

BIOCHEMISTRY
KROK 2019

1. Enzymes are widely used as drugs in pharmacy. What is the main difference that separates enzymes from non-biological catalysts?

+High specificity and selectivity
High universality
Low universality
High dispersion
High homogeneity

2. Parents of a 10-year-old child have made an appointment with endocrinologist due to complaints of the child's low height. The child's appearance is corresponding with that of a 5-year-old. What hormone causes such changes in physical development, if its secretion is disrupted?

+Somatotrophic hormone
Adrenocorticotrophic hormone
Thyroxin
Testosterone
Insulin

3. A patient complains of tachycardia, insomnia, weight loss, irritability, sweating. Objectively: the patient has goiter and slight exophthalmos. What gland is affected, and what functional disorder is it?

+Hyperthyroidism
Hypothyroidism
Hyperparathyroidism
Hypoparathyroidism
Adrenomedullary hyperfunction

4. Purine ring biosynthesis occurs in ribose-5-phosphate by gradual accumulation of nitrogen and carbon atoms and closing the rings. The source of ribose phosphate is the process of:

+Pentose phosphate cycle
Glycolysis
Glyconeogenesis
Gluconeogenesis
Glycogenolysis

5. What enzyme allows for synthesis of various genes from template-RNA to DNA in genetic engineering (this enzyme catalyzes the process discovered in RNA-viruses)?

+Reverse transcriptase
Exonuclease
DNA-ligase
Helicase
Endonuclease

6. Diet of an individual must contain vitamins. What vitamin is usually prescribed for treatment and prevention of pellagra?

+Vitamin PP
Vitamin C
Vitamin A
Vitamin B1
Vitamin D

7. Intracellular metabolism of glycerol starts with its activation. What compound is formed in the first reaction of its conversion?

+ α -glycerolphosphate
Pyruvate
Lactate
Choline
Acetyl coenzyme A

8. The end product of starch hydrolysis is:

+D-glucose
D-fructose
Saccharose
Maltose
D-galactose

9. Accidental ingestion of death cap mushrooms containing α -amanitin causes intoxication. What enzyme is inhibited with this toxin?

+RNA polymerase II
DNA polymerase
DNA synthetase
Peptidyl transferase
Translocase

10. An ophthalmologist has detected increased time of dark adaptation in a patient. What vitamin deficiency can result in such symptom?

+A
C
K
B1
B6

11. A 70-year-old patient presents with cardiac and cerebral atherosclerosis. Examination revealed changes of blood lipid spectre. Increase of the following lipoproteins plays a significant role in atherosclerosis pathogenesis:

+Low-density lipoproteins
Very low-density lipoproteins
Intermediate density lipoproteins
High-density lipoproteins
Chylomicrons

12. A patient demonstrates milkywhite color of blood plasma due to high content of chylomicrons. Disintegration of triacylglycerol is disrupted. Deficiency of the following enzyme activity is observed:

+Lipoprotein lipase
Amylase
Tripsin
Cholesterol esterase
Lactase

13. A woman noticed that a cut on her skin was still bleeding even after 20 minutes had passed. What vitamin deficiency causes such condition?

+Vitamin K
Vitamin A
Vitamin D
Vitamin E
Vitamin B12

14. Primary structure of nucleic acids is a polynucleotide chain that has a certain composition and order of the nucleotides. What bonds stabilize this structure?

+3, 5-phosphodiester
Peptide
Glycosidic
Disulfide
Amide

15. Natural peptides can perform various functions. What bioactive peptide is a major antioxidant and performs coenzyme functions?

+Glutathione
Bradykinin
Oxytocin
Liberin
Anserine

16. An elderly man exhibits low levels of red blood cells and hemoglobin in blood; however, his color index is 1,3. Blood smear analysis revealed megaloblasts. What type of anemia is observed in this case?

+B12-folic acid deficiency
Iron-deficiency
Acquired hemolytic
Hereditary hemolytic
Chronic posthemorrhagic

17. After drinking milk a 1-year-old child developed diarrhea, flatulence. The baby is likely to have deficiency of the following enzyme:

+Lactase
Maltase
Aldolase
Hexokinase
Glycosidase

18. Patients with severe depression demonstrate decreased serotonin levels in brain and cerebrospinal fluid. What amino acid is a serotonin precursor?

+Tryptophan
Threonine
Tyrosine
Glutamic acid
Aspartic acid

19. Fatty acids synthesis occurs in human body. What compound is initial in this process?

+Acetyl coenzyme A
Vitamin C
Glycine
Succinate
Cholesterol

20. A patient has icteric skin; unconjugated bilirubin content in blood is high; conjugated bilirubin in urine is not

detected. There is significant amount of urobilin in urine and stercobilin in feces. Name the pathology characterized by given symptoms:

+Hemolytic jaundice
Obstructive jaundice
Jaundice of the newborn
Hepatocellular jaundice
Atherosclerosis

21. Cataract (lenticular opacity) has developed in a 52-year-old woman with diabetes mellitus. Lenticular opacity was caused by intensification of the following processes:

+Protein glycosylation
Lipolysis
Ketogenesis
Protein proteolysis
Gluconeogenesis

22. A patient with hyperproduction of thyroid hormones has been prescribed Merказolilum. This drug inhibits the following enzyme participating in iodothyronine synthesis:

+Iodide peroxidase
Aromatase
Reductase
Decarboxylase
Aminotransferase

23. A patient consulted an ophthalmologist about deterioration of twilight vision and xerophthalmus. What drug should the doctor prescribe?

+Retinol
Pyridoxine
Tocopherol
Ascorbic acid
Coccarboxylase

24. A patient demonstrates symmetrical dermatitis on the palms. A doctor made a diagnosis of pellagra. What vitamin deficiency can result in such symptoms?

+Nicotinic acid
Cobalamin
Ascorbic acid
Folic acid
Cholecalciferol

25. The second stage of detoxification involves joining certain chemical compounds with functional groups of toxins. Select one such compound:

+Glucuronic acid
Higher fatty acids
Cholesterol
Glucose
Pyruvate

26. A patient undergoes chemotherapy with 5-fluorouracil that is a competitive inhibitor of thymidilate synthase. What process is inhibited by this drug?

+Thymidine monophosphate synthesis
Purine nucleotides disintegration
Adenosine triphosphate synthesis
Purine nucleotides salvage
Glucose synthesis

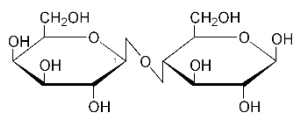
26. Universal system of biological oxidation of nonpolar compounds (numerous drugs, toxic agents, steroid hormones, cholesterol) is microsomal oxidation. Name the cytochrome that is included in oxygenase chain of microsomes:

- +Cytochrome P-450
- Cytochrome C
- Cytochrome A3
- Cytochrome A
- Cytochrome C1

27. Structure of proteins includes proteinogenic amino acids. What is the position of the amino group in the structure of these amino acids?

- + α -position
- β -position
- γ -position
- δ -position
- position

28. Name the disaccharide with the following structure:



- + β -lactose
- α -lactose
- β -maltose
- β -cellulose
- Saccharose

29. Chromatin contains positively charged histone proteins. What amino acid is contained in histone proteins in large amounts?

- +Lysine
- Alanine
- Valine
- Threonine
- Serine

30. A man presents with signs of albinism: blonde hair, extreme photosensitivity, impaired vision. What amino acid metabolism is disrupted in the patient?

- +Tyrosine
- Methionine
- Proline
- Histidine
- Valine

31. Substrate-linked phosphorylation occurs in the cycle of tricarboxylic acids. What compound takes part in this reaction?

- +Succinyl coenzyme A
- α -ketoglutarate
- Acetyl coenzyme A
- Succinate
- Malate

32. Inhibition of the synthesis of bile acids from cholesterol in liver of an experimental animals has caused maldigestion of lipids. What is the role of these acids in the enteral lipidic metabolism?

+They emulsify dietary lipids

They keep balance of alkaline environment in the intestines

They participate in the synthesis of lipids

They are part of LDL

They activate the formation of chylomicrons

33. A patient with atherosclerosis has been prescribed Linaetholum containing essential fatty acids. Which of the following acids is an essential part of the preparation?

- +Linolenic
- Palmitic
- Crotonic
- Stearic
- Oleic

34. In response to the administration of protein drugs, a patient developed an allergic reaction. The development of the allergic reaction is caused by the increased synthesis of the following compound:

- +Histamine
- Choline
- Adrenaline
- Histidine
- Serotonin

35. The patient has icteric skin; unconjugated bilirubin content in blood is high; conjugated bilirubin in urine is not detected. There is significant amount of urobilin in urine and stercobilin in feces. Name the pathology characterized by the given symptoms:

- +Hemolytic jaundice
- Obstructive jaundice
- Jaundice of the newborn
- Hepatocellular jaundice
- Atherosclerosis

36. A patient complains of pain in the small joints. High concentration of uric acid is detected in his blood plasma. What pathology causes such changes?

- +Gout
- Diabetes mellitus
- Phenylketonuria
- Lesch-Nyhan syndrome
- Diabetes insipidus

37. Hemoglobin catabolism results in release of iron which is transported to the bone marrow by a certain transfer protein and is used again for the synthesis of hemoglobin. Specify this transfer protein:

- +Transferrin (siderophilin)
- Transcobalamin
- Haptoglobin
- Ceruloplasmin
- Albumin

38. A patient has a mental disorder due to the insufficient synthesis of gammaaminobutyric acid in the brain. Such pathological changes might be caused by the deficiency of the following vitamin:

- +Pyridoxine
- Tocopherol

Cyanocobalamin
Folic acid
Riboflavin

39. The method consisting in removal of low-molecular impurities from colloidal systems and high-molecular compound solutions by semipermeable membrane diffusion is called:

+Dialysis
Electrodialysis
Ultrafiltration
Decantation
Compensatory dialysis

40. Fatty acids arrive into mitochondria, and there their oxidation occurs. Name the vitamin-like substance that takes part in transportation of fatty acids through mitochondrial membrane:

+Carnitine
Choline
Biotin
Pantothenic acid
Folic acid

41. A 5-year-old child presents with abdominal distension, abdominal cramps, and diarrhea occurring 1-4 hours after drinking milk. Described symptoms are caused by the lack of enzymes that break up:

+Lactose
Glucose
Maltose
Saccharose
Fructose

42. Albumine, blood serum proteins, and gastric juice pepsin consist of macromolecules of polypeptide chains that are joined with hydrogen bonds into hydrophilic spheres. These proteins are named:

+Globular
Fibrillar
Structural
Synthetic
Artificial

43. Parents of the 10-year-old child have made an appointment with endocrinologist due to complaints of child's low height. The child's appearance is corresponding with that of 5-year-old child. What hormone secretion disorder causes such physical development changes?

+Somatotrophic hormone
Adrenocorticotrophic hormone
Thyroxin
Testosterone
Insulin

44. During gastric secretory function research decrease of hydrochloric acid concentration in gastric juice was detected. What enzyme will be less active in such a condition?

+Pepsin
Amylase
Lipase

Dipeptidase
Hexokinase

45. Information transfer from peptide hormones to intracellular second messengers occurs involving adenylate cyclase. What reaction is catalyzed by adenylate cyclase?

+Cyclic adenosine monophosphate production
ATP breakdown into ADP and inorganic phosphate
ATP synthesis from adenosine monophosphate and pyrophosphate
ADP breakdown with adenosine monophosphate and inorganic phosphate production
ATP breakdown into adenosine monophosphate and pyrophosphate

46. When hydrogen peroxide solution is administered to bleeding wounds, it is broken up by one of the blood enzymes. Point out this enzyme.

+Catalase
Monoamine oxidase
Cytochrome oxidase
Aspartate aminotransferase
Lactate dehydrogenase

47. Natural peptides can carry out various functions. What biologically active peptide is one of the main antioxidants and carries out coenzyme functions?

+Glutathione
Bradykinin
Oxytocin
Releasing hormone (Liberine)
Anserine

48. Tetanic spasms of skeletal muscles occur under low calcium concentration in blood. What endocrine disorder can this condition be associated with?

+Hypofunction of parathyroid glands
Hyperfunction of adrenal cortex
Hypofunction of adrenal cortex
Hyperthyroidism
Hypothyroidism

49. Eicosanoids, - hormone-like compounds, - are used to stimulate labor and for contraception. What substances have such an effect?

+Prostaglandines
Interleukines
Endorphines
Angiotensines
Enkephalines

50. A newborn infant has hemolytic jaundice caused by rhesus incompatibility. What bile pigment will be concentrated highest in the blood of this infant?

+Unconjugated bilirubin
Conjugated bilirubin
Urobilinogen
Stercobilinogen
Bile acids

51. The 49-year-old female patient suffering long-term from pancreatic diabetes has developed the following symptoms after administering insulin: weakness, facial pallor, palpitation, anxiety, double vision, numbness of lips and tongue apex. Glucose molar concentration in blood was 2,5 mmol/l. What complication has developed in the patient?

+Hypoglycemic coma
Hyperosmolar coma
Hyperglycemic coma
Hyperketonemic coma
Uremic coma

52. L-DOPA and its derivatives are used in treatment of Parkinson's disease. What amino acid is this substance made of?

+Tyrosine
Asparagine
Glutamate
Tryptophan
Arginine

53. Milk intake has resulted in the one-year-old child having diarrhea and abdominal distension. What enzyme deficiency does the child have?

+Lactase
Maltase
Aldolase
Hexokinase
Glycosidase

54. The 56-year-old patient has developed megaloblastic anemia in the course of alcoholic cirrhosis. What vitamin deficiency is the main cause of anemia in this patient?

+Folic acid
Lipoic acid
Biotin
Thiamine
Pantothenic acid

55. Ketoacidosis occurs during starvation. What metabolite blood concentration increase is symptomatic of this medical condition?

+Acetoacetate
Oxaloacetate
Malonate
Beta-hydroxy-beta-methylglutarylCoA
Acetyl-CoA

56. Streptomycin and other aminoglycosides by binding with 30S subunit of ribosome prevents formylmethionyl-tRNA joining. What process is disrupted due to this effect?

+Translation initiation
Translation termination
Transcription initiation
Transcription termination
Replication initiation

57. The patient has hypovitaminosis PP. What amino acid taken with meals partially compensates patient's need for vitamin PP?

+Tryptophan

Phenylalanine

Valine

Arginine

Methionine

58. The 13-year-old female patient having suffered from measles complains of dry mouth, thirst, body weight loss, polyuria, her glucose concentration in blood is 16 mmol/l. What disease can be suspected?

+Type I pancreatic diabetes
Type II pancreatic diabetes
Diabetes insipidus
Steroidogenic diabetes
Glycogenosis

59. The patient with mushroom poisoning has developed the following symptoms: yellow coloring of skin and sclera, dark-colored urine. Hemolytic jaundice was diagnosed. What pigment causes such coloring of the patient's urine?

+Stercobilin
Conjugated bilirubin
Biliverdin
Unconjugated bilirubin
Verdohemoglobin

60. During long-term carbon tetrachloride poisoning of animals significant activity drop of aminoacyl tRNA synthetase in hepatocytes was detected. What metabolic process is disrupted in this case?

+Protein biosynthesis
DNA replication
RNA transcription
Post-translational modification of peptides
Post-transcriptional modification of RNA

61. Nucleoproteins contain significant amount of alkaline proteins. What proteins carry out structural function in chromatin?

+Protamines and histones
Albumines and globulines
Prolamines and glutenins
Hemoglobin and myoglobin
Interferones and mucin

62. The patient has icteric skin; unconjugated bilirubin content in blood is high; conjugated bilirubin in urine is not detected. There is significant amount of urobilin in urine and stercobilin in feces. Name the pathology characterized by given symptoms

+Hemolytic jaundice
Obstructive jaundice
Jaundice of the newborn
Hepatocellular jaundice
Atherosclerosis

63. Oligomycin antibiotic is prescribed to the patient with tuberculosis. What mitochondrial process is slowed down by this medicine?

+Oxidative phosphorylation
Substrate-linked phosphorylation
Microsomal oxidation
Lipid peroxidation

Oxidative decarboxylation

64. The patient has been prescribed drug with antibacterial effect on tuberculosis mycobacteria. What drug is used in tuberculosis treatment and is pyridoxine antivitamin?

- +Isoniazid
- Heparin
- Trimethoprim/sulfamethoxazole (Co-trimoxazole)
- Streptomycin
- Sulfanilamide

65. Detoxication rate is 4 times lower in children than in adults. What enzyme necessary for toxic compounds conjugation has low activity in children?

- +Glucuronosyltransferase
- ALAT
- AspAT
- Creatine phosphokinase
- LDH1

66. Certain drugs can stimulate liver to synthesize enzyme systems taking part in drugs and toxins metabolism. What compound stimulates drug metabolism in liver microsomes?

- +Phenobarbital
- Heparin
- Menadione sodium bisulfite
- Sulfanilamide
- Aspirin

67. Barbiturates are used as soporifics. These substances, similarly to rotenone, are tissue respiration inhibitors. What complex level do these compounds suppress respiratory chain at?

- +NADH-coenzyme Q reductase
- Cytochrome oxidase
- Cytochrome C reductase
- Adenosine triphosphate synthetase
- Succinate dehydrogenase

68. Inhibitors of one of the amides metabolism enzymes are used to treat depression. What enzyme inhibition has such an effect?

- Flavin adenine dinucleotide (FAD)- containing monoamine oxidase (MAO)
- Acetylcholinesterase
- Formylkynureninase (Arylformamidase)
- Kynurenine 3-hydroxylase
- Lactate dehydrogenase

69. Pathogenic microorganisms produce various enzymes in order to penetrate body tissues and spread there. Point out these enzymes among those named below.

- +Hyaluronidase, lecithinase
- Lyase, ligase
- Transferase, nuclease
- Oxydase, catalase
- Esterase, protease

70. The patient has mucosal dryness and mesopic vision disorder. What vitamin deficiency causes these symptoms?

- +A
- P
- E
- C
- D

71. After an insulin injection a 45-year-old female with a long history of diabetes mellitus has developed weakness, paleness, palpitation, anxiety, double vision, numbness of lips and the tip of tongue. Blood glucose is at rate of 2,5 mmol/L. What complication has developed in the patient?

- +Hypoglycemic coma
- Hyperketonemic coma
- Hyperglycemic coma
- Hyperosmolar coma
- Uremic coma

72. A patient complains of severe abdominal pain, cramps, blurred vision. His relatives exhibit the same symptoms. The urine is of red color. The patient has been hospitalized for acute intermittent porphyria. This disease might have been caused by the impaired synthesis of the following compound:

- Bile acids
- Insulin
- +Heme
- Collagen
- Prostaglandins

73. It is known that malonyl-CoA is formed from acetyl-CoA and carbon dioxide under the influence of acetyl-CoA carboxylase. What vitamin is a coenzyme of this enzyme?

- +Biotin
- Ascorbate
- Pantothenic acid
- Folic acid
- Thiamine

74. A patient with myocardial infarction has been administered intravenously a direct anticoagulant, namely:

- Vikasol
- Calcium gluconate
- Thrombin
- Neodicumarin
- +Heparin

75. A patient was admitted to a hospital in a state of hypoglycemic coma. It occurs at the following level of blood glucose:

- 3,3 mmol/L
- 4,0 mmol/L
- 5,5 mmol/L
- +2,5 mmol/L
- 4,5 mmol/L

76. A patient with Parkinson's disease exhibits low level of dopamine which is produced from dihydroxyphenylalanine (DOPA). What enzyme catalyzes this conversion?

- Deaminase
- +Decarboxilase
- Carboxypeptidase

Aminotransferase
Hydrolase

77. Blood pressure is regulated by a number of biologically active compounds. What peptides that enter the bloodstream can affect the vascular tone?

Enkephalins
+Kinins
Leukotrienes
Endorphins
Iodothyronines

78. Chronic pancreatitis is accompanied by the decreased synthesis and secretion of trypsin. This impairs the hydrolysis and absorption of the following substances:

Disaccharides
+Proteins
Polysaccharides
Lipids
Nucleic acids

79. In response to the administration of protein drugs, a patient developed an allergic reaction. The development of the allergic reaction is caused by the increased synthesis of the following compound:

Histidine
Cholin
Adreneline
+Histamine
Serotonin

80. Diabetes and starvation cause the excess production of ketone bodies that are used as an energy source. They are produced from the following compound:

Isocitrate
Lactate
+Acetyl-CoA
Malate
Ketoglutarate

81. The intracellular metabolism of glycerol starts with its activation. What compound is formed as result of the first reaction of its conversion?

Lactate
Choline
Acetyl coenzyme A
+Alpha-glycerolphosphate
Pyruvate

82. A patient has developed megaloblastic anemia on a background of alcoholic cirrhosis. The main cause of anemia in this patient is the following vitamin deficiency:

Thiamin
Biotin
+Folic acid
Pantothenic acid
Lipoic acid

83. Vitamin B₁ deficiency has a negative effect on a number of processes. This is caused by the dysfunction of the following enzyme:

+Pyruvate dehydrogenase complex

Succinate dehydrogenase
Aminotransferase
Lactate dehydrogenase
Glutamate

84. During the gastric secretion, proteolytic enzymes are secreted in form of zymogenes. What enzyme is activated by hydrochloric acid?

Trypsin
+Pepsin
Chymotrypsin
Amylase
Lipase

85. The anti-tumor preparation Methotrexate is a structural analogue of folic acid. The mechanism of its action is based on the inhibition of the following enzyme:

+Dihydrofolate reductase
Creatine kinase
Xanthine oxidase
Lactate dehydrogenase
Hexokinase

86. A child exhibits physical and mental retardation. Urine analysis revealed high concentration of orotic acid. This disease can be addresses by the constant use of:

Glutamine
Guanine
Adenine
+Uridine
Alanine

87. Growth of some cancer cells is caused by a certain growth factor. Treatment of leukemia involves applying an enzyme that destroys this essential factor. Specify this enzyme:

Aspartate aminotransferase
Succinate dehydrogenase
Glutaminase
+Asparaginase
Citrate synthase

88. Food rich in carbohydrates at first increases the blood sugar and then decreases its rate due to the insulin action. What process is activated by this hormone?

Breakdown of glycogen
Breakdown of proteins
Gluconeogenesis
+Synthesis of glycogen
Breakdown of lipids

89. Antidepressants can increase the concentration of catecholamines in the synaptic cleft. What is the mechanism of action of these drugs?

Activation of acetylcholinesterase
Inhibition of xanthin oxidase
Activation of monoamine oxidase
Inhibition of acetylcholinesterase
+Inhibition of monoamine oxidase

90. A 40-year-old male presented to the endocrinology department with disproportionate enlargement of limbs,

mandible and nose. These manifestations are caused by the overproduction of the following hormone:

+Somatotropin
Adrenalin
Vasopressin
Corticotropin
Aldosterone

91. After drinking milk a 1-year-old child developed diarrhea, flatulence. The baby is likely to have the deficiency of the following enzyme:

Hexokinase
Glycokinase
+Lactase
Aldolase
Maltase

92. A child with PKU has an unpleasant mouse-like odor, growth retardation, mental retardation. These symptoms are associated with the high concentration of the following substance in blood:

+Phenylpyruvic acid
Uric acid
Cholesterol
Adrenaline
Glucose

93. Sulfanilamides are widely used as bacteriostatic agents. The mechanism of antimicrobial action of sulfanilamides is based on their structural similarity to:

Glutamic acid
Folic acid
+Para-aminobenzoic acid
Nucleic acid
Antibiotics

94. A patient with hyperproduction of thyroid hormones has been prescribed Merkazolilum. This drug inhibits the following enzyme of iodothyronine synthesis:

+Iodide peroxidase
Reductase
Decarboxylase
Aromatase
Aminotransferase

95. A patient has obstruction of common bile duct. Which of these substances is usually found in urine in such cases?

Glucose
+Bilirubin
Uric acid
Ketone bodies
Creatinine

96. Hemoglobin catabolism results in release of iron which is transported to the bone marrow by a certain transfer protein and used again for the synthesis of hemoglobin. Specify this transfer protein:

Ceruloplasmin
Albumin
Haptoglobin
Transcobalamin
+Transferrin (siderophilin)

97. A patient was found to have a tumor of pancreatic head, which is accompanied by the impaired patency of the common bile duct. Blood test will reveal an increase in the following substance level:

+Bilirubin
Insulin
Urea
Hemoglobin
Adrenalin

98. Sulfanilamides inhibit the growth and development of bacteria. The mechanism of their action is based on the impairment of the following acid synthesis:

Lipoic
+Folic
Pangamic
Nicotinic
Pantothenic

99. Addison's (bronze) disease is treated with glucocorticoids. Their effect is provided by the potentiation of the following process:

Glycogenolysis
Glycolysis
Pentose phosphate cycle
Ornithine cycle
+Gluconeogenesis

100. A patient exhibits small (petechial) hemorrhages under the skin and mucous membranes, bleeding gums, tooth decay, general weakness, edemata of the lower extremities. What vitamin deficiency can be suspected?

E
+C
B₁
A
D

101. A patient with ischemic heart disease has been administered inosine which is an intermediate metabolite in the synthesis of:

Glycoproteins
Metalloproteins
Lipoproteins
+Purine nucleotides
Ketone bodies

102. Depressive states can be treated by means of drugs inhibiting the enzyme that inactivates biogenic amines. Specify this enzyme:

+MAO (monoamine oxidase)
AST (aspartate aminotransferase)
CPK (creatine phosphokinase)
ALT (alanine aminotransferase)
LDH (lactate dehydrogenase)

103. Growth of some cancer cells is caused by a certain growth factor. Treatment of leukemia involves applying an enzyme that destroys this essential factor. Specify this enzyme:

+Asparaginase

Succinate dehydrogenase
Aspartate aminotransferase
Glutaminase
Citrate synthetase

104. Blood serum electrophoresis revealed interferon. This protein is in the following fraction:

+ γ -globulins
 α_1 -globulins
 β -globulins
 α_2 -globulins
Albumins

105. The intercellular metabolism of glycerol starts with its activation. What compound is formed in the first reaction of its conversion?

+Alpha-glycerolphosphate
Lactate
Choline
Pyruvate
Acetyl coenzyme A

106. Amylolytic enzymes catalyze the hydrolysis of polysaccharides and oligosaccharides. They have an effect upon the following chemical bond:

+Glycosidic
Amide
Peptide
Hydrogen
Phosphodiester

107. The patient uses a daily basis for several raw eggs, which contain antivitamin biotin – avidin. Violations of any phase of lipid metabolism might arise?

+Fatty acid biosynthesis
Lipid transport in blood
Lipid absorption
Glycerol oxidation
Cholesterol biosynthesis

108. Urine analysis revealed a decrease in sodium ion concentration. Which hormone provides an enhanced reabsorption of sodium ions in the convoluted nephron tubules?

+Aldosterone
Acetylcholine
Vasopressin
Adrenalin
Somatostatin

109. A 70-year-old patient has been found to have atherosclerosis of heart and brain vessels. Examination revealed the changes in the lipid profile. Pathogenesis of atherosclerosis is greatly influenced by an increase in the following lipoproteins rate:

+Low-density lipoproteins
Very-low-density lipoproteins
High-density lipoproteins
Intermediate-density lipoproteins
Chylomicrons

110. Fatty degeneration of liver is prevented by lipotropic substances. Which of the following substances relates to them?

+Methionine
Glycine
Glucose
Bilirubin
Cholesterol

111. A patient with ischemic heart disease has been administered inosine, which is an intermediate metabolite in the synthesis of:

+Purine nucleotides
Ketone bodies
Glycoproteins
Lipoproteins
Metaloproteins

112. A 40-year-old patient has developed polyuria (10 -12 liters per day), and polydipsia induced by damage to the hypothalamic-hypophyseal tract. What hormone deficiency causes such disorders?

+Vasopressin
Somatotropin
Thyrotropin
Corticotropin
Oxytocin

113. A patient has developed megaloblastic anemia on a background of alcoholic cirrhosis. The main cause of anemia in this patient is the following vitamin deficiency:

+Folic acid
Pantothenic acid
Biotin
Lipoic acid
Thiamine

114. A patient was found to have an increased blood serum LDH-1 activity. In which organ is the pathological process localized?

+Heart
Kidneys
Muscles
Stomach
Liver

115. It is known that some chemical compounds uncouple the tissue respiration and oxidative phosphorylation. Name one of these compounds:

+2,4-dinitrophenol
Antimycin A
Carbon monoxide
Lactic acid
Acetyl-CoA

116. A patient consulted a doctor about sunburns, decreased visual acuity. His hair, skin and eyes are not pigmented. He has been diagnosed with albinism. The patient presents with the following enzyme deficiency:

+Tyrosinase
Hexokinase
Arginase

Histidine decarboxylase
Carbonic anhydrase

117. Caffeine inhibits phosphodiesterase which converts cAMP to AMP. The most typical feature of caffeine intoxication is the reduced intensity of:

+Glycogen synthesis
Glycolysis
Pentose phosphate pathway
Lipolysis
Protein phosphorylation

118. A male patient was found to have hypovitaminosis PP. What amino acid taken with food may partially compensate the vitamin PP deficiency?

+Tryptophan
Methionine
Valine
Phenylalanine
Arginine

119. The primary structure of nucleic acids is a polynucleotide chain which has a certain composition and order of the nucleotides. What bonds stabilize this structure?

+3',5'-phosphodiester
Disulfide
Peptide
Glycosidic
Amide

120. Alkaptonuria is characterized by an excessive urinary excretion of homogentisic acid. Development of this disease is associated with disorder of the following amino acid metabolism:

+Tyrosine
Tryptophan
Alanine
Methionine
Asparagine

121. A patient has an increased concentration of hippuric acid in the urine. This acid is the product of benzoic acid detoxification in the liver. In the human body benzoic acid is formed from the following amino acid:

+Phenylalanine
Malate
Lactate
Succinate
Aspartate

122. Under various diseases in support of diagnosis analysis of the protein blood fractions is carried out in biochemical laboratories with the help of electrophoresis. What protein feature is this method based on?

+Availability of charge
Big molecular weight
Optical activity
Ability to swell
High viscosity

123. In pharmaceutical industry some proteins, which are used as preparations for treatment, are isolated from the

biological liquids. Point what method is used for this purpose:

+Salting-out
Denaturation
Electrophoresis
Sequencing
Dialysis

124. In medical practice preparations of protein hydrolyzate are used for parenteral nutrition. Value of the hydrolyzates is determined by presence of the essential amino acids in them. Point, which from the listed amino acids is essential:

+Methionine
Tyrosine
Alanine
Glycine
Cysteine

125. One of the amino acids active form serves as a methyl group donor for pharmaceutical [drug] substance methylation. Choose it:

+Methionine
Glutamine
Glutamate
Cysteine
Glycine

126. Albumins are blood serum proteins that are synthesized in the liver and fulfil certain functions. Point one of them:

+Pharmaceutical substances transportation
Thrombi formation
Carbon dioxide (gas) transportation
Oxygen transportation
Antibody production

127. Interferon was revealed under electrophoretic separation of the ill person blood serum. What fraction does this protein belong to?

+Gamma-globulins
Albumins
Beta-globulins
Alpha-2-globulins
Alpha-1-globulins

128. Irreversible changes of the protein conformation are observed during heat treatment of food. This process is named:

+Denaturation
Renaturation
Salting-out
Dialysis
Aqueation

129. Preparation tannin is used in practical medicine as an astringent under acute and chronic sicknesses of the intestines. The astringent action of tannin is connected with its ability to:

+Denaturate proteins
Hydrolyze proteins
Renaturate proteins
Salting-out proteins
Oxidize proteins

130. Proteins have several levels of the three-dimensional structure. What bonds take part in the formation of the secondary structure?

+Hydrogen
Van der Waals forces
Ether
Hydrophobic
Ionic

131. Basis of the amino acid structural classification is the structure of their side chain. Which of the listed amino acids is basic?

+Lysine
Proline
Alanine
Leucine
Methionine

132. Level of blood total protein is one of the metabolism indices in the human organism. A quantitative determination in clinicodiagnostic laboratories is based on:

+Biuret test
Ninhydrin test
Xanthoprotein test
Fole reaction
Nitroprusside test

133. One of protein functions is a protection of the organism from infectious diseases. What preventive antiviral preparation of nonspecific defence is recommended at the time of influenza epidemic?

+Interferon
Thymosin
Thymolin
Albumin
Sulfacetamide

134. A patient with the damaged esophagus was recommended a parenteral feeding. Point, which from the listed preparations belongs to such a group?

+Hydrolysine
Asparkam
Rheopolyglucin
Polyglucin
Panangin

135. Biosynthesis of collagen – main protein of the connective tissue – includes co- and post-translational modifications that lead to the mature collagen fibril formation. In the basis of collagen formation is the process of:

+Hydroxylation
Proteolysis
Phosphorylation
Carboxylation
Glycosilation

136. Albumins show the most electronegative properties under electrophoretic division of the blood serum proteins. What amino acid that is contained in molecules of albumins determines their acidic properties?

+Glutamic acid
Leucine
Lysine
Alanine
Tryptophan

137. A structural specificity of fibrillar proteins is in forming of multimolecular filiform complexes – fibrils that consist of some parallel polypeptide chains. Name a fibrillar protein that is included in the composition of hair, skin, nails.

+Alpha-keratin
Albumin
Prothrombin
Globulin
Histone

138. In case of insufficient uptake or abnormality in formation of lipotropic factors in the human organism fatty degeneration of the liver appears. Which of the listed compounds is lipotropic?

+Choline
Cholesterol
Cholic acid
Pyridoxine
Nicotinamide

139. Bile acid preparations are sometimes recommended with the preparation “Festal” (contains the pancreatic enzymes) for the improvement of digestion under pancreas secretory insufficiency. What is the purpose of their usage?

+For emulsification of fats
For activation of the proteolytic enzymes
For activation of α - amylase
For stimulation of the pancreatic juice secretion
For stimulation of intestinal peristalsis

140. In a 60-year-old man with atherosclerosis some plasma membrane function abnormalities were observed because of the increasing of their harshness. What membrane compound content increase can lead to this?

+Cholesterol
Phosphatidylcholin
Glycolipids
Phosphatidylethanolamine
Proteins

141. A patient with ischemic cardiomyopathy was recommended to use fats which contain polyunsaturated fatty acids in the diet. Which of the listed fatty acids is polyunsaturated?

+Arachidonic acid
Oleic acid
Palmitic acid
Stearic acid
Myristic acid

142. A doctor prescribed an anti-inflammatory drug to a patient with ulcer. This drug is a derivative of prostaglandin E_1 . What compound is a metabolic source for that substance?

+Arachidonic acid
Butyric acid
Oleic acid
Palmitic acid
Stearic acid

143. Food fibers that are components of the plant cell wall fulfill an important part in prophylaxis of GIT diseases. What main polysaccharide is present in the plant cell wall?

+Cellulose
Starch

Glycogen
Inulin
Chondroitin sulfate

144. Main structural component of the plant cell wall is the homopolysaccharide cellulose. Like starch it contains glucose, but in contrast to the latter cellulose is not digested in the human GIT. Why?

+Because glucose residues in cellulose are connected by β -1,4-glycosidic bonds

They joined by α -1,4-glycosidic bonds

Because cellulose is not branched

As it contains galactose residues also

Because cellulose contains L-glucose

145. A 30-year-old man is under hypoenergetic condition that is connected with functional abnormalities of the electron transport chain cytochromes, which are by their chemical nature:

+Hemoproteins

Glycoproteins

Flavoproteins

Lipoproteins

Retinalproteins

146. Simple and conjugated proteins exist in the human organism. What is the difference between conjugated and simple proteins?

+Existence of non-protein part in the protein

Protein molecular conformation

Absence of non-protein part in the protein

Sequence of the amino acids in the protein

Quantity of the amino acids in the protein

147. Prosthetic group of conjugated proteins joins to the polypeptide by different bonds. The residuum of phosphoric acid is joined to the protein part of phosphoproteins by:

+OH-group of serine

COOH-group of glutamine

CH-group of methionine

NH-group of lysine

SH-group of cysteine

148. Chylomicrons are formed in the wall of the small intestine after the absorption of fat components. What lipids are transported in the chylomicrons?

+Triglycerides, phospholipids, cholesterol and its esters

Only triglycerides

Triglycerides and phospholipids

Cholesterol and its esters

Phospholipids, cholesterol and its esters

149. Carbohydrate component of proteoglycans is represented by glycosaminoglycans (GAGs). Which from the glycosaminoglycans is localized mainly in the liver, lungs and vascular wall?

+Heparin

Hyaluronic acid

Keratan sulfate

Dermatan sulfate

Chondroitin sulfate

150. Changes in the blood lipoprotein level is an evidence of lipid metabolism pathology. Increase of which

lipoprotein level can lead to the atherosclerosis development?

+Low density lipoproteins (β - LP)

Chylomicrons

High density lipoproteins (α - LP)

Structural lipoproteins

Intermediate density lipoproteins

151. Secretion of the ionized copper with urine and deposit of it in the tissues and organs is observed in a patient. Point the protein which synthesis abnormalities lead to these consequences.

+Ceruloplasmin

Transferrin

Properdin

Haptoglobin

Cryoglobulin

152. Pathological types of hemoglobin can exist along with the normal types in the adult organism. Point one of them.

+HbS

HbA2

HbF

HbCO₂

HbO₂

153. Hemoglobin is a conjugated protein that transports oxygen to tissues and takes out carbon dioxide (gas). Point, what class of the compounds it belongs to?

+Chromoproteins

Lipoproteins

Glycoproteins

Nucleoproteins

Metalloproteins

154. Preparation "Lidase" is used after burns, operations and also haematomas for the resolution of scars. This preparation contains an enzyme that decomposes:

+Hyaluronic acid

Keratan sulfate

Chondroitin-4-sulfate

Heparin

Dermatan sulfate

155. To a patient who suffers from joint disease, a doctor prescribed an ointment which active substance was a glycosaminoglycan – an important component of cartilage. What was this substance?

+Chondroitin sulfate

Heparin

Glycogen

Arabinose

Vitellin

156. In the process of hemoglobin catabolism ferrum is liberated. It then enters the bone marrow, and is again used for hemoglobin biosynthesis. What protein is ferrum transported in a complex with?

+Transferrin

Hepatocuprein

Albumin

Haptoglobin

Transcobalamin

157. What fraction is not revealed at electrophoretic separation of blood lipoproteins in a healthy human?

+Chylomicrons
Lipoproteins of intermediate density
VLDL
LDL
HDL -JIBII

158. Nowadays in the tRNA structure more than 50 minor nitrogenous bases except 4 major types were found out. Name one of them.

+Dihydrouracyl
Cytosine
Uracyl
5-methyluracil
Adenine

159. We can determine the biochemical function of biologically active compounds in the organism when we know their structure.

+DNA
RNA
Proteins
Polysaccharides
Abnormalities of rhodopsin synthesis

160. What class of the biologically active compounds does polynucleotide (from deoxyribonucleotides) belong to?

In a patient with cirrhosis an impairment in dark adaptation was observed. What can be the most likely reason of that?

+Abnormalities of vitamin A absorption in the intestines
Lack of vitamin A in the diet
Excess of vitamin A in the diet
Abnormalities of trans-retinal transformation into cis-retinal
Lipids

161. Nucleotides are monomers of the nucleic acids. What compounds can be found after complete hydrolysis of the ribonucleotides?

+Orthophosphoric acid, ribose, uracyl
Cytosine, thymine, orthophosphoric acid
Guanine, deoxyribose, orthophosphoric acid
Orthophosphoric acid, adenine, deoxyribose
Ribose, thymine, cytosine

162. Histones that have a positive charge are a part of chromatin. Which amino acid from the listed is the most prevalent in histones and carries a positive charge?

+Lysine
Threonine
Valine
Alanine
Serine

163. Nucleic acids provide storage and transmission of the hereditary information to progeny, and the mechanism of its realization. Which nucleic acid contains the information about quantity and order of amino acid residue interchange in the protein molecule?

+mRNA
tRNA
28S rRNA
18S rRNA
lnRNA

164. We can determine the biochemical function of biologically active compounds in the organism when we

know their structure. What class of the biologically active compounds does polynucleotide (from deoxyribonucleotides) belong to?

+DNA
RNA
Proteins
Polysaccharides
Lipids

165. In the last month of pregnancy a doctor prescribed "Vicasol" to a woman. Which vitamin analogue is it?

+Vitamin K
Vitamin B₆
Vitamin B₅
Vitamin A
Vitamin B₁₂

166. Vitamin A is oxidized very quickly in an open air and loses its biological activity. Which component in food products prevents vitamin A from oxidation?

+Vitamin E
Sugar
Protein
Fat
Vitamin PP

167. A 35-year-old patient in a pre-surgical period was prescribed vicasol (a synthetic analogue of vitamin K). What mechanism of action has this drug?

+Prothrombin synthesis stimulation
Plasminogen activation
Tissue thromboplastin synthesis stimulation
Hageman's factor activation
Complement system activation

168. In a 40-year-old woman with chronic kidney disease osteoporosis has developed. What compound deficiency is the main reason for this pathology?

+1,25 (OH)₂ D₃
1(OH) D₃
Vitamin D₂
25 (OH) D₃
Vitamin D₃

169. A woman took paediatrist's advice about a bad state of health of her 8-month-old child: hyperhydrosis, increase of the fontanelle dimensions, delay in teeth eruption. What preparation should be administered first of all?

+Cholecalciferol
Cobalamin
Calcium gluconate
Thiamine bromide
Calcium pangamate

170. Isoniazid was prescribed to a 30-year-old man who was consumptive. Which vitamin hypovitaminosis would develop under a protracted course of therapy?

+Pyridoxine
Thiamine
Cobalamin
Biotin
Riboflavin

171. Thiamine pyrophosphate is the coenzyme synthesized from vitamin B₁. Point out the process which this coenzyme participates in:

+Oxidative decarboxylation of pyruvate

Lipolysis
Gluconeogenesis
Glycolysis
Lipid absorption

172. In test animals a vitamin influence on citric acid cycle rate was investigated. What vitamin absence did not decrease the rate of the CAC reactions?

+Cobalamin
Thiamin
Riboflavin
Nicotinamide
Pantothenic acid

173. Ascorbic acid hypovitaminosis leads to scurvy. Synthesis of what protein is damaged under this pathology?

+Collagen
Albumin
Fibrinogen
Prothrombin

174. A patient eats every day some raw eggs which contain an antivitamin for biotin – avidin. What stage of lipid metabolism can be impaired in this case?

+Fatty acid biosynthesis
Lipid transport in blood
Cholesterol biosynthesis
Glycerol oxidation

175. Vitamins and vitamin-similar compounds are necessary for activation and carrying long-chain fatty acid through the inner mitochondrial membrane. Point one of them:

+Carnitine
Riboflavin
Ubiquinone
Biotin
Thiamine

176. For vitamin absorption certain conditions are necessary. An intrinsic factor (a glycoprotein secreted by the oxyntic cells of the stomach) is needed for the absorption of:

+Vitamin B₁₂
Vitamin B₅
Vitamin C
Vitamin B₆
Vitamin B₂

177. Lack of which vitamin leads to decreasing of the aminotransferase and decarboxylase activities?

+Vitamin B₆
Vitamin B₃
Vitamin B₁₂
Vitamin B₂
Vitamin B₁

178. Antivitamin to what organic compound that is used by a bacterial cell for the folic acid biosynthesis (part of bacterial enzymes) sulfanilamide preparations are?

+Para-aminobenzoic acid
Nicotinic acid
Choline
Riboflavin
Pyridoxine

179. A patient with impaired immunity, susceptibility to catarrhal illness was recommended to take ascorutin as more effective medicine compared with ascorbic acid. What substance in this medicine enhances the vitamin C action?

+Vitamin P
Vitamin A
Vitamin D
Glucose
Lactose

180. In the human organism most vitamins undergo some conversions. What vitamin takes part in the formation of the coenzyme of acylation (CoASH)?

+Pantothenic acid
Vitamin D
Vitamin C
Vitamin A
Vitamin K

181. A 50-year-old patient has hypovitaminosis of vitamin C (scurvy) connected with the imbalanced food. Decreasing activity of which enzyme is a basis of the conjunctive tissue lesion under these pathology conditions?

+Proline hydroxylase
Pyruvate carboxylase
Thryptophan hydroxylase
Alanine aminotransferase
Glutaminase

182. Parents of a 10-year-old boy appealed to a physician with a complaint about growth stop. During checkup the physician found the changes in mucous membranes and suspected cancerous anemia. He suggested that this pathology had been connected with a vitamin deficiency. Point, what vitamin deficiency might cause development of this state?

+Folic acid
Nicotinic acid
Orotic acid
Choline
Arachidonic acid

183. In the patient's urine a certain compound that has an isoalloxazine ring in its structure have been found. What this compound is?

+Vitamin B₂
Vitamin B₅
Vitamin B₆
Vitamin B₁
Vitamin B₃

184. Which vitamin is needed to maintain the conversion of pyruvic acid into acetyl-CoA?

+B₁
B₁₂
B₆
C
D₂

185. Vitamin B₂ is included in the composition of flavin-related dehydrogenase coenzymes. Point out such a coenzyme.

+FMN

NAD⁺
NADP⁺
Coenzyme-A
TPP

186. Point the active form of vitamin D which functions in the system of homeostatic regulation of calcium metabolism and osteogenesis:

+24,25-Dihydroxycholecalciferol
Ergosterol
Ergocalciferol
Dehydrocholesterol
Cholecalciferol

187. A patient was diagnosed with hypoacidic gastritis and gastroduodenitis. The result of blood analysis – megaloblastic anemia. What substance deficiency caused the development of anemia?

+Gastromucoprotein
Ferrum
Mucin
Gastricsin
Trypsin

188. For treatment of cancer tumors methotrexate – a structural analogue of folic acid – is administered. This preparation is a competitive inhibitor of dihydrofolate reductase, that is why it inhibits the biosynthesis of:

+dTMP
dAMP
AMP
TMP
UMP

189. In patients with alcoholism disorders of the central nervous system - memory loss, psychoses are often observed. These symptoms are caused by lack of vitamin B1 in the body. Disturbance of formation of which coenzyme can cause these symptoms?

+Thiamine pyrophosphate
Coenzyme A
FAD
NADP
Pyridoxal phosphate

190. A consumptive patient was prescribed riphampicin that inhibits an enzyme RNA-polymerase at the initiation stage of the process of:

+Transcription
Translation
Replication
Reparation
Amplification

191. One codon from 64 triplets that code amino acids is an initiation codon which codes the amino acid methionine. Point this triplet:

+AUG
UCG
GGU
GAC
CAU

192. DNA-polymerase creates the Okazaki fragments on the “replication fork” lagging strand. Point enzyme that joins these fragments into one chain:

+DNA-ligase
Primase
Exonuclease
RNA-polymerase
DNA-polymerase

193. AIDS virus RNA penetrated inside the leucocyte and with the help of revertase (reverse transcriptase) causes a virus DNA synthesis in the cell. The base of this process is:

+Reverse transcription
Operon repression
Operon depression
Reverse translation
Convariant replication

194. A 58-year-old man underwent the operation for removal of prostate (gland) cancer. In 3 months he took the course of a radial and chemotherapy. 5- Fluorodeoxyuridine (thymidylate synthase inhibitor) was included to the medical preparation complex. Synthesis of what compound was blocked by this preparation?

+DNA
tRNA
rRNA
iRNA
Protein

195. A large group of antibiotics, which are used in medicine, inhibits a nucleic acid and protein synthesis. What specific process or reaction from the following is inhibited by erythromycin?

+Ribosome translocation on mRNA in prokaryotes and eukaryotes
Transcription initiation in prokaryotes
Peptidyltransferase reaction of the translation in prokaryotes
Aminoacyl-tRNA binding to the ribosome A site in prokaryotes
Transcription in prokaryotes & eukaryotes

196. In genetic engineering the way of synthesis of different genes from a RNA matrix chain to DNA is carried out with the help of the following enzyme (this enzyme catalyzes the process found in RNA-containing viruses):

+Revertase
DNA- ligase
Helicase
Exonuclease
Endonuclease

197. Protein synthesis in prokaryotes takes place on ribosomes after the amino acid activation and their transportation to ribosomes with the help of t-RNAs. What amino acid is the first in the biosynthesis?

+Formylmethionine
Valine
Serine
Glycine
Cysteine

198. Delay of malignant tumor cell division occurs under the influence of preparations that block the dTMP synthesis, inhibiting thymidylate synthase. Choose a compound which can have such influence.

+5-Fluorouracyl
Thymine
Hypoxanthine

Dihydroorotic acid
Adenylosuccinate

199. Under occasional usage of mushrooms (death-cup), which contain a venom – α -amanitin, poisoning of the human organism occurs. Point, what enzyme is inhibited by this venom?

+RNA polymerase II
DNA polymerase
DNA synthetase
Peptidyl transferase
Translocase

200. A newly synthesized organic compound specifically oppresses the reverse transcriptase activity. What pharmacological action is most probable to this compound?

+Antiviral
Antimicrobial
Antitumoral
Immunosuppressive
Radioprotectoral

201. Mechanism of antiviral and antineoplastic action of interferons is connected with the influence on the process of:

+Initiation of protein biosynthesis
Elongation of protein biosynthesis
Termination of protein biosynthesis
DNA biosynthesis
RNA biosynthesis

202. DNA polymerases that take part in DNA replication are not capable to start synthesis of a new strand of DNA without RNA-primer. What enzyme is needed for its (primer) synthesis?

+Primase
DNA-ligase
Helicase
DNA-polymerase I
Gyrase

203. Detoxification of heavy metals on molecular level in the human organism is the consequence of:

+Metallothionein gene amplification
Microsomal oxidation
Formation of a complex with the active form of glucuronic acid
Formation of a complex with the active form of sulfuric acid
Interactions with hepatocyprein

204. In diagnostics of HIV-infection a method of polymerase chain reaction (PCR) is used. What is the PCR method based on?

+Gene amplification
Gene recombination
Translation
Transcription
Genome cutting

205. Enzyme preparations are used in medical practice for treatment of festering wounds. What enzyme from the listed below is used in these cases?

+Trypsin
Acid phosphatase
Alkaline phosphatase

Amylase
Arginase

206. Enzymes catalyze proceeding of biochemical processes in the organism. What is the optimal temperature for their action?

+37 °C – 40 °C
0 °C – 4 °C
28 °C – 30 °C
2 °C – 4 °C
18 °C – 20 °C

207. Acetylcholinesterase inhibition occurs under usage of proserin, which is the pharmaceutical preparation. Point the type of inhibition:

+Competitive
Uncompetitive
Noncompetitive
Allosteric
Reversible

208. Immobilized on bandage material trypsin preparations are used for purification of festering wounds and their fast cicatrization. What is their advantage over a free enzyme?

+Longer period of action
Stronger activity
Higher specificity of action
Higher sensitivity to temperature
Higher sensitivity to pH changes

209. Increasing of the LDH₁, LDH₂, AST, and creatine phosphokinase (MB isozyme) activity was determined in the patient's blood. Diagnose, what organ the abnormalities of biochemical processes are taking place in?

+Heart
Skeletal muscles
Kidneys
Liver
Pancreas

210. A patient with myocardial infarction was prescribed the fibrinolytic preparation "Streptodecase" that was made of a water-soluble matrix of polysaccharide nature using the method of:

+Enzyme immobilization
Autolysis
Ultracentrifugation
Electrophoresis
Extraction

211. Preparation armine from a group of POC (organophosphorous compounds) that has a strong anticholinesterase activity was used as antiglaucomic substance during last years. Point the type of acetylcholinesterase inhibition:

+Noncompetitive
Uncompetitive
Allosteric
Substrate
Competitive

212. Dehydrogenases are enzymes that split hydrogen atoms off a substrate. What class of enzymes does lactate dehydrogenase belong to?

+Oxidoreductases
Transferases

Lyases
Hydrolases
Isomerases

213. Enzyme lipase splits ester bonds in triacylglycerol molecules. What class this enzyme belongs to?

+Hydrolases
Transferases
Isomerases
Oxidoreductases
Ligases

214. Sulfanilamides are widely used as bacteriostatic substances. The mechanism of antimicrobial action of sulfanilamide preparations is based on the structural similarity with:

+Para-aminobenzoic acid
Glutamic acid
Folic acid
Nucleic acid
Antibiotics

215. Acute pancreatitis was diagnosed in a patient. Determination of what from the listed below blood enzymes could be a diagnostic criterion?

+Amylase
Aldolase
LDH
Creatine kinase
Alanine amino peptidase

216. Leading majority of cell enzymes has the maximum of activity in the range of pH 6-8. But there is an enzyme which optimum lies in the interval of pH 9.5 -10. This enzyme is:

+Arginase
Pepsin
Trypsin
Papain
Urease

217. The enzyme urease is able to destroy the structure of urea only. The type of its specificity is:

+Absolute
Stereo-chemical
Absolute group
Relative group
Classic

218. A burn scar has left in a patient. For its resolution an electrophoresis with enzyme has been appointed to the patient. Name the enzyme.

+Hyaluronidase
Arginase
Asparaginase
ATP-synthase
Glycine oxidase

219. Vasopressin - a hormone which expresses a powerful antidiuretic action, stimulating a return current of water through the membranes of renal tubules. What is its chemical nature?

+Peptide
Carbohydrate
Amino acid derivative
Steroid

Lipid

220. Injection of adrenalin to the organism results in the increase of glucose level in the blood. What process is mainly activated in this case?

+Glycogen degradation
Alcoholic fermentation
Pentose phosphate pathway
Citric acid cycle
Glycogen synthesis

221. A patient was prescribed a steroid anabolic medicine. What hormones synthetic analogues have been found an application in medicine as preparations with anabolic action?

+Androgens
Mineralocorticoids
Gestagens
Glucocorticoids
Estrogens

222. Cyclic nucleotides (cAMP and cGMP) are second messengers in the transfer of information. What is the way of their regulatory function?

+Specific protein kinase activation
Histone phosphorylation
Neurotransmitter activation
CNS stimulation
Transcription and translation stimulation

223. A patient without consciousness was delivered to reanimation. Marked smell of acetone from the mouth, acute hyperglycemia and ketonemia were observed. Which complications of diabetes mellitus took place in that case?

+Diabetic coma
Hypoglycemic coma
Cataract
Acetone acute poisoning
Nephrite

224. What endocrine gland hormones express influence on energy metabolism due to increasing of oxidative phosphorylation rate in the mitochondria that is accompanied by increased oxygen consumption by the organism and calorogenic effect?

+Thyroid gland
Pancreatic gland
Parathyroid gland
Adenohypophysis
Adrenal medullary gland

225. At insufficient consumption of carbohydrates with food the need in them for organism is compensated due to gluconeogenesis. Which of the listed hormones express a stimulating influence on gluconeogenesis?

+Glucocorticoids
Mineralocorticoids
Insulin
Calcitonin
Vasopressin

226. Adrenal cortex glands produce some hormones revealing an anti-inflammatory effect. Point the main hormone which is carrying out this function?

+Hydrocortisone
Aldosterone

Testosterone
Estrone
Progesterone

227. Cholecalciferol (vitamin D₃) in the liver and kidneys is activated and converted to the active form – 1,25-dihydroxycholecalciferol. Name a hormone which regulates this process.

Insulin
+Parathyroid hormone
Aldosterone
Calcitonin
Adrenocorticotrophic hormone

228. Sulfanilurea derivatives (e.g. butamide) are commonly used at non-insulin dependent diabetes treatment. What is a biochemical mechanism of their hypoglycemic action?

+Strengthening of the insulin hypoglycemic action
Reduction of the glucocorticoid hypoglycemic action
Reduction of the insulin hypoglycemic action
Strengthening of the glucocorticoid hyperglycemic action
Reveal a diuretic action

229. Non-steroid anti-inflammatory remedies, e.g. aspirin, inhibit cyclooxygenase which converts arachidonic acid into:

+Prostaglandins
Leukotrienes
Biogenic amines
Endorphins
Catecholamines

230. Amino acid tyrosine is a predecessor of some hormones. Point one of them, produced in the adrenal medulla glands.

+Adrenaline
Histamine
Gastrine
Serotonin
Glucagon

231. Tyrosine is used for the thyroxine synthesis. What atoms from microelements take part in this process?

+I
Fe
Cu
Ca
Zn

232. In therapy of chronic inflammation processes a series of medical preparations is used. Point out, which of the preparations reversibly inhibits cyclooxygenase (COX) of arachidonic acid.

Carnitine
Antimycin
Vikasol
+Indomethacin
Cholecalciferol

233. Cyclooxygenase activity may be inhibited by use of some medicines. Which of them irreversibly inhibits this enzyme?

Allopurinol
Insulin
Oligomycin
+Aspirin

Aminaloln

234. In a patient with Itsenko-Cushing's syndrome a steady hyperglycemia and glucosuria are observed. What hormone synthesis and secretion are increased in this case?

+Cortisol
Epinephrine
Glucagon
Thyroxine
Aldosterone

235. Under emotional stress triglyceride lipase is activated in adipocytes. Point out, concentration of what second messenger increases at that situation.

cGMP
Diacylglycerol
+cAMP
AMP
Ca²⁺

236. Name a hormone-synchronizer of biogenic rhythms in the organism which is the derivative of an amino acid:

+Melatonin
Adrenalin
Dopamine
Noradrenalin
Thyroxine

237. A patient with the signs of feminization (eunuchoidism) was prescribed the most active male sex hormone. Point it.

+Dihydrotestosterone
Testosterone
Progesterone
Androsterone
Pregnenolone

238. A gynecologist used a neurohypophysis hormone for the stimulation of child birth activity. Name it.

+Oxytocin
Vasopressin
Intermedin
Chorionic gonadotropin
Serum gonadotropin

239. To initiate analgesia a peptide that reveals the morphine effect, but is synthesized in the CNS may be used. Name it.

+β-Endorphine
Oxytocin
Somatoliberin
Vasopressin
Calcitonin

240. Renin is an enzyme which is produced by the juxtaglomerular cells of kidneys in response to blood pressure lowering. Its action is directed to:

+Angiotensinogen – a protein, which is secreted by the liver
Natriuretic hormone, which is synthesized in atrium and brain
Decrease of arachidonic acid availability for synthesis of prostaglandins and leukotrienes
Stimulation of glucose transport into cells
Smooth muscle relaxation, artery and arteriole wall widening

241. Atriopeptin, aurikulin, cardionatrin – the peptides which possess a diuretic effect that exceeds by 20 times the action of the pharmacological preparation furosemide. What hormone synthetic analogues are they?

+Atrium natriuretic factor
Antidiuretic hormone
Insulin
Somatostatin
Aldosterone

242. Hormones are divided into 2 groups in connection with cellular localization of receptor. Which hormone influences directly on the nucleus initiating physiological effects?

+Estradiol
Growth hormone
Insulin
Dopamine
Calcitonin

243. A 21-year-old sportsman has been taking anabolic steroids in for three months. How it may affect total protein concentration in the blood serum?

+Total protein concentration will rise
Total protein concentration will lower
Will not affect
Immunoglobulin concentration will rise
Cholesterol concentration will lower

244. Parents noticed that their 6-year-old boy lagged behind in physical and psychic development. The boy became inattentive, indifferent, incapable to memorize simple educational actions. A doctor suspected in the child's organism a lack of:

+Iodine
Somatotropin
Vitamin B₁
Ferrum
Calcium

245. Research of urine composition found a decrease of sodium ions concentration. Which of hormones provides strengthening of sodium reabsorption in the convoluted tubules of the nephron?

+Aldosterone
Acetylcholine
Somatostatin
Adrenaline
Vasopressin

246. A number of enzymes takes part in the ATP synthesis in the cell. Enzymes of the electron transport chain, which provide ATP synthesis, are localized in:

+Mitochondrion
Lysosome
Nucleus
Peroxisome
Ribosome

247. Under intoxication by carbon monoxide the tissue respiration in man is inhibited. Name the enzyme of the respiratory chain, which activity is sharply lowering at such conditions.

+Cytochrome oxidase
Succinate dehydrogenase

NADH - dehydrogenase
ATP-synthase
Coenzyme Q

248. Antibiotic antimycine A blocks electron transport by the electron transport chain. Mark what point does it affect on?

+Between cytochromes b and c₁
Between FADH₂ and CoQ
Between cytochromes c₁ and c
Between nucleotides NADH and FADH₂
Between CoQ and cytochrome b

249. The biggest part of biochemical processes in the human organism is closely related with the use of energy. What compound is the unique accumulator, donor, and transformer of the energy in the organism?

+Adenosine triphosphate
Phosphoenolpyruvate
Creatinephosphate
Acetyl -KoA
Succinyl-CoA

250. Under some compound's action the blocking of oxidative phosphorylation occurs in the mitochondria, however oxygen consumption takes place and substrates are being oxidized. Point compound that uncouples those processes.

+Thyroxine
Adrenalin
Progesterone
Oestradiol
Somatostatin

251. Status of the patient's antioxidant system was estimated on basis of determination of one endogenous antioxidant content. What namely?

+Alpha-tocopherol
Trivalent ferrum
Ornithine
Hydrogen peroxide
Cholecalciferol

252. In a patient with stomatitis and necrotic alterations in the oral cavity an inborn catalase deficiency (acatalasia) was revealed. This enzyme (catalase) catalyzes the reaction:

+Cleavage of H₂O₂ to H₂O and O₂
Cleavage of H₂O₂ to H₂O and O
Synthesis of H₂O₂
Synthesis of ATP
Decarboxylation of α-ketoacids

253. Inherited genetic defects lead to the abnormalities in synthesis of some enzymes in the human organism. Point the enzyme which defect leads to derangements in lactose hydrolysis:

+Lactase
Saccharase
Maltase
Amylase
Peptidase

254. A newborn has diarrhea, vomit, and since some time lenticular opacity (cataract) is developed. This disease is connected with the abnormalities in the synthesis of the

enzyme:

+Galactose 1-phosphate uridyl transferase

Hexokinase

Glucose 6-phosphatase

Glycogen synthetase

Glucose phosphate isomerase

255. Influence of some hormones on carbohydrate metabolism express in stimulation of the glycogen degradation. What enzyme catalyzes the first step of the glycogen degradation with glucose 1-phosphate formation?

+Glycogen phosphorylase

Glycogen synthetase

Phosphofructokinase

Aldolase

Pyruvate kinase

256. The order and localization in the cell of the glycolysis fermentative reactions are determined at present time. Point this localization.

+Cytosol

Mitochondria

Golgi apparatus

Lysosomes

Nucleus

257. It is known that some carbohydrates are not digested in the GIT of the human organism. Choose such carbohydrate.

+Cellulose

Sucrose

Lactose

Starch

Glycogen

258. A sportsman finished the training. What process activation gives the result in increasing of lactate in the blood?

+Glycolysis

Gluconeogenesis

Tricarboxylic acid cycle

Glycogen synthesis

Pentose-phosphate pathway

259. The main source of energy for erythrocytes is glycolysis. What is the energy output of glycolysis?

+2 ATP molecules

7 ATP molecules

5 ATP molecules

3 ATP molecules

4 ATP molecules

260. In a 22-year-old woman after aspirin treatment the signs of hemolytic anemia were observed. It was due to hereditary deficiency of the pentose phosphate pathway enzyme – glucose-6-phosphate dehydrogenase which supplies the organism with:

+NADPH

FMN

NAD⁺

FAD

ATP+NADPH

261. In sportsmen in some time after physical activity the process of gluconeogenesis is activated. Point the substrate which is used for this process.

+Lactate

Serine

α -Ketoglutarate

Aspartic acid

Glutamic acid

262. The second event of aerobic degradation of glucose in the cell is the oxidative decarboxylation of pyruvate. Point the main product of this process.

+Acetyl-CoA

Oxaloacetate

Citrate

Pyruvate

Succinate

263. A suffer from diabetes mellitus got a high dose of insulin. It caused giddiness, loss of consciousness and spasms. What glucose blood level can be observed under these conditions?

+2,3 mmol/L

3,5 mmol/L

6,5 mmol/L

8,0 mmol/L

12,5 mmol/L

264. Hyperglycemic coma has been diagnosed in a patient. What is a blood glucose level possible for these conditions?

+18,0 mmol/L

3,0 mmol/L

9,0 mmol/L

5,3 mmol/L

7,5 mmol/L

265. Point a localization of the process of pyruvate oxidative decarboxylation in the cell.

+Mitochondria

Cytoplasm

Nucleus

Ribosome

Endoplasmatic reticulum

266. A 5-year-old boy is diagnosed cataract, fat degeneration of the liver. Biochemical analysis revealed the increase of blood galactose level and decrease of blood glucose level. What metabolic disorder takes place in the patient?

+Galactosemia

Fructosemia

Glycogen storage disease

Diabetes mellitus

Porphyria

267. At aerobic conditions pyruvate is oxidized, with loss of its carboxyl group by the pyruvate dehydrogenase complex, located in the mitochondria of eukaryotic cells. Point one coenzyme, which is part of this complex:

+FAD

FMN

Pyridoxal phosphate

Metyl-cobalamine

N-carboxybiotine

268. In a 5-year-old child with an increased body temperature after aspirin treatment an intensive erythrocyte haemolysis was observed. What enzyme inherited deficiency could cause hemolytic anemia in the child?

+Glucose-6-phosphate dehydrogenase
Glucose-6-phosphatase
Glycogen phosphorylase
Glucokinase
Gamma-glutamyl transferase

269. In a 40-year-old patient with schizophrenia normal levels of glucose, ketone bodies and urea in the blood were observed. Shock therapy by regular insulin injections led to an insulin coma development. After that a psychic state of the patient became better. What was the most probable reason for the insulin coma?

+Hypoglycemia
Hyperglycemia
Tissue dehydration
Metabolic acidosis
Glucosuria

270. In a man after use of honey on empty stomach hypoglycemia has developed. What inherited disease this may specify of?

+Fructose intolerance
Diabetes mellitus
Galactosemia
Glycogen storage disease
Milk intolerance

271. One of the stages of aerobic oxidation of glucose is the oxidative decarboxylation of pyruvate. What vitamins take part in this process?

+PP, B1, B2, pantothenic acid
A, D, C
H, K, P
Bc, B12, B6
B5, Bc, B12

272. In a patient who suffers from enterocolitis diarrhea, cramps, flatulence have appeared after milk intake. What enzyme deficiency these abnormalities are connected with?

+Lactase
Maltase
Saccharase
Amylase
Glycogen synthase

273. Avidin – a hen egg protein - is a mighty specific inhibitor of the vitamin H-containing enzymes. What conversion from the listed below will be blocked after avidin introduction?

+Pyruvate-oxaloacetate
Glucose-pyruvate
Pyruvate-Glucose
Oxaloacetate-Glucose
Glucose-Ribose-5-phosphate

274. Cleavage of starch and glycogen starts in the oral cavity due to the action of amylase that is excreted by salivary glands. What bonds are hydrolyzed by the enzyme in question?

+ α -1,4-glycosidic
 α -1,6-glycosidic
 β -1,4-glycosidic
 β -1,2-glycosidic
 α -1,3-glycosidic

275. Red blood cells use for their life energy in the form of ATP. Specify the metabolic process that provides erythrocytes the necessary quantity of ATP.

+Anaerobic glycolysis
Gluconeogenesis
pentose phosphate cycle
Beta-oxidation of fatty acids
Citric acid cycle

276. The main mechanism of ammonia utilization in the organism is the urea biosynthesis. What high-energy compound formation in the urea synthesis the cycle begins from?

+Carbamoyl phosphate
Citrulline
Arginine
Fumaric acid
Argininosuccinate

277. Irritability of the nervous system, which can be observed under a B₆ hypovitaminosis, is connected with the lack of synthesis of a biogenic amine that has an inhibitory effect on the CNS. Name this biogenic amine.

+Gamma-aminobutyric acid
Histamine
Dopamine
Tryptamine
Serotonin

278. A patient has liver function abnormalities. What biochemical index is necessary to measure in the blood to determine the liver state?

+ALT
Creatine phosphokinase
Aldolase
LDH₁
Lipase

279. Ammonia is generated in different tissues and organs and neutralized in the liver by converting into urea. What amino acid transports it from the skeletal muscles to liver?

+Alanine
Histidine
Glycine
Serine
Aspartate

280. Ammonia is a toxic compound and its increasing in the blood is especially dangerous for neurons. What amino acid from the listed below is used as effective remedy that binds ammonia in the brain?

+Glutamic
Succinic
Benzoic
Hippuric
Sulfosalicylic

281. Aminotransferases are the enzymes which transfer amino groups from one compound to another. Point the acceptor of amino groups.

+ α -Ketoglutaric acid
Lactic acid
Succinate
Acetone
Butyric acid

282. Pancreatic enzymes are transported to the duodenum in inactive state. Point the enzyme that activates trypsinogen.

+Enterokinase
Gastricsin
Lipase
Pepsin
Elastase

283. Aminotransferases transfer an amino group from one compound to another. Now more than 50 aminotransferases are known. Point the substance that is a prosthetic group of these enzymes.

+B₆
B₁
B₅
B₁₂
PP

284. In a patient the amino acid transport in the intestine cells is decreased. What substance participates in the amino acid transport?

+Glutathione
Antiserine
Amylase
Ornithine
Alanine

285. Point the normal values of gastric juice pH.

+1,5-2,5
4,0-5,0
6,8-7,2
1,0-5,0
2,0-4,0

286. At alkaptonuria an excessive excretion of homogentisate with the urine takes place. What amino acid metabolism the abnormality of this pathology appearance is connected with?

+Tyrosine
Phenylalanine
Alanine
Methionine
Asparagine

287. Pigment melanin synthesis doesn't occur at albinism. Abnormalities that cause this disease are connected with metabolism of the amino acid:

+Phenylalanine
Asparagine
Alanine
Methionine
Glutamine

288. Mother of a 2-year-old boy told a doctor of a very unusual smell of urine which resembled the maple syrup smell. After carrying the analyses out the diagnosis was made. Ketoaciduria of branched acids. Which are these amino acids?

+Leucine, valine, isoleucine
Tyrosine, tryptophan
Arginine, histidine
Proline, serine, glycine
Phenylalanine, tyrosine

289. A 23-year-old man was diagnosed muscular dystrophy and recommended to use for intensification of the pyrimidine synthesis...

+Potassium orotate
Ascorbic acid
Lipoic acid
Coccarboxylase
Cyanocobalamin

290. As a result of abnormality of nucleic acid metabolism the precipitation of some salts in tissues, especially in the joints takes place. That can provoke certain diseases. Point the substance that forms the salts.

+Uric acid
Glyoxylate
Urea
Allantoin
Lactic acid

291. A 27-year-old patient went to a doctor with symptoms of jaundice, high temperature and general weakness. It was diagnosed acute viral hepatitis. Which of biochemical indices is prevalent in the peak of jaundice?

+Conjugated bilirubin
Stercobilin
Non-conjugated bilirubin
Verdoglobin
Biliverdin

292. In a patient the increasing of a conjugated bilirubin level in the blood serum was observed, the faeces were light-grey; the urine had a colour of beer. The skin and mucous tunics were yellow. What type of jaundice took place in this case?

+Biliary obstruction
Hepatic jaundice
Physiologic jaundice
Jilber's disease
Hemolytic jaundice

293. To a patient who was diagnosed with viral conjunctivitis a doctor prescribed eye drops which contained:

+DNA-ase
RNA-ase
Trypsin
Penicillin
Streptocid

294. One of the main pathogenetic ways of radiation sickness genesis is a free radical process intensification. What substances are the primary source of free radicals?

+Lipids
Carbohydrates
Proteins
Water
Metal ions

295. For improving sports results a sportsman was recommended to use carnitine. What process is activated by carnitine?

+Transport of fatty acids
Transport of glucose
Transport of vitamine K
Transport of calcium ions
Transport of amino acids

296. During one cycle of the beta-oxidation in mitochondria 1 FADH₂ and 1 NADH(H⁺) are produced. They pass atoms of hydrogen to the electron transport chain, where in the oxidative phosphorylation are produced:

- +5 ATP
- 10 ATP
- 8 ATP
- 15 ATP
- 3 ATP

297. Level of cholesterol in the blood of a patient who has diabetes mellitus is 12 mmol/L. Point a possible complication:

- +Atherosclerosis
- Rickets
- Dermatitis
- Paralyses
- Diarrhea

298. The intracellular metabolism of glycerol begins from its activation. What compound is synthesized in the first reaction of its transformation?

- + α -Glycerolphosphate
- Pyruvate
- Choline
- Lactate
- Acetyl-CoA

299. In a 12-year-old child type I hyperlipoproteinemia was diagnosed and characterized by a high content of chylomicrons in the blood plasma. The high concentration of chylomicrons was a consequence of the lack of:

- +Lipoprotein lipase
- Triacylglycerol lipase
- Carnitine acyl transferase
- Cholesterol esterase
- Phosphokinase

300. Point the end product of β -oxidation of fatty acids with odd number of carbonic atoms.

- +Propionyl-CoA
- Succinyl-CoA
- Acetyl-CoA
- Acetoacetyl-CoA
- Hydroxymethylglutaryl-CoA

301. During fasting ketoacidosis is developing. Increased concentration of which metabolite in blood is a symptom of this condition?

- +Acetoacetate
- Oxaloacetate
- Malonate
- Acetyl-CoA
- Beta-hydroxy-beta-methylglutaryl-CoA

302. A process of conjugation in phase II of toxic compound neutralization is fulfilled by means of joining of certain chemical compounds to their functional groups. Choose one of such compounds:

- +Glucuronic acid
- Higher fatty acids
- Cholesterol
- Glucose
- Pyruvate

303. Choose the right definition to the term "xenobiotics":
+Alien substances that enter the human organism and aren't used in it

- Low molecular weight organic substances that interact with enzyme and modulate its activity
- Protein catalysts that accelerate reactions in the cell
- Allosteric effectors
- Substances that regulate metabolism and development of the organism

304. Cleavage of acetylsalicylic acid (aspirin) in the human organism to salicylic and acetic acids is by type a reaction of:

- +Hydrolysis
- Isomerization
- Conjugation
- Reduction
- Oxidation