

Questions to Colloquium
on "**Biochemistry of carbohydrates**" for 2nd year students (engl.)

1. The structure, classification and biological role of carbohydrates.
2. Digestion and absorption of carbohydrates in gastrointestinal tract. Types of digestion. Their characteristics. The structure and role of fiber in digestion.
3. Violation of digestion and absorption of carbohydrates. Malabsorption. Causes, clinical manifestation.
4. The mechanism of monosugars transport into the cell: the role of carriers, Na⁺/K⁺-ATPase and hormones.
5. The metabolism of galactose in normal and pathological conditions.
6. The metabolism of fructose in normal and pathological conditions.
7. Meaning of glucose phosphorylation. Characterization of glucokinase and hexokinase. Pathways of Gl-6-P metabolism in tissues.
8. Structure and metabolism of glycogen (glycogenolysis and glycogenesis). Hormonal regulation of glycogen metabolism (the role of hormones, cAMP, Ca²⁺). Hereditary disorders of glycogen metabolism (glycogenoses).
9. Anaerobic glycolysis: lactic fermentation. Intracellular and organ localization, reactions, enzymes (classes), regulation, energy balance, biological role.
10. Anaerobic glycolysis: alcohol fermentation. Intracellular and organ localization, reactions, enzymes (classes) and energy balance. The similarity and difference from lactic acid fermentation.
11. Kinase reaction and substrate phosphorylation in glycolysis. Glycolytic oxidoreduction and its role.
12. Ethanol metabolism in the body (ADH characteristic, and catalase MEOS paths). The damaging effect of ethanol on the body. Mechanisms of development of ethanol intoxication and addiction formation.
13. Aerobic glycolysis: diagram organ and intracellular localization, regulation (Pasteur effect). The biological role, the energy balance. PDC complex structure.
14. GNG. Intracellular and organ localization, reactions, enzymes (classes), regulation, and biological role of energy balance.
15. Substrate and energy supplying to GNG. Interorgan substrates cycles (Cori and Felig cycles).
16. Characteristics of PPP. Intracellular localization and organ reaction, enzymes (classes), the regulation of biological role.
17. The structure (formula) and the biological role of GAG biosynthesis scheme. Mucopolysaccharidosis.
18. The mechanism of action and biological role of insulin. Normo, hypo and hyperglycemia. Reasons, mechanism of occurrence and clinical manifestations. Meaning of ChREBP protein in the metabolism of carbohydrates.
19. Urgent mechanism of blood glucose level regulation. Glycogenolysis (reaction, enzymes), its value.
20. Constant mechanism of blood glucose level regulation. The role of the GNG, its substrate supplying. The synthesis of glucose from glycerol (reaction enzymes).
21. The mechanism of action and biological role of insulin. The structure of the insulin receptor. The mechanism of development of biochemical changes and complications of islet failure effects, their clinical manifestation.
22. Diabetes, type, the fundamental differences of DM type I and II.
23. Diagnosis of diabetes. Technique of the glycemic curve plotting.
24. The role of vitamins (B₁, B₂, B₃, PP, lipoic acid) in carbohydrate metabolism in PDC complex.