

## Histomorphological analysis of the colonic barrier in a mouse model of obesity

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**Background and Aim.** Obesity is a metabolic disorder with an increasing incidence in Western countries and childhood. It is characterized by low-grade systemic inflammation and several comorbidities, including alterations of gastrointestinal (GI) functions, which impact negatively on patients' quality of life. There is currently limited information on the morpho-functional features of the GI tract in obese subjects. Of note, the intestinal barrier function has been found to be altered in obese subjects, even before the occurrence of body weight increase [1]. In this light, the present study was carried out to assess, in a mouse model of diet-induced obesity, whether high fat diet (HFD) is associated with morphological alterations of the colonic mucosal barrier.

**Methods.** C57BL/6 mice (n=5/group) were fed with standard diet (SD, 18% calories from fat) or HFD (60% calories from fat). After 8 weeks, body weight, and levels of blood cholesterol, triglycerides and glucose were evaluated. Malondialdehyde (MDA, colorimetric assay), IL-1 $\beta$  and IL-6 levels (ELISA assays) were examined in colonic tissues. Morphological features of colonic mucosal structures (lining epithelial cells, goblet cells, inflammatory infiltrates and enteric glia) were examined by histochemistry and immunohistochemistry.

**Results.** HFD mice displayed significant differences at both molecular and histomorphological level, as compared with SD animals: increased body weight and blood metabolic indexes; increased MDA, IL-1 $\beta$  and IL-6 levels in colonic tissues; altered pattern of claudin-1 expression along with upregulation of transmembrane 16A protein and induced nitric oxide synthase in the enteric epithelium facing the lumen; increased proliferation rate of crypts; altered composition of goblet cell mucous; mucosal gliosis and infiltrates with mixed inflammatory cells.

**Conclusions.** After 8 weeks, HFD intake led to significant alterations of systemic metabolic indexes, colonic tissue inflammation, and colonic mucosal barrier in obese mice, as compared with controls. Morphological studies can be useful to allow the characterization of histopathological patterns of colonic wall remodelling and inflammation underlying bowel motor dysfunctions associated with obesity.

### References

[1] Raybould HE. J Physiol 2012, 590:441

### Keywords

Diet-induced obesity, mouse model, intestinal mucosal barrier, morphological remodelling