Ministry of Public Health of Ukraine

O. O. BOGOMOLETS NATIONAL MEDICAL UNIVERSITY

Department of Bioorganic and Biological Chemistry

LIST OF TEST QUESTIONS

for preparation of Content module № 3

" Biochemistry of tissues and physiological functions "

FOR STUDENTS OF THE 2ST YEAR OF STUDY OF MEDICAL and STOMATOLOGICAL FACULTIES

Kyiv-2019

Compilers:

Yanitskaya L.V., PhD in biology, associated professor of bioorganic and biological chemistry department in O. O. Bogomolets National Medical University;

Oberikhina N.V., PhD in chemistry, associated professor of bioorganic and biological chemistry department in O. O. Bogomolets National Medical University;

Yurzhenko N.N., PhD in chemistry, teaching fellow associated of bioorganic and biological chemistry department in O. O. Bogomolets National Medical University;

Pradii T.P., teaching fellow associated of bioorganic and biological chemistry department in O. O. Bogomolets National Medical University;

Sanzhur T.S., teaching fellow associated of bioorganic and biological chemistry department in O. O. Bogomolets National Medical University;

Mykhailova A.G., teaching fellow associated of bioorganic and biological chemistry department in O. O. Bogomolets National Medical University;

Edited by *Gayova L.V.,* Dr. Sci. Med., professor, head of bioorganic and biological chemistry department in O.O. Bogomolets National Medical University.

Approved:

At the cycle commission meeting for medical and biological disciplines in O.O. Bogomolets National Medical University in the form List of test questions for preparation of Content module № 3 "Biochemistry of tissues and physiological functions" for students of the 2st year of study of medical and stomatological faculties, protocol № 4 from 11th of February 2019.

At the meeting of the bioorganic and biological chemistry department in O.O. Bogomolets National Medical University in the form List of test questions for preparation of Content module № 3 "Biochemistry of tissues and physiological functions" for students of the 2st year of study of medical and stomatological faculties, protocol № 13 from 23th of January 2019.

The system of licensed integrated examinations is a complex of means of standardized verification of the level of professional competence, which is an integral part of the state certification of students who are being trained the specialties "Medicine" and "Pharmacy".

The purpose of the licensed integrated exam is to establish the compliance of the level of professional competence of the graduate with the minimum required level in accordance with the requirements of the State standards of higher education. Professional competence is defined as the ability to apply knowledge and understanding of fundamental biomedical sciences and basic medical disciplines that are basic to assisting the patient under the supervision of a more experienced physician.

The Licensed Integrated Exam includes one, two or three separate test assignments, depending on the educational qualification level. The content of the test tasks of the licensed integrated exam is approved annually by the Ministry of Health of Ukraine and should correspond to educational and professional programs.

Future specialists of the "Specialist" and "Master" levels (doctors, dentists, pharmacists, psychologists, etc.) consistently take three exams - Step 1, Step 2, and Step 3.

"Step 1" - is an exam of general scientific sciences, which is passed after studying the basic fundamental disciplines, which are part of "Step 1". The test exam is on the 3rd course (future physicians and dental practitioners).

The value of the "passed" criterion is approved by the Ministry of Health of Ukraine (Order of the Ministry of Health of Ukraine dated 05.10.2016 №1043) and makes up 60.5% of the correct answers. For all students who received on the test exams "Step 1" result "unpassed," is allowed to

re-pass of "Step 1" not more than two times before the nearest session in terms approved by the Ministry of Health of Ukraine. In case of not retaking the exam «Step 1», the student is not allowed to the next examination session and deducted from a higher educational institution as having failed to complete the curriculum.

The content of the exam "Step 1. Dentistry" is: microbiology (6-8%), biology (7-9%), histology (9-11%), pathological anatomy (10-14%), pharmacology (10-14%). , normal physiology (10-14%), pathological physiology (10-14%), biological chemistry (10-14%), normal anatomy (13-17%).

The content of the exam "Step 1. General medical preparation" consists of: histology (4-6%), biology (6-8%), microbiology (7-9%), normal anatomy (9-11%), pathological anatomy (10-14%), pharmacology (11-15%), normal physiology (13-17%), pathological physiology (13-17%), biological chemistry (13-17%).

The collection of test tasks for biological chemistry for preparation for the license exam "Step 1. General medical preparation" and "Step 1. Stomatology" is intended for students of the 2nd year of medical faculties, medical-psychological, dental faculties and faculty of training of doctors of the armed forces of Ukraine. About 700 test tasks are included, which are grouped according to the themes of the content module №3 " Biochemistry of tissues and physiological functions". Test tasks are standardized, each of them has one correct answer (format A). Individual work with test tasks will help improve the quality of the studied material and prepare for the license integrated examination "Step 1. General medical preparation" and "Step 1. Dentistry", as well as preparation for the examination on the discipline "Biological chemistry".

Content

1. Gastroenterologists were assigned allopurinol, which inhibits the synthesis of uric acid by inactivating such an enzyme:
A. Xanthine oxidase
B. Deaminase
C. Hyaluronidase
D. Lactate dehydrogenase
E. Transaminase

2. On the basis of laboratory analysis, the patient was diagnosed with gout. Based on laboratory analysis, the patient confirmed the diagnosis of gout. What was the analysis for the diagnosis?
A. Determination of uric acid in the blood and urine
B. Determination of urinary creatinine
C. Determination of residual nitrogen in the blood
D. The determination of urea in the blood and urine
E. Determination of urine ammonia

3. A patient suffering from gout was prescribed allopurinol.What pharmacological property of allopurinol provides the rapeutic effect in this case?
A. Competitive inhibition of xanthine oxidase
B. Acceleration of nitrogen-containing substances excretion
C. Acceleration of pyrimidine nucleotides catabolism
D. Deceleration of pyrimidine nucleotides salvage
E. Acceleration of nucleic acids synthesis

4. 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

5. A 42-year-old man suffering from gout has increased level of urinary acid in blood. Allopurinol was prescribed to decrease the level of urinary acid. Competitive inhibitor of what enzyme is allopurinol?
A. Xanthine oxidase
B. Adenosine deaminase
C. Adenine phosphoribosiltransferase
D. Hypoxanthine phosphoribosiltransferase
E. Guanine deaminase

6. Allopurinol is a competitor of xanthine oxidase, who was prescribed for urolithiasis after the examination. The basis for this was the chemical analysis of kidney stones, which consisted mainly of:
A. Urat sodium
B. Dihydrate calcium oxalate
C. Monohydrate calcium oxalate
D. Phosphate calcium
E. Calcium Sulphate

7. A 48 year old patient complained about intense pain, slight swelling and reddening of skin over the joints, temperature rise up to 38oC. 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

8. 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

9. A patient has increased content of uric acid in his blood that is clinically presented by pain syndrome as a result of urate deposition in the joints. What process does this acid result from?
A. Lysis of purine nucleotides
B. Lysis of pyrimidine nucleotides
C. Heme catabolism
D. Proteolysis
E. Reutilization of purine bases

10. 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

11. In the synthesis of purine nucleotides, some amino acids, indigenous vitamins, phosphoric ribozymes are involved. Name the most important vitamin needed for purine nucleotide synthesis de novo.
A. Folic acid
B. Pantothenic acid
C. Nicotinic acid
D. Ryboflavin
E. Pyridoxine

12. The patient has a hypovitaminosis of folate, which may lead to a violation of the synthesis:
A. Purin and Tymidyl nucleotides
B. Purine nucleotides and cholesterol
C. Tymidyl nucleotides and fatty acids
D. Heme and creatine
E. Citrate and ketone bodies

13. Purine ring biosynthesis occurs in ribose-5-phosphate through gradual accumulation of nitrogen and carbon atoms and closing of the rings. The source of ribose phosphate is the process of:
A. Pentose phosphate cycle
B. Glycolysis
C. Glyconeogenesis
D. Gluconeogenesis
E. Glycogenolysis

14. A 8 year old boy suffering from the Lesh-Nichan disease.He has increased content of uric acid in his blood. Indicate which violation of the process is the cause of this hereditary disease?
A. Lysis of purine nucleotides
B. Synthesis of purine nucleotides
C. Synthesis of pyrimidine nucleotides
D. Lysis of pyrimidine nucleotides
E. Formation of deoxyribonucleotides

15. Children with Lesch-Nyhan syndrome have a severe form of hyperuricemia accompanied by the formation of tophi, urate calculi in the urinary tracts, as well as serious neuro-psychiatric disorders. The cause of this disease is the reduced activity of the following enzyme:
A.Hypoxanthine-guanine
phosphoribosyltransferase
B. Xanthine oxidase
C. Dihydrofolate reductase
D. Thymidylate synthase
E. Karbamoyl phosphate synthetase

16. A 1,7-year-old child with a developmental delay and manifestations of self-agression has the concentration of uric acid in blood at the rate of 1,96 millimole/l. What metabolic disoder is this typical for?
A. Lesch-Nyhan syndrome
B. Podagra
C. Acquired immunodeficiency syndrome
D. Gierke's disease
E. Cushing's basophilism

17. A newborn child gains weight very slowly, his urine contains too much orotic acid that is indicative of disturbed synthesis of pyrimidine nucleotides. What metabolite should be used in order to normalize metabolism?
A. Uridine
B. Adenosine
C. Guanosine
D. Thymidine
E. Histidine

18. In orotaciduria the release of Orotic acid is many times higher than normal. Synthesis of what substances will be disturbed in this pathology?
A. Pyrimidine nucleotides.
B. Biogenic Amines.
C. Purine nucleotides.
D. Urea
E. Uric acid

19. Pterin derivatives (aminopterin and methotrexate) are the inhibitors of dihydrofolate reductase, so that they inhibit the regeneration of tetrahydrofolic acid from dihydrofolate. These drugs inhibit the intermolecular tranfer of monocarbon groups, thus suppressing the synthesis of the following polymer:
A. DNA
B. Protein
C. Homopolysaccharides

D. Gangliosides
E. Glycosaminoglycans

20. 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 hinder synthesis of the nucleic acids?
A. Mononucleotide synthesis
B. Replication
C. Transcription
D. Reparation
E. Processing

21. 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 hinder synthesis of the nucleic acids?
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C. Transcription
D. Reparation
E. Processing

22. An oncological patient was administered methotrexate. With the lapse of time the target cells of the tumour lost sensitivity to this preparation. We can observe changes in the gene expression of the following enzyme:
A. Dihydrofolate reductase
B. Thiminase
C. Desaminase
D. Folate oxidase
E. Folate decarboxylase

23. Leukoses are treated with antimetabolite methotrexate. What vitamin is its antagonist?
A. Folic acid
B. Cyanocobalamin
C. Phyllochinone
D. Piridoxine
E. Rutin

24. For the normal of the replication process necessary Thimidyl nucleotides that are synthesized by the enzyme Thymidylate synthase are , as coenzyme is used:
A. Methylenetetrahydrofolate
B. Carboxybiotin
C. Thiamindyfosphate
D. Pyridoxalphosphate
E. Nicotinamidadenindynucleotide

25. radiation and chemotherapy. The complex of medicinal products included 5-fluoro-deoxyuridine - thymidylate synthetase inhibitor. Synthesis of what substance is blocked by this drug?
A. DNA
B. i-RNA
C. p-RNA
D. t-RNA
E. -

26. According to the model of double DNA helix that was suggested by Watson and Creek, it was established that one of chains would not be lost during replication and the second chain would be synthesized complementary to the first one. What way of replication is it?
A. Semiconservative
B. Analogous
C. Identical
D. Dispersed
E. Conservative

27. Among organic substances of a cell there is a polymer composed of dozens, hundreds, and thousands of monomers. This molecule is capable of self-reproduction and can be an information carrier. X-ray structure analysis shows this molecule to consist of two complementary spiral threads. Name this compound:
A. DNA
B. RNA
C. Cellulose
D. Carbohydrate
E. Hormone

28. Ability to divide is characteristic of procariotic and eukaryotic cells. Procariotic cell division is different from that of eukaryotic, but there is one molecular process that is the basis of both types of division. Name this process.
A. DNA replication
B. Transcription
C. Reparation
D. Translation
E. Gene amplification

29. Epithelium regeneration of mucous membrane of oral cavity (cell reproduction) was

accompanied by semiconservative DNA replication (selfreproduction). Nucleotides of a new DNA chain are complementary to:
A. Maternal chain
B. Sense codons
C. DNA-polymerase enzyme
D. Introns
E. RNA-polymerase enzyme

30. During cell division DNA replication occurs after a signal is received from the cytoplasm, then a certain portion of the DNA helix unwinds and splits into two individual strains. What enzyme facilitates this process?
A. Helicase
B. RNA polymerase
C. Ligase
D. Restrictase
E. DNA polymerase

31. A group of researchers set an experiment and obtained anucleatemutant cells. In the first place they will have disturbed synthesis of the following compounds:
A. Ribosomal RNA
B. Transfer RNA
C. Lipids
D. Monosaccharides
E. Polysaccharides

32. Nucleolus organizers of human chromosomes 13-15, 21, 22 include about 200 gene clusters that synthesize RNA. These chromosomal regions contain the information on the following type of RNA:
A. rRNA
B. tRNA
C. mRNA
D. snRNA
E. tRNA + rRNA

33. Amino acids join to each other in ribosomes of granular endoplasmic reticulum. Knowing the sequence of amino acids and applying genetic code, it is possible to determine the sequence of nucleoids in:
A. mRNA
B. Introns
C. Proteins
D. Carbohydrates
E. rRNA

34. You are studying functioning of a bacteria operon. The operator gene has been released from the repressor gene. Immediately after this the following process will start in the cell:
A. Transcription
B. Translation
C. Replication
D. Processing
E. Repression

35. It was proved that a molecule of immature mRNA (precursor mRNA) contained more triplets than amino acids found in the synthesized protein. The reason for that is that translation is normally preceded by:
A. Processing
B. Initiation
C. Reparation
D. Mutation
E. Replication

36. Nowadays about 50 minor bases have been found in the t-RNA structure besides the main four nitrogenous bases. Choose the minor nitrogenous base:
A. Dihydrouracil
B. Uracil
C. Cysteine
D. Adenine
E. Cytosine

37. Inside a human cell the informational RNA containing both exons and introns was delivered to the granular endoplasmic reticulum to the ribosomes. What process does NOT take place?
A. Processing
B. Replication
C. Transcription
D. Translation
E. Prolongation

38. Synthesis of i-RNA passes on the DNA matrix, taking into account the principle of complementarity. If the triplets in the DNA are the following - ATG-CGT, then the corresponding i-RNA codons will be:
A. UAC-GCA
B. AUG-CGU
C. ATG-CGT
D. UAG-CGU
E. TAG-UGU

39. General structure of eukaryotic genes is as follows: exon-intron-exon. Such functional

structure of a gene leads to certain specifics of the transcription process. What sequence will correspond with precursor mRNA (immature)?
A. Exon-intron-exon
B. Exon-exon-intron
C. Exon-exon
D. Intron-exon
E. Exon-intron

40. In the nucleus of eukaryote's cells the first pro-RNA molecule is synthesized that is complementary to the exons and introns of the structural gene. But the ribosome receives such i-RNA, which is complementary to exons only. This indicates that the nucleus takes place:
A. Processing
B. Transcription
C. Reparation
D. Replication
E. Reverse transcription

41. As a result of intoxication in the epithelial cell of the mucous membrane of the oral cavity, enzymes that provide splicing are not synthesized. What is the reason for the termination of protein biosynthesis in this case?
A. The i-RNA is not synthesised
B. ATP is not synthesised
C. The p-RNA is not synthesised
D. Amino acids are not activated
E. Transport of amino acids has been disturbed

42. During reproduction of some RNA-containing viruses that cause tumors in animals, genetic information can be transmitted in the opposite direction from the RNA to the DNA via a specific enzyme. The enzyme of reverse transcription is called:
A. Reverse transcriptase
B. DNA polymerase
C. Ligase
D. Primase
E. Topoisomerase

43. In the body of a person transcription occurs. The RNA polymerase, moving along the DNA molecule, has reached a certain sequence of nucleotides. After this transcription stopped. This section of the DNA is called:
A. Terminator
B. Promoter
C. Repressor
D. Operator
E. Regulator

44. A patient with pulmonary tuberculosis is prescribed the most effective antituberculous antibiotic. Name this drug:
A. Rifampicin
B. Tetracycline
C. Streptocide
D. Furasolidone
E. Bactrim (Co-trimoxazole)

45. Tuberculosis can be treated by means of combined chemotherapy that includes substances with different mechanisms of action.What antituberculous medication inhibits transcription of RNA into DNA in mycobacteria?
A. Rifampicin
B. Isoniazid
C. Streptomycin
D. Ethionamide
E. Para-aminosalicylic acid

46. RNA that contains AIDS virus penetrated into a leukocyte and by means of reverse transcriptase forced a cell to synthetize a viral DNA. This process is based upon:
A. Reverse transcription
B. Operon repression
C. Reverse translation
D. Operon depression
E. Convariant replication

47. T-lymphocytes are determined to be affected with HIV. In this case viral enzyme reverse transcriptase (RNA-dependent DNA-polymerase) catalyzes the synthesis of:
A. DNA based on the viral RNA matrix
B. Viral RNA based on the DNA matrix
C. Viral protein based on the viral RNA matrix
D. Viral DNA based on the DNA matrix
E. Informational RNA based on the viral protein matrix

48. For the treatment of urogenital infections use hinolones - inhibitors of the enzyme DNA gyrase. What process is disrupted by hinolones in the first place?
A. Replication of DNA
B. Reparation of DNA
C. Amplification of the genes
D. Recombination of the genes
E. Reverse transcription

49. 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

50. At the stage of translation in the rough endoplasmic reticulum, the ribosome moves along the mRNA. Amino acids are joined together by peptide bonds in a specific sequence, and thus polypeptide synthesis takes place. The sequence of amino acids in a polypeptide corresponds to the sequence of:
A. mRNA codons
B. tRNA nucleotides
C. tRNA anticodons
D. rRNA nucleotides
E. rRNA anticodons

51. Students studying the features of the genetic code found that there are amino acids that are answered by 6 codons, 5 amino acids - 4 different codons. Other amino acids are encoded by three or two codons and only two amino acids by one codon. What feature of the genetic code did students discover?
A. Degeneracy (Redundancy)
B. Universality
C. Collinearity
D. Unidirectional
E. Compose of three nucleotide

52. The mutation of the structural gene did not lead to the substitution of amino acids in protein molecules. This revealed the following property of the genetic code:
A. Degeneracy (Redundancy)
B. Mutable
C. Collinearity
D. Insufficiency
E. Universality

53. It is known that information about amino acid sequence in a protein molecule is stored as a sequence of four nucleotide types in a DNA molecule, and different amino acids are encoded by different quantity of triplets ranging from one to six. Name this property of genetic code:
A. Degeneracy
B. Universality
C. Disjointness
D. Triplety
E. Specificity

54. Formation of ribosome subunits in a cell was disturbed in course of an experiment (bymeans of . activated mutagenic factors). This will have an effect on the following metabolic process:
A. Protein biosynthesis
B. Carbohydrate biosynthesis
C. ATP synthesis
D. Photosynthesis
E. Biological oxidation

55. Amino acids join to each other in ribosomes of granular endoplasmic reticulum. Knowing the sequence of amino acids and applying genetic code, it is possible to determine the sequence of nucleoids in:
A. mRNA
B. Introns
C. Proteins
D. Carbohydrates
E. rRNA

56. A tissue sample of benign tumor was studied under the electron microscope. A lot of small (15-20 nm) spherical bodies, consisting of 2 unequal subunits were
detected. These are:
A. Ribosomes
B. Golgi complex
C. Smooth endoplasmic reticulum
D. Microtubules
E. Mitochondria

57. A 36-year-old patient under went tooth extraction at a dental clinic. After two weeks the stratified squamous epithelium regenerate dat the site of extraction.What organelles were involved in there storation of the mucous membrane?
A. Ribosomes
B. Centrosomes
C. Postlysosomes
D. Smooth EPR
E. Mitochondria

58. Genetic information is stored in DNA but does not participate directly in protein synthesis with in DNA cells. What process ensures transfer of genetic information into polypeptide chain?
A. Translation
B. FormationofrRNA
C. FormationoftRNA
D. FormationofiRNA
E. Replication

59. A patient has decreased concentration of magnesium ions that are required for ribosomes connection to granular endoplasmic reticulum. This condition is known to disrupt the process of protein biosynthesis. Disruption occurs at the following stage:
A. Translation
B. Transcription
C. Replication
D. Amino acids activation
E. Processing

60. For the formation of a transport form of amino acids for the synthesis of a protein, it is necessary:
A. Aminoacyl-tRNA synthetase
B. GTP
C. m-RNA
D. Ribosome
E. Revertase

61. During the study of cells, a high content of the aminoacyl-tRNA synthetase enzyme was established in their cytoplasm. This enzyme provides the following process in a cell:
A. Activation of amino acids
B. Reparation
C. Elongation
D. Transcription
E. Replication

62. In the cell there is a process of translation. When the ribosome reaches the codons of UAA, UAG, or UGA, the polypeptide chain synthesis is terminated. These codons are not recognized by any t-RNA in the biosynthesis of the polypeptide and this is a signal:
A. Termination
B. Post-translational modification
C. Begin transcription
D. Elongation
E. Initiation

63. One of the protein synthesis stages is recognition. The first iRNA triplet starts with UAU triplet. What complementary triplet is found in tRNA?
A. AUA
B. AAA
C. GUG
D. UGU
E. CUC

64. Cytological studies revealed a large number of different t-RNA molecules that deliver amino acids to the ribosome. The number of different types of t-RNA in a cell will be equal to the number of:
A. Triplets encoding amino acids
B. Nucleotides
C. Amino acid
D. Proteins synthesised in the cell
E. Different types of RNA

65. Labelled amino acids alanine and tryptophane were injected to a mouse in order to study localization of protein synthesis in its cells. The labelled amino acids will be accumulated near the following organellas:
A. Ribosomes
B. Smooth endoplasmic reticulum
C. Cell centre
D. Lysosomes
E. Golgi apparatus

66. The patient was prescribed antibiotic chloramphenicol (levometsitin), which disrupts protein synthesis in the body by inhibiting the process:
A. Translation elongation
B. Formation of polyribosomes
C. Transcription
D. Processing
E. Gene amplification

67. Infectious diseases are treated with antibiotics (streptomycin, erythromycin, chloramphenicol). They inhibit the following stage of protein synthesis:
A. Translation
B. Transcription
C. Replication
D. Processing
E. Splicing

68. A 28-year-old patient with bacterial pneumonia was prescribed a course of treatment with erythromycin. Its antibacterial properties are known to be due to the ability of this substance to combine with the free 50S-subunit of the ribosome. What substances synthesis does this antibiotic block in bacterial cells?
A. Proteins
B. RNA
C. DNA
D. Fat
E. Polysaccharides

69. Streptomycin and other aminoglycosides prevent the joining of formylmethionyl tRNA by bonding with the 30S ribosomal subunit. This effect leads to disruption of the following process:
A. Translation initiation in procaryotes
B. Translation initiation in eucaryotes
C. Transcription initiation in procaryotes
D. Transcription initiation in eucaryotes
E. Replication initiation in procaryotes

70. In a genetical laboratory in course of work with DNA molecules of white rats of Wistar's line a nucleotide was substituted for another one. At that only one amino acid was substituded in the peptide. This
result is caused by the following mutation:
A. Transversion
B. Deletion
C. Duplication
D. Displacement of reading frame
E. Translocation

71. Hurtnup's disease is caused by point mutation of only one gene. This results in abnormal absorption of tryptophane in the intestine as well as its abnormal
reabsorption in renal tubules. This causes synchronous disorders in digestive and urinary excretion systems. What genetic phenomenon is observed in this case?
A. Pleiotropy
B. Complementary interaction
C. Polymery
D. Codominance
E. Semidominance

72. During the experiment, an increase in β-galactosidase activity was demonstrated after lactose was added to the culture medium with E.coli. What portion of the lactose operon will be unlocked from the repressor in these conditions?
A. Operator
B. Promoter
C. Structural gene
D. Regulatory gene
E. Primer

73. It is known that the gene responsible for the development of the MN blood groups has two allelic states. If the gene M is considered as the initial gene, the allelic gene N appeared due to:
A. Mutations
B. Gene combinations
C. DNA repair
D. DNA replication
E. Crossing over

74. As a result of treatment of viral RNA with nitrous acid, UCA triplet mutated to UGA triplet. What kind of mutation occurred?
A. Transition
B. Nucleotide deletion
C. Missense
D. Nucleotide insertion
E. Inversion

75. A mutation has occurred in a cell in the first exon of the structural gene. The number of nucleotide pairs changed from 290 to 250. Name this type of mutation:
A. Deletion
B. Inversion
C. Duplication
D. Translocation
E. Nullisomy

76. When examining a 2-month-old child, the pediatrician noticed that the crying of the child resembles a cat's cry. Diagnosed microcephaly and heart disease. Using the cytogenetic method, the child's cartiotype: 46, XX, 5p. This disease is a consequence of this process:
A. Deletion
B. Duplication
C. Inversion
D. Translocation
E. Pleiotropy

77. Parents of a sick 5-year-old girl visited a genetic consultation. Karyotype investigation revealed 46 chromosomes. One chromosome of

the 15th pair was abnormally long, having a part of the chromosome belonging to the21st pair attached to it. What mutation occurred in this girl?
A. Translocation
B. Deletion
C. Inversion
D. Deficiency
E. Duplication

78. In some regions of South Africa there is a spread sickle-shaped cell anemia, in which erythrocytes have shape of a sickle as a result of substitution of glutamin by valine in the hemoglobin molecule. What is the cause of this disease?
A. Gene mutation
B. Disturbance of mechanisms of genetic information realization
C. Crossingover
D. Genomic mutations
E. Transduction

79. Sickle-shaped e cell anemia in humans is accompanied by the appearance of abnormal hemoglobin in the blood, a change in the form of red blood cells and the development of anemia. This disease is the result of:
A. Gene mutations
B. Polythene
C. Chromosomal aberration
D. Polyplody
E. Mitochondrial mutation

80. A 15-year-old man is complaining of general weakness, dizziness, rapid fatigability. During the examination, erythrocytes of a modified form were detected, their number was reduced. Preliminary diagnosis: sickle cell anemia. What type of mutation causes the development of this pathological condition?
A. Point mutation
B. Reading frame shift mutation
C. Deletion
D. Inversion
E. Chromosomal aberration

81. Part of the DNA chain turned 180 degree as a result of gamma radiation. What type of mutation took place in the DNA chain?
A. Inversion
B. Deletion
C. Doubling
D. Translocation
E. Replication

82. An experiment proved that UV irradiated skin cells of patients with xeroderma pigmentosum restore the native structure of DNA slower than the cells of healthy people due to the defect in repair enzyme. What enzyme takes part in this process?
A. Endonuclease
B. RNA ligase
C. Primase
D. DNA polymerase
E. DNA gyrase

83. In the course of evolution there developed molecular mechanisms for correction of damaged DNA molecules. This process is called:
A. Reparation
B. Transcription
C. Translation
D. Replication
E. Processing

84. In the human cells under the action of ultraviolet radiation the DNA molecule has been damaged. The system of repairing the damaged area of the DNA molecule to the intact chain through a specific enzyme was revised. What is the name of this phenomenon?
A. Reparation
B. Duplication
C. Replication
D. Initiation
E. Termination

85. Cells of a person working in the Chornobyl Exclusion Zone have under gone a mutation in DNA molecule. However, with time the damaged interval of DNA molecule has been restored to its initial structure with a specific enzyme. In this case the following occurred:
A. Repair
B. Replication
C. Transcription
D. Reverse transcription
E. Translation

86. Under the influence of physical factors there can develop defect sin a DNA molecule. Ultraviolet irradiation, for instance, can cause development of dimers. Dimers are two adjacent

pyrimidine bases joined together. Name these bases:
A. Thymine and cytosine
B. Adenine and thymine
C. Guanine and cytosine
D. Adenine and guanine
E. Guanine and thymine

87. Patients suffering from xeroderma pigmentosum have extremely photosensitive skin due to disrupted excision repair. Specify the process that is affected in such patients:
A. Repair of DNA molecule
B. Synthesis of iRNA
C. Maturation of iRNA
D. Synthesis of protein primary structure
E. Intron extraction and exon connection
Test items for licensing examination Krok 1 «Stomatology». – 2016. - № 192.
88. An employee of a chemical enterprise was exposed to nitric acid and nitrite, which cause cytosine deamination in the DNA molecule. What enzyme initiates a chain of reparation processes?
A. Uridine DNA glycosidase
B. Citidine triphosphate synthetase
C. Orotidyl monophosphate decarboxylase
D. DNA-dependent RNA polymerase
E. Thymidylat synthase

89. Tetracycline taking in the first half of pregnancy causes abnormalities of fetus organs and systems, including tooth hypoplasia and alteration of their colour. What type of variability is the child's disease related to?
A. Modification
B. Combinative
C. Mutational
D. Hereditary
E. Recombinan

90. The woman took antibiotics in the first half of pregnancy. This led to the hypoplasia of the teeth and the change in their color in the child. The genotype has not changed. Set the type of variability that underlies the disease:
A. Modification
B. Combinative
C. Mutational
D. Correlative
E. Recombinative

91. Fetal malformations may result from such maternal diseases as rubella, syphilis, toxoplasmosis, cytomegaly, herpes, chlamydia. What is the form of variability relating to such malformations?
A. Modifiation
B. Mutational
C. Combinative
D. Genomic imprinting
E. Epimutational

92. As a result of iodine deficiency in foodstuffs Transcarpathian people often have endemic goiter. This disease is caused by the following type of variability:
A. Modification
B. Mutational
C. Combinative
D. Ontogenetical
E. Correlative

93. Lymphocyte is affected by HIV retrovirus (AIDS). In this case, the direction of information flow in the cell will be:
A. RNA → DNA → i-RNA → polypeptide
B. DNA → i-RNA → polypeptide → DNA
C. DNA → Polypeptide → i-RNA
D. i-RNA → polypeptide → DNA
E. Polypeptide → RNA → DNA → i-RNA

94. A young family came for a genetic counseling to identify the father of their child. The husband insists that the child does not resemble him at all and cannot possibly be his. Polymerase chain reaction method
for person identification is based on the following:
A. Gene amplification
B. Nucleotide deletion
C. Genetic recombination
D. Missense mutation
E. Transduction

95. A doctor was addressed by a 30-year old man. There is a probability of the patient being HIV-positive. To clarify the diagnosis the doctor proposed to perform polymerase chain reaction. The basic process in this kind
of investigation is:
A. Gene amplification
B. Transcription
C. Genetic recombination
D. Genomic mutation

E. Chromosome mutation

96. It is known that the gene responsible for development of blood groups according to AB0 system has three allele variants. Existence of the IV blood group can be explained by the following variability form:
A. Combinative
B. Mutational
C. Phenotypic
D. Genocopy
E. Phenocopy

97. A mother had taken synthetic hormones during pregnancy. Her daughter was born with hirsutismformally resembling of adrenal syndrome. Such
manifestation of variability is called:
A. Phenocopy
B. Mutation
C. Recombination
D. Heterosis
E. Replication

98. The doctor discovered a kid's disease due to a lack of vitamin D, but in his manifestation similar to hereditary vitamin-resistant rickets (curvature of tubular bones, deformity of joints of lower extremities, dental abscesses). How called defects of development, which resemble hereditary, but not inherited?
A. Phenocopy
B. Genocopy
C. Monosomies
D. Trisomy
E. Gene diseases

Biochemistry of intercellular communications: hormones of protein-peptide nature

1. Degeneration of glycogen in liver is stimulated by glucagon. What secondary messenger (mediator) is thus formed in the cell?
A. c-AMP
B. c-GMP
C. CO
D. NO
E. Triacylglycerol

2. The ions of metals take part in the regulation of physiological functions. One of them was named the "king of messengers". Such a bioelement mediator is:
A. Ca ++
B. Na +
C. K +
D. Fe +++
E. Zn ++

3. Tissue inosytol triphosphates are generated as a result of the phosphatidyl inositol diphosphate hydrolysis and act as secondary agents (mediators) in the mechanism of hormone action. Their effect in cells is directed at:
A. Calcium ion liberation from cellular depot
B. Adenylate cyclase activation
C. Protein kinase A activation
D. Phosphodiesterase inhibition
E. Protein kinase A inhibition

4. The formation of a secondary mediatoris 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+

5. A patient with a diagnosis of diabetes, in the morning on an empty stomach received a prescribed dose of insulin with prolonged action. He missed another meal and soon felt weakness, pain, dizziness, sweating, trembling of the body, convulsions, feeling of hunger, hypoglycemia. The use of glucose did not alleviate the condition. What hormonal drug is necessary to enter to stop this condition?
A. Adrenaline
B. Triamcinolone
C. Norepinephrine
D. Prenisolone
E. Hydrocortisone

6. Condition of a patient with diabetes mellitus sharply deteriorated after a regular injection of insulin. The patient became anxious and broke out in cold sweat; tremor of the extremities, general weakness, and dizziness appeared. What medicine can remove these symptoms?
A. Adrenaline
B. Tolbutamide
C. Caffeine
D. Noradrenaline
E. Glibutid(Buformin)

7. Dentists widely apply local anaesthesia adding adrenalin to an anaesthetic solution. What is the purpose of this method?
A. Local vasoconstriction
B. Local vasodilatation
C. Lowering of arterial pressure
D. Local reduction of vascular resistance
E. Microcirculation improvement

8. A 50-year-old man declined anaesthesia during dental manipulations. Due to severe pain he developed anuria caused by acute increase in production of:
A. Adrenaline
B. Renin
C. Thymosin
D. Thyroxin
E. Glucagon

9. A sick woman after parenteral administration of the hormone had an increase in blood pressure, as well as increased levels of glucose and lipids in the blood. What hormone was introduced?
A. Adrenaline
B. Glucagon
C. Insulin
D. Progesterone
E. Folliculin

10. A patient suffering from pheochromocytoma complains of thirst, dry mouth, hunger. Blood test for sugar revealed hyperglycemia. What type of hyperglycemia is it?

A. Adrenal
B. Hypercorticoid
C. Alimentary
D. Somatotropic
E. Hypoinsulinemic

11. Patient with diabetes mellitus experienced loss of consciousness and convulsions after an injection of insulin. What might be the result of biochemical blood analysis for concentration of 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

12. A patient with diabetes mellitus had an insuline injection. It caused loss of consciousness and convulsions. What was the result of biochemic blood analysis on glucose content?
A. 2,5 mmole/l
B. 3,3 mmole/l
C. 8,0 mmole/l
D. 10 mmole/l
E. 5,5 mmole/l

13. A 16-year-old young man was taken to hospital, the patient had insulin-dependent diabetes mellitus. The patient's blood glucose level was 1.8 mmol/l. The patient was given insulin. Two hours later, the glucose level decreased to 8.2 mmol/l, since insulin:
A. Stimulates the conversion of glucose to glycogen and TAG in the liver
B. Stimulates glucose transport through plasma membranes in the brain and liver
C. It inhibits the synthesis of ketone bodies from glucose
D. Stimulates the breakdown of glycogen in the liver E. Stimulates the breakdown of glycogen in the muscles

14. A patient with insulin-dependent diabetes had an insulin injection. Some time later he felt weakness, irritability, excessive sweating. What is the main reason of these disorders?
A. Carbohydrate starvation of brain
B. Intensified glycogenolysis
C. Intensified ketogenesis
D. Intensified lypogenesis
E. Reduced glyconeogenesis

15. Before the cells can utilize the glucoze, it is first transported from the extracellular space through the plasmatic membrane inside theml. This process is stimulated by the following hormone:
A. Insulin
B. Glucagon
C. Thyroxin
D. Aldosterone
E. Adrenalin

16. After insulin injection, glucose levels fall within a few seconds. This is due to the activation of this process: A. Transport of glucose into cells
B. Glycolysis
C. Synthesis of glycogen
D. Synthesis of lipids
E. Pentose phosphate cycle

17. Prior to glucose utilization in cells it is transported inside cells from extracellular space through plasmatic membrane. This process is stimulated by the following hormone:
A. Insulin
B. Glucagon
C. Thyroxin
D. Aldosterone
E. Adrenalin

18. A patient is in the state of hypoglycemic coma. What hormone can cause this condition if overdosed?
A. Insulin
B. Progesterone
C. Cortisol
D. Somatotropin
E. Corticotropin

19. A patient during fasting developed ketoacidosis as a result of increased fatty acids decomposition. This decomposition can be inhibited with:
A. Insulin
B. Glucagon
C. Adrenaline
D. Thyroxin
E. Cortisol

20. Examination of a patient revealed overgrowth of facial bones and soft tissues, tongue enlargement, wide interdental spaces in

the enlarged dental arch. What changes of the hormonal secretion are the most likely?
A. Hypersecretion of the somatotropic hormone
B. Hyposecretion of the somatotropic hormone
C. Hypersecretion of insulin
D. Hyposecretion of thyroxin
E. Hyposecretion of insulin

21. A 49-year-old patient was found to have a disproportionate enlargement of hands, feet, nose, ears, superciliary arches and cheek bones. Blood test revealed hyperglycemia, impaired glucose tolerance. What is the most likely cause of this pathology development?
A. Hypersecretion of growth hormone
B. Posterior pituitary hormone hypersecretion
C. Insulin hyposecretion
D. Vasopressin hyposecretion
E. Glucocorticoid hypersecretion

22. A woman after labor lost 20 kg of body weight, her hair and teeth fall out, she has muscle atrophy (hypophysial cachexia). Synthesis of what hypophysis hormone is disturbed?
A. Somatotropic
B. Corticotrophic
C. Thyreotropic
D. Gonadotropic
E. Prolactin

23. Adult height 100 cm with a proportional body structure and normal mental development. It might be caused by deficiency secretion of the following hormone:
A. Somatotropic
B. Gonadotropic
C. Adrenocorticotropic
D. Thyroid-stimulating
E. Prolactin

24. Examination of a patient revealed enlargement of some body parts (jaw, nose, ears, feet, hands), but body proportions were conserved. It might be caused by intensified secretion of the following hormone:
A. Somatotropin
B. Somatostatin
C. Tetraiodothyronine
D. Triiodothyronine
E. Cortisol

25. A student who passes an exam has a plasma glucose content of 8 mmol/l. Increased secretion which of hormones contributes to the development of hyperglycemia?
A. Glucagon
B. Insulin
C. Thyroxine
D. Triiodothyronine
E. Aldosterone

26. A patient with tress and painful sensation before a visit to the dentist is accompanied by anuria (lack of urination). This phenomenon is due to an increase in:
A. Secretion of vasopressin and adrenaline
B. Activity of the parasympathetic nervous system
C. Activity antinociceptive system
D. Secretion of vasopressin and a decrease in adrenaline
E. Secretion of adrenaline and a decrease in vasopressin

27. As a result of a home injury, a patient suffered a significant blood loss, which led to a fall in blood pressure. Rapid blood pressure recovery after the blood loss is provided by the following hormones:
A. Adrenaline, vasopressin
B. Cortisol
C. Sex hormones
D. Oxytocin
E. Aldosterone

28. A severe injury in a 36-year-old patient resulted in a significant blood loss which was accompanied by a blood pressure drop. What hormones provide rapid recovery of blood pressure after the blood loss?
A. Adrenalin, vasopressin
B. Cortisol
C. Sex hormones
D. Oxytocin
E. Aldosterone

29. A man has the increased volume of circulating blood and reduced osmotic pressure of plasma considerable. He has decrease in diuresis. The primary cause of such diuresis disorder is the hypersecretion of the following hormone:
A. Vasopressin
B. Aldosterone

C. Adrenalin
D. Renin
E. Natriuretic

30. A 20 year old patient complains of excessive thirst and urinary excretion upto 10 L a day. The level of glucose in blood is normal, there is no glucose in urine. What hormone deficit can cause such changes?
A. Vasopressin
B. Oxytocin
C. Insulin
D. Triiodothyronine
E. Cortisol

31. A patient with pituitary tumor complains of increased daily diuresis (polyuria). Glucose concentration in blood plasma equals 4,8 mmol/l. What hormone can be the cause of this if its secretion is disturbed?
A. Vasopressin
B. Aldosterone
C. Natriuretic hormone
D. Insulin
E. Angiotensin I

32. Limiting water intake has led to dehydration of the organism. What mechanism is activated under these conditions to preserve water in the body?
A. Increased vasopressin secretion
B. Increased somatostatin secretion
C. Reduced vasopressin secretion
D. Increased aldosterone secretion
E. Reduced aldosterone secretion

33. At ria of a test animal were super distended with blood,which resulted in decreased reabsorption of Na+ and water in renal tubules.This can be explained by the effect of the following factor on the kidneys:
A. Natriuretic hormone
B. Aldosterone
C. Renin
D. Angiotensin
E. Vasopressin

34. A 32-year-old patient consulted a doctor about the absence of lactation after parturition. Such disorder might be explained by the deficit of the following hormone:
A. Prolactin
B. Somatotropin
C. Vasopressin
D. Thyrocalcitonin
E. Glucagon

35. A 25-year-old woman one month after giving birth consulted a doctor about a decrease in milk production. What hormone deficiency led to this condition?
A. Prolactin
B. Somatostatin
C. Adrenocorticotropic hormone
D. Insulin
E. Glucagon

36. 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

37. After a case of sepsis a 27-year-old woman developed ”bronzed” skin discoloration characteristic of Addison’s disease. Hyperpigmentation mechanismin this case is based on increased secretion of:
A. Melanocyte-stimulating hormone
B. Somatotropin
C. Gonadotropin
D. β-lipotropin
E. Thyroid-stimulating hormone

38. A 20-year-old woman came to the doctor with complaints of general weight loss, loss of appetite, weakness, skin discoloration resembling bronze tan. In addtition to hyperpigmentation, examination in the hospital revealed bilateral adrenal tuberculosis. What substance leads to skin hyperpigmentation, when accumulated excessively?
A. Melanin
B. Bilirubin
C. Hemozoin
D. Lipofuscin
E. Adrenochrome

39. A patient with gastric juice hypersecretion has been recommended to exclude from the diet

rich broths and vegetable infused water. A doctor recommended it, because these food products stimulate production of the following hormone:
A. Production of gastrin
B. Taste Receptors
C. Mechano-receptors of the oral cavity
D. Mechanoreceptors of the stomach
E. Formation of secretin

40. During an acute experiment some of diluted solution of hydrochloric acid was injected into the duodenal cavity of an experimental animal. This will result in hypersecretion of the following hormone:
A. Secretin
B. Gastrin
C. Motilin
D. Neurotensin
E. Histamine

41. A pregnant woman with a low labor activity entered the maternity ward. Assign a hormonal remedy to enhance labor activity:
A. Oxytocin
B. Progesterone
C. Methandrostenolone
D. Hydrocortisone
E. ACTH

42. A 26-year-old woman at 40 weeks pregnant has been delivered to the maternity ward. Objectively: the uterine cervix is opened, but the contractions are absent. The doctor has administered her a hormonal drug to stimulate the labor. Name this drug:
A. Oxytocin
B. Hydrocortisone
C. Estrone
D. Testosterone
E. ACTH

43. To stimulate the laboractivity aparturient woman was prescribed a drug a posterior pituitary hormone that does not affect the blood pressure. As the pregnancy progresses, the sensitivity to this hormone increases.Name the prescribed drug:
A. Oxytocin
B. Dinoprostone
C. Dinoprost
D. Pituitrin
E. Ergotal

44. A 40-year-old patient complains of intensive heartbeats, sweating, nausea, visual impairment, arm tremor, hypertension. From his anamnesis: 2 years ago he was diagnosed with pheochromocytoma. Hyperproduction of what hormones causes the given pathology?
A. Catecholamines
B. Aldosterone
C. Glucocorticoids
D. ACTH
E. Thyroidal hormones

45. A special diet has led to a decrease in Ca^{2+} ions in the blood. What hormone will increase the secretion?
A. Parathormone
B. Thyrocalcitonin
C. Vasopressin
D. Somatotropin
E. Thyroxine

46. A patient has the sudden decrease of Ca^{2+} content in blood. What hormone secretion will increase?
A. Parathormone
B. Thyrocalcitonin
C. Aldosterone
D. Vasopressin
E. Somatotropin

47. The calcium ions in the blood plasma of a patient is increased, reduced - in the bones. The excessive secretion of which hormone may cause such changes?
A. Parathormone
B. Thyroxine
C. Triiodothyronine
D. Thyreocalcitonin
E. Aldosteron

48. Kidneys of a man under examination show increased resorbtion of calcium ions and decreased resorbtion of phosphate ions. What hormone causes this phenomenon?
A. Parathormone
B. Thyrocalcitonin
C. Hormonal form D3
D. Aldosterone
E. Vasopressin

49. Following thyroid surgery, a 47-year old female patient had fibrillary twitching of

muscles in the arms, legs and face. These disorders can be treated by the introduction of the following hormone:
A. Parathyroid hormone
B. Triiodothyronine
C. Thyrotropin
D. Thyroxine
E. Thyroid-stimulating hormone

50. During removal of the hyperplastic thyroid gland of a 47-year-old woman, the parathyroid gland was damaged.One month after the surgery the patient developed signs of hypoparathyroidism: frequent convulsions, hyperreflexia, laryngospasm. What is the most likely cause of the patient's condition?
A. Hypocalcemia
B. Hyponatremia
C. Hyperchlorhydria
D. Hypophosphatemia
E. Hyperkalemia

51. A child has abnormal formation of tooth enamel and dentin as a result of low concentration of calcium ions in blood. Such abnormalities might be caused by deficiency of the following hormone:
A. Parathormone
B. Thyrocalcitonin
C. Thyroxin
D. Somatotropic hormone
E. Triiodothyronine

52. Owing to a pronounced decrease in plasma calcium concentration, a 2-year-old child had tetanic reductions in the respiratory and pharyngeal muscles. Decreased secretion of what hormone can be the cause of this?
A. hormone
B. Calcitonin
C. Aldosterone
D. Somatotropin
E. Cortisol

53. A 2-year-old child experienced convulsions because of lowering calciumions concentration in the blood plasma. Function of what structure is decreased?
A. Parathyroid glands
B. Hypophysis
C. Adrenal cortex
D. Pineal gland
E. Thymus

54. A patient has hypocalcemia. What hormone deficiency may be it's cause?
A. Parathormone
B. Thyrocalcitonin
C. Aldosterone
D. Corticotropin
E. Corticoliberin

55. A patient presents with osteoporosis; hypercalcemia and hypophosphatemia are observed in the patient's blood. What is the cause of this condition?
A. Increased parathormone secretion
B. Increased thyroxin secretion
C. Inhibited parathormone secretion
D. Increased corticosteroid secretion
E. Inhibited corticosteroid secretion

56. A 5-month-old boy was hospitalized for tonic convulsions. He has a lifetime history of this disease. Examination revealed coarse hair, thinned and fragilenails, 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

57. A 5-month-old boy was hospitalized for tonic convulsions. Sick since birth. On examination, the hair is hard, the nails are thinned and brittle, the skin is pale and dry. In the blood: calcium - 1.5 mmol / l, phosphorus - 1.9 mmol / l. What are these changes related to?
A. Hypoparathyroidism
B. Hyperparathyroidism
C. Hyperaldosteronism
D. Hypoaldosteronism
E. Hypothyroidism

58. Periodic renal colics attacks areobserved in a woman with primery hyperparathyroidizm. Ultrasonic examination revealed small stones in the kidneys. What is the most plausible reason of the stones's formation?
A. Hypercalcemia
B. Hyperphosphatemia
C. Hypercholesterinemia
D. Hyperuricemia
E. Hyperkalemia

59. A 56-year-old man presents with parathyroid tumor. The following is observed: muscle weakness, osteoporosis, bone deformation, nephroliths consisting of oxalates and phosphates. The patient's condition is caused by:
A. Increased secretion of parathyroid hormone
B. Decreased secretion of parathyroid hormone
C. Increased secretion of calcitonin
D. Decreased secretion of calcitriol
E. Increased secretion of thyroxin

60. Due to trauma the patient's parathyroid glands have been removed, which resulted in inertness, thirst, sharp increase of neuromuscular excitability. Metabolism of the following substance is disturbed:
A. Calcium
B. Manganese
C. Chlorine
D. Molybdenum
E. Zinc

61. There is a 9 year old boy in endocrinological department, who has already had a few fractures of extremeties caused by fragility of bones. Malfunction of what endocrinous glands (gland) takes place?
A. Parathyroid glands
B. Thyroid gland
C. Thymus
D. Adrenal glands
E. Epiphysis

62. A patient with signs of osteoporosis and urolithiasis has been admitted to the endocrinology department. Blood test 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

63. Cardinal symptoms of primary hyperparathyroidism are osteoporosis andrenal 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

64. 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

65. A patient with hypoparathyreosis has multiple carious lesions of teeth. This pathology is caused by insufficiency of the following hormone:
A. Calcitonin
B. Thyroxin
C. Triiodothyronine
D. Thyroid-stimulating hormone
E. Somatotropin

66. A 46-year-old patient suffering from the diffuse toxic goiter underwent resection of the thyroid gland. After the surgery the patient presents with appetite loss, dyspepsia, increased neuromuscular excitement. The body weight remained unchanged. Body temperature is normal. Which of the following has caused such a condition in this patient?
A. Reduced production of parathormone
B. Increased production of thyroxin
C. Increased production of calcitonin
D. Increased production of thyroliberin
E. Reduced production of thyroxin

67. During surgery on the thyroid gland due to the disease of the Basedow's disease, the parathyroid glands were mistakenly removed. There were convulsions, tetany. Exchange of which item was broken?
A. Calcium
B. Magnesium
C. Potassium
D. Iron
E. Sodium

68. Soldiers injured in the midst of a battle may not feel pain before it is completed. What

hormones of the opiate antinociceptive system reduce the sensation of pain?
A. Endorphins
B. Serotonin
C. Vasopresin
D. Aldosterone
E. Oxytocin

Biochemistry of intercellular communications: hormones of steroid and thyroid nature

1. A girl is diagnosed with adrenogenital syndrome (pseudohermaphroditism). This pathology was caused by hypersecretion of the following adrenal hormone:
A. Androgen
B. Estrogen
C. Aldosterone
D. Cortisol
E. Adrenalin

2. The secretion of which hypophysial hormones will be inhibited after taking the oral contraceptives containing sexhormones?
A. Gonadotropic hormone
B. Vasopressin
C. Thyrotrophic hormone
D. Somatotropic hormone
E. Ocytocin

3. The woman was threatened with premature termination of pregnancy. This is most likely due to insufficient secretion of such a hormone:
A. Progesterone
B. Estradiol
C. Oxytocin
D. Testosterone
E. Aldosterone

4. Testosterone and it's analogs increase the mass of skeletal muscles that allows to use them for treatment of dystrophy. Dueto interaction of the hormone with what cell substrate is this action caused?
A. Nuclear receptors
B. Membrane receptors
C. Ribosomes
D. Chromatin
E. Proteins-activators of transcription

5. A 30-year-old female exhibits signs of virilism (growth of body hair, balding temples, menstrual disorders). This condition can be caused by the over production of the following hormone:
A. Testosterone
B. Oestriol
C. Relaxin
D. Oxytocin
E. Prolactin

6. Parents of a 10 y.o. boy consulted a doctor about extension of hair-covering, growth of beard and moustache, low voice. Intensified secretion of which hormone must be assumed?
A. Of testosterone
B. Of somatotropin
C. Of oestrogen
D. Of progesterone
E. Of cortisol

7. A female patient presents with endocrine dysfunction of follicular cells of the ovarian follicles resulting from an inflammation. The synthesis of the following hormone will be inhibited:
A. Estrogen
B. Progesterone
C. Lutropin
D. Follicle stimulating hormone
E. Follistatine

8. Intake of oral contraceptives containing sex hormones inhibits secretion of the hypophysiae hormones. Secretion of which of the indicated hormones is inhibited while taking oral contraceptives with sexhormones?
A. Follicle-stimulating
B. Vasopressin
C. Thyrotropic
D. Somatotropic
E. Oxytocin

9. Corticosteroid hormones regulate the adaptation processes of the body as a whole to environmental changes and ensure the maintenance of internal homeostasis. What hormone activates the hypothalamo-pituitary-adrenal axis?
A. Corticoliberin
B. Somatoliberin
C. Somatostatin
D. Corticostatin
E. Thyroliberin

10. A man prescribed by a doctor for a long time took the preparation of a group of glucocorticoid hormones. Which of the following hormones will be depressed due to this?
A. Corticotropic
B. Somatotropic

C. Tyrotropic
D. Sexual
E. Mineralocorticoid

11. The release of adrenal hormones is regulated by ACTH of the adenohypophysis. What hormones are secreted by the adrenal glands under the action of the latter?
A. Glucocorticoids
B. Androgenes
C. Catecholamines
D. Mineralocorticoid
E. Prostaglandins

12. A patient has been taking glucocorticoids for a long time. Drug withdrowal caused acute attack of his disease, blood pressure reduction, weakness. What are these occurences connected with?
A. Adrenal glands insufficiency
B. Drug habituation
C. Sensibilisation
D. Hyperproduction of corticotroph hormone
E. Cumulation

13. Chronic overdosage of glucocorticoids leads to the development of hyperglycemia. What process of carbohydrate metabolism is responsible for this effect?
A. Gluconeogenesis
B. Glycogenolysis
C. Aerobic glycolisis
D. Pentose-phosphate cycle
E. Glycogenesis

14. A 40-year-old woman with Cushing's disease presents with steroid diabetes. On biochemical examination she has hyperglycemia and hypochloremia. What process activates in the first place in such patients?
A. Gluconeogenesis
B. Glycogenolysis
C. Glucose reabsorption
D. Glucose transportation into a cell
E. Glycolysis

15. A 28-year-old patient with Itsenko-Cushing syndrome Hyperglycemia, glycosuria were detected hyperglycemia, glycosuria. The main mechanism of hyperglycemia in this patient is stimulation:
A. Gluconeogenesis
B. Liver glycogenolysis
C. Muscle glycogenolysis
D. Intestinal glucose absorption
E. Synthesis of glycogen

16. A patient with Itsenko-Cushing syndrome has persistent hyperglycemia and glycosuria, hypertension, osteoporosis, obesity. What hormon's synthesis and secretion are intensified in this case?
A. Cortisol
B. Adrenaline
C. Glucagon
D. Thyroxin
E. Aldosterone

17. On examination of the patient, the doctor suspected Itsenko-Cushing's syndrome. Determination of what substance in the patient's blood will confirm the doctor's presumption
A. Cortisol
B. Tocopherol
C. Retinol
D. Adrenaline
E. Cholesterol

18. A patient with a diagnosis of Itsenko-Cushing's disease (hyperproduction of adrenal hormones) has an increased concentration of glucose, ketone bodies, sodium in the blood . What is the biochemical mechanism leading to the occurrence of hyperglycemia?
A. Gluconeogenesis
B. Glycogenesis
C. Glycogenolysis
D. Glycolysis
E. Aerobic glycolysis

19. The patient was found to have obesity, hirsutism, a "moon-shaped" face, scarring of a purple color on the skin of the thighs. Blood pressure is 180/110 mm Hg, blood glucose is 17.2 mmol / l. What change in the production of adrenal hormones is possible such a picture?
A. Hyperproduction of glucocorticoids
B. Hypoproducts of glucocorticoids
C. Hyperproduction of mineralocorticoids
D. Hypoproducts of mineralocorticoids
E. Hypoproduction of adrenaline

20. A 44 year old woman complains of general weakness, heart pain, significant increase of body weight. Objectively: moon face, hirsutism, AP is 165/100 mm Hg, height - 164 cm, weight

- 103 kg; the fat is mostly accumulated on her neck, thoracic girdle, belly. What is the main pathogenetic mechanism of obesity?
A. Increased production of glucocorticoids
B. Reduced production of thyroid hormones
C. Increased insulin production
D. Reduced glucagon production
E. Increased mineralocorticoid production

21. A 16-year-old patient suffering from Itsenko-Cushing's disease was counseled for over weight. During the survey, it turned out that the energy value of the food consumed is 1700-1900 kcal / day. What is the leading cause of obesity in this case?
A. Excess glucocorticoid
B. Lack of insulin
C. Excess insulin
D. Lack of glucocorticoids
E. Hypodynamia

22. A 29-year-old female patient has moon - shaped face, upper body obesity, stretch marks on the abdomen, hirsutism; urine shows an increased rate of 17-oxy ketosteroids. What disease are these presentations typical for?
A. Itsenko-Cushing syndrome
B. Pheochromocytoma
C. Conn's syndrome
D. Primary aldosteronism
E. Secondary aldosteronism

23. 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

24. Examination of a 42 year old patient revealed a tumour of adenohypophysis. Objectively: the patient's weight is 117 kg, he has moon-like hyperemic face, redblue striae of skin distension on his belly. Osteoporosis and muscle dystrophy are present. AP is 210/140 mm Hg. What is the most probable diagnosis?
A. Cushing's disease
B. Cushing's syndrome
C. Conn's disease
D. Diabetes mellitus
E. Essential hypertension

25. A 38-year-old female patient complains of general weakness, cardiac pain, increased appetite, no menstruation. Objectively: the height is 166 cm, weight 108 kg, the patient has moon-shaped face, subcutaneous fat is deposited mainly in the upper body, torso and hips. There are also blood-red streaks. Ps-62/min, AP-160/105 mm Hg. Which of the following diseases is the described pattern of obesity most typical for?
A. Cushing pituitary basophilism
B. Alimentary obesity
C. Myxedema
D. Insulinoma
E. Babinski-Frohlich syndrome

26. Examination of a patient with high blood pressure revealed secondary arterial hypertension. It was found that the cause of this condition of the patient is a hormonally active tumor of the adrenal cortex. Hyperproduction of what hormone is the cause of secondary arterial hypertension in a patient?
A. Cortisol
B. Adrenaline
C. Thyroxine
D. Insulin
E. Glucagon

27. Acceptance of corticosteroid analogues causes the breakdown of muscle proteins to free amino acids. In which process will amino acids be involved in such conditions?
A. Gluconeogenesis in the liver
B. Muscle glycolysis
C. Synthesis of higher fatty acids
D. Glycogenolysis
E. Decarboxylation

28. A 19-year-old male was found to have an elevated level of potassium in the secondary urine. These changes might have been caused by the increase in the following hormone level:
A. Aldosterone
B. Oxytocin
C. Adrenaline
D. Glucagon
E. Testosterone

29. A concentrated solution of sodium chloride was intravenously injected to ananimal. This caused decreased reabsorption of sodium ions in the renal tubules. It is the result of the following changes of hormonal secretion:
A. Aldosterone reduction
B. Aldosterone increase
C. Vasopressin reduction
D. Vasopressin increase
E. Reduction of atrial natriuretic factor

30. A patient with adenoma of glomeral zone of adrenal cortex (Conn's disease) has arterial hypertension, convulsions, polyuria. What is the main link in pathogenesis of these disorders?
A. Aldosterone hypersecretion
B. Aldosterone hyposecretion
C. Catecholamine hypersecretion
D. Glucocorticoid hypersecretion
E. Glucocorticoid hyposecretion

31. After a traffic accident a man presents with severe blood loss, consciousness disturbance, low blood pressure, as well as compensatory activation of the reninangiotensin system, which results in:
A. Hyperproduction of aldosterone
B. Increased blood coagulation
C. Intensification of erythropoiesis
D. Hyperproduction of vasopressin
E. Intensification of heart contractions

32. A patient has hyperkaliemia and hyponatremia. Reduced secretion of what hormone may cause such changes?
A. Aldosterone
B. Vasopressin
C. Cortosol
D. Parathormone
E. Natriuretic hormone

33. People adapted to high external temperatures have such pecularity: profuse sweating isn't accompanied by loss of large volumes of sodium chloride.This is caused by the effect of the following hormone upon the perspiratory glands:
A. Aldosterone
B. Vasopressin
C. Cortisol
D. Tgyroxin
E. Natriuretic

34. A humans are reduced diuresis, hypernatremia and hypokalemia. What hormone hypersecretion can cause such changes?
A. Aldosterone
B. Vasopressin
C. Atrial Natriuretic Factor
D. Adrenaline
E. Parathormone

35. Atria of an experimental animal were superdistended by blood that resulted in decreased reabsorption of Na^+ and water in renal tubules. This can be explained by the influence of the following factor upon kidneys:
A. Natriuretic hormone
B. Aldosterone
C. Renin
D. Angiotensin
E. Vasopressin

36. A patient has insufficient blood supply to the kidneys, which has caused the development of pressor effect due to the constriction of arterial resistance vessels. This is the result of the vessels being greately affected by the following substance:
A. Angiotensin II
B. Angiotensinogen
C. Renin
D. Catecholamines
E. Norepinephrine

37. Examination of a patient with high blood pressure showed him secondary arterial hypertension. The cause of this condition is a renin-producing tumor of the kidney. What is the main link in the pathogenesis of secondary arterial hypertension in a patient?
A. Angiotensin 2, aldosterone hyperproduction
B. Cortisol hyperproduction
C. Insulin hyperproduction
D. Insufficient vasopressin production
E. Insufficient catecholamines production

38. A patient with cirrhosis of the liver has sustained arterial hypotension (BP is 90/50 mm Hg). What is the reason for lowering blood pressure in this pathology of the liver?
A. Reduced angiotensin synthesis
B. Increased synthesis of Na-uretic hormone
C. Excessive inactivation of vasopressin
D. Increasing the reflex influence from the receptor zone of the aortic arch

E. Activation of the kallikrein-kinin system

39. A patient with kidney disease has high blood pressure, espesially the diastolic one. Hypersecretion of what biologically active substance causes blood pressure rise?
A. Renin
B. Adrenaline
C. Noradrenaline
D. Vasopressin
E. Catecholamines

40. Under the experimental conditions, a rabbit was tied up the renal artery, it was resulted in a significant increase in blood pressure after 2 weeks. As a result of an increase in the secretion of a biologically active substance, this happened?
A. Renin
B. Adrenaline
C. Vasopressin
D. Norepinephrine
E. Natriuretic hormone

41. A patient who had been continuously taking drugs blocking the production of angiotensin II developed bradycardia and arrhythmia. A likely cause of these disorders is:
A. Hyperkalemia
B. Hypokalemia
C. Hypernatremia
D. Hypocalcemia
E. Hypercalcemia

42. A patient with kidney disease has high blood pressure, espesially the diastolic one. Hypersecretion of what biologically active substance causes blood pressure rise?
A. Renin
B. Adrenaline
C. Noradrenaline
D. Vasopressin
E. Catecholamines

43. A 40-year-old woman on examination presents with intensified basal metabolic rate. What hormone present in excess leads to such condition?
A. Triiodothyronine
B. Thyrocalcitonin
C. Glucagon
D. Aldosterone
E. Somatostatin

44. Indirect calorimetry allowed to establish that a 30-year-old male patient had a 30% decrease in basal metabolic rate. This might be caused by the reduced concentration of the following hormones in blood plasma:
A. Triiodothyronine, tetraiodothyronine
B. Thyrocalcitonin, parathormone
C. Glucocorticoids
D. Catecholamines
E. Somatoliberin, somatostatin

45. A 37-year-old patient has has lost 5 kg in weight over the past three months, he complains of hand tremor, excessive sweating, exophthalmos, tachycardia. These changes might have been caused by the increased secretion of the following hormone:
A. Thyroxine
B. Cortisol
C. Insulin
D. Glucagon
E. Thyrocalcitonin

46. A 38-year-old woman complains of excessive sweating, palpitations, fever in the evening hours. The main exchange is increased by 60%. The doctor decided the diagnosis - thyrotoxicosis. What properties of thyroxin lead to increased heat production?
A. Separates oxidative phosphorylation
B. Increases conjugation of oxidation and phosphorylation
C. Reduces β-oxidation of fatty acids
D. Reduces amino acid deamination
E. Promotes acetyl-coA accumulation

47. A 40-year-old woman suffering from diffuse toxic goiter presents with constant increase of her body temperature. What mechanism results in such clinical presentation?
A. Separation of oxidation and phosphorization in cell mitochondria
B. Increased breakdown of glycogen inhepatic cells
C. Increased catabolism of protein incells
D. Increased excitability of nerve cells
E. Increased cell sensitivity to catecholamines

48. A patient is followed up in an endocrinological dispensary on account of hyperthyreosis. Weight loss, tachycardia, finger tremor are accompanied by hypoxia symptoms -

headache, fatigue, eye flicker. What mechanism of thyroid hormones action underlies the development of hypoxia?
A. Disjunction, oxydation and phosphorilation
B. Inhibition of respiratory ferment synthesis
C. Competitive inhibition of respiratory ferments
D. Intensification of respiratory ferment synthesis
E. Specific binding of active centres of respiratory ferments

49. A 56 y.o. patient has been suffering from thyreotoxicosis for a long time.What type of hypoxia can be developed?
A. Tissue
B. Hemic
C. Circulatory
D. Respiratory
E. Mixed

50. The patient mistakenly took an excess dose of thyroxine. What changes in secretion of thyroliberin and thyrotropin will it lead to?
A. Secretion of hormones will decrease
B. Secretion of hormones will increase.
C. Secretion of hormones will not change
D. Secretion of thyroliberin will increase, thyrotropin will decrease
E. Secretion of thyrotropin will increase, thyroliberin will decrease

51. A 19-year-old female suffers from tachycardia in rest condition, weight loss, excessive sweating, exophtalmos and irritability. What hormone would you expect to find elevated in her serum?
A. Thyroxine
B. Cortisol
C. Mineralocorticoids
D. ACTH
E. Insulin

52. A child presents with symptoms of psychic and physical retardation (cretinism). It is usually associated with the following hormone deficiency:
A. Thyroxin
B. Somatotropic
C. Calcitonin
D. Insulin
E. Testosterone

53. A doctor has established significant growth retardation, disproportional body build, and mental deficiency of a child. What is the most likely cause of this pathology?
A. Hypothyroidism
B. Insufficient nutrition
C. Hyperthyroidism
D. Genetic defects
E. Hypopituitarism

54. A 12-year-old child is of short stature, has disproportionate body structure and mental retardation. These characteristics might be caused by the hyposecretion of the following hormone:
A. Thyroxine
B. Insulin
C. Cortisol
D. Somatotropin
E. Glucagon

55. Inhabitants of territories with cold climate have high content of an adaptive thermoregulatory hormone. What hormone is meant?
A. Thyroxin
B. Insulin
C. Glucagon
D. Somatotropin
E. Cortisol

56. The clinical examination of the patient revealed an increase in the thyroid gland (goiter), an increase in basal metabolism, loss of body weight, an imbalance of heat, an increase in appetite, an increase in excitability and irritability, exophthalmos and tachycardia were detected. What endocrine disruption leads to these symptoms?
A. Hyperfunction of the thyroid gland
B. Hypofunction of the parathyroid glands
C. Pituitary Hyperfunction
D. Epiphysis hypofunction
E. Hypofunction of the thyroid gland

57. It is known that steroid anti-inflammatory drugs inhibit the activity of phospholipase A2, which is necessary for the synthesis of prostaglandins. What substance is the precursor of these inflammatory mediators?
A. Arachidonic acid
B. Cholesterol
C. Tyrosine

D. Proopiomelanocortin
E. Palmitic acid

58. A patient is followed up in the clinic on account of for pneumonia complicated by pleurisy. He was given prednisolon as part of a combination therapy. The anti-inflammatory effect of this synthetic glucocorticoid is associated with blocking the release of arachidonic acid by inhibiting:
A. Phospholipase A2
B. Cyclo-oxygenase
C. Phospholipase C
D. Lipoxygenase
E. Peroxidase

59. Utilization of arachidonic acid via cyclooxigenase pathway results in formation of some bioactive substances. Name them:
A. Prostaglandins
B. Thyroxine
C. Biogenic amins
D. Somatomedins
E. Insulin-like growth factors

60. Experimental studies revealed steroid hormones to have an effect on proteosynthesis. They influence synthesis of the following substances:
A. Specific messenger RNA
B. Adenosine triphosphate
C. Specific transfer RNA
D. Guanosine triphosphate
E. Specific ribosomal RNA

Biochemistry and pathobiochemistry of blood

1. A 7-year-old girl has signsof anemia. Laboratory examination revealed pyruvate kinase deficiency in erythrocytes. What process disturbance plays the main role in anemiadevelopment?
A. Anaerobic glycolysis
B. Oxidative phosphorylation
C. Tissue respiration
D. Peroxide decomposition
E. Aminoacids desamination

2. Human red blood cells contain no mitochondria. What is the main pathway forATP production in these cells?
A. Anaerobic glycolysis
B. Aerobic glycolysis
C. Oxidative phosphorylation
D. Creatine kinase reaction
E. Cyclase reaction

3. Erythrocytes of the patient withhemolytic anemia present with significantdecrease of pyruvate kinase activity. Whatmethabolic process is disturbed in thiscase?
A. Glycolysis
B. Glycogenolysis
C. Gluconeogenesis
D. Pentose-phosphate pathway of glucoseoxidation
E. Glycogen synthesis

4. A 3 year old child with fever wasgiven aspirin. It resulted in intensified erythrocyte haemolysis. Hemolyticanemia might have been caused bycongenital insufficiency of the followingenzyme:
A. Glucose 6-phosphate dehydrogenase
B. Glucose 6-phosphatase
C. Glycogen phosphorylase
D. Glycerol phosphate dehydrogenase
E. γ-glutamiltransferase

5. There is an increased tendency of erythrocytes to hemolysis in patients with a hereditary defect of glucose-6-phosphate dehydrogenase. What metabolic process is impaired under these conditions?
A. Pentose phosphate pathway of glucose oxidation
B. Gluconeogenesis
C. Aerobic glucose oxidation
D. Synthesis of glycogen
E. -

6. Sulfanilamides are applied as antimicrobal agents in clinical practice.Sulfanilamide treatment, however, canresult in hemolytic anemia developmentin patients that suffer from geneticdefect of the following enzyme ofpentose phosphate metabolism inerythrocytes:
A. Glucose-6-phosphate dehydrogenase
B. Hexokinase
C. Transketolase
D. Transaldolase
E. Pyruvate kinase

7. Biochemical analysis of an infant'serythrocytes revealed evident glutathioneperoxidase deficiency and low concentration of reduced glutathione. What pathological condition can develop in this infant?
A. Hemolytic anemia
B. Pernicious anemia
C. Megaloblastic anemia
D. Sicklemia
E. Iron-deficiency anemia

8. A 20 year old patient complains ofgeneral weakness, dizziness, quick fatigability. Blood analysis results: Hb-80g/l. Microscopical examination results:erythrocytes are of modified form. Thiscondition might be caused by:
A. Sickle-cell anemia
B. Hepatocellular jaundice
C. Acute intermittent porphyria
D. Obturative jaundice
E. Addison's disease

9. With a number of hemoglobinopathies, amino acid substitutions occur in the α- and β-chains of hemoglobin. Which of them is characteristic of Hb S (sickle cell anemia)?
A. Glutamate-valine
B. Aspartate-lysine
C. Alanin-serine
D. Methionine-histidine
E. Glycine-serine

10. Substitution of the glutamic acid onvaline was revealed while examining initial molecular structure. For what inheritedpathology is this symptom typical?
A. Sickle-cell anemia

B. Thalassemia
C. Minkowsky-Shauffard disease
D. Favism
E. Hemoglobinosis

11. A patient suffers from mutation of a gene that corresponds with hemoglobin synthesis. This condition led to development of sicklecell disease. Name the pathologicalhemoglobin characteristic of this disease:
A. HbS
B. HbA
C. HbF
D. HbA1
E. Bart-Hb

12. Along with normal hemoglobin typesthere can be pathological ones in the organism of an adult. Name one of them:
A. HbS
B. HbF
C. HbA1
D. HbA2
E. HbO2

13. After an extended treatment with sulfanamides a patient has developedmacrocytic anemia. Production of activeforms of the following vitamin is disruptedin such a condition:
A. Folic acid
B. Thiamine
C. Riboflavin
D. Pyridoxine
E. Cyanocobalamin

14. A 50-year-old patient has beenexamined by a dentist and found tohave crimson smooth tongue. Bloodanalysis revealed a decrease in RBC leveland hemoglobin concentration, symptoms of megaloblastichematopoiesis, degenerative changes inWBCs. What blood disorder was found inthis patient?
A. B12-folic-acid-deficiency anemia
B. Iron deficiency anemia
C. Myeloid leukemia
D. Aplastic anemia
E. Hemolytic anemi

15. After removal in the patient 2/3 of the stomach in the blood decreased the amount of hemoglobin, the number of erythrocytes, increased the size of these blood counts. What vitamin deficiency leads to such changes in blood?
A. B12
B. C
C. P
D. B6
E. PP

16. A 43-year-old patient with chronic atrophic gastritis and megaloblastic hyperchromic anemia excreted methylmalonic acid in the urine. What vitamin deficiency is caused by the occurrence of the specified symptom complex?
A. B12
B. B2
C. B3
D. B5
E. B6

17. A pregnant woman turned to the obstetrician-gynecologist, who was diagnosed with megaloblastic anemia. Which of the following drugs should be prescribed?
A. Cyanocobalamin
B. Pentoxyl
C. Methyluracil
D. Glaucin
E. Streptokinase

18. The patient was diagnosed with megaloblastic anemia. Specify a vitamin deficiency which can lead to the development of this disease.
A. Cyanocobalamin.
B. Rutin.
C. Nicotinamide.
D. Thiamine.
E. Cholecalciferol

19. In a 65-year-old patient with prolonged complaints characteristic of chronic gastritis, megalocytes were found in peripheral blood, and megaloblastic erythropoiesis was found in the bone marrow. What is the most likely diagnosis?
A. B12-folic deficiency anemia
B. Aplastic anemia
C. Hypoplastic anemia
D. Hemolytic anemia
E. Iron deficiency anemia

A patient who had subtotal gastrectomy 5 years ago developed B12 folic acid deficiency

anemia. What is the leading mechanism in the development of such anemia?
A. The absence of an internal factor Castle
B. The absence of an external factor Castle
C. Impaired absorption of vitamin B12 in the small intestine
D. Folic acid deficiency
E. Transcobalamin deficiency.

20. Examination of a patient, suffering from atrophic gastritis, revealedmegaloblastic anemia. The anemia is likely to be caused by the deficiency of the following substance:
A. Gastromucoproteid
B. Vitamin B6
C. Vitamin B1
D. Iron
E. Erythropoietins

21. Surgical removal of a part of stomachresulted in disturbed absorption of vitamin B12, it is excreted with feces. Thepatient was diagnosed with anemia. Whatfactor is necessary for absorption of thisvitamin?
A. Gastromucoprotein
B. Gastrin
C. Hydrochloric acid
D. Pepsin
E. Folic acid

22. Examination of a 52-year-oldfemale patient has revealed a decreasein the amount of red blood cells andan increase in free hemoglobin inthe blood plasma (hemoglobinemia).What type ofanemia is being observed in the patient?
A. Acquired hemolytic
B. Hereditary hemolytic
C. Acute hemorrhagic
D. Chronic hemorrhagic
E. Anemia due to diminishederythropoiesis

23. A patient with hemolytic anemia showed pyruvate kinase deficiency in erythrocytes. In these conditions, the cause of hemolysis of red blood cells are:
A. Reduced Na^+, K^+ -ATPases
B. Na^+ deficiency in red blood cells
C. Excess K^+ in red blood cells
D. Genetic defects of glycophorin A
E. Spectrin deficiency

24. During laboratory examination of the blood of a person who was bitten by a snake, hemolysis of red blood cells and hemoglobinuria were detected. The action of snake venom due to the presence of the enzyme in it:
A. Phospholipase A2
B. Phospholipase A1
C. Phospholipase C
D. Phospholipase D
E. Sphingomyelinase

25. For people who permanently reside in highlands, adaptation to "oxygen starvation" is carried out by facilitating the release of hemoglobin oxygen due to:
A. Increased formation of 2,3-diphosphoglycerate in erythrocytes
B. Reduced formation of 2,3-diphosphoglycerate in erythrocytes
C. The increase in CO2 partial pressure
D. Increasing blood pH
E. Decreased blood temperature

26. After the accident in the chemical industry, the environment was polluted with nitro compounds. The people living in this area, there was a sharp weakness, headache, shortness of breath, dizziness. What is the cause of hypoxia?
A. Methemoglobin formation
B. Inhibition of dehydrogenase
C. Formation of carboxyhemoglobin
D. Reduced function of flavin enzymes
E. Inactivation of cytochrome oxidase

27. A 7-year-old child presents with marked signs of hemolytic anemia. Biochemical analysis of erythrocytes determined low concentration of NADPH and reduced glutathione. What enzyme is deficient in this case leading to the biochemical changes and their clinical manifestations?
A. Glucose-6-phosphate dehydrogenase
B. Hexokinase
C. Fructokinase
D. Pyruvate kinase
E. Lactate dehydrogenase

28. A 38 year old patient takes aspirin and sulfanilamides. After their intake intensified erythrocyte haemolysis is observed which is caused by deficiency of glucose 6-phosphate dehydrogenase. This pathologyis caused by failure of the following coenzyme:
A. NADP – H
B. FAD - H2
C. Pyridoxal phosphate

D. FMN - H2
E. Ubiquinone

29. A 22 year old woman has been taking sulfanilamides for a long time that led to symptoms of hemolytic anaemia caused by hereditary disturbance of synthesis of glucose 6-phosphate dehydrogenase. This enzyme of pentose-phosphate cycleis responsible for generation of:
A. NADP - H2
B. NAD
C. FAD
D. FMN
E. ATP

30. It is known that pentose-phosphate pathway actively functions in the erythrocytes. What is the main function of this metabolic pathway in the erythrocytes?
A. Counteraction to lipid peroxidation
B. Activation of microsomal oxidation
C. Neutralization of xenobiotics
D. Oxidation of glucose into lactate
E. Increase of lipid peroxidation

31. In course of metabolic process active forms of oxygen including superoxide anion radical are formed in the human body. By means of what enzyme is this anion inactivated?
A. Superoxide dismutase
B. Catalase
C. Peroxidase
D. Glutathioneperoxidase
E. Glutathionereductase

32. Reduced activity of antioxidant enzymes enhances peroxidation of cell membrane lipids. The reduction of glutathione peroxidase activity is caused by the following microelement deficiency:
A. Selenium
B. Molybdenum
C. Cobalt
D. Manganese
E. Copper

33. In pathological processes accompanied by hypoxia, an incomplete reduction of the oxygen molecule in the respiratory chain and accumulation of hydrogen peroxide occurs. Specify the enzyme that ensures its destruction:
A. Catalase
B. Cytochrome oxidase
C. Succinate dehydrogenase
D. Ketoglutarate dehydrogenase
E. Aconitase

34. When periodontitis develops lipid peroxidation in periodontal tissues, the content of malondialdehyde, hydrogen peroxide increases in the oral cavity. Which of the following enzymes provide antioxidant protection?
A. Superoxide dismutase, catalase
B. Amylase, trypsin
C. Maltase, chymotrypsin
D. Lactase, lysozyme
E. Sucrase, prothrombin

35. Periodontitis induces the development of lipid peroxidation in the periodontal tissues, as well as an increase in malondialdehyde and hydrogen peroxide concentration in the oral cavity. Which of the following enzymes provides antioxidant protection?
A. Catalase
B. Amylase
C. Maltase
D. Lactase
E. Invertase

36. Those organisms which in the process of evolution failed to develop protection from H2O2 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 B5
D. Oxygenase and catalase
E. Flavin-dependent oxidase

37. Patient with abscess of the cut wound applied to the traumatological department. In order to clean the wound from the pus doctor washed it with 3% hydrogen peroxide. Foam was absent. What caused the absence of the drug activity?
A. Inherited insufficiency of catalase
B. Low concentration H2O2
C. Inherited insufficiency of erythrocyte phosphatdehydrogenase
D. Shallow wound
E. Pus in the wound

38. A worker has decreased buffer capacity of blood due to exhausting muscular work. The influx of what acid substance in the blood can cause this symptom?
A. Lactate
B. Pyruvate
C. 1,3-bisphosphoglycerate
D. α-ketoglutarate
E. 3-phosphoglycerate

39. A child during the first 3 months after birth developed a severe form of hypoxia, which was manifested by asphyxia and cyanosis of skin. The reason for this is a violation of the replacement of fetal hemoglobin on:
A. Hemoglobin A
B. Hemoglobin S
C. Glycated hemoglobin
D. Methemoglobin
E. Hemoglobin M

40. Diseases of the respiratory system and circulatory disorders impair the transport of oxygen, thus leading to hypoxia. Under these conditions the energy metabolism is carried out byanaerobic glycolysis. As a result, the following substance is generated and accumulated in blood:
A. Lactic acid
B. Pyruvic acid
C. Glutamic acid
D. Citric acid
E. Fumaric acid

41. A patient is followed up in an endocrinological dispensary on account of hyperthyreosis. Weight loss, tachycardia, finger tremor are accompanied by hypoxia symptoms - headache, fatigue, eye flicker. What mechanism of thyroid hormones action underlies the development of hypoxia?
A. Disjunction oxydation and phosphorilation
B. Inhibition of respiratory fermentsynthesis
C. Competitive inhibition of respiratoryferments
D. Intensification of respiratory fermentsynthesis
E. Specific binding of active centres ofrespiratory ferments

42. 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

43. A 32-year-old female patient suffers from gingivitis accompanied by gum hypoxia. What metabolite of carbohydrate metabolism is produced inthe periodontium tissues more actively in this case?
A. Lactate
B. Ribose 5-phosphate
C. Glycogen
D. Glucose 6-phosphate
E. NADPH-H

44. A 29-year-old patient was delivered to a hospital because of intoxication with carbon monoxide. Objectively: the patient presents with symptoms of severe hypoxia- evident dyspnea, cyanosis, tachycardia. What compound is produced as a result of intoxication with carbon monooxide?
A. Carboxyhemoglobin
B. Methemoglobin
C. Carbhemoglobin
D. Sulfhemoglobin
E. Oxyhemoglobin

45. A man lost consciousness in a car with running engine where he had been waiting for a friend for a long time. What hemoglobin compaund can be found in the blood of the patient?
A. Carboxyhemoglobin
B. Deoxyhemoglobin
C. Carbhemoglobin
D. Methemoglobin
E. Oxyhemoglobin

46. A patient with respiratory failure has blood pH of 7,35. pCO2 test revealed hypercapnia. Urine pH test revealed an increase in the urine acidity. What form of acid-base imbalance is the case?
A. Compensated respiratory acidosis
B. Compensated metabolic acidosis
C. Decompensated metabolic acidosis
D. Compensated respiratory alkalosis
E. Decompensated respiratory alkalosis

47. 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

48. A 30-year-old man with diabetes mellitus type I was hospitalised. The patient is comatose. Laboratory tests revealed hyperglycemia and ketonemia. What metabolic disorder can be detected in this patient?
A. Metabolic acidosis
B. Metabolic alkalosis
C. Respiratory acidosis
D. Respiratory alkalosis
E. Normal acid-base balance

49. A patient suffers from disrupted patency of the airways at the level of small and medium-sized bronchial tubes. What changes of acid-base balance can occur in the patient?
A. Respiratory acidosis
B. Respiratory alkalosis
C. Metabolic acidosis
D. Metabolic alkalosis
E. Acid-base balance remains unchanged

50. 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 alcalosis
C. Any changes woun't happen
D. Respiratory acidosis
E. Respiratory alcalosis

51. Ketosis develops in the patients with diabetes mellitus, as the result of activation of fatty acids oxidation processes. What acidbase imbalance can result from accumulation of excessive ketone bodies in the blood?
A. Metabolic acidosis
B. Metabolic alkalosis
C. No imbalance occurs
D. Respiratory acidosis
E. Respiratory alkalosis

52. Prophylactic examination of a patient revealed hyperglycemia, ketonuria, polyuria, glycosuria. What form of acid-base balance disorder is the case?
A. Metabolic acidosis
B. Gaseous acidosis
C. Nongaseous acidosis
D. Gaseous alkalosis
E. Metabolic alkalosis

53. A patient with diabetes developed a diabetic coma due to the acid-base imbalance. Specify the kind of this imbalance:
A. Metabolic acidosis
B. Metabolic alkalosis
C. Respiratory acidosis
D. Gaseous alkalosis
E. Non-gaseous alkalosis

54. Ketoacidosis that develops due to accumulation of ketone bodies in blood serum is a primary complication of diabetes mellitus. What acid-base disbalance develops during this condition?
A. Metabolic acidosis
B. Metabolic alkalosis
C. Respiratory acidosis
D. Respiratory alkalosis
E. –

55. Due to recurring vomiting a patient has lost significant amount of gastric juice, which led to development of acidbase dysbalance. What type of acid-base dysbalance has developed?
A. Nongaseous alkalosis
B. Gaseous acidosis
C. Nongaseous acidosis
D. Gaseous alkalosis
E. Metabolic acidosis

56. A mountaineer who rose to a height of 5200m developed gas alkalosis. What is the cause of its development?
A. Hyperventilation
B. Hypoventilation of the lungs
C. Hyperoxemia
D. Hypoxemia
E. Reduced ambient temperature

57. In a laboratory study of the respiratory function of the blood, it has been established that there is a deterioration of CO_2 transport.

What enzyme deficiency in red blood cells can this be due to?
A. Carboanhydrase
B. 2,3-diphosphoglycerate
C. Adenylate cyclase
D. Protein kinase
E. Phosphorylase

58. In the process of hemoglobin catabolismiron is released and then as a part of special transport protein is returned to the bonemarrow, to be used again for hemoglobinsynthesis. Name this transport protein:
A. Transferrin
B. Transcobalamin
C. Haptoglobin
D. Ceruloplasmin
E. Albumin

59. Hemoglobin catabolism results in release of iron which is transported to the bone marrow by a certain transfer protein and used again for the synthesis of hemoglobin. Specify this transfer protein:
A. Transferrin (siderophilin)
B. Transcobalamin
C. Haptoglobin
D. Ceruloplasmin
E. Albumin

60. In the liver of a patient suffering from iron deficiency anemia, a violation of the synthesis of iron-containing protein, which is a source of iron for heme synthesis, was found. What is the name of this protein?
A. Ferritin
B. Transferrin
C. Hemosiderin
D. Ceruloplasmin
E. Hemoglobin

61. In men of 40 years as a result of enhanced hemolysis of erythrocytes, the iron content in the blood plasma increased. What protein provides its deposition in the tissues?
A. Ferritin
B. Haptoglobin
C. Transferrin
D. Transcortin
E. Albumin

62. 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

63. A 16-year-old girl, who has been starving herself for a long time to lose weight, developed an edema. This phenomenon is mainly caused by:
A. Hypoproteinemia due to protein synthesis disturbance
B. Hypoglycemia due to glycogen synthesis disturbance
C. Venous congestion and increased venous pressure
D. Deceleration of glomerular filtration rate
E. Decreased production of vasopressin in the hypothalamus

64. A 36-year-old female patient who has been limiting the number of food stuffs in her diet for 3 months presents with a decrease in body weight, deterioration of physical and mental health, face edemata. These changes may be caused by the deficiency of the following nutrients:
A. Proteins
B. Vitamins
C. Fats
D. Carbohydrates
E. Micronutrients

65. Upon toxic damage of hepatic cells resulting in disruption of liver function the patient developed edemas. What changes of blood plasma are the main cause of edema development?
A. Decrease of albumin content
B. Increase of globulin content
C. Decrease of fibrinogen content
D. Increase of albumin content
E. Decrease of globulin content

66. In case of toxic damage to hepatocytes with a violation of their protein synthesis function, the patient's content of albumin in the blood plasma and oncotic pressure of the plasma

sharply decreased. What will be the result of these changes?
A. The appearance of edema
B. Reduced diuresis
C. Reduced ESR
D. Increased circulating blood volume
E. Increased blood viscosity

67. 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

68. 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

69. 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

70. The prolonged action of a number of antibiotics and sulfonamides is due to the fact that they circulate in the blood for a long time in combination with:
A. Albumin
B. Transferrin
C. Hemoglobin
D. Haptoglobin
E. Hemopexin

71. Electrophoretic study of a bloodserum sample, taken from the patient with pneumonia, revealed an increase in one of the protein fractions. Specify this fraction:
A. γ-globulins
B. Albumins
C. α1-globulins
D. α2-globulins
E. β-globulins

72. When the inflammatory process is activated, some autoimmune and infectious diseases in the blood plasma sharply increase the level of proteins of the acute phase. Which of the following proteins can form a gel when the whey cools?
A. Cryoglobulin
B. Haptoglobin
C. Ceruloplasmin
D. C-reactive protein
E. α2 macroglobin

73. A 49-year-old male patient with acute pancreatitis was likely to develop pancreatic necrosis, while active pancreatic proteases were absorbed into the blood stream and tissue proteins broke up. What protective factors of the body can inhibit these processes?
A. α2-macroglobulin, α1-antitrypsin
B. Immunoglobulin
C. Cryoglobulin, interferon
D. Ceruloplasmin, transferrin
E. Hemoplexin, haptoglobin

74. Wilson's disease is a disorder of copper transport which leads to the accumulation of this metal in brain and liver cells. It is associated with a disturbance in the synthesis of the following protein:
A. Ceruloplasmin
B. Metallothionein
C. Transcobalamin
D. Haptoglobin
E. Siderophilin

75. 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

76. Biochemical analysis of the blood serum of a patient with hepatolenticular degeneration (Wilson-Konovalov disease) revealed a decrease in the content of ceruloplasmin. In this patient, the concentration of such ions in the serum will be increased:
A. Copper
B. Calcium
C. Phosphorus
D. Potassium
E. Sodium

77. A patient suffering from hepatocerebral degeneration has low concentration of ceruloplasmin in blood serum. What element accumulation will be observed in liver, cerebrum and kidneys of the patient?
A. Cuprum
B. Calcium
C. Sodium
D. Potassium
E. Ferrum

78. A 33-year-old woman suffers from hepatocerebral dystrophy (Wilson's disease). In the blood - low content of ceruloplasmin. In the urine - sharply elevated amino acids. What process has increased these changes?
A. Complexation of amino acids with copper
B. Urea synthesis
C. Transamination of amino acids
D. Disintegration of tissue proteins
E. Gluconeogenesis

79. A 38 year old patient suffers from rheumatism in its active phase. What laboratory characteristic of blood serumis of diagnostic importance in case of this pathology?
A. C-reactive protein
B. Uric acid
C. Urea
D. Creatinine
E. Transferrin

80. Blood plasma of a healthy man contains several dozens of proteins. During an illness new proteins can originate, namely the protein of "acute phase". Select such protein from the listed below:
A. C-reactive protein
B. Prothrombin
C. Fibrinogen
D. G immunoglobulin
E. A immunoglobulin

81. A 60-year-old man complains of joint pain. An increase in the concentration of C-reactive protein and hydroxyproline was detected in the patient's serum. What disease are these symptoms characteristic of?
A. Rheumatism
B. Gout
C. Hepatitis
D. Jaundice
E. Diabetes

82. A 6-month-old child experienced frequent and intense subcutaneous hemorrhages. The appointment of a synthetic analogue of vitamin K (vikasol) gave a positive effect. In the γ-carboxylation of glutamic acid, what protein of the blood coagulation system is this vitamin taking part in?
A. Prothrombin
B. Fibrinogen
C. Hageman factor
D. Antihemophilic globulin A
E. Rosenthal factor

83. 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

84. The patient complains of frequent bleeding from the gums. A deficiency of coagulation factor II (prothrombin) was found in the blood. What phase of blood coagulation is impaired in a person, above all?
A. Thrombin formation
B. The formation of prothrombinase
C. Formation of fibrin
D. Fibrinolysis
E. Clot retraction

85. Inflammatory processes cause synthesis of protein of acute phase in an organism. What substances stumulate their synthesis?
A. Interleukin-1
B. Immunoglobulins
C. Interferons
D. Biogenic amins
E. Angiotensin

86. Pyrogenal administered to a rabbit, in the course of an experiment, resulted in increase of its body temperature. What substance of those named below acts as a secondary pyrogen that is a part of fever inducing mechanism?
A. Interleukin 1
B. Pseudomonas polysaccharide (Piromen)
C. Histamine
D. Bradykinin
E. Immunoglobulin

87. A patient who suffers from pneumonia has high body temperature. What biologically active substance plays the leading part in origin of this phenomenon?
A. Interleukin-I
B. Histamine
C. Bradykinin
D. Serotonin
E. Leukotrienes

88. After transfusion of 200 ml of blood apatient presented with body temperature rise up to 37,9^{o}C. Which of the following substances is the most likely cause of temperature rise?
A. Interleukin-1
B. Interleukin-2
C. Tumour necrosis factor
D. Interleukin-3
E. Interleukin-4

89. For the development of febrile conditions, an increase in the level of the “acute phase” proteins of ceruloplasmin, fibrinogen, and C-reactive protein is characteristic. Specify the possible mechanism of this phenomenon:
A. Stimulating effect of IL-1 on hepatocytes
B. The destructive effect of temperature on the cells of the body
C. Proliferative effect of IL-2 on T-lymphocytes
D. Degranulation of tissue basophils
E. -

90. The student used canned donor blood to determine the time it was collected. However, he could not get any positive result. The reason for this is the lack of blood:
A. Ionized calcium
B. Hageman factor
C. Thromboplastin
D. Fibrinogen
E. Vitamin K.

91. A 16 year old boy after an illness has diminished function of protein synthesis in liver as a result of vitamin K deficiency. It will cause disturbance of:
A. Blood coagulation
B. Erythrocyte sedimentation rate
C. Anticoagulant generation
D. Erythropoietin secretion
E. Osmotic blood pressure

92. The patient has hemorrhages, the concentration of prothrombin is reduced in the blood. What vitamin deficiency led to a violation of the synthesis of this clotting factor?
A. K
B. A
C. D
D. C
E. E

93. A 37-year-old patient, with long-term use of antibiotics, has increased bleeding with minor injuries. In the blood - a decrease in activity II, VII, X blood clotting factors; lengthening of blood clotting time. What vitamin deficiency caused these changes?
A. Vitamin K
B. Vitamin A
C. Vitamin C
D. Vitamin D
E. Vitamin E

94. Plasmic factors of blood coagulationare 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

95. 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

96. 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

97. A few days before an operation apatient should be administered vitamin K or its synthetic analogue Vicasol. Vitamin K takes part in the following posttranslational modification of the II, VII, IX, X blood clotting factors:
A. Carboxylation
B. Decarboxylation
C. Deamination
D. Transamination
E. Glycosylation

98. A patient, who has been suffering for a long time from intestine disbacteriosis, has increased hemorrhaging caused by disruption of posttranslational modification of blood-coagulation factors II, VII, IX, and X in the liver. What vitamin deficiency is the cause of this condition?
A. K
B. 12
C. 9
D. C
E. P

99. A newborn baby has numerous hemorrhages. Blood coagulation tests reveal increased prothrombin time. The child is most likely to have a disorder of the following biochemical process:
A. Production of gammacarboxyglutamate
B. Conversion of homocysteine to methionine
C. Conversion of methylmalonyl CoA to succinyl CoA
D. Degradation of glutathione
E. Hydroxylation of proline

100. Activation of a number of hemostatic factors occurs through their joining with calcium ions. What structural component allows for adjoining of calcium ions?
A. Gamma-carboxyglutamic acid
B. Gamma-aminobutyric acid
C. Gamma-oxybutyric acid
D. Hydroxyproline
E. Monoamine-dicarboxylic acids

101. A 46-year-old female patient hasa 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

102. A 15-year-old boy has been diagnosedwith acute viral hepatitis. What blood values hould be determined to confirm acute affection of hepatic cells?
A. Aminotransferase activity (AST, ALT)
B. Unconjugated and conjugated bilirubin content
C. Erythrocytes sedimentation rate (ESR)
D. Cholesterol content
E. Protein fraction content

103. 12 hours after an accute 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

104. A 43-year-old man after eating fatty foods and alcohol complains of severe abdominal

pain. The serum content of trypsin is 850 mmol / (h • l) (normal 60-240 mmol / (h • l)). What is the most characteristic pathology of the digestive system?
A. Acute pancreatitis
B. Dynamic intestinal obstruction
C. Mechanical intestinal obstruction
D. Gastric ulcer
E. Hepatitis

105. For biochemical diagnostics of myocardial infarction it is necessary to measure activity of a number of enzymes and their isoenzymes. What enzymatic test is considered to be the best to prove or disprove the diagnosis of infarction in the early period after the chest pain is detected?
A. Creatine kinase isoenzyme CK-MB
B. Creatine kinase isoenzyme CK-MM
C. LDH1 lactate dehydrogenaseisoenzyme
D. LDH2 lactate dehydrogenaseisoenzyme
E. Aspartate aminotransferasecytoplasmic isoenzyme

106. An increase in the activity of LDH4,5, ALT, carbamoylornitene transferase was detected in the patient's blood. In which body can you predict the development of the pathological process?
A. Liver (possible hepatitis)
B. Heart muscle (possible myocardial infarction)
C. Skeletal muscle
D. Kidneys
E. Connective tissue

107. Albumin concentration in the patient's blood is 2.8 g / l, increased concentration of lactate dehydrogenase 5 (LDH 5). What kind of organ disease does this indicate?
A. Liver
B. Kidney
C. Heart
D. Lung
E. Spleen

108. Blood test of the patient revealed albumine content of 20 g/l and increased activity of lactate dehydrogenase isoenzyme 5 (LDH5). These results indicate disorder of the following organ:
A. Liver
B. Kidneys
C. Heart
D. Lungs
E. Spleen

109. In the serum of the patient increased activity of hyaluronidase. Determining what biochemical index of serum will allow to confirm the assumption of connective tissue pathology?
A. Sialic acids
B. Bilirubin
C. Uric acid
D. Glucose
E. Galactose

110. Marked increase of activity of MB forms of CPK (creatinephosphokinase) and LDH-1 was revealed by examination of the patient's blood. What is the most probable pathology?
A. Miocardial infarction
B. Hepatitis
C. Rheumatism
D. Pancreatitis
E. Cholecystitis

111. An increase in the activity of LDH 1, LDH 2, AsAT, and creatine kinase was found in the patient's blood. In which organ of the patient is the most likely development of the pathological process?
A. Heart
B. Pancreas
C. Liver
D. Kidneys
E. Skeletal muscle

112. There is increased activity of AST, LDH1, LDH2, and CPK in the patient's blood. Pathological process most likely occurs in the:
A. Heart
B. Skeletal muscles
C. Kidneys
D. Liver
E. Adrenal glands

113. The activity of the isoenzymes LDG1 and LDG2 appeared in the patient's blood plasma. On the pathology of a body that indicates?
A. Myocardium
B. Liver
C. Kidney
D. Brain
E. Skeletal muscle

114. A patient presents high activity of LDH1,2, aspartate aminotransferase, creatine phosphokinase. In what organ (organs) is the development of apathological 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

115. 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 creatinekinase and LDH1. What disease are these symptoms typical for?
A. Acute myocardial infarction
B. Acute pancreatitis
C. Stenocardia
D. Cholelithiasis
E. Diabetes mellitus

116. 6 hours after the myocardial infarction a patient was found to have elevated level of lactate dehydrogenase in blood. What isoenzyme should be expected in this case?
A. LDH1
B. LDH2
C. LDH3
D. LDH4
E. LDH5

117. A 47-year-old male patient was diagnosed with myocardial infarction in the intensive care unit. Which of the lactate dehydrogenase (LDH) fractions will prevail in the blood serum during the first two days?
A. LDH 1
B. LDH 2
C. LDG 3
D. LDH 4
E. LDG 5

118. The high level of Lactate Dehydrogenase (LDH) isozymes concentration showed the increase of LDH-1 and LDH-2 in a patient's blood plasma. Point out the most probable diagnosis:
A. Myocardial infarction
B. Skeletal muscle dystrophy
C. Diabetes mellitus
D. Viral hepatitis
E. Acute pancreatitis

119. A 60-year-old man consulted a doctor about an onset of chest pain. In blood serum analysis showed a significant increase in the activity of the following enzymes: creatine kinase and its MB-isoform, aspartate aminotransferase. These changes indicate the development of the pathological process in the following tissues:
A. Cardiac muscle
B. Lungs
C. Skeletal muscles
D. Liver
E. Smooth muscles

120. Hereditary hyperlipoproteinemia type I is caused by lipoprotein lipase deficiency. Increasing the level of some transport forms of lipids in plasma even on an empty stomach is characteristic?
A. Chylomicrons
B. Low density lipoproteins
C. Very low density lipoproteins
D. High density lipoproteins
E. Modified lipoproteins

121. Cholesterol content in blood serum of a 12-year-old boy is 25 mmol/l. Anamnesis states hereditary familial hypercholesterolemia caused by synthesis disruption of receptor-related proteins for:
A. Low-density lipoproteins
B. High-density lipoproteins
C. Chylomicrons
D. Very low-density lipoproteins
E. Middle-density lipoproteins
M-a-2016-176

122. Examination of the patient revealed an increase in the content of low-density lipoproteins in the blood serum. What disease can be assumed in this patient?
A. Atherosclerosis
B. Kidney damage
C. Acute pancreatitis
D. Gastritis
E. Inflammation of the lungs

123. A 58-year-old patient suffers from the cerebral atherosclerosis. Examination revealed hyperlipoidemia. What class of lipoproteins will most probably show increase in concentration in this patient's blood serum?
A. Low-density lipoproteins
B. High-density lipoproteins
C. Fatty acid complexes with albumins
D. Chylomicrons
E. Cholesterol

124. Rabbits lived on food with addition of cholesterol. Five months later the atherosclerotic aorta changes were revealed. Name the main cause of atherogenesis in this case:
A. Exogenous hypercholesterolemia
B. Overeating
C. Hypodynamia
D. Endogenous hypercholesterolemia
E. –

125. Examination of an ill child's blood revealed inherited hyperlipoproteinemia. Genetic defect of what enzyme synthesis causes this phenomenon?
A. Lipoprotein lipase
B. Glycosidase
C. Proteinase
D. Hemsynthetase
E. Phenylalanine hydroxylase

126. In the study of the patient's blood plasma 4 hours after ingestion of fatty foods, it was found that it is cloudy. The most likely cause of this condition is an increase in plasma concentration:
A. Chylomicrons
B. HDL
C. LDL
D. Cholesterol
E. Phospholipids

127. Blood serum of the patient has milky appearance. Biochemical analysis revealed high content of triacylglycerols and chylomicrons. This condition is caused by hereditary defect of the following enzyme:
A. Lipoprotein lipase
B. Phospholipase
C. Pancreatic lipase
D. Adipose tissue hormone-sensitive lipase
E. Phosphodiesterase

128. During examination of a teenager with xanthomatosis the family history of hypercholesterolemia is revealed. What transportable lipids are increased in concentration in case of such a disease?
A. Low-density lipoproteins
B. Chylomicrons
C. Very low-density lipoproteins
D. High-density lipoproteins
E. Intermediate-density lipoproteins

129. The level of which plasma protein allows retrospectively (for the previous 4-8 weeks before the examination) to assess the level of glycemia, if the patient has diabetes mellitus, which is accompanied by fasting hyperglycemia more than 7.2 mmol / l?
A. Glycosylated hemoglobin.
B. Albumin.
C. C-reactive protein.
D. Ceruloplasmin.
E. Fibrinogen.

130. A patient is diagnosed with pancreatic diabetes with associated hyperglycemia. Glycemia rate can be assessed retrospectively (4-8 weeks prior to examination) by measuring concentration of the following blood plasma protein:
A. Glycated hemoglobin
B. Albumin
C. Fibrinogen
D. C-reactive protein
E. Ceruloplasmin

131. 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

132. A 42-year-old woman, who has been keeping to a vegetarian diet for a long period of time, consulted a doctor. Examination revealed negative nitrogen balance in the patient. What

factor is the most likely cause of such a condition?
A. Insufficient amount of proteins in the diet
B. Insufficient amount of dietary fiber
C. Excessive amount of fats in the diet
D. Insufficient amount of fats in the diet
E. Decreased rate of metabolic processses

133. Examination of a 45-year-old man whohad kept to a vegeterian diet for a long time revealed negative nitrogen balance.Which peculiarity of his diet is the causeof this phenomenon?
A. Lack of proteins
B. Lack of fats
C. Excess of water
D. Excess of carbohydrates
E. Lack of vitamins

134. A 14 year old child was found to have a positive nitrogen balance. Which of the following could be the reason for this?
A. Body growth
B. Fasting
C. Reduced protein in food
D. Significant physical loads
E. Emotional stress

135. A month after a serious operation a 38-year-old patient has recovered and has now positive nitrogen balance. Urine of this patient may be found to have low concentration of the following nitrogencontaining substance:
A. Urea
B. Lactate
C. Stercobilinogen
D. Galactose
E. 17-ketosteroids

136. A chiled was diagnosed with acuterenal failure. What biochemic saliva indices can confirm this diagnosis?
A. Increased level of rest nitrogen
B. Increase of immunoglobuline A
C. Reduction of alkaline phosphatase
D. Increase of alpha amylase
E. Decreased level of phosphate

137. A patient who goes out of a state of prolonged fasting has determined nitrogen metabolism. What result can you expect?
A. Reducing nitrogen excretion
B. Increased nitrogen excretion
C. Nitrogen equilibrium
D. Nitrogen balance unchanged
E. Ketonemia

138. A patient with primary nephrotic syndrome has the following content of whole protein: 40 g/l. What factor caused hypoproteinemia?
A. Proteinuria
B. Transition of protein from vessels to tissues
C. Reduced protein synthesis in liver
D. Increased proteolysis
E. Disturbance of intestinal protein absorption

139. Examination of a patient with chronicrenal insufficiency revealed an increase in residual nitrogen concentration in blood up to 35 millimole/l, more than half of which is urea. What type of hyperazotemia is it?
A. Retentional
B. Hepatic
C. Productional
D. Residual
E. Combined

140. On the basis of laboratory analysis, the patient confirmed the diagnosis of gout. To establish the diagnosis was carried out determination of the content:
A. Urinary acid in the blood and urine
B. Creatinine in urine
C. Residual nitrogen in the blood
D. Urea in the blood and urine
E. Ammonia in the urine

141. A young man of 18 years old was diagnosed with muscular dystrophy. Is the increase in the serum content of the substance most likely in this pathology?
A. Creatine
B. Myoglobin
C. Myosin
D. Lactate
E. Alanin

142. A 46-year-old patient complains of dry mouth, thirst, frequent urination, and general weakness. In the blood: hyperglycemia, hyperketonemia. In the urine: glucose, ketone bodies. On ECG: diffuse changes in the myocardium. What is the most likely diagnosis?
A. Diabetes
B. Alimentary hyperglycemia
C. Acute pancreatitis
D. Diabetes mellitus

E. Coronary heart disease

143. The patient after suffering parotitis lost weight, constantly feeling thirsty, drinks a lot of water, notes frequent urination, increased appetite, pruritus, weakness, furunculosis. In the blood: glucose - 16 mmol / l, ketone bodies 100 mkmol / l. What disease has the patient developed?
A. Insulin-dependent diabetes mellitus
B. Insulin independent diabetes
C. Steroid diabetes
D. Diabetes mellitus
E. Diabetes mellitus malnutrition

144. 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% (standardis - 0). What is the most probable diagnosis?
A. Hyperglycemic coma
B. Hypoglycemic coma
C. Acute heart failure
D. Acute alcoholic intoxication
E. Anaphylactic shock

145. A 38-year-old patient was admitted to the intensive care unit in an unconscious state. Reflexes are absent. Blood sugar - 2.1 mmol / l. In history - diabetes mellitus from 18 years. What kind of coma does the patient have?
A. Hypoglycemic
B. Ketoacidotic
C. Lacticidemic
D. Hyperosmolar
E. Hyperglycemic

146. A patient with a diagnosis of Itsenko-Cushing's disease (hyperproduction of adrenal hormones) in the blood has an increased concentration of glucose, ketone bodies, sodium. What is the biochemical mechanism leading to the occurrence of hyperglycemia?
A. Gluconeogenesis
B. Glycogenesis
C. Glycogenolysis
D. Glycolysis
E. Aerobic glycolysis

147. A 48 year old patient complained about intense pain, slight swelling and reddening of skin over the joints, temperature rise up to 38oC. Bloodanalysis revealed high concentration ofurates. This condition might be caused by disturbed metabolism of:
A. Purines
B. Collagen
C. Cholesterol
D. Pyrimidines
E. Carbohydrates

148. A patient has increased content of uric acid in his blood that is clinically presented by pain syndrome as a result of urate deposition in the joints. What process does this acid result from?
A. Lysis of purine nucleotides
B. Lysis of pyrimidine nucleotides
C. Heme catabolism
D. Proteolysis
E. Reutilization of purine bases

149. A 1,7-year-old child with a developmental delay and manifestations of self-agression has the concentration of uric acid in blood at the rate of 1,96 millimole/l. What metabolic disoder is this typical for?
A. Lesch-Nyhan syndrome
B. Podagra
C. Acquired immunodeficiency syndrome
D. Gierke’s disease
E. Cushing’s basophilism

150. M-r S presents all signs of the hepatic coma: loss of consciousness, absence of reflexes, cramps, convulsion, disorder of heart activity, recurrent (periodical) respiration. What are cerebrotoxical substances which accumulate in blood under hepar insufficiency?
A. Ammonia
B. IL-1
C. Autoantibody
D. Necrosogenic substances
E. Ketonic body

151. After a serious viral infection a 3-year-old child has repeated vomiting, loss of consciousness, convulsions. Examination revealed hyperammoniemia. 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 purtefaction of proteins in intestines
E. Inhibited activity of transamination enzymes

152. A 2-year-old child presents with mental development retardation, intolerance of proteins, severe hyperammonemia against the background of low blood urea content. This condition is caused by the congenital deficiency of the following mitochondrial enzyme:
A. Carbamoyl phosphate synthetase
B. Citrate synthase
C. Succinate dehydrogenase
D. Malate dehydrogenase
E. Monoamine oxidase

153. A newborn presents with weak suckling, frequent vomiting, and hypotonia. Blood and urine citrulline are very high. What metabolic process is disturbed?
A. Ornithine cycle
B. Tricarboxylic acid cycle
C. Glycolysis
D. Gluconeogenesis
E. Cori cycle

154. Nitrogen is being excreted from thebody mainly as urea. When activity of acertain enzyme in the liver is low, it resultsin inhibition of urea synthesis and nitrogenaccumulation in blood and tissues. Namethis enzyme:
A. Carbamoyl phosphate synthetase
B. Aspartate aminotransferase
C. Urease
D. Amylase
E. Pepsin

155. The patient has a reduced content of indican in the blood serum, and also his daily excretion with urine is reduced. Impairment of which organ is the cause of this?
A. Liver
B. Kidney
C. Heart
D. Lungs
E. Pancreas

156. 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

157. A sick child presents with high content of phenyl pyruvate in urine (normally it is practically absent). Blood phenylalanine level is 350 mg/L (norm - 15 mg/L). What disease are these symptoms characteristic of?
A. Phenylketonuria
B. Albinism
C. Tyrosinosis
D. Alkaptonuria
E. Gout

158. A hospital admitted a 9 y.o. boy with mental and physical retardation. Biochemical blood analysis revealed high content of phenylalanine. Such condition may be caused by blocking of the following enzyme:
A. Phenylalanine-4-monooxigenase
B. Oxidase of homogentisic acid
C. Glutamine transaminase
D. Aspartate aminotransferase
E. Glutamate decarboxylase

159. Blood of the patients with diabetes mellitus shows increased content of free fatty acids. Name the most likely cause of this:
A. Increased activity of adipose triglyceride lipase
B. Accumulation of palmitoyl-CoA in cytosol
C. Activation of ketone bodies utilization
D. Activation of apoA1, apoA2, and apoA4 apolipoprotein synthesis
E. Decreased activity of plasma phosphatidylcholine-cholesterolacyltransferase

Biochemistry of immune system

1. Differentiation of B-lymphocytes into plasma cells leads to synthesis of immunoglobulins that ensure specific immune response of the body. Differentiation of B-lymphocytes takes place in the following organ of immune system:
A. Tonsils
B. Red bone marrow
C. Liver
D. Thymus
E. Thyroid gland

2. Among lymphocytes, there are populations of cells with membrane receptors for IgM, they are activated by the action of specific antigens, mitotically multiply, and differentiate into plasma cells that produce antibodies (immunoglobulins). What are these cells called?
A. B-lymphocytes
B. Memory T lymphocytes
C. T-killer lymphocytes
D. T-suppressor lymphocytes
E. -

3. A 2-year-old boy often became ill with respiratory diseases, stomatitis, pustular skin lesions. Even small damage to the gums and mucous membranes is complicated by prolonged inflammation. It is established that the blood of the child is practically absent immunoglobulins of all classes. Reduction the functional activity of a cell population is the basis of the syndrome described?
A. B-lymphocytes
B. T lymphocytes
C. Neutrophils
D. Macrophages
E. NK lymphocytes

4. A 13-year-old boy presents with eczematous rashes on his shins and torso. Anamnesis states cases of otitis, pneumonia, and furuncles in the patient. Blood test: platelets - 70 • 109/l, low activity of T helper and T suppressor cells, low IgM, with normal IgA and IgG. What immunodeficient disease does this boy have?
A.Wiskott-Aldrich syndrome
B. Louis-Bar syndrome (Ataxiatelangiectasia)
C. Severe combined immunodeficiency (Swiss type)
D. DiGeorge syndrome
E. Chediak-Higashi syndrome

5. Bone marrow has been transplanted to the liquidator of Chernobyl atomic power station accident which was irradiated. The reaction “a transplant against a host” development was diagnosed at the patient after operation. Which antigens are the reason of this reaction?
A. Antigens of HLA system in the cells of liquidator’s organism
B. Antigens of Rh system in the erythrocytes of liquidator
C. Antigens HBs, HBc, HBe
D. Antigens of ABO system in the erythrocytes of liquidator
E. Antigens of HLA system in the cells of donor’s spinal cord

6. A male patient has been diagnosed with acute poststreptococcal glomerulonephritis. It is most likely that the lesion of the basement membrane of renal corpuscles was caused by the following allergic reaction:
A. Immune complex
B. Anaphylactic
C. Cytotoxic
D. Delayed
E. Stimulating

7. A 5-year-old child is diagnosed with Bruton syndrome (X-linked agammaglobulinemia) that manifests itself in severe clinical course of bacterial infections and absence of B lymphocytes and plasma cells. What changes of immunoglobulin content can be observed in blood serum of the child with immunodeficiency?
A. Decreased IgA, IgM
B. Increased IgA, IgM
C. Decreased IgD, IgE
D. Increased IgD, IgE
E. No changes

8. Examination of a child who frequently suffers from infectious diseases revealed that IgG concentration in blood serum was 10 times less than normal, IgA and IgM concentration was also significantly reduced. Analysis showed also lack of B-lymphocytes and plasmocytes. What disease are these symptoms typical for?
A. Bruton’s disease
B. Swiss-type agammaglobulinemia
C. Dysimmunoglobulinemia
D. Louis-Bar syndrome

E. Di George syndrome

9. Parents of 5-year-old child report him o have frequent colds that develop into pneumonias, presence of purulent rashes on the skin. Laboratory tests have revealed the following: absence of immunoglobulins of any type, and naked cells are absent from the lymph nodes punctate. What kind of immune disorder is it?
A. X-linked hypogammaglobulinemia
(Bruton type agammaglobulinemia)
B. Autosomal recessive agammaglobulinaemia (Swiss type)
C. Hypoplastic anemia
D. Agranulocytosis
E. Louis-Barr syndrome

10. A child with suspected tuberculosis was given Mantoux test. After 24 hours the site of the allergen injection got swollen, hyperemic and painful.What are the main components that determine such response of the body?
A. Mononuclear cells, T-lymphocytes and lymphokines
B. Granulocytes, T-lymphocytes and IgG
C. Plasma cells, T-lymphocytes and lymphokines
D. B-lymphocytes, IgM
E. Macrophages, B-lymphocytes and monocytes

11. A 27-year-old woman has dropped penicillin containing eye drops. In a few minutes there appeared feeling of itching, burning of the skin, lips and eyelids
edema, whistling cough, decrease of BP. What imunoglobulins take part in the development of this allergic reaction?
A. IgE and IgG
B. IgM and IgG
C. IgA and IgM
D. IgM and IgD
E. IgG and IgD

12. A 3 year old child with multiple impaired development of the bones of the facial skull died. The cause of death is sepsis, which developed on the background of bronchopneumonia. Blood content immunoglobulins within the physiological norm. At the autopsy revealed the absence of the thymus. Name the main cause of the child's illness:
A. Syndrome of cellular immunity deficiency
B. Combined Immunodeficiency Syndrome
C. Secondary immunodeficiency syndrome
D. Acute lymphocytic leukemia
E. Syndrome of chronic intoxication

13. During the examination of the patient a insufficient quantity of immunoglobulins was detected. What kind of immune cells do they produce?
A. Plasma cells
B. T-helper
C. T-killers
D. T-suppressors
E. Plasmoblasty

14. Following exposure to radiation a lot of mutant cells appeared in a patient. Some time later most of them were detected and destroyed by the following cells of the immune system:
A. T-lymphocytes-killers
B. Plasmoblasts
C. T-lymphocytes-supressors
D. B-lymphocyte
E. Stem cells

15. Numerous plasma cells were found in the blood girl 16 years old, suffering from an autoimmune inflammation of the thyroid gland. With the proliferation and differentiation of what blood cells cause increase of plasmocyte?
A B-lymphocytes
B T-helper
C Mast cells
D T-killer
E T-suppressor

16. The patient is diagnosed with ARVI. Class M immunoglobulins have been found in the serum. What is the period of the infection process in this case?
A. Acute
B. Prodromally
C. Incubation
D. Reconvalescence
E. Micro carrier

17. A 34-year-old patient, after suffering an intestinal infection caused by Salmonella, symptoms of the disease began to fade. What class of immunoglobulins will be detected in the patient's blood during the recovery period?
A. Ig G
B. Ig A

C. Ig D
D. Ig E
E. Ig M

18. Preventive vaccination against polyomyelitis is made with inactivated vaccine introduced parenterally. What immunoglobulins create the postvaccinal immunity in the case?
A. IgM, IgG
B. IgG, secretory IgA
C. IgM, secretory IgA
D. Serum IgA, IgM
E. Ig E, IgM

19. A 37-year-old man was injected with novocaine solution in the treatment of acute pulpitis. A few minutes later the patient developed an anaphylactic shock.What immunoglobulin does the antigen mainly interact with in the body during a given allergic reaction?
A. IgE
B. IgM
C. IgA
D. IgD
E. IgG

20. After the introduction of lidocaine, a 25-year-old patient developed shortness of breath, bronchospasm, and his blood pressure dropped sharply, which required the use of immediate relief from a dentist doctor. What mechanism is the basis of such phenomena?
A. Allergic reactions involving IgE
B. Allergic cytotoxic reactions
C. The phenomenon of idiosyncrasy
D. Hypersensitivity due to T-lymphocytes
E. Effects caused by T-killers

21. Skin samples of a patient with bronchial asthma revealed allergen sensitization of poplar fuzz. What factor of immune system plays the main part in
development of this immunopathological state?
A. IgE
B. IgD
C. IgM
D. Sensitized T-lymphocytes
E. –

22. A teenger had his tooth extracted under novocain anaesthesia. 10 minutes later he presented with skin pallor, dyspnea, hypotension. When this reaction is developed and the allergen achieves tissue basophils, it reacts with:
A. IgE
B. IgA
C. IgD
D. IgM
E. T-lymphocytes

23. A 34-year-old patient, after suffering an intestinal infection caused by Salmonella, symptoms of the disease began to fade. What class of immunoglobulins will be detected in the patient's blood during the recovery period?
A. Ig G
B. Ig A
C. Ig D
D. Ig E
E. Ig M

24. One of the functions of saliva is protective, which is realized by the formation of local immunity of the mucous membrane due to the secretion of the parotid glands of such a protein:
A. Secretory Immunoglobulin A
B. Collagen
C. Elastin
D. Fibrinogen
E. Albumin

25. Various cells of the oral mucous membrane and antimicrobial substances synthesized by these cells play an important part in the local immunity of the oral cavity. Specify the key factors for the local immunity:
A. Secretory IgA
B. B-lymphocytes
C. IgG
D. Macrophages
E. Eosinophils

26. In our country, routine preventive vaccinations against poliomyelitis ivolve using live vaccine that is administered orally. What immunoglobulins are responsible for the development of local post-vaccination immunity in this case?
A. Secretory IgA
B. IgM
C. IgG
D. Serum IgA
E. IgE

27. Throughout a year a 37-year-old woman periodically got infectious diseases of bacterial origin, their course was extremely lingering, remissions were short. Examination revealed low level of major classes of immunoglobulins. The direct cause of this phenomenon may be the following cell dysfunction:
A. Plasmocytes
B. Phagocytes
C. Neutrophils
D. Macrophages
E. Lymphocytes

28. A patient has been hospitalized with provisional diagnosis of virus B hepatitis. Serological reaction based on complementation of antigen with antibody chemically bound to peroxidase or alkaline phosphatase has been used for disease diagnostics. What is the name of the applied serological reaction?
A. Immune-enzyme analysis
B. Radioimmunoassay technique
C. Immunofluorescence test
D. Bordet-Gengou test
E. Antigen-binding assay

29. A doctor examined a patient with recurrent aphthous stomatitis with concominant candidosis and decided to eliminate a possibility of HIV-infection. What examination can help to clear the situation up and make a provisional diagnosis?
A. Immune-enzyme analysis
B. Gel precipitation reaction
C. Reaction of hemagglutination inhibition
D. Reaction of hemagglutination
E. Phase-contrasr microscopy

30. T-lymphocytes are determined to be affected with HIV. In this case viral enzyme reverse transcriptase (RNA-dependent DNA-polymerase) catalyzes the synthesis of:
A. DNA based on the viral RNA matrix
B. Viral RNA based on the DNA matrix
C. Viral protein based on the viral RNA matrix
D. Viral DNA based on the DNA matrix
E. Informational RNA based on the viral protein matrix

31. Lymphocytes are affected by HIV retrovirus (AIDS). In this case, the direction of information flow in the cell will be:
A. RNA → DNA → i-RNA → Polypeptide
B. DNA → i-RNA → polypeptide → DNA
C. DNA → polypeptide → i-RNA
D. i-RNA → polypeptide → DNA
E. Polypeptide → RNA → DNA → i-RNA

32. A patient with acquired immunodeficiency syndrome (СНІД) the immunological reactivity, manifested by the development of chronic inflammatory processes, infectious diseases, tumor growth, is significantly reduced. What types of blood cells damages HIV-infections, which results in reduced immune protection?
A. T4 helper
B. Natural Kileri (NK)
C. T-suppressors
D. T8-Effects
E. B-lymphocytes

33. A 20-year-old patient, an AIDS diagnosis was established. What cell populations are most sensitive to human immunodeficiency virus?
A. T-helpers
B. Hepatocytes
C. Endotheliocytes
D. Epithelial cells
E. B lymphocytes

34. A 1-year-old child often suffers from viral and bacterial infections that are difficult to treat. During the investigation the immunological status revealed the absence of lymphocytes in the blood providing cellular immunity. What immunodeficiency and what system is detected in this child?
A. In a T cell primary response
B. In a T-cell secondary response
C. In a B cell primary response
D. In a macrophage system primary response
E. In a microphages primary response

35. Blood serum of a newborn contains antibodies to measles virus. What kind of immunity is this indicative of?
A. Natural passive
B. Natural active
C. Artificial passive
D. Artificial active
E. Heredoimmunity

36. A child was born with cleft palate. Examination revealed aorta defects and reduced number of T-lymphocytes in blood. What immunodeficient syndrome is it?

A. Di George
B.Wiskott-Aldrich
C. Chediak-Higashi
D. Louis-Bar
E. Swiss-type

37. A female patient underwent liver transplantation. 1,5 month after it her condition became worse because of reaction of transplant rejection. What factor of
immune system plays the leading part in this reaction?
A. T-killers
B. Interleukin-1
C. Natural killers
D. B-lymphocytes
E. T-helpers

38. A patient consulted an immunologist about diarrhea, weight loss within several months, low-grade fever, enlarged lymph nodes. The doctor suspected HIV infection. What immunocompetent cells must be studied in the first place?
A. Helper T-lymphocytes
B. Suppressor T-lymphocytes
C. B-lymphocytes
D. Monocytes
E. Plasma cells

39. After transfusion of 200 ml of blood a patient presented with body temperature rise up to 37,9°C. Which of the following substances is the most likely cause of temperature rise?
A. Interleukin-1
B. Interleukin-2
C. Tumour necrosis factor
D. Interleukin-3
E. Interleukin-4

40. A patient with skin mycosis has disorder of cellular immunity. The most typical characteristic of it is reduction of the following index:
A. T-lymphocytes
B. Immunoglobulin G
C. Immunoglobulin E
D. B-lymphocytes
E. Plasmocytes

41. Inflammatory processes cause synthesis of protein of acute phase in an organism. What substances simulate their synthesis?
A. Interleukin-1
B. Immunoglobulins
C. Interferons
D. Biogenic amins
E. Angiotensin

42. 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

43. The patient contacted the dermatologist with complaints about eczematous lesions of the skin that appeared after contact with the detergent "Lotus". The use of rubber gloves prevents this. The pathological reaction of the skin is caused by activation:
A. T-lymphocytes
B. B-lymphocytes
C. Monocytes
D. Neutrophils
E. Basohiles

44. The development of febrile states are characterized by an increase in the level “the acute phase” proteins. There are ceruloplasmin, fibrinogen, C-reactive protein. Enter the
Possible mechanism of this phenomenon:
A. Stimulating effect of IL-1 on hepatocytes
B. The destructive effect of temperature on the cells of the body
C. The proliferative effect of IL-2 on
T lymphocytes
D. Degranulation of tissue basophils
E. -

45. A pregnant woman with the previous diagnosis of toxoplasmosis has been hospitalized. What serological reaction should be used to determine toxoplasmosis in test specimens?
A. Complement fixation test.
B. Neutralization
C. Haemadsorption
D. Agglutination
E. Inhibition of hemagglutination

Biochemistry of liver

1. Disorderthe splitting of the lipids in the small intestine is due to a disorder of lipase activity. Which of the following factors activates the lipase?
A. Bile acids
B. Hydrochloric acid
C. Enterokinase
D. Pepsin
E. Solts of Na+

2. Examination of a patient revealed that dental hypoplasia was caused by hypovitaminosis of vitamins A and D. These vitamins were administered perorally but they didn't have any medicinal effect. What is the probable cause of disturbed vitamin assimilation?
A. Bile acid deficiency
B. Phospholipase A2 deficiency
C. Cholesterolesterase deficiency
D. Colipase deficiency
E. Pancreatic lipase deficiency

3. A coprological study found that the feces are discolored, there are found drops of neutral fat. The most likely cause of this is a violation:
A. Flow of bile into the intestine
B. pH of gastric juice
C. Secretions of pancreatic juice
D. Secretion of intestinal juice
E. Absorption processes in the intestine

4. After eating fatty foods, the patient has nausea and heartburn, steatorrhea occurs. The reason for such a state can be:
A. Lack of bile
B. Increased lipase secretion
C. Violation of trypsin synthesis
D. Lack of amylase
E. Impaired phospholipase synthesis

5. Due to the blockage of the common bile duct (which was radiographically confirmed), the biliary flow to the duodenum was stopped. We should expect the impairment of:
A. Fat emulsification
B. Protein absorption
C. Carbohydrate hydrolysis
D. Secretion of hydrochloric acid
E. Salivation inhibition

6. A 65-year-old patient suffers from cholelithiasis. Recently, there were signs of achilic syndrome due to obturation of the biliary tract. Which components of food will be mastered the most?
A. Fats
B.Carbohydrates
C. Proteins
D. Nucleic acids
E. Electrolytes

7. The drug "Geptral", which is used in liver diseases contains S-adenosylmethionine. This active amino acid is involved in the synthesis of:
A. Phospholipids
B. Fatty acids
C. Triacylglycerols
D. Cholesterol
E. Heme

8. The patient appointed a lipotropic drug a donor of methyl groups, to prevent a fatty liver distrophia. This is sensible:
A. S-Adenosylmethionine
B. Cholesterol
C. Bilirubin
D. Valine
E. Glucose

9. Examination of cell culture gotfrom a patient with lysosomal pathology revealed accumulation of great quantity of lipids in the lysosomes. What of the following diseases is this disturbance typical for?
A. Tay-Sachs disease
B. Gout
C. Phenylketonuria
D.Wilson disease
E. Galactosemia

10. Steatosis occurs as a result of the accumulation of triacylglycerols in hepatocytes. One of the mechanisms of development of this disease is reduction of utilization neutral fat LDL. What lipotropic substances prevent the development of steatosis? A. Methionine, BC, B12
B. Arginine, B2, B3
C. Alanine, B1, PP
D. Valine, B3, B2
E. Isoleucine, B1, B2

11. In an experimental animal, receiving non-protein diet, fatty infiltration of the liver has developed due to the deficiency of the methylating agents. The formation of which metabolite is disturbed in the experimental animal?
A. Choline
B. DOPA
C. Cholesterol
D. Acetoacetate
E. Linolic acid

12. A dry cleaner'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

13. In the 2-year-old boy, an increase in the size of the liver and spleen, cataract is observed. The concentration of sugar is elevated in the blood, but the test of glucose tolerance is normal. An hereditary violation of the metabolism of which substance is the cause of this condition?
A. Galactose
B. Fructose
C. Glucose
D. Maltose
E. Saccharose
14. During starvation normal rate ofglucose is maintained by means ofactivation of gluconeogenesis. Whatsubstance can be used as a substrate forthis process?
A. Alanine
B. Ammonia
C. Adenine
D. Urea
E. Guanine

15. In a patient undergoing a course of medical starvation, the normal level of glucose in the blood is maintained mainly due to gluconeogenesis. From what amino acids at the same time in the human liver most actively synthesized glucose?
A. Alanine
B. Lysine
C. Valine
D. Glutamic acid
E. Leucine

16. The gluconeogenesis is activated in the liver after intensive physical trainings. What substance is utilized in gluconeogenesis first of all in this case:
A. Lactate
B. Pyruvate
C. Glucose
D. Glutamate
E. Alanine

17. In patients with glycogenosis, that is von Gierke's disease, the conversion of glucose-6-phosphate in to glucose is inhibited, which is accompanied by the improper breakdown of glycogen in the liver. The cause of this condition is the following enzyme deficiency:
A. Glucose-6-phosphatase
B. Glycogen phosphorylase
C. Glucose-6-phosphate dehydrogenase
D. Phosphofructokinase
E. Phosphoglucomutase

18. A child has a history of hepatomegaly, hypoglycemia, seizures, especially on an empty stomach and in stressful situations. The child is diagnosed with Gierke disease. This disease is caused by the genetic defect of the following enzyme:
A. Glucose-6-phosphatase
B. Amyloid-1,6-glycosidase
C. Phosphoglucomutase
D. Glycogen phosphorylase
E. Glucokinase

19. A patient with chronic hypoglycemia had adrenaline introduction. After introduction blood test hasn't changed essentially. Doctor assumed liver pathology. What liver function may have been changed?
A. Function of glycogen depositing
B. Function of cholesterin production
C. Ketogenic function
D. Glycolytic function
E. Excretory function

20. After the introduction of adrenaline in a patient with persistent hypoglycemia, blood test has not changed significantly. In such circumstances, there is a possibility of disturbances in the liver. What function of the liver is changed?
A. Glycogendeposing.
B. Glycolytic.

C. Excretory.
D. Ketogenic.
E. Cholesterol-forming.

21. In the human diet there are a large number of carbohydrates. The number of which structures will increase in cytoplasm of hepatocytes?
A. Glycogen granules
B. Drops of fat
C. The lysosomes
D. Free ribosomes
E. Inclusion of lipofuscine

22. The main part of nitrogen is taking out of organism as element of urea. Reducing the activity of what liver enzyme leads to inhibition of the synthesis of urea and increasing the accumulation of ammonia in blood and tissues?
A. Carbamoyl phosphate synthase
B. Aspartate aminotransferase
C. Urease
D. Amilaza
E. Pepsin

23. In the biosynthesis of urea in the liver, the formation of ornithine and urea is stimulated. What amino acid is the intermediate product of this synthesis?
A. Arginine
B. Leicinc.
C. Citrate.
D. Valin.
E. Tryptophan.

24. In a boy of 4 years after suffering from severe viral hepatitis, vomiting, episodes of nephropathy, seizures are observed. In the blood there is hyperammonia. Violation of which of the biochemical process in the liver caused such a condition of the patient?
A. Disposal of ammonia.
B. Decarboxylation of amino acids.
C. Disposal of Biogenic Amines.
D. Synthesis of alphabets.
E. Gluconeogenesis.

25. Upon toxic damage of hepatic cells resulting in disruption of liver function the patient developed edemas. What changes of blood plasma are the main cause of edema development?
A. Decrease of albumin content
B. Increase of globulin conten
C. Decrease of fibrinogen conten
D. Increase of albumin conten
E. Decrease of globulin conten

26. A 25-year-old patient has been diagnosed with chronic hepatitis. The patient complains of 10 kg weight loss within 2 months. Objectively: the patient has dry peeling skin, pale with yellow shade, petechial haemorrhages, stomatorrhagia. Petechial haemorrhages and stomatorrhagia are caused by the disturbance of the following hepatic function:
A. Protein synthesizing
B. Chromogenic
C. Glycogen synthesizing
D. Detoxication
E. Depositing

27. Hepatitis has led to the development of hepatic failure. Mechanism of edemata formation is activated by the impairment of the following liver function:
A. Protein-synthetic
B. Barrier
C. Chologenetic
D. Antitoxic
E. Glycogen-synthetic

28. A patient being treated for viral hepatitis type B got symptoms of hepatic insufficiency. What blood changes indicative of protein metabolism disorder will be observed in this case?
A. Absolute hypoalbuminemia
B. Absolute hyperalbuminemia
C. Absolute hyperfibrinogenemia
D. Proteinic blood composition is unchanged
E. Absolute hyperglobulinemia

29. In obstructive jaundice and bile ducts, prothrombin insufficiency is often observed. With a deficiency in the organism of which vitamin it is connected?
A. K
B. B6
C. A
D. C
E. E

30. A patient has been admitted to the contagious isolation ward with signs of jaundice caused by hepatitis virus.Which of the

symptoms given below is strictly specific for hepatocellular jaundice?
A. Increase of ALT, AST level
B. Hyperbilirubinemia
C. Bilirubinuria
D. Cholemia
E. Urobilinuria

31. A 15-year-old boy has been diagnosed with acute viral hepatitis. What blood value should be determined to confirm acute affection of hepatic cells?
A. Aminotransferase activity (AST, ALT)
B. Unconjugated and conjugated bilirubin content
C. Erythrocytes sedimentation rate (ESR)
D. Cholesterol content
E. Protein fraction content

32. Blood analysis of a patient with jaundice reveals conjugated bilirubinemia, increased concentration of bile acids. There is no stercobilinogen in urine. What type of jaundice is it?
A. Obstructive jaundice
B. Hepatocellular jaundice
C. Parenchymatous jaundice
D. Hemolytic jaundice
E. Cythemolytic jaundice

33. Encephalopathy has developed in a child with hemolytic disease of the newborn. What substance had increased in the child's blood, resulting in damage to the CNS?
A. Unconjugated bilirubin
B. Bilirubin-albumin complex
C. Bilirubin glucuronide
D. Verdohemoglobin
E. Bileacids

34. Barbiturates prescribed for jaundice treatment because it induces UDP-glucuronosyltransferase synthesis. Which substance formation provide therapeutic effect?
A. Direct (conjugated) bilirubin
B. Indirect (unconjugated) bilirubin
C. Biliverdin
D. Protoporphyrin
E. Heme

35. The patient came to doctor with compliance about yellow sclera and skin. No encephalopathy, cholestasis or acholic syndrome. Which type of jaundice is developed in this patient?
A. Gallstone
B. Hemolytic jaundice
C. Hepatitis
D. Chronic gastritis
E. Chronic colitis

36. The patient turned to doctor with disturbances in the right side of the subarea. After examination of the patient, the doctor was found yellow sclera. Laboratory diagnostic revealed increased ALT, negative stercobilin in feces. Which type of disease is developed these symptoms?
A. Hepatitis
B. Haemolytic jaundice
C. Chronic gastroduodenitis
D. Chronic colitis
E. Chronic gastritis

37. The 20-years-old man is diagnosed with heredity deficiency of UDP-glucuronosyltransferase. Change in which blood parameter can prove this diagnosis?
A. Indirect (unconjugated) bilirubin
B. Direct (conjugated) bilirubin
C. Urobilin
D. Stercobilinogen
E. Animal indican

38. The preterm newborn has a jaundice. Which enzyme is probably deficient in this baby?
A. UDP-glucosyltransferase
B. alkaline phosphatase
C. acidic phosphatase
D. catalase
E. NAD+-dehydrogenase

39. The born in time newborn has yellow skin and mucus color. The most probable reason of this condition is temporary insufissiency of the following enzyme:
A. UDP-glucosyltransferase
B. Glucuronosyltransferase
C. Heme synthase
D. Heme oxygenase
E. Biliverdin reductase

40. The newborn has a physiological jaundice. The level of blood free bilirubin considerably higher than normal. What enzyme deficiency can cause this

A. UDP-glucosyltransferase
B. Transaminase
C. Xanthine oxidase
D. Adenosine deaminase
E. Heme oxygenase

41. Transfusion of Rh-incompatible blood resulted in hemolytic jaundice development in the patient. What laboratory blood value confirms this type of jaundice?
A. Accumulation of unconjugated bilirubin
B. Reduction of unconjugated bilirubin
C. Accumulation of urobilinogen
D. Reduction of stercobilin
E. Reduction of conjugated bilirubin

42. The patient has a following symptoms: yellow skin, dark urine, yellow-dark feces. Which substance you will predict to be increased in blood serum?
A. Free bilirubin
B. Conjugated bilirubin
C. Mesobilirubin
D. Verdoglobin
E. Biliverdin

43. 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

44. Enzymatic jaundices are accompanied by abnormal activity of UDPglucuronyl transferase. What compound is accumulated in blood serum in case of these pathologies?
A. Unconjugated bilirubin
B. Conjugated bilrubin
C. Dehydrobilirubin
D. Hydrobilirubin
E. Choleglobin

45. The 20-years-old patient has a jaundice and the following laboratory parameter: increase general blood bilirubin, predominantly by indirect (free) fraction; urine and feces has a high stercobilin; blood direct (conjugated) bilirubin is normal. Which type of jaundice this patient is most probably develop?
A. Hemolytic
B. Parenchymatous (hepatic)
C. Mechanical
D. Newborn jaundice
E. Gilbert's syndrome

46. The patient develops yellowish of skin and mucus membranes. Analysis of blood plasma revealed increased total bilirubin, feces – increased stercobilin, urine – increased urobilin. What type of jaundice this patient has?
A. Hemolytic
B. Gilbert's syndrome
C. Parenchymatous
D. Obstructive
E. Cholestatic

47. After blood transfusion patient has yellowish of skin and mucus membrane, increased total and indirect bilirubin, increased urine urobilin and feces stercobilin. What kind of jaundice can be the reason?
A. Hemolytic jaundice.
B. Newborn jaundice.
C. Obstructive jaundice.
D. Parenchymatous jaundice.
E. Genetic jaundice.

48. The patient who suffers from jaundice because of increased bilirubin as part of its indirect fraction. Urine and feces have intensive color. What is the most probable explanation to these disruptions?
A. Increased erythrocyte hemolysis
B. Disrupted liver urobilinogen transformation.
C. Disruption of direct bilirubin formation.
D. Liver parenchyma damage.
E. Disruption of bile flow from liver

49. The 28-years-old woman came to infectious department with yellow skin, sclera, mucus membrane. Laboratory diagnosis revealed increased blood direct bilirubin; urobilinogen and bilirubin in urine. Which of following condition can lead to those symptoms?
A. Parenchymatous jaundice
B. Hemolytic jaundice
C. Kidney infarction
D. Renal tuberculosis
E. Mechanical jaundice

50. The 28-years old man came to doctor to complaints about acute disturbances in the right side of the subarea, nausea, vomiting. Objectively: jaundice of the skin and sclera; the temperature of the body is elevated, the urine is dark color. Feces is hypochloric. The patient have hyperbilirubinemia (bilateral and indirect biliary), bilirubinuria, urobilinuria, gipoproteinemiya, reduction of blood transfusion. Which of following condition can lead to those symptoms?
A. Hemolitic jaundice
B. Subacute jaundice
C. Suprachondrial hemolytic jaundice
D. Acute cholecystitis
E. Acute pancreatitis

51. The 48-years-old woman was delivered to hospital with compliance of general weakness, sleep disturbance. Objectively: skin and sclera are yellow. Blood analysis has increased total bilirubin with direct bilirubin predominance. Feces is acholic. Urine has dark color, because of bile pigments. Which type of jaundice this patient has?
A. Mechanical
B. Hemolytic
C. Parenchymatous
D. Gilbert's syndrome
E. Crigler–Najjar syndrome

52. The patient was delivered to hospital with complaints about general weakness and sleep disturbance. Skin has yellow color. There is increased blood direct bilirubin and bile acids. Feces is acholic. Which type of disease can provoke those changes?
A. Mechanical jaundice
B. Hemolytic jaundice
C. Pre-hepatic jaundice
D. Gilbert's syndrome
E. Chronic cholecestitis

53. The patient with jaundice has increased direct bilirubin and bile acids in blood; no stercobilinogen was revealed in urine. What type of jaundice can be the reason of these symptoms?
A. Mechanical
B. Hepatic
C. Parenchymatous
D. Hemolytic
E. Post-hepatic

54. The patient has yellow skin, skin rash, general weakness. In the urine: there is no urobilin. Which type of pathology this patient is most probably develop?
A. Mechanical jaundice
B. Parenchymal jaundice
C. Acute liver insufficiency
D. Haemolytic jaundice
E. Chronic liver insufficiency

55. The 43-years-old patient during 10 years has a repetitive compliance about acute bellyache, cramps, vision problems. His relatives have Patient urine have red color. He was diagnosed with acute intermittent porphyria. The reason of he his disease is not being a vampire but disrupted biosynthesis of:
A. Heme
B. Bile acids
C. Insulin
D. Collagen
E. Prostaglandin

56. The patients with erythropoietic porphyria (Gunther disease) have ultraviolet red-fluorescent tooth, sun-sensitive skin, red-colored urine. Which enzyme deficiency cause this disease?
A. Uroporphyrinogen III synthase
B. δ- aminolevulinic acid synthase
C. Uroporphyrinogen I synthase
D. Uroporphyrinogen decarboxylase
E. Ferrochelatase

57. The patient who suffers from anemia has increased protoporphyrin IX. Which mineral deficiency can lead to such pathology?
A. Iron
B. Potassium
C. Magnesium
D. Sodium
E. Phosphorus

58. The patient has increased photosensitivity, after prolong sun exposure urine starts to get dark-red color. Which type of disease has this characteristic?
A. Porphyria
B. Alkaptonuria
C. Albinism
D. Hemolytic jaundice
E. Pellagra

59. The 33 years old patient worries 10 years. Periodically, he addresses the doctor with complaints of acute abdominal pain, convulsions, visual impairment. His relatives are witnessing similar symptoms. Urine red. Hospitalized with diagnoses - acute diarrhea porphyria. The cause of the disease may be a violation of the biosynthesis of such a substance:
A. Gem
B. Insulin
C.Chicken acids
D. Prostaglandins
E. Collagen

60. A 43-year-old woman complains of general weakness, weight loss, apathy, and drowsiness. Chronic lead intoxication confirmed laboratory - revealed hypochromic anemia. In the blood, an increased level of Zn-protoporphyrin and a reduced level of alpha-aminolevulinic acid, indicating a violation of the synthesis:
A. Heme
B. DNA
C. RNA
D. Protein
E. Mevalonic acid

61. 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. Coproporphyria
E. Intermittent porphyria

62. A patient suffering from chronic hepatitis complains of increasing the sensitivity to barbiturates, which were earlier tolerated without symptoms of intoxication. With the disturbance of which of the liquor functions, this is connected at the highest possible level?
A. Detoxification
B. Hemopoietic
C. Hemodynamic
D. Formation of bile
E. Phagocytic

63. Detoxification of xenobiotics (drugs, epoxides, the arena oxides, aldehydes, nitro derivatives, etc.) and endogenous metabolites (estradiol, prostaglandins, leukotrienes) takes place in the liver by conjugation with:
A. Glutathione
B. Aspartic acid
C. Glycine
D. S-Adenozylmethionin
E. Fosfoadenozyn

64. For a patient suffering from chronic hepatitis, a load of sodium benzoate was carried out to evaluate the degreasing function of the liver. For the discharge of what substances with urine judge the neutralizing function of the stomach?
A. Hippuric acid
B. Phenylacetic acid
C. Citric acid
D. Valerian acid
E. Oxalic acid

65. Patient has cirrhosis of the liver. The study of which of the listed substances that are excreted in the urine can characterize the state of the antitoxic function of the liver?
A. Hippuric acid
B. Ammonium salts
C. Creatinine
D. Uric acid
E. Amino acids

66. A woman of a chemical enterprise due to violation of the rules of safe work has suffered a toxic action of nitric acid and nitrites, which cause deamination of cytosine in the DNA. What enzyme initiates a chain of reparative processes?
A. Uridine-DNA-glucosidase
B. Cytidine triphosphate synthetase
C. Orthotidyl monophosphate-decarboxylase
D. DNA-Dependent-RNA Polymerase
E. Timidilatsintaza

67. In the 70's, scientists found that the cause of severe jaundice of newborns is a disturbance of the binding of bilirubin in hepatocytes. What substance is used to form a conjugate?
A. Glucuronic acid
B. Uric acid
C. Sulfuric acid

D. Lactic acid
E. Pyruvic acid

68. A 50-year-old patient with food poisoning was prescribed a dropper with a 10% glucose solution. It not only provides the energy needs of the body, but also performs a detoxification function due to the formation of a metabolite that participates in the conjugation reaction:
A. Gluuronation
B. Sulfonation
C. Methylation
D. Glycosylation
E. Hydroxylation

69. To determine the antitoxic function of the liver, the patient is assigned sodium benzonate, which in the liver turns into hippuric acid. What compound is used for this?
A. Glycine
B. Methionine
C. Cysteine
D. FAFS
E. UDF-glucuronic acid

70. In a patient with chronic alcoholic liver disease, processes of xenobiotics and endogenous toxic compounds biotransformation are disturbed. Reducing the activity of which chromoprotein can be the cause of this?
A. Cytochrome P-450
B. Hemoglobin
C. Cytochrome Oxidase
D. Cytochrome b
E. Cytochrome c1

71. In the liver, detoxification of natural metabolites and xenobiotics is impaired. Name cytochrome, the activity of which can be reduced:
A. Cytochrome P-450
B. Cytochrome oxidase
C. Hemoglobin
D. Cytochrome b
E. Cytochrome c1

72. 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

73. The universal biological system of oxidation of nonpolar compounds (drugs, toxic compounds), steroid hormones, cholesterol is microsomal oxidation. What is the name of the cytochrome, which is part of the oxygenase chain of the microsome.
A. Cytochrome P 450.
B. Cytochrome a3.
C. Cytochrome in.
D. Cytochrome c.
E. Cytochrome a.

Pathologic urine components

1. A 13 year-old boy is complaining about general weakness, dizziness, fatigue. Mental retardation is detected. The examination revealed high concentrations of valine, isoleucine, and leucine in blood and urine. The urine has a specific smell. What is the most possible diagnosis?
A. Maple syrup urine disease
B. Addison's disease
C. Tyrosinosis
D. Histidinemia
E. Grave's disease

2. Excess of phenylpyruvate and phenylacetate was detected in the urine sample of a 6 day-old baby. Which amino acid metabolism is disturbed?
A. Phenylalanine
B. Tryptophan
C. Methionine
D. Histidine
E. Arginine

3. In a sick child, a raised level of phenylpyruvate was detected in the urine (in the norm practically absent). The amount of phenylalanine in the blood is 350 mg/l (about 15 mg/l). Which disease is characterized by the above symptoms?
A. Fenilketonuria.
B. Albin.
C. Alpathonuria.
D. Gout
E. Tyrosinosis.

4. A child with mental and physical development retardation was delivered to the hospital. Phenylpyruvate was found in the urine. Disturbance of which process is the reason for this pathology?
A. Amino acid metabolism
B. Lipid metabolism
C. Carbohydrate metabolism
D. Water-salt balance regulation
E. Calcium and phosphate homeostasis

5. A 12-year-old boy in the urine revealed high levels of all amino acids in the aliphatic row. In this case, the highest excretion of cysteine and cysteine was noted. In addition, ultrasound of the kidneys showed the presence of stones in them. Choose a possible pathology.
A. Cystinuria.
B. Alpathururia.
C. Cystitis
D. Phenylketonuria.
E. Hartnup's disease.

6. 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

7. A patient with systemic scleroderma has an intensified collagen destruction. Collagen destruction will be reflected by intensified urinary excretion of the
following amino acid:
A. Oxyproline
B. Alanine
C. Tryptophane
D. Serine
E. Phenylalanine

8. A child has physical and mental retardation, serious abnormalities in connective tissue of internal organs; urine contains keratan sulfates. This is caused by metabolic disorder of the following substance:
A. Glycosaminoglycan
B. Collagen
C. Elastin
D. Fibronectin
E. Hyaluronic acid

9. A traumatology unit received a patient with crushed muscular tissue. What biochemical indicator of urine will be raised in this case?
A. Creatinine
B. Total lipids
C. Glucose
D. Mineral salts
E. Uric acid

10. 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

11. 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

12. A baby has coloured sclera and mucouses and her urine is darkening when exposed to air. Homogentisic acid was found in urine and blood samples. What is the reason for this condition?
A Alcaptonuria
B. Albinism
C. Galactosemia
D. Cystinuria
E. Histidinemia

13. A 5-year old child has darkened urine but no bile enzymes were found in it. The child is diagnosed with alcaptonuria. Which enzyme deficiency is the reason for it?
A. Homogentisic acid oxydase
B. Phenylalanine hydroxylase
C. Tyrosinase
D. Oxyphenylpyruvate oxydase
E. Phenylpyruvate decarboxylase

14. A lab test revealed increased concentration of leucine, valine, isoleucine and ketone derivatives in the blood and urine. The urine has a specific smell of maple syrup. Which enzyme deficiency is typical for this condition?
A. Amino acid dehydrogenase
B. Aminotranspherase
C. Glucose-6-phosphatase
D. Phosphofructokinase
E. Phosphofructomutase

15. Excretion of homogentisic acid with the urine is the reason for the condition called alcaptonuria. Disturbance of which amino acid metabolism causes this condition?
A. Tyrosine
B. Phenylalanine
C. Alanine
D. Methionine
E. Asparagine

16. The 28-years old man came to doctor to complaints about acute disturbances in the right side of the subarea, nausea, vomiting. Objectively: jaundice of the skin and sclera; the temperature of the body is elevated, the urine is dark color. Feces is hypochloric. The patient have hyperbilirubinemia (bilateral and indirect biliary), bilirubinuria, urobilinuria, gipoproteinemiya, reduction of blood transfusion. Which of following condition can lead to those symptoms?
A. Hemolitic jaundice
B. Subacute jaundice
C. Suprachondrial hemolytic jaundice
D. Acute cholecystitis
E. Acute pancreatitis

17. 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

18. A patient, who has been subsisting exclusively on polished rice, has developed polyneuritis due to thiamine deficiency. What substance is an indicator of such avitaminosis, when it is excreted with urine?
A. Pyruvic acid
B. Malate
C. Methylmalonic acid
D. Uric acid
E. Phenyl pyruvate

19. A patient 43 years old with chronic atrophic gastritis and hyperchromic megaloblastic anemia increased methylmalonic acid excretion in the urine. The lack of which vitamin caused the occurrence of this symptom complex?
A. B12
B. B2
C. B3
D. B5
E. B6

20. A hereditary disease - homocystinuria - is caused by disturbed transformation of homocysteine in to methionine. Accumulated homocysteine forms its dimer (homocystine) that can be found in urine. What vitamin preparation can decrease homocysteine production?
A. Vitamin B12
B. Vitamin C
C. Vitamin B1
D. Vitamin B2
E. Vitamin PP

21. In a newborn child there is a decrease in intensity of sucking, frequent vomiting, hypotension. In urine and blood, the concentration of citrulline is significantly increased. What metabolic process is affected?
A. Ornithine cycle
B. Glycolysis
C. Core's cycle
D. CTK
E. Gluconeogenesis

22. In the urine of the newborn, determined by citrulline and high levels of ammonia. Indicate which substance is most likely to be inflicted on a baby?
A. Urea.
B. Bilirubin.
C. Creatine.
D. Creatinine.
E. Uric acid.

23. According to the results of glucose tolerance test a patient has no disorder of carbohydrate tolerance. Despite that glucose is detected in the patients's urine (5 mmol/l). The patient has been diagnosed with renal diabetes. What renal changes cause glucosuria in this case?
A. Decreased activity of glucose reabsorption enzymes
B. Increased activity of glucose reabsorption enzymes
C. Exceeded glucose reabsorption threshold
D. Increased glucose secretion
E. Increased glucose filtration

24. A 42 year old woman diagnosed with diabetes mellitus was admitted the endocrinological department with complaints of thirst, excessive appetite. What pathological components are revealed in course of laboratory examination of the patient's urine?
A. Glucose, ketone bodies
B. Protein, aminoacids
C. Protein, creatine
D. Bilirubin, urobilin
E. Blood

25. A patient at the early stage of diabetes mellitus was found to have polyuria.What is its cause?
A. Hyperglycemia
B. Ketonemia
C. Hypocholesterolemia
D. Hypercholesterolemia
E. Hyperkaliemia

26. At the reception to the therapist came a man of 37 years of age with complaints of periodic intense pain in the joints of the thumb and their swelling. In the urine: slightly acidic reaction and pink color. With the presence of which substances can these changes be associated?
A. Salt of uric acid
B. Chlorides
C. Amoniev's salt
D. Phosphate calcium
E. Magnesium sulphate

27. On the basis of laboratory analysis, the patient was diagnosed with gout. Based on laboratory analysis, the patient confirmed the diagnosis of gout. What was the analysis for the diagnosis?
A. Determination of uric acid in the blood and urine
B. Determination of urinary creatinine
C. Determination of residual nitrogen in the blood
D. The determination of urea in the blood and urine
E. Determination of urine ammonia

28. A patient has been operated due to acute abdomen. His urine is brown, concentration of indican is higher than 93 mmol/day. What does it indicate?
A. High intensity of protein decomposition processes in the intestine
B. Decreased activity of the urea cycle enzymes
C. Acceleration of aromatic amino acids desamination
D. Disturbance of the kidney absorption

E. Decrease of ammonia detoxification

29. A 43 year-old woman has been operated due to acute abdomen. Her urine is brown and the concentration of indican in the blood has increased rapidly. What does it indicate?
A.High intensity of protein decomposition
B. Acceleration of amino acids desamination
C. Supression of glomerular filtration
D. Decreased intensity of the urea cycle
E. Inhibition of gluconeogenesis

30. A 60 year-old man suffers from chronic intestinal obstruction. The processes of protein decomposition in the large intestine are intensified. What is the evidence of these processes?
A. Indicanuria
B. Bilirubinuria
C. Hyperuricosuria
D. Creatinuria
E. Glucosuria

31. A newborn child gains weight very slowly, his urine contains too much orotic acid that is indicative of disturbed synthesis of pyrimidine nucleotides. What metabolite should be used in order to normalize metabolism?
A. Uridine
B. Adenosine
C. Guanosine
D. Thymidine
E. Histidine

32. In orotaciduria the release of Orotic acid is many times higher than normal. Synthesis of what substances will be disturbed in this pathology?
A. Pyrimidine nucleotides.
B. Biogenic Amines.
C. Purine nucleotides.
D. Urea
E. Uric acid

33. The patient has increased photosensitivity, after prolong sun exposure urine starts to get dark-red color. Which type of disease has this characteristic?
A. Porphyria
B. Alkaptonuria
C. Albinism
D. Hemolytic jaundice
E. Pellagra

34. Analysis of a dentist's urine obtained at the end of his working day revealed protein concentration at the rate of 0,7 g/l. His morning urine hadn't such changes. What is this phenomenon called?
A. Functional proteinuria
B. Organic proteinuria
C. Nonselective proteinuria
D. Extrarenal proteinuria
E. Hematuria

35. Chronic glomerulonephritis was diagnosed in a 34-year-old patient 3 years ago. Edema has developed within the last 6 monthes. What caused the edema?
A. Proteinuria
B. Hyperproduction of vasopressin
C. Liver disfunction of protein formation
D. Hyperosmolarity of plasma
E. Hyperaldosteronism

36. Glucose concentration in a patient's blood is 15 millimole/l (reabsorption threshold is 10 millimole/l). What effect can be expected?
A. Glucosuria
B. Diuresis reduction
C. Reduced glucose reabsorption
D. Reduced vasopressin secretion
E. Reduced aldosterone secretion

37. A patient with rheumatoid arthritis has been given hydrocortisone for a long time. He has developed hyperglycemia, polyuria, glycosuria, thirst. These complications of treatment result from the activation of the following process:
A. Gluconeogenesis
B. Glycogenolysis
C. Glycogenesis
D. Glycolysis
E. Lipolysis

38. A 28-year-old patient with Itsenko-Cushing syndrome Hyperglycemia, glycosuria were detected hyperglycemia, glycosuria. The main mechanism of hyperglycemia in this patient is stimulation:
A. Gluconeogenesis
B. Liver glycogenolysis
C. Muscle glycogenolysis
D. Intestinal glucose absorption
E. Synthesis of glycogen

39. Fructosuria is known to be connected with inherited deficiency of fructose-1-phosphate aldolase.What product of fructose metabolism will accumulate in the organism resulting in toxicaction?
A. Fructose-1-phosphate
B. Glucose-1-phosphate
C. Glucose-6-phosphate
D. Fructose-1,6-biphosphate
E. Fructose-6-phosphate

40. Prophylactic examination of a patient revealed hyperglycemia, ketonuria, polyuria, glycosuria. What form of acidbase balance disorder is the case?
A. Metabolic acidosis
B. Gaseous acidosis
C. Nongaseous acidosis
D. Gaseous alkalosis
E. Metabolic alkalosis

41. Examination of a 2 year-old child with renal insufficiency revealed hyperoxaluria that caused depositing of calcium oxalate stones in the kidneys. The reason for this condition is a disturbance of metabolism of the following aminoacid:
A. Glycine
B. Lysine
C. Methionine
D. Arginine
E. Histidine

42. Cardinal symptoms of primary hyperparathyroidism are osteoporosis andrenal 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

43. In the laboratory examination of blood of a person who was bitten by a change, hemolysis of erythrocytes, hemoglobinuria was revealed. The action of a mixed poison is due to the presence of an enzyme in it:
A. Phospholipase A2
B. Phospholipase D
C. Phospholipase S.
D. Phospholipase A1
E. Sphingomyelinase

44. A patient presents with high content of vasopressin (antidiuretic hormone) in the blood. What changes in the patient's diuresis will occur?
A. Oliguria
B. Polyuria
C. Anuria
D. Glycosuria
E. Natriuria

45. A patient with tress and painful sensation before a visit to the dentist is accompanied by anuria (lack of urination). This phenomenon is due to an increase in:
A. Secretion of vasopressin and adrenaline
B. Activity of the parasympathetic nervous system
C. Activity antinociceptive system
D. Secretion of vasopressin and a decrease in adrenaline
E. Secretion of adrenaline and a decrease in vasopressin

46. A patient with pituitary tumor complains of increased daily diuresis (polyuria). Glucose concentration in blood plasma equals 4,8 mmol/l. What hormone can be the cause of this if its secretion is disturbed?
A. Vasopressin
B. Aldosterone
C. Natriuretic hormone
D. Insulin
E. Angiotensin I

47. After a person had drunk 1,5 liters of water, the amount of urine increased significantly, and its relative density decreased to 1,001. These changes are a result of decreased water reabsorption in the distal nephron portion due to reduced secretion of:
A. Vasopressin
B. Aldosterone
C. Angiotensin II
D. Renin
E. Prostaglandins

48. A man has a considerable decrease in diuresis as a result of 1,5 l blood loss. The primary cause of such diuresis disorder is the hypersecretion of the following hormone:
A. Vasopressin

B. Corticotropin
C. Natriuretic
D. Cortisol
E. Parathormone

49. Analysis of urine from a 24-year-old man revealed the following changes: daily diuresis - 10 l, relative density - 1,001, qualitative alterations are absent. A patient complains of excessive thirst, frequent urination. What is the most likely cause of this disease?
A. Vasopressin hyposecretion
B. Glucocorticoid hypersecretion
C. Vasopressin hypersecretion
D. Relative insulin insufficiency
E. Aldosteron hypersecretion

50. A 50 year old patient complains of excessive thirst, drinks a lot of water; expressed polyuria. Blood glucose - 4.8 mmol / l. There is no glucose and acetone bodies in urine, colorless urine, specific gravity - 1.002 - 1.004. What is the cause of polyuria?
A. Lack of vasopressin
B. Hypothyroidism
C. Insulin Deficiency
D. Aldosteronism
E. Thyrotoxicosis

51. A patient with damage to the posterior lobe of the pituitary gland has increase in daily diuresis to 10-15 liters What is the main mechanism in the development of polyuria?
A. Vasopressin deficiency
B. Excess vasopressin
C. Excess aldosterone
D. Excess natriuretic factor
E. Corticotropin deficiency

52. A 20 year old patient complains of excessive thirst and urinary excretion upto 10 L a day. The level of glucose in blood is normal, there is no glucose in urine. What hormone deficit can cause such changes?
A. Vasopressin
B. Oxytocin
C. Insulin
D. Triiodothyronine
E. Cortisol

53. A 19-year-old male was found to have an elevated level of potassium in the secondary urine. These changes might have been caused by the increase in the following hormone level:
A. Aldosterone
B. Oxytocin
C. Adrenaline
D. Glucagon
E. Testosterone

54. A concentrated solution of sodium chloride was intravenously injected to an animal. This caused decreased reabsorption of sodium ions in the renal tubules. It is the result of the following changes of hormonal secretion:
A. Aldosterone reduction
B. Aldosterone increase
C. Vasopressin reduction
D. Vasopressin increase
E. Reduction of atrial natriuretic factor

55. At ria of a test animal were super distended with blood,which resulted in decreased reabsorption of Na+ and water in renal tubules.This can be explained by the effect of the following factor on the kidneys:
A. Natriuretic hormone
B. Aldosterone
C. Renin
D. Angiotensin
E. Vasopressin

Biochemistry of nervous tissue

1. A substance that is synthesized in the central nervous system and simulates the effects of morphine can be used for analgesia. Specify the following substance:
A. β-endorphin
B. Oxytocin
C. Vasopressin
D. Calcitonin
E. Somatoliberin

2. Cell membrane restpotential changed from-85 to-90mV. It can becaused by activation of the following cell membrane channels:
A. Potassium
B. Sodium
C. Potassium and sodium
D. Calcium E. Potassium and calcium

3. The speed of the excitation nerve fibers is 120 m / s. Which of the above factors, above all, provides such speed?
A. Presence of myelin sheath
B. Great resting potential
C. Large amplitude potential effects
D. Low threshold of depolarization
E. A big factor of reliability

4. The patient is trembling hands, which is associated with Parkinson's disease. What mediator deficiency in striopalidar structures leads to such symptoms?
A. Dopamine
B. GABA
C. Substance P
D. Norepinephrine
E. Serotonin

5. An 84-year-old patient suffers from parkinsonism. One of the pathogenetic development elements of this disease is deficiency of a certain mediator in some of the brain structures. Name this mediator:
A. Dopamine
B. Adrenaline
C. Noradrenaline
D. Histamine
E. Acetylcholine

6. In the experiment, the permeability of the excitable cell membrane to potassium ions was magnified. What changes in the electrical state of the membrane will occur?
A. Hyperpolarization
B. Depolarization
C. Action potential
D. Local response
E. There will be no changes

7. A 50-year-old man came to a hospital with complaints of memory disorders, painful sensations along the nerve trunks, decreased mental ability, circulatory disorders and dyspepsia. Anamnesis states excessive alcohol consumption. What vitamin deficiency can result in such symptoms?
A. Thiamine
B. Niacin
C. Retinol
D. Calciferol
E. Riboflavin

8. Decarboxylation of glutamate induces production of gamma aminobutyric acid (GABA) neurotransmitter. After breakdown, GABA is converted into a metabolite of the citric acid cycle, that is:
A. Succinate
B. Citric acid
C. Malate
D. Fumarate
E. Oxaloacetate

9. Degenerative changes in posterior and lateral columns of spinal cord (funicular myelosis) caused by methylmalonic acid accumulation occur in patients with B12-deficiency anemia. This results in synthesis disruption of the following substance:
A. Myelin
B. Acetylcholine
C. Norepinephrine
D. Dopamine
E. Serotonin

10. After pharmacological blockade ion channels of the nerve fiber membrane resting potential decreased from -90 to -80 mV. What channels were blocked?
A. Potassium
B. Sodium
C. Calcium
D. Magnesium
E. Chloric

11. Disruption of nerve fiber myelinogenesis causes neurological disorders and mental retardation. These symptoms are typical for hereditary and acquired alterations in the metabolism of:
A. Sphingolipids
B. Neutral fats
C. Higher fatty acids
D. Cholesterol
E. Phosphatidic acid

12. 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. UDP

13. A patient presents with dysfunction of the cerebral cortex accompanied by epileptic seizures. He has been administered a biogenic amine synthetized from glutamate and responsible for central inhibition. What substance is it?
A. γ-aminobutyric acid
B. Serotonin C.
C. Dopamine
D. Acetylcholine
E. Histamine

14. An unconscious patient was taken by ambulance to the hospital. On objective examination the patient was found to have no reflexes, periodical convulsions, irregular breathing. After laboratory examination the patient was diagnosed with hepatic coma. Disorders of the central nervous system develop due to the accumulation of the following metabolite:
A. Ammonia
B. Urea
C. Glutamine
D. Bilirubin
E. Histamine

15. For the treatment of depression of different genesis, antidepressants are used, which are monoamine oxidase inhibitors. What substance is a "neurotransmitter of well-being" and its concentration increases in the brain under the action of antidepressants?
A. Serotonin
B. Dopamine
C. Glycine
D. Taurine
E. Norepinephrine

16. Brain cells are very sensitive to energy deficiency, which can be caused by a high content of ammonia, which stimulates the outflow of alpha-ketoglutarate from:
A. Citric acid cycle
B. Ornithine cycle
C. Glycolysis
D. Glycogenolysis
E. Pentose phosphate pathway

17. 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

18. Pharmacological effects of antidepressants are based upon blocking (inhibiting) the enzyme that acts as a catalyst for the breakdown of biogenic amines noradrenalin and serotonin in the mitochondria of cephalic neurons. What enzyme takes part in this process?
A. Monoamine oxidase
B. Transaminase
C. Decarboxylase
D. Peptidase
E. Lyase

19. 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

20. Cerebral trauma caused increase of ammonia formation. What aminoacid takes part in removal of ammonia from
cerebral tissue?
A. Glutamic
B. Tyrosine
C. Valine
D. Tryptophan
E. Lisine

21. 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

22. A patient presented to a hospital with complaints about quick fatigability and significant muscle weakness. Examination revealed an autoimmune disease that
causes functional disorder of receptors in the neuromuscular synapses. This will result in the disturbed activity of the following mediator:
A. Acetylcholine
B. Noradrenaline
C. Dopamine
D. Serotonin
E. Glycine

23. Glutamate decarboxylation results in formation of inhibitory transmitter in CNS. Name it:
A. GABA
B. Glutathione
C. Histamine
D. Serotonin
E. Asparagine

24. In medical practice for alcoholism prevention widely used teturam, which is inhibitor aldehyde dehydro- nazy The increase in blood of what tabolita aversion to al to someone?
A. Acetaldehyde
B. Ethanol
C. Malonic aldehyde
D. Propionic aldehyde
E. Methanol

25. Soldiers who were injured in the midst of the battle may not be aware of the pain until it is completed. What hormones are opiate antinociceptive system reduce the sensation of pain?
A. Endorfines
B. Serotonines
C. Vasopressin
D. Aldosterone
E. Oxytocine

26. In an excitable cell the ion channels were blocked. It hasn’t changed essentially the value of rest potential, but the cell lost its ability to generate AP (action potential). What channels were blocked?
A. Natrium
B. Potassium
C. Natrium and potassium
D. Chloric
E. Calcium

27. The infant has epileptiform convulsions caused by vitamin B6 deficiency. This is due to a decrease in the nervous tissue of the inhibitory mediator, γ-aminobutyric acid. What is the enzyme's activity reduced in this case?
A. Glutamate decarboxylase
B. Alanine aminotransferase
C. Glutamate dehydrogenase
D. Pyridoxal kinase
E. Glutamate Synthetase

Biochemistry of muscle tissue

1. Buffer capacity of a worker's blood was decreased due to exhausting muscular work. By coming of what acid substance in the blood can this state be explained?
A. Lactate
B. Pyruvate
C. 1,3-bisphosphoglycerate
D. α-ketoglutarate
E. 3-phosphoglycerate

2. 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

3. A considerable increase of activity of MB-forms of CPK (creatinephosphokinase) and LDH-1 was revealed on the examination of patient's blood. What is the most likely pathology?
A. Miocardial infarction
B. Hepatitis
C. Rheumatism
D. Pancreatitis
E. Cholecystitis

4. With intense physical work, muscle tissue accumulates lactic acid, which diffuses into the blood and is absorbed by the liver and the heart. What process ensures the recovery of glycogen stores in the muscles?
A. The Cori Cycle
B. Citric Acid Cycle
C. Urea Cycle
D. A Cycle of Tricarboxylic Acids
E. Hexose Monophosphate Pathway

5. 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

6. A 35-year-old man developed acute heart failure while running for a long time. What changes in ionic composition can be observed in the cardiac muscle?
A. Accumulation of Na+ and Ca2+ ions in the myocardium cells
B. Accumulation of K+ and Mg2+ ions in the myocardium cells
C. Reduction of Na+ and Ca2+ ions in the myocardium cells
D. Reduction of K+ and Mg2+ ions in the extracellular space
E. Reduction of Na+ and Ca2+ ions in the extracellular space

7. A patient is diagnosed with cardiac infarction. Blood test for cardiospecific enzymes activity was performed. Which of the enzymes has three isoforms?
A. Creatine kinase
B. Lactate dehydrogenase
C. Aspartate transaminase
D. Alanine transaminase
E. Pyruvate kinase

8. A 50-year-old woman diagnosed with cardiac infarction has been delivered into an intensive care ward. What enzyme will be the most active during the first two days?
A. Aspartate aminotransferase
B. Alanineaminotransferase
C. Alanineaminopeptidase
D. LDH4
E. LDH5

9. 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

10. 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

11. Rheography of an 18 year old student during exercise showed redistribution of blood flow between organs. The peak blood flow will be observed in the following vessels:
A. Skeletal muscles
B. Liver
C. Cerebrum
D. Kidneys
E. Gastrointestinal tract

12. A 46-year-old female patient has 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

13. 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

14. Some students developed myodynia after continuous physical activity during physical education. The reason for such condition was accumulation of lactic acid in the skeletal muscles. It was generated in the students' bodies after activation of the following process:
A. Glycolysis
B. Gluconeogenesis
C. Pentose-phosphate cycle
D. Lipolysis
E. Glycogeny

15. 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

16. 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

17. Cytoplasm of the myocytes contains a lot of dissolved metabolites resulting from glucose oxidation. Name the metabolite that turns directly into lactate:
A. Pyruvate
B. Oxaloacetate
C. Glycerophosphate
D. Glucose-6-phosphate
E. Fructose-6-phosphate

18. A patient came to the hospital complaining about quick fatigability and apparent muscle weakness. Examination revealed an autoimmune disease that causes disorder of functional receptor condition in neuromuscular synapses. What transmitter will be blocked?
A. Acetylcholine
B. Noradrenalin
C. Dopamine
D. Serotonin
E. Glycine

19. During processing of the atypical cardiomyocytes of the synaptic node with a biologically active substance, an increase in their membrane potential was recorded due to increased permeability for potassium ions. What biologically active substance affects cardiomyocytes?
A. Acetylcholine
B. Adrenalin
C. Noradrenaline
D. Thyroxine
E. Atriopeptide

20. 12 hours after an accute 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

21. 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

22. A traumatology unit received a patient with crushed muscular tissue. What biochemical indicator of urine will be raised in this case?
A. Creatinine
B. Total lipids
C. Glucose
D. Mineral salts
E. Uric acid

23. A 1 y.o. child with symptoms of muscle affection was admitted to the hospital. Examination revealed carnitine deficit inmuscles. Biochemical base of this pathology is disturbed process of:
A. Transporting of fatty acids to mitochondrions
B. Regulation of Ca2+ rate in mitochondrions
C. Substrate phosphorylation
D. Lactic acid utilization
E. Actin and myosin synthesis

24. After a sprint an long distantion the skeletal muscle training person uses glucose for the purpose of obtaining energy ATP for muscle contraction. Specify basic glucose utilization process in these conditions:
A. Aerobic glycolysis
B. Anaerobic glycolysis
C. Glycogenolysis
D. Gluconeogenesis
E. Glycogenesis

25. The gluconeogenesis is activated in the liver after intensive physical trainings.What substance is utilized in gluconeogenesis first of all in this case:
A. Lactate
B. Pyruvate
C. Glucose
D. Glutamate
E. Alanine

26. 6 hours after the myocardial infarction a patient was found to have elevated level of lactate dehydrogenase in blood. What is enzyme should be expected in this case?
A. LDH1
B. LDH2
C. LDH3
D. LDH4
E. LDH5

Biochemistry of connective tissue

1. 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

2. A child has physical and mental retardation, serious abnormalities in connective tissue of internal organs; urine contains keratan sulfates. This is caused by metabolic disorder of the following substance:
A. Glycosaminoglycan
B. Collagen
C. Elastin
D. Fibronectin
E. Hyaluronic acid

3. Inherited diseases, such as mucopolysaccharidoses, are manifested in metabolic disorders of connective tissue, bone and joint pathologies. The sign of this disease is the excessive urinary excretion of the following substance:
A. Glycosaminoglycans
B. Amino acids
C. Glucose
D. Lipids
E. Urea

4. A 28 year old pregnant woman had the enzymes in the cells of amniotic fluid analyzed. The analysis revealed insufficient activity of β-glucuronidase. What pathological process is it?
A. Mucopolysaccharidosis
B. Glycogenosis
C. Aglycogenosis
D. Collagenosis
E. Lipidosis

5. The five year old boy was observed small stature, mental retardation, limited movement, rough facial features. These features have become noticeable from 18 months of age. He was diagnosed with a deficiency of L-iduronidase. The exchange of which compounds is broken?
A. Glycosminoglycans
B. Proteins
C. Nucleotides
D. Vitamins
E. Phospholipids

6. A patient in the dental department has been diagnosed with Paget's disease, which is accompanied by collagen degradation. The decisive fact for the diagnosis was the detection in the patient's urine of an elevated level:
A. Hydroxproline
B. Arginine
C. Tryptophan
D. Serina
E. Alanina

7. A 60 year old man complains about in the joints. In the serum of the patient, the concentration of C-reactive protein and oxyproline was found to increase. what disease these symptoms can be associated with:
A. Rheumatism
B. Gout
C. Hepatitis
D. Jaundice
E. Diabetes

8. 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

9. A 30-year-old woman first developed pain, swelling, and skin redness in the area of joints about a year ago. Provisional diagnosis is rheumatoid arthritis. One of the likely causes of this disease is change in the structure of the following connective tissue protein:
A. Collagen
B. Mucin
C. Myosin
D. Ovalbumin
E. Troponin

10. Collagenosis patients typically present with connective tissue destruction processes.The presence of the seprocesses can beconfirmed by the increasein:

A. Blood oxyproline and oxylysine
B. Blood creatine and creatinine
C. LDH-isoenzyme activity in the blood
D. Transaminase activity in the blood
E. Blood urates

11. 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

12. A 63-year-old woman developed symptoms of rheumatoid arthritis. Their increase of which blood values indicators could be the most significant in proving the diagnosis?
A. Additive glycosaminoglycans
B. Lipoproteids
C. Acid phosphatase
D. General cholesterol
E. R-glycosidase

13. Osteolaterism is charcterized by a decrease in collagen strength caused by much less intensive formation of crosslinks 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

14. A 34-year-old patient has a history of periodontitis. As a result of increased collagen degradation, there is a significantly increased urinary excretion of one of the amino acids. Which one?
A. Hydroxyproline
B. Valine
C. Alanine
D. Glycine
E. Serine

15. Calcification of the intercellular substance of bone tissue is accompanied by the deposition of hydroxyapatite crystals along the collagen fibers. This process requires the presence of alkaline phosphatase in the intercellular substance. What cell produces this enzyme?
A. Osteoblast
B. Osteocyte
C. Osteoclast
D. Chondroblast
E. Chondrocyte

16. When a wound heals, a scar takes its place. What substance is the main component of its connective tissue?
A. Collagen
B. Elastin
C. Keratan sulfate
D. Chondroitin sulfate
E. Hyaluronic acid

17. A patient with systemic scleroderma has an intensified collagen destruction. Collagen destruction will be reflected by intensified urinary excretion of the following amino acid:
A. Oxyproline
B. Alanine
C. Tryptophane
D. Serine
E. Phenylalanine

18. A patient who is ill with scurvy displays disturbed processes of connective tissue formation that leads to loosening and falling of teeth. Disturbed activity of what enzyme causes these symptomps?
A. Lisilhydroxylase
B. Glycosiltransferase
C. Elastase
D. Procollagenpeptidase of N-terminal peptide
E. Procollagenpeptidase of C-terminal peptide

19. In spring a patient experiences petechial haemorrhages, loosening of teeth, high liability to colds. A doctor supposes hypobitaminosis C. In this respect loosening of teeth can be explained by:
A. Structural failure of collagen in the periodontal ligaments
B. Structural change of glycosaminoglycan
C. Increased permeability of periodont membranes
D. Mechanical damage of teeth
E. Disturbed oxidation-reduction process in the periodont

20. Increased fragility of vessels, enamel and dentine destruction resulting from scurvy are caused by disorder of collagen maturation. What stage of procollagen modification is disturbed under 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

Biochemistry of tooth and saliva

1. What enzyme has a demineralizing effect - enhances the cleavage of the mineral components of the tissues in the tooth?
A. Sulfate phosphatase
B. Alkaline phosphatase
C. Glucose-6-phosphatase
D. Glucogenphosphorylase
E. Phosphotransferase

2. The hydroxyapatite crystals are deposited along the collagen fibers in the process of grafting the intercellular substance of the tissue. In order to realize this process, the presence of intercellular alkaline phosphatase must be present. What kind of creatine produces this enzyme?
A. Osteoblast
B. Osteocyte
C. Osteoclasts
D. Hondroblaste
E. Chondrocyte

3. The pH of saliva is 6.4 - 7.8 it is in the norm. What changes in the enamel leads to a shift in the pH of saliva in the sour beet (less than 6.2)?
A. Demineralization
B. Calcification
C. Fluorosis
D. Mineralization
E. Strengthening of stability

4. Cationic glycoproteins are the main components of salivation of the parotid glands. What Amino Acids cause their positive charge?
A. Lizin, arginine, hististine
B. Aspartate, glutamate, glucine
C. Aspartate, arginine, glutamate
D. Glutamate, valine, leucine
E. Cysteine, glucine, proline

5. The protective function of saliva is due to several mechanisms, including the presence of an enzyme that has bactericidal action, causes lysis of the polysaccharide complex of the staphylococcal shell, streptococci. Indicate this enzyme:
A. Lysozyme
B. α-amylase
C. Oligo-1,6-glucosidase
D. Collagenase
E. β-glucuronidase

6. The periodontal dentist must be assessed in the patient by factors of non-specific resistance of saliva and excretory mucous membrane of the oral cavity. What factor of non-specific resistance should first be studied in the investigated material?
A. Lysozyme
B. Secretory IgA
C. Properdine
D. Interferon
E. Complement

7. What substance gives slime a viscous mucous character, performs a protective role and including from mechanical damage to the oral mucosa?
A. Mutsin
B. Glucose
C. Kalikrein
D. Amilaza
E. Lysozyme

8. Some beards of saliva perform a protective function. Which one protects the oral mucosa from mechanical damage?
A. Mutsin
B. Lysozyme
C. Catalase
D. Peroxidase
E. Renin

9. The patient with chronic inflammation of submaxilar salivary glands have observed giposalivation. What violation of the increment of which biologically active substance is observed at this process?
A. Parotin
B. Calcitonin
C. Paratyrin
D. Gluckagon
E. Somatostatin

10. Patient with symptoms of reduced excretory function of the kidneys, an unpleasant smell from the mouth is indicated. What substance are increased excretion of the salivary glands is the cause of this?
A. Urea
B. Alpha amylase
C. Lysozyme
D. Phosphatase
E. Mutsin

11. The child has acute renal insufficiency. What biochemical indicators of saliva can be confirmed?
A. Increasing the level of residual nitrogen
B. Increase in immunoglobulin A.
C. Reduction of alkaline phosphatase
D. Increase in alpha amylase
E. Reducing the phosphate level

12. Periodontitis is accompanied by activation of proteolysis in periodontal tissues. The increase of which oral fluid component testifies to the activation of proteolysis?
A. Amino acids
B. Organic acids
C. Glucose
D. Biogenic Amines
E. Cholesterol

13. When treated with hydrogen peroxide in the mucous membrane of the patient's oral cavity, the blood was painted in a brown color instead of pene formation. When the concentration of any of the enzymes listed below is reduced, is it possible?
A. Catalase
B. Pseudocholinesterase
C. Glucose-6-phosphate dehydrogenase
D. Acetyltransferase
E. Methemoglobin reductase

14. In periodontites, lipid peroxidation develops in the periodontal tissues, and the content of malonic dialdehyde, hydrogen peroxide increases in the oral cavity. Which of the enzymes is antioxidant protection?
A. Superoxide dismutase, catalase
B. Amilase, trypsin
C. Maltase, Chymotrypsin
D. Lactase, lysozyme
E. Saharaza, prothrombin.

15. With age, the activity of the peripheral salivary glands decreases. Which does an enzyme's activity decrease in slime?
A. Amilaza
B. Lysozyme
C. Phosphatase
D. Geksokinase
E. Malthus

16. A 60 year old patient was found to have a dysfunction of main digestive enzyme of saliva. This causes the disturbance of primary hydrolysis of:
A. Carbohydrates
B. Fats
C. Proteins
D. Cellulose
E. Lactose

17. It is necessary to evaluate the digestible properties of saliva. With what substrate for this it needs to be shifted?
A. Starch
B. Casein
C. Fat
D. DNA
E. RNA

18. When investigating human saliva it is necessary to assessits hydrolytic properties. What substance should be used as a substrate in the process?
A. Starch
B. Proteins
C. Fats
D. Fiber
E. Amino acids

19. Afther using cookies, sweets in mixed saltines temporarily increases the level of lactate. The activation of which biomic process leads to this?
A. Anaerobic digestion
B. Tissue breathing
C. Aerobic Glucose
D. Gluconeogenesis
E. Microsomal oxidation

20. In the saliva of patient is increased content of lactate was detected. Activation of a process is the main reason for the increase of lactate?
A. Anaerobic decomposition of glucose
B. Aerobic decomposition of glucose
C. Decomposition of glycogen
D. Hydrolysis of carbohydrates
E. Glucose-lactate cycle

21. To form a mineral matrix of hard tooth tissues, a high concentration of phosphate ions is required, which is formed during the process of hydrolysis of phosphorous-bonded bonds with the participation of alkaline phosphatase.

What ions of the metal are the triggers of this process:
A. Zinc
B. Magnium
C. Iron
D. Calcium
E. Natrium

22. In economically developed countries, common caries is a cureus of teeth. This disease affects more than 95% of the population. What role plays in the demineralization of hard tooth tissues in caries?
A. Organic acids
B. Malnutrition
C. Extreme effects on the organism
D. Disturbance of regulation of metabolism
E. Insufficient vitamin C

23. The high excess concentration of glucose in oral solution in diabetes leads to development:
A. Multiple caries
B. Hyperplasia enamel
C. Hypoplasia of enamel
D. Fluorosis
E. Enhanced calcification of enamel

24. In the Transcarpathian settlement, after prophylactic examination of many children have found a multiple of caries. With mineral of the insufficiency in food you can link development of careers?
A. Fluoride
B. Iodine
C. Molibden
D. Iron
E. Cobalt

25. A child has disturbed processes of ossification and "punctate"enamel. What microelement metabolism is disturbed?
A. Fluorine
B. Iron
C. Zinc
D. Chromium
E. Copper

26. A saline metal was assigned for salvage therapy at the initial caries of the teeth. Which drug is determinated of this process?
A. Sodium fluoride
B. Sodium bromide
C. Sodium chloride
D. Calcium chloride
E. Kalia bromide

27. A patient with renal insufficiency developed osteodystrophy, which is accompanied by intensive demineralization of the hips. Which active form of vitamin violation's of the formation is the cause of this complication?
A. Calcipherol
B. Retinol
C. Thiamin
D. Naftohinon
E. Ryboflavin

28. The enamel is characterized by high stability to the action of various mechanical and chemical factors. Which component is synthesis of provides such resistance?
A. Fluorapatite
B. Hydroxyapatite
C. Chlorapatite
D. Collagen
E. Carbonate apatite

29. Calcification of dental tissues is significantly influenced by osteocalcin protein which has an ability to bind calcium ions due to the presence of the following modified amino acid residues in the polypeptide chain:
A. γ-carbon glutamine
B. Alanine
C. γ-aminobutyric
D. Carboxy aspargine
E. δ-aminopropionic

30. A 35-year-old patient consulted a dentist about low density of dental tissues, increased fragility of teeth on eating solid food. In order to determine Ca/P relation a scrape of enamel was sent to the laboratory. What value of this index is suggestive of intensified demineralization?
A. 0,9
B. 1,67
C. 1,85
D. 2,5
E. 1,5

31. The preparation comlex for periodontitis treatment includes the medicine from the group of water soluble vitamins, bioflavonide derivative, which is prescribed together with ascorbic acid. This preparation has anti-

oxidative properties, decreases gingival hemorrhage. What preparation is meant?
A. Rutin
B. Calcium pantothenate
C. Calcium panganate
D. Cyanocobalamin
E. Folic acid

32. 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

33. The patient has an increase in the permeability of the walls of blood vessels with the development of increased bleeding and the appearance of small point hemorrhages on the skin, tooth loss. How does the vitamin exchange disorder explain these symptoms?
A. Hypovitaminosis C
B. Hypervitaminosis D
C. Hypervitaminosis C
D. Hypovitaminosis D
E. Hypovitaminosis A

34. In examining the oral cavity of the patient, the dentist paid attention to the presence of an inflammatory and dystrophic process in the mucous membrane (Hunter's glossitis, atrophic stomatitis). A blood test revealed hyperchromic anemia. What factor is the cause of this disease?
A. Hypovitaminosis B_{12}
B. Hypovitaminosis B_1
C. Hypovitaminosis B_6
D. Increasing pH of the gastric juice
E. Hypovitaminosis A

35. 10 month old child has high excitability, sleep disturbance, amyotonia, retarded dentition, teeth erupt withinadequate enamel calcification. Thesechanges are caused by deficiency of thefollowing vitamin:
A. Cholecalciferol
B. Riboflavin
C. Thiamine
D. Retinol
E. Nicotinamide

36. The child has a delayed teething, their wrong arrangement, upon examination noticeable dryness of the oral cavity, in the corners of the mouth there are cracks with suppuration. With the lack of the vitamin this condition may be related?
A. Vitamin D.
B. Vitamin C.
C. Vitamin E.
D. Vitamin K.
E. Vitamin A.

37. In a child of the first year of life is observed an increase in the size of the head and abdomen, late teething, violation of the enamel structure. The consequence of vitamin deficiencies are these changes?
A. Hypovitaminosis D
B. Hypovitaminosis C
C. Hypovitaminosis A
D. Hypovitaminosis B_1
E. Hypovitaminosis B_2

38. A child with renal insufficiency exhibits delayed teeth eruption. This is mostlikely caused by the abnormal formationof the following substance:
A. 1,25 (*OH*)2*D*3
B. Glycocyamine
C. Glutamate
D. α-ketoglutarate
E. Hydroxylysine

39. A patient has enamel erosion. What vitamin should be administered for itstreatment?
A. *D*3
B. *C*
C. *K*
D. *B*1
E. *PP*

40. A 5 years old child has insufficient calcification of enamel, tooth decay. Which vitamin hypovitaminosis leads to the development of this process?
A. Calciferol
B. Tocopherol
C. Biotin
D. Nicotinic acid
E. Folic acid

41. Hormonal form of a certain vitamin induces genome level synthesis of *Ca* binding proteins and enterocytes thus regulating the intestinal absorption of Ca^{2+} ions required for dental tissuedevelopment. What vitamin is it?
A. *D*3
B. *A*
C. *B*1
D. *E*
E. *K*

42. While the examination of patient's oral cavity the dentist found xerostomia, numerous erosions. What vitamin deficit caused this effect?
A. Vitamin *A*
B. Vitamin *K*
C. Vitamin *P*
D. Vitamin *H*
E. Vitamin *PP*

43. In order to prevent gum inflammation and to improve regeneration of epithelial periodontium cells manufacturers add to the tooth pastes one of the following vitamins:
A. Retinol
B. Calciferol
C. Thiamine
D. Biotin
E. Phyloquinone

44. There are various diseases that cause sharp increase of active oxygen, leading tocell membranes destruction. Antioxidantsare used to prevent it from happening. Themost potent natural antioxidant is:
A. Alpha-tocopherol
B. Glycerol
C. Vitamin *D*
D. Fatty acids
E. Glucose

45. When treating sialadenitis (inflammation of the salivary glands), preparations of vitamins are used. Which of the following vitamins plays an important role in antioxidant defense?
A. Tocopherol
B. Pantothenic acid
C. Riboflavin
D. Thiamine
E. Pyridoxine