Questions for the final control

CONTENT MODULE 1. BIOLOGICALLY IMPORTANT CLASSES OF BIOORGANIC COMPOUNDS. BIOPOLYMERS AND THEIR STRUCTURAL COMPONENTS.

***Theoretical basis of the future and reaction properties of bioorganic compounds*.**

1. Bioorganic chemistry as a science: significance, subject and knowledge, sections, research methods. Significance in the system of high medical coverage.
2. Classification of organic compounds based on the carbon radical and the nature of the functional groups.
3. The most important classes of bioorganic compounds based on the nature of functional groups: alcohols, phenols, thiols, aldehydes, ketones, carboxylic acids, folded ethers, amides, nitrogen compounds, etc.
4. Nomenclature of organic ideas: trivial, rational, international. The principles of establishing the names of organic structures according to the IUPAC nomenclature: mixed, radical-functional.
5. The nature of the chemical binder in organic compounds: hybridization of orbit, electronic structure of semi-carbon.
6. Expanse of bioorganic properties: stereochemical formulas; configuration and conformation. Stereoisomers: geometric, optical, rotational (conformers).
7. Optical isomerism; chirality of organic molecules. D/L- and R/S-stereochemical nomenclatures. Enantiomers and diastereoisomers of bioorganic compounds. The connection between spacious living and physiological activity.
8. Types of reactions in bioorganic chemistry: classification based on the result (directness) and the reaction mechanism. Apply it.
9. Carbonyl compounds in bioorganic chemistry. Chemical power and biomedical significance of aldehydes and ketones.
10. Carboxylic acids in bioorganic chemistry: natural and chemical power; functional derivatives of carboxylic acids (anhydrides, amides, folding esters). Decarboxylation reactions.
11. Structure and the power of dicarboxylic acids: oxalic, malonic, succinic, glutaric, fumaric.
12. Lipids: identification, classification. Fatty acids: palmitic, stearic, oleic, linoleic, linolenic, arachidonic. Sorry lipids. Triacylglycerols (neutral fats): structure, physiological significance, hydrolysis.
13. Folding lipids. Phospholipids: phosphatidic acid, phosphatidylethanolamine, phosphatidylcholine, phosphatidylserine. Sphingolipids. Glycolipids. The role of folding lipids in everyday biomembranes.
14. Amen: nomenklatura, authorities. Biomedical significance of biogenic amines (adrenaline, norepinephrine, dopamine, tryptamine, serotonin, histamine) and polyamines (putrescine, cadaverine).
15. Amino alcohols: structure, power. Biomedically important are ethanol amine (cola mine), choline, acetylcholine.
16. Hydroxy acids in bioorganic chemistry: the presence and power of monocarboxylic (lactic and hydroxybutyric), dicarboxylic (malic, tartaric) hydroxy acids.

α-Amino acids, peptides, proteins.

17. Amino acids: amino acids, stereoisomerism, chemical power. Biomedical significance of L-a-amino acids. Reactions of biochemical transformations of amino acids: deamination, transamination, decarboxylation.
18. Amino acid storage of proteins and peptides; classification of natural L-a-amino acids. Chemical and physical-chemical power of proteinogenic amino acids. Ninhydrin reaction, its significance in the analysis of amino acids.
19. Proteins and peptides: identification, classification, biological functions. Types of bonds between amino acid residues in protein molecules. Peptide link: composition, structure; Biuret reaction.

20. Levels of structural organization of proteins: primary, secondary, tertiary and quaternary structures. Oligomeric proteins.

21. Physico-chemical properties of proteins; Ex molecular weight. Denaturation of proteins.

Structure and function of carbohydrates.

22. Carbohydrates: identification, classification. Monosaccharides (aldoses and ketoses; trioses, tetrosities, pentoses, hexoses, heptoses), biomedical significance of several representatives.

23. Monosaccharides: pentose (ribose, 2-deoxyribose, xylose), hexose (glucose, galactose, manose, fructose) - Structure, properties. Clear reactions to glucose.

24. The power of similar monosaccharides. Amino derivatives: glucosamine, galactosamine. Uronic acids. L-Ascorbic acid (vitamin C). Monosaccharide renewal products: sorbitol, mannitol.

25. Oligosaccharides: power, power. Disaccharides (sucrose, lactose, maltose), their biomedical value.

26. Polysaccharides. Homopolysaccharides: starch, glycogen, cellulose, dextrin-structure, hydrolysis, biomedical value. A clear reaction to starch.

27. Heteropolysaccharides: meaning, structure. The potential and biomedical significance of glycosaminoglycans (mucopolysaccharides) – hyaluronic acid, chondroitin sulfates, heparin**.**

Biologically active heterocyclic compounds. Nucleosides, nucleotides, nucleic acids.

28. Five-membered heterocycles with one heteroatom (pyrole, furan, thiophene). Biomedical significance of tetrapyrolic compounds: porphins, porphyrins, heme.

29. Indol and its derivatives: tryptophan and reactions of tryptamine and serotonin; Indoxyl, skatole, skatol are important in the processes of protein rotting into the intestines.

30. Five-membered heterocycles with two nitrogen heteroatoms. Pyrazol, pirazolone; Similar treatments for pirazolon-5 as medicinal agents (antipyrine, amidopirine, analgin). Imidazole and its derivatives: histidine, histamine.

31. Five-membered heterocycles with two different heteroatoms: thiazole, oxazole. Thiazole is a structural component of the thiamine molecule (vitamin B1).

32. Six-membered heterocycles with a nitrogen atom: pyridine. Nicotinamide (vitamin PP.) is a storage component of oxidatively derived pyridine coenzymes. Pyridoxine and molecular forms of vitamin B6.

33. Six-membered heterocycles with two nitrogen atoms. Diazines: pyrimidine, pirazine, pyridazine. Nitrogen bases - similar pyrimidines (uracil, cytosine, thymine).

34. Related substances as medicinal uses: 5-fluorouracil, potassium orotate. Barbituric acid; barbiturates as an anesthetic and against epileptic symptoms (phenobarbital, veronal).

35. Purin and it’s derivates. Amino-like purines (adenine, guanine), their tautomeric forms; biochemical significance in the concentration of nucleotides and coenzymes.

36. Hydroxy-based purines: hypoxanthine, xanthine, uric acid. Methylated xanthine compounds (caffeine, theophylline, theobromine) are physiologically active and act on the central nervous and cardiovascular system.

37. Nucleosides, nucleotides. Nitrogens are the basis of the purine and pyrimidine series, which are part of the stock of natural nucleotides. Minor nitrogenous bases.

38. Nucleosides. Nucleotides as phosphorylated derivatives of nucleosides (nucleoside mono-, di- and triphosphates). Nomenclature of nucleosides and nucleotides as components of RNA and DNA.

39. What are the biochemical functions of strong nucleotides: coenzyme nucleotides; cyclic nucleotides 3',5'-cAMP and 3',5'-cGMP.

40. Nucleic acids (deoxyribonucleic acids, ribonucleic acids) as polynucleotides. Polarity of polynucleotide lances of DNA and RNA.

41. Structure and the power of DNA; nucleotide storage, complementarity of nitrogenous bases. The primary, secondary and tertiary structure of DNA. RNA: Structure, types of RNA and their role in protein biosynthesis.

42. Vitamins: halal characteristics; understanding about the coenzyme action of vitamins. Structure and the power of vitamins B1, B2, B6, PP.

CONTENT MODULE 2. General patterns of metabolism.

Introduction into biochemistry. Biochemical components of cells.'

43. Biological chemistry (biochemistry) as a science. The place of biochemistry among other medical and biological disciplines. History of biochemistry; development of biochemical research in Ukraine.

44. Objects of education and training in biochemistry. The role of biochemistry in the established molecular mechanisms of the pathogenesis of human illness is evident.

45. Relationship between biochemistry and other biomedical sciences. Medical biochemistry. Clinical biochemistry. Biochemical laboratory diagnostics.

46. Biochemical components of cellulose, their biochemical functions. Class of biomolecules. Hierarchy of biomolecules, their relationships.

Enzymes and coenzymes. Regulation of metabolism.

47. Enzymes: value; the power of enzymes as biological catalysts.

48. Classification and nomenclature of enzymes, characteristics of certain classes of enzymes.

49. What are the mechanisms of enzymes. Active and allosteric (regulatory) center.

50. Cofactors and coenzyme. Due to the power of coenzymes, vitamins are precursors in the biosynthesis of coenzymes. Coenzymes: types of reactions that catalyze other classes of coenzymes.

51. Isoenzymes, features of their functioning, significance in the diagnosis of illness.

52. Mechanisms of action and kinetics of enzymatic reactions: duration of liquid reaction, substrate concentration, pH and temperature. Principles and methods for identifying enzymes in biological objects. One type of activity and number of enzymes.

53. Activators and inhibitors of enzymes: applications and mechanisms of action.

54. Types of enzyme inhibition: turnaround (competitive, non-competitive) and non-turnover inhibition.

55. Regulation of enzymatic processes. Paths and mechanisms of regulation: allosteric enzymes; covalent modification of enzymes. Cyclic nucleotides (cAMP, cGMP) as regulators of enzymatic reactions and biological functions of cells.

56. Enzymopathies - problems (surges) in the metabolism of carbohydrates, amino acids, porphyrins, purines.

57. Enzymodiagnosis of pathological processes and illness.

58. Enzymotherapy - stagnation of enzymes, their activators and inhibitors in medicine.

Metabolism fundamentals. Citric acid cycle.

59. Metabolism (metabolism) - the underlying patterns of catabolic and anabolic processes.

60. Complex stages of internal cellular catabolism of biomolecules: proteins, carbohydrates, lipids.

61. Tricarboxylic acid cycle. Localization, sequence of enzymatic reactions, significance in the metabolism of speech. Energy balance of the tricarboxylic acid cycle. Physiological significance of the TCA reaction.

Molecular basis of bioenergetics.

62. Reactions of biological oxidation; types of reactions (dehydrogenase, oxidase, oxygenase) and their biological significance. Respiratory chain.

63. Enzymes of biological oxidation in mitochondria: pyridine-, flavin-dehydrogenases, cytochromes. Sequence of components of the mitochondrial membrane. Molecular complexes of the inner membranes of mitochondria.

64. Oxide phosphorylation: points of conjugation of electron transport and phosphorylation, coefficient of oxide phosphorylation

65. Chemiosmotic theory of oxide phosphorylation, mitochondrial ATP synthetase.

66. Inhibitors of electron transport and inhibitors of oxide phosphorylation.

67. Microsomal oxidation: cytochrome P-450; molecular organization of electron transfer chain.

CONTENT MODULE 3. METABOLISM OF CARBOHYDRATES, LIPIDS AND IT'S REGULATION.

Metabolism of carbohydrates and its regulation.

68. Aerobic and anaerobic oxidation of glucose, natural characteristics of processes.

69. Anaerobic oxidation of glucose. Sequence of reaction of enzymes to glycolysis.

70. Aerobic oxidation of glucose. Stages of transformation of glucose to CO2 and H2O. Oxidation decarboxylation of pyruvate. Enzymes, coenzymes and sequence of reactions in a multienzyme complex.

71. Glycolytic oxidoreduction: substrate phosphorylation and nutrient mechanisms of glycolytic NADH oxidation.

72. The bioenergetics of aerobic and anaerobic glucose oxidation, the Pasteur effect, are consistent.

73. Phosphorolytic pathway for the breakdown of glycogen in liver and meat. Regulation of glycogen phosphorylase activity.

74. Glycogen biosynthesis: enzymatic reactions, physiological significance. Regulation of glycogen synthase activity.

75. Mechanisms of reciprocal regulation of glycogenolysis and glycogenesis through cascade cAMP-dependent phosphorylation of enzyme proteins. The role of adrenaline, glucagon and insulin in the hormonal regulation of glycogen exchange in meat and liver.

76. Genetic disorders of glycogen metabolism (glycogenosis, aglycogenosis).

77. Gluconeogenesis: substrates, enzymes and physiological significance of the process. Glucose-lactate (Coria cycle) and glucose-alanine cycles.

78. Blood glucose (glucosemia): normoglycemia, hypoglycemia, glucosuria. Blood diabetes is a pathology of glucose metabolism. Hormonal regulation of blood glucose concentration and exchange.

79. Pentose phosphate pathway of glucose oxidation: scheme of the process and biological significance.

80. Metabolic pathways for the transformation of fructose and galactose; hereditary disorders of metabolism.

Lipid metabolism and its regulation.

81. Catabolism of triacylglycerols in adipocytes of adipose tissue: sequence of reactions, mechanisms of regulation of triglyceride lipase activity. Neurohumoral regulation of lipolysis with the participation of adrenaline, norepinephrine, glucagon and insulin).

82. Reactions of oxidation of fatty acids (b-oxidation); the role of carnitine in the transport of fatty acids in mitochondria. Energetic activity of the oxidation of fatty acids in cells.

83. Oxidation of glycerol: enzymatic reactions, bioenergetics.

84. Ketone bodies. The reactions of biosynthesis and utilization of ketone bodies are of physiological significance. Disruption of the exchange of ketone bodies due to pathology (diabetes of the blood, fasting).

85. Biosynthesis of saturated fatty acids: reactions to the biosynthesis of saturated fatty acids (palmite) and regulation of the process. Biosynthesis of unsaturated fatty acids in the human body.

86. Biosynthesis of triacylglycerols and phosphoglycerides. Metabolism of sphingolipids. Genetic abnormalities in the metabolism of sphingolipides - sphingolipidoses.

87. Biosynthesis of cholesterol: reaction scheme, regulation of cholesterol synthesis. Ways of biotransformation of cholesterol: esterification; the release of urinary acids, steroid hormones, vitamin D3.

88. Circulatory transport and deposition of lipids in adipose tissue. Lipoprotein lipase in endothelium. Blood plasma lipoproteins: lipid and protein (apoprotein) storage. Hyper-lipoproteinemia.

89. Pathologies of lipid metabolism: atherosclerosis, obesity, blood diabetes.

CONTENT MODULE 4. METABOLISM OF AMINO ACIDS. MOLECULAR BIOLOGY. BIOCHEMISTRY OF INTERCENTAL COMMUNICATIONS.

Metabolism of amino acids. Enzymopathies of amino acid metabolism.

90. Pool of free amino acids in the body: the supply and vigor of free amino acids in tissues.

91. Transamination of amino acids: reactions and their biochemical significance, mechanisms of aminotransferases.

92. Direct and indirect deamination of high-grade L-amino acids in tissues.

93. Decarboxylation of L-amino acids in the human body. Physiological significance of the creation of products. Oxidation of biogenic amines.

94. Ways of creation and release of ammonia in the body. Biosynthesis of meat: sequence of enzyme reactions in biosynthesis, genetic abnormalities of enzymes in the fruit cycle.

95. Pathways to the metabolism of carbon skeletons of amino acids in the human body. Glucogenic and ketogenic amino acids.

96. Biosynthesis and biological role of creatine and creatine phosphate.

97. Glutathione: potential, biosynthesis and biological functions of glutathione

98. Specialized routes to the metabolism of cyclic amino acids - phenylalanine and tyrosine. Decreased enzyme metabolism of cyclic amino acids - phenylalanine and tyrosine.

99. Exchange of cyclic amino acid tryptophan and cyclic enzyme.

Fundamentals of molecular biology.

100. Nitrogen bases, nucleosides and nucleotides are storage components of nucleic acid molecules. Minor nitrogenous bases and nucleotides. Free nucleotides (ATP, NAD, NADP, FAD, FMN, CTP, UTP; 3',5'-AMP, 3',5'-GMP) and their biochemical functions.

101. Nucleic acids. The essential characteristics of DNA and RNA, their biological significance in the preservation and transmission of genetic information. Features of the primary structure of DNA and RNA. Ligaments that stabilize the primary structure of nucleic acids.

102. Secondary structure of DNA, the role of water links in its creation (Chargaff rules, Watson-Crick model), anti-parallelism of chains. Tertiary structure of DNA. Physico-chemical powers of DNA: interaction of DNA with cationic ligands, creation of nucleosomes.

103. Molecular organization of nuclear chromatin in eukaryotes: nucleosomal organization; histones and non-histone proteins. Nucleoproteins: natural, biological functions

104. Structure, the power of biological functions of RNA. Types of RNA: mRNA, tRNA, rRNA. Features of the structural organization of different types of RNA.

105. Biochemical warehouse, the future functions of biological membranes. Compartmentalization of biochemical processes in cells.

106. The role of lipids in biological membranes. Ride-mosaic model of biomembranes.

107. Biosynthesis of purine nucleotides: reaction scheme for the synthesis of IMP; concentration of AMP and GMF; regulation mechanisms.

108. Biosynthesis of pyrimidine nucleotides: reaction scheme; regulation of synthesis. Biosynthesis of deoxyribonucleotides. Solution of thymidyl nucleotides; Inhibitors of dTMP biosynthesis as antitumor agents.

109. Catabolism of purine nucleotides; decreased metabolism of uric acid.

110. Scheme of catabolism of pyrimidine nucleotides.

111. DNA replication: biological significance; non-conservative mechanism of replication. Sequence of stages and enzymes of DNA replication in prokaryotes and eukaryotes.

112. RNA transcription: RNA polymerases of prokaryotes and eukaryotes, transcription signals (promoter, initiator and terminator parts of the genome). Processing is a post-transcriptional modification of newly synthesized mRNA.

113. Genetic (biological) code; triplet structure of the code, properties. Transport - tRNA and activation of amino acids. Aminoacyl-tRNA synthetases. Stages and mechanisms of translation (protein biosynthesis) in ribosomes: initiation, elongation and termination.

Fundamentals of molecular genetics.

114. Post-translational modification of peptide lances. Regulation of broadcasting. Transcription and translation inhibitors in prokaryotes and eukaryotes: antibiotics and interferons -

their use in medicine; diphtheria toxin.

115. Regulation of gene expression in prokaryotes: regulatory and structural parts of the lactose (Lac-) operon (regulatory gene, promoter, operator).

116. Mutations: genomic, chromosomal, gene; mechanisms of mutagens; the role of inducing mutations in human culprit enzyme diseases and disease diseases. The mechanisms of DNA repair are of biological significance. Reparation of UV-induced gene mutations: xeroderma pigmentosum.

117. Genetic engineering: design of recombinant DNA; cloning of genes; genetic engineering synthesis of enzymes, hormones, interferons, etc.

Molecular mechanisms of hormone action on target cells.

118. Hormones: general characteristic; the role of hormones and other bioregulators in the system of intercellular integration of functions in the human body.

119. Classification of hormones and bioregulators: type of structure and mechanisms of action of hormones.

120. Response of target cells to hormones. Membrane (ionotropic, metabotropic) and cytosolic receptors. Biochemical systems of intracellular transmission of hormonal signals: G-proteins, second messengers (cAMP, Ca2+/calmodulin, IP3, DAG). Molecular-clinical mechanisms of steroid and thyroid hormones.

Biochemistry of hormonal regulation of metabolism.

121. Hormones of the hypothalamus - liberin and statin.

122. Hormones of the anterior pituitary gland: somatotropin (STH), prolactin. pathological processes associated with impaired functions of these hormones.

123. Hormones of the posterior part of the pituitary gland. Vasopressin and oxytocin: biological, biological functions.

124. Insulin: structure, biosynthesis and secretion; influx on the exchange of carbohydrates, lipids, amino acids and proteins. Rest-stimulating effects of insulin. Glucagon: regulation of carbohydrate and lipid metabolism.

125. Thyroid hormones: structure, biological effects of T4 and T3. Disruption of metabolic processes in hypo- hyperthyroidism. Hormonal regulation of calcium homeostasis in the body. Parathyroid hormone, calcitonin, calcitriol.

126. Catecholamines (adrenaline, norepinephrine, dopamine): biological, biosynthesis, physiological effects, biochemical mechanisms of action.

127. Steroid hormones of measles (C21-steroids) - glucocorticoids and mineralocorticoids; Structure, power.

128. Women’s state hormones: estrogens, progesterone. Physiological and biochemical effects; sound of the phases of the ovulation cycle. Human state hormones (C19-steroids). Physiological and biochemical effects of androgens; regulation of synthesis and secretion.

129. Eicosanoids: biological, biological and pharmacological influences. Aspirin and other non-steroidal anti-inflammatory agents as inhibitors of prostaglandin synthesis.

CONTENT MODULE 5. BIOCHEMISTRY OF TISSUE AND PHYSIOLOGICAL FUNCTIONS

Biochemistry of human food. Vitamins as components of food.

130. Biochemistry of human food: components and vital parts of normal food; biological value of other nutrients. Mechanisms of transformation of living substances (proteins, carbohydrates, lipids) in the grass tract. Enzymes of the pouch and intestines.

131. Disruption of digestion of certain nutrients in the stomach and intestines; hereditary enzymopathies of digestive processes. Microelements in human nutrition. Biological functions of individual trace elements; manifestations of trace element deficiency..

132. Vitamins in people's food. Water- and fat-rich vitamins; Exogenous and endogenous causes of vitamin deficiency.

133. Vitamin B1 (thiamine): biological, biological power, mechanism of action, sources, dietary needs. Vitamin B2 (riboflavin): biological, biological power, mechanism of action, food, dietary needs. Vitamin PP (nicotinic acid, nicotinamide): biological, biological power, mechanism

of action, show deficiencies, sources, basic needs.

134. Vitamin B6 (pyridoxine): biological power, mechanism of action, product, dietary needs. Vitamin B12 (cobalamin): biological influences, mechanism of action, manifestations of deficiencies, food intake. Vitamin B (folic acid): biological influences, mechanism of action, product, dietary requirements.

135. Vitamin N (biotin): biological influences, mechanism of action, product, dietary needs. Vitamin B3 (pantothenic acid): biological properties, mechanism of action, food consumption.

136. Vitamin C (ascorbic acid): biological, biological influences, mechanism of action, show deficiencies, food, dietary needs. Vitamin P (flavonoids): biological, biological power, mechanism of action, show deficiencies, food, supplementary needs.

137. Vitamin A (retinol, retinal, retinoic acid): biological influences, mechanism of action, show deficiencies, sources, basic needs. Vitamin D3 (cholecalciferol): biological influences, mechanism of action, manifestations of deficiencies, dietary requirements.

138. Vitamin K (phyloquinone, farnoquinone): biological influences, mechanism of action, show deficiencies, sources, dietary needs. Vitamin E (a-tocopherol): biological influences, mechanism of action, manifest deficiencies, food intake.

Biochemistry and pathobiochemistry of blood.

139. Biochemical and physiological functions of blood in the human body. Dihal function of erythrocytes. Hemoglobin: mechanisms of participation in the transport of acid and carbon dioxide. Variants and pathological forms of hemoglobins in humans.

140. Buffers of the blood system. Disturbance of the acid-base balance in the body (metabolic and respiratory acidosis, alkalosis). Biochemical storage of human blood. Blood plasma proteins and their clinical and biochemical characteristics.

141. Blood plasma enzymes; significance in enzymodiagnostics of diseases of organs and tissues. Kalikrein-kinin system of blood and tissues. Medicines - antagonists of kinin production.

142. Non-protein organic compounds of blood plasma. Inorganic components of plasma.

143. Biochemical and functional characteristics of the hemostatic system.

144. Laryngeal blood system; characteristics of other factors; mechanisms of functioning of the cascade system of laryngeal blood. The role of vitamin K in coagulation reactions; medicinal properties - agonists and antagonists of vitamin K.

145. Anticoagulant blood system; characteristics of anticoagulants. Recession of the process of laryngeal blood. Fibrinolytic blood system. Medicines that influence the process of fibrinolysis.

146. Immunoglobulins; biochemical characteristics of several classes of immunoglobulin in humans. Mediators and hormones of the immune system: interleukins; interferons; protein-peptide factors regulating the growth and proliferation of cells.

147. Complement system; biochemical components of the human complement system; classic and alternative ways of activation. Biochemical mechanisms of immunodeficiency states: primary (slump) and secondary immunodeficiency.

Functional and clinical biochemistry of organs and tissues.

148. Biochemical functions of the liver: carbohydrate-producing, protein-synthesizing, nut-creating, fermentative-creating, regulation of lipid composition in the blood.

149. Detoxifying function of the liver; types of biotransformation reactions of xenobiotics and endogenous toxins. Conjugation reactions in hepatocytes: biochemical mechanisms, functional significance.

150. Reactions of microsomal oxidation. Cytochrome P-450; electron transport lancets in the membranes of the endoplasmic reticulum of hepatocytes.

151. Metabolism of porphyrins: heme; Scheme of the biosynthesis reaction of protoporphyrin IX and heme. Decrease in the biosynthesis of porphyrins, such as porphyria.

152. The role of the liver in the exchange of chewing pigments. Pathobiochemistry and types of diseases; biochemical diagnostics of diarrhea; slump (enzymatic) jaundices. Catabolism of hemoglobin and heme (scheme); creation and development of precious pigments.

153. Water-salt metabolism in the body. Internal and post-clinical water; exchange of water, sodium, potassium.

154. The role of kidneys in the regulation of volume, electrolyte storage and pH in the body.

Biochemical mechanisms of the sebaceous function of kidneys. The biochemical composition of humans urine is normal and responsible for the development of pathological processes. Clinical and diagnostic significance of stock analysis.

155. Renin-angiotensin system. Hypotensive drugs are inhibitors of angiotensin-converting enzyme.

156. Biochemical composition of muscle. Myofibril proteins: myosin, actin, tropomyosin, troponin. Molecular mechanisms of muscle shortening. Bioenergetics of muscle tissue.

157. Biochemistry of the nervous system. Energy exchange in the human brain. Significance of aerobic oxidation of glucose; change the minds of physiological sleep and anesthesia.

158. Biochemistry of neurotransmitters; receptors of neurotransmitters and physiologically active reactions.

159. Peptidergic system of the brain: opioid peptides, opioid peptide receptors.

160. Disruption of the exchange of neurotransmitters and modulators in the brain during mental disorders. Neurochemical mechanisms of psychotropic disorders.