SYLLABUS FOR CREDIT TEST – MEDICAL BIOCHEMISTRY 1

Synthesis of acetyl-CoA, Krebs cycle

- Transport of pyruvate into the mitochondria, synthesis of acetyl-CoA from pyruvate, characteristics of pyruvate dehydrogenase complex. Citrate cycle (Krebs cycle), mechanism of individual reactions. Energy yield of Krebs cycle. Purpose of Krebs cycle for energy metabolism of the cell.
- Regulation of Krebs cycle.

Energy-rich compounds

- Definition of energy-rich bond, types of energy-rich bonds. Synthesis and utilization of energy-rich compounds. Purpose of energy-rich compounds for the functions of the cell.

Metabolism of carbohydrates

- Sources of carbohydrates in the food, digestion and absorption of carbohydrates in gastrointestinal tract.
- Glycolysis - individual reactions of this metabolic pathway. Glycolysis in aerobic and in anaerobic conditions. Energy yield of glycolysis, phosphorylation at the substrate level. Regulation of glycolysis - metabolic and hormonal.
- Transport of reducing equivalents from cytosol into the mitochondria.
- Glycogen structure, synthesis and degradation. Regulation of glycogen metabolism.
- Gluconeogenesis, synthesis of glucose from noncarbohydrate sources (amino acids, lactate, glycerol), regulation of gluconeogenesis.

Regulation of carbohydrate metabolism in the organism

- Level of glucose in the blood (glycaemia) and its regulation. Glucose tolerance test -principle and purpose in diagnosis. Defects of regulation of carbohydrate metabolism – metabolic characteristics and symptoms.

Metabolism of lipids

- Synthesis of ketone bodies from acetyl-CoA, enzymes, intermediates. Utilization of ketone bodies in the organism. Defects of ketone bodies metabolism.
- Synthesis and degradation of TAG.
- Composition and synthesis of basic groups of lipoproteins and their changes during transport in the body. Transport of exogenous lipids. Role of liver in lipoprotein metabolism. Apoproteins and their role in lipoprotein metabolism.

Metabolism of amino acids

- General reactions of amino acid metabolism, connection amino acids with intermediary metabolism. Decarboxylation of amino acids. Processes related to ammonia metabolism - deamination of amino acids - direct, indirect, transamination. Fixation and transport of ammonia. Synthesis of urea and its excretion.

Physiological levels of biochemical parameters in blood and their purpose for evaluation of metabolic defects and defects of the organism

- Enzymes: ALT, AST
- Organic compounds: urea, triacylglycerols (TAG), cholesterol, glucose, ketone bodies