ABSTRACT

The aim of this thesis is to summarize current knowledge about VLDL (very low density lipoprotein) assembly.

In the first part of this thesis basic characteristics of lipids and lipoproteins are described. Lipids are the most favourable source of energy for animals. Lipoproteins are the macromolecular complexes that transport hydrofobic lipids in plasma. According to their density, they are classified to five groups: chylomicrons, VLDL, IDL, LDL, HDL.

Second part of this thesis is focused on the apolipoproteins - structural peptide components of lipoproteins. The characteristics and functions of major apolipoprotein classes are explained with the main focus on apolipoproteins B that have an important role in VLDL assembly.

The process of VLDL assembly is described in detail in the third part of the thesis. VLDL assembly consists of two steps. Pre-VLDL and lipid droplet are synthetized independently in the first step, for which apolipoprotein B-100 and microsomal triglyceride transfer protein (MTP) are essential. Second step is the fusion of pre-VLDL with the lipid droplet. ADP-ribosylation factor 1 (ARF1) and phospholipase D (PLD) are the essential components in the second step. Also apolipoprotein E, apolipoprotein A-V and acyl-coenzym A:cholesterol acyl transferasa 2 (ACAT2) are important. VLDL assembly is regulated by the amount of lipids and the level of insulin in plasma.

In the last part of this thesis genetic defects of VLDL synthesis and secretion are described – familial hypobetalipoproteinemia (FHBL) and abetalipoproteiinemia (ABL). The dysregulation of VLDL assembly and its connection to insulin resistance and diabetes mellitus II. type are also discussed here.

Keywords:

very low density lipoprotein (VLDL), apolipoprotein B-100, microsomal triglycerid transfer protein, ADP-ribosylation factor 1, phospholipase D, acyl-coenzym A:cholesterol acyl transferase 2, familial hypobetalipoproteinemia, abetalipoproteinemia, diabetes II. type