

ONLINE EDUCATION

Approved
at the methodological session
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MSQ FOR EXAM (on-line)

(Attention: option A is correct answer)

1

After consumption of rich food a patient has nausea and heartburn, steatorrhea. This condition might be caused by:

- A Bile acid deficiency
- B Increased lipase secretion
- C Disturbed tripsin synthesis
- D Amylase deficiency
- E Disturbed phospholipase synthesis

2

Galactosemia is revealed in the child. Concentration of glucose in the blood is not considerably changed. Deficiency of what enzyme caused this illness?

- A Galactose-1-phosphate uridylyltransferase
- B Amylo-1,6-glucosidase
- C Phosphoglucomutase
- D Galactokinase
- E Hexokinase

3

Fatty of phospholipids is disordered due to fat infiltration of the liver. Indicate which of the presented substances can enhance the process of methylation during phospholipids synthesis?

- A Methionine
- B Ascorbic acid
- C Glucose
- D Glycerin
- E Citrate

4

Characteristic sign of glycogenosis is muscle pain during physical work. Blood examination reveals usually hypoglycemia. This pathology is caused by congenital deficiency of the following enzyme:

- A Glycogen phosphorylase
- B Glucose 6-phosphate dehydrogenase

- C Alpha amylase
- D Gamma amylase
- E Lysosomal glycosidase

5

An infant has apparent diarrhea resulting from improper feeding. One of the main diarrhea effects is plentiful excretion of sodium bicarbonate. What form of acid-base balance disorder is the case?

- A Metabolic acidosis
- B Metabolic alkalosis
- C Respiratory acidosis
- D Respiratory alkalosis
- E No disorders of acid-base balance will be observed

6

Methotrexate (structural analogue of the folic acid which is competitive inhibitor of the dihydrofolatreductase) is prescribed for treatment of the malignant tumour. On which level does methotrexate inhibit synthesis of the nucleic acids?

- A Mononucleotide synthesis
- B Replication
- C Transcription
- D Reparation
- E Processing

7

RNA-polymeraseB(II) is blocked due to amanitine poisoning (poison of death-cup). It disturbs:

- A Synthesis of m-RNA
- B Synthesis of t-RNA
- C Reverse transcription
- D Primers synthesis
- E Maturation of m-RNA

8

Pain along large nervous stems and increased amount of pyruvate in the blood were revealed in the patient. Insufficiency of what vitamin can cause such change?

- A B1
- B B2
- C PP
- D Pantothenic acid
- E Biotin

9

Patient with encephalopathy was admitted to the neurological in-patient department. Correlation of increasing of encephalopathy and substances absorbed by the bloodstream from the intestines was revealed. What substances that are created in the intestines can cause endotoxemia?

- A Indole
- B Butyrate
- C Acetacetate
- D Biotin

E Ornithine

10

Examination of a patient suffering from cancer of urinary bladder revealed high rate of serotonin and hydroxyanthranilic acid. It is caused by excess of the following amino acid in the organism:

- A Tryptophan
- B Alanine
- C Histidine
- D Methionine
- E Tyrosine

11

A mother consulted a doctor about her 5-year-old child who develops erythemas, vesicular rash and skin itch under the influence of sun. Laboratory studies revealed decreased iron concentration in the blood serum, increased uroporphyrinogen I excretion with the urine. What is the most likely inherited pathology in this child?

- A Erythropoietic porphyria
- B Methemoglobinemia
- C Hepatic porphyria
- D Coproporphyrin
- E Intermittent porphyria

12

A 3 year old child with fever was given aspirin. It resulted in intensified erythrocyte haemolysis. Hemolytic anemia might have been caused by congenital insufficiency of the following enzyme:

- A Glucose 6-phosphate dehydrogenase
- B Glucose 6-phosphatase
- C Glycogen phosphorylase
- D Glycerol phosphate dehydrogenase
- E γ -glutamyltransferase

13

Blood of a 12 year old boy presents low concentration of uric acid and accumulation of xanthine and hypoxanthine. This child has genetic defect of the following enzyme:

- A Xanthine oxidase
- B Arginase
- C Urease
- D Ornithine carbamoyltransferase
- E Glycerylkinase

14

Increased amount of free fat acids is observed in the blood of the patients with diabetes mellitus. It can be caused by:

- A Increased activity of triglyceridelipase adipocytes
- B Storage of palmitatoil-CoA
- C Activation of the ketone bodies utilization
- D Activation of the synthesis of the apolipoproteins
- E Decreased activity of phosphatidylcholine-cholesterol-acyltransferase blood plasma

15

A 46-year-old female patient has a continuous history of progressive muscular (Duchenne's) dystrophy. Which blood enzyme changes will be of diagnostic value in this case?

- A Creatine phosphokinase
- B Lactate dehydrogenase
- C Pyruvate dehydrogenase
- D Glutamate dehydrogenase
- E Adenylate cyclase

16

A patient is ill with diabetes mellitus that is accompanied by hyperglycemia of over 7,2 millimole/l on an empty stomach. The level of what blood plasma protein allows to estimate the glycemia rate retrospectively (4-8 weeks before examination)?

- A Glycated hemoglobin
- B Albumin
- C Fibrinogen
- D C-reactive protein
- E Ceruloplasmin

17

In case of enterobiasis acriflavine - the structural analogue of vitamin B₂ - is administered. The synthesis disorder of which enzymes does this medicine cause in microorganisms?

- A FAD-dependent dehydrogenases
- B Cytochrome oxidases
- C Peptidases
- D NAD-dependent dehydrogenases
- E Aminotransferases

18

A 10-year-old girl often experiences acute respiratory infections with multiple spotty haemorrhages in the places of clothes friction. Hypovitaminosis of what vitamin is present at the girl?

- A C
- B B6
- C B1
- D A
- E B2

19

Hydroxylation of endogenous substrates and xenobiotics requires a donor of protons. Which of the following vitamins can play this role?

- A Vitamin C
- B Vitamin P
- C Vitamin B6
- D Vitamin E
- E Vitamin A

20

The formation of a secondary mediator is obligatory in membrane-intracellular mechanism of hormone action. Point out the substance that is unable to be a secondary mediator:

- A Glycerol
- B Diacylglycerol
- C Inositol-3,4,5-triphosphate
- D CAMP
- E Ca²⁺

21

A 4 y.o. child with signs of durative proteinic starvation was admitted to the hospital. The signs were as follows: growth inhibition, anemia, edemata, mental deficiency. Choose a cause of edemata development:

- A Reduced synthesis of albumins
- B Reduced synthesis of globulins
- C Reduced synthesis of hemoglobin
- D Reduced synthesis of lipoproteins
- E Reduced synthesis of glycoproteins

22

Researchers isolated 5 isoenzymic forms of lactate dehydrogenase from the human blood serum and studied their properties. What property indicates that the isoenzymic forms were isolated from the same enzyme?

- A Catalyzation of the same reaction
- B The same molecular weight
- C The same physicochemical properties
- D Tissue localization
- E The same electrophoretic mobility

23

On some diseases it is observed aldosteronism with hypertension and edema due to sodium retention in the organism. What organ of the internal secretion is affected on aldosteronism?

- A Adrenal glands
- B Testicle
- C Ovaries
- D Pancreas
- E Hypophysis

24

An experiment proved that UV-radiated cells of patients with xeroderma pigmentosum restore the native DNA structure slower than cells of healthy individuals as a result of reparation enzyme defection. What enzyme helps this process?

- A Endonuclease
- B RNA ligase
- C Primase
- D DNA polymerase III
- E DNA gyrase

25

A patient with suspicion on epidemic typhus was admitted to the hospital. Some arachnids and insects have been found in his flat. Which of them may be a carrier of the pathogen of epidemic typhus?

- A Lice

- B** Spiders
- C** Bed-bugs
- D** Cockroaches
- E** Houseflies

26

A businessman came to India from South America. On examination the physician found that the patient was suffering from sleeping-sickness. What was the way of invasion?

- A** As a result of bug's bites
- B** As a result of mosquito's bites
- C** With contaminated fruits and vegetables
- D** Through dirty hands
- E** After contact with a sick dogs

27

Tere is observed inhibited fibrillation in the patients with bile ducts obstruction, bleeding due to low level of absorbtion of some vitamin. What vitamin is in deficit?

- A** K
- B** A
- C** D
- D** E
- E** Carotene

28

A 52 year-old patient with bronchial asthma was treated with glucocorticoids. Fever reaction appeared as a result of postinjective abscess. The patient had subfebrile temperature, which didn't correspond to latitude and severity of inflammatory process. Why did patient have low fever reaction?

- A** Inhibited endogen pyrogens production
- B** Violation of heat loss through lungs
- C** Inflammatory barrier formation in injection place
- D** Violation of heat-producing mechanisms
- E** Thermoregulation center inhibition

29

A 35-year-old man under the treatment for pulmonary tuberculosis has acute-onset of right big toe pain, swelling, and low-grade fever. The gouty arthritis was diagnosed and high serum uric acid level was found. Which of the following antituberculosis drugs are known for causing high uric acid levels?

- A** Pyrazinamide
- B** Cycloserine
- C** Thiacetazone
- D** Rifampicin
- E** Aminosalicyclic acid

30

During metabolic process active forms of the oxygen including superoxide anion radical are formed in the human body. With help of what enzyme is this anion activated?

- A** Superoxide dismutase
- B** Catalase
- C** Peroxidase

- D Glutathioneperoxidase
- E Glutathionereductase

31

A patient presents high activity of LDH_{1,2}, aspartate aminotransferase, creatine phosphokinase. In what organ (organs) is the development of a pathological process the most probable?

- A In the heart muscle (initial stage of myocardium infarction)
- B In skeletal muscles (dystrophy, atrophy)
- C In kidneys and adrenals
- D In connective tissue
- E In liver and kidneys

32

Buffer capacity of blood was decreased in the worker due to exhausting muscular work. Entry of what acid substance to the blood can this state be explained?

- A Lactate
- B Pyruvate
- C 1,3-bisphosphoglycerate
- D α -ketoglutarate
- E 3-phosphoglycerate

33

While examining the child the doctor revealed symmetric cheeks roughness, diarrhea, disfunction of the nervous system. Lack of what food components caused it?

- A Nicotinic acid, tryptophane
- B Lysine, ascorbic acid
- C Threonine, pantothenic acid
- D Methionine, lipoic acid
- E Phenylalanine, pangamic acid

34

A 13-year-old boy complains of general weakness, dizziness, tiredness. He is mentally retarded. Increased level of valine, isoleucine, leucine is in the blood and urine. Urine has specific smell. What is the diagnosis?

- A Maple syrup urine disease
- B Addison's disease
- C Tyrosinosis
- D Histidinemia
- E Graves' disease

35

Increased breaking of vessels, enamel and dentine destruction in scurvy patients are caused by disorder of collagen maturing. What stage of modification of procollagen is disordered in this avitaminosis?

- A Hydroxylation of proline
- B Formation of polypeptide chains
- C Glycosylation of hydroxylysine residues
- D Removal of C-ended peptide from procollagen
- E Detaching of N-ended peptide

36

A 62-year-old female patient has developed a cataract (lenticular opacity) secondary to the diabetes mellitus. What type of protein modification is observed in case of diabetic cataract?

- A Glycosylation
- B Phosphorylation
- C ADP-ribosylation
- D Methylation
- E Limited proteolysis

37

Aspirin has antiinflammatory effect due to inhibition of the cyclooxygenase activity. Level of what biological active acids will decrease?

- A Prostaglandins
- B Leucotriens
- C Catecholamines
- D Biogenic amines
- E Iodinethyronyns

38

At the laboratory experiment the eukocyte culture was mixed with staphylococci. Neutrophile leukocytes engulfed and digested bacterial cells. This processes are termed:

- A Phagocytosis
- B Pinocytosis
- C Diffusion
- D Facilitated diffusion
- E Osmosis

39

Examination of a patient revealed typical presentations of collagenosis. This pathology is characterized by increase of the following urine index:

- A Hydroxyproline
- B Arginine
- C Glucose
- D Mineral salts
- E Ammonium salts

40

Marked increase of activity of MB-forms of CPK (creatinephosphokinase) and LDH-1 were revealed on the examination of the patient's blood. What is the most likely pathology?

- A Miocardial infarction
- B Hepatitis
- C Rheumatism
- D Pancreatitis
- E Cholecystitis

41

Untrained people often have muscle pain after sprints as a result of lactate accumulation. This might be caused by intensification of the following biochemical process:

- A Glycolysis
- B Gluconeogenesis

- C Pentose phosphate pathway
- D Lipogenesis
- E Glycogenesis

42

A 16-year-old boy was performed an appendectomy. He has been hospitalized for right lower quadrant abdominal pain within 18 hours. The surgical specimen is edematous and erythematous. Infiltration by what of the following cells is the most typical for the process occurring here?

- A Neutrophils
- B Eosinophils
- C Basophils
- D Lymphocytes
- E Monocytes

43

ATP synthesis is totally blocked in a cell. How will the value of membrane rest potential change?

- A It will disappear
- B It will be slightly increased
- C It will be considerably increased
- D First it will increase, then decrease
- E First it will decrease, then increase

44

The concentration of albumins in human blood sample is lower than normal. This leads to edema of tissues. What blood function is damaged?

- A Maintaining the oncotic blood pressure
- B Maintaining the Ph level
- C Maintaining the body temperature
- D Maintaining the blood sedimentation system
- E All answers are correct

45

Examination of a patient suffering from frequent haemorrhages in the inner organs and mucous membranes revealed proline and lysine being included in collagen fibers.

Impairment of their hydroxylation is caused by lack of the following vitamin:

- A C
- B E
- C K
- D A
- E D

46

A 20 year old patient complains of general weakness, dizziness, quick fatigability. Blood analysis results: Hb- 80 g/l. Microscopical examination results: erythrocytes are of modified form. This condition might be caused by:

- A Sickle-cell anemia
- B Hepatocellular jaundice
- C Acute intermittent porphyria
- D Obturative jaundice

E Addison's disease

47

A 48 year old patient complained about intense pain, slight swelling and reddening of skin over the joints, temperature rise up to 38°C. Blood analysis revealed high concentration of urates. This condition might be caused by disturbed metabolism of:

- A** Purines
- B** Collagen
- C** Cholesterol
- D** Pyrimidines
- E** Carbohydrates

48

A patient has yellow skin colour, dark urine, dark-yellow feces. What substance will have strengthened concentration in the blood serum?

- A** Unconjugated bilirubin
- B** Conjugated bilirubin
- C** Mesobilirubin
- D** Verdoglobin
- E** Biliverdin

49

A patient has an increased pyruvate concentration in blood. A large amount of it is excreted with the urine. What vitamin is lacking in this patient?

- A** B1
- B** E
- C** B3
- D** B6
- E** B2

50

Ammonia is a very toxic substance, especially for nervous system. What substance takes the most active part in ammonia detoxication in brain tissues?

- A** Glutamic acid
- B** Lysine
- C** Proline
- D** Histidine
- E** Alanine

51

A patient has pellagra. Interrogation revealed that he had lived mostly on maize for a long time and eaten little meat. This disease had been caused by the deficit of the following substance in the maize:

- A** Tryptophan
- B** Tyrosine
- C** Proline
- D** Alanine
- E** Histidine

52

Increased production of thyroidal hormones T3 and T4, weight loss, tachycardia, psychic excitement and so on present on thyrotoxicosis. How do thyroidal hormones effect energy metabolism in the mitochondrion of cells?

- A Disconnect oxidation and oxidated phosphorylation
- B Activates phosphorylation of substance
- C Stops phosphorylation of substance
- D Stops respiratory chain
- E Activates oxidated phosphorylation

53

A patient with high rate of obesity was advised to use carnitine as a food additive in order to enhance "fat burning". What is the role of carnitine in the process of fat oxidation?

- A Transport of FFA (free fatty acids) from cytosol to the mitochondria
- B Transport of FFA from fat depots to the tissues
- C It takes part in one of reactions of FFA beta-oxidation
- D FFA activation
- E Activation of intracellular lipolysis

54

An experimental animal that was kept on protein-free diet developed fatty liver infiltration, in particular as a result of deficiency of methylating agents. This is caused by disturbed generation of the following metabolite:

- A Choline
- B DOPA
- C Cholesterol
- D Acetoacetate
- E Linoleic acid

55

A patient consulted a doctor about symmetric dermatitis of open skin areas. It was found out that the patient lived mostly on cereals and ate too little meat, milk and eggs. What vitamin deficiency is the most evident?

- A Nicotinamide
- B Calciferol
- C Folic acid
- D Biotin
- E Tocopherol

56

A 46 year old woman suffering from chololithiasis developed jaundice. Her urine became dark-yellow and feces became colourless. Blood serum will have the highest concentration of the following substance:

- A Conjugated bilirubin
- B Unconjugated bilirubin
- C Biliverdin
- D Mesobilirubin
- E Urobilinogen

57

A 46 year old patient applied to a doctor complaining about joint pain that becomes stronger the day before weather changes. Blood examination revealed strengthened concentration of

uric acid. The most probable cause of the disease is the intensified disintegration of the following substance:

- A Adenosine monophosphate
- B Cytidine monophosphate
- C Uridine triphosphate
- D Uridine monophosphate
- E Thymidine monophosphate

58

A 42-year man suffering from gout has increased level of urinary acid in the blood. Allopurinol was prescribed to decrease the level of urinary acid. Competitive inhibitor of what enzyme is allopurinol?

- A Xanthinoxidase
- B Adenosinedeaminase
- C Adeninephosphoribosiltransferase
- D Hypoxantinphosphoribosiltransferase
- E Guaninedeaminase

59

A 38 year old patient suffers from rheumatism in its active phase. What laboratory characteristic of blood serum is of diagnostic importance in case of this pathology?

- A C-reactive protein
- B Uric acid
- C Urea
- D Creatinine
- E Transferrin

60

Patient experienced increased susceptibility of the skin to the sunlight. His urine after some time became dark-red. What is the most likely cause of this?

- A Porphyria
- B Hemolytic jaundice
- C Albinism
- D Pellagra
- E Alkaptonuria

61

A patient with serious damage of muscular tissue was admitted to the traumatological department. What biochemical urine index will be increased in this case?

- A Creatinine
- B Common lipids
- C Glucose
- D Mineral salts
- E Uric acid

62

12 hours after an acute attack of retrosternal pain a patient presented a jump of aspartate aminotransferase activity in blood serum. What pathology is this deviation typical for?

- A Myocardium infarction
- B Viral hepatitis
- C Collagenosis

- D** Diabetes mellitus
- E** Diabetes insipidus

63

Donor skin transplantation was performed to a patient with extensive burns. On the 8-th day the graft became swollen and changed colour; on the 11-th day graft rejection started. What cells take part in this process?

- A** T-lymphocytes
- B** Erythrocytes
- C** Basophils
- D** Eosinophils
- E** B-lymphocytes

64

A 30 y.o. woman had been ill for a year when she felt pain in the area of joints for the first time, they got swollen and skin above them became reddened. Provisional diagnosis is rheumatoid arthritis. One of the most probable causes of this disease is a structure alteration of a connective tissue protein:

- A** Collagen
- B** Mucin
- C** Myosin
- D** Ovoalbumin
- E** Troponin

65

Autopsy of a 12-year-old girl revealed: multiple cutaneous hemorrhages (mostly into the skin of buttocks, lower extremities), serous and mucous membrane hemorrhages, cerebral hemorrhages. Adrenal glands show focal necrosis and massive hemorrhages; kidneys show necrotic nephrosis, suppurative arthritis, iridocyclitis, vasculitis. What is the most probable diagnosis?

- A** Meningococemia
- B** Epidemic typhus
- C** Periarteritis nodosa
- D** Systemic lupus erythematosus
- E** Radiation sickness

66

Examination of a 27-year-old patient revealed pathological changes in liver and brain. Blood plasma analysis revealed an abrupt decrease in the copper concentration, urine analysis revealed an increased copper concentration. The patient was diagnosed with Wilson's degeneration. To confirm the diagnosis it is necessary to study the activity of the following enzyme in blood serum:

- A** Ceruloplasmin
- B** Carbonic anhydrase
- C** Xanthine oxidase
- D** Leucine aminopeptidase
- E** Alcohol dehydrogenase

67

A patient complains about dyspnea provoked by the physical activity. Clinical examination revealed anaemia and presence of the paraprotein in the zone of gamma-globulins. To

confirm the myeloma diagnosis it is necessary to determine the following index in the patient's urine:

- A Bence Jones protein
- B Bilirubin
- C Haemoglobin
- D Ceruloplasmin
- E Antitrypsin

68

As a result of exhausting muscular work a worker has largely reduced buffer capacity of blood. What acidic substance that came to blood caused this phenomenon?

- A Lactate
- B Pyruvate
- C 1,3-bisphosphoglycerate
- D 3-phosphoglycerate
- E -

69

A 2-year-old child with mental and physical retardation has been delivered to a hospital. He presents with frequent vomiting after having meals. There is phenylpyruvic acid in urine. Which metabolism abnormality is the reason for this pathology?

- A Amino-acid metabolism
- B Lipidic metabolism
- C Carbohydrate metabolism
- D Water-salt metabolism
- E Phosphoric calcium metabolism

70

A patient was delivered to the hospital by an emergency team. Objectively: grave condition, unconscious, adynamy. Cutaneous surfaces are dry, eyes are sunken, face is cyanotic. There is tachycardia and smell of acetone from the mouth. Analysis results: blood glucose - 20,1 micromole/l (standard is 3,3-5,5 micromole/l), urine glucose - 3,5% (standard is - 0). What is the most probable diagnosis?

- A Hyperglycemic coma
- B Hypoglycemic coma
- C Acute heart failure
- D Acute alcoholic intoxication
- E Anaphylactic shock

71

Profuse foam appeared when dentist put hydrogen peroxide on the mucous of the oral cavity. What enzyme caused such activity?

- A Catalase
- B Cholinesterase
- C Acetyltransferase
- D Glucose-6-phosphatdehydrogenase
- E Methemoglobinreductase

72

A 62 y.o. woman complains of frequent pains in the area of her chest and backbone, rib fractures. A doctor assumed myelomatosis (plasmocytoma). What of the following laboratory

characteristics will be of the greatest diagnostic importance?

- A Paraproteinemia
- B Hyperalbuminemia
- C Proteinuria
- D Hypoglobulinemia
- E Hypoproteinemia

73

A newborn child has convulsions that have been observed after prescription of vitamin B6. This most probable cause of this effect is that vitamin B6 is a component of the following enzyme:

- A Glutamate decarboxylase
- B Pyruvate dehydrogenase
- C Netoglutarate dehydrogenase
- D Aminolevulinic acid synthase
- E Glycogen phosphorylase

74

Nappies of a newborn have dark spots that witness of formation of homogentisic acid. Metabolic imbalance of which substance is it connected with?

- A Tyrosine
- B Galactose
- C Methionine
- D Cholesterol
- E Tryptophan

75

Pathological changes of the liver and brain were revealed in a 27-year-old patient. The copper concentration is abruptly decreased in blood plasma and increased in the urine. Wilson's disease was diagnosed. Activity of what enzyme in the blood serum should be examined to prove diagnosis?

- A Ceruloplasmin
- B Carboanhydrase
- C Xanthine oxidase
- D Leucine aminopeptidase
- E Alcohol dehydrogenase

76

A 50-year-old patient complains about general weakness, appetite loss and cardiac arrhythmia. The patient presents with muscle hypotonia, flaccid paralysis, weakened peristaltic activity of the bowels. Such condition might be caused by:

- A Hypokalemia
- B Hypoproteinemia
- C Hyperkalemia
- D Hypophosphatemia
- E Hyponatremia

77

An 18-year-old patient has enlarged inguinal lymph nodes, they are painless, thickened on palpation. In the area of genital mucous membrane there is a small-sized ulcer with thickened edges and "lequel" bottom of greyish colour. What is the most probable diagnosis?

- A Syphilis
- B Tuberculosis
- C Lepra
- D Trophic ulcer
- E Gonorrhoea

78

Concentration of pyruvate is increased in the patient's blood, the most of which is excreted with urine. What avitaminosis is observed in the patient?

- A Avitaminosis B1
- B Avitaminosis E
- C Avitaminosis B3
- D Avitaminosis B6
- E Avitaminosis B2

79

Carnitine including drug was recommended to the sportsman for improving results. What process is activated most of all with help of carnitine?

- A Transport of fatty acids to the mitochondria
- B Synthesis of steroid hormones
- C Synthesis of ketone bodies
- D Synthesis of lipids
- E Tissue respiration

80

A patient with suspected diphtheria went through bacterioscopic examination. Examination of throat swab revealed rod-shaped bacteria with volutin granules. What etiotropic preparation should be chosen in this case?

- A Antidiphtheric antitoxic serum
- B Bacteriophage
- C Diphtheria antitoxin
- D Eubiotic
- E Interferon

81

Patient with diabetes mellitus experienced loss of consciousness and convulsions after injection of insulin. What is the result of biochemical blood analysis for concentration of the sugar?

- A 1,5 mmol/L
- B 8,0 mmol/L
- C 10,0 mmol/L
- D 3,3 mmol/L
- E 5,5 mmol/L

82

A woman who has been keeping to a clean-rice diet for a long time was diagnosed with polyneuritis (beriberi). What vitamin deficit results in development of this disease?

- A Thiamine
- B Ascorbic acid
- C Pyridoxine
- D Folic acid

E Riboflavin

83

Removal of gall bladder of a patient has disturbed processes of Ca absorption through the intestinal wall. What vitamin will stimulate this process?

- A D₃
- B PP
- C C
- D B₁₂
- E K

84

A 63-year-old woman developed signs of rheumatoid arthritis. Increase of which indicated blood values level could be helpful in proving diagnosis?

- A Additive glycosaminoglycans
- B Lipoproteids
- C Acid phosphatase
- D General cholesterol
- E R-glycosidase

85

A 1,5-year-old child presents with both mental and physical lag, decolorizing of skin and hair, decrease in catecholamine concentration in blood. When a few drops of 5% solution of trichloroacetic iron had been added to the child's urine it turned olive green. Such alteration are typical for the following pathology of the amino acid metabolism:

- A Phenylketonuria
- B Alkaptonuria
- C Tyrosinosis
- D Albinism
- E Xanthinuria

86

A patient complains of frequent diarrheas, especially after consumption of fattening food, and of body weight loss. Laboratory examination revealed steatorrhea; hypocholic feces. What can be the cause of this condition?

- A Obturation of biliary tracts
- B Mucous membrane inflammation of small intestine
- C Lack of pancreatic lipase
- D Lack of pancreatic phospholipase
- E Unbalanced diet

87

On the empty stomach in the patients blood glucose level was 5,65 mmol/L, in an hour after usage of sugar it was 8,55 mmol/L, in a 2 hours - 4,95 mmol/L. Such indicators are typical for:

- A Healthy person
- B Patient with hidden diabetes mellitus
- C Patient with insulin-dependent diabetes mellitus
- D Patient with non-insulin dependent diabetes mellitus
- E Patient with tireotoxicosis

88

A child is languid, apathetic. Liver is enlarged and liver biopsy revealed a significant excess of glycogene. Glucose concentration in the blood stream is below normal. What is the cause of low glucose concentration?

- A Low (absent) activity of glycogene phosphorylase in liver
- B Low (absent) activity of hexokinase
- C High activity of glycogen synthetase
- D Low (absent) activity of glucose 6-phosphatase
- E Deficit of a gene that is responsible for synthesis of glucose 1-phosphaturidine transferase

89

A 65 year old man suffering from gout complains of kidney pain. Ultrasound examination revealed renal calculi. The most probable cause of calculi formation is the strengthened concentration of the following substance:

- A Uric acid
- B Cholesterol
- C Bilirubin
- D Urea
- E Cystine

90

A 65-year-old suffering from the gout man complains of the pain in the kidney's region. On ultrasonic examination the renal calculi were revealed. As a result of what process were they formed?

- A Decay of purine nucleotides
- B Protein catabolism
- C Ornithine cycle
- D Heme decay
- E Restoration of cysteine

91

A 5-year-old child who often falls ill with respiratory diseases has eczematous appearances after consumption of some food products, tendency to prolonged course of inflammatory processes. What kind of diathesis can be suspected in this case?

- A Exudative-catharral
- B Hemmorrhagic
- C Arthritism
- D Lymphohypoplastic
- E Asthenic

92

The greater amount of nitrogen is excreted from the organism in form of urea. Inhibition of urea synthesis and accumulation of ammonia in blood and tissues are induced by the decreased activity of the following liver enzyme:

- A Carbamoyl phosphate synthetase
- B Aspartate aminotransferase
- C Urease
- D Amylase
- E Pepsin

93

A 35 y.o. patient who often consumes alcohol was treated with diuretics. There appeared serious muscle and heart weakness, vomiting, diarrhea, AP- 100/60 mm Hg, depression.

This condition is caused by intensified excretion with urine of:

- A Potassium
- B Sodium
- C Chlorine
- D Calcium
- E Phosphates

94

After intake of rich food a patient feels nausea and sluggishness; with time there appeared signs of steatorrhea. Blood cholesterol concentration is 9,2 micromole/l. This condition was caused by lack of:

- A Bile acids
- B Triglycerides
- C Fatty acids
- D Phospholipids
- E Chylomicrons

95

Examination of a man who hadn't been consuming fats but had been getting enough carbohydrates and proteins for a long time revealed dermatitis, poor wound healing, vision impairment. What is the probable cause of metabolic disorder?

- A Lack of linoleic acid, vitamins A, D, E, K
- B Lack of palmitic acid
- C Lack of vitamins PP, H
- D Low caloric value of diet
- E Lack of oleic acid

96

A 44-year-old woman complains of common weakness, heart pain, considerable increase of body weight. Objectively: moon-like face, hirsutism, AP- 165/100 mm Hg, height - 164 cm, weight - 103 kg; fat is mostly accumulated in the region of neck, upper shoulder girdle, stomach. What is the main pathogenetic mechanism of obesity?

- A Increased production of glucocorticoids
- B Decreased production of thyroidal hormones
- C Increased production of insulin
- D Decreased production of glucagon
- E Increased production of mineralocorticoids

97

An experimental animal has been given excessive amount of carbon-labeled glucose for a week. What compound can the label be found in?

- A Palmitic acid
- B Methionine
- C Vitamin A
- D Choline
- E Arachidonic acid

98

After a serious viral infection a 3-year-old child has repeated vomiting, loss of consciousness, convulsions. Examination revealed hyperammonemia. What may have caused changes of biochemical blood indices of this child?

- A Disorder of ammonia neutralization in ornithinic cycle
- B Activated processes of aminoacids decarboxylation
- C Disorder of biogenic amines neutralization
- D Increased purtfection of proteins in intestines
- E Inhibited activity of transamination enzymes

99

Examination of a patient with frequent hemorrhages from internals and mucous membranes revealed proline and lysine being a part of collagene fibers. What vitamin absence caused disturbance of their hydroxylation?

- A Vitamin C
- B Vitamin K
- C Vitamin A
- D Thiamine
- E Vitamin E

100

A 36-year-old female patient has a history of collagen disease. Urine analysis is likely to reveal an increased concentration of the following metabolite:

- A Oxyproline
- B Indican
- C Creatinine
- D Urea
- E Urobilinogen

101

Albinos can't stand sun impact - they don't aquire sun-tan but get sunburns. Disturbed metabolism of what aminoacid underlies this phenomenon?

- A Phenilalanine
- B Methionine
- C Tryptophan
- D Glutamic acid
- E Histidine

102

A patient with continious bronchopneumonia was admitted to the therapeutic department. Antibiotic therapy didn't give much effect. What medication for improvement of immune state should be added to the complex treatment of this patient?

- A Timaline
- B Analgin
- C Sulfocamphocaine
- D Benadryl
- E Paracetamol

103

A patient suffers from hepatic cirrhosis. Examination of which of the following substances excreted by urine can characterize the state of antitoxic function of liver?

- A Hippuric acid

- B** Ammonium salts
- C** Kreatinine
- D** Uric acid
- E** Aminoacids

104

Vitamin A together with specific cytoceptors penetrates through the nuclear membranes, induces transcription processes that stimulate growth and differentiation of cells. This biological function is realized by the following form of vitamin A:

- A** Trans-retinoic acid
- B** Trans-retinal
- C** Cis-retinal
- D** Retinol
- E** Carotin

105

Products of some proteins hydrolysis and modification are the biologically active substances called hormones. Lipotropin, corticotropin, melanotropin and endorphins are synthesized in the hypophysis of the following protein:

- A** Proopiomelanocortin (POMC)
- B** Neuroalbumin
- C** Neurostromin
- D** Neuroglobulin
- E** Thyreoglobulin

106

In patients with the biliary tract obstruction the blood coagulation is inhibited; the patients have frequent haemorrhages caused by the subnormal assimilation of the following vitamin:

- A** K
- B** A
- C** D
- D** E
- E** C

107

The study of the genealogy of a family with hypertrichosis (helix excessive pilosis) has demonstrated that this symptom is manifested in all generations only in men and is inherited by son from his father. What is the type of hypertrichosis inheritance?

- A** Y-linked chromosome
- B** Autosome-recessive
- C** Autosome-dominant
- D** X-linked recessive chromosome
- E** X-linked dominant chromosome

108

A newborn child suffers from milk curdling in stomach, this means that soluble milk proteins (caseins) transform to insoluble proteins (paracaseins) by means of calcium ions and a certain enzyme. What enzyme takes part in this process?

- A** Renin
- B** Pepsin
- C** Gastrin

- D Secretin**
- E Lipase**

109

The penetration of the irritable cell membrane for potassium ions has been increased during an experiment. What changes of membrane electric status can occur?

- A Hyperpolarization**
- B Depolarization**
- C Action potential**
- D Local response**
- E No changes**

110

A sportsman was recommended to take a medication that contains carnitine in order to improve his results. What process is activated by carnitine the most?

- A Fatty acids transport to mitochondrions**
- B Synthesis of steroid hormones**
- C Synthesis of ketone bodies**
- D Synthesis of lipids**
- E Tissue respiration**

111

To prevent postoperative bleeding a 6 y.o. child was administered vicasol that is a synthetic analogue of vitamin K. Name post-translational changes of blood coagulation factors that will be activated by vicasol:

- A Carboxylation of glutamin acid**
- B Phosphorylation of serine radicals**
- C Partial proteolysis**
- D Polymerization**
- E Glycosylation**

112

A 4 y.o. boy has had recently serious viral hepatitis. Now there are such clinical presentations as vomiting, loss of consciousness, convulsions. Blood analysis revealed hyperammoniemia. Disturbance of which biochemical process caused such pathological condition of the patient?

- A Disturbed neutralization of ammonia in liver**
- B Disturbed neutralization of biogenic amines**
- C Increased putrefaction of proteins in bowels**
- D Activation of aminoacid decarboxylation**
- E Inhibition of transamination enzymes**

113

During examination of an 11-month-old infant a pediatrician revealed osteoectasia of the lower extremities and delayed mineralization of cranial bones. Such pathology is usually provoked by the deficit of the following vitamin:

- A Cholecalciferol**
- B Thiamin**
- C Pantothenic acid**
- D Bioflavonoids**
- E Riboflavin**

114

Examination of a patient suffering from chronic hepatitis revealed a significant decrease in the synthesis and secretion of bile acids. What process will be mainly disturbed in the patient's bowels?

- A Fat emulsification
- B Protein digestion
- C Carbohydrate digestion
- D Glycerin absorption
- E Amino acid absorption

115

The energy inputs of a healthy man have been measured. In what position was the patient if his energy inputs were less than the main exchange?

- A Sleep
- B Rest
- C Easy work
- D Nervous exertion
- E Calmness

116

Glutamate decarboxylation results in formation of inhibitory transmitter in CNS. Name it:

- A GABA
- B Glutathione
- C Histamine
- D Serotonin
- E Asparagine

117

In course of histidine catabolism a biogenic amine is formed that has powerful vasodilating effect. Name it:

- A Histamine
- B Serotonin
- C Dioxyphenylalanine
- D Noradrenalin
- E Dopamine

118

Utilization of arachidonic acid via cyclooxygenase pathway results in formation of some bioactive substances. Name them:

- A Prostaglandins
- B Thyroxine
- C Biogenic amines
- D Somatomedins
- E Insulin-like growth factors

119

After a sprint an untrained person develops muscle hypoxia. This leads to the accumulation of the following metabolite in muscles:

- A Lactate

- B** Ketone bodies
- C** Acetyl CoA
- D** Glucose 6-phosphate
- E** Oxaloacetate

120

Myocyte cytoplasm contains a big number of dissolved metabolites of glucose oxidation. Name one of them that turns directly into a lactate:

- A** Pyruvate
- B** Oxaloacetate
- C** Glycerophosphate
- D** Glucose 6-phosphate
- E** Fructose 6-phosphate

121

Emotional stress causes activation of hormon-sensitive triglyceride lipase in the adipocytes. What secondary mediator takes part in this process?

- A** Cyclic adenosine monophosphate
- B** Cyclic guanosine monophosphate
- C** Adenosine monophosphate
- D** Diacylglycerol
- E** Ions of Ca^{2+}

122

A patient has been diagnosed with alkaptonuria. Choose an enzyme whose deficiency can be the reason for this pathology:

- A** Homogentisic acid oxidase
- B** Phenylalanine hydroxylase
- C** Glutamate dehydrogenase
- D** Pyruvate dehydrogenase
- E** Dioxyphenylalanine decarboxylase

123

A patient diagnosed with carcinoid of bowels was admitted to the hospital. Analysis revealed high production of serotonin. It is known that this substance is formed of tryptophane aminoacid. What biochemical mechanism underlies this process?

- A** Decarboxylation
- B** Desamination
- C** Microsomal oxydation
- D** Transamination
- E** Formation of paired compounds

124

A genetics specialist analyzed the genealogy of a family and found that both males and females may have the illness, not across all the generations, and that healthy parents may have ill children. What is the type of illness inheritance?

- A** Autosomal recessive
- B** Autosomal dominant
- C** X-linked dominant
- D** X-linked recessive
- E** Y-linked

125

Analysis of amniotic fluid that was obtained as a result of amniocentesis (puncture of amniotic sac) revealed cells the nuclei of which contain sex chromatin (Barr's body). What can it be evidence of?

- A Development of female fetus
- B Development of male fetus
- C Genetic disorders of fetus development
- D Trisomy
- E Polyploidy

126

Vitamin B1 deficiency results in disturbance of oxidative decarboxylation of α -ketoglutaric acid. This will disturb synthesis of the following coenzyme:

- A Thiamine pyrophosphate
- B Nicotinamide adenine dinucleotide (NAD)
- C Flavine adenine dinucleotide (FAD)
- D Lipoic acid
- E Coenzyme A

127

A child's blood presents high content of galactose, glucose concentration is low. There are such presentations as cataract, mental deficiency, adipose degeneration of liver. What disease is it?

- A Galactosemia
- B Diabetes mellitus
- C Lactosemia
- D Steroid diabetes
- E Fructosemia

128

According to clinical indications a patient was administered pyridoxal phosphate. What processes is this medication intended to correct?

- A Transamination and decarboxylation of aminoacids
- B Oxidative decarboxylation of ketonic acids
- C Desamination of purine nucleotide
- D Synthesis of purine and pyrimidine bases
- E Protein synthesis

129

A 45 y.o. woman suffers from Cushing's syndrome - steroid diabetes. Biochemical examination revealed: hyperglycemia, hypochloremia. Which of the under-mentioned processes is the first to be activated?

- A Gluconeogenesis
- B Glycogenolysis
- C Glucose reabsorption
- D Glucose transport to the cell
- E Glycolysis

130

Autopsy of a 46-year-old man revealed multiple brown-and-green layers and hemorrhages on the mucous membrane of rectum and sigmoid colon; slime and some blood in colon lumen; histologically - fibrinous colitis. In course of bacteriological analysis of colon contents *S. Sonne* were found. What is the most probable diagnosis?

- A Dysentery
- B Cholera
- C Salmonellosis
- D Yersiniosis
- E Crohn's disease

131

A patient had been ill with bronchial asthma for many years and died from asthmatic fit. Histologic lung examination revealed: lumen of bronchioles and small bronches contain a lot of mucus with some eosinophils, there is sclerosis of alveolar septums, dilatation of alveole lumen. What mechanism of development of hypersensitivity reaction took place?

- A Reagin reaction
- B Cytotoxic reaction
- C Immunocomplex reaction
- D Cytolysis determined by lymphocytes
- E Granulomatosis

132

Desulfiram is widely used in medical practice to prevent alcoholism. It inhibits aldehyde dehydrogenase. Increased level of what metabolite causes aversion to alcohol?

- A Acetaldehyde
- B Ethanol
- C Malonyl aldehyde
- D Propionic aldehyde
- E Methanol

133

A 1-year-old child with symptoms of muscle involvement was admitted to the hospital. Examination revealed carnitine deficiency in his muscles. What process disturbance is the biochemical basis of this pathology?

- A Transporting of fatty acids to mitochondrions
- B Regulation of Ca^{2+} level in mitochondrions
- C Substrate phosphorylation
- D Lactic acid utilization
- E Actin and myosin synthesis

134

The patient with complaints of permanent thirst applied to the doctor. Hyperglycemia, polyuria and increased concentration of 17-ketosteroids in the urine were revealed. What disease is the most likely?

- A Steroid diabetes
- B Insulin-dependent diabetes mellitus
- C Myxoedema
- D Type I glycogenosis
- E Addison's disease

135

Index of pH of the blood changed and became 7,3 in the patient with diabetes mellitus. Detecting of the components of what buffer system is used while diagnosing disorder of the acid-base equilibrium?

- A Bicarbonate
- B Phosphate
- C Hemoglobin
- D Oxyhemoglobin
- E Protein

136

As a result of posttranslative modifications some proteins taking part in blood coagulation, particularly prothrombin, become capable of calcium binding. The following vitamin takes part in this process:

- A K
- B C
- C A
- D B1
- E B2

137

Objective examination of a patient revealed: slender figure, big skull, highly developed frontal region of face, short extremities. What constitutional type is it characteristic for?

- A Respiratory
- B Muscular
- C Digestive
- D Cerebral
- E Mixed

138

A 38-year-old patient died during intractable attack of bronchial asthma. Histologic examination revealed mucus accumulation in bronchial lumen, a lot of fat cells (labrocytes) in the wall of bronches, many of them are in the state of degranulation, there are also a lot of eosinophils. What pathogenesis of bronchial changes is it?

- A Atopy
- B Cytotoxic, cytolytic action of antibodies
- C Immunocomplex mechanism
- D Cellular cytolysis
- E Granulomatosis

139

Diabetes mellitus causes ketosis as a result of activated oxidation of fatty acids. What disorders of acid-base equilibrium may be caused by excessive accumulation of ketone bodies in blood?

- A Metabolic acidosis
- B Metabolic alkalosis
- C Any changes woun't happen
- D Respiratory acidosis
- E Respiratory alkalosis

140

A woman with 0 (I) blood group has born a child with AB blood group. This woman's husband

has A blood group. What genetic interaction explains this phenomenon?

- A Recessive epistasis
- B Codominance
- C Polymery
- D Incomplete dominance
- E Complementation

141

Depressions and emotional insanities result from the deficit of noradrenalin, serotonin and other biogenic amines in the brain. Their concentration in the synapses can be increased by means of the antidepressants that inhibit the following enzyme:

- A Monoamine oxidase
- B Diamine oxidase
- C L-amino-acid oxidase
- D D-amino-acid oxidase
- E Phenylalanine-4-monooxygenase

142

A 3 year old child with symptoms of stomatitis, gingivitis and dermatitis of open skin areas was delivered to a hospital. Examination revealed inherited disturbance of neutral amino acid transporting in the bowels. These symptoms were caused by the deficiency of the following vitamin:

- A Niacin
- B Pantothenic acid
- C Vitamin A
- D Cobalamin
- E Biotin

143

During hypersensitivity test a patient got subcutaneous injection of an antigen which caused reddening of skin, edema, pain as a result of histamine action. This biogenic amine is generated as a result of transformation of the following histidine amino acid:

- A Decarboxylation
- B Methylation
- C Phosphorylation
- D Isomerization
- E Deaminization

144

A patient with suspected diagnosis "progressing muscular dystrophy" got his urine tested. What compound will confirm this diagnosis if found in urine?

- A Kreatine
- B Collagen
- C Porphyrin
- D Myoglobin
- E Calmodulin

145

A patient complained about dizziness, memory impairment, periodical convulsions. It was revealed that these changes were caused by a product of decarboxylation of glutamic acid. Name this product:

- A GABA
- B Pyridoxal phosphate
- C TDP
- D ATP
- E THFA

146

A sportsman needs to improve his sporting results. He was recommended to take a preparation that contains carnitine. What process is activated the most by this compound?

- A Fatty acids transporting
- B Amino acids transporting
- C Calcium ions transporting
- D Glucose transporting
- E Vitamin K transporting

147

A doctor examined a child and revealed symptoms of rachitis. Development of this disease was caused by deficiency of the following compound:

- A 1,25 [OH]-dichydroxycholecalciferol
- B Biotin
- C Tocopherol
- D Naphtaquinone
- E Retinol

148

Laboratory examination of a child revealed increased concentration of leucine, valine, isoleucine and their ketoderivatives in blood and urine. Urine smelt of maple syrup. This disease is characterized by the deficit of the following enzyme:

- A Dehydrogenase of branched amino acids
- B Aminotransferase
- C Glucose-6-phosphatase
- D Phosphofructokinase
- E Phosphofructomutase

149

A 9-month-old infant is fed with artificial formulas with unbalanced vitamin B₆ concentration. The infant presents with pellagral dermatitis, convulsions, anaemia. Convulsion development might be caused by the disturbed formation of:

- A GABA
- B Histamine
- C Serotonin
- D DOPA
- E Dopamine

150

It was found out that some compounds, for instance fungi toxins and some antibiotics can inhibit activity of RNA-polymerase. What process will be disturbed in a cell in case of inhibition of this enzyme?

- A Transcription
- B Processing
- C Replication

- D Translation**
- E Reparation**

151

When blood circulation in the damaged tissue is restored, then lactate accumulation comes to a stop and glucose consumption decelerates. These metabolic changes are caused by activation of the following process:

- A Aerobic glycolysis**
- B Anaerobic glycolysis**
- C Lipolysis**
- D Gluconeogenesis**
- E Glycogen biosynthesis**

152

During starvation muscle proteins break up into free amino acids. These compounds will be the most probably involved into the following process:

- A Gluconeogenesis in liver**
- B Gluconeogenesis in muscles**
- C Synthesis of higher fatty acids**
- D Glycogenolysis**
- E Decarboxylation**

153

Surgical removal of a part of stomach resulted in disturbed absorption of vitamin B_{12} , it is excreted with feces. The patient was diagnosed with anemia. What factor is necessary for absorption of this vitamin?

- A Gastromucoprotein**
- B Gastrin**
- C Hydrochloric acid**
- D Pepsin**
- E Folic acid**

154

A newborn develops dyspepsia after the milk feeding. When the milk is substituted by the glucose solution the dyspepsia symptoms disappear. The newborn has the subnormal activity of the following enzyme:

- A Lactase**
- B Invertase**
- C Maltase**
- D Amylase**
- E Isomaltase**

155

Patients who suffer from severe diabetes and don't receive insulin have metabolic acidosis. This is caused by increased concentration of the following metabolites:

- A Ketone bodies**
- B Fatty acids**
- C Unsaturated fatty acids**
- D Triacylglycerols**
- E Cholesterol**

156

A 4 year old child with hereditary renal lesion has signs of rickets, vitamin D concentration in blood is normal. What is the most probable cause of rickets development?

- A Impaired synthesis of calcitriol
- B Increased excretion of calcium
- C Hyperfunction of parathyroid glands
- D Hypofunction of parathyroid glands
- E Lack of calcium in food

157

A 6 year old child was delivered to a hospital. Examination revealed that the child couldn't fix his eyes, didn't keep his eyes on toys, eye ground had the cherry-red spot sign. Laboratory analyses showed that brain, liver and spleen had high rate of ganglioside glycometide. What congenital disease is the child ill with?

- A Tay-Sachs disease
- B Wilson's syndrome
- C Turner's syndrome
- D Niemann-Pick disease
- E MacArdle disease

158

In clinical practice tuberculosis is treated with isoniazid preparation - that is an antivitamin able to penetrate into the tuberculosis bacillus. Tuberculostatic effect is induced by the interference with replication processes and oxidation-reduction reactions due to the buildup of pseudo-coenzyme:

- A NAD
- B FAD
- C FMN
- D TDP
- E CoQ

159

A newborn child was found to have reduced intensity of sucking, frequent vomiting, hypotonia. Urine and blood exhibit increased concentration of citrulline. What metabolic process is disturbed?

- A Ornithinic cycle
- B Tricarboxylic acid cycle
- C Glycolysis
- D Glyconeogenesis
- E Cori cycle

160

A male patient has been diagnosed with acute radiation disease. Laboratory examination revealed a considerable reduction of platelet serotonin level. The likely cause of platelet serotonin reduction is the disturbed metabolism of the following substance:

- A 5-oxytryptofane
- B Tyrosine
- C Histidine
- D Phenylalanine
- E Serine

161

Dietary intake of a 30 year old nursing woman contains 1000 mg of calcium, 1300 mg of phosphorus and 20 mg of iron per day. It is necessary to change content of these mineral substances in the following way:

- A To increase phosphorus content
- B To increase calcium content
- C To reduce fluorine content
- D To increase iron content
- E To reduce iron content

162

Cardinal symptoms of primary hyperparathyroidism are osteoporosis and renal lesion along with development of urolithiasis. What substance makes up the basis of these calculi in this disease?

- A Calcium phosphate
- B Uric acid
- C Cystine
- D Bilirubin
- E Cholesterol

163

Study of conversion of a food colouring agent revealed that neutralization of this xenobiotic takes place only in one phase - microsomal oxydation. Name a component of this phase:

- A Cytochrome P-450
- B Cytochrome B
- C Cytochrome C
- D Cytochrome A
- E Cytochrome oxidase

164

A patient had hemorrhagic stroke. Blood examination revealed strengthened kinin concentration. The patient was prescribed contrical. It was administered in order to inhibit the following proteinase:

- A Kallikrein
- B Pepsin
- C Trypsin
- D Chemotrypsin
- E Collagenase

165

A 49-year-old driver complains about unbearable constricting pain behind the breastbone irradiating to the neck. The pain arose 2 hours ago. Objectively: the patient's condition is grave, he is pale, heart tones are decreased. Laboratory studies revealed high activity of creatine kinase and LDH1. What disease are these symptoms typical for?

- A Acute myocardial infarction
- B Acute pancreatitis
- C Stenocardia
- D Cholelithiasis
- E Diabetes mellitus

166

Plasmonic factors of blood coagulation are exposed to post-translational modification with the participation of vitamin K. It is necessary as a cofactor in the enzyme system of γ -carboxylation of protein factors of blood coagulation due to the increased affinity of their molecules with calcium ions. What amino acid is carboxylated in these proteins?

- A Glutamic
- B Valine
- C Serine
- D Phenylalanine
- E Arginine

167

Pharmacological effects of antidepressants are connected with inhibition of an enzyme catalyzing biogenic amines noradrenaline and serotonin in the mitochondria of cerebral neurons. What enzyme participates in this process?

- A Monoamine oxidase
- B Transaminase
- C Decarboxylase
- D Peptidase
- E Lyase

168

An oncological patient was prescribed methotrexate. With the lapse of time target cells of the tumour lost susceptibility to this drug. There is change of gene expression of the following enzyme:

- A Dehydrofolate reductase
- B Thiaminase
- C Deaminase
- D Folate oxidase
- E Folate decarboxylase

Krok 1 Medicine

1

After consumption of rich food a patient has nausea and heartburn, steatorrhea. This condition might be caused by:

- A Bile acid deficiency
- B Increased lipase secretion
- C Disturbed trypsin synthesis
- D Amylase deficiency
- E Disturbed phospholipase synthesis

2

Characteristic sign of glycogenosis is muscle pain during physical work. Blood examination reveals usually hypoglycemia. This pathology is caused by congenital deficiency of the following enzyme:

- A Glycogen phosphorylase
- B Glucose 6-phosphate dehydrogenase
- C Alpha amylase
- D Gamma amylase
- E Lysosomal glycosidase

3

An infant has apparent diarrhea resulting from improper feeding. One of the main diarrhea effects is plentiful excretion of sodium bicarbonate. What form of acid-base balance disorder is the case?

- A* Metabolic acidosis
- B* Metabolic alkalosis
- C* Respiratory acidosis
- D* Respiratory alkalosis
- E* No disorders of acid-base balance will be observed

4

Examination of a patient suffering from cancer of urinary bladder revealed high rate of serotonin and hydroxyanthranilic acid. It is caused by excess of the following amino acid in the organism:

- A* Tryptophan
- B* Alanine
- C* Histidine
- D* Methionine
- E* Tyrosine

5

A mother consulted a doctor about her 5-year-old child who develops erythemas, vesicular rash and skin itch under the influence of sun. Laboratory studies revealed decreased iron concentration in the blood serum, increased uroporphyrinogen I excretion with the urine. What is the most likely inherited pathology in this child?

- A* Erythropoietic porphyria
- B* Methemoglobinemia
- C* Hepatic porphyria
- D* Coproporphyrin
- E* Intermittent porphyria

6

A 3 year old child with fever was given aspirin. It resulted in intensified erythrocyte haemolysis. Hemolytic anemia might have been caused by congenital insufficiency of the following enzyme:

- A* Glucose 6-phosphate dehydrogenase
- B* Glucose 6-phosphatase
- C* Glycogen phosphorylase
- D* Glycerol phosphate dehydrogenase
- E* γ -glutamyltransferase

7

Blood of a 12 year old boy presents low concentration of uric acid and accumulation of xanthine and hypoxanthine. This child has genetic defect of the following enzyme:

- A* Xanthine oxidase
- B* Arginase
- C* Urease
- D* Ornithine carbamoyltransferase
- E* Glycerylkinase

8

A patient is ill with diabetes mellitus that is accompanied by hyperglycemia of over 7,2 millimole/l on an empty stomach. The level of what blood plasma protein allows to estimate the glycemia

rate retrospectively (4-8 weeks before examination)?

A Glycated hemoglobin

B Albumin

C Fibrinogen

D C-reactive protein

E Ceruloplasmin

9

A 4 y.o. child with signs of durative proteinic starvation was admitted to the hospital. The signs were as follows: growth inhibition, anemia, edemata, mental deficiency. Choose a cause of edemata development:

A Reduced synthesis of albumins

B Reduced synthesis of globulins

C Reduced synthesis of hemoglobin

D Reduced synthesis of lipoproteins

E Reduced synthesis of glycoproteins

10

Researchers isolated 5 isoenzymic forms of lactate dehydrogenase from the human blood serum and studied their properties. What property indicates that the isoenzymic forms were isolated from the same enzyme?

A Catalyzation of the same reaction

B The same molecular weight

C The same physicochemical properties

D Tissue localization

E The same electrophoretic mobility

11

On some diseases it is observed aldosteronism with hypertension and edema due to sodium retention in the organism. What organ of the internal secretion is affected on aldosteronism?

A Adrenal glands

B Testicle

C Ovaries

D Pancreas

E Hypophysis

12

An experiment proved that UV-radiated cells of patients with xeroderma pigmentosum restore the native DNA structure slower than cells of healthy individuals as a result of reparation enzyme defection. What enzyme helps this process?

A Endonuclease

B RNA ligase

C Primase

D DNA polymerase III

E DNA gyrase

13

A patient presents high activity of LDH_{1,2}, aspartate aminotransferase, creatine phosphokinase. In what organ (organs) is the development of a pathological process the most probable?

A In the heart muscle (initial stage of myocardium infarction)

B In skeletal muscles (dystrophy, atrophy)

C In kidneys and adrenals

D In connective tissue

E In liver and kidneys

14

While examining the child the doctor revealed symmetric cheeks roughness, diarrhea, disfunction of the nervous system. Lack of what food components caused it?

A Nicotinic acid, tryptophane

B Lysine, ascorbic acid

C Threonine, pantothenic acid

D Methionine, lipoic acid

E Phenylalanine, pangamic acid

15

A 62-year-old female patient has developed a cataract (lenticular opacity) secondary to the diabetes mellitus. What type of protein modification is observed in case of diabetic cataract?

A Glycosylation

B Phosphorylation

C ADP-ribosylation

D Methylation

E Limited proteolysis

16

A 53-year-old male patient is diagnosed with Paget's disease. The concentration of oxyproline in daily urine is sharply increased, which primarily means intensified disintegration of:

A Collagen

B Keratin

C Albumin

D Hemoglobin

E Fibrinogen

17

Examination of a patient revealed typical presentations of collagenosis. This pathology is characterized by increase of the following urine index:

A Hydroxyproline

B Arginine

C Glucose

D Mineral salts

E Ammonium salts

18

Untrained people often have muscle pain after sprints as a result of lactate accumulation. This might be caused by intensification of the following biochemical process:

A Glycolysis

B Gluconeogenesis

C Pentose phosphate pathway

D Lipogenesis

E Glycogenesis

19

ATP synthesis is totally blocked in a cell. How will the value of membrane rest potential change?

A It will disappear

B It will be slightly increased

C It will be considerably increased

D First it will increase, then decrease

E First it will decrease, then increase

20

Examination of a patient suffering from frequent haemorrhages in the inner organs and mucous membranes revealed proline and lysine being included in collagen fibers. Impairment of their hydroxylation is caused by lack of the following vitamin:

A C

B E

C K

D A

E D

21

A 20 year old patient complains of general weakness, dizziness, quick fatigability. Blood analysis results: Hb- 80 g/l. Microscopical examination results: erythrocytes are of modified form. This condition might be caused by:

A Sickle-cell anemia

B Hepatocellular jaundice

C Acute intermittent porphyria

D Obturative jaundice

E Addison's disease

22

A 48 year old patient complained about intense pain, slight swelling and reddening of skin over the joints, temperature rise up to 38°C. Blood analysis revealed high concentration of urates. This condition might be caused by disturbed metabolism of:

A Purines

B Collagen

C Cholesterol

D Pyrimidines

E Carbohydrates

23

A patient has yellow skin colour, dark urine, dark-yellow feces. What substance will have strengthened concentration in the blood serum?

A Unconjugated bilirubin

B Conjugated bilirubin

C Mesobilirubin

D Verdoglobin

E Biliverdin

24

A patient has an increased pyruvate concentration in blood. A large amount of it is excreted with the urine. What vitamin is lacking in this patient?

A B₁

- B** E
- C** B₃
- D** B₆
- E** B₂

25

Ammonia is a very toxic substance, especially for nervous system. What substance takes the most active part in ammonia detoxication in brain tissues?

- A** Glutamic acid
- B** Lysine
- C** Proline
- D** Histidine
- E** Alanine

26

A patient has pellagra. Interrogation revealed that he had lived mostly on maize for a long time and eaten little meat. This disease had been caused by the deficit of the following substance in the maize:

- A** Tryptophan
- B** Tyrosine
- C** Proline
- D** Alanine
- E** Histidine

27

Cyanide is a poison that causes instant death of the organism. What enzymes found in mitochondria are affected by cyanide?

- A** Cytochrome oxidase (aa3)
- B** Flavin enzymes
- C** Cytochrome B₅
- D** NAD⁺-dependent dehydrogenase
- E** Cytochrome P-450

28

A patient with high rate of obesity was advised to use carnitine as a food additive in order to enhance "fat burning". What is the role of carnitine in the process of fat oxidation?

- A** Transport of FFA (free fatty acids) from cytosol to the mitochondria
- B** Transport of FFA from fat depots to the tissues
- C** It takes part in one of reactions of FFA beta-oxidation
- D** FFA activation
- E** Activation of intracellular lipolysis

29

An experimental animal that was kept on protein-free diet developed fatty liver infiltration, in particular as a result of deficiency of methylating agents. This is caused by disturbed generation of the following metabolite:

- A** Choline
- B** DOPA
- C** Cholesterol
- D** Acetoacetate
- E** Linoleic acid

30

A patient consulted a doctor about symmetric dermatitis of open skin areas. It was found out that the patient lived mostly on cereals and ate too little meat, milk and eggs. What vitamin deficiency is the most evident?

- A* Nicotinamide
- B* Calciferol
- C* Folic acid
- D* Biotin
- E* Tocopherol

31

A 46 year old woman suffering from chololithiasis developed jaundice. Her urine became dark-yellow and feces became colourless. Blood serum will have the highest concentration of the following substance:

- A* Conjugated bilirubin
- B* Unconjugated bilirubin
- C* Biliverdin
- D* Mesobilirubin
- E* Urobilinogen

32

A 46 year old patient applied to a doctor complaining about joint pain that becomes stronger the day before weather changes. Blood examination revealed strengthened concentration of uric acid. The most probable cause of the disease is the intensified disintegration of the following substance:

- A* Adenosine monophosphate
- B* Cytidine monophosphate
- C* Uridine triphosphate
- D* Uridine monophosphate
- E* Thymidine monophosphate

33

It has been found out that one of a pesticide components is sodium arsenate that blocks lipoic acid. Which enzyme activity is impaired by this pesticide?

- A* Pyruvate dehydrogenase complex
- B* Microsomal oxidation
- C* Methemoglobin reductase
- D* Glutathione peroxidase
- E* Glutathione reductase

34

A 38 year old patient suffers from rheumatism in its active phase. What laboratory characteristic of blood serum is of diagnostic importance in case of this pathology?

- A* C-reactive protein
- B* Uric acid
- C* Urea
- D* Creatinine
- E* Transferrin

35

A patient with serious damage of muscular tissue was admitted to the traumatological department. What biochemical urine index will be increased in this case?

- A* Creatinine
- B* Common lipids
- C* Glucose
- D* Mineral salts
- E* Uric acid

36

12 hours after an acute attack of retrosternal pain a patient presented a jump of aspartate aminotransferase activity in blood serum. What pathology is this deviation typical for?

- A* Myocardium infarction
- B* Viral hepatitis
- C* Collagenosis
- D* Diabetes mellitus
- E* Diabetes insipidus

37

Donor skin transplantation was performed to a patient with extensive burns. On the 8-th day the graft became swollen and changed colour; on the 11-th day graft rejection started. What cells take part in this process?

- A* T-lymphocytes
- B* Erythrocytes
- C* Basophils
- D* Eosinophils
- E* B-lymphocytes

38

A 30 y.o. woman had been ill for a year when she felt pain in the area of joints for the first time, they got swollen and skin above them became reddened. Provisional diagnosis is rheumatoid arthritis. One of the most probable causes of this disease is a structure alteration of a connective tissue protein:

- A* Collagen
- B* Mucin
- C* Myosin
- D* Ovoalbumin
- E* Troponin

39

Autopsy of a 12-year-old girl revealed: multiple cutaneous hemorrhages (mostly into the skin of buttocks, lower extremities), serous and mucous membrane hemorrhages, cerebral hemorrhages. Adrenal glands show focal necrosis and massive hemorrhages; kidneys show necrotic nephrosis, suppurative arthritis, iridocyclitis, vasculitis. What is the most probable diagnosis?

- A* Meningococemia
- B* Epidemic typhus
- C* Periarthritis nodosa
- D* Systemic lupus erythematosus
- E* Radiation sickness

40

Examination of a 27-year-old patient revealed pathological changes in liver and brain. Blood plasma analysis revealed an abrupt decrease in the copper concentration, urine analysis revealed an increased copper concentration. The patient was diagnosed with Wilson's degeneration. To confirm the diagnosis it is necessary to study the activity of the following enzyme in blood serum:

- A* Ceruloplasmin
- B* Carbonic anhydrase
- C* Xanthine oxidase
- D* Leucine aminopeptidase
- E* Alcohol dehydrogenase

41

A patient complains about dyspnea provoked by the physical activity. Clinical examination revealed anaemia and presence of the paraprotein in the zone of gamma-globulins. To confirm the myeloma diagnosis it is necessary to determine the following index in the patient's urine:

- A* Bence Jones protein
- B* Bilirubin
- C* Haemoglobin
- D* Ceruloplasmin
- E* Antitrypsin

42

Examination of a child who hasn't got fresh fruit and vegetables during winter revealed numerous subcutaneous hemorrhages, gingivitis, carious cavities in teeth. What vitamin combination should be prescribed in this case?

- A* Ascorbic acid and rutin
- B* Thiamine and pyridoxine
- C* Folic acid and cobalamin
- D* Riboflavin and nicotinamide
- E* Calciferol and ascorbic acid

43

A drycleaner's worker has been found to have hepatic steatosis. This pathology can be caused by the disruption of synthesis of the following substance:

- A* Phosphatidylcholine
- B* Tristearin
- C* Urea
- D* Phosphatidic acid
- E* Cholic acid

44

As a result of exhausting muscular work a worker has largely reduced buffer capacity of blood. What acidic substance that came to blood caused this phenomenon?

- A* Lactate
- B* Pyruvate
- C* 1,3-bisphosphoglycerate
- D* 3-phosphoglycerate
- E* -

45

A patient was delivered to the hospital by an emergency team. Objectively: grave condition, unconscious, adynamy. Cutaneous surfaces are dry, eyes are sunken, face is cyanotic. There is tachycardia and smell of acetone from the mouth. Analysis results: blood glucose - 20,1 micromole/l (standard is 3,3-5,5 micromole/l), urine glucose - 3,5% (standard is - 0). What is the most probable diagnosis?

- A* Hyperglycemic coma
- B* Hypoglycemic coma
- C* Acute heart failure
- D* Acute alcoholic intoxication
- E* Anaphylactic shock

46

A 62 y.o. woman complains of frequent pains in the area of her chest and backbone, rib fractures. A doctor assumed myelomatosis (plasmocytoma). What of the following laboratory characteristics will be of the greatest diagnostical importance?

- A* Paraproteinemia
- B* Hyperalbuminemia
- C* Proteinuria
- D* Hypoglobulinemia
- E* Hypoproteinemia

47

A newborn child has convulsions that have been observed after prescription of vitamin B₆.

This most probable cause of this effect is that vitamin B₆ is a component of the following enzyme:

- A* Glutamate decarboxylase
- B* Pyruvate dehydrogenase
- C* Netoglutarate dehydrogenase
- D* Aminolevulinic synthase
- E* Glycogen phosphorylase

48

Nappies of a newborn have dark spots that witness of formation of homogentisic acid.

Metabolic imbalance of which substance is it connected with?

- A* Tyrosine
- B* Galactose
- C* Methionine
- D* Cholesterol
- E* Tryptophan

49

Parodontitis is treated with calcium preparations and a hormone that stimulates tooth mineralization and inhibits tissue resorption. What hormone is it?

- A* Calcitonin
- B* Parathormone
- C* Adrenalin
- D* Aldosterone
- E* Thyroxine

50

A child has an acute renal failure. What biochemical factor found in saliva can confirm this diagnosis?

- A* Increase in urea concentration
- B* Increase in glucose concentration
- C* Decrease in glucose concentration
- D* Increase in concentration of higher fatty acids
- E* Decrease in nucleic acid concentration

51

After implantation of a cardiac valve a young man constantly takes indirect anticoagulants. His state was complicated by hemorrhage. What substance content has decreased in blood?

- A* Prothrombin
- B* Haptoglobin
- C* Heparin
- D* Creatin
- E* Ceruloplasmin

52

After severe viral hepatitis a 4 year old boy presents with vomiting, occasional loss of consciousness, convulsions. Blood test revealed hyperammonemia. Such condition is caused by a disorder of the following biochemical hepatic process:

- A* Disorder of ammonia neutralization
- B* Disorder of biogenic amines neutralization
- C* Protein synthesis inhibition
- D* Activation of amino acid decarboxylation
- E* Inhibition of transamination enzymes

53

A 50-year-old patient complains about general weakness, appetite loss and cardiac arrhythmia. The patient presents with muscle hypotonia, flaccid paralyses, weakened peristaltic activity of the bowels. Such condition might be caused by:

- A* Hypokaliemia
- B* Hypoproteinemia
- C* Hyperkaliemia
- D* Hypophosphatemia
- E* Hyponatremia

54

An 18-year-old patient has enlarged inguinal lymphnodes, they are painless, thickened on palpation. In the area of genital mucous membrane there is a small-sized ulcer with thickened edges and "laquer" bottom of greyish colour. What is the most probable diagnosis?

- A* Syphilis
- B* Tuberculosis
- C* Lepra
- D* Trophic ulcer
- E* Gonorrhea

55

A patient with suspected diphtheria went through bacterioscopic examination. Examination of throat swab revealed rod-shaped bacteria with volutin granules. What etiotropic preparation should be chosen in this case?

- A* Antidiphtheric antitoxic serum
- B* Bacteriophage

- C* Diphtheria antitoxin
- D* Eubiotic
- E* Interferon

56

A woman who has been keeping to a clean-rice diet for a long time was diagnosed with polyneuritis (beriberi). What vitamin deficit results in development of this disease?

- A* Thiamine
- B* Ascorbic acid
- C* Pyridoxine
- D* Folic acid
- E* Riboflavin

57

Removal of gall bladder of a patient has disturbed processes of Ca absorption through the intestinal wall. What vitamin will stimulate this process?

- A* D₃
- B* PP
- C* C
- D* B₁₂
- E* K

58

A 1,5-year-old child presents with both mental and physical lag, decolorizing of skin and hair, decrease in catecholamine concentration in blood. When a few drops of 5% solution of trichloroacetic iron had been added to the child's urine it turned olive green. Such alteration are typical for the following pathology of the amino acid metabolism:

- A* Phenylketonuria
- B* Alkaptonuria
- C* Tyrosinosis
- D* Albinism
- E* Xanthinuria

59

Feces of a patient contain high amount of undissociated fats and have grayish-white color. Specify the cause of this phenomenon:

- A* Obturation of bile duct
- B* Hypoactivation of pepsin by hydrochloric acid
- C* Hypovitaminosis
- D* Enteritis
- E* Irritation of intestinal epithelium

60

A patient complains of frequent diarrheas, especially after consumption of fattening food, and of body weight loss. Laboratory examination revealed steatorrhea; hypocholic feces. What can be the cause of this condition?

- A* Obturation of biliary tracts
- B* Mucous membrane inflammation of small intestine
- C* Lack of pancreatic lipase
- D* Lack of pancreatic phospholipase
- E* Unbalanced diet

61

A child is languid, apathetic. Liver is enlarged and liver biopsy revealed a significant excess of glycogene. Glucose concentration in the blood stream is below normal. What is the cause of low glucose concentration?

- A* Low (absent) activity of glycogene phosphorylase in liver
- B* Low (absent) activity of hexokinase
- C* High activity of glycogen synthetase
- D* Low (absent) activity of glucose 6-phosphatase
- E* Deficit of a gene that is responsible for synthesis of glucose 1-phosphaturidine transferase

62

A 46-year-old female patient consulted a doctor about pain in the small joints of the upper and lower limbs. The joints are enlarged and shaped like thickened nodes. Serum test revealed an increase in urate concentration. This might be caused by a disorder in metabolism of:

- A* Purines
- B* Carbohydrates
- C* Lipids
- D* Pyrimidines
- E* Amino acids

63

A 65 year old man suffering from gout complains of kidney pain. Ultrasound examination revealed renal calculi. The most probable cause of calculi formation is the strengthened concentration of the following substance:

- A* Uric acid
- B* Cholesterol
- C* Bilirubin
- D* Urea
- E* Cystine

64

A 5-year-old child who often falls ill with respiratory diseases has eczematous appearances after consumption of some food products, tendency to prolonged course of inflammatory processes. What kind of diathesis can be suspected in this case?

- A* Exudative-catharral
- B* Hemmorrhagic
- C* Arthritism
- D* Lymphohypoplastic
- E* Asthenic

65

The greater amount of nitrogen is excreted from the organism in form of urea. Inhibition of urea synthesis and accumulation of ammonia in blood and tissues are induced by the decreased activity of the following liver enzyme:

- A* Carbamoyl phosphate synthetase
- B* Aspartate aminotransferase
- C* Urease
- D* Amylase
- E* Pepsin

66

A 35 y.o. patient who often consumes alcohol was treated with diuretics. There appeared serious muscle and heart weakness, vomiting, diarrhea, AP- 100/60 mm Hg, depression. This condition is caused by intensified excretion with urine of:

- A* Potassium
- B* Sodium
- C* Chlorine
- D* Calcium
- E* Phosphates

67

After intake of rich food a patient feels nausea and sluggishness; with time there appeared signs of steatorrhea. Blood cholesterol concentration is 9,2 micromole/l. This condition was caused by lack of:

- A* Bile acids
- B* Triglycerides
- C* Fatty acids
- D* Phospholipids
- E* Chylomicrons

68

Examination of a man who hadn't been consuming fats but had been getting enough carbohydrates and proteins for a long time revealed dermatitis, poor wound healing, vision impairment. What is the probable cause of metabolic disorder?

- A* Lack of linoleic acid, vitamins A, D, E, K
- B* Lack of palmitic acid
- C* Lack of vitamins PP, H
- D* Low caloric value of diet
- E* Lack of oleic acid

69

A 44-year-old woman complains of common weakness, heart pain, considerable increase of body weight. Objectively: moon-like face, hirsutism, AP- 165/100 mm Hg, height - 164 cm, weight - 103 kg; fat is mostly accumulated in the region of neck, upper shoulder girdle, stomach. What is the main pathogenetic mechanism of obesity?

- A* Increased production of glucocorticoids
- B* Decreased production of thyroidal hormones
- C* Increased production of insulin
- D* Decreased production of glucagon
- E* Increased production of mineralocorticoids

70

An experimental animal has been given excessive amount of carbon-labeled glucose for a week. What compound can the label be found in?

- A* Palmitic acid
- B* Methionine
- C* Vitamin A
- D* Choline
- E* Arachidonic acid

71

After a serious viral infection a 3-year-old child has repeated vomiting, loss of consciousness, convulsions. Examination revealed hyperammonemia. What may have caused changes of biochemical blood indices of this child?

- A* Disorder of ammonia neutralization in ornithinic cycle
- B* Activated processes of aminoacids decarboxylation
- C* Disorder of biogenic amines neutralization
- D* Increased putrefaction of proteins in intestines
- E* Inhibited activity of transamination enzymes

72

Examination of a patient with frequent hemorrhages from internals and mucous membranes revealed proline and lysine being a part of collagene fibers. What vitamin absence caused disturbance of their hydroxylation?

- A* Vitamin C
- B* Vitamin K
- C* Vitamin A
- D* Thiamine
- E* Vitamin E

73

Albinos can't stand sun impact - they don't aquire sun-tan but get sunburns. Disturbed metabolism of what aminoacid underlies this phenomenon?

- A* Phenilalanine
- B* Methionine
- C* Tryptophan
- D* Glutamic acid
- E* Histidine

74

A nurse accidentally injected a nearly double dose of insulin to a patient with diabetes mellitus. The patient lapsed into a hypoglycemic coma. What drug should be injected in order to help him out of coma?

- A* Glucose
- B* Lidase
- C* Insulin
- D* Somatotropin
- E* Noradrenaline

75

A biochemical urine analysis has been performed for a patient with progressive muscular dystrophy. In the given case muscle disease can be confirmed by the high content of the following substance in urine:

- A* Creatine
- B* Porphyrin
- C* Urea
- D* Hippuric acid
- E* Creatinine

76

A patient with continious bronchopneumonia was admitted to the therapeutic department.

Antibiotic therapy didn't give much effect. What medication for improvement of immune state should be added to the complex treatment of this patient?

- A* Timaline
- B* Analgin
- C* Sulfocamphocaine
- D* Benadryl
- E* Paracetamol

77

A patient suffers from hepatic cirrhosis. Examination of which of the following substances excreted by urine can characterize the state of antitoxic function of liver?

- A* Hippuric acid
- B* Ammonium salts
- C* Kreatinine
- D* Uric acid
- E* Aminoacids

78

Malaria is treated with structural analogs of vitamin B₂ (riboflavin). These drugs disrupt the synthesis of the following enzymes in plasmodium:

- A* FAD-dependent dehydrogenase
- B* Cytochrome oxidase
- C* Peptidase
- D* NAD-dependent dehydrogenase
- E* Aminotransferase

79

Vitamin A together with specific cytoceptors penetrates through the nuclear membranes, induces transcription processes that stimulate growth and differentiation of cells. This biological function is realized by the following form of vitamin A:

- A* Trans-retinoic acid
- B* Trans-retinal
- C* Cis-retinal
- D* Retinol
- E* Carotin

80

Products of some proteins hydrolysis and modification are the biologically active substances called hormones. Lipotropin, corticotropin, melanotropin and endorphins are synthesized in the hypophysis of the following protein:

- A* Proopiomelanocortin (POMC)
- B* Neuroalbumin
- C* Neurostromin
- D* Neuroglobulin
- E* Thyreoglobulin

81

In patients with the biliary tract obstruction the blood coagulation is inhibited; the patients have frequent haemorrhages caused by the subnormal assimilation of the following vitamin:

- A* K
- B* A

C D
D E
E C

82

A newborn child suffers from milk curdling in stomach, this means that soluble milk proteins (caseins) transform to insoluble proteins (paracaseins) by means of calcium ions and a certain enzyme. What enzyme takes part in this process?

- A* Renin
- B* Pepsin
- C* Gastrin
- D* Secretin
- E* Lipase

83

A sportsman was recommended to take a medication that contains carnitine in order to improve his results. What process is activated by carnitine the most?

- A* Fatty acids transport to mitochondrions
- B* Synthesis of steroid hormones
- C* Synthesis of ketone bodies
- D* Synthesis of lipids
- E* Tissue respiration

84

Human red blood cells do not contain mitochondria. What is the main pathway for ATP production in these cells?

- A* Anaerobic glycolysis
- B* Aerobic glycolysis
- C* Oxidative phosphorylation
- D* Creatine kinase reaction
- E* Cyclase reaction

85

To prevent postoperative bleeding a 6 y.o. child was administered vicasol that is a synthetic analogue of vitamin K. Name post-translational changes of blood coagulation factors that will be activated by vicasol:

- A* Carboxylation of glutamin acid
- B* Phosphorylation of serine radicals
- C* Partial proteolysis
- D* Polymerization
- E* Glycosylation

86

A 4 y.o. boy has had recently serious viral hepatitis. Now there are such clinical presentations as vomiting, loss of consciousness, convulsions. Blood analysis revealed hyperammonemia.

Disturbance of which biochemical process caused such pathological condition of the patient?

- A* Disturbed neutralization of ammonia in liver
- B* Disturbed neutralization of biogenic amines
- C* Increased putrefaction of proteins in bowels
- D* Activation of aminoacid decarboxylation
- E* Inhibition of transamination enzymes

87

During examination of an 11-month-old infant a pediatrician revealed osteoectasia of the lower extremities and delayed mineralization of cranial bones. Such pathology is usually provoked by the deficit of the following vitamin:

- A* Cholecalciferol
- B* Thiamin
- C* Pantothenic acid
- D* Bioflavonoids
- E* Riboflavin

88

Examination of a patient suffering from chronic hepatitis revealed a significant decrease in the synthesis and secretion of bile acids. What process will be mainly disturbed in the patient's bowels?

- A* Fat emulsification
- B* Protein digestion
- C* Carbohydrate digestion
- D* Glycerin absorption
- E* Amino acid absorption

89

Glutamate decarboxylation results in formation of inhibitory transmitter in CNS. Name it:

- A* GABA
- B* Glutathione
- C* Histamine
- D* Serotonin
- E* Asparagine

90

In course of histidine catabolism a biogenic amin is formed that has powerful vasodilatating effect. Name it:

- A* Histamine
- B* Serotonin
- C* Dioxyphenylalanine
- D* Noradrenalin
- E* Dopamine

91

Utilization of arachidonic acid via cyclooxygenase pathway results in formation of some bioactive substances. Name them:

- A* Prostaglandins
- B* Thyroxine
- C* Biogenic amins
- D* Somatomedins
- E* Insulin-like growth factors

92

After a sprint an untrained person develops muscle hypoxia. This leads to the accumulation of the following metabolite in muscles:

- A* Lactate
- B* Ketone bodies
- C* Acetyl CoA
- D* Glucose 6-phosphate
- E* Oxaloacetate

93

Myocyte cytoplasm contains a big number of dissolved metabolites of glucose oxidation. Name one of them that turns directly into a lactate:

- A* Pyruvate
- B* Oxaloacetate
- C* Glycerophosphate
- D* Glucose 6-phosphate
- E* Fructose 6-phosphate

94

Emotional stress causes activation of hormon-sensitive triglyceride lipase in the adipocytes. What secondary mediator takes part in this process?

- A* Cyclic adenosine monophosphate
- B* Cyclic guanosine monophosphate
- C* Adenosine monophosphate
- D* Diacylglycerol
- E* Ions of Ca^{2+}

95

A patient diagnosed with carcinoid of bowels was admitted to the hospital. Analysis revealed high production of serotonin. It is known that this substance is formed of tryptophane aminoacid. What biochemical mechanism underlies this process?

- A* Decarboxylation
- B* Desamination
- C* Microsomal oxydation
- D* Transamination
- E* Formation of paired compounds

96

A genetics specialist analyzed the genealogy of a family and found that both males and females may have the illness, not across all the generations, and that healthy parents may have ill children. What is the type of illness inheritance?

- A* Autosomal recessive
- B* Autosomal dominant
- C* X-linked dominant
- D* X-linked recessive
- E* Y-linked

97

Analysis of amniotic fluid that was obtained as a result of amniocentesis (puncture of amniotic sac) revealed cells the nuclei of which contain sex chromatin (Barr's body). What can it be evidence of?

- A* Development of female fetus
- B* Development of male fetus
- C* Genetic disorders of fetus development

- D* Trisomy
- E* Polyploidy

98

Vitamin B₁ deficiency results in disturbance of oxidative decarboxylation of α -ketoglutaric acid. This will disturb synthesis of the following coenzyme:

- A* Thiamine pyrophosphate
- B* Nicotinamide adenine dinucleotide (NAD)
- C* Flavine adenine dinucleotide (FAD)
- D* Lipoic acid
- E* Coenzyme A

99

A child's blood presents high content of galactose, glucose concentration is low. There are such presentations as cataract, mental deficiency, adipose degeneration of liver. What disease is it?

- A* Galactosemia
- B* Diabetes mellitus
- C* Lactosemia
- D* Steroid diabetes
- E* Fructosemia

100

According to clinical indications a patient was administered pyridoxal phosphate. What processes is this medication intended to correct?

- A* Transamination and decarboxylation of aminoacids
- B* Oxidative decarboxylation of ketonic acids
- C* Desamination of purine nucleotide
- D* Synthesis of purine and pyrimidine bases
- E* Protein synthesis

101

A 45 y.o. woman suffers from Cushing's syndrome - steroid diabetes. Biochemical examination revealed: hyperglycemia, hypochloremia. Which of the under-mentioned processes is the first to be activated?

- A* Gluconeogenesis
- B* Glycogenolysis
- C* Glucose reabsorption
- D* Glucose transport to the cell
- E* Glycolysis

102

Autopsy of a 46-year-old man revealed multiple brown-and-green layers and hemorrhages on the mucous membrane of rectum and sigmoid colon; slime and some blood in colon lumen; histologically - fibrinous colitis. In course of bacteriological analysis of colon contents *S.Sonne* were found. What is the most probable diagnosis?

- A* Dysentery
- B* Cholera
- C* Salmonellosis
- D* Yersiniosis
- E* Crohn's disease

103

A patient had been ill with bronchial asthma for many years and died from asthmatic fit. Histologic lung examination revealed: lumen of bronchioles and small bronches contain a lot of mucus with some eosinophils, there is sclerosis of alveolar septums, dilatation of alveole lumen. What mechanism of development of hypersensitivity reaction took place?

- A* Reagin reaction
- B* Cytotoxic reaction
- C* Immunocomplex reaction
- D* Cytolysis determined by lymphocytes
- E* Granulomatosis

104

Those organisms which in the process of evolution failed to develop protection from H_2O_2 can exist only in anaerobic conditions. Which of the following enzymes can break hydrogen peroxide down?

- A* Peroxidase and catalase
- B* Oxygenase and hydroxylase
- C* Cytochrome oxidase, cytochrome B_5
- D* Oxygenase and catalase
- E* Flavin-dependent oxidase

105

Desulfiram is widely used in medical practice to prevent alcoholism. It inhibits aldehyde dehydrogenase. Increased level of what metabolite causes aversion to alcohol?

- A* Acetaldehyde
- B* Ethanol
- C* Malonyl aldehyde
- D* Propionic aldehyde
- E* Methanol

106

A 1-year-old child with symptoms of muscle involvement was admitted to the hospital. Examination revealed carnitine deficiency in his muscles. What process disturbance is the biochemical basis of this pathology?

- A* Transporting of fatty acids to mitochondrions
- B* Regulation of Ca^{2+} level in mitochondrions
- C* Substrate phosphorylation
- D* Lactic acid utilization
- E* Actin and myosin synthesis

107

A man got poisoned with mushrooms. They contain muscarine that stimulates muscarinic cholinoreceptors. What symptom is typical for poisoning with inedible mushrooms?

- A* Miosis
- B* Mydriasis
- C* Bronchi dilation
- D* Heart rate rise
- E* Arterial pressure rise

108

Prolonged fasting causes hypoglycemia which is amplified by alcohol consumption, as the following process is inhibited:

- A* Gluconeogenesis
- B* Glycolysis
- C* Glycogenolysis
- D* Lipolysis
- E* Proteolysis

109

As a result of posttranslative modifications some proteins taking part in blood coagulation, particularly prothrombin, become capable of calcium binding. The following vitamin takes part in this process:

- A* K
- B* C
- C* A
- D* B₁
- E* B₂

110

Objective examination of a patient revealed: slender figure, big skull, highly developed frontal region of face, short extremities. What constitutional type is it characteristic for?

- A* Respiratory
- B* Muscular
- C* Digestive
- D* Cerebral
- E* Mixed

111

A 38-year-old patient died during intractable attack of bronchial asthma. Histologic examination revealed mucus accumulation in bronchial lumen, a lot of fat cells (labrocytes) in the wall of bronches, many of them are in the state of degranulation, there are also a lot of eosinophils.

What pathogenesis of bronchial changes is it?

- A* Atopy
- B* Cytotoxic, cytolytic action of antibodies
- C* Immunocomplex mechanism
- D* Cellular cytolysis
- E* Granulomatosis

112

Diabetes mellitus causes ketosis as a result of activated oxidation of fatty acids. What disorders of acid-base equilibrium may be caused by excessive accumulation of ketone bodies in blood?

- A* Metabolic acidosis
- B* Metabolic alkalosis
- C* Any changes woun't happen
- D* Respiratory acidosis
- E* Respiratory alkalosis

113

A woman with 0 (I) blood group has born a child with AB blood group. This woman's husband has A blood group. What genetic interaction explains this phenomenon?

- A* Recessive epistasis
- B* Codominance
- C* Polymery
- D* Incomplete dominance
- E* Complementation

114

Osteolaterism is characterized by a decrease in collagen strength caused by much less intensive formation of cross-links in collagen fibrils. This phenomenon is caused by the low activity of the following enzyme:

- A* Lysyl oxidase
- B* Monoamino-oxidase
- C* Prolyl hydroxylase
- D* Lysyl hydroxylase
- E* Collagenase

115

Depressions and emotional insanities result from the deficit of noradrenalin, serotonin and other biogenic amines in the brain. Their concentration in the synapses can be increased by means of the antidepressants that inhibit the following enzyme:

- A* Monoamine oxidase
- B* Diamine oxidase
- C* L-amino-acid oxidase
- D* D-amino-acid oxidase
- E* Phenylalanine-4-monooxygenase

116

A 3 year old child with symptoms of stomatitis, gingivitis and dermatitis of open skin areas was delivered to a hospital. Examination revealed inherited disturbance of neutral amino acid transporting in the bowels. These symptoms were caused by the deficiency of the following vitamin:

- A* Niacin
- B* Pantothenic acid
- C* Vitamin A
- D* Cobalamin
- E* Biotin

117

A 5-month-old boy was hospitalized for tonic convulsions. He has a life-time history of this disease. Examination revealed coarse hair, thinned and fragile nails, pale and dry skin. In blood: calcium - 1,5 millimole/l, phosphor - 1,9 millimole/l. These changes are associated with:

- A* Hypoparathyroidism
- B* Hyperparathyroidism
- C* Hyperaldosteronism
- D* Hypoaldosteronism
- E* Hypothyroidism

118

During hypersensitivity test a patient got subcutaneous injection of an antigen which caused reddening of skin, edema, pain as a result of histamine action. This biogenic amine is generated as a result of transformation of the following histidine amino acid:

- A* Decarboxylation
- B* Methylation
- C* Phosphorylation
- D* Isomerization
- E* Deaminization

119

A patient with suspected diagnosis "progressing muscular dystrophy" got his urine tested. What compound will confirm this diagnosis if found in urine?

- A* Kreatine
- B* Collagen
- C* Porphyrin
- D* Myoglobin
- E* Calmodulin

120

Cytogenetic examination of a patient with dysfunction of the reproductive system revealed normal karyotype 46,XY in some cells, but most cells have Klinefelter's syndrome karyotype - 47,XXY. Such phenomenon of cell inhomogeneity is called:

- A* Mosaicism
- B* Inversion
- C* Transposition
- D* Duplication
- E* Heterogeneity

121

An oncological patient had been administered methotrexate. With time target cells of the tumour lost sensitivity to this drug. At the same time the change in gene expression of the following enzyme is observed:

- A* Dehydropholate reductase
- B* Thiaminase
- C* Deaminase
- D* Pholate oxidase
- E* Pholate decarboxylase

122

A patient complained about dizziness, memory impairment, periodical convulsions. It was revealed that these changes were caused by a product of decarboxylation of glutamic acid. Name this product:

- A* GABA
- B* Pyridoxal phosphate
- C* TDP
- D* ATP
- E* THFA

123

A sportsman needs to improve his sporting results. He was recommended to take a preparation that contains carnitine. What process is activated the most by this compound?

- A* Fatty acids transporting
- B* Amino acids transporting
- C* Calcium ions transporting

- D* Glucose transporting
- E* Vitamin K transporting

124

A doctor examined a child and revealed symptoms of rachitis. Development of this disease was caused by deficiency of the following compound:

- A* 1,25 [OH]-dichydroxycholecalciferol
- B* Biotin
- C* Tocopherol
- D* Naphtaquinone
- E* Retinol

125

Laboratory examination of a child revealed increased concentration of leucine, valine, isoleucine and their ketoderivatives in blood and urine. Urine smelt of maple syrup. This disease is characterized by the deficit of the following enzyme:

- A* Dehydrogenase of branched amino acids
- B* Aminotransferase
- C* Glucose-6-phosphatase
- D* Phosphofructokinase
- E* Phosphofructomutase

126

A 9-month-old infant is fed with artificial formulas with unbalanced vitamin B₆ concentration. The infant presents with pellagral dermatitis, convulsions, anaemia. Convulsion development might be caused by the disturbed formation of:

- A* GABA
- B* Histamine
- C* Serotonin
- D* DOPA
- E* Dopamine

127

It was found out that some compounds, for instance fungi toxins and some antibiotics can inhibit activity of RNA-polymerase. What process will be disturbed in a cell in case of inhibition of this enzyme?

- A* Transcription
- B* Processing
- C* Replication
- D* Translation
- E* Reparation

128

When blood circulation in the damaged tissue is restored, then lactate accumulation comes to a stop and glucose consumption decelerates. These metabolic changes are caused by activation of the following process:

- A* Aerobic glycolysis
- B* Anaerobic glycolysis
- C* Lipolysis
- D* Gluconeogenesis
- E* Glycogen biosynthesis

129

During starvation muscle proteins break up into free amino acids. These compounds will be the most probably involved into the following process:

- A* Gluconeogenesis in liver
- B* Gluconeogenesis in muscles
- C* Synthesis of higher fatty acids
- D* Glycogenolysis
- E* Decarboxylation

130

Examination of a patient revealed II grade obesity. It is known that he consumes a lot of sweets and rich food, has sedentary way of life. That's why anabolic metabolism has the priority in his organism. Which of the following pathways is amphibolic?

- A* Cycle of tricarboxylic acids
- B* Glyconeogenesis
- C* Lipolysis
- D* Glycolysis
- E* Fatty acids oxidation

131

Surgical removal of a part of stomach resulted in disturbed absorption of vitamin B_{12} , it is excreted with feces. The patient was diagnosed with anemia. What factor is necessary for absorption of this vitamin?

- A* Gastromucoprotein
- B* Gastrin
- C* Hydrochloric acid
- D* Pepsin
- E* Folic acid

132

A newborn develops dyspepsia after the milk feeding. When the milk is substituted by the glucose solution the dyspepsia symptoms disappear. The newborn has the subnormal activity of the following enzyme:

- A* Lactase
- B* Invertase
- C* Maltase
- D* Amylase
- E* Isomaltase

133

Patients who suffer from severe diabetes and don't receive insulin have metabolic acidosis. This is caused by increased concentration of the following metabolites:

- A* Ketone bodies
- B* Fatty acids
- C* Unsaturated fatty acids
- D* Triacylglycerols
- E* Cholesterol

134

A 4 year old child with hereditary renal lesion has signs of rickets, vitamin D concentration in blood is normal. What is the most probable cause of rickets development?

- A* Impaired synthesis of calcitriol
- B* Increased excretion of calcium
- C* Hyperfunction of parathyroid glands
- D* Hypofunction of parathyroid glands
- E* Lack of calcium in food

135

A patient presents with dysfunction of cerebral cortex accompanied by epileptic seizures. He has been administered a biogenic amine synthesized from glutamate and responsible for central inhibition. What substance is it?

- A* Gamma-amino butyric acid
- B* Serotonin
- C* Dopamine
- D* Acetylcholine
- E* Histamine

136

Toxic affection of liver results in dysfunction of protein synthesis. It is usually accompanied by the following kind of dysproteinemia:

- A* Absolute hypoproteinemia
- B* Relative hypoproteinemia
- C* Absolute hyperproteinemia
- D* Relative hyperproteinemia
- E* Paraproteinemia

137

A 6 year old child was delivered to a hospital. Examination revealed that the child couldn't fix his eyes, didn't keep his eyes on toys, eye ground had the cherry-red spot sign. Laboratory analyses showed that brain, liver and spleen had high rate of ganglioside glycometide. What congenital disease is the child ill with?

- A* Tay-Sachs disease
- B* Wilson's syndrome
- C* Turner's syndrome
- D* Niemann-Pick disease
- E* MacArdle disease

138

In clinical practice tuberculosis is treated with isoniazid preparation - that is an antivitamin able to penetrate into the tuberculosis bacillus. Tuberculostatic effect is induced by the interference with replication processes and oxidation-reduction reactions due to the buildup of pseudo-coenzyme:

- A* NAD
- B* FAD
- C* FMN
- D* TDP
- E* CoQ

139

A newborn child was found to have reduced intensity of sucking, frequent vomiting, hypotonia.

Urine and blood exhibit increased concentration of citrulline. What metabolic process is disturbed?

- A* Ornithinic cycle
- B* Tricarboxylic acid cycle
- C* Glycolysis
- D* Glyconeogenesis
- E* Cori cycle

140

Dietary intake of a 30 year old nursing woman contains 1000 mg of calcium, 1300 mg of phosphorus and 20 mg of iron per day. It is necessary to change content of these mineral substances in the following way:

- A* To increase phosphorus content
- B* To increase calcium content
- C* To reduce fluorine content
- D* To increase iron content
- E* To reduce iron content

141

Cardinal symptoms of primary hyperparathyroidism are osteoporosis and renal lesion along with development of urolithiasis. What substance makes up the basis of these calculi in this disease?

- A* Calcium phosphate
- B* Uric acid
- C* Cystine
- D* Bilirubin
- E* Cholesterol

142

Study of conversion of a food colouring agent revealed that neutralization of this xenobiotic takes place only in one phase - microsomal oxydation. Name a component of this phase:

- A* Cytochrome P-450
- B* Cytochrome B
- C* Cytochrome C
- D* Cytochrome A
- E* Cytochrome oxidase

143

A patient had hemorrhagic stroke. Blood examination revealed strengthened kinin concentration. The patient was prescribed contrical. It was administered in order to inhibit the following proteinase:

- A* Kallikrein
- B* Pepsin
- C* Trypsin
- D* Chemotrypsin
- E* Collagenase

144

A 49-year-old driver complains about unbearable constricting pain behind the breastbone irradiating to the neck. The pain arose 2 hours ago. Objectively: the patient's condition is grave, he is pale, heart tones are decreased. Laboratory studies revealed high activity of creatine

kinase and LDH₁. What disease are these symptoms typical for?

- A* Acute myocardial infarction
- B* Acute pancreatitis
- C* Stenocardia
- D* Cholelithiasis
- E* Diabetes mellitus

145

Plasmic factors of blood coagulation are exposed to post-translational modification with the participation of vitamin K. It is necessary as a cofactor in the enzyme system of γ -carboxylation of protein factors of blood coagulation due to the increased affinity of their molecules with calcium ions. What amino acid is carboxylated in these proteins?

- A* Glutamic
- B* Valine
- C* Serine
- D* Phenylalanine
- E* Arginine

146

Pharmacological effects of antidepressants are connected with inhibition of an enzyme catalyzing biogenic amines noradrenaline and serotonin in the mitochondrions of cerebral neurons. What enzyme participates in this process?

- A* Monoamine oxidase
- B* Transaminase
- C* Decarboxylase
- D* Peptidase
- E* Lyase

147

An oncological patient was prescribed methotrexate. With the lapse of time target cells of the tumour lost susceptibility to this drug. There is change of gene expression of the following enzyme:

- A* Dehydrofolate reductase
- B* Thiaminase
- C* Deaminase
- D* Folate oxidase
- E* Folate decarboxylase

148

A 67-year-old male patient consumes eggs, pork fat, butter, milk and meat. Blood test results: cholesterol - 12,3 mmol/l, total lipids - 8,2 g/l, increased low-density lipoprotein fraction (LDL). What type of hyperlipoproteinemia is observed in the patient?

- A* Hyperlipoproteinemia type IIa
- B* Hyperlipoproteinemia type I
- C* Hyperlipoproteinemia type IIb
- D* Hyperlipoproteinemia type IV
- E* Cholesterol, hyperlipoproteinemia

149

A patient with signs of osteoporosis and urolithiasis has been admitted to the endocrinology department. Blood test has revealed hypercalcemia and hypophosphatemia. These changes

are associated with abnormal synthesis of the following hormone:

A Parathyroid hormone

B Calcitonin

C Cortisol

D Aldosterone

E Calcitriol

150

Increased HDL levels decrease the risk of atherosclerosis. What is the mechanism of HDL anti-atherogenic action?

A They remove cholesterol from tissues

B They supply tissues with cholesterol

C They are involved in the breakdown of cholesterol

D They activate the conversion of cholesterol to bile acids

E They promote absorption of cholesterol in the intestine