

**Thematic plan of seminar-type classes  
in discipline « Biochemistry, biochemistry of the oral cavity »  
for students of 2024 year of admission  
under the educational programme  
31.05.03 Dentistry,  
specialisation (profile) Dentistry  
(Specialist's degree),  
form of study full-time  
for the 2025-2026 academic year**

№	Thematic blocks	
1	Introduction to Biological Chemistry. Regulations for biochemistry lab. Basic methods of separation and purification of proteins	2
2	Structure and physicochemical properties of proteins.	2
3	Interaction of proteins with ligands. The structure and function of hemoglobin. The structure and function of immunoglobulins.	2
4	Enzymes. Biological role. Mechanism and features of enzymatic catalysis. Coenzyme function of vitamins .	2
5	Kinetics of enzymatic reactions. Principles for determining the activity of enzymes.	2
6	Regulation of enzyme activity. Inhibition of enzyme activity. The use of enzymes in medicine.	2
7	Colloquium "Proteins and enzymes".	2
8	Energy exchange. Tissue respiration. Ways of ATP formation. Structural organization of the electron transport chain.	2
9	Specific and general pathways of catabolism. Oxidative decarboxylation of pyruvate. Citrate cycle	2
10	Structure and biological role of carbohydrates. Digestion of carbohydrates. Synthesis and breakdown of glycogen.	2
11	Glucose catabolism. Anaerobic and aerobic glucose breakdown. Gluconeogenesis.	2
12	Regulation of glycogen synthesis and mobilization. Regulation of glycolysis and gluconeogenesis in the liver. Pentose phosphate pathway of glucose conversion.	2
13	Colloquium «Energy exchange. Chemistry, carbohydrate metabolism.»	2
14	Lipid chemistry. Digestion and absorption of lipids. Assimilation of dietary fats. Lipoproteins.	2
15	Synthesis of higher fatty acids and triacylglycerols.	2
16	Mobilization of fats. Oxidation of fatty acids. Participation of hormones in the regulation of fatty acid oxidation in the liver. Ketone bodies.	2
17	Eicosanoids. Synthesis of cholesterol in the liver. HDL metabolism. Bile acids. Lipid metabolism disorders.	2
18	Biological membranes. Structure, properties and biol. Mechanisms of transport of substances through membranes, mechanisms of transmission of hormonal signals.	2

19	Colloquim «Chemistry and lipid metabolism».	2
20	Nitrogen balance. Protein nutrition. Digestion of proteins. Transamination. Deamination. Neutralization of ammonia in tissues.	2
21	Synthesis of urea. Synthesis of nonessential amino acids. Phenylalanine and tyrosine metabolism. Amino acid decarboxylation. Biogenic amines, their functions.	2
22	Heme and iron metabolism. Hereditary disorders. Jaundice.	2
23	Toxic compounds. The enzymes of detoxication and antioxidant defense. Inactivation of xenobiotics in the body. Microsomal oxidation system.	2
24	COLLOQUIUM: amino acid metabolism; metabolism of heme and iron; inactivation of xenobiotics.	2
25	The structure of nucleic acids. DNA biosynthesis (replication) and repair. RNA biosynthesis (transcription). Post-translational RNA modifications..	2
26	Protein biosynthesis (translation). Inhibitors of matrix biosynthesis. Regulation of protein biosynthesis in eukaryotes.	2
27	The role of hormones in the regulation of metabolism. Classification of hormones. Regulation of the metabolism of carbohydrates, lipids and amino acids.	2
28	Regulation of the metabolism of the main energy substrates. Diabetes. Regulation of water-salt metabolism.	2
29	COLLOQUIUM: nucleotide metabolism. Matrix biosynthesis. The hormonal system.	2
30	Biochemistry of the extracellular matrix and connective tissue. Glycosaminoglycans. Collagens. Elastin.	2
31	Bone biochemistry. Mineral composition of bone tissue. Bone proteins and their role in mineralization. Bone tissue remodeling.	2
32	Biochemistry of tooth tissue. Determination of calcium, phosphorus and magnesium in bone hydrolyzate	2
33	Biochemistry of the oral fluid. Regulation of saliva secretion. Inorganic components of saliva. Proteins and enzymes of saliva.	2
34	COLLOQUIUM: Biochemistry of the oral cavity. Biochemistry of connective tissue and extracellular matrix. Biochemistry of the bone tissue of the tooth. Biochemistry of saliva and oral fluid.	2

Considered at the meeting of the department of "29" \_05\_ 2025, protocol No 12

Head of the Department of Basic  
and Clinical Biochemistry



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