Abstract book

NASO Scientific Spring meeting

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Abstracts are ordered based on presentation during the Spring meeting

Title:	**Cold-induced thermogenesis shows a diurnal variation, that unfolds differently in males and females**
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Abstract: (max 300 words)	**Introduction:** Cold exposure mobilizes lipids to feed thermogenic processes in organs, including brown adipose tissue (BAT). In rodents, BAT metabolic activity exhibits a diurnal rhythm, which is highest at the start of the wakeful period. Here, we studied whether cold-induced thermogenesis displays diurnal variation in humans and differs between males and females **Methods:** This randomized crossover study included 24 young and lean males (n = 12) and females (n = 12). Participants underwent a 2.5-hour personalized cooling protocol using water-perfused mattresses in the morning (7:45 am) and evening (7:45 pm), with one day in between. We measured energy expenditure (EE; indirect calorimetry) and supraclavicular skin temperature (infrared thermography) in response to cold exposure. **Results:** In males, cold-induced EE was higher in the morning than in the evening (+54±10% vs +30±7%, P=0.05). By contrast, cold-induced EE did not differ between the morning and the evening in females (+37±9% vs +30±10%; P=0.42). Only in males, supraclavicular skin temperature upon cold increased more in the morning than in the evening (+0.2±0.1°C vs -0.2±0.2°C; P=0.05). In males, circulating free fatty acid (FFA) levels were increased after cold in the morning, but not in the evening (+90±18% vs +9±8%; P<0.001). In females, circulating FFA (+94±21% vs +20±5%; P=0.006), but also triglycerides (+42±5% vs +29±4%, P=0.01) and cholesterol levels (+17±2% vs 11±2%; P=0.05) were more increased after cold exposure in the morning than in the evening. **Conclusion:** Cold-induced thermogenesis is higher in the morning than in the evening in males, however, lipid metabolism is more modulated in the morning than in the evening in females. **1. Conflict of interest:** None **2. Funding:** Dutch Heart Foundation (2017T016 to S.K., CVON2014-02 ENERGISE and CVON2017 GENIUS-2 to P.C.N.R.), Dutch Society for Diabetes Research (Prof. Terpstra Award to S.K.) and Dutch Diabetes Foundation (2015.81.1808 to M.R.B.).

Title:	Prospective relation between long-term glucocorticoid exposure and incident cardiovascular diseases in a large population based cohort: results from the Lifelines cohort study.
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Abstract: (max 300 words)	**Introduction:** Long-term glucocorticoid levels measured in scalp hair (HairGCs), including hair cortisol and its inactive form hair cortisone, are frequently used biomarkers that represent the cumulative exposure to glucocorticoids over the prior months. HairGCs have repeatedly been associated to cardiometabolic parameters, but longitudinal data are lacking. **Methods**: We investigated 6341 hair samples of participants from a large prospective cohort study (Lifelines) for cortisol and cortisone levels, and associated these to incident cardiovascular diseases (CVD) during the 5-7 years of follow-up. We estimated the odds ratio (OR) of HairGC levels for incident CVD cases, corrected for age, sex, waist circumference, current smoking, systolic blood pressure, and the presence of type 2 diabetes mellitus. **Results:** Hair cortisone levels were associated with incident CVD in both the crude and adjusted analyses (OR 2.91 (95% confidence interval (CI) 1.47-5.60 per point increase in 10-log cortisone concentration (pg/mg).p=0.002), and OR 2.15 (95% CI 0.99-4.55, p=0.049 respectively). This effect was most profound in the youngest half of incident CVD (OR 3.70, 95% CI 1.27-10.3, p=0.014). In the elder half of CVD cases, hair cortisone was not associated with incident CVD. In this cohort, hair cortisol showed no significant associations to incident CVD. **Conclusion:** In this large prospective cohort study, higher long-term glucocorticoid levels measured in scalp hair, represent a relevant and significant predictor for future cardiovascular diseases. We found the strongest associations for hair cortisone, and within younger individuals. **1. Conflict of interest:** None **2. Funding:** Elisabeth Foundation; Netherlands Organization of Scientific Research NWO, Grant/ Award Number: 91716453

Title:	**The effect of extended personalization to a combined lifestyle intervention program**
Authors:	Smid DJ, Oosterman JE, Kamstra RJM, Pasman WJ, de Hoogh IM, Wopereis S.
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Abstract: (max 300 words)	**Introduction:** Low-grade inflammation, due to overweight and obesity, can interfere with normal insulin function thereby contribute to the development of type 2 diabetes (T2D). A healthier lifestyle can prevent or reverse T2D. The combined dietary and physical activity lifestyle intervention (CLI) program "SLIMMER" is proven effective. However, achieving and maintaining healthier lifestyle behavior is difficult. Personalization may make it easier to achieve and maintain healthy lifestyle habits. We assessed the effects of extended personalization components to the SLIMMER program on metabolic health and low-grade inflammation. **Methods:** 54 intervention and 46 control participants, 18-70 years, with overweight or obesity, meeting the inclusion criteria of the SLIMMER program, were included and followed during the first six months of the CLI. For the intervention group, the PhenFlex was used to examine changes in metabolic and inflammatory status and to determine prediabetes subtypes, which allowed for personalized dietary and exercise advice. Participants in the control group followed the regular SLIMMER program. Anthropometry was done and blood was drawn at the beginning and at six months of the CLI for both groups. **Results:** At six months, body weight improved significantly in both the intervention (n=54) and control group (available of 31 participants), -4.6 kg (p <.000) and -2.7 kg (p =.036) respectively. This shows greater improvement in body weight for the intervention group compared to the control group. In the intervention group, fasting glucose improved significantly (-0.37 mmol/l, p =.004). However, the control group (n=45) did not show a significant improvement (-0.02 mmol/l, p =.876). **Conclusion:** While analyses are still ongoing, there are promising results for the effects of this personalized CLI on body composition, fasting glucose and inflammatory markers. Further comparison between the intervention and control group is needed to indicate whether the personalized CLI evokes more health benefits than the regular CLI program. **1. Conflict of interest:** None Disclosed **2. Funding:** Research relating to this abstract was funded by TNO. GGD-NOG was involved as owner of the SLIMMER program in the outline of the study.

Title:	**Timing matters: Late, but not early exercise training remodels gut microbiome and attenuates hepatic steatosis in NAFLD**
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Abstract: (max 300 words)	**Introduction:** Exercise effectively treats and prevents cardiometabolic disorders, but it is unclear whether the beneficial effects of exercise are restricted to unique circadian windows. Non-alcoholic fatty liver disease (NAFLD) affects two billion people worldwide but is currently only treatable via lifestyle interventions. We therefore aimed to study whether the timing of exercise training differentially modulates NAFLD development. **Methods:** 26 weeks old Male APOE*3-Leiden.CETP mice were fed a high fat-high cholesterol diet to induce NAFLD. These mice were endurance-trained on a treadmill for twelve weeks either in the early (ZT13) or in the late (ZT22) active phase. Subsequently, NAFLD score, hepatic inflammation, and liver fat content were assessed and compared to sedentary mice, and 16S sequencing was conducted to investigate gut microbiome changes. **Results:** Exercise training prevented an increase in body fat mass (+2.7±1.8 g and with early (E-RUN) and 2.3±2.7 g with late exercising (L-RUN) compared to +5.6±3.1 and +5.9±3.6 g in the corresponding sedentary groups E-SED and L-SED, respectively). Exercise at either time also decreased liver fibrosis (E-RUN 2.6±2% and L-RUN 3.3±2.3% fibrotic area vs. 4.7±1.9% and 5.5±2.9% in corresponding controls). However, only late, but not early training, decreased the NAFLD score (L-RUN 3.7±0.84 vs. L-SED 4.8±0.4), liver weight (L-RUN 2.6±0.5g vs. L-SED 3.3±0.7g) and liver triglycerides (L-RUN 659±231 nmol/mg protein vs. L-SED 852±248 nmol/mg protein). These changes were accompanied by altered beta diversity of the caecal microbes with late exercise characterized by an enrichment of *Firmicutes* and particularly short-chain fatty acid- and secondary bile acid-producing geni. **Conclusion:** Timing of exercise training is a critical factor for the positive effect on NAFLD in this pre-clinical model, and the effect of late exercise may be modulated via the gut-liver axis. **1. Conflict of interest:** None **2. Funding:** Novo Nordisk Foundation grant NNF18OC0032394 to Milena Schönke

Title:	**Stimulation of the beta-2-adrenergic receptor with salbutamol activates human brown adipose tissue**
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Abstract: (max 300 words)	**Introduction:** Although the beta-3-adrenergic receptor (ADRB3) is the most important activating adrenergic receptor on brown adipose tissue (BAT) in rodents, the key adrenergic receptor involved in human BAT activation is currently unknown. As we recently revealed that the ADRB2 is the main contributor in activating human brown adipocytes in vitro, we aimed to assess whether the ADRB2 agonist salbutamol activates human BAT in vivo. **Methods:** We performed a randomized double-blinded crossover trial in 10 young and lean men to compare the effects of a single intravenous bolus of the ADRB2 agonist salbutamol without and with the ADRB1/2 antagonist propranolol on glucose uptake by BAT, as assessed by a dynamic 2-[^{18}F]fluoro-2-deoxy-D-glucose ([^{18}F]FDG) PET-CT scan, resting energy expenditure and circulating lipids. **Results:** Salbutamol, compared to salbutamol with propranolol, increased glucose uptake by BAT, but not skeletal muscle and white adipose tissue, and increased energy expenditure and heart rate without affecting circulating lipids. The salbutamol-induced glucose uptake by BAT positively associated with the increase in energy expenditure. Notably, participants with high salbutamol-induced glucose uptake by BAT had a lower body fat mass, waist-hip ratio and serum LDL-cholesterol concentration. **Conclusion:** Specific ADRB2 agonism activates human BAT, which warrants investigation of ADRB2 activation in long-term studies. **1. Conflict of interest:** None Disclosed **2. Funding:** NWO-VENI grant (09150161910073 to M.R.B.), Netherlands Cardiovascular Research Initiative: an initiative with support of the Dutch Heart Foundation (CVON2017 GENIUS-2 to P.C.N.R.).

Title:	**Nudging strategies to improve food choices of healthcare workers in the workplace cafeteria: a pragmatic field study**
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Abstract: (max 300 words)	Introduction: Dutch healthcare workers experience the highest workload and absenteeism rates compared to others. This has been associated with an unhealthier diet which may lead to obesity and related comorbidities. Nudging strategies have been shown to improve food choices by encouraging people to choose for the healthier options, without restricting them in their choices. We studied the potential of several nudging strategies; determined their feasibility in a real- life setting; and explored their effectiveness on healthier purchases. Methods: We conducted an explorative, prospective field study. Based on a literature search and a qualitative field study, we selected the potentially most effective and feasible nudges. These were implemented in a commercial workplace cafeteria of a Dutch academic medical centre. The nudging strategies included product placement, increasing the ratio of healthy to unhealthy product options, and providing nutritional information and motivational statements. Data of purchased products was collected using photographs of the lunch trays of healthcare workers, with the products then labelled and their nutritional value calculated. Effects were evaluated after one and two months. Chi-square analyses were used to analyse differences over time Results: A total of 905 photographs were analysed. The implemented nudging strategies showed a 41% increase in the purchase of whole-wheat products at the expense of non-whole-wheat products, between baseline and final measurement (p=0.012). The purchases of healthy and unhealthy bread fillings and beverages did not significantly change. Conclusion: This study showed that a combination of three nudging strategies partly improved healthy food choices for lunch in a Dutch healthcare setting. These results may help guide other professionals to implement nudging strategies to improve employee food choices. Future research should evaluate the effect over a longer period of time, thereby identifying the most effective combination of nudging strategies and investigate how these effect the health of hospital employees. **1. Conflict of interest:** none **2. Funding:** Research relating to this abstract was funded by SoFoKles, the Social Fund for the Knowledge Sector

Title:	**How well does it fit? A process evaluation of a multidisciplinary pre- and postoperative bariatric surgery support program on appropriateness and acceptability from patients' perspective.**
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Abstract: (max 300 words)	**Introduction:** Multidisciplinary support can help to improve health and cope with changes after bariatric surgery. However, there is uncertainty regarding which components are effective. Until now, most studies comprise outcome evaluations. To optimize complex programs it is also important to understand *how* intervention effects are achieved. Therefore we performed a process evaluation of a pre- and post-bariatric surgery program with medical, dietary and psychological content, delivered via group sessions until 9 months after surgery. **Methods:** The evaluation examined program "appropriateness" (relevance, perceived fit, practicability), and "acceptability" (of content, delivery). Twenty-one participants were recruited at different time points during the program. Interviews (n=11) and two focus groups were performed. **Results:** Participants expressed to be satisfied with the pre-surgery program. Relevant pre-surgery program content included practicing post-operative regimens, psychoeducation on eating behaviour, peer interaction and including a social contact. Information from experienced patients on complications was missed. Delivery in groups was regarded as helpful for sharing experiences. However, many participants felt that group interaction controlled sessions, limiting especially post-surgery program relevance and fit. Practicability of recommendations was influenced by personal, physical and social factors. Program attention for food choices, planning and social occasions was described to increase practicability. Multiple factors (e.g. type and complexity of health or psychological needs, gender, age, surgery type) influenced perceived program fit. Continuity of support was affected by timing of sessions: participants expected that maintaining behaviours would be most difficult >1 year after surgery, and therefore recommended spreading sessions more over time. Sessions planned too close to each other reduced relevance. Change of healthcare professionals was experienced as negative for continuity. **Conclusion:** Specific program content was described as useful, however, delivery may be improved in multiple respects. By implementing improvements, program relevance, practicability and perceived fit can be optimized. **1. Conflict of interest:** none. **2. Funding:** none.

Title:	**Dietary galactose increases the expression of mitochondrial OXPHOS genes and modulates the carbohydrate oxidation pathways in mouse intestinal mucosa.**
Authors:	Ferran S. Fos-Codoner, Lianne M. S. Bouwman, Jaap Keijer, and Evert M. van Schothorst
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Abstract: (max 300 words)	**Introduction:** Isocaloric replacement of part of the dietary glucose (GLU) by galactose (GAL) reflecting extended lactose intake during the early post weaning phase previously showed substantial beneficial effects on short and long term physiological parameters like body weight, body composition, insulin sensitivity and hepatic health (reduced inflammation) in mice. **Methods:** Here, we investigated the effects of these diets (16%en GAL + 16%en GLU *vs.* 32%en GLU) on post-absorptive proximal intestine gene profiles using RNAseq technology and their link to other organs (e.g. liver). **Results:** Galactose consumption primarily affected pathways involved in energy metabolism; in particular, we observed a consistent upregulation of mitochondrial transcripts (20% of top regulated genes). Oxidative phosphorylation (OXPHOS) outstood as most upregulated pathway, as evidenced by the upregulation of several of the subunits of all five complexes of the electron transport chain independent of total mitochondrial mass (functional assay). Additionally, protective immune activation (antigen processing and presenting) and carbohydrate metabolism pathways, including glycolysis, acetyl-CoA production and fructose oxidation, also showed a consistent upregulation by galactose. In particular, galactose induced upregulation of key fructolytic enzymes in the intestine were negatively correlated with hepatic triglycerides accumulation. Interestingly, no significant changes were observed in TCA cycle or fat metabolism. **Conclusion:** For the first time, our results confirm *in vivo,* the already well-established role of galactose acting as potent OXPHOS activator in previously seen *in vitro* settings. It also strongly supports the idea of intestinal cells acting as the body's gate keeper absorbing and converting (carbohydrate) metabolites, and modulating immune activation. By doing so, intestinal cells can affect substrate availability and most likely contribute to metabolic (e.g. fructose shielding) and inflammatory changes seen in other organs like liver in a protective manner. **1. Conflict of interest:** The authors declare no conflict of interest **2. Funding:** TKI Top Sector (F F-C)

Title:	**A qualitative study to explore the role of general practice in the management of childhood overweight and obesity from the perspectives of GPs, practice nurses and parents.**
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Affiliations	*[1]Department of General Practice, Erasmus MC University Medical Center, Rotterdam, The Netherlands; [2]Department of Public Health, Erasmus MC University Medical Center, Rotterdam, The Netherlands.*
Abstract: (max 300 words)	**Background**: Addressing overweight in children should be done as early as possible because overweight during childhood increases children's risk to develop health problems later in life. General practice might be a potential setting for signaling and first steps in management of overweight in children. The primary aim of this study is to explore opinions, needs and preferences about the role of general practice in the management of children with overweight from the perspectives of GPs, practice nurses and parents. **Method**: A qualitative study was performed using focus groups with GPs, practice nurses and parents of children with and without overweight. All interviews were recorded and literally transcribed. **Results**: In total five focus groups with 25 GPs (group size:3-7), two with 7 practice nurses (group size:3-4) and four with 18 parents of children with and without overweight (group size:4-5) were performed. GPs agreed that they could play a role in signaling and addressing overweight in children, but GPs find it difficult to start this conversation due to the short consultation time, fear for the reaction of parents and the lack of clarity about treatment and referral options. Parents find general practice an ideal setting to signal and discuss overweight in children. Parents are open for the conversation and are willing to make a treatment plan together as long as the GP is non-judgmental, honest and respectful. Both GPs and practice nurses saw no role for practice nurses in the management of overweight in children. They have no experience, knowledge nor time to work with overweight children. **Conclusion**: Although GPs experience different barriers, parents agreed that GPs play a role in the management of overweight in children. In order to support GPs, a Minimal Intervention Strategy will be developed to support GPs with signaling, addressing and referring children with overweight and obesity. **1. Conflict of interest: No.** **2. Funding: Stichting Theia.**

Title:	**Comparison of different methods to measure muscle mass in a population with class II/III obesity: MUSCLE study.**
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Abstract: (max 300 words)	**Introduction:** In obesity, a low muscle mass has been associated with increased prevalence of comorbidities, e.g. type 2 diabetes mellitus and hypertension, but also with lower psychological health and quality of life. A validated, cheap and accessible method to measure muscle mass in obesity is not available yet. The aim of this study was to compare cheaper and more accessible methods to measure muscle mass in a population with class II/III obesity against results obtained by dual-energy X-ray absorptiometry (DXA). **Methods:** This prospective cross-sectional study included participants between the age of 18 and 65 years with a BMI above 35 kg/m². The methods used in this study were: DXA, ultrasound (US) – Leeuwarden lean mass formula (US-LLM3), bioelectrical impedance analysis (BIA) – fat free mass formulas, anthropometric measures – skinfold thickness, and 24 hour urinary creatinine excretion ratio (CER). Differences between the methods were assessed by Pearson correlation, Bland-Altman plots and intraclass correlation coefficient (ICC). **Results:** A total of 84 participants (82% female), with a median age of 44 years and mean BMI of 40.3 kg/m², were included in this study. For both US and BIA, we found a high positive correlation and an excellent ICC (resp. 0.953 and 0.938) compared to the DXA. Additionally, US showed no proportional bias whereas the BIA did. A high correlation was found between DXA and CER, but the CER showed a moderate validity (0.527). The skinfold thickness only showed a moderate correlation and a poor validity (0.469) compared to DXA. **Conclusion:** Lean mass measured with US-LLM3 is most comparable with DXA results in a population with class II/III obesity, closely followed by the BIA. **1. Conflict of interest:** None disclosed. **2. Funding:** No funding to report

Title:	**The effect of lifestyle and behavior on 2-hour glucose estimations for people with type 2 diabetes**
Authors:	Kamstra RJM[1], Snel T[1,2,3], de Hoogh IM[1,3], Krone T[1], Eggink HM[1], Pijl H[3], de Graaf AA[1]
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Abstract: (max 300 words)	**Introduction:** Given the heterogeneity of the disease, people with type 2 diabetes might benefit from personalized lifestyle advice. Measuring the effects of lifestyle on continuous glucose values gives insight into the potential of personalized lifestyle advice. This study gained insight into the effects of sleep, carbohydrate intake and exercise on glucose values 2 hours later in people with type 2 diabetes. **Methods:** The study population consisted of 40 people with type 2 diabetes treated with lifestyle advice and/or metformin. The study consisted of 11 monitoring periods of 4 days. During each period, participants were asked to monitor their habitual lifestyle with the use of a continuous glucose monitor, activity and sleep tracker and a smartphone application for registering food intake, medication use and wellbeing. The measured lifestyle factors sleep, carbohydrate intake, exercise and current glucose value were used to predict 2-hour glucose values using a regression model. **Results:** The final effects included in the model were fixed effects for hours of sleep in the past night, carbohydrate intake in grams during the last 15 minutes, upcoming 30 minutes of exercise in Metabolic Equivalent of Tasks and current glucose level in mmol/L. These factors influenced the glucose values 2 hours later (estimates ± standard error): sleep: -0.022 ± 0.003, carbohydrates: 0.018 ± 0.002, exercise: -0.040 ± 0.004 and current glucose level: 0.509 ± 0.002. More sleep and exercise were associated with lower glucose levels, while more carbohydrates and a higher current glucose level were associated with higher glucose levels. **Conclusion:** Sleep, carbohydrate intake, exercise and current glucose level all affect glucose values 2 hours later. By knowing the effects of the various lifestyle factors, personal advice can be given to people with type 2 diabetes for improved glycemic control. 1. **Conflict of Interest:** This work is performed as part of a public-private partnership between TNO, LUMC, Ekomenu, Roche and Reinier Haga MDC. 2. **Funding:** The project is co-funded by the PPP Allowance made available by Health~Holland, Top Sector Life Sciences & Health.

Title:	**Long-term Glucocorticoid Exposure and Levels of Appetite-Regulating Hormones in Patients with Obesity**
Authors:	S Kuckuck*[1,2], R Lengton*[1,2], E.S. van der Valk[1,2], M Mohseni[1,2], A.M. Iyer[1,2], M.R. Boon[1,2], J.A. Visser[1,2], S.A.A. van den Berg[2,3] & E.F.C. van Rossum[1,2] *shared first authorship. Both authors contributed equally to the present work.
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Abstract: (max 300 words)	**Background:** Glucocorticoid excess has been shown to pose a risk factor for hedonic overeating and obesity (BMI≥30.0 kg/m^2) as well as for comorbidities such as type 2 diabetes. Results from studies using short-term experimental and pharmacological glucocorticoid exposure indicate that these effects are likely, at least partially, mediated by alterations in the signaling of appetite-regulating hormones. However, the association of *long-term* glucocorticoid exposure with levels of appetite-regulating hormones in humans is unknown. **Methods:** Data were collected from 49 adults with obesity (38 women, BMI≈39.7 kg/m^2). Glucocorticoid levels were measured in scalp hair reflecting long-term exposure (cortisol 'HairF'; and cortisone 'HairE'), using liquid chromatography-tandem mass spectrometry (LC-MS/MS). We also measured overnight-fasted serum levels of the hormonal appetite regulators leptin, pancreatic polypeptide (PP), gastric-inhibitory peptide (GIP), peptide tyrosine-tyrosine (PYY), agouti-related protein (AgRP) and cholecystokinin (CCK); all using enzyme-linked immunosorbent assay; as well as adiponectin and insulin (using chemiluminescent enzyme immunoassay). To investigate associations between hair glucocorticoid levels and hormonal appetite regulators, we used linear regressions, adjusted for BMI, sex and age. **Results:** HairF (pg/ml) was positively associated with adiponectin levels (µg/ml); β=0.211 [95%CI: 0.012;0.410] p=0.038. HairE (pg/ml) also tended correlate positively with adiponectin; β=0.091 [95%CI: -0.003;0.185], and p=0.057. CCK levels (pg/ml log10) tended to correlate only with HairE; β=0.005 [95%CI: 0.000;0.011], p=0.065. No associations were observed between levels of leptin, insulin, PP, GIP, PYY or AgRP with HairF or HairE. **Conclusion:** Higher long-term glucocorticoid levels positively correlated with fasting serum levels of adiponectin, a long-term regulator of energy balance with insulin-sensitizing action. Moreover, long-term exposure to increased cortisone levels may be related to higher fasting levels of the short-term satiety hormone CCK. Future studies should investigate the association of long-term glucocorticoid exposure with postprandial levels of appetite-regulating hormones to further unravel the role of these associations in controlling eating behaviour and metabolism. **1. Conflict of interest:** None Disclosed. **2. Funding:** Research relating to this abstract was funded by the Elisabeth Foundation and the Netherlands Organization for Scientific Research (NWO, Vidi grant No.

Title:	**Hepatic steatosis in patients with obesity: The role of long-term glucocorticoid exposure and liver fibroblast growth factor 21**
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Abstract: (max 300 words)	**Introduction** Obesity is associated with long-term exposure to increased glucocorticoid levels in hair. Glucocorticoid excess promotes fat accumulation in the liver and is associated with a higher prevalence of non-alcoholic fatty liver disease (NAFLD). In response to fat accumulation, the liver produces the stress-hormone FGF21 which was shown to protect against NAFLD in mice. Therefore, we investigated whether higher FGF21 levels were associated with less severe hepatic steatosis in the context of glucocorticoid excess among patients with obesity. **Methods** We included 39 women with obesity (BMI≈40.4kg/m^2) who underwent bariatric surgery. Before surgery, long-term glucocorticoid levels were measured in scalp hair: cortisol (HairF) and cortisone (HairE). Liver biopsies were taken from patients who were classified as being relatively low-/normocortisolitstic (HairF ≤ 3.2 pg/mg) or relatively hypercortisolistic (HairF ≥ 9.3 pg/mg). Liver biopsies were scored by a trained pathologist for the degree of steatosis based on the NAFLD activity score (NAS) (0-8). In addition, liver FGF21 mRNA expression levels were measured by RT-qPCR. We investigated the cross-sectional association between FGF21 levels and the severity of hepatic steatosis in the context of high/low hair glucocorticoid levels, using linear regression analyses, adjusted for BMI. **Results** Only in patients with high HairF, FGF21 levels tended to be positively associated with NAS (r=0.348, p=0.099). No association was observed between FGF21 levels and NAS in patients with low HairF/HairE or high HairE. In addition, no association was found between HairF/HairE and FGF21 levels. **Conclusion** In patients with high hair cortisol levels, liver FGF21 levels tended to be positively associated with NAS. This supports the notion that FGF21 levels are increased in hepatic steatosis. However, it is unclear whether FGF21 has protective effects on NAFLD and whether it may be interpreted as a compensatory mechanism to high systemic glucocorticoid exposure. **1. Conflict of interest:** None Disclosed. **2. Funding:** Research relating to this abstract was funded by the Elisabeth Foundation and the Netherlands Organization for Scientific Research (NWO, Vidi grant No. 91716453)

Title:	**Butyrate and hexanoate-enriched triglycerides increase postprandial systemic butyrate and hexanoate in men with overweight/obesity: A double-blind, placebo-controlled, randomized, crossover trial**
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Abstract: (max 300 words)	**Introduction:** Short chain fatty acids (SCFA) are increasingly recognized for their potential ability to alleviate obesity-associated chronic low-grade inflammation and disturbed substrate and energy homeostasis. Evidence suggests that an increase in circulating SCFA might be necessary to induce beneficial alterations in energy metabolism. Here, we aimed to study whether orally administrated SCFA incorporated into triglycerides reach the circulation and affect postprandial metabolism in men with overweight/obesity. **Methods**: A double-blind, placebo-controlled, randomized, crossover study was conducted at Maastricht University with fourteen men with overweight/obesity (BMI 25-35 kg/m2) of which twelve men finished all testdays and were included for analysis. The participants received a liquid high fat mixed meal test containing either a low (650 mg), medium (1,325 mg), or high dose (2,000 mg) of Akovita SCT or a placebo (sunflower oil) in randomized order. Blood was sampled at baseline and after ingestion for 6 h for the primary outcome plasma butyrate and hexanoate concentration. Secondary outcomes included hydrogen breath, appetite, gastrointestinal complaints, circulating glucagon-like peptide 1, free fatty acids, glucose, triglycerides, insulin, and cytokines concentrations. **Results:** All doses were well-tolerated. The medium dose increased ($P < 0.05$) and the high dose tended to increase ($P < 0.10$) postprandial circulating butyrate and both doses increased circulating hexanoate ($P < 0.05$) compared to placebo whereas the low dose did not. Nevertheless, Akovita SCT supplementation did not affect any secondary outcomes compared to placebo. **Conclusion:** Akovita SCT increased postprandial circulating butyrate and hexanoate without changing metabolic parameters in men with overweight/obesity. Future randomized clinical trials should investigate whether long-term Akovita SCT supplementation can aid in the treatment or prevention of metabolic disorders. **1. Conflict of interest:** LS and AH are employees of AAK Netherlands BV. **2. Funding:** AAK Netherlands BV, Zaandijk, The Netherlands

Note by NASO Board: Abstract was not selected to be included in one of the pitch sessions, since it was already selected as a pitch under Publication Prize 2022.