— Journée nutrition et santé humaine

October 21, 2019

INAF, Pavillon des Services, Université Laval

CONFERENCE PROGRAMM, Room 1724

TIME		TOPICS	SPEAKER	AFFILIATION	*TITLE*
08:15	**08:55**	**Welcome and Poster installation**			
09:00	09:20	Opening Conference	Hélène Jacques	INAF, FSAA	*Welcome and presentation of FSAA*
09:20	09:40	Introduction of INAF	Sylvie Turgeon	INAF, FSAA	*INAF, Science for Food and Health*
09:40	10:00	Introduction of HNH group	Edith Feskens	HNH, WUR	*Division of Human Nutrition and Health, Improve health through better nutrition.*
10:00	10:20	Sensory Science and Eating Behaviour	Laure Saulais	INAF, FSAA	*Challenges in predicting consumers behaviours to design a more sustainable future of food*
10:20	10:40		Paulina Morquecho Campos	HNH, WUR	*Do we respond to food cues like Pavlovian dogs?*
10:40	**11:10**	**BREAK - INAF Poster Session**	Students from INAF	INAF, FSAA	*INAF Poster Presentation*
11:10	11:30	Sensory Science and Eating Behaviour	Angelo Tremblay	INAF, FSAA	*A tradition of collaborative nutrition research between Laval University and Dutch research units (Wageningen, Maastricht, Amsterdam)*
11:30	11:50	Nutritional Biology	Charlotte Kramer	HNH, WUR	*Developing a new Nutrient-Rich Food Score to Assess nutrient Density in Older Adults*

TIME		TOPICS	SPEAKER	AFFILIATION	*TITLE*
11:50	**13:00**			**LUNCH and NETWORKING**	
13:00	13:20	Nutrition and Disease	Vincent Fradet	INAF, FSAA	*Nutritional insights into prostate cancer prevention - impacts of omega-3 fatty acids*
13:20	13:40		Vera Wesselink	HNH, WUR	*The inflammatory potential of the diet in relation to colorectal cancer recurrence and survival*
13:40	14:00		Benoît Lamarche	INAF, FSAA	*Nutrition research in the context of precision public health*
14:00	14:20		Kamalita Pertiwi	HNH, WUR	*Circulating fatty acids: Utility as biomarkers of intake and the relation to cardiometabolic outcomes.*
14:20	**15:00**	**BREAK - WUR Poster Session**	Students from WUR	HNH, WUR	*WUR Poster Presentation*
15:00	15:20	Nutrition, Metabolism and Genomics	Marie-Claude Vohl	INAF, FSAA	*Genetic Determinants of the Plasma Triglyceride Response to an N-3 PUFA Supplementation*
15:20	15:40		Anouk Gijbels	HNH, WUR	*The PERSON-study: PERSonalized glucose Optimization through Nutritional intervention*
15:40	**16:40**	**INAF TOUR**	Sylvie Turgeon, Renée Michaud	INAF, FSAA	*Tour*
16:40	**18:00**			**5 à 7 (Happy hours) / NETWORKING / Joint Poster Session**	

Partenaire du 5 à 7

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#POSTER	POSTER INFO
0	**Consumption and sources of saturated fatty acids in Canada: Data from the 2015 Canadian Community Health Survey** Stéphanie Harrison [1,2], Didier Brassard [1,2], Simone Lemieux [1, 2] et Benoît Lamarche [1, 2] (1)Institut sur la nutrition et les aliments fonctionnels (INAF); (2)École de Nutrition, Université Laval. Objectives: The 2019 revised version of Canada's Food Guide (CFG) recommends limited consumption of processed foods high in saturated fatty acids (SFA). Yet, the contributions of each CFG group to total SFA intake of Canadians are not specifically known. The objectives of this study were to determine the sources of SFA consumed by Canadian adults and identify potential differences in these sources between sexes and age groups. Methods: A nation representative sample from the Canadian Community Health Survey 2015 (CCHS 2015 Nutrition) was used for these analyses. Dietary intakes were measured using a single 24-hour recall. Food sources of SFA were classified according to the revised 2019 CFG food categories: vegetables and fruits (VF), whole grain foods (WG) and protein foods (including milk and alternatives and meats and alternatives). We have also examined the contribution of all other foods, i.e. those not included in these three categories, to total SFA intake. Results: Among Canadian adults, SFA contribute to 10.4±0.1% (SEM) of total energy intake. CFG food categories contributed to total SFA intake as follows: VF (5.4±0.2%), WG (2.5±0.1%), protein foods (47.7±0.5% with 23.2±0.4% from milk and alternatives and 24.5±0.4% from meats and alternatives) and all other foods (44.2±0.5%). Men compared with women consumed more SFA from protein foods (+3.5% SFA intake, p=0.0001) and less SFA from all other foods (-2.9% SFA intake, p=0.0015). In the protein foods category, men compared with women consumed more SFA from meats and alternatives (+4.4% SFA intake, p<0.0001) but not from milk and alternatives (p=0.28). Age was inversely associated with the proportion of SFA from milk and alternatives (p=0.0018) and positively associated with the proportion of SFA from meats and alternatives (p=0.0055) but not from all other foods. Conclusions: These data show that mean SFA consumption is slightly greater than the 10%E cut-off previously proposed in Canada. Protein foods and all other foods are the main sources of SFA in the diet of Canadians. Future studies should examine which food substitution is most likely to contribute to a greater reduction in SFA intake at the population level.

#POSTER	POSTER INFO
1	**Genetic predictors of weight loss following bariatric surgery** de Toro-Martín, J* [1][2], Guénard, F [1][2], Marceau, S [3], Tchernof, A [2][4], Pérusse, L [1][5], et Vohl, MC [1][2] (1) Institute of Nutrition and Functional Foods (INAF), Université Laval, (2) School of Nutrition, Université Laval, (3) Department of Surgery, Université Laval, (4) Quebec Heart and Lung Institute, (5) Department of Kinesiology, Université Laval, Québec, Canada. **Background and aims.** Obesity is considered as a major risk factor for diabetes and cardiovascular diseases. Although bariatric surgery is a successful approach for promoting weight loss and metabolic improvements, the extent of beneficial outcomes is variable among patients undergoing such intervention. The aim of this study was to test the contribution of genetic factors to this interindividual variability of the weight loss response after bariatric surgery. Methods. Genotyping of 185 SNPs found to be associated with obesity in previous genome-wide genetic association studies was performed in 860 patients with severe obesity and undergoing bariatric surgery (biliopancreatic diversion with duodenal switch – BPD-DS). The percentage of excess body weight loss (%EBWL) was monitored over a period of four years after surgery and modeled by semiparametric trajectory analysis and by using a mixed effects linear model. Genetic associations between group trajectories and each SNP were assessed independently and a polygenic risk score (PRS) was constructed and tested against %EBWL models. **Results.** Two different groups arose from the trajectory analysis of %EBWL. A first group of patients whose %EBWL exceeded 80% throughout the follow-up period (80.8% of patients), and a second group with a less pronounced %EBWL (19.2% of patients). The predictive power of the model, evaluated by the area under the receiver-operating characteristics curve (AUC-ROC), was 0.82 (0.81-0.83), taking into account the effects of age, sex, type of surgery (laparotomy or laparoscopy) and initial body mass index (iBMI). Addition of the PRS significantly increased the predictive value of the model [AUC-ROC = 0.88 (0.86-0.89); $P <0.0001$]. The linear trend test demonstrated a significant effect of the PRS on the probability of a lower response [OR = 1.07 (1.06-1.08); $P <0.0001$]. The mixed linear model, including post-surgery cube time, age, sex, iBMI, type of surgery and PRS, showed the best fit of %EBWL ($r2 = 0.95$). The likelihood ratio test showed that the inclusion of the PRS significantly increased the overall model fit ($X2 = 12.6$, $P = 0.0004$). **Conclusion.** In this study, the genetic profile was a significant determinant of the evolution of weight loss after BPD-DS. These results suggest that genetic testing could potentially be used in the pre-surgical assessment of patients with severe obesity. **Keywords:** obesity, atherosclerosis, biliopancreatic diversion with duodenal switch (BPD-DS), genetic background

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2	**Gene co-expression network analysis in the relationship between plasma carotenoids and lipid profile** Frédéric Guénard [1], Bénédicte L. Tremblay [1], Benoît Lamarche [1], Louis Pérusse [1], Marie-Claude Vohl [1] 1 Institute of Nutrition and Functional Foods (INAF), Laval University, Quebec City, Canada. Variability in circulating carotenoids may be attributable to several factors including genetic variants and lipid profile. However, few studies have considered the impact of gene expression in the inter-individual variability in circulating carotenoids. Most studies considered expression of genes individually and ignored their high degree of interconnection. Weighted gene co-expression network analysis (WGCNA) is a system biology approach used for finding gene clusters with highly correlated expression levels and for relating them to phenotypic traits. The objective of the present study was to examine the relationship between plasma total carotenoids and lipid profile using WGCNA. Plasma carotenoid levels were measured using high performance liquid chromatography analysis in 48 healthy subjects. Genome-wide expression levels were measured using HumanHT-12 v4 (Illumina Inc.). R software v2.14.1 was used to compute regressions between expression levels and total carotenoids. WGCNA was performed on the subset of probes showing a significant association with total carotenoids. Modules derived from WGCNA were correlated with lipid profile. Expression levels of 533 probes were associated with total carotenoids. WGCNA was thereafter conducted from total carotenoids-associated probes to identify specific modules and key genes related to lipid profile. Among the four WGCNA distinct modules identified and represented by colors, turquoise, blue and brown modules had significant correlations with plasma HDL-C and total cholesterol (TC). Gene significances for HDL-C and TC were correlated with module membership in the brown and blue modules, respectively. A total of four and 29 hub genes modulated by total carotenoids were potentially related to TC and HDL-C, respectively. This approach provides an integrative element of understanding to the potential implication of gene expression in the relationship between plasma carotenoids and lipid levels. Further studies and validation of the hub genes are needed.

#POSTER	POSTER INFO
3	**Relationship between omega-3 fatty acid intake and prostate cancer risk: Preliminary result of the BIOCAPPE_GRÉPEC study** Hanane Moussa [1], Lamoussa Diabaté [1], Laurence Bettan [1], Karine Robitaille [1], Molière Nguile-Makao [1], Hélène Hovington [1], Fred Saad [2], Michel Carmel [3], Armen Aprikian [4], BIOCaPPE Network [1,2,3,4], Benoit Lamarche [5], Pierre Julien [1], Yves Fradet [1], Vincent Fradet [1,5] 1 Centre de recherche du CHU de Québec-Université Laval, Québec, Qc; 2 Centre de Recherche du CHUM, Montréal, Qc; 3 Centre de Recherche du CHUS, Sherbrooke, Qc; 4 Institut de Recherche du CUSM, Montréal, Qc; 5 Institut sur la nutrition et les aliments fonctionnels (INAF), Québec, Canada. **Introduction:** Prostate cancer is a major health problem worldwide. Omega-3 fatty acids (ω3) are among the dietary factors that might impact prostate cancer risk. Preclinical and clinical studies suggest that a high consumption of ω3 have protective effects on prostate cancer development and progression. **Objective:** To explore the associations between prostate cancer incidence and consumption of ω3 in men at high risk of prostate cancer. **Methods:** We are conducting a multicenter prospective cohort study with 2500 men at high risk of prostate cancer to evaluate the role of lifestyle, including diet, on prostate cancer incidence. At study baseline, ω3 intake is evaluated by a food frequency questionnaire developed and validated at INAF - Université Laval. The incidence of cancer is evaluated after two years of follow-up. Preliminary association between ω3 intake and prostate cancer incidence in the first 256 participants was explored using multivariate logistic regression. **Result:** Among the first 256 participants, 33% were diagnosed with prostate cancer at 2 years. We observed an inverse association between PCa incidence and intake of long chain ω3 (LCω3) intake measured in the diet (OR 0.33, IC95% 0.11-0.95, p=0.04). This inverse association was accompanied by a dose-response relationship (p-trend = 0.02). **Conclusion:** These preliminary results suggest a potential link between prostate cancer incidence and LCω3 consumption in men at risk of prostate cancer.

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4	**Le phénotype "fit-actif"** Elisa Marin Couture [1,2] and Angelo Tremblay [1,2,3] 1 Department of kinesiology, Faculty of Medicine, Laval University, Quebec City, Canada; 2 Institute of Nutrition and Functional Food; 3 Quebec Heart and Lung Institute Research Center. **Introduction :** En dépit du fait que les personnes régulièrement actives présentent une adiposité corporelle significativement plus faible que celles observée chez des gens sédentaires, le consensus de la littérature actuelle tend à suggérer que l'activité physique (AP) n'exerce qu'un faible impact sur l'adiposité dans le contexte d'un programme de prise en charge pondérale. À cet égard, notre équipe de recherche a démontré auprès d'un groupe d'étudiants du niveau collégial qu'une classification qui intègre le niveau de pratique d'AP et le niveau de condition physique permet possiblement de mieux faire ressortir l'impact à long terme de l'activité physique sur le bilan d'énergie et la composition corporelle. **Objectif :** Comparer la composition corporelle et la santé métabolique des sujets « fit-actifs » aux sujets « unfit-inactifs » dans l'Étude des familles de Québec. **Méthodes :** La définition de « fit » correspondait aux sujets se trouvant dans la médiane supérieure au test de PWC 150kg; alors que « actif » se rapportait à l'activité physique vigoureuse du moment par des valeurs équivalentes à 8 ou 9 rapportées au moins 3 fois dans le Journal de Bouchard. Les sujets ont été évalués dans les trois phases de l'Étude des familles de Québec. **Résultats :** Les marqueurs de composition corporelle et de santé métabolique étaient en majorité significativement différents lorsque les sujets « fit-actifs » et les sujets « unfit-inactifs » étaient comparés (p<0,001). Ces différences sont d'autant plus marquantes lorsque les résultats sont évalués en phases 2 et 3 de l'Étude des familles de Québec. Cependant, les marqueurs génétiques étudiés ne sont pas significatifs entre les deux groupes. **Conclusion :** Les sujets « fit-actifs » présentent une adiposité corporelle ainsi qu'une santé métabolique meilleures que celles observées chez les sujets « unfit-inactifs ».

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5	**Interest in undergoing nutrigenetic tests according to genetic knowledge among Quebecers** Bastien Vallée Marcotte [1], Hubert Cormier [1], Véronique Garneau [1], Julie Robitaille [1], Sophie Desroches [1], Marie-Claude Vohl [1] 1 Institute of Nutrition and Functional Foods (INAF), Laval University, Quebec, Canada. Studies on public attitudes and perceptions of nutrigenetics have shown that the population is generally interested in personalised nutrition via genetic testing. Since this science has rapidly evolved in the past years, it becomes relevant to periodically survey the population to follow its interest. The objective of the present study was to survey French Canadians from the province of Quebec about their current knowledge and levels of interest in nutrigenetic testing for personalised nutrition. A total of 1425 individuals answered a 37-item questionnaire via SurveyMonkey Gold with enhanced security. The questionnaire was beforehand tested by 20 unrelated individuals. Genetic knowledge was assessed by a 16-question questionnaire validated by Jallinoja and Aro (1999) that was included as one of the 37 items of the survey. General linear models adjusted for age and sex were used to test for associations between genetic knowledge and interest in nutrigenetics. Chi-square tests were used to test for associations between categorical variables. The vast majority of participants were not familiar with the term "nutrigenetics" (82.7%). When analysed as a continuous variable, interest in nutrigenetic testing was inversely associated with genetic knowledge in a generalized linear model adjusted for age and sex ($p<0.0001$). When grouped into quartiles, participants who had better genetic knowledge (the first and second quartiles each) were less interested in nutrigenetic testing compared to participants with poor genetic knowledge (third and fourth quartiles) ($p<0.001$). No significant association between willingness to follow genetic-based personalised nutritional advice and genetic knowledge was found, although a trend was observed for the group constituting the second and the fourth quartiles of genetic knowledge ($p=0.053$). An inverse correlation between educational level and interest in nutrigenetic testing was observed in a model adjusted for age and sex (Spearman Partial Correlation Coefficient: -0.133, $p<0.0001$). In conclusion, results of this study suggest that individuals who have better knowledge of genetics are less interested in nutrigenetic testing than individuals with poor genetic knowledge, perhaps because they may deem that they do not need such tests to guide their food choices.

#POSTER	POSTER INFO
6	**Prevention of potential adverse metabolic effects of a supplementation with omega-3 fatty acids using a gene-based approach** Maximilien Franck [1,2,§], Juan de Toro-Martín [1,2,§], Frédéric Guénard [1,2], Iwona Rudkowska [3,4], Simone Lemieux [1,2], Benoît Lamarche [1,2], Patrick Couture [1,4], Marie-Claude Vohl [1,2] 1 Institute of Nutrition and Functional Foods (INAF), Laval University, Quebec City, QC, Canada; 2 School of Nutrition, Laval University, Quebec City, QC, Canada; 3 Department of Kinesiology, Laval University, Quebec City, QC, Canada; 4 Endocrinology and Nephrology Unit, CHU de Quebec Research Center, Quebec City, QC, Canada; § Both authors contributed equally to this work. **Introduction:** The consumption of long-chain omega-3 polyunsaturated fatty acids (n-3 PUFA) has been reported to have beneficial health effects, among others, by reducing plasma triglyceride levels. Nonetheless, a concomitant increase in fasting plasma glucose levels is often reported, but it is highly variable between subjects. Herein, we aimed to determine the importance of the genetic background in the interindividual variability of glycaemic control following an n-3 PUFA supplementation. **Methods:** A total of 210 participants completed a 6-week n-3 PUFA supplementation with 5g/day of fish oil (providing 1.9g–2.2g of eicosapentaenoic acid [EPA] + 1.1g of docosahexaenoic acid [DHA]). Insulin resistance was estimated by the homeostatic model assessment (HOMA-IR) and subjects were further classified as at-risk-IR (arIR) when they showed increased HOMA-IR following the n-3 PUFA supplementation, as compared to pre-supplementation values. Genome-wide genotyping data was obtained for 138 participants using HumanOmni-5-Quad BeadChips containing 4,301.331 single nucleotide polymorphisms (SNPs). A genome-wide association analysis (GWAS) was carried out between arIR and not-at-risk-IR (narIR) participants. A genetic risk score (GRS) was finally constructed by summing the number of risk alleles. **Results:** Following the n-3 PUFA supplementation, 64 participants had increased HOMA-IR as compared to initial values and were classified as arIR (46.4%) whereas remaining subjects were classified as narIR (n=74, 53.6%). A total of 7 loci had frequency differences between arIR and narIR participants at a suggestive GWAS association threshold (P<10-5), including SNPs within RPS6KA2, FMN1 and TSHZ2 genes. The GRS showed a strong and significant association (P=2.3x10-9) with the risk of increased HOMA-IR following the n-3 PUFA supplementation (OR=4.6 [95%CI, 2.78-7.54]). **Conclusion:** These results suggest that genetic background has a relevant role in the interindividual variability observed in glycaemic control following an n-3 PUFA supplementation. Subjects being at risk of side effects associated with an n-3 PUFA supplementation could be identified using genetic-based precision nutrition approaches.

#POSTER	POSTER INFO
7	**Comparing dietary intake estimates from interviewer-administered and web-based 24-hour recall: evidence from CCHS 2015 and the PREDISE study** Didier Brassard [1, 2], Catherine Laramé [1], Julie Robitaille Julie [1,2], Simone Lemieux [1, 2], Benoît Lamarche [1, 2] 1 Centre Nutrition, santé et société (NUTRISS), Institute of Nutrition and Functional Food (INAF), Université Laval, Quebec, Canada; 2 School of Nutrition, Université Laval, Quebec, Canada. **Background:** Dietary intake estimates have traditionally been collected using interviewer-administered 24-hour recall (TRAD) in nutrition surveys. Considering the expansion of web-based instruments, we sought to examine the consistency of dietary intake estimates obtained using a self-administered web-based 24-hour recall (the R24W) compared with TRAD. Objective: To compare dietary intake estimates obtained using either a TRAD or R24W 24-h recall in population-based samples from the province of Québec in Canada. **Methods:** This comparison of dietary assessment methods was based on two sample survey studies in adults (18-65 y) conducted in the Province of Québec. In the first study, PREDISE (2015-2017), a sample of 1147 French-speaking adults from 5 regions of Quebec was recruited. In the second study, the Canadian Community Health Survey 2015, 875 French-speaking adults located in the same 5 regions were included. Key characteristics of both samples were matched through selection and weighting (language, sex, age, region, education, body mass index, weekend, season). Dietary intake data from the first 24-hour recall of each survey were compared. The plausibility of reported energy intakes was compared using predictive equations of the Institute of Medicine. Results: On average, self-reported energy intakes (E) from the R24W compared TRAD were 18% higher in women (2087 kcal vs. 1774 kcal, respectively; $P<0.001$) and 16% higher in men (2862 kcal vs. 2464 kcal, respectively; $P=0.004$). Intakes of low nutritive value foods were 28% higher using the R24W compared with TRAD (761 kcal vs. 594 kcal, respectively; $P=0.009$). Intakes of most food groups derived from the R24W were higher compared with TRAD: 11% (vegetables and fruit; $P=0.05$), 21% (milk and alternatives; $P=0.05$) and 19% (meat and alternatives; $P=0.06$). The likelihood of under-reporting of energy intakes was 15% lower with the R24W than with TRAD (prevalence ratio 0.89; 95%CI, 0.85-0.93). **Conclusions:** In matched population-based samples, intake of energy, food groups and nutrients were systematically lower using TRAD compared with the R24W. These differences should be considered when determining the dietary assessment instrument used in nutrition surveys.

#POSTER	POSTER INFO
8	**Early cross-fostering transfer of gut microbiota reveals sex-specific effects of cranberry polyphenols in a mouse model of diet-induced obesity** Laurence Daoust [1-2-3], Béatrice Choi [1-2-3], Vanessa Vilela [1-2-3], Sébastien Lacroix [3], Thibault Varin [1-3], Geneviève Pilon [1-3], Émile Lévy [3-4-5], Denis Roy [2-3], Yves Desjardins [2-3], André Marette [1-2-3] 1. Quebec Heart and Lung Institute, Quebec, Canada; 2. Laval University, Quebec, Canada; 3. Institute of Nutrition and Functional Food (INAF), Quebec, Canada; 4. Montreal University, Montreal, Canada; 5. St-Justine University Hospital Center, Montreal, Canada **Introduction.** The postnatal obesogenic environment in which children evolve has been suggested to predict the long-term risk to develop metabolic disorders associated with obesity in adulthood. Moreover, multiple studies have highlighted the beneficial effects associated with the consumption of rich-polyphenol fruits extracts to prevent obesity-associated metabolic disturbances. **Objective.** The objective of this project was to evaluate the preventive effect of a rich-polyphenols cranberry extract (CE) administered to high-fat high sucrose (HFHS) diet-induced obese dams during the preconceptional, gestational and lactation period, on the metabolic health of their offspring, and the potential role of the gut microbiota using a cross-fostering approach. **Methodology.** Dams were fed an HFHS diet and were daily gavage with the rich-polyphenol CE (CE-Dams) or water (Veh-Dams) for 14 to 19 weeks. Dams were mated after 8 to 12 weeks of treatment and gave birth after 11 to 15 weeks of treatment. In the first 48 hours after birth, approximatively half of the litter was exchanged by cross-fostering i.e. from Veh-Dams to CE-Dams or from CE-Dams to Veh-Dams and weaned by their adoptive mother. The other half was weaned by their biological mother. After the weaning period, offspring were individually caged and fed an HFHS diet for 8 weeks. Body mass analyses and an oral glucose tolerance test were performed after 8 weeks of treatment. **Results.** CE administration in HFHS-fed dams was associated with an improved metabolic phenotype by reduced adiposity, liver weight and liver triglycerides accumulation. Glucose homeostasis was also improved in CE-Dams. However, CE treatment of dams was associated with a deleterious phenotype in female offspring, mainly observed by increased body weight, adiposity and impaired glucose metabolism. No effect was observed in male offspring. Interestingly, microbiome analyses reveal that male and female offspring born and weaned by CE-Dams cluster differently on the principal component analysis. **Conclusion.** We have demonstrated for the first time the beneficial metabolic effects of the administration of a polyphenol-rich CE in preconceptional, gestational and lactating dams. Moreover, these results show that CE promote sex-specific metabolic alterations in offspring that may be transferred by the gut microbiota.

#POSTER	POSTER INFO
9	**Composition and metabolic activity of the gut microbiota influenced by Iron, Selenium and Manganese and their relation with the endocannabinoid system** Fredy Alexander Guevara Agudelo [1,2,3], Nadine Leblanc [2,3], Vincenzo Di Marzo [1,2,3], Frédéric Raymond [1,2,3] 1. Faculté des sciences de l'agriculture et de l'alimentation, Université Laval, Québec, Canada; 2. Canada Research Excellence Chair in the Microbiome - Endocannabinoidome Axis in Metabolic Health (CERC); 3. Institut sur la nutrition et les aliments fonctionnels (INAF), Québec, Canada. The composition of the diet plays an important role in the change and distribution of the different intestinal microbial populations, since it can be influenced by various components of the diet. For example, high fiber content, low fat content, trace metals, etc. Both the host and the microorganisms that make up the intestinal microbiota are sensitive to the dietary changes in transition metals, such as iron, selenium and manganese, which act as cofactors or have structural functions in the conformation of mammalian and bacteria proteins. The endocannabinoid (eCB) system and the set of bioactive lipids that comprise it participate in multiple physiological processes that include metabolic regulatory mechanisms contributing to the maintenance of the body's homeostasis. Various studies have shown the relationship between the gut microbiota and eCBs and/or related mediators, focusing especially on energy metabolism (Fig 1). We will study the effect of changes in the dietary concentrations of trace minerals such as iron, selenium and manganese on the connections between both systems.

#POSTER	POSTER INFO
10	**Major shift in gut microbiome and exacerbation of the development of obesity and insulin resistance upon feeding dietary protein sources representative of human consumption in mice fed a high-fat high-sucrose diet** Béatrice S.-Y. Choi [1,2], Noëmie Daniel [1,2], Vanessa P. Houde [1,2], Cécile Vors [2], Thibault V. Varin [2], Philippe St-Pierre [1,2], Angelo Tremblay [1,2] and André Marette [1,2] 1 Quebec Heart and Lung Institute, Laval University, Canada; 2 Institute of Nutraceuticals and Functional Foods, Laval University, Canada. Animal models fed purified diets are commonly used to mimic human diseases. While much attention is given to the sources of lipids and carbohydrates to promote obesity and cardiometabolic diseases, very little attention is paid to protein sources. The objective of this project was to study the impact of a protein mix on metabolic health and gut microbiome. We developed a mix of 10 protein sources representing the proportions consumed by the American population (USDA database) and included this mix into a low-fat low-sucrose diet (LFLS) and a high-fat high-sucrose diet (HFHS). C57BL/6J male mice were fed these diets or control diets using the most common protein source, casein, for 12 weeks. A major shift in gut microbiota composition was observed in animals fed the protein mix including an increase bacterial diversity and changes in a number of taxa, such as a decrease in Akkermansia and Bacteroides as well as an increase in Adlercreutzia and Tyzzerella. Microbial metabolites were also affected as revealed by changes of fecal SCFA and BCFA profiles. All SCFAs were increased in the protein mix compared to casein in the LFLS and/or HFHS, but changes in isobutyric acid and isovaleric acid were the most striking, as it was driven by HFHS, but also by the protein mix. Regarding metabolic health, the protein mix amplified the effects of the HFHS diet on the development of obesity, glucose intolerance and insulin resistance but had no such effects in animals fed the LFLS diets. Impaired insulin action was associated with enhanced inhibitory phosphorylation of IRS-1 and impaired phosphorylation of Akt, which were linked to an overactivation of the mTORC1/S6K1 pathway as well as an induction of PKC theta protein expression, in the liver. This study demonstrates the importance of considering a diverse source of dietary proteins when using animal models of diet-induced obesity and insulin resistance to better represent human pathology.

#POSTER	POSTER INFO
11	**Eating behaviour traits mediate the association between late eating and energy intake** Raphaëlle Jacob [1,2,3], Véronique Provencher [1,2], Angelo Tremblay [2,3,4], Shirin Panahi [2,3,4,5], Vicky Drapeau [2,3,5] 1 School of Nutrition, Laval University, Quebec, Canada; 2 Institute of Nutrition and Functional Foods (INAF), Laval University, Quebec, Canada; 3 Quebec Heart and Lung Institute Research Center, Quebec, Canada; 4 Department of Kinesiology, Laval University, Quebec, Canada; 5 Department of Physical Education, Laval University, Quebec, Canada. Late distribution of food intake has recently been recognized as a determinant of obesity and few studies have observed that late eating was associated with a higher energy intake (EI). However, the mechanisms by which the timing of food intake impacts EI are not well understood. We have previously shown that late eating was associated with unfavourable eating behaviour traits such as higher levels of susceptibility to disinhibition and hunger. This study aimed to assess whether eating behaviour traits mediate the association between late eating and EI. Baseline data from overweight or obese individuals (n=304; age=38.7±8.4 years; BMI=33.2±3.4 kg/m2, 55.3% women) who participated in four weight loss studies were used in this cross-sectional study. EI was assessed using a three-day food record. The distribution of EI was assessed by calculating the percent of total EI from period 5 (5:00 pm to 7:59 pm) and period 6 (8:00 pm until last hour of food consumption recorded) of the day. Eating behaviour traits were assessed with the Three-Factor Eating Questionnaire and the Binge Eating Scale. Mediation analyses were performed according to sex using bootstrapping with the Process Macro among the whole cohort and among true reporters of EI (i.e., ratio EI/RMR>1.35; n=177). Among women, the association between percent EI from periods 5 and 6 combined and total EI was partly mediated by susceptibility to disinhibition ($\beta_{indirect}$=5.20±2.02, 95% CI, 1.91 to 9.92) and its subscale habitual susceptibility to disinhibition ($\beta_{indirect}$=4.48±1.98, 95% CI, 1.30 to 9.16). Similarly, among women who were true reporters of EI, the association between percent EI from periods 5 and 6 and total EI was mediated by susceptibility to disinhibition ($\beta_{indirect}$=2.81±1.51, 95% CI, 0.54 to 6.68) and habitual susceptibility to disinhibition ($\beta_{indirect}$=3.85±2.17, 95% CI, 0.32 to 9.09). The association between percent EI from period 6 and total EI was also partly mediated by susceptibility to hunger among women who were true reporters of EI ($\beta_{indirect}$=1.89±1.34, 95% CI, 0.07 to 5.78). No significant mediations were observed in men. These results suggest that eating behaviour traits are involved in the mechanisms by which late eating is associated with energy intake in women.

#POSTER	POSTER INFO
12	**A novel oral nutritional supplement improves gait speed in Dutch older adults with (risk of) undernutrition** Grootswagers, P [1]; Smeets, E [1]; Oteng, A [1]; De Groot, L [1] 1. Human Nutrition and Health, Wageningen University, Wageningen, Netherlands. **Rationale:** Oral nutritional supplements are effective in enabling body weight gain. Effects on muscle health and performance are controversial and may depend on the composition of the supplements. In this study, we tested the efficacy of a novel oral nutritional supplement on body weight, muscle mass and physical function. **Methods:** Elderly (>65 y) participants with (risk of) undernutrition (n = 82) were randomly allocated to 12 weeks of supplementation with the novel supplement (586 kcal, 22 g protein of which 50% whey and 50% casein, 205 mg ursolic acid, 12 g BCAAs, 11 µg vitamin D) or standard care (600 kcal, 24 g protein of which 100% casein, 6 g BCAAs, 4 µg vitamin D). Body composition and physical function were measured at baseline and after 12 weeks. Changes over time were assessed by linear mixed models. **Results:** Body weight increased significantly, both in the intervention group (+1.6 ± 0.2 kg, $p < 0.0001$) and in the standard care group (+1.8 ± 0.2 kg, $p < 0.0001$). Lean body mass increased on average with 252 ± 112 g ($p = 0.077$), without differences between groups. Standard care showed a larger increase in fat mass (+1.6 ± 0.2 kg, $p < 0.0001$) over time as compared to intervention (+1.1 ± 0.2 kg fat mass, $p < 0.0001$; time*treatment effect $p = 0.044$). Walking performance on 4 m and 400 m improved over time in the intervention group, where the standard care showed no improvements (time*treatment effects 400 m: $p = 0.038$ and 4 m: $p = 0.047$). Knee extension force, hand grip strength and total SPPB score did not change in the two groups. Gene sets related to mitochondrial biogenesis and oxidative phosphorylation were strongly upregulated in the intervention group. **Conclusions**: A 12 weeks intervention with a nutritional supplement containing ursolic acid, whey protein, BCAAs and vitamin D improved walking performance both on short and long distance as compared to standard care, due to improvements in mitochondrial functioning. **Keywords:** Ageing, Undernutrition, Muscle, Protein, Mitochondria, Ursolic Acid

#POSTER	POSTER INFO
13	**Severity of olfactory deficits is reflected in functional brain networks — An fMRI study** Postma, EM [1][2], Reichert, JL [3][4], Smeets PAM [1][5], Boek, WM [2], De Graaf, K [1] Schopf, V [3][4], Boesveldt, S [1] (1) Division of Human Nutrition and Health, Wageningen University, Wageningen, The Netherlands; (2) ENT Department, Hospital Gelderse Vallei, Ede, The Netherlands; (3) Institute of Psychology, University of Graz, Graz, Austria; (4) BioTechMed, Graz, Austria; (5) Image Sciences Institute, University Medical Center Utrecht, Utrecht, The Netherlands **Abstract:** Even though deficits in olfactory function affect a considerable part of the population, the neuronal basis of olfactory deficits remains scarcely investigated. To achieve a better understanding of how smell loss affects neural activation patterns and functional networks, we set out to investigate patients with olfactory dysfunction using functional magnetic resonance imaging (fMRI) and olfactory stimulation. We used patients' scores on a standardized olfactory test as continuous measure of olfactory function. 48 patients (mean olfactory threshold discrimination identification (TDI) score = 16.33, SD = 6.4, range 6 - 28.5) were investigated. Overall, patients showed piriform cortex activation during odor stimulation compared to pure sniffing. Group independent component analysis indicated that the recruitment of three networks during odor stimulation was correlated with olfactory function: a sensory processing network (including regions such as insula, thalamus and piriform cortex), a cerebellar network and an occipital network. Interestingly, recruitment of these networks during pure sniffing was related to olfactory function as well. Our results support previous findings that sniffing alone can activate olfactory regions. Extending this, we found that the severity of olfactory deficits is related to the extent to which neural networks are recruited both during olfactory stimulation and pure sniffing. This indicates that olfactory deficits are not only reflected in changes in specific olfactory areas but also in the recruitment of occipital and cerebellar networks. These findings pave the way for future investigations on whether characteristics of these networks might be of use for the prediction of disease prognosis or of treatment success. **Keywords**: anosmia, fMRI, functional connectivity, hyposmia, neuronal plasticity, olfaction, olfactory disorders

#POSTER	POSTER INFO
14	**Lifestyle trends in colorectal cancer survivors** van Zutphen, M [1], Boshuizen, H [1], Kok, H[1], van Baar, H[1], Geijsen, A[1], Wesselink, E[1], Winkels, R[2], Halteren, H[3], de Wilt, J[4], Kampman, E[1], van Duijnhoven, F[1] (1) Division of Human Nutrition and Health, Wageningen University & Research, (2) Department Public Health Sciences, College of Medicine, Penn State University, (3) Department of Internal Medicine, Admiraal de Ruyter Ziekenhuis, (4) Department of Surgery, Radboud University Medical Centre. **Purpose** A healthy lifestyle after colorectal cancer (CRC) diagnosis may improve prognosis. Data related to lifestyle change in CRC survivors are inconsistent and potential interrelated changes are unknown. Methods We assessed dietary intake, physical activity, body mass index (BMI), waist circumference, and smoking among 1,072 patients diagnosed with stages I-III CRC at diagnosis, six months and two years post-diagnosis. An overall lifestyle score was constructed based on the 2018 World Cancer Research Fund/American Institute of Cancer Research recommendations (range 0-7). We used linear mixed models to analyze changes in lifestyle over time. **Results** Participants had a mean (±SD) age of 65 ± 9 years and 43% had stage III disease. In the two years following CRC diagnosis, largest changes were noted for sugary drinks (-45 g/day) and red and processed meat intake (-62 g/week). BMI (+0.4 kg/m2), waist circumference (+2 cm), and dietary fiber intake (-1 g/day) changed slightly. CRC survivors did not statistically significant change their mean intake of fruits and vegetables, alcohol, or ultra-processed foods, nor did they change their physical activity or smoking behavior. Half of participants made simultaneous changes that resulted in improved concordance with one component as well as deteriorated concordance with another component of the lifestyle score. Overall lifestyle score changed from a mean 3.4 ± 0.9 at diagnosis to 3.5 ± 0.9 two years post-diagnosis. **Conclusion** CRC survivors hardly improve their overall lifestyle after diagnosis. Given the importance of a healthy lifestyle, strategies to effectively support behaviour changes in CRC survivors need to be identified. **Keywords:** colorectal cancer, survivorship, lifestyle changes, dietary changes, lifestyle recommendations

#POSTER	POSTER INFO
15	**Colorectal cancer patients who increase their physical activity after surgery are more often recovered** van Zutphen, M[1], Winkels, R [1], van Duijnhoven, F[1], van Harten-Gerritsen, A[1], Kok, D[1], van Duijvendijk, P[2], van Halteren, H[3], Hansson, B[4], Kruyt F[5], Spillenaar Bilgen, E[6], de Wilt, H[7], Dronkers, J[8], Kampman, E[1] (1) Division of Human Nutrition and Health, Wageningen University & Research, (2) Department of surgery, Gelre Hospital, (3) Department of Internal Medicine, Admiraal de Ruyter Hospital, (4) Department of Surgery, Canisius Wilhelmina Hospital, (5) Department of Surgery, Gelderse Vallei Hospital, (6) Department of Surgery, Rijnstate Hospital, (7) Department of Surgery, Radboud University Nijmegen Medical Centre, (8) Department of Physical Therapy, Gelderse Vallei Hospital. **Background:** The influence of physical activity on patient-reported recovery of physical functioning after colorectal cancer (CRC) surgery is unknown. Therefore, we studied recovery of physical functioning after hospital discharge by (a) a relative increase in physical activity level and (b) absolute activity levels before and after surgery. **Methods:** We included 327 incident CRC patients (stages I-III) from a prospective observational study. Patients completed questionnaires that assessed physical functioning and moderate-to-vigorous physical activity shortly after diagnosis and 6 months later. Cox regression models were used to calculate prevalence ratios (PRs) of no recovery of physical functioning. All PRs were adjusted for age, sex, physical functioning before surgery, stage of disease, ostomy and body mass index. **Results:** At six months post-diagnosis 54% of CRC patients had not recovered to pre-operative physical functioning. Patients who increased their activity by at least 60 min/week were 43% more likely to recover physical function (adjusted PR 0.57 95%CI 0.39-0.82), compared with those with stable activity levels. Higher post-surgery levels of physical activity were also positively associated with recovery (P for trend=0.01). In contrast, activity level before surgery was not associated with recovery (P for trend=0.24). **Conclusions:** At six month post-diagnosis, about half of CRC patients had not recovered to preoperative functioning. An increase in moderate-to-vigorous physical activity after CRC surgery was associated with enhanced recovery of physical functioning. This benefit was seen regardless of physical activity level before surgery. These associations provide evidence to further explore connections between physical activity and recovery from CRC surgery after discharge from the hospital. **Keywords:** recovery of function, colorectal surgery, colorectal cancer, physical activity, rehabilitation, epidemiology

#POSTER	POSTER INFO
16	**Foraging minds in modern environments: High-calorie and savory-taste biases in human food spatial memory** Rachelle de Vries [1,2], Emely de Vet [2], Kees de Graaf [1], Sanne Boesveldt [1] 1Division of Human Nutrition & Health, Wageningen University & Research, Wageningen, the Netherlands; 2Consumption and Healthy Lifestyles, Wageningen University & Research, Wageningen, the Netherlands. **Background and aim.** In order to survive erratic food habitats of the past, our hunter-gatherer ancestors needed to efficiently locate high-quality nutritional resources, using input from various sensory modalities. We previously demonstrated the existence of high-calorie and savory-taste biases in human food spatial memory in a lab study using visual food cues. We now investigated whether these biases would likewise manifest with the sense of olfaction (Study 1) – given its evolutionary significance to the process of spatial navigation and food decision making – as well as in a naturalistic field setting (Study 2). Methods. In Study 1, we carried out a controlled computer-based experiment which required 88 normosmic Dutch participants (78% female, Mage = 21.93 ± 1.99, MBMI= 20.6 ± 0.8) to learn and recall (randomized) locations of (sweet/savory) high- and low-calorie food odors on a campus map. In Study 2, 512 participants (48.5% female, Mage= 28.4 ± 9.1, MBMI= 23.9 ± 3.5) navigated between different pillars in a room that displayed (sweet/savory) high- and low-calorie food stimuli, and carried out an incidental spatial memory task with either food products (N = 258) or food odors (N = 254). Results. In Study 1, consistent with what was found using visual food cues, individuals displayed a greater overall accuracy in odor-cued food spatial memory for high-calorie food odors compared to low-calorie alternatives [Average distance between true and guessed locations [D] of 118.27 versus 152.72 pixels, $F(1,1240) = 18.43$, $p < .001$]. Furthermore, savory food odor locations were more accurately recalled than sweet counterparts [D of 121.73 versus 149.25 pixels, $F(1,1309) = 23.00$, $p < .001$]. These effects were not contingent upon an individual's hedonic evaluations of odors, recognition memory for odors, or the time taken to encode and recall odor locations. Similarly, in Study 2, individuals relocated high-calorie food products and odors to correct pillar locations more frequently than low calorie alternatives (p's < .01) – independent of liking, desirability of, or familiarity with a food stimulus. However, the proportion of correct "hits" did not significantly differ between Taste groups. **Conclusion.** Across sensory modalities and experimental paradigms, individuals more accurately recalled the locations of high-calorie foods. Findings further support an adaptive account of human spatial memory and suggest that spatial processing tendencies optimized for fluctuating ancestral food habitats may be preserved.

#POSTER	POSTER INFO
17	**The PERSON-study: PERSonalized glucose Optimization through Nutritional intervention** A. Gijbels [1,3], K.M. Jardon [2,3], I. Trouwborst [2,3], S.M. Bowser [2,3], E. Siebelink [1], G.B. Hul [2,3], G.H. Goossens [2,3], E.E. Blaak [2,3], E.J. Feskens [1,3], L.A. Afman [1,3] and the PERSON Study consortium 1. Division of Human Nutrition and Health, Wageningen University & Research, The Netherlands, 2. Department of Human Biology, NUTRIM School of Nutrition and Translational Research in Metabolism, Maastricht University, The Netherlands, 3. Top Institute Food and Nutrition (TiFN), Wageningen, The Netherlands. **Background:** Postprandial glycemic responses vary between individuals, as do the responses to dietary and/or lifestyle interventions that aim to improve metabolic health. A better understanding of inter-individual differences in these responses may contribute to the development of more personalized intervention strategies to optimize health effects. **Objective:** To 1) study the effects of a metabolic phenotype-targeted dietary intervention on metabolic health at the functional and molecular level, mental performance, and well-being, and 2) explain and predict individual blood glucose responses. Study design: In total, 240 overweight/obese (BMI 25-40 kg/m2) men and women (age 40-75y) with either skeletal muscle insulin resistance (MIR) or hepatic insulin resistance (LIR) will participate in a 12-week double-blind, randomized, parallel dietary intervention study at Wageningen University and Research or Maastricht University. MIR/LIR is determined by a 7-point oral glucose tolerance test (OGTT). Subjects follow one of two eucaloric diets varying in macronutrient content and quality, that is hypothesized to be either optimal or suboptimal depending on their metabolic phenotype (MIR/LIR). Extensive laboratory and daily life phenotyping will be performed before and after the intervention. **Primary outcome:** Disposition index (OGTT); **Secondary outcomes:** Tissue-specific insulin sensitivity (2-step hyperinsulinemic-euglycemic clamp), glucose homeostasis (continuous glucose monitoring, OGTT), body composition (DXA), abdominal fat distribution (MRI), liver fat content (1H-MRS), fasting and insulin-stimulated energy expenditure and substrate oxidation (indirect calorimetry), fasting and postprandial metabolomics, subcutaneous adipose tissue and skeletal muscle transcriptome, fecal and oral microbiota composition, anthropometrics, cognitive performance and well-being.

#POSTER	POSTER INFO
18	**Stimulating dietary fiber intake by personalized advice – PNH living lab 'more fiber'** Iris Rijnaarts [1,4], Jan Top [1], Marielle Timmer [1], Emily Bouwman [2], Koen Hogenelst [3], Femke Hoevenaars [3], Erwin Zoetendal [5], Nicole de Wit [1] 1. Wageningen Food & Biobased Research, Wageningen University & Research, Wageningen, The Netherlands, 2. Wageningen Economic Research, Wageningen University & Research, Wageningen, The Netherlands, 3. TNO, Leiden, the Netherlands. 4. Human Nutrition, Wageningen University & Research, Wageningen, The Netherlands, 5. Microbiology, Wageningen University & Research, Wageningen, The Netherland. **Background & aims:** dietary fibers are linked to improved gut health and prevention of diseases such as constipation, diabetes and colorectal cancer. Currently, few adults meet the recommendation of 30 or 40 grams per day. Personalized dietary advice (PDA) may be the solution to increase dietary fiber intake in large populations. Therefore, we aimed to investigate if PDA is more effective in increasing dietary fiber intake in the Dutch population, than the general advice that is currently provided. **Methods:** Based on current dietary intake and personal characteristics, a PDA was computed using data and knowledge modelling. The study consisted of a 6-week intervention period and 3-month follow-up with two groups: intervention (n=45) and control (n=47). Before and after the intervention period, dietary intake, body weight and fecal short chain fatty acid levels were measured. Daily data of stool pattern, wellbeing, hunger and satiety was also measured. At the 3 month follow-up, long-term compliance to a high fiber intake was assessed. **Results:** data analysis is still ongoing, only preliminary results are currently available. So far, both the control and intervention group increased in fiber intake, but more subjects in the intervention group adhered to the guideline of 14 grams of fiber/1000 kcal after the intervention (44% versus 25%, p=0.080). The dietary fiber data however showed a large within person variation. The evaluation questionnaire revealed that subjects from the intervention group had significantly higher understanding on how to increase their fiber intake (p=0.033). They also found the dietary advice more positive (p=0.014), more useful (p=0.048), easier to follow (p=0.010) and more fitting to their personal needs (p=0.032) than subjects in the control group.

#POSTER	POSTER INFO
19	**Associations between (un)healthy food and (not) tastiness in families with a low SEP** Amy VAN DER HEIJDEN [1], Hedwig TE MOLDER [2], Gerry JAGER [1] 1: Wageningen University & Research, Division of Human Nutrition and Health, Stippeneng 4, 6708 WE Wageningen, the Netherlands; 2: Wageningen University & Research, Strategic Communication Group, Hollandseweg 1, 6707 KN Wageningen, the Netherlands. Children of families with a lower socioeconomic position consume poorer diets than children of families with a higher socioeconomic position. This is problematic, since food preferences developed in childhood affect food preferences and choices later in life. Literature also suggests associations between healthy food and not tasty. These associations have not yet been investigated specifically in populations with a lower socioeconomic position, nor in children. The present study assessed implicit and explicit associations between (un)healthy food and tastiness in primary school-aged children and parents with a lower socioeconomic position. 37 Parent-child dyads performed two computer-based implicit association tests and three paper-and-pencil questionnaires. Parents' results of both the implicit and explicit tasks indicate that parents associate healthy food and tastiness with each other. Children's results are contradictive; implicit tasks indicate an association between healthy food and tastiness, while most of the explicit tasks indicate a preference for unhealthy rather than healthy foods. We elaborate on the extent to which the findings may represent participants' beliefs, the extent to which the findings may be a representation of social norms, and possible shifting of social norms. Potential differences between parents and children are taken into account. Used measurement instruments and their application in the investigated target group are reflected upon. **Keywords:** implicit associations; explicit associations; food healthiness; food tastiness; primary school-aged children; lower socioeconomic position

#POSTER	POSTER INFO
20	**Improvement in Activities of Daily Living (ADLs) in older adults over the age of 65: ProMuscle in Practice study** Dorhout, B.G. [1], Kanits, F. [1], van Dongen, E.J.I. [2], de Groot, C.P.G.M. [1], Doets, E.L. [2], Haveman-Nies, A. [3] (1) Division of Human Nutrition and Health, Wageningen University & Research, (2) Food, Health & Consumer Research, Wageningen Food & Biobased Research, (3) Consumption and Healthy Lifestyles, Wageningen University & Research. **Objective:** The combination of resistance exercise (RE) and a protein rich diet is effective in counteracting the decline in physical functioning in a controlled setting. However, not much is known about the effectiveness of this strategy in a real-life setting. This is investigated with the ProMuscle in Practice study (PiP), with a focus on Activities of Daily Living (ADLs). ADLs are the essential activities that a person needs to perform to be able to live independently. In older adults, ADL disability and dependence are associated with morbidity and mortality (Clegg, Young, Iliffe, Rikkert, & Rockwood, 2013; Millan-Calenti et al., 2010). Therefore, improving ADL could have large benefits for individuals, their families, and society. **Theory/methods:** A randomized controlled, multicentre intervention study was conducted in the Netherlands. We included 168 community-dwelling older adults (≥ 65 years), who were (pre-)frail or experienced loss of muscle strength. The intervention group received a 12-week intensive support intervention, consisting of RE and a protein-rich diet. After that, they received a 12-week moderate support intervention, to continue their behaviour regarding RE and protein intake. The control group received no intervention. ADL was measured at baseline, 12 and 24 weeks. Separate ADLs and overall change was analysed including a scaled score for functioning, from Late Life Function and Disability Index (LLFDI). **Results**: Improvement in functioning on ADLs was found after 12 weeks in both intervention and control group (I: +3.02, p=0.021; C: +2.02, p=0.071). After 12 weeks, an increase of 4.90 on the function score was only found for women of the intervention group (p=0.004). A higher increase was found for low/middle educated (+4.43, p=0.007) compared to highly educated older adults (+0.36, p=0.572). **Conclusions:** PiP seems promising in improving physical functioning on ADLs. Especially women in the intervention group seem to benefit from the program compared to man. More research is needed to explain these differences. **Keywords:** older adults, lifestyle intervention, physical functioning, resistance exercise, protein intake.

#POSTER	POSTER INFO
21	**Plasma and dietary linoleic acid and risk of type 2 diabetes after myocardial infarction: the Alpha Omega Cohort** Pertiwi, K[1], Wanders, AJ[2], Harbers, MC[1], Küpers, LK[1], Soedamah-Muthu, SS[1], de Goede, J[1], Zock, PL[2], Geleijnse, JM[1] (1) Division of Human Nutrition and Health, Wageningen University, The Netherlands, (2) Future Health & Wellness, Unilever R&D, Vlaardingen, The Netherlands. **Background and aims**. Plasma linoleic acid (18:2n-6, LA) has been associated with a lower risk of type 2 diabetes mellitus (T2D) in population-based cohort studies, while no consistent associations have been found with dietary LA. The role of plasma and dietary LA in the risk of T2D after myocardial infarction (MI) is unclear. We aimed to study plasma and dietary LA in relation to incident T2D in post-MI patients. Methods. We included 3,257 patients (80% males) from the Alpha Omega Cohort aged 60-80 y who had an MI <10 y before study enrollment and were free of T2D. At baseline (2002-2006), plasma LA was measured in cholesteryl esters and dietary LA was estimated with a 203-item food-frequency questionnaire. Incident T2D was ascertained through self-reported physician diagnosis and medication use. Hazard ratios (HR) and 95% confidence interval (CI) for incident T2D by plasma and dietary LA were calculated by using Cox regression models, adjusting for demographic, lifestyle and dietary factors. Dietary LA was analyzed in a theoretical substitution model by isocalorically replacing the sum of saturated (SFA) and trans fatty acids (TFA). Results. Plasma and dietary LA were weakly correlated (Spearman r= 0.13, P <0.001). During a median follow-up of 41 months, 171 patients developed T2D. Plasma LA was inversely associated with T2D risk in quintiles (HR Q5vsQ1: 0.44; 95% CI: 0.26, 0.75) and continuously (HR per 5%: 0.73, 95% CI: 0.62, 0.86). Substitution of dietary LA for SFA+TFA showed no significant association with T2D risk (HR Q5vsQ1: 0.78; 95% CI: 0.36, 1.72; HR per 5 en%: 1.18; 95% CI: 0.59, 2.35). Conclusion. In our cohort of post-MI patients, plasma LA was inversely related to T2D risk whereas dietary LA was not related. Further research is needed to assess whether plasma LA indicates metabolic state rather than dietary LA in this type of patients. **Keywords.** dietary fatty acids, plasma fatty acids, biomarkers, omega-6 PUFA, linoleic acid, cardiac patients, type 2 diabetes, prospective cohort study

#POSTER	POSTER INFO
22	**High Versus Low Dietary Protein Intake and Bone Health in Older Adults: A Systematic Review and Meta-Analysis** Inge Groenendijk [1], Laura den Boeft [1], Luc JC van Loon [2], Lisette CPGM de Groot [1] (1) Division of Human Nutrition and Health, Wageningen University & Research; 2) Department of Human Biology, NUTRIM School of Nutrition and Translational Research in Metabolism, Maastricht University Medical Centre+. Protein may play a beneficial role in the prevention of bone loss and in slowing down osteoporosis. The effect of dietary protein may be different in older adults compared to younger adults, since this population has a greater need for protein. The aim of this systematic review and meta-analysis was to investigate the impact of a dietary protein intake above the Recommended Dietary Allowance (RDA) of 0.8 g/kg body weight/day from any source on Bone Mineral Density (BMD)/Bone Mineral Content (BMC), bone turnover markers, and fracture risk in older adults compared to a lower dietary protein intake. A systematic search was conducted through October 2018 in 3 databases: CENTRAL, MEDLINE and EMBASE. We included all prospective cohort studies and Randomized Controlled Trials (RCTs) among adults aged ≥65 years that examined the relation between protein intake on bone health outcomes. Two investigators independently conducted abstract and full-text screenings, data extractions, and risk of bias assessments. Authors were contacted for missing data. After screening of 523 records, twelve cohort studies and one RCT were included. Qualitative evaluation showed a positive trend between higher protein intakes and higher femoral neck and total hip BMD. Meta-analysis of four cohort studies showed that higher protein intakes resulted in a significant decrease in hip fractures (pooled hazard ratio: 0.89; 95% confidence interval: 0.84, 0.94). This systematic review supports that a protein intake above the current RDA may reduce hip fracture risk and may play a beneficial role in BMD maintenance and loss in older adults. **Keywords**: Protein; Bone; Bone density; Fractures; Older adults
23	**Inflammatory pathways involved in the gut-brain axis in cachexia** Xiaolin Li[1], Mieke Poland[1], Tosca Holtrop[1] and Klaske van Norren[1]

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	(1) Division of Human Nutrition and Health, Wageningen University & Research. **Background:** Cancer-related cachexia is characterized by skeletal muscle wasting and systemic inflammation. The gut and hypothalamus have been indicated to play a key role. However, the mechanistic details remain largely unexplored. Aim: To determine the mechanisms behind the cross talk between the tumour, the gut and the hypothalamus that lead to muscle wasting in cachexia. **Methods:** To imitate the influence of decreased integrity of the gut, sub-inflammatory levels (31.6 ng/ml) of the gut-derived bacterial compound Lipopolysaccharides (LPS) were added to hypothalamic (HypoE-N46) cells. These cells were incubated with the secretome of cachexia inducing tumour cells from murine colon (C26). Subsequently, hypothalamic cells were exposed for 24 hours to LPS in combination with tumour-secretome or a mimic of this secretome (110 pg/mL IL6, 30000 pg/mL MCP-1, 100 pg/mL LIF, 6500 pg/mL PGE2). Effects on inflammation were assessed by measuring Il-6, MCP-1 and LIF secretion using a commercial ELISA. **Results:** The IL6-release of hypothalamic cells reached 1100 pg/mL when incubated with the combination of the C26 tumour-secretome and 31.6 ng/ml of LPS. This was several magnitudes higher than the release of hypothalamic cells incubated with C26 tumour-secretome or LPS separately (50 pg/mL and 365 pg/mL respectively, $p<0.05$). A similar finding was observed with the C26 tumour-secretome mimic (separately: 26 pg/mL, combination LPS and tumour-secretome mimicking medium:940 pg/mL, $p<0.05$). The MCP-1 and LIF release of the hypothalamic cells showed no or less additive effects of the tumour-secretome and LPS, indicating that for secretion of these inflammatory mediators different pathways might be involved. **Conclusions:** These data indicate that the inflammatory hypothalamic response to a tumour can be significantly more pronounced in the presence of low levels of gut-derived bacterial compounds like LPS. This increased activation seems to be associated with the inflammatory mediators secreted by the tumour.