

Specific features of the intestinal mucosa of obese Zucker rats

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Metabolic syndrome is a group of obesity-related metabolic abnormalities that increase an individual's risk of developing type 2 diabetes and cardiovascular disease. The obese Zucker rats (OZR) may represent a valuable animal model for studying several aspects of this increasingly prevalent problem in worldwide. In fact, the genetically obese (fa/fa) Zucker rats, due a recessive mutation of the leptin receptor gene (*lepr*), exhibit hyperphagia and develop hallmark features of metabolic syndrome, including hyperlipidemia, hypertension, insulin resistance, and increased adiposity and oxidative stress.

Here, we report the preliminary results from our current studies aimed to investigate different metabolic markers in the OZR intestinal mucosa, compared with their lean counterparts (LZR). Starting from the important role attributed to carbohydrates in regulating the critical equilibrium of the intestinal environment, we applied lectin histochemistry to visualize the glycosylation pattern expressed in the OZR intestinal mucosa. The investigation was mainly focused to identification and in situ characterization of sialylated and fucosylated glycomponents which were directly demonstrated with SNA, MAL II, LTA, and UEA lectin binding. In addition, in order to look for additional and complementary information about sialic acid acetylation degree and sites, PNA and DBA lectin histochemistry was combined with sialidase predigestion, potassium hydroxide deacetylation, and differential periodate oxidation. As a parallel study, the distributional patterns of carbonic anhydrase (CA), the enzyme which is differently expressed in the gastrointestinal tract with several functions, such as regulation of cellular and extracellular acid-base homeostasis, salt absorption and fluid balance, were visualized. The immunohistochemical localization of the CA isoenzymes CAIV, CA IX, CA XII, and CA XIV was performed with the relevant specific antibodies.

The complex of the data obtained suggest a marked modulation of the sialoglycoconjugate expression in the OZR intestinal epithelium, when compared with the LZR, to be considered as an interesting topic for further investigations.

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