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OP248 FOLATE PRODUCTION IN BIFIDOBACTERIA FROM INFANT AND ADULT HUMANS
M. R. D’Aimmo1, M. Modesto2, P. Mattarelli2,3, B. Sgorbati2, B. Biavati2, T. Andlid1.1 DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING, Chalmers University of Technology, Göteborg, Sweden, 2DIPSIA, BOLOGNA UNIVERSITY, Bologna, Italy
INTRODUCTION: Folates – the naturally chemically reduced forms of folic acid (vitamin B9) - are co-factors in essential metabolic pathways such as DNA synthesis and methylation pathways. Humans cannot synthesise folate and depend on intake both from the diet (green vegetables, cereals, rice, milk, fermented milk products, etc.) and from indigenous folate synthesizing bacteria of the intestinal mucosa. Folate needs of the individuals whereas in adults a more complex diet is sometime not able to cover all the folate need. The relevance of the different ratio of 5-CH3-H4 folate and a low amount of H4 folate. In infants we obtained the opposite findings. All bifidobacteria tested (both from adult and infant) were able to produce folate. Strains derived from adults were the higher producer of total folate (range from 35 to 200 μg/g dry matter) and an inverted ratio of 5-CH3-H4 folate in respect to adults. In infants we obtained the opposite results with strains typical of infant habitat producing low amounts of total folate (range from 35 to 200 μg/g dry matter) and an inverted ratio of 5-CH3-H4 folate in respect to adults. Therefore the folate activity was much higher in adults than in infants. CONCLUSION: In agreement with idea of coevolution of host-gut microbiome (Ley et al., 2008) we find that bifidobacteria present in the adult gut were able to produce a large amount of folate whereas strains derived from the infant gut were less able to produce folate. These findings correlate with the diet and the folate requirement of the host: in infants, in fact, milk feeding is able to support the folate needs of the individuals whereas in adults a more complex diet is sometime not able to cover all the folate need. The relevance of the different ratio of 5-CH3-H4 folate production in adults and infants has being studied only in few strains and further studies are requested in order to complete this finding and provide an ecological explanation.
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Disclosure of Interest: None Declared
Keywords: Bifidobacterium adolescentis, Bifidobacterium breve, Bifidobacterium longum subsp. infants, Folate production, Gut microbiota

OP249 UNDISSOCIATED GELATIN TANNATE REDUCES INTESTINAL LEAKINESS AND MUCOSA INFLAMMATION BY FORMING A PROTECTIVE BIOFILM: RESULTS FROM IN-VITRO AND IN-VIVO MODELS
I. Bueno1,2, S. Sekkali3, V. Theodore4, M. Dattilo5. 1NRN, Toulouse, France, 2Bioprotect, Ariano Irpino, Italy
INTRODUCTION: Gelatine (GEL) stabilised by cross-linking with tannic acid (TA) forms gelatine tannate (GT): GT is considered as a protective biofilm on the gut mucosa and has been shown to cure diarrhoea but the mechanism of action needs further investigation.
Aims&Methods: We aimed at investigating the effect of GT and its components (GEL and TA) on the intestinal mucosa using both in-vitro and in-vivo models.

OP247 DISTURBED INTESTINAL INTEGRITY IN PATIENTS WITH COPD: EFFECTS OF ACTIVITIES OF DAILY LIVING
K. Lenaerts1, E. Rutten2, W. Buurman1, E. Wouters2. 1Department of Surgery, Magna Graecia University, Catanzaro, Italy, 2Centre of expertise for Chronic Organ Failure (Ciro), Horn, Netherlands
INTRODUCTION: Chronic obstructive pulmonary disease (COPD) is accepted to be a multicomponent disease with various comorbidities. The contribution of the gastrointestinal tract to the systemic manifestation of COPD has never been investigated. This metabolically active organ may experience recurring local oxygen deficits during daily life, leading to disturbed intestinal integrity in COPD patients.
Aims&Methods: 18 patients with moderate COPD (mean FEV1: 55±3%pred) and 14 matched healthy controls were tested on two occasions, a baseline measurement at rest and, at another day, during the performance of activities of daily living (ADLs). To assess enterocyte damage, plasma intestinal fatty acid binding protein (IFABP) levels were determined, whereas urinary excretion of orally ingested sugar probes was measured using liquid chromatography and mass spectrometry to assess gastrointestinal permeability.
Results: Plasma IFABP concentrations were not different between COPD patients and healthy controls at rest. In contrast, 0-3h urinary lactulose/thamnosate and sucralose/erythritol ratios and 5-24h urinary sucralose/erythritol ratios were significantly higher in COPD patients compared to controls, indicating increased intestinal permeability. The performance of ADLs led to significantly increased plasma IFABP concentrations in COPD patients but not in control subjects. In line, the intestinal permeability difference between COPD patients and controls was intensified.
Conclusions: Besides the altered intestinal permeability in COPD patients at rest, performing ADLs led to entercyte damage in addition to intestinal hyperpermeability in COPD patients but not in controls, indicating functional alteration in the gastrointestinal tract. Hence, intestinal compromise should be considered as a new component of the COPD multisystem disease.
The in-vitro "filming" activity was evaluated by Corrosibles® a standard measure on Carboxy-terminated active markers on Caco-2 goblet cells. The effect of GT (5 or 20 mg/ml) on Caco-Goblet cell permeability was assessed by Trans-Epithelial Electrical Resistance (TEER) and Lucifer Yellow (LY) before and after apical S. typhimurium. The tight-junction (TJ) proteins aquaporin-3 (AQP3) and occludin (OCL) were assayed by RT-PCR as markers of TJ integrity.

In-vivo, Wistar rats received orally either GT (250 mg/kg), Gel (125 mg/kg), or TA (125 mg/kg), and 2 h later were injected IP with LPS from E. coli. Jejunal strips were collected 6 hours later for in vitro TJ permeability measurement using FITC-dextran and mucosal myelo-peroxidase (MPO) activity as a marker of inflammation.

RESULTS: GT increased the corrosion time (hydrochloric ac. 37%) from 400 to 699 sec (p<0.001) suggesting a chemical biofilm protection. In addition, GT 5 mg/ml of Caco-Goblet cell at 4 hours (from 180.1 to 269.2 ohm·cm²; p<0.005) and decreased the basal permeability to LY in basal conditions at both 2 and 4h. The LY permeability increased from 1.18 to 7.54 after 2 hours of exposure to S. typhimurium however a pre-treatment with GT suppressed the LPS-induced increase in MPO.

Keywords: Diarrhoea, Gelatin tannate, inflammation, LPS, paracellular permeation.

OP250 DIABETES AND GASTROINTESTINAL DISORDERS: THE EFFECT OF INTESTINAL METHANE PRODUCTION ON GLYCEMIC CONTROL

V. Cesaroi, T. A. Di Rienzo1, D. Pitocco2, M. Campanile1, G. D’Angelo1, S. Perec2, F. D’Aversa1, A. Tortora1, F. Barbaro1, G. Vitale1, G. Gigante1, G. Caccio2, A. Monaci2,1,*, V. Otteni1, Internal Medicine, Diabology, POLICLINICO GEMELLI, Rome, Italy

INTRODUCTION: At the state of art it isn’t known the correlation between diabetes and lower gastrointestinal disorders. Some studies show a significantly higher prevalence of small intestinal bacterial overgrowth (SIBO) in patients with type 1 diabetes. No data exists about gastrointestinal methane (CH4) production in patients with diabetes.

AIMS&METHODS: Aim of our study was to evaluate the effect of methanogenic flora eradications on glycemic control and daily insulin requirements in patients with type 1 diabetes in order to identify a possible role of CH4 production on diabetes control variability. 30 consecutive patients (9 males, 21 females; mean age 45±7/2 years) affected by type 1 diabetes underwent H2/CH4 lactulose breath test to evaluate the presence of SIBO and CH4 production (CH4 concentration at 3 ppm over that of room air). The lactulose control was evaluated trough gaseous hydrogen and daily insulin requirement (ratio between total insulin units in a day and body weight).

CH4 producers were treated with metronidazole (500 mg bid for 10 days) and underwent a control breath test 7 days after the end of therapy. Data were analyzed using paired-data t-test.

RESULTS: 12/30 patients (40%) were methane-producers (mean baseline value 6+-2 ppm; mean peak 25+-30 ppm); the mean glycemic control was 7.6% and the daily insulin requirement was 1.32±0.12 UI/kg. 12 patients (75%) showed a significant (P < 0.001) reduction of their glycemic control (mean Hba1c 7.6% vs 6.8%) and daily insulin requirements (0.66+0.12 vs 0.49+0.08 UI/kg) after metronidazole therapy.

CONCLUSION: Our study showed for the first time a possible role of CH4 production in diabetes metabolic control. In particular, the most interesting data is that poorly controlled diabetes seems to be related to a gut CH4 production and subsequently reduced significantly the LPS-induced increase in MPO.

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Disclosure of Interest: None Declared

Keywords: diabetes mellitus type 1, glycemic control, parenteral nutrition, toll like receptor-4

OP251 MEDIUM-CHAIN TRIGLYCERIDE INDUCED LEUKOCYTE ACTIVATION IS NOT MEDIATED BY TOLL-LIKE RECEPTOR 4

E. D. Olthof1,*, A. F. Guelich2, L. A. Joostens1, H. M. Schap1, Roelofs1, G. J. Wientjens1.

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INTRODUCTION: Lipids, as part of parental nutrition formulations modulate the function of the immune system. For instance, medium-chain triglycerides (MCTs), but not long-chain triglycerides (LCT), as part of parenteral lipid emulsions activate leucocytes in vitro by mechanisms that are still unknown. It has been shown that saturated fatty acids can activate TOLL-like receptor 4 (TLR-4) mediated pro-inflammatory signaling pathways in leucocytes.

AIMS&METHODS: Aim of our study was to investigate whether TLR-4 is also involved in MCT-induced leucocyte activation. We assessed the in vitro effect of the parenteral mixed lipid emulsion LCT/MCT, at a clinically relevant triglyceride concentration of 5 mmol/l, on the expression of leucocyte surface markers and activation markers in the presence or absence of the specific TLR-4 inhibitors TAK-242 (0.5 and 5 mmol/l) and Bartonella quintana LPS (0.1, 1 and 2.5 mg/ml).

RESULTS: As expected, LCT/MCT induced leucocytes, with an increase in expression of adhesion (55% and 41% in granulocytes and monocytes, respectively), azurophilic and specific degranulation (19% and 22%, respectively in granulocytes) markers, and a decrease in L-selectin (14% and 20% in granulocytes and monocytes, respectively). Inhibition of TLR-4 by TAK-242 and Bartonella quintana LPS did not alter the LCT/MCT-induced decrease in L-selectin and increase in adhesion marker expression in granulocytes and monocytes. Furthermore, in granulocytes Bartorrella quintana LPS did not change the MCT-induced increased expression of specific and azurophilic degranulation markers in granulocytes. Inhibiton of LPS in the presence of specific TLR-4 inhibitors in granulocytes markers was abolished during LTR-4 inhibition with 5 mmol/l TAK-242. However, a similar decrease in degranulation marker expression was found after incubation with 5 mmol/l TAK-242 alone.

CONCLUSION: MCT-induced immune activation is not mediated by TLR-4 signaling

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Disclosure of Interest: None Declared

Keywords: immune activation, medium chain triglyceride, parenteral nutrition, toll like receptor-4

TUESDAY, OCTOBER 15, 2013

11:00–12:30

Pancreatitis: Lessons from animal models – Salon 11/12

OP252 IMPROVEMENT OF ENDOPLASMIC RETICULUM STRESS BY ENHANCED PERK PATHWAY REDUCES MURINE EXPERIMENTAL ACUTE PANCREATITIS

T. Okazaki1, A. Nishio1, T. Masahiro1, T. Inoue1, Y. Sakaguchi1, T. Fukui2, K. Uchida1, K. Okazaki1.

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INTRODUCTION: Endoplasmic reticulum (ER) stress causes the accumulation of misfolded proteins inside the ER and initiates unfolded protein response (UPR). UPR is activated during pancreatitis to restore ER homeostasis. Although protein kinase RNA-like ER kinase (PERK) is associated with the UPR through phosphorylation of eukaryotic initiation factor 2a (eIF2α), the role of PERK signaling pathway in pancreatitis is not fully clarified. We investigated the significance of PERK signaling pathway in severe acute pancreatitis in mice using an eIF2α dephosphorylation inhibitor, salubrinal.

AIMS&METHODS: Severe acute pancreatitis was induced by intraperitoneal injection of cerulin (CER) at a dose of 50 mg/kg six times at 1 hour intervals. Moreover, LPS was administered at a dose of 10mg/kg as the septic challenge immediately after the completion of CER injections. Salubrinal was administered intraperitoneally immediately after LPS injection and six hours later. Mice were sacrificed at 24 hours after the first injection of CER and the severity of pancreatitis was histologically graded with a scoring system. Serum amylase and proinflammatory cytokine levels were measured. Expression of ER stress-related proteins was examined by western blotting.

RESULTS: The severity of pancreatitis in mice treated with salubrinal was significantly attenuated compared with control mice. Serum amylase and proinflammatory cytokine levels were reduced in salubrinal compared with control group.

CONCLUSION: Inhibition of eIF2α dephosphorylation decreased ER stress and reduced severe acute pancreatitis in mice. Augmentation of PERK signaling pathway could be a potential therapeutic option for the treatment of acute pancreatitis.


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Disclosure of Interest: None Declared

Keywords: ER stress, pancreatitis, PERK signaling, Salubrinal

OP253 SEROTONIN REGULATES PROGENITOR CELL-BASED BUT NOT CLONAL REGENERATION IN THE ADULT PANCREATIC ACINAR CELL

E. Saponara1,*, A. Sonda1, K. Grablauksaitiene1, Y. Tian1, T. Reding2, R. Graf3.

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INTRODUCTION: Progenitor cell-based regeneration of acinar cells is activated during cerulin-induced pancreatitis. This process requires a preliminarily acinar de-differentiation via secretion of yamogens, followed by expression of progenitor cell markers and formation of acinar-to-duodenal metaplasia (ADM). Clonal regeneration without loss of yamogens and cell de-differentiation is observed following 60% pancreatectomy. Previously, we demonstrated that...