Abstract

Lipoprotein lipase (LPL) is a key enzyme in lipoprotein metabolism. The enzyme catalyzes hydrolysis of triacylglycerols (TG) of chylomicrons and of very low density lipoproteins (VLDL). However, the mechanisms involved in the regulation of this protein are not fully understood yet. Therefore, the aim of the theses is to study selected aspects of LPL activity regulation.

Recently discovered apolipoprotein A-V (apo A-V) substantially affects triglyceridemia and it is presumed that it may function as LPL activator. However, its concentration in the blood is extremely low and we therefore investigated whether most of apo A-V could be bound to the heparan sulfate proteoglycan (HSPG) of vascular wall similarly to LPL. Intravenous heparin application in healthy volunteers resulted in an expected increase in LPL activity but apo A-V concentration did not change. Our results do not support the hypothesis that most of apo A-V is bound to HSPG of the capillary endothelium.

An alcohol consumption plays also a role in LPL regulation – the long-term moderate alcohol consumption is known to increase enzyme activity; on the contrary, it is presumed that LPL activity is inhibited immediately after alcohol consumption. However, the direct evidence for such a premise is missing. The other aim of the theses was to determine whether acute alcohol administration affects LPL activity in healthy volunteers. LPL activity was evaluated using intravenous fat tolerance test (IVFTT) that reflects LPL activity *in vivo*. It was found that LPL activity is lower after alcohol administration than after water administration in control experiment. These results can be considered to be the first direct evidence that LPL is inhibited after an acute alcohol administration. In this experiment we also compared two methods of evaluating IVFTT and found that they substantially differ in the interpretation of results and that the nephelometry have to be used for evaluation of the LPL activity.

Key words: lipoprotein lipase, apolipoprotein A-V, triacylglycerols, lipoproteins, alcohol