

**Conclusion:** We demonstrated that basic tastes perception is constant over the time and not significantly affected by BMI reduction. Our results indicated that the reported food choice changes in obese subjects after bariatric surgery are not dependent by weight loss. Further study are needed to characterize the underlying psycho-neuro-hormonal factors involved in the complex mechanisms regulating food preferences after bariatric surgery.

#### Hiatal hernia is the strongest predictor of esophagitis in gastroesophageal reflux disease

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**Objective:** In the recent years, studies have indicated that hiatal hernias have an important role in the pathogenesis of reflux disease, promoting reflux by many different mechanisms, emphasizing that the larger the hiatal hernia, the higher the reflux intensity and erosive esophagitis prevalence. The aim of this study was to determine how the presence and size of a hiatal hernia are related to lower esophageal sphincter (LES) pressure and motility abnormalities, the efficacy of esophageal acid clearance, the amount of gastroesophageal reflux, and the degree of mucosal damage.

**Methods:** We reviewed esophageal manometry and pH monitoring from patients with typical reflux symptoms (heartburn and regurgitation) previously submitted to upper endoscopy. Reflux intensity was measured by the % of total time of pH <4 (%TT) and by % of time of pH <4 in upright (%UT) and supine (%ST) positions. Endoscopic evidence of esophagitis was graded using the Los Angeles Classification (A, B, C, and D). Hiatal hernias were classified as moderate if their size ranged from 1 to 3 cm, and large if ≥4 cm.

**Results:** A total of 593 patients were included, 100 being in the erosive reflux disease group and 493 in the non-erosive reflux disease group. Hiatal hernias were present in 189/593 (32%), of which 22% were moderate, and 10% were large. In erosive reflux disease patients, hiatal hernia incidence was significantly higher (63% vs 37%,  $p < 0.001$ ). In this group, there were 41 (41%) with moderate hiatal hernias and 22 (22%) with large ones. In non-erosive reflux disease patients, there were 126 (26%) with hiatal hernias. On the other hand, esophagitis incidence was significantly higher in both GERD patients with large hiatal hernia and with moderate hiatal hernia group than in without hernia group (respectively 37%, 32%, and 9%;  $p < 0.001$ ). In patients with reflux disease, the %TT, %UT and %ST values were lowest in the group without hiatal hernia and it was detected that these values significantly increased with larger herni size ( $p < 0.001$ ,  $p < 0.01$  and  $p < 0.01$ ). However, there was no correlation between the presence and size of hiatal hernia with LES pressure and esophageal motility disorders.

**Conclusion:** Hiatal hernias increase acid exposure time in total time of pH <4 (%TT) and by % of time of pH <4 in upright (%UT) and supine (%ST) positions in all reflux patients. Hiatal hernia is strongest predictor of esophagitis, thereby increasing esophageal acid exposure.

#### Glucagon-like peptide-2: gut signal and lipid parameters in obese mice

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**Objective:** The gastrointestinal tract is a specialized sensory system, which detects and responds to constant

changes in luminal content. Chronic consumption of a high fat diet (HFD) causes intestinal changes related to gut peptide release and function. Glucagon-like peptide-2 (GLP-2) is a nutrient-responsive hormone acting through the GLP-2R receptor. Studies on animal models and human beings have reported that GLP-2 is involved in the regulation of postprandial lipemia. Indeed, GLP-2 facilitates intestinal absorption of lipids and it enhances and regulates chylomicron secretion from the intestine. The aim of the present study was to investigate if and to which extent endogenous GLP-2 influences lipid parameters in HFD-fed mice by blocking the GLP-2R with chronic treatment with the GLP-2R antagonist GLP-2 (3-33).

**Methods:** HFD-fed mice and age-matched standard diet (STD)-fed animals were injected once a day with intraperitoneal GLP-2 (3-33) (60 ng) or PBS (vehicle control) for 4 weeks. Plasma lipid parameters, hepatic functional markers, intrahepatic lipid concentration, lipid intestinal absorption and liver morphology were examined.

**Results:** Compared with age-matched control animals, HFD-fed mice displayed higher plasma levels of triglycerides, cholesterol, LDL, AST and ALT. They also showed increased intrahepatic lipid concentration and hepatic steatosis. None difference was observed in the lipid elimination in the feces. In HFD-fed mice the chronic treatment with GLP-2 (3-33) significantly worsens lipid profile. It increased triglyceride, cholesterol and ALT plasma levels and reduced HDL compared with PBS treated mice. It also enhanced intrahepatic lipid concentration and worsened liver morphology but it failed to change lipid elimination in the feces. In STD fed mice, the chronic treatment with GLP-2 (3-33) did not affect any parameters.

**Conclusion:** These data suggest that endogenous GLP-2 may exert defensive role against lipid imbalance in obese conditions because the block of the GLP-2 signaling worsens the lipid metabolism in HFD mice.

#### Normal values for 3D high resolution anorectal manometry in children

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**Objective:** 3D high-resolution anorectal manometry is the most precise tool to assess function and 3D topographic picture of pressures along the anal canal. Until now, it has been used only in adult population. The normal values have not been evaluated so far. The aim of the study was 3D manometric evaluation of anorectal function in children without symptoms from lower gastrointestinal tract.

**Methods:** Children without any symptoms from lower gastrointestinal tract were prospectively enrolled in the study. Manometry procedures were performed using a rigid probe (Covidien AG, Switzerland) without premedication. Pressures within the anal canal and 3D picture of sphincters were obtained. The volume of balloon to elicit rectoanal inhibitory reflex (RAIR) was established. If possible, defecation dynamics and thresholds of sensation were evaluated. Data were expressed as mean (5th and 95th percentile).

**Results:** 50 children (28 males; age: 2–17 years, mean: 7 years) were studied. Mean resting and squeeze sphincter pressures were 90.2 (65.3–123.7) mmHg and 201 (106–263.4) mmHg, respectively. The mean length of the anal canal was 2.72 (1.9–3.8) cm and it was correlated with age and height ( $p = 0.000$ ). Mean rectal balloon volume to

elicit RAIR was 13 (10–30) cc. The first sensation, urge and discomfort were observed at 23.3 (10–101) mL, 45.3 (10–102) mL and 93.4 (30–180) mL of the balloon volume, respectively. There was no lesions of sphincters according to 3D topographic picture of the anal canal. There was no statistically significant difference in pressure profiles between males and females. Positive correlation between age and volume of balloon needed to elicit RAIR and discomfort was found.

**Conclusion:** Normative data of 3D high-resolution anorectal manometry in children without symptoms from lower gastrointestinal tract were established. There were no significant gender differences concerning pressure results.

#### Irritable bowel syndrome with diarrhea and non-celiac gluten sensitivity are characterized by increased zonulin serum levels

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**Objective:** Zonulin, also known as pre-haptoglobin 2, reversibly opens tight junctions (TJ), and is overexpressed in disorders in which TJ dysfunction is central, including celiac disease (CD). We investigated the role of zonulin in the pathogenesis of irritable bowel syndrome (IBS) and non-celiac gluten sensitivity (NCGS).

**Methods:** A total of 15 patients with IBS-D, 15 patients with NCGS, 15 patients with CD and 15 healthy controls (HC) were studied. Zonulin serum levels were evaluated by ELISA assay and normalized to total protein content. Zonulin gene expression was evaluated in paraffin-embedded colonic biopsy samples (20 IBS and 10 HC) using quantitative real-time RT-PCR assay. Clinical data and symptoms were recorded for each patient including: anti-transglutaminase (TTG) antibodies, anti-deamidated gliadin peptide (DGP) antibodies, IgE, abdominal symptoms and bowel habit.

**Results:** The four groups studied showed significant different zonulin serum levels ( $p < 0.0001$ ). CD patients showed significantly higher zonulin serum levels compared to HC ( $0.033 \pm 0.004$  vs  $0.007 \pm 0.001$  ng/mg total proteins,  $p < 0.0001$ ) and to IBS-D patients ( $0.012 \pm 0.002$  ng/mg total proteins,  $p < 0.001$ ). NCGS zonulin serum levels were significantly higher than HC ( $0.030 \pm 0.006$  vs  $0.007 \pm 0.001$ ,  $p < 0.05$ ) and IBS-D ( $p < 0.05$ ). IBS-D patients showed higher zonulin serum level than HC. Zonulin levels were positively correlated with the titer of anti-TTG antibodies ( $r = 0.6$ ;  $p < 0.05$ ) and anti-DGP antibodies ( $r = 0.6$ ;  $p < 0.05$ ). A strand of positive correlation was observed in NCGS patients between zonulin levels and serum IgE levels. mRNA expression of zonulin was increased in the colonic mucosa of patients with IBS in comparison with HC.

**Conclusion:** We showed increased zonulin serum levels in IBS-D and NCGS patients, in addition to CD. A positive and significant correlation was found between zonulin serum levels and both anti-DGP and anti-TTG antibody titers. Our data suggest that a zonulin-dependent TJ dysfunction inducing 'leaky gut' may play a role in the pathophysiology of IBS and NCGS. The possible role of zonulin as a biomarker in pathologies with permeability alteration like NCGS and IBS should be investigated.