

THEMATIC SCHEDULE
of practice and laboratory studies on biological chemistry for the 2nd year students of medical faculty during the autumn term of 2023 – 2024 academic year

No	The topic	Number of hours	Dates
<i>Thematic module 1. "Biochemistry as a science. Structure and features of enzymes. Medical enzymology"</i>			
1.	Control of the initial level of knowledge. Subject and tasks of biochemistry. Purpose and methods of biochemical investigations; their justification, clinical and diagnostic value.	3	6.09
2.	Investigation of the structure and physico-chemical properties of enzymes. Determination of the activity of enzymes, investigation of their mechanism of action and kinetics of enzymatic catalysis. Application of methods for detecting enzymes in biological objects.	3	13.09
3.	Investigation of regulation of enzymatic processes and analysis of mechanisms of occurrence of enzymopathies. Medical enzymology.	3	20.09
4.	Investigation of the role of cofactors and coenzyme vitamins. Role of water- and fat-soluble vitamins in metabolism of living organisms.	3	27.09
<i>Thematic module 2. "Basic principles of metabolism. Molecular basics of bioenergetics"</i>			
5.	Metabolism and energy. Investigation of the functioning of the tricarboxylic acid cycle.	3	4.10
6.	Investigation of biological oxidation processes, oxidative phosphorylation and ATP synthesis. Investigation of the activity of inhibitors and oxidative phosphorylation uncouplers.	3	11.10
<i>Thematic module 3. "Metabolism of carbohydrates and its regulation"</i>			
7.	Digestion of carbohydrates. Study of glycolysis – anaerobic oxidation of carbohydrates.	3	18.10
8.	Investigation of aerobic oxidation of glucose and alternative pathways of turnover of monosaccharides.	3	25.10
9.	Investigation of catabolism and biosynthesis of glycogen. Regulation of metabolism of glycogen, biosynthesis of glucose – gluconeogenesis.	3	1.11
10.	Study of mechanisms of metabolic and hormonal regulation of carbohydrate metabolism. Diabetes.	3	8.11
<i>Thematic module 4. "Metabolism of lipids and its regulation"</i>			
11.	Digestion of lipids. Investigation of catabolism and biosynthesis of triacylglycerols and phospholipids. Intracellular lipolysis and molecular mechanisms of its regulation.	3	15.11
12.	β -Oxidation and biosynthesis of fatty acids. Study of the metabolism of fatty acids and ketone bodies.	3	22.11
13.	Biosynthesis and biotransformation of cholesterol. Pathology of lipid metabolism: steatorrhea, atherosclerosis, obesity. Transport forms of lipids - blood plasma lipoproteins.	3	29.11
<i>Thematic module 5. "Metabolism of amino acids and its regulation"</i>			
14.	Investigation of digestion of proteins in gastro-intestinal tract. The study of amino acid transformations (transamination, deamination, decarboxylation).	3	6.12
15.	Investigation of ammonia detoxification processes and urea biosynthesis. Biosynthesis of glutathione and creatine.	3	13.12
16.	Specific pathways of amino acids metabolism, their inborn and acquired disorders. Aminoacidurias: reasons and consequences.	3	20.12
Totally:		48	

Confirmed by the Chair session
 Protocol No. 1 dated «31» August 2023
 The Head of the department _____ Prof. L.Kobylińska

THEMATIC SCHEDULE OF LECTURES
on biological chemistry for the 2nd year students of medical faculty
during the autumn term of 2023 – 2024 academic year

No	Topics and contents of lectures	Lecturer	Hours	Dates
<i>Thematic module 1. “Biochemistry as a science. Structure and features of enzymes. Medical enzymology”</i>				
1	Enzymes: structure, properties, classification. Regulation of metabolic processes	Prof. Lesya Kobylińska	2	1.09
<i>Thematic module 2. “Molecular principles of bioenergetics”</i>				
2	Bioenergetics. Tricarboxylic acid cycle. Biological oxidation and oxidative phosphorylation.	Prof. Lesya Kobylińska	2	15.09
<i>Thematic module 3. “Metabolism of carbohydrates and its regulation”</i>				
3	Metabolism of carbohydrates, its regulation, changes in pathology.	Prof. Lesya Kobylińska	2	29.09
<i>Thematic module 4. “Metabolism of lipids and its regulation”</i>				
4	Metabolism of lipids, its regulation, changes in pathology	Prof. Lesya Kobylińska	2	27.10
<i>Thematic module 5. “Metabolism of amino acids and its regulation”</i>				
5	Metabolism of amino acids, its regulation, changes in pathology	Prof. Lesya Kobylińska	2	10.11
<i>Totally</i>			10	

THEMATIC SCHEDULE of individual work on biological chemistry for the 2nd year students of medical faculty during the autumn term of 2018 – 2019 academic year
6. Thematic plan of individual students' work in the discipline "Biological chemistry"

№	Topic	Number of hours	Kind of control	f
1	Modern biochemical methods of investigation. Contribution of scientists from the department of biochemistry of Danylo Halytsky Lviv National Medical University into the development of biological chemistry.	2	Current control on practical classes	
2	Mechanism of catalytic action of chymotrypsin and acetylcholinesterase.	1		
3	Application of enzymes in the disorders of the digestive system, in purulent-necrotic processes as fibrinolytic drugs etc. Changes of physico-chemical properties of catalase under conditions of oxidative stress in different pathological conditions.	2		
4	Modern vitamin preparations and their preventive and therapeutical use in medical practice. Biologically active supplements.	3		
5	Role of the most important metabolites of amphibolic pathways (glucose-6-phosphate, pyruvate, α -ketoglutarate, acetyl-S-CoA, succinyl-S-CoA etc) in the integration of metabolism.	2	Current control on practical classes	
6	Alteration of ATP synthesis under the effect of pathogenic factors of chemical, biological and physical origin on the organism. Role of cytochromes and coenzyme Q in metabolic processes in the cell.	2		
7	Peculiarities of regulation of glucose turnover in health and disease. Molecular basis of Krebs and Pasteur effects	2		
8	Causes and manifestations of inborn and inherited alterations of the pentose-phosphate pathway. Causes, manifestations and diagnostics of congenital disturbances of fructose and galactose metabolism.	1		
9	Hereditary disorders of the exchange of glycoconjugates. Mucopolisaccharidosis.	1		
10	Methods of diagnosis and principles of biochemical correction of diabetes mellitus. Biochemical bases of modern methods of diagnostics and treatment of diabetes mellitus.	2		
11	Metabolism of sphingolipids in norm and in pathology; clinical significance, violation of the metabolism of sphingolipids. Biological functions of polyunsaturated fatty acids, their sources and use in clinical practice	3	Current control on practical classes	
12	Congenital and acquired lipid metabolism disorders. Primary and secondary deficiency of carnitine, their symptoms and treatment	2		
13	Oxidative stress, its causes, manifestations and the possibility of correction.	2		
14	Clinical diagnostic significance of determination of aminotransferases activity. Synthesis and breakdown of biogenic amines.	2		
15	Urea cycle, hereditary defects of enzymes involved in urea synthesis. Specific pathways of metabolism of phenylalanine and tyrosine, their disorders	2	Current control on practical classes	
16	Hereditary disorders of sulfur containing amino acids metabolism.	2		
	Totally ISW in Biological Chemistry	32		