Project 1.3 Unraveling mechanisms and physiological outcome of lipid-evoked regulation of proteostasis in the intestine

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Background:

The main aim of our laboratory is to understand the cross-talk of different classes of signaling molecules in the regulation of metabolic homeostasis. We are especially interested in unraveling novel signaling modules promoting adipose tissue and intestine dysfunction during metabolic diseases such as obesity, type 2 diabetes, or atherosclerosis.

Overconsumption of energy-dense, rich in lipids foods promotes the development of obesity, diabetes, and atherosclerosis. Moreover, lipid-rich diets increase incidents of inflammatory bowel disease (IBD) and are a significant risk factor for the development of colorectal cancer. Absorption of lipids in the intestine is a complex, multistep process, initiated by the micellization of lipids by bile acids, their digestion in the lumen of the intestine mainly by pancreatic lipase, uptake of fatty acids (FAs) and glycerol by the enterocytes followed by resynthesis of the triglycerides (TGs) at the endoplasmic reticulum (ER). Upon resynthesizing, TGs might be targeted for secretion to the general circulation in the specialized vesicles called chylomicrons or stored in lipid droplets (LDs) in the epithelial cells of the intestine. In our laboratory, we are interested in the identification of molecular mechanisms regulating intestinal lipid absorption machinery. In our previous study, we identified Protein kinase D2 to be central for regulation of lipid absorption in the intestine. Of not, inhibition of PKD2 in the intestine protects from the development of obesity.

Aim:

The aim of the project is to identify other mechanisms mediating lipid handling by the epithelial cells. We will focus especially on pathways regulating lipid storage in LDs. We hope that the identification of the molecular pathways regulating lipid metabolism in the intestine will not only increase our understanding of this process, but will also result in the identification of novel targets for pharmacological intervention to treat obesity, diabetes, atherosclerosis as well as IBD.

Requirements:

- master's degree (awarded or to be defended soon) in biology, biotechnology, biomedicine, veterinary or related subjects;
- good knowledge of English (both written and spoken);
- strong motivation and commitment to science;
- preferably experience in laboratory work, in particular working with animals (proven internships and placements would be an advantage).