

## ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Pharmacology & Toxicology

Student: Bianka Šebeňová

Supervisor: Prof. PharmDr. Petr Pávek, Ph.D.

Title of diploma thesis: Expression of glucose transporters in tissues by the RT-qPCR method in the murine MASH model

Metabolic-associated fatty liver disease is a condition that belongs to manifestations of the metabolic syndrome. Long-term positive energy balance leads to weight gain and metabolic dysregulation. The consequence of chronic high intake of simple sugars is lowered tissue sensitivity to insulin, initially manifesting as hyperinsulinemia and eventually leading to insulin resistance.

The aim of this diploma thesis was to quantify and evaluate the expression of glucose transporters in mice. Mice were fed with a MASH diet which contained a high amount of fat and simple sugars in a caloric surplus, similar to the western diet. Another goal was to compare the HOMA-IR index in mice on the MASH diet versus the control group fed on the chow diet.

Transporters mRNA were quantified using RT-qPCR in liver, *ileum*, and fat tissue. The data revealed that the mRNA levels of Sglt1 and Glut2 transporters in *ileum* were higher in mice on the MASH diet. Increased mRNA of the Glut1 in the liver tissue was also observed. Liver Glut2 mRNA was almost unchanged. Regarding adipose tissue, Glut1 mRNA was more abundant in comparison with the expression in chow diet-fed mice, and expression of Glut4 mRNA was slightly downregulated in mice on MASH diet.

Insulin levels were quantified using the enzyme-linked immunosorbent assay (ELISA). The HOMA-IR index considering fasting glycaemia and insulinemia revealed that values in mice on the MASH diet were higher than in the control group. It indicates that glucose tolerance is disrupted, and insulin resistance may occur.