МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ
«ГОМЕЛЬСКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ»

Кафедра биологии
с курсами нормальной и патологической физиологии

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МЕДИЦИНСКАЯ БИОЛОГИЯ И ОБЩАЯ ГЕНЕТИКА

(сборник тестов)

Рекомендовано учебно-методическим объединением
по высшему медицинскому, фармацевтическому образованию
в качестве учебно-методического пособия для студентов
учреждений высшего образования,
обучающихся по специальности 1-79 01 01 «Лечебное дело»

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(collection of tests)

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Учебно-методическое пособие содержит тестовые задания, соответствующие типовой учебной программе по дисциплине «Медицинская биология и общая генетика», которые могут быть использованы как промежуточный контроль подготовки студентов. Тесты составлены по всем разделам дисциплины со сквозной нумерацией вопросов.

Предназначено для англоязычных студентов 1 курса учреждений высшего образования, обучающихся по специальности 1-79 01 01 «Лечебное дело».

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CONTENT

Introduction 4

1. Section "Molecular-genetic and cell levels of the living things organization" 5

2. Section "Ontogenetic level of the living things organization" 35

3. Section "Population-species level of the living things organization" 87

4. Section "Biosphere-biogeocenotic level of the living things organization" 103

Answers to tests 143

Literature 147

INTRODUCTION

Medical biology and general genetics is a discipline characterized by the rapid growth of fundamental and applied knowledges. Human is both a biological and social being; the study of it as the biological being is the basic principle of studying biology in a medical high school.

The study guide is written in accordance with the curriculum for the discipline "Medical biology and general genetics." This guide is intended for English-speaking students of the 1st year as an intermediate control of the learning material. The section “Biosphere-biogeocenotic level of the living things organization” can be useful for 3rd and 4th year students studying the discipline “Ecological parasitology”.

In preparing the manual, the authors’ anxiety was to help students to master the necessary knowledge in the full extent, so that the educational material on the discipline was read as the single system with common laws of origin, development, patterns of structure and activity, and with the common nature of various biological systems at all levels of the living things organization. Tests encompass all sections of the discipline: 1. Molecular-genetic and cell levels of the living things organization; 2. Ontogenetic level of the living things organization; 3. Population-species level of the living things organization; 4. Biosphere-biogeocenotic level of the living things organization.

The presented tests forces students to examine into details the educational material, which may not be specified with other forms of the knowledge control. For the correct answer to the tests there is a list of the main and additional literature.

The authors gratefully accept the critical comments and suggestions on the content and design of the study guide.

1. SECTION
“MOLECULAR-GENETIC AND CELL LEVELS OF THE LIVING THINGS ORGANIZATION”

Choose one correct answer:

1. Major component of DNA is:
Answer variants:
a) histones;
b) deoxyribonucleotides;
c) proteins;
d) amino acids;
e) ribonucleotides.

2. Purine nitrogenous bases are:
Answer variants:
a) A + T;
b) C + T;
c) A + G;
d) G + T;
e) G + C.

3. Pyrimidine nitrogenous bases are:
Answer variants:
a) A + T;
b) G + T;
c) G + C;
d) C + T;
e) A + G.

4. The total amount of A + G of double-stranded DNA is equal to the total amount of:
Answer variants:
a) C + T;
b) A + T;
c) G + T;
d) G + C;
e) A + C.

5. Complementary pairs of nucleotides of double-stranded DNA form bonds.

Answer variants:

a) covalent;
b) phosphodiester;
c) peptide;
d) disulfide;
e) hydrogen.

6. Nucleotides in polynucleotide strand of DNA are connected by bonds.

Answer variants:

a) phosphodiester;
b) hydrogen;
c) peptide;
d) disulfide;
e) there is no right answer.

7. Which base pairs form triple hydrogen bonds:

Answer variants:

a) A-T;
b) A-G;
c) C-T;
d) U-T;
e) G-C.

8. A virus contains 10 % adenine, 24 % thymine, 30 % guanine, and 36 % cytosine. The genetic material in this virus is:

Answer variants:

a) double-stranded DNA;
b) single-stranded DNA;
c) double-stranded RNA;
d) single-stranded RNA;
e) none of the above.

9. In a DNA the coding region reads 5'-CGT-3'. This would code in the RNA as:

Answer variants:

a) 5'-GCA-3';
b) 5'-ACG-3';
c) 5'-CGU-3';
d) 5'-UGC-3';
e) 5'-CGT-3'.

10. Okazaki fragments are formed during the synthesis of:

Answer variants:

a) single-stranded DNA;
b) mRNA;
c) tRNA;
d) polypeptide;
e) double-stranded DNA.
f)

11. What type of inheritance is characteristic for mitochondrial DNA?

Answer variants:

a) horizontal;
b) vertical;
c) paternal;
d) maternal;
e) no right answer.

12. Heterochromatin:

Answer variants:

a) is responsible for all negative transcriptional control;
b) contains more DNA than does euchromatin;
c) is transcriptionally inactive;
d) clumps the X chromosome in human males;
e) occurs only during mitosis.

13. What structure is formed by DNA wrapped about two times around an octamer of eight histone proteins?

Answer variants:

a) chromatin fiber;
b) nucleosome;
c) solenoid;
d) chromatid;
e) chromosome.

14. Chromosome with the same length of the arms is called:

Answer variants:

a) metacentric;
b) acrocentric;
c) submetacentric;
d) telocentric;
e) autosome.

15. Chromosome with slightly different length of the arms is called:
Answer variants:
a) metacentric;
b) acrocentric;
c) submetacentric;
d) telocentric;
e) autosome.

16. Y-chromosome is:
Answer variants:
a) metacentric;
b) acrocentric;
c) submetacentric;
d) telocentric;
e) autosome.

17. The long and short arms of chromosomes are designated respectively as:
Answer variants:
a) p and q arms;
b) b and q arms;
c) l and s arms;
d) q and p arms;
e) b and s arms.

18. The centromere index is:
Answer variants:
a) the ratio of the length of chromosome arms;
b) the ratio of the length of any arm to the length of the chromosome;
c) the location of the secondary constriction on the chromosome;
d) the ratio of the centromere size to the length of the chromosome;
e) the ratio of the length of the short arm to the length of the chromosome.

19. DNA synthesis occurs during …… period of the mitotic cycle.
Answer variants:
a) presynthetic;
b) premitotic;
c) synthetic;
d) postsynthetic;
e) mitotic division.

20. What is the period of the mitotic cycle in which the processes of cell growth, formation of organelles, synthesis of proteins, RNA, lipids and carbohydrates take place, but DNA is not synthesized?

Answer variants:

a) synthetic;
b) premitotic
c) telophase;
d) presynthetic;
e) anaphase.

21. How many chromosomes does a human somatic cell have in the presynthetic period of the mitotic cycle?

Answer variants:

a) 46;
b) 92;
c) 47;
d) 45;
e) 23.

22. How many DNA molecules does a human somatic cell have in the presynthetic period of the mitotic cycle?

Answer variants:

a) 92;
b) 47
c) 45;
d) 46;
e) 23.

23. How many DNA molecules does a human somatic cell have in the postsynthetic period of the mitotic cycle?

Answer variants:

a) 46;
b) 92;
c) 47
d) 45;
e) 23.

24. How many chromosomes does a human somatic cell have in the postsynthetic period of the mitotic cycle?

Answer variants:

a) 92;
b) 47;
c) 45;

d) 23;
e) 46.

25. What are the consequences of the DNA polymerase damage during the mitotic cycle?

Answer variants:

a) damage of the formation of the spindle division;
b) damage of the cytokinesis;
c) damage of the DNA replication;
d) decrease in the duration of mitosis;
e) increase in the duration of mitosis.

26. What are the consequences of the helicase enzyme damage during the mitotic cycle?

Answer variants:

a) damage of the formation of the spindle division;
b) damage of the cytokinesis;
c) decrease in the duration of mitosis;
d) increase in the duration of mitosis;
e) damage of the DNA replication.

27. If a lymphocyte is damaged by an RNA-containing virus, the direction of the information flow in the cell will be:

Answer variants:

a) RNA → DNA → mRNA → polypeptide;
b) DNA → mRNA → polypeptide → DNA;
c) DNA → polypeptide → mRNA;
d) mRNA → polypeptide → DNA;
e) polypeptide → RNA → DNA → mRNA.

28. The genetic material in eukaryotic cells is:

Answer variants:

a) nucleic acid;
b) chromatin;
c) polypeptide;
d) circular DNA molecule;
e) nucleoid.

29. What is the name of a molecule in the cell nucleus, capable to self-reproduction and storage of genetic information?

Answer variants:

a) rRNA;

b) mRNA;
c) histon;
d) DNA;
e) hemoglobin.

30. DNA polymerase have:
Answer variants:
a) 5' - 3' polymerase acitivity;
b) 3' - 5' polymerase activity;
c) 3' - 5' exonuclease activity;
d) 5' - 3' exonuclease activity;
e) endonuclease activity.

31. Under what type of DNA replication each of its strands becomes a template for the synthesis of a new strand.
Answer variants:
a) analogical;
b) semi-conservative;
c) identical;
d) dispersed;
e) conservative.

32. In case of a semi-conservative mechanism of DNA replication, the nucleotides of the synthesized DNA strand are complementary to the nucleotides of:
Answer variants:
a) RNA polymerase enzyme;
b) DNA polymerase enzyme;
c) sence codons;
d) introns of a gene;
e) maternal DNA strand.

33. What enzyme breaks down the hydrogen bonds and unwinds the DNA helix during replication?
Answer variants:
a) RNA-polymerase;
b) helicase;
c) ligase;
d) restrictase;
e) DNA-polymerase.

34. Maximum damage to DNA is caused by:
Answer variants:
a) UV-rays;

b) increased on 10 degrees temperature;
c) X-rays;
d) sulfanilamides;
e) formaldehyde.

35. Codon consists of:
Answer variants:
a) 2 base pairs;
b) 3 base pairs;
c) 4 base pairs;
d) 5 base pairs;
e) two nucleotides.

36. What is the phenomenon of recovery a damaged part of the DNA molecule using specific enzymes?
Answer variants:
a) replication;
b) initiation;
c) termination;
d) duplication;
e) repair.

37. Ultraviolet rays cause the formation of pyrimidine dimers in the DNA molecule. Specify them:
Answer variants:
a) adenine and thymine;
b) guanine and thymine;
c) thymine and cytosine;
d) guanine and cytosine;
e) adenine and guanine.

38. Transcription is:
Answer variants:
a) one of the forms of exchange of genetic information;
b) the process of reading genetic information from DNA to mRNA;
c) the process of protein synthesis from the mRNA template;
d) a substitution of purine bases in the DNA molecule;
e) the amino acid transport by tRNA.

39. Translation is:
Answer variants:
a) the process of protein synthesis from the mRNA template;

b) one of the forms of exchange of genetic information;
c) the process of reading genetic information from DNA to mRNA;
d) a substitution of purine bases in the DNA molecule;
e) the amino acid transport by tRNA.

40. Xeroderma pigmentosum is a rare autosomal recessive condition that includes abnormal skin pigmentation and acute sensitivity to sunlight. What process is disrupted as a result of this defect:

Answer variants:
a) DNA replication;
b) DNA repair;
c) translation;
d) transcription;
e) initiation.

41. A segment of a eukaryotic gene that is not represented in the mature messenger RNA is known as:

Answer variants:
a) poly(A) tail;
b) TATA box;
c) intron;
d) exon;
e) plasmid.

42. Which of the following is not a post transcriptional modification of mRNA?

Answer variants:
a) splicing;
b) 5' capping;
c) 3' polyadenylation;
d) processing;
e) glycolysation.

43. The template for the synthesis of mRNA molecule in bacteria is:

Answer variants:
a) a part of one of the DNA strands;
b) the DNA molecule;
c) one of the strands of the DNA molecule;
d) a strand of DNA molecules without introns;
e) a strand of DNA molecules without exons.

44. What is the structure of pro-mRNA molecule in eukaryotes?

Answer variants:
a) intron-intron-exon;

b) exon-intron-exon;
c) exon-exon-intron;
d) intron-intron;
e) exon-exon.

45. The sequence of amino acids in the molecule of human insulin is encoded by:

Answer variants:
a) the sequence of structural genes;
b) the sequence of nucleotides of the DNA molecule;
c) the sequence of nucleotides in the exon regions of the gene;
d) a certain alternation of exons and introns;
e) the sequence of nucleotides in the introns of the gene.

46. What is the process of mRNA synthesis on the DNA template?

Answer variants:
a) replication;
b) elongation;
c) translation;
d) transcription;
e) termination.

47. What process is disturbed in case of inhibition of RNA polymerase by toxins:

Answer variants:
a) transcription;
b) replication;
c) repair;
d) translation;
e) processing.

48. What mRNA codons will be complementary to triplets ATG-CGT of DNA molecule?

Answer variants:
a) AUG-CGU;
b) UAC-GCA;
c) ATG-CGT;
d) UAG-CGU;
e) TAC-GCA.

49. Transcription stops after RNA polymerase reaches a nucleotides sequence of DNA called:

Answer variants:
a) operator;

b) repressor;
c) regulator;
d) terminator;
e) stop codon.

50. An mRNA molecule contains both exons and introns due to the absence of:

Answer variants:
a) splicing;
b) replication;
c) transcription;
d) translation;
e) recombination.

51. The set of stages of the mRNA maturation is called:

Answer variants:
a) replication and recombination;
b) transcription and recombination;
c) translation;
d) termination;
e) processing and splicing.

52. What process precedes the translation in eukaryotes, leading to a decrease in the number of nucleotides in the mRNA molecule:

Answer variants:
a) initiation;
b) splicing;
c) repair;
d) mutation;
e) replication.

53. The removal of introns and joining of exons of mRNA in eukaryotes is called:

Answer variants:
a) transcription;
b) repair;
c) splicing;
d) replication;
e) reverse transcription.

54. Splicing enzymes are not synthesized in the cell. What is the reason for the termination of protein biosynthesis in this case?

Answer variants:
a) ATP is not synthesized;

b) rRNA is not formed;
c) amino acids are not activated;
d) mature mRNA is not formed;
e) amino acid transport is disrupted.

55. Stop codon is:
Answer variants:
a) UAG;
b) UCA;
c) UAC;
d) UCC;
e) UGG.

56. What property of the genetic code allows applying the retroviruses as vectors in gene therapy?
Answer variants:
a) specificity;
b) collinearity;
c) continuity;
d) redundancy;
e) universatility.

57. Several triplets are changed in the gene, but despite this, the cell continued to synthesize the same protein. What property of the genetic code can explain this phenomenon?
Answer variants:
a) universatility;
b) triplet structure;
c) redundancy;
d) non-overlaping;
e) collinearity.

58. What property of the genetic code is manifested if the mutation of the structural gene does not lead to the replacement of amino acids in the protein?
Answer variants:
a) mutability;
b) collinearity;
c) triplet structure;
d) redundancy;
e) universatility.

59. Amino acids are encoded by a different number of triplets of the mRNA molecule (from one to six). What is the name of this property of the genetic code?

Answer variants:

a) universatility;
b) collinearity;
c) triplet structure;
d) mutability;
e) redundancy.

60. A single amino acid is encoded by three:

Answer variants:

a) triplets;
b) nucleotides;
c) genes;
d) codons;
e) proteins.

61. The polypeptide consists of 24 amino acids. How many nucleotides are in the template of mature mRNA?

Answer variants:

a) 72;
b) 24;
c) 26;
d) 144;
e) 48.

62. Some triplets of mRNA (UAA, UAG, UGA) do not encode amino acids, but are able to terminate translation. These triplets are called:

Answer variants:

a) operators;
b) anticodons;
c) stop codons;
d) exons;
e) introns.

63. The sense codons in the process of polypeptide biosynthesis are signals for:

Answer variants:

a) joining of specific exons;

b) start of transcription;
c) termination of transcription;
d) joining of RNA polymerase;
e) joining of a specific amino acid.

64. The polypeptide consists of 54 amino acids. How many codons are in the template of mature mRNA?

Answer variants:
a) 54;
b) 27;
c) 108;
d) 162;
e) 44.

65. In eukaryotes, the amino acid sequence in the polypeptide will correspond to the sequence of:

Answer variants:
a) tRNA triplets;
b) rRNA triplets;
c) mRNA codons;
d) triplets of pro-mRNA;
e) DNA nucleotides.

66. What process provides the expression of genetic information in the polypeptide chain?

Answer variants:
a) formation of rRNA
b) translation;
c) formation of tRNA;
d) formation of mRNA;
e) replication.

67. The patient revealed a decrease of magnesium ions, which are necessary for the attachment of ribosomes to the granular endoplasmic reticulum. It is known that this leads to protein biosynthesis damage. The damage occurs at the stage of:

Answer variants:
a) transcription;
b) replication;
c) activation of amino acids;
d) termination;
e) translation.

68. What stage of protein synthesis inhibits antibiotics?

Answer variants:

a) processing;
b) translation;
c) reduplication;
d) splicing;
e) replication.

69. Which triplet of tRNA will be complementary to AUG triplet of mRNA?

Answer variants:

a) UAC;
b) AAA;
c) TUC;
d) UGU;
e) CUC.

70. The mRNA codons UAA, UAG, UGA are not recognized by any tRNA during the process of polypeptide biosynthesis. These are signals for:

Answer variants:

a) posttranslational modification;
b) elongation;
c) termination;
d) initiation;
e) start of transcription.

71. Translation during the biosynthesis of viral proteins in a eukaryotic cell is carried out in (by):

Answer variants:

a) the nucleus;
b) lysosomes;
c) the smooth endoplasmic reticulum;
d) ribosomes;
e) the centrosome.

72. What is the chemical bond arise between amino acids in a protein during translation?

Answer variants:

a) hydrogen;
b) disulfide;
c) hydrophobic;
d) ionic;
e) peptide.

73. What mutation causes the sickle cell anemia if in the hemoglobin of a patient glutamic acid is replaced by valine?

Answer variants:

a) gene mutation;
b) chromosome mutation;
c) crossing over;
d) genome mutation;
e) transduction.

74. What amino acid substitution is typical for sickle cell anemia?

Answer variants:

a) aspartic acid → lysine;
b) alanine → serine;
c) glutamic acid → valine;
d) methionine → histidine;
e) glycine → serine.

75. What pathological hemoglobin is characteristic for sickle cell anemia?

Answer variants:

a) HbA;
b) HbF;
c) HBa1;
d) HbS;
e) Bart-Hb.

76. The synthesis of what substances hormones influence in the regulation of translation in eukaryotes?

Answer variants:

a) specific rRNAs;
b) specific mRNAs;
c) specific tRNAs;
d) ATP;
e) GTP.

77. Immediately after the operator is released from the regulator protein, in the cell begin:

Answer variants:

a) transcription;
b) replication;
c) repression;
d) translation;
e) processing.

78. During the experiment, an increase in β-galactosidase activity was demonstrated after addition of lactose to the culture medium with E. coli. What part of the lactose operon is released from the repressor under these conditions?

Answer variants:

a) promoter;
b) structural gene;
c) terminator;
d) regulatory gene;
e) operator.

79. Basic unit of heredity is:

Answer variants:

a) one nucleotide;
b) one pair of nucleotides;
c) one gene;
d) one strand of the DNA molecule;
e) two strands of DNA molecule.

80. Which organisms have no membrane organelles in their cells?

Answer variants:

a) viruses;
b) prokaryotes;
c) fungi;
d) eukaryotes;
e) protists.

81. Which organisms have a nucleus surrounded by a nuclear membrane in their cells?

Answer variants:

a) eukaryotes;
b) prokaryotes;
c) bacteriophages;
d) bacteria;
e) viruses.

82. What organelles have own protein synthesis system?

Answer variants:

a) Golgi apparatus;
b) lysosomes;
c) vacuoles;
d) endoplasmic reticulum;
e) mitochondria.

83. What organelles are two-membrane?

Answer variants:

a) nucleus;
b) lysosomes;
c) mitochondria;
d) endoplasmic reticulum;
e) peroxisomes.

84. What organelles are involved in the aerobic process of energy storage in the form of ATP molecules?

Answer variants:

a) mitochondria;
b) lysosomes;
c) rough endoplasmic reticulum;
d) smooth endoplasmic reticulum;
e) centrosome.

85. What cell organelles are involved in protein biosynthesis?

Answer variants:

a) smooth endoplasmic reticulum;
b) peroxisomes;
c) centrosome;
d) ribosomes;
e) lysosomes.

86. Specify the organelle consisting of a network of interconnected membranes branching throughout the cytoplasm of eukaryotic cells, forming tubes and flattened sacs.

Answer variants:

a) mitochondrion;
b) centrosome;
c) ribosome;
d) Golgi complex;
e) endoplasmic reticulum.

87. Specify the organelle consisting of flattened membranous sacs called cisternae and small membrane-enclosed vesicles.

Answer variants:

a) Golgi complex;
b) mitochondrion;
c) centrosome;
d) cytoskeleton;
e) ribosome.

88. What cell organelle receives proteins from the endoplasmic reticulum, modifies, concentrates, packages, and sorts them before they are sent to their cellular or extracellular destinations?

Answer variants:

a) centrosome;
b) Golgi complex;
c) lysosome;
d) ribosome;
e) mitochondrion.

89. What cell organelles are responsible for the secretion of hormones?

Answer variants:

a) mitochondria;
b) ribosomes;
c) centrosome;
d) Golgi complex;
e) lysosomes.

90. In the formation of the mitotic spindle, ……. are involved.

Answer variants:

a) microtubules;
b) Golgi complex;
c) lysosomes;
d) endoplasmic reticulum;
e) ribosomes.

91. What organelles are involved in the synthesis of glycogen and proteins?

Answer variants:

a) mitochondria;
b) rough and smooth endoplasmic reticulum;
c) peroxisomes;
d) centrosome;
e) lysosomes.

92. The process of intracellular digestion provides by:

Answer variants:

a) ribosomes;
b) mitochondria;
c) centrosome;
d) lysosomes;
e) Golgi complex.

93. Organelles of the anabolic system of the cell are:

Answer variants:

a) ribosomes and the Golgi complex;
b) mitochondria and endoplasmic reticulum;
c) endoplasmic reticulum and lysosomes;
d) ribosomes and peroxisomes;
e) mitochondria.

94. Disturbance of the formation of ribosome subunits in the cell affects on:

Answer variants:

a) carbohydrate biosynthesis;
b) biological oxidation;
c) ATP synthesis;
d) photosynthesis;
e) protein biosynthesis.

95. Activity of what organelles lead to high concentration of hydrolytic enzymes in the cytoplasm?

Answer variants:

a) centrosome;
b) endoplasmic reticulum;
c) lysosomes;
d) mitochondria;
e) ribosomes.

96. Ribosomes are located:

Answer variants:

a) in hyaloplasm and karyoplasm;
b) on the outer nuclear membrane and in the mitochondria;
c) on the inner nuclear membrane and in chloroplasts;
d) on endoplasmic reticulum membranes and in hyaloplasm;
e) in the mitochondrial matrix and lysosomes.

97. Function of the rough endoplasmic reticulum is:

Answer variants:

a) protein biosynthesis;
b) DNA synthesis;
c) synthesis of fats and carbohydrates;
d) intracellular digestion;
e) peroxisome formation.

98. Structural components of the Golgi complex are:
Answer variants:
a) canals, cristae and stroma;
b) stroma and vesicles;
c) subunits, cristae and vacuoles;
d) cristae, matrix and channels;
e) cisternae and vesicles.

99. What cell organelles are involved in protein utilization?
Answer variants:
a) lysosomes;
b) proteasomes;
c) Golgi complex;
d) ribosomes;
e) centrosome.

100. Organelles of the catabolic system of the cell are:
Answer variants:
a) ribosomes, glyoxisomes and endoplasmic reticulum;
b) endoplasmic reticulum and cell center;
c) mitochondria, peroxisomes and lysosomes;
d) mitochondria and ribosomes;
e) Golgi complex and peroxisomes.

101. What cell organelle completes the digestion of bacteria in the cell?
Answer variants:
a) mitochondrion;
b) rough endoplasmic reticulum;
c) Golgi apparatus;
d) lysosome;
e) ribosome.

102. What organelles are involved in autolysis?
Answer variants:
a) endoplasmic reticulum;
b) lysosomes;
c) Golgi apparatus;
d) microbodies;
e) mitochondria.

103. What organelles are non-membrane?
Answer variants:
a) ribosomes;

b) lysosomes;
c) Golgi complex;
d) rough endoplasmic reticulum;
e) mitochondria.

104. What is the function of the centrosome in the cell? It involved in:
Answer variants:
a) protein biosynthesis;
b) transcription;
c) cell division;
d) intracellular digestion;
e) trophic function.

105. How many biological membranes constitute the nuclear envelope?
Answer variants:
a) 1;
b) 3;
c) the number of membranes varies;
d) nuclear membrane does not have membranes;
e) 2.

106. The structural components of mitochondria are:
Answer variants:
a) outer, inner membranes and thylakoids;
b) thylakoids and ATP-soma;
c) circular DNA, ribosomes and cristae;
d) cristae, cisterns and vesicles;
e) matrix and thylakoids.

107. The anaerobic stage of energy exchange takes place in:
Answer variants:
a) cell cytoplasm;
b) intestine;
c) cytoplasm and mitochondria;
d) cytoplasm and endoplasmic reticulum;
e) Golgi complex and cell nucleus.

108. Restoration of what organelles becomes unpossible if the nucleolus of the cell is damaged?
Answer variants:
a) endoplasmic reticulum;
b) ribosomes;

c) lysosomes;
d) Golgi complex;
e) microtubules.

109. The aerobic stage of energy exchange takes place in:
Answer variants:
a) cytoplasm and mitochondria;
b) cytoplasm and endoplasmic reticulum;
c) cell cytoplasm;
d) mitochondria;
e) Golgi complex and cell nucleus.

110. The preliminary stage of the energy exchange takes place in:
Answer variants:
a) cytoplasm and mitochondria;
b) cytoplasm and endoplasmic reticulum;
c) intestine;
d) cell cytoplasm;
e) Golgi complex and cell nucleus.

111. Heterotrophic organisms are:
Answer variants:
a) animals, fungi, most protists;
b) animals, fungi, algae;
c) animals and plants;
d) plants and algae;
e) algae.

112. The secretory granules in the cytoplasm of cells belong to:
Answer variants:
a) microfilaments;
b) lysosomes;
c) exocytosis vacuoles;
d) rough endoplasmic reticulum;
e) inclusions.

113. Fats must be in the diet because they are part of:
Answer variants:
a) cellular ion channels;
b) cell membranes;
c) cell receptors;
d) cellular ion pumps;
e) glycocalyx.

114. What is the main mechanism of transport of O_2 and CO_2 into the cell?

Answer variants:

a) active transport;
b) filtration;
c) simple diffusion;
d) pinocytosis;
e) facilitated diffusion.

115. What happens with erythrocytes if a drop of blood is added to a test tube containing 0.9% NaCl solution?

Answer variants:

a) remain without changes;
b) swelling;
c) wrinkling;
d) mechanical hemolysis;
e) osmotic hemolysis.

116. What happens with erythrocytes if a drop of blood is added to a test tube containing H_2O?

Answer variants:

a) mechanical hemolysis;
b) osmotic hemolysis;
c) biological hemolysis;
d) remain without changes;
e) wrinkling.

117. What happens with erythrocytes if a drop of blood is added to a test tube containing 3 % NaCl solution?

Answer variants:

a) remain without changes;
b) osmotic hemolysis;
c) biological hemolysis;
d) wrinkling;
e) swelling.

118. Without the use of ATP, substances move across the cell membrane by:

Answer variants:

a) pinosetosis and osmosis;
b) endocytosis;
c) against a concentration gradient;
d) phagocytosis;
e) diffusion.

119. With the use of ATP, substances move across the cell membrane by:

Answer variants:

a) against a concentration gradient;
b) osmosis;
c) diffusion;
d) facilitated diffusion;
e) no right answer.

120. Transport of substances from a cell when vesicles with substances fuse with the plasma membrane is called:

Answer variants:

a) osmosis;
b) endocytosis;
c) exocytosis;
d) pinocytosis;
e) diffusion.

121. Transports of solid macromolecules into eukaryotic cells by means of vesicle formation is called:

Answer variants:

a) exocytosis;
b) osmosis;
c) active transport;
d) phagocytosis;
e) pinocytosis.

122. Transports of fluids into eukaryotic cells by means of vesicle formation is called:

Answer variants:

a) pinocytosis;
b) exocytosis;
c) osmosis;
d) phagocytosis;
e) active transport.

123. What is the total amount of ATP molecules that is equivalent to the complete oxidation of glucose molecule during cellular respiration?

Answer variants:

a) 48;
b) 12;
c) 32
d) 36;
e) 38.

124. The correct sequence of mitotic phases is:

Answer variants:

a) prophase, metaphase, anaphase, telophase;
b) prophase, metaphase, telophase, anaphase;
c) interphase, prophase, metaphase, anaphase;
d) anaphase, telophase, interphase, prophase;
e) interphase, metaphase, anaphase, telophase.

125. What cells of human is not divided by mitosis during the all life?

Answer variants:

a) endothelial cells;
b) neurons;
c) muscle (smooth) cells;
d) epidermal cells;
e) hematopoietic cells.

126. What type of cell division results in polyploid cells formation?

Answer variants:

a) polytheny;
b) mitosis;
c) amitosis;
d) endomitosis;
e) meiosis.

127. What type of cell division occurs without formation of the mitotic spindle, through formation of a constriction of the nucleus and cytoplasm?

Answer variants:

a) amitosis;
b) mitosis;
c) polytheny;
d) meiosis;
e) endomitosis.

128. What phase of mitosis is described: there is no membrane of the nucleus and the nucleolus, the centrioles are at the poles of the cell, the chromosomes have the shape of threads, freely located in the cytoplasm?

Answer variants:

a) metaphase;
b) anaphase;
c) interphase;
d) telophase;
e) prophase.

129. What phase of mitosis is described: two sister chromatids move to opposite ends of the mitotic spindle?

Answer variants:

a) metaphase;
b) anaphase;
c) interphase;
d) prophase;
e) telophase.

130. What phase of mitosis is described: chromosomes are at the equatorial plate, two chromatids are held together at the centromere?

Answer variants:

a) interphase;
b) prophase;
c) anaphase;
d) metaphase;
e) telophase.

131. At what phase of mitosis the study of human karyotype is carried out?

Answer variants:

a) metaphase;
b) prophase;
c) interphase;
d) anaphase;
e) telophase.

132. What phase of mitosis is described: the chromosomes are uncoil; the nuclear envelope and nucleolus are coalesce and reform?

Answer variants:

a) metaphase;
b) prophase;
c) anaphase;
d) interphase;
e) telophase.

133. Interphase periods:

Answer variants:

a) prophase, metaphase and premitotic;
b) presynthetic, synthetic and postsynthetic;
c) anaphase, telophase and presynthetic;
d) prophase, anaphase and telophase metaphase;
e) interphase and prophase.

134. The content of genetic material in a cell in the presynthetic period of interphase is:

Answer variants:

a) 1n1chr1c;
b) 1n2chr2c;
c) 2n1chr2c;
d) 2n2chr4c;
e) 1n4chr4c.

135. The content of genetic material in a cell at the end of the synthetic period of interphase is:

Answer variants:

a) 2n2chr4c;
b) 1n1chr1c;
c) 1n2chr2c;
d) 2n1chr2c;
e) 1n4chr4c.

136. The content of genetic material in a cell in the postsynthetic period of interphase is:

Answer variants:

a) 1n1chr1c;
b) 1n2chr2c;
c) 2n1chr2c;
d) 2n2chr4c;
e) 1n4chr4c.

137. The content of genetic material in a cell in the prophase of mitosis is:

Answer variants:

a) 1n1chr1c;
b) 2n2chr4c;
c) 1n2chr2c;
d) 2n1chr2c;
e) 1n4chr4c.

138. The content of genetic material in a cell in telophase of mitosis is:

Answer variants:

a) 2n1chr2c;
b) 1n1chr1c;
c) 1n2chr2c;
d) 2n2chr4c;
e) 1n4chr4c.

139. How many chromosomes does a human cell have in anaphase of mitosis at each of its poles?

Answer variants:

a) 92;
b) 23;
c) 69;
d) 96;
e) 46.

140. What cells divide by meiosis?

Answer variants:

a) somatic cells;
b) oocytes;
c) sex cells;
d) tumor cells;
e) regenerating tissue cells.

141. Sequence of prophase stages of meiosis I:

Answer variants:

a) leptotene, zygotene, pachitene, diplotene, diakinesis;
b) diakinesis, diplotene, pachitene, zygotene, leptotene;
c) leptothene, diakinesis, diplotene, pachitene, zygotene;
d) leptotene, zygotene, diakinesis, diplotene, pahitene;
e) diplotene, pachytene, zygotene, leptotene, diakinesis.

142. In the anaphase of meiosis II occurs:

Answer variants:

a) separation of the homologous chromosomes;
b) chromosome spiralization;
c) separation of the chromatids;
d) crossing over;
e) moving of centrioles to cell poles.

143. In the anaphase of meiosis I occurs:

Answer variants:

a) chromosome spiralization;
b) crossing over;
c) separation of the chromatids;
d) separation of the homologous chromosomes;
e) moving of centrioles to cell poles.

144. At what stage of prophase of meiosis I does crossing-over occurs?

Answer variants:

a) pachitene;
b) leptotene;
c) zygotene;
d) diplotene;
e) diakinesis.

145. The set of chromosomes in Plasmodium sp. is 1n = 12. In human liver cells, it multiplies by schizogony (one of the types of mitosis). How many chromosomes will be in the nucleus of the Plasmodium after schizogony?

Answer variants:

a) 24;
b) 32;
c) 64;
d) 76;
e) 12.

146. According to the rule of Constancy of the number of chromosomes, somatic cells of each species have their own number of chromosomes. The mechanism that maintains the constancy of the number of chromosomes during sexual reproduction of organisms is:

Answer variants:

a) schizogony;
b) amitosis;
c) meiosis;
d) regeneration;
e) reparation.

147. The content of the genetic material in a cell in prophase of meiosis I is:

Answer variants:

a) 2n2chr4c
b) 1n1chr1c
c) 1n2chr2c
d) 2n1chr2c
e) 1n4chr4c

148. The content of genetic material in a cell in prophase of meiosis II is:

Answer variants:

a) 1n1chr1c;
b) 1n2chr2c;
c) 2n1chr2c;
d) 2n2chr4c;
e) 1n4chr4c.

149. The content of genetic material in a cell in telophase of meiosis I is:
Answer variants:
a) 1n1chr1c;
b) 2n1chr2c;
c) 2n2chr4c;
d) 1n4chr4c;
e) 1n2chr2c.

150. The content of genetic material in a cell in telophase of meiosis II is:
Answer variants:
a) 1n2chr2c;
b) 2n1chr2c;
c) 1n1chr1c;
d) 2n2chr4c;
e) 1n4chr4c.

2. SECTION "ONTOGENETIC LEVEL OF THE LIVING THINGS ORGANIZATION"

151. In the family, one of the parents is homozygous for the dominant gene of polydactyly, and the second is healthy (homozygous for the recessive gene). If couple will have children, what of the Mendel's laws will shows up in the inheritance of the trait?
Answer variants:
a) segregation;
b) dominance;
c) independent assortment;
d) gametes purity;
e) linked inheritance.

152. In the family, the father of the child is homozygous for the dominant gene of dark tooth enamel, and the mother has teeth of normal color. What of the Mendel's laws is shows up in the inheritance of the trait?
Answer variants:
a) segregation;
b) incomplete linkage;
c) independent assortment;
d) complete linkage;
e) dominance.

153. Husband and wife have a wide gap between the incisors (dominant trait). Both are heterozygous. If couple will have children, what of the Mendel's laws will shows up in the inheritance of the trait?

Answer variants:

a) dominance;
b) independent assortment;
c) segregation;
d) incomplete linkage;
e) complete linkage.

154. In the family, the child has a wide gap between the incisors (dominant trait). His brother has incisors without the gap. Genotype of brother is:

Answer variants:

a) recessive homozygote;
b) dominant homozygote;
c) heterozygote;
d) diheterozygote;
e) triheterozygote.

155. The couple's daughter has achondroplasia (dwarfism). This anomaly controlled by the dominant gene (A). The girl's brother has normal development. What is the genotype of the brother?

Answer variants:

a) AA;
b) Aa;
c) aa;
d) AaBb;
e) AABB.

156. In the family, both parents are deaf. Deafness of the woman depends on an autosomal recessive gene. Her husband's deafness was formed as a result of taking antibiotics in childhood. Determine the probability of the child birth with deafness, if husband is homozygous for the allele of normal hearing.

Answer variants:

a) 25 %;
b) 50 %;
c) 75 %;
d) 100 %;
e) 0 %.

157. In a family, one of the healthy parents have recessive gene of phenylketonuria. Determine the probability of child birth with phenylketonuria in this family.

Answer variants:

a) 0 %;
b) 25 %;
c) 50 %;
d) 75 %;
e) 100 %.

158. Healthy parents have two sons with phenylketonuria and one healthy daughter. What is the probability that their fourth child will have phenylketonuria?

Answer variants:

a) 0 %;
b) 50 %;
c) 25 %;
d) 75 %;
e) 100 %.

159. Healthy parents have child with phenylketonuria. What are the genotypes of the parents?

Answer variants:

a) AA x AA;
b) AA x Aa;
c) Aa x aa;
d) Aa x Aa;
e) aa x aa.

160. What are the genotypes of the parents if blue-eyed father and brown-eyed mother have 5 children, two of which have blue eyes?

Answer variants:

a) Aa x aa;
b) AA x aa;
c) aa x aa;
d) AA x Aa;
e) Aa x AA.

161. In humans, brown color of eyes is a dominant attribute over blue color. Determine the possible phenotype segregation in F_1 in heterozygous brown-eyed parents:

Answer variants:

a) 100 % brown;

b) 100 % blue;
c) 1 (brown) : 1 (blue);
d) 1 (brown) : 3 (blue);
e) 3 (brown) : 1 (blue).

162. Parents with hemoglobinopathy (disorder with autosomal dominant mode of inheritance) have a healthy son. What are the genotypes of the parents?

Answer variants:

a) the mother is heterozygous for the hemoglobinopathy gene, this gene is absent in the father;
b) both are homozygous for the hemoglobinopathy gene;
c) both are heterozygous for the hemoglobinopathy gene;
d) the father is heterozygous for the hemoglobinopathy gene, this gene is absent in the mother;
e) hemoglobinopathy gene is absent in both parents.

163. Marfan's syndrome can affect many organs, often causing abnormalities in the heart, blood vessels, eyes, bones, and joints. What genetic phenomenon causes the development of symptoms of Marfan's syndrome?

Answer variants:

a) pleiotropy;
b) incomplete dominance;
c) existence of multiple alleles;
d) codominance;
e) complementary genes action.

164. A point mutation of a single gene causes the development of Hartnup disorder. It affects the absorption of the amino acid tryptophan in the intestine and its reabsorption in the renal tubules, which leads to disorders of the digestive and excretory systems. What genetic phenomenon causes the development of symptoms of Hartnup disorder?

Answer variants:

a) complementary genes action;
b) polygeny;
c) codominance;
d) pleiotropy;
e) incomplete dominance.

165. The allele interactions are:

Answer variants:

a) codominance, epistasis;

b) complementary genes action, overdominance;
c) polygeny, complementary genes action;
d) epistasis, incomplete dominance;
e) dominance, overdominance.

166. The gene interactions are:
Answer variants:
a) polygeny, complementary genes action;
b) codominance, epistasis;
c) complementary genes action, overdominance;
d) dominance, overdominance;
e) epistasis, incomplete dominance.

167. A person may have a different degree of development of a hereditary disease. The degree of development of a trait in the realization of a genotype in to phenotype in different environmental conditions is called:
Answer variants:
a) penetrance;
b) expressivity;
c) heredity;
d) mutability;
e) polygeny.

168. Cystinuria is an inherited autosomal recessive disease that is characterized by high concentrations of the amino acid cysteine in the urine in heterozygotes and formation of cystine stones in the kidneys, ureter, and bladder in homozygotes. What genetic phenomenon causes the development of different symptoms in heterozygotes and homozygotes?
Answer variants:
a) complementary genes action;
b) epistasis;
c) incomplete dominance;
d) dominance;
e) codominance.

169. Sometimes clinically healthy people in high-altitude conditions show signs of anemia. When diagnosing, sickle cell erythrocytes are detected in their blood. Determine their genotype.
Answer variants:
a) $X^{C}X^{c}$;

b) SS;
c) I^AI^0;
d) X^cX^c;
e) Ss.

170. The young couple had a child with signs of anemia. The baby died a few hours after birth. The survey revealed that the child's red blood cells have an abnormal sickle shape. What genotype does the child's parents have?

Answer variants:

a) SS x SS;
b) Ss x Ss;
c) X^CX^c x X^cY;
d) X^cX^c x X^cY;
e) I^AI^B x I^AI^0.

171. In a person with an I^AI^B blood group, antigen A and antigen B are simultaneously present in erythrocytes. What genetic phenomenon causes the development of both antigens in erythrocytes?

Answer variants:

a) codominance;
b) complementary genes action;
c) incomplete dominance;
d) polygeny;
e) epistasis.

172. The father has 0 blood group, the mother - AB. Determine the blood groups of their children.

Answer variants:

a) AB;
b) 0, A, B, AB;
c) 0, AB;
d) 0;
e) A, B.

173. Parents with B and 0 blood groups have a child with 0 blood type. What is the probability that the next child will have 0 blood group?

Answer variants:

a) 50 %;
b) 25 %;
c) 0 %;
d) 75 %;
e) 100 %.

174. Parents with B and A blood groups have a child with 0 blood group. What is the probability that the next child will have B blood group?

Answer variants:

a) 0 %;
b) 50 %;
c) 25 %;
d) 75 %;
e) 100 %.

175. Heterozygous parents with B and A blood groups have a child. What is the probability that the child has 0 blood group?

Answer variants:

a) 0 %;
b) 50 %;
c) 75 %;
d) 25 %;
e) 100 %.

176. Heterozygous parents with B and A blood groups have a child. What is the probability that the child has A blood group?

Answer variants:

a) 25 %;
b) 0 %;
c) 50 %;
d) 75 %;
e) 100 %.

177. Heterozygous parents with B and A blood groups have a child. What is the probability that the child has AB blood group?

Answer variants:

a) 0 %;
b) 25 %;
c) 50 %;
d) 75 %;
e) 100 %.

178. The child has AB blood group, his father - B blood group. What is the blood group of the mother?

Answer variants:

a) 0 or B;
b) B or A;
c) AB or 0;

d) AB or B;
e) A or AB.

179. The child has AB blood group, his father - A blood group. What is the blood group of the mother?

Answer variants:
a) 0 or B;
b) A or AB;
c) B or A;
d) AB or B;
e) AB or 0.

180. The child has 0 blood group, his father - A blood group. What is the blood group of the mother?

Answer variants:
a) A, B or AB;
b) AB;
c) 0, A or B;
d) AB or 0;
e) AB or B.

181. The child has A blood group, his father - B blood group. What is the blood group of the mother?

Answer variants:
a) A or AB;
b) 0 or B;
c) B or A;
d) AB or 0;
e) AB or B.

182. A woman with an I (0) Rh- blood group married to a man with an IV (AB) Rh+ blood group. What is the possible blood group in children?

Answer variants:
a) IV (AB) Rh+;
b) IV (AB) Rh-;
c) III (B) Rh+;
d) I (0) Rh+;
e) I (0) Rh-.

183. A woman with III (B) Rh- blood group has a child with II (A) blood group. The child is diagnosed with hemolytic disease of the newborn. The reason is the rhesus factor conflict. What is the blood group of father?

Answer variants:
a) I (0), Rh+;

b) II (A), Rh+;
c) III (B) , Rh+;
d) I (0), Rh-;
e) II (A), Rh-.

184. The girl has 0 blood group, and her sister - AB blood group. What are the blood groups of the parents of these girls?

Answer variants:
a) A (I^AI^0) and B (I^BI^0);
b) A (I^AI^A) and B (I^BI^0);
c) 0 (I^0I^0) and AB (I^AI^B);
d) B (I^BI^0) and AB (I^AI^B);
e) 0 (I^0I^0) and B (I^BI^0).

185. Husband has IV (AB) blood group, and his wife - III (B). The father of the woman has I (0) blood group. Specify the genotype that their children cannot have:

Answer variants:
a) I^AI^B;
b) I^BI^B;
c) I^AI^0;
d) I^BI^0;
e) I^0I^0.

186. In human, one of the variants of tooth enamel color is formed as a result of the incomplete dominance interaction of two alleles of the same gene. How many genotypes and phenotypes form and determine this gene?

Answer variants:
a) 3 genotypes and 4 phenotypes;
b) 4 genotypes and 4 phenotypes;
c) 6 genotypes and 4 phenotypes;
d) 3 genotypes and 3 phenotypes;
e) 6 genotypes and 6 phenotypes.

187. In human, one of the variants of tooth enamel color is formed as a result of the incomplete dominance interaction of two alleles of the same gene. How many phenotypes determine this gene?

Answer variants:
a) 3;
b) 2;
c) 4;
d) 5;
e) 6.

188. Normal hearing of human depends on the presence of two dominant genes in the genotype. Determine the type of gene interaction.

Answer variants:

a) dominance;
b) complementary action;
c) polygeny;
d) codominance;
e) epistasis.

189. Husband and wife are deaf and have DDee and ddEE genotypes. Their children were born with normal hearing. What is the type of interaction of genes D and E?

Answer variants:

a) dominance;
b) epistasis;
c) complementary action;
d) polygeny;
e) overdominance.

190. Parents with I (0) and II (A) blood groups have a child with IV (AB) blood group. What type of allele interaction explains this phenomenon?

Answer variants:

a) epistasis recessive;
b) codominance;
c) polygeny;
d) incomplete dominance;
e) complementary action.

191. The degree of skin pigmentation in humans is controlled by several dominant genes. An increase in the number of these genes in the genotype determines more intense pigmentation. What type of gene interaction explains this phenomenon?

Answer variants:

a) pleiotropy;
b) epistasis;
c) codominance;
d) polygeny;
e) complementary action.

192. The degree of skin pigmentation in humans is polygenic characteristic that controlled by three pairs of unlinked genes. Skin pigmentation in a person with the AABBCC genotype will be:

Answer variants:

a) black (negroid);

b) white (european);
c) yellow (mongoloid);
d) brown (mulatto);
e) white (albino).

193. Milk secretion is determined by polymeric genes. Amount of milk increases with the number of dominant alleles of these genes. What is genotype of a woman with the lack of milk secretion?

Answer variants:

a) $M_1m_1M_2m_2$;
b) $m_1m_1M_2m_2$;
c) $m_1m_1m_2m_2$;
d) $M_1M_1m_2m_2$;
e) $M_1m_1m_2m_2$.

194. Enamel hypoplasia is controlled by the dominant X-linked gene. The woman has normal tooth enamel, and her husband has enamel hypoplasia. Who of the children will have enamel hypoplasia?

Answer variants:

a) only daughters;
b) all children;
c) only sons;
d) half of daughters;
e) half of sons.

195. The father is healthy, the mother suffers from vitamin-D-resistant rickets and she is heterozygous. Who of the children will have this form of rickets if the disease controlled by the dominant X-linked gene.

Answer variants:

a) only daughters;
b) only sons;
c) all children;
d) all children will be healthy;
e) half of all daughters and sons.

196. Vitamin D-resistant form of rickets is determined by the dominant X-linked gene. Determine the genotype of healthy boy in a family where the mother is healthy and the father suffers from vitamin-D-resistant rickets.

Answer variants:

a) AA;
b) X^AY;
c) X^aY;

d) Aa;
e) aa.

197. The woman is healthy, and her husband is diagnosed with a disease controlled by the dominant X-linked gene. Who of the children will manifest this disease?

Answer variants:
a) only daughters;
b) all children;
c) only sons;
d) half of sons;
e) half of daughters.

198. Determine the probability of a boy birth with hemophilia-A in a family where the mother of the child and her parents did not suffer from this disease, and the father of the child has been sick since birth.

Answer variants:
a) 75 % of boys will be sick;
b) equal to 0 %;
c) 50 % of boys will be sick;
d) 25 % of boys will be sick;
e) equal to 100 %.

199. The husband of the woman has hemophilia-B. There were no cases of hemophilia in the woman's family. Determine the risk of child birth with hemophilia-B in the family.

Answer variants:
a) 0 %;
b) 50 %;
c) 75 %;
d) 25 %;
e) 100%.

200. What is the probability of manifestation of color blindness in children if a man has color blindness but in the genotype of his wife this allele is absent?

Answer variants:
a) 25 %;
b) 0 %;
c) 50 %;
d) 75 %;
e) 100 %.

201. The couple are healthy, but the wife's father has hemophilia-A. Who of the children will manifest this disease?

Answer variants:

a) sons and daughters;
b) only daughters;
c) half of daughters;
d) all children;
e) half of sons.

202. What is the genotype of an albino female (albinism is inherited as autosomal recessive attribute) with normal blood clotting and 0 blood group?

Answer variants:

a) $aaI^AI^AX^hX^h$;
b) $aaI^0I^0X^HX^H$;
c) $AaI^AI^0X^HX^H$;
d) $AAI^0I^0X^HX^h$;
e) $AAI^AI^BX^HX^H$.

203. Define the inheritance of hypertrichosis of ears, if the trait is passed from father to sons and occurs in each generation.

Answer variants:

a) Y-linked;
b) autosomal recessive;
c) autosomal dominant;
d) X-linked recessive;
e) X-linked dominant.

204. Determine the probability of a boy birth with hypertrichosis of ears if the father has this trait. The hypertrichosis is controlled by Y-linked gene.

Answer variants:

a) 0 %;
b) 25 %;
c) 35 %;
d) 100 %;
e) 75 %.

205. The father has hypertrichosis, and the mother is healthy. Determine the probability of a child birth with hypertrichosis in this family if hypertrichosis is a Y-linked trait.

Answer variants:

a) 50 %;
b) 25 %;

c) 12,5 %;
d) 6,25 %;
e) 100 %.

206. Very large teeth is a Y-linked trait. The mother has teeth of normal size, and her son has very large ones. Determine the probability of having very large teeth in the father of the child.

Answer variants:
a) 75 %;
b) 50 %;
c) 25 %;
d) 12,5 %;
e) 100 %.

207. The man and his four sons have syndactyly, but his three daughters have normal fingers. Two proband's sisters have normal fingers. The father of proband has syndactyly. What is the mode of inheritance of this trair?

Answer variants:
a) autosomal dominant;
b) Y-linked;
c) autosomal recessive;
d) X-linked dominant;
e) X-linked recessive.

208. What is the preliminary diagnosis can be done to a patient with a karyotype 46, XY and female secondary sexual characteristics?

Answer variants:
a) Down syndrome;
b) poly-X syndrome;
c) Klinefelter syndrome;
d) Morris syndrome;
e) Turner syndrome.

209. In some regions of Belarus, endemic goiter is found due to iodine deficiency in food. What type of diversity shows up this disease?

Answer variants:
a) modificational;
b) mutational;
c) combinative;
d) ontogenetic;
e) correlative.

210. A woman during pregnancy suffered a viral rubella. The child was born with defects — clefted lip and palate. The karyotype of the child is normal. Anomalies of his face are manifestation of:

Answer variants:

a) combinative diversity;
b) polyploidy;
c) chromosomal mutation;
d) aneuploidy;
e) modificational diversity.

211. In the family, a child with phenylketonuria developed normally thanks to early diagnosis and treatment, including diet therapy. His recovery is associated with the following type of diversity:

Answer variants:

a) modificational;
b) combinative;
c) somatic;
d) genotypic;
e) all answers are correct.

212. What type of diversity is related with development of hypoplasia and discoloration of the child's teeth if the mother in the first half of pregnancy took medicine drugs that caused these changes?

Answer variants:

a) combinative;
b) modificational;
c) mutational;
d) hereditary;
e) recombinational.

213. In the family, a boy was born with cleft lip and palate, defects of the cardiovascular system, and microcephaly. Karyotype is 46, XY. It was found that the mother suffered a viral rubella during pregnancy. This pathology of the child can be an example of:

Answer variants:

a) trisomy at 18th chromosome;
b) monosomy;
c) trisomy at 21st chromosome;
d) phenocopy;
e) trisomy at 13th chromosome.

214. In the 50s, the use of thalidomide by pregnant women caused the birth of several thousand children with the absence or underdevelopment of the skeleton of the limbs, face and other defects. What is the name of the factor that caused these anomalies?

Answer variants:

a) teratogenic;
b) carcinogenic;
c) physical;
d) biological;
e) polygenic.

215. The doctor discovered rickets in a child. The rickets manifestation was similar to hereditary D-resistant rickets. What is the name of changes in the phenotype caused by environmental factors that similar to changes caused by mutation?

Answer variants:

a) trisomy;
b) monosomy;
c) genocopy;
d) gene diseases;
e) phenocopy.

216. A woman during pregnancy took synthetic hormones. The newborn girl showed signs similar to adrenogenital syndrome. What is the name of this variation?

Answer variants:

a) mutation;
b) recombination;
c) phenocopy;
d) heterosis;
e) genocopy.

217. In humans, there are three allelic states of the gene which determines the development of blood groups according to the AB0 system. The birth of a child with blood group IV in parents with groups II and III can be explained by the following form of variability:

Answer variants:

a) combinative;
b) phenotypic;
c) mutational;
d) ontogenetic;
e) modificational.

218. Long-term use of certain medical drugs before of pregnancy increases the risk of having a baby with genetic abnormalities. What is the name of this effect of medical drugs?

Answer variants:

a) ontogenetic;
b) mutagenic;
c) oncogenic;
d) embryotoxic;
e) fetotoxic.

219. It is known that a gene that determines the development of blood groups according to the MN system has two allelic states. If the M allele is considered the original, then the allele N appears as a result of:

Answer variants:

a) combination of genes;
b) DNA repair;
c) DNA replication;
d) crossing-over;
e) mutation.

220. One form of rickets is inherited as dominant attribute. This disease may result of:

Answer variants:

a) gene mutation;
b) genome mutation;
c) chromosome mutation;
d) polyploidy;
e) aneuploidy.

221. Specify the type of mutation in DNA in case of T↔G substitution:

Answer variants:

a) translocation;
b) missense;
c) transition;
d) transversion;
e) inversion.

222. Treatment of viral RNA with nitrous acid resulted in a change of the UAA codon to the UGA codon. What is the type of mutation occurred in DNA?

Answer variants:

a) transition;

b) nucleotide deletion;
c) transversion;
d) nucleotide insertion;
e) inversion.

223. As a result of gene mutation (T↔G), there was a replacement of one amino acid in the polypeptide to another. What is the type of mutation?

Answer variants:
a) deletion;
b) duplication;
c) missense;
d) frame shift;
e) translocation.

224. As a result of the action of γ-radiation on the DNA of bacteria, two nucleotides are lost. What is the name of the induced mutation?

Answer variants:
a) duplication;
b) inversion;
c) deletion;
d) translocation;
e) replication.

225. Base substitution mutations can have the following molecular consequence except for:

Answer variants:
a) reading frame changes downstream to the mutant site;
b) codon for one amino acid is changed into stop codon;
c) codon for one amino acid is changed into a codon of another amino acid;
d) codon for one amino acid is changed into termination codon;
e) codon for an amino acid is changed into another codon for same amino acid.

226. Transfer of genetic material in I meiotic division between two non-homologous chromosomes is:

Answer variants:
a) inversion;
b) deletion;
c) insertion;
d) transversion;
e) translocation.

227. The region of the DNA molecule turned 180° as a result of the induced mutation. What is the name of the mutation?

Answer variants:

a) deletion;
b) inversion;
c) duplication;
d) translocation;
e) replication.

228. In humans, the color of the iris of the right and left eyes may be different. What is the mutation causes this form of variability?

Answer variants:

a) generative;
b) heteroploidy;
c) somatic;
d) polyploidy;
e) aneuploidy.

229. After exposure to colchicine, 92 chromosomes were found in human lymphocytes. This mutation is called:

Answer variants:

a) polyploidy;
b) aneuploidy;
c) deletion;
d) inversion;
e) translocation.

230. In human cells, 45 chromosomes are found. This mutation refers to:

Answer variants:

a) polyploidy;
b) deletion;
c) inversion;
d) translocation;
e) aneuploidy.

231. During cytogenetic analysis, 44 chromosomes were found in the cells of an aborted embryo (absence of 1 pair of homologous chromosomes). What is the name of the mutation?

Answer variants:

a) chromosomal aberration;
b) nullisomy;
c) gene (point);

d) deletion;
e) monosomy.

232. Aneuploidy is due to:
Answer variants:
a) mosaicism;
b) deletion;
c) inversion;
d) chromosomal non-disjunction at meiosis;
e) translocation.

233. An analysis of the pedigree found that achondroplasia appears in both sexes with equal frequency and in each generation, both sexes transmit the condition to their offspring, affected offspring have at least one affected parent. What is the mode of inheritance for the achondroplasia?
Answer variants:
a) autosomal dominant;
b) autosomal recessive;
c) X-linked dominant;
d) X-linked recessive;
e) Y-linked.

234. What is the mode of inheritance of achondroplasia (this condition is characterized by diminished growth in the long bones of the arms and legs, leading to dwarfism)?
Answer variants:
a) autosomal recessive;
b) X-linked dominant;
c) X-linked recessive;
d) Y-linked;
e) autosomal dominant.

235. An analysis of the pedigree found that Tay-Sachs disease appears in both sexes with equal frequency and tends to skip generations, affected offspring are usually born in unaffected parents. What is the mode of inheritance for this disease?
Answer variants:
a) autosomal recessive;
b) autosomal dominant;
c) X-linked dominant;
d) X-linked recessive;
e) Y-linked.

236. A child with a high concentration of phenylpyruvic acid in the urine and blood was born in healthy parents. A preliminary diagnosis was made - phenylketonuria. What is the mode of inheritance for this disease?

Answer variants:

a) X-linked recessive;
b) autosomal recessive;
c) autosomal dominant;
d) Y-linked;
e) X-linked dominant.

237. What is the mode of inheritance for cystic fibrosis if this disease appears in both sexes with equal frequency and tends to skip generations, affected offspring are usually born in unaffected parents?

Answer variants:

a) autosomal dominant;
b) X-linked dominant;
c) Y-linked;
d) autosomal recessive;
e) X-linked recessive.

238. An analysis of the pedigree found that familial vitamin D-resistant rickets appears more frequent in females than males and in each generation, affected fathers pass the disease on to all their daughters. What is the mode of inheritance for this disease?

Answer variants:

a) X-linked dominant;
b) autosomal dominant;
c) autosomal recessive;
d) X-linked recessive;
e) Y-linked.

239. Father passes familial vitamin D-resistant rickets to all five their daughters. Mother and two sons are healthy. What is the mode of inheritance for this disease?

Answer variants:

a) autosomal recessive;
b) autosomal dominant;
c) Y-linked;
d) X-linked recessive;
e) X-linked dominant.

240. An analysis of the pedigree found that hypophosphatemia is inherited by sons from affected mother but affected daughters must have either affected mother or affected father. What is the mode of inheritance for this disease?

Answer variants:

a) X-linked recessive;
b) X-linked dominant;
c) autosomal recessive;
d) autosomal dominant;
e) Y-linked.

241. Genetic counseling of the family about hemophilia revealed that the disease manifests only in men, but not in every generation. What is the mode of inheritance for this disease?

Answer variants:

a) X-linked dominant;
b) Y-linked;
c) autosomal dominant;
d) X-linked recessive;
e) autosomal recessive.

242. The couple had a son with hemophilia. Parents are healthy, but the maternal grandfather has hemophilia. Determine the mode of inheritance of hemophilia.

Answer variants:

a) X-linked recessive;
b) autosomal recessive;
c) X-linked dominant;
d) Y-linked;
e) autosomal dominant.

243. Parents have a normal sight, but their child (boy) is diagnosed with color blindness. Maternal grandfather has the same anomaly. Determine the mode of inheritance of color blindness.

Answer variants:

a) X-linked dominant;
b) autosomal recessive;
c) X-linked recessive;
d) autosomal dominant;
e) Y-linked.

244. A boy with Lesch-Nyhan syndrome has healthy parents, but the maternal grandfather is ill. What mode of inheritance is assumed if the syndrome manifests only in males?

Answer variants:

a) X-linked dominant;
b) autosomal recessive;
c) autosomal dominant;
d) Y-linked;
e) X-linked recessive.

245. A man and his son have a hypertrichosis of the ears. This trait was also observed in the father and grandfather of the man. What is the mode of inheritance of hypertrichosis?

Answer variants:

a) Y-linked;
b) X-linked dominant;
c) autosomal recessive;
d) autosomal dominant;
e) X-linked recessive.

246. An analysis of the pedigree found that trait of large teeth is passed from father to all sons and does not skip generations. What is the mode of inheritance of large teeth?

Answer variants:

a) X-linked dominant;
b) Y-linked;
c) autosomal recessive;
d) autosomal dominant;
e) X-linked recessive.

247. What is the concordance of ABO blood groups in monozygotic twins?

Answer variants:

a) 75 %;
b) 50 %;
c) 25 %;
d) 100 %;
e) 0 %.

248. The child has a weak pigmentation of the skin, blond hair, blue eyes. Parents are brunettes. Over the past three months after the birth, the child manifests increased irritability and muscle tone, tremor, and convulsions. The cause of this condition is:

Answer variants:

a) phenylketonuria;

b) galactosemia;
c) glycogenosis;
d) albinism;
e) histidinemia.

249. The newborn has jaundice, vomiting and diarrhea. During the examination, increased liver and spleen was observed. In laboratory studies, galactose and proteins were revealed in urine. What is the most likely diagnosis?

Answer variants:
a) albinism;
b) Down syndrome;
c) phenylketonuria;
d) galactosemia;
e) cystic fibrosis.

250. A child with blond hair and weak pigmentation of the skin has increased muscle tone, convulsions, and mental retardation. What is the method should be used to establish the diagnosis?

Answer variants:
a) cytogenetic;
b) statistic;
c) dermatological;
d) pedigree analysis;
e) biochemical.

251. A child with blond hair and weak pigmentation of the skin has increased muscle tone, convulsions, and mental retardation. For diagnosis, it is necessary to determine in the blood and urine the concentration of:

Answer variants:
a) phenylpyruvate;
b) tryptophan;
c) histidine;
d) leucine;
e) valine.

252. Thanks to the development of medicine, it became possible to assure the normal development of children with certain hereditary diseases with the help of drugs and diet therapy. This refers mainly to:

Answer variants:
a) anemia;
b) phenylketonuria;

c) cystic fibrosis;
d) cystinuria;
e) achondroplasia.

253. The child has reduced pigmentation in the skin, hair, and eyes. The preliminary diagnosis is albinism. What amino acid exchange causes this biochemical disorder?

Answer variants:
a) proline;
b) lysine;
c) alanine;
d) tryptophan;
e) tyrosine.

254. Albinos show sensitivity to the sun light: burns of skin appear. What amino acid exchange causes albinism?

Answer variants:
a) methionine;
b) phenylalanine;
c) tryptophan;
d) glutamine;
e) histidine.

255. A forty year old man paid attention to the darkening of his urine in the air. There were pains in the back and joints. What is the most likely diagnosis?

Answer variants:
a) alkaptonuria;
b) hemolysis;
c) albinism;
d) gout;
e) phenylketonuria.

256. The child's urine is darkening in the air. Homogentisic acid is found in blood and urine. What is the most likely diagnosis?

Answer variants:
a) albinism;
b) galactosemia;
c) cystinuria;
d) alcaptonuria;
e) histidinemia.

257. A forty year old man has ochre pigmentation of skin, eyes, and auricles. An analysis of urine revealed an increased concentration of homogentisic acid. What disease is characterized by the described changes?

Answer variants:

a) phenylketonuria;
b) alcaptonuria;
c) albinism;
d) achondroplasia;
e) cystinuria.

258. The mother noticed a dark urine in a 5-year-old child. The diagnosis is alkaptonuria. Deficiency of what enzyme is observed in this case?

Answer variants:

a) homogentisic acid oxidase;
b) phenylalanine hydroxylase;
c) tyrosinase;
d) oxyphenylpyruvate oxidase;
e) phenylpyruvate decarboxylase.

259. An infant has vomiting, diarrhea, weight loss, jaundice, and enlarged liver and spleen. The diet that excludes lactose improved the child health. What disease is supposed?

Answer variants:

a) galactosemia;
b) cystic fibrosis;
c) phenylketonuria;
d) fructosemia;
e) homocystinuria.

260. The patient was diagnosed with galactosemia. What method was used to diagnose?

Answer variants:

a) cytogenetic;
b) statistic;
c) twin's;
d) genealogical;
e) biochemical.

261. Tay-Sachs disease is a genetic disorder that results in the destruction of nerve cells in the brain and spinal cord, leading to death in early childhood. What metabolic disorder does this disease have?

Answer variants:

a) metal ions;

b) lipids;
c) carbohydrates;
d) amino acids;
e) nucleic acids.

262. In the patient, the accumulation of a significant amount of lipids in the lysosomes is revealed. What disease can cause this changes?

Answer variants:
a) gout;
b) phenylketonuria;
c) Tay-Sachs disease;
d) Wilson disease;
e) galactosemia.

263. Defect of the formation of CNS membranes leads to progressive mental and motor disorders. This is characteristic for inherited disorders of metabolic exchange of:

Answer variants:
a) sphingolipids;
b) neutral fats;
c) fatty acids;
d) cholesterol;
e) proteins.

264. Wilson's disease is a rare inherited disorder that causes copper accumulation in the liver, brain and other vital organs. Defect of what protein causes this disease?

Answer variants:
a) hemoglobin;
b) ceruloplasmin;
c) collagen;
d) fibrillin;
e) immunoglobulin.

265. Biochemical analysis of the patient's blood revealed a decrease in the amount of ceruloplasmin. Concentration of what ions would be increased in the blood?

Answer variants:
a) calcium;
b) phosphorus;
c) potassium;
d) sodium;
e) copper.

266. An infant is mentally retarded, has uncontrollable spasms in arms and legs, a tendency to selfdestructively bit his fingers and lips, and a high concentrations of uric acid in blood. What disease may cause this simptoms?

Answer variants:

a) Lesch-Nyhan syndrome;
b) gout;
c) galactosemia;
d) Wilson's disease;
e) phenylketonuria.

267. The newborn has lens dislocation, arachnodactyly, aortic aneurysm. These traits are typical for:

Answer variants:

a) phenylketonuria;
b) Marfan's syndrome;
c) Wilson's disease;
d) fructosuria;
e) galactosemia.

268. What is the preliminary method of diagnosis of phenylketonuria in newborns?

Answer variants:

a) cytogenetic;
b) statistic;
c) Guthrie test;
d) immunological;
e) biochemical.

269. The newborn has convulsions, vomiting, jaundice, peculiar smell of urine. What method should be used to make an accurate diagnosis in the case of an assumption of a hereditary metabolic disease?

Answer variants:

a) twin's;
b) cytogenetic
c) statistic;
d) dermatoglyphic;
e) biochemical.

270. What substances in the blood should be analysed to reveal paternity?

Answer variants:

a) DNA;
b) mRNA;

c) lipids;
d) tRNA;
e) rRNA.

271. What are genotypes of mother and father in case of Rh-conflict during pregnancy?

Answer variants:

a) mother is Rh+ (homozygote), father is Rh+ (homozygote);
b) mother is Rh+ (homozygote), father is Rh+ (heterozygote);
c) mother is Rh–, father is Rh+ (homozygote);
d) mother is Rh–, father is Rh–;
e) mother is Rh+ (heterozygote), father is Rh+ (homozygote).

272. How does human mitochondrial disoders inherited?

Answer variants:

a) from father only by daughters;
b) from mother only by sons;
c) from both parents to all children;
d) from mother to all children;
e) from father only by sons.

273. What material is used to study of sex chromatin most often?

Answer variants:

a) buccal epithelium;
b) red blood cells;
c) skin epidermis;
d) nerve cells;
e) germ cells.

274. During prenatal diagnosis, one Barr body was found in fetal cells precipitated from amniotic fluid. This indicates about:

Answer variants:

a) the development of a normal male fetus;
b) polyploidy;
c) the development of a normal female fetus;
d) genetic disorders of the fetus;
e) trisomy of 21 chromosome.

275. During prenatal diagnosis, two Barr bodies were found in fetal cells precipitated from amniotic fluid. What disease would be diagnosed in the fetus?

Answer variants:

a) Down syndrome;

b) triple X syndrome;
c) Turner syndrome;
d) Cri-du-chat syndrome;
e) Edwards syndrome.

276. During amniocentesis, 3 Barr bodies were found in fetal cells. What disease would be diagnosed in the fetus?

Answer variants:

a) poly X syndrome;
b) Down syndrome;
c) Turner syndrome;
d) Patau syndrome;
e) Edwards syndrome.

277. Cri-du-chat syndrome is the result of:

Answer variants:

a) duplication of the 5th chromosome region;
b) translocation of the 21st chromosome fragment to the 15^{th} chromosome;
c) deletion on the short arm of the 21st chromosome;
d) inversion of the 21st chromosome region;
e) deletion on the short arm of the 5th chromosome.

278. An infant has characteristic cry, which is similar to that of a meowing kitten, due to problems with the larynx and nervous system. Most likely, the anomaly is caused by:

Answer variants:

a) deletion on the short arm of the 11th chromosome;
b) deletion on the short arm of the 9th chromosome;
c) deletion on the short arm of the 5th chromosome;
d) deletion on the short arm of the 7th chromosome;
e) inversion of the 21st chromosome region.

279. Which of the following is an example of disorders of sex chromosomes?

Answer variants:

a) Klinefelter syndrome;
b) Down syndrome;
c) Marfan's syndrome;
d) Patau syndrome;
e) Edwards syndrome.

280. Deletion on the short arm of the 5th chromosome is characteristic for…….. syndrome.

Answer variants:

a) Down;
b) Cri-du-chat;
c) Kleinfelter;
d) Edwards;
e) Patau.

281. A child has a small chin, slanted eyes, poor muscle tone, a protruding tongue due to a small mouth and relatively large tongue, a flat and wide face, a short neck, excessive joint flexibility, extra space between big toe and second toe, abnormal patterns on the fingertips and short fingers, mental retardation, and congenital heart disease. This child has ……. syndrome.

Answer variants:

a) Edwards;
b) Klinefelter;
c) Down;
d) Patau;
e) Turner.

282. What chromosome changes would cause Down syndrome?

Answer variants:

a) monosomy of the X chromosome;
b) trisomy of the 13th chromosome;
c) trisomy of the X chromosome;
d) trisomy of the 21st chromosome;
e) trisomy of the 18th chromosome.

283. A newborn with congenital heart disease was given a preliminary diagnosis: Down syndrome. What method can be used to confirm this disease?

Answer variants:

a) cytogenetic;
b) twin's;
c) statistic;
d) pedigree analysis;
e) biochemical.

284. A trisomy of the 13th chromosome was found in a newborn with multiple defects of the skull, limbs and internal organs. It is:

Answer variants:

a) Edward syndrome;

b) Klinefelter syndrome;
c) Down syndrome;
d) Patau syndrome;
e) Turner syndrome.

285. Most common chromosomal syndrome is:
Answer variants:
a) Edward;
b) Down;
c) Klinefelter;
d) Patau;
e) Turner.

286. What is the most likely reason of Patau syndrome?
Answer variants:
a) trisomy of the 18th chromosome;
b) trisomy of the 21st chromosome;
c) nondisjunction of sex chromosomes;
d) trisomy of the 13th chromosome;
e) partial monosomy.

287. Trisomy of the 18th chromosome is characteristic for the syndrome:
Answer variants:
a) Edwards;
b) Patau;
c) Down;
d) Klinefelter;
e) Turner.

288. What phenomenon is related to a child birth with trisomy of the 18th chromosome?
Answer variants:
a) effect of teratogenic factors;
b) somatic mutation in the embryo;
c) dominant mutation;
d) chromosomal mutation - duplication;
e) nondisjunction of a pair of chromosomes during gametogenesis.

289. What is the karyotype of a person with Turner syndrome?
Answer variants:
a) 46, XX;
b) 47, XXY;

c) 45, X0;
d) 46, XY;
e) 47, trisomy of the 13th chromosome.

290. The girl was diagnosed with Turner syndrome. What method can be used to confirm this diagnosis?

Answer variants:
a) cytogenetic;
b) dermatoglyphic;
c) twin's;
d) pedigree analysis;
e) biochemical.

291. In Turner syndrome which of the following is NOT seen:

Answer variants:
a) short stature;
b) webbed neck;
c) widely spaced nipples;
d) mental retardation;
e) reproductive sterility.

292. The following clinical group of symptoms was revealed in a young girl: short stature, short and webbed neck, low hairline at the back of the neck, broad chest, reproductive sterility. What is the most likely reason of this pathology?

Answer variants:
a) trisomy of the 18th chromosome;
b) monosomy of the X chromosome;
c) trisomy of the 13th chromosome;
d) trisomy of the 20th chromosome;
e) partial monosomy.

293. During genetic counseling of a woman, the following phenotypic signs were revealed: congenital skin folds on the neck, low-set ears, and wide chest with widely spaced nipples. The most likely diagnosis of the patient is:

Answer variants:
a) Turner syndrome;
b) poly X syndrome;
c) Patau syndrome;
d) Klinefelter syndrome;
e) triple X syndrome.

294. The girl was diagnosed with Turner syndrome. How many pairs of autosomes in somatic cells was revealed in this patient?

Answer variants:

a) 23;
b) 44;
c) 22;
d) 45;
e) 24.

295. Determine the number of Barr bodies that would be found in most interphase nuclei of human somatic cells with a karyotype: 46, XX.

Answer variants:

a) 3;
b) 2;
c) 4;
d) 0;
e) 1.

296. Determine the number of Barr bodies that would be found in most interphase nuclei of human somatic cells with a karyotype: 46, XY.

Answer variants:

a) 0;
b) 3;
c) 2;
d) 4;
e) 1.

297. Determine the number of Barr bodies that would be found in most interphase nuclei of human somatic cells with a karyotype: 47, XXY.

Answer variants:

a) 3;
b) 2;
c) 1;
d) 4;
e) 0.

298. One Barr body is found in the buccal epithelium of a man. What disease is supposed?

Answer variants:

a) Turner syndrome;
b) triple X syndrome;
c) Down syndrome;

d) Klinefelter syndrome;
e) poly X syndrome.

299. During the examination of a 42-year-old man with testicular atrophy, increased breast tissue, weak hair growth on the face and chest, and a 47, XXY karyotype were revealed. These traits indicate about:

Answer variants:
a) Klinefelter syndrome;
b) Down syndrome;
c) Patau syndrome;
d) triple X syndrome;
e) phenylketonuria.

300. Result of the examination of a man is: his height is 189 cm, he has rounded body type with some degree of gynecomastia and absence of facial and body hair; microscopy revealed sex chromatin in 30% of the cells of the buccal epithelium. These traits indicate about:

Answer variants:
a) Down syndrome;
b) trisomy X;
c) Klinefelter syndrome;
d) Patau syndrome;
e) phenylketonuria.

301. The patient is tall, has reduced intelligence and underdevelopment of the primary and secondary sex characteristics. One Barr body is found in most cells of the buccal epithelium. These traits indicate about:

Answer variants:
a) Down syndrome;
b) Patau syndrome;
c) trisomy X;
d) Klinefelter syndrome;
e) phenylketonuria.

302. What is the karyotype of a man if he has three Barr bodies in the most of cells?

Answer variants:
a) 49, XXXXY;
b) 48, XXXY;
c) 45, X;
d) 46, XY;
e) 47, XXY.

303. In the study of the karyotype of a man, two types of cells were found: with chromosome sets 46, XY and 47, XXY. The most likely diagnosis for this patient is:

Answer variants:

a) monosomy X;
b) Klinefelter syndrome;
c) Patau syndrome;
d) Down syndrome;
e) trisomy X.

304. When examining a patient with disturbed reproductive function, the normal karyotype 46, XY was found in some cells, but the karyotype 47, XXY was in most cells. What is the name of this phenomenon?

Answer variants:

a) inversion;
b) transposition;
c) duplication;
d) monomorphism;
e) mosaicism.

305. Klinefelter syndrome occurs:

Answer variants:

a) only in men;
b) only in women;
c) more often in men than in women;
d) more often in women than in men;
e) 50 % men and 50 % women.

306. What investigations should be performed for preliminary diagnosis of Klinefelter syndrome?

Answer variants:

a) pedigree analysis;
b) study of leukocyte formula;
c) study of Rh blood type;
d) study of karyotype;
e) spermatogenesis.

307. Trisomy X is confirmed if in the cell nucleus of woman's buccal epithelium ……. is (are) revealed.

Answer variants:

a) trisomy of the 21^{st} chromosome;
b) 1 Barr body;

c) 2 Barr bodies;
d) trisomy of the Y chromosome;
e) monosomy of the X chromosome.

308. Trisomy X is found in a young woman. How many Barr bodies is characteristic for somatic cells of the woman?

Answer variants:
a) 1;
b) 3;
c) 4;
d) 5;
e) 2.

309. What karyotype confirms the diagnosis of Triple X syndrome?

Answer variants:
a) 47, XXX;
b) 46, XX;
c) 47, XXY;
d) 48, XXYY;
e) 48, XXXY.

310. Inherited human diseases are:

Answer variants:
a) tonsillitis, influenza, and sickle cell anemia;
b) tuberculosis, anemia, and hemophilia;
c) human immunodeficiency syndrome and phenylketonuria;
d) anemia, albinism, and tuberculosis;
e) Down syndrome, Klinefelter syndrome, and color blindness.

311. Examples of human genome mutations:

Answer variants:
a) cri-du-chat syndrome, Klinefelter syndrome, and albinism;
b) Down syndrome, Klinefelter syndrome, and Turner syndrome;
c) albinism, phenylketonuria, and hemophilia;
d) Klinefelter syndrome, Down syndrome, and human immunodeficiency;
e) albinism, Down syndrome, sickle cell anemia, and tuberculosis.

312. Examples of human chromosome mutations:

Answer variants:
a) Klinefelter syndrome, and albinism;
b) Klinefelter syndrome, and Turner syndrome;
c) phenylketonuria and hemophilia;

d) cri-du-chat syndrome;
e) Down syndrome and human immunodeficiency.

313. The main objectives of genetic counseling:

Answer variants:

a) counseling families and patients with hereditary pathology and calculating probabilities that family members might transmit the condition to future generations;
b) counseling families and patients with infectious diseases;
c) calculating probability of chronic non-infectious disease in the family;
d) surgical correction of malformations;
e) counseling on the possible effects of vaccines.

314. Common reasons for prenatal diagnostics: 1) both parents are carriers for a recessive genetic disease, 2) young age of parents, 3) husband and wife are closely related, 4) parents having chronic infectious disease, 5) mother age 35 or older, 6) pregnant woman from a region with increased ionizing radiation:

Answer variants:

a) 2, 3, 5, 6;
b) 1, 3, 4, 5;
c) 1, 3, 5, 6;
d) 1, 2, 5, 6;
e) 2, 4, 5, 6.

315. The method of anthropogenetics used for assessment of influence of heredity and environment on development of traits is called:

Answer variants:

a) pedigree analysis;
b) cytogenetic;
c) dermatoglyphic;
d) biochemical;
e) twin's.

316. The method of anthropogenetics based on tracing of a trait in a series of generations is called:

Answer variants:

a) pedigree analysis;
b) biochemical;
c) cytogenetic;
d) twin's;
e) statistic.

317. Genetic consultation is obligatory at marriage:

Answer variants:

a) pregnant woman from a region with increased ionizing radiation;
b) husband and wife are closely related;
c) all answers are correct;
d) persons know of a genetic disease in the family;
e) mother age 35 or older.

318. Twins are called ……. if the trait is manifested only in one of the pair.

Answer variants:

a) discordant;
b) competitive;
c) concordant;
d) uncomfortable;
e) antagonists.

319. The method of studying of a skin relief on fingers, palms, and feet is called:

Answer variants:

a) twin's;
b) cytogenetic;
c) pedigree analysis;
d) dermatoglyphic;
e) statistic.

320. The method of anthropogenetics used to study the karyotype is called:

Answer variants:

a) biochemical;
b) cytogenetic;
c) pedigree analysis;
d) twin's;
e) statistic.

321. The method of anthropogenetics used to diagnose of metabolic diseases is called:

Answer variants:

a) twin's;
b) biochemical;
c) cytogenetic;
d) dermatoglyphic;
e) statistic.

322. Exclude the wrong answer. Methods of anthropogenetics include:

Answer variants:

a) physiological;
b) dermatoglyphic;
c) twin's;
d) pedigree analysis;
e) cytogenetic.

323. Determination of α-fetoprotein concentration in the amniotic fluid and blood serum of a pregnant woman helps to diagnose some serious fetal malformations. A lower than normal level of α-fetoprotein is observed in case of:

Answer variants:

a) albinism;
b) myopia;
c) Down syndrome;
d) anencephaly;
e) no right answer.

324. Determination of α-fetoprotein concentration in the amniotic fluid and blood serum of a pregnant woman helps to diagnose some serious fetal malformations. A higher than normal level of α-fetoprotein is observed in case of:

Answer variants:

a) albinism;
b) myopia;
c) Down syndrome;
d) anencephaly;
e) no right answer.

325. Chorionic villi sampling is performed at:

Answer variants:

a) 4–5th week of pregnancy;
b) 8–12th week of pregnancy;
c) 5–9th week of pregnancy;
d) 13–17th week of pregnancy;
e) 2–3rd week of pregnancy.

326. Congenital malformations of the digestive system were found in a newborn. This disorder was related with smoking and drinking alcohol by his mother during pregnancy. What of the embryo layers was affected by these teratogens?

Answer variants:

a) endoderm;

b) ectoderm;
c) mesoderm;
d) all embryo layers;
e) endoderm and mesoderm.

327. The periods when the embryo is most sensitive to damage by various agents (chitin, alcohol, viruses (rubella), ionizing radiation) that cause disorders of embryo development are called:

Answer variants:
a) dangerous periods;
b) doubtful periods;
c) critical periods;
d) teratogenic periods;
e) bad periods.

328. What provisional organ performs the function of the first haematogenic organ in the embryo?

Answer variants:
a) placenta;
b) amnion;
c) chorion;
d) allantois;
e) yolk sac.

329. What is the effect of alcohol, that leds to the birth of a child with defects in the physical and mental development?

Answer variants:
a) teratogenic;
b) mutagenic;
c) alcoholic;
d) carcinogenic;
e) mechanical.

330. A woman used alcohol during pregnancy and had a child with a cleft lip and palate. These traits resemble the manifestation of some chromosomal abnormalities. What the process affects the child?

Answer variants:
a) carcinogenesis;
b) mutagenesis;
c) phylogenesis;
d) teratogenesis
e) ontogenesis.

331. Zygote is:
Answer variants:
a) fertilized egg;
b) female gamete;
c) male gamete;
d) embryo;
e) all answers are correct.

332. The process of implanting a fertilized egg into the uterine mucosa is called:
Answer variants:
a) transplantation;
b) ovulation;
c) menstruation;
d) imitation;
e) implantation.

333. What structure is formed as a result of the zygote cleavage?
Answer variants:
a) placenta;
b) blastula;
c) egg;
d) sperm;
e) gastrula.

334. The process that causes the meeting of sperm and egg is:
Answer variants:
a) ovogenesis;
b) copulation;
c) ovulation;
d) insemination;
e) spermatogenesis.

335. Placenta is:
Answer variants:
a) embryo;
b) fertilized egg;
c) organ providing interaction of the mother and fetus;
d) internal embryo layer;
e) zygote.

336. Placenta is formed from:
Answer variants:
a) the tissue of the mother's uterine wall and the fetus' own tissue;

b) the tissue of the mother's uterine wall only;
c) wall of the ovarium;
d) the fetus' own tissue only;
e) all answers are correct.

337. Placenta performs the functions of:
Answer variants:
a) respiration of the fetus;
b) excretory function;
c) nutrition of the fetus;
d) tactile function;
e) nutrition and respiration of the fetus, excretory function.

338. At what week of pregnancy the organogenesis begins in a human embryo?
Answer variants:
a) 1–2nd;
b) 3–4th;
c) 5–6th;
d) 7–8th;
e) 8–9th.

339. From what week of pregnancy a human embryo is called fetus?
Answer variants:
a) 9;
b) 5;
c) 7;
d) 11;
e) 14.

340. The provisional organ forming a cavity filled with fluid is called:
Answer variants:
a) chorion;
b) alveoli;
c) allantois;
d) yolk sac;
e) amnion.

341. The outer embryo layer, which is formed in the early stages of the development of the human embryo, is called:
Answer variants:
a) allantois;

b) alveoli;
c) chorion;
d) amnion;
e) placenta.

342. A newborn was diagnosed with hydrocephaly. This disorder is caused by the influence of teratogenic factors. Which of embryo layers was affected?

Answer variants:

a) endoderm;
b) endoderm and mesoderm;
c) all embryo layers;
d) mesoderm;
e) ectoderm.

343. Difficulties in studying of human genetics:

Answer variants:

a) a large number of chromosomes, late puberty and the impossibility of breeding;
b) a large number of offspring and the possibility of breeding;
c) a small number of chromosomes, a slow change of generations and the impossibility of breeding;
d) rapid change of generations and a large number of offspring;
e) high economic costs.

344. Indirect type of individual development is:

Answer variants:

a) the type of development of organisms whose larvae are similar to the adult organism;
b) the type of development in which a born organism has all organs characteristic of an adult organism;
c) the type of development of organisms whose larvae do not resemble an adult organism;
d) the type of development, which is characterized by binary fission;
e) all answers are correct.

345. Formation of tissues and organs of embryo is called:

Answer variants:

a) organogenesis;
b) cleavage;
c) amitosis;
d) gastrulation;
e) blastula.

346. Excretory system is formed from:
Answer variants:
a) endoderm;
b) ectoderm;
c) mesoderm;
d) a + b;
e) mesogloies.

347. Reproductive system is formed from:
Answer variants:
a) mesoderm;
b) endoderm;
c) ectoderm;
d) a + b;
e) mesogloies.

348. The brain and spinal cord are formed from:
Answer variants:
a) endoderm;
b) mesoderm;
c) ectoderm;
d) a + c;
e) mesogloies.

349. Muscles and all types of connective tissue are formed from:
Answer variants:
a) endoderm;
b) ectoderm;
c) mesogloies;
d) a + d;
e) mesoderm.

350. Direct type of individual development is typical for:
Answer variants:
a) human;
b) beaf tapeworm;
c) large liver fluke;
d) human roundworm;
e) tick.

351. Oogenesis occurs in:
Answer variants:
a) testis;

b) ovarium;
c) uterus;
d) testis, ovarium, uterus;
e) autosomes.

352. In case of girl birth, the primary follicles in her ovaries are:
Answer variants:
a) secondary oocytes;
b) primary oocytes;
c) ovicells;
d) zygotes;
e) future spermatogonia.

353. What cells are formed during oogenesis as a result of meiosis II?
Answer variants:
a) secondary oocyte and first polar body;
b) secondary oocyte and secondary polar bodies;
c) oogonia;
d) secondary oogonia;
e) ovicell and secondary polar bodies.

354. What cells are formed during spermatogenesis as a result of meiosis II?
Answer variants:
a) primary spermatocytes;
b) spermatogonia;
c) secondary spermatocytes;
d) spermatids;
e) secondary spermatogonia.

355. The mammalian sperm consists of:
Answer variants:
a) gonad, neck, tail;
b) head, neck, tail;
c) head, flagellum, neck;
d) gonad, flagellum, neck;
e) heads, acrosome, flagellum.

356. Acrosome function in sperm is:
Answer variants:
a) synthesis of enzymes that dissolve the egg coats at fertilization;
b) energy generation for the movement of flagella and centrioles;

c) synthesis of hormones;
d) a + b;
e) not clear.

357. Periods of spermatogenesis are:
Answer variants:
a) development, reproduction, growth, formation;
b) growth, maturation, formation, development;
c) maturation, development, growth, formation;
d) fertilization, growth, formation, reproduction;
e) reproduction, growth, maturation, formation.

358. What cells are formed during spermatogenesis as a result of meiosis I?
Answer variants:
a) 2 secondary spermatocytes;
b) 2 primary spermatocytes;
c) 4 spermatids;
d) 5 spermatogonia;
e) 2 spermatids.

359. Primary male reproductive cells are called:
Answer variants:
a) primary spermatocytes;
b) spermatids;
c) spermatogonia;
d) secondary spermatocytes;
e) primary spermatogonia.

360. Periods of oogenesis:
Answer variants:
a) development, reproduction, growth;
b) reproduction, growth, maturation;
c) growth, maturation, formation;
d) maturation, formation, development;
e) differentiation, preparation, growth, reproduction.

361. Primary female reproductive cells are called:
Answer variants:
a) secondary oocytes;
b) primary oocytes;
c) third order oocytes;
d) eggs;
e) oogonia.

362. The end of the growth period during oogenesis is the formation of:
Answer variants:
a) primary oocytes;
b) oogonia;
c) secondary oocytes;
d) third-order oocytes;
e) ovicells.

363. One of the forms of asexual reproduction is:
Answer variants:
a) parthenogenesis;
b) hermaphroditism;
c) sporulation;
d) ontogenesis;
e) copulation.

364. The simplest form of asexual reproduction is:
Answer variants:
a) fragmentation;
b) budding;
c) sporulation;
d) binary fission;
e) schizogony.

365. The set of chromosomes in sex cells is called:
Answer variants:
a) diploid;
b) haploid;
c) polyploid;
d) tetraploid;
e) triploid.

366. During oogenesis, in the growth zone of human ovaries occurs:
Answer variants:
a) division of diploid primary oocytes by meiosis;
b) growth of haploid secondary oocytes and their division by mitosis with the formation of an ovicell and polar bodies;
c) division of haploid secondary oocytes by mitosis and their growth;
d) division of haploid secondary oocytes by meiosis II and their growth;
e) growth of diploid oogonia and their transformation into primary oocytes.

367. Sperm function during fertilization is (are):
Answer variants:
a) participation in the formation of embryo layers;

b) accumulation of proteins and ATP for the development of the embryo;
c) bringing of genetic material into the ovicell;
d) energy generation;
e) participation in the formation of amnion.

368. What is the type of individual development in which a born organism has all organs characteristic of an adult organism?

Answer variants:
a) direct development;
b) indirect development;
c) incomplete indirect development;
d) development with metamorphosis;
e) development of larva.

369. Formation of the brain in humans occurs on:

Answer variants:
a) 2nd week of intrauterine development;
b) 3rd week of intrauterine development;
c) 6th week of intrauterine development;
d) 1st week of intrauterine development;
e) 8th week of intrauterine development.

370. Complete differentiation of all organ systems is observed on:

Answer variants:
a) 2nd week of intrauterine development;
b) 3rd week of intrauterine development;
c) 6th week of intrauterine development;
d) 1st week of intrauterine development;
e) 8th week of intrauterine development.

371. From what week of intrauterine development the fetal period begins?

Answer variants:
a) 3rd;
b) 5th;
c) 7th;
d) 9th;
e) 1st.

372. The following changes may appeared in ontogenesis of human: the lung capacity decreased, the blood pressure increased, and atherosclerosis developed. Most likely this period is:

Answer variants:
a) older age;

b) young age;
c) mature age;
d) teenage;
e) youthful.

373. What is the effect of alcohol during embryo development?
Answer variants:
a) mutagenic;
b) teratogenic;
c) carcinogenic;
d) regenerative;
e) toxic.

374. What is the effect of nicotine during embryo development?
Answer variants:
a) embryotoxic;
b) fetotoxic;
c) hepatotoxic;
d) allergenic;
e) teratogenic.

375. What kind of disorders leads to the birth of a child with Down syndrome in older woman (mother age 35 or older)?
Answer variants:
a) blastopathy;
b) embryopathy;
c) non-specific fetopathy;
d) disturbances in meiosis;
e) specific fetopathy.

376. A change of teeth in humans is manifestation of ……. law.
Answer variants:
a) biogenetic;
b) Mendel;
c) Hardy-Weinberg;
d) Vavilov;
e) embryonic induction.

377. What is the period of postembryonic development of human from birth to puberty?
Answer variants:
a) teenage;

b) senile;
c) mature;
d) juvenile;
e) elderly.

378. What is the reason for the development of physiological spinal curves in human?

Answer variants:

a) swimming;
b) upright walking;
c) crawling;
d) sitting;
e) lying.

379. What period of human ontogenesis is characterized by: decreasing of DNA and RNA synthesis in cells, disturbance of protein synthesis, decreasing in mitotic activity?

Answer variants:

a) prereproductive;
b) reproductive;
c) middle age;
d) juvenile;
e) postreproductive.

380. What period of human ontogenesis is characterized by: decreasing in the compact and spongy substances of the bone tissue, appearance of gray hair, loss of skin elasticity?

Answer variants:

a) children;
b) teenage;
c) elderly;
d) mature;
e) youthful.

381. What vital functions a person stop at clinical death?

Answer variants:

a) DNA replication;
b) mobility;
c) self-renewing of cells;
d) heartbeat and respiration;
e) metabolic processes.

382. What is the main histocompatibility complex in human.

Answer variants:

a) HLa;
b) AB0;
c) Rh;
d) MN;
e) mRNA.

383. What is the type of transplantation in which a skin fragment is transplanted between monozygote tweens?

Answer variants:

a) homotransplantation;
b) allotransplantation;
c) autotransplantation;
d) xenotransplantation;
e) syngeneic transplantation.

384. What is the type of transplantation in which embryonic stem cells from the same patient are used?

Answer variants:

a) xenotransplantation;
b) autotransplantation;
c) isotransplantation;
d) heterotransplantation;
e) allotransplantation.

385. What is the type of transplantation in which a skin fragment from one part of the body is transplanted to another part of the body of the same patient?

Answer variants:

a) syngeneic transplantation;
b) allotransplantation;
c) autotransplantation;
d) xenotransplantation;
e) homotransplantation.

3. SECTION
"POPULATION-SPECIES LEVEL OF THE LIVING THINGS ORGANIZATION"

386. What is the genetic characteristic of a population?
Answer variants:
a) sex ratio;
b) gene pool;
c) genetic differences from other populations;
d) gene flow;
e) gene drift.

387. The Hardy-Weinberg low is applied:
Answer variants:
a) for isolated population;
b) in the absence of natural selection;
c) in the absence of the migration;
d) for an ideal population (mating is random, population size is very large, there is no migration between populations, there is no mutation and natural selection);
e) in the presence of panmixia.

388. The Hardy-Weinberg low is enabled to establish:
Answer variants:
a) the frequency of dominant homozygotes only;
b) the genetic structure of the population;
c) the frequency of pathologies;
d) the gene drift;
e) the level of panmixia.

389. A population is a group of:
Answer variants:
a) randomly mating individuals of the same species, long time living in the same territory and relatively isolated from other groups of individuals of this species;
b) randomly mating individuals in a given natural range;
c) individuals of different species, similar in feeding type, living in a particular geographic area;
d) individuals adapted for cohabitation in a homogeneous territory or water area;
e) individuals occupying a certain natural range, having morphological, physiological, genetic, and behavioral similarities.

390. Changes in the genetic structure of populations does not caused by:

Answer variants:

a) migration;
b) mutations;
c) gene drift;
d) random mating;
e) natural selection.

391. If 1 of 10 thousand persons is albino, then the frequency of recessive homozygotes is:

Answer variants:

a) 0,001;
b) 0,01;
c) 0,00001;
d) 0,0001;
e) 10000.

392. If 1 of 10 thousand persons is an albino, then the frequency of the recessive allele is:

Answer variants:

a) 0,01;
b) 0,001;
c) 0,0001;
d) 0,00001;
e) 10000.

393. In accordance with the Hardy-Weinberg law, the ratio of the frequencies of dominant homozygotes (AA), heterozygotes (Aa) and recessive homozygotes (aa) in the absence of evolutionary factors:

Answer variants:

a) may change;
b) may change over several generations;
c) changes in the next generation always;
d) remains without changes;
e) determined by crossover.

394. Hardy-Weinberg equilibrium does not changed by:

Answer variants:

a) gene drift;
b) mutations;
c) panmixia;
d) migration;
e) natural selection.

395. In one of the maternity homes, 250 out of 1000 pregnant women have Rh-conflict. The frequency of recessive allele (Rh-) in this population is:

Варианты ответа

a) 0,5;
b) 0,2;
c) 0,1;
d) 0,4;
e) 0,75.

396. In one of the maternity homes, 250 out of 1000 pregnant women have Rh-conflict. The frequency of dominant allele (Rh+) in this population is:

Answer variants:

a) 0,2;
b) 0,1;
c) 0,4;
d) 0,5;
e) 0,7.

397. In one of the maternity homes, 250 out of 1000 pregnant women have Rh-conflict. The frequency of heterozygotes in this population is:

Answer variants:

a) 0,2;
b) 0,1;
c) 0,4;
d) 0,75;
e) 0,5.

398. Gene drift is:

Answer variants:

a) change in the frequency of alleles caused by natural selection;
b) elimination of pathological genes;
c) random changes in allele frequency;
d) directional change in the allele frequency as a result of breeding;
e) gene flow from one population to another.

399. Gene drift is characteristic for:

Answer variants:

a) large populations that include all typical alleles for this species;
b) small populations where not all alleles typical for this species can be represented;
c) any population in which there are all alleles typical for the species;
d) any population having mutant individuals;
e) large populations with immigration of individuals from a neighboring populations.

400. Gene flow is the exchange of genes between:

Answer variants:

a) different populations of the same species due to the migration of individuals between populations;

b) populations of different species;

c) individuals of the same population during the breeding season;

d) populations of different species living in different soil-ecological conditions;

e) gene flow is the elimination of pathological genes.

401. The bottleneck effect is:

Answer variants:

a) random change in the frequency of alleles due to the establishment of a population by a small number of individuals;

b) random change in the frequency of alleles due to a drastic reduction in population size;

c) changing the locus of the gene in the chromosome;

d) gene exchange between different populations;

e) elimination of pathological genes.

402. The founder effect is:

Answer variants:

a) random change in the frequency of alleles due to the establishment of a population by a small number of individuals;

b) random change in the frequency of alleles due to a drastic reduction in population size;

c) changing the locus of the gene in the chromosome;

d) elimination of pathological genes;

e) gene exchange between different populations.

403. Characteristics of the circulatory system of fishes are:

Answer variants:

a) closed, three-chamber heart;

b) opened, two-chamber heart;

c) closed, no heart;

d) closed, two-chamber heart;

e) four-chamber heart.

404. What pairs of gill arteries form sublingual and maxillary arteries in fishes?

Answer variants:

a) 3 и 4;

b) 6 и 7;
c) 3 и 4;
d) 5 и 6;
e) 1 и 2.

405. Characteristics of the circulatory system of amphibians are:
Answer variants:
a) closed, three-chamber heart;
b) closed, two-chamber heart;
c) closed, no heart;
d) closed, three-chamber heart with an incomplete septum in the ventricle;
e) four chamber heart.

406. Heart chambers of amphibians are:
Answer variants:
a) atrium and two ventricles;
b) two atria and ventricle;
c) atrium and ventricle;
d) two atria and two ventricles;
e) ventricle and atrium.

407. Characteristics of the circulatory system of reptiles are:
Answer variants:
a) closed, three-chamber heart with an incomplete septum in the atrium;
b) closed, no heart;
c) opened, atrium and ventricle;
d) closed, two-chamber heart;
e) closed, three-chamber heart with an incomplete septum in the ventricle.

408. Characteristics of the circulatory system of birds are:
Answer variants:
a) four-chamber heart, right aortic arch;
b) three-chamber heart;
c) three-chamber heart with an incomplete septum in the ventricle;
d) four-chamber heart, left aortic arch;
e) ventricle and atrium.

409. Characteristics of the circulatory system of mammals are:
Answer variants:
a) three-chamber heart;
b) three-chamber heart with an incomplete septum in the ventricle;
c) four-chamber heart, left aortic arch;

d) four-chamber heart, right aortic arch;
e) ventricle and atrium.

410. What pair of arterial arches forms carotid arteries in mammals?
Answer variants:
a) 2;
b) 1;
c) 4;
d) 5;
e) 3.

411. How many pairs of arterial arcs are formed in embryo of vertebrates?
Answer variants:
a) 6–7;
b) 8–9;
c) 10–11;
d) 12–24;
e) 4–5.

412. In what class of vertebrate animals a double circulatory system appears during evolution at first time?
Answer variants:
a) fishes;
b) amphibians;
c) birds;
d) reptiles;
e) mammals.

413. In mammals, the systemic circulation starts from:
Answer variants:
a) the right ventricle to the pulmonary artery;
b) the right atrium;
c) the left atrium;
d) the left ventricle to the right aortic arch;
e) the left ventricle to the left aortic arch.

414. Types of vertebrate kidney are:
Answer variants:
a) pronephros, mesonephros, and metanephros;
b) prekidney, pronephros, and metanephros;
c) primary kidney, mesonephros, and metanephros;

d) pronephros, secondary kidney, and metanephros;
e) primary kidney, secondary kidney, and metanephros.

415. The metanephros type of kidney functioned in adult state of:
Answer variants:
a) amphibians and reptiles;
b) amphibians, reptiles and mammals;
c) reptiles, birds and mammals;
d) fishes and amphibians;
e) fishes only.

416. The mesonephros type of kidney functioned in adult state of:
Answer variants:
a) amphibians and reptiles;
b) reptiles, birds and mammals;
c) amphibians, reptiles and mammals;
d) fishes only;
e) fishes and amphibians.

417. The prekidney functioned in the postembryonic period of:
Answer variants:
a) lancelets;
b) amniotes;
c) amphibians;
d) anamniotes;
e) reptiles.

418. The primary kidney functioned in the postembryonic period of:
Answer variants:
a) mollusks;
b) anamniotes;
c) lancelets;
d) amniotes;
e) arthropods.

419. The secondary kidney functioned in the postembryonic period of:
Answer variants:
a) anamniotes;
b) lancelets;
c) arthropods;
d) amniotes;
e) mollusks.

420. The glomerulus of capillaries of the secondary kidney is located in:
Answer variants:
a) Bowman's capsule;
b) the wall of Wolf's duct;
c) nephropore;
d) nephrostome;
e) the wall of Muller's duct.

421. The duct of the prekidney is called:
Answer variants:
a) Sylvius aqueduct;
b) Muller's;
c) Wolf's;
d) Botalli;
e) Morgan's.

422. The oviduct of vertebrates is formed from:
Answer variants:
a) nephrostome of primary kidney;
b) Wolf's duct;
c) nephrostome of prekidney;
d) Muller's duct;
e) Muller's and Wolf's ducts.

423. The function of the Wolf's duct in male of anamniotes is:
Answer variants:
a) ureter;
b) sperm duct;
c) a canal connecting testicle and sperm duct;
d) seminal receptacle;
e) ureter and sperm duct.

424. The function of the Wolf's duct in male of amniotes is:
Answer variants:
a) sperm duct;
b) ureter;
c) ureter and sperm duct;
d) a canal connecting testicle and sperm duct;
e) seminal receptacle.

425. The function of the Wolf's duct in female of anamniotes is:
Answer variants:
a) sperm duct;

b) ureter;
c) oviduct;
d) uterus;
e) reduced.

426. The function of the Wolf's duct in female of amniotes is:
Answer variants:
a) ureter;
b) sperm duct;
c) oviduct;
d) reduced;
e) uterus.

427. The function of the Muller's duct in male of amniotes is:
Answer variants:
a) reduced;
b) ureter;
c) sperm duct;
d) oviduct;
e) uterus.

428. The function of the Muller's duct in female of anamniotes is:
Answer variants:
a) ureter;
b) sperm duct;
c) kidney;
d) reduced;
e) oviduct.

429. The function of the Muller's duct in female of amniotes is:
Answer variants:
a) ureter;
b) sperm duct;
c) oviduct;
d) kidney;
e) reduced.

430. The function of the Muller's duct in male of anamniotes is:
Answer variants:
a) reduced;
b) ureter;
c) sperm duct;

d) oviduct;
e) uterus.

431. Mammalian oviduct differentiate into:
Answer variants:
a) ovaries, fallopian tubes, and uterus;
b) fallopian tubes, oviducts, and uterus;
c) ovaries and fallopian tubes;
d) oviducts and uterus;
e) fallopian tubes, uterus, and vagina.

432. Principal divisions of the brain are:
Answer variants:
a) forebrain, diencephalon, and hindbrain;
b) forebrain, midbrain, and hindbrain;
c) forebrain, midbrain, and myelincephalon;
d) telencephalon, diencephalon, and myelincephalon;
e) forebrain and diencephalon.

433. The first and second brain ventricles are located in:
Answer variants:
a) big hemispheres of telencephalon;
b) telencephalon and diencephalon;
c) diencephalon and mesencephalon;
d) telencephalon and mesencephalon;
e) diencephalon.

434. Type of a brain in fishes is:
Answer variants:
a) mammalian;
b) zauropsydic;
c) ichtiopsydic;
d) amphipsydic;
e) heteropsydic.

435. Type of a brain in mammals is:
Answer variants:
a) zauropsydic;
b) mammalian;
c) ichtiopsydic;
d) amphipsydic;
e) heteropsydic.

436. Type of a brain in reptiles is:

Answer variants:

a) zauropsydic;
b) mammalian;
c) ichtiopsydic;
d) amphipsydic;
e) heteropsydic.

437. The highest center of nervous activity in the ichtiopsydic type of a brain is:

Answer variants:

a) diencephalon;
b) striated bodies of telencephalon;
c) cortex of telencephalon;
d) there is no right answer;
e) mesencephalon.

438. The highest center of nervous activity in the zauropsydic type of a brain is:

Answer variants:

a) mesencephalon;
b) diencephalon;
c) archicortex of telencephalon;
d) striated bodies of telencephalon;
e) cerebellum.

439. The highest center of nervous activity in the mammalian type of a brain is:

Answer variants:

a) cortex of telencephalon;
b) mesencephalon;
c) forebrain;
d) diencephalon;
e) cortex of mesencephalon.

440. The function of fish's telencephalon is:

Answer variants:

a) optic center;
b) center of highest nervous activity;
c) hearing center;
d) olfactory center;
e) taste center.

441. The highest center of nervous activity in reptiles is:

Answer variants:

a) cortex of telencephalon;

b) mesencephalon;

c) diencephalon;

d) hearing center;

e) striated bodies of telencephalon.

442. One of the directions of the evolution of the vertebrate brain is an increase of the cortex surface of telencephalon due to:

Answer variants:

a) appearance of convolutions;

b) growth of striated bodies;

c) growth of the hippocampus;

d) growth of the brain roof;

e) growth of the cerebellum.

443. Malformations of the human brain related with evolution are:

Answer variants:

a) microcephaly, Marfan's syndrome;

b) microcephaly, anencephaly;

c) microcephaly, encephalitis;

d) cryptorchidism;

e) Fallot tetrad, hydrocephaly.

444. Amphibian skin is:

Answer variants:

a) dry, has scales;

b) with well developed epidermis and dermis, well-developed subcutaneous fatty tissue;

c) contains placoid scales covered with a layer of enamel, rich in mucous glands;

d) thin, has single-layer epidermis, contains a large number of single-cellar mucous glands;

e) thin, smooth, contains a large number of multicellular mucous glands.

445. What aromorphosis is observed in amniotes?

Answer variants:

a) replacement of the mucous epidermis with a dry keratanized epidermis;

b) reducing of the dermis;

c) reducing the number of mucous glands;

d) formation of the dermis with dense rows of collagen and elastic fibers;

e) change in the dermis/epidermis ratio to the epidermis prevalence side.

446. In what class of vertebrates there are no skin glands but develops horny scales?

Answer variants:

a) amphibians;
b) reptiles;
c) cartilage fish;
d) birds;
e) mammals.

447. Appendages of keratanized layer of epidermis are:

Answer variants:

a) claws and odorous glands;
b) claws and coracoid;
c) sebaceous and milk glands;
d) scales and claws;
e) single-celled mucous glands and horny scales.

448. Malformations of the human skin that related with evolution are:

Answer variants:

a) lack of sweat glands and ichthyosis;
b) thick layer of subcutaneous fat;
c) thin layer of subcutaneous fat;
d) anencephaly and ichthyosis;
e) Fallot triad.

449. Subdivisions of axial skeleton of fishes are:

Answer variants:

a) cervical, body's, sacral and tail segments;
b) ribs and spine, consisting of three segments;
c) cervical, thoracic, lumbar, sacral, and tail segments;
d) cervical, body's and tail segments;
e) body's and tail segments.

450. Subdivisions of axial skeleton of amphibians are:

Answer variants:

a) body's and tail segments;
b) cervical, body's, sacral and tail segments;
c) body's, sacral, and tail segments;
d) cervical, thoracic, lumbar, sacral, and tail segments;
e) cervical, thoracic, body's, lumbar, sacral, and tail segments.

451. Subdivisions of axial skeleton of mammals are:

Answer variants:

a) cervical, body's, sacral and tail segments;

b) body's, sacral, and tail segments;
c) body's and tail segments;
d) cervical, thoracic, lumbar, sacral, and tail segments;
e) cervical, thoracic, body's, lumbar, sacral, and tail segments.

452. Malformations of the human axial skeleton related with evolution are:
Answer variants:
a) additional cervical and lumbar ribs;
b) tail and cleft palate;
c) lumbar ribs and polydactyly;
d) neck ribs and osteochondrosis;
e) tail and syndactyly.

453. The direction of evolution of the axial skeleton of the vertebrates are: 1) replacement of the chord with cartilageous and then to a bone skeleton; 2) division of the axial skeleton into subdivisions (from 2 to 5); 3) increasing in the number of vertebrae in the subdivisions; 4) evolution from a fin to a five-toed limb; 5) increasing the mobility of the joints of the limbs with their girdles; 6) formation of the chest.
Answer variants:
a) 1, 3, 5, 6;
b) 1, 3, 4, 5;
c) 1, 2, 3, 6;
d) 1, 2, 4, 5;
e) 1, 3, 4, 6;

454. The direction of evolution of the skull of the vertebrates are: 1) merging of the facial skeleton with cranium; 2) replacement of the cartilageous skull to bone skull; 3) increasing in the volume of the forebrain; 4) mobile connection of the skull with the spinal column; 5) increasing in the number of bones of the skull; 6) reducing the number of bones of the skull due to their merging.
Answer variants:
a) 1, 5, 6, 2;
b) 1, 2, 4, 6;
c) 1, 2, 3, 5;
d) 1, 2, 3, 6;
e) 1, 5, 2, 4.

455. Malformations of the human skull related with evolution are:
Answer variants:
a) ichthyosis, hypertrichosis, cleft palate;

b) adentia (absence of teeth), anencephaly;
c) cryptorchidism, microcephaly;
d) hydrocephalus, absence of chin, ichthyosis;
e) adentia (absence of teeth), microgenia (underdevelopment of lower jaw), cleft palate.

456. The direction of evolution of the digestive system of the vertebrates are: 1) digestive tube differentiation; 2) development of digestive glands; 3) differentiation of teeth; 4) appearance of the posterior intestine; 5) appearance of the oral apparatus; 6) increasing of the absorption surface of the intestine.

Answer variants:
a) 1, 2, 3, 6;
b) 1, 2, 5, 6;
c) 1, 2, 4, 5;
d) 1, 2, 3, 5;
e) 1, 3, 4, 6.

457. What are characteristics of the homodont teeth system?

Answer variants:
a) all of the teeth are not of the same shape;
b) there are no teeth;
c) there are no teeth in the upper jaw, but present in the lower jaw;
d) all of the teeth are of the same shape;
e) in the upper jaw all of the teeth are not of the same shape, and in the lower jaw — have the same shape.

458. The digestive system of bone fish is represented by: 1) large intestine; 2) stomach; 3) small intestine; 4) salivary glands; 5) cecum; 6) cloaca; 7) esophagus.

Answer variants:
a) 7, 2, 4, 5; 6;
b) 7, 2, 3, 1, 6;
c) 4, 1, 2, 5, 6;
d) 4, 1, 2, 3, 6;
e) 4, 7, 2, 3, 5; 6.

459. For the first time, ……. appeared in evolution of reptiles.

Answer variants:
a) small and large intestine;
b) pancreas and tongue;
c) esophagus and intestines;

d) differentiation of the teeth and cecum;
e) molars and anus.

460. Malformations of the human digestive system related with evolution are:
Answer variants:
a) esophagus fistulas in the neck and homodont teeth system;
b) appendix and additional liver lobes;
c) cloaca and molars;
d) homodont teeth system and appendix;
e) cryptorchidism.

461. The direction of evolution of the respiratory system of the vertebrates are: 1) from the lungs of the alveolar structure to the lungs of the cellular structure; 2) development and differentiation of the respiratory pathways; 3) from the gills to the lungs of the alveolar structure; 4) increasing of the respiratory surface of the lungs; 5) formation of the chest; 6) appearance of the oral apparatus.
Answer variants:
a) 2, 3, 4, 6;
b) 1, 3, 4, 5;
c) 1, 2, 3, 5;
d) 2, 3, 4, 5;
e) 1, 3, 5, 6.

462. The respiratory system of amphibians includes:
Answer variants:
a) alveoli and laryngeal-tracheal chamber;
b) lungs of the cell structure and laryngeal-tracheal chamber;
c) spongy lungs and tracheal chamber;
d) trachea, bronchi and lungs of the alveolar structure;
e) sacciform lungs and laryngeal-tracheal chamber.

463. For the first time, bronchi appeared in the evolution of class:
Answer variants:
a) reptiles;
b) amphibians;
c) fishes;
d) birds;
e) mammals.

464. The respiratory system of mammals includes:
Answer variants:
a) sacciform lungs and laryngeal-tracheal chamber;

b) trachea, bronchi and lungs of the alveolar structure;
c) lungs of the cell structure and laryngeal-tracheal chamber;
d) alveoli and laryngeal-tracheal chamber;
e) lungs of the alveolar structure and gills in aquatic mammals.

465. Malformations of the human respiratory system related with evolution are:

Answer variants:
a) sacciform or cellular lungs;
b) preservation of Botalli duct;
c) bronchopneumonia and tuberculosis;
d) hypoplasia of lungs or its lobe, athresia of trachea;
e) preservation of mesonephros.

4. SECTION "BIOSPHERE-BIOGEOCENOTIC LEVEL OF THE LIVING THINGS ORGANIZATION"

466. What parasite causes dysentery?

Answer variants:
a) *Entamoeba histolytica;*
b) *Balantidium coli;*
c) *Trichomonas hominis;*
d) *Giardia lamblia*;
e) *Entamoeba gingivales*.

467. What is directions of the prevention of human parasitic diseases in the natural foci?

Answer variants:
a) eradication of the vector;
b) biogeocenosis alteration;
c) human personal protection;
d) eradication of reservoir hosts;
e) limiting of the natural range of a parasite.

468. What form of Entamoeba histolytica can not be detected in the liquid feces of a patient with acute amebiasis?

Answer variants:
a) cysts;
b) big vegetative form;

c) small vegetative form;
d) any form;
e) tissue form.

469. The most common site for amebiasis is:
Answer variants:
a) cecum;
b) sigmoid colon;
c) transverse colon;
d) liver;
e) small intestine.

470. What protozoa with 4 nuclei cysts become detected in a patient with chronic colitis (inflammation of the large intestine)?
Answer variants:
a) *Entamoeba coli*;
b) *Entamoeba histolytica*;
c) *Entamoeba gingivales*;
d) *Toxoplasma gondii*;
e) *Balantidium coli*.

471. What is the chain of stages during life cycle of dysentery amoeba?
Answer variants:
a) forma minuta, tissue form, cyst, forma magna;
b) tissue form, forma magna, forma minuta, cyst;
c) cyst, tissue form, forma magna, forma minuta, cyst;
d) cyst, forma minuta, forma magna, tissue form;
e) forma magna, forma minuta, cyst, tissue form.

472. What protozoal disease causes appearance of bloody diarrhea more than once per day?
Answer variants:
a) amebiasis;
b) leishmaniasis;
c) trypanosomiasis;
d) trichomoniasis;
e) malaria.

473. What protozoal disease can cause liver abscesses in humans?
Answer variants:
a) trypanosomiasis;
b) leishmaniasis;

c) malaria;
d) amebiasis;
e) toxoplasmosis.

474. A microscopic examination of the feces of a clinically healthy person revealed round cysts with four nuclei. What is the Latin name of protozoa, cysts of which are revealed in the asymptomatic carrier?

Answer variants:

a) *Trypanosoma gambiense*;
b) *Leishmania tropica*;
c) *Trichomonas hominis*;
d) *Plasmodium falciparum*;
e) *Entamoeba histolytica*.

475. What is the species of kingdom Protista can asymptomatically parasitize in a human?

Answer variants:

a) *Entamoeba histolytica*;
b) *Giardia lamblia*;
c) *Entamoeba coli*;
d) *Trichomonas hominis*;
e) *Balantidium coli*.

476. What protozoal disease is characterized by the presence in the human feaces vegetative forms of parasite with short pseudopodia and with phagocytosed erythrocytes inside?

Answer variants:

a) leishmaniasis;
b) trichomoniasis;
c) amebiasis;
d) giardiasis;
e) toxoplasmosis.

477. Typical symptoms of amebiasis are:

Answer variants:

a) bloody diarrhea, abdominal pain, general intoxication;
b) pain in the left hypochondrium and hypersomnia;
c) headache and hypersomnia;
d) burning sensation in urogenital ways and headache;
e) general intoxication, fever, enlarged liver and spleen.

478. What species of kingdom Protista is characterized by the following morphological traits: large cells with one nucleus and with phagocytosed erythrocytes?

Answer variants:

a) *Balantidium coli;*

b) *Toxoplasma gondii;*

c) *Giardia lamblia;*

d) *Trypanosoma gambiense;*

e) *Entamoeba histolytica.*

479. What is the species of kingdom Protista can cause inflammation of the oral mucosa?

Answer variants:

a) *Entamoeba histolytica*;

b) *Entamoeba gingivales;*

c) *Entamoeba coli;*

d) *Trichomonas hominis;*

e) *Giardia lamblia.*

480. What is protozoan of class Sarcodina can parasitize in the carious cavities of the teeth?

Answer variants:

a) *Entamoeba coli;*

b) *Entamoeba histolytica;*

c) *Amoeba proteus;*

d) *Entamoeba gingivalis;*

e) *Giardia lamblia.*

481. What is the species of kingdom Protista (size 6–30 μm, with single nucleus and pseudopodia) parasitize in the gum pockets?

Answer variants:

a) *Entamoeba gingivalis;*

b) *Entamoeba histolytica;*

c) *Trichomonas hominis;*

d) *Toxoplasma gondii;*

e) *Balantidium coli.*

482. Specify the species of kingdom Protista that can cause complications at dental diseases.

Answer variants:

a) *Entamoeba histolytica;*

b) *Entamoeba coli;*

c) *Balantidium coli;*
d) *Trichomonas hominis;*
e) *Entamoeba gingivalis.*

483. What is the single-celled organism (Protozoa) can be found in plaque?

Answer variants:
a) *Giardia lamblia*;
b) *Entamoeba gingivalis*;
c) *Trichomonas hominis*;
d) *Entamoeba histolytica*;
e) *Entamoeba coli.*

484. What protozoal disease is characterized by the presence in the duodenal contents vegetative forms of pear-shaped parasite with four pairs of flagella and two nuclei?

Answer variants:
a) visceral leishmaniasis;
b) trichomoniasis;
c) toxoplasmosis;
d) giardiasis;
e) malaria.

485. What is the species of protozoa a pear in shape with four pairs of flagella and two nuclei in front part of the body?

Answer variants:
a) *Giardia lamblia*;
b) *Entamoeba histolytica*;
c) *Trichomonas hominis*;
d) *Entamoeba coli*;
e) *Balantidium coli*.

486. Characteristic symptoms of giardiasis are:

Answer variants:
a) pain in the left hypochondrium;
b) headache and sleepiness;
c) burning sensation in the urinary tract;
d) general intoxication, fever, enlarged liver and spleen;
e) malabsorption, abdominal pain, nausea, diarrhea.

487. A patient presents with diarrhoea. Analysis of stool on wet mount shows mobile protozoa with two nuclei. What is the species of protozoa?

Answer variants:
a) *Toxoplasma gondii*;

b) *Leishmania tropica*;
c) *Giardia lamblia*;
d) *Trichomonas vaginalis*;
e) *Trypanosoma cruzi*.

488. What protozoal disease is characterized by the presence in the duodenal contents of the patient the pear-shaped protozoa, with two nuclei and several flagella?

Answer variants:
a) giardiasis;
b) balantidiasis;
c) amebiasis;
d) trichomoniasis;
e) toxoplasmosis.

489. What diagnosis can be made if a laboratory study of the duodenal contents revealed pear-shaped protozoa with two nuclei and 4 pairs of flagella? At the same time the laboratory study of feaces revealed oval cysts with four nuclei.

Answer variants:
a) amebiasis;
b) giardiasis;
c) toxoplasmosis;
d) intestinal trichomoniasis;
e) balantidiasis.

490. Microscopic examination of skin sores revealed oval, without flagella, single-celled organisms. What preliminary diagnosis would be supposed in the patient?

Answer variants:
a) visceral leishmaniasis;
b) trypanosomiasis;
c) toxoplasmosis;
d) cutaneous leishmaniasis;
e) balantidiasis.

491. Unicellular, without flagella organisms are found on the patient's face during laboratory examination of the material from the bottom of sores. What is the most likely diagnosis in the patient?

Answer variants:
a) cutaneous leishmaniasis;
b) trypanosomiasis;

c) toxoplasmosis;
d) scabies;
e) myiasis.

492. What disease would be suspected in a person who came from Central Asia with skin sores with a raised edge and central crater?

Answer variants:
a) myiasis;
b) demodicosis;
c) trypanosomiasis;
d) cutaneous leishmaniasis;
e) scabies.

493. What disease is characterized by the appearance of diffuse skin lesions after a person being bitten by sandflies?

Answer variants:
a) cutaneous leishmaniasis;
b) myiasis;
c) demodicosis;
d) toxoplasmosis;
e) scabies.

494. What is the way of infection with cutaneous leishmaniasis?

Answer variants:
a) airborne;
b) contact;
c) transdermal;
d) oral;
e) transmissional.

495. For what species of parasitic protozoa sandflies are vector?

Answer variants:
a) *Leishmania tropica major;*
b) *Balantidium coli;*
c) *Plasmodium falciparum;*
d) *Trypanosoma cruzi;*
e) *Toxoplasma gondii*.

496. For the prevention of what protozoal disease is it necessary to vaccinate a person?

Answer variants:
a) toxoplasmosis;

b) cutaneous leishmaniasis;
c) malaria;
d) trypanosomiasis;
e) urogenital trichomoniasis.

497. What disease would be suspected in child 10-14 years of age (living in tropical Africa) if it is accompanied by non-periodic fevers, exhaustion, anemia, an enlarged liver and spleen, and symptoms are appered after being bitten by sandflies?

Answer variants:
a) balantidiasis;
b) toxoplasmosis;
c) sleeping sickness;
d) visceral leishmaniasis;
e) Chagas disease.

498. What protozoal disease is characterized by the following symptoms: an enlarged liver, spleen, and peripheral lymph nodes?

Answer variants:
a) visceral leishmaniasis;
b) balantidiasis;
c) amebiasis;
d) toxoplasmosis;
e) giardiasis.

499. What is the group of diseases caused by human-specific parasites?

Answer variants:
a) transmissive;
b) zoonotic;
c) infectious;
d) multifactorial;
e) anthroponotic.

500. What single-cell organisms are found in vaginal and urethral secretions? The protozoa have a pear-shape with a spike in posterior end of the cell, a large nucleus in anterior end, and an undulating membrane.

Answer variants:
a) *Trichomonas hominis;*
b) *Balantidium coli;*
c) *Trichomonas vaginalis;*
d) *Trypanosoma gambiense;*
e) *Giardia lamblia.*

501. The characteristic symptoms of urogenital trichomoniasis are:

Answer variants:

a) abdominal pain, nausea, diarrhea;
b) pain in the left hypochondrium;
c) headache and sleepness;
d) general intoxication, fever, enlarged liver and spleen;
e) vaginitis with a purulent discharge.

502. What disease is caused by protozoa detected in the vaginal smear? Parasites have oval-pear shape, with flagella and undulating membrane.

Answer variants:

a) urogenital trichomoniasis;
b) giardiasis;
c) intestinal trichomoniasis;
d) toxoplasmosis;
e) balantidiasis.

503. What is the species of protozoa with size up to 30 mμ, oval in shape, with 4 flagella, undulating membrane, nucleus, vacuoles, and axostyle?

Answer variants:

a) *Balantidium coli;*
b) *Trichomonas vaginalis*;
c) *Giardia lamblia*;
d) *Trypanosoma gambiense*;
e) *Toxoplasma gondii*.

504. Specify the place of localization of Trichomonas hominis in the human body.

Answer variants:

a) small intestine;
b) duodenum;
c) prostate;
d) large intestine;
e) vagina.

505. Specify the invasive stage of the agent of toxoplasmosis.

Answer variants:

a) sporozoite;
b) cyst;
c) pseudocyst;
d) merozoite;
e) sporocyst.

506. Do the epidemiological risk of antelope from Africa brought to zoo of Europe if Trypanosoma brucei gambiense detected in their blood?

Answer variants:

a) risk only to humans;
b) risk to pets and humans
c) risk to other antelopes;
d) there is no epidemiological risk;
e) risk only to predators.

507. What method of laboratory diagnosis should be used to determine the agent of the sleeping sickness?

Answer variants:

a) urine analysis;
b) fecal smear microscopy;
c) blood smear microscopy;
d) ulcer scraping;
e) muscle biopsy.

508. What disease is caused by protozoa with curved body that is narrowed on both ends, length 15-40 mμ, with an oval nucleus in the middle part, undulating membrane, and flagellum?

Answer variants:

a) sleeping sickness;
b) toxoplasmosis;
c) giardiasis;
d) urogenital trichomoniasis;
e) visceral leishmaniasis.

509. What species of protozoa causes the Chagas disease?

Answer variants:

a) *Trypanosoma brucei;*
b) *Leishmania tropica;*
c) *Toxoplasma gondii;*
d) *Leishmania donovani;*
e) *Trypanosoma cruzi.*

510. What insect is a vector for the agent of the Chagas disease?

Answer variants:

a) tsetse fly;
b) kissing bug;
c) mosquito;
d) bed bug;
e) sandfly.

511. What stage of Plasmodium would be found in the patient's blood, if patient has fever, chills, headache, weakness?

Answer variants:

a) sporocysts;
b) ookinetes;
c) oocysts;
d) merozoites;
e) micro- or macrogametes.

512. What laboratory test is done to confirm the diagnosis of malaria?

Answer variants:

a) blood smear microscopy;
b) leukocytes study;
c) muscle biopsy;
d) fecal smear microscopy;
e) examination of lymph node punctate.

513. What protozoal disease would be suspected in the person if he suffered a fever after 14 days of blood transfusion?

Answer variants:

a) toxoplasmosis;
b) leishmaniasis;
c) amebiasis;
d) trypanosomiasis;
e) malaria.

514. Characteristic symptoms of malaria are:

Answer variants:

a) periodic fever, chills, headache, weakness;
b) pain in the left hypochondrium;
c) abdominal pain, nausea, diarrhea;
d) abdominal pain, sleepness, exhaustion;
e) vaginitis with a purulent discharges.

515. What is the causative agent of the disease, if the patient has fever and chills every 48 hours?

Answer variants:

a) *Plasmodium malaria;*
b) *Trypanosoma brucei;*
c) *Plasmodium vivax;*
d) *Leishmania tropica;*
e) *Toxoplasma gondii.*

516. What is the causative agent of the disease, if the patient has fever and chills every 72 hours?

Answer variants:

a) *Leishmania tropica*;
b) *Plasmodium malaria*;
c) *Trypanosoma brucei*;
d) *Plasmodium falciparum*;
e) *Plasmodium vivax*.

517. The causative agent of what disease can be transmitted by specific vectors?

Answer variants:

a) malaria;
b) amebiasis;
c) balantidiasis;
d) trichomoniasis;
e) giardiasis.

518. What of the following methods is the most common to diagnose of malaria?

Answer variants:

a) biological;
b) biochemical;
c) serological;
d) microbiological;
e) microscopic.

519. What is the invasive stage of Plasmodium for human?

Answer variants:

a) tissue schizonts;
b) sporozoites;
c) merozoites;
d) trophozoites;
e) marita.

520. What insects are associated with the spread of malaria?

Answer variants:

a) sandflies of the genus *Phlebotomus*;
b) blackflies of the genus *Simulium*;
c) midges of the family *Ceratopogonidae*;
d) mosquitoes of the genus *Anopheles*;
e) gadflies of the family *Tabanidae*.

521. What biological material is used to diagnose of toxoplasmosis?
Answer variants:
a) blood;
b) feaces;
c) urine;
d) duodenal contents;
e) sputum.

522. What way of human infection with toxoplasmosis is not possible?
Answer variants:
a) eating raw or undercooked meat;
b) eating unwashed vegetables;
c) contacts with cats;
d) drinking water contaminated with oocytes;
a) contacts with a sick person.

523. What protozoal disease can cause miscarriage or fetal death?
Answer variants:
a) trichomoniasis;
b) toxoplasmosis;
c) leishmaniasis;
d) giardiasis;
e) trypanosomiasis.

524. What disease is caused by protozoa semilunar in shape with a sharpened one end and a blunt second one?
Answer variants:
a) leishmaniasis;
b) giardiasis;
c) amebiasis;
d) toxoplasmosis;
e) trichomoniasis.

525. What is protozoa after Giemsa staining has the following structure: semilunar in shape, cytoplasm vacuolized and colored blue, large nucleus colored red?
Answer variants:
a) *Toxoplasma gondii*;
b) *Giardia lamblia;*
c) *Trypanosoma gambiense;*
d) *Balantidium coli*;
e) *Leishmania tropica*.

526. What protozoa may cause developmental defects in a newborn child if a mother had contacts with cats during pregnancy?

Answer variants:

a) *Leishmania tropica*;
b) *Entamoeba histolytica*;
c) *Balantidium coli*;
d) *Toxoplasma gondii*;
e) *Trichomonas vaginalis*.

527. Protozoans were detected by microscopic examination of a blood smear and punctate from a lymph node. What is the species of protozoans if they semilunar in shape with a sharpened one end and a blunt second one?

Answer variants:

a) *Trichomonas hominis;*
b) *Toxoplasma gondii;*
c) *Giardia lamblia;*
d) *Balantidium coli;*
e) *Plasmodium vivax.*

528. What laboratory test is the most effective for confirming the diagnosis of toxoplasmosis?

Answer variants:

a) serological tests;
b) blood smear microscopy;
c) microscopy of a vaginal smear;
d) muscle biopsy;
e) fecal smear microscopy.

529. The final host in the life cycle of Toxoplasma gondii is:

Answer variants:

a) dog;
b) cow;
c) human;
d) rat;
e) cat.

530. What disease may occur when eating raw meat?

Answer variants:

a) giardiasis;
b) balantidiasis;
c) toxoplasmosis;
d) leishmaniasis;
e) trypanosomiasis.

531. Oocysts of toxoplasma are found in:

Answer variants:

a) dogs;
b) cats;
c) mosquitoes;
d) humans;
e) cows.

532. What disease would be suspected in a person if unicellular organisms of an oval shape covered with cilia are found in feces?

Answer variants:

a) balantidiasis;
b) amebiasis;
c) toxoplasmosis;
d) giardiasis;
e) trichomoniasis.

533. What is invasive stage of the large liver fluke (Fasciola hepatica) for humans?

Answer variants:

a) metacercariae;
b) egg;
c) miracidium;
d) larva;
e) adolescariae.

534. What is the way of human infection with fascioliasis?

Answer variants:

a) drinking raw water from a pond;
b) eating crayfish;
c) ingestion of infected liver;
d) eating undercooked freshwater fish;
e) eating raw meat.

535. What disease may occur when drinking raw water from a pond?

Answer variants:

a) opisthorchosis;
b) paragonimiasis;
c) fascioliasis;
d) clonorchosis;
e) dicroceliosis.

536. What helminth larvae would infect a person whose eat vegetables growing near a pond?

Answer variants:

a) *Paragonimus westermani* metacercaries;
b) *Fasciola hepatica* adolescaria;
c) *Dicrocoelium lanceatum* metacercaries;
d) *Opisthorchis felineus* metacercaries;
e) *Diphyllobothrium latum* plerocercoid.

537. Which helminth eggs are yellow in color, size of 130–150 mμ, oval in shape with an operculum on one end?

Answer variants:

a) lung fluke;
b) cat liver fluke;
c) echinococcus;
d) fish tapeworm;
e) large liver fluke.

538. Characteristic symptoms of fascioliasis are:

Answer variants:

a) allergic rash, abdominal pain, fever, vomiting, diarrhea;
b) abdominal pain, bloody diarrhea, general intoxication;
c) headache, sleepness, exhaustion, anemia;
d) vaginitis with a purulent discharge;
e) general intoxication, periodic fever, chill.

539. What helminthosis is diagnosed if helminth eggs an oval in shape with operculum on one end, yellow in color, up to 30 mμ in size are found in the feces? (The patient ate raw freshwater fish).

Answer variants:

a) paragonimiasis;
b) opisthorchiasis;
c) fascioliasis;
d) schistosomiasis;
e) dicroceliasis.

540. Characteristic symptoms of opisthorchiasis are:

Answer variants:

a) abdominal pain, bloody diarrhea, general intoxication;
b) headache, sleepness, exhaustion, anemia;
c) vaginitis with a purulent discharge;
d) allergic rash, abdominal pain, nausea, vomiting, diarrhea;
e) general intoxication, periodic fever, chill.

541. What is the invasive stage of Opisthorchis felineus for intermediate host?

Answer variants:

a) egg;
b) cysticercus;
c) cercarium;
d) metacercarium;
e) sporocyst.

542. What is the invasive stage of Opisthorchis felineus for additional host?

Answer variants:

a) egg;
b) metacercarium;
c) cercarium;
d) sporocyst;
e) cysticercus.

543. What food may infect a person with opisthorchiasis?

Answer variants:

a) undercooked freshwater fish;
b) raw meat;
c) unwashed fruit;
d) unwashed vegetables;
e) water from a pond.

544. What preventive measures should be followed in connection with a natural focus of opisthorchiasis?

Answer variants:

a) cook pork adequately;
b) cook beef adequately;
c) boil drinking water;
d) cook fish adequately;
e) wash vegetables and fruits.

545. What is the name of helminthosis, which is characterized by natural foci associated with eating of raw freshwater fish?

Answer variants:

a) fascioliasis;
b) echinococcosis;
c) dicroceliasis;
d) teniasis;
e) opisthorchiasis.

546. What disease may occur when eating undercooked freshwater fish?

Answer variants:

a) opisthorchiasis;
b) dicroceliasis;
c) schistosomiasis;
d) fascioliasis;
e) paragonimiasis.

547. What is the disease caused by the helminth with the following characteristics: length is 4-13 mm, in the middle part of the parasite's body there is branched uterus, an oval ovarium behind it, and at the end there are two rosette shape testis?

Answer variants:

a) fascioliasis;
b) paragonimiasis;
c) schistosomiasis;
d) opisthorchiasis;
e) dicroceliasis.

548. What is the invasive stage of Opisthorchis felineus for final host?

Answer variants:

a) egg;
b) metacercarium;
c) sporocyst;
d) miracidium;
e) cercarium.

549. What is the way of human infection with paragonimiasis?

Answer variants:

a) eating unwashed vegetables and fruits;
b) eating raw meat;
c) eating undercooked freshwater fish;
d) drinking raw water from a pond;
e) eating undercooked freshwater crabs and shrims.

550. What helminthosis can be diagnosed if helminth eggs an oval in shape with operculum on one end, golden-brown in color, up to 110 mμ in size are found in the sputum?

Answer variants:

a) paragonimiasis;
b) schistosomiasis;
c) opisthorchiasis;

d) dicroceliasis;
e) fascioliasis.

551. What is the invasive stage of Paragonimus westermani for final host?

Answer variants:
a) egg;
b) sporocyst;
c) metacercarium;
d) miracidium;
e) cercarium.

552. What is the invasive stage of Paragonimus westermani for additional host?

Answer variants:
a) metacercarium;
b) egg;
c) sporocyst;
d) miracidium;
e) cercarium.

553. Parasite causing lung infestation is:

Answer variants:
a) *Paragonimus westermani*;
b) *Fasciola hepatica*;
c) *Dicrocoelium lanceatum;*
d) *Clonorchis sinensis;*
e) *Schistosoma mansoni*.

554. Determine the species of pulmonary helminth: body is flat and egg-shaped, reddish-brown in color; size is about 10 mm long and 5 mm broad.

Answer variants:
a) *Fasciola hepatica;*
b) *Paragonimus westermani;*
c) *Dicrocoelium lanceatum;*
d) *Clonorchis sinensis;*
e) *Schistosoma mansoni*.

555. What is the way of human infection with urogenital schistosomiasis?

Answer variants:
a) transmissional;
b) transplacental;

c) interintestinal;
d) transdermal;
e) contact.

556. What helminthosis can be diagnosed if helminth eggs with a terminal spine are found in the urine?

Answer variants:
a) urogenital schistosomiasis;
b) intestinal schistosomiasis;
c) Japanese schistosomiasis;
d) opisthorchiasis;
e) dicroceliasis.

557. Who is the additional host in life cycle of the cat liver fluke?

Answer variants:
a) crabs, shrims;
b) fish of the family *Cyprinidae*;
c) pike, perch;
d) crayfish;
e) snails.

558. What helminthosis can be diagnosed if helminth eggs with a prominent lateral spine are found in the feaces of a patient?

Answer variants:
a) opisthorchiasis;
b) urogenital schistosomiasis;
c) paragonimiasis;
d) fascioliasis;
e) intestinal schistosomiasis.

559. What are the morphological features of flukes?

Answer variants:
a) leaf-shaped body, attachment organs - suckers;
b) tape-like body shape, attachment organs - bothria;
c) tape-like body shape, attachment organs - hooks;
d) oval body shape, attachment organs - hooks;
e) spindle-shaped body, attachment organs - spines.

560. How does a person become infected with urogenital schistosomiasis?

Answer variants:
a) eating unwashed vegetables and fruits;
b) swimming in contaminated ponds;

c) eating undercooked freshwater fish;
d) eating undercooked meat;
e) eating undercooked freshwater crabs and shrims.

561. What species of tapeworm is characterized by 7–12 branches of uterus in mature segments?

Answer variants:
a) pork tapewort;
b) beef tapeworm;
c) dwarf tapeworm;
d) fish tapeworm;
e) dog tapeworm.

562. Pigs are reservoir for:

Answer variants:
a) *Taeniarhynchus saginatus;*
b) *Fasciola hepatica;*
c) *Hymenolepis nana;*
d) *Echinococcus grannulosus;*
e) *Taenia solium.*

563. What helminth species is characterized by a length of up to 3 meters and segmented body (there are four suckers and a proboscis with hooklets on the scolex)?

Answer variants:
a) dwarf tapeworm;
b) dog tapeworm;
c) pork tapewort;
d) beef tapeworm;
e) fish tapeworm.

564. What disease is caused by a tapeworm of 3 meters long (mature proglottids have 7–12 lateral branches of the uterus)?

Answer variants:
a) echinococcosis;
b) teniarhynchiasis;
c) diphyllobotriasis;
d) opisthorchiasis;
e) teniasis.

565. What helminth may cause cysticercosis?

Answer variants:
a) *Taenia solium;*

b) *Taeniarhynchus saginatus;*
c) *Trichocephalus trichiurus;*
d) *Trichinella spiralis;*
e) *Diphyllobothrium latum.*

566. What disease is caused by the larvae in shape resembling rice grains which are found in the eyes and brain in human?

Answer variants:
a) diphyllobotriasis;
b) echinococcosis;
c) teniarhynchiasis;
d) hymenolepiasis;
e) cysticercosis.

567. What disease may occur when eating pork that has not passed veterinary and sanitary control?

Answer variants:
a) hymenolepiasis;
b) echinococcosis;
c) cysticercosis;
d) teniasis;
e) teniarhynchiasis.

568. What disease may occur when eating beef that has not passed veterinary and sanitary control?

Answer variants:
a) teniarhynchiasis;
b) teniasis;
c) echinococcosis;
d) hymenolepiasis;
e) diphyllobotriasis.

569. What species of tapeworm is characterized by 17–34 branches of uterus in mature segments?

Answer variants:
a) *Taenia solium;*
b) *Hymenolepis nana;*
c) *Taeniarhynchus saginatus;*
d) *Diphyllobothrium latum;*
e) *Echinococcus granulosus.*

570. What species of tapeworm is characterized by size of 4-10 meters long, hermaphroditic helminth segments have two lobes of ovarium and uterus does not branch?

Answer variants:

a) pork tapewort;
b) dwarf tapeworm;
c) dog tapeworm;
d) fish tapeworm;
e) beef tapeworm.

571. What disease is characterized by the fact that the mature segments of the helminth may pass out of the human anus, actively crawl through the body and linen, attracting the patient attention?

Answer variants:

a) teniasis;
b) teniarhynchiasis;
c) diphyllobotriasis;
d) echinococcosis;
e) hymenolepiasis.

572. How does a person become infected with teniasis?

Answer variants:

a) eating undercooked freshwater fish;
b) eating undercooked beef;
c) eating unwashed vegetables and fruits;
d) eating undercooked pork;
e) eating undercooked freshwater crabs and shrims.

573. What disease may occur when eating freshly salted pike roe?

Answer variants:

a) diphyllobotriasis;
b) echinococcosis;
c) teniasis;
d) trichinellosis;
e) ascariasis.

574. What diagnosis is assumed in case of anemia in a fishermen, often eating undercoked freshwater fish?

Answer variants:

a) echinococcosis;
b) enterobiasis;
c) trichinellosis;
d) diphyllobotriasis;
e)paragonimiasis.

575. In what helminth the width of the proglottids exceeds the length? The rosette-shaped uterus is in the center of the mature proglottids.

Answer variants:

a) *Diphyllobothrium latum;*
b) *Taenia solium;*
c) *Taeniarhynchus saginatus;*
d) *Echinococcus granulosus;*
e) *Hymenolepis nana*.

576. What disease may occur when eating raw or undercooked freshwater fish?

Answer variants:

a) cysticercosis;
b) diphyllobotriasis;
c) trichinellosis;
d) hymenolepiasis;
e) schistosomiasis.

577. What helminth causes intestinal obstruction, nausea, vomiting, and anemia associated with a lack of vitamin B_{12}?

Answer variants:

a) dwarf tapeworm;
b) dog tapeworm;
c) pinworm;
d) human roundworm;
e) fish tapeworm.

578. When eating of what products does a person become infected with diphyllobothriasis?

Answer variants:

a) raw beef;
b) raw pork;
c) raw freshwater fish;
d) raw freshwater crabs and crayfish;
e) unwashed vegetables and fruits.

579. What is the way of infection with hymenolepiasis in case of significant intensity of invasion?

Answer variants:

a) autoinvasion;
b) oral;
c) airborne;
d) specific contamination;
e) contact.

580. Specify helminthosis, in which vesicles of larvae become detected in the lungs by ultrasonography.

Answer variants:

a) hymenolepiasis;
b) diphyllobotriasis;
c) trichinellosis;
d) teniasis;
e) echinococcosis.

581. What is the invasive stage of Taeniarhynchus saginatus for intermediate host?

Answer variants:

a) cysticercus;
b) egg;
c) cercarium;
d) procercoid;
e) marita.

582. What disease would occur in human after contacts with dogs?

Answer variants:

a) teniasis;
b) paragonimiasis;
c) dicroceliosis;
d) echinococcosis;
e) fascioliasis.

583. What animal may infect human with echinococcosis?

Answer variants:

a) dog;
b) cat;
c) pig;
d) rabbit;
e) cow.

584. Specify helminthosis on the base of the following characteristics: vesicles of larvae appear in liver of patient, the vesicle wall includes an external capsule and an inner parenchymal shell, on which daughter and granddaughter vesicles are formed with scolexes pushed inside.

Answer variants:

a) fascioliasis;
b) opisthorchiasis;
c) ascariasis;

d) dicroceliosis;
e) echinococcosis.

585. The intermediate host of the beef tapeworm is:
Answer variants:
a) dog;
b) cat;
c) cow;
d) human;
e) pig.

586. What helminth species the following traits: the body is cylindrical, spindle-shaped, size ♀ — 20–40 cm, ♂ — 15–25 cm, the posterior end of male is curved to the ventral side?
Answer variants:
a) *Ascaris lumbricoides;*
b) *Trichuris trichura;*
c) *Enterobius vermicularis;*
d) *Dracunculus medinensis;*
e) *Trichinella spiralis*.

587. Which helminth eggs are characterized by yellow-brown color with a tubercular shell?
Answer variants:
a) *Enterobius vermicularis*;
b) *Trichuris trichura*;
c) *Ascaris lumbricoides*;
d) *Hymenolepis nana*;
e) *Diphyllobothrium latum*.

588. At what disease the helminth larvae are found in the sputum of a person?
Answer variants:
a) ascariasis;
b) enterobiasis;
c) teniasis;
d) cysticercosis;
e) opisthorchiasis.

589. What helminth may cause a short-term symptoms of pneumonia during its larvae migration through the human lungs?
Answer variants:
a) *Trichuris trichura*;

b) *Enterobius vermicularis*;
c) *Hymenolepis nana*;
d) *Taenia solium*;
e) *Ascaris lumbricoides*.

590. How does a person become infected with ascariasis?
Answer variants:
a) eating undercooked freshwater fish;
b) eating unwashed vegetables and fruits;
c) eating undercooked pork;
d) eating undercooked freshwater crabs and shrims;
e) swimming in contaminated ponds.

591. What disease may occur in human consuming vegetables or fruits that have not been carefully cooked, washed, or peeled?
Answer variants:
a) opisthorchiasis;
b) enterobiasis;
c) teniasis;
d) cysticercosis;
e) ascariasis.

592. What helminth may cause symptoms such as fever, coughing, skin rashes, enlarged liver, and pneumonia during its larvae migration?
Answer variants:
a) cat liver fluke;
b) whipworm;
c) dog roundworm;
d) beef tapeworm;
e) pinworm.

593. What helminth in the mature stage is localized in the small intestine, in the larval stage — in alveoli, bronchi, and trachea?
Answer variants:
a) *Ascaris lumbricoides*;
b) *Echinococcus granulosus*;
c) *Enterobius vermicularis*;
d) *Trichuris trichura*;
e) *Trichinella spiralis*.

594. Determine the helminth species on the base of the following characteristics: white in color, 30-50 mm long with a whip-like anterior end and a thick posterior end, can be found in the cecum of a person.

Answer variants:

a) *Enterobius vermicularis*;
b) *Ascaris lumbricoides*;
c) *Trichuris trichura*;
d) *Ancylostoma duodenale*;
e) *Strongyloides stercoralis*.

595. What helminthosis can be diagnosed if helminth eggs have barrel shape (50 × 30 mμ) with colorless plugs at the poles and brown color?

Answer variants:

a) enterobiasis;
b) ancylostomiasis;
c) echinococcosis;
d) trichuriasis;
e) ascariasis.

596. What helminthosis can be diagnosed if helminth has white-yellow color, thread-like anterior end and a thick posterior end (parasites are found in the cecum of a person)?

Answer variants:

a) trichuriasis;
b) ascariasis;
c) enterobiasis;
d) hymenolepiasis;
e) trichinellosis.

597. What helminth species is characterized by the following morphology: roundworm up to 5 cm in length, it has hair-like anterior end, the posterior end of males is spirally curved?

Answer variants:

a) *Enterobius vermicularis*;
b) *Ancylostoma duodenale*;
c) *Strongyloides stercoralis*;
d) *Ascaris lumbricoides*;
e) *Trichuris trichura*.

598. How does a person become infected with trichuriasis?

Answer variants:

a) eating dried fish;
b) eating raw fish;

c) eating undercooked beef;
d) eating unwashed vegetables and fruits;
e) eating undercooked pork.

599. What helminth eggs are characterized by the barrel shape, brown color, and colorless plugs at the poles?

Answer variants:
a) *Trichuris trichura*;
b) *Ancylostoma duodenale*;
c) *Enterobius vermicularis*;
d) *Ascaris lumbricoides*;
e) *Strongyloides stercoralis*.

600. What is the characteristic trait of whipworm eggs?

Answer variants:
a) asymmetrically oval;
b) colorless plugs at the poles;
c) shell is radially striated;
d) operculum on one of the poles;
e) tubercular outer shell.

601. What helminth is characterized by the following morphology of eggs: asymmetrically oval in shape, colorless, semitransparent, 50 × 23 μm in size?

Answer variants:
a) *Ascaris lumbricoides*;
b) *Ancylostoma duodenale*;
c) *Trichuris trichura*;
d) *Enterobius vermicularis*;
e) *Hymenolepis nana*.

602. Determine a species of helminths found on the perianal folds in a 5 year old child: up to 1 cm long, cylindrical shape with pointed ends, white in color:

Answer variants:
a) *Ascaris lumbricoides*;
b) *Enterobius vermicularis*;
c) *Strongyloides stercoralis*;
d) *Trichinella spiralis*;
e) *Trichuris trichura*.

603. What helminthosis is characterized by the next typical symptoms: the child troubled sleep, often scratchen the anus area?

Answer variants:
a) enterobiasis;

b) ascariasis;
c) trichuriasis;
d) hymenolepiasis;
e) trichinellosis.

604. What is the period of maturation of pinworm eggs?
Answer variants:
a) 6–7 days;
b) 1–2 days;
c) about 6 hours;
d) about 1 month;
e) 6–7 months.

605. What helminthosis can be diagnosed if helminth's asymmetrically oval eggs are detected on the perianal folds?
Answer variants:
a) enterobiasis;
b) ascariasis;
c) amoebiasis;
d) trichuriasis;
e) hymenolepiasis.

606. Where does pinworm eggs mature?
Answer variants:
a) in soil;
b) in intestine;
c) in perianal area;
d) in water;
e) in urine.

607. What should be done to clarify the diagnosis of enterobiasis?
Answer variants:
a) X-ray examination;
b) muscle biopsy;
c) scraping of perianal folds;
d) immunodiagnosis;
e) analysis of duodenal contents.

608. What disease would be suspected by the symptoms: recurrent urticaria, anemia, fever, bronchitis, larvae 2.5 × 1.6 μm are detected in the duodenal contents and in the feces?
Answer variants:
a) strongyloidiasis;

b) trichuriasis;
c) trichinellosis;
d) enterobiasis;
e) teniasis.

609. What helminthosis would be diagnosed by the symptoms: headache, weakness, abdominal pain, diarrhea, severe itching of the skin of the legs?

Answer variants:

a) enterobiasis;
b) teniasis;
c) trichuriasis;
d) trichinellosis;
e) strongyloidiasis.

610. At what disease the final host is carnivores animals (usually a domestic dog or coyote) and human, while the intermediate host is mosquitoes?

Answer variants:

a) dirofilariasis;
b) strongyloidiasis;
c) trichuriasis;
d) hymenolepiasis;
e) enterobiasis.

611. What diagnosis can be done on the morphology of the helminth removed from the upper eyelid: thread-like body covered with thin striated cuticle, light yellow in color, 12 cm long?

Answer variants:

a) trichuriasis;
b) dirofilariasis;
c) enterobiasis;
d) strongyloidiasis;
e) trichinellosis.

612. What helminthosis can be preliminary diagnosed by the symptoms: headache, muscleache, weakness, fever, swelling of the eyelids and face?

Answer variants:

a) teniasis;
b) opisthorchiasis;
c) fascioliasis;
d) trichinellosis;
e) ascariasis.

613. What foods may cause trichinellosis?

Answer variants:

a) raw pork;
b) raw beef;
c) raw fish;
d) raw crayfish and crabs;
e) unwashed fruits and vegetables.

614. Larvae of which parasite resides in striped muscles?

Answer variants:

a) *Trichuris trichura;*
b) *Trichinella spiralis;*
c) *Ascaris lumbricoides;*
d) *Enterobius vermicularis;*
e) *Strongyloides stercoralis.*

615. What method can confirm the diagnosis of trichinellosis?

Answer variants:

a) using adhesive tape;
b) urine analysis;
c) sputum analysis;
d) immunodiagnostic test;
e) microscopic analysis of feces on helminth eggs.

616. What is the species of helminth with free-living generation in its life cycle?

Answer variants:

a) *Trichuris trichura;*
b) *Trichinella spiralis;*
c) *Ascaris lumbricoides;*
d) *Enterobius vermicularis;*
e) *Strongyloides stercoralis*.

617. For what helminthosis the mosquitoes are an intermediate host in life cycle of parasite?

Answer variants:

a) dirofillariasis;
b) trichinellosis;
c) ascariasis;
d) trichuriasis;
e) strongyloidiasis.

618. At what disease in the biopsy of the calf muscles can be find spirally curved larvae covered with capsules?

Answer variants:

a) hymenolepiasis;
b) trichinellosis;
c) enterobiasis;
d) trichuriasis;
e) strongyloidiasis.

619. What helminth causes these symptoms: headache, pain in the muscles when swallowing, chewing and rotating the eyes, weakness, fever, swelling of the eyelids and face?

Answer variants:

a) *Trichinella spiralis*;
b) *Ascaris lumbricoides*;
c) *Enterobius vermicularis*;
d) *Strongyloides stercoralis*;
e) *Trichuris trichura*.

620. At what helminthosis the prevention measures are the organization of the veterinary and sanitary control of meat products, and the zoohygienic management of pigs?

Answer variants:

a) strongyloidiasis;
b) ascariasis;
c) trichinellosis;
d) echinococcosis;
e) alveococcosis.

621. What disease would arise on the 7–10th day after eating homemade pork sausage?

Answer variants:

a) trichinellosis;
b) echinococcosis;
c) ascariasis;
d) trichuriasis;
e) dirofilariasis.

622. What disease can be assumed in a person while revealing of thread-like helminth 12.5 cm long in the thickening of the skin?

Answer variants:

a) ascariasis;

b) enterobiasis;
c) strongyloidiasis;
d) dirofilariasis;
e) trichinellosis.

623. What presumptive diagnosis can be made if a 8.5 cm helminth having an elongated thread-like body was found under the conjunctiva of the eye?

Answer variants:
a) diphyllobotriasis;
b) dirofilariasis;
c) ascariasis;
d) enterobiasis;
e) trichuriasis.

624. What insect is the vector for dirofilaria?

Answer variants:
a) mosquitoes;
b) blackflies;
c) sandflies;
d) gadflies;
e) tsetse flies.

625. What roundworm is a contact helminth?

Answer variants:
a) *Trichinella spiralis;*
b) *Dirofilaria repens;*
c) *Ascaris lumbricoides;*
d) *Trichuris trichura;*
e) *Enterobius vermicularis.*

626. Who is the vector for West-European encephalitis virus?

Answer variants:
a) *Xenopsylla cheopis;*
b) *Ixodes ricinus;*
c) *Sarcoptes scabiei;*
d) *Ornithodorus papillipes;*
e) *Blatta orientalis.*

627. Who causes demodecosis in a human?

Answer variants:
a) follicle mite;
b) pubic louse;

c) bed chinch;
d) biting house fly;
e) tsetse fly.

628. What parasite is the causative agent of scabies?
Answer variants:
a) *Ixodes ricinus;*
b) *Ornitodorus papillipes;*
c) *Dermacentor pictus;*
d) *Sarcoptes scabiei;*
e) *Ixodes persulcatus.*

629. What diagnosis can be assumed if, when examining the patient's skin, there are rash and intraskin canals of a dirty-whitish color?
Answer variants:
a) demodicosis;
b) scabies;
c) pediculosis;
d) cutaneous leishmaniasis;
e) myiasis.

630. What parasite is intraskin?
Answer variants:
a) itch mite;
b) kissing bug;
c) pubic louse;
d) dog tick;
e) pasture tick.

631. What arthropod species causes scabies disease?
Answer variants:
a) dog tick;
b) taiga tick;
c) pasture tick;
d) village mite;
e) itch mite.

632. What diagnosis can be made if microscopy of material taken from lesions in the cheek skin reveals elongated arthropods with 4 pairs of short limbs?
Answer variants:
a) skin myiasis;
b) phtiriasis;

c) demodicosis;
d) scabies;
e) pediculosis.

633. What species of arthropod transmits the causative agent of plague by way of contamination?

Answer variants:
a) *Pediculus humanus;*
b) *Cimex lectularius;*
c) *Phlebotomus papatasii;*
d) *Ixodes ricinus;*
e) *Dermacentor pictus.*

634. What are morphological features of ticks at the imago stage?

Answer variants:
a) four pairs of walking limbs, two body segments;
b) three pairs of walking limbs, body is not divided into segments;
c) four pairs of walking limbs, body is not divided into segments;
d) four pairs of walking limbs, three body segments;
e) three pairs of walking limbs, two body segments.

635. What is the prevention measure of demodicosis?

Answer variants:
a) protection against tick bites;
b) use of repellents;
c) treatment of the interiors with insecticides;
d) personal hygiene;
e) donor blood screening.

636. Infection of a person with relapsing fever and spotted fever may happen due to:

Answer variants:
a) bite of *Dermacentor pictus*;
b) scratching the skin due to *Sarcoptes scabiei* irritation;
c) bite of *Phlebotomus papatasii*;
d) bite of *Ixodes ricinus*;
e) crushing and rubbing into the skin the hemolymph of *Pediculus humanus humanus.*

637. What is the way of infection with taiga encephalitis?

Answer variants:
a) transmissional;
b) transdermal;

c) oral;
d) sexual;
e) contact.

638. What species of arthropod is the vector of the causative agent of taiga encephalitis?

Answer variants:
a) *Ornithodoros papillipes;*
b) *Stomoxys calcitrans;*
c) *Ixodes persulcatus;*
d) *Phlebotomus papatasii;*
e) *Ixodes ricinus.*

639. What arthropod is the vector of the causative agent of Lyme borreliosis?

Answer variants:
a) mosquito of *Anopheles* genus;
b) kissing bug;
c) itch mite;
d) dog tick;
e) sandfly.

640. West-Europian encephalitis was diagnosed when examining a patient. Infection of the patient was due to a bite of:

Answer variants:
a) dog tick;
b) mosquito of *Anopheles* genus;
c) village mite;
d) itch mite;
e) sandfly.

641. Who is a permanent ectoparasite?

Answer variants:
a) *Ixodes persulcatus;*
b) *Pulex irritans;*
c) *Cimex lectularius;*
d) *Glossina palpalis;*
e) *Pediculus humanus.*

642. A 10-year-old school girl has recurrent episodes of boils on the scalp. The boils subside with antibiotic therapy but recur after same time. The most likely cause of recurrences is:

Answer variants:
a) scabies;

b) skin damage by chinches;
c) pediculosis;
d) allergy;
e) demodicosis.

643. What insect is the causative agent of pediculosis?
Answer variants:
a) bed bug;
b) pubic louse;
c) human flea;
d) head louse;
e) house fly.

644. What blood-sucking insect develops in standing water?
Answer variants:
a) mosquitoes;
b) lice;
c) fleas;
d) sandflies;
e) flies.

645. What disease is transmited by tsetse flies?
Answer variants:
a) phtiriasis;
b) malaria;
c) pediculosis;
d) trypanosomiasis;
e) leishmaniasis.

646. Determine the insects found in the armpits of a patient by their morphology: 1.0–1.5 mm in size, gray in color, with a short wide body, thorax and abdomen almost not separated, body covered with hairs:
Answer variants:
a) flea;
b) head louse;
c) pubic louse;
d) body louse;
e) itch mite.

647. Reduvid bug is a vector for the transmission of:
Answer variants:
a) sleeping sickness;

b) phtiriasis;
c) plague;
d) Chagas disease;
e) relapsing fever.

648. What disease agents can be transmitted by a flea?
Answer variants:
a) plague;
b) cholera;
c) relapsing fever;
d) dysentery;
e) encephalitis.

649. Who is a vector for the transmission of leishmaniasis?
Answer variants:
a) *Cimex lectularius;*
b) *Phtirus pubis;*
c) *Pediculus humanus;*
d) *Anopheles maculipennis;*
e) *Phlebotomus papatasii.*

650. Who is the definitive host in the life cycle of Plasmodium?
Answer variants:
a) sandflies of the genus *Phlebotomus*;
b) mosquitoes of the genus *Anopheles*;
c) blackflies of the genus *Simulium*;
d) midges of the family *Ceratopogonidae*;
e) gadflies of the family *Tabanidae*.

651. Boundaries of the malaria distribution coincide with ranges of mosquitoes of the genus:
Answer variants:
a) *Anopheles;*
b) *Culex;*
c) *Aedes;*
d) *Mansonia;*
e) *Culiseta.*

652. The housefly can be a mechanical vector for agents of:
Answer variants:
a) relapsing fever;
b) spotted fever;

c) encephalitis;
d) leishmaniasis;
e) cholera, dysentery, typhoid fever.

653. What insect larvae cause myiasis?

Answer variants:

a) triatomine bug;
b) biting house fly;
c) Wolfhart's fly;
d) mosquitoes of the genus *Anopheles*;
e) sandflies of the genus *Phlebotomus*.

654. When examining a patient, alive larvae were found in the wound. The patient was diagnosed with tissue myiasis. What insect causes this disease?

Answer variants:

a) *Glossina palpalis;*
b) *Wohlfahrtia magnifica;*
c) *Musca domestica;*
d) *Phlebotomus papatasii;*
e) *Stomoxys calcitrans.*

ANSWERS TO TESTS

1. SECTION
"MOLECULAR-GENETIC AND CELL LEVELS OF THE LIVING THINGS ORGANIZATION"

№ question	Correct answers	№ question	Correct answers	№ question	Correct answers	№ question	Correct answers
1	b	39	a	77	a	115	a
2	c	40	b	78	e	116	b
3	d	41	c	79	c	117	d
4	a	42	e	80	b	118	e
5	e	43	a	81	a	119	a
6	a	44	b	82	e	120	c
7	e	45	c	83	c	121	d
8	b	46	d	84	a	122	a
9	c	47	a	85	d	123	e
10	e	48	b	86	e	124	a
11	d	49	d	87	a	125	b
12	c	50	a	88	b	126	d
13	b	51	e	89	d	127	a
14	a	52	b	90	a	128	e
15	c	53	c	91	b	129	b
16	a	54	d	92	d	130	d
17	c	55	a	93	a	131	a
18	e	56	e	94	e	132	e
19	c	57	c	95	c	133	b
20	d	58	d	96	d	134	c
21	a	59	e	97	a	135	a
22	d	60	b	98	e	136	d
23	b	61	a	99	b	137	b
24	e	62	c	100	c	138	a
25	c	63	e	101	d	139	e
26	e	64	a	102	b	140	b
27	a	65	c	103	a	141	a
28	b	66	b	104	c	142	c
29	d	67	e	105	e	143	d
30	a	68	b	106	c	144	a
31	b	69	a	107	a	145	e
32	e	70	c	108	b	146	c
33	b	71	d	109	d	147	a
34	c	72	e	110	c	148	b
35	b	73	a	111	a	149	e
36	e	74	c	112	e	150	c
37	c	75	d	113	b		
38	b	76	b	114	c		

2. SECTION
"ONTOGENETIC LEVEL OF THE LIVING THINGS ORGANIZATION"

№ question	Correct answers	№ question	Correct answers	№ question	Correct answers	№ question	Correct answers
151	b	193	c	235	a	277	e
152	e	194	a	236	b	278	c
153	c	195	e	237	d	279	a
154	a	196	c	238	a	280	b
155	c	197	a	239	e	281	c
156	e	198	b	240	b	282	d
157	a	199	a	241	d	283	a
158	c	200	b	242	a	284	d
159	d	201	e	243	c	285	b
160	a	202	b	244	e	286	d
161	e	203	a	245	a	287	a
162	c	204	d	246	b	288	e
163	a	205	a	247	d	289	c
164	d	206	e	248	a	290	a
165	e	207	b	249	d	291	d
166	a	208	d	250	e	292	b
167	b	209	a	251	a	293	a
168	c	210	e	252	b	294	c
169	e	211	a	253	e	295	e
170	b	212	b	254	b	296	a
171	a	213	d	255	a	297	c
172	e	214	a	256	d	298	d
173	a	215	e	257	b	299	a
174	c	216	c	258	a	300	c
175	d	217	a	259	a	301	d
176	a	218	b	260	e	302	a
177	b	219	e	261	b	303	b
178	e	220	a	262	c	304	e
179	d	221	d	263	a	305	a
180	c	222	a	264	b	306	d
181	a	223	c	265	e	307	c
182	c	224	c	266	a	308	e
183	b	225	a	267	b	309	a
184	a	226	e	268	c	310	e
185	e	227	b	269	e	311	b
186	d	228	c	270	a	312	d
187	a	229	a	271	c	313	a
188	b	230	e	272	d	314	c
189	c	231	b	273	a	315	e
190	a	232	d	274	c	316	a
191	d	233	a	275	b	317	c
192	a	234	e	276	a	318	a

№ question	Correct answers	№ question	Correct answers	№ question	Correct answers	№ question	Correct answers
319	d	336	a	353	e	370	e
320	b	337	e	354	d	371	d
321	b	338	b	355	b	372	a
322	a	339	a	356	a	373	b
323	c	340	e	357	e	374	e
324	d	341	c	358	a	375	d
325	b	342	e	359	c	376	a
326	a	343	a	360	b	377	d
327	c	344	c	361	e	378	b
328	e	345	a	362	a	379	e
329	a	346	c	363	c	380	c
330	d	347	a	364	d	381	d
331	a	348	c	365	b	382	a
332	e	349	e	366	e	383	e
333	b	350	a	367	c	384	b
334	d	351	b	368	a	385	c
335	c	352	b	369	c		

3. SECTION
“POPULATION-SPECIES LEVEL OF THE LIVING THINGS ORGANIZATION”

№ question	Correct answers	№ question	Correct answers	№ question	Correct answers	№ question	Correct answers
386	b	406	b	426	d	446	b
387	d	407	e	427	a	447	d
388	b	408	a	428	e	448	a
389	a	409	c	429	c	449	e
390	d	410	e	430	a	450	b
391	d	411	a	431	e	451	d
392	a	412	b	432	b	452	a
393	d	413	e	433	a	453	c
394	c	414	a	434	c	454	b
395	a	415	c	435	b	455	e
396	d	416	e	436	a	456	a
397	e	417	a	437	e	457	d
398	c	418	b	438	d	458	b
399	b	419	d	439	a	459	d
400	a	420	a	440	d	460	a
401	b	421	b	441	e	461	d
402	a	422	d	442	a	462	e
403	d	423	e	443	b	463	a
404	e	424	a	444	e	464	b
405	a	425	b	445	a	465	d

4. SECTION
"BIOSPHERE-BIOGEOCENOTIC LEVEL OF THE LIVING THINGS ORGANIZATION"

№ question	Correct answers	№ question	Correct answers	№ question	Correct answers	№ question	Correct answers
466	a	508	a	550	a	592	c
467	c	509	e	551	c	593	a
468	e	510	b	552	e	594	c
469	a	511	d	553	a	595	d
470	b	512	a	554	b	596	a
471	d	513	e	555	d	597	e
472	a	514	a	556	a	598	d
473	d	515	c	557	b	599	a
474	e	516	b	558	e	600	b
475	a	517	a	559	a	601	d
476	c	518	e	560	b	602	b
477	a	519	b	561	a	603	a
478	e	520	d	562	e	604	c
479	b	521	a	563	c	605	a
480	d	522	e	564	e	606	c
481	a	523	b	565	a	607	c
482	e	524	d	566	e	608	a
483	b	525	a	567	d	609	e
484	d	526	d	568	a	610	a
485	a	527	b	569	c	611	b
486	e	528	a	570	e	612	d
487	c	529	e	571	b	613	a
488	a	530	c	572	d	614	b
489	b	531	b	573	a	615	d
490	d	532	a	574	d	616	e
491	a	533	e	575	a	617	a
492	d	534	a	576	b	618	b
493	a	535	c	577	e	619	a
494	e	536	b	578	c	620	c
495	a	537	e	579	a	621	a
496	b	538	a	580	e	622	d
497	d	539	b	581	b	623	b
498	a	540	d	582	d	624	a
499	e	541	a	583	a	625	e
500	c	542	c	584	e	626	b
501	e	543	a	585	c	627	a
502	a	544	d	586	a	628	d
503	b	545	e	587	c	629	b
504	d	546	a	588	a	630	a
505	a	547	d	589	e	631	e
506	d	548	b	590	b	632	c
507	c	549	e	591	e	633	a

№ question	Correct answers	№ question	Correct answers	№ question	Correct answers	№ question	Correct answers
634	c	640	a	646	c	652	e
635	d	641	e	647	d	653	c
636	e	642	c	648	a	654	b
637	a	643	d	649	e		
638	c	644	a	650	b		
639	d	645	d	651	a		

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