

**Thematic plan of seminars
in the discipline " Medical Biochemistry "
for students of the educational program
specialist degree
in the specialty of training 33.05.01 Pharmacy,
direction (profile) Pharmacy,
form of study full - time
for the 2024-2025 academic year**

№	Thematic blocks	Hours (academic)
3 semester		
1.	1. Introduction to biological chemistry.	2
	2. Methods of quantitative determination of protein in blood serum.	2
2.	1. Structural organization of proteins.	2
	2. Physico-chemical properties of proteins.	2
3	1. Interaction of protein with ligands.	2
	2. The relationship of the structure of proteins with their function on the example of hemoglobin and myoglobin, collagen and immunoglobulins.	2
4	1. Enzymes, biological role.	2
	2. Mechanism and features of enzymatic catalysis.	2
5	1. Kinetics of enzymatic reactions.	2
	2. General properties of enzymes.	2
6	1. Regulation of enzyme activity as a molecular basis for the regulation of metabolism.	2
	2. Regulation of intracellular metabolism by external signals.	2
7	COLLOQUIUM 1: Proteins and enzymes	4
	Part 1: Proteins	
	Part 2: Enzymes	
8	1. Energy metabolism: ways of ATP formation.	2
	2. Biological oxidation.	2
9	1. The general pathway of catabolism.	2
	2. Oxidative decarboxylation of pyruvate. Citric acid cycle (TCA).	2
10	1. Structure of carbohydrates.	2
	2. Classification and functions of carbohydrates.	2
11	1. Glucose catabolism.	2
	2. Aerobic and anaerobic oxidation of glucose.	2
12	1. Gluconeogenesis. Substrates. Reactions of gluconeogenesis. Importance of gluconeogenesis. Regulation.	2

	2. The pentose cycle. Reactions of the pathway. Significance of HMP shunt.	2
13	COLLOQUIUM 2: Energy metabolism. Common catabolic pathways. Structure and functions of carbohydrates.	4
	Part 1: Energy metabolism. Common catabolic pathways. Part 2: Structure and functions of carbohydrates	
14	1. Lipids: structure, biological role, classification.	2
	2 Digestion and absorption of lipids of food.	2
15	1. Oxidation of fatty acids and degradation of glycerol.	2
	2. Synthesis of fatty acids and lipids. Metabolism of ketone bodies. Ketoacidosis.	2
16	COLLOQUIUM 3: Chemistry and metabolism of lipids.	4
	Part 1: Chemistry of lipids. Part 2: Metabolism of lipids.	
4 semester		
17	1. Structure of membranes.	1
	2. Transport across membranes.	1
18	1. Common ways of amino acid metabolism.	1
	2. Direct and indirect deamination.	1
19	1. Common ways of amino acid metabolism.	1
	2. Utilization of ammonia in the ornithine cycle and excretion of urea.	1
20	1. Metabolism of heme and iron.	1
	2. Infringements of heme and iron metabolism.	1
21	1. Toxic substances and the mechanism of their neutralization.	1
	2. Microsomal oxidation.	1
22	COLLOQUIUM 4: Membranes. Metabolism of amino acids, heme and iron.	2
	Part 1: Membranes. Part 2: Metabolism of amino acids, heme and iron.	
23	1. Metabolism of complex proteins.	1
	2. Synthesis and degradation of nucleotides.	1
24	1. Structure and functions of nucleic acids.	1
	2. Nucleoproteins.	1
25	1. Genes and genome.	1
	2. Template biosynthesis.	1
26	1. Regulation of gene expression.	1
	2. Posttranslational modification of proteins.	1
27	COLLOQUIUM 5: Biosynthesis of nucleic acids and proteins.	2

	Regulation of biosynthesis. Part 1: Biosynthesis of nucleic acids and proteins.	
	Part 2: Regulation of biosynthesis.	
28	1. Integration of metabolism.	1
	2. Intercellular communication.	1
29	1. Biochemistry of blood.	1
	2. Principles of biochemical diagnostics and interpretation of the results of biochemical tests.	1
30	COLLOQUIUM 6: Integration of metabolism in the body. The hormonal system. Biochemistry of blood. Part 1: Integration of metabolism in the body. The endocrine system.	2
	Part 2: Biochemistry of blood.	
31	1. Biochemistry of connective tissue. Connective tissue proteins. Structure and biosynthesis of collagen. Adhesive proteins.	1
	2. Heteropolysaccharides. Hyaluronic acid. Proteoglycans.	1
32	1. The biochemical basis of medical biotechnology.	1
	2. Biological methods of control of medicinal substances of natural origin.	1
33	1. Biochemistry of muscle tissue.	1
	2. Biochemistry of nerve tissue.	1
34	1. Nutrition. Nutritional importance of carbohydrates, lipids and proteins.	1
	2. Nutritional importance of vitamins and minerals. Recommended dietary allowances (RDA). Balanced diet.	1
	Intermediate certification	exam
	Total	136

Considered at the meeting of the Department of Fundamental and Clinical Biochemistry on 17 June 2024, protocol №11.

Head of the Department

O.V. Ostrovskij.