Abstract

This thesis focuses on the effects of n-3 polyunsaturated fatty acids (n-3 PUFA) on development of non-alcoholic fatty liver disease (NAFLD) in experiment, on prevalence of this condition in patients with type 2 diabetes mellitus and metabolic syndrome and also on non-invasive diagnostics.

The aim was to study the effect of n-3 PUFA on NAFLD development in an experimental model and based on analysis of a group of patients with type 2 diabetes and metabolic syndrome to assess the prevalence of this condition. Lastly we aimed to evaluate non-invasive diagnostic methods of liver fibrosis and NASH.

We demonstrated beneficial effects of n-3 PUFA administration on NAFLD development in a C57/Bl6 mice high fat methionin–cholin defficient dietary model of NAFLD. n-3 PUFA administration led to biochemical improvement, decrease of lipid accumulation in the liver as well as improvement of histology. These effects are determined by complex modulation of lipid metabolism, mainly due to decrease in availability of fatty acids for triglyceride synthesis in the liver, changes of adipokine levels and amelioration of proinflammatory status in the liver.

In a group of type 2 diabetics we found NAFLD prevalence of almost 80%, 14% of these patients had also signs of liver fibrosis or cirrhosis. Non-invasive methods (serum hyaluronic acid, ELF score, OELF score for liver fibrosis staging and cytokeratin 18 fragments for NASH presence evaluation) pose an accurate diagnostic tool in patients with clearly defined NAFLD.

Presented results demonstrate beneficial effects of n-3 PUFA administration on NAFLD development in experiment, document high prevalence of NAFLD in patients with type 2 diabetes and show good accuracy of non-invasive diagnostics of NAFLD.

Key words: n-3 polyunsaturated fatty acids (PUFA), non-alcoholic fatty liver disease (NAFLD), non-alcoholic steatohepatitis (NASH), type 2 diabetes mellitus, metabolic syndrome, prevalence, non-invasive diagnostics