

**Thematic lesson plan of seminars  
in the discipline "Biochemistry, biochemistry of the oral cavity"  
for students of the educational program  
specialist in the specialty 31.05.03 Dentistry,  
direction (profile) Dentistry,  
form of study full-time  
for the 2023-2024 academic year**

№	Thematic blocks	Hours (academic )
1	Introduction to Biological Chemistry. Regulations for biochemistry lab. Basic methods of separation and purification of proteins • Determination of the amount of protein by the biuret method	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. • Thermolability of enzymes by the example of salivary amylase. • Determination of diastase (amylase) in urine.	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

	Mobilization of fats. Oxidation of fatty acids. Participation of hormones in the regulation of fatty acid oxidation in the liver. Ketone bodies.	
16	Eicosanoids. Synthesis of cholesterol in the liver. HDL metabolism. Bile acids. Lipid metabolism disorders. • Determination of total serum cholesterol. • Detection of ketone bodies in urine	2
17	Biological membranes. Structure, properties and biorol. Mechanisms of transport of substances through membranes, mechanisms of transmission of hormonal signals.	2
18	Colloquim «Chemistry and lipid metabolism».	2
19	Nitrogen balance. Protein nutrition. Digestion of proteins. Transamination. Deamination. Neutralization of ammonia in tissues.	2
20	Synthesis of urea. Synthesis of nonessential amino acids. Phenylalanine and tyrosine metabolism. Amino acid decarboxylation. Biogenic amines, their functions.	2
21	Heme and iron metabolism. Hereditary disorders. Jaundice.	2
22	Toxic compounds. The enzymes of detoxication and antioxidant defense. Inactivation of xenobiotics in the body. Microsomal oxidation system.	2
23	Tests: amino acid metabolism; metabolism of heme and iron; inactivation of xenobiotics.	2
24	COLLOQUIUM: amino acid metabolism; metabolism of heme and iron; inactivation of xenobiotics.	2
25	Metabolism of nucleotides. Biosynthesis and degradation of purine and pyrimidine bases.	2
26	The structure of nucleic acids. DNA biosynthesis (replication) and repair. RNA biosynthesis (transcription). Post-translational RNA modifications..	2
27	Protein biosynthesis (translation). Inhibitors of matrix biosynthesis. Regulation of protein biosynthesis in eukaryotes.	2
28	The role of hormones in the regulation of metabolism. Classification of hormones. Regulation of the metabolism of carbohydrates, lipids and amino acids.	2
29	Regulation of the metabolism of the main energy substrates. Diabetes. Regulation of water-salt metabolism. Regulation of Ca + 2 and phosphate metabolism.	2
30	Tests: nucleotide metabolism. Matrix biosynthesis. The hormonal system.	2
31	COLLOQUIUM: nucleotide metabolism. Matrix biosynthesis. The hormonal system.	2
32	Biochemistry of the extracellular matrix and connective	2

	tissue. Glycosaminoglycans. Collagens. Elastin.	
33	Bone biochemistry. Mineral composition of bone tissue. Bone proteins and their role in mineralization. Bone tissue remodeling.	2
34	Biochemistry of tooth tissue. Determination of calcium, phosphorus and magnesium in bone hydrolyzate	2
35	Biochemistry of the oral fluid. Regulation of saliva secretion. Inorganic components of saliva. Proteins and enzymes of saliva. Oral cavity protective systems.	2
36	Plaque. Dental calculus. Saliva as an object of laboratory diagnostics. • Determination of urea, mucin, glucose, total amino acid nitrogen in the oral fluid.	2
37	Tests: Biochemistry of the oral cavity.	2
38	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
	<b>Total</b>	<b>76</b>

Considered at the meeting of the department of "10" \_may\_ 2023, protocol No 16

Head of the Department

**O.V. Ostrovskiy**