

1. A patient has high concentration of chylomicrons in blood, especially after taking fatty food. He has also type I hyperlipoproteinemia that resulted from deficiency of the following enzyme:

- a. Adenylate cyclase
- b. Phospholipase C
- c. Prostaglandin synthetase
- d. Lipoprotein lipase**
- e. Protein kinase

2. A patient has been administered a competitive inhibitor of cholinesterase. Name it:

- a. Indometacin
- b. Allopurinol
- c. Aspirin
- d. Sodium diclophenac
- e. Proserin**

3. A 30 year-old patient suffering from pulmonary tuberculosis has been prescribed isoniazid. Continuous taking of this drug may lead to the deficiency of the following vitamin:

- a. Ergocalciferol
- b. Retinol
- c. Tocopherol
- d. Cobalamin
- e. Pyridoxine**

4. A patient has neurasthenic syndrome, diarrhea, dermatitis. This is associated with deficiency of the following vitamin:

- a. Vitamin D
- b. Vitamin K
- c. Nicotinic acid**
- d. Folic acid
- e. Vitamin B12

5. Pharmaceutical preparations of protein hydrolysate are applied for parenteral proteinic feeding. Hydrolysates are of full value if they contain essential amino acids. Which of the following amino acids relates to the essential ones:

- a. Serine
- b. Glycine
- c. Cysteine
- d. Alanine
- e. Methionine**

6. A patient has taken a large dose of a barbiturate hypnotic (amytal) that inhibits NAD-dependent dehydrogenase of the respiratory chain. What process running in the mitochondria will be disturbed?

- a. Glucose synthesis
- b. ATP synthesis**
- c. Amino acid synthesis
- d. Glycogen synthesis
- e. Lipide synthesis

7. Active form of one of the sulphur-containing amino acids can be used as a methyl group donor for the drug methylation. Specify this amino acid:

- a. Glycin
- b. Tyrosine
- c. Glutamate
- d. Methionine**
- e. Glutamine

8. Protein digestion in the stomach is carried out by pepsin secreted in form of an inactive pepsinogen. Pepsinogen is converted to pepsin by the removal of the N-terminal peptide that is

provoked by:

- a. Bile acids
- b. Amino acids
- c. Sulfuric acid
- d. Acetic acid

**e. Perchloric acid**

9. Enzyme hyaluronidase breaks down hyaluronic acid thus increasing intercellular permeability. Which vitamin strengthens vascular walls and inhibits activity of hyaluronidase?

- a. A
- b. B2
- c. D

**d. P**

e. B1

10. High-grade deficit of the ascorbic acid causes development of scorbutus. This pathology develops due to the disturbed synthesis of the following connective tissue protein:

- a. Albumin
- b. Ceruloplasmin
- c. Prothrombin
- d. Fibrinogen

**e. Collagen**

11. Cardiac diseases are treated with cocarboxylase preparation. This preparation is the coenzymatic form of the following vitamin:

**a. B1**

- b. B12
- c. P
- d. C
- e. B6

12. A patient underwent an operation. After it he was prescribed glycosaminoglycan that has coagulating action. Specify this substance:

- a. Hyaluronic acid
- b. Keratan sulfate

**c. Heparin**

- d. Chondroitin-6-sulfate
- e. Chondroitin-4-sulfate

13. During starvation the normal rate of glucose in blood is sustained due to the gluconeogenesis stimulation. Which of the following substances can be used as a source for glucose synthesis?

a. Urea

**b. Alanine**

- c. Ammonia
- d. Adenine
- e. Nicotinamide

14. Oxidative deamination of biogenic amines in the tissues is catalyzed by the following enzyme:

a. Acetylcholinesterase

**b. Monoaminoxidase**

- c. Alanine transaminase
- d. Aspartate transaminase
- e. Decarboxylase

15. Analysis of a patient's urine revealed increased concentration of the uric acid. The patient was prescribed allopurinol. What is the biochemical mechanism of its action?

a. Nucleoside inhibition

**b. Xanthine oxidase inhibition**

- c. Desaminase inhibition
- d. Cyclooxygenase activation
- e. Phosphorylase inhibition

16. After examination a patient has been diagnosed with alkaptonuria. This pathology is caused by the deficit of the following enzyme:

- a. Thyroxin hydroxylase
- b. Monoamine oxidase
- c. Diamine oxidase
- d. Acetylcholinesterase
- e. Homogentisic acid oxidase**

17. It is known that the unconjugated bilirubin being the product of heme catabolism is detoxicated in liver. Which compound is involved into the bilirubin detoxication within the hepatocytes?

- a. Urea
- b. Lactic acid
- c. Glycin
- d. Glucuronic acid**
- e. Mevalonic acid

18. Gluconeogenesis plays an important part in maintaining normal glucose rate in blood during starvation. Name the main substrate of this process:

- a. Nucleic acids
- b. Cholesterol
- c. Amino acids**
- d. Bile acids
- e. Acetone

19. Interaction of catecholamines with beta-adrenoreceptors increases the level of cyclic adenosine monophosphate in tissue cells. Name an enzyme that catalyzes reaction of cyclic adenosine monophosphate generation:

- a. Creatine kinase
- b. Adenylate cyclase**
- c. Phosphatase
- d. Phosphodiesterase
- e. Guanylate cyclase

20. Antivitamins are substances of various structure that limit utilization of vitamins in an organism and have an opposite to them action. Name antivitamin of vitamin K:

- a. Deoxypyridoxine
- b. Sulfapyridasine
- c. Dicumarol**
- d. Aminopterin
- e. Isoniazid

21. Steroid hormones are synthesized out of a precursor that contains cyclopentanoperhydrophenanthrene. Name this precursor:

- a. Tyrosine
- b. Cholesterol**
- c. Malonyl-CoA
- d. Acetyl-CoA
- e. Levulinic acid

22. Water-soluble vitamins take coenzyme form in an organism. Thiamine diphosphate is the coenzyme of the following vitamin:

- a. B6
- b. B12
- c. B2

d. C

**e. B1**

23. Biochemical function of water-soluble vitamins depends on their ability to turn into the coenzymatic forms. Specify the coenzymatic form of the vitamin B2 (riboflavin):

a. TMP (thiamine monophosphate)

b. NAD<sup>+</sup> (nicotinamide adenine dinucleotide)

**c. FMN (flavin mononucleotide)**

d. TDP (thiamine diphosphate)

e. PALP (pyridoxal phosphate)

24. A patient suffers from jaundice. Examination revealed that blood plasma had high concentration of indirect reacting (free) bilirubin, feces and urine had high concentration of stercobilin, concentration of direct reacting (conjugated) bilirubin was normal. What type of jaundice is it?

a. Obstructive

**b. Hemolytic**

c. Parenchymatous

d. Neonatal jaundice

e. Gilberts disease

25. A patient complains of pain behind the breastbone on the left, perspiration and palpitation. Which of the following enzymes should be found in blood in order to confirm the diagnosis of myocardium infarction?

a. AIAT, aldolase, LDH-4

b. Acid phosphatase, LDH-5, LDH-4

c.  $\alpha$ -fetoprotein, aldolase, CPK

**d. AspAT, CPK, LDH-1**

e. Amylase, alkaline phosphatase, AIAT

26. It is known that indirect bilirubin generated as a result of heme disintegration is detoxicated in liver. What organic compound takes part in bilirubin detoxication in hepatocytes?

a. Urea

b. Lactic acid

c. Glycin

**d. Uridine diphosphate glucuronic acid**

e. Mevalonic acid

27. Ammonia is generated in different tissues and organs and then transported to liver for detoxication and conversion into urea. What amino acid transports it from skeletal muscles to liver?

a. Valine

**b. Alanine**

c. Glycin

d. Histidine

e. Serine

28. Single-oxygenase system of membranes of endoplasmic hepatocyte reticulum includes flavoprotein NADP-cytochrome, R-450-reductase and R-450-cytochrome. It stimulates inactivation of biologically active substances or neutralization of toxic compounds by catalyzing the reaction of:

**a. Hydroxylation**

b. Methylation

c. Reduction

d. Acetylation

e. Oxidation

29. Vitamin A is quickly oxidized in the open air and hereupon loses its biological activity. What component of the foodstuffs mainly prevents the oxidation of the vitamin?

a. Protein

b. Fat

- c. Nicotinic acid
- d. Common salt

**e. Tocopherol**

30. Introduction of glucocorticoids induces strengthening of glucose concentration in blood. Which of the following processes will be activated in liver?

- a. Ketogenesis
- b. Glycolysis
- c. Glycogenolysis
- d. Oxidation of fatty acids

**e. Gluconeogenesis**

31. A patient complains about gingival haemorrhage, petechial haemorrhages. What vitamin preparation should be recommended?

- a. Cyanocobalamin
- b. Thiamine hydrochloride

**c. Ascorutinum**

- d. Nicotinic acid
- e. Pyridoxine hydrochloride

32. Decarboxylation of the amino acid histidine results in formation of histamine in the cells. Neutralization of this biogenic amine takes place due to the following enzyme:

- a. Aminotransferase
- b. Aminopeptidase
- c. Monoaminooxidase (MAO)
- d. Catalase

**e. Diaminooxidase (DAO)**

33. Blood analysis revealed rise of activity of LDH1, LDH2, aspartate aminotransferase, kreatine phosphokinase-MB. Biochemical disorder is observed in the following organ:

- a. Pancreas

**b. Heart**

- c. Kidneys
- d. Skeletal muscles
- e. Liver

34. Digestion of proteins in the digestive tract is a complex process of their hydrolysis till peptides and free amino acids. What enzymes decompose proteins in the duodenum?

- a. Enterokinase, lipase
- b. Pepsin, gastricsin
- c. Lipase, phospholipase

**d. Trypsin, chemotrypsin**

- e. Amylase, maltase

35. For treatment of the psychosis a patient was administered the neuroleptic aminazine. The main way of its biotransformation in the organism is induction of microsomal oxidation. Specify the principal component of this system:

**a. Cytochrome R-450**

- b. Cytochrome oxidase
- c. CoQ-reductase
- d. NAD-dehydrogenase
- e. Cytochrome C

36. Anti-inflammatory effect of a number of drugs is caused by the inhibition of arachidonic acid release. This acid is the precursor of:

- a. Urea
- b. Uric acid

**c. Prostaglandins**

- d. Haem
- e. Cholesterol

37. Some products of amino acid decarboxylation are biologically active substances. What CNS inhibition mediator is formed by decarboxylation of glutamic acid?

- a. Asparagine
- b. GABA**
- c. Histamine
- d. Putrescine
- e. Cadaverine

38. A patient with low immunity, frequent colds is recommended to take ascorutine as a more effective drug than ascorbic acid. What constituent substance of this preparation intensifies action of vitamin C?

- a. Vitamin A
- b. Lactose
- c. Vitamin D
- d. Vitamin P**
- e. Glucose

39. In order to prevent adipose degeneration of liver after the viral hepatitis a patient should be administered lipotropins. Name one of them:

- a. Contrykal
- b. Vicasol
- c. Tryptophan
- d. Allopurinol
- e. Choline**

40. Blood analysis of a patient revealed high content of the following enzymes: creatine kinase (MB-isoform), aspartate aminotransferase and LDH 1,2. What pathology should be suspected in this case?

- a. Myocardium infarction**
- b. Liver cirrhosis
- c. Pancreatitis
- d. CNS affection
- e. Muscular dystrophy

41. Patients joints are enlarged, look like thickened disfigured knots. Blood analysis revealed high concentration of uric acid and its salts. This state is caused by metabolic disorder of the following substances:

- a. Purines**
- b. Porphyrines
- c. Phospholipids
- d. Cholesterol
- e. Pyrimidines

42. A patient suffers from the cerebral atherosclerosis. Blood count showed hyperlipoproteinemia. You will most likely observe increase in the concentration of the following plasma lipoprotein class:

- a. Fatty acid complexes with albumines
- b. Low-density lipoproteins**
- c. Chylomicrons
- d. High-density lipoproteins
- e. Globulin complexes with steroid hormones

43. Albinism is characterized by lacking formation of melanin in an organism. This disease is caused by metabolic disorder of the following amino acid:

- a. Asparagine
- b. Phenylalanine**

- c. Alanine
- d. Methionine
- e. Glutamine

44. Inflammatory processes in the gall bladder exert negative influence on the colloidal properties of bile. This may lead to gallstone formation. One of the causes of their formation is the crystallization of the following substance:

- a. Oxalates
- b. Cholesterol**
- c. Haemoglobin
- d. Albumine
- e. Urates

45. Some proteins in the human organism have buffer properties. Which amino acid allows hemoglobine to reveal its buffer properties in blood?

- a. Histidine**
- b. Isoleucine
- c. Threonine
- d. Valine
- e. Alanine

46. Thyroid hormones are derivatives of amino acids. What amino acid underlies the structure of these hormones?

- a. Proline
- b. Serine
- c. Glutamine
- d. Tyrosine**
- e. Tryptophan

47. Transamination is the biochemical process in which amino groups of different amino acids take form of one of the amino acids. What amino acid is it?

- a. Leucine
- b. Arginine
- c. Glycine
- d. Valine
- e. Glutamic**

48. Aminotransferases are the enzymes that transfer an amino group from one compound to another. What compound is the acceptor of amino groups?

- a.  $\alpha$ -ketoglutaric acid**
- b. Lactic acid
- c. Butyric acid
- d. Succinic acid
- e. Acetone

49. Alpha-cells of pancreas stimulate synthesis of the glucagon hormone that is involved into the carbohydrate metabolism. It has the following effect on liver processes:

- a. Inhibits glycolysis
- b. Activates lypogenesis
- c. Activates alcoholic fermentation
- d. Inhibits glycogenolysis
- e. Activates glycogenolysis**

50. A man has symptoms of cardiovascular atherosclerosis. The most probable characteristic of this state will be growth of the following biochemical value:

- a. Activity of pancreatic lipase
- b. Concentration of low-density lipoproteins**
- c. Concentration of chylomicrons

d. Concentration of high-density lipoproteins

e. LDH5 activity

51. A patient presents with weakening of the inhibitory processes of CNS which is associated with disturbed production of gamma-aminobutyric acid. What substance is the GABA precursor?

a. Glutamate

b. Methionine

c. Glycin

d. Valine

e. Tryptophane

52. Ions of heavy metals are very toxic. They block SH-groups that are a part of active centre of enzymes. What is the type of their inhibition mechanism?

a. Substrate

b. Noncompetitive

c. Competitive

d. Allosteric

e. Uncompetitive

53. Under anaerobic conditions during glycolysis ATP is synthesized by the way of substrate phosphorylation. This process uses energy of other high-energy compounds. Specify one of such compounds:

a. Pyruvate

b. Glucose

c. Glucose 6-phosphate

d. Lactate

e. Phosphoenol pyruvate

54. Decarboxylation of 5-hydroxytryptophane gives origin to a certain biogenic amine with vasoconstrictive action. What biogenic amine is it?

a. Gamma-aminobutyric acide

b. Histamine

c. Serotonin

d. Putrescine

e. Cadaverine

55. Examination of a patient revealed reddening of oral mucosa, cracks on the lips and mouth corners, face skin dryness and desquamation, conjunctiva inflammation, vasculature invasion into the cornea. The possible cause of this pathology is the deficit of the following vitamin:

a. B2

b. E

c. D

d. K

e. C

56. A male patient who suffers from chronic intestinal obstruction has intensified putrefaction of proteins in the colon. What toxic substance originates from tryptophane in this case?

a. Indole

b. Lactate

c. Glucose

d. Kreatine

e. Bilirubin

57. A male patient has pain in the right subcostal area, acholic feces. Decolouration of feces is caused by deficiency of:

a. Bile acids

b. Skatole

c. Hemoglobin

d. Bilirubin

**e. Stercobilin**

58. A patient has been administered L-carnitine. This preparation ensures transmembrane transfer of the following substances:

a. Pyrimidine nucleotides

b. Glucose

c. Amino acids

d. Purine nucleotides

**e. Higher fatty acids**

59. An elderly woman complains of twilight vision impairment. Which of the following vitamins should be administered in this case?

**a. A**

b. E

c. PP

d. D

e. C

60. A patient is 50 years old. As a result of continuous improper diet he has developed hypovitaminosis C. Lesion of connective tissue is caused by low activity of the following enzyme:

a. Glutaminase

**b. Proline hydroxylase**

c. Pyruvate carboxylase

d. Alanine aminotransferase

e. Tryptophane hydroxylase

61. Low rate of vitamin B6 in the dietary intake leads to disturbance of protein metabolism. What biochemical processes in the patients organism will become less active?

a. Phosphorilation

b. Reduction-oxidation

**c. Transamination**

d. Methylation

e. Hydrolysis

62. Systematic and intensive physical exercise causes reduction of fat concentration in the adipose tissues. It is released from the cells into the blood in form of:

a. Glucose

**b. Free fatty acids and glycerine**

c. Lipoproteins

d. Chylomicrons

e. Ketone bodies

63. Dehydrogenases are enzymes that detach hydrogen atoms from the substrate. What enzyme class is lactate dehydrogenase related to?

a. Isomerases

b. Lipases

c. Transferases

d. Hydrolases

**e. Oxidoreductases**

64. A woman in labour was given a preparation that activates contractions of smooth uterine muscles. What hormone is contained in this preparation?

a. Secretin

b. Gastrin

**c. Oxytocin**

d. Angiotensin

e. Bradykinin

65. Patients ill with tuberculosis take a drug that is an antivitamin of nicotinic acid. Name this substance:

- a. Isoriboflavin
- b. Oxythiamine
- c. Sulfanilamide
- d. Acrichine
- e. Isoniazid**

66. Bile contains of bile acids. choose one of them:

- a. Pyruvic acid
- b. Cholic**
- c. Lactic
- d. Glutamine
- e. Arachidonic

67. The pancreas secretes an enzyme that is able to hydrolyze  $\alpha$ -1,4-glycosidic linkages in a glycogen molecule. Specify this enzyme:

- a. Lysozyme
- b.  $\alpha$ -amylase**
- c. Enterokynase
- d. Phosphatase
- e. Chemotrypsin

68. Transport form of lipids in blood are lipoproteins. Cholesterol is transported to the liver mostly in form of:

- a. Albumins
- b. High-density lipoproteins**
- c. Very-low-density lipoproteins
- d. Low-density lipoproteins
- e. Interferons

69. Nonsteroid anti-inflammatory drugs are used in medical practice for treating the rheumatoid arthritis, osteoporosis, inflammatory diseases of the connective tissue. These preparations inhibit the activity of the following enzyme:

- a. Cyclooxygenase**
- b. Succinate dehydrogenase
- c. Xanthine oxidase
- d. Aminotransferase
- e. Hexokinase