weight and fat mass without major deterioration of Phe control. Ongoing dietetic follow-up and biochemical monitoring remain essential during weight loss to support adherence and mitigate long-term obesity-related complications.

Keywords: phenylketonuria; obesity; low-protein diet; anti-obesity pharmacotherapy; dietitian support

Funding: None to declare

Conflict of interest: None to declare

PO 20 | Poster

Effect of a sugars-sweetened beverages reduction strategy using soymilk versus cow's milk on blood pressure and kidney health: The Soy Treatment Evaluation for Metabolic health (STEM) randomized trial

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Background: Sugar-sweetened beverages (SSBs) reduction is a key public health strategy for cardiometabolic risk reduction, with low-fat cow's milk recognized as the preferred caloric replacement. Although fortified soymilk is recognized as nutritionally equivalent to cow's milk and carries approved health claims for cholesterol and coronary heart disease risk reduction, its effects on blood pressure and kidney health remains unclear.

Aims: To evaluate the effect of replacing SSBs with soymilk vs cow's milk (as the standard of care) on blood pressure (BP) and markers of kidney function and injury in habitual SSBs consumers with obesity.

Methods: The STEM trial is a pragmatic, combined superiority and non-inferiority, 24-week, parallel, 3-arm, randomized trial in adults with obesity consuming ≥1 SSBs/day. Participants were randomized to their usual SSBs; sweetened, fortified 2% soymilk; or 2% cow's milk. Outcomes included systolic (SBP) and diastolic (DBP) blood pressure (JNC VII criteria), serum creatinine; eGFR (CKD-EPI 2021 formula); urinary albumin excretion rate (AER); and urinary albumin/creatinine ratio (ACR). Primary analyses were by ITT-IPW ANCOVA, with adjustments for age, sex, medication use, baseline BP, and dose. (Clinicaltrials.gov NCT05191160).

Results: We randomized 186 participants (57% male; mean [SD] age, 39.9 [11.8] years; BMI, 34.6 [6.1] kg/m², waist circumference 112.6 [13.8] cm, SBP 118.3 [15.6] mmHg, DBP 75.8 [11.4] mmHg; serum creatinine 74.7 [17.0] µmol/L, eGFR 103.6 [18.2] mL/min/1.73m², AER 13.5 [28.7] mg/day, ACR 1.50 [2.55] g/mol creatinine; SSBs intake, 2.3 [1.3] 355mL servings/d). Replacing SSBs with soymilk reduced AER (mean difference, -4.61 [95% CI, -8.81, -0.41]) at week 24. No other comparisons across outcomes were different. There was effect modification by sex for BP. Replacing SSBs with soymilk reduced SBP (−7.03 [−13.38, −0.67]) and DBP (−7.42 [−13.70, −1.14]) with an effect greater for soymilk than cow's milk on DBP (-5.13 [-9.99, -0.26]) in females only.

Conclusions: In habitual SSBs consumers with obesity, replacing SSBs with soymilk reduces AER, an established marker of kidney injury, as well as SBP and DBP in females only. These findings support SSBs reduction and soymilk as an alternative to cow's milk in SSBs reduction strategies for kidney health as well as blood pressure reduction in females.

Keywords: sugar-sweetened beverages, cow's milk, soymilk, blood pressure, kidney health

Funding: United Soybean Board through SNI Global

Conflict of interest: No disclosures to report

PO 21 | Poster

Can metabolomics predict the cardiometabolic response to changes in lifestyle habits?

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Background: Consuming a Mediterranean diet (MedDiet) and engaging in regular physical activity (PA) are key lifestyle habits for preventing cardiometabolic diseases. However, effects vary considerably among individuals. Precision nutrition examines the variability among individual's responses to lifestyle interventions and may help identify those with a greater potential for a favourable cardiometabolic response to such interventions.

Aim: This project aimed to examine the potential of untargeted metabolomics data to identify individuals most likely to show favourable cardiometabolic responses to lifestyle interventions.

Methods: In a 2x2 factorial randomized clinical trial, 200 sedentary men and women with abdominal obesity, moderately elevated triglycerides (TG) and a relatively low-quality diet were randomized to one of 4 interventions: 1- MedDiet alone, 2- PA alone, 3- MedDiet+PA, 4- control (no intervention). Favourable mean changes in LDL cholesterol (LDL-C), systolic blood pressure (SBP) and TG after the MedDiet and PA, alone or in combination, were observed despite important interindividual variations. Untargeted metabolomics data from pre-intervention blood samples and logistic regression algorithms were used (70% training sample, 30% testing sample) to identify individuals showing favourable responses in TG, SBP, and LDL-C after the interventions.

Results: The logistic regression models predicted the TG, LDL-C, and SBP responses to the interventions with ROC AUC scores of 94%, 97%, and 96%, respectively. The best predictors of the responses were the top 40 ranked metabolites, whereas baseline TG, SBP, and LDL-C levels, as well as intervention group assignment, did not contribute considerably to model performance. Metabolites best predicting the responses were distinct across the three cardiometabolic outcomes.

Conclusion: These results suggest that an untargeted metabolomics approach has the potential to identify individuals most likely to show a favourable response to lifestyle interventions.

Keywords: Mediterranean diet; Physical activity; Metabolomic.

Funding: Elise Gendron received a graduate scholarship from the Canadian Institutes of Health Research.

Conflict of interest: No potential disclosures.

PO 22 | Poster

Effect of plant-based foods and (poly)phenol supplementation on gut-microbiota metabolism in participants with overweight or obesity and cardiometabolic risk: a study protocol for a single-blind, parallel and randomised controlled trial

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Background: Dietary (poly)phenols may contribute to the management of overweight, obesity, and cardiometabolic risk factors through effects on energy metabolism, adiposity, and gut microbial metabolites.

Aims: The main objective of this study is to evaluate the impact of increased dietary (poly)phenol intake -either through a healthy plant-based diet (PBD) or supplementation- on body weight and cardiometabolic risk factors in adults with overweight or obesity.

Methods: The Prevention/Precision Diet in Araucanía (PREDIET-ARAC) trial is a randomized, single-blind, parallel-arm, placebo-controlled clinical trial assessing the effects of increasing (poly)phenol intake -through a plant-based diet (PBD) or supplementation- during a caloric deficit intervention. Ninety-nine adults (25–45 years; BMI 25–35 kg/m²) with cardiometabolic risk factors are randomized 1:1:1 into three 12-week groups: (i) PBD rich in (poly)phenols; (ii) healthy diet plus (poly)phenol supplementation; and (iii) healthy diet with placebo. Dietary intake is assessed though repeated recalls, and (poly)phenol intake is estimated using Phenol-Explorer database. Clinical assessments include anthropometry, bioimpedance, blood pressure, and functional measures. Blood samples are collected at baseline and post-intervention for targeted metabolomics using UHPLC-MS/MS. The PBD incorporates foods supplied by the food industry, emphasizing regional and Latin American sources (blueberries, apples, nuts, olive oil, and coffee). Statistical analyses include comparison tests, regression models, and machine learning algorithms. Expected

results: The results are expected to strengthen evidence supporting (poly)phenol intake as an adjunct in obesity management, demonstrate benefits on body weight and cardiometabolic risk factors, and identify biomarkers of intake or effect derived from metabolomic profiling. This trial will contribute to the understanding of the physiological role of (poly)phenols in humans, promote the incorporation of (poly)phenols into dietary recommendations, and guide the design of future nutritional interventions. The study adheres to the Declaration of Helsinki and CONSORT guidelines (Ethical approval No. 11250095-58; Trial registration: NCT06911346).

Keywords: healthy plant-based diet; (poly)phenol supplementation; overweight and obesity; biomarkers; clinical trial.

Funding: This work was supported by the Chilean Government through the Agencia Nacional de Investigación y Desarrollo (ANID) grant number [FONDECYT Iniciación 11250095].

Conflict of interest: Apple (CHISA S.A. Company), blueberries (via the Chilean Blueberry Committee), hazelnuts (Grupo Hijuelas), extra-virgin olive oil (Olive Capital) and coffee (Nestlé) were provided as non-financial support for the dietary intervention. Polyphenol extracts used in the supplementation group, including maqui (MNL Group), cranberry (Bayas del Sur), and grape extracts (Nscipharma Group), were also donated for use in the study.

PO 23 | Poster

Food sources and estimated intake of odd-chain-, branched-chain- and very long-chain saturated fatty acids in Sweden

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Background: Circulating odd-chain fatty acids (OCFA), branched-chain FA (BCFA) and very-long-chain saturated FA (VLC-SFA) are associated with cardiometabolic risk but their dietary sources are unclear.

Aims: We aimed to 1) identify dietary sources contributing to intake of OCFAs, BCFAs and VLC-SFAs, 2) estimate dietary intake at per capita level and individual level across demographic groups, 3) investigate whether intake of these SFAs were associated with dietary quality.

Methods: We used a market basket study to analyze fatty acid content in food groups (n=14) and estimate per capita intake. We used two national dietary surveys (Riksmaten Adolescents (n=3099) and Riksmaten Adults (n=1797)) to estimate intake at the individual level. Dietary quality was assessed by a Swedish healthy eating index.

Results: Fatty dairy products was the main contributor to intake of OCFA and BCFA (0.37-0.67 g/d), followed by meat or lean dairy depending on sex and age. Although most food groups contributed to intake of VLC-SFA (0.4 g/d), fats and oils made the largest contribution. Per capita intake and intake based on dietary surveys were generally consistent. Males had higher intake of OCFA and BCFA, whereas females had higher intake of VLC-SFA. Adolescents had higher intake of OCFA and BCFA compared to adults and older adults, whereas older adults had higher intake of VLC-SFA. Intakes of OCFA and BCFA were inversely associated with dietary quality whereas intake of VLC-SFA was positively associated with dietary quality.

Conclusions: Multiple and diverse food groups contribute to intake of OCFA, BCFA and VLC-SFA. Contributions from specific food groups varies depending on sex and age. Using circulating levels of these fatty acids to reflect intake of specific food groups may be challenging, and demographics needs to be considered. Intakes of OCFA and BCFA are inversely associated with dietary quality whereas intake of VLC-SFA is positively associated.

Keywords: very-long-chain saturated fatty acids, branched-chain fatty acids, odd-chain fatty acids

Funding: No funding was obtained for this study

Conflict of interest: None

PO 24 | Poster

Polygenic risk score for zinc metabolism is associated with serum zinc concentrations and early glycemic alterations in adolescents

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Background: Zinc (Zn) plays an essential role in insulin secretion by pancreatic β-cells. Disruptions in Zn homeostasis may represent an early factor in metabolic dysfunction in adolescents, a critical developmental period for the onset of insulin resistance. However, the cumulative impact of genetic variants related to Zn metabolism in this context remains underexplored.

Aims: This study aimed to investigate the association between a polygenic risk score derived from Zn metabolism-related polymorphisms (PRS-Zn) and both serum Zn concentration and glycemic biomarkers in adolescents.

Methods: This cross-sectional analysis included 200 adolescents (aged 14-17 years) from the 2015 ISA-Nutrition study in São Paulo, Brazil. The final PRS-Zn model comprised three single nucleotide polymorphisms (SLC30A8 rs13266634, SLC30A8 rs3802177, and CA1 rs1532423 - Axiom 2.0 Assay, ThermoFisher Scientific), adjusted for age, sex, and ancestry. Serum Zn was measured by flame atomic absorption spectrophotometry. Fasting blood glucose was analyzed using commercial kits, insulin levels were determined by multiplex immunoassay, and HOMA-IR was calculated. Associations were assessed using simple linear regression models.

Results: Mean serum Zn was 94.8 µg/dL (95% CI: 93.0–96.7). The PRS-Zn emerged as a robust negative predictor of serum Zn (B = -32.99; p = 0.003), explaining 4.4% of its variance. Furthermore, a higher PRS-Zn was significantly associated with elevated insulin concentrations (B = 21.35; p = 0.014) and higher HOMA-IR (B = 4.69; p = 0.021). No significant association was found with fasting glucose (B = -24.41; p = 0.364).

Conclusions: A higher PRS-Zn is associated with reduced serum Zn and early markers of insulin resistance in adolescents, preceding any alterations in fasting glucose. These findings highlight the potential of Zn-related polygenic risk scores as early screening tools to identify adolescents at high metabolic risk and establish strategies for nutritional prevention.

Keywords: zinc, polygenic risk score, insulin resistance, adolescents, precision nutrition.

Funding: São Paulo State Research Foundation (Fundação de Amparo à Pesquisa do Estado de São Paulo) – Grant Numbers: 2017/05125-7, 2023/03023-3 and 2025/26170-7.

Conflict of interest: None.

PO 25 | Poster

Precision nutrition with (poly)phenols for cardiometabolic risk prevention: the PRE-CARE-DIET study

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Background: Precision nutrition strategies targeting the prevention of cardiometabolic diseases, such as type 2 diabetes, are gaining increasing attention. (Poly)phenols, widely present in plant-based foods, have been suggested to modulate glucose metabolism and

insulin sensitivity. Individuals showing similar metabolic signatures can be clustered into phenolic metabolic phenotypes (metabotypes). However, inter-individual variability in response to (poly)phenol-rich diets remains poorly understood.

Aims: The PRE-CARE-DIET study aims to evaluate whether a personalised, sustainable, (poly)phenol-rich diet can improve cardiometabolic health, considering individual metabolic differences and their association with disease risks.

Methods: A targeted, randomised, controlled trial is being conducted in adults at cardiometabolic risk (40–80 years; BMI 18.5–39.9 kg/m²). Participants are clustered into two metabotypes, based on urinary phenolic metabolite excretion profiles following an Oral (Poly)phenol Challenge Test. They are randomly assigned to a 16-week treatment or control group. The treatment group follows a personalized diet with a >50% increase in the actual (poly)phenol intake, while controls receive general healthy eating advice. Clinical, dietary, and lifestyle data are collected, alongside biological samples. Insulin resistance and sensitivity indices (HOMA, QUICKI), as well as validated diabetes risk scores (FINDRISC, QDiabetes), are assessed.

Results: Preliminary findings suggest a trend toward improvement in cardiometabolic markers in the treatment group, including indications of enhanced insulin sensitivity and reduced insulin resistance. A parallel downward trend in diabetes risk scores is also observed compared with controls. These patterns are being assessed in association with a chronic increase in (poly)phenol intake. In addition, potential differences between metabotypes and other markers are being investigated.

Conclusions: This study is expected to contribute to the prevention of metabolic diseases through improvements in metabolic risk markers. In this context, the integration of a multi-omics approach may provide further insight into inter-individual variability in phenolic metabolism and its association with cardiometabolic risk, supporting the development of tailored precision nutrition strategies.

Keywords: (poly)phenols; cardiometabolic health; precision nutrition; metabotype

Funding: This study has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 950050, PREDICT-CRE project), the FARE CARE-DIET project (code R20MPBW4FM), funded by the "Ministero dell'Università e della Ricerca (MUR)", and the PNRR PE ON FOODS OBI-WAN-DIET project funded by the European Commission, NextGenerationEU (code PE00000003),

Conflict of interest: No conflicts of interest.

Wednesday, June 17th, 2026

09:45 – 10:15 ACTIVE COFFEE BREAK 3, POSTER SESSION 3 (PO 26 – PO 38)

PO 26 | Poster

Prevalence of Sarcopenia and Dynapenia and Their Association with Clinical and Lifestyle Factors in Adults with Type 1 Diabetes Mellitus

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Background: Sarcopenia, characterized by the loss of muscle mass and strength, has recently been recognized as a potential complication of diabetes. However, evidence regarding the prevalence of sarcopenia and dynapenia and their clinical correlates in individuals with type 1 diabetes mellitus (T1DM) remains limited.

Aims: To evaluate the prevalence of sarcopenia and dynapenia in adults with T1DM and to analyze their association with clinical, metabolic, and lifestyle-related factors.

Methods: A cross-sectional study was conducted including adults with T1DM. Muscle mass was assessed using bioelectrical impedance analysis to calculate appendicular skeletal muscle mass index (ASMI). Muscle strength was evaluated through handgrip strength (HGS) using a dynamometer. Sarcopenia was defined as low HGS combined with low ASMI, while dynapenia was defined as low HGS with normal ASMI. Associations between sarcopenia/dynapenia and clinical, metabolic, and lifestyle variables were analyzed.

Results: A total of 62 individuals with T1DM (66% women; mean age 38 ± 14 years; BMI 24.9 ± 4.7 kg/m²) were included. The prevalence of sarcopenia and dynapenia was 8% and 23%, respectively. Men were more frequently represented in both sarcopenic and dynapenic groups. Sarcopenic individuals showed significantly higher HbA1c levels. Lower diabetes duration, reduced adherence to the Mediterranean diet, and lower BMI were associated with sarcopenia. Additionally, reduced phase angle, lower HGS, and lower adherence to the Mediterranean diet were associated with dynapenia.

Conclusions: Sarcopenia and especially dynapenia are prevalent in adults with T1DM. Simple clinical measures such as handgrip strength and ASMI may help identify patients at risk of impaired muscle health. Poor glycemic control, low BMI, and lower adherence to the Mediterranean diet were associated with worse muscle outcomes.

Keywords: Sarcopenia; Dynapenia; Type 1 diabetes mellitus; Muscle strength; Mediterranean diet

Funding: In addition, M.T.Z-M is funded by a postdoctoral fellowship from Instituto de Investigación Biosanitaria de Granada (Ibs. Granada) (74-2022).

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

PO 27 | Poster

Rethinking Ultra-Processed Foods: Unequal Effects on Health in People with Diabetes

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Background: The health impact of ultra-processed foods (UPFs) in individuals with type 2 diabetes is not well established, and potential heterogeneity across UPF subgroups remains largely unexplored.

Aims: This study examined the associations of total and group-specific UPF consumption with diet quality and cardiometabolic risk in diabetes.

Methods: We analyzed data from 2,660 men and women enrolled in the TOSCA.IT study. Dietary intake was assessed using a food frequency questionnaire, and UPFs were classified according to the NOVA system. Glycemic control and major cardiometabolic risk factors were measured using standardized procedures. Associations between total and group-specific UPF intake and study outcomes were evaluated across quintiles using general linear models.

Results: UPFs accounted for 13.6% of total daily energy intake. Major contributors included sugar-sweetened and artificially-sweetened beverages, processed meat, poultry and fish, refined cereals, packaged sweet and savory snacks, desserts, and yogurt/dairy-based products. Higher consumption of total UPFs (highest vs. lowest quintile) was associated with poorer diet quality, characterized by higher intakes of animal protein, total fat, cholesterol, and added sugars, and lower intakes of plant protein, monounsaturated fats, fiber, and polyphenols. Greater UPF intake was also associated with worse glycemic control and an adverse cardiometabolic profile, including higher BMI, lipid levels, blood pressure, insulin resistance, subclinical inflammation, and liver fat. These associations were consistent across most UPF groups. However, yogurt and dairy-based products diverged from this pattern, being associated with better diet quality, improved glycemic control, and a more favorable cardiometabolic profile.

Conclusions: UPF consumption is common among individuals with type 2 diabetes and is generally associated with poorer diet quality and increased cardiometabolic risk. However, substantial heterogeneity exists across UPF subgroups. These findings support a more nuanced interpretation of UPFs and highlight the need to refine classification systems such as NOVA.

Keywords: Ultra-processed foods; Type 2 diabetes; Diet quality.

Funding: The study is supported by the Italian Medicines Agency (AIFA) within the Independent Drug Research Program - contract N. FARM6T9CET - and by Diabete Ricerca, the no-profit Research Foundation of the Italian Diabetes Society. The funding agency played no role in the study.

Conflict of interest: Nothing to declare.

PO 28 | Poster

Impact of the morning vs. evening consumption of high-protein meals on the metabolic state of individuals with prediabetes or type 2 diabetes: pilot results of the PROTIME trial

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Background: High-protein diets improve glucose metabolism, but the impact of protein timing remains unclear. The PROTIME-trial compares two isocaloric, normoproteic diets differing in daily protein distribution in individuals with prediabetes and non-insulin-treated type 2 diabetes (T2D).

Aims: To assess feasibility and explore preliminary effects of protein timing on glucose metabolism and cardiometabolic outcomes.

Methods: In this ongoing randomized cross-over trial, 30 overweight or obese individuals (BMI>25 kg/m2) with prediabetes and non-insulin-treated T2D are being recruited, aiming for an equal distribution of both conditions. Participants complete two 4-week isocaloric interventions separated by a 4-week washout: (1) high-protein breakfast/high-carbohydrate dinner (HP/HC) and (2) high-carbohydrate breakfast/high-protein dinner (HC/HP). High- carbohydrate meal contain ~60 EN% carbohydrates, 30 EN% fat and 10 EN% protein; high- protein meals contain 35 EN% carbohydrates, 30 EN% fat and 35 EN% protein. Daily macronutrient distribution of both diets was 50 EN% carbohydrates, 30 EN% fat and 20 EN% protein, in accordance to recommendations of the German Nutrition

Society. Individualized meal plans were provided. Dietary intake was self-reported. Continuous glucose monitoring (FreeStyle Libre Pro iQ) and physical activity monitoring (Actigraph wGT3X-BT) were performed. Glucose variability was analyzed using EasyGV©.

Results: Preliminary data indicate high dietary adherence. Macronutrient targets were achieved in both interventions (n=15). Mean absolute of glycemic excursions (MAGE) increased during HP/HC compared to HC/HP (p=0.02), suggesting increased glycemic variability. Low and high blood glucose indices increased in HP/HC indicating higher risk of hypo and hyperglycemia. Fasting glucose (p=0.01) and HbA1c (p=0.02) improved in HC/HP. There was a preservation of lean mass in HP/HC despite fat mass loss (p<0.001). HDL, LDL and cholesterol significantly improved in both interventions.

Conclusions: Both dietary interventions have shown a high feasibility. Cardiometabolic effects of protein distribution need to be investigated in the larger cohort.

Keywords: Type 2 diabetes, protein timing, glucose homeostasis, cardiometabolic parameters

Funding: German Center for Diabetes Research (DZD). Funders are not involved in the study design, collection, analysis, interpretation of data, writing of this abstract, or the decision to submit it for the presentation during the congress.

Conflict of interest: No conflicts of interest to declare.

PO 29 | Poster

Nut consumption and sperm quality in healthy men: Results from the Led-Fertyl Study

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Background: The presence of antioxidants and other bioactive compounds in nuts is well-documented, and recent evidence suggests an association between regular nut consumption and sperm quality. However, current scientific evidence is limited and inconsistent.

Aims: The study aimed to evaluate the association between nut consumption and sperm quality parameters in healthy men of reproductive age.

Methods: A cross-sectional analysis was conducted using the data from 222 young men enrolled in the Led-Fertyl study. Nut consumption was categorized as <3, ≥3 to <7, and ≥ 7 servings/week (1 serving=30 g). The main outcomes were sperm quality parameters (sperm count, concentration, vitality, motility, and normal morphology). Multivariate linear and logistic regression models were used to analyze associations, adjusted for main confounders.

Results: Total sperm count (β=3.38; 95%CI: 1.59, 5.16) and concentration (β=1.17; 95%CI: 0.15, 2.19) were higher among participants in the highest category of nut consumption (≥7 servings/week) compared to those in the lowest (<3 servings/week). A similar association was observed when modeling nut consumption as continuous; each additional serving per day was associated with higher total sperm count and concentration (β=2.38; 95%CI: 1.03, 3.72 and β=0.83; 95%CI: 0.06, 1.59, respectively). A theoretical substitution of 1-serving/day of nuts with 1-serving/day of potato chips or pastries was associated with lower total sperm count and concentration. Furthermore, compared to participants in the lowest category of nut consumption, those in the highest were 75% less likely to have abnormal sperm motility (OR:0.25; 95%CI: 0.07, 0.95) and 69% less likely to have seminogram abnormalities (OR:0.31; 95%CI: 0.14, 0.68).

Conclusions: Our findings suggest that regular nut consumption is associated with better sperm quality parameters in young, healthy men of reproductive age.

Keywords: Nuts, sperm quality, male fertility, Mediterranean diet, unsaturated fatty acids

Funding: Several sources supported the Led-Fertyl study: the Spanish government's official funding agency for biomedical research, ISCIII, through the Fondo de Investigacion para la Salud (FIS); the European Union ERDF/ESF, 'A way to make Europe'/ 'Investing in

your future' [PI21/01447]; and the Diputació de Tarragona (2021/11-No.Exp. 8004330008-2021-0022642). The ISCIII, Spanish Ministry of Health, awarded E.D.-C a Contrato Pre-doctoral de Formación en Investigación en Salud (PFIS FI22/00018) of the Acción Estratégica en Salud program (AES).

Conflict of interest: None of the authors have declared any conflicts of interest.

PO 30 | Poster

Diet Quality, Socio-Demographic Factors, and Type 2 Diabetes Mellitus in Adults Across European Countries: Insights from SHARE

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Background: Type 2 diabetes (T2D) is projected to rise from the eighth to top five global disease burden by 2050. Diet quality plays a key role: plant-based, high-fiber diets lower risk, while processed foods and red meats increase it. The Mediterranean diet offers protection, but adherence remains low. Limited research has examined how socio-economic and cultural factors interact across European regions to shape dietary patterns and T2D prevalence, particularly among older adults.

Aims: To investigate whether socio-economic and cultural factors and European region are associated with diet quality and T2D prevalence in older adults across EU countries.

Methods: Data from wave 9 of SHARE questionnaire was assessed for diet quality using a 10-point score from six diet-related variables, analyzing 19,480 European adults after handling missing data via multiple imputation. Analyses included descriptive statistics, bivariate tests, logistic regression, t-tests, and linear regression to explore predictors of diet quality and T2D trends.

Results: Normal weight reduced T2D odds by 71% (OR: 0.29, 95% CI: 0.25–0.32), and employment by 65% (OR: 0.34, 95% CI: 0.25–0.47); while men had 61% higher odds (OR: 1.61, 95% CI: 1.46–1.77); no regional difference emerged (OR: 1.00, 95% CI: 0.90–1.10). Diet quality averaged 7.42 (SD = 1.35), with Mediterranean regions scoring higher (M = 7.70 vs. 7.21, $p < 0.001$, Cohen's d = 0.37). Regression showed non-Mediterranean residence, male gender, and higher education linked to lower diet quality, while BMI had no effect.

Conclusions: Regional differences did not play a major role in T2D risk, even though diet quality was higher in Mediterranean regions, yet men and higher-educated individuals reported poorer diets. These insights call for focused interventions, addressing gender-specific nutrition gaps, and education-based dietary improvements, to mitigate T2D risk and enhance diet quality in older European adults.

Keywords: Diabetes mellitus; Mediterranean diet; diet quality.

Funding: Project funding by National Research, Development, and Innovation Fund of Hungary (Research Project No. 143383) awarded to Orsolya Varga.

Conflict of interest: The authors do not have potential conflicts of interest.

PO 31 | Poster

Interactions between a whole food, plant-based diet and the gut microbiome in cardiovascular prevention in heterozygous familial hypercholesterolemia

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Background: Heterozygous familial hypercholesterolemia (HeFH) is a genetic disorder that impairs LDL clearance, affecting >34 million adults worldwide and driving premature cardiovascular disease (CVD). We recently demonstrated that whole-food, plant-based (WFPB) diets yield clinically meaningful reductions in plasma apolipoprotein (apo)B in HeFH. Whether diet-induced gut microbiome changes contribute to these benefits and whether the gut microbiome moderates them remain unknown.

Aims: To evaluate the impact of a WFPB diet, relative to a standard American diet (SAD), on the gut microbiome and to examine whether the gut microbiome moderates diet-induced cardioprotective benefits in adults with HeFH.

Methods: In this randomized, controlled crossover trial conducted in fully controlled feeding settings, 25 adults with genetically confirmed HeFH consumed a WFPB diet and a SAD for 4 weeks each, in random order. At the end of each diet, fecal samples were collected for shotgun metagenomics, and plasma samples for apoB measurement.

Results: Compared with the SAD, the WFPB decreased gut relative abundance of *Ruminococcus torques* (-43.5%, 95%CI: -63.1%, -24.0%, P=0.0009), *Collinsella aerofaciens* (-46.3%, 95%CI: -74.0%, -18.5%, P=0.0007), and *Clostridium innocuum* (-76.9%, 95%CI: -100%, -23.1%, P<0.0001), all taxa that have previously been linked to higher CVD risk. Moreover, while the WFPB diet reduced apoB by 16.3% (95%CI: −20.3%, −12.3%; P<0.0001) in these 25 individuals, the magnitude of this reduction differed by the presence of *Prevotella copri* in the gut microbiome, whose abundance was unchanged by the WFPB diet (P=0.83). ApoB decreased by 18.3% (95%CI: −22.4%, −14.2%) among non-carriers and by 9.9% (95%CI: −21.7%, 1.9%) among carriers (P carriers vs non carriers=0.06).

Conclusions: In adults with HeFH, WFPB-induced changes in the gut microbiome suggest that its cardioprotective benefits extend beyond lowering atherogenic lipids. Future precision nutrition strategies aimed at reducing *P. copri* abundance may help maximize the apoB-lowering effect of diet.

Keywords: plant-based diet; gut microbiome.

Funding: The trial was funded by the Canadian Institutes of Health Research and gut microbiome analysis was funded by the Weston Family Foundation.

Conflict of interest: JPDC received research funding from the Dairy farmers of Canada.

PO 32 | Poster

Mediterranean diet, gut microbiota, and cognitive decline in older adults with obesity/overweight and metabolic syndrome: a prospective cohort study

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Background: Diet dynamically shapes the gut microbiome, which in turn influences cognitive function through bidirectional gut-brain communication. While the Mediterranean diet (MedDiet) is a well-established dietary pattern with demonstrated neuroprotective benefits, the interplay between MedDiet adherence, gut microbiota and longitudinal cognitive trajectories remains poorly understood.

Aims: To identify a gut microbial signature of the MedDiet adherence and prospectively examine the associations of MedDiet adherence and MedDiet gut microbial signature (MedDiet-GMS) with cognitive changes over time in older adults at high risk of cognitive decline.

Methods: This prospective study included 746 participants (mean age 65±5 years, 48% women) with overweight/obesity and metabolic syndrome. Adherence to the MedDiet was assessed using a validated 14-item Mediterranean Diet Adherence Screener (MEDAS). Baseline gut microbiota composition was profiled via 16S rRNA sequencing. Cognitive function was evaluated at baseline, 2, 4, and 6 years using a comprehensive neuropsychological battery. Elastic net regressions were applied to derive a MedDiet-GMS, and linear mixed models assessed associations of MEDAS and MedDiet-GMS with trajectories of cognitive function, adjusting for potential confounders.

Results: Higher MedDiet adherence was associated with greater gut microbial diversity and distinct microbial composition. The MedDiet-GMS comprised 20 taxa, including short-chain fatty acid-producers (e.g., *Barnesiella*, *Butyricicoccus*) positively weighted and pro-inflammatory taxa (e.g., *Eggerthella*) negatively weighted. Both higher MEDAS scores and MedDiet-GMS were independently associated with slower global cognitive decline. MedDiet-GMS was additionally linked to preserved executive function, while MEDAS was associated with attenuated general cognitive decline. *Eggerthella*, inversely associated with MedDiet adherence, was linked to greater executive function decline.

Conclusions: Greater adherence to the MedDiet was associated with a favorable gut microbiota profile and slower cognitive decline over 6 years. A microbiome-derived signature of MedDiet adherence was prospectively associated with favorable cognitive trajectories in older adults at risk of cognitive decline. External validation and experimental research are warranted.

Keywords: Mediterranean diet (MedDiet); gut microbiota; cognitive decline; cognitive function; microbiota-gut-brain axis.

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Conflict of interest: JSS reports serving on the board of and receiving grant support through his institution from the International Nut and Dried Fruit Council, serving on the board of the Instituto Danone Spain and the International Danone institute. None of the other authors declare competing interests.

PO 33 | Poster

Rosa canina triterpenoids as selective PPARγ modulators improving insulin sensitivity and obesity: from in vivo effects to molecular mechanisms

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Background: Peroxisome proliferator-activated receptor gamma (PPARγ) is a key therapeutic target in metabolic diseases due to its central role in adipogenesis, lipid metabolism, and insulin sensitivity. However, adverse effects associated with full agonists have prompted the search for safer strategies based on selective PPARγ modulation. Rosa canina (rosehip) is a bioactive-rich food containing polyphenols, carotenoids, and pentacyclic triterpenoids, whose consumption has been associated with anti-obesity and antidiabetic effects.

Aims: To integrate in vivo and mechanistic evidence to elucidate how Rosa canina modulates PPARγ activity and contributes to improve glucose homeostasis and insulin sensitivity.

Methods: Diet-induced obese mice supplemented with R. canina flesh were used to evaluate body weight, glucose homeostasis, adipose tissue morphology, and hepatic lipid metabolism. In parallel, Pomolic acid (Po) and hederagenin (Hede), from the apolar fraction of R canina flesh, were characterized in HepG2 and 3T3-L1 luciferase reporter approaches, adipogenesis and gene expression assays, TR-FRET binding and coregulator recruitment studies, and molecular dynamics simulations.

Results: R. canina supplementation reduced body weight gain and improved glucose tolerance and insulin sensitivity with decreased lipid accumulation in adipose tissue and liver and downregulation of lipogenic genes. These effects were associated with antagonism of PPARγ activity. Po and Hede were identified as ligands that bind PPARγ and inhibit rosiglitazone- induced transactivation. Po acted as a neutral antagonist, repressing adipogenic and lipogenic gene expression, whereas Hede behaved as a selective modulator,

promoting lipid handling and fatty acid oxidation while limiting triglyceride accumulation. Structural analyses revealed a slight differential binding mode between them.

Conclusions: R. canina improves obesity, insulin sensitivity and glucose homeostasis, at least in part, through PPARγ modulation by pentacyclic triterpenoids. These findings highlight dietary PPARγ modulators as promising strategies for the prevention and management of obesity and type 2 diabetes.

Keywords: Rosa canina; PPARγ; Pentacyclic triterpenoids; Obesity; Insulin resistance.

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Conflict of interest: Not reported in source file.

PO 34 | Poster

Cardiovascular Health on Social Media: Assessing the Prevalence of Non-Evidence-Based Information

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Background: Globally, 94% of internet users are active on social media, making it a primary channel for health information — and misinformation. Despite this scale, the prevalence of cardiovascular health misinformation across languages and platforms remains poorly characterized.

Aims: To determine the prevalence of non-evidence-based information (NEBI) in cardiovascular health across English, Hindi, and Spanish on multiple social media platforms.

Methods: Using a cross-sectional design, we analyzed Facebook, YouTube, Instagram, TikTok, X, Google, and Edge, replicating typical user search behavior.

Results: We evaluated 14,901 posts (English 40.6%, Spanish 39.7%, Hindi 19.7%), most authored by independent users (80.8%) targeting a general audience (80.5%). NEBI prevalence was 59.0%, lowest on Edge (43.1%), YouTube (43.2%), and Google (45.6%), and highest on Instagram (76.3%), TikTok (74.7%), and Facebook (69.2%; $p < 0.001$). English content had the highest NEBI rate (73.5%), followed by Hindi (56.6%) and Spanish (45.5%). Independent users produced NEBI at far higher rates (65.8%) than hospitals (25.5%), government agencies (30.7%), and news agencies (45.3%). Images had the highest NEBI rate (78.9%), followed by videos (69.7%) and text posts (65.5%); podcasts (23.7%) and infographics (27.8%) had the lowest. Compared to evidence-based content, NEBI had lower median subscriber counts (32,150 vs. 65,400; $p < 0.001$) and views (19,650 vs. 35,377; $p < 0.001$) but generated more likes (197 vs. 163; $p = 0.009$) and was characterized by emotionally charged, subjective language. In English, the highest NEBI rates were related to

tobacco (82.1%), blood pressure (BP – 79.1%), and blood sugar (74.4%); In Hindi were tobacco (64.6%), blood sugar (56.2%), and BP (56.1%); In Spanish were weight (51.4%), BP (49.2%), and tobacco (43.2%).

Conclusions: A 59% of cardiovascular health content online is NEBI, with substantial variation across platforms, languages, and topics, exposing billions of users daily to potentially harmful health information to make their health decisions.

Keywords: Cardiovascular Diseases; Health Misinformation; Infodemiology

Funding: This research was supported by the Bernard Lown Scholar Program for Cardiovascular Health at the Harvard T.H. Chan School of Public Health, USA (grant no. RFA-2301).

Conflict of interest: None to declare

PO 35 | Poster

Ultra-processed food intake and associations with dyslipidemia, glycemic control, and gut microbiome in adults with type 1 diabetes in Southern Italy

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Background: Ultra-processed food (UPF) consumption is increasing worldwide and is associated with cardiometabolic risk. However, its relationship with glycemic control, cardiovascular risk, and gut microbiome in type 1 diabetes (T1D) remains unclear.

Aims: To investigate the association between UPF intake, glycemic control, lipid profile, and gut microbiome features in adults with T1D from Southern Italy.

Methods: In this cross-sectional study, 253 adults with T1D were evaluated. Dietary intake was assessed using the validated EPIC food-frequency questionnaire and classified according to the NOVA system. Clinical and biochemical parameters were collected. Gut microbiome composition was analyzed by shotgun metagenomic sequencing in a subgroup (n=103). Associations were assessed using linear regression models and PERMANOVA, adjusting for age and adherence to the Mediterranean diet.

Results: Mean UPF intake was 116.0±57.5 g/1000 kcal, with no sex differences. Higher UPF consumption was associated with higher triglycerides (r=0.19; p=0.004) and lower HDL cholesterol (r=–0.18; p=0.005), independent of confounders. Sugar/artificially sweetened beverages were positively associated with triglycerides (r=0.17; p=0.008), while animal-based UPFs were inversely associated with HDL cholesterol (r=–0.16; p=0.015). Among participants on multiple daily injections or open-loop insulin therapy (n=109), ready-to-eat/ready-to-heat mixed dishes were positively associated with HbA1c (r=0.24; p=0.012). Microbiome analysis showed positive association between sugar/artificially sweetened beverages and *Coprococcus comes*, and negative association with *Anaerotruncus massiliensis*. Triglycerides correlated with microbial metabolic pathways.

Conclusions: Higher intake of total and specific UPF subgroups is associated with atherogenic dyslipidemia, poorer glycemic control, and microbiome alterations in adults with T1D. Reducing UPF consumption may provide metabolic benefits in this population.

Keywords: Ultra-processed foods; Type 1 diabetes; Triglycerides; HDL cholesterol; Gut microbiome

Funding: Not reported in source file.

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PO 36 | Poster

Blood glucose status of pregnant women in the northwest region of China

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Background: The blood glucose level during pregnancy is important for assessing the health of pregnant women and predicting the outcome of the pregnancy.

Aims: To compare differences in fasting blood glucose (FPG), glycosylated hemoglobin (HbA1c), and oral glucose tolerance test (OGTT) levels by age, education level, pre-pregnancy BMI, and pregnancy stage, and to provide scientific data for clinical management of blood glucose during pregnancy.

Methods: This cross-sectional study collected 2,007 FPG, 1,074 HbA1c, and 2,496 OGTT samples data. One-way ANOVA was used to compare the differences across groups, and multiple linear regression was used to analyze independent effects of these factors on blood glucose indicators.

Results: The fasting glucose, HbA1c, OGTT 60-minute blood glucose, OGTT 120-minute blood glucose was 4.88±0.64 mmol/L, 5.04±0.48% and 7.86±1.81 mmol/L, 6.74±1.43 mmol/L, respectively. There were significant differences across age groups in HbA1c, OGTT 60-minute blood glucose, OGTT 120-minute blood glucose ($P<0.05$), with the ≥35 years group having the highest values. Pre-pregnancy BMI groups showed significant differences in all blood glucose indicators ($P<0.001$), with the obese group having the highest levels. Education level showed a significant difference in OGTT 120-minute blood glucose (the group of college degree or above had the highest levels). Multivariate analysis indicated that pre-pregnancy BMI was the influencing factor of all blood glucose indicators ($P<0.001$). Age significantly affected HbA1c and post-load glucose. Education level only influenced OGTT 120-minute glucose.

Conclusions: Pre-pregnancy BMI was the most critical factor affecting glucose metabolism in pregnant women. Overweight and obese women showed significantly higher blood glucose levels. Pre-pregnancy weight management should be prioritized for blood glucose control during pregnancy.

Keywords: Blood glucose; Pregnancy; Pre-pregnancy BMI; Oral glucose tolerance test; Obesity

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Conflict of interest: The authors declare no conflict of interest for this study.

PO 37 | Poster

Longitudinal associations between beverage consumption and adiposity in preschool children

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Background: Consumption of sweetened beverages is a modifiable behavior linked to childhood obesity, but longitudinal evidence in early childhood is still scarce.

Aims: To assess prospective associations between the intake of sugar-sweetened beverages (SSBs), milkshakes, artificially sweetened beverages (ASBs), and 100% fruit juice and different indicators of adiposity. Additionally, to estimate the potential effect of replacing these beverages with water or milk.

Methods: A two-year longitudinal analysis including 1433 preschoolers participating in a children cohort. Beverage consumption was evaluated using the cumulative average intake of SSBs, milkshakes, ASBs, and 100% fruit juice. Outcomes included z-scores of body mass index (zBMI), waist circumference (zWC), waist-to-height ratio (zWHtR), and fat mass index (zFMI). Associations were analyzed using multivariable linear mixed-effects models. Isovolumetric substitution models estimated the expected changes in adiposity when replacing 200mL/day of each beverage with water or milk.

Results: The mean baseline age was 4.9±1.1 years, and 51% were girls. Greater cumulative intake of SSBs was associated with higher levels of adiposity: zBMI (β=0.135; 95%CI: 0.068–0.202), zWC (β=0.268; 95%CI: 0.165–0.372), zWHtR (β=0.011; 95%CI: 0.006–0.016), and zFMI (β=0.137; 95%CI: 0.047–0.228). Consumption of ASBs and milkshakes was positively associated with zBMI (β=0.315; 95%CI: 0.017–0.613 and β=0.115; 95%CI: 0.020–0.210), zWC (β=0.629; 95%CI: 0.158–1.100 and β=0.274; 95%CI: 0.127–0.422), and zWHtR (β=0.025; 95%CI: 0.000–0.050 and β=0.009; 95% CI: 0.001–0.017) after two-year follow-up. No significant associations were observed for 100% fruit juice intake. Substitution analyses indicated that replacing 200mL/day of SSBs or ASBs with water or milk was associated with lower adiposity across the evaluated indicators.

Conclusions: Higher consumption of SSBs, ASBs, and milkshakes during early childhood was linked to greater adiposity, whereas 100% fruit juice intake was not associated. Replacing SSBs and ASBs with water or milk may contribute to reducing adiposity development among preschoolers.

Keywords: sugar-sweetened beverages; artificially sweetened beverages; 100% natural fruit juice; preschool children; adiposity

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Conflict of interest: The authors have no conflict of interest to declare.

PO 38 | Poster

Optimal Non-pharmacological Lifestyle Modifications in people with Type 2 diabetes (ON LiMiT): study protocol display

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Background: While remission of type 2 diabetes (T2D) is attainable through substantial bodyweight loss, it remains to be studied if reducing dietary carbohydrate content combined with exercise is superior to the recommended diet and no exercise in sustaining remission.

Aims: To find the optimal diet and exercise intervention for sustaining remission of T2D. We hypothesize that a carbohydrate-reduced diet (CHr) combined with high-intensity exercise (EX) is superior to a carbohydrate-rich diet (CHR) and no EX in maintaining remission. Diabetes remission is defined as sustained HbA1C<48 without use of antihyperglycemic medication. Main outcome: percentage of persons with medication-free remission after 2 years.

Methods: Fifteen hundred persons with T2D, a BMI>27 and diabetes duration less than 6 years and no insulin treatment are randomized 1:1:1:1:1 to 1. CHR+EX, 2. CHr+EX, 3. CHR–EX, 4. CHr–EX or 5. Standard care as control (CON). All groups except CON

undergo a 12-week weight loss phase using very-low calorie diet (VLCD). At week 13-18 the allocated diet type will gradually be introduced using meal boxes along with EX/no-EX. From week 19 to 104 the participants will follow the allocated diet ad libitum and EX/no-EX. EX is supervised 2 out of 3 times per week. Diabetes remission and is followed regularly by measurement of HbA1 and medical records. Compliance is recorded using a study app, dietary questionnaires, smart watches and scales. Presently, a needs assessment and pilot study (n=24) is running to enable adjustment of the ON LiMiT trial which is planned to start Autumn 2026.

Results: The results from the main trial are expected in year 2030.

Conclusions: ON LiMiT will be the largest study to date concerned with finding the optimal carbohydrate and exercise intervention for remission of type 2 diabetes.

Keywords: Type 2 diabetes, remission, carbohydrate, diet, exercise

Funding: Novo Nordisk Foundation

Conflict of interest: None

16:00 – 16:15 ACTIVE COFFEE BREAK 4, POSTER SESSION 4 (PO 39 – PO 50)

PO 39 | Poster

BMI trajectories, medication use, comorbidities and healthcare service utilization in adults with newly diagnosed type 2 diabetes: a registry-based cohort study

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Background: Body mass index (BMI) development after a type 2 diabetes (T2D) diagnosis may reflect metabolic risk and influence long term treatment needs, yet its relationship with healthcare use and comorbidities remains unclear.

Aims: To identify BMI trajectories in adults with newly diagnosed T2D and examine associations with monitored laboratory values, medication use, comorbidity accumulation, and healthcare service utilization.

Methods: This registry-based cohort study included 3539 adults diagnosed with T2D in North Karelia, Finland, between 2011 and 2014, with follow up until 2024. Growth mixture modelling was used to derive 10-year BMI trajectories. Logistic, linear, and Poisson regression models assessed differences between BMI trajectory classes in laboratory monitoring, medication use, comorbidities, and healthcare service use.

Results: Three BMI trajectories emerged: stable (77.7%), increasing (14.6%), and decreasing (7.7%). The increasing class accumulated more chronic kidney and urinary tract diseases, obesity related diagnoses, sleep disorders, sleep apnea and chronic lower respiratory diseases than the stable class. The decreasing class, characterized by initially high BMI followed by weight loss, had the highest mortality and a higher prevalence of dementia, cardiovascular, and pulmonary diseases. HbA1c and LDL cholesterol monitoring was lowest in the decreasing class. Use of glucagon-like peptide-1 agonists was highest in the decreasing class early in follow up and in the increasing class by 2024. Treatment target achievement did not differ between classes. Healthcare utilization was highest in the decreasing class at the end of the follow-up while the use of dietitian services remained low throughout the follow-up.

Conclusions: BMI trajectories among individuals with T2D formed three distinct patterns associated with differences in laboratory values, medication use and healthcare needs. These patterns reflect differences in metabolic risk and care intensity. Continuous

monitoring of key clinical parameters together with effective weight management and optimized care pathways are essential to support effective long-term management of T2D.

Keywords: Type 2 diabetes; BMI trajectories; medication use; healthcare utilization; comorbidities

Funding: This study is part of the PALVA-project which is funded by the Next Generation EU (VN/29470/2023). Funding has also been achieved from the Strategic Research Council of the Academy of Finland [project IMPRO, 312703, 336325].

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

PO 40 | Poster

AI-DAPT: A Hybrid Modeling Approach to Unify Interstitial and Blood Glucose Across Glycemic States for Non-Invasive Glucose Prediction

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Background: In the EU-Project Ai-Dapt, we are developing a non-invasive glucose prediction based on photoplethysmography (PPG). Most data driven models require large volumes of data to be trained for such a complex task. While blood glucose is the clinical gold standard to measure glucose, collecting large amounts of it simply requires much manual labour. Continuous glucose monitoring (CGM) devices follow a different measurement process that is automated but is not as accurate. Thus, such devices facilitate the collection of large amounts of interstitial glucose data. However, when validating results, a reasonable amount of blood sugar readings is still required. Working with 2 different sources of glucose data is challenging, as well as working with normo-glycemic patients and dysglycemic patients. We identify the mapping of interstitial glucose to blood glucose as an essential tool for the future development of CGM algorithms.

Aim: We want to develop an algorithm that unifies CGM interstitial glucose data and blood glucose while accounting for differences between participants with T2D, prediabetes, and no diabetes.

Methods: We plan to recruit 150 participants with different glycemic status, who will wear a smartwatch, which records PPG-Data and CGMs, which collect interstitial glucose levels in free living-conditions or in a controlled study visit where participants undergo metabolic tests (MMTTs or OGTTs). Within this cohort, 5 participants with T2D, 5 with prediabetes and 5 without diabetes will undergo metabolic tests while wearing a CGM and the Smartwatch. This will be used as reference data to create a hybrid model that combines regression with extended Kalman filtering to generate calibrated glucose time series. Future perspective: We expect to establish a validated hybrid model that unifies venous and CGM glucose across different glycemic states. This will provide a scalable reference framework for validating noninvasive PPG-based interstitial glucose predictions on blood glucose validation sets.

Keywords: AI, T2D, Non-Invasive glucose measurement.

Funding: Horizon Europe Framework Programme (HORIZON)

Conflict of interest: None

PO 41 | Poster

How ultra-processed foods modulate cardiometabolic risk: A 2X2 factorial randomized control trial protocol

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Background: Despite growing evidence linking overconsumption of ultra-processed foods (UPFs) to numerous adverse health outcomes, there is still no consensus regarding whether all UPFs are equally concerning for cardiovascular health, regardless of their nutrient profile.

Aim: This 2x2 factorial randomized controlled trial aim to determine which feature(s) of UPFs, namely their poor nutrient profile or their underlying industrial processes, contribute to cardiometabolic risk.

Methods: 120 adults, men and women, are randomly assigned to one of the four experimental 6-week diets: 1- Low-UPF diet (5% total energy) low in saturated fats (SFAs), added sugars and sodium; 2- Low-UPF diet (5% total energy) rich in SFAs, added sugars and sodium; 3- High UPF diet (75% total energy) low in SFAs, added sugars and sodium; 4- High UPF diet (75% total energy) rich in SFAs, added sugars and sodium. All foods and beverages are provided to participants under isoenergetic conditions using a cyclic seven-day menu. The high UPFs diets are largely comprised of commercial foods with variable amounts of SFAs, added sugars and sodium. The low UPFs diets are custom prepared with varying amounts of SFAs, added sugars and sodium to match the nutrient values of the high UPFs diets. Three primary outcomes are measured at baseline and on two consecutive days post-treatment and compared among groups using a factorial design approach: fasting LDL-C concentrations, insulin sensitivity (HOMA-IR) and day-time systolic ambulatory blood pressure (dtSBP).

Conclusion: This randomized controlled trial will be the first to use fully controlled feeding conditions to disentangle out the individual effects of the industrial processing techniques from the poor nutrient content of UPFs on cardiometabolic risk.

Keywords: Ultra-processed foods, randomized controlled trial, cardiometabolic risk

Funding: This RCT is supported by a grant from the Canadian Institutes of Health Research. MR has received graduate scholarships the Fonds de recherche du Québec (FRQ).

Conflict of interest: No potential disclosures.

PO 42 | Poster

Metabolic low-grade inflammation within clinically normal ranges signals future chronic kidney disease

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Background: Chronic low-grade inflammation arising from metabolic dysregulation has been increasingly implicated in the development and progression of chronic kidney disease (CKD) within the cardiovascular–kidney–metabolic framework. However, little is known about how chronic inflammatory profiles and their long-term patterns before diagnosis relate to CKD development.

Aims: We examined the associations of multidimensional inflammatory biomarkers with incident CKD and characterized inflammatory trajectories preceding disease onset.

Methods: Using data from the West China Hospital Alliance Longitudinal Epidemiology Wellness study (WHALE, DOI: 10.1007/s10654-025-01290-1), we conducted a population-based cohort study including adults without CKD at baseline who had at least two health examinations. CKD was defined as estimated glomerular filtration rate <60 mL/min/1.73 m² or urinary albumin-to-creatinine ratio ≥30 mg/g. Fifty-five inflammatory biomarkers derived from routine hematological tests were examined across four domains: cellular immune imbalance, circulating inflammatory proteins, humoral immune factors and hemorheological alterations. Associations with CKD were estimated using adjusted Poisson regression. Latent class mixed models were used to identify longitudinal trajectories of key biomarkers prior to CKD onset.

Results: Among 327,076 participants (mean age 40.2±12.8 years; 45.1% female), higher counts and proportions of leukocytes, neutrophils, monocytes, eosinophils and basophils were positively associated with CKD risk (RR range: 1.011–1.892), whereas lymphocyte proportion and lymphocyte-to-monocyte ratio were inversely associated with CKD risk. Elevated CRP (RR=1.212) and CRP-to-albumin ratio (CAR; RR=1.218) were associated with increased CKD risk, while albumin showed a protective association (RR=0.965). Persistently higher CRP (OR=1.843) and CAR (OR=1.841) level trajectories within conventional clinical ranges for over a decade before diagnosis were linked to increased CKD risk.

Conclusions: A systemic inflammatory profile was associated with subsequent CKD development. Importantly, low-grade inflammation within clinically normal ranges was observed many years before disease onset, highlighting the potential renal burden imposed by long-term metabolic imbalance rather than overt pathological inflammation. Keywords chronic kidney disease; metabolic low-grade inflammation; cohort study; longitudinal trajectories

Keywords: Not reported in source file.

Funding: This study was supported by the National Natural Science Foundation of China (Grant No. 32571690); National Natural Science Foundation of China (Grant No. 32471519).

Conflict of interest: None

PO 43 | Poster

Protocol for the Nourish 2 Flourish (N2F) pilot trial: a Portfolio Diet-based nutrition education and community gardening intervention for type 2 diabetes prevention in Peel

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Background: The Region of Peel has the highest rate of type 2 diabetes (T2D) and the largest proportion of immigrants and racialized populations in the province of Ontario in Canada. To address this health burden and respond to the needs of Peel residents, we

collaborated with community members to co-design a pilot study, Nourish 2 Flourish (N2F). This 12-month intervention combines culturally-tailored nutrition education based on the Portfolio Diet with community gardening to reduce T2D risk.

Aims: 1) Co-design an intervention and implementation strategy with interest holders and the target population to ensure its relevancy. 2) Deliver the N2F intervention to 150 participants and assess the effect of the intervention on changes in diet quality, anthropometric measurements, biomarkers of T2D risk, and implementation success outcomes.

Methods: 1) Hold focus groups with target population (adults at risk for T2D in Peel) and quarterly meetings with the Peel Community Advisory Committee, composed of interest-holders across Peel, to gather insights on intervention design. The Consolidated Framework for Implementation Research is used to map feedback. 2) Recruit participants at high risk for T2D (overweight, high waist circumference, and CANRISK score of ≥ 21) from social media, physical flyers, and community organizations and screened using a motivational interviewing technique. 2) The nutrition curriculum modelled after DPP is delivered virtually by a registered dietician across 16 sessions. Diet is assessed using 3-day food records collected through the Keenoa mobile application. Anthropometric measurements and lifestyle data are collected at the University of Toronto Mississauga Campus. Biomarkers of T2D risk are collected at LifeLabs clinics. All measurements are collected at baseline and 12 months and are assessed using a one-group pretest-posttest design. Preliminary

Results: The trial commenced in February 2026. Recruitment strategies included Facebook advertisements and outreach to 17 community partners. To date, 34 participants completed the screening survey, 16 were deemed eligible, and 10 completed the baseline study visit.

Conclusions: Findings from N2F could provide a feasible and effective strategy to address the T2D burden in Peel and insights for scale-up.

Keywords: type 2 diabetes prevention; Portfolio Diet; community trial; implementation science; health equity

Funding: Novo Nordisk Network for Healthy Populations. Canada Research Chair Program.

Conflict of interest: No disclosures

PO 44 | Poster

Estimating the Effects of Nordic Diets on the Risk of Major Adverse Liver Outcomes: a Target Trial Emulation across Two Cohorts in Sweden

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Background: Cohort studies have shown benefits on severe liver diseases from dietary patterns similar to Nordic dietary patterns when comparing high versus low adherence. However, several methodological limitations of these observational studies preclude meaningful causal interpretation compared to evidence that could be obtained from a randomized trial, such as relevant public and patient health diet comparisons of sustained adherence to Nordic diets over time.

Aims: To estimate the effects of sustained adherence to the healthy Nordic diet (HND) or the Nordic Nutrition Recommendations 2023 (NNR23), on the 24-year risk of major adverse liver outcomes (MALO) in a middle-aged to elderly Swedish population.

Methods: Two Swedish cohorts (n=64,406) were used to emulate population-adapted threshold interventions of the HND and the NNR23 diet. The parametric g-formula was used to estimate risk differences (RDs) under each hypothetical intervention compared with no intervention. Secondary analyses included comparing the HND and NNR23 with a low-adherence group as well as including reducing alcohol as an additional hypothetical intervention. All-cause mortality was a secondary outcome.

Results: Estimated RDs for the HND and no intervention and the NNR23 diet and no intervention were -0.13% (95% CI: -0.29, 0.05) and 0.06% (95% CI: -0.05, 0.16), respectively. Compared to NNR23, the estimated RD for the HND was -0.18% (95% CI: -0.41, 0.05). Meaningful reductions of MALO from the HND were estimated in secondary analyses. Furthermore, a lower risk of all-cause mortality from the HND was estimated, when compared to the other diets.

Conclusions: We estimated no clear risk reductions from a HND or a NNR23 diet on the 24-year risk of MALO when compared to each other or no intervention. However, meaningful reductions from the HND were estimated in secondary analyses. The HND also reduced the risk of all-cause mortality.

Keywords: Healthy Nordic Diet; Liver Disease; Causal Inference; Target Trial Framework

Funding: This work was supported by a research grant from the Danish Diabetes and Endocrine Academy, which is funded by the Novo Nordisk Foundation, grant number NNF22SA0079901.

Conflict of interest: HH:s institutions have received research funding from Astra Zeneca, EchoSens, Gilead, Intercept, MSD, Novo Nordisk, Takeda and Pfizer with HH as the PI. He has served as consultant, speaker or on advisory boards for Astra Zeneca, Boehringer Ingelheim, Bristol Myers-Squibb, GSK, Echosens, Ipsen, MSD and Novo Nordisk and has been part of hepatic events adjudication committees for Arrowhead, Boehringer Ingelheim, KOWA and Jazz Pharma. No other authors declare any conflicts of interests.

PO 45 | Poster

Prospective associations between ultra- processed food consumption and adiposity and blood pressure in children

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Background: In recent years, consumption of ultra-processed foods (UPF) has increased worldwide. Although previous studies have associated UPF consumption with adiposity and cardiometabolic risk in adults, longitudinal evidence in children is yet limited.

Aims: To estimate the prospective associations between UPF consumption and cardiometabolic risk factors over a 3-year follow-up in healthy Spanish children.

Methods: A 3-year prospective study was conducted in 1,509 participants of an ongoing, multicenter children cohort. Exposure was assessed as the cumulative average UPF consumption among children reporting plausible energy intake. Linear mixed models were fitted and adjusted for potential confounders (sex, age, physical activity, and adherence to the Mediterranean diet) to assess the associations between UPF consumption and z-scores of body mass index (zBMI), fat mass index (zFMI), waist circumference (zWC), waist-to-height ratio (zWHR), and systolic and diastolic blood pressure (zSBP and zDBP).

Results: A total of 1033 children were included (mean baseline age: 4,5±1,1 years; 50,5% girls). Higher cumulative UPF consumption was prospectively associated with greater adiposity and diastolic blood pressure during 3-year follow-up. In the adjusted models, each 100gr/day increase in the cumulative UPF consumption was significantly associated with higher zBMI (β: 0,05; 95%CI 0,02-0,07), zFMI (β: 0,05; 95%CI 0,02-0,08), zWC (β: 0,10; 95%CI 0,07-0,14), zWHR (β: 0,11; 95%CI 0,07-0,15), and zDBP (β: 0,06; 95%CI 0,01-0,10) at 3-year follow-up.

Conclusions: Higher UPF consumption in childhood was prospectively associated with greater adiposity and higher diastolic blood pressure. These findings support a potential role of UPF consumption in the early development of cardiometabolic risk.

Keywords: ultra-processed food, childhood obesity, cardiometabolic risk factors.

Funding: Funds for the establishment of the CORALS cohort in the first year of the study (2019) were provided by an agreement between the Danone Institute from Spain and the Centro de Investigación Biomédica en Red de la Fisiopatología de la Obesidad y Nutrición (CIBEROBN). This work was partially funded by the 2024 Intramural Projects Call of the CIBEROBN and by the Spanish government's official funding agency for biomedical research, ISCIII, through the Fondo de Investigación para la Salud (FIS), the European Union ERDF/ESF, 'A way to make Europe'/ 'Investing in your future' [PI24/00711]. At present, funding also includes the Generalitat Valenciana, PROMETEO 21/2021.

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

PO 46 | Poster

Reduction in dietary Dioxin exposure following a low-fat vegan diet: results from a 16-week randomized trial

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Background: Persistent organic pollutants such as polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) are endocrine disrupting chemicals that accumulate in adipose tissue and have been linked to adverse metabolic outcomes, including obesity and cardiometabolic disease. Diet, particularly the consumption of animal-derived foods, represents the primary route of human exposure.

Aims: This study aimed to evaluate the effect of a low-fat vegan diet on estimated dietary PCDD/Fs intake in overweight and obese adults.

Methods: In this 16-week randomized controlled trial, 244 adults (BMI 28–40 kg/m²) were assigned to either a low-fat vegan diet (n=122) or a control group maintaining their usual diet (n=122). Dietary intake was assessed using 3-day food records at baseline and 16 weeks. PCDD/Fs intake was estimated by combining food consumption data with toxic equivalency (TEQ) values derived from EFSA databases and laboratory analyses. Changes in dioxin intake were analyzed using repeated measures ANOVA, and associations with body weight were assessed using correlation and regression analyses.

Results: The vegan group showed a significantly greater reduction in dietary dioxin intake compared with the control group. Lower-bound daily intake decreased by 51.22 pg/day in the vegan group versus 13.02 pg/day in controls ($p<0.001$). Similarly, weekly intake decreased by 358.52 pg/week versus 91.17 pg/week, respectively ($p<0.001$). Reductions were primarily driven by the elimination of dairy products, eggs, and meat. Changes in dioxin intake were modestly correlated with weight loss ($r=0.19$, $p=0.005$), although this association was attenuated after adjusting for energy intake.

Conclusions: A low-fat vegan diet substantially reduces dietary intake of PCDD/Fs, largely through the exclusion of animal-derived foods. These findings suggest that plant-based dietary patterns may be an effective strategy to lower body burden of lipophilic environmental contaminants, with potential implications for metabolic health.

Keywords: Dioxins, Polychlorinated dibenzo-p-dioxins (PCDD/Fs), Vegan diet, Plant-based diet, Dietary exposure, Obesity

Funding: None to declare

Conflict of interest: None to declare

PO 47 | Poster

Implementation of a screening model for type 2 diabetes within the healthcare system: the DigiCare4You study

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Background: Type 2 diabetes (T2D) represents a growing challenge for healthcare systems, requiring strategies that enable not only early identification of individuals at risk but also effective interventions to improve metabolic outcomes. Integrated digital tools have emerged as a promising approach to connect community-based detection with clinical follow-up.

Objective: To evaluate the implementation of an integrated screening model for early detection of T2D and to assess its impact on intervention participation and glycaemic control in adults.

Methods: DigiCare4You is a multicentre community-based intervention conducted across four European countries. Overall, more than 11400 families participated in the initial screening phase. In Spain, 15,000 families were informed, of which 2334 participated in a first stage screening using the FINDRISC questionnaire. A total of 807 adults were identified as high risk for T2D, and 421 (52.2%) completed a second-stage clinical screening in primary care, including anthropometry, blood pressure and biochemical parameters. Participants diagnosed with prediabetes or T2D were allocated to either a control or an intervention group. The control group received general lifestyle and nutritional advice, while the intervention group received structured lifestyle counselling supported by digital tools.

Results: In total, 5037 adults were identified as high risk for T2D, of whom 44.6% completed clinical evaluation. In Spain, among those assessed, 18.1% were identified with prediabetes, 1.1% with T2D and 11.9% had pre-existing diabetes. A total of 91% of individuals diagnosed with prediabetes or diabetes agreed to participate in the intervention (n=141). Follow-up showed improvements in glycaemic profiles, with favourable trends observed in HbA1c levels after the intervention. The implementation of the programme enabled effective integration between community screening and primary care, improving early detection and access to structured interventions supported by digital tools.

Conclusions: DigiCare4You study demonstrates that integrating community-based screening into the healthcare system, combined with digital tools for the management of prediabetes and type 2 diabetes, may enhance early detection and support improvements in glycaemic control among high-risk populations. Its integrated and scalable approach highlights its potential as a cost-effective strategy to improve the efficiency and sustainability of healthcare systems in the prevention of chronic diseases.

Keywords: Not reported in source file.

Funding: Not reported in source file.

Conflict of interest: Not reported in source file.

PO 48 | Poster

Association of Diabetes with Falls and Clinical Burden among Older Adults in the Mexican Border Region: A Cross-Sectional Study

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Background: Type 2 Diabetes is increasingly recognized as a condition associated with clinical burden and functional decline. In Mexico, its prevalence among older adults is approximately 25% (ENASEM, 2021). However, evidence on its relationship with body composition and functional outcomes in community-dwelling older adults remains limited.

Aims: To explore the clinical and functional profile associated with diabetes, focusing on body composition, clinical burden, and risk of falls in the Mexico border region.

Methods: A cross-sectional study was conducted in 138 adults (mean age: 73 years; 73% women). The prevalence of self-reported diabetes was 37%. Clinical variables included hypertension, dyslipidemia, and number of medications. Body composition was assessed by bioelectrical impedance analysis, obtaining body fat percentage and skeletal muscle mass and Appendicular skeletal muscle mass (ASM) was estimated using the Rangel-Peniche equation. Functional assessment included gait speed (4-meter walk test), handgrip strength, and activities of daily living (Barthel Index and Lawton & Brody scale). Falls in the previous year were recorded. Multivariable logistic regression models, adjusted for age and sex, were used to estimate odds ratios (ORs). Statistical significance was set at $p<0.05$

Results: No statistically significant associations were observed with body composition (ASM and body fat percentage: OR = 1.01; p = 0.55 and OR = 1.00; p = 0.82, respectively) or physical performance (gait speed and handgrip strength: OR = 1.69; p = 0.287 and OR = 0.83; p = 0.748, respectively). Likewise, no associations were observed with activities of daily living (Barthel and Lawton & Brody: OR = 0.97; p = 0.142 and OR = 1.36; p = 0.355, respectively). Individuals with diabetes showed a higher frequency of falls (OR = 1.67, p = 0.007). They also had higher odds of hypertension (OR = 11.23, $p < 0.001$) and a greater number of medications (OR = 1.30, p = 0.002).

Conclusions: Diabetes in older adults is associated with increased clinical burden and higher frequency of falls. No significant associations were observed with body composition or physical performance measures.

Keywords: diabetes, falls, older adults

Funding: (DINV) Dirección de Investigación. Universidad Iberoamericana CDMX

Conflict of interest: No potential conflicts of interest to disclose

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Early Dietary Patterns and Body Composition in Preschool Children Exposed to Maternal Obesity or Gestational Diabetes

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Background: The rising prevalence of maternal obesity and gestational diabetes mellitus (GDM) has important implications for offspring metabolic health. Maternal glycemia and adiposity influence early adiposity and may contribute to long-term metabolic risk, with features of metabolic syndrome emerging in childhood. However, studies examining associations between adiposity, diet, and lifestyle in children with prenatal metabolic exposure remain scarce. The longitudinal PONCH cohort follows women with normal weight (NW), obesity (OB), or GDM and their children, showing higher adiposity from birth in exposed offspring.

Aims: To investigate dietary intake in preschool children of normoglycemic (NW and OB) and GDM mothers, and to examine associations between dietary habits and anthropometric measures.

Methods: NW and OB women were recruited at 8–12 weeks of gestation, while women with GDM were enrolled at diagnosis. Their children have been invited to annual follow-up visits including body composition assessment, anthropometry, blood sampling, and

questionnaires. On average, 111 children (2-6 years) attended visits, of whom 87% provided validated Food Frequency Questionnaires completed by the mothers.

Results: Children in the GDM- and OB-groups had higher total sugar intake than the NW-group, who consumed more unsaturated fats. Vegetable intake was significantly higher in the NW-group compared to GDM (37%, $p<0.05$) and OB groups (62%, $p<0.05$). Intake of high-calorie, low-nutrient foods was positively associated with adiposity across groups. Full-fat milk and yoghurt were inversely associated with adiposity-related measures in the OB- and GDM-groups ($r=-0.23$ to -0.33, $p<0.05$). In the GDM-group, fish intake was inversely associated with BMI and body fat% ($r=-0.31$ to -0.37, $p<0.05$), a pattern not observed in NW- or OB-groups.

Conclusions: Distinct dietary patterns were observed in children with prenatal metabolic exposure, with fish and full-fat dairy intake inversely associated with adiposity. These findings suggest that maternal metabolic status may influence early diet–adiposity relationships and may guide early-life prevention strategies.

Keywords: Gestational diabetes mellitus; Preschool children; Adiposity; Dietary patterns; Prenatal metabolic exposure

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Conflict of interest: I have no disclosures to declare.

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Updating and expanding the evidence for soy heart health claims development: A systematic review and meta-analysis of randomized trials of the effect of soy protein on a comprehensive set of established blood lipids

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Background: Current soy heart health claims are based on the cholesterol-lowering effect of isolated soy protein (ISP) with an evidence census through 2013. There is a need to update these estimates and assess an expanded set of established blood lipid targets.

Aims: We conducted a systematic review and meta-analysis of randomized trials of the effect of isolated soy protein (ISP) on an expanded set of established blood lipids.

Methods: We searched MEDLINE, Embase, and The Cochrane Central Register through December 17, 2025. We included randomized trials ≥3 weeks of the effect of ISP interventions compared with a non-soy-containing control on blood lipids. Two independent reviewers extracted data and assessed risk of bias. The primary outcome was low density lipoprotein cholesterol (LDL-C) and secondary outcomes were total cholesterol (TC), high density lipoprotein (HDL-C), triglycerides (TG), non-HDL-C, and apolipoprotein B (apo B). Data were expressed as a mean difference (MD) with 95% confidence intervals (95% CI). Certainty of evidence was assessed using GRADE. (ClinicalTrials.gov, NCT04861545)

Results: We included 90 trials (K=139 trial comparisons) in 5,547 participants with various health statuses. The median ISP dose was 30 g/d with a median follow-up of 8 weeks. ISP reduced LDL-C (K=135; MD -0.15 [95% CI, -0.18, -0.12] mmol/L); TC (K=136; -0.16 [-0.20, -0.12] mmol/L); TG (K=118; -0.10 [-0.15, -0.05] mmol/L); non-HDL-C (K=132; -0.19 [-0.22, -0.15] mmol/L); and apo B (K=47; -0.05 [-0.07, -0.04] g/L); and increased HDL-C (K=132; 0.03 [0.01, 0.04] mmol/L), compared with a non-soy control. The certainty of evidence was assessed as high for LDL-C, TC, HDL-C, and non-HDL-C and moderate for TG and apo B (downgrades for imprecision).

Conclusions: Updated evidence for an expanded set of established lipid targets reinforces existing soy heart health claims. ISP at a median dose of 30g/d improves lipids with a strong indication for small important reductions in LDL-C, TC, and non-HDL-C and a trivial increase in HDL-C and a good indication for a small important reduction in apo B and trivial reduction in TG in adults with varying health conditions.

Keywords: Cardiovascular disease; cholesterol; LDL-C; meta-analysis; randomized controlled trials.

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Conflict of interest: SBM reports nothing to disclose in relation to this manuscript.

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Belén Pastor-Villaescusa	PO 37, PO 45, SO 25, SO 26, SO 30, SO 36
Alpa V. Patel	SO 14
E Pavić	PO 19
Indira Paz-Graniel	PO 6
MC Peddie	OA 3
A Pedret	PO 3
Robin Peeters	PO 4
Per-Ola Carlsson	SO 28
Júlia Perera	SO 27
Josué Alberto Pérez Acosta	SO 25, SO 26, SR 1
J Pérez-Jiménez	PO 14, OA 7
Silvia Pérez-Piñero	SO 23

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DPY Phang	SO 13
Rosaura Picáns-Leis	PO 37, PO 45, SO 25, SO 26, SO 30, SO 36
ME Piché	PO 21
Mats Pihlsgård	SO 38
Xavier Pintó	SO 37
Olga Pivovarova-Ramich	PO 11, PO 28, SO 10
C Plante	OA 13
PL Plante	PO 21
Julio Plaza Díaz	OA 1, SO 25, SO 26, SO 30, SO 34, SR 1
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Ana Maria Prieto-Iborte	SO 30
Lara Prohens	SO 37
V Provencher	PO 41
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J Queral	PO 3
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V Rahelić	PO 19
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S Ramalingam	PO 34
D. Dan Ramdath	PO 20, SO 20, SO 39
Noelia Ramírez	PO 37
Sonia Ramos	PO 1, OA 7
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C Razquin	SO 24
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Rashmi Sinha	SO 14
V Skantze	PO 9, SO 2, SO 33
Coco M Fuhri Snethlage	SO 32
Carlos Alexandre Soares Andrade	PO 17
Maarten R Soeters	SO 32
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R Solà	PO 3
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Chao Song	PO 36
Mingyang Song	OA 4
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R Suppi	SO 6
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Ruijie Tang	SR 4
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Gabriella Laila Tarek	PO 17
Anne-Julie Tessier	SO 16
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Natalia Vázquez-Bolea	PO 45, SO 25, SO 36
Rocío Vázquez-Cobela	PO 37, PO 45, SO 25, SO 26, SO 30, SO 36
Héctor Vázquez-Lorente	PO 45, OA 1, SO 30, SO 37, SR 1
Zenaida Vázquez-Ruiz	SO 37
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A Veilleux	PO 31
M Ventura	PO 16
Subodh Verma	SO 20

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Vladimir Vuksan	SO 20
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Xiaowen Wang	OA 4
Zhiting Wang	PO 39
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Katja Wikström	PO 39
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Walter Willett	SO 14
P Williamson	PO 2
C Wolfe	PO 2
Zhaogui Wu	PO 15
Nanyan Xiang	PO 42, OA 10
Shihao Xiao	PO 42
PX Xie	SO 13
Xueru Xu	PO 42
Bo Yang	PO 8
J Yang	SO 13
Yong Yang	PO 42
Vivian Yin	PO 43, SO 15, SO 19, SR 3
H Yun	SO 24

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Juliane Zemdegs	SO 38
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