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**LIPIDS AND LIPOPROTEINS AND CHANGES IN THEIR
METABOLISM DURING INTERNAL DISEASES**

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Lipids are chemically heterogeneous organic substances, the general property of most of which is solubility in organic solvents - ether, acetone, benzene, chloroform, etc.

Most of them are esters of higher fatty acids with glycerol or other alcohols of a specific structure. In addition to these components, lipids also contain phosphoric acid, nitrogenous compounds or carbohydrates. In the body, in the form of complexes with proteins, lipids are structural elements of cells and cell organelles. They participate in the transport of substances, immune reactions, provide the body with energy material, perform the function of nutrient depots, some regulatory functions (for example, steroid hormones, prostaglandins, leptin), protect the body and organs of animals from

the effects of supraphysiological temperatures and mechanical damage, influence on the activity of membrane-bound enzymes. Lipids contribute to the dissolution and absorption of some vitamins (A, D, E, K, F). The main hydrolysis of fats is carried out in the small intestine with the participation of pancreatic enzymes: lipase, cholinesterase, phospholipase, etc. For the normal hydrolysis of fats by pancreatic lipase, an important condition is their emulsification with bile acids, which, by dispersing large drops of fat into small ones, increase the area of contact with enzymes. Pancreatic lipase hydrolyzes fat to glycerol and free fatty acids or to di- and monoacylglycerols. Since fats do not dissolve in body fluids, their transport becomes possible after they are incorporated into the composition of proteins with a special complex structure - lipoproteins.

Lipoproteins are high-molecular water-soluble particles that are a complex of proteins and lipids formed by non-covalent bonds, in which proteins together with polar lipids form a surface hydrophilic layer that surrounds and protects the inner hydrophobic lipid sphere from the aqueous environment and ensures the transport of lipids into the bloodstream and their entry into organs and tissues.

Lipoproteins differ in composition in animals of different species. Among them, several classes are distinguished, namely: chylomicrons, very low-density lipoproteins (VLDL), or pre- β -lipoproteins, low-density lipoproteins (LDL), or β -lipoproteins, and high-density (HDL), or α -lipoproteins. The main transport forms of triacylglycerols are chylomicrons and VLDL. Chylomicrons and HDL are formed in the intestinal mucosa; the latter and VLDL, in addition, the liver, and VLDL - in the blood with VLDL. Fats synthesized in the intestines and involved in chylomicrons and HDL enter the lymphatic capillaries, then the lymphatic vessels of the mesentery through the thoracic duct - the jugular vein and the general circulation. With the blood, they get to the organs and tissues, including the liver. In the liver, fatty acids and glycerol also come from fat depots and other tissues during the endogenous breakdown of fats (lipolysis). Triacylglycerols are synthesized in hepatocytes from the precursors of fats that have entered from the intestines or formed in the process of enhanced lipolysis, which are transported as part of lipoproteins to tissues and organs, as well as to adipose tissue, where they are deposited as an energy material. LPG is the main transport form of cholesterol, the content of which in the structure of these particles is the highest and reaches 58%, therefore LPG and their predecessor - VLDL received the name of atherogenic lipoproteins. HDL are structures rich in protein and phospholipids, which carry out reabsorption of cholesterol and contribute to its removal from the vascular wall. This class of lipoproteins is called antiatherogenic. They transport fat-soluble vitamins, hormones and other biologically active substances. Among these substances there are compounds that have antioxidant activity in relation to lipids: α - and γ -tocopherols, α - and β -carotenes, ubiquinone, etc. But the main lipids that are transported in the bloodstream as part of lipoprotein complexes are triacylglycerols, non-esterified and esterified cholesterol, phospholipids and a small amount of non-esterified fatty acids. A necessary component of lipoprotein complexes are proteins, which have received the name of apolipoproteins. They have the unique property of interacting with lipids, which separates them from other blood plasma proteins. Now, several apolipoproteins are isolated, and the so-called A, B, C nomenclature is used to

define them.

Lipoproteins play a significant role in the assessment of physiological and pathological health conditions of animals, therefore, changes in the lipid spectrum of blood are given important diagnostic value. Clinical work uses the determination of such tests as atherogenic fractions of lipoproteins, as well as total lipids, triacylglycerols, phospholipids, non-esterified fatty acids and other components of the lipid metabolism system.