ABSTRACT

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Title of diploma thesis: Expression and activities of antioxidant enzymes in the *in vivo* models of non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease is one of the most common liver diseases. This disease is caused by an imbalance between fat intake and fat degradation. Lipid accumulation can be caused by several factors (genetic predisposition, diet, metabolic diseases, etc.). If these factors act for a long enough period, the disease can lead to liver fibrosis or even cirrhosis. The aim of this diploma thesis was to compare the expression and activity of the antioxidant enzymes glutathione-S-transferase (GST), glutathione peroxidase (GPx), glutathione reductase (GR), superoxide dismutase (SOD), and catalase in two models of NAFLD (dietary model (K) - high fat, fructose, and cholesterol diet (FFC); chemical model - induced by monosodium glutamate (MSG)). Furthermore, the effect of LiPR31 and liraglutide on the expression and activity of antioxidant enzymes were investigated in these models. Expression and activity were determined in 20,000×g supernatant of mouse liver. RT-qPCR was used to determine relative mRNA expression. Protein expression was determined by western blot and specific activities of individual enzymes were assessed using spectrophotometric methods. In the MSG group on standard diet (STD), the specific activity of GST and the mRNA and protein expression of GSTP1 were decreased, whereas the protein expression of GSTM was increased. Furthermore, decreased SOD1 mRNA expression and increased GPx7 protein expression and GPx specific activity were observed in the MSG STD group. Liraglutide and LiPR31 significantly increased SOD specific activity in K FFC mice, which was reduced compared to K STD, and increased SOD1 mRNA expression in the MSG STD group.