

#### 4B for LDs

### **Biodiversity, Biogenesis, Biodegradation and Biomedicine of lipid droplets in age-dependent vascular dysfunction**

Endothelial cells play a crucial role in regulating the transport of lipids from the blood. Under physiological conditions, endothelial cells effectively "buffer" excess lipids by converting them into lipid droplets (LDs) during the postprandial phase, when the body processes and absorbs consumed food. Shortly after their formation, these LDs undergo lipolysis in a process controlled by a set of enzymes and LDs-associated proteins. However, it remains unexplored whether age-altered endothelial cells retain the ability to effectively buffer lipids under conditions of postprandial lipid overload. Today, most people consume too much fatty food and spend the majority of the day in the postprandial phase. The endothelium's inability to cope with excess lipids in the blood is considered a prerequisite for the development of endothelial dysfunction, and consequently, cardiovascular diseases.

The main goal of the project is to understand how endothelial cells altered by the aging manage lipid overload in the postprandial phase. It is planned to investigate how the normalization of lipid droplet lipolysis affects both endothelial function in the postprandial phase and chronic age-related endothelial dysfunction. Our previous studies showed increased accumulation of lipid droplets in the endothelial cells of 18-month-old mice compared to 3-month-old mice. This suggests a general age-related impairment of lipid droplet lipolysis, which may lead to a decline in endothelial-dependent vasodilation as the organism ages. These findings highlight the underestimated impact of proper lipid droplet lipolysis on endothelial function in the context of lipid overload.