



**INSTITUȚIA PUBLICĂ  
UNIVERSITATEA DE STAT DE MEDICINĂ ȘI FARMACIE  
"NICOLAE TESTEMIȚANU" DIN REPUBLICA MOLDOVA**

RED.: 1

DATA: 20.05.2009

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Approved  
at the Department of biochemistry and clinical biochemistry  
meeting from 29.08.2019, protocol no. 1  
Chief of the Department, MD, Ph.D., assoc. prof.  
\_\_\_\_\_ Olga Tagadiuc

**Syllabus of lectures and practical classes in Biochemistry  
for students of Pharmacy Faculty, academic year 2019-2020**

**Autumn semester (5) – third year**

<b>N</b>	<b>Date</b>	<b>Topic of lectures</b>	<b>Topic of practical classes</b>
1	02-06.09	The role of biochemistry in the Pharmacy and medical education system. Classification of the amino acids. Polypeptide theory. Biological functions of proteins. Levels of structural organization, classification of proteins.	Introductory conversation. Importance of biochemistry for Pharmacy. Amino acids - structure, classification, biomedical role. Biological active peptide. Antibiotics of peptide structure. Color reactions of amino acids and proteins.
2	09-13.09		Protein structure. Classification of proteins. The general characteristics of simple and conjugated proteins. Identification of amino acids by paper chromatography method.
3	16-20.09	Physicochemical properties of proteins. Methods of separation, purification and determination of proteins. Chemical nature and structure of the enzyme. Mechanism of action of the enzymes. Nomenclature and classification of enzymes.	Physicochemical properties of proteins: molecular mass, solubility, thermal stability. Electric charge and isoelectric point of the proteins. Colloidal solution (gel and xerogel). Methods of separation and purification of proteins. Dialysis of proteins and salting out.
4	23-27.09		Enzymes - chemical nature, structure, classification and nomenclature. Mechanism of enzymes action. Vitamins as coenzymes. Coenzymes of vitamins B1, B2, B6, PP, folic acid and pantothenic acid. Example of reaction with participation of these coenzymes. Identification of vitamins B1, B2, B6, PP (B5).
5	30.09-04.10	Vitamins as coenzymes. Enzyme properties. Regulation of the enzyme activity. Enzymes in diagnosis and therapy. Chemical structure, biological role of DNA and RNA. Mechanism of Replication and role of telomerase DNA	General properties of enzymes – thermal stability, dependence of activity on pH, specificity. Regulation of enzymes activity. Inhibition of enzymatic reactions: reversible and irreversible, specific and nonspecific, competitive and non-competitive. The treatment based on competitive inhibition mechanism



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		repair. Mutations..	(sulfanilamidele) Isoenzymes. Enzyme therapy and enzymodiagnosics. Determination of enzymatic activity. Determination of alfa-amylase activity.
6	07-11.10	<b>Totalization "Protein and Enzymes"</b>	
7	14-18.10	Mechanism and regulation of transcription. Gene engineering. Translation. Regulation of protein biosynthesis. Role of drugs in regulation of translation.	The biological role of nucleic acids. Contemporary Conceptions of DNA and RNA structure. Use of Purine Derivatives in Therapy. The central dogma of genetics. DNA Biosynthesis - Replication. DNA repair. Conception of incomplete replication of DNA strands, its significance, notions about telomere and telomerases. Determination of nucleic acid components in yeast hydrolyzate.
8	21-25.10		The mechanism of transcription. The stages of transcription. Posttranscriptional modifications. Reverse transcription. Transcription regulation. Determination of RNA.
9	28.10-01.11	General concepts about metabolism. Bioenergetics. Energy status of the cell. The phases of catabolism. Oxidative decarboxylation of pyruvate. The role of Krebs cycle and partial reactions of the tricarboxylic acid cycle. Anaplerotic reactions.	Genetic code. The mechanism of translation. Activation of aminoacids and stages of translation (initiation, elongation and termination). Posttranslational modifications of proteins. Regulation of protein biosynthesis and role of drugs in this regulation. Determination of serum total protein by biuret method.
10	04-08.11	<b>Totalization "Nucleic acids"</b>	
11	12-16.11	Biological oxidation. Respiratory chain and oxidative phosphorylation. Oxido-reduction Potential. Structure of proton and electron carriers. Mitchell's hypothesis. Microsomal oxidation and role of this process in detoxification of drugs.	General concepts about metabolism. Catabolism and anabolism. The stages of catabolism. Regulation of metabolism. Oxidative decarboxylation of pyruvic acid. Krebs cycle – role and partial reactions. Regulation of Krebs Cycle. Determination of pyruvate in the urine.
12	18-22.11		Biological oxidation. Respiratory chain and oxidative phosphorylation. Chemiosmotic Theory of Oxidative Phosphorylation (P. Mitchell). Microsomal oxidation and its role in detoxifying drugs. Qualitative and quantitative determination of catalase.
13	25-29.11	Carbohydrates: biological role and classification. Digestion and absorption of carbohydrates. Glycogen metabolism Aerobic and anaerobic glycolysis: reactions, regulation,	Classification and structure of carbohydrates. Biochemical mechanisms of digestion and absorption of food carbohydrates in the gastrointestinal tract. Ways of using the absorbed carbohydrates. Mobilization and synthesis of



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		energy balance. Shuttle-systems malate - aspartate and glycerol phosphate.	glycogen, regulation of process. Identification of carbohydrates in biological fluids.m. Fehling reaction. Seliwanoff reaction.
14	02-06.12		Glycolysis. Energy yield of anaerobic and aerobic oxidation of glucose. Shuttle transfer systems of cytoplasmic protons in mitochondria. The fate of lactic acid. Metabolism of galactose and fructose. Gluconeogenesis. Determination of fructozo-1,6-diphosphataldolase activity.
15	09-13.12	Gluconeogenesis. Alcoholic fermentation of glucose. Pentosephosphate pathway for glucose oxidation. Regulation and pathology of glucose metabolism. Getting photosynthesis. Phases of photosynthesis. Phase to light and phase to darkness. The Calvin Cycle. Chlorophyll and chlorophyll-related drugs.	Alcoholic fermentation of glucose. Pentosephosphate Cycle. Regulation and pathology of glucose metabolism. Use of inorganic phosphate in the process of glucose fermentation. The notion of photosynthesis. Phase to light and phase to darkness. The Calvin Cycle. Chlorophyll and chlorophyll-related drugs. Determination of the amount of glucose in blood serum (o-toluidine and enzyme methods).
16	16-20.12	<b>Totalization" Methabolism and Carbohydrates"</b>	
17	23-25.12	<b>Admission to the session.</b>	

NOTICE: Lectures are held by Bobcova Svetlana, PhD in chem. sciences., assoc. professor.  
Duration of lectures – 2 hours, of practical classes – 3 hours