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Metabolism & Endocrinology
Oral Communications C

14.30 – 16.00, Sunday, 16 September
Rutherford, Fourth Floor

14.30 Cengizhan Tanman, Marmara University, Turkey
C067 The effects of oral chondroitin sulfate on metabolism and gut inflammation induced by high fat diet in rats

14.45 Marlene Lages, ciTechCare, Polytechnic Institute of Leiria, Portugal
PCB218 Assessing cardiorespiratory and metabolic parameters responses to a mixed meal vs a glucose challenge- a pilot study in healthy volunteers

15.00 Joseph Boachie, University of Warwick, UK
C069 Vitamin B12 deficiency inhibits the lipid lowering effect of metformin in the liver

15.15 Valentin Schmidt, Charité - Universitätsmedizin Berlin, Germany
C070 A novel tool for identifying transcriptional targets in kidney development using the example of Wilms tumor protein (WT1)

15.30 Elizabeth Haythorne, University of Oxford, UK
C071 Hyperglycaemia adversely affects mitochondrial function in pancreatic islets

15.45 Wesam Farrash, University of Nottingham; Umm Al-Qura University, Saudi Arabia
C072 The impact of acute exercise upon myokine secretion in rat models outbred for either low or high aerobic capacity in response to treadmill run training

Where applicable, the authors confirm that the experiments described here conform with the ethical requirements.

C067

THE EFFECTS OF ORAL CHONDROITIN SULFATE ON METABOLISM AND GUT INFLAMMATION INDUCED BY HIGH FAT DIET IN RATS

B.A. Çevlikli[2], C. Tanman[2], E. Yircali[2], A. Ürpekli[2], F.C. yildiz[2], Z.N. Özdemir Kumral[1], S. Arabaci Tamer[1], D. Gökçeoğlu[8], D. Akakin[8], D. Özbeyli[4], L. Sen[1], K. Ozguler[5], B. Aksu[5], C. Erzik[7], O. Sirikci[6], B. Yeğen[1] and N. Imeryüz[1,3]

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Chondroitin sulphate (CS) controls weight gain[1] induced high fat diet (HFD) in mice by restricting fat absorption and increasing incretin hormone secretion[2], alleviates intestinal inflammation in chronic mild stress models. It is unknown whether anti-inflammatory action of CS has a role in the control of weight gain induced by HFD. Sprague-Dawley rats (10 week old, male, n=6 each) treated with either saline (S, 0.1 ml/100g/rat) or CS (80 mg/kg/day,oral), were fed daily and isocalorically for 4 weeks with chow ND (fat 2.7%) or HFD (45% fat). Rats in ND+S, ND+CS, HFD+S and HFD+CS groups were weighed weekly. Fecal samples were taken at 0-2-4 weeks under sterile conditions to detect *Desulphovibrio piger* (D. piger) by qPCR. Instestinal and colonic motility was recorded at the end of the experiments. Rats were decapitated and trunk blood was obtained for biochemical analysis. Epididymal fat was weighted and myeloperoxidase (MPO) activity studied in the ileal, colonic and gastric samples. Histopathological evaluation and scoring of inflammation were done in H&E stained samples. Data were stated as mean±standard error or median (range), compared with 2-way ANOVA; $p<0.05$ were considered significant. Daily caloric intake of ND group was found higher than HFD group ($F_{7.21}=5.02$ diet, $F_{2.3}=19.8$ time, $p<0.05$). CS has decreased the amount of weight gain ($F_{1.24}=7.658$, $p<0.05$) and also decreased the HFD induced increment of epididymal fat weight ($F_{1.20}=36.4$ diet, $F_{1.20}=4.4$ treatment, $p<0.05$). In ND group triglyceride levels significantly decreased with CS treatment ($F_{1.2}=5.25$, $p<0.05$). HFD groups resulted in increased MPO levels, indicating neutrophil infiltration to the tissues, as compared to ND groups in gastric and ileal tissues ($F_{1.14}=21.3$ and $F_{1.17}=11.57$ respectively, $p<0.05$). Histopathological inflammation score worsened by HFD while ameliorated by CS treatment in ileal ($F_{1.21}=22.52$, diet, $p<0.001$, $F_{1.21}=6.56$ CS, $p<0.05$) and gastric ($F_{1.20}=36.4$ diet, $F_{1.20}=4.4$ CS $p<0.05$) tissue samples. HFD has increased small intestinal transit ($F_{1.20}=5.7$, $p<0.05$) while decreasing pellet output ($F_{1.20}=15.12$, $p<0.001$). Time dependent increase was recorded in D. piger bacterial population with HFD ($F_{2.32}=33$, $p<0.001$). Also D. piger population significantly increased in ND group dependent to time and CS treatment ($F_{2.30}=40.7$, $F_{15.30}=2.7$ respectively, $p<0.01$). In conclusion, the most likely reason for decreasing levels of weight gain in CS treated rats might be the recovery from intestinal inflammation. Changes in intestinal microbiota by means of CS treatment might be another reason which requires further elucidation. Current study demonstrates that HFD promotes visceral fat deposition, inflammation in the gastrointestinal tract, triggers changes in gut motility and has a role in the maintenance of microbiota while CS regulates this interaction.

Shang Q, Shi J, Song G, Zhang M, Cai C, Hao J, Li G, Yu G. Structural modulation of gut microbiota by chondroitin sulfate and its oligosaccharide. Int J Biol Macromol. 2016 Aug;89:489-98.

Krieger JP, Langhans W, Lee SJ. Novel role of GLP-1 receptor signaling in energy expenditure during chronic high fat diet feeding in rats. Physiol Behav. 2018 Apr 11. pii: S0031-9384(18)30168-9

Where applicable, the authors confirm that the experiments described here conform with the ethical requirements.

C068

A novel *ex vivo/in vitro* approach to investigate the effects of milk-derived peptides on glut4 translocation

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Introduction

Traditional *in vitro* experiments using mammalian cell culture have provided valuable insight to skeletal muscle metabolism. The nature of traditional approaches to cell culture, however, lacks direct translocation to *in vivo* physiology (Cantor et al 2017). Following the ingestion of whey protein, a plethora of hormones from several different tissues are released, which stimulate cross-talk between multiple organs to coordinate an integrated systemic response (van Loon et al 2000;Nilsson et al 2004). Due to these hugely dynamic multi-organ responses, direct presentation of intact or hydrolysed proteins to a cell in culture very rarely replicates the nutrient, humoral or bioactives the cell encounters *in vivo*. Consequently, using a novel *ex vivo/in vitro* approach, we investigate the effects of fasting and postprandial human serum on GLUT4 translocation in L6-GLUT4myc myotubes follwoing protien ingestion.

Methods

L6-GLUT4myc myotubes were first treated with human serum [0.1-20%] collected after an overnight fast (~10 h) to characterise the effect on GLUT4 translocation and signal transduction. After optimising *in vitro* screening conditions, myotubes were incubated with traditional cell culture media supplemented with postprandial human serum collected from male volunteers (n=8) after ingestion of 0.33 g/kg BMof either intact or hydrolysed whey protein, or an isonitrogenous control. Blood samples were collected every 30 min for 2 h post feeding. One and two-way ANOVA with repeated measures (time x treatment), were used to assess statistical differences where appropriate (α level set at $p<0.05$). For post-hoc testing, Tukey's or Dunnetts multiple comparisons test was used to detect significant differences between treatments and/or time points when a significant main effect or interaction effect was indicated.