Test Items for Licensing Examination
Krok-1 General Medical Training
MEDICAL BIOLOGY

for medical students

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http://physiology.med.sumdu.edu.ua/

This book includes 1547 test items in cytogenetics, classical genetics, molecular genetics, medical genetics, population genetics, general biology, protozoology, helminthology, and entomology.

The book has been developed for students and teachers of medical, pediatric, medical-and-prophylactic, and stomatological faculties.

Comments and notes are given to some test problems. Special attention is given to errors in tests.
## CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>Cytology and Cytogenetics</td>
<td>5</td>
</tr>
<tr>
<td>Classical Genetics</td>
<td>49</td>
</tr>
<tr>
<td>Molecular Genetics</td>
<td>81</td>
</tr>
<tr>
<td>Medical Genetics</td>
<td>127</td>
</tr>
<tr>
<td>Population Genetics and Evolution</td>
<td>203</td>
</tr>
<tr>
<td>General Biology</td>
<td>209</td>
</tr>
<tr>
<td>Protozoans</td>
<td>243</td>
</tr>
<tr>
<td>Helminths</td>
<td>277</td>
</tr>
<tr>
<td>Arthropods</td>
<td>327</td>
</tr>
<tr>
<td>Mixed Questions on Parasitology</td>
<td>344</td>
</tr>
</tbody>
</table>
INTRODUCTION

Exam test “Krok-1” contains 200 question on medical biology, human anatomy, cytology & histology, microbiology, human physiology, pathophysiology, pathologic anatomy, pharmacology, and biochemistry; approximately 16–18 of them are questions on medical biology. Students have 200 minutes for answering.

All tests on medical biology were received from the Testing center of Ministry of Public Health of Ukraine (http://testcentr.org.ua/), selected from the book named Collection of tasks for preparing for test examination in natural science “Krok-1 General Medical Training” (V. F. Moskalenko, O. P. Volosovets, I. E. Bulakh, O. P. Yavorovskiy, O. V. Romanenko, and L. I. Ostapyuk, eds. – K.: Medicine, 2006) and from exam booklets (2001–2015), and then were reviewed and reorganized.

Five answers from which only one answer is correct are given to each test. Correct answer is marked by plus. Working with tests, close marks near answers by a piece of paper. Choose the answer (or finished statements) that fits best and then check your answer.

Many mistakes in these tests were corrected (for example, we use the term “DNA repair” in this book instead of “reparation”, “Edwards' syndrome” instead of “Edward's syndrome” etc.). Comments and notes are given to some test problems. Special attention is given to errors in tests.

In 2011, students studying stomatology received incorrect test question: Premolar teeth absence is inherited as an autosomal dominant factor. Parents with normal dental system gave birth to a child with lacking premolar teeth. What is the probability of giving birth to children without this pathology (%) in this family? Answer 75% was proposed as correct. However, normal parents must have aa genotype, and it is NOT possible for them to give birth to a child with dominant trait with such probability. Child with dominant trait can appear as a result of gametic mutation or in the case of incomplete penetrance (when one of parents can have Aa genotype but recessive trait).

Oleg Smirnov
CYTOLOGY AND CYTOGENETICS

1. Cells of red marrow were taken for laboratory researches. They belong to cellular complexes which are updated. Define a set of chromosomes and quantity of DNA (number of chromatids) which are characteristic for \(G_1\) period in these cells:

- \(2n, 4c\)
- \(2n, 1c\)
- \(+2n, 2c\)
- \(1n, 1c\)
- \(1n, 2c\)

2. One can see under a microscope that the nucleus envelope in a cell is destroyed, short chromosomes in the form of a letter X are evenly placed on all the cell. At what stage of division the cell is?

- Prophase
- Anaphase
- Interphase
- Metaphase
- Telophase

3. By means of the micromanipulator Golgi complex is removed from a cell. How it will affect further cell activity?

- Process of mitosis will be broken
- Formation of lysosomes, their maturing and exocytosis of cellular secretory products will be broken
- Formation of ribosomes and synthesis of proteins will be broken
- Autolysis will develop that can lead to the cell death
- Processes of energy metabolism will be broken

4. The scraping of mucous of a mouth of the man was made by means of the spatula. The oval nuclei unequal in the size are well visible in non-destroyed epithelial cells of the painted smear. In what way division of these cells occurred?

- Mitosis
- Meiosis
- Binary division
- Schizogony
- Amitosis

5. The chromosomal analysis of the woman of 33 years showed that the part of a short arm of the 16th chromosome joined the 22nd chromosome. How this phenomenon is called?

- Transduction
- Translocation
– Inversion
– Deletion
– Deficiency

6. The single fragment, which came off a long arm of the chromosome of group C, was revealed in a metaphase plate from culture of lymphocytes of the patient with flu. During what period of mitotic cycle this mutation occurred?
– $G_1$ period
– $G_2$ period
– Telophase
– Anaphase
+ S period

7. The additional chromosome from group E was revealed in a metaphase plate from the culture of lymphocytes of the child vaccinated against smallpox. Analyse this fact and choose to what type this mutation belongs:
– translocation
– inversion
– deletion
– polyploidy
+ heteroploidy

8. Tissue of testes was taken for laboratory investigations. According to one of classifications, cells of this tissue belong to the renewed cellular complexes. Analyse probable states of cells in this tissue:
– cells divide only mitotically
– cells divide by meiosis only
– cells increase in sizes only
+ cells divide at first mitotically, and then meiotically
– cells divide at first meiotically, and then mitotically

9. The strong linkage between two X chromosomes was formed in oocytes under the influence of a mutagen. Formation of what set of chromosomes in an ovum it can lead to?
– 47 chromosomes
– 23 or 24 chromosomes
– 24 or 25 chromosomes
+ 22 or 24 chromosomes
– 46 chromosomes

10. Microorganisms that belong to prokaryotes, have such structures:
– mitochondria
11. During chromosome disjunction at a stage of maturing of spermatogenesis, the X chromosome did not separate from the Y chromosome. What can be a karyotype of future individual if the normal ovum will be fertilized by such spermatozoon?

- 45, XO
- 46, XX
- 46, XY
- 47, XYY
- 47, XXY

12. In order to analyse the karyotype, a cell culture was influenced by colchicine, which destroys the spindle of division. At what stage was the mitosis stopped?

- Metaphase
- Prophase
- Anaphase
- Telophase
- Prometaphase

13. The somatic cell of the man, which is in metaphase of mitotic division, is visible on the histologic preparation. How many chromosomes are a part of a metaphase plate, if we will consider that each chromosome contains two sister chromatids?

- 46 chromosomes
- 92 chromosomes
- 48 chromosomes
- 23 chromosomes
- 24 chromosomes

14. Thymine with radioactive label was added to a nutrient medium with the cells capable to division by mitosis. About what large amount of thymine, which is determined in nuclei of cells at autoradiographic investigation, can indicate?

- About small number of cells that are in interphase
- About large number of cells that are in the synthetic period of interphase
- About high mitotic activity
- About small number of cells that are in the pre-synthetic period of interphase
- About a large number of cells that are in interphase

15. One of the reasons of rheumatism in man at the cellular level
is self-damage of cartilage cells through destruction of organoid structure. What is the organoid?
- Golgi complex
- Cell center
+ Lysosome
- Mitochondrion
- Ribosome

16. After mitosis, some organelles in daughter cells are formed de novo, others are formed only by doubling of existing organelles. Specify what organelles from given below have ability to self-doubling:
- granular endoplasmic reticulum
- ribosomes
- lamellar complex
- agranular endoplasmic reticulum
+ mitochondria

17. It is necessary for successful fertilization that acrosome reaction occurs due to which the nucleus of spermatozoon enters inside the egg. Name the organelle that takes the greatest part in formation of an acrosome:
- ribosome
- mitochondrion
- endoplasmic reticulum
+ Golgi complex
- cell center

18. Culture of tumor cells was influenced by colchicine that blocks synthesis of the proteins tubulins forming a division spindle. What stages of cell cycle will be broken?
+ Mitosis
- G0 period
- Pre-synthetic period
- Post-synthetic period
- Synthetic period

19. In a cell, enzymes are located in organelles in such a way that they provide performance of functions of certain organelles. Name enzymes that are located in lysosomes:
- enzymes of synthesis of fatty acids
+ hydrolases
- enzymes of protein synthesis
- enzymes of urea synthesis
- enzymes of glycogen synthesis
20. Abnormal biopolymers were revealed in cells of an organism of the 7-year-old child with a congenital disease. About malfunction of what organelles one can talk?
+ Lysosomes
– Mitochondria
– Peroxisomes
– Ribosomes
– Granular endoplasmic reticulum

21. Throughout life (from division to death), the cell is on different phases of cell cycle – interphase passes into mitosis. What protein is produced in a cell and regulates the entering of a cell into mitosis?
– Desmin
+ Cyclin
– Keratin
– Vimentin
– Tubulin

22. Cytochemical investigation revealed the high content of hydrolytic enzymes in cytoplasm. About activity of what organelles from listed below this fact indicates?
– Cell center
– Endoplasmic reticulum
+ Lysosomes
– Polysomes
– Mitochondria

23. Cortisone, which stimulates protein synthesis, was prescribed to the patient. What changes will happen in nuclei of cells at stimulation of protein synthesis?
– Perinuclear space will increase
– Perinuclear space will decrease
– The amount of heterochromatin will increase
+ The amount of euchromatin will increase
– The amount of nuclear pores will decrease

24. On diffraction patterns of liver cells of a rat, two-membrane structures of an oval form are well noticeable; their internal membrane forms cristae. What are these organelles?
– Peroxisomes
+ Mitochondria
– Centrosomes
– Ribosomes
– Lysosomes
25. A specimen of an onion rootlet includes the cell in which the fully condensed chromosomes are located in the equatorial plane making the monaster. What phase of the mitotic cycle is the cell in?¹

- Interphase
+ Metaphase
- Prophase
- Late telophase²
- Early telophase

26. According to the rule of the permanent chromosomes number, each animal species can be characterized by a specific and permanent number of chromosomes. What mechanism provides this feature during sexual reproduction?

- Repair
- Translation
+ Meiosis
- Mitosis
- Cytokinesis

27. Organelles with one or two membranes are present among membrane organelles of a cell. What organelles have two-membrane structure?

- Mitochondria, Golgi apparatus
- Cell center, ribosomes
+ Mitochondria, plastids
- Golgi apparatus, ribosomes
- Endoplasmic reticulum, plastids

28. Mitotic division of diploid somatic cell began. Mitosis was disturbed, and uninuclear polyploid cell was formed. At what stage mitosis was interrupted?

- Prophase
- Telophase
+ Anaphase
- Cytokinesis
- Metaphase

29. The structure of ribosomes is broken in a cell. What processes will suffer first of all?

- Synthesis of nucleic acids

¹ In the book “Collection of tasks…”, this question is written as follows: During the analysis of the mitotic stage in the onion root cells, a cell, in which spiralized chromosomes were placed in the equatorial zone, was revealed. What mitotic stage is the cell at?
² Other incorrect answers: anaphase; telophase.
+ Synthesis of protein
– Synthesis of carbohydrates
– Synthesis of lipids
– Synthesis of mineral substances

30. The somatic diploid cell entered mitosis, and then normal process of mitosis was interrupted with colchicine. At what stage process of mitosis was interrupted, and what set of chromosomes will be present in the nucleus?
– Anaphase, 2n
– Anaphase, 4n
+ Metaphase, 2n
– Metaphase, 4n
– Telophase, 2n

31. The cell organelle has its own protein synthesizing system. Name it:
– Golgi apparatus
– lysosome
– vacuoles
– endoplasmic reticulum
+ mitochondrion

32. Products of metabolism are excreted from a cell through Golgi complex as a result of connection of its membrane structure with plasmalemma. What is the process?
– Osmosis
– Diffusion
– Endocytosis
+ Exocytosis
– Active transport

33. Nucleoli of nuclei in culture of tissues were damaged by nuclear radiation. Restoring of what organelles in cytoplasm of cells becomes problematic?
+ Ribosomes
– Lysosomes
– Golgi complex
– Microtubules
– Endoplasmic reticulum

34. During mitotic cell division, a scientist can see the phase when the nuclear envelope and nucleolus disappear, the centrioles are placed on the opposite poles of the cell and chromosomes are in the form of a thread ball freely placed in the cytoplasm. What stage of mitotic cycle is the cell at?
Metaphase
+ Prophase
– Anaphase
– Interphase
– Telophase

35. Salts of heavy metals introduced into experimental animals during 24 days. Study of preparations of liver under electronic microscope revealed destruction of mitochondria in hepatocytes. With large confidence it is possible to claim that in hepatocytes such processes are broken:
– protein synthesis
+ energy metabolism
– lipid metabolism
– synthesis of carbohydrates
– water absorptions

36. In a cytogenetic laboratory, the karyotype of a healthy man was studied. 46 chromosomes were seen in each somatic cell. How many autosomes does each cell include?
– 23
– 22
+ 44
– 46
– 92

37. It is established that human karyotype is presented by 46 chromosomes, each consisting of two chromatids. At what stage of mitosis the karyotype is defined?
– Telophase
+ Metaphase
– Prometaphase
– Anaphase
– Prophase

38. The cell of the laboratory animal was overdosed with Roentgen rays. As a result, albuminous fragments formed in the cytoplasm. What cell organoid will take part in their utilization?
+ Lysosomes
– Endoplasmic reticulum
– Ribosome
– Golgi complex
– Cells centre

39. 46 chromosomes were revealed on karyotype examination of the 5-year old girl. One of the 15th pair of chromosomes is longer
than usual due to connected chromosome from the 21 pair\(^1\). What type of mutation does this girl have?

- Insufficiency\(^2\)
- Deletion
- Duplication
- Inversion
+ Translocation

40. *In the histologic preparation stained by iron hematoxylin, the cell resembling dumbbells is presented; spiral chromosomes are visible in its poles. In what phase of cell cycle there is a cell?*

- Anaphase
- Metaphase
- Prophase
+ Telophase
- Interphase

41. *Process of synthesis of ATP in human cells was sharply increased during physical activity; this process occurs in:*

- lysosomes
+ mitochondria
- Golgi complex
- chromosomes
- ribosomes

42. *It was revealed that the number of chromosomes in a metaphase plate of the man was less than in norm on three chromosomes after influence of a mutagen. The specified mutation belongs to:*

- polyploidy
- translocation
- inversion
- polyteny
+ aneuploidy

43. *Specific cellular proteins are continuously synthesized in the growing tissues of human body. This process happens due to work of:*

- lysosomes
+ ribosomes
- cell center
- smooth ER

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\(^1\) In the book “Collection of tasks…”, this question (question No. 103) has the phrase "due to joining a part of chromosome of the 21 pair".

\(^2\) Another possible answer – “aneuploidy”.
nucleolus

44. The cell of an ovary is in the S period of interphase. At this time such event occurs:
- spiralization of chromosomes
- DNA replication
- ATP accumulation
- division of chromosomes
- synthesis of nuclear membrane

45. The oogenesis is divided into three periods: reproduction, growth and maturing. Cells that entered growth period are called:
- oogonia
- primary oocytes
- ovum
- secondary oocytes
- primary polocytes

46. A cell was affected by a substance which broke the integrity of lysosome membranes. What can happen to the cell as a result?
- Specialization
- Differentiation
- Reproduction
- Transformation
+ Autolysis

47. To diagnose human chromosomal disorders in order to analyse the karyotype, a cell culture is influenced by colchicine – a substance which destroys the spindle of division. At what mitotic stage is the karyotype studied?
- Telophase
- Interphase
- Prophase
+ Metaphase
- Anaphase

48. Mitosis is the basic mechanism of a cell that provides the development of organisms, their regeneration and reproduction. It is possible because this mechanism is responsible for:
- Formation of polyploid cells
- Crossing-over
+ Equal distribution\(^1\) of chromosomes between daughter cells
- Irregular distribution\(^1\) of chromosomes between daughter cells
- Change of genetic information

\(^1\) In the book “Collection of tasks…”, the term "divergency" is used (this is a mistake).
49. **Transcription in a cell occurs in euchromatin sites. What changes in cytoplasm of cells appear in the case of increase in amount of euchromatin?**
- Number of polysomes decreases
- Part of agranular endoplasmic reticulum increases
- Activity of a cell center decreases
+ Number of ribosomes increases
- Activity of lysosomes increases

50. **A patient has an acute pancreatitis which can develop into pancreas autolysis. The dysfunction of what organelles can cause this pathology?**
+ Lysosomes
- Mitochondria
- Ribosomes
- Centrioles
- Microtubules

51. **In course of practical training students studied a stained blood smear of a mouse with bacteria phagocytosed by leukocytes. What cell organella completes digestion of these bacteria?**
- Ribosomes
+ Lysosomes
- Granular endoplasmic reticulum
- Golgi apparatus
- Mitochondrions

52. **Studying of highly condensed chromosomes of the dividing cell is carried out. At what stage of mitotic cycle process of cell division was interrupted for this purpose?**
- Interphase
- Anaphase
- Telophase
+ Metaphase
- Prophase

53. **During cell cycle, chromosomes can be both one-chromatid and two-chromatid. In the dividing cell, one-chromatid chromosomes are revealed. In this case, such phase of cell cycle was studied:**
- interphase – the post-synthetic period
- metaphase
+ anaphase
- prometaphase
- prophase
54. Human cell is studied under the microscope during anaphase of mitosis. At this stage under sufficient magnification, it is possible to see:

– conjugation of chromatids
– formation of tetrads
– spiralization of chromosomes
+ disjunction of chromatids
– despiralization of chromosomes

55. The zone of reproduction of woman’s sex gland is analyzed. In this zone, cell divide by:

– meiosis
– schizogony
– oogamy
+ mitosis
– amitosis

56. During the postsynthetic period of mitotic cycle, the synthesis of proteins – tubulins, which take part in the mitotic spindle formation, was destroyed. It can cause the impairment of:

– duration of mitosis
– spiralization of chromosomes
– despiralization of chromosomes
+ chromosome's separation
– cytokinesis

57. On practical class in cell biology, students studied plasma membrane. In the electronic photo of a cell, macromolecules that bind specific receptors on its surface are noticeable. In what way they enter a cell?

– Through ionic channels
+ Due to endocytosis
– By means of protein transmitters which move like revolving doors
– By passive transport
– Due to work of sodium-potassium pump

58. The scraping of mucous of the mouth was taken by the spatula for laboratory investigations. Analyse probable conditions of these cells:

– divide only mitotically
– only increase in sizes

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1 Another possible answer: "formation of ribosome subunits".
2 Another possible answer: "disjunction of daughter chromosomes". In the book “Collection of tasks…”, the incorrect term "divergence of daughter chromosomes" is used (this is a mistake).
3 Another possible answer: "formation of nucleolus".
– divide by meiosis and amitosis
+ divide mitotically and by amitosis
– divide mitotically; polyteny is observed

59. The study of the female karyogram shows that the centromere in X chromosome is placed near the centre. What do we call such chromosome?
– Telocentric
– Subacrocentric
+ Submetacentric
– Acrocentric
– Metacentric

60. Indicator of intensity of mutational process in human is the sister chromatid exchange – SCE. This process happens at a stage:
– interphase before meiosis
+ prophase of mitosis
– metaphase of mitosis
– metaphase of the first meiotic division
– anaphase of the second meiotic division

61. One of characteristics of a cell for anaphase of mitosis is 4n 4c. It is caused by fact that in this phase such event occurs:
– association of sister chromatids
– formation of tetrads
– despiralization of chromosomes
+ chromatid disjunction to the cell poles
– exchange of regions of sister chromatids

62. Feature of meiosis in oogenesis is existence of a specific stage, which is absent in spermatogenesis. How this stage is called?
– Zygotene
– Leptotene
– Diplotene
– Pachytene
+ Dictyotene

63. What cell division leads to formation of diploid set of chromosomes?
– Meiosis
+ Mitosis
– Amitosis

1 such term is not used in the world.
– Schizogony
– Endomitosis

64. After colchicine influence, it was revealed that the number of chromosomes in a metaphase plate of the man exceed the norm on twenty three chromosomes. This mutation belongs to:
+ polyploidy
– aneuploidy
– polyteny
– inversion
– translocation

65. High-molecular compounds – proteins and carbohydrates – enter a cell by phagocytosis. Fermental systems of a cell split this material into low molecular compounds. They were used in further anabolic processes. The cell synthesized own compounds – proteoglycans – and excreted them in the form of the formed secret drops. What cell organelles were involved into into the operation at the final stage that takes part in formation of drops of secret?
+ Lamellar Golgi complex
– Granular endoplasmic reticulum
– Lysosomes
– Free ribosomes of cytoplasm
– Smooth endoplasmic reticulum

66. Remember value of processes of mitosis and meiosis in life cycles of the organisms reproducing by asexual and sexual was and specify, what of the statements formulated below is correct:
– gametes are always formed in the process of meiosis
+ gametes are always haploid
– mitosis occurs in diploid cells only
– as a result of mitosis, diploid cells are always formed
– as a result of meiosis, only gametes are formed

67. In the first half of the XX century, many authors described more intensively painted sites of polytene chromosomes, which alternated with poorly painted sites. Some researchers assumed that intensively painted sites contain genes. What are modern views on their function?
+ They are genetically inert sites of chromosomes that contain spiral chromatin
– They are sites where transcription occurs
– They are sites of decondensed chromatin
– They are sites that are invisible in interphase under a light microscope
– They are genetically active sites

68. **During the examination of the cell structure, a globular monomembranous organelle, which contains hydrolytic enzymes, was found. This organelle is known to provide intracellular digestion and protective reactions of the cell. What organelle is it?**

– Endoplasmic reticulum
– Centriole
+ Lysosome
– Ribosome
– Mitochondrion

69. **Chromosomes of eukaryotic cells consist generally of chromatin – a complex of double-stranded DNA and five fractions of histone proteins forming nucleosomes. What histone stabilizes nucleosome structure?**

– H2A
– H3
– H2B
+ H1
– H4

70. **Human karyotype is studied when a cell is at metaphase. What do we call the substance that can stop the cell division at this stage?**

– Methanol
– Iodine
+ Colchicine
– Potassium chloride
– Ethanol

71. **During the examination of pancreatic gland cells under an electronic microscope, an organelle has been found which consists of cisterns, canals, closets and is connected with plasmalemma. What organelle is it?**

– Centriole
– Mitochondrion
+ Endoplasmic reticulum
– Lysosome
– Peroxisome

72. **In one of phases of spermatogenesis, the changes of a nucle-**

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1 In the book “Collection of tasks…”, another similar question is also present: **In a cell a ball-shaped monomembranous organelle that contains hydrolytic enzymes has been studied. What organelle is it?**
us and cytoplasm of spermatids causing formation of mature sex cells are observed. Name a gametogenesis phase:
– proliferation
– maturing
– growth
– reproduction
+ formation

73. Microfilaments and microtubules are known to include tubulin proteins, which take part in the formation of the division spindle. In what period of the mitotic cycle are tubulin proteins synthesized?
– Postmitotic period of interphase
– Mitosis
– Synthesis period (S) of interphase
+ Postsynthesis period (G2) of interphase
– Presynthesis period (G1) of interphase

74. There is an organelle near the nucleus which consists of two cylinders built of microtubules. The cylinders are situated perpendicularly to each other. The organelle is a component of the mitotic spindle of division in animal cells. What organelle is this?
– Mitochondrion
– Ribosome
– Endoplasmic reticulum
+ Centrosome
– Lysosome

75. An intensive aerobic process of energy formation and accumulation in the form of high energy ATP bonds takes place in the cells of muscular tissue. In which organelle does this process occur?
– In the peroxisome
– In the endoplasmic reticulum
– In the lysosome
+ In the mitochondrion
– In the centriole

76. The nuclei of cells were affected by a substance which destroyed the histone structure. What components of the cells will change as a result of this intervention in the first place?

1 There is a mistake in this question in the book “Collection of tasks…” – the term "centriole" is used in this book. Structure that contains a pair of cylinders (i.e. a pair of centrioles) is called the centrosome.
– Mitochondria
– Nuclear membrane
– Ribosomes
+ Chromosomes
– Cell membranes

77. During an experiment, the culture of the cells divided by mitosis was influenced by the substance which destroyed the spindle of division. Which substance was used in the experiment?
– Penicillin
+ Colchicine
– Histamine
– Methanol
– Iodine

78. It is known that the growing old epithelial cells die. What cell organeloids provide their digestion and removal in an internal?
– Ribosomes
– Mitochondria
– Plastids
+ Lysosomes
– Golgi complex

79. The increase in thyroid gland was revealed in the student of 18 years. He had the raised metabolism and the increased pulse rate. These signs are observed in the case of hypersecretion of thyroxin hormone. What organelles of cells of thyroid gland are responsible for secretion and release of hormones most of all?
+ Golgi complex
– Mitochondria
– Ribosomes
– Centrosomes
– Lysosomes

80. During preparation to the final round of the Ukrainian competition in biology, members of a study group argued concerning the term cybrids. Find the correct answer and solve their dispute:
– degree of mutability of a genome
+ fused eukaryotic cells, cellular hybrids
– cells which are transformed by foreign DNA
– hybrids that are received as a result of crossing
– hybrids of species of citrus plant

81. Karyotyping of healthy man cells is carried out. A small acrocentric odd chromosome was found in the karyotype. What chromosome is it?
– Group A chromosome
– Group B chromosome
– X chromosome
+ Y chromosome
– Group C chromosome

82. What process in a cell provides constancy of chromosome number?
– Amitosis
+ Mitosis
– Endomitosis
– Meiosis
– Polyteny

83. In one of cell organoids, completion of the creation of protein molecule and formation of a complex of protein molecules with carbohydrates and fats occur. What is the organoid?
– Endoplasmic reticulum
– Lysosomes
+ Golgi complex
– Ribosomes
– Mitochondria

84. Number of what structures is increased in polytene chromosomes?
– Chromatids
– Microfibrils
+ Chromonemata
– Neurofibrilla
– Myofibrils

85. Influenced by some chemical substances, the process of ribosome subunits formation has been impaired in a cell. In consequence this will stop the synthesis of:
– carbohydrates
+ proteins
– lipids
– DNA
– RNA

86. In one of meiosis phases in the man, nuclei containing 23 chromosomes with diploid set of DNA are formed. How this phase of meiosis is called?
+ Telophase I
– Interphase
– Anaphase I
87. It is known that cell cycle consists of several consecutive transformations in a cell. On one of stages there are processes preparing DNA synthesis (the quantity of RNA and protein increases). During what period of cell life it occurs?

- Synthetic
- Mitotic
+ G₁ (pre-synthetic)
- Premitotic
- Post-synthetic

88. Organoids are the constant differentiated cytoplasm regions, which have certain structure and functions: endoplasmic reticulum, ribosomes, lysosomes, mitochondria, lamellar complex, cell center, microtubules, and plastids. What cellular components are discovered by means of an electronic microscope?

- Nucleus
- Lamellar Golgi complex
- Lysosomes
+ Hyaloplasm, endoplasmic reticulum, ribosomes
- Mitochondria

89. Cytogenetic investigations showed that each chromosome is differentiated on two types of sites, different in coloring. Sites which are poorly painted by nuclear dyes, received the name:

- kinetochore
- centromere
- heterochromatin
- nucleolar organizer
+ euchromatin

90. Mitochondria are two-membrane organoids; lysosomes and Golgi complex are one-membrane organoids. What organoids of a cell have no membrane?

- Lysosomes, mitochondria
+ Ribosomes, centrosome
- Peroxisomes, ribosomes
- Golgi complex
- Plastids

91. Under influence of colchicine solution on the cell culture, a large number of metaphase plates appears; it indicates stopping of mitosis at a metaphase stage. What organoid is exposed to destruction and does not carry out its function during mitosis?
− Golgi apparatus
− Lysosomes
− Mitochondria
+ Microtubules
− Endoplasmic reticulum

92. During the whole life of a human, in some adult cells mitosis is not observed, and the quantity of DNA stays permanent. What do we call these cells?
+ Neurons
− Hepatocytes
− Eye cornea epitheliocytes
− Red bone marrow cells
− Germinal epithelium

93. Under the influence of gamma-radiation a fragment of a chromosome was lost. What chromosomal mutation is it?
+ Deletion
− Duplication
− Inversion
− Intrachromosomal translocation
− Interchromosomal translocation

94. Protein and ribosomal RNA – RNP, ribonucleoprotein – are a part of ribosomes. Where subunits of ribosomes are formed?
− In mitochondria
− In Golgi complex
− On tubules of endoplasmic reticulum
+ In a nucleolus
− In lysosomes

95. Prokaryotes are anucleate organisms, which have no typical nucleus and nuclear membrane. Genetic material is presented in them by one ring thread of DNA molecule. How genetic material of prokaryotes is called?
+ Genophore
− Nucleus
− Virion
− Mycoplasma
− Nucleolus

96. In the presynthesis period \((G_1)\) of the cell cycle the synthesis of DNA doesn’t occur, that’s why the number of DNA molecules is equal to the number of chromosomes. How many DNA molecules does any human somatic cell in the presynthesis period \((G_1)\) have?
97. A cell includes ball-shaped mono-membranous organelles that include proteolytic enzymes. Organelles size is 0.2–1 micrometers. Their formation is connected with Golgi apparatus. What organelles are these?

- Centrioles
- Ribosomes
- Plastids
- Mitochondria
+ Lysosomes

98. In the cells capable to division, there are processes of growth, formation of organelles and their accumulation due to active synthesis of proteins, RNA, lipids, and carbohydrates. How the period of mitotic cycle in which such processes occur, but DNA is not synthesized, is called?

+ G₁ (pre-synthetic)
- Synthetic
- Premitotic
- Telophase
- Anaphase

99. In a nucleus, there are non-constant structures that disappear at the beginning of cell division and appear again at the end of it. They include protein and RNA. They take part in the formation of ribosome subunits. What are these structures called?

+ Nucleoli
- Nucleosomes
- Polysomes
- Microfibrils
- Microtubules

100. Large cells with the paired homologous chromosomes and points of crossing-over in some of these chromosomes were found in a sample of ovary tissue. In what period of gametogenesis these cells are?

- Differentiation
+ Maturing
- Growth
- Reproduction
1. Chromosomes are pair structures in all species. Such set of chromosomes is called diploid. How the diploid set of chromosomes of a cell is called?

- Locus
- Genome
- Idiogram
+ Karyotype
- Genotype

2. During the cell cycle, regular changes in quantity of genetic material happen. What is the period, when the replication of DNA happens, called?

- Anaphase
- Prophase
- Metaphase
+ Interphase
- Telophase

3. On the preparation painted by hematoxylin and eosin, dark blue grains and clots of chromatin are visible in the nucleus. In what phase of cellular cycle the nucleus is?

+ Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase

4. During anaphase, chromosomes (each containing one chromatid)\(^1\) are placed on the poles of the cell. How many chromosomes does the cell have during the anaphase?

- 96
- 46
- 23
- 69
+ 92

5. In intensively functioning cells (for example, of liver), the increase in chromosome number is often observed. What process happens in a cell?

+ Endomitosis
- Polyteny

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\(^1\) There is a mistake in this question in the book “Collection of tasks…” – incorrect word combination “monochromatic chromosomes” is used in this book.
– Amitosis
– Mitosis
– Meiosis

106. There is an organelle in human cells. The functions of this organelle are the formation of lysosomes, the secretion of glycoproteins, carbohydrates, lipids, and the formation of yolk granules during the oocytes maturation. What is this organelle called?
– Lysosome
– Endoplasmic reticulum
+ Golgi apparatus
– Peroxisome
– Ribosome

107. The second division of meiosis resembles mitosis very much. But there are some differences. In what features metaphase of mitosis differs from metaphase of the second division of meiosis in the man?
– Additional DNA synthesis occurs in metaphase of meiosis
– Chromosomes move to opposite poles in metaphase of meiosis, and chromatids move in metaphase mitosis
– Additional DNA synthesis occurs in metaphase of mitosis
– There are 46 chromosomes in the metaphase plate of the second division of meiosis, and there are 23 chromosomes in the metaphase plate of mitosis
+ There are 23 chromosomes in the metaphase plate of the second division of meiosis, and there are 46 chromosomes in a metaphase plate of mitosis

108. Secretion of glycoprotein mucin that forms mucus is reduced in the patient. Disturbance of functions of what organoids can cause this phenomenon?
– Endoplasmic reticulum (ER)
– Lysosomes
– Mitochondria
+ Golgi complex
– Nuclei

109. Among microorganisms, prokaryotes and eukaryotes differ in features of cellular structure. What microorganisms among mentioned below are prokaryotes?
– Protozoans
– Viruses
+ Bacteria
– Mushrooms
– Prions

110. *Long cylinders with diameter about 24 nanometers are present in animal cells. They are formed from dimers of the protein tubulin and play an important role in maintenance of a certain form of the whole cell and its organoids, and also take part in transport of macromolecules and organelles. They provide chromosome disjunction during cell division.* Define these organelles:
– plastids
+ microtubules
– mitochondria
– microfilaments
– endoplasmic reticulum

111. *In the medico-genetic center, the doctor applied a method of differential painting according to Giemsa for identification of chromosomes of each pair; then all chromosomes got specific alternation of light and dark bands. The graphic representation of chromosomes taking into account their form and coloring has the name:* 
+ ideogram
– genotype
– gene pool
– karyotype
– genome

112. *Moving of the daughter chromatids to the poles of the cell is observed in the mitotically dividing cell. At what stage of the mitotic cycle is this cell?*
– Telophase
+ Anaphase
– Prophase
– Metaphase
– Interphase

113. *Different cellular organelles are characterized by an unequal set of enzymes that is associated with specificity of the functions, which are carried out by them. What organelle contains digestive enzymes only?*
– Lamellar complex
– Mitochondrion

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1 In the book “Collection of tasks…”, this question is written as follows: *During the mitotic division in a cell we can observe the separation of chromatids towards the opposite poles. What stage of the cell cycle takes place in the cell?*
114. At some diseases, changes that are followed by damages of integrity of membranes of lysosomes occur in cells. What changes will happen in cells?
– Process of mitosis will be broken
– Process of translation will be broken
– Damage of the process of transcription will occur
+ Autolysis will occur
– Accumulation of substances by cell will occur

115. Three new mutant genes appeared in the oocyte I. Name the maximum number of zygotes which can receive these genes:
+ one
– two
– three
– four
– none

116. The patient with poisoning got to clinic. It is established that detoxication mechanisms are disturbed in his organism. With change of functions of what listed organoids this defect is associated?
+ Endoplasmic reticulum (ER)
– Golgi complex
– Lysosomes
– Mitochondria
– Nucleus

117. Destruction of mitochondria was revealed in a cell at investigation of the diffraction pattern. What process in a cell can be broken thereof?
– Nuclear division
– Crossing-over
– Photosynthesis
– Synthesis of carbohydrates
+ Oxidation of organic substances

118. Four phases are distinguished in mitosis. In what phase human cell has 92 chromosomes, each of them containing one chromatid?
– Interphase
– Prophase
– Metaphase
+ Anaphase
– Telophase

119. The number of cells, which entered a phase of DNA synthesis of a mitotic cycle within a day, was 20% less, than number of the cells that entered the previous mitosis. Where cells got to?
– Remained in mitosis
– Died in the process of apoptosis
+ Remained in the G₁ period or entered G₀ phase
– Entered G₂ phase
– Were lost owing to necrosis

120. Name organoids that are present in cells of bacteria:
– mitochondria
– chloroplasts
– digestive vacuoles
+ ribosomes
– nucleus

121. Glycogen and proteins are actively synthesized in cells of healthy liver. What types of organelles are well developed?
– Cell center
+ Granular and agranular ER
– Lysosomes
– Golgi complex
– Peroxisomes

122. By means of electronic microscopy, it is recorded that the surface of the majority of cells forms numerous microscopic outgrowths of cytoplasm. What process actively happens in these cells?
– Protein biosynthesis
– Biological oxidation
+ Phagocytosis
– Diffusion
– ATP synthesis

123. Somatic cells of the man are diploid (2n chromosomes). Nevertheless, polyploid cells of red marrow (megakaryocytes) can have up to 64n chromosomes. What is the mechanism of their appearance?
– Amitosis
+ Endomitosis
– Mitosis
– Meiosis
– Polyteny
124. There are cellular and noncellular forms of life. What of the forms, which are listed below, belong to the noncellular forms?
+ Viruses
– Bacteria
– Blue-green algae
– Mycoplasmas
– Protozoans

125. Colchicine, which blocks "assembling" of proteins of achromatotic spindle, influenced a cell. What stage of mitotic cycle will be broken?
+ Anaphase
– Prophase
– Cytokinesis
– G₁ period of interphase
– G₂ period of interphase

126. Decrease in level of albumine and fibrinogen was revealed in the patient's blood. Decrease of the activity of what organelles of hepatocytes most possibly causes this phenomenon?
– Lysosomes
+ Granular ER
– Mitochondria
– Agranular ER
– Golgi complex

127. Synthesis of histone proteins in a cell is artificially blocked. What structure of a cell will be damaged?
– Nucleolus
+ Nuclear chromatin
– Golgi apparatus
– Cellular envelope
– Nuclear envelope

128. During the inspection of a girl's karyotype, a shortened arm of the 20th pair chromosome was found. What do we call this mutation?
– Duplication
+ Deletion
– Inversion
– Translocation
– Monosomy on the 20th chromosome

129. Cells of human liver and kidneys contain numerous organelles of 0.1–1.5 microns in size which are surrounded by one membrane and filled with the enzymes providing $H_2O_2$-dependent
breath and biosynthesis of bilious acids. How these organelles are called?
+ Peroxisomes
– Lysosomes
– Ribosomes
– Digestive vacuoles
– Golgi apparatus

130. During studying a karyotype of an aborted embryo, it was revealed that one of the chromosomes of number 1 has one arm and terminal placement of a centromere. How such type of a chromosome is called?
– Acrocentric
– Submetacentric
+ Telocentric
– Metacentric
– Isochromosome

131. When students studied structures of a cell, there was such question: "What are biological membranes in their structure?"
– Bimolecular protein layer
+ Bimolecular lipidic layer with protein components
– Bimolecular lipidic layer
– Monomolecular lipidic layer
– Bimolecular protein layer with lipidic components

132. The cell cycle is known to consist of several subsequent stages. At one of the stages, the synthesis of DNA happens. What do we call this period of the cell cycle?
– Presynthesis period (G₁) of interphase
+ Synthesis period (S) of interphase
– Mitosis
– Premitotic period of interphase
– Postsynthesis period (G₂) of interphase

133. At what variant of a karyotype one Barr's body is determined in nuclei of somatic cells?
– 45, XO
– 46, XY
– 47, XY, 21+
– 48, XXXY
+ 47, XX, 15+

134. The tumor of a uterus was removed in the woman of 60 years. At investigation of tumor cells, multipolar mitoses with chromosome disjunction to many poles were found. What orga-
nelles were damaged?
– Secondary lysosomes
+ Centrosomes
– Peroxisomes
– Ribosomes
– Rough ER

135. The doctor cytogenetics during preparation of a metaphase plate treated culture of leukocytes with hypotonic (0.56%) solution of potassium chloride. After such treatment, swelling of cells and a rupture of a cellular membrane occurred due to water inflow to a cell. What mechanism of transport takes place in this case?
– Phagocytosis
– Pinocytosis
– Diffusion
+ Endosmosis
– Facilitated diffusion

136. Autolysis occurred in a cell owing to damage of integrity and functions of membranes. What organoids were damaged?
+ Lysosomes
– Nucleus
– Mitochondria
– Endoplasmic reticulum
– Golgi apparatus

137. The mature viral part consists of fibrous envelope and nucleocapsid in which genetic material is concentrated. What name the mature part of a virus has?
– Prokaryote
+ Virion
– Genophore
– Nucleoid
– Phage

138. Diseases, which are associated with accumulation of carbohydrates, lipids etc. in cells, often are present in the man. The reason of developing of these hereditary diseases is lack of the appropriate enzymes in:
+ lysosomes
– mitochondria
– endoplasmic reticulum
– Golgi apparatus
– nucleus
139. Amitosis is a direct nuclear fission of a cell at which the interphase condition of the nucleus remains, nucleoli and nuclear membrane are well noticeable. During amitosis, chromosomes do not visible, and their uniform distribution is not occurred. As a result of amitosis, genetically different cells are formed. In what human cells amitosis is the normal phenomenon?

- Blastomeres
- Spermatogonia
- Oocytes
+ Cells of skin epithelium
- Gametes

140. In a cell, the chromosomes are in the condition of maximum spiralization and are placed along the equatorial zone. What period of mitosis is described?

- Prophase
- Telophase
+ Metaphase
- Anaphase
- Prometaphase

141. Under the influence of gamma-radiation a fragment of a chromosome has turned by 180°. What chromosomal mutation has taken place?

- Duplication
- Deletion
+ Inversion
- Intrachromosomal translocation
- Interchromosomal translocation

142. Animal cells are capable to the active movements, for example, to the ameboid movements. What structures of a cell provide such mobility of cells?

- Cytoplasm microtubules
- Intermediate microfilaments
+ Actin microfilaments
- Cell center and microtubules of a spindle of division
- Myofibrils

143. On one of stages of a cellular cycle, homologous chromosomes reach cell poles, are unwound; nuclear envelopes are formed around them, nucleoli are restored. In what phase of mitosis there is a cell?

- Metaphase
- Anaphase
– Prometaphase
+ Telophase
– Prophase

144. Examination of a patient with hepatolenticular degeneration revealed that synthesis of ceruloplasmin protein has a defect. What organelles is this defect connected with?
– Agranular endoplasmic reticulum
– Mitochondrions
– Golgi complex
+ Granular endoplasmic reticulum
– Lysosomes

145. In the medico-genetic center when studying a metaphase plate of the sick child, the circular chromosome was revealed; it was formed due to connection of end sites of the 16th autosome. Damage of what structure of a chromosome became the reason of this anomaly?
– Long arm
– Short arm
– Centromeres
+ Telomeric region
– Secondary constriction

146. Action of electromagnetic radiation on epithelial cells of intestines and kidneys was studied in radiological laboratory. What of the listed conditions cells will be the most sensitive to this damaging factor in?
– Specific work of cells
– Pinocytosis
– Excretion
+ Mitosis
– Phagocytosis

147. Organoids, which have no membranous structure and consist of two particles of different size, are present in cells of all organisms. They have microscopic sizes and carry out function of protein synthesis. How these organoids are called?
+ Ribosomes
– Lysosomes
– Leukocytes
– Chromosomes
– Mitochondria

148. Malarial plasmodium has a set of chromosomes 1n=12, its cells propagate in human body by schizogony. The number of
chromosomes in the nucleus of plasmodium, which reproduces in cells of human liver, will make:
+ 12
– 24
– 36
– 60
– 72

149. Small cells are found in a sample of tissue of embryonic ovary. Some of them divide mitotically. What stage of oogenesis is observed?
– Formation
– Growth
– Maturing
+ Multiplication
– Differentiation

150. Colchicine (the substance isolated from the plant Colchicum L.) stops process of mitosis. What exactly in the mechanism of mitosis is broken by colchicine?
– Division of centrioles of a centrosome
+ Formation of mitotic spindle
– Dissolution of a nuclear membrane
– Doubling of chromosomes
– Cytoplasm division

151. A tissue sample of benign tumor was studied under the electron microscope. A lot of small (15–20 nm) spherical bodies, consisting of two unequal subunits were detected. These are:
– microtubules
– Golgi complex
– mitochondria
+ ribosomes
– smooth endoplasmic reticulum

152. The culture of tumor cells shows fast cellular division by direct cleavage of a nucleus. Formation of threads of a spindle and condensation of chromatin are not revealed. How this type of cell division is called?
– Cytokinesis
– Karyokinesis
+ Amitotic division
– Mitosis
– Endomitosis

153. At the laboratory experiment, the leukocyte culture was
mixed with staphylococci. Neutrophile leukocytes engulfed and digested bacterial cells. This process is termed:
– facilitated diffusion
– diffusion
– osmosis
+ phagocytosis
– pinocytosis

154. Granular endoplasmic reticulum and Golgi apparatus are well developed in some cells. What main function is carried out by these cells?
+ Protein secretion
– Phagocytosis and digestion of engulfed particles
– Energy development
– Transfer of nervous stimulation
– Production of protein

155. Golgi complex exports substances from a cell due to the fusion of the membrane saccule with the cell membrane. The saccule contents flows out. What process is it?
– Active transport
– All answers are false
– Facilitated diffusion
+ Exocytosis
– Endocytosis

156. Life cycle of a cell includes the process of DNA autoreduplication. As a result of this process, monochromatid chromosomes become bichromatid. This phenomenon is observed within the following period of the cell cycle:
– $G_1$
– $G_2$
+ S
– $G_0$
– M

157. On an electron micrograph a scientist has identified a structure formed by eight histone proteins and a part of DNA molecule which makes about 1.75 revolutions around the molecules. Which structure has been identified?
– Chromosome
– Elementary fibril
+ Nucleosome
– Chromatid
– Half-chromatid
158. While studying maximally spiralized chromosomes of human karyotype, the process of cell division was stopped in the following phase:¹

– prophase
– anaphase
– interphase
+ metaphase
– telophase

159. A cell at the stage of mitotic anaphase was treated² by colchicine that inhibits chromosome separation to the poles. What type of mutation will be caused?

– Duplication
– Inversion
– Translocation
+ Polyploidy
– Deletion

160. Normal actively dividing cells of human red bone marrow are analyzed. What number of cell's chromosomes is typical for $G_1$ period?

+ 46
– 48
– 23
– 45
– 47

161. It is established that toxic effect of cyanides is shown in inhibition of cellular respiration. What organoid of a cell is sensitive to these poisons?

– Ribosomes
+ Mitochondria
– Cell center
– Golgi complex
– Lysosomes

162. Human karyotype is studied at metaphase stage of mitosis. At this stage it is possible to see, under appropriate magnification, that each chromosome consists of such number of chromatids:

¹ In the book “Collection of tasks...”, this question is written as follows: During the cell division we can see the maximum amount of condensed chromosomes. At what stage of the cell cycle is the process of the cell division stopped?
² In the exam booklet the word "stimulated" was used. But colchicine does not stimulate cellular processes!
163. One of two centrioles of a centrosome (cell center) was withdrawn from hepatocyte (liver cell) by means of the micromanipulator. What process will not take place in this cell?
+ Division
– Energy metabolism
– Synthesis of glycogen
– Biosynthesis of proteins
– Synthesis of lipids

164. In the electronic microphoto of a cell, the scientist revealed supramolecular structure – glycosyl groups of glycocalix, which have an appearance of the short chains that are closely bound with membrane proteins and lipids. What function is carried out by these structures?
– Structural
– Transport
+ Receptor
– Barrier
– Enzymatic

165. Eukaryotic cells contain membrane organelles, which are formed in Golgi complex and have enzymes for destruction of hydrogen peroxide that is formed during oxidation of some organic substances. What other important function is carried out by these organelles?
– Synthesis of complex carbohydrates
– Formation of ATP
– Synthesis of polypeptides
– Proteolysis
+ Oxidation of fatty acids

166. Signal molecules – protein receptors – are located on plasmatic membranes of cells. They bind molecules and initiate the answer. How receptors, which perceive neurotransmitters, work?
– Strengthen passive diffusion
+ Assist formation of open channels in membranes
– Strengthen active diffusion
– Activate pinocytosis
– Slow down transport of substances
167. Specific membrane bubbles were formed in a cell after absorption of dissolved substances. How this type of transport of molecules through a membrane is called?
- Phagocytosis
+ Pinocytosis
- Diffusion
- Facilitated diffusion
- Exocytosis

168. Each species of organisms has certain constant number of chromosomes. The mechanism, which maintains this constancy during asexual reproduction, is:
- meiosis
- reduplication
+ mitosis
- repair
- transcription

169. It is possible to see bacteria and leukocytes in the cytoplasm of mouth amoeba at different stages of digestion. How absorption of solid particles by a cell is called?
- Pinocytosis
- Osmosis
- Exocytosis
- Diffusion
+ Phagocytosis

170. During formation of teeth, cell fission of a nipple of human epidermis occurs. Thus new cells with identical number of chromosomes and equivalent volume of genetic information are formed. These cells divide by:
- Amitotic division
- Endomitosis
- Schizogony
+ Mitosis
- Meiosis

171. How fibers of intestines absorb amino acids as products of proteolysis?
+ By means of transport proteins
- By phagocytosis
- By pinocytosis
- By means of diffusion (on a concentration gradient)
- By means of osmosis

172. In a laboratory, the group of researchers experimentally re-
ceived mutant cells without nucleoli. Synthesis of what compounds will be broken in them first of all?
– Polysaccharides
– Lipids
– Transport RNA
– Monosaccharides
+ Ribosomal RNA

173. The system of intracellular tubules and tanks, which is divided on rough and smooth, is revealed in eukaryotic cell under electronic microscope. It provides isolation of fermental systems and is necessary for their subsequent involvement in the coordinated reactions. What organelles are continuations of this system and directly depend on its functioning because convert the substances synthesized in it into more complex compounds?
+ Golgi complex
– Mitochondria
– Microtubules
– Centrosome
– Lysosomes

174. In what sequence the following processes happen during mitosis in animals and plants: 1. Nuclear envelope destroys. 2. Chromosomes move to the middle part of the cell (equator). 3. Microtubules join kinetochores. 4. Daughter chromosomes separate?
– 1, 2, 3, 4
– 2, 3, 1, 4
– 4, 3, 2, 1
+ 1, 3, 2, 4
– 3, 1, 2, 4

175. When studying cells of a pancreas at the subcellular level, disturbances of functions of concentration, dehydration and compaction of products of intracellular secretion, and also of synthesis of polysaccharides, lipids, and enzymes are revealed. What organelles are responsible for these processes?
– Ribosomes
– Lysosomes
+ Golgi complex
– Mitochondria
– Endoplasmic reticulum

176. For studying of heredity at the molecular level, parasitic forms, which can invade bacterial cell without causing its lysis
during certain time, are used. They are often similar to tadpoles, consist of a head and a tail, they cannot be seen under light microscope. What forms of the organization of living things these parasites belong to?
– Plasmids
+ Bacteriophages
– Cyanobacteria
– Protozoans
– Mycoplasmas

177. During investigation of culture of tissue of malignant tumor, cell fission that happened by formation of constriction of a nucleus without achromatinic apparatus was revealed; also nuclear envelope and nucleoli remained. What type of cell division occurred in the studied malignant tumor?
– Endomitosis
– Mitosis
+ Amitotic division
– Exomitosis
– Meiosis

178. Substances are excreted from a cell as a result of connection of membrane structure of Golgi apparatus with a plasmatic membrane. Content of such structure is thrown out of cell borders. This process has the name:
+ exocytosis
– osmosis
– endocytosis
– diffusion
– transport

179. Experimental studying of a new medical preparation revealed its blocking effect on assembly of proteins tubulins, which are the basis of spindle in dividing cells. What stage of a cellular cycle is broken by this preparation?
– Synthetic period
– Telophase of mitosis
– Postmitotic period of interphase
– Premitotic period of interphase
+ Anaphase of mitosis

180. The cell underwent influence of the ionizing radiation at deficiency of vitamin E. It promoted the strengthened exit of hydrolytic enzymes into cytoplasm, and it has led to total destruction of intracellular structures. Define, what organelles of a cell are rich-
est with hydrolytic enzymes, and autolysis occurs as result of destruction of their membranes.

- Endoplasmic network
+ Lysosomes
- Golgi complex
- Microbodies
- Mitochondria

181. The mutual attraction of chromosomes is called "conjugation" or "synapsis". Conjugation occurs very precisely. The ends of chromosomes or the whole chromosomes join at all the length. At what stage of the first prophase of meiosis conjugation occurs?

- Diakinesis
- Dictyotene
- Diplonema
+ Zygonema
- Leptonema

182. The violations, which appear in mitosis, lead to formation of cells with different karyotypes that is one of mechanisms of somatic aneuploidy. What is the name of such mitosis?

- Abnormal
- Chromosomal
- Genomic
+ Pathological
- Genic

183. Example of what type of transport through a membrane is the H pump, which extorts hydrogen ions from a cell by means of ATP?

- Osmosis
- Passive transport
- Facilitated diffusion
- Exocytosis
+ Active transport

184. Spindle is formed during mitosis. What cellular structure takes the most active part in formation of a spindle?

- Nucleus
+ Cytoskeleton
- Ribosomes
- Mitochondria
- Agranular ER

185. During oogamy, one ovum ripens, grows, then the follicle bursts and the ovum (an oocyte of the II order) comes to uterine
tubes. What number of chromosomes and DNA the ovum has at this time?
– 1n 1c
– 2n 2c
+ 1n 2c
– 2n 4c
– 4n 4c

186. The mutagen influenced a cell and partially destroyed a spindle of division. The karyological analysis was carried out. Calculation of chromosomes in a metaphase plate showed existence of 49 chromosomes. How this mutation is called?
– Polyploidy
– Mosaicism
+ Heteroploidy
– Triploidy
– Duplication

187. The important role in the process of protein biosynthesis belongs to the ribosomal RNA forming a structural skeleton of ribosomes. And where formation of ribosomal RNA occurs?
– In cytoplasm
+ In nucleoli
– In mitochondria
– In lysosomes
– In a cell center

188. Three periods are distinguished in interphase of cellular cycle. During S phase of cellular cycle occurs:
– meiosis
– cytokinesis
– mitosis
+ DNA replication
– amitotic division

189. The preparation destroying a spindle influenced on culture of mitotically dividing cells in experiment. It has led to damage of:
– postsynthetic period
– formations of a nuclear envelope
– doubling of chromatids
– despiralization of chromosomes
+ chromosome disjunction to cell poles

190. The cells of human red marrow relating to a cellular complex that constantly renews are investigated. How these cells are formed in norm?
– By binary division
– By schizogony
+ By mitosis
– By meiosis
– By amitotic division

191. Microscopic analysis of human heart cells revealed some oval organelles, their envelope being formed by two membranes: the external one is smooth, and the internal one forms cristae. Biochemical analysis determined the presence of ATP synthetase enzyme. What organelles were analysed?  
+ Mitochondria
– Lysosomes
– Ribosomes
– Endoplasmic reticulum
– Centrosomes

192. Cells with 44 and 48 chromosomes were found in culture of leukocytes of peripheral blood of liquidators of the Chernobyl accident that can indicate to disturbance of mitotic cycle at a stage:
– synthetic period of interphase
– prophase
– telophase
+ anaphase
– G₁ period of an interphase

193. Formation of subunits of ribosomes in a cell was broken experimentally (by influence of mutagenic factors). What metabolic process will be affected?
– Biosynthesis of carbohydrates
– ATP synthesis
+ Protein biosynthesis
– Photosynthesis
– Biological oxidation

194. It was established that cells of organisms lack membrane organelles and their hereditary material has no nucleosome organization. What are the organisms?
– Eukaryotes
+ Prokaryotes
– Viruses
– Protozoans

1 In the book “Collection of tasks...”, this question is written as follows: The electronograms of the rat's liver cells demonstrate some bimembraneous oval structures, the internal membrane of which forms cristae. What organelles are these?
– Ascomycetes

195. **At a meeting of student scientific circle, first-year students decided to investigate their karyotype by method of studying of sex chromatin. What material is used most often for these investigations?**
– Erythrocytes
– Skin epidermis
+ Mouth epithelium
– Nervous cells
– Sex cells

196. **The buccal swab of the mucous of man's mouth was taken by the spatula for laboratory investigations. Probable ways of cell fission of this tissue:**
+ cells divide mitotically and by amitotic division
– cells divide only mitotically
– cells divide only by amitotic division
– cells divide by meiosis and amitotic division
– cells divide mitotically, and endomitosis is observed

197. **During mitotic division of diploid somatic cell, it was influenced by colchicine. Mitosis was disturbed, and the uninuclear polyploid cell was formed. Mitosis was suspended at a stage:**
+ metaphase
– anaphase
– prophase
– telophase
– cytokinesis

198. **Three chromosomes of the 13th pair were revealed at the newborn child with multiple defects of a skull, extremities and internal by means of karyotyping method. The diagnosis was established:**
– Edwards' syndrome
– Klinefelter's syndrome
– Down syndrome
+ Patau syndrome
– Turner's syndrome

199. **Increase of permeability of membranes of lysosomes is observed in a cell as a result of ionizing radiation or avitaminosis E. What consequences such pathology can lead to?**
– Intensive synthesis of proteins
– Intensive synthesis of energy
– Restoration of cytoplasmatic membrane
+ Partial or total destruction of a cell
– Formation of a spindle of division

200. When carrying out scientific experiment, the researcher destroyed structure of one of parts of a cell that disturbed ability of a cell to division. What structure was destroyed most likely?
- Mitochondria
- Glycocalix
+ Centrosome
- Microfibrils
– Golgi complex

201. Students study the stages of gametogenesis. They analyze a cell having haploid number of chromosomes, and each chromosome consists of two chromatids. The chromosomes are located in the equatorial plane of the cell. Such situation is typical for the following stage of meiosis:
– prophase of the first division
– anaphase of the second division
– metaphase of the first division
+ metaphase of the second division
– anaphase of the first division

202. The organisms to be identified have a nucleus surrounded by a nuclear membrane. Genetic material is concentrated predominantly in the chromosomes that consist of DNA strands and protein molecules. These cells divide mitotically. Identify these organisms:
– bacteriophages
– viruses
+ eukaryotes
– prokaryotes
– bacteria

203. Long influence of toxicants on an organism led to considerable decrease in protein synthesis in hepatocytes. What organelles suffered from intoxication most of all?
– Golgi complex
– Mitochondria
– Microtubules
– Lysosomes
+ Granular endoplasmic reticulum

204. Analysis of an electron diffraction pattern of a cell revealed mitochondrion destruction. This might result in abnormal course of the following cell process:
– nuclear division
+ oxidation of organic substances
– crossing over
– cleavage
– protein hydrolysis

205. Cytogenetic analysis established that the patient had the 47, XYY karyotype. The extra chromosome in the karyotype has a centromere located very close to one of the chromosome ends so that one chromosomal arm is much shorter than the other one. Such a chromosome is called:
+ acrocentric
– metacentric
– submetacentric
– telocentric
– submetacentric with a satellite

206. The recombination of genetic material is reached by several mechanisms one of which is the crossing over. At what stage of a prophase of the first meiotic division it occurs?
– Leptonema
– Zygonema
– Diplonema
+ Pachynema
– Diakinesis

207. During the period of presynthesis of mitotic cycle, synthesis of the enzyme DNA-dependent DNA polymerase in a cell was broken. What effects it can lead to?
– Disturbance of spindle formation
– Disturbance of cytokinesis
+ Disturbance of DNA replication
– Reduction of duration of mitosis
– Disturbance of chromosome disjunction to poles
CLASSICAL GENETICS

208. The woman with I (O) rh⁻ blood type married the man with IV (AB) Rh⁺ blood type. What variant of blood type and Rhesus factor can be expected in children?
+ III (B) Rh⁺
- I (O) rh⁻
- IV (AB) Rh⁺
- I (O) Rh⁺
- IV (AB) rh⁻

209. Phenotypically identical anomalies can be caused by genotypical as well as environmental factors influencing an embryo. For example, congenital cataract can be autosomal recessive disease or the result of infection of German measles or influence of ionizing radiation during the early period of pregnancy. How changes, which occur under the influence of environmental factors and repeat the traits of an organism with another genotype, are called?
- Multiple alleles
- Genocopies
- Incomplete penetrance
+ Phenocopies
- Pleiotropic action of genes

210. In what of marriages rhesus incompatibility of mother and a fetus is possible?
+ rr × RR
- RR × rr
- Rr × Rr
- Rr × rr
- Rr × RR

211. The blind girl, whose parents, brothers and sisters were blind too, married the blind young man, whose brother and sister were blind too, but other family members – mother, father, two sisters and brother – were able to see. From this marriage 8 children were born, which were able to see. Analyse a pedigree and name the reason of the birth children, who are able to see, in blind parents:
- pleiotropic action of genes
+ genocopies
- multiple alleles
- incomplete penetrance
- phenocopies
212. **Endemic goiter is widespread among Transcarpathian population due to iodine deficiency in food. What form of variability is this case based on?**
- Mutational
- Modification
- Combinative
- Hereditary
- Genotypical

213. **Development of any traits in the man is result of complex interactions between genes and products of translation at the molecular level. It is established that one pair of alleles controls permeability of capillaries, development of a trunk of brain and cerebellum, and one of functions of thymus. What phenomenon it can belong to?**
- Codominance
- Complementarity
- Pleiotropy
- Overdominance
- Interaction of polymeric genes

214. **The group of Caucasians men settled in South Africa, and marriages happened only between them throughout several generations. Their skin became darker, like skin of Negroids. However, children of these people continued to be born as white. About what phenomenon one can talk?**
- Modification variation
- Genocopies
- Phenocopies
- Genotypical variation
- Combinational variation

215. **Woman with Rh-positive (Rh+) blood is pregnant; her fetus is Rh-negative (rh-). Whether developing of rhesus incompatibility in this case is possible?**
- Rhesus incompatibility does not arise
- Rhesus incompatibility arises at the third and other pregnancies
- Rhesus incompatibility does not arise at the first pregnancy, but appears at the second pregnancy
- Rhesus incompatibility will arise surely
- Rhesus incompatibility arises if before pregnancy Rh-negative blood was transfused

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1 Other possible incorrect answers – "Ontogenetic", "Correlative".
216. These mutations are not transferred to descendants at sexual reproduction, nevertheless, in individual development they can influence formation of a trait, leading to formation of organisms as mosaics. About what mutations there is a talk?
– Gene mutations
– Generative mutations
– Translocations
– Transgenation
+ Somatic mutations

217. The wife is blind owing to anomaly of a crystalline lens, and the husband is blind owing to anomaly of a cornea (both types of blindness are transferred as the recessive traits that are not linked). They have two children: blind child and child that is able to see. What is the highest probability that their third child will be able to see?
– 12%
– 37.5%
– 25%
+ 50%
– 0%

218. Familial hypercholesterolemia is inherited on autosomal recessive type. In heterozygotes, this disease is shown by the increased content of cholesterol in blood. In homozygotes, besides, xanthomas (benign tumors of skin and tendons) and early atherosclerosis develop. What is the probability of the birth of healthy child in a family, where one of parents has only high content of cholesterol in blood, and the second parent has all complex of manifestation of this hereditary disease?
– 75%
+ 0%
– 25%
– 100%
– 50%

219. The child who is sick with phenylketonuria (autosomal recessive hereditary disease) was born at clinically healthy parents. What are genotypes of parents?
– aa × aa
– AA × AA
– AA × Aa
– Aa × aa
+ Aa × Aa
220. Rh-negative mother has the first blood type; father has the third blood group and is Rh-positive. What blood types are possible in children if the father is heterozygous on the first trait?

– The first and second Rh-positive
– The first and third Rh-negative
– The first and second Rh-negative
+ The first and third Rh-positive
– The second and third Rh-positive

221. Inheritance of blood types is defined by a type of gene interaction. Parents have the second and third blood types, and their child has the first blood type. What type of interaction of genes is the cornerstone of this phenomenon?

+ Complete dominance
– Incomplete dominance
– Codominance
– Interaction of polymeric genes
– Complementary interaction of genes

222. A married couple consulted a specialist at the genetic consultation about probability of having children with haemophilia. Both spouses are healthy, but the wife's father has haemophilia. In this family hemophilia may be passed to:

– daughters only
– all the children
– half of daughters
+ half of sons
– both sons and daughters

223. Genes A and B are linked incompletely. What recombinant gametes are formed by Drosophila female with AB//ab genotype?

+ Ab, aB
– B, b
– AB, ab
– A, a
– Aa, Bb

224. The female albino (trait is inherited on autosomal recessive type), who has normal blood clotting and I (O) blood type, addressed in genetic consultation. What of the listed genotypes is the most probable for this woman?

– AA ii X^H X^h
+ aa ii X^H X^H
– Aa I^i X^H X^H
– aa I^I^i X^h X^h
225. The part of erythrocytes of the man has crescent shape; he did not know about it before conscription. HbS hemoglobin was found in his blood along with HbA hemoglobin. What type of interaction of genes is characteristic of this pathology?
– Codominance
+ Incomplete dominance
– Complementarity
– Complete dominance
– Overdominance

226. At parents with what genotypes children with all blood types of ABO system can be born?
– χ^A χ^B X^H X^H
– χ^A i X^B
– χ^B i X^A
+ χ^A i X^B i
– ii X^A χ^B

227. Brown eyes of man is dominant trait, blue eyes is recessive trait. The blue-eyed man, which parents had brown eyes, married the brown-eyed woman, whose father had blue eyes and mother had brown eyes. What the most exact ratio can be present in their children?
– 1:2:1 in genotype
– 3:1 in phenotype
– 2:1 in phenotype
– 1:2:1 on in phenotype
+ 1:1 in genotype

228. Significant role in human pathology belongs to so-called phenocopies, which resemble genetically caused changes on the manifestation and are caused by an adverse effect of any factors. At what stage phenocopies arise?
– During spermatogenesis in the father
– During oogenesis in the mother
– During fertilization
– At the time of delivery
+ During implementation of genetic information

229. The phenomenon of interaction of polymeric genes, as one of kinds of interaction of nonallelic genes, consists in dependence of the degree of trait manifestation on different dominant genes. What of the genotypes given below best of all corresponds to interaction of polygenes?
230. The child's father is Rh-positive with the second blood type and homozygous, mother is Rh-negative with the first blood type. What phenotypes and genotypes can be present in children?

- Homozygous Rh-negative with the first blood type
- Heterozygous Rh-positive with the second blood type
- Homozygous Rh-positive with the second blood type
- Heterozygous Rh-positive with the first blood type

231. Albinism is inherited as autosomal recessive trait. Albino child was born in a family where both parents are healthy. What is the probability of the birth of the normal child?

- 25%
- 100%
+ 75%
- 10%
- 50%

232. Two boys were mixed in maternity hospital. Parents of one of them had I and IV blood types, parents of the second had II and IV blood types. Investigations showed that children have I and IV blood types. The forensic medical examination established that one of boys is the extramarital. What genotypes parents of the child with I blood type should have?

- I^A I^A × I^B I^B
- I^A I^B × I^A I^B
- I^A I^B × I^B I^B
+ I^B I^B × I^A I^A
- I^B I^B × I^B I^B

233. Red hairs is recessive trait, black hairs is dominant trait. At what marriages children with red hairs will be born with probability of 25%?

- aa × aa
- Aa × aa
- AA × AA
- AA × aa
+ Aa × Aa

234. Normal pigmentation of human skin (C) dominates over albi-
nism (c); existence of freckles (P) dominates over their absence (p). Define probability of the birth of the children similar to parents if the father and mother are diheterozygous:

\[-\frac{1}{16}\]
\[-\frac{2}{16}\]
\[-\frac{3}{16}\]
\[-\frac{6}{16}\]
\[+\frac{9}{16}\]

235. X-linked recessive lethal gene causes resorption of human embryo at early stages of development. What of possible zygotes that is the carrier of such gene is not capable to develop?

– None
– \(X^A X^A\)
– \(X^A Y\)
– \(X^a Y\)
– \(X^A X^A\)

236. Inclination to diabetes mellitus is provoked by the autosomal recessive gene. This gene becomes apparent only in 30% of homozygous individuals. What genetic regularity is observed in this case?

– Discontinuity
– Complementarity
– Gene expressiveness
– Incomplete penetrance
– Pleiotropism

237. Healthy young spouses have the son with hemophilia. The grandfather on the mother's side is sick with hemophilia. What are genotypes of parents?

– \(X^H X^H, X^H Y\)
– \(X^H X^h, X^h Y\)
– \(X^h X^H, X^h Y\)
– \(X^h X^h, X^H Y\)
– \(X^h X^h, X^H Y\)

238. The children's form of amaurotic familial idiocy (Tay–Sachs disease) is inherited as an autosomal recessive trait and ends with death until 4–5 years. The first child in a family died of this disease when the second had to be born. What is the probability that the second child will have the same disease?

– 0%
– 100%
– 50%
239. The daughter of the color-blind man marries the son of other color-blind man, and these spouses distinguish colors normally. What is the greatest probability of appearance of daltonism in their children?

+ 25%
– 75%

240. Healthy parents have a son with phenylketonuria, but owing to a special diet he has normal development. What type of variability is his normal development connected with?

– Mutational variability
– Combinative variability
+ Modificative variability
– Genotype variability
– Inherited variability

241. Father suffers from migraine (dominant trait), and mother is healthy. Father has normal hearing, mother also is normal, but she has recessive allele of deafness. What is the probability of the birth of children with both diseases if the father is heterozygous on both genes?

+ 1/8
– 2/8
– 3/8
– 4/8
– 8/8

242. The bud appeared from a plant cell in which the mutation occurred, and then shoot with new properties was formed. At what reproduction new properties will be inherited by descendants?

– Sexual with fertilization
– Sexual without fertilization
– Budding
+ Vegetative
– Spore formation

243. One of parents of healthy husband has diabetes, and both parents of wife are sick. What percent of children will be similar

1 There is a mistake in this question in the book “Collection of tasks…” – incorrect phrase "Parents with normal health have an ill with phenylketonuria son" is used in this book.
244. In a large family, there are four sons and three daughters who differ phenotypically from each other on many traits. This results from the fact that different combinations of chromosomes get to each gamete during the process of gametogenesis in parents. At what stage of meiosis it happens?
- Metaphase of meiosis I
+ Anaphase of meiosis I
- Anaphase of meiosis II
- Prophase of meiosis I
- Prophase of meiosis II

245. What is the probability of the birth of the boy in a family, where mother is the carrier of recessive lethal allele that is sex-linked and causes death of an embryo at early stages of development?
- $1/4$
+ $1/3$
- $2/3$
- $1/2$
- $3/4$

246. As a result of iodine deficiency in foodstuff, Transcarpathian people often have endemic goiter. What form of variation is the cornerstone of this disease?
- Mutational
- Combinational
+ Modification
- Hereditary
- Genotypical

247. Synthesis of interferon (the protein) in human cells is determined by complementary interaction of dominant alleles of different genes A and B. Ability to form interferon in one of parents is inhibited due to lack of gene B; the second parent is healthy and all his relatives are healthy too. What is the probability of appear-

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1 Another variant is "ontogenetic".
ance of healthy progeny?
— 0%
— 100%
— 25%
— 75%
— 50%

248. Deafness can be caused by different recessive alleles "a" and "b", which are located in different pairs of chromosomes. The deaf man with aaBB genotype married the deaf woman with AAbb genotype. Four children was born in this family. How many from them were deaf?
+ None
— Two
— Four
— One
— Three

249. Pigmentation of human skin is controlled by several pairs of genes, which are not linked and interact as additive polymeric genes. The person with genotype $a_1a_1a_2a_2a_3a_3$ will have such pigmentation of skin:
— an albino (pigmentation is absent)
— black (Negroid)
— yellow (Mongoloid)
+ white (Caucasian)
— brown (mulatto)

250. The young man from the Central Africa arrived to Ukraine to get the higher medical education. He suffers from easy form of sickle-cell anemia. On the third year of training, he married the Ukrainian girl who was healthy on this trait. They gave birth to the daughter. What is the highest probability that this child will be sick (gene of sickle-cell anemia is inherited as incompletely dominant)?
— 0%
— 50%
— 25%
— 100%
— 75%

251. Two organisms are crossed. One of them is heterozygous on a dominant gene, and the second is homozygous on a recessive gene. What is this crossing?
— Complementary
– Dihybrid
+ Analyzing
– Not linked
– Polyhybrid

252. *Four blood types of ABO system in human are defined by interaction of three genes of one locus:* \( i \), \( I^A \), and \( I^B \). How many genotypes and phenotypes they form?
– Three genotypes and three phenotypes
– Three genotypes and four phenotypes
– Four genotypes and four phenotypes
+ Six genotypes and four phenotypes
– Six genotypes and six phenotypes

253. *In human population of the city N, among all people who has dominant gene of schizophrenia, 35% have an apparent clinical picture. This characteristic of a gene is called:*
+ penetrance
– stability
– expressivity
– specificity
– mutability

254. *In numerous experiments, homozygous or heterozygous organisms are crossed between themselves. Then quantitative manifestations of traits are analyzed in progeny. Define, what the method is used:*
– genealogical
– cytogenetic
– selective
+ hybrid
– population-statistical

255. *There is a unicellular organism, which is characterized by a set of chromosomes \( 2n=8 \) and breeds in the asexual way. Genetic variety of individuals in population will make (without mutations):*
+ 1 type
– 8 types
– 128 types
– 32 types
– 256 types

256. *IV blood type was revealed in the donor. Phenotypically it is characterized by existence of:*
– antigens A and antibodies beta
– antigens B and antibodies alpha
+ antigens A and B
– antigens A and antibodies alpha
– antibodies alpha and beta

257. Owing to viral infection, one person had changes of a phenotype, which are similar to mutations, but did not change a genotype. This phenomenon is called:
+ phenocopy
– mutation
– recombination
– genocopy
– long modification

258. In a family, there were 7 healthy children who were born at different times. They differ phenotypically. Their differences are caused by:
– penetrance
+ combinational variation
– frequency of occurrence of a dominant gene
– different karyotypes
– frequency of occurrence of a recessive gene

259. The mass of the man is controlled by several pairs of genes that are not linked. The more dominant genes in a genotype, the more body weight of the man. It is an example of:
– monogenic inheritance
– overdominance
+ interaction of polymeric genes
– epistasis
– complete dominance

260. Blood types of Rh system in man are defined by interaction of two alleles of one gene. These alleles form and define:
– three genotypes and four phenotypes
– four genotypes and two phenotypes
– six genotypes and four phenotypes
– six genotypes and six phenotypes
+ three genotypes and two phenotypes

261. Choose an autosomal recessive trait of the man among listed below:
– right-handedness
– polydactyly
– pigmentation of skin
– hemophilia
+ blood type I of ABO system
262. The monocellular parasite with a set of chromosomes $2n=24$, which breeds by schizogony, is studied. A genetic variety of individuals in population will make (without mutations):
+ 1 type
– 256 types
– 24 types
– 128 types
– 32 types

263. A family of students who came from Africa got a child with anemia signs. The child died soon. Examination revealed that the child's erythrocytes have abnormal semilunar shape. Specify genotypes of the child's parents.\(^1\)
– $aa \times aa$
– $Aa \times aa$
– $Aa \times AA$
– $AA \times AA$
+ $Aa \times Aa$

264. A husband is a homozygote by a dominant gene which causes polydactyly. His wife is a homozygote by recessive allele of this gene. Which of the below mentioned genetic regularities can be apparent in their children as for their having polydactyly?
– The law of segregation
+ The law of dominance\(^2\)
– The law of independent assortment
– Linkage of genes
– Sex-linked inheritance

265. The husband is brown-eyed and homozygous on a dominant gene, and the wife is blue-eyed. Such regularity will be shown in their children as:
– independent inheritance
– hypothesis of purity of gametes
– segregation of hybrids
– linked inheritance
+ uniformity of hybrids of the first generation

266. Human skin color is controlled by several pairs of genes,

\(^1\) In the book “Collection of tasks…”, this question is written as follows: *In a family of students from Africa a child with signs of anemia was born. The child died within a short time. It was found that the child's erythrocytes were shaped like a sickle. What genotypes may the parents have if they have a light form of anemia?*

\(^2\) There is a mistake in this question in the book “Collection of tasks…” – incorrect word combination “The law of unit characters” is used in this book.
which are not linked and interact as additive polygenes. What skin pigmentation will be present in the man with genotype $A_1A_1A_2A_2A_3A_3$?
- Yellow (Mongoloid)
- White (Caucasian)
- Brown (mulatto)
+ Black (Negroid)
- An albino (pigmentation is absent)

267. Human height is controlled by several pairs of genes that are not linked; very small men are dominant homozygotes, and vary tall men are recessive homozygotes. What type this phenomenon belongs to?
+ Interaction of polymeric genes
- Pleiotropy
- Codominance
- Overdominance
- Complementarity

268. Spouses gave birth to the child with bright blue eyes. In some months, color of an iris of the eye changed and became greenish-gray. Parents consulted the pediatrician, suspecting possibility of pathology, but the doctor calmed them; he explained that this is:
- consequence of changing of feeding of the baby from maternal milk to dairy mixes
- result of teething
+ manifestation of norm of reaction of appropriate genes
- the phenomenon inherited from one of parents
- usual feature of the period of ontogenesis

269. The intensity of human skin pigmentation is controlled by a few pairs of nonallelic dominant genes. It was found that if the quantity of the genes increases, the pigmentation becomes more intensive. What do we call this type of interaction of these genes?
- Epistasis
- Pleiotropy
+ Polymery
- Codominance
- Complementary

270. The same genotype in a human can cause the development of a feature with different degrees of manifestation that depends on the interaction of this gene with the others and on the influence of environmental conditions. What do we call the degree of
**271.** At what blood types of parents on Rhesus factor system, Rhesus factor incompatibility is possible during pregnancy?

- Wife is Rh\(^+\) (homozygote), husband is Rh\(^+\) (homozygote)
- Wife is Rh\(^+\) (heterozygote), husband is Rh\(^+\) (heterozygote)
- Wife is rh\(^-\), husband is Rh\(^+\) (homozygote)
- Wife is rh\(^-\), husband is rh\(^-\)
- Wife is Rh\(^+\) (heterozygote), husband is Rh\(^+\) (homozygote)

**272.** Chromosome aberrations and changes of chromosome number can arise at different stages of individual development. What can be the reason that the organism, which can be called a full mutant, was formed?

- Mutant gametes of parents
- Mutant gametes of father
- Mutant gametes of mother
- Gametes of parents the normal
- Wrong second division of zygote

**273.** Children with normal hearing have been born by deaf and dumb parents with the genotype DD\(ee\) and dd\(EE\). What is the form of gene interaction between the genes D and E?

- Complementarity
- Complete dominance
- Epistasis
- Polymery
- Codominance

**274.** Some clinically healthy people can feel anemia symptoms in the conditions of high mountains. Blood test can reveal sickle-shaped erythrocytes. What is the genotype of such people?

- \(X^cX^c\)
- aa
- AA
- Aa

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1 This answer (in the book “Collection of tasks…”) is not good. The answer “expressivity” is better.
275. The woman who needs in urgent blood transfusion got to hospital. Analysis showed that the woman has I blood type, rh-. What blood type and Rhesus factor her husband should have that her son could become a donor for her?
+ I (O) rh−
– Any
– IV (AB) rh+
– Correct answer is not present
– IV (AB) rh−

276. One of the parents is suspected of having phenylketonuria recessive gene. What is the risk of giving birth to a child with in-born phenylketonuria?
– 50%
+ 0%
– 100%
– 25%
– 75%

277. It is known that the gene responsible for development of blood groups according to ABO system has three allelic variants. If a man has IV blood group, it can be explained by the following variability form:
– phenocopy
– phenotypic
– genocopy
– mutational
+ combinative

278. Spouses, where the wife has normal structure of a hand and the husband has polydactyly, consulted a doctor with such question: whether inheritance of this anomaly by their future child is possible, if their first child has normal structure of a hand? The gene of polydactyly is known to be dominant. What is the probability of the birth of the six-fingered child at these spouses?
– 25%
– 75%
– 0%
– 100%
+ 50%

279. Rhesus incompatibility occurs during transfusion to the recip-
ient of Rh-positive blood of the same group on ABO system if blood of this recipient:

– contains agglutinogen A
– is Rh-positive
– contains beta agglutinin
– contains agglutinogen B
+ contains no Rh factor

280. Woman applied to the medico-genetic consulting centre for information about the risk of haemophilia in her son. Her husband has been suffering from this disease since birth. Woman and her parents are healthy (don't have haemophilia). Is the boy likely to have the disease in this family?

– 25% of the boys will be ill
– All boys will be ill
+ All boys will be healthy
– 50% of the boys will be ill
– 75% of the boys will be ill

281. Changes of chemical structure of a gene can appear in its different sites. If such changes are compatible to life, i.e. do not lead to death of organisms, they remain in gene pool of the species. How different variants of one gene are called?

– Genocopies
– Phenocopies
+ Multiple alleles
– Plasmids
– Cistrons

282. Phenylketonuria that, as a rule, leads to death at six-month age is inherited as an autosomal recessive trait. Achievements of modern medicine allow to prevent serious consequences of disturbance of phenylalanine metabolism. The woman, who was cured of phenylketonuria, married the healthy man. Define the highest probability of the birth of the viable child with phenylketonuria in this family:

– 6.25%
– 18.75%
– 25%
+ 50%
– 100%

283. Mutagenic factors can have specific form of influence. For example, acridines induce shift of reading frame due to inserts or losses of nucleotides. How the mutations associated with increase
or reduction of genetic material are called?
– Genocopies and phenocopies
– Leading and lagging behind
+ Duplications and deletions
– Spontaneous and induced
– Hereditary and nonheritable

284. There are two children in a family. The daughter has O blood type, the son has AB blood type. What genotypes their parents have?
+ \( \text{I}^A \text{i} \times \text{I}^B \text{i} \)
– \( \text{I}^A \text{I}^A \times \text{I}^B \text{I}^B \)
– \( \text{I}^A \text{I}^B \times \text{I}^A \text{I}^B \)
– \( \text{i} \times \text{I}^A \text{I}^A \)
– \( \text{i} \times \text{I}^A \text{I}^B \)

285. A woman with O (I) blood group has born a child with AB blood group. Woman's husband has A blood group. What genetic interaction explains this phenomenon?
+ Recessive epistasis
– Polymery
– Complementation
– Codominance
– Incomplete dominance

286. A number of mechanisms (for example, endomitosis), which increase amount of hereditary material and intensity of metabolism in cells with keeping constant number of cells, evolves from mitotic cycle. What are these mutations?
– Chromosome mutations
– Genomic generative mutations
+ Genomic somatic mutations
– Heteroploidy
– Gametopathy

287. A couple came for medical genetic counseling. The man has hemophilia, the woman is healthy and there were no cases of hemophilia in her family. What is the risk of having a sick child in this family?
– 25%
+ 0%
– 100%
– 75%
– 50%

288. Lack of sweat glands in man is coded by the recessive gene
localized in the X chromosome. Future spouses addressed to genetic consultation: the healthy young man marries the girl whose father suffered from lack of sweat glands, and mother and her relatives were healthy. What is the probability of manifestation of this trait in sons from this marriage?

- 0%
- 25%
+ 50%
- 75%
- 100%

289. The mutation – inversion of one of chromosomes – takes place in the patient owing to pathogenic influence of the ionizing radiation. How the pathogenic factor, which led to such pathological changes, is called?

- Chemical mutagen
- Carcinogen
+ Physical mutagen
- Biological mutagen
- Virus

290. The father has alkaptonuria, mother is homozygous on the normal gene. The probability of appearing of alkaptonuria in children makes:

- 75%
- 100%
- 25%
+ 0%
- 50%

291. Heterozygous father has astigmatism; mother is healthy. The probability of appearance of astigmatism in children makes:

- 75%
- 25%
- 0%
- 100%
+ 50%

292. Disturbance of intellectual development was revealed in the child with Rett syndrome. Geneticists established that the essential role in pathogenesis of this syndrome belongs to morpho-functional changes of mitochondria. What type of heredity has caused this pathology?

- Chromosomal
- Plasmid
293. The father of the pregnant woman has hemeralopia, which is inherited as the recessive X-linked trait. This disease did not happen among the husband's relatives. What is the probability that the born child will have hemeralopia if it was established that fetus is a male?
+ 50%
– 0%
– 25%
– 100%
– 75%

294. Phenylketonuria is inherited on autosomal recessive type. At what genotypes of phenotypically healthy wife and husband, the child with phenylketonuria can be born?
– AA and AA
+ Aa and Aa
– AA and aa
– Aa and aa
– aa and aa

295. Violation of formation of collagenic fibers is the cornerstone of a number of hereditary diseases. Formation of collagenic fibers is broken also at deficiency of vitamin C in an organism. How traits, which are caused by environmental factors and resemble hereditarily traits, are called?
– Mobile genetic elements
– Plasmids
– Suppressors
– Genocopies
+ Phenocopies

296. The woman with Rh-negative blood of III group gave birth to the child with IV blood type who had hemolytic disease of newborns owing to rhesus incompatibility. What genotype on a blood type and Rhesus factor is the most probable at the father?
– Rf Rr
– Rf rr
+ Rf RR
– Rf rr
– Rf Rr

297. Healthy girl was born at the parents sick with hemoglobinop-
athy (autosomal dominant type of inheritance). What are genotypes of parents?
– Mother is heterozygous on the gene of hemoglobinopathy, father has no this gene
– Father is heterozygous on the gene of hemoglobinopathy, mother has no this gene
+ Both are heterozygous on the gene of hemoglobinopathy
– Both are homozygous on the gene of hemoglobinopathy
– Both parents have no gene of hemoglobinopathy

298. The family has the child with blood type O (I). What are possible genotypes of parents of this child?
+ \(^{A}i\) and \(^{B}i\)
– \(^{A}i^{A}\) and \(^{B}i^{B}\)
– \(^{A}i^{B}\) and \(^{B}i^{A}\)
– \(^{A}i\) and \(^{B}i\)

299. There are two healthy children in a family, and the third was born with phenylketonuria which is inherited on autosomal recessive type. What is the probability of the birth of the child with PKU in this family?
– \(\frac{1}{2}\)
– \(\frac{1}{3}\)
+ \(\frac{1}{4}\)
– \(\frac{1}{6}\)
– \(\frac{3}{4}\)

300. Celiac disease is inherited on autosomal recessive type. Treatment consists in withdrawal of cooked cereals and bread, which contain gliadin, from a diet of children. What form of variation is caused by treatment of the child with celiac disease by means of withdrawal certain products from a diet?
+ Phenotypic
– Combinational
– Gene
– Chromosomal
– Genomic

301. Violation of chromosome disjunction or change of their structure during cleavage of a zygote leads to appearance of cellular clones with different karyotypes among normal blastomeres. How this phenomenon is called correctly?
– Chromosome aberration
– Aneuploidy
- Polyploidy
+ Genetic mosaic
- Gene mutation

302. The molecule of hemoglobin consists of two α chains and two β chains. Genes coding both chains are located in different pairs of homologous chromosomes. What type of interaction exists between these genes?
- Epistasis
- Polygenic inheritance
- Codominance
- Complete dominance
+ Complementarity

303. The deaf child was born in the woman who had German measles during pregnancy. This disease is a consequence of:
- chromosome aberration
+ modification variation
- gene mutation
- genomic mutation
- combinational variation

304. The husband has IV (AB) blood type, and wife has III (B) blood type. The wife's father has I (O) blood type. They gave birth to 5 children. Choose a genotype of the child who can be considered illegitimate:
- A^A B^B
+ ii
- A^A B^A
- A^A i
- B^A i

305. Hartnup\textsuperscript{1} disease is caused by point mutation of only one gene, which results in disturbance of tryptophane absorption in the intestine and its abnormal reabsorption in the renal tubules. It is the reason for disorder of both digestive and urination systems. What genetic phenomenon is observed in this case?
+ Pleiotropy
- Semidominance\textsuperscript{2}
- Complementary interaction
- Codominance
- Polymery

\textsuperscript{1} During exam in 2009 (among students studying stomatology), incorrect name "Hurtnup" was used.
\textsuperscript{2} Incomplete dominance.
306. A boy has I (I^0I^0) blood group and his sister has IV (I^A I^B) blood group. What blood groups do their parents have?
+ II (I^A I^A) and III (I^B I^B)
- II (I^A I^A) and III (I^B I^B)
- I (I^A I^A) and III (I^B I^B)
- III (I^B I^B) and IV (I^A I^B)

307. Cystinuria in humans shows itself in form of cystine stones in kidneys (homozygotes) or else an increased rate of cystine in urine (heterozygotes). Cystinuria is a monogenic disease. Specify the type of interaction between cystinuria genes and normal rate of cystine in urine:
- Complete dominance
+ Semidominance
- Codominance
- Complementarity
- Epistasis

308. Features of inheritance of blood types in man in the case of "Bombay phenomenon" are caused by recessive epistasis. What genotype the man with blood type I can have?
- I^A I^A HH
- I^B I^B HH
- I^A I^B Hh
- I^B I^A Hh
+ I^A I^B hh

309. Five married couples addressed to clinic for women. They want to know, whether there is a threat of development of hemolytic disease in their children. In what case the risk of developing of rhesus incompatibility is the highest?
- Wife is DD (first pregnancy); husband is Dd
- Wife is Dd (second pregnancy); husband is Dd
- Wife is Dd (third pregnancy); husband is DD
+ Wife is dd (second pregnancy); husband is DD
- Wife is dd (third pregnancy); husband is dd

310. The child, who is sick with sickle-cell anemia, has some pathological signs: anemia, increased spleen, damages of skin, heart, kidneys, and brain. How multiple action of one gene is called?
- Polygenic inheritance
- Complementarity
+ Pleiotropy
– Codominance
– Epistasis

311. In the case when one of parents has blood type O, and the other has AB, the child can have a blood type:
– O, AB
– AB
– O, AB, A, B
+ A, B
– O, A, B

312. The young couple gave birth to the child with different color of the right and left eyes. How this phenomenon is called?
– Chromosome aberration
+ Somatic mutation
– Heteroploidy
– Modification variation
– Combinational variation

313. It is known that the gene responsible for development of an abnormal shape of teeth is dominant and is not sex-linked. The sick guy has big teeth which project forward. The brother and the sister of this guy have teeth of usual form and position. What variation is observed in this family?
– Ontogenetic
+ Combinational
– Modification
– Mutational
– Cytoplasmatic

314. Rh-positive heterozygous woman with IV (AB) blood type and Rh-negative homozygous man with II (A) blood type (antigenic ABO system) get married. What is the probability of the birth of Rh-positive child with III (B) blood type in this family?
+ 0%
– 25%
– 50%
– 75%
– 100%

315. At what interaction of genes the inhibitory gene only inhibits action of other gene and does not determine development of a certain trait?
– Dominance
+ Epistasis
– Incomplete dominance
– Codominance
– Complementarity

316. **Hypoplasia of enamel is inherited as the dominant X-linked trait. In a family, mother suffers from this anomaly and father is healthy. What is the probability of the birth of the son with normal teeth?**

– 0%
– 25%
– 50%
– 75%
– 100%

317. **The woman with Rh-negative blood of II group gave birth to the child with IV group for whom hemolytic disease was diagnosed owing to rhesus incompatibility. What blood type is possible for the child's father?**

– I (O), Rh-positive
– II (A), Rh-positive
– IV (AB), Rh-negative
– III (B), Rh-negative
+ III (B), Rh-positive

318. **There are two dominant genes in human X chromosome, which take part in blood clotting. The same role is also carried out by an autosomal dominant gene. Lack of any of these genes leads to hemophilia. Name a form of interaction between three genes.**

+ Complementarity
– Epistasis
– Polygenic inheritance
– Codominance
– Pleiotropy

319. **Symptoms of anemia were observed in clinically healthy thirty-year-old woman when she climbed Goverla mountain (Ukraine). During carrying out the general blood test, crescent erythrocytes along with normal red cells were revealed. What is genotype of this woman?**

– AA
– aa
+ Aa
– X^A^A
– X^a^X^a

320. **An 18-year-old male has been diagnosed with Marfan syndrome. Examination revealed a developmental disorder of con-**
nective tissue and eye lens structure, abnormalities of the cardiovascular system, arachnodactylyia. What genetic phenomenon has caused the development of this disease?

– Codominance
– Incomplete dominance
– Complementarity
+ Pleiotropy
– Multiple allelism

321. A woman with III (B) rh⁻ blood group gave birth to a child with II (A) blood group. The child is diagnosed with hemolytic disease of newborn caused by rhesus incompatibility. What blood group can the child's father have?

– I (O), Rh⁺
– I (O), rh⁻
– II (A), rh⁻
+ II (A), Rh⁺
– III (B), Rh⁺

322. In the process of cell division, the approaching of homologous chromosomes happened; as a result of this event, parental and maternal chromosomes exchanged allelic genes. How the process of recombination of genetic material at the gene level, which along with other types of variation provides a variety of the organic world, is called?

– Conjugation
+ Crossing-over
– Copulation
– Diakinesis
– Cytokinesis

323. Father is Rh-negative. Mother is Rh-positive. She gave birth to the Rh-positive child. Whether the hemolytic disease, as a result of rhesus incompatibility, can develop in this family?

+ No, it cannot
– Only in the child
– Only in mother
– Only in father
– In father and the child

324. Genes of a locus L, which are responsible for development of blood types in MN system, give three genotypes and also three phenotypes. With what phenomenon it is possible to explain appearance in man of MN blood type?

+ Combinational variation
– Mutational variation
– Genocopy
– Phenocopy
– Modification variation

325. **Mother has II blood type, and father has IV blood type of ABO system. Father and mother are Rh-positive, and both grandfathers are Rh-negative. What blood type is impossible in their children?**
– The second
– The third
– Rh-negative
+ The first
– The fourth

326. **What type of regulation of sex by means of sex chromosomes is characteristic for man?**
– XO type
– ZW type
– ZO type
+ XY type
– WO type

327. **Rh-negative woman with IV (AB) blood type and Rh-negative man with I (O) blood type (antigenic ABO system) get married. What is the probability of the birth of Rh-negative homozygous child with III (B) blood type in this family?**
– 25%
+ 0%
– 100%
– 50%
– 75%

328. **Four blood types of ABO system are determined by inheritance of three alleles of one gene (I⁰, I², I²). Alleles of I² and I² in heterozygotes define the fourth group. Name a form of interaction between genes, which takes place in the case of inheritance of the fourth blood type.**
+ Codominance
– Complete dominance
– Interaction of polymeric genes
– Overdominance
– Epistasis

[1] Another possible incorrect answer is "Complementarity".
329. During a surgery, there was a need of massive blood transfusion. Blood type of injured person is III (B) \( \text{Rh}^+ \). What donor needs to be chosen?
- IV (AB) \( \text{Rh}^+ \)
- IV (AB) \( \text{rh}^- \)
- II (A) \( \text{Rh}^+ \)
+ III (B) \( \text{rh}^- \)
- I (0) \( \text{rh}^- \)

330. Let us assume that one pair of alleles controls development of crystalline lens, and the second pair - development of retina. In this case, normal sight will be result of interaction of genes which is called:
- incomplete dominance
- codominance
- polymerism
+ complementation
- overdominance

331. In what of the given cases, danger for the patient can arise during blood transfusion?
- \( \text{Rh}^+ \) recipient will receive \( \text{Rh}^- \) blood
+ \( \text{Rh}^- \) recipient will receive \( \text{Rh}^+ \) blood
- \( \text{Rh}^+ \) recipient will receive \( \text{Rh}^+ \) blood
- \( \text{Rh}^- \) recipient will receive \( \text{Rh}^- \) blood
- In none of the listed cases

332. Environmental factors can cause changes of phenotype, which copy the traits of another genotype. Such changes are shown with high frequency at certain (critical) stages of ontogenesis and are not inherited. What name such changes have?
- Modifications
- Long modifications
- Mutations
- Genocopies
+ Phenocopies

333. The child was born in heterozygous parents with II (A) and III (B) blood types according to the ABO system. What is the probability that the child has I (O) blood group?
- 100%
- 75%
- 0%
+ 25%
- 50%
334. A wide cleft between incisors of both mother and father is the dominant feature. They are both homozygous. What genetic regularity will their children have?
+ Uniformity of first generation hybrids
– Hybrid segregation by phenotype
– Independent inheritance of traits
– Non-linked inheritance
– Linked inheritance

335. Secretion of breast milk at women is caused by polymeric genes, and the amount of milk increases with increase in number of dominant alleles of these genes in the woman’s genotype. What genotype the woman in labor with lack of milk can have?
– $m_1 m_1 M_2 m_2$
– $M_1 m_1 M_2 m_2$
– $M_1 M_1 m_2 m_2$
– $M_1 m_1 m_2 m_2$
+ $m_1 m_1 m_2 m_2$

336. Alkaptonuria\(^1\) is inherited as an autosomal recessive feature. Parents with a normal phenotype have a baby with alkaptonuria. What genotype do parents have?
– $aa$ and $aa$
– $AA$ and $AA$
– $AA$ and $Aa$
– $Aa$ and $aa$
+ $Aa$ and $Aa$

337. Phenylketonuria is the disease caused by recessive gene, which is localized in an autosome. Parents are heterozygotes on this gene. They already have two sick sons and one healthy daughter. What is the probability that the fourth expected child also will be born sick?
– 0%
+ 25%
– 50%
– 75%
– 100%

338. Parents with a normal phenotype gave birth to an albino child (the feature that is inherited by the autosomal recessive type). What genotype do the parents have?

\(^1\) In the book “Collection of tasks…”, another similar question is also present: Galactosemia is an autosomal recessive character. What genotypes may healthy parents have if their baby has galactosemia?
339. The boy has large fissure between cutters. It is known that the gene that is responsible for development of such anomaly is dominant. The sister of this boy has teeth of usual position. This girl according to her genotype will be:
- diheterozygote
- dominant homozygote
- heterozygote
+ recessive homozygote
- triheterozygote

340. The man with color blindness addressed to genetic consultation. It is X-linked recessive trait. What is the probability of appearance of color-blind children in his family, if such allele is absent in the genotype of his wife?
- 75%
- 50%
- 100%
- 25%
+ 0%

341. One of variants of coloring of tooth enamel in men is defined by interaction of two allelic genes as incomplete dominance. These genes form and define:
- three genotypes and four phenotypes
- four genotypes and four phenotypes
- six genotypes and four phenotypes
+ three genotypes and three phenotypes
- six genotypes and six phenotypes

342. Formation in human cells of interferon, which is a protein produced for protection against viruses, is associated with interaction of genes. What of the listed types of gene interaction causes synthesis of interferon?
+ Complementary action
- Complete dominance
- Interaction of polygenes
- Codominance
- Epistasis

343. It is known that the gene responsible for the development of
the MN blood groups has two allelic states. If the gene M is considered as the initial gene, the allelic gene N appeared due to:
– DNA repair
– DNA replication
– crossing over
– gene combination
+ mutation

344. One of variants of coloring of tooth enamel in men is defined by interaction of two allelic genes as incomplete domination. How many phenotypes are defined by these genes?
– Two
– Four
– Five
+ Three
– Six

345. Examination of newborns in one of the Ukrainian cities revealed a baby with phenylketonuria. The baby's parents don't suffer from this disease and have two other healthy children. Specify the most likely parents' genotype with phenylketonuria gene:
– AA × aa
– Aa × AA
– Aa × aa
+ Aa × Aa
– aa × aa

346. A woman was infected with rubella virus during pregnancy. The child was born with developmental malformations, namely cleft lip and palate. The child's genotype is normal. These malformations are manifestation of:
– polyploidy
+ modification variability
– combinative variability
– chromosomal mutation
– aneuploidy

347. An underage patient has signs of achondroplasia (dwarfism). It is known that this is a monogenic disease and the gene that is responsible for the development of such abnormalities is a dominant one. The development of that child's brother is normal. Specify the genotype of the healthy child:
– AaBb

1 Another possible variant: "A female suffered rubella during pregnancy.".
– AABB
– Aa
+ aa
– AA

348. The antigen A, which is controlled by $I^A$ allele, and the antigen B, which is a product of expression of $I^B$ allele, are present at the same time in erythrocytes of the person with the fourth blood group ($I^A I^B$ genotype). What example of gene interaction this phenomenon represents?
– Incomplete dominance
– Polymerism
– Epistasis
+ Codominance
– Complementarity

349. If a trait is determined mostly by genetic factors, the percentage of concordance between the twins is much higher in monozygotic twins than in dizygotic ones. What is the percentage of blood group concordance in monozygotic twins?
+ 100%
– 75%
– 50%
– 25%
– 0%
MOLECULAR GENETICS

350. During the biochemical analysis of human cells, DNA that differs in its structure from chromosomal DNA was received. This nucleic acid was received from:
- ribosomes
- Golgi complex
- smooth endoplasmic network
+ mitochondria
- lysosomes

351. Solution of radioactively labelled leucine was added to nutrient medium where cells of animals are grown up. After a while, high concentration of this labelled amino acid was found by radioautography method near certain organoids. These organoids can be:
- smooth endoplasmic network
- Golgi apparatus
- cell center
+ ribosomes
- lysosomes

352. Under the influence of mutagen, the composition of some triplets in a gene was changed but the cell continued the synthesis of the same protein. What characteristics of the genetic code can it be connected with?
- Specificity
- Universality
- Triplet nature
+ Degeneracy
- Collinearity

353. Spiralization of chromosomes has great biological value, as:
- reactions of transcription are accelerated
- activation of DNA occurs
+ process of chromatid disjunction is facilitated
- DNA inactivation occurs
- reactions of transcription are slowed down

354. Part of the DNA chain turned 180 degrees as a result of gamma radiation. What type of mutation took place in the DNA chain?
+ Inversion

1 or colinearity.
355. Human cells were influenced by ultraviolet radiation, and as a consequence of this the DNA molecules had been changed\(^1\). Nevertheless, by means of specific enzymes the DNA structure was renewed. What do we call this phenomenon?

- Replication
- Duplication
- Repair
- Initiation
- Termination

356. Process of translation has a direct bearing on mechanisms of implementation of hereditary information – on gene expression. The beginning of this process in prokaryotes is associated with binding of specific amino acid to the peptide center of ribosome. What of the listed below amino acids is the first in a molecule of the synthesized protein?

- Methionine
- Arginine
- Formylmethionine
- Lysine
- Proline

357. It was proved that a molecule of immature mRNA (precursor mRNA) contained more triplets than amino acids found in the synthesized protein. The reason for that is that translation is normally preceded by:

- initiation
- replication
- processing
- repair
- mutation

358. Sickle-cell anemia is caused by mutation of the gene that is responsible for synthesis of protein part of hemoglobin. In this case, polar amino acid is replaced by nonpolar that leads to reduction of solubility of hemoglobin and changing of erythrocyte shape. Specify, what replacement takes place in the hemoglobin molecule:

---

\(^1\) In the book “Collection of tasks…”, the word "destroyed" is used (this is a mistake).
- alanine – into phenylalanine
- glutamic acid – into aspartic acid
- valine – into serine
+ glutamic acid – into valine
- glutamic acid – into lysine

359. **Chargaff's rule indicates an equal ratio of the purine and pyrimidine nitrogenous bases, which are the part of DNA molecules of any organism. The ratio between the sums of the complementary bases (A+T)/(G+C) indicates:**
- amount of the proteins encoded in DNA
- phylogenetic relations of an organism
- size of DNA molecule
+ species of an organism
- mutation degree

360. **Changes of nucleotides are observed in DNA molecule. What consequences it can lead to?**
- Anomalies of autosomes
- Chromosomal diseases
- Anomalies of sex chromosomes
- Translocations
+ Gene diseases

361. **As a result of radiation influence on sequence of nucleotides in DNA, two nucleotides are lost. What of the listed types of mutations happened in DNA chain?**
- Inversion
+ Deletion
- Duplication
- Replication
- Translocation

362. **Hereditary disease – xeroderma pigmentosum – was revealed in the patient. Malignant tumors were formed on skin. What is the nature of this disease?**
- Activity of cardiovascular system is broken
+ Light repair of thymine dimers is disturbed
- Thymine dimers are formed with high frequency
- Methylation of purines occurs frequently
- Melanin metabolism is disturbed

363. **What structural and chemical components take part in translation?**
- Ribosomes, mRNA, tRNA, ATP, nucleotides, enzymes
- Ribosomes, mRNA, tRNA, AMP, amino acids, enzymes
– Ribosomes, pre-RNA, tRNA, ATP, lipids, enzymes
+ Ribosomes, mRNA, tRNA, ATP, amino acids, enzymes
– Ribosomes, pre-RNA, tRNA, ATP, amino acids, enzymes

364. **Deoxyribonucleic acid (DNA) is the carrier of genetic information; its structural monomers are:**
+ mononucleotides
– amino acids
– nucleosides
– deoxyribose
– nitrogenous bases

365. **22-year-old girl has an open form of tuberculosis. The antibiotic rifampicin, which binds DNA-dependent RNA polymerase of prokaryotes, is part of the complex of the medicines prescribed for this girl. What process in the causative agent of tuberculosis is inhibited by rifampicin, which has medical effect?**
– Translation
– Reverse transcription
– Replication
– Formations of aminoacyl-tRNA
+ Transcription

366. **In the process of transcription, synthesis of complementary RNA molecule on DNA matrix is carried out. Choose the enzyme catalyzing this process:**
– helicase
– topoisomerase
– DNA polymerase
+ DNA-dependent RNA polymerase
– primase

367. **Polypeptide which has been synthesized on the ribosome includes 54 amino acids. How many codons did mRNA, used as a matrix during the synthesis, have?**
– 44
– 27
– 108
– 162
+ 54

368. **Transversion has occurred in the mRNA molecule that codes for synthesis of β chain of hemoglobin A: the purine nucleotide**

1 There is a mistake in this question. Correct answer must be 55 because we must add the stop codon.
was replaced with the pyrimidine nucleotide. It has led to damage of structure of hemoglobin molecule: valine appeared in the 6th position of β chain instead of glutamic acid. Clinically it is manifested as such disease:
– α thalassemia
– β thalassemia
+ sickle-cell anemia
– Minkowsky–Shauffard disease
– favism

369. In genetic engineering, different mechanisms of introduction of an artificial gene to a cell of the recipient are used. In what method of the listed below viruses are used for this purpose?
+ Transduction
– Hybridization
– Copulation
– Transformation
– Conjugation

370. Specify, what molecular mechanism of mutations is induced by nitrous acid:
+ reaction with amino groups of purines and pyrimidines
– formation of gaps in DNA chains
– formation of thymine dimers
– formation of mistakes in bonds of DNA with protein
– blocking of DNA-dependent RNA polymerase

371. Labelled amino acids alanine and tryptophane were injected to a mouse in order to study localization of protein synthesis in its cells. The labelled amino acids will be accumulated near the following organelas:
– agranular (smooth) endoplasmic reticulum
– lysosomes
– Golgi apparatus
+ ribosomes
– cell center

372. The substance blocking work of DNA polymerases was added into a nutrient medium for cultivation of cells. What process is damaged during the interphase period of cellular cycle?
– ATP synthesis
+ DNA repair
– Translation
– Active transport
– Transcription
373. During research of some cell organoids, their own nucleic acids containing uracil were revealed in these organoids. These organoids were:
+ ribosomes
– Golgi complex
– chromosomes
– microtubules
– cell center

374. The fragment of diphtheria toxin is an enzyme that catalyzes reaction of ribosylation of the elongation factor TF-2 with its inactivation. What of the listed processes is blocked by diphtheria toxin as a result?
– RNA synthesis
– DNA synthesis
+ Protein synthesis
– RNA maturing (processing)
– Posttranslational modification of protein

375. The preparations changing structure of ribosomes were used for influence on a cell. What processes will be broken first of all?
– Transport of substances
– Activation of amino acids
+ Translation
– Synthesis of lipids
– Transcription

376. It was revealed that in culture of experimental cells the fragment of nucleotide sequence in the DNA chain has moved. What of the listed changes has happened in DNA chain?
– Deletion
– Replication
+ Translocation
– Duplication
– Inversion

377. The antibiotic rifampicin is used in clinical practice as antitubercular drug. The mechanism of action of rifampicin is inhibition of:
– translation (protein synthesis)
+ transcription (RNA synthesis)
– replication (DNA synthesis)
– reverse transcription (DNA synthesis on a RNA matrix)
– posttranslational modification of protein

378. Gene expression is multistage process; information encoded
in DNA is transferred to the sequence of amino acids of polypeptide as a result of this process. Define what of the listed stages does not the part of this process:

- transcription
- processing
- splicing
- replication
- translation

379. Uracil (U) with a radioactive label was added into nutrient medium with human cells. During radioautography, labelled uracil will be found in:

- endoplasmic network
- Golgi apparatus
- ribosomes
- lysosomes
- cell center

380. The molecule of insulin consists of two polypeptide chains that are connected by disulfide bridges. Translation of each of them happens separately in cytoplasm, and later in a Golgi complex such process happens:

- folding of a polypeptide chain in a spiral
- cutting of amino acids in both ends
- binding of hormone with glucose
- replacement of some amino acids
- formation of quarternary structure

381. What is the length of DNA carrying information about synthesis of peptide, which contains 110 amino acid residues?

- 220 nucleotides
- 110 nucleotides
- 55 nucleotides
- 440 nucleotides
- 330 nucleotides

382. One of characteristics of genetic code is its degeneracy. What does it mean?

+ More than one codon correspond to one amino acid
- There are codons, which do not code amino acid
- One codon correspond to each amino acid
- One amino acid corresponds to each codon
- One codon corresponds to different amino acids

383. Researches showed that glutamic acid in the sixth position of hemoglobin of the patient was replaced by valine. For what dis-
ease it is characteristic?
– Leukosis
– Beta thalassemia
– Alpha thalassemia
– Hemophilia
+ Sickle-cell anemia

384. What of the statements listed below about synthesis of protein is correct?
– Only one codon exists for each type of amino acid
– The molecules of transport RNA that are specific to appropriate amino acids are synthesized on matrix mRNA in cytoplasm
+ Matrix (information RNA), which is synthesized on DNA matrix in a nucleus, carries information defining sequence of amino acids in a polypeptide chain
– Decoding of genetic code on ribosomes can begin from any point of mRNA
– Molecules of transport RNA deliver mRNA from a nucleus to ribosomes

385. Choose the substances which are the part of one nucleotide:
– triose, nitrous acid, uracil
+ pentose, residue of phosphoric acid, nitrogenous base
– hexose, residue of phosphoric acid, cyclic nitrogenous compound
– amino acid, phosphate group, thymine
– tetrose, phosphate group, adenine

386. In the nucleus, the molecule of immature mRNA transforms to the molecule of the mature mRNA, which is shorter than the immature mRNA. What do we call the combination of stages in this transformation?
– Replication
+ Processing
– Recognition
– Transmission
– Termination

387. It is known that the information about the amino acid sequence in the protein molecule is written in the form of nucleotide sequence. There are four types of nucleotides in the DNA molecule. Different amino acids are encoded by different number of triplets ranging from one to six. What do we call this property of the genetic code?
– Triplet nature
– Universality
388. Blood of a child and putative father was referred to forensic medical examination for affinity. What chemical components should be identified in the blood under study?
- Transfer RNA
- Ribosomal RNA
- Messenger RNA
+ DNA
- snRNA

389. Structural analogs of pyrimidines (fluorouracil, fluorodeoxyuridine, Ftorafur) inhibit DNA replication and therefore are used for treatment of malignant tumors. What from the listed is broken under their action, causing blocking of DNA synthesis?
+ Synthesis of deoxyribonucleotides – precursors of DNA
- Initiation of synthesis of nucleotide chains of DNA
- Activity of DNA polymerases
- Untwisting of the double spiral of DNA
- Activity of DNA ligase

390. At all forms of reproduction (sexual and asexual reproduction), elementary discrete unit of heredity is:
- one nucleotide
- one chain of DNA molecule
- one pair of nucleotides
+ one gene
- two chains of DNA molecule

391. Reverse transcriptases (revertases, or RNA-dependent DNA polymerases) catalyze:
- DNA synthesis on rRNA
- synthesis of mRNA on DNA
- synthesis of all types of RNA on DNA
+ DNA synthesis on RNA
- DNA synthesis on DNA

392. In a general view, the genetic apparatus of eukaryotes is such: acceptor zone–exon–intron–exon. Such structural-functional organization causes special features of transcription. Choose what mRNA will be present according to the mentioned
scheme:
+ exon–exon
– exon–exon–intron
– exon–intron–exon
– acceptor zone–exon–intron–exon
– acceptor zone–exon–exon–intron

393. Radioprotectors, which increase resistance of an organism to action of mutagenic factors, were prescribed to the employee of scientific research institute, who works with radioactive materials. What possible mechanism of adaptation influence at the cellular level is carried out by radioprotectors?
– Stimulate mechanisms of DNA repair
– All listed mechanisms
– Activate nonspecific mechanisms of protection
+ Inactivate products of free-radical oxidation
– None of the listed mechanisms

394. Enzyme DNA ligase that takes part in the process of excision repair of DNA, was blocked under the influence of unknown mutagen. What stage of the process of DNA repair will be broken?
– Recognition of the damaged site of DNA and its removal
– Cutting of the damaged DNA site
– Cutting of the damaged site of DNA and its replacement by the appropriate DNA site
– Synthesis of a new site by the principle of complementarity
+ Linking together of the built-in nucleotides with an intact site of DNA molecule

395. Protein-repressor has been found in a cell. What gene codifies the amino acid sequence of this protein?1
– Promoter
– Terminator
+ Regulator
– Modifier
– Operator

396. Hydrocortisone and prednisolone, which stimulate transcription and therefore protein synthesis, were prescribed to the patient. What changes appear in karyoplasm of the nucleus at long drug intake?
– Amount of the functioning euchromatin decreases

1 It should be emphasised that promoter, terminator, and operator are NOT genes, but they are regulatory regions of genes!
– Amount of the functioning heterochromatin decreases
– Amount of the functioning heterochromatin increases
– Activity of the functioning heterochromatin increases
+ Amount and activity of the functioning euchromatin increase

397. Sickle-sell anemia, when erythrocytes are in the form of a sickle, is widespread among the population of some districts in tropic Africa. What biological phenomenon is this disease based on?
+ Gene mutation
– Chromosomal aberration
– Modification
– Chromosomal mutation
– Transduction

398. The health officer suspended work of chemical plant as a large number of different chemical mutagens were emitted into atmosphere as a result of breakages of treatment facilities. What type of mutations can arise under this influence?
– Insertions
– Chromosome aberrations
– Genomic mutations
+ Point mutations
– Missense mutations

399. The transcription is taking place in human cells. RNA polymerase enzyme moving along the DNA molecule has reached a specific nucleotide sequence; after that the transcription ended. What do we call this DNA site?
– Operator
+ Terminator
– Promoter
– Repressor
– Regulator

400. During the synthesis period (S) of the cell cycle, the redouble of DNA quantity takes place. This process occurs as a result of:
– denaturation of DNA
– dissociation of DNA
+ replication of DNA
– DNA repair
– coagulation of DNA

401. The promoter is known to be responsible for joining the RNA polymerase enzyme and initiating the transcription. At that site deletion of two nucleotide pairs has taken place. What conse-
quences could it have?
+ Lack of protein synthesis
– Formation of abnormal proteins
– Synthesis of protein in unlimited quantities
– Formation of normal protein
– Short finish of protein synthesis

402. Scientists established amino acid sequence in the molecule of ribonuclease enzyme. How this sequence is encoded in a cell?
– Sequence of exons in DNA molecule
– Nitrogenous bases in DNA
+ Sequence of nucleotides of the appropriate site of the sense strand DNA
– Sequence of introns in DNA
– Alternation of exons and introns

403. According to the hypothesis of lactose operon (Jacob, Monod, 1961), in Escherichia coli the lactose, which gets into a cell from the environment, acts as an inducer. In what way does the lactose induce the synthesis of enzymes that decompose it, that is turn on the operon?
+ It combines with the repressor protein
– It combines with the operator\(^1\) gene
– It combines with the regulator gene
– It combines with the promoter
– It combines with the structural gene

404. Let’s assume that pro-RNA and mature mRNA were extracted from a nucleus. What of them is mature?
– Full copy of two chains of DNA
+ Lacks introns
– Full copy of matrix chain of DNA
– Lacks exons
– Lacks several triplets

405. Hemoglobin of the adult man (HbA) is the tetramer protein consisting of two α chains and two β peptide chains. What name such structure of this protein has?
– Primary
– Tertiary
– Secondary
+ Quartenary
– Peptide

\(^1\) In the book “Collection of tasks...”, the term "operator gene" is used. Correct term is "gene operator" or "operator". Instead of "It combines", the phrase "It binds" must be used.
406. The antibiotic rifamycin, which is used for treatment of tuberculosis, influences certain biochemical processes. Name them:
+ inhibits RNA polymerase at initiation stage
– inhibits DNA polymerase at initiation stage
– inhibits DNA ligase
– inhibits aminoacyl-tRNA synthetase
– inhibits action of protein factors during protein synthesis

407. Scientists Francois Jacob and Jacques Monod proposed the general scheme of a structure of the genetic apparatus of prokaryotes (operon model) in 1961. What is the role of protein repressor in this model?
+ Binds to operator
– Binds to promoter
– Activates structural genes (cistrons)
– Binds to terminator
– Inactivates proteins synthesized according to the program of structural genes

408. Chemical substance, which blocks work of the enzymes that take part in despiralization of DNA, was introduced into a cell. What processes and during what period of mitotic cycle of a cell are broken?
– DNA replication in metaphase
– Despiralization of chromosomes and formation of a nuclear envelope in telophase are broken
– Division of a site of centromere into separate chromatids in anaphase
+ DNA replication in the synthetic period
– Daughter chromosomes do not reach cell poles in anaphase

409. One of DNA chains consists of nucleotides: ATC-ACC-GAC-GTT… What sequence of nucleotides is on the second chain of this DNA molecule?
– ATC-ACC-GAC-GTT…
– GCT-GTT-AGT-ACC…
+ TAG-TGG-CTG-CAA…
– CGA-CAA-TCA-TGG…
– TTG-CAG-CCA-CTA…

410. During conjugation of bacteria of two strains A and B, it was established that gene Str was transferred on the 3rd minute of conjugation, gene Bac – on the 5th minute, and gene Ins – on the 9th minute. It indicates such phenomenon as:
– degeneracy of genetic code
– mosaicism of nucleoid in bacteria
+ linear arrangement of genes
– existence of processes of reparation
– exon-intron organization of a genome

411. During translation, a few ribosomes, placed along the mRNA molecule at a certain distance from one another, join each mRNA simultaneously. What do we call the translation complex that consists of one mRNA molecule and some ribosomes which are placed on it?
– Centrosome
– Lysosome
– Phagosome
– Nucleosome
+ Polysome

412. You are studying functioning of the bacterial operon. The operator has been released from the repressor. Immediately after this the following process will start in the cell:
– processing
+ transcription
– replication
– translation
– repression

413. Such research with bacteria from different strains was conducted. U-shaped tube in the lower part was divided by the bacterial filter. In one its half there were bacteria E. coli, which contain the enzyme that splits lactose, and a prophage (gene lac\(^+\)). In other half there was a strain that has no this enzyme (gene lac\(^-\)). After a while the analysis of cells of the second strain was performed; it was found that lac\(^+\) forms appeared among them. What substance has caused the transduction phenomenon?
– tRNA
– mRNA
– Lipid
– Enzyme
+ DNA

414. It is established that the molecule of pro-RNA consists of 9000 nucleotides, and 3000 nucleotides of them are introns. Define how many amino acids are present in a polypeptide:
– about 3000

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\(^1\) Incorrect sentence was present in the site http://testcentr.org.ua/ (2013): "The operator gene has been released from the repressor gene."
415. A number of hemoglobinopathies is characterized by amino acid replacements in alpha and beta chains of hemoglobin. What of them is characteristic for HbS (in the case of sickle-cell anemia)?
- Ala → Ser
+ Glu → Val
- Met → His
- Gly → Ser
- Glu → Lys

416. During investigation of the process of replication of E. coli genome, small fragments of newly synthesized DNA were revealed. By means of what enzyme they form polynucleotide chain?
- DNA polymerase
- DNase
- DNA-dependent RNA polymerase
- Nucleotidase
+ DNA ligase

417. F plasmids encode synthesis of:
- enterotoxin
- proteins causing death of bacteria of the same species
+ sex fibers for transfer of genetic information
- enzymes, which cause an inactivation of medicines or reduce permeability of cellular wall for antibiotics
- enzyme destroying membranes of erythrocytes

418. Process, in which DNA released during lysis of one bacterium penetrates into another bacterium and leads to change of its phenotype, is called:
- sexduction
+ transformation
- transfection
- conjugation
- transduction

419. Mutations among bacteria arise due to action of:
- adaptive enzymes
- high oxidation-reduction potential of nutrient medium
- recombinant vaccines
constructive enzymes
+ nitrogenous bases

420. Erythrocytes of the patient with heavy form of hemolytic anemia have sickle form. What is the molecular reason of developing of this disease?
– Disturbance of haem synthesis
– Disturbance of synthesis of porphyrins
+ Replacement of glutamic acid by valine in beta chain of hemoglobin
– Disturbance of synthesis of beta chain of hemoglobin
– Disturbance of synthesis of alpha chain of hemoglobin

421. What enzyme of HIV (human immunodeficiency virus) is associated with the mechanism of reverse transcription?
– Protease
– Integrase
– Endonuclease
+ Revertase
– RNA polymerase

422. Solution of thymine (T) with radioactive label was added to nutrient medium where human cells are cultivated. Labelled thymine will be found by radioautography in:
– ribosomes
– endoplasmic network
– Golgi apparatus
+ mitochondria
– lysosomes

423. What is main mechanism of action of antineoplastic antibiotics?
– Alkylation of RNA and DNA
– Inhibition of cellular division in metaphase
– Incorporation into DNA and RNA molecules instead of natural compounds
– Competitive inhibition of DNA metabolism
+ Formation of stable complex with DNA of a tumor cell

424. According to the model of double DNA helix that was suggested by Watson and Crick, it was established that one of chains would not be lost during replication and the second chain would be synthesized complementary to the first one. What mechanism of replication is it?¹

¹ In the book “Collection of tasks…”, this question is written as follows: DNA double spirals, which were formed as a result of replication, consist of one maternal chain and one daughter chain. What do we call this way of replication?
+ Semiconservative
  – Analogous
  – Dispersed
  – Identical
  – Conservative

425. Lesion by Rous sarcoma becomes possible only if information about the structure of RNA-containing virus is introduced into the genome of the host cell. What enzyme has to be present in structure of oncogenic virus of Rous sarcoma?
+ Reverse transcriptase
  – DNA gyrase
  – Aminoacyl-tRNA synthetase
  – DNA-dependent RNA polymerase
  – RNA replicase

426. Pigmentation of human skin intensifies under the influence of ultraviolet radiation. It results from change of:
  – number of chromosomes
  – structure of chromosomes
  – structure of genes
  + activity of genes
  – activity of ribosomes

427. RNA of the AIDS virus penetrated into a leucocyte and forced a cell to synthetize viral DNA by means of reverse transcriptase. This process is based upon:
  – replication
  + reverse transcription
  – operon repression
  – reverse translation
  – operon depression

428. The chemical composition of human DNA molecules as carriers of genetic information is analyzed. Monomers of these biopolymers are:
+ nucleotides
  – nitrogenous bases
  – deoxyribose
  – genes
  – amino acids

429. What researches of the listed below served as the first proof of the leading role of DNA in storage and transfer of hereditary in-

1 Incorrect term "convariant replication" was present in the site http://testcentr.org.ua/ (2013).
430. It was determined that the mRNA triplet sequence totally corresponded to the amino acid sequence in the polypeptide chain. What do we call this characteristic of the genetic code?

- Universality
- Triplet nature
- Specificity
- Degeneracy
- Collinearity

431. Oncogenic RNA viruses were introduced into an organism of experimental animal. By means of what enzyme replication of their genome occurs?

- DNA ligase
- RNA-dependent DNA polymerase
- DNA polymerase
- Translocase
- DNA-dependent RNA polymerase

432. It was established that exons of the human gene (DNA molecule) contain 9000 nucleotides. What amount of amino acids is present in the polypeptide that is coded by this gene?

+ About 1500
- About 3000
- About 9000
- About 4500
- About 12000

433. Antibiotics, which inhibit biosynthesis of nucleic acids and proteins, are used in clinical practice as antineoplastic and antibacterial drugs. What mechanism of action is the most probable for antibiotics with antineoplastic activity?

- They block the center of binding of aminoacyl-tRNA in the aminoacyl center of a ribosome
- They bind a large subunit of ribosomes and inhibit translocation of a ribosome along mRNA

1 or collinearity. Question is not good, because collinearity is NOT the property of the genetic code.
– They bind a large subunit of ribosomes and inhibit activity of peptidyltransferase
– They bind a small subunit of ribosomes and inhibit elongation process
+ They form stable complexes with DNA and inhibit processes of replication and transcription

**434. One of the stages of protein synthesis is recognition of a codon and anticodon. The second triplet of mRNA is UAU. What complementary triplet is found in tRNA?**

– GUG
– UAU
+ AUA
– UGU
– CUC

**435. It is known that the genetic code is degenerate and has triplet nature. What nucleotide can be changed in the coding triplet without loosing its sense?**

– Second
– First
+ Third
– Second or third
– First or second

**436. Life cycle of the cell is divided into the periods. In the S period of an interphase, replication occurs. Why the S period is much shorter (6–10 hours), than time necessary in experiment for DNA replication 1 cm long?**

– Due to higher activity of replication enzymes in a cell
– It is the result of chromosomal organization of genetic material
– Due to DNA replication from two ends of a chromosome
– Due to DNA replication in different directions from a replication point
+ Due to dividing of chromosomal DNA into replicons

**437. RNA viruses of measles were revealed in an organism of the patient. By means of what enzyme an increase in number of molecules of virus RNA in this patient occurs?**

– Translocase
– DNA ligase
– DNA-dependent RNA polymerase
+ RNA-dependent RNA polymerase
– Reverse transcriptase

**438. The sequence of amino acid residues in a polypeptide molecule was established. This sequence will correspond to a certain arrangement of nucleotides in such site of DNA:**
– promoter
– pseudogene
– operator
– terminator
+ structural gene

439. *In a cell, the mutation of the first exon of structural gene took place. The number of nucleotide pairs has decreased – 250 pairs instead of 290. Determine the type of mutation:*
– Inversion
– Duplication
+ Deletion
– Translocation
– Nonsense mutation

440. *The patient with skin cancer was treated with antineoplastic antibiotic actinomycin D. What stage of gene expression is inhibited by this preparation?*
– Initiation of translation
– DNA replication
+ Transcription
– Termination of translation
– Elongation of translation

441. *mRNA is synthesized in a cell nucleus on one chain of DNA. How this process is called?*
+ Transcription
– Reparation
– Replication
– Translation
– Activation of amino acids

442. *For determination of molecular mass of a gene, one can use average value of molecular mass of one nucleotide that makes 345. What exactly needs to be considered for this purpose?*
– Number of amino acids in the appropriate protein molecule
+ Number of nucleotides in both chains of DNA of a gene
– Number of nucleotides in the appropriate mRNA
– Number of nucleotides in a triplet
– Number of nucleotides in one chain of DNA of a gene

443. *Protein synthesis is carried out on ribosomes from matrixes of mRNA to which the activated amino acids are transported. What RNA transports amino acids to ribosomes?*
– Information RNA
– Ribosomal RNA
+ tRNA
– Mature mRNA
– Pro-RNA

444. Four nitrogenous bases in a combination of three in triplets give $4^3 = 64$ different codons therefore the same amino acids can be coded by different triplets. How the bigger quantity of transport RNAs (61) than amino acids, which are used for protein synthesis (20), can be explained?
– Universality of a code
– Specificity of a code
– Variability of DNA
+ Degeneracy of genetic code
– The repeating sequences of nucleotides

445. In the process of maturing of information RNA, special enzymes cut off introns and join exons (processing). How informative sites of a gene are called?
– Transcriptons
+ Exons
– Anticodons
– Introns
– Codons

446. In eukaryotes, as a result of transcription, pro-RNAs containing sites, which are not informative (introns) and are cut out during its maturing, are formed mainly. This process is called:
– capping
– attenuation
– gene conversion
– recombination
+ splicing

447. It was revealed that T lymphocytes were affected by HIV. Virus enzyme – reverse transcriptase (RNA-dependent DNA polymerase) – catalyzes the synthesis of:
– viral DNA on DNA matrix
+ DNA on the matrix of virus mRNA
– mRNA on the matrix of virus protein
– DNA on virus ribosomal RNA
– virus informational RNA on the matrix of DNA

448. A patient’s organism has decreased concentration of magnesium ions that are necessary for attachment of ribosomes to the granular endoplasmic reticulum. This condition is known to disrupt the process of protein biosynthesis. Disruption occurs at the
following stage:
- amino acid activation
- processing
- transcription
- replication
+ translation

449. Degeneracy of genetic code is ability of several triplets to code for one amino acid. What amino acid is encoded by one triplet?
- Leucine
- Serine
- Alanine
+ Methionine
- Lysine

450. Gene expression consists of a number of stages. During one of them, synthesis of mRNA is carried out on one of DNA molecule chains. How the specified process is called?
- Elongation
- Collinearity
- Translation
+ Transcription
- Termination

451. The gene apparatus of the man contains about 30 thousand genes, and the number of variants of antibodies reaches millions. What mechanism is used for formation of new genes that are responsible for synthesis of such quantity of antibodies?
+ Recombination of genes
- Amplification of genes
- DNA replication
- DNA repair
- Formation of Okazaki fragments

452. In operon model, the promoter is a place of primary attachment of RNA polymerase from which process of transcription begins. What can block this process?
- Interaction of structural genes
+ Attachment of protein repressor to the operator
- Attachment of repressor to the regulatory gene
- Interaction of terminator with repressor
- Interaction of terminator with the operator

453. Different cells that belong to one man are capable to synthesize different proteins at the same time. It is possible because:
- cells of one organism have different DNA
- protein biosynthesis occurs differently in different cells of one organism
+ different sites of DNA are transcribed in different cells at the same time
- different mutations occur constantly in cells of an organism
- synthesized proteins get different structure in the process of self-assembly

**454.** An influenza virus penetrated into a cell. The mechanism of protein biosynthesis was reorganised for the virus protein synthesis to occur:
+ on the polyribosomes
- in the nucleus
- in the lysosomes
- in the peroxisomes
- in the centriole

**455.** Different physical and chemical factors can destroy the structure of DNA. What do we call the ability of the cells to regenerate the DNA structure?
- Transduction
- Transcription
- Replication
+ Repair
- Transformation

**456.** It was considered for the long time that relationship of virus and bacterial cell always end with destruction of the last one. Nevertheless, it was revealed over time, that not all phages cause cell death. They are capable to carry part of a genome of one bacterium to a genome of another one; owing to this process, genotype of recipient cell receives properties of another strain. How this phenomenon is called?
- Transformation
+ Transduction
- Translation
- Transcription
- Transposition

**457.** Children, who are homozygous on recessive autosomal mutation "xeroderma pigmentosum", look normally at the birth, but already at early age they receive damages of skin under the influence of sunlight. Xeroderma pigmentosum results from disturbance of the process of:
- replication
+ repair
- translation
transcription
recombination

458. Phenylketonuria is the hereditary disease caused by a point mutation. This is the change of:
- number of chromosomes in diploid set
- number of genes
+ molecular structure of a gene
- number of chromosome sets
- structures of a single chromosome

459. One of the main characteristics of a living being is ability to reproduction. On what level of living organisms organization does this process happen on the basis of matrix biosynthesis?
- Organismic
- Subcellular
- Cellular
- Tissue
+ Molecular

460. β thalassemia is a disease which is characterized by insufficient production of β chains of globin. It was found that excess of pro-RNA and deficiency of mRNA of β globin are observed in cells of patients. What stage of gene expression is broken in these people?
- Reduplication
- Transcription
+ Processing
- Translation
- Reparation

461. During the analysis of DNA fragment synthesized in the process of polymerase chain reaction, it was revealed that it contains 180 nucleotide pairs. What amount of monomers of protein is encoded by this fragment?
- 2
+ 60
- 90
- 120
- 180

462. During oral test of students on the subject "Molecular Biology", the teacher asked a question: "Why the genetic code is called universal?" The correct answer should be as follows: "Because it...":
- contains information on the protein structure
+ is universal for all organisms
– is triplet code
– codes for amino acids
– is used during replication, transcription and translation

463. DNA replication is carried out by means of a complex of enzymes. What process is catalyzed by enzyme primase?
– Untwisting of chains of DNA molecule
– A rupture of DNA chain in the point "ori"
– Linking together of Okazaki fragments
– Stabilization of single-stranded sites of DNA
+ Synthesis of primers – RNA chains

464. The new growth with metastases was revealed on the patient’s gum; it is a consequence of long smoking. What of the given processes is the reason of appearing of the new growth?
– Reparation
– Transcription
+ Mutation
– Replication
– Translation

465. The group of antibiotics brakes different stages of RNA synthesis. What form of variation is caused by such antibiotics?
– Correlative
– Combinational
– Mutational
– Ontogenetic
+ Modification

466. Genetic structure of eukaryote is "exon–intron–exon". This structure-functional organization of the gene causes transcription peculiarities.1 What will be pro-mRNA according to the scheme?
– Exon-exon-intron
– Intron-exon
+ Exon-intron-exon
– Exon-intron
– Exon-exon

467. Protein synthesis includes several subsequent stages. It is preceded by the synthesis of immature mRNA. What do we call this process?
– Termination

1 In exam booklets, this sentence was written as follows: "This structure-functional organization of the gene caused transcription peculiarities."
– Replication
– Elongation
– Translation
+ Transcription

468. Despiralization of DNA molecule was experimentally disturbed in an animal cell. What processes will not happen in a cell first of all?
– Anaphase of mitosis
– Translation
+ Transcription
– Anaphase of meiosis
– Processing

469. During protein synthesis, a ribosome, having passed an initiation stage, passes to the subsequent reading of mRNA codons, moving to the 3'-end. How this stage is called?
– Processing
+ Elongation
– Termination
– Prolongation
– Splicing

470. On one of stages of protein biosynthesis, reading of genetic information from mRNA molecule occurs. What chemical compound carries out this process?
+ tRNA
– Amino acid
– rRNA
– RNA polymerase
– Pro-RNA

471. DNA of the man and all eukaryotes contains exons (informative sites) and introns (fragments that are not informative). In the course of maturing of RNA, cutting of introns and joining of exons occur. What is the name of this process?
+ Splicing
– Reparation
– Transcription
– Termination
– Replication

472. By means of researches, which were performed by F. Sanger, it was found that the sequence of amino acid residues, which are connected by peptide bonds, forms:
+ primary structure of protein
– secondary structure of protein
– tertiary structure of protein
– quarternary structure of protein
– β-structure of protein

473. Duration of addition of one amino acid to a polypeptide chain in bacterial cell under optimum conditions makes approximately $\frac{1}{20}$ second. How much time cell needs to synthesize polypeptide, which is encoded by gene having 1200 nucleotide pairs?
– $\frac{1}{20}$ s
– 400 s
– 2 s
– 20 s
– $\frac{1}{2}$ s

474. tRNA molecules have two active centers. The molecule of amino acid is attached to one of them, and the aminoacyl-tRNA complex is formed. The second active center consists of three nucleotides and is called:
– aminoacyl center
– amino peptidyl center
– peptidyl center
– anticodon
– codon

475. Skin of patients with xeroderma pigmentosum is extremely sensitive to sunlight, and skin cancer can develop. Hereditary insufficiency of enzyme UV endonuclease is the reason of this condition. What process is broken as the result of this defect?
– DNA replication
– DNA repair
– translation
– transcription
– reverse transcription

476. Quinolones – inhibitors of enzyme DNA gyrase – are used for treatment of urogenital infections. What process is broken under the influence of quinolones first of all?
– Replication
– Recombination of genes
– Amplification of genes
– Reparation
– Reverse transcription

477. All types of RNA take part in the process of gene expression. Determine RNA and its function by such traits: it has 300–3000
nucleotides, its weight is from several hundred thousands to two million Dalton, it exists in the form of two fractions (mature and its precursor) and it is localized between two subunits of ribosomes:
- rRNA – provides transcription
- tRNA – defines initiation process
- rRNA – provides removing of protein from a ribosome
- tRNA – takes part in activation of amino acids
+ mRNA – takes part in translation

478. The part of gene mutations as inserts and losses of nucleotide pairs in DNA molecule occurs due to unequal crossing-over; frequency of this crossing-over increases considerably under the influence of chemical and physical mutagenic factors. How the minimum quantity of the genetic material, which is lost or acquired owing to unequal crossing-over and induces mutation, is called?
- Muton
+ Recon
- Cistron
- Transcripton
- Replicative fork

479. Examination of initial molecular structure of hemoglobin revealed substitution of the glutamic acid by valine. What inherited pathology is it typical for?
- Thalassemia
+ Sickle-cell anemia
- Hemoglobinosis
- Minkowsky–Shauffard disease
- Favism

480. There are different levels of regulation of gene expression in eukaryotic cell. At what level process is controlled by enhancers?
- Translation
- Replication
- Processing
+ Transcription
- Posttranslational modification

481. The patient needs a large amount of proteins. What preparation needs to be applied?
+ Increasing translation
- Reducing translation
- Reducing transcription
– Increasing replication
– Reducing replication

482. The increase in quantity of new growths was revealed on skin of the woman after stay in a solarium. Damage of nucleotide sequence owing to influence of ultraviolet rays was the cause of appearance of new growths. Damage of what listed processes led to appearance of new growths?
– Transcription
+ DNA repair
– Formation of mutations in DNA
– Termination of DNA synthesis
– DNA replications

483. Increase in formation of immunoglobulins owing to increase in synthesis of appropriate mRNAs was revealed in the child recovering after flu. What process of the listed below leads to increase in amount of protective proteins?
– DNA mutation
+ Transcription
– DNA repair
– DNA replication
– Termination of DNA synthesis

484. Some mRNA triplets (UAA, UAG, UGA) code no amino acids, but in the process of reading of information they serve as terminators, in other words, they are able to stop the translation. What are they?
+ Stop codons
– Operators
– Anticodons
– Exons
– Introns

485. The patient with sickle-cell anemia has crescent shape of erythrocytes due to replacement of glutamic acid by valine in a hemoglobin molecule. What is the main defect of hereditary material?
– Structural chromosomal defect
– Crossing-over
– Mutation of changing of chromosome number
– Recombination
+ Gene mutation

486. Tryptophane for tryptophane operon is the compound that blocks this operon. How tryptophane blocks an operon?
– Binds to operator
– Binds to regulatory gene
+ Binds to protein repressor
– Binds to promoter
– Binds to structural gene

487. The gene, which encodes the polypeptide chain, consists of 4 exons and 3 introns. When processing is over, the mature mRNA consists of nucleotides, which are complementary to:
– 3 introns
– 2 exons and 1 intron
– 1 exon and 1 intron
+ 4 exons
– 4 exons and 3 introns

488. It is known that when one nucleotide in DNA is replaced, only one amino acid in peptide can be replaced. What property of genetic code is proved by this fact?
+ Nonoverlapping of the code
– Degeneracy of the code
– Universality of the code
– Triplet structure of the code
– Specificity of the code

489. In an organism, nitrogenous acid, which causes oxidizing deamination of the nitrogenous bases of nucleotides, is synthesized from nitrates, nitrites and nitrosamines. It can lead to a point mutation – replacement of cytosine to:
– adenine
– guanine
– inosine
+ uracil
– thymine

490. A mutation of a structural gene did not lead to replacement of amino acids in protein. It shown such property of genetic code as:
– mutability
+ redundancy
– colinearity
– insufficiency
– universality

491. The man of 58 years underwent an operation concerning prostate cancer. The course of radiation therapy and chemotherapy was carried out to him in 3 months. The complex of medi-
cines contained 5-fluorodeoxyuridine – an inhibitor of thymidylate synthase. Synthesis of what substance is blocked first under the influence of this preparation?

- rRNA
- Protein
- tRNA
- mRNA
+ DNA

492. What is necessary for formation of transport form of amino acids for protein synthesis?

- mRNA
- GTP
+ Aminoacyl-tRNA synthetase
- Ribosome
- Revertase

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

+ synthesis of mRNA
- primers synthesis
- synthesis of tRNA
- reverse transcription
- maturation of mRNA

494. In a healthy cell of salivary gland of the man, processes of biosynthesis of enzymes are investigated. The main direction of flow of information in this cell will be:

- mRNA → polypeptide → DNA
+ DNA → mRNA → polypeptide
- tRNA → mRNA → DNA → polypeptide
- DNA → polypeptide → mRNA
- polypeptide → mRNA → DNA

495. Solution of thymine (T) with radioactive label is introduced into nutrient medium with cells. In what cell structures this labelled thymine will be found during radioautography?

+ Nucleus
- Lysosomes
- Endoplasmic reticulum
- Ribosomes
- Golgi apparatus

496. Mature mRNA, in which molecule sense codons are revealed, approached a ribosome. These codons in the process of biosynthesis of polypeptide are a signal of:
It was established that genetic information can be transferred not only from DNA to RNA, but also in the opposite direction – from RNA to DNA. What enzymes carry out this transfer?

– Ligases
– Restrictases
– Synthetases
+ Revertases
– Polymerases

The lymphocyte is affected with retrovirus HIV (AIDS). In this case, the direction of flow of information in a cell will be:

– mRNA → polypeptide → DNA
– DNA → mRNA → polypeptide
+ RNA → DNA → mRNA → polypeptide
– DNA → polypeptide → mRNA
– polypeptide → RNA → DNA → mRNA

What of the following statements about genetic code is wrong?

– The codon contains three nucleotides
+ There is only one codon for each amino acid
– Codons are in matrix ribonucleic acid
– Each codon defines one amino acid
– The nucleotide of one codon cannot be part of other codon

It is known that there are 64 codons. How many codons have no information about amino acids and are stop codons?

– 1
+ 3
– 5
– 8
– 10

What answer from listed is the most competent? Transcription is:

– transcription of genetic information from DNA molecule on matrix ribonucleic acid
– copying of matrix ribonucleic acid from DNA molecule
– synthesis of proteins
+ synthesis of matrix RNA on DNA molecule as sequence of nucleotides that
complementary to DNA molecule
– polypeptide synthesis

502. The structure of DNA twisted into a double spiral was proposed on the basis of data on X-ray diffraction, which were collected by:
+ Franklin and Wilkins
– Griffith
– Avery, MacLeod and McCarty
– Watson and Crick
– Hershey and Chase

503. What from listed is correct about bonds in DNA?
– The skeleton has 3′,2′-phosphodiester bonds
– Two chains are connected by covalent bonds
– One chain is ended with the 2′-phosphate
+ Follow from the 5′-phosphate to the 3′-carbon of sugar
– Both chains are ended with 3′-hydroxylic groups

504. What of these postulates corresponds to the modern level of genetic knowledge?
– One gene – one trait
– One gene – one protein
– One gene – one ATP
– One gene – one DNA
+ One gene – one polypeptide

505. An experiment proved that UV-irradiated skin cells of patients with xeroderma pigmentosum restore the native DNA structure slower than cells of healthy people due to the defect in repair enzyme. What enzyme takes part in this process?
– Primase
– RNA ligase
– DNA polymerase III
+ Endonuclease
– DNA gyrase

506. Overdose of such antibiotics as kanamycin and chloramphenicol (Levomycetin) is dangerous, it leads to deafness. It is explained by the fact that they inhibit:
– replication
– transcription in a nucleus
– translation in cytoplasm of eukaryotic cells
– transcription in mitochondria
+ translation in mitochondria

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

+ Transcription
– Replication
– Translation
– Processing
– Repair

508. It is known that the structural part of genes of eukaryotes is characterized by alternation of sense sites and sites that are not informative. What is the name of sites that has no information about sequence of amino acids in polypeptide?

– Exons
+ Introns
– Mutons
– Recons
– Sites

509. It was established that not all point mutations like replacement of a base pair serve as the reason of change of amino acid in a polypeptide. Thanks to what property of genetic code it is possible?

+ Degeneracy
– Colinearity
– Universality
– Continuity
– Triplet structure

510. What organic compounds play a role of messengers between DNA molecules, which are carriers of genetic information, and polypeptide chains, which are elementary traits?

– Carbohydrates
– Lipids
– Proteins
– ATP
+ RNA

511. The flow of substances, energy and information constantly passes through a human body. Reading and realization of genetic information at the molecular level are associated, first of all, with properties of:

– carbohydrates
– lipids
– amino acids
During epithelium regeneration of mucous membrane of oral cavity, DNA replication (selfreproduction) occurred according to semiconservative mechanism. Nucleotides of the new DNA chain are complementary to:
+ Maternal chain
– Sense codons
– DNA polymerase enzyme
– Introns
– RNA polymerase enzyme

It is known that some chemical compounds (bromine preparations, proflavin and other) are capable to cause mutations like deletions. To what such mutations will lead if damages happen in a structural site of a gene?
– Replacement of nucleotides of DNA
– Inversion of sites of DNA
+ Damages of reading frame
– Replacement of several nucleotides
– The genetic code will not change

Genetic polymorphism serves as basis for interpopulation and intrapopulation variation of people, which is shown in irregular distribution on the planet of some diseases, severity of their clinical course, different degree of predisposition to them, and drug effect. What consequences for people action of mutational process, which results in genetic and phenotypic polymorphism, has?
– Frequency of appearance of mutations in human population decreases
– Accumulation of homozygotes in large populations occurs
+ Hereditary variety is a barrier to organ transplantation
– Possibility of death of zygotes and embryos in each next generation of people decreases

It is known that the sequence of triplets in DNA defines an order of amino acids in a protein molecule. What is the property of genetic code?
– Complementarity
+ Colinearity
– Specificity
– Nonoverlapping
– Anti-parallelism

Synthesis of protein on a ribosome begins with formation of
initiation complex that includes:
– tRNA with phenylalanine
– tRNA with alanine
– tRNA with tyrosine
– tRNA with leucine
+ tRNA with methionine

517. It is known that the structural part of genes of eukaryotes is characterized by alternation of sense sites and sites that are not informative. What is the name of sites containing information about sequence of amino acids in polypeptide?
– Introns
– Mutons
+ Exons
– Sites
– Recons

518. The linear structure of protein, which does not have metabolic activity, was formed on a ribosome. In the process of "matur- ing", it can lose end amino acids, form tertiary and quarternary structures, connect to carbohydrate or lipidic molecules. How processes of transformation of initial structure of polypeptide and formation of metabolic active proteins are called?
– Induced translation
– Protein termination
– Polypeptide elongation
– Translocation
+ Posttranslational modification

519. Process of conjugation was established in bacteria; during this process, the cytoplasmatic bridge is formed between bacteria; plasmids are transferred through this bridge from the donor cell to the recipient cell. What is value of this process?
– Provides exchange of substances between cells
– Promotes activization of mutational process
+ Provides transfer and recombination of genetic material
– Increases heterozygosity
– Liquidates undesirable mutations

520. The man is the carrier of AIDS virus, which belongs to RNA-containing viruses. Synthesis of virus DNA occurs in cells of this person. A basis of this process is:
– Replication
– Transcription
+ Reverse transcription
521. Ultraviolet rays break integrity of DNA molecules and lead to formation of pyrimidine dimers, which cause mutations. Why the irradiated cells survive much better on light, than in the dark?
- Excision repair occurs
+ Photorepair occurs
- Mitosis is activated
- Recombinational reparation occurs
- DNA polymerase is activated

522. It is known that β-carotene, vitamins C and E reduce spontaneous damages of DNA. What group these substances belong to?
+ Antimutagens
- Mutagens
- Comutagens
- Teratogens
- Oncogenes

523. The gene for alanine tRNA was synthesized for the first time by H. Khorana in 1970. This gene consisted of 77 nucleotide pairs, had no regulatory part and therefore did not function. The gene for tyrosine tRNA, which was synthesized by Khorana later, functioned as real gene. What sites of a gene were synthesized in addition?
- Enhancers
- Structural genes
- Regulatory gene
+ Promoter and terminator
- Repressor

524. Formation of RNA molecules on DNA matrix is called:
- processing
- translation
+ transcription
- splicing
- posttranslational modification

525. Infectious diseases are treated with antibiotics streptomycin, erythromycin, and chloramphenicol. They inhibit the following stage of protein synthesis:
- splicing
- processing
- replication
+ translation
– transcription

526. Synthesis of DNA begins from the primer. The primer is:
– oligodeoxyribonucleotide
+ oligoribonucleotide
– ATP
– dATP (deoxyadenosine triphosphate)
– DNA fragment consisting of 40 nucleotides

527. All RNA types are synthesized in the form of RNA precursors that are exposed then to maturing (processing). One of stages of processing is splicing. Splicing is:
+ cutting of sites that are not informative (introns) and binding together of informative sites (exons)
– addition of 7-methylguanosine to the 5′-end
– addition of 100–200 residues of adenylic acid to the 3′-end
– chemical modification of the nitrogenous bases
– fragmentation of RNA

528. Under the influence of solar radiation, in DNA of human skin such structures are most often formed:
– deletions
– replacements of nucleotides
+ thymine dimers
– chromosome mutations
– one-stranded DNA

529. In the cells of the patient with AIDS, which are affected with HIV virus, activity of enzyme revertase is revealed. What nucleic acid is synthesized with participation of this enzyme?
– mRNA
+ DNA
– rRNA
– tRNA
– Pro-mRNA

530. Streptomycin was used for treatment of an infectious disease. Synthesis of what substances will be suspended by action of this antibiotic?
– DNA
– mRNA
– tRNA
– rRNA
+ Proteins

531. In experiment, increase of activity of beta galactosidase after addition of lactose into culture medium with E. coli was shown.
What site of lactose operon becomes unblocked from a repressor under these conditions?
- Promoter
  + Operator
- Structural gene
- Regulatory gene
- Primer

**532.** Rifamycin was prescribed to the patient with tuberculosis of lungs. It inhibits enzyme RNA polymerase at stage of initiation of the process:
- translation
- replication
- termination
- elongation
+ transcription

**533.** Translation begins with an initiation phase, when AUG codon encoding methionine binds to complementary anticodon of tRNA. Specify this anticodon.
- UCG
- UGC
- ACU
+ UAC
- AUG

**534.** Process of protein biosynthesis is energy-dependent. Specify, what energy-rich substratum is used in this process at an elongation stage.
- ATP
- ADP
+ GTP
- UTP
- CTP

**535.** In structure of an operon of DNA of prokaryotes, there is a site to which RNA polymerase is attached in the phase of initiation of transcription. Find the name of this site.
- Primary transcript
+ Promoter
- Operator
- Regulatory gene
- Structural gene

**536.** The concept about transfer of hereditary information in the direction "DNA–RNA–protein" was the central dogma of molecular
biology. How hereditary information is transferred in retroviruses?
– RNA–DNA–protein
– DNA–protein–RNA
– DNA–DNA–RNA–protein
– DNA–RNA–protein
+ RNA–DNA–RNA–protein

537. Process of transcription occurs in a cell of pathogenic bacterium. What serves as matrix for synthesis of one molecule of mRNA?
– Entire DNA molecule
+ Site of one chain of DNA
– One entire chain of DNA molecule
– The chain of DNA molecule lack of introns
– The chain of DNA molecule lack of exons

538. In some regions of South Africa, there is a spread of sickle-cell anemia, in which erythrocytes have sickle shape due to substitution of glutamic acid\(^1\) by valine in the hemoglobin molecule. What is the cause of this disease?
– Genomic mutation
– Crossing over
– Transduction
– Disturbance of mechanisms of genetic information realization
+ Gene mutation

539. As a result of intoxication, enzymes providing splicing are not synthesized in the epithelial cell of mucous membrane of oral cavity. What is the reason of the termination of protein biosynthesis in this case?
– ATP is not synthesized
– rRNA is not synthesized
– Amino acids are not activated
– Transport of amino acids is broken
+ Mature mRNA is not synthesized

540. In a genetical laboratory in course of work with DNA molecules of white rats of Wistar’s line, a nucleotide was substituted for another one. As a result, only one amino acid was substituted in the peptide. This result is caused by the following mutation:
– Deletion
– Duplication

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\(^1\) This question was present in the site http://testcentr.org.ua/ (2013) and contained a mistake: "substitution of glutamin by valine".
Displacement of reading frame
+ Transversion
− Translocation

541. When studying features of genetic code, students found that there are amino acids, which are encoded by 6 codons, and five amino acids are encoded by 4 different codons. Other amino acids are encoded by three and two codons and only two amino acids by one codon. Specify, what property of genetic code was rediscovered by students?
− Universality
+ Redundancy
− Colinearity
− Unidirectionality
− Triplet code

542. The worker of the chemical company owing to violation of safety rules underwent toxic effect of nitrogenous acid and nitrates, which cause deamination of cytosine in DNA molecule. What enzyme initiates a chain of repair processes?
+ Uracil DNA glycosylase
− DNA-dependent RNA polymerase
− Orotidine monophosphate decarboxylase
− Thymidylate synthase
− Cytidine triphosphate synthetase

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

544. It is known that the operator is responsible for binding of RNA polymerase and initiation of transcription. Deletion of two nucleotides has occurred in this site. What consequences it can have?
− Formation of abnormal proteins
+ Lack of protein synthesis

1 In fact, this mutation is called "missense mutation" (variant of the point mutation) and can be both transversion and transition depending on the nature of base substitution.
2 In the booklet published in 2006, incorrect word "triplety" was used.
– Synthesis of protein in unlimited quantity
– Formation of normal protein
– Fast termination of protein synthesis

545. *mRNA, which contains both exonic and intronic sites,* was transported to ribosomes of granular ER in human cell. It is explained by absence of:
– replication
– transcription
– translation
+ processing
– prolongation

546. *As a result of translation, the linear protein molecule corresponding to its primary structure was formed.* What connection appears between residues of amino acids in this protein structure?
+ Peptide
– Hydrogen
– Disulfide
– Hydrophobic
– Ionic

547. *The mutation of a structural gene happened.* In this gene, the number of nucleotides changed: instead of 90 base pairs, it became 180. This mutation is called:
– Inversion
+ Duplication
– Deletion
– Translocation
– Transversion

548. *Damage of a structural gene as a part of DNA molecule occurred.* However, it did not lead to replacement of amino acids in protein because after a while this damage was liquidated by means of specific enzymes. It was shown that DNA has ability for:
– transcription
– mutation
– reverse transcription
– replication
+ repair

549. *The majority of structural genes of eukaryotes in their structure (DNA fragments) are functionally unequal.* They contain exons (informative sites) and introns (not informative fragments). What molecule of RNA is synthesized at first on this DNA?
informational RNA
+ pro-mRNA
– tRNA
– rRNA
– mRNA

550. Treatment of a patient with hereditary form of immunodeficiency involved gene therapy: the enzyme gene was introduced into the cells of the patient by means of a retrovirus. What property of the genetic code allows to use retroviruses as vectors of functional genes?
– Specificity
– Collinearity
– Continuity
+ Universality
– Redundancy

551. Infectiologists widely apply antibiotics that inhibit synthesis of nucleic acids. What stage of biosynthesis is braked by rifampicin?
– Transcription in prokaryotes and eukaryotes
– Splicing in prokaryotes and eukaryotes
– Termination of transcription in prokaryotes and eukaryotes
– Replication in prokaryotes
+ Initiation of transcription in prokaryotes

552. mRNA synthesis takes place on DNA matrix taking into account the principle of complementarity. If triplets in DNA are the following – ATG-CGT, the corresponding codons of mRNA will be:
– UAG-CGU
– ATG-CGT
– AUG-CGT
+ UAC-GCA
– TAG-UGU

553. During cell division¹, DNA replication occurs by a signal from the cytoplasm, and a certain portion of the DNA helix unwinds and splits into two individual strains. What enzyme facilitates this process?
– RNA polymerase
– Ligase
– Restrictase
+ Helicase
– DNA polymerase

¹ It is not correct. DNA replication occurs before cell division, in interphase. (This question was during exams in 2013, 2014, and 2015).
554. Nowadays about 50 minor bases have been found in the tRNA structure besides the main four nitrogenous bases. Choose the minor nitrogenous base:
- cysteine
+ dihydouracil
- cytosine
- uracil
- adenine

555. The students studied peculiarities of genetic code and found out that there are amino acids corresponded by 6 codons, 5 amino acids – 4 different codons. Other amino acids are codified by three or two codons and only two amino acids are codified by one codon. What peculiarity of genetic code did the students find out?
- Versatility
- Collinearity
+ Redundancy\(^1\)
- Unidirectionality
- Triplet code

556. Tuberculosis can be treated by means of combined chemotherapy that includes substances with different mechanisms of action. What antituberculous medication inhibits transcription of DNA into RNA\(^2\) in mycobacteria?
- Isoniazid
- Streptomycin
+ Rifampicin
- Ethionamide
- Para-aminosalicylic acid

557. Nucleolar organizers of the 13–15, 21, 22\(^{nd}\) human chromosomes contain about 200 cluster genes that synthesize RNA. These chromosomal regions contain the information on the following type of RNA:
- tRNA + rRNA
- snRNA
- mRNA
+ rRNA
- tRNA

558. A doctor was addressed by a 30-year-old man. There is a probability of the patient being HIV-positive. To clarify the diag-

\(^1\) i. e. degeneracy.
\(^2\) In the site http://testcentr.org.ua/ (2013), incorrect phrase "transcription of RNA into DNA" was present.
nosis the doctor proposed to perform polymerase chain reaction. The basic process in this kind of investigation is:
– gene mutation
– transcription
– chromosome mutation
– genetic recombination
+ gene amplification

559. Patients with xeroderma pigmentosum are characterized by abnormally high sensitivity to ultraviolet rays leading to skin cancer that arises owing to inability of fermental systems to repair damages of the hereditary material of cells. With disturbance of what process this pathology is associated?
+ DNA repair
– Gene conversion
– DNA recombination
– Gene complementation
– DNA reduplication

560. A process of translation occurs in a cell. When the ribosome reaches UAA, UAG or UGA codons, synthesis of a polypeptide chain comes to an end. These codons in the process of polypeptide biosynthesis are not recognized by any tRNA and therefore serve as a signal of:
– posttranslational modification
– beginning of transcription
+ termination
– elongation
– initiation

561. As a result of treatment of viral RNA with nitrous acid, UCA triplet mutated to UGA triplet. What kind of mutation occurred?
– Nucleotide deletion
– Missense
+ Transversion
– Nucleotide insertion
– Inversion

562. A large number of different tRNA molecules, which transport amino acids to a ribosome, was revealed during cytologic investigations. The number of different tRNAs in a cell will be equal to the number of:

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1 During exams for students studying stomatology in 2014 and 2015, the answer "Transition" was proposed as correct answer, but this is mistake.
563. 28-years-old patient with bacterial pneumonia was administered a course of erythromycin treatment. It is known that antibacterial properties of erythromycin are determined by the ability to bind with free 50S subunit of a ribosome. Synthesis of what substances is blocked by this antibiotic in bacterial cells?
+ Proteins
– RNA
– DNA
– Fats
– Polysaccharides

564. Ability to divide is characteristic of procaryotic and eukaryotic cells. Procaryotic cell division is different from that of eukaryotic, but there is one molecular process that is the basis of both types of division. Name this process.
– Transcription
– Reparation
– Translation
+ DNA replication
– Gene amplification

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1 In 1966, F. Crick developed the wobble hypothesis, which proposed that some nonstandard pairings of bases could occur at the third position of a codon. Wobble allows some tRNAs to pair with more than one codon on an mRNA; thus the cells of most organisms possess from about 32 to 50 different types of tRNA.
MEDICAL GENETICS

565. A 14-year-old girl has some abnormalities: her height is lower than that of the girls of the same age, the signs of puberty are absent, her neck is very short, her shoulders are wide. During the cytogenetic analysis, the lack of one X chromosome was found. The girl has normal intellectual development. What disease does the girl have?
+ Turner's syndrome
– Down's syndrome
– Edwards' syndrome
– Patau syndrome
– Klinefelter's syndrome

566. A healthy woman who had viral roseola during pregnancy gave birth to a deaf baby with a normal karyotype and genotype. The baby's deafness is a manifestation of:
+ Phenocopy
– Gene mutation
– Genocopy
– Combinative variability
– Chromosomal aberration

567. The 14-year-old girl lags behind in physical and intellectual development, has small height and wide thorax resembling a shield; secondary sexual characteristics are absent. Barr's bodies are not present. What is the mechanism of this disease?
– Genetic defect of synthesis of gonadotrophin
– Genetic defect of synthesis of sex hormones
– Hypothyroidism
+ Disturbance of disjunction of sex chromosomes in meiosis
– The acquired insufficiency of somatotropin (growth hormone)

568. During examination of buccal epithelium of the man, sex chromatin was revealed. What chromosomal disease this is characteristic for?
+ Klinefelter's syndrome
– Down syndrome
– Trisomy on the X chromosome
– Hypophosphatemic rickets
– Turner's syndrome

569. The patient has the long growth of extremities, extended "arachnoid" fingers, defects of crystalline lens of an eye, anomalies of cardiovascular system. Intelligence is normal. What traits
this patient can have still?
- Cleft soft and hard palate
+ Maldevelopment of connective tissue
- Underdevelopment of gonads
- Flat face and wide nose bridge
- Underdevelopment of the lower jaw

570. The 15-year-old boy of tall height, with delay of intellectual development and the delayed sexual maturity has XXY karyotype. How many Barr’s bodies are in his cells?
- 0
+ 1
- 2
- 3
- 4

571. In medical consultation, the family tree of the patient with alkaptonuria is constructed. He is 12 years old. What symbol is necessary to be used for designation of the proband?
- To shade or paint over a symbol (square)
- To draw a horizontal hyphen over a square
- To put an exclamation mark or an asterisk near a square
+ To draw an arrow near a square
- To put the dot inside a square

572. In what family there is a high risk of development in the newborn of acholuric jaundice at the second childbirth?
- The wife is Rh-positive, the husband is Rh-negative, the first child is Rh-negative
- The wife is Rh-positive, the husband is Rh-negative, the first child is Rh-positive
- The wife is Rh-negative, the husband is Rh-positive, the first child is Rh-negative
- The wife is Rh-positive, the husband is Rh-positive, the first child is Rh-positive
+ The wife is Rh-negative, the husband is Rh-positive, the first child is Rh-positive

573. Down syndrome was found in the 6-year-old child. However, the chromosomal analysis showed, that not all cells have an abnormal karyotype. How this phenomenon is called?
- Epistasis
- Incomplete penetrance
- Incomplete domination
+ Mosaicism
Variable expressivity

574. The woman of 25 years is pregnant for the third time; she got to clinic with threat of induced abortion. What combination of Rhesus factor in her organism and in a fetus can be the cause of it?
- rh− in the mother, rh− in the fetus
- Rh+ in the mother, rh− in the fetus
- Rh+ in the mother, Rh+ in the fetus
+ rh− in the mother, Rh+ in the fetus
- It is impossible to define

575. The karyotype of mother contains 45 chromosomes. It was established that it is associated with translocation of the 21st chromosome on the 15th one. What disease most likely will be present in the child (the father's karyotype is normal)?
- Klinefelter's syndrome
+ Down syndrome
- Patau syndrome
- Morris' syndrome
- Edwards' syndrome

576. "Cat's cry" syndrome – the "mewing" voice timbre – has appeared in the child immediately after the birth. What was found after investigation of a karyotype of this child?
- Additional Y chromosome
- Deficiency of X chromosome
- Additional 21st chromosome
+ Deletion of short arm of the 5th chromosome
- Additional X chromosome

577. Narrow shoulders and wide pelvis, underdevelopment of testes, high voice, gynecomasty, and infertility are characteristic for:
- Down syndrome
- Edwards' syndrome
+ Klinefelter's syndrome
- Patau syndrome
- Turner's syndrome

578. In the 5-year-old child, tyrosine metabolism is broken. It leads to lesion of nervous system and mental deficiency, but is easily treated by the special diet prescribed at early age. What is this disease?
- Hemophilia
- Cystinuria
+ Phenylketonuria
– Brachydactyly
– Thalassemia

579. At what disease heterozygotes are resistant to malaria?
– Brachydactyly
– Cystinuria
– Phenylketonuria
– Hemophilia
+ Sickle-cell anemia

580. The child's birth is not recommended to the woman of 43 years because of high probability of chromosome syndrome in the child. Why such restriction does not concern men?
+ Stage of prophase of I meiotic division in women is very long
– Ovum is motionless
– Limited number of oocytes of the first order
– During oogenesis, only one ovum is formed, but not four ova
– During oogenesis, formation stage is absent

581. The truncated extremities, small skull, flat wide nose bridge, narrow palpebral fissures, the hanging fold of an upper eyelid, a monkey fold, and mental retardation are characteristic for:
– Turner's syndrome
– Edwards' syndrome
– Klinefelter's syndrome
+ Down syndrome
– trisomy X

582. Positive reaction of the Følling test, musty specific odour of urine and sweat, retarded motor and mental development from 6-month age, and lightening of hairs are characteristic for:
– Turner's syndrome
– galactosemia
– fructosuria
+ phenylketonuria
– Patau syndrome

583. Cleft palate, underdevelopment or lack of eyes, incorrectly formed ears, deformation of hands and feet, and maldevelopment of heart and kidneys are characteristic for:
+ Patau syndrome
– Down syndrome
– Klinefelter's syndrome
– Turner's syndrome
– Edwards' syndrome

584. Retarded motor and mental development, paleness of integ-
Uments, hairs and iris of eyes, and positive test with 5% solution of trichloroacetic iron are observed in the 6-month-old child. What of the specified hereditary diseases is revealed in the child?

- Galactosemia
- Alkaptonuria
- Down syndrome
- Albinism
+ Phenylketonuria

585. The narrow forehead and wide occiput, deformed ears that are located very low, underdevelopment of the lower jaw, and wide short fingers are characteristic for:

- Turner’s syndrome
+ Edwards’ syndrome
- Down syndrome
- Patau syndrome
- Klinefelter’s syndrome

586. What methods of investigation allow to establish the diagnosis of phenylketonuria in due time?

- Determination of Barr’s bodies or drum sticks
- Calculation of probability of the birth of the patient (according to genetic laws)
+ Biochemical test of blood and urine
- Determination of karyotype
- Studying of dermatoglyphics

587. Mother and father are healthy. In genetic consultation, sex chromatin and karyotype of a fetus were determined by the method of amniocentesis: n=45, XO. What diagnosis can be made to the future child?

- Syndrome trisomy X
- Philadelphia chromosome
- Hepatolenticular degeneration (Wilson’s disease)
+ Turner’s syndrome
- Phenylketonuria

588. In a family, the father has hemophilia and daltonism at the same time. You are a doctor of genetic consultation. Analyse possible variants of inheritance of these anomalies:

+ both genes will be received by girls
- the gene of hemophilia will be received by boys
- both genes will be received by boys
- the gene of daltonism will be received by girls
- both genes will be received by children irrespective of sex
589. The woman prematurely gave birth to the dead boy. What reason of spontaneous abortion is the most frequent?
- Gene mutation
- Trauma
+ Chromosome aberration
- Incompatibility on Rhesus factor
- Infection of mother

590. By what method it is possible to diagnose heterozygous carrier state of the pathological gene if the dose effect for the specified allele is observed, and expressiveness of a trait in phenotypes of dominant homozygote and heterozygote are different?
- Genealogical method
- Cytogenetic method
+ Biochemical method
- Twin study
- Population-statistical method

591. Disturbance of synthesis of tyrosine, adrenaline, noradrenaline, and melanin are observed in the patient. Mental deficiency is expressed. What is the most probable diagnosis?
- Ichthyosis
- Hepatocerebral dystrophy (Wilson's disease)
- Gout
+ Phenylketonuria
- Family amaurotic idiocy (Tay-Sachs disease)

592. The woman with monosomy on the X chromosome addressed to genetic consultation. Daltonism was revealed in her organism. Choose her karyotype and genotype:
- 45, X<sup>d</sup>X<sup>d</sup>
- 46, X<sup>D</sup>0
- 45, X<sup>D</sup>0
- 46, X<sup>d</sup>0
+ 45, X<sup>d</sup>0

593. Mother and father are healthy. Fetus karyotype 47,XX,+21 was determined by method of amniocentesis. Make the diagnosis:
- cat's cry syndrome
+ Down syndrome
- syndrome "superwoman"
- Turner's syndrome
- Edwards' syndrome

594. The child is ill with phenylketonuria and has mental retardation. What mechanism will be the main thing in development of
damage of the central nervous system?
– Increase in tyrosine synthesis
+ Accumulation of phenylalanine and phenyl ketones (phenylpyruvate) in blood
– Decrease in synthesis of melanin
– Increase in excretion of phenyl ketone bodies with urine
– Decrease in synthesis of thyroid hormones

595. Healthy spouses, whose son is sick with phenylketonuria, addressed to genetic consultation. Spouses are disturbed by health of the next child. Phenylketonuria is inherited on autosomal recessive type. What is the probability of the birth of the second child with phenylketonuria?
– 0%
– 50%
– 100%
– 75%
+ 25%

596. What method of genetic examination most likely makes it possible to diagnose Shereshevskiy–Turner syndrome?
– Genealogical
– Demographic-statistical
+ Identification of sex chromatin
– Bigeminal
– Dermatoglyphics

597. The newborn with anomalies of skull and extremities was examined in genetic consultation by karyotyping. Existence of three autosomes of the 18th pair was established. What disease is the most probable in the child?
+ Edwards' syndrome
– Syndrome XXX
– Down syndrome
– Patau syndrome
– Klinefelter's syndrome

598. In human, hemophilia is encoded by the recessive gene linked with X chromosome. Future spouses addressed to genetic consultation: the healthy young man marries the girl, which father had hemophilia and mother and her relatives were healthy. What is the probability of manifestation of the mentioned trait in sons from this marriage?
+ 50%
– 100%
75%  
0%  
25%  

599. The pregnant woman, who worked in the harmful factory, addressed to genetic consultation because she has the bases for excitement concerning the birth of the abnormal child. After carrying out of amniocentesis, there was a question about induced abortion. Doctors explained the woman that her future child will not be viable and will have defects in a structure of heart, kidneys, and digestive system, cleft soft palate and cleft hard palate, and underdevelopment or lack of eyes. About what disturbance in a karyotype one can talk in this case?  
– Polysomy X  
– Monosomy X  
– Trisomy Y  
+ Trisomy 13  
– Trisomy 21  

600. A 20-year-old tall young man of asthenic constitution, who demonstrates signs of hypogonadism, gynecomastia, and diminished production of semen, has been found having a 47, XXY karyotype. What do we call such chromosomal syndrome?  
– Shereshevskiy–Turner  
– Wiskott–Aldrich  
– Louis-Bar  
+ Klinefelter  
– Down's syndrome  

601. One of the forms of rickets is inherited in the autosomal dominant way. This disease is a result of:  
– Aneuploidy  
– Changes in the number of chromosomes  
– Chromosomal mutations  
– Polyploidy  
+ Gene mutations  

602. One of forms of rickets is inherited according to autosomal dominant type. This disease is the result of:  
– aneuploidy  
– genomic mutation  
– chromosome mutation

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1 This question has bad answers because aneuploidy and polyploidy are changes in the number of chromosomes, and these three types of mutations are chromosomal mutations.
– polyploidy
+ gene mutation

603. It is known that phenylketonuria arises owing to mutation of the gene, which is responsible for phenylalanine transformation and disintegration of phenylalanine to the final products of metabolism. Choose, what way of metabolism of phenylalanine will lead to development of phenylketonuria:
– phenylalanine → tyrosine → thyroxin
– phenylalanine → thyroxin → noradrenaline
– phenylalanine → thyroxin → homogentisic acid
+ phenylalanine → phenylpyruvate → keto-acids
– phenylalanine → tyrosine → melanin

604. Medical examination at the military registration and enlistment office revealed that a 15-year-old boy was high, with eunuchoid body proportions, gynecomastia, female pattern of pubic hair distribution. The boy had also fat deposits on the thighs, no facial hair, high voice, subnormal intelligence quotient. Which karyotype corresponds to\(^1\) this disease?
+ 47, XXY
– 47, XXX
– 46, XY
– 46, XX
– 45, XO

605. During the analysis of urine of the three-month child, the increased amount of homogentisic acid was revealed; urine when standing on air gets dark coloring. What of the listed below diseases, the described changes are characteristic for?
+ Alkaptonuria
– Albinism
– Aminoaciduria
– Cystinuria
– Phenylketonuria

606. Owing to disturbance of meiosis, such types of ova were formed in the woman: 22+XX, 22+0. What diseases are possible in her daughters if man's spermatozoa have normal set of chromosomes?
– Trisomy X and Down syndrome
– Turner's syndrome and Klinefelter's syndrome
– Klinefelter's syndrome and trisomy X

\(^{1}\) During exams (2009, 2011), incorrect word combination "corresponds with" was used.
Krok-1 Tests – Medical Biology  136  Smirnov O.Yu.

- Klinefelter’s syndrome and Down syndrome
+ Turner’s syndrome and trisomy X

607. Healthy parents have got a fair-haired, blue-eyed girl. Irritability, anxiety, sleep and feeding disturbance developed in the first months of the infant's life. Neurological examination revealed developmental lag. What method of genetic investigation should be used for the exact diagnosis?
- Population-statistical
- Cytological
- Twin study (Gemellary)
- Genealogical
+ Biochemical

608. During the analysis of the woman's buccal mucosa epithelium cells, no sex chromatin\(^1\) was found. Which of the below mentioned diseases can it be?
- Edwards' syndrome
- Klinefelter's syndrome
- Down's syndrome
+ Turner's syndrome
- Patau syndrome

609. Parents with suspicion on a chromosomal disease of the child addressed to the medico-genetic center. During karyotyping of the child, translocation of additional chromosome 21 on the 15\(^{th}\) chromosome was revealed. The doctor established the diagnosis: translocation form of Down syndrome. Damage of what structure of the chromosome has caused developing of this disease?
- Short arm
- Long arm
- Secondary constriction
- Centromere
+ Telomeric region

610. During clinical examination of the pregnant woman, the increase in the content of phenylalanine in blood was revealed. How it can affect the child?
- Development of galactosemia is possible

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\(^1\) In the book “Collection of tasks…” – “sexual chromatin”. Similar question is present in the Section “Pathophysiology”: A doctor consulted a woman with defects of physical and sexual development. Microscopy of mucosa cells in the oral cavity did not reveal any sex chromatin in the nuclei. What kind of chromosomal pathology does it characterize? Answers: Shereshevsky-Turner syndrome; Down's syndrome; Recklinghausen's disease; Klinefelter's syndrome; trisomy on X chromosome.
+ Development of mental retardation is possible
– Development of Wilson’s disease is possible
– No influence
– The child’s birth with Down syndrome is possible

611. A 18-year-old man with asthenic body constitution (tall, narrow shoulders, broad pelvis) and with poor hair on his face came to the geneticist. There was marked mental retardation. The preliminary diagnosis was Klinefelter's syndrome. What method of medical genetics can confirm the diagnosis?¹
– Dermatoglyphics
– Population-statistic
– Genealogic
+ Cytogenetic
– Twin study

612. The girl of 18 years with complaints to lack of menstruations consulted a doctor. During examination, such traits were revealed: height is 140 cm, short neck with characteristic folds of skin ("neck of a sphinx"), big shoulders, narrow pelvis, lack of secondary sex traits, and underdevelopment of ovaries. What provisional diagnosis can be established?
– Patau syndrome
– Morris’s syndrome
+ Turner’s syndrome
– Down syndrome
– Klinefelter’s syndrome

613. Woman with the first blood type and normal blood clotting married the man is ill with hemophilia and has the second blood type. At what genotypes of parents the child, who has the first blood type and is ill with hemophilia, can be born in this family?
– $i X^H X^H \times \bar{\alpha} i X^h Y$
– $i X^H X^h \times \bar{\alpha} \bar{\alpha} X^h Y$
– $i X^H X^H \times \bar{\alpha} \bar{\alpha} X^H Y$
+ $i X^H X^h \times \bar{\alpha} \bar{\alpha} X^h Y$

¹ In the book “Collection of tasks…”, this question is written as follows: An 18-year-old young man is tall and has narrow shoulders, a large pelvis, an adult woman pattern of hair distribution, and oxyphonia. Mental retardation is also present. Based on these symptoms, the provisional diagnosis of Klinefelter's syndrome was made by a doctor. What genetic method can confirm the diagnosis? Answers: a) Cytogenetic; b) Pedigree analysis; c) Study of twins; d) Biochemical; e) Population-statistical. In addition, another similar question is present in this book: A teenager with the provisional diagnosis of Klinefelter's syndrome came for advice to a genetic consultation. What genetic method does the doctor have to apply to make a correct diagnosis?
\[ ii X^H X^H \times I^h Y \]

614. The man of 26 years complains of infertility. Objective traits: height of 186 cm, long extremities, gynecomasty, hypoplasia of testicles; Barr's bodies are found in scraping of mucous membrane of a cheek. Klinefelter's syndrome is diagnosed. What mechanism of chromosomal anomaly takes place at this disease?

- Chromosome deletion
- Translocation
+ Nondisjunction of heterochromosomes in meiosis
- Inversion of a chromosome
- Nondisjunction of chromatids in mitosis

615. Phenylketonuria was revealed in the child. What of the listed methods of treatment need to be used?

- Hormonal therapy
- Surgical treatment
- Removal of toxic substances from an organism
+ Dietotherapy
- Medicinal therapy

616. With damage of structure of what cellular organelles, storage diseases appear?

+ Lysosomes
- Golgi complex
- Centrosomes
- Mitochondria
- Plastids

617. Trisomic, translocation, and mosaic forms of Down's syndrome are known. What method of human genetics can be applied to differentiate these forms of Down's syndrome?

- Population-statistical
- Study of twins
- Pedigree analysis\(^1\)
- Biochemical
+ Cytogenetic

618. It is known that, during application of the method of determination of sex chromatin, calculation of number of Barr's bodies in the painted smear of buccal epithelium (mucous membrane of a cheek) allows to establish precisely human karyotype. What karyotype will be present in woman if two Barr's bodies are present?

- 48, XXXY

\(^1\) Another answer: "Genealogical".
619. **Studying of prints of epidermic ridges of fingers of hands (dactyloscopy) is used in criminalistics for identification of the personality, and also for diagnostics of genetic anomalies, in particular, of Down syndrome. What layer of skin defines identity of prints?**

+ Papillary
- Corneous
- Reticular
- Bright
- Basal

620. **A 40-year-old pregnant woman underwent amniocentesis. The examination of fetus karyotype revealed 47,XY,+21. What pathology of the fetus was found out?**

- Phenylketonuria
- Patau's disease
- Klinefelter's syndrome
+ Down's syndrome
- Schereschevsky–Turner's disease

621. **Positive reaction of urine with 10% solution of chloride of iron was revealed in the child after the birth. For what hereditary pathology it is characteristic?**

- Alkaptonuria
- Tyrosinosis
- Diabetes (hereditary form)
+ Phenylketonuria
- Galactosemia

622. **Choose what of the diseases listed below has is based on destruction of normal process of DNA repair after ultraviolet radiation:**

- hypertrichosis
+ xeroderma pigmentosum
- simple ichthyosis
- melanism
- albinism

623. **Spouses, who after three-year married life had no children, addressed to genetic consultation. During examination of the husband, the underdevelopment of testes and lack of spermat-**
genesis was revealed. He has narrow shoulders, wide pelvis, and undeveloped muscles. What of the listed karyotypes this man had?
- 46, t13.13
- 46, 5p−
- 45, XO
- 47, 21+
+ 47, XXY

624. A 1.5-year-old child has mental and physical lag, decolorizing of skin and hair, decrease in catecholamine concentration in blood. When a few drops of 5% solution of trichloroacetic iron had been added to the child's urine it turned olive green. Such alterations are typical for the following pathology of the amino acid metabolism:¹
- albinism
- xanthinuria
+ phenylketonuria
- alkaptonuria
- tyrosinosis

625. The woman addressed to genetic consultation concerning deviations of physical and sexual development. During microscopy of cells of a mucous membrane of a mouth, sex chromatin was not revealed. For what chromosomal pathology it is characteristic?
+ Turner's syndrome
- Klinefelter's syndrome
- Down syndrome
- Recklinghausen's disease
- Trisomy of the X chromosome

626. Need to carry out identification of the personality appears periodically in forensic medical practice. The method of dactyloscopy is used for this purpose. Explain what structure defines individual drawing of skin of human fingers:
- features of the structure of reticular layer of derm
- structure of epidermis and derm
+ features of the structure of papillary layer of derm

¹ In the book “Collection of tasks…”, this question is written as follows: A few months after birth a child developed symptoms of the CNS disorder. The skin and hair became lighter. The solution of 5% trichloroacetic ferric lactase, added to fresh urine, gives it olive-green coloring. What kind of hereditary disorder is characterized by these manifestations? Answers: tyrosinosis; alcaptonuria; fructosuria; phenylketonuria; albinism.
- features of the structure of epidermis
- structure of epidermis, derm, and hypoderm

627. Mother and father of future child are healthy. The method of amniocentesis determined a fetus karyotype: 45, XO. What syndrome can be expected in a newborn baby?
- Patau syndrome
+ Turner's syndrome
- Syndrome "superwoman"
- Cri du chat syndrome
- Edwards' syndrome

628. The child of 10-month age, whose parents are brunettes, has fair hairs, very light skin, and blue eyes. Externally at the birth he looked normally, but for the last three months disturbance of cerebral blood flow, lag in intellectual development were observed. The reason of such state is:
+ phenylketonuria
- glycogenosis
- histidinemia
- galactosemia
- sharp porphyria

629. The young man of tall height, with increased lower jaw and projected superciliary arches, was surveyed in genetic consultation in connection with problems in training and antisocial behavior. The karyotype 47, XYY is revealed. What is the disease?
- Edwards' syndrome
- Patau syndrome
+ Syndrome "superman"
- Turner's syndrome
- Klinefelter's syndrome

630. Father and son in a family are sick with hemophilia A. Mother is healthy. Choose genotypes of parents:
- \(X^H X^h \times X^h Y\)
- \(Aa \times aa\)
- \(X^h X^h \times X^H Y\)
- \(aa \times Aa\)
+ \(X^H X^h \times X^h Y\)

631. The diagnosis "Konovalov–Wilson’s disease", which is associated with metabolic disorder, was made to the woman of old age. Disturbance of metabolism of what substances is caused by this disease?
+ Minerals
– Amino acids
– Carbohydrates
– Lipids
– Proteins

632. *One little body of sex X chromatin was revealed in nuclei of the majority of cells of an epithelium of mucous membrane of man’s cheek. For what of the listed syndromes it is characteristic?*
– Trisomy on the X chromosome
+ Klinefelter’s syndrome
– Turner’s syndrome
– Down syndrome
– Edwards’ syndrome

633. *Hemophilia A is the hereditary disease caused by existence of the pathological gene in:*
– 21\textsuperscript{st} chromosome
– 19\textsuperscript{th} chromosome
– Y chromosome
– 7\textsuperscript{th} chromosome
+ X chromosome

634. *Dyspepsia, excitation, increase of muscular tone and tendon reflexes are noted in the monthly child. Test on finding of phenylpyruvic acid in urine is positive. Choose the diagnosis of the disease:*
– mucopolysaccharidosis
– daltonism
– Duchenne’s dystrophy
+ phenylketonuria
– hemophilia A

635. *For studying of human heredity, different methods of human genetics are used; among them, there are genealogical method and twin study. What can be determined by twin study?*
– Expressivity
+ Coefficient of heredity
– Penetrance
– Type of inheritance
– Zygosity of the proband

636. *The examination of a youth with mental retardation revealed eunuchoid body construction and genitals underdevelopment. The cells of the oral cavity contained chromatin. What method of genetic investigation should be performed to make more specified diagnosis?*
– Population-statistic
– Dermatoglyphics
– Biochemical
+ Cytological
– Clinico-genealogical

637. Parents of the newborn, at whom Down syndrome is suspected, addressed to genetic consultation. What method of investigation it is necessary to prescribe for confirmation of the diagnosis of chromosomal pathology and for exception of phenocopy?
+ Cytogenetic
– Dermatoglyphic
– Biochemical
– Determination of sex chromatin
– Immunological

638. Sharp lag in psychomotor development, attacks of spasms, pale skin with eczematous changes, blond hairs, and blue eyes are observed in the child of 6 months. Determination of concentration of what substance in blood and urine will most authentically allow to establish the diagnosis for this child?
– Leucine
– Histidine
– Tryptophane
+ Phenylpyruvate
– Valine

639. Rh-negative woman marries the heterozygous Rh-positive man. What is the probability of rhesus incompatibility between organisms of the mother and a fetus during the second pregnancy?
– 0%
– 12.5%
– 25%
+ 50%
– 75%

640. Men owing to abuse of alcohol can have nondisjunction of sex chromosomes in meiosis. What hereditary diseases can be caused by this situation in descendants?
– Klinefelter's syndrome
– Trisomy on the X chromosome
– Turner's syndrome
– Any hereditary diseases
+ Klinefelter's syndrome and Turner's syndrome
641. One of forms of cystinuria is caused by an autosomal recessive gene. However, raised cysteine contents in urine are observed in heterozygotes, whereas stones in kidneys are formed in recessive homozygotes. What form of cystinuria is possible in children in the family, where the father has this disease and mother has raised content of cysteine in urine?
+ Both (formation of stones and raised content of cysteine in urine)
– No listed form
– Formation of stones
– Raised content of cysteine
– Raised content of cysteine and lack of both forms of cystinuria

642. In a maternity hospital, a child with numerous development anomalies was diagnosed with Patau syndrome. What genetic method can confirm this diagnosis?
– Pedigree analysis
– Biochemical
– Population-statistical
+ Cytogenetic
– Study of twins

643. At what disease it is possible to determine heterozygous carrier state by method of load tests?
+ Galactosemia
– Down syndrome
– Hemophilia
– Patau syndrome
– Cystinuria

644. A man with the problem of sterility appealed to a genetic consultation. During the analysis of the cheek mucosa epithelium one Barr body was found in each nucleus of most cells. In neutrophil nuclei, they found one "drumstick" in each. Which syndrome can cause such phenomenon?
– Patau syndrome
– Turner's syndrome
– Trisomy on X chromosome
– Down's syndrome
+ Klinefelter's syndrome

645. Developing of following diseases is associated with genetic factors. Name pathology with hereditary predisposition:
– sickle-cell anemia
– daltonism
– phenylketonuria
646. Examination of an 18-year-old girl revealed the following features: hypoplasia of the ovaries, broad shoulders, narrow pelvis, shortening of the lower extremities, and "neck of sphinx". Mental development is normal. The girl was diagnosed with Turner's syndrome. What kind of chromosome abnormality is it?

- Trisomy 18
- Trisomy X
- Trisomy 13
+ Monosomy X
- Nullisomy X

647. The pregnant woman addressed to genetic consultation. Her first child was born with numerous malformations: nonclosure of an upper lip and palate, microphthalmos, syndactyly, heart and kidneys malformations. The child died at the age of one month; 46 chromosomes were revealed in his karyotype, the 13th chromosome was translocated on the other chromosome. With what chromosomal disease this child was born?

- Turner's syndrome
+ Patau syndrome
- Edwards' syndrome
- Down syndrome
- Klinefelter's syndrome

648. The woman with Rh-negative blood of III group gave birth to the child with the II blood type, who had hemolytic disease owing to rhesus incompatibility. What group according to ABO system and Rhesus factor is possible in the child's father?

- II (A), rh⁻
- I (O), rh⁻
- III (B), Rh⁺
- I (O), Rh⁺
+ II (A), Rh⁺

649. In a maternity hospital a child with numerous development anomalies of the internal organs, such as the heart, kidneys, digestive system, was born. A doctor suspected Edwards' syndrome. What genetic method can confirm this diagnosis?

- Biochemical
- Dermatoglyphic
- Study of twins
- Pedigree analysis

- Huntington's chorea
+ diabetes
+ Cytogenetic

650. A number of methods is used in human genetics. What of the listed methods gives the chance to estimate extent of influence of heredity and environment on development of a trait?
– Cytogenetic method
+ Twin study
– Biochemical method
– Dermatoglyphic method
– Genealogical method

651. In 1950s in Western Europe, women who had taken thalidomide (soporific) bore a few thousands of babies with underdevelopment or absence of extremities and transgression of the skeleton. What nature did the pathology have?
– Genocopy
– Chromosomal mutation
+ Phenocopy
– Chromosomal aberration
– Gene mutation

652. What of the listed human diseases is hereditary and monogenic?
– Hypertension
– Stomach ulcer
– Poliomyelitis
+ Hemophilia A
– Diabetes

653. An 18-year-old girl has body disproportion: wide shoulders, a narrow pelvis, shortened low extremities, wing-like skin folds on the neck, underdeveloped ovaries. During the laboratory analysis, neither "drumsticks" in the neutrophil nuclei nor Barr bodies in the nuclei of the buccal epithelium cells were found. Dermatoglyphics method revealed that her atrd palmar angle is 66°. What provisional diagnosis can be made in this case?¹
+ Turner's syndrome
– Down's syndrome²
– Klinefelter's syndrome

¹ In the book “Collection of tasks…”, another similar question is also present: An 18-year-old girl complained to a doctor of the absence of menstruation. The patient had such features: 140 cm in height, a short neck with typical folds ("neck of sphinx"), wide shoulders, a narrow pelvis, absence of secondary sexual characters, underdeveloped ovaries. What was the provisional diagnosis of the girl?
² Another possible answer: Cri du chat (cat cry) syndrome.
– Patau syndrome
– Edwards’ syndrome¹

654. A girl with the provisional diagnosis of Turner’s syndrome came for advice to a genetic consultation. Which genetic method can confirm this diagnosis?
– Pedigree analysis
– Hybridization of somatic cells
+ Sex chromatin test
– Biochemical
– Study of twins

655. A 28-year-old female patient consulted a gynecologist about sterility. Examination revealed underdeveloped ovaries and uterus, irregular menstrual cycle. Analysis of sex chromatin revealed two Barr’s bodies in most somatic cells. What chromosome disease is the most probable in this case?²
– Turner’s syndrome
+ Triple X syndrome
– Klinefelter’s syndrome
– Patau’s syndrome
– Edwards’ syndrome

656. A baby has such pathology: anomaly of the lower jaw and the larynx development accompanied by voice changes resembling a cat’s cry. Moreover, the baby has microcephaly, heart trouble, and four fingers. A likely cause of such anomaly is the deletion of:
– short arm of the 11th chromosome
– short arm of the 7th chromosome
– short arm of the 9th chromosome
+ short arm of the 5th chromosome
– short arm of the 21st chromosome

657. Four-year-old girl has dislocation of crystalline lenses, long and slender fingers, hereditary heart disease, and high level of oxyproline (amino acid) in urine. All these defects are caused by anomaly of connective tissue. For what disease these clinical symptoms are characteristic?
+ Marfan’s syndrome

¹ Another possible answer: Morris’s syndrome.
² In the book “Collection of tasks…”, this question is written as follows: A 28-year-old woman saw a physician because of infertility. Underdevelopment of the ovary and the womb, disorder of the menstrual cycle were diagnosed. During the test of buccal epithelium cells it appeared that most of their nuclei had two Barr bodies. The neutrophil nuclei had two “drumsticks” each. What provisional diagnosis can we make in this case?
– Phenylketonuria
– Hypophosphatemia
– Fructosuria
– Galactosemia

658. Down syndrome is the most widespread of all syndromes associated with chromosomal anomalies. Characteristic symptoms of Down syndrome are shortening of extremities, small skull, anomalies of a structure of the face, narrow palpebral fissures, epicanthus, mental retardation, frequent damages of a structure of an internal. In the case of Down syndrome caused by trisomy of the 21st chromosome, the main diagnostic method is:
– genealogical method
+ cytogenetic method
– biochemical method
– population-statistical method
– modeling

659. The child, who was born in late marriage, has the small growth, lag in intellectual development, thick "geographical" tongue, narrow palpebral fissures, flat face with wide cheekbones. What sort of disturbance has caused development of the described syndrome?
– Birth injury
+ Chromosomal pathology
– Intrauterine immune conflict
– Intrauterine intoxication
– Intrauterine infection

660. In genetic consultation, it was established that heterozygous carrier mother gave a mutant gene to half of sons who are sick, and half of daughters who are phenotypically healthy carriers and can transfer a recessive gene together with the X chromosome to the next generation. What gene from the listed diseases can be transmitted by the daughter?
– Polydactyly
– Thalassemia
– Phenylketonuria
+ Hemophilia
– Hypertrichosis

661. Lack of B lymphocytes and sharp decrease in amount of immunoglobulins of the main classes were revealed in blood of the sick boy. The diagnosis of congenital agammaglobulinaemia is made. Owing to what event this hereditary disease has appeared,
if parents of the patient are healthy, and cases of the disease in a pedigree are not observed?

- Somatic mutation in the patient
- Mutation in somatic cells of parents
- Incomplete penetrance of a gene in parents
+ Mutation in sex cells of parents
- Generative mutation in the patient

662. There is repeated pregnancy. Mother has O blood type, she is Rh-negative, and both fetuses have II blood group and are Rh-positive. By what variant there can be conflict?

- Incompatibility on A-antigen
- Rh-incompatibility
+ Incompatibility on Rh-system and ABO system
- Incompatibility on other systems
- Incompatibility on B-antigen

663. The lymphatic edema of extremities and surplus of skin on the neck is revealed in the newborn girl. There are no "drum sticks" in neutrophils. What is your diagnosis?

- Klinefelter's syndrome
- Down syndrome
- Patau syndrome
- Edwards' syndrome
+ Turner's syndrome

664. Three sons grew up in a family where the father had hypertensive disease. One of them worked as the air traffic controller, the head of flights at the large international airport with high intensity of the movement. Two other sons lived in rural areas and had professions of the beekeeper and the plant breeder. The dispatcher at mature age got sick with a heavy form of hypertensive disease. This disease was absent in other sons, but small raising of blood pressure was only occasionally noted. To what group of genetic diseases it is necessary to carry hypertensive disease in this family?

- Monogenic disease
- Chromosomal disease
+ Multifactorial disease
- Genomic disease
- Disease of nonheritable character

665. During determination of a blood type on ABO system antigens A and B were revealed. This blood can be transfused to the persons having such group:
666. The provisional diagnosis – phenylketonuria – was made to the child in maternity hospital. What results of biochemical investigation will confirm the diagnosis?

- Deposition of urine acid salts in joints
- Disturbed synthesis of tyrosine, adrenaline, noradrenaline, and melanin
- Accumulation of lipids in nervous cells, retina of an eye, and liver
- Disturbed carbohydrate metabolism
- Disturbed copper exchange

667. In genetic consultation, the analysis of linkage groups and localization of genes in chromosomes was carried out. Thus the method was used:

+ hybridizations of somatic cells
- population-statistical method
- twin study
- genealogical method
- dermatoglyphic method

668. A healthy woman, who had had viral roseola during pregnancy, gave birth to a baby with a cleft lip and cleft palate. The baby has a normal karyotype and genotype. This anomaly can be the result of:

+ Influence of teratogenic factor
- Gene mutation
- Chromosomal aberration
- Chromosomal mutation
- Combinative variability

669. The pregnant woman is on consultation. The doctor for the prognosis of health of the expected child can use a genetic method:

- method of crossing
+ amniocentesis
- twin study
- biochemical method
- dermatoglyphic method

670. During the checkup of an 18-year-old boy, some physical and psychical development defects are found. They are as follows: eunuchoidism, female lipopexia and an adult woman pattern of
hair distribution, muscular hypoplasia, mental deficiency. Using the cytogenetic method, the karyotype of the patient was determined. Which karyotype was it?

- 47, XY, 21+
- 45, XO
- 47, XY, 18+
- 47, XYY
+ 47, XXY

671. The translocation of a site of the 22\( ^{\text{nd}} \) chromosome on the other chromosome is revealed in the patient's leukocytes. Such mutation leads to development of:

- Turner's syndrome
- Down syndrome
+ chronic leukemia
- syndrome "cry of a cat"
- phenylketonuria

672. The heterozygous carrier state of a semilethal allele, which has dose effect, was established in the patient; expressiveness of this allele in homozygotes and heterozygotes is different. This fact was established by means of a method:

- cytogenetic method
- population-statistical method
- mapping of chromosomes
- twin study
+ biochemical method

673. Rhesus-negative woman with I (O) blood type is pregnant with the Rh-positive fetus having A blood type. To prevent a sensitization of Rh-negative mother by Rh-positive erythrocytes of a fetus, she needs to enter intravenously for 72 hours after the delivery:

- B-globulin
- fibrinogen
+ anti-D globulin
- Rhesus agglutinins
- prothrombin

674. A human has galactosemia – a disease of accumulation. Which genetic method can we use to diagnose the case?

- Cytogenetic
+ Biochemical
- Population-statistical
- Study of twins
Pedigree analysis

675. The 22nd human chromosome has different mutant variants – monosomies and trisomies, deletions of a long arm, and translocations. Each mutation has the clinical variant of manifestation. By what method it is possible to define variant of a chromosome mutation?

- Sequencing
- Biochemical method
+ Cytogenetic method
- Twin study
- Dermatoglyphic method

676. The patient has a mutation of the gene that is responsible for hemoglobin synthesis. It has led to development of the disease sickle-cell anemia. How the pathological hemoglobin revealed at this disease is called?

- HbA
- HbF
+ HbS
- HbA1
- Bart-Hb

677. During the examination of an 18-year-old girl, such features as underdeveloped ovaries, wide shoulders, a narrow pelvis, shortened low extremities, a "neck of sphinx" were determined. There was no mental deficiency. A doctor suspected Turner's syndrome. With what genetic method can this diagnosis be confirmed?

+ Cytogenetic
- Population-statistical
- Study of twins
- Pedigree analysis
- Biochemical

678. The child had the special "mewing" voice timbre in the early childhood. Retardation of psychomotor development and mental deficiency are observed. The syndrome of "cat's cry" is diagnosed. At what level of the organization there was damage, which has caused this syndrome?

+ Molecular
- Subcellular
- Cellular
- Tissue
- Organismal
679. During examination of the child, the pediatrician noted lag in physical and intellectual development. The content of keto-acid in urine is sharply raised; this acid gives qualitative color reaction with chloric iron. What metabolic disorder was revealed?

– Cystinuria
– Tyrosinemia
+ Phenylketonuria
– Alkaptonuria
– Albinism

680. The patient is 18 years old. Phenotypically: she has small height, short neck, epicanthus, and downward slant of palpebral fissures. Karyotype 45, XO. Sex chromatin: 0% of X chromatin. The most probable diagnosis is:

– Sandberg's syndrome
+ Turner's syndrome
– Down syndrome
– Klinefelter's syndrome
– true hermaphroditism

681. The newborn child had multiple malformations: cleavage of hard palate, cyst of spinal cord, wrong placement of heart. The child's mother, working in radiation laboratory without following safety rules, underwent the corpuscular ionizing radiation (mutagenic influence). With what type of prenatal maldevelopment such changes, which appeared in the child born by the woman, are associated?

+ Embryopathies – disturbances of embryogenesis on the 2-8\textsuperscript{th} weeks of development
– Blastopathies – disturbances at a blastula stage
– Gametopathies – disturbances at a zygote stage
– Fetopathies – disturbances after 10 weeks of development
– Extra duration of pregnancy

682. A patient with a normal karyotype has some abnormalities of the fingers (arachnodactyly), skeleton, cardiovascular system, disorders in the development of connective tissue, and lens defect. What provisional diagnosis can we make?

– Edwards' syndrome
– Down's syndrome
– Turner's syndrome
– Patau syndrome
+ Marfan's syndrome

683. The first step in diagnosing diseases provoked by the disorder
of metabolism is the application of express methods\(^1\) which are based on a simple quality reaction of determining metabolites in blood or urine. The second step is to confirm the diagnosis, for which exact chromatographic methods of enzymes and amino acids study are used. What genetic method can be applied?

\[\begin{array}{l}
+ \text{Biochemical} \\
- \text{Study of twins} \\
- \text{Cytogenetic} \\
- \text{Population-statistical} \\
- \text{Hybridization of somatic cells}
\end{array}\]

\textbf{684.} A baby boy has deformations of cerebral and facial cranial parts, microphthalmia, an ear deformation, and cleft palate\(^2\). The baby's karyotype is 47,XY,13+. What disease is it?

\[\begin{array}{l}
- \text{Edwards' syndrome} \\
- \text{Klinefelter's syndrome} \\
+ \text{Patau syndrome} \\
- \text{Down's syndrome} \\
- \text{Turner's syndrome}
\end{array}\]

\textbf{685.} It is known that 0–5\% of interphase nuclei of man's somatic cells and 60–70\% of nuclei of woman's cells contain in norm masses of sex chromatin. For what purpose the number of masses of sex chromatin is defined in genetic consultations?

\[\begin{array}{l}
- \text{For studying of structure of sex X chromosome} \\
- \text{For express diagnostics of human sex} \\
- \text{For studying of structure of sex Y chromosome} \\
- \text{For studying of structure of autosomes} \\
+ \text{For determination of the karyotype}
\end{array}\]

\textbf{686.} A patient has mental deficiency, a short stature, and the mongolian type of the eyelid fold. The microscopical examination of the patient's karyotype revealed the presence of trisomy on the 21\textsuperscript{st} chromosome. What do we call the disease, which is caused by this chromosomal abnormality?

\[\begin{array}{l}
+ \text{Down's syndrome} \\
- \text{Klinefelter's syndrome} \\
- \text{Turner's syndrome} \\
- \text{Edwards' syndrome} \\
- \text{Patau syndrome}
\end{array}\]

\textbf{687.} What diseases can develop if deficiency of the enzymes play-
\footnote{\textsuperscript{1} quick tests.}
\footnote{\textsuperscript{2} There is a mistake in this question in the book “Collection of tasks...” – the word "plate" is used in this book.}
ing a role in digestion of substances is present in lysosomes?
+ Storage diseases
– Chromosomal diseases
– Diseases associated with mineral exchange
– Anomalies of autosomes
– Anomalies of sex chromosomes

688. Autopsy of a newborn boy revealed polydactyly, microcephaly, cheilochisis and uranoschisis as well as hypertrophy of parenchimatous organs. These defects correspond with the description of Patau’s syndrome. What is the most probable cause of this pathology?¹
– Partial monosomy
+ Trisomy of the 13th chromosome
– Nondisjunction of sex chromosomes
– Trisomy of the 21st chromosome
– Trisomy of the 18th chromosome

689. A baby was born with abnormalities of the external and internal organs development. During the check up the following abnormalities were found: epicanthus, shortened extremities, a small skull, impaired development of the cardiovascular system. On these grounds, the provisional diagnosis of Down's syndrome was made. What genetic method can confirm this pathology?
– Pedigree analysis
– Population-statistical
– Study of twins
+ Cytogenetic
– Biochemical

690. What substance is accumulated in tissues of brain and liver and causes their degeneration at Wilson–Konovalov's disease?
– Phosphorus
– Tyrosine
– Phenylalanine
– Lipids
+ Copper

¹ In the book “Collection of tasks...”, this question is written as follows: The pathoanatomic inspection of a newborn boy's dead body showed the following abnormalities: polydactyly, microcephaly, a cleft lip and cleft palate, hypertrophy of the parenchymal organs. These symptoms are typical of Patau syndrome. What is the cause of this disease? Answers: a) Trisomy on the 21st chromosome; b) Trisomy on the 18th chromosome; c) Trisomy on the 13th chromosome; d) Trisomy on X chromosome; e) Monosomy on X chromosome.
691. As a result of abnormal chromosomes disjunction\(^1\) during meiosis, a secondary oocyte\(^2\), which contains only 22 autosomes, has been formed. What disease can the baby have after the impregnation of this secondary oocyte by a normal spermatozoon (22+X)?

– Klinefelter’s syndrome
– Turner’s syndrome
– Trisomy on the X-chromosome
– Down's syndrome
– Edwards’ syndrome

692. In the case of amaurotic idiocy (Tay–Sachs disease), the irreversible heavy disturbances of the central nervous system are developed; they lead to death at early children's age. At this disease, disturbance of metabolism of what substances is observed?

– Carbohydrates
– Amino acids
– Mineral substances
+ Lipids
– Nucleic acids

693. During the analysis of the buccal mucosa epithelium of a male patient, two Barr bodies in each nucleus of most cells were found and in neutrophil nuclei two "drumsticks" in each were found. What syndrome is it typical of?

– Patau syndrome
– Turner’s syndrome
+ Klinefelter’s syndrome
– Down's syndrome
– Edwards’ syndrome

694. The galactosemia – storage disease – is diagnosed for the man. Owing to damage of what cellular structure this disease has appeared?

– Lysosomes
– Centrosomes
– Cell center
– Mitochondria
+ Golgi complex

695. Albinos badly sunbathe – they get burns. Disturbance of metabolism of what amino acid is the cornerstone of this phenome-

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\(^1\) In the book “Collection of tasks…”, incorrect term "divergence" is used (this is a mistake).

\(^2\) Another possible variant is "an ovum", but in humans, a secondary oocyte is fertilized.
non?
– Glutamic acid
– Histidine
+ Phenylalanine
– Methionine
– Tryptophane

696. Mucopolysaccharidosis belongs to storage diseases. Due to the lack of enzymes, cleavage of polysaccharides is broken. Increase of their secretion with urine and accumulation in one of cell organoids are observed in patients. What organoids mucopolysaccharides are accumulated in?
– In Golgi complex
+ In lysosomes
– In endoplasmic reticulum
– In mitochondria
– In the cell center

697. Mother of the child consulted the dermatologist with complaints to existence of dark spots on ears, nose, and cheeks of the child. Urine when standing on air became black. What is the most probable diagnosis?
– Urticaria
– Albinism
+ Alkaptonuria
– Daltonism
– Down syndrome

698. During the examination of a baby boy, a pediatrician noticed that the baby's crying was similar to a cat's cry. Besides, the baby had microcephaly and abnormality in heart development. By means of the cytogenetic method, it was found that the baby's karyotype was 46, XY, 5p−. At what mitotic stage was the karyotype of the baby examined?
+ Metaphase
– Prometaphase
– Prophase
– Anaphase
– Telophase

699. The woman on the 16th week of pregnancy addressed to genetic consultation. By drawing up a pedigree, it became clear that her husband from first marriage has a child, which is ill with phenylketonuria. What method will allow to define existence of phenylketonuria in a fetus?
– Cytogenetic method
– Genealogical method
+ Amniocentesis
– Dermatoglyphics
– Twin study

700. Specify the reason of developing of the hereditary diseases which received the name "storage disease":
+ absence of certain enzymes in lysosomes
– absence of certain enzymes in mitochondria
– absence of certain enzymes in ER
– absence of certain enzymes in Golgi apparatus
– absence of certain enzymes in a nucleus

701. The analysis of the fetus's amniotic fluid cells for the presence of sexual chromatin shows that the majority of their nuclei have two Barr bodies each. Which inherited disease can this baby have?
– Down's syndrome
+ Trisomy on X chromosome
– Turner's syndrome
– Patau syndrome
– Edwards' syndrome

702. The woman worked some time at the factory under harmful working conditions. She gave birth to the child with cleft lip and cleft palate. What factor served as the reason of defect development?
– Mechanical influence on a fetus
– Alimentary factor
– Increase in body temperature of the pregnant woman
– Infectious disease
+ Radiation

703. During the cytogenetic analysis, a patient was found to have cells with chromosome number 46,XY and 47,XXY in the same proportions. What did the doctor diagnose?
– Down's syndrome
– Morris's syndrome
– Patau syndrome
+ Klinefelter's syndrome
– Turner's syndrome

704. Watching the child for 1.5 years, mother began to notice lag in intellectual development. After careful examination, phenylketonuria was established in the child. The cause of this disease can
be:
+ damage of structure of structural genes of a transcript
– monosomy on the X chromosome
– insufficient number of mitochondria in cells
– additional chromosome from the 21st pair of autosomes
– other reason

705. The genealogical method of human genetics provides collection of information, drawing up and the analysis of pedigrees. How the person which pedigree needs to be made is called?
– Respondent
– Subject of research
+ Proband
– Sib
– Patient

706. There is a direct dependence of rules of inheritance of antigenic specificity and genetic conditionality of manifestation of immune reactions in the human body. What science studies these processes?
– Genetics
+ Immunogenetics
– Immunology
– Immunopathology
– Ecological genetics

707. For a number of hereditary diseases, which were considered incurable, possibility of suppression of their phenotypic manifestation was established due to the development of medical genetics. At present it most of all concerns:
+ phenylketonuria
– anemias
– mucoviscidosis
– cystinuria
– achondroplasia

708. It is known that molecules only of one type of antibodies are synthesized in each B lymphocyte; these molecules are encoded by only one of two homologous chromosomes containing such genes. What name has this phenomenon?
– Gene exception
– Genomic exception
– Genetic exception
– Chromosomal exception
+ Allelic exception
709. Karyotype of the man is 47 chromosomes; the Barr's body is revealed in the nucleus of somatic cell. Endocrine insufficiency is observed: underdevelopment of testes, lack of spermatogenesis. What disease is characterized by this phenotype?
- Patau syndrome
- Edwards' syndrome
- Turner's syndrome
- Down syndrome
+ Klinefelter's syndrome

710. Phenylketonuria is the autosomal recessive disease, which is followed by disturbance of synthesis of melanin and β-adrenergic agonists, disorders of motive functions, and mental retardation. What method of studying of human heredity needs to be used for the purpose of more precise definition of the diagnosis?
- Genealogical
+ Biochemical
- Dermatoglyphics
- Cytogenetic
- Population-statistical

711. The twin method of diagnostics is used for:
- diagnostics of chromosomal diseases
- diagnostics of metabolic diseases
- determination of the nature of inheritance of a trait
+ estimation of degree of influence of genotype and environment on the trait development
- diagnostics of diseases, which are inherited as sex-linked traits

712. A 10-year-old girl has got shortened extremities, a small skull, a face anomaly, the mongolian type of eyelid fold, epicanthus, mental deficiency, disorders of the heart and vascular structure. In a genetic clinic the girl's karyotype was determined. What was the girl's karyotype?
- 45, XO
- 47, XX, 13+
- 47, XX, 18+
+ 47, XX, 21+
- 47, XXX

713. Symptoms of rickets are revealed in the child; also, the level of phosphates in blood is reduced. Treatment by ergocalciferol did not yield positive results. On what type this disease is inherited?
+ Dominant, linked with X chromosome
- Autosomal dominant
714. By means of the cytogenetic analysis, the karyotype 47, XX, 13+ of a child with plural defects of the skull, extremities, and internal organs was determined. What syndrome did the baby have?

- Edwards' syndrome
- Patau syndrome
- Klinefelter's syndrome
- Down's syndrome
- Turner's syndrome

715. During the cytogenetic analysis in the cells of an abortive fetus, only 44 chromosomes were found due to the absence of both chromosomes from the 3rd pair. What type of mutation occurred?

- Monosomy
- Chromosomal aberration
- Gene mutation
- Polyploidy
+ Nullisomy

716. The dermatoglyphic method is applied to more precise definition of the diagnosis of hereditary pathology. In the patient with disturbance of mental activity and mental retardation, the cross furrow is revealed on a palm, and the palmar corner (atd) equals 80°. For what hereditary pathology these traits are characteristic?

- Klinefelter's syndrome
+ Down syndrome
- Turner's syndrome
- Marfan's syndrome
- Edwards' syndrome

717. 30-year-old woman addressed to genetic consultation; two Barr bodies was established in nuclei of the most cells of cheek mucosa epithelium. What provisional diagnosis can be made?

- Trisomy on the 13th chromosome
- Trisomy on the 21st chromosome
+ Trisomy on X chromosome
- Trisomy on the 18th chromosome
- Monosomy on X chromosome

718. A patient has phenylpyruvic acid in the blood and urine. Based on this, the diagnosis of phenylketonuria is made. What genetic method is used?
– Pedigree analysis
– Population-statistical
– Study of twins
+ Biochemical
– Immunological

719. Mother is Rh-negative. She gave birth to the Rh-positive child with symptoms of hemolytic disease. What cells of the sick child are destroyed in this case?
– Macrophages
– Thrombocytes
+ Erythrocytes
– B lymphocytes
– T lymphocytes

720. A sick child has disturbance of lipid exchange, which is accompanied by the increase of lipid concentration in the blood serum and the accumulation of the substance in the nerve cells. Some dysfunctions of the higher nervous system are also present. What hereditary disease can such symptoms be typical of?
+ Tay–Sachs disease
– Edwards' syndrome
– Phenylketonuria
– Marfan's syndrome
– Hemophilia

721. During the examination of a newborn, the diagnosis of Down's syndrome was made. What is the main cause of this pathology? ¹
– Trisomy on the 13th chromosome
+ Trisomy on the 21st chromosome
– Trisomy on X chromosome
– Trisomy on the 18th chromosome²
– Monosomy on X chromosome³

722. Coloring of sclerae and mucous membranes is observed in the baby. The urine, which darkens on air, is excreted. Homogentisic acid is found in blood and urine. What can be the cause of this state?

¹ Another possible question with the same answers: "A 2-year-old boy is diagnosed with Down syndrome. What chromosomal changes may be the cause of this disease?".
² Another possible incorrect answer: "Monosomy on the 1st chromosome".
³ Another possible incorrect answer that is used in the book “Collection of tasks…”: "Undivergence of sex chromosomes", but the word "undivergence" does not exist (this is a mistake), the term "nondisjunction" must be used!
Choose the most exact definition of congenital diseases:

- they are all hereditary diseases
- hereditary diseases with dominant type of inheritance
- diseases caused by pathology of childbirth
- diseases with which the person is born
- transplacental infectious diseases

The male karyotype is 47, XXY. He has endocrine insufficiency\(^1\): underdevelopment of testicles and absence of spermatogenesis. What disease do these symptoms suggest?

- Edwards' syndrome
- Patau syndrome
- Klinefelter's syndrome
- Turner's syndrome
- Down's syndrome

The patient has pathological process, which is caused by the gene mutation linked with sex X chromosome. This disease is followed by deficiency of the VIII factor and lengthening of time of blood clotting till 25 min. How this disease is called?

- Galactosemia
- Hemophilia
- Daltonism
- Glaucoma
- Hemeralopia

In the genetic consultation, a provisional diagnosis of Turner's syndrome of a 14-year-old girl was made. What karyotype does the girl have?

- 47, XY, 13+
- 46, XX
- 47, XXY
- 46, XY
- 45, XO

"Cat's cry" syndrome is characterized by the underdevelopment of laryngeal muscles, "miaowing" voice timbre, psychomo-

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\(^1\) In the collection of tests, the word "hypertrophy" is present in this place.
toric immaturity\(^1\) of a child. This disease is the result of:

- duplication of a fragment of the 5\(^{th}\) chromosome
- translocation of the 21\(^{st}\) chromosome on the 15\(^{th}\)
+ deletion of the short arm of the 5\(^{th}\) chromosome
- deletion of the short arm of the 21\(^{st}\) chromosome
- inversion of a fragment of the 21\(^{st}\) chromosome

728. Spouses with the 9-month-old child who has hypotrophy, but is mentally normally developed, consulted a hospital. The child is ill almost since the neonatal period: he has pertussoid spasmodic cough. Since five months, after adding of food, frequent defecation with large amount of light-coloured fecal masses with an unpleasant odour were appeared. The increase in liver is noted. According to laboratory data, concentration of sodium and chlorine in sweat is increased. About what disease one can think?

- Amaurotic idiocy of children
+ Mucoviscidosis
- Agammaglobulinaemia
- Duchenne’s dystrophy
- Hemophilia

729. The frequency of heterozygotes with a genome of phenylketonuria in the population of Ukraine is 3%. What method of genetical investigation is used for revealing early phenylketonuria of a newborn?

- Cytogenetic
- Population-statistical
- Genealogical
- Dermatoglyphics
+ Biochemical

730. The 3-year-old child is hospitalized in children’s clinic in a serious condition with hemoglobinopathy (sickle-cell anemia). Replacement of glutamic acid by what amino acid in the β chain of globin is the cornerstone of formation of pathological hemoglobin in this case?

- Arginine
- Serine
- Tyrosine
- Phenylalanine
+ Valine

\(^1\) Attention! In the book “Collection of tasks…”, the incorrect word "immaturation" is used (this word does not exist).
731. The child with Down syndrome and karyotype of 46 chromosomes was born in healthy parents. However, one of chromosomes from the D group had the extended short arm. What is the cause of illness of the child?

- Monosomy on the 21st pair of chromosomes
- Unbalanced translocation of an excess 21st chromosome
- Trisomy on 21st pair of chromosomes
- Balanced translocation
- Trisomy on the 15th pair of chromosomes

732. Green color of urine after addition of 5% FeCl₃ solution was revealed in the mentally retarded child. Disturbance of metabolism of what amino acid, the positive result of this diagnostic test indicates to?

- Arginine
- Tryptophane
- Phenylalanine
- Glutamine
- Tyrosine

733. The boy with splitting of an upper jaw ("cleft lip" and "wolf mouth") was born in the 45-year-old woman. During additional examination, considerable disturbances of nervous and cardiovascular systems and of sight were found. By investigation of a karyotype, the trisomy on the 13th chromosome was diagnosed. What syndrome is present in the boy?

- Klinefelter's syndrome
- Turner's syndrome
- Edwards' syndrome
- Down syndrome
- Patau syndrome

734. The patient with complaints to intolerance of solar radiation consulted a doctor. He has burns of skin and disturbance of sight. Provisional diagnosis is albinism. Disturbance of metabolism of what amino acid is present in this patient?

- Proline
- Tryptophane
- Alanine
- Tyrosine
- Lysine

735. A 32 y.o. man is tall; he has gynecomastia, adult woman pattern of hair distribution, high voice, mental deficiency, sterility. Provisional diagnosis is Klinefelter's syndrome. In order to specify
diagnosis it is necessary to analyze:
- spermatogenesis
- genealogy
- blood group
+ karyotype
- leukogram

736. It is widely known about Rhesus factor conflict in the situation when mother is \( rh^- \) and child is \( Rh^+ \). Why it does not happen on the contrary?
- The fetus produces very few antibodies
- The organism of mother is not sensitive to fetus's antibodies
- Fetus is not sensitive to mother's Rhesus factor
+ Foetus does not produce antibodies yet
- All listed factors are important

737. The baby, who is the second child in a family, had hemolytic disease of the newborn that is caused by rhesus incompatibility. It is known from the anamnesis that the first child is Rh-negative. What are genotypes of parents?
- Wife is heterozygous; husband is homozygous on the gene of Rhesus factor negativity
- Wife is homozygous on the gene of Rhesus factor negativity; husband is homozygous the gene of Rhesus factor positivity
+ Wife is homozygous on the gene of Rhesus factor negativity; husband is heterozygous
- Wife and husband are homozygous on the gene of Rhesus factor negativity
- Wife and husband are homozygous on the gene of Rhesus factor positivity

738. During examination of teenage children in a military registration and enlistment office, the young man with certain deviations of psychosomatic development was revealed, namely: asthenic structure of a body, increase in mammary glands, and decrease in intelligence. He was directed to genetic consultation for specification of the diagnosis. What karyotype will be revealed?
- 46, XY, there are no Barr's bodies
+ 47, XXY, one Barr's body
- 47, XXY, two Barr's bodies
- 45, XO, there are no Barr's bodies
- 47, XXX, two Barr's bodies

739. For diagnosis of metabolic disease, which is caused by changes of activity of different enzymes, amino acid composition of proteins and their primary structure are studied. What method is used in this case?
+ Chromatography
– Cytogenetic method
– Dermatoglyphics
– Electronic microscopy
– Genealogical method

740. In one of uniovular twins who lived in different ecological conditions, the ecogenetic (multifactorial) disease was diagnosed. What had caused its demonstration?
– Interaction of genes
+ Specific factor of the environment
– Deficiency of enzymes
– Mutant dominant gene
– Change of a gene pool of population

741. 15-year-old boy of high growth, mentally retarded and with delay of sexual development has one Barr’s body in epithelial cells. What chromosomal disease this patient has?
– Syndrome "superwoman"
+ Klinefelter's syndrome
– Syndrome of "cat's cry"
– Edwards' syndrome
– Turner's syndrome

742. In the patient with symptoms of Down syndrome, 46 chromosomes were revealed. Therefore, his pathology appeared owing to one of chromosomal anomalies, namely:
– inversion
– deletion
– polyploidy
+ translocation
– duplication

743. In the child who was on breastfeeding, the dyspeptic phenomena and weight loss are observed; yellowing of skin and increase in liver were appeared. Test with chloride iron is negative. The doctor prescribed special diet instead of breast milk; it improved child's status. What disease is possible in this child?
+ Galactosemia
– Mucoviscidosis
– Phenylketonuria
– Fructosemia
– Homocystinuria

744. Karyotype of the woman is 47 chromosomes, two Barr’s bodies are revealed in the nucleus of somatic cell. Endocrine patholo-


Sufficient function of ovaries with lack of follicles that causes infertility and primary or more often secondary amenorrhea. What disease is indicated by this phenotype?

- Patau syndrome
- Edwards' syndrome
- Klinefelter's syndrome
- Turner's syndrome
- + Trisomy on the X chromosome

**745.** Healthy parents with unremarkable family history have the child with multiple developmental defects. Cytogenetic analysis revealed the trisomy 13 in the somatic cells (Patau syndrome). What phenomenon has caused the defects?

- Somatic mutation
- Dominant mutation
- Chromosomal mutation
- Recessive mutation
- + Abnormal gametogenesis

**746.** Examination of cell culture got from a patient with lysosomal pathology revealed accumulation of great quantity of lipids in the lysosomes. What of the following diseases is this disturbance typical for?

- Galactosemia
- Phenylketonuria
- + Tay–Sachs disease
- Gout
- Wilson disease

**747.** A woman who was sick with rubella during the pregnancy gave birth to a deaf child with hare's lip and cleft palate. This congenital defect is an example of:

- genocopy
- Down's syndrome
- Edwards' syndrome
- Patau's syndrome
- + phenocopy

**748.** Digestion and bile flow are broken in the child; increased release of chlorides with urine is observed. Mucoviscidosis is diagnosed. Damage of components of what cellular structure takes place in this disease?

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1 This answer can also be considered as correct answer because abnormal gametogenesis leads to the numerical chromosomal mutation (trisomy) that causes Patau syndrome.
+ Cellular membrane
− Nuclear membrane
− Mitochondria
− Ribosomes
− Endoplasmic reticulum

749. Man with karyotype 46,XY has female phenotype with developed external secondary sex traits. According to this information the doctor established provisional diagnosis:
+ Morris' syndrome
− Down syndrome
− syndrome "superman"
− Klinefelter's syndrome
− Turner's syndrome

750. What is hemophilia?
− Acceleration of blood clotting
− Destruction of erythrocytes
− Slowdown of blood clotting
− Increase in time of bleeding
+ Absence of blood clotting

751. Usage of thalidomide by pregnant women in the 1950s led to the birth of thousands of children with defects of skeleton (lack of extremities). This congenital defect is the result of:
− monosomy
− gene mutation
− triploidy
+ modifications
− trisomy

752. The underdevelopment of ovaries is observed in the sick woman, thus the trisomy on the X-chromosome (karyotype XXX) is found. How many Barr's bodies will be determined in somatic cells?
− 0
− 1
+ 2
− 3
− 4

753. A 15-year-old boy suffers from alkaptonuria. His urine turns black after settling. Hereditary metabolic disorder of which substance is taking place?
− Uric acid
+ Tyrosine
During genetic examination of patients with chronic myeloleukemia, specific anomaly of one of chromosomes was revealed. Such chromosome has received the name "Philadelphia" and it is a genetic marker of the disease. What type of chromosome aberration takes place in this case?

- Deletion of short arm of one of chromosomes of the 22nd pair
- Translocation of short arm of one of chromosomes of 21st pair
- Duplication of long arm of one of chromosomes of the 22nd pair
- Deletion of part of long arm of one of chromosomes of the 22nd pair with translocation to the 9th chromosome
- Inversion of short arm of one of chromosomes of 21st pair

16-year-old young man addressed to the genetic consultation concerning disturbance of color recognition: he does not distinguish green and red colors. He told that his father also does not distinguish these colors, and color recognition in mother is not broken. What can be told in this regard about mother's genotype?

- Polygenic on the daltonism gene
- Homozygous on the daltonism gene
- Homozygous on the gene of normal recognition of color
- Homozygous on the hemeralopia (day blindness) gene
- Heterozygous on the daltonism gene

The man with chromosomal damage has the balanced translocation of a long arm of the 21st chromosome on the 13th chromosome. Highest risk of what disease exists for his children?

- Turner's syndrome
- Edwards' syndrome
- Patau syndrome
- Down syndrome
- Klinefelter's syndrome

Continuous taking of some drugs foregoing the pregnancy increase the risk of giving birth to a child with congenital defects. What is this effect called?

- Mutagenic effect
- Blastomogenic effect
- Teratogenic effect
- Fetotoxic effect
- Embryotoxic effect

Examination of a 12-year-old boy with developmental lag re-
vealed achondroplasia: disproportional constitution with evident shortening of upper and lower limbs as a result of growth disorder of epiphyseal cartilages of long tubular bones. This disease is:

– congenital
– acquired
– inherited, sex-linked
– inherited, recessive
+ inherited, dominant

**759.** Dark spots indicating the formation of homogentisic acid are found on diapers of the newborn child. With disturbance of metabolism of what substance it is associated?

– Galactose
+ Tyrosine
– Tryptophane
– Cholesterol
– Methionine

**760.** Sex chromosomes of a woman didn't separate and move to the opposite poles of a cell during gametogenesis (meiosis). The ovum was impregnated with a normal spermatozoon. Which chromosomal disease can be found in her child?

– Patau's syndrome
+ Turner's syndrome
– Cat cry syndrome
– Edwards' syndrome
– Down's syndrome

**761.** A boy referred to a genetics clinic was found to have one drumstick in blood neutrophils. The boy is likely to have the following syndrome:

– Turner's
+ Klinefelter's
– Trisomy X
– Edwards'
– Down's

**762.** A couple had a child with Down's syndrome. Mother is 42 years old. This disease is most probably caused by the following impairment of prenatal development:

– blastopathy
+ gametopathy
– embryopathy
– non-specific fetopathy
– specific fetopathy
763. Cytogenetic examination of the patient with reproductive dysfunction revealed normal karyotype 46,XY in some cells, but most of cells have karyotype of Klinefelter’s syndrome – 47,XXY. Such phenomenon of cell heterogeneity is called:
+ mosaicism
– duplication
– inversion
– heterogeneity¹
– transposition

764. Two-year-old child who has impairment of intellectual and physical development and suffers on frequent vomiting after meal, was taken to the hospital. Phenylpyruvic acid was defined in urine. What consequence of disturbance this pathology has?
+ Metabolism of amino acids
– Carbohydrate metabolism
– Water-salt exchange
– Lipid metabolism
– Phosphorus-calcium metabolism

765. The man with daltonism married the healthy woman whose father had daltonism and mother is healthy, and patients with daltonism are not present among her relatives. Define probability of the birth of children sick with daltonism in this family.
– 0%
– 25%
+ 50%
– 75%
– 100%

766. The 14-year-old boy has high growth with eunuchoid proportions of a body, narrow shoulders, wide pelvis, the hypodermic basis is excessively developed, pilosis in a pubis zone is of female type, penis has normal size, and intelligence is considerably lowered. What pathology should be suspected?
– Trisomy on the X chromosome
+ Klinefelter’s syndrome
– Down syndrome
– Turner’s syndrome
– Edwards' syndrome

767. The 35-year-old woman had car accident and got brain concussion. Soon after discharge from the hospital, the first disorders

¹ During exams in 2010 and 2011 this answer was replaced by "monomorphism".
of mentality appeared, which became deeper, and in a year the diagnosis were made to her – schizophrenia. Studying of a pedigree showed that schizophrenics are also present among her cousins and second cousins. In this case schizophrenia is:

– congenital disease
– hereditary disease
– the acquired disease
+ disease with hereditary predisposition
– remote consequence of a trauma

768. During examination of the patient, who complains of general weakness and bone pain, the diagnosis "chronic myeloleukemia" was established. Name the chromosomal anomaly typical for the majority of cases of this disease.

– Duplication of the 21st chromosome
+ Translocation of the 9th chromosome on the 22nd chromosome
– Translocation of the 21st chromosome on the 15th chromosome
– Partial deletion of the 12th chromosome
– Full deletion of the X chromosome

769. Fructosemia is the hereditary disease caused by sharp decrease of the activity of enzyme fructose-bisphosphate aldolase. This disease meets frequency of 1:20000 in the population. On what type fructosemia is inherited?

– X-linked dominant inheritance
– X-linked recessive inheritance
– Holandric inheritance
– Autosomal dominant inheritance
+ Autosomal recessive inheritance

770. The newborn child has such symptoms: spasms, vomiting, jaundice, specific odour of urine. The doctor-geneticist stated suspicion about hereditary disease of metabolism. What method of investigation needs to be used for statement of the exact diagnosis in the absence of DNA diagnostics?

– Dermatoglyphic
+ Biochemical
– Population-statistical
– Cytogenetic
– Twin study

771. High palate, wrong growth of big teeth with defects of tooth enamel was revealed in the young man who has high growth (187 cm). During investigation of buccal scraping by means of luminescent microscopy, two Y chromosomes were revealed. This
anomaly is the result of:
– monosomy
– alloploidy
– nullisomy
– autopolyploidy
+ trisomy

772. The pregnant woman for the first time consulted the doctor of genetic consultation concerning possible hereditary pathology in her future child. What method will be the first during her examination?
– Cytogenetic
– Twin study
– Karyotyping
+ Genealogical
– Biochemical

773. Mohr’s syndrome is inherited as dominant and is followed by numerous anomalies of development of a skeleton (brachydactyly), disturbance of teeth formation, hypodontia, etc. What method of human genetics will be used by the doctor for differentiation of this pathology from possible genocopy and for the prognosis of possible pathology in descendants?
+ Genealogical
– Cytogenetic
– Dermatoglyphic
– Twin study
– Population-statistical

774. People with Down syndrome have anomalies of front part of a skull, including hypoplasia of the upper jaw, high palate, the wrong growth of teeth. What karyotype is characteristic for the man with Down syndrome?
– 47, XY, +18
– 47, XXY
+ 47, XY, +21
– 48, XXXY
– 47, XXX

775. Children with congenital heart diseases, deafness and cataract were born in six women, who were ill with viral disease (rubella) in the first third of pregnancy. What result of influence of the virus is observed in this case?
– Cancerogenic
– Recombination of genes
– Malignization
– Genocopy
+ Teratogenic

776. Hypertrichosis of auricles is caused by a gene that is localized in Y-chromosome. Father has this feature. What is the probability that son will have this anomaly?

– 25%
– 35%
– 0%
+ 100%
– 75%

777. The diagnosis Turner's syndrome was established to the sick woman. Karyotype is 45,XO. What number of sex chromosomes is present in this set?

+ One
– Zero
– Two
– Forty four
– Forty five

778. There is ichthyosis in the family pedigree. This feature appears in each generation and is typical only of male. What type of inheritance does this feature have?

– Recessive, X-linked
– Autosomal dominant
– Autosomal recessive
+ Y-linked
– Dominant, X-linked

779. In marriage of the healthy woman and man, who has vitamin D-resistant rickets, all sons are healthy, and all daughters have this disease. Establish type of inheritance of the specified pathology:

– autosomal recessive
– autosomal dominant

1 This information is out of date. According to more careful study, this trait is autosomal (some families hid their affected female members).

2 In the book “Collection of tasks...”, another similar question is also present: An excessive ear pilosis (hypertrichosis) is determined by the gene, which is localized in Y chromosome. A man has got this feature. What is the probability of his having a son with such a feature? Answers: 75%; 0%; 25%; 35%; 100%. Authors propose the answer “100%” as correct but this is a mistake. When you ask about probability that parents will have a son with a feature, you should to calculate this probability among ALL children and correct answer must be 50%. Hence authors do not propose correct answer at all.
– recessive, linked with X chromosome
+ dominant, linked with X chromosome
– linked with Y chromosome

780. During a prophylactic medical examination, a 7-year-old boy was diagnosed with daltonism. His parents are healthy and have normal color vision, but his grandfather on his mother's side has the same abnormality. What is the type of the abnormality inheritance?
– Autosomal dominant
– Sex-linked dominant
+ Sex-linked recessive
– Autosomal recessive
– Incomplete dominance

781. The child with hemophilia – the serious recessive illness, which is linked with sex, was born in healthy parents. What is characteristic for X-linked recessive type of inheritance?
– Sick father always has all sick daughters and healthy sons
+ The trait appears in half of sons of heterozygous mother, who is a carrier, and sick daughter always has sick father
– Sick man always has sick father and sick brothers
– The trait appears in all sons of heterozygous mother, who is a carrier, and women have no such disease
– Sick father always has all sick sons and healthy daughters

782. A proband, his three sons, his brother and father have syndactyly. His sisters and two daughters do not have this sign. What is the character of the inheritance of this sign?
+ Holandric
– Autosomal recessive
– Autosomal dominant
– Dominant, X-linked
– Recessive, X-linked

783. It is known that, except autosomal, there is sex-linked inheritance. What is characteristic for inheritance of the recessive traits that are linked with X chromosome?
– Are absent in men at all
– More often are found in phenotype of women
– Are found in men and women with identical frequency
+ More often are found in phenotype of men
– Are absent in women at all

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1 In the book “Collection of tasks…” and in some exam booklets – "semidominance".
2 Another possible disease in the question is ichthyosis.
784. After the genealogy analysis, a geneticist came to the conclusion: a feature is manifested in each generation, men and women inherit the feature with equal frequency, parents in the equal way give this feature to their offspring. What type of inheritance does the investigated feature have?¹
+ Autosomal-dominant inheritance
– X-linked dominant inheritance
– X-linked recessive inheritance
– Autosomal-recessive inheritance
– Y-linked inheritance

785. Young healthy spouses have two children with Tay–Sachs disease (disease of accumulation of lipids). Parents are found to be relatives. What is the most probable type of inheritance of this disease?
+ Autosomal recessive
– Recessive, linked with X chromosome
– Linked with Y chromosome
– Autosomal dominant
– Dominant, linked with X chromosome

786. The skin of a newborn boy is covered with a thick layer of keratinized scales (ichthyosis). It looks like reptile skin. After the investigation of the pedigree of his family, it was revealed that this feature occurs in each generation only in males. Which of the below mentioned biological regularities becomes apparent in this case?
– The law of independent assortment
– The law of unit characters
– The law of segregation
+ Sex-linked inheritance
– Linkage of genes

787. The pedigree of the family with brachydactyly is characterized by the following: a ratio between the affected men and women is 1:1, nearly a half of children of the affected parents are affected. What is the type of inheritance of this trait?
– Autosomal recessive
+ Autosomal dominant
– Linked with Y chromosome

¹ In the book “Collection of tasks...”, this question is written as follows: Due to the results of the pedigree analysis a geneticist found out that a feature becomes apparent in each generation, a male and a female inherit this feature with the same frequency, both parents transmitting this feature to their children. What type of inheritance does this feature have?
– Recessive, linked with X chromosome
– Dominant, linked with X chromosome

**788.** During medico-genetic counseling of the family with hereditary pathology, it was revealed that anomaly is appears through generation in men. What type of inheritance is characteristic of this hereditary anomaly?

– Autosomal recessive
– Autosomal dominant
+ Recessive, linked with X chromosome
– Dominant, linked with X chromosome
– Linked with Y chromosome

**789.** The proband has webbed fingers on legs. His three sons also have fingers that grow together, and two daughters have normal fingers. Sisters of the proband have normal fingers. Fingers of his brother and father are webbed too. How the transferred trait is called?

– Recessive
– Allelic
– Dominant
– Expressive
+ Holandric

**790.** The genealogical method of human genetics allows to establish the type of inheritance of a trait. What is not typical for autosomal recessive inheritance?

– The probability of the birth of the sick child makes 25%
+ Presence of patients in all generations
– Presence of patients "across" the pedigree
– Rather small amount of patients in a pedigree
– Phenotypically healthy parents of the sick child are heterozygous

**791.** Both a mother and a father are phenotypically healthy. They have a sick baby in whose blood and urine phenylpyruvic acid has been found, which indicates phenylketonuria. What is the type of the inheritance of this disease?

– Autosomal dominant
+ Autosomal recessive
– Recessive, X-linked
– Y-linked
– Dominant, X-linked

**792.** A couple has a son with haemophilia. The parents are healthy but the maternal grandfather also has haemophilia. Specify the
**type of inheritance:**
- Y-linked
- Autosomal recessive
- Dominant, sex-linked
- Recessive, sex-linked
- Autosomal dominant

**793.** Hypertrichosis is the Y-linked character. The father has hypertrichosis, and the mother is healthy. In this family, the probability of having a child with hypertrichosis is:
+ 0.5
- 1
- 0.25
- 0.125
- 0.0625

**794.** During the pedigree analysis of a family with such an inherited pathology as transgression of enamel formation, it was found that the disease appeared in each generation. It is inherited by daughters from fathers. What type of inheritance can we observe in this case?
+ Dominant, X-linked
- Recessive, X-linked
- Autosomal dominant
- Autosomal recessive
- Y-linked

**795.** A man suffering from a hereditary disease married a healthy woman. They got five children, three girls and two boys. All the girls inherited the father's disease. What is the type of the disease inheritance?
- Autosomal recessive
- Y-linked
- Recessive, X-linked
+ Dominant, X-linked
- Autosomal dominant

**796.** Pedigree analysis showed that the proband's disease occurred in each generation, affected a relatively big number of sibs, both

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1 In the book “Collection of tasks...”, this question is written as follows: A child, ill with hemophilia, has been born to healthy parents, but the mother's grandfather had hemophilia, too. What type of inheritance does this feature have?
2 In the exam booklet (2012) the answer "semidominance" was present but we replaced it.
3 This information is out of date. According to more careful study, this trait is autosomal (some families hid their affected female members).
men and women. What type of inheritance does it point out?
- Y-linked
- Autosomal recessive
- Dominant, X-linked
- Recessive, X-linked
+ Autosomal dominant

797. The study of the genealogy of a family with hypertrichosis (hirsutism or pilosis) has demonstrated that this trait is manifested in all generations only in men and is inherited by son from his father. What is the type of hypertrichosis inheritance?¹
- Autosomal-recessive
- X-linked recessive
+ Y-linked²
- Autosomal-dominant
- X-linked dominant

798. During employment to the chemical and pharmaceutical enterprise, some men who did not feel odour of hydrocyanic acid were revealed. What type of inheritance is characteristic for this anomaly?
- Linked with Y chromosome
- Linked with X chromosome, dominant
+ Linked with X chromosome, recessive
- Autosomal recessive
- Autosomal dominant

799. Frequency of cardiovascular diseases constantly increases in human populations because these diseases are:
+ multifactorial
- autosomal dominant
- linked with X chromosome
- autosomal recessive
- chromosomal

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

¹ In the book “Collection of tasks…”, this question is written as follows: In a family pedigree hypertrichosis (excessive pilosis of the auricle) is observed. This feature appears in each generation and is typical only of men. What type of inheritance does this feature have?
² In the site http://testcentr.org.ua/ (2013), incorrect phrase was used: "connected with Y-chromosome". The term "Y-linked" must be used. Also information about hypertrichosis is out of date. According to more careful study, this trait is autosomal.
In genetic consultation, spouses asked a question about probability of the birth of children with X-linked form of rickets. The father is healthy, but mother and the grandmother from the maternal line have this disease. Vitamin-D resistant rickets can appear in:

- daughters only
- half of daughters and sons
- sons only
- all children
- the correct answer is absent (all children will be healthy)

Healthy woman from two of her marriages has three sons affected by daltonism. Both of her husbands are healthy. What is the most possible type of inheritance of this disease?

- Autosomal recessive
- Autosomal dominant
- Linked with Y chromosome
- Recessive, linked with X chromosome
- Dominant, linked with X chromosome

As a result of prophylactic medical examination, a 7-year-old boy was diagnosed with Lesch–Nyhan syndrome (only boys are affected). His parents are healthy but his grandfather by his mother’s side suffers from the same disease. What is the type of disease inheritance?

- Autosomal recessive
- Dominant, sex-linked
- Autosomal dominant
- Recessive, sex-linked
- Y-linked

The healthy young woman, which father suffers from Taybi syndrome (multiple anomalies of the face and skeleton, abnormal growth of teeth), consulted the doctor-geneticist. The disease is inherited as the X-linked recessive one. Predict the birth of the sick child for this woman if her husband is healthy.

- 37.5%

Another possible answer is "semidominance", but it is not a type of inheritance.
+ 25%
– 56.25%
– 50%
– 75%

805. *During oogenesis, the cell with unbalanced number of chromosomes – 22 chromosomes – was formed; X chromosome is absent. What probability of appearance of the child with Klinefelter's syndrome if this cell will be fertilized by a spermatozoon with normal number of chromosomes?*

+ 0%
– 100%
– 50%
– 25%
– 75%

806. *16-year-old girl consulted the stomatologist concerning dark enamel of teeth. When studying a family tree, it was established that this pathology is transmitted from the father to all girls, and from heterozygotic mother to 50% of boys. What is the type of inheritance of this disease?*

– Dominant, linked with Y chromosome
– Recessive, linked with X chromosome
– Autosomal dominant
+ Dominant, linked with X chromosome
– Autosomal recessive

807. *A female patient sought medical-genetic consultation. Physical examination revealed pterygium colli deformity (webbed neck), broad chest, underdeveloped breasts. Study of buccal epithelium cells revealed no X-chromatin in the nuclei. This indicates that the patient has the following syndrome:*

+ Turner's
– Klinefelter's
– Patau's
– Down's
– Edwards'

808. *Hairs grow intensively on edge of auricles of the man and his son. This phenomenon was observed also in the man's father. What type of inheritance is characteristic for this trait?*

+ Linked with Y chromosome
– Autosomal recessive
– Dominant, linked with X chromosome
– Autosomal dominant
Recessive, linked with X chromosome

809. Changes in human karyotype cause chromosomal diseases. Specify what of these disturbances are lethal.
- Monosomy of X chromosome
- Monosomies of autosomes
- Trisomy of X chromosome
- Polysomy of Y chromosome
- Trisomies of autosomes

810. It is known that in case of related marriages of healthy people, children with hereditarily pathologies are born more often. At what type of inheritance it more often occurs?
- Autosomal dominant
- X-linked dominant
- Autosomal recessive
- X-linked recessive
- Cytoplasmatic

811. The additional X chromosome was revealed in the man by karyotyping method. Specify probability of the birth of the son if he marriage healthy woman.
+ 0%
- 50%
- 75%
- 25%
- 100%

812. Specify, to what type of mutations it is possible to belong the organism with trisomy on the 13th chromosome (Patau syndrome), the 18th chromosome (Edwards' syndrome), and the 21st chromosome (Down syndrome).
- Aneuploidy of heterosomes
- Structural chromosome aberrations
- Phenocopies
- Somatic mutations
+ Aneuploidy of autosomes

813. Dietotherapy can prevent clinical manifestation of a number of hereditary diseases or facilitate their clinical course. What type of variation is caused by dietotherapy?
- Mutational
- Combinational
- Correlative
+ Modification
- Teratogenic
814. The child with Patau syndrome was born in healthy parents. By means of what method of human genetics it is possible to differentiate this hereditary disease from phenocopy?
- By determination of sex chromatin
+ Cytogenetic
- Biochemical
- Twin study
- Dermatoglyphic

815. Genetic determination of disorder of lipid metabolism can be associated with deficiency of lysosomal enzymes, be followed by increase in concentration of lipids in blood serum, and it plays an important role in development of atherosclerosis. Thus accumulated action of many genes that influence on the development of pathology occurs. What group of diseases can be caused by this action of genes?
- Monogenic diseases
- Chromosomal diseases
- Mitochondrial diseases
- Genomic diseases
+ Multifactorial diseases

816. In the liquid received during amniocentesis, cells with Y chromosome were revealed. Whether is it an indicator for induced abortion?
- Yes, it indicates pathology
- No, it is pleiotropy
+ No, it indicates that fetus is male
- No, it is sex-linked inheritance
- No, twins will be born

817. Children with congenital shortcomings of development are born more often in women of advanced age (35–45 years). What is the major factor, which influences on appearance of heavy anomalies that are often not compatible with life?
- Insufficient number of oocytes
- Decrease in general metabolism
- Insufficient hormonal activity
+ Genetic defects in oocytes throughout life
- Disturbance of production of ova in the woman

818. The diagnosis of Patau syndrome was made to the newborn child with many malformations. What is the prognosis of life at this syndrome?
- Average life expectancy is 3 weeks
Average life expectancy is 3 months
– Average life expectancy is 3 years
– Average life expectancy is 10 years
– Forecast of life is favorable

819. The child with Down syndrome with a karyotype of 46 chromosomes was born in healthy parents. However, one of chromosomes of D group had the extended short arm. What method revealed an unbalanced translocation of an extra chromosome 21?
+ Cytogenetic
– Biochemical
– Population-statistical
– Genealogical
– Twin study

820. Sex chromatin was revealed in cells of the man with eunuchoid and slightly feminized body structure. What diagnosis can be made?
+ Klinefelter’s syndrome
– Down syndrome
– Patau syndrome
– Trisomy X
– Phenylketonuria

821. Monosomy X was revealed in the 14-year-old girl. What diagnosis will be made?
– Down syndrome
+ Turner’s syndrome
– Patau syndrome
– Mucoviscidosis
– Wilson–Konovalov’s disease

822. Vomiting began in the newborn child. The laboratory analysis of urine showed the enhanced content of amino acids with branched chain – valine, leucine, isoleucine. Urine has a characteristic odour of maple syrup. What hereditary disease is associated with these changes?
+ Leucinosis
– Cystinosis
– Alkaptonuria
– Fructosuria
– Mucoviscidosis

823. Parents of the child consulted the doctor-geneticist for more precise definition of the diagnosis. During research of the child, liver pathology (cirrhosis, high content of copper) and movement
disorders were determined. What hereditary disease of metabolism disorder is available in the child?
- Tay–Sachs disease
- Lesch–Nyhan syndrome
+ Wilson–Konovalov's disease
- Niemann–Pick disease
- Gaucher disease

824. The sweat test – investigation of the content of chlorine and sodium in sweat – was carried out to the two-year-old girl with suspicion on molecular hereditary disease. It was established that their concentration exceeds norm by 5 times. For what hereditary disease it is characteristic?
- Phenylketonuria
- Galactosemia
- Fructosemia
+ Mucoviscidosis
- Homocystinuria

825. The patient among somatic cells with normal karyotype has cells with trisomy on 21st pair. What is the mechanism of this mutation?
- nondisjunction of chromosomes of the 21st pair during oogenesis
+ nondisjunction of chromosomes of the 21st pair during mitosis
- nondisjunction of chromosomes of the 21st pair during spermatogenesis
- structural chromosome aberration
- gene mutation

826. Specify, what set of sex chromosomes is present in the woman if the mass of sex chromatin is not revealed in nuclei of the epithelium of mucous membrane of the oral cavity.
- XXY
- XY
- XXXX
- XX
+ XO

827. During examination of the two-month child, the female pediatrician paid attention that crying of the child resembles cat's cry; microcephaly and heart disease is diagnosed. By means of cytogenetic method, the child's karyotype was found: 46,XX,5p−. This disease is a consequence of:
- duplication
+ deletion
- inversion
- translocation
- pleiotropy

828. The newborn boy has dolichocephalic skull, microstomia, narrow palpebral fissures, and the deformed auricles. Karyotype of the child is 47,XY,18+. Establish the diagnosis.
- Patau syndrome
- Down syndrome
- Klinefelter's syndrome
- Turner's syndrome
+ Edwards' syndrome

829. Myotonic dystrophy is characterized by muscular weakness, myotonia, and cardiac arrhythmia. The analysis of a family tree has revealed that the disease is found in each generation, meets identically in individuals of both sexes, parents equally transmit the disease to children. Define type of inheritance of this disease.
- Autosomal recessive
- X-linked dominant
- X-linked recessive
+ Autosomal dominant
- Y-linked

830. Each doctor has to know markers, which are characteristic for hereditary diseases. Crystalline lens dislocation was revealed in the patient. What syndrome will be diagnosed by the doctor, if he also will take into account features of the shape of hand and foot of the patient?
+ Marfan's syndrome
- Turner's syndrome
- Klinefelter's syndrome
- Down syndrome
- Trisomy X

831. Urine of the sick child has specific sweetish odour. It is associated with disturbance of metabolism of such amino acids as leucine, isoleucine, and valine. What diagnosis will be made to the child by the doctor?
- Phenylketonuria
- Fructosuria
- Galactosemia
- Alkaptonuria
+ Maple syrup urine disease

832. In the case of disturbance of metabolism of one of amino acids, the diagnosis is confirmed by direct determination of activity
of histidase in a horn layer of skin or in liver tissue. What hereditary disease one can talk about?
- Homocystinuria
+ Histidinemia
- Phenylketonuria
- Cystinuria
- Tyrosinemia

833. **What hereditary disease is characterized by association of cirrhosis, dystrophic processes of a brain and reduction of the content of ceruloplasmin?**
- Tay–Sachs disease
- Niemann–Pick disease
+ Wilson–Konovalov's disease
- Marfan's syndrome
- Gilbert's disease

834. **Karyotype of the patient's with Turner's syndrome is studied. Cell fission is stopped at metaphase stage of mitosis. How many chromosomes are present at this stage in one metaphase plate?**
- 43 autosomes + 2 X chromosomes
+ 44 autosomes + 1 X chromosome
- 44 autosomes + 2 X chromosomes
- 45 autosomes + 0 X chromosomes
- 42 autosomes + 3 X chromosomes

835. **During investigation of cells of buccal epithelium of the mucous membrane of a cheek, no mass of sex chromatin was revealed in the male patient. What is possible diagnosis?**
+ Normal man
- Klinefelter's syndrome
- Turner's syndrome
- Syndrome "superman"
- Morris' syndrome

836. **The woman gave birth to two babies. The provisional diagnosis was made to one child: syndrome of "cat's cry", which is characterized by the "meowing" voice timbre. By means of what method it is possible to confirm or disprove this diagnosis?**
- Biochemical method
- Amniocentesis
- Twin study
+ Cytogenetic method
- Population-statistical method

837. **By means of a cytogenetic method, the patient's karyotype
with Klinefelter's syndrome 47,XXY is studied. How many masses of sex chromatin are present in a nucleus of one cell in this case?
- Two
+ One
- Four
- No mass
- Three

838. Galactosemia is an autosomal recessive disease, which leads to injury of brain, liver, and eyes if the child remains on breast-feeding. What method of genetic examination needs to be applied to exact establishment of the diagnosis?
- Twin study
- Genealogical method
- Hybridizations of somatic cells
+ Biochemical method
- Cytogenetic method

839. Phenylketonuria is an autosomal recessive disease at which disturbance of phenylalanine metabolism is characterized by variable expressivity. What is the main method of prevention and treatment of this disease?
- Application of a diet without amino acids
+ Application of a diet with low concentration of phenylalanine
- Use of special medicines
- Application of herbs
- Application of a diet without fats

840. By means of cytogenetic method, the woman's karyotype with syndrome X trisomy was established: 47,XXX. How many masses of sex chromatin are present in a nucleus of one cell in this case?
- One
- Four
- No mass
+ Two
- Three

841. During oogenesis (meiosis I) in the woman, the oocyte II with 22 chromosomes and polar body with 24 chromosomes was formed owing to nondisjunction of sex chromosomes (X chromosomes). What is the probability of appearance of the child with Turner's syndrome, if the formed ovum will be fertilized by a spermatozoon with normal chromosome number?
- 0%
842. Scoliosis is a spinal curvature. According to scientists, in 60-70 years of the 20th century, this disease was considered to inherit according to autosomal dominant type. But by the analysis of different genealogical families with cases of scoliosis, it was proved that the trait is characterized by variable expressivity and incomplete penetrance. Appearance of a trait is increased in families of patients. Such features of manifestation of a trait specify:
- autosomal dominant type of inheritance
- autosomal recessive type of inheritance
- X-linked type of inheritance
+ multifactorial type of inheritance
- dependence of trait manifestation on external factors only

843. To the newborn child who refuses food and has periodic vomiting, the diagnosis was made: Niemann–Pick disease. What metabolic disorder this disease is associated with?
- Amino acids
+ Lipids
- Carbohydrates
- Nucleic acids
- Mineral substances

844. The child with Down syndrome with a karyotype of 46 chromosomes was born in healthy parents. However, one of chromosomes of group D had the extended short arm. The unbalanced translocation of the additional 21st chromosome was revealed. This case belongs to what form of variation?
- Genomic mutation
- Modification
- Gene mutation
+ Chromosome mutation
- Recombination

845. The increased "folded" tongue that protrudes from the mouth, high palate, the wrong growth of teeth, diastema, cross stripes on lips, and epicanthus are observed in the child. What disease is present in the child?
+ Down syndrome
- Patau syndrome
- Edwards' syndrome
– Turner’s syndrome
– Klinefelter’s syndrome

846. Changes of genes or chromosomes in gametes of parents lead to that the zygote carries the corresponding mutation from the moment of its formation. The malformations caused by such genetic changes are called:
– multifactorial
– exogenous
– environmental
+ hereditary
– phylogenetic

847. The woman gave birth to the child with pathology of maxillofacial area (cleft lip and cleft hard palate). What method of diagnostics needs to be used to confirm hereditary character of the given pathology?
– Twin study
+ Cytogenetic method
– Population-statistical method
– Genealogical method
– Biochemical method

848. In the cases of metabolic disorders, deviations from normal composition of urine are observed. Content of what acid is increased in urine in the case of alkaptonuria?
+ Homogentisic
– Phenylpyruvic
– Acetoacetic
– Uric
– Pyruvic

849. Konovalov–Wilson’s disease is diagnosed in the patient. Increase of what microelement in urine confirms this diagnosis?
– Sulfur
– Sodium
+ Copper
– Potassium
– Calcium

850. Blood test showed that the patient has abnormal hemoglobin S and erythrocytes have abnormal shape. The patient complains of increased fatigue. What is the most probable diagnosis?
– Phenylketonuria
+ Sickle-cell anemia
– Gout
- Hemophilia
- Galactosemia

851. Disturbance of normal color perception is the recessive trait linked with X chromosome. Mother is the carrier of the gene of daltonism, and the father is the color-blind person. In this family the probability of the birth of the child with abnormal color perception will make:
- 0.125
- 0.75
+ 0.5
- 0.25
- 1

852. The provisional diagnosis – Turner's syndrome – was made to the girl. The karyotyping is carried out. On the anaphase stage of mitosis, the number of chromosomes in one cell will make:
- 45
+ 90
- 46
- 92
- 94

853. Analysis of amniotic fluid that was obtained as a result of amniocentesis (puncture of amniotic sac) revealed cells with the nuclei that contain sex chromatin (Barr's body). What can it be evidence of?
- Genetic disorders of fetus development
- Development of male fetus
- Polyploidy
+ Development of female fetus
- Trisomy

854. According to the phenotypic diagnosis, a female patient has been provisionally diagnosed with X-chromosome polysomia. This diagnosis can be confirmed by a cytogenetic method. What karyotype will allow to confirm the diagnosis?
- 46,XX
- 48,XXXXY
- 48,XXYY
- 47,XXY
+ 47,XXX

855. During medico-genetic counseling, it was revealed that hemophilia skips generation and appears in males only. What method of medical genetics was used for this purpose?
856. Niemann–Pick disease is the hereditary disease caused by disturbance of metabolism of lipids. Accumulation of sphingomyelin in liver, brain, spleen, kidneys, and skin is noted. Girls and boys are ill equally. The disease appears during the first months of life and leads to death in early children's age. What is the type of inheritance of this disease?
- Autosomal dominant
- X-linked dominant
- X-linked recessive
- Autosomal recessive
- Y-linked

857. 19-year-old girl has such group of clinically revealed traits: low height, sexual infantilism, lag in intellectual and sexual development, heart disease. What is the most possible reason of this pathology?
- Trisomy on the 13th chromosome
- Trisomy on the 20th chromosome
- Partial monosomy
- Trisomy on the 18th chromosome
- Monosomy on the X chromosome

858. The analysis of a genealogy of the family with cases of teeth anomaly (dark enamel) showed that the disease is transmitted from mother to daughters and sons equally, and from the father only to his daughters. What is the type of inheritance of this trait?
- Autosomal recessive
- X-linked recessive
- Autosomal dominant
- X-linked dominant
- Codominant

859. The child with cleft lip and cleft palate, anomalies of thumbs of a hand) and microcephaly was born in healthy spouses. Karyotype of the child is 47,18+. What type of a mutation caused this hereditary disease?
- Monosomy on an autosome
- Monosomy on the X chromosome
- Polyploidy
Nullisomy
+ Trisomy on an autosome

860. The 22-year-old woman consulted a doctor with the complaint to infertility. During examination, it was revealed that the karyotype is 45,XO, height is 145 cm, wing-shaped folds are present on a neck, secondary sexual traits are underdeveloped. What disease this phenotype indicates to?
– Klinefelter’s syndrome
+ Turner’s syndrome
– Patau syndrome
– Trisomy X
– Trisomy Y

861. The woman, who took alcoholic beverages during pregnancy, gave birth to the deaf child with cleft upper lip and cleft palate. These traits resemble manifestation of some chromosomal anomalies. What process has led to such consequences?
– Carcinogenesis
– Ontogenesis
+ Teratogenesis
– Phylogeny
– Mutagenesis

862. The man, his son and daughter have no small molars. Such anomaly was observed also in the grandfather on the father’s side. What is the most possible type of inheritance of this anomaly?
+ Autosomal dominant
– Autosomal recessive
– Dominant, linked with X-chromosome
– Recessive, linked with X-chromosome
– Y-linked

863. Enamel hypoplasia is caused by a dominant gene localized in the X chromosome. Mother has normal enamel, and father has enamel hypoplasia. Which of children will have this anomaly?
– All the children
+ Only the daughters
– Only the sons
– Half of the daughters
– Half of the sons

864. 17-year-old young man addressed to genetic consultation concerning deviations in physical and sexual development. During microscopy of cells of mucous membrane of a mouth, one Barr’s
Specify the most probable karyotype of the young man.
- 45, XO
+ 47, XXY
- 47, 21+
- 47, 18+
- 47, XYY

Examination of a 7-year-old child revealed the following symptoms: small height, broad roundish face, closely placed eyes with narrow palpebral fissures, half-open mouth. Valvular defect has been also diagnosed. These clinical presentations are most likely typical for Down's syndrome. Name the cause of such pathology:
+ Trisomy of the 21st chromosome
- Trisomy of the 13th chromosome
- X-chromosome trisomy
- Partial monosomy
- Nondisjunction of sexual chromosomes

Very big teeth are a Y-linked sign. Mother's teeth are of normal size, and her son's teeth are very big. Probability of father's having very large teeth is:
- 12.5%
- 25%
- 50%
- 75%
+ 100%

An 8 month old child has non-closed palate, a number of eye defects, microcephaly, disorder of cardiovascular system. Cytogenetic analysis revealed 47 chromosomes with an additional 13th chromosome. What diagnosis can be made on the basis of clinical observations and cytogenetic examinations?
- Cat cry syndrome
- Edwards' syndrome
- Down's syndrome
- Klinefelter's syndrome
+ Patau's syndrome

A group of students has representatives of different races. One of the students has straight black hair and overhanging skin fold of superior eyelid – epicanthus. What race does this student most probably represent?
- Negroid
+ Mongoloid
– Caucasoid
– Australoid
– Ethiopian

869. **Tetracycline taking in the first half of pregnancy causes abnormalities of fetus organs and systems, including tooth hypoplasia and alteration of their colour. What type of variability is the child's disease related to?**
– Combinative
– Mutational
+ Modification
– Hereditary
– Recombinant

870. **A 1.5-year-old child was taken to the hospital. The examination revealed dementia, disorder of motor functions regulation, hypopigmentation of skin, high rate of phenylalanine in blood. What is the most probable diagnosis?**
– Galactosemia
– Tyrosinosis
– Down's syndrome
– Mucoviscidosis
+ Phenylketonuria

871. **Tricho-dento-osteal syndrome is one of ectodermic dysplasias, which is characterized by damage of teeth, hair, and bones. The analysis of a family tree revealed existence of pathology in each generation in men and women. On what type this syndrome is inherited?**
– Autosomal recessive
– Recessive, X-linked
+ Autosomal dominant
– Dominant, X-linked
– Y-linked

872. **A 25-year-old patient consulted a doctor about dysmenorrhea and infertility. Examination revealed that the patient was 145 cm high and had underdeveloped secondary sex characteristics, alar folds on the neck. Cytological study didn't reveal any Barr bodies in the somatic cells. What diagnosis was made?**
– Trisomy X syndrome
+ Turner's syndrome

\[1\] During exam in 2007, incorrect word "Europeoid" was used.
– Klinefelter syndrome
– Morris syndrome
– Down syndrome

873. During the examination of the man's epithelium of the cheek mucosa, it was established that in most cells the nuclei had Barr bodies. What syndrome is it typical of?
– Turner's syndrome
+ Klinefelter’s syndrome
– Trisomy on X chromosome
– Down's syndrome
– Edwards' syndrome

874. Mucoviscidosis is shown not in each generation, women and men inherit a trait with equal frequency, and healthy parents transmit the trait to the children with equal frequency. On what type it is inherited?
– Autosomal dominant
– Mitochondrial
– Linked with X chromosome
+ Autosomal recessive
– Linked with Y chromosome

875. The disease, which is caused by the dominant gene localized in the X chromosome, was revealed in the man. Who from children will have this disease if the wife is healthy?
– Only sons
+ Only daughters
– All children
– Half of daughters
– Half of sons

876. During examination of buccal epithelium of the man with eu- nuchoid traits, sexual X chromatin was revealed in many cells. What chromosomal disease this is characteristic for?
+ Klinefelter's syndrome
– Down's syndrome
– Trisomy on the X chromosome
– Turner's syndrome
– Marfan's syndrome

877. For some hereditary diseases that were incurable earlier, possibility of curing by means of substitutive dietotherapy has appeared with development of medical genetics. At present it most of all concerns:
– anemia
– mucoviscidosis
+ phenylketonuria
– cystinuria
– achondroplasia

**878.** The man consulted a doctor concerning infertility. He has high height, decrease in intelligence, and underdevelopment of sexual glands. Sexual chromatin (1 Barr's body) is revealed in an epithelium of mucous membrane of oral cavity. About what pathology one can think?
+ Klinefelter's syndrome
– Acromegaly
– Adrenogenital syndrome
– DiGeorge syndrome
– Cushing's syndrome

**879.** The woman was infected with a measles virus during pregnancy. The child was born with malformations, which are called cleft lips and cleft palate. These defects are manifestation of:
– polyploidy
– combinational variation
– chromosome mutations
+ modification variation
– aneuploidy

**880.** The man addressed to genetic consultation concerning infertility. In nuclei of the majority of cells of epithelium of mucous membrane of a cheek, one Barr's body was revealed. The cause of such state can be:
– Trisomy X
– Turner's syndrome
– Down's syndrome
+ Klinefelter’s syndrome
– Trisomy Y

**881.** A mother had taken synthetic hormones during pregnancy. Her daughter was born with hirsutism formally resembling of adrenal syndrome. Such manifestation of variability is called:
– mutation
– recombination
– replication
– heterosis
+ phenocopy

**882.** Parents of the newborn with damage of the maxillofacial system (micrognathia, microstomia, short upper lip) addressed to
genetic consultation. The doctor suspected that this is a chromosomal disease. What method needs to be used for specification of the diagnosis?

- Immunogenetic
- Dermatoglyphic
+ Cytogenetic
- Genealogical
- Biochemical

883. The child was born with many malformations: nonclosure of upper lip and palate, microphthalmia, syndactyly, heart diseases, anomalies of kidneys. He died at the age of one month. During karyotyping, the set of chromosomes 47, 13+ was revealed in his cells. What type of a mutation caused this disease?

- Duplication
- Translocation
- Inversion
- Polyploidy
+ Trisomy

884. In case of alkaptonuria, excess release of homogentisic acid with urine happens. With disturbance of metabolism of what amino acid this disease is developed?

- Methionine
+ Tyrosine
- Phenylalanine
- Asparagine
- Alanine

885. Amniocentesis revealed two sex chromatin bodies (Barr bodies) in each cell of the sample. What disease is this character typical for?

- Patau syndrome
+ Trisomy X
- Klinefelter syndrome
- Turner's syndrome
- Down's syndrome

886. The man according to the recommendation of the andrologist addressed to genetic consultation concerning deviations of physical and mental development. The following was objectively established: high growth, asthenic constitution, gynecomastia, and mental retardation. By microscopy of cells of a mucous membrane of a mouth, sexual chromatin (one Barr's body) was revealed in 30% of cases. What is the most probable diagnosis?
887. For diagnosing of some chromosomal diseases, determination of sexual chromatin is used. Name the disease, for which this determination is necessary:

- Down syndrome
- E trisomy
- Turner's syndrome
- hemophilia
- Bruton's disease

888. An individual is characterized by rounded face, broad forehead, a mongolian type of eyelid fold, flattened nasal bridge, permanently open mouth, projecting lower lip, protruding tongue, short neck, flat hands, and stubby fingers. What diagnosis can be put to the patient?

- Alkaptonuria
- Down's syndrome
- Super male
- Turner's syndrome
- Klinefelter's syndrome

889. A healthy woman has three sons affected by color blindness who were born after her two marriages. Children of her both husbands are healthy. What is the most possible pattern of inheritance of this disease?

+ X-linked recessive
- Autosomal-recessive
- Y-linked
- Autosomal-dominant
- X-linked dominant

890. Woman accepted tranquilizers from the group of petroldiazepines in the second half of pregnancy. Childbirth came in time, proceeded normally, but the child with numerous anomalies of development (cleft lip, polydactyly) was born. How the described action of a remedy is called?

- Fetotoxic effect
- Mutagenic effect
+ Teratogenic effect
- Blastomogenic effect
– Embryotoxic effect

891. A child with normal karyotype is diagnosed with cleft lip and hard palate, defects of the cardiovascular system, microcephaly. The child's mother suffered rubella during pregnancy. This pathology in the child may be an example of:
+ phenocopy
– incomplete dominance
– trisomy
– genocopy
– monosomy

892. The child with encephalopathy was born at young spouses. The doctor established that the disease is associated with disturbance of mitochondrial DNA. How mitochondrial pathologies are inherited?
– From mother to sons only
– From both parents to all their children
– From father to sons only
+ From mother to all her children
– From father to daughters only

893. The child with multiple malformations was born at healthy parents which heredity is not burdened. The cytogenetic analysis revealed trisomy of the 18th chromosome (Edwards's syndrome) in somatic cells of the child. With what phenomenon the birth of such child is associated?
+ Nondisjunction of pair of chromosomes during gametogenesis
– Somatic mutation in an embryo
– Dominant mutation
– Chromosome mutation – duplication
– Influence of teratogens

894. During the analysis of a family tree of a proband, it was revealed that the trait appears with an identical frequency in representatives of both sexes, sick persons are present in all generations (straight up), and across – in sibs (brothers and sisters of a proband) in approximately large families. What is the mode of inheritance of this trait?
– Y-linked
+ Autosomal dominant
– Autosomal recessive
– X-linked recessive
– X-linked dominant

895. Determination of X chromatin in somatic cells is used for ex-
press diagnosis of the hereditary diseases associated with change of number of gonosomes. What is karyotype of the man if overwhelming majority of his cells contain one body of X chromatin?

+ 47, XXY
– 45, XO
– 49, XXXXY
– 46, XY
– 48, XXXY

896. The doctor found in the child the rickets caused by deficiency of vitamin D, but this rickets on its manifestations was similar to hereditary vitamin-resistant rickets (curvature of tubular bones, deformation of joints of the lower extremities, tooth abscesses). How developmental anomalies, which resemble hereditary ones but are not inherited, are called?

+ Phenocopies
– Genocopies
– Monosomies
– Trisomies
– Gene diseases

897. Detection of X-chromatin in somatic cells is used for the quick diagnosis of hereditary diseases associated with a change in the sex chromosome number. Vast majority of a man’s cells have three X-chromatin bodies. What is the man’s karyotype?

– 45, X
– 46, XY
+ 49, XXXXY
– 47, XXY
– 48, XXXY

898. When examining a female patient, a doctor observed the following: misshapen auricles, elevated palate, teeth growth disorder; mental retardation; no disruption of reproductive function. Provisional diagnosis is the "super woman" syndrome. Point out the karyotype of this disease.

+ 47,XXX
– 47,XXY
– 47,YYY
– 47,XYY
– 45,X0
899. In one population, the part of the recessive allele makes 0.1, in another population is 0.9. In what of these populations marriages of heterozygotes are more probable?

+ In both populations they are identical
– In the first
– In the second
– The event is impossible
– All answers are wrong

900. In the area with the population 280 000 people, 14 albinos and 9 patients with phenylketonuria are registered. All traits are hereditary and are determined by autosomal recessive genes. By what formula it is possible to determine probability of marriage of carriers of these genes?

– $p^2 + 2pq + q^2$
– $pq^2$
– $2p_1q_1 \times 2p_2q_2$
– $p + q$
– $p^2 + 2pq$

901. Hardy-Weinberg’s law allows to determine genetic structure of population, i.e. frequency of dominant and recessive genes, a ratio of homo- and heterozygotes. It establishes that:

– the ratio of genotypes in population changes
– the ratio of genes in population remains constant
– the ratio of genes in population changes
+ the ratio of alleles of alternative manifestations of a trait remains constant
– the ratio of alleles of alternative manifestations of a trait changes

902. The Rh-positive fetus develops in the Rh-negative woman. There was rhesus incompatibility, which threatens health of future child. To what type of natural selection it is necessary to belong this phenomenon?

– Selection against homozygotes
+ Selection against heterozygotes
– Selection in favor of heterozygotes
– Directional selection
– Stabilizing selection

903. Under the influence of a mutagen the structure of a gene changed and the recessive mutation appeared that got into a gamete and then into the formed zygote. After reproduction of an organism it got into some individuals. What happens with this
mutation further according to the Hardy–Weinberg's law if it does not influence viability?
- From generation to generation, its frequency will decrease, and it will gradually disappear
- From generation to generation, its frequency will increase
+ Its frequency in population remains to be constant
- Frequency of this mutation can incidentally decrease or increase, or remain constant
- Frequency of this mutation will sharply decrease, and it will quickly disappear

904. The disease sickle-cell anemia is caused by presence of a recessive gene. People, who have this disease, as a rule, die at children’s age. However, the frequency of a gene is quite high. Explain why the gene of sickle-cell anemia does not disappear as a result of natural selection:
- high frequency of mutations
- panmixia
- inbreeding
+ survival of heterozygotes
- large distribution of the gene

905. The fundamental law of population genetics describes change of frequencies of genes (alleles) or genotypes in populations. It has the name:
- Vavilov's law of homological rows
+ Hardy-Weinberg's law
- 1st Mendel's law
- 2nd Mendel's law
- 3rd Mendel's law

906. Malarial plasmodium – a causative agent of tertian malaria – has two strains: southern and northern. They differ in duration of the incubatory period: it is short in the southern strain, and it is long in the northern strain. In this phenomenon, what action is apparent?
- Genetic drift
- Isolation
- Population waves
+ Natural selection
- Struggle for existence

907. In the human population that is close to ideal population according to their characteristics, 84% of individuals are Rh-positive. Frequency of occurrence of this trait through three gen-
erations will make:
– 24%
– 94%
– 6%
+ 84%
– 16%

908. A married couple came to the genetic counseling. The husband suffers from the insulin-dependant diabetes; the wife is healthy. What is the probability that this couple will have an insulin-dependant child?
– The same as throughout the population
– Lower than throughout the population
– 100%
+ Higher than throughout the population
– 50%

909. The number of the Mennonite sect who live in Lancaster (Pennsylvania, USA) makes 1400 persons, frequency of closely related (family, incest) marriages is 95%, natural increase of the population is 25%, migration from other groups is 1%. What name this community of people has received?
– Ideal population
+ Isolate
– Real population
– Deme
– Species

910. In what human populations there will be large portion of old men?
– In quickly growing populations
– In the populations which are in a steady state
+ In populations where number of inhabitants decreases
– All answers are correct
– All answers are wrong

911. In the region, which is endemic on the falciparum malaria, a large number of people with sickle-cell anemia were revealed. With action of what type of selection it can be associated?
+ Selection in favor of heterozygotes
– Selection in favor of homozygotes
– Stabilizing selection
– Disruptive selection
– Directional selection

912. In human populations, the allelic structure of genotypes de-
pends on system of marriages. What system of marriages supports the high level of heterozygosity?

- Positive assortative marriages
- Closely related marriages
- Inbreeding
- Incest marriages
- Outbreeding

913. The hereditary disease – sickle-cell anemia, which is inherited on autosomal recessively type, is very widespread in the tropical countries of Africa. Endemism of this disease is associated with fact that in the tropical countries:

- heterozygotic carriers are more prolific
- malaria is widespread
- hemoglobin aggregates in erythrocytes are not formed
- less homozygous descendants are born
- the survival of sick patients is higher

914. Closely related marriages are forbidden. How the genetic structure of population in the case of such marriage will change?

- Recessive homozygosity increases
- Recessive homozygosity decreases
- Heterozygosity increases
- Heterozygosity and dominant homozygosity increase
- Heterozygosity and dominant homozygosity decrease

915. In small population of people, which number does not exceed 1500 people, the frequency of intra group marriages makes over 90%. Thereof through 4 generations (about 100 years), all members of this population are at least the second cousins. Such population is called:

- ideal
- deme
- nation
- nationality
- isolate

916. In population of inhabitants of Odessa region, the dominant gene of right-handedness meets with the frequency of 0.8; recessive gene of left-handedness – 0.2. How many percents of heterozygotes are in this population?

- 32%
- 46%
- 58%
- 64%
In the population, the part of Rh-positive people is 84%, and Rh-negative is 16%. What frequency of the recessive allele of the gene is in this population?

- 0.16
- 0.25
+ 0.4
- 0.5
- 0.84

In ancient times in Egypt, marriages between relatives of the first degree of relationship (brother-sister) were observed that led to the birth of mentally retarded and sick children. How such marriages are called?

- Unrelated
- Panmictic
- Positive assortative
+ Incest
- Negative assortative

A malarial plasmodium – the pathogen of vivax malaria – has two strains: southern and northern. They differ by the duration of their incubation period: the southern has short and the northern – long one. What selection works in this case?

- Artificial
- Sexual
+ Cutting
- Moving
- Stabilizing

People, who live in different areas of Earth, differ phenotypically: Negroids, Mongoloids, and Caucasians. With what form of selection this can be explained?

- Stabilizing selection
+ Disruptive selection
- Artificial selection
- Directional selection
- Sexual selection

In population of inhabitants of Odessa region, the dominant gene of the positive Rhesus factor meets with frequency 0.6; the recessive gene of lack of Rhesus factor – 0.4. How many percent of heterozygotes are present in this population?

- 54%
- 62%
In some populations, which are isolated in their reproduction, genes frequencies can differ considerably. Therefore, the frequency of the blood type II (A) among Indians of a tribe "black legs" makes 80% and among Indians of the State of Utah makes 2%. What elementary evolutionary factors define such differences?

- Selection in favor of heterozygotes
- Founder effect and genetic drift
- Population waves
- Mutations and natural selection
- Stabilizing selection and isolation

Studying incidence in the Crimean population, doctors-geneticists came to conclusion that the number of patients with phenylketonuria and heterozygotes on this gene increased in recent years. What law was used for determination of genetic structure of the population?

- G. Mendel
- Hardy-Weinberg
- T. Morgan
- N. Vavilov
- Haeckel–Muller

Analysis of the family history of children with Van der Woude syndrome revealed that in their families one of the parents had the typical for this syndrome defects (cleft lip and palate, lip pits regardless of gender). What is the type of inheritance of this syndrome?

- Multifactorial
- Autosomal recessive
- X-linked dominant
- X-linked recessive
+ Autosomal dominant
GENERAL BIOLOGY

925. As a result of expression of some genome components, the embryo cells acquire typical morphological, biochemical, and functional properties. Name this process:
- capacitation
- reception
- determination
- differentiation
- induction

926. The multiple sclerosis was revealed in the man of 72 years. During this disease, the reactions directed against tissues the central nervous system develop. What is the disease?
- Autoimmune
- Alloimmune
- Hemolytic
- Homeostatic
- Transplant

927. During experiment with a frog blastula, one blastomere was removed at a stage of 16 blastomeres. The isolated cell continued to develop normally and gave rise to a new embryo. What important property of blastomeres was shown?
- Formation of poles of an embryo
- Totipotency
- Ability to differentiation
- Formation of germ layers
- Ability to embryonic induction

928. During the postembryonic development in a man's organism some age-related changes occur. They are skin elasticity loss, visual and hearing impairment. What do we call the period of individual development when such changes occur?
- Aging
- Adolescence
- First mature
- Juvenile
- Youth

929. In a transplantation centre, a patient has been transplanted a heart. What cells of the immune system can influence the graft cells?
- Macrophages
- Plasma cells
+ T lymphocytes
– B lymphocytes
– Lymphoblasts

930. **In a certain time of day, the increase in blood clotting is observed in man. What biological regularity can explain this phenomenon?**
– Physiological regeneration
– Reparative regeneration
– Genotype
+ Biological rhythms
– Regeneration and genotype

931. **Antibiotic actinomycin D is known to have no toxic effect on the maternal organism; on the other hand, it impairs the formation of tissues and organs of ectodermic origin in the embryo organism. A woman was taking actinomycin D during pregnancy. What organs or systems of the fetus can be impaired as a result?**
– Sex glands
– Skeleton muscles
– Locomotion system
– Urogenital system
+ Nervous system

932. **How highlands conditions influence development and passing of life cycle by a man?**
– Accelerate all stages of postnatal development
– Do not influence menarche, but reduce the period of starting of menopause
+ Slow down processes of puberty and aging
– Change human biorhythms
– Slow down processes of puberty and strengthen aging processes

933. **At the stage of blastocyst, the beginning of a human embryo implantation into the womb wall was recorded. What term of embryogenesis does it occur at?**
– 10–12 days
– 3–4 days
+ 6–7 days
– 24–26 days
– 30–35 days

934. **Existence of life at all its levels is defined by structure of the lowest level. What level of the organization provides existence of a cellular level of life?**
– Tissue
– Organismal
During the postembryonic development of a human, two lordoses and two kyphoses are formed. It can be explained as the human ability to:

- sit
+ walk vertically
- swim
- creep
- lie

In parallel experiments on rats, which were subjected to long direct solar radiation, and rats, which were in the chambers closed by glass, development of tumors on hairless parts of skin in animals that were in open chambers. With influence of what factors listed below this phenomenon is associated?

- Solar heat
- Biological carcinogens
+ Ultraviolet radiation
- Infrared radiation
- Exogenous chemical carcinogens

Skin of the donor was repeatedly transplanted to the woman of 38 years, but it was rejected much quicker, than after the first transplantation. This reaction happens due to activity of part of thymocytes, which:

+ have immunological memory
- are capable to absorb and digest pathogenic bacteria
- have antihistaminic action
- stimulate reproduction of B lymphocytes
- turn B-lymphocytes into plasmablasts

The tissue slice from region of chronic stomach ulcer was sent to pathomorphologic office. During histologic research, necrosis, granulation tissue, excessive development of sclerous tissue and metaplasia of an epithelium were revealed in the wall of ulcer. What type of regeneration these changes indicate to?

+ Pathological regeneration with disturbance of change of phases
- Reparative regeneration – substitution
- Physiological regeneration
- Reparative regeneration – restitution
- Hypertrophy

At a definite stage of embryogenesis, the mother's and fe-
tus's circulatory systems are becoming physiologically connected. What provisional organ fulfils this function?
- Amnion
- Yolk sac
+ Placenta
- Serosa
- Allantois

940. The knowledge of poisonous plants is necessary for man because poisonings due to their similarity to the nonpoisonous plants occur quite often. The henbane – a grassy two-year plant from the family Solanaceae – is very dangerous for man. What clinical sign is the most characteristic at poisoning with henbane?
- Disorders of function of digestion
- Headache
+ Nervous excitement
- Paralysis of respiratory muscles
- Edema, hemorrhages

941. Autotransplantation of skin was made to the patient after burn. Rejection of a transplant did not happen. How it can be explained?
- Genes coding synthesis of autoantibodies are not inherited
+ There is natural immunological tolerance
- Substances of skin cells are not antigens
- Owing to the burn disease, the condition of immunological insufficiency occurred
- Artificial immunological tolerance was created

942. Data of paleoanthropology, which were received by anthropologists owing to long-term archeological excavations, indicate that such diseases as the deforming arthrosis and spondylosis were widespread during Mesolithic and Neolithic eras. About what things these finds indicate first?
- Existence of causative agents of diseases
- Disturbance of ossification of bones
- Insufficient food
+ Excessive physical activities
- Attack of predators on man

943. In the man, the mature plasma cell lost ability to reproduction and started to secrete antibodies – immunoglobulins. At what stage of life cycle it occurs?
+ G₁
- S period
G2
Prometaphase
Differentiation

944. *In the process of anthropogenesis, a number of changes of skull, throat, brain is observed in man in comparison with monkeys. What of these signs are associated with development of the articulate speech first of all?*

- Stronger projection of a brain skull concerning the plane of the face
- More developed parietal parts
- Increase in the sizes of hemispheres of a brain
- Reduction of the sizes of canines
+ Growth of precentral and frontal gyri

945. *The composition of blood in man has changed at long stay in highlands conditions. What changes are observed in blood?*

- The amount of gamma globulins increases
- Viscosity of blood decreases
- The number of leukocytes increases
- The number of thrombocytes increases
+ The number of erythrocytes and the content of hemoglobin in them increase

946. *Toxic agents of an animal origin are used in small doses with the medical purpose. For treatment of what disease it is most expedient to use snake poison, which is rich in coagulants?*

- Epilepsy
- Bronchial asthma
- Rheumatism
+ Hemophilia
- Gout

947. *For studying of features of a structure of human body, depending on object for studying, scientists use different anthropological methods: somatometry, osteometry, somatoscopy, etc. Choose, what from described methods first of all belongs to craniometry?*

- Preparing of masks, dental models
- Studying of the head shape
- Measuring of the remains of bones of the body
+ Measuring of skulls
- Using of models

948. *The newborn has multiple malformations. What of the listed defects has phylogenetic conditionality?*

- Natural dislocation of hip
– Spinal curvature
– Reduced jaw
– Anophthalmos
+ Additional ribs on cervical vertebrae

949. On autopsy of a still-born infant, heart abnormalities have been revealed: ventricles are not separated, a single arterial trunk originates from the right part. For what class of vertebrates is such heart construction characteristic?
– Fishes
– Birds
– Mammals
+ Amphibian
– Reptiles

950. Relationships between organisms, which are connected with food, lead to appearance of food chains. Each food chain includes, as a rule, no more than 4–5 levels because, due to energy losses, the general biomass of each subsequent level is about 10 times less than the previous one. What of the listed organisms needs to place on a top of an ecological pyramid?
– Wheat
– Man
+ Plague bacteria
– Flea
– Souslik

951. What functional indicators of an organism do not decrease when aging, but, on the contrary, increase?
+ Cholesterol level in blood
– Hormonal activity of thyroid gland
– Contractile ability of cardiac muscle
– Visual acuity
– Activity of enzymes

952. Recently, increase of concentration of CO₂ in the atmosphere is observed. What biological consequences this change in gas structure of the atmosphere can lead to?
– Exhaustion of the ozone layer that protects all living things from radiation
+ Creation of "greenhouse effect", warming of climate on the planet, thawing of ices in Polar Regions
– Harm to plants
– Falling of sulfuric and nitric acids with rain, dew, snow, hoarfrost
– Falling of global sea level

953. A newborn child has microcephalia. Doctors consider that this
is the result of mother's taking actinomycin D during pregnancy. What embryonal layer was influenced by this teratogen? ¹

1. Ectoderm
   - All germ layers
   - Entoderm
   - Mesoderm
   - Entoderm and mesoderm

954. When determining process of aging of a human body, weakening of T-system activity was revealed at senile age. It is known that processes breaking homeostasis occur in an organism at the cellular and molecular levels. What function of T-lymphocytes killers is broken first of all?
   - Transformation of plasmablasts into plasmocytes
   + Recognition and destruction of mutant cells of the organism
   - Stimulation of reproduction of B lymphocytes
   - Release of immunoglobulins by B lymphocytes
   - Inhibition of the immune answer of B cells

955. Defect of the interventricular septum was established at the newborn. In a ventricle, the arterial and venous blood is mixed. At what representatives of a class of vertebrates heart has such structure?
   - Fishes
   - Amphibians
   + Reptiles
   - Birds
   - Mammals

956. 14-year-old boy is characterized by lag in growth (small growth), but proportions of a body and sexual development are normal. What hormonal changes can occur in this case?
   + Deficiency of somatotropic hormone
   - Deficiency of sex hormones
   - Deficiency of thyroid hormones
   - Excess of somatotropic hormone
   - Excess of thyroid hormones

957. Clinical death is registered in the person. What vital functions have stopped thus?
   - Renewal of cells
   - Processes of metabolism

¹ In the collection of test questions in the Internet site http://testcentr.org.ua/ (2013) as well as during exam in 2006, incorrect terms "leaf", "leaves", "ectoderma", "entoderma", and "mesoderma" were used instead of "layer", "layers", "ectoderm", "entoderm", and "mesoderm".
+ Heartbeat and breath
– DNA replication
– Mobility

958. **Operation on heart transplantation was performed to the sick person with congenital heart disease. In 24 hours, process of rejection of a donor transplant began. What provided this process?**
– Macrophages
– T lymphocytes killers
– T lymphocytes helpers
– T lymphocytes suppressors
+ Antibodies (immunoglobulins)

959. **The serious hereditary disease of skin – lack of sweat glands (anhidrosis) – was revealed in the child; thereof important functions of skin – perspiration and thermal control – are broken. This defect is a consequence of disturbance during embryogenesis of anlage of:**
– splanchnic
+ ectoderm
– sclerotome
– entoderm
– dermatome

960. **During various inflammatory processes in the man, the number of leukocytes in blood increases. This regularity is manifestation of:**
– regeneration
– reparation
+ adaptation
– transplantation
– degeneration

961. **The part of a liver was removed in the man after trauma. The left part of a liver regenerates to the normal sizes, but its form remains changed. What regeneration takes place?**
– Compensatory hypertrophy
– Epimorphosis
– Morphallaxis
+ Regeneration hypertrophy
– Substitutive hypertrophy

962. **In experimental conditions, the eye bubble was transplanted under skin of ventral area of an embryo (G. Spemann, 1901). What operation consequences will occur?**
– Nervous tube will be formed
963. A large number of mutant cells appeared in the man for one day after radiation. But after a while, the majority of them were recognized and destroyed due to activity of:
- T-lymphocytes suppressors
- B lymphocytes
- plasmablasts
+ T-lymphocytes killers
- stem cells

964. Lag in growth (small growth), disturbance of body proportions and lag of sexual development are noted in the boy of 14 years. About lesion of what structures of endocrine system this can indicate?
+ Forward part of hypophysis
- Middle part of hypophysis
- Back part of hypophysis
- Thyroid gland
- Sexual glands

965. In a human embryo, the anlage of axis organs has begun. How this development stage is called?
- Blastula
- Zygote
- Cleavage
+ Neurula
- Gastrula

966. After radiation by high dose of radiation, the lymphoid system considerably suffered in the teenager; disintegration of a large number of lymphocytes occurred. Due to activity of what organ, restoration of normal blood count is possible?
- Thyroid gland
- Liver
- Pancreas
+ Thymus
- Adrenal gland

967. The newborn has a dry skin covering with a thick layer of horny scales – an ichthyosis. Representatives of what class of vertebrates have the skin of similar structure?
- Reptiles
968. A patient has been badly burnt; as a result, he has skin defects. To liquidate these defects, the surgeons have grafted a piece of skin from another part of the patient's body. What type of transplantation is it?

- Homotransplantation
- Explantation
- Allotransplantation
- Xenotransplantation
+ Autotransplantation

969. Nuclei of blastula cells were transplanted into denucleated ova of a frog. Normal embryos developed from an ovum in 80% of cases. Explain this phenomenon:

- it happens due to inactivation (stable repression) of groups of genes
- nuclei of cells had lost genetic information
- there is no loss of genes in the process of cell differentiation
+ nuclei of blastula cells are genetically full (totipotent)
- nuclei of cells contain the same number of different genes, as well as in impregnated egg

970. There is a theory that mitochondria are descendants of prokaryotic cells that at a certain stage of evolution penetrated into cytoplasm of eukaryotic cells and live at present in symbiosis with host cells. This theory is confirmed by the fact that in mitochondria:

- oxidizing phosphorylation occurs
+ biosynthesis of protein begins with formylmethionine
- cristae are present
- double membrane is present
- cycle of citric acid occurs

971. During the ontogenesis, there appear some changes in a human organism: the vital capacity of his lungs decreases, his arterial pressure increases, and the progress of atherosclerosis takes place. What do we call the period of individual development in which all these changes happen?

- Youth
+ Elderly
- Adolescence
- Juvenile
972. As a result of road accident, the 36-year-old patient got an open fracture of bones of a shin. During the process of union, the excess bone callosity was formed in the place of fracture. What type of regeneration the formation of this callosity should be referred to?

- Restitution
- Pathological regeneration
- Reparative regeneration
- Substitution
- Physiological regeneration

973. The patient is prepared for operation of kidney transplantation. All try to find a donor. What antigens of the donor and recipient from the listed ones have the greatest value for successful engraftment?

- MN blood type system
- ABO blood system
- Rh system
- Duffy system
- HLA system

974. Pulmonary stagnation was revealed in the five-month girl. During examination, connection between ascending aorta and pulmonary artery, which in norm is observed in some amphibious and reptiles, was found. What is a congenital malformation?

- Defect of interatrial septum
- Defect of interventricular septum
- Development of the right arch of aorta
- Nonclosure of the Botallo's duct
- Transposition of main vessels

975. In experiment, processes of transcription in nuclei of nervous cells were blocked in the head end of an embryo of a frog at a neurula stage. To what congenital defect it can result in?

- Anencephalia
- Nonclosure of hard palate
- Spinal hernia
- Hydrocephaly
- Cleft lip

976. During autopsy of the young man who was the driver and died after road accident, the doctor-pathologist was surprised with the considerable size of heart, which almost twice surpassed normal size. In what kind of activity the driver was engaged?
977. The man lived a long time in highlands conditions. What changes will be present in his blood system?
- Increase in diameter of blood vessels
- Decrease in number of leukocytes
- Pulse becomes rarer
+ Increase in amount of hemoglobin
- Increase in number of leukocytes

978. Human embryos with abnormal number of chromosomes are nonviable in most cases. What form of selection can explain this?
+ Stabilizing
- Sexual
- Directional
- Disruptive
- Artificial

979. The mutant line "nudc" of mice was received in genetic laboratory; it has no thymus and no cellular immune answer. Experiments with transplantation of allogenic tissues to these mice showed that rejection of the transplanted material in mice does not occur. With lack of what cells this phenomenon is associated?
- Macrophages
- B lymphocytes
- Monocytes
+ T-lymphocyte killers
- Plasma cells

980. Albinism is observed among all classes of vertebrate animals. This hereditary pathology is also present in man and is caused by autosomal recessive gene. What law is manifested by the existence of albinism in man and representatives of different classes of vertebrate animals?
+ Vavilov's law of homologous rows of hereditary variation
- Haeckel–Muller's biogenetic law
- Mendel's law of dominance
- Mendel's law of independent assortment
- Morgan's law of inheritance of linked genes

981. At examination of the patient, the insufficient amount of immunoglobulins was revealed. What cells of immune system of the
patient have broken function that can cause such symptom?
- T killers
- Plasmablasts
- T suppressors
+ Plasmatic cells
- T helpers

982. The child having a deep mental deficiency with cleft lip, cleft palate and heart defects was born in woman who uses drugs. In what period of ontogenesis listed abnormalities could appear?
- In the period of gametogenesis and the postnatal period
- In the period of histogenesis and organogenesis
- In the period of morphogenesis and the postnatal period
+ In the periods of gametogenesis and embryogenesis
- In the period of development of a fetus and in the postnatal period

983. Rudimental organs are organs that lost their function, but remain in embryonal state in adult organisms. What of the listed human organs are rudimentary?
- Existence of more than two mammary glands
- Tail
- Head
- Cervical fistula
+ Tailbone

984. During an active physical activity, concentration of carbonic acid in blood of the man increases. It leads to deepening and acceleration of breath, owing to this, concentration of carbonic acid and ions of hydrogen in blood decreases. This supports:
- immunity
- ontogenesis
+ homeostasis
- phylogeny
- anabiosis

985. At the different levels of the organization, adaptation is maintained in biological systems. Adaptation is believed to be the adaptation of the living thing to environmental conditions that change continuously. Without adaptations, support of normal existence is impossible. What is the cornerstone of adaptations?
- Heredity and variation
+ Irritability and proper responses
- Metabolism and energy
- Discretization and integrity
- Homeostasis and reproduction
986. The young man of military age is examined in clinic. Lack of teeth on the lower jaw is revealed. It is found that defect of teeth is observed in the patient since the childhood. What could serve as the reason of this anomaly?
- Infectious disease
- Reception of medicines
+ Disturbance of organogenesis during embryogenesis
- Alimentary insufficiency
- Vitamin deficiency

987. Tooth was extracted in the 50-year-old woman. New tissue regenerated on a place of tooth removal. Based on functions of cellular organelles, specify the most active of them during repair of tissues:
- centrosomes
- mitochondria
- ER
- lysosomes
+ ribosomes

988. The boy, whose body is covered with hairs (hypertrichosis), was born in a family. This defect is caused by fact that a large number of hair follicles is formed at a stage of organogenesis, nevertheless, later, during embryogenesis, reduction of their most part occurs. The insufficient reduction of excess number of the described structures is the reason of developing of this congenital malformation. Disturbance of what anlage causes this abnormality?
- Splanchnotom
+ Ectoderm
- Dermatome
- Sclerotome
- Entoderm

989. Transplantation of donor skin was made to the patient with considerable burns. For the 8th days, the transplant swelled, its color changed, and for the 11th days, it started being rejected. What cells take part in this process?
- B lymphocytes
- Eosinophils
+ T lymphocytes
- Erythrocytes
- Basophils

990. At parents who are sick with alcoholism, children are born the
dead or have a deep mental deficiency, strabismus, with cleft palate and heart diseases (fetal alcohol syndrome). During what period these disturbances can occur?

+ Formations of gametes
– Postembryonic period
– Embryonic period
– Gastrulation stage
– Stage of organogenesis

991. The gastrulation, or formation of germ layers of an embryo, happens in the different ways. By what way the ectoderm and entoderm in man are formed?

– Epiboly
– Invagination
– Immigrations
+ Immigration and delamination
– Invagination and delamination

992. Choose, what components of primary anlages remain in sexual system of females of amniotes:

– Muller's and Wolffian ducts
+ Muller's duct and rudiments of ductules of a head kidney
– Wolffian duct
– rudiments of ductules of a primordial kidney
– all answers are wrong

993. Transplantation of a kidney to the patient according to vital indications was carried out. Less than in a month, the patient died owing to rejection of the transplanted organ. Incompatibility on what system became the rejection reason?

– MN
+ HLA
– ABO
– Rhesus factor
– Erythrocytic antigens

994. Development of the general adaptation syndrome and stress in an organism is followed by a complex of nonspecific reactions. What of stages of stress is critical and can lead to development of diseases of dysadaptation?

– Alarm stage
– Resistance stage
– Tolerance stage
– Anxiety stage
+ Exhaustion stage
995. Representatives of one of human populations have the extended body, wide variability of growth, reduced volume of muscles, extended extremities, reduced thorax in sizes and volume, increased perspiration, lowered indicators of basal metabolism and synthesis of fats. What adaptive type of people this population belongs to?

– Arctic adaptive type
– Adaptive type of a zone of temperate climate
+ Tropical adaptive type
– Intermediate adaptive type
– Mountain adaptive type

996. The man has strongly developed musculoskeletal system, the large sizes of a thorax, the raised content of mineral substances in bone tissue, high level of hemoglobin, proteins (albumine and globulins) and cholesterol in blood, ability of an organism to oxidize metabolism products is increased, the energy metabolism is strengthened, thermal control is stable. What is adaptive type?

– Adaptive type of a zone of temperate climate
– Mountain adaptive type
– Intermediate adaptive type
– Tropical adaptive type
+ Arctic adaptive type

997. In an experimental laboratory, a pig's kidney has been grafted to a cow. What do we call this way of transplantation?

– Explantation
– Autotransplantation
– Allotransplantation
+ Xenotransplantation
– Homotransplantation

998. Restoration of the lost organ begins with lysis of the tissues adjacent to a wound, intensive reproduction of cells of regeneration rudiment; differentiation of cells leads to formation of an organ. What type of regeneration it is a matter of?

+ Epimorphosis
– Heteromorphosis
– Endomorphosis
– Morphallaxis
– Regeneration hypertrophy

999. How natural processes of change of biogeocenosis occur?

– Owing to increase in number of individuals in population
– Owing to decrease in number of individuals in population
1000. The allogenic transplant was transplanted to the patient. But after a while, rejection of the transplanted tissue occurred. Owing to activity of what cells it happened?
- Stem cells
- Thrombocytes
- Cells of thymus
+ T lymphocytes
- Cells of spleen

1001. The resection of a kidney was carried out to the man after a trauma. The remained kidney regenerated with increase in the size. What processes took place during regeneration?
- Increase in the sizes of cells
- Increase in quantity of an intercellular substratum
- Differentiation of undifferentiated cells with their further proliferation
- Proliferation of the differentiated cells
+ Proliferation of undifferentiated cells with their further differentiation

1002. The boy with tail part of a backbone was born. The doctor explained his parents that human embryo has 8–11 tail vertebras during 1.5–3 months of an embryogenesis, nevertheless, then, till the birth, the part of them is reduced, and only 4–5 vertebras, which form a tailbone, remain. Disturbance of processes of their reduction is the reason of the described defect, which the doctor suggested to eliminate surgically. Disturbance of what anlage this defect is associated with?
- Splanchnotom
- Chords
- Myotome
- Dermatome
+ Sclerotome

1003. The child with signs of long starvation, owing to what dehydration of an organism occurred, was hospitalized in hospital. What solution can restore normal balance?
- Sucrose solution
- Solution of proteins
- Glucose solution
+ Isotonic solution of sodium chloride
- Hypertensive solution of sodium chloride

1004. The HLA region (the main complex of histocompatibility) is
located in the 6th chromosome. Each gene has some allelic variants. What causes a variety of genotypes in populations?

- Combination of alleles
- Polymeric interaction
- Complementary interaction
- Epistatic influence
- Domination

1005. The anlage of axial organs was disturbed in the human embryo. At what stage of an embryogenesis it was happened?

- Organogenesis
- Gastrulations
- Histogenesis
- Blastula
- Cleavage

1006. In experiment, thymus was cut out in newborn rats. What of the listed changes will occur in an organism of these animals?

- Increase in number of lymphocytes
- T lymphocytes will not form
- Rejection of a transplant
- Disturbance of motor reactions
- Antibodies will not form

1007. Dark skin of the man of the equatorial race prevents penetration of ultraviolet rays, and curly hairs protect from a heat. What level of adaptation the given traits correspond to?

- Molecular
- Organismal
- Population and species
- Biocenotic
- Biospheric

1008. In a human organism some abnormalities, connected with the disorder of teeth differentiation and changes in their number (the homodent tooth system), were found. What type of evidence of human evolution can such abnormalities belong to?

- Cytological
- Rudiments
- Recapitulation
- Atavisms
- Biochemical

1009. In provinces with the excess content of molybdenum in the environment, synthesis of uric acid is broken at locals. What disease develops thereof?
– Giantism
– Chondrodystrophy
– Endemic goiter
– Phenylketonuria
+ Endemic gout

1010. **Owing to defective diet of maternal organism, the death of an embryo during the first critical period was established. Why it happened?**
– Blastocyst is not capable to implantation
– Shortage of vitamins caused a mutation in embryonic cells
– Blastocyst started to divide unevenly
+ Epithelium of a uterus is not ready to attach an embryo at blastocyst stage
– Deficiency of vitamins caused a mutation in cells of uterus epithelium

1011. **The kidney was transplanted to the patient in clinic. What of the listed cells of immune system can have direct impact on cells of a transplant?**
– Plasmablasts
– T helpers
+ T killers
– Plasmatic cells
– Thymocytes

1012. **In some unicellular organisms, for example, in amoebae, nutrition happens by means of phagocytosis. In what human cells is phagocytosis the way of protection of the organism from foreign agents (for example, microorganisms)?**
+ Leucocytes
– Erythrocytes
– Epitheliocytes
– Myocytes
– Thrombocytes

1013. **In a transplantation center, a 40-year-old patient has been transplanted a kidney which was taken from a donor perished in an automobile accident. To avoid graft rejection, the patient’s graft immunity is suppressed with the help of:**
– Antibiotics
– Vitamins
+ Immunodepressants
– Antiseptics
– Immunostimulants

1014. **As a result of radiation by ultraviolet rays, skin of the man darkens that is protective reaction of an organism. What protec-
tive substance – derivative of amino acids – is synthesized in cells under the influence of ultraviolet?
– Arginine
+ Melanin
– Methionine
– Phenylalanine
– Thyroxin

1015. During primary agammaglobulinaemia, the content of immunoglobulins in blood serum is sharply lowered, plasmatic cells are absent in lymphoid organs. What part of immunity is broken in this case?
– Synthesis of lactic acid
– Lysozyme synthesis
+ Antibody formation
– Phagocytosis
– Formation of T lymphocytes

1016. A highly injured person has gradually died. Please choose the indicator of biological death:
– disarray of chemical processes
+ autolysis and decay of cells
– absence of movements
– absence of palpitation and breathing
– loss of consciousness

1017. In the newborn, five pairs of nipples of mammary glands were revealed (polythelia) that though has especially cosmetic value, nevertheless disturbed parents. The doctor explained that, at the beginning of an embryogenesis, five pairs of nipples are layered and four of them are reduced before child's birth. Disturbance of what anlage caused this congenital malformation?
– Myotome
+ Ectoderm
– Sclerotomes
– Splanchnotom
– Dermatome

1018. Dog tapeworm was found in the liver of the patient of age of 58 years. In this regard, the surgeon executed a resection of part of the liver with larva of dog tapeworm. What type of regeneration will occur in the liver?
– Epimorphosis
– Metamorphoses
+ Endomorphosis
1019. The inspector of forest protection found the forest lake, which is completely filled up with garbage. In the protocol, the disturbed ecosystem was specified. What natural system was destroyed?

- Biotope
- Biome
- Ecosphere
- Ecological niche
+ Biogeocenosis

1020. In cells of human body, intensity of synthesis of DNA and RNA is reduced, synthesis of necessary proteins and mitotic activity is slightly broken. To what period of ontogenesis such changes most likely correspond?

- Teenage age
+ Advanced age
- Young age
- Beginning of mature age
- Youthful age

1021. In the case of repeated skin transplantation from the same donor, process of rejection in the recipient happened much quicker, than after the first transplantation. With existence of what cells this is associated?

+ T lymphocytes
- Plasmablasts
- Thrombocytes
- Erythrocytes
- Stem cells

1022. For people who live in highlands conditions long ago, many adaptations are characteristic. What of the following adaptations is not typical for inhabitants of mountains?

- The raised content of hemoglobin
- Increase in vital capacity of lungs
+ Reduction of length of feet in comparison with length of hands
- Strengthening of pulmonary ventilation
- The increased content of myoglobin in muscles

1023. A young man complains about urination disorder. Examination of the external genitals revealed that the urethra was split on top side and urine could flow out of this orifice. What anomaly of the external genitals development is it?
+ Epispadia
- Phimosis
- Hypospadias
- Hermaphroditism
- Paraphimosis

1024. *How the organ transplantation from one man to another is called?*
+ Allotransplantation
- Autotransplantation
- Explantation
- Xenotransplantation
- Heteromorphosis

1025. *The human body is influenced at the same time by different socioecological factors, thus action of one factor depends on the force and modifying influence of other factors. This regularity has the name:*
- ecological valency
- adaptation
- effect of compensation
+ interaction of factors
- restrictive factor

1026. *Toxic substances, which are present in poison of snakes, have different properties. What property is used when snake poison is used as remedy?*
- Cytotoxic
- Hemolytic
+ To increase blood clotting
- Neurotoxic
- Cardiotoxic

1027. *During embryonal development, the process of realization of genetic information and of the development of an organism can be broken by some chemical compound; as a result, malformation occurs. How such compound is called?*
- Fibrinogen
- Antigen
- Comutagen
+ Teratogen
- Agglutinogen

1028. *For the purpose of myocardium infarction treatment, a patient was injected with embryonal stem cells derived from the same patient by means of therapeutic cloning. What transplantation-
1029. Examination of newborn boy's genitalia revealed the urethral fissure that opens on the underside of his penis. What malformation is it?
- Cryptorchidism
- Monorchism
- Epispadia
- Hermaphroditism
+ Hypospadias

1030. A patient in a transplantation centre underwent heart transplantation. The organ was taken from a donor who died in a road accident. Foreign heart can be rejected as a result of development of transplantation immunity. It is usually prevented by means of:
+ immunosuppressors
- X-ray therapy
- chemotherapy
- enzymes
- ultrasound

1031. An alcoholic woman has born a girl with mental and physical developmental lag. Doctors diagnosed the girl with fetal alcohol syndrome. What effect is the cause of the girl's state?
- Malignization
- Carcinogenic
- Mechanic
+ Teratogenic
- Mutagenic

1032. The child with nonclosure of arches of vertebrae and cleft palate was born at young spouses. How malformations, which resemble appropriate organs of ancestral groups of a man, are called?
- Non-phylogenetic
+ Atavistic
- Genocopies
- Phenocopies
- Allogenic
1033. For more precise definition of the mechanism of development of cheiloschisis and palate in human, similar anomaly was studied in mice in the laboratory of experimental biology. What method of genetics was used?
- Cytogenetic
- Dermatoglyphics
- Twin
- Population-statistical
+ Modelling

1034. Ability to adaptation varies in the wide range, which gives the possibility to distinguish some functional types of the constitutional reaction among people. How the organism, which is intermediate type with an optimum and adequate way of response to different changes of environment, is called?
- Asthenic
+ Mixed body
- Stayer
- Normothenic
- Sprinter

1035. The majority of parasitic unicellular organisms die in environmental conditions. However, these species exist already millions of years. Existence of parasitic species does not stop thanks to existence in their life cycles of different forms of:
+ reproduction
- phylogeny
- ontogenesis
- metabolism
- homeostasis

1036. In the process of human embryogenesis, the blastocyst starts to form for the 6–7\textsuperscript{th} days after fertilization; this blastocyst significantly differs in certain signs of its structure from a typical blastula of a lancelet. These characteristic signs are the presence of:
- large number of blastomeres
- primary mouth
+ trophoblast and embryoblast
- animal and vegetative poles
- secondary mouth

1037. Ability to adaptation varies in the wide range, which gives the possibility to distinguish some functional types of the constitutional reaction among people. Specify human type with poten-
tial tendency to strong physiological reactions, which provide high reliability at apparent, but short-term actions of environment.

- Mixed body
- Asthenic
- Normosthenic
- Stayer
+ Sprinter

1038. Surgical procedure was performed. On the place of section, scar was formed. Specify what of organellas are most active at restoration of epithelial tissue, proceeding from the carried-out functions.

- Centrosomes
- Vacuoles
- Lysosomes
+ Ribosomes
- Golgi’s complex

1039. Fertilization is a process of fusion of male and female gametes therefore the zygote having a diploid set of chromosomes is formed. In the process of fertilization, the spermatozoon carries out acrosome reaction. What enzyme takes part in its providing?

+ Hyaluronidase
- Ligase
- Glucose-6-phosphate dehydrogenase
- Restrictase
- Ribonuclease

1040. Ability to adaptation varies in the wide range, which gives the possibility to distinguish some functional types of the constitutional reaction among people. Specify type of human body, which is capable to maintain steadily long and monotonous physiological loadings.

+ Stayer
- Asthenic
- Mixed body
- Normosthenic
- Sprinter

1041. Scientists investigated development of not fertilized ova of a rabbit after their activation by low temperature. How this form of reproduction is called?

- Natural parthenogenesis
- Schizogony
- Copulation
+ Artificial parthenogenesis
– Conjugation

1042. The birth of two, three, four and even seven uniovular twins in a man is associated with fact that the isolated blastomere develops in a full-fledged organism. What name this phenomenon has?
– Embryonic induction
– Labile differentiation
– The decoding organization
+ Totipotency
– Stable differentiation

1043. In embryogenesis of a man, as well as of vast majority of vertebrata, six pairs of branchial arteries from which reach vessels of the fourth pair are the best developed. What human vessel is homologous to this pair of branchial arteries?
+ Left arch of an aorta
– Right arch of an aorta
– Carotid
– Pulmonary artery
– Superior vena cava

1044. Strict restriction in stay time at the height over 800 meters above sea level without oxygen cylinders exists for the man. What factor is limiting for life in this case?
+ Partial pressure of oxygen in air
– Level of ultraviolet radiation
– Humidity level
– Temperature
– Force of terrestrial gravitation

1045. The four-year-old girl has three bones in the hand thumb instead of two ones. The similar structure of a thumb is present in amphibians and reptiles. How this anomaly of development is called?
– Polydactyly
– Oligodactyly
+ Polyphalangism
– Brachydactyly
– Syndactyly

1046. In applied medicine of Ukraine because of shortage of human donor material, the transplantation problem is solved over thirty years by use of organs and tissues of an animal origin (valves of heart of a pig, connective tissues of pig and cow origin,
etc.). How this type of transplantation is called?

+ Xenotransplantation
– Isotransplantation
– Allotransplantation
– Autotransplantation
– Heterotransplantation

1047. Operation on removal of the left kidney was performed to the forty-five-year-old patient with malignant tumor. In two years, according to ultrasonic research, it was revealed that the right kidney increased in sizes approximately by one and half times. Results of the general analysis of urine and other laboratory investigations showed gradual improvement of functioning of the right kidney. On what type regeneration processes occurred in this case?

+ Compensatory hypertrophy
– Regeneration hypertrophy
– Morphallaxis
– Epimorphosis
– Heteromorphosis

1048. By means of D. Gurdon’s experiments made in 1964–1966, it was proved that during transplantation of nuclei of somatic cells at different stages of development into denucleated (without nucleus) ovum of a frog, normal development of a tadpole occurs and, though is very rare, an adult frog is developed. What was proved by these experiences?

– Totipotency of cells
– Phenomenon of embryonic induction
– Genes are inactive in a zygote
+ All cells have identical genes
– Differentiation of cells of a germ

1049. Operation on transplantation of the left kidney owing to its hydronephrosis was appointed to the patient. His monozygotic twin brother was chosen as the donor of a kidney. What name this type of transplantation received?

+ Isotransplantation
– Heterotransplantation
– Autotransplantation
– Allotransplantation
– Xenotransplantation

1050. At the pregnant woman who is sick with toxoplasmosis, process of mesoderm formation was broken during an embryogene-
sis of a fetus. What pathology of system or organs can arise in the newborn?

– Nervous
– Intestines epithelium
– Liver
+ Secretory system
– Pancreas

1051. Depending on a way of introduction of poison to an organism of the victim, poisonous animals are divided on armed and unarmed animals. The armed poisonous animal, which lives in the desert on the coast of the Black and Mediterranean seas, has poisonous gland on the end of abdomen. Poison is removed through a needle by means of muscles that surround this gland. Toxicity is shown in tachycardia, increase of arterial pressure, weakness, adynamia, and disturbance of thermal control; edema of lungs can occur. Determine this animal.

– Spider *Latrodectus tredecimguttatus*
+ Scorpion
– Bee
– Gadfly
– Bird spider

1052. The twelve-year-old girl had leukemia and was doomed to death. Searches of donor marrow were unsuccessful. Doctors advised parents of the girl to give birth to other child with hope that embryonic blood from an umbilical cord will become a source of stem hemopoietic cells and will help to prevent rejection reaction. What type of transplantation helped to rescue the girl?

– Xenotransplantation
– Isotransplantation
+ Allotransplantation
– Autotransplantation
– Heterotransplantation

1053. In the women who became pregnant during mass use of pesticides in rural areas, the laying of ectoderm of an embryo was disturbed. Congenital malformations of what systems or organs can arise in newborns in this situation?

– Skeleton
+ Nervous
– Derm
– Liver
– Pancreas
1054. At a stage of a late gastrula of human embryo, the third germ layer (mesoderm) is formed by movement of group of cells of entoderm, which are not united in uniform layer. What is the type of gastrulation?

- Delamination
- Invagination
+ Immigration
- Epiboly
- Mixed

1055. For use of animals as donors of organs for the man, transgenic pigs are created by means of a method of genetic engineering. Their cells are deprived of one of the main antigens, which cause reaction of rejection of tissues in the man. What is the type of transplantation?
+ Xenotransplantation
- Allotransplantation
- Autotransplantation
- Homotransplantation
- Isotransplantation

1056. The two-layer embryo of human embryo in the first phase of gastrulation is formed by dividing of cells of an ectoderm into layers. What is the type of gastrulation?

- Immigration
- Epiboly
- Invagination
+ Delamination
- Mixed

1057. Primordial germ cells arise when sexual glands did not begin development yet. Later these undifferentiated sex cells migrate in gonads and occupy them. Entoderm of what provisional (temporary) organ is the source of these cells?

- Allantois
+ Vitelline sac
- Placenta
- Chorion
- Amnion

1058. Because of action of teratogenic factor, development of blood system of an embryo was disturbed. In what germ layer this disturbance occurred?
+ Mesoderm
- Entoderm
– Ectoderm
– Entoderm and mesoderm
– Entoderm and ectoderm

1059. Ecological factors directly or indirectly influence activity of organisms. What abiotic factor on the planet is primary in ensuring trophic needs of all living beings?
+ Light
– Warm
– Ionizing radiation
– Water
– Air

1060. In experiments with development of a toad when the embryo was at a stage of two blastomeres, V. Roux killed one blastomere, and another left intact, but normal development of an embryo was broken. Why?
– Owing to totipotency of blastomeres
+ Owing to embryonic induction
– Owing to disturbance of gene regulation
– Owing to disturbance of metabolism intensity
– Owing to disturbance of differentiation of blastomeres

1061. The family came to hospital with symptoms of poisoning: abdominalgia, strong diarrhea and continuous vomiting, thirst, spasms of gastrocnemius muscles, and hemoglobinuria. Symptoms of poisoning were shown in 10 hours after the use of mushrooms that had a white cap in the form of a hand bell, with a diameter of 10–12 cm. A stem has white sagging ring under a cap. What mushrooms caused poisoning?
– Fly agaric
+ Amanita phalloides
– Boletus satanas
– Russule
– Inonotus obliquus

1062. Examination of a pregnant woman who has been taking alcohol revealed disturbed anlage of ectoderm during the fetal life. What derivatives of this germ layer\(^1\) have defects?
– Kidneys
– Bowels epithelium
+ Neural tube
– Liver

\(^1\) During exam in 2007, incorrect term "leaf" was used instead of "germ layer".
– Sexual glands

1063. *The maldevelopments happening at a zygote stage during prenatal ontogenesis are called:*
– blastopathies
– embryopathies
– fetopathies
+ gametopathies

1064. *It was established that intensity of basal metabolism of the healthy person has a daily rhythm of fluctuations. Specify its correct circadian rhythm.*
+ It gradually increases during daylight hours and decreases at night
– It gradually decreases during daylight hours and raises at night
– It is low during daylight hours and high at night
– It is high during daylight hours, decreases in the first half of night, and it is high in the second half of night
– It is low during daylight hours, raises in the first half of night, and it is low in the second half of night

1065. *Development of teeth of the person was studied during the embryonic and postembryonic period. It was established that they are derivatives of:*
– entoderm and mesoderm
– only mesoderm
+ ectoderm and mesoderm
– only ectoderm
– ectoderm and entoderm

1066. *The newborn child was revealed to have congenital malformations of digestive system that is associated with action of teratogenic factors at the beginning of pregnancy. What of germ layers teratogen influenced on?*
– All layers
– Ectoderm
– Mesoderm
– Endoderm and mesoderm
+ Endoderm

1067. *During examination of external genitals of the boy, full closing of urethra at above was revealed. The urethral canal remains open from below in the form of a small fissure. What type of developmental anomaly of external genitals is observed in this case?*
– Phimosis
+ Hypospadias
- Paraphimosis
- Epispadias
- Hermaphroditism

1068. The provisional diagnosis "multiple sclerosis" was made to the person as a result of perversion of immune reaction. You will carry this disease to:
+ Autoimmune
- Infectious
- Invasive
- Genomic
- Chromosomal

1069. During heart transplantation from one person to another, graft immunity is suppressed for prevention of rejection with the help:
- infrared radiation
- ultrasound
- antimutagens
+ immunodepressants
- mutagens

1070. In human populations, some people have three generations of teeth during their life instead of two generations. This is manifestation of the law:
+ biogenetic
- of independent inheritance
- Hardy-Weinberg's
- of homologous rows of hereditary variation
- of embryonic induction

1071. A physician collects the patient's history of the postembryonic period of ontogenesis from birth to puberty. In this case we are talking about:
- first period of adulthood
- senile age
- second period of adulthood
- advanced age
+ juvenile period

1072. Examination of uterine cavity revealed an embryonated ovum that wasn't attached to the endometrium. The embryo is in the following stage of development:
- Zygote
+ Blastocyst
- Morula
– Gastrula
– Neurula

1073. An embryo has signs of disturbed process of dorsal mesoderm segmentation and somite generation. What part of skin is most likely to have developmental abnormalities?
– Hair
– Sebaceous glands
+ Derma
– Epidermis
– Sudoriferous glands

1074. During embryogenesis, the epithelial band also known as vestibular plate gives rise to development of vestibule of mouth. What biological mechanism of the programmed death of cells provides growth of buccolabial sulcus from epithelial plate?
– Necrosis
– Meiosis
– Paranecrosis
– Amitosis
+ Apoptosis

1075. It is known that people who permanently live in highland have an increased concentration of erythrocytes per each blood volume unit. Owing to this fact blood can optimally fulfil the following function:
– amino acid transport
– haemostasis participation
+ gas transport
– maintenance of acid–base balance
– maintenance of ionic equilibrium

1076. During embryogenesis, trophoblast develops into a rudimentary organ that has endocrinal function. What rudiment is it?
– Yolk sac
– Allantois
– Amnion
+ Villous chorion
– Umbilical cord

1077. A 30-year-old patient has undergone keratoplasty in the transplantation centre, cornea has been taken from a donor, who died in a road accident. What kind of transplantation was performed?
– Explantation
+ Allotransplantation
Xenotransplantation
– Heterotransplantation
– Autotransplantation

1078. Research of an organism of the inhabitant of Pamir revealed a high level of standard metabolism, extension of a thorax, increase of oxygen capacity of blood due to increase in erythrocytes, and high hemoglobin content. To what adaptive ecological type it is necessary to refer this person?
– Desert
+ Mountain
– Arctic
– Tropical
– Subtropical

1079. The pediatrician noticed absence of the act of defecation at the newborn child within the first day. What malformation this fact indicates?
– Esophageal atresia
– Cleft lip
– Esophageal diverticulum
+ Anal atresia
– Jejunal diverticulum

1080. Reduction of compact and spongy substances of a bone tissue is observed at the person. Facial part of a skull changes, the gray hair appears, skin loses elasticity. At what stage of ontogenesis there are these changes?
+ Senile age
– Youthful age
– Teenage age
– Childhood
– Infancy

1081. In Western Europe, nearly half of all congenital malformations occur in the children of mothers conceived in the period when pesticides were used extensively in the region. Those congenital conditions result from the following influence:
– carcinogenic
– malignization
– mutagenic
+ teratogenic
– mechanical
PROTOZOANS

1082. In the preparation of red marrow punctate painted according to Romanowsky, intracellular small oval little bodies were revealed, 3 microns in size; a nucleus occupy 1/3 cells, inside there is a nucleolus. What the diagnosis can be?
- Toxoplasmosis
- Trypanosomosis
+ Visceral leishmaniasis
- Balantidiasis
- Malaria

1083. The woman gave birth to the dead child with numerous malformations (incompletely separated auricles and ventricles, microphthalmos, microcephaly). What protozoan disease could serve as the reason of intrauterine death of a fetus?
- Balantidiasis
+ Toxoplasmosis
- Malaria
- Leishmaniasis
- Trypanosomosis

1084. Inflammation of urogenital tracts was revealed in the patient. In a smear from a mucous membrane of a vagina, oval cells with large nucleus, an edge at the end of a body and an undulating membrane were revealed; flagella are located at the forward end. Name this disease:
- lambliosis
+ trichomoniasis
- balantidiasis
- leishmaniasis
- amebiosis

1085. Antelopes from coast of Lake Victoria were delivered in a zoo of one of the cities of Ukraine. Trypanosomes were revealed in blood smears of animals. What the most appropriate preventive measures need to be carried out?
+ Preventive measures are not necessary
- To take blood smears from persons who were in contact with animals
- To cure animals
- Quarantine measures
- To kill animals as carriers of trypanosomes

1086. The patient with provisional diagnosis "amebiosis" got to office of infectious diseases hospital. For laboratory diagnostics it is
necessary to use such material:
– blood plasma
– cells of marrow
– dental plaque
– duodenal contents
+ excrements

1087. What protozoan disease one can catch through blood transfusion?
– Trichomoniasis
+ Malaria
– Leishmaniasis
– Lambliosis
– Toxoplasmosis

1088. In liquid feces of the patient with mucus and blood, large oviform cells were revealed; the large nucleus in them is similar to haricot, and some blinking is noticeable around an envelope. What is the parasite?
– Toxoplasma
– Trichomonas hominis
+ Balantidium
– Lambia
– Entamoeba histolytica

1089. The patient with complaints to often repeating wearisome attacks, which are followed by fever, heat and sweat, consulted a doctor. For statement of the final diagnosis it is necessary to investigate:
– duodenal contents
– cerebrospinal fluid
– discharge of genitals
+ blood
– excrements

1090. Excrements of the patient who has chronic inflammation of a thick gut were investigated in laboratory. Roundish cysts up to 18 microns in size with 8 and 16 nuclei were revealed. What parasite they belong to?
– Entamoeba histolytica
– Balantidium
– Lamblia
– Toxoplasma
+ Entamoeba coli

1091. The child with gross abnormalities of skull structure, without
eyes and handles, with almost total absence of external genitals was born. Mother had 2 abortions earlier. What the disease can be present?

+ Toxoplasmosis
– Trypanosomosis
– Visceral leishmaniasis
– Amebiosis
– Malaria

1092. Formed excrements without impurity of mucus and blood from the patient with chronic amoebic dysentery were brought to laboratory. What forms of amoeba can be found in them?

– cysts with 8 and 16 nuclei
+ Cyst with 4 nuclei and minute form
– Oocyst with 8 sporozoites
– Tissue form
– Cyst with 4 nuclei, minute and tissue forms

1093. The patient consulted a doctor about weakness, increased fatigue, sleeplessness at night and drowsiness in the afternoon, headache, apathy, and lethargy. What method of diagnostics should be used?

+ Microscopy of cerebrospinal fluid
– Microscopy of stool
– Microscopy of breast bone punctate
– Inoculation of blood on a nutrient medium, microscopy
– Microscopy of drop and smear of blood

1094. Children sick with lambliosis were treated in the gastroenterologic office. Their infection occurred:

– transplacentally
– owing to stings of mosquitoes
+ when swallowing cysts with water and food
– through injury of skin (through scratch)
– when swallowing vegetative forms with water and food

1095. In the 3-year-old child, temperature sharply increased, diarrhea and rashes on skin appeared, spleen and liver enlarged. The cat, that have lacrimation and have lost sight, lives in a family. What disease is possible in the child?

– Balantidiasis
– Visceral leishmaniasis
– Trichomoniasis
– Amebiosis
+ Toxoplasmosis
1096. Liquid excrements from the patient with chronic gastrointestinal disease have brought to the laboratory. On the basis of what result of investigation the diagnosis of amebiosis is made?
+ Only after identification of tissue form of an amoeba
– After identification of tissue form of an amoeba and positive results of the immunological test
– There is enough to detect impurity of blood in stool
– After identification of any form of an amoeba (tissue or minute form, or cyst)
– After identification of minute form or cyst of an amoeba

1097. Provisional diagnosis "urogenital trichomoniasis" was made to the patient. For specification of the diagnosis, it is necessary:
– to reveal cysts in excrements
– to perform immunological test
– to reveal vegetative forms in excrements
+ to reveal vegetative forms in discharge of genitals
– to reveal vegetative forms in blood

1098. Blood was found in liquid excrements with mucus taken from the patient with ulcer damage of intestines. What protozoan disease is more probable to assume?
– Leishmaniasis
– Toxoplasmosis
+ Amebiosis
– Trichomoniasis
– Lambliosis

1099. Fever is observed in the patient one and a half weeks. Attacks of high temperature repeat after 2 days. When it is necessary to take blood for the analysis?
+ At any time
– In the period of fever and temperature increase
– Between attacks
– In the period of heat, at very high temperature
– At decrease in temperature

1100. The woman had 2 spontaneous abortions. The doctor revealed toxoplasmosis. What most probable way this woman caught the disease?
+ Alimentary
– Contact and household (through a bast and a towel) or sexual
– Transmissible
– Transplacental
– During blood transfusion

1101. The group of Ukrainian biologists caught gerbils in Central
Asia. Skin ulcers were revealed in some members of expedition. What species of a protozoan is the most probable causative agent of the disease?
- Balantidium coli
- Plasmodium falciparum
+ Leishmania major
- Trypanosoma cruzi
- Toxoplasma gondii

1102. Small curved mooned bodies were found in a punctate of lymph nodes of the patient. When staining according to Romanowsky, cytoplasm is blue and nucleus is red. Flagella are absent. What is it?
- Leishmania
+ Toxoplasma
- Lamblia
- Trypanosome
- Trichomonas

1103. Liquid excrements with blood impurity from the patient with chronic amoebic dysentery were brought to the laboratory. What forms of dysenteric amoeba can be found there?
- Cysts with 8 and 16 nuclei
+ Tissue form
- Cyst with 4 nuclei, minute and tissue forms
- Cyst with 4 nuclei and minute form
- Tissue form, minute form, and uninuclear cyst

1104. The patient has headache and muscle pain; his temperature suddenly increased, towards evening decreased with strong perspiration. Skin is icteric, liver and spleen are enlarged. What methods of diagnostics are necessary?
- Microscopy of punctates of internal organs
- Intracutaneous allergic test with toxoplasmic antigen
- Immunological reactions of patient's blood with antigens
- Protozoological investigation of feces of the patient
+ Microscopy of a drop and smears of blood

1105. Oval cysts wit the size of 50×30 micron, with well noticeable envelope and two nuclei of the different size, were revealed in native smear of feces of clinically healthy person. These cysts belong to:
- Giardia lamblia
- Entamoeba gingivalis
- Entamoeba histolytica
1106. The child of 14 years with normal development was hospitalized with the diagnosis of toxoplasmosis. Infection could happen:
+ through hands contaminated by oocysts
– by swallowing cysts with water
– through injuries of skin (through scratch)
– transplacentally
– through mucous membranes of a nose

1107. The female student complains of stomach pain, appetite loss, liquid stool with mucus impurity. Oval masses of 12 microns with a double envelope, and 2–4 nuclei inside were found in excrements. What is it?
– Balantidium
– Cyst of amoeba
– Tissue form of amoeba
+ Lamblia cyst
– Minute form of amoeba

1108. A patient has typical symptoms of malaria: wasting fever, exhaustion. These attacks repeat after certain intervals of time. What stage of Plasmodium is in the patient's blood?
– Ookinetes
– Oocysts
– Sporozoites
– Sporocysts
+ Merozoites

1109. Foreign student who arrived from India addressed to polyclinic. Vegetative forms of dysenteric amoeba were found in excrements. Name the most probable way of penetration of the causative agent to the patient's organism:
– parenteral
+ alimentary
– transmissible
– sexual
– airborne

1110. The patient's excrements with suspicion on amebiosis were

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1 This answer is not good (it's difficult to find merozoites on the slide, because they are present in the blood before the attack during very short period). Correct answer must be "trophozoites".
brought to laboratory in an hour after defecation. Amoebas were not found. Whether it excludes the diagnosis of amebiosis?
+ No, because vegetative forms quickly destroy in environment
– No, because it is necessary to make additional blood test and immunological research
– Yes, because all forms of amoeba are absent (minute form, tissue form, and cyst)
– Yes, because minute forms and cysts are absent
– Yes, because tissue forms are absent

1111. The patient has inflammation of duodenum and gall bladder. Oval cysts of 12 microns in size and with four nuclei and well-outlined thick envelope were revealed in feces. What disease can be in the patient?
– Toxoplasmosis
– Trichomoniasis
+ Lambliosis
– Balantidiasis
– Amebiosis

1112. A patient with a provisional diagnosis of liver abscess was delivered to a surgical department of a hospital. The patient was staying in Ukraine. He had stomach disorder, indigestion, and frequent bloody diarrhea. The patient hadn't consulted a doctor before. Which protozoan illness could the patient be ill with?
– Malaria
– Trypanosomiasis
– Leishmaniasis
+ Amebiasis
– Toxoplasmosis

1113. Slime, blood and protozoa 30–200 microns long have been revealed in man’s feces. The body is covered with cilia and has correct oval shape with a little bit narrowed anterior and wide round shaped posterior end. At the anterior end, a mouth is visible. In cytoplasm, there are two nuclei and two small vacuoles. What are the described features typical for?
+ Balantidium
– Lamblia
– Intestinal amoeba
– Trichomonas
– Dysenteric amoeba

1 Another variant: The patient had been staying for a long time on business in one of African countries.
1114. The dead child with numerous malformations was born at the woman. What material needs to be investigated for confirmation of the diagnosis of toxoplasmosis?
+ Placenta and histologic cuts of organs of fetus
– Mother's stool
– Immunological test of mother's blood with antigen
– Contents of intestines of fetus
– Punctate of an internal of mother

1115. Protozoans, which move by means of protrusions of ectoplasm and had phagocytosed erythrocytes, were found in fresh bloody and mucous excrements of the patient with dysfunction of intestines. What species of protozoans was found most possibly?
– Trichomonas hominis
– Toxoplasma gondii
+ Entamoeba histolytica
– Balantidium coli
– Lamblia intestinalis

1116. Pear-shaped protozoans of 10–20 microns in size were found in liquid excrements. They have 5 flagella and quickly move. The undulating membrane and large nucleus are noticeable. The body has an axostyle at the end of a cell. What protozoan was found?
– Lamblia
– Trichomonas
– Entamoeba coli
+ Trichomonas hominis
– Balantidium

1117. The patient has large ulcers (10–15 cm) on the lower extremities, which are painful at palpation, with large sanioserous exudate. A month ago, he was in rural areas of the Asian country where sand flies and rodents live. Name the disease and its causative agent:
+ zoonotic cutaneous leishmaniasis, Leishmania major
– kala azar, Leishmania donovani
– trypanosomosis, Trypanosoma brucei gambiense
– allergic reaction to stings of sand flies
– anthroponotic cutaneous leishmaniasis, Leishmania tropica

1118. Existence of Entamoeba histolytica forma minuta was established among intestinal microflora by careful laboratory investigations of intestines content of healthy man. Under what conditions amebiosis can develop in this person?
– After the use of fermented milk products
+ Owing to malnutrition
– Owing to long stay in the sun
– As a result of partial loss of blood
– After contact with person that is ill with flu

1119. Fever, enlargement of spleen and liver are observed in the patient; reduction of number of erythrocytes in blood is established. By microscopic investigation of smears of the punctate of breastbone, large number of small monocellular nonflagellated parasites is revealed in cells of bone marrow. One nucleus is located in their cytoplasm. The rhabdoid blepharoplast is noticeable. During cultivation of a parasite on artificial nutrient medium, it turns into a flagellate form. What disease can be assumed?
– Trichomoniasis
– Amebiasis
+ Visceral leishmaniasis
– Trypanosomosis
– Chagas’ disease

1120. Armadillos from South America were delivered into a zoo of one of the cities of Ukraine. In their blood Trypanosoma cruzi were revealed. Whether these animals represent epidemiological danger?
+ Epidemiological danger is absent
– They are dangerous only to man
– They are dangerous to pets and man
– They are dangerous only to dogs
– They are dangerous to other armadillos and dogs

1121. A duodenal content smear of a patient with indigestion contains protozoa 10–18 mcm large. They have four pairs of flagella, two symmetrically located nuclei in the broadened part of body. What kind of the lowest organisms is it?
– Dysentery ameba
– Intestinal ameba
– Trichomonas
+ Lamblia
– Balantidium

1122. The group of the Ukrainian tourists brought gerbils from Samarkand. At examination of these small animals at customs office, ulcers were found on their skin. What species of a protozoan is the most probable causative agent of disease of animals?
– Balantidium coli
+ Leishmania major
– Trypanosoma cruzi
– Plasmodium falciparum
– Toxoplasma gondii

1123. The tsetse fly (Glossina palpalis), which just left a pupa, has sucked blood of the person sick with African sleeping sickness. In a week the same fly bit the healthy person, but he did not get sick with trypanosomosis because:
+ development of the invasive stage of trypanosome in an organism of a fly needs 20 days
– this person did proper preventive vaccination in due time
– vector of the causative agent of trypanosomosis is not tsetse fly, but sand fly is
– the person had congenital immunity
– trypanosomosis is natural and focal disease, and repeated sting happened, obviously, outside the natural focus

1124. During investigation of a blood smear of the patient with suspicion on malaria taken in the remission period, plasmodia were not revealed. In what period of the disease it was necessary to take blood, and what preparations should be prepared for confirmation of the diagnosis?
– Microscopic investigation of the smear of peripheral blood taken in fever time
– Microscopic investigation of blood drop taken during remission
– Infection of laboratory animals with patient’s blood taken in any period
+ Microscopic investigation of blood drop and smear of peripheral blood, taken in the attack period
– Serological investigations during any period

1125. What clinical picture can be observed in the patient with tertian malaria (infecting agent is Plasmodium vivax), if we will to measure temperature every day and mark days when it raises?

1126. A patient consulted a doctor because of complaints of general weakness, pain in bowels, indigestion, frequent cases of bloody diarrhea (3–5 times a day). Laboratory analysis showed

1 Old Latin name is Leishmania tropica major.
that the patient's feces contained vegetative forms of protozoans with an unstable body shape. Their cytoplasm contained food vacuoles with erythrocytes. What representative of Protozoa was found in the patient's feces?¹

– Giardia intestinalis
– Balantidium coli
– Entamoeba coli
– Trichomonas vaginalis
+ Entamoeba histolytica

1127. By using in food of insufficiently boiled meat of mammals, it is possible to catch:

– trypanosomosis
– lambliosis
+ toxoplasmosis
– balantidiasis
– leishmaniasis

1128. Having returned from Turkmenia, a patient with ulcers on his face came to a doctor. The doctor diagnosed cutaneous leishmaniasis. How did the disease agent get into the patient's organism?

+ By the inoculable way
– By the respiratory way
– By a direct contact
– By a sexual contact
– By food

1129. During medical examination, the cysts containing 4 nuclei of the identical size are revealed in excrements of the worker of the dining hall. For what protozoan such cysts are characteristic?

– Entamoeba coli
– Balantidium coli
+ Entamoeba histolytica
– Trichomonas vaginalis
– Toxoplasma gondii

1130. Some antelopes were brought to the Kyiv zoo from Africa. Trypanosoma gambiense were found in their blood. Are these antelopes epidemically dangerous?

– Dangerous to domestic animals and human
– Dangerous only to human
+ Are not epidemically dangerous at all

¹ Similar question can have answers with common English names of causative agents.
Dangerous to other antelopes
Dangerous only to predators

1131. Chronic (asymptomatic) toxoplasmosis was established in the person. Hospitalization was not made, and confused relatives isolated the patient from any contacts. The doctor pointed to inexpediency of isolation, because:
- man is infected with toxoplasmosis only antenatally
+ man cannot be a source of infection for other person
- the causative agent of toxoplasmosis is transferred by the airborne way
- all family is already infected with Toxoplasma and it is necessary to treat all persons
- it will provoke an exacerbation of disease

1132. Two cases of malaria were revealed in the settlement located near a reservoir. The diagnosis was confirmed by blood test, which showed existence of the causative agent of tertian malaria. It is:
+ Plasmodium vivax
- Plasmodium falciparum
- Plasmodium malariae
- Plasmodium ovale
- Plasmodium berghei

1133. As a result of examination, the diagnosis of visceral leishmaniasis was made to the patient. The causative agent of this disease is localized in:
- muscles
- erythrocytes
- cells of a brain
- lungs
+ cells of liver and spleen

1134. The patient with heavy disorder of intestines consulted a doctor; liquid excrements with mucus was found to have blood. Bacterial dysentery was suspected, but the diagnosis was not confirmed in the laboratory. What protozoan disease is most probable in this patient?
- Toxoplasmosis
- Lambiosis
- Trichomoniasis
+ Amebiasis
- Leishmaniasis

1135. The worker of a farmyard caught balantidiasis. Choose stage that is invasive for man:
Blood of the donor who arrived from Angola was transfused to the female patient during delivery. In two weeks the recipient had a fever. It was assumed that the patient has malaria. By means of what laboratory investigation it is possible to specify this diagnosis?

- Studying of leukocytic blood count
- Investigation of blood drop
- Determination of the causative agent by method of inoculation of blood on a nutrient medium
- Carrying out serological tests
- Investigation of a punctate of lymph nodes

What stages of life cycle of Toxoplasma occur in a human body?

- Endogonic development
- Schizogony
- Sporogony
- Gametogenesis
- Fertilization

The inflammation and enlargement of lymph nodes, ulcers of skin and surrounding tissues were found in the patient. The microscopic investigation of discharge from ulcers revealed intra-cellular forms of flagellates. What disease the patient can have?

- Coccidiosis
- Balantidiasis
- Visceral leishmaniasis
- Toxoplasmosis
- Dermatotropic leishmaniasis

Blood for investigation was taken from the patient with malaria in the period of fever and temperature increase. What stages of erythrocytic schizogony will prevail?

- Multinuclear schizonts
- Ameboid trophozoites
- Trophozoites in a ring stage
- Sexual forms
- Disintegration of schizonts and release of merozoites

A patient complained of general weakness, bad appetite,
and nausea. After the examination in the duodenal aspirates pear-shaped protozoans with 4 pairs of flagella and two nuclei were found. Which disease could the patient be ill with?

- Trichomoniasis
- Leishmaniasis
+ Giardiasis
- Toxoplasmosis
- Malaria

1141. A woman delivered a dead child with multiple developmental defects. What protozoan disease might have caused the intrauterine death?¹

- Leishmaniasis
+ Toxoplasmosis
- Amebiasis
- Lambliais²
- Malaria

1142. The patient with complaints to frequent liquid excrements, pain in stomach, and vomiting consulted the infectious diseases hospital. During protozoan research of excrements, small vegetative forms without erythrocytes were revealed. Excrements were placed in the refrigerator, and cysts with four nuclei were found in a day. The cause of such state can be:

- Trichomonas
+ Entamoeba histolytica
- Balantidium
- Entamoeba coli
- Lamblia

1143. Malaria is a serious protozoan disease, which is characterized by wearisome attacks of fever. These attacks occur because:

- spleen and bone marrow are affected
- organism's sensitization occurs
+ hemolysis of erythrocytes occurs owing to schizogony
- antibodies are formed against erythrocytes, and they cause hemolysis
- cells of a liver are broken off owing to schizogony

1144. Oval cysts with 2–4 nuclei and of 10–14 microns in size, and with an envelope that is separated in the form of a half moon, were found in excrements of the patient with symptoms of in-

¹ In the book “Collection of tasks…”, this question is written as follows: A woman gave birth to a dead baby with a lot of failures of development. What protozoan disease could cause the fetus’s death?

² Another possible answer – “Giardiasis”.
flammations of duodenum, gall bladder, and bile ducts. What protozoa parasitize in the patient?
+ Lamblia
– Balantidium
– Entamoeba histolytica
– Trypanosome
– Leishmania

1145. A businessman came to India from South America. On examination, the physician found that the patient was suffering from Chagas disease. What was the way of invasion?
– Through dirty hands
– With contaminated fruits and vegetables
– As a result of mosquito’s bites
– After contact with a sick dog
+ As a result of bug’s bites

1146. A patient with bile ducts inflammation was admitted to a gastrointestinal department. In the bile, active pear-shaped protozoans with 2 nuclei and 4 pairs of flagella were found. What protozoan disease did the patient have?
+ Giardiasis
– Toxoplasmosis
– Balantidiasis
– Trichomoniasis
– Amebiasis

1147. 42-year-old man with complaints to weakness of muscles, fatigue, drowsiness, and decrease in mental work consulted a doctor. It was found that 5 years ago he was in Ethiopia. What actions of the doctor are most expedient for making of the diagnosis?
– To take excrements for research
– To analyze the smear taken from genitals
– To carry out microscopy of blood smears
+ To investigate punctates of lymph nodes and cerebrospinal fluid
– To investigate biopsy material of muscles

1148. At what human protozoan disease brain and eyes are invaded?
– Leishmaniasis
– Lambliosis
– Trichomoniasis
+ Toxoplasmosis
– Amebiasis
1149. By means of blood-sucking vectors human can be infected by:
- Lamblia
+ Leishmania
- trichomonads
- amoebas
- Toxoplasma

1150. Due to the birth of the child with numerous malformations (microcephaly, idiocy etc.), spouses consulted the genetic consultation. The woman during pregnancy was ill, but she did not use mutagens and teratogens. Karyotype of parents and child is normal. A doctor has found that the family keeps a cat in the apartment. What can be a probable cause of malformation of the newborn child?
- Woman had leishmaniasis during pregnancy
- Woman had dysentery during pregnancy
- Woman had balantidiasis during pregnancy
- Woman was ill trichomoniasis during pregnancy
+ Woman had toxoplasmosis during pregnancy

1151. A patient with attacks of wasting fever and the body temperature rising up to 40°C was admitted to an infectious department of a hospital. The attacks repeated rhythmically every 48 hours. It was known from anamnesis that the patient had recently returned from South Africa where he had been staying for 3 years. What was the causative organism of the disease?
- Agent of Gambian trypanosomiasis
- Agent of giardiasis
- Agent of quartan malaria
+ Agent of tertian malaria

1152. The diagnosis of amebiosis is made in case of identification in excrement of:
- cysts with four nuclei
- uninuclear cysts
- minuta forms
- cysts with eight nuclei
+ large tissue forms

1153. The patient has blood feces, 3–10 and more times per day.

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1 In the book “Collection of tasks…”, incorrect word combination "four-days’ malaria" is used.
2 In the book “Collection of tasks…”, incorrect word combination "three-days’ malaria" is used.
What protozoan disease can be present in the patient?
- Leishmaniasis
- Trypanosomosis
+ Amebiasis
- Malaria
- Trichomoniasis

1154. Visceral leishmaniasis is revealed in the child from Central Asia. Name internal organ in which parasites can be located:
- spinal cord
- brain
- heart
- lungs
+ red bone marrow

1155. What clinical picture can be observed in the patient with quartan malaria (Plasmodium malariae is an infecting agent), if we will to measure temperature every day and mark days when it raises?
- 40–37–40–37–37–…

1156. A doctor is staying in one of Asian countries taking care of 10-year-old sick children. The symptoms of the disease are: exhaustion, fever, anemia, hepatomegaly, and splenomegaly. As there are a lot of mosquitoes in this country, the children are likely to be sick with:
+ visceral leishmaniasis
- balantidiasis
- toxoplasmosis
- giardiasis
- amebiasis

1157. Examination of the duodenal contents revealed some pear-shaped protozoa with two nuclei and four pairs of flagella. The organisms had also two axostyles between the nuclei and a ventral adhesive disc. What representative of protozoa was found in the patient?
- Toxoplasma
+ Lamblia

1 supporting filaments.
– Intestinal trichomonad
– Trypanosome
– Leishmania

1158. 25-year-old woman liked to eat crude livestock products (milk, eggs, meat). When she became pregnant, doctors during examination found high titers of antibodies in blood that was evidence of an invasion. There was a question of induced abortion. What disease was revealed in this woman?
– Trypanosomosis
+ Toxoplasmosis
– Trichomoniasis
– Lambliosis
– Malaria

1159. Professional diseases most often happen in people of certain profession. What of protozoan diseases can belong to professional diseases?
+ Balantidiasis
– Amebiosis
– Lambliosis
– Malaria
– Leishmaniasis

1160. The patient with complaints to increased temperature and diarrhea with mucus and blood consulted a doctor. During examination, colourless oocysts of 23–33 microns in size, of extended oviform shape, with extended forward end on which there is a shallow constriction, were revealed in excrements of the patient. An oocyst has double envelope and granular layer inside. For what species of protozoans the described features are characteristic?
– Balantidium coli
– Lamblia intestinalis
+ Isospora belli
– Toxoplasma gondii
– Entamoeba histolytica

1161. For what protozoans the transmissible way of distribution of an infecting agent is possible?
– Lamblia, Toxoplasma
– Malarial plasmodia, Toxoplasma
– Trichomonads, trypanosomes
+ Malarial plasmodia, Leishmania
– Lamblia, Balantidium
1162. Parents with an ill child consulted the infection disease doctor. They had been working in one of the Asian countries for a long time. The child has sallow skin, loss of appetite, laxity, enlarged liver, spleen, peripheral lymph nodes. What protozoan illness can be suspected?
+ Visceral leishmaniasis
– Toxoplasmosis
– Amebiasis
– Lambliasis
– Balantidiasis

1163. The man of middle age lost sight on the right eye and consulted a doctor on deterioration of sight on the left eye. What protozoan disease the doctor can suspect?
– Leishmaniasis
+ Toxoplasmosis
– Trypanosomosis
– Lambliosis
– Trichomoniasis

1164. During microscopy of smear of excrements, cysts with four nuclei were revealed. What protozoan parasite they belong to?
– Leishmania
– Balantidium
+ Entamoeba histolytica
– Trichomonas
– Toxoplasma

1165. During microscopic research of native preparation of excrement of the patient which have bloody and mucous character, spherical microorganisms in which cytoplasm contains erythrocytes and small cysts with 4 nuclei were found. About what causative agent one can think?
+ Entamoeba histolytica
– Entamoeba coli
– Lamblia intestinalis
– Trichomonas hominis
– Leishmania donovani

1166. Woman who had some spontaneous abortions is investigated in the clinic for women. Based on the epidemiological anamnesis, chronic toxoplasmosis was suspected. What laboratory investigation is more effective for confirmation of the diagnosis?
– Microscopy of blood smear
– Microscopy of vaginal smear
+ Serological reactions
  – Skin test
  – Microscopy of smear of excrements

1167. Two weeks after blood transfusion, a recipient has developed fever. What protozoal disease can be suspected?
  – Trypanosomiasis
  + Malaria
  – Leishmaniasis
  – Toxoplasmosis
  – Amebiasis

1168. The examination of a patient showed that he had toxoplasmosis. Which material was used for diagnosing the disease?
  – Feces
  + Blood
  – Urine
  – Duodenal contents
  – Sputum

1169. What protozoan disease belongs to natural and focal diseases?
  + Leishmaniasis
  – Lambliosis
  – Trichomoniasis
  – Amebiosis
  – Balantidiasis

1170. The patient with complaints to headache was taken to hospital. He is ill 1.5 weeks. The disease began with sharp temperature increase of a body to 39.9°C. In 3 hours, it decreased, and the perspiration began. Attacks repeat rhythmically each 48 hours. The patient was at excursion in one of the African countries. Doctors suspected malaria. What method of laboratory investigation needs to be used?
  – Immunological test
  + Blood test
  – Analysis of excrements
  – Analysis of discharge from vagina
  – Analysis of urine

1171. A female patient has symptoms of inflammation of urogenital tracts. Examination of a vaginal smear revealed big unicellular pear-shaped organisms with a sharp spike at the posterior end of

1 Another possible answer: phlegm.
the body, big nucleus and undulating membrane. What protozoa were found in the smear?
- Trypanosoma gambiense
- Trichomonas hominis
+ Trichomonas vaginalis
- Trichomonas buccalis
- Lamblia intestinalis

1172. Patients with similar complaints applied to the doctor: weakness, pain in the intestines, and disorder of GIT. Examination of the faeces revealed that one patient with four nucleus cysts should be hospitalized immediately. For what protozoa are such cysts typical?
- Balantidium
+ Dysenteric amoeba
- Lamblia
- Intestinal amoeba
- Trichomonas

1173. For the purpose of parasitological confirmation of the diagnosis and for isolation of the causative agent of infantile leishmaniasis, sternal puncture of bone marrow of patients was carried out. What causative agent can be revealed in marrow preparations (choose the Latin name)?
- Leishmania tropica minor
- Leishmania donovani
+ Leishmania infantum
- Lamblia intestinalis
- Trypanosoma cruzi

1174. A woman who had two miscarriages came to a maternity welfare centre¹. Which protozoan illness could provoke the miscarriages?
- Balantidiasis
- Trichomoniasis
+ Toxoplasmosis
- Giardiasis
- Amebiasis

1175. The patient having the painless ulcers covered with brown-red crusts on the open part of a body consulted a doctor. After removal of these crusts, the surface covered with granulations

¹ In the book “Collection of tasks…”, incorrect word combination "women's consulting centre" is used.
was opened. During microscopic investigation of preparations stained according to Romanowsky-Giemsa, microorganisms of spherical and oval shape were revealed. Duration of a disease was more than one year. What microorganism can cause this disease?

– Lamblia intestinalis
– Leishmania tropica var. major
– Trichomonas hominis
+ Leishmania tropica var. minor
– Leishmania donovani

1176. During microscopy of smear of human feces, eight-nuclear cysts were revealed. What protozoan they belong to?

– Balantidium
+ Intestinal amoeba
– Lamblia
– Intestinal trichomonad
– Toxoplasma

1177. Nausea, vomiting, frequent (20 times per day) liquid stool with impurity of mucus and blood are observed in the patient. During microscopic investigation of excrements, the vegetative forms, having 2 nuclei and cilia, and uninuclear cysts were found. What most probable diagnosis can be assumed for this patient?

– Toxoplasmosis
– Amebiosis
– Lambliosis
+ Balantidiasis
– Trichomoniasis

1178. During examination of the pregnant woman, Trichomonas vaginalis was revealed. In what biological form this parasite is usually present in a human body?

– Cyst with 4 nuclei
+ Trophozoite
– Cyst with 8 nuclei
– Uninuclear cyst
– Merozoite

1179. Examination of a man revealed a protozoan disease that affected brain and caused vision loss. Blood analysis revealed unicellular half-moon-shaped organisms with pointed end. The causative agent of this disease is:

– Leishmania
+ Toxoplasma
– Lamblia
– Amoeba
– Trichomonad

1180. **Patients with complaints to general weakness, pain in intestines, and disorder of digestion got to hospital. During investigation of excrements, cysts with four nuclei were found. For what protozoan such cysts are characteristic?**  
– Balantidium  
– Intestinal amoeba  
– Oral amoeba  
+ Dysenteric amoeba  
– Lamblia

1181. **Parasitic protozoans were found in the cavity of carious teeth. It was established that they belong to the Sarcodina class. It is considered that they can cause some complications at stomatologic diseases. These monocellular organisms are:**  
– Entamoeba coli  
– Amoeba proteus  
– Entamoeba histolytica  
– Lamblia intestinalis  
+ Entamoeba gingivalis

1182. **When doctors of sanitary and epidemiologic station inspect workers of the sphere of public catering, they often reveal asymptomatic carrier condition when clinically healthy person is a source of cysts that infect other people. During parasitizing of what causative agent in human this is possible?**  
– Malarial plasmodium  
+ Dysenteric amoeba  
– Trypanosomes  
– Dermatotropic *Leishmania*  
– Viscerotropic *Leishmania*

1183. **In the woman's anamnesis, there were two miscarriages. The third pregnancy ended in a birth of a baby with a lot of malformations (upper extremities were absent and lower extremities were underdeveloped). The presence of what protozoans in the woman's body could cause such abnormalities?**  
– Entamoeba histolytica  
– Giardia intestinalis

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1 During exams in 2007, 2008 and 2009 (among students studying stomatology), incorrect question was used: “What causative agent cannot parasitize in such a way?”
1184. The patient has fever with increase of temperature up to 39–40°C twice a day, increase of spleen and liver. Blood test showed anemia. What disease can be suspected at the patient?
+ Leishmaniasis
– Giardiasis
– Trichomoniasis
– Balantidiasis
– Trypanosomosis

1185. A journalist's body temperature has sharply increased in the morning three weeks after his mission in India; it was accompanied with shivering and bad headache. A few hours later the temperature decreased. The attacks began to repeat in a day. He was diagnosed with tropical malaria. What stage of development of Plasmodium is infective for anopheles female?
– Sporozoites
– Schizonts
+ Gametocytes
– Merozoites
– Microgamete

1186. During investigation of blood smear taken from the sick person and stained by Romanowsky's method, a doctor revealed protozoa and diagnosed Chagas' disease. What protozoan caused this disease?
– Leishmania donovani
– Toxoplasma gondii
– Leishmania tropica
– Trypanosoma brucei
+ Trypanosoma cruzi

1187. The child had nausea, vomiting and pains in right hypochondrium. During investigation of stool, oval cysts (8–14 microns) with 2–4 nuclei were found. What disease can be suspected in the patient?
+ Giardiasis
– Amebiasis
– Trichomoniasis
– Trypanosomosis
– Leishmaniasis

1188. Cells of malarial plasmodium, which occupy almost all the
erythrocyte, were found in blood smear of the patient with malaria. Nuclei are large, the pigment is observed. What stage of erythrocytic schizogony was found in the preparation?

- Sporozoites
- Trophozoites
- Ring trophozoites
+ Merozoites
- Oocysts

1189. The woman with complaints, which are characteristic for inflammatory process in vagina, consulted the gynecologist. What species of protozoans can cause these complaints?

- Plasmodium malariae
- Toxoplasma gondii
+ Trichomonas vaginalis
- Entamoeba coli
- Lamblia intestinalis

1190. During investigation of the smear of cerebrospinal fluid painted on Romanowsky, mooned protozoans with the narrowed end, blue cytoplasm and red nucleus were revealed. About what disease one can talk?

- Leishmaniasis
- Malaria
+ Toxoplasmosis
- Trypanosomosis
- Amebiasis

1191. Man who lived in the endemic focus, had tertian malaria. In one and a half years after moving to other district, he got sick with malaria again. What is the most probable form of this disease?

- Superinfection
- Reinfection
- Long-lasting infection
+ Recurrence
- Secondary infection

1192. A patient working at a pig farm complains of paroxysmal abdominal pain, liquid feces with admixtures of mucus and blood, headache, weakness, and fever. Examination of large intestine revealed ulcers from 1 mm up to several cm large, feces contained oval unicellular organisms with cilia. What disease should be suspected?

- Amebiasis
1193. Give an example of a natural and focal disease that is caused by flagellates.
– Trichomoniasis
+ Trypanosomosis
– Toxoplasmosis
– Lambliosis
– Balantidiasis

1194. There are free-living and parasitic forms among unicellular organisms. Diseases, which are caused by parasitic unicellular organisms, have the general name:
+ protozoan diseases
– trematodiases
– filariases
– nematodoses
– cestodiases

1195. The patient with complaints to abdominalgia, frequent liquid excrements with impurity of mucus and blood consulted a doctor. During investigation of excrements, vegetative forms of protozoans of 30–40 microns in size, which contain a large number of the phagocytized erythrocytes, were revealed in smears. What protozoan disease is present in this patient?
– Leishmaniasis
– Trichomoniasis
– Lambliosis\(^1\)
– Toxoplasmosis
+ Amebiosis

1196. Some of the protozoans form cysts in difficult environments. Specify such animal:
– malarial plasmodium
– trypanosome
– intestinal trichomonad
+ dysenteric amoeba
– vaginal trichomonad

1197. Oval monocellular animals covered with short cilia were revealed in excrements of the patient with disorder of digestive

\(^1\) Another possible answer is "Giardiasis".
tract. Their cytoplasm contains two pulsing vacuoles, micro- and a macronucleus. To what disease these signs indicate?
- Amebiasis
+ Balantidiasis
- Toxoplasmosis
- Viscerotropic leishmaniasis
- Lambliosis

1198. The pregnant woman has a suspicion on toxoplasmosis. What effective method of diagnosis of toxoplasmosis will confirm the diagnosis?
- Polymerase chain reaction
- Clinical blood test
+ Blood microscopy
- DNA analysis
- Kassoni's reaction

1199. African sleeping sickness is found in the patient. What insect, when biting the patient, could transmit to him the causative agent of this disease?
- Wohlfahrtia
- Typhoid fly
- Stable fly
+ Tsetse fly
- Bed bug

1200. Cysts of protozoans were revealed in smears of feces of the patient. What types of listed below they can belong to?
+ Lamblia intestinalis
- Trichomonas tenax
- Trichomonas hominis
- Chilomastix mesnili
- Trichomonas vaginalis

1201. After sting of sand fly, ulcer was formed on the face of woman living in Turkmenistan. After microscopy of discharge from ulcer, the diagnosis was made: dermatotropic leishmaniasis. What stage of Leishmania was found in cells of skin of the patient?
- Flagellate
- Ciliary
+ Nonflagellated
- With pseudopodia
- Cyst

1202. By studying smear from urinogenital tracts of the man under
the microscope, the laboratory assistant has found protozoans having the following traits: pear-shaped body of 20 microns in size, 4 flagella, undulating membrane, a nucleus, vacuoles, and an axostyle. Define this parasite.

+ Vaginal trichomonad
– Lamblia
– Intestinal trichomonad
– Trypanosome
– Toxoplasma

1203. During three pregnancies, abortions are observed in the woman. By examination, it was noted that the woman spent holidays in the south of Ukraine for a long time; she lived in a family where there was a cat. What parasite this woman could catch so that it can be the cause of abortions?

– Lamblia
– Amoeba
– Plasmodium
+ Toxoplasma
– Balantidium

1204. During sanitary inspection of a reservoir in which children from a recreation camp bathe, oval cysts of 50–60 microns in size in the diameter, in which 2 nuclei (large and small) are visible in the cytoplasm, were revealed. What cysts of protozoans were found in water?

– Lamblia
– Balantidium
– Toxoplasma
– Amoeba
– Euglena

1205. Protozoans of pear-shaped form that have body length of 6–13 microns were found during microscopic investigation of discharge from gums of the patient having periodontosis. There is one nucleus in the cell, 4 flagella are located on the forward end, undulating membrane is present. What protozoa were found in the patient?

– Leishmania
+ Trichomonads
– Amoebas
– Balantidium
– Lamblia

1206. The patient in a serious condition, with symptoms of dehy-
dration, intestines pains, anemia, and blood diarrhea got to infectious diseases hospital. The doctor suspected existence of amoebic dysentery, but the diagnosis during laboratory investigation was not confirmed. What protozoan disease, except dysentery, can cause similar symptoms in human?

+ Balantidiasis
– Lambliosis
– Trichomoniasis
– Toxoplasmosis
– Trypanosomosis

1207. The female patient complains of bad dream, the reduced working capacity, an itch, feeling of heartburn around genitals, purulent foamy discharge. During differential diagnostics, unicellular organisms of a pear-shaped form with 4 flagella and a thorn on the opposite end of a body were revealed. What is a species of organisms?

– *Lamblia intestinalis*
– *Trichomonas hominis*
+ *Trichomonas vaginalis*
– *Toxoplasma gondii*
– *Entamoeba gingivalis*

1208. Recently the disease of toxoplasmosis quite often meets at newborns. What is the reason of it?

– Non-compliance of rules of personal hygiene
– Hereditary factors
– Environment factors
– Birth injuries
+ Intrauterine infection from sick mother

1209. During microscopic investigation of fresh excrements of the patient with complaints to frequent liquid excrements with blood ("crimson jelly"), large cells with one nucleus and the phagocytized erythrocytes were revealed. What protozoan is such morphological structure typical for?

– *Giardia lamblia*
– *Campylobacter jejuni*
– *Toxoplasma gondii*
+ *Entamoeba histolytica*
– *Balantidium coli*

1210. The woman with complaints to drowsiness, fast fatigue, exhaustion, and fever consulted a doctor. It is known that she returned from travel across Africa recently. What main method of
laboratory investigation is necessary for making the diagnosis?
+ Microscopic research of blood smears and punctate of lymph nodes
– Biochemical research
– Immunological reactions
– Clinical blood test
– Biological method

1211. The woman of 25 years with complaints to liquid excrements, abdominal distension, and loss of appetite consulted a doctor. During microscopy of smears of excrements, Lamblia was found. What main mechanism of transmission of the causative agent?
– Parenteral
+ Faecal and oral
– Sexual
– Transmissible
– Contact

1212. During examination of workers of cafe, vegetative forms of Balantidium coli were revealed in excrements of one of workers. What measures need to be taken in order to avoid distribution of an invasion?
+ To isolate the carrier of an invasion and to treat him
– To do protective immunizations to all workers of cafe
– To discharge of operation of the carrier of an invasion
– To carry out disinfection of the working room
– No measures are necessary

1213. Unicellular organisms of pear-shaped form with 4 flagella were found in deposit on gums of the patient with periodontosis. What of the listed protozoans was in deposit?
– Balantidium coli
– Trichomonas hominis
– Entamoeba gingivalis
+ Trichomonas tenax
– Acanthamoeba

1214. The woman gave birth to the child with multiple malformations (hydrocephaly, underdeveloped extremities). There is a suspicion on toxoplasmosis. What method needs to be used for clarifying of the diagnosis?
– Clinical blood test
+ Serological tests
– Investigation of smears of excrements
– Biochemical blood test
Investigation of punctate of breastbone

1215. During investigation of smears from an oral cavity of the patient, the vegetative forms of Trichomonas tenax were found. To what type of symbiosis it is possible to belong them?

- Ectoparasitism
- Endoparasitism
- Commensalism
- Mutualism
- Common inhabitation

1216. A lymph node punctate of a patient with suspected protozoal disease was examined. Examination of the stained specimen (Romanowsky's stain) revealed some crescent bodies with pointed end, blue cytoplasm and red nucleus. What protozoans were revealed in the smears?

- Visceral leishmania
+ Toxoplasmas
- Malarial plasmodia
- Trypanosomes
- Dermotropic leishmania

1217. Cysts were found in the feces of a restaurant worker. They had 4 nuclei of the same size. Which of the protozoans did the cysts belong to?

- Entamoeba coli
- Balantidium coli
+ Entamoeba histolytica
- Trichomonas vaginalis
- Toxoplasma gondii

1218. A gynaecologist was examining a patient and revealed symptoms of genital tract inflammation. A smear from vagina contains pyriform protozoa with a spine, flagella at their front; there is also an undulating membrane. What disease can be suspected?

+ Urogenital trichomoniasis
- Intestinal trichomoniasis
- Toxoplasmosis
- Balantidiasis
- Lambliasis

1219. The patient with inflammation symptoms in a mouth consulted the stomatologist. Protozoans with changeable shape of a body, which changes owing to formation of pseudopodia, were revealed in smears taken from a surface of teeth and gums. The
size of a body is 6–30 microns. Specify a species of a protozoan.
- Intestinal amoeba
- Dysenteric amoeba
- Intestinal trichomonad
- Lamblia
- Oral amoeba

1220. The patient had felt weakness, headache, and periodic temperature increase in 15 days after return from many months swimming in the Areas of Mediterranean and the Western Africa. The doctor suspected malaria in the patient. What of the listed methods is the most adequate in diagnosis of this disease?
- Microbiological
- Microscopic
- Serological
- Allergic
- Biological

1221. Cysts with 8 nuclei were found in the feces examined through a microscope. Which protozoans did those cysts belong to?
- Balantidium coli
- Entamoeba coli
- Giardia intestinalis
- Trichomonas hominis
- Toxoplasma gondii

1222. During the checkup of restaurant workers doctors often notice asymptomatic parasitosis: a totally healthy person is a carrier of cysts which infect other people. The parasitism of which parasites makes it possible?
+ Entamoeba histolytica
- Plasmodium vivax
- Trypanosoma gambiense
- Leishmania donovani
- Leishmania infantum

1223. Blood for confirmation of the clinical diagnosis "toxoplasmosis" was taken from the pregnant woman. What of the listed serological reactions has diagnostic value?
- Neutralization reaction
- Hemadsorption test
- Agglutination reaction

1 Other possible incorrect answers: precipitation test, Widal test, and Wassermann test.
Hemagglutination-inhibition reaction
+ Complement-fixation reaction

1224. According the anamnesis, woman had three abortions; as a result of the fourth pregnancy, the child with lesion of the central nervous system and an eye, enlargement of lymph nodes and spleen was born. It is known that two cats live in the house of the patient. During microscopic investigation of blood smears and punctates of lymph nodes, little mooned bodies were found in her cells; one end of these bodies is pointed and has a structure in the form of a sucker, another end is rounded. What parasite is found in the woman?
+ Toxoplasma gondii
– Lamblia intestinalis
– Balantidium coli
– Trichomonas hominis
– Plasmodium vivax

1225. By microscopic research of scraping of a gum of the 60-year-old woman with heavy form of periodontosis, uninuclear protozoa of 3–60 microns in size with wide pseudopodia were revealed. What protozoa were revealed in the patient?
+ Entamoeba gingivalis
– Trichomonas tenax
– Entamoeba histolytica
– Toxoplasma gondii
– Balantidium coli

1226. The person after sting of sand fly had skin ulcers. The analysis of contents of an ulcer revealed nonflagellated unicellular organisms. What is the provisional diagnosis?
– Trypanosomosis
– Balantidiasis
+ Dermatotropic leishmaniasis
– Visceral leishmaniasis
– Toxoplasmosis

1227. In the feces of a person ill with chronic colitis round cysts with 4 nuclei, 10 micrometers in diameter were found. Which of the protozoans do they belong to?
– Entamoeba gingivalis
– Entamoeba coli
+ Entamoeba histolytica
– Giardia intestinalis
– Balantidium coli
1228. A patient who has recently arrived from an endemic area presents with elevated body temperature, headache, chills, malaise, that is with the symptoms which are typical for a common cold. What laboratory tests are necessary to prove or to disprove the diagnosis of malaria?
– Study of lymph node punctate
– Urinalysis
– Study of cerebrospinal fluid
– Microscopy of bone marrow punctate
+ Microscopy of blood smears

1229. During the examination of duodenal aspirates of a patient with indigestion, pear-shaped protozoans measuring 10–18 micrometers with 4 pairs of flagella were found. In a large part there were 2 symmetrically placed nuclei. Which of the protozoans parasitized within the patient's body?
– Entamoeba coli
– Entamoeba histolytica
– Trichomonas hominis
+ Giardia intestinalis
– Balantidium coli

1230. A patient was taken to a hospital with complaints of general weakness, pain in bowels, indigestion. The feces examination revealed cysts with 4 nuclei. Which protozoan are these cysts most typical of?
– Giardia intestinalis
– Entamoeba coli
– Balantidium coli
– Entamoeba gingivalis
+ Entamoeba histolytica
HELMINTHS

1231. What is used as diagnostics of trichinosis from listed laboratory examinations?
- Analysis of feces on the presence of eggs of helminths
- Analysis of urine on the presence of eggs of helminths
- Identification of parasites and their eggs in scraping from perianal area
- Analysis of duodenal contents on the presence of eggs of helminths
+ Biopsy of muscles

1232. The patient has enlarged liver, nausea, increased temperature, and hepatic colics. Large (140×80 micron) yellow oval eggs with lid are found in feces. What disease can be present?
+ Fascioliasis
- Opisthorchiasis
- Ascariasis
- Echinococcosis
- Dicroceliasis

1233. The patient, who lived in Western Siberia, complains of weakness, loss of appetite, nausea, headache, and pain in right hypochondrium. He likes to eat fish and pork. What helminthosis should be expected?
- Ascariasis
- Taeniasis
- Diphyllobothriasis
- Trichinosis
+ Opisthorchiasis

1234. The sanitary station forbade sale of batch of fish infected with plerocercoids. These larvae can cause:
- trichinosis
- ancylostomiasis
+ diphyllobothriasis
- taeniasis
- trichocephalasis

1235. The child uneasily sleeps, gnashes teeth during dream, and scratches perianal area. Thin white worms 1 cm long with pointed ends are revealed. About what helminthosis one can think?
- Trichocephalasis
- Ascariasis
- Trichinosis
+ Enterobiasis
- Strongyloidosis
1236. Little mobile red worms of 1 cm in size are found in feces of the patient with apparent anemia and allergic manifestations. What disease is the most probable?
- Ascariasis
+ Ancylostomiasis
- Dracunculosis
- Loiasis
- Trichinosis

1237. The doctor prescribed the patient the dietary food including dishes of crude beef liver. What consequences can arise in this case?
- Infection with cysticercosis is possible
- Infection with fascioliasis is possible
- Infection with opisthorchiasis is possible
- Infection with echinococcosis is possible
+ Infection with the listed diseases is impossible

1238. During examination of employees of catering establishment, persons with helminthoses are revealed. In the case of what disease they represent threat for people around?
- Opisthorchiasis
- Paragonimiasis
- Echinococcosis
+ Taeniasis
- Wuchereriasis

1239. Microscopic examination of the sputum of a patient with pneumonia occasionally revealed some larvae. Eosinophiles were detected on blood examination. What helminthiasis can be diagnosed?
- Enterobiosis
- Paragonimiasis
+ Ascariasis
- Opisthorchiasis
- Trichocephaliasis

1240. During veterinary and sanitary examination of pork in the market, the larvae curtailed into a spiral were revealed. Meat was not allowed to sale because it is infected by:
- assassin worm
+ Trichinella
- ascarid
- whipworm
- American hookworm
1241. During analysis of stool and sputum on the presence of eggs of helminths, large (100 microns) golden eggs with thick envelope and operculum and a knob on the opposite pole were revealed. Make the diagnosis:
- hymenolepiasis
+ paragonimiasis
- hookworm disease
- echinococcosis
- loiasis

1242. Diphyllobothriasis is revealed in 54-year-old sick woman. By using of what products she caught this disease?
+ Insufficiently salted fish and caviar
- Crude liver of a cow
- Crude crayfish or crabs
- Insufficiently thermally processed cow meat
- Insufficiently thermally processed meat of a pig

1243. The student from Yemen has edema and pain in the right foot. Whitish elongated structure resembling varicose vein and a bubble with diameter of 1 cm on its end are visible under skin. Formulate the diagnosis:
- onchocercosis
- taeniasis with T. saginata or T. solium
+ dracunculosis
- paragonimiasis
- wuchereriasis

1244. Name the most probable way of infection with fascioliasis:
+ through unboiled water from stagnant reservoirs, dirty vegetables
- through crude liver of a pig
- through insufficiently fried or boiled thoroughly meat of a pig
- through crude liver of a cow
- through crude or insufficiently processed fish

1245. There are three children of younger school age in the family. One of them is sick with hymenolepiasis. For disease prevention among other family members, it is necessary to investigate:
- phlegm
- urine
- blood
- duodenal contents
+ feces

1246. During puncture of a liver cyst (a tumor with liquid), small whitish masses in the form of sand grains are revealed in trans-
parent yellowish liquid. What helminthosis can be expected?
+ Echinococcosis
– Fascioliasis
– Schistosomiasis
– Hymenolepiasis
– Cysticercosis

1247. In stool of the patient with disorder of digestion, large oval yellowish eggs with dark brown rough envelope were revealed; dark mass is located in the middle part of these eggs, free spaces in the shape of a moon are present on the poles. What is the diagnosis?
+ Ascariasis
– Taeniasis
– Fascioliasis
– Trichinosis
– Trichocephaliasis

1248. The patient has headache, muscle pain during his movement, swallowing, chewing and rotation of eyes; he has weakness, temperature, edema of eyelid and face. Eggs are absent in stool and perianal area. What is probable helminthosis?
– Cysticercosis
+ Trichinosis
– Ancylostomiasis
– Echinococcosis
– Trichocephaliasis

1249. During microscopy of excrements, small (30 microns) yellowish oval eggs with thin envelope are revealed. A lid with noticeable projections of an envelope is present on one pole. What is a species of a parasite?
– Whipworm
– Liver fluke
– Broad tapeworm
+ Cat liver fluke
– Ascarid

1250. The student from Africa complains of pain in the bottom of an abdomen and during urination, blood in urine. Erythrocytes and large (about 120 microns) oval eggs with a spine on one pole are revealed in the sediment of urine. Name the causative agent:
– Opisthorchis felineus
+ Schistosoma haematobium
– Trichocephalus trichiurus
– Onchocerca volvulus
– Paragonimus ringeri

1251. Long white tape of helminth, which proglottids have width larger than length and have dark rosette-like mass in their center, was revealed in stool of the patient. How the disease is called?
– Onchocercosis
+ Diphyllobothriasis
– Paragonimiasis
– Taeniarhynchosis
– Trichocephaliasis

1252. Roundish colourless masses with double yellowish envelope and three pairs of hooks in the middle part were incidentally revealed in stool of the patient. Threadlike structures are absent. Make the diagnosis:
+ taeniasis with T. saginata or T. solium
– hymenolepiasis
– taeniasis
– taeniarhynchosis
– dicroceliasis

1253. Accidents of opisthorchiasis were revealed in the settlement located on the bank of Dnieper River. For the purpose of prevention, the sanitary station is obliged to warn inhabitants that they need:
– to boil meat well
+ to boil and fry thoroughly fish
– to boil drinking water
– to pour boiling water over vegetables and fruit
– not to catch crayfish

1254. A 26-year old female consulted a doctor about having stool with white flat moving organisms resembling noodles. Laboratory analysis revealed proglottids with the following characteristics: long, narrow, with a longitudinal canal of the uterus with 17–35 lateral branches on each side. What kind of intestinal parasite was found?
– Hymenolepis nana
– Taenia solium
+ Taeniarhynchus saginatus
– Diphyllobothrium latum
– Echinococcus granulosus

1255. The dog tapeworm was revealed during autopsy of laborato-
ry rabbits. For this parasite, rabbit, as well as human, is:
– additional host
+ intermediate host
– vector
– final host
– reservoir host

1256. The sick child periodically has abdominalgia, liquid stool, and nausea. Once the cylindrical white worm of 15 cm was excreted during vomiting. What laboratory investigation should be performed?
– Identification of proglottids in stool and determining number of lateral branches of uterus
– Detection of larvae of helminth in muscles by biopsy
– Analysis of perianal zone for the presence of eggs of helminths by method of scraping or by means of an adhesive tape
– Analysis of feces and duodenal contents for the presence of eggs
+ Analysis of feces for the presence of eggs

1257. 40-year-old woman has symptoms of mechanical jaundice. As it became clear, she is sick with fascioliasis. By what way the woman caught the disease?
– Through contaminated hands after stroking a stray dog
– Through contaminated hands after stroking a homeless cat
– She ate insufficiently fried pig liver
+ She ate dirty strawberry
– She ate beef liver paste

1258. Larvae of helminths were revealed in the student from Africa during microscopy of blood smears stained according to Romanowsky. What helminthosis one can talk about?
– Hookworm disease
– Dicroceliasis
+ Filariasis
– Strongyloidosis
– Infection with Taenia solium or T. saginata

1259. By using of meat of what animal human catches trichinosis?
– Crawfish and crab
– Cow
+ Pig
– Chicken
– Fish

1260. In the case of what disease the patient will be dangerous to people around him?
– Fascioliasis
+ Hymenolepiasis
– Echinococcosis
– Diphyllobothriasis
– Taeniarhynchosis

1261. **White helminths of 5–10 mm were revealed in stool; at the anterior end, they have expansion of gullet that resembles a bubble.** Eggs are not found in stool, but are found in scraping from perianal folds; they are colourless, asymmetrical, and oval. **What is the diagnosis?**
– Hookworm disease
+ Enterobiasis
– Taeniasis
– Trichinosis
– Trichocephalasis

1262. **A patient came to a stomatological department complaining of pain in the chewing muscles.** It was known from anamnesis that he was fond of hunting and often ate meat of wild animals. **The encysted larva of what parasite was found in the result of muscle biopsy of the patient?**
– Ancylostoma duodenale
– Taenia solium
– Dracunculus medinensis
+ Trichinella spiralis
– Wuchereria bancrofti

1263. **The patient with complaints to periodically developing diarrhea, loss of weight, pain in abdomen consulted a doctor.** Earlier he had an itch of skin of feet. Then cough and fever appeared. **A month ago, the patient was on a business trip in China. During investigation of stool, oval transparent eggs with thin envelope and the size of 55×30 micron and with larva were found.** **What helminthosis can be present?**
– Strongyloidosis
– Trichocephalasis
+ Hookworm disease
– Ascariasis
– Diphyllobothriasis

1264. **During sanitation inspection of carcasses on meat-processing plant, fascioliasis was revealed.** **What was taken for the analysis?**
+ Liver
– Lungs
– Brain
– Muscles
– Heart

1265. The student from Yemen has abdominalgia, temperature, and early he had itch, weakness and headache. At home, she bathed and washed in a pond. The most probable disease is:
+ schistosomiasis
– ascariasis
– taeniasis
– enterobiasis
– paragonimiasis

1266. A helminth 2 m long was found in the feces of a patient after drug treatment. The helminth's body consisted of segments, has a little head with hooks and four suckers. Which helminth did the patient have?
+ Taenia solium
– Taenia saginata
– Hymenolepis nana
– Echinococcus granulosus
– Diphyllobothrium latum

1267. 42-year-old patient after business trip to India complains of cough with abundant sputum, with blood impurity, breast pain, a dyspnea, and weakness. What helminthosis should be expected first?
– Cysticercosis
– Loiiasis
– Echinococcosis
+ Paragonimiasis
– Wuchereriasis

1268. A child complains of general weakness, loss of appetite, a troubled sleep, itching in the perianal area. The provisional diagnosis is enterobiasis. In order to specify this diagnosis it is necessary to perform:
– duodenal contents analysis
– roentgenoscopy
– immune diagnostics
– biopsy of muscle tissue
+ scraping from perianal folds

1269. 26 year-old female patient complains of weakness, nausea, abdominal distension, and diarrhea. Sometimes she saw whitish
rectangular masses $0.3 \times 1.5 \text{ cm}$ in stool and on bed linen. Make a provisional diagnosis:

- hymenolepiasis
- taeniarhynchosis
- fascioliasis
- taeniasis
- enterobiasis

1270. White segmented helminths $1 \text{ cm}$ long are revealed in excrements after dehelmintization. Four suckers and rostellum with hooks in two rows are noticeable on a head. Determine a disease:

+ hymenolepiasis
- taeniasis
- dicroceliasis
- taeniarhynchosis
- echinococcosis

1271. The patient with complaints to general weakness, headache, nausea, vomiting, and liquid stool with impurity of mucus and blood, consulted a doctor. During microscopy of duodenal contents and fresh stool, mobile larvae were revealed. What is the most probable diagnosis?

+ Strongyloidosis
- Dracunculosis
- Paragonimiasis
- Hookworm disease
- Trichocephaliasis

1272. After expulsion of helminth from intestines, the ovary with two lobes is found in its hermaphroditic proglottid. It is morphological feature of:

- Hymenolepis nana
- Opisthorchis felineus
+ Taeniarhynchus saginatus
- Schistosoma haematobium
- Taenia solium

1273. Cysticercosis is revealed in the patient of the ophthalmologic office. Infection occurred with:

- larvae of Ascaris lumbricoides
- larvae of Taenia solium
- eggs of Enterobius vermicularis
+ eggs of Taenia solium
- larvae of Hymenolepis nana

1274. White helminth of $4 \text{ cm}$, with thick posterior end, is revealed
in the vermiform appendage. Eggs are found in excrements, they have lemon-shaped form with plugs on poles with the size 50×30 micron. Make the diagnosis:
+ trichocephaliasis
– ascariasis
– tæniasis with T. saginata or T. solium
– opisthorchiasis
– strongyloidosis

1275. During veterinary examination of pork, fluid-filled cysts resembling rice grain were found. Such meat is not subject to sale as it is infected with larvae of:
– Echinococcus granulosus
+ Taenia solium
– Diphyllobothrium latum
– Echinococcus multilocularis
– Taeniarhynchus saginatus

1276. The patient has weakness, decrease in working capacity, headache, nausea, salivation, and stomach pain. Anemia is revealed in blood; gray wide oval operculated eggs of 80 microns are revealed in feces. What is the disease?
– Fascioliasis
– Dicroceliasis
– Taeniarhynchosis
+ Diphyllobothriasis
– Trichocephaliasis

1277. The patient complains of weakness, vertigo, disorder of digestion, vomiting, and epileptic attacks. Before this, he used the pork bought from individuals. What helminthosis is characterized by these symptoms?
– Trichinosis
+ Cysticercosis
– Malayan filariasis
– Tæniasis
– Taeniarhynchosis

1278. The pale patient has weakness, headache, vertigo, feeling of weight in stomach, and anemia. Sometimes he saw red worms of 1 cm in size in stool. Earlier he had itch of feet and urticaria. What is possible diagnosis?
– Cysticercosis
– Hymenolepisis
– Intestinal schistosomiasis
Wuchereriasis
+ Ancylostomiasis

1279. **Roundish eggs of 50 microns with colourless oncospheres and threadlike structures are revealed in 12-year-old boy with complaints to abdominalgia, disorder of digestion, uneasy dream, and nausea. What is diagnosis?**

- Ascariasis
+ Hymenolepiasis
- Taeniasis or taeniarhynchosis
- Fascioliasis
- Echinococcosis

1280. **For prevention of what helminthosis it is necessary to follow rules of personal hygiene?**

- Fascioliasis
- Diphyllobothriasis
- Taeniarhynchosis
- Opisthorchiasis
+ Echinococcosis

1281. **The patient from Eastern Siberia with the complaint to pain in his liver got to hospital. Eggs of about 30 microns, which resemble seeds of cucumbers in their shape, are found in feces. What diagnosis can be made to the patient?**

- Dicroceliasis
- Taeniarhynchosis
- Hymenolepiasis
+ Opisthorchiasis
- Paragonimiasis

1282. **A family has a big dog. What helminthosis one can catch from it?**

+ Echinococcosis
- Paragonimiasis
- Dracunculosis
- Opisthorchiasis
- Hymenolepiasis

1283. **Larvae of what cestode can parasitize in human muscles?**

- Beef tapeworm
  - *Trichinella*
- Dwarf tapeworm
+ Pork tapeworm
- Threadworm

1284. **Choose the correct life cycle for Opisthorchis felineus:**
1285. The patient with complaints to pain and edema of the right foot is hospitalized to hospital. Threadlike thickening with a bubble on its end is visible under skin. The patient traveled in Yemen last year where he sometimes drank water without boiling. What disease can be suspected?
- Schistosomiasis
+ Dracunculosis
- Trichinosis
- Paragonimiasis
- Hymenolepiasis

1286. A worker of a live-stock farm was made a provisional diagnosis of echinococcosis. The diagnosis was confirmed during a surgery. From what animal could the patient get the disease?
- A sheep
- A pig
+ A dog
- A rabbit
- A caw

1287. It is established that the tapeworm 3 m long that has up to 12 lateral branches of uterus in mature proglottid parasitizes in human intestines. What disease is caused by larva of this helminth during autoinvasion?
- Echinococcosis
+ Cysticercosis
- Diphyllobothriasis
- Taeniarhynchosis
- Taeniasis

1288. During operation, small bubbles, that have insignificant amount of liquid and closely adjoin one to another, are found in a liver of the patient. What helminthosis has revealed in the patient?
- Fascioliasis
+ Alveococcosis
- Opisthorchiasis
- Echinococcosis
1289. During investigation of excrements of the patient on existence of eggs of helminths, Fasciola eggs are revealed. Whether the available information is enough for the doctor to make the diagnosis "fascioliasis"?

- It is necessary to take blood for analysis
- To assign repeated research of excrements in 8 hours
+ To assign repeated research of excrements in 5–7 days, having excluded a liver from a diet
- It is necessary to take duodenal contents
- To assign repeated research of excrements in 5–7 days, having excluded vegetables from a diet

1290. The patient was treated for anemia. The course of treatment led to relief, but not to recovery. Fragments of the body of broad tapeworm were found in stool. What stage of development was invasive?

+ Plerocercoid
- Egg
- Stage of segmented body
- Coracidium
- Proceroid

1291. Schistosomes belong to the most widespread tropical helminths. Despite sanitary and epidemic measures, in the countries of Africa, Asia and South America number of patients with schistosomiasis strongly increased for the last decade. What reasons facilitate this?

+ Land reclamation
- Pollution of reservoirs
- Resistance of schistosomes to drugs
- Illiteracy of the human population
- The use of fish in food

1292. During microscopy of excrements of the patient who came back to Ukraine from Eastern Siberia, the small yellowish eggs reminding cucumber seeds were revealed. The doctor made the diagnosis: opisthorchiasis. In what way infection has occurred?

- When eating meat of wild mammals
- By drink of not boiled water
- When eating sea fish
- When eating fresh-water crayfish and crabs
+ When eating fresh-water fishes

1293. Breast pain and blood spitting appeared in the sheep breed-
er who shepherded sheep under escort of dogs. Roundish mass was revealed radiologically in lungs. Immunological reactions confirmed provisional diagnosis. Infection of what of the listed helminths these symptoms correspond to?

- Liver fluke
- Broad tapeworm
- Dwarf tapeworm
- Dog tapeworm
- Lung fluke

1294. For prevention of what helminthosis it is necessary to follow rules of personal hygiene?

- Trichinosis
- Taeniarhynchosis
- Alveococcosis
- Opisthorchiasis
- Diphylllobothriasis

1295. Radiological examination of the patient who has icteric sclerae and skin, pains in liver revealed bubble with the daughter bubbles containing scolices. What helminth can parasitize in the organism?

- Trichinella
- Pork tapeworm
- Dwarf tapeworm
- Dog tapeworm
- Broad tapeworm

1296. The patient consulted a doctor with complaints to presence in stool of structures reminding noodles. In laboratory, they were identified as mature proglottids of the armed tapeworm. What diagnostic sign was used?

- Number of vitelline glands
- Localization of cirrus
- Number of branches of uterus
- Number of testes
- Number of lobes of ovaries

1297. A female patient consulted a physician about digestive disorder and extended abdominal pain. Examination revealed drastic decrease in hemoglobin concentration. It is known from the anamnesis that while living in the Far East the patient used to eat freshly salted caviar. Some relatives living with her had the simi-
lar condition. What is the most likely diagnosis?¹
– Ascariasis
– Trichiniasis
– Echinococcosis
– Teniasis
+ Diphyllobothriasis

1298. In a family, the father got sick with trichinosis. What preventive measures need to be held to avoid infection of other family members?
– Sanitary cleaning of the room
– Treatment of the patient
– Isolation of the patient
+ No any measures
– Protective immunization

1299. Female of a roundworm has size up to 1 cm, a male is of 0.5 cm. They live in the lower parts of a small intestine. Eggs are colourless and have an asymmetric form. Where eggs of these helminths mature?
– In water
+ On skin of man
– On soil
– In intestines of man
– In the intermediate host

1300. Owing to non-observance of rules of personal hygiene, some invasive eggs of Ascaris lumbricoides got to the person with food. Careful feces analysis for the presence of eggs of helminths, that was performed in three months and half a year, certified lack of mature parasites in intestines of this person. It happened because:
– mature parasites start lay invasive eggs not earlier than in a year after invasion
+ parasites could not break protective barriers of a human body and pass development stages, that are necessary for achievement of sexual maturity
– eggs of parasites should be determined on perianal folds
– this parasite is not invasive for man
– parasite lives not more long than 1 month therefore eggs in excrements are

¹ In the book “Collection of tasks…”, this question is written as follows: A woman came to a doctor complaining of general weakness, epigastric pain, indigestion. After the examination of the patient anemia connected with vitamin B₁₂ deficiency was found. It was known from anamnesis that living in the Far East she used to eat caviar. Laboratory analysis showed that the feces contained eggs of helminth which were oval-shaped, yellow, and had an operculum on one of the poles. What disease did the patient have?
absent

1301. The treatment of a patient with pneumonia didn't relieve his condition. He began complaining of stomachache, vomiting, indigestion, worsening of his general state. The analysis of the feces revealed oval-shaped helminth's eggs covered with a thick tuberculate envelope. What diagnosis can be made basing on the above mentioned data?

– Fascioliasis
– Trichuriasis
– Diphyllobothriasis
– Enterobiasis
+ Ascariasis

1302. During blood test of the patient with parasitic disease (helminthic invasion), in blood we can find increase of:

+ eosinophils
– basophils
– platelets
– monocytes
– lymphocytes

1303. The child addressed to policlinic with complaints to general weakness, headache, cough with excretion of phlegm, sometimes with blood streaks. During examination, helminth larvae were revealed in sputum. For what parasitic invasion it is characteristic?

– Dracunculosis
– Taeniasis
– Trichocephalasis
– Enterobiasis
+ Ascariasis

1304. In the region where episode of trichinosis is registered, it is necessary to reveal all persons infected with trichinosis. What method of diagnostics needs to be applied?

+ Immunological reactions
– Analysis of saliva
– Feces analyses
– Radiology
– Biopsy of muscles

1305. Two children with pinworms were revealed in kindergarten. What preventive measure needs to be held to avoid infection of other children?

– To boil meat and fish well
– Nothing is necessary
– To wash fruit and vegetables well
+ To carry out disinfection of toys
– To perform vaccinations

1306. Name what helminthoses of the listed below can be the cause of chronic appendicitis:
+ ascariasis, enterobiasis, trichocephalasis
– trichinosis, ancylostomiasis, paragonimiasis
– wuchereriasis, trichinosis, ancylostomiasis
– Malayan filariasis, loiasis, opisthorchiasis
– taeniasis, trichocephalasis, fascioliasis

1307. At the same time man can be the obligate final host and the facultative intermediate host of such helminth from the phylum Flat worms:
– broad tapeworm
– dog tapeworm
+ pork tapeworm (armed tapeworm)
– *Echinococcus multilocularis*
– beef tapeworm (unarmed tapeworm)

1308. Papillomatous outgrowths, trophic ulcers, elephantiasis of the lower extremities, edemata of genitals, faces, and hands are observed on skin of the sick person. What disease can be suspected?
– Ascariasis
– Ancylostomiasis
– Trichinosis
– Paragonimiasis
+ Wuchereriasis

1309. Wife of fisherman consulted the pediatrician about her child who has attacks, spasms, sometimes with loss of consciousness. During laboratory investigation, oval grayish eggs, with a lid on one pole and a small knob on the other, were found in excrements of the child. What helminth can serve as the causative agent of this disease of the child?
– Cat liver fluke
+ Broad tapeworm
– Liver fluke
– Whipworm
– Lancet fluke

1310. A sick child had recurrent diarrhea, epigastric pain, nausea, vomiting. Once after the child's vomiting his mother found a spindle-shaped helminth 20 cm long. Which disease could cause such
a condition?
- Trichuriasis
+ Ascariasis
- Ancylostomiasis
- Dracunculiasis
- Trichinosis

1311. A patient with the preliminary diagnosis of trichinosis was admitted to a hospital. Consuming of what food could cause that disease?
+ Pork
- Beef
- Fish
- Crayfish
- Crab

1312. Five clinical forms of cysticercosis are distinguished: epileptic, pseudo tumor, hypertension with hydrocephaly, pseudo-paralytic, and disturbance of cerebral blood flow. The reason of any form of cysticercosis is that human is:
- obligate final host of armed tapeworm
+ facultative intermediate host of armed tapeworm
- obligate final host of unarmed tapeworm
- facultative intermediate host of unarmed tapeworm
- final host of liver fluke

1313. Larvae of what nematodes migrate through human bloodstream during their development cycle?
+ Hookworm, Trichinella, ascarid
- Whipworm, threadworm, filariae
- Ascarid, pinworm, assassin worm
- Pinworm, American hookworm, ascarid
- Whipworm, hookworm, threadworm

1314. Fragments of a helminth were found in the feces of a patient after drug treatment. These fragments had a tape-like segmented structure. The width of the segments exceeded their length. In the centre of the segment there was a rosette-shaped uterus. Which helminth did the patient have?
+ Diphyllobothrium latum
- Taenia solium
- Taenia saginata
- Alveococcus multilocularis
- Hymenolepis nana

1315. In the spring of 19996 after the use in food of pork without
of appropriate veterinary and sanitary examination, edema of eyelids and face, headache and muscular ache, high temperature, general weakness, and intestinal frustration started developing in inhabitants of some regions of the Dnepropetrovsk region of Ukraine. The doctor investigated slices of gastrocnemius muscles of patients and found larvae covered with capsules. What diagnosis was made by the doctor to patients?

– Trichocephaliasis
– Hookworm disease
– Opisthorchiasis
– Echinococcosis
+ Trichinosis

1316. Adult filariae parasitize in various human organs. Larvae (microfilariae) circulate in blood, but their activity is not identical during a day. Larvae of some species of filariae appear in peripheral blood at night, and of other species appear in the afternoon; this is manifestation of:

– abilities to penetrate into the blood-sucking mouthparts of the intermediate host only after becoming the invasive stage
– adaptation of a parasite to a daily rhythm of activity of human
– dependences of development of microfilariae in the intermediate host from temperature conditions
+ adaptation of a parasite to activity of insects that serve as vectors
– need to get into a body of the final host where the larva molts twice

1317. What helminth is a hematophagous organism?

– Ascarid
– Pinworm
+ Assassin worm
– Dragon worm
– Trichinella

1318. A patient has severe indigestion. Ripe and immovable segments of a tapeworm are found in his feces; the uterus of each of them has 7–12 lateral branches. Which helminth does the patient have?

– Diphyllobothrium latum
– Taenia saginata
– Hymenolepis nana
+ Taenia solium
– Echinococcus granulosus

1319. Microscopy revealed yellow-brown knobby-coated eggs of helminths with a thick wall in the feces of a schoolboy. Which
helminth did the eggs belong to?
- Trichocephalus trichiurus
- Enterobius vermicularis
+ Ascaris lumbricoides
- Hymenolepis nana
- Diphyllobothrium latum

1320. Proglottids of a tapeworm with rosette-like uterus were revealed in feces of the patient with disorders of digestion and malignant anemia. What the disease can be present?
- Hymenolepiasis
- Taeniasis
- Echinococcosis
- Taeniarhynchosis
+ Diphyllobothriasis

1321. The miner of 48 years complains of weakness, headache, vertigo, and feeling of weight in a stomach. Earlier he had a strong itch of feet skin and the urticaria. During research, the anemia was revealed. In his excrements, the patient sometimes saw little mobile red worms about 1 cm long. What most probable disease the doctor can suspect?
- Trichocephaliasis
- Ascariasis
- Trichinosis
+ Ancylostomiasis
- Dracunculosis

1322. Choose the correct life cycle for Taenia solium:
+ egg – oncosphere – fluid-filled cyst (cysticercus)
- egg – miracidium – sporocyst – redia – cercaria – metacercaria
- egg – larva – adult organism
- egg – rhabditiform larva – filariform larva – adult organism
- egg – rhabditiform larva – strongyloid larva – filariform larva – adult organism

1323. The patient is hospitalized in hospital with complaints to pains in intestines, diarrheas, vertigo, loss of appetite, dyspnea, and periodic fever. As a result of laboratory investigations, oval eggs with big lateral spine were found in excrements of the patient. What species of helminth could cause a similar clinical picture?
- Paragonimus ringeri
- Schistosoma haematobium
+ Schistosoma mansoni
– Schistosoma japonicum
– Clonorchis sinensis

**1324.** The patient with complaints to cutaneous itch, urticaria, and increased temperature got to infectious diseases hospital. During examination, infiltrates in lungs, bronchitis, and eosinophilic leukocytosis in blood, which reached 50%, were revealed in the patient; larvae of 0.2–0.5 mm in size were found in excrements. About what helminthosis we can talk?
– Ascariasis
– Enterobiasis
+ Strongyloidosis
– Ancylostomiasis
– Paragonimiasis

**1325.** The patient was in long business trip in Sudan. In a month upon return, he consulted the ophthalmologist with complaints to pains in eyes, edemata of eyelids, lachrymation, and temporary weakening of sight. Helminths with transparent threadlike body and 50–70 mm in size were found under the eye's conjunctiva. What diagnosis the doctor can make?
– Malayan filariasis
– Onchocercosis
– Trichocephaliasis
+ Loiasis
– Wuchereriasis

**1326.** The patient with complaints to pain in liver and nausea consulted a doctor. Oval eggs of 130–145 microns, with the thin, smooth and well expressed envelope were revealed in his excrements. Color of eggs is yellowish. An internal content is granular and uniform. The lid is visible on one pole. What helminth possesses these eggs?
– Lancet fluke
+ Liver fluke
– Cat liver fluke
– Dog tapeworm
– Broad tapeworm

**1327.** The patient for three weeks has frequent diarrheas, which quite often alternate with constipations. The doctor suspected strongyloidosis. What material needs to be directed for laboratory investigation for finding of the causative agent and confirmation of the diagnosis?
+ Phlegm, duodenal contents, excrements
Excrements, urine
Scraping from perianal folds
Phlegm, blood
Blood, excrements, urine

1328. How the person catches echinococcosis?
- When processing carcasses of wild animals
+ By contact with dogs
- By using wild berries
- By using liver that is invaded by *Echinococcus*
- By using insufficiently thermally processed beef

1329. What of the listed helminthoses are contagious for human?
- Hymenolepiasis, opisthorchiasis
- Taeniasis, hymenolepiasis
- Echinococcosis, enterobiasis
- Ascariasis, enterobiasis
+ Hymenolepiasis, enterobiasis

1330. A 10-year-old child complains of weakness, nausea, irritability. Helminths of white color and 5–10 mm long were found on the underwear. On microscopy of the scrape from the perianal folds achromic ova of the unsymmetrical form were revealed. Indicate what helminth is parasitising on the child?
- *Ascaris lumbricoides*
- *Ancylostoma duodenale*
- Trichina
+ *Enterobius vermicularis*
- *Trichuris*

1331. Echinococcosis belongs to the most dangerous helminthoses of the person that demands surgical intervention. What method is used for laboratory diagnosis of this disease?
- Radiological
- Analysis of feces on the presence of eggs of helminths
+ Immunological
- Analysis of feces on the presence of larvae of helminths
- Biological tests

1332. A child doesn't sleep well; sometimes he scratches the area around the anus. After the examination of the child's nightwear white filiform helminths 1 cm long were found. During the microscopic examination of a specimen from perianal folds of the child small ovoid asymmetrical colourless eggs were observed. What is the helminth, which parasitizes in the child's organism, called?
- *Trichinella spiralis*
– Ascaris lumbricoides
– Strongyloides stercoralis
+ Enterobius vermicularis
– Trichocephalus trichiurus

1333. During the examination, a patient was diagnosed with opisthorchiasis. With what food could the patient get the agent of opisthorchiasis?
– Cysticercosis beef
– Dirty vegetables
– Cysticercosis pork
– Dirty fruit
+ Undercooked fish

1334. Father bought some pork at the market. What disease may the members of his family catch supposed this meat didn’t pass the veterinary control?
+ Teniosis
– Beef tapeworm infection
– Hymenolepiasis
– Echinococcosis
– Liver fluke infection

1335. During microscopy of scraping from perianal folds, the colourless eggs having the shape of asymmetrical ovals and the size of 50×23 micron, were revealed at the child. What helminth possesses these eggs?
– Ascarid (Ascaris lumbricoides)
– Hookworm (Ancylostoma duodenale)
– Whipworm (Trichuris)
+ Pinworm (Enterobius)
– Dwarf tapeworm (Hymenolepis nana)

1336. A patient consulted an urologist about pain during urination. Analysis of his urine taken in the daytime revealed eggs with a characteristic sharp point. It is known from the anamnesis that the patient has recently returned from Australia. Some relatives living with her had the similar condition. What is the most likely diagnosis?
– Intestinal schistosomiasis
+ Urogenital schistosomiasis
– Opisthorchiasis
– Dicroceliasis
– Japanese schistosomiasis

1337. During the operation, white helminths 40 mm long with a
thin filiform anterior part of the body were found in the appendix. After the preliminarily examination of the patient's feces oval-shaped eggs with two prominent plugs on the poles were found. What helminth was found during the operation?
- Ancylostoma duodenale
- Enterobius vermicularis
- Ascaris lumbricoides
+ Trichocephalus trichiurus
- Strongyloides stercoralis

1338. It is well known that some of the helminths at the larval stage parasitize in the muscles of fish. What helminthiasis may a person get if he eats raw fish?
- Ascariasis
- Taeniasis
- Enterobiasis
- Trichinosis
+ Diphyllobothriasis

1339. During dehelmintization of the patient, helminth up to 2 m long was excreted with feces. Its body consists of proglottids, has a small head with hooks and four suckers. What helminth parasitized in the person?
- Dwarf tapeworm
- Unarmed tapeworm
- Dog tapeworm
- Broad tapeworm
+ Armed tapeworm

1340. After the dissection of a woman's dead body larvae of helminths – cysticerci\(^1\) were found in the tissue of the brain. Which helminth did the larvae belong to?
- Alveococcus multilocularis
- Taenia saginata
- Echinococcus granulosus
- Hymenolepis nana
+ Taenia solium

1341. The patient with complaints to headache and convulsive attacks got to therapeutic office. During examination of the patient, the increased intracranial pressure and pains when pressing eyelids were revealed. From the anamnesis, it is known that the patient often uses the pork bought in the market. About what hel-

\(^1\) In the book “Collection of tasks…” – “cysticercus were found” (this is a mistake).
Minthosis we can talk?
- Taeniarhynchosis
- Diphyllobothriasis
+ Cysticercosis
- Trichinosis
- Hymenolepiasis

1342. This nematode is characterized by direct development without migration. Eggs need in 25–30 days for maturing in the soil. The use of vegetables, berries or drinking water contaminated by mature eggs can lead to infection of the person. What is a species of helminth?
+ Whipworm
- Ascarid
- Pinworm
- Dog tapeworm
- Broad tapeworm

1343. A mother of a 5-year-old girl found filiform helminths 0.5–1 cm long with sharp tips on the child’s nightwear. She brought them to a laboratory. Which disease did these parasites cause?
- Ascariasis
- Diphyllobothriasis
- Taeniasis
+ Enterobiasis
- Opisthorchiasis

1344. 18 patients in a serious condition (high temperature, edema of the face and neck, muscle pain) at the same time got to regional hospital. Two persons soon died. Poll of patients revealed that all of them are residents of one village, and they were on a family holiday of the fellow villager a week ago. What parasitic disease can be suspected?
- Ascariasis
- Toxoplasmosis
- Trichocephaliasis
- Strongyloidosis
+ Trichinosis

1345. During the examination of a man who has recently come back from Africa, intestinal schistosomiasis is diagnosed. How could the pathogenic organism penetrate into the organism of the patient?
- While eating meat
- While eating fish
+ During river swimming
– Through dirty hands
– Through mosquitoes' bites

1346. A patient came to a doctor complaining of allergy and epigastric pain. Oval-shaped, yellow eggs measuring 135×80 micrometers with an operculum on one of the poles were found in the feces during the stool examinations. What disease did the patient have?
+ Fascioliasis
– Taeniasis
– Opisthorchiasis
– Diphyllobothriasis
– Echinococcosis

1347. Larvae of roundworms (Nematoda) have been found in the sputum of a patient with the provisional diagnosis of pneumonia. What species of the roundworm is this?
– Fasciola hepatica
– Paragonimus ringeri
+ Ascaris lumbricoides
– Taenia solium
– Echinococcus granulosus

1348. Two days after consumption of smoked pork a patient got face and eyelid edema, gastrointestinal disturbances, abrupt temperature rise, muscle pain. Blood analysis showed full-blown eosinophilia. What helminth could the patient be infected with?
– Ascarid
– Whipworm
+ Trichina
– Pinworm
– Hookworm

1349. In some days after the use of smoked pork, the patient had edema of the face and eyelids, gastrointestinal frustration, sharp temperature increase, and muscular pain. Sharply expressed eosinophilia was found in blood test. What helminth the person could catch through pork?
+ Trichinella
– Pinworm
– Ascarid
– Whipworm
– Hookworm

1350. A patient complains of pain in the area of his liver. Duodenal
Intubation revealed yellowish, oval, narrowed at the poles eggs with an operculum at the end. Size of these eggs is smallest among all helminth eggs. What is the most probable diagnosis?

+ Opisthorchiasis
– Diphyllobothriasis
– Teniasis
– Beef tapeworm infection
– Echinococcosis

1351. A 35-year-old man was taken to a hospital. He failed to see with one of his eyes. It was known from anamnesis that he used to eat pork. After the radiologic examination and serologic findings, he was diagnosed with cysticercosis. What helminth is an agent of cysticercosis?

– Taenia saginata
+ Taenia solium
– Trichocephalus trichiurus
– Trichinella spiralis
– Diphyllobothrium latum

1352. A patient came to a doctor complaining of general weakness and indigestion. He brought segments of a tapeworm found on his bedclothes. Which of the helminths did the patient have?

– Hymenolepis nana
– Taenia solium
+ Taenia saginata
– Diphyllobothrium latum
– Echinococcus granulosus

1353. During regular examination of schoolchildren, it was revealed that 10-year-old girl had asymmetric oval eggs with a larva in the scrape from her perianal folds. What diagnosis should be made?

– Ascariasis
– Trichocephalosis
+ Enterobiosis
– Amebiasis
– Ankylostomiasis

1354. A hunter drank raw water from a pond. Which of helminthiasis may the man get?

– Opisthorchiasis
+ Fascioliasis
– Paragonimiasis
– Clonorchiasis
– Taeniasis

1355. A group of men applied to the doctor complaining of rising temperature, headache, swelling of face and eyelids, myalgia. From the history, it became known that they all were hunters and they often ate meat of wild animals. What is the most likely diagnosis?
+ Trichinosis
– Teniasis
– Filariosis
– Taeniarhynchosis
– Cysticercosis

1356. It is known that larvae of some helminths, which are causative agents of transmissible helminthoses, can be revealed in the patient's blood only in a certain time of day. What microfilariae of helminth were found in the fresh blood smears taken from the patient at night?
– Blinding filaria
– Eye worm
– Dragon worm
+ Bancroft's filaria
– Trichinella

1357. The guide of the scientific expedition in India was native who always was with his dog. What invasive disease can be transmitted to the participants of the expedition because of contacts with this dog if it is the source of invasion?
– Dicroceliasis
– Teniasis
+ Echinococcosis
– Fascioliasis
– Paragonimiasis

1358. Eggs of what helminth need soil for development?
– Opisthorchis felineus
– Trichinella spiralis
+ Ascaris lumbricoides
– Diphyllobothrium latum
– Enterobius vermicularis

1359. The patient who arrived from Africa had blood in urine. During microscopy of sediment of urine, oval eggs of yellow color with a spine on one of the poles were found. What helminth they belong to?
– Opisthochris
1360. Some residents of one village who have identical symptoms: edema of eyelids and face, severe muscular pain, high temperature, and headache, consulted a doctor. All sick residents were guests at a wedding where dishes were prepared from pork three weeks ago. The doctor suspected trichinosis. What method will help to confirm the diagnosis?

- Analysis of feces on the presence of eggs of helminths
- Blood test
- Analysis of urine
- Analysis of a phlegm
+ Immunological

1361. Why drugs dissolving proglottids or causing vomiting as well as manipulations, which can cause reversed peristalsis (introduction of a probe), are not be allowed to prescribe for patients with taeniasis?

- The listed factors accelerate development of sexually mature form of helminth
- These factors serve as the reason for autoreinfection
- Such actions of the doctor lead to sensitization of an organism of the patient
+ The listed factors help eggs to get to acid environment, lead to dissolving of their envelopes and release of a germ (oncosphere)
- Such actions of the doctor help to delay of helminth in intestines

1362. What invasive stage of Echinococcus granulosus?

- Larva
- Vegetative form
- Encapsulated metacercaria
+ Egg
- Cercaria

1363. The group of miners with complaints to weight loss, headache, apathy, darkening in eyes, anemia, disorder of digestion, itch of skin, and dermatitis, consulted a doctor. Oval eggs with thin transparent envelope of 55–75 microns × 34–40 microns in size were revealed in excrements of patients. With what helminth miners could be infected?

- Ascarid
+ Assassin worm
– Pinworm
– Trichinella
– Whipworm

1364. Name a parasite, development of fluid-filled cysts of which in a human body can lead to strong headache, hearing disorder, vestibular frustration, paresis, and sight loss:
– dwarf tapeworm
+ armed tapeworm
– unarmed tapeworm
– rat tapeworm
– Echinococcus multilocularis

1365. A 35-year-old man came to a doctor complaining of epigastric pain. As it appeared, the patient was fond of fishing and often ate raw fish. Eggs of helminths were found in the patient's feces. The eggs were dark and oval-shaped with an operculum on one of the poles, 30×15 micrometers in size. Which helminthiasis did the patient have?
+ Opisthorchiasis
– Paragonimiasis
– Fascioliasis
– Schistosomiasis
– Ancylostomiasis

1366. In life cycle of parasites, the unique phenomenon is the free-living stage of development. For what helminth this phenomenon is characteristic?
+ Strongyloides stercoralis
– Trichocephalus trichiurus
– Enterobius vermicularis
– Dracunculus medinensis
– Taeniarhynchus saginatus

1367. Cardinal difference of Echinococcus multilocularis from a dog tapeworm is the shape of a uterus. What form uterus of Echinococcus multilocularis has?
+ Spherical
– With diverticula
– Rosette-like
– With lateral branches
– Tubular

1368. The patient suffers over 10 years from edemata of the lower extremities with their significant increase. During examination in the hospital, sharp disturbance of lymph outflow was es-
1369. During dehelmintization, the big piece of the helminth with segmented body was found in the patient. Length of a proglottid exceeds its width. In the center of a proglottid, an ovary with three segments is localized. What is a species of helminth?
+ Taenia solium
– Schistosoma mansoni
– Hymenolepis nana
– Paragonimus
– Fasciola hepatica

1370. By contact with a dog, a man can catch echinococcosis. What is decisive in diagnosis of echinococcosis in the person?
– Roentgenoscopy
– Analysis of feces on the presence of eggs of helminths
+ Immunological reactions
– Biopsy
– Blood test

1371. A tourist who was staying in Eastern Asia had been hospitalized to a therapeutic department with suspected pneumonia. During the examination of the patient's sputum and feces, the eggs of Paragonimus ringeri were found. With what food could the patient get the pathogenic organism?
+ Undercooked crabs
– Unboiled water
– Undercooked fish
– Undercooked pork
– Dirty fruit and vegetables

1372. The patient with suspicion on a venereal disease, because he had severe pains during urination and blood in urine, consulted the doctor. From the anamnesis, it became clear that the patient worked in India on rice fields. During investigation of urine after centrifugation, eggs of helminths with a spine on a back pole were revealed. What disease is diagnosed for the patient?
– Fascioliasis
– Paragonimiasis
+ Bilharziasis
1373. When opening a liver of the dead person, mass in the form of roundish bubble with a smooth surface 5 cm in diameter was revealed. A large number of small bubbles with transparent colourless content is localized in its cavity. Liver tissue around the bubble is sclerotized. What diagnosis is most probable?

- Opisthorchiasis
- Dicroceliasis
- Alveococcosis
- Cysticercosis
+ Hydatid echinococcosis
- Schistosomiasis

1374. Choose typical features of flat worms:
+ body cavity is absent, the space between organs is filled with parenchyma
- the digestive system consists of three parts with an anus
- the nervous system is presented by ganglia and nerve trunks
- separate sexes; difference in an external structure between males and females exists
- eggs of all helminths need water for development

1375. Patients from one family were admitted to hospital. Clinical symptoms of a disease are edemata of eyelids and face, fever, eosinophilia, headache, and muscle pain. The disease began for the 10th day after eating sausage and fat, which were sent by relatives from Khmelnitsky region of Ukraine. What parasitic disease is most probable?

- Trichocephaliasis
- Taeniasis
+ Trichinosis
- Echinococcosis
- Taeniarhynchosis

1376. One of the tourists who came back from travel across Southeast Asia was hospitalized with suspicion on pneumonia because of he had red-brown phlegm with blood impurity, fever and the general serious condition. During stay abroad, the tourist often ate crayfish and crabs. During research of phlegm and feces, golden-brown eggs with the size of 90×60 microns were found. What disease is present in the patient?

- Echinococcosis
+ Paragonimiasis
- Taeniasis
- Fascioliasis
– Hymenolepiasis

1377. The patient has dermatitis, disorder of a digestive tract; blood impurity is found in liquid excrements. Helminthosis was suspected, but the negative result was received during the first investigation of feces. Only after hospitalization of the patient when investigations were performed in the conditions of a hospital (the analysis of fresh feces), rhabditiform larvae were found. What diagnosis can be made?
– Hookworm disease
– Trichocephaliasis
– Ascariasis
– Diphyllobothriasis
+ Strongyloidosis

1378. What intermediate host is present in the life cycle of Wuchereria bancrofti?
– Rodent
– Dog
+ Mosquito
– Man
– Fish

1379. During necropsy, over 200 small helminths of 4–13 mm in size, which have two suckers on the forward end of a body, and two rosette-like testes on back part, were found in a liver. What diagnosis will be made by the doctor?
– Fascioliasis
– Paragonimiasis
– Clonorchiasis
+ Opisthorchiasis
– Dicroceliasis

1380. A man has worked in an African country for 3 years. A month after his return to Ukraine he consulted an ophthalmologist and complained about eye ache, eyelid edema, lacrimation, and temporary visual impairment. Underneath the eye conjunctiva the doctor revealed helminths 30–50 mm long with elongated filiform body. What diagnosis might be suspected?
– Enterobiasis
– Trichocephaliasis
+ Filariasis
– Diphyllobothriasis
– Ascariasis

1381. In the perianal folds of a 5-year-old girl, her mother found
some white "worms" that caused itch and anxiety in the child. The "worms" were sent to the laboratory. During examination, the physician revealed white filiform helminths 0.5–1 cm long, with pointed ends, some helminths had twisted ends. What is the most likely diagnosis?
– Ascariasis
– Opisthorchiasis
– Diphyllobothriasis
– Teniasis
+ Enterobiasis

1382. A male patient has fever and enanthem. As a result of the examination involving serological tests he has been diagnosed with Fasciola hepatica. It was found that the patient had been infected through raw river water. Which stage of Fasciola life cycle is invasive for humans?
+ Adolescaria
– Cysticercus
– Metacercaria
– Miracidium
– Ovum

1383. 15-year-old girl was taken to the hospital with inflammation of vermiform appendage. Blood test revealed signs of anemia. Lemon-shaped helminthic eggs with size of 50×30 micron, that have "plugs" on the poles, were revealed in excrements. What species of helminth parasitizes in the patient?
– Hookworm
+ Whipworm¹
– Dog tapeworm
– Pinworm
– Dwarf tapeworm

1384. A miner consulted a physician about the appearance of body rash followed by loss of appetite, bloating, duodenal pain, frequent bowel movements, and dizziness. Ovoscopic probes of feces and duodenal contents revealed some eggs covered with a transparent membrane through which 4–8 germinal cells could be seen. What disease is likely to have occurred in the patient?
– Trichocephalasis
– Hymenolepiasis
– Enterobiasis

¹ Another possible answer is Trichuris.
– Strongyloidiasis
+ Ancylostomiasis

1385. The patient with complaints to disorders of digestion and defecation, nausea, pains in epigastric region that resemble stomach ulcer consulted a doctor. Based on laboratory diagnostics, trichocephalasis was established. The patient could catch this disease by using:
– dried fish
– milk products
– badly fried beef
+ dirty vegetables and fruit
– badly fried pork

1386. Fever, rash on skin, itch, and inflammation of lymph nodes are observed in the person who visited Indochina several months ago. What helminthosis can be expected?
+ Malayan filariasis
– loiasis
– onchocercosis
– dirofilariasis
– taeniarhynchosis

1387. Life expectancy of pinworms is about a month only, but people can be ill with enterobiasis for a long time. It occurs owing to:
– uses of unboiled water
– uses of dirty vegetables
– swallowing of larvae with food
+ repeated swallowing of eggs from dirty hands
– active penetration of parasites through skin

1388. The patient with fever, joint pain, nausea, vomiting, diarrhea, and spleen enlargement got to hospital. The patient worked in Egypt at irrigating fields. The doctor made the diagnosis schistosomiasis. What is the intermediate host in a cycle of development of schistosomes?
– Fishes
+ Molluscs
– Crayfish, crabs
– Pigs
– Ants

1389. Disorders of digestion and nervous system, the affected skin, allergic rash, and cough are observed in the patient. Larvae in excrements are revealed in the laboratory. What disease can
be suspected in the patient?
- Ascariasis
- Taeniasis
- Cysticercosis
+ Strongyloidosis
- Hymenolepiasis

1390. In one of Polesye¹ regions there was an outbreak of helminthiasis manifested by cramps and facial edemata. The developed preventive measures in particular included ban for eating infested pork even after heat processing. What helminthiasis was the case?
- Teniasis
- Echinococcosis
+ Trichinosis
- Taeniarhynchosis
- Alveococcosis

1391. The patient with complaints to edemata of eyelids and conjunctiva, severe pain in the left eye, consulted a hospital. During surgical intervention, the roundworm about 60 mm long was removed from her eye. It was established that recently she was in Africa where she went according to the tour. Name a possible vector of the causative agent of this disease.
- Mosquito Mansonia
- Buffalo gnats
+ Gadfly of the genus Chrysops
- Human flea
- Sand fly

1392. The patient came to clinic with complaints to pain in breast, dyspnea, weakness and cough with phlegm with blood impurity. From the anamnesis, it is known that it was some months in business trip in the Far East and often ate crayfish, crabs. What is the provisional diagnosis?
+ Paragonimiasis
- Diphyllobothriasis
- Opisthorchiasis
- Fascioliasis
- Taeniasis

1393. During additional examination, small asymmetric eggs 26–30 microns long, having lids and small tubercle on the opposite

¹ Name of the wooded district in the eastern European country (Ukraine, Russia etc.).
ends, are revealed in excrements of the patient with mechanical jaundice and bright manifestation of allergic reactions. From the anamnesis, it is known that the patient living in the Western Ukraine for 20 years works as the log worker in Western Siberia. What is diagnosis of the disease?

- Fascioliasis
- Dicroceliasis
- Paragonimiasis
- Opisthorchiasis
- Nanophyetiasis

**1394. The woman who came back from India consulted a hospital with complaints to a strong edema of extremities, genitals, and breast. The doctor at poll of the patient found that the woman lived in the region with a large number of mosquitoes. During examination, recurrent lymphadenitis and the increased mediastinum nodes were revealed. For what group of helminthoses the above-named symptoms are characteristic?**

- Trematodiases
- Filariases
- Cestodiases
- Hookworm diseases
- Schistosomiasis

**1395. The patient who arrived from Egypt has complaints to pain in the bottom of an abdomen, which become stronger during urination. It was revealed by poll that he often bathed in the river in hot time of day. Impurities of blood and eggs of a parasite with a spine were found in urine of the patient. What disease can be expected?**

- Opisthorchiasis
- Dicroceliasis
- Paragonimiasis
- Fascioliasis
- Schistosomiasis

**1396. During dehelmintization, the tapeworm of 3.5 m long was driven from intestines of the patient. Mature proglottids of helminth are not mobile and have up to 12 lateral branches of a uterus. In this case it is necessary to conduct additional investigations of the patient to exclude a disease:**

- Cysticercosis
- Echinococcosis
- Taeniarhynchosis
– Diphyllobothriasis
– Taeniasis

1397. On the African continent numerous cases of the diseases caused by round worms – filariae – are registered. Vectors of these helminths are:
+ mosquitoes
– bugs
– tsetse flies
– sand flies
– fleas

1398. After examination by means of serological reactions, the diagnosis "opisthorchiasis" was made to the patient with the increased temperature and a rash on skin. In what way he could catch the disease?
– Through dirty hands
+ By using of the infected fish
– By using of unboiled water from the small river, a pond
– By using of the infected liver
– With help of flies

1399. During examination, the diagnosis "metagonimiasis" is made to the patient. What is prevention of this disease?
+ Do not use badly processed fish
– Do not use dirty vegetables
– To wash hands
– Do not use badly processed liver of animals
– Do not use badly processed beef

1400. During examination, nanophyetiasis was revealed in the foreign citizen. In what way he could catch?
– When swimming in the river
– By the use in food of meat
+ By the use in food of fish
– Through dirty hands
– By stings of mosquitoes

1401. What is the sequence of developmental stages of Trichinella in the human body from the moment of the beginning of an invasion? 1. Migration of larvae through the lymph and blood stream. 2. Moving of the encapsulated larvae into intestines. 3. Subsidence of larvae in striated muscles. 4. Transformation of larvae into sexually mature forms (males and females) and fertilization. 5. Formation of a capsule around larvae in muscles. 6. Female gives birth to live larvae.
1402. Koreans got used crustaceans for culinary processing in such manner that is unusual for Europeans, – they subject crayfish, crabs and shrimps only to "cold" processing, filling in them with marinade. What trematodiasis can people catch by eating these dishes?
- Fascioliasis
- Dicroceliasis
- Opisthorchiasis
+ Paragonimiasis
- Intestinal schistosomiasis

1403. The foreign female student with complaints to feeling of weight in the bottom of an abdomen, and also with complaints to excretion of insignificant amount of blood at the end of an urination, consulted the urologist. During microscopy of sediment of urine, yellow eggs about 140 microns in size, with terminally located spine are revealed. What diagnosis will be made by the infectiologist?
+ Schistosomiasis
- Opisthorchiasis
- Dicroceliasis
- Paragonimiasis
- Fascioliasis

1404. It is known that in the case of opisthorchiasis and diphyllobothriasis, the invasive stage is located in fish, and the analysis of eggs of helminths is used for laboratory diagnostics. However, in the case of diphyllobothriasis, a symptom that is not characteristic for opisthorchiasis exists. What is this symptom?
- Pneumonia
+ Anemia
- Nausea
- Increasing of body temperature
- Muscular pains

1405. What sequence of developmental stages of an ascarid from the moment of an invasion of the person? 1. Female lays eggs in intestines. 2. Swallowing of invasive egg. 3. Migration of larvae through the blood system. 4. Development of larva in egg, which
is in soil. 5. An exit of larva from egg and its passing through a gut wall to the bloodstream. 6. Swallowing of larvae and their development in intestines into sexually mature forms. 7. Migration of larvae from blood system into airways and nasopharynx.

1. 2, 3, 4, 5, 6, 7
2. 5, 3, 7, 6, 1, 4
3. 6, 7, 4, 3, 1, 2, 5
4. 2, 5, 3, 7, 6, 4, 1
5. 2, 5, 6, 1, 3, 7, 4

1406. Schistosomiases are serious helminthic diseases that are widespread in Africa, Asia, and Latin America. How the person catches schistosomiases?

– By water drink
– By the use in food of fish
+ By contact with water in the polluted reservoirs
– By sting of insects
– By the use in food of crustaceans

1407. The journalist worked in India for a long time. After a while and after arrival of this country, the elevation that is similar to lace and has the bubble filled with necrotic masses on its end was formed in his subcutaneous tissue of popliteal area of the right extremity. What helminthosis can be suspected in the patient?

+ Dracunculosis
– Trichinosis
– Ascariasis
– Enterobiasis
– Opisthorchiasis

1408. Being in Africa, the person noticed that he has blood in urine. During laboratory investigation of day urine, oval yellow eggs with a spine on one of poles were revealed. To what helminth they belong?

– Ascarid
+ Urinary schistosome
– Pinworm
– Trichinella
– Liver fluke

1409. During autopsy of the died person, the pathologist found larvae in tissues of brain. It was established that they belong to one of the helminths listed below. Specify it:

– Unarmed tapeworm
– Liver fluke
– Lung fluke
– Cat liver fluke
+ Armed tapeworm

1410. Infection of the person with some helminthoses can occur through the skin. What of the specified helminths can penetrate into human body through the skin?
– Ascarid
– Pinworm
– Armed tapeworm
– Unarmed tapeworm
+ Hookworm

1411. Opisthorchiasis is the disease caused by cat liver (Siberian) fluke. Opisthorchiasis was revealed in the patient. How the causative agent penetrated to the patient's organism?
– By the use in food of the crude or insufficiently thermally processed meat of cattle
+ By the use in food of crude or dried fish
– By drink of unboiled water from open reservoirs
– By the use in food of dirty vegetables
– By contact with a sick cat

1412. Flukes belong to the phylum Flat worms. All flukes are parasitic organisms. Diseases which are caused by them, have the general name:
– Filariae
– Cestodiasis
– Nematodoses
+ Trematodiasis
– Protozoan diseases

1413. Penetration of helminths into a human body can occur in different ways. What of the listed helminthoses is caused by larvae of a parasite, which actively penetrate into the human body?
– Dracunculosis
+ Urinary schistosomiasis
– Trichocephalasis
– Enterobiasis
– Dicroceliasis

1414. The vast majority of flukes have difficult life cycle part of which passes in water. At what representative of the class Flukes life cycle is not associated with a reservoir?
– Lung fluke
– Cat liver fluke
1415. The woman complains of headache, muscle pain during swallowing, chewing and rotation of eyes, weakness, the increased temperature, an edema of eyelids and face. In 1.5–2 months prior to appearance of these symptoms, the woman used pork which did not pass veterinary and sanitary examination. What helminth causes the specified symptoms in the person?
- Ascarid
+ Trichinella
- Threadworm
- American hookworm
- Assassin worm

1416. Intestinal obstruction, small appetite, nausea, vomiting, and anemia were revealed in the patient. Based on the laboratory diagnostics, diphyllobothriasis is established. Infection happened through the use of:
- Crabs and crayfish
- Eggs
- Beef
+ Fishes
- Pork

1417. The teenage girl complains of the general weakness, disorders of digestion, diarrheas. During coprology examination, mature proglottids in which the uterus has 7–12 lateral branches are revealed. Establish the diagnosis.
+ Taeniasis
- Taeniarhynchosis
- Diphyllobothriasis
- Echinococcosis
- Hymenolepiasis

1418. Coprology examination of patient's feces revealed small operculated eggs. It is known from the anamnesis that the woman often consumes fish. Based on laboratory analysis, establish what helminth parasitizes in the woman.
+ Cat liver fluke
- Blood fluke
- Lung fluke
- Liver fluke
- Lancet fluke
1419. The child has complaints to headache, disorder of digestion, the general weakness, fast fatigue. During examination, colourless ellipsoidal eggs with threadlike appendages on poles are revealed in excrements. Such signs of eggs are characteristic for:
- armed tapeworm
- unarmed tapeworm
+ dwarf tapeworm
- broad tapeworm
- dog tapeworm

1420. The patient with signs of spasmodic intestinal obstruction causing by helminths got to clinic. Name the representative of a class of roundworms, which even in one copy in human intestines is capable to cause such serious condition of the patient.
- Assassin worm
+ Human ascarid
- Whipworm
- Threadworm
- Pinworm

1421. In the unregulated market, the woman bought a liver of cattle and did not notice that it is invaded by a liver fluke. She roasted a liver not much and served it up. Whether family members can get fascioliasis?
- Those who swallowed the fertilized eggs will get sick
- All family members will get sick
- Those who ate sexually mature individuals will get sick
+ Such probability is absent
- Those who ate larvae of a fluke will get sick

1422. In Ukraine, diseases caused by roundworms filariae often occur. The patient with hypodermic and intraocular migration of adult helminths consulted the doctor. These helminths were removed surgically. In what way she was infected with this parasite?
+ Transmissible
- Alimentary
- Contact
- By contamination
- Percutaneous

1423. During a season of maturing and gathering strawberry, all family became ill with pneumonia, which was followed by thorax pain, cutaneous itch, and temperature increase. Larvae of a parasite were found in phlegm of patients. Specify the causative agent
of a disease.
- Enterobius vermicularis
- Dracunculus medinensis
+ Ascaris lumbricoides
- Trichocephalus trichiurus
- Fasciola hepatica

1424. During dehelmintization of a patient, long fragments of a helminth having a segmented structure were revealed. Mature proglottids of 30 by 12 mm were rectangular, closed uterus was in the form of a stem with 17–35 lateral branches. Define a species of a helminth.
- Alveococcus
+ Unarmed tapeworm
- Dog tapeworm
- Dwarf tapeworm
- Armed tapeworm

1425. Geographical distribution of opisthorchiasis coincides with an area of a fresh-water mollusk which is the intermediate host of this trematode. What is a mollusk?
+ Bithynia
- Galba
- Zebrina
- Melania
- Bulinus

1426. During examination, the foreign citizen was found to have loiasis. In what way he could catch?
- When swimming in the river
- Using fish as food
- Through dirty hands
+ By stings of gadflies
- By stings of mosquitoes

1427. Hookworm disease – the serious illness which is followed by exhaustion, anemia, intestines dysfunction, and dermatitis. What contingent of the population is most subject to infection with this helminthosis?
- Health workers
- Employees of meat-processing plants
+ Miners
- Hunters
- Employees of pig farms

1428. The patient had elephantiasis more than 10 years; this dis-
ease is caused by wuchereriasis. Blood for the analysis was taken from the patient for the exact diagnosis in what time of day?

- In the morning
- In the afternoon
- In the evening
+ At night
- Time does not matter

1429. Larva of what helminth migrates with blood flow into the liver, heart, and lungs?
+ Ascaris lumbricoides
- Alveococcus multilocularis
- Echinococcus granulosus
- Taenia solium
- Taenia rhynchus saginatus

1430. The patient with complaints to temperature increase, pain in the right hypochondrium consulted a doctor. The patient is fond of fishing and often uses dried fish. What of listed parasites could cause a disease?
- Fasciola hepatica
+ Opisthorchis felineus
- Dicrocoelium lanceatum
- Paragonimus westermani
- Clonorchis sinensis

1431. Manifestations of chronic hepatitis and pancreatitis with periodic exacerbations are observed in the patient who worked some years in China. What parasite could cause a disease?
- Opisthorchis felineus
- Fasciola hepatica
- Dicrocoelium lanceatum
+ Clonorchis sinensis
- Paragonimus westermani

1432. During dehelmintization of the patient, helminth up to 2 meters long was excreted with feces. Helminth’s body is segmented, white colored; length of proglottids exceeds width. The small head with four suckers and hooks is revealed. Define species of helminth.
- Dog tapeworm
- Dwarf tapeworm
- Beef tapeworm
+ Pork tapeworm
- Echinococcus multilocularis
1433. The patient consulted with the complaint to the general weakness, headache, nausea, liquid excrements with impurity of mucus and blood. At microscopy of excrements, barrel-shaped eggs of helminth were revealed. Make the provisional diagnosis.
- Ancylostomiasis
+ Trichocephaliasis
- Enterobiasis
- Ascariasis
- Necatoriasis

1434. The patient with complaints to headache, pain in muscles during the movement, weakness, temperature and an edema of eyelids and face came to hospital. The doctor connects this state with the use of the pork bought from individuals. What provisional diagnosis the doctor can make?
- Fascioliasis
- Opisthorchiasis
+ Trichinosis
- Taeniasis
- Taeniarhynchosis

1435. The person has an irritation of skin – itch, rashes, depigmentation, increased lymph nodes. Filariae are found in the eye. The diagnosis "onchocercosis" is made. What bloodsucking insects could become vectors of filariae of the genus Onchocerca?
- Gadflies
- Mosquitoes
- Sand flies
- Biting midges
+ Buffalo gnats

1436. During the microscopy of the scrape of the anal mucosa of a child, asymmetric colorless eggs were found. Which helminth did those eggs belong to?
- Ancylostoma duodenale
- Ascaris lumbricoides
+ Enterobius vermicularis
- Trichocephalus trichiurus
- Hymenolepis nana

1437. A shepherd who has tended sheep together with dogs consulted a doctor about pain in his right subcostal area, nausea, and vomiting. Roentgenoscopy revealed a tumour-like mass. What kind of helminthiasis might be suspected?
+ Echinococcosis
– Ascaridiasis
– Taeniasis
– Taeniarhynchosis
– Enterobiasis

1438. Patient was revealed to have intestinal impassability, bad appetite, nausea, vomiting. The anemia associated with lack of B12 vitamin is established. What parasite of human small intestine causes this pathology?
– Dwarf tapeworm
– Dog tapeworm
– Whipworm
+ Broad tapeworm
– Echinococcus multilocularis

1439. The patient within three years was treated without any result about considerable decrease in acidity of gastric juice. He was depressed by emergence of proglottids on linen and bed, which moved and crept out of an anus by oneself. What is the most probable diagnosis?
– Hymenolepiasis
– Opisthorchiasis
+ Taeniarhynchosis
– Taeniasis
– Cysticercosis

1440. A patient has been preliminarily diagnosed with paragonimiasis. This disease is caused by lung flukes. The causative agent entered into the patient’s body through:
– eating unwashed vegetables
+ eating half-cooked lobsters and crabs
– contact with an infected cat
– eating half-cooked or dried fish
– drinking raw water from open reservoirs

1441. Mother with the child consulted the pediatrician; she has found on child’s linen small white worms of threadlike form with the pointed ends, about 1 cm long. From the story of mother: the child sleeps uneasily, in a dream gnashes teeth, often scratches anal area. Define a type of helminth:
+ pinworm
– ascarid
– whipworm
– armed tapeworm
– assassin worm
1442. The person who has a cat with opisthorchiasis consulted the familiar doctor. He wants to know how members of his family can catch this disease?
- Through badly fried thoroughly meat
+ Through fish
- Through dirty hands
- Through dirty vegetables
- By contact with a cat

1443. The patient with complaints to pain in eyes and partial loss of sight addressed to ophthalmologic office. The larvae reminding a form of rice grain were revealed under retina. What parasitic disease is revealed in this patient?
- Dicroceliasis
- Loiasis
- Taeniarhynchosis
- Hymenolepiasis
+ Cysticercosis

1444. A patient consulted a physician about chest pain, cough, and fever. Roentgenography of lungs revealed eosinophilic infiltrates, which were found to contain the larvae. What kind of helminthiasis are these presentations typical for?
- Trichinosis
- Echinococcosis
+ Ascariasis
- Fascioliasis
- Cysticercosis

1445. The miner with complaints to rash on a body, loss of appetite, abdominal swelling, pain in a duodenum, frequent defecation, and vertigo consulted a doctor. Analysis of excrements and contents of a duodenum on the presence of eggs were carried out, and the eggs covered with transparent envelope and 4–8 germinal cells were found. What disease is possible in the patient?
- Hymenolepiasis
- Enterobiasis
- Trichocephalasis
- Strongyloidosis
+ Ancylostomiasis

1446. In the vermiform appendix, a white helminth was found, 40 mm long with thin filiform forward end. Excrements contained oval eggs with plugs at the poles. Determine the kind of a hel-
minth.
– Ascarid
– Hookworm
– Seatworm
– Threadworm
+ Whipworm

1447. The preliminary diagnosis was made to the patient: paragonimiasis. This disease is caused by a lung fluke. The causative agent entered into the patient’s organism during:
– the use in food of dirty vegetables
– contact with a sick cat
– the use in food of half-baked or sun dried fish
+ the use in food of half-baked crayfish and crabs
– drink of unboiled water from open reservoirs

1448. A man visited Lebanon. Soon after return, he felt pain and heaviness in the perineum and suprapubic region. On examination, he was diagnosed with urogenital schistosomiasis. In what way could he become infected?
+ By swimming in contaminated water
– By eating unwashed fruit and vegetables
– By eating insufficiently salted fish
– By eating undercooked meat of cattle
– By eating undercooked meat of crayfish and crabs

1449. The fisherman caught fish from the river, slightly roasted it on a fire and ate, almost half-baked. In some weeks, signs of damage of a liver and a pancreas appeared. The laboratory analysis of excrements showed the presence of small eggs of helminth. What trematodosis did the fisherman possibly catch?
– Dicrocoeliosis
+ Opisthorchiasis
– Schistosomiasis
– Fascioliasis
– Paragonimiasis

1450. In case of some helminthiases, an affected person can detect helminth himself because mature segments of the causative agent are able to crawl out of the anus. This is typical for the following disease:
– Pork tapeworm infection
– Hymenolepiasis
+ Beef tapeworm infection
– Bothriocephaliasis
Echinococcosis

1451. *Short-term pneumonia is revealed at the patient. Migration of larvae of what helminth can lead to this disease?*

- Whipworm
- Ascarid
- Pinworm
- Dwarf tapeworm
- *Echinococcus multilocularis*
ARTHROPODS

1452. What characteristics of arthropods?
– The secretory system consists of protonephridia
+ The chitinous cover is an exoskeleton
– The blood system is absent
– The respiratory system is absent
– They have nonsegmented cylindrical body

1453. A sick man with high temperature and a lot of tiny wounds on the body has been admitted to the hospital. Lice have been found in the folds of his clothing. What disease can be suspected?
– Scabies
– Malaria
– Plague
– Tulareemia
+ Epidemic typhus

1454. The geologist who is in the center of spring-summer encephalitis has found on his body a small being from the phylum Arthropoda. What can be dangerous as an encephalitis vector?
+ Imago of Ixodes tick
– Clothes louse
– Bed bug
– Black cockroach
– Imago of the tick of the family Gamasoidea

1455. Two cows died from anthrax in the settlement, and in a week one child of 14 years got sick. In what most probable way he caught?
– Through contact with a dog which protected herd
– Through the food contaminated by typhoid and screwworm flies
– Through a sting of a dog flea
– Through stings of louses
+ Through a sting of Stomoxys fly

1456. The blood-sickening jumping insects that are small (2–3 mm) and flattened laterally are revealed indoors. Their worm-shaped larvae develop in floor cracks. Causative agents of what human disease can be most likely revealed in the digestive system of these insects?
– Helminthoses
– Sleeping sickness
+ Plague
– Chagas' disease
– Relapsing fever

1457. A patient came to a doctor complaining of itching between the fingers and on the abdomen, which intensified at night. After the examination of his skin, rash and thin grey stripes were found. What pathogenic organism could produce such symptoms?
– *Ixodes ricinus*
+ *Sarcoptes scabiei*
– *Ornithodoros papillipes*
– *Dermacentor pictus*
– *Ixodes persulcatus*

1458. On the head of the worker of a livestock farm a big wound with necrotic tissue is present. During management of the wound, worm-shaped larvae of 1 mm in size were removed. What disease can be diagnosed?
+ *Myiasis*
– *Demodicosis*
– *Phthiriasis*
– *Scabies*
– *Typhus*

1459. The patient complains of a strong itch. Scratches and small wounds are present on his body. In business trip, he did not change linen, the whitish insects having three pairs of extremities with claws are found in seams of linen; their body is flattened from a back. Define a species of a parasite:
– itch mite
– bed bug
+ clothes louse
– human flea
– *Wohlfahrtia*

1460. In Africa, damages of an eyeball which are caused by roundworms from the genus *Onchocerca* are registered among seasonal workers. Against representatives of what genus of flies it is necessary to take measures for elimination?
– *Anopheles*
– *Phlebotomus*
– *Pediculus*
– *Pulex*
+ *Simulium*

1461. Infection of human with epidemic typhus occurs:
– during a sting of a tick through saliva
– during a sting of louses through saliva
– during a sting of a bed bug through saliva
+ during rubbing in of louses excrements into the sting place
– during a sting of a mosquito through saliva

1462. The woman consulted a doctor with complaints to suppuration on hairy part of the head, intolerable eyeball pains. From the anamnesis it became clear that the woman worked in the field where flies with dark spots on an abdomen flew; some of them crept in a nose and ears during her dream. Larvae of what fly could cause this disease?
+ Wohlfahrtia
– Stable fly
– Gadfly
– Tsetse fly
– Flesh fly

1463. In blood of the person on whom pubic louses parasitize, spirochetes – causative agents of relapsing fever were found. The expert claims that this species of louses has no relation to infection of the person with relapsing fever, because:
– causative agents of this disease are transmitted by clothes louse only
+ causative agents of this disease are transmitted by clothes or head louses
– causative agents of this disease are transmitted by head louse only
– causative agents of this disease are distributed by mechanical vectors only
– it is a disease of "dirty hands"

1464. A patient complains of skin itch, especially between the fingers, in the inguinal creases, on the lower abdomen. Examination of these regions revealed there some small vesicles. Laboratory diagnostics allowed to establish that this condition had been caused by a representative of Arthropoda. Specify the disease caused by this arthropod:
+ Scabies
– Demodicosis
– Pediculosis
– Myiasis
– Dermatotropic leishmaniasis

1465. What medical importance the kissing bug Triatoma has?
– Plague vector
– Typhus vector
+ Vector of the American trypanosomosis
– Vector of relapsing fever

1 During exam in 2006, incorrect word "miasis" was used.
The saliva is poisonous, stings are painful, it is not a vector of diseases

1466. *The kindergarten left on dacha in the summer. There were many bird’s nests over windows of sleeping rooms. After some days children started complaining of an itch. During examination, big bright red spots were found on children bodies, and blood drops on underclothes. What insects bit children?*

+ Bugs  
– Mosquitoes  
– Cockroaches  
– Sand flies  
– Spiders

1467. *In some regions of the world the cases of malaria became more frequent. What insect is a carrier of the agent of malaria?*

– *Culex* mosquito  
– *Phlebotomus* sandfly  
– *Simulium* black fly  
+ *Anopheles* mosquito  
– *Aëdes* mosquito

1468. *During microscopy of material from the centers of lesion of the patient suffering from eels and inflammatory changes of face skin, live arthropods of spherical form with 4 pairs of truncated extremities are found. The cause of such state can be:*

+ scabies  
– allergy  
– myiasis  
– dermatitis  
– pediculosis

1469. *What arthropods are poisonous for human?*

– *Stomoxys calcitrans*  
– *Dermacentor pictus*  
+ Black widow  
– Solpugids  
– *Ixodes ricinus*

1470. *After the examination, a patient was diagnosed with tick-borne relapsing fever. How was he infected?*

+ By means of a soft tick’s bite  
– By means of an itch mite’s bite  
– By means of a hard tick's bite  
– By means of a housefly mite's bite  
– By means of a dog tick’s bite
1471. Grey insects measuring 1–1.2 mm with a short wide body covered with setae were observed on the pubis of some boys during the medical checkup. What insects were these?
- Sarcoptes scabiei
- Pulex irritans
- Pediculus humanus capitis
- Cimex lectularius
+ Phthirus pubis

1472. The typhoid fly has great epidemiological value in distribution of intestinal diseases (typhoid, cholera, dysentery). It is explained by fact that:
+ places of egg laying of flies are the decaying substrata, human excrements, humus
- the fly female lays until 160 eggs
- mouth of typhoid fly is the licking and sucking
- flies that left pupae, pass through a garbage layer with thickness up to 30 cm
- the larva is thermophilic, it migrates there, where temperature is of 40–46°C

1473. The patient with scratches on the head came to hospital. During examination insects of gray color, 3 mm long, with a body flattened in the dorsoventral direction and three pairs of extremities are found. What is the most probable diagnosis?
- Scabies
- Invasion of skin by bugs
+ Pediculosis
- Demodicosis
- Allergy

1474. During clearing of the wood workers destroyed nests of rodents when rooted out stubs. Ticks crept out from that places and attacked several workers during their rest. Shortly those workers got sick. Causative agents of what diseases can be transmitted by these ticks?
- Plagues
+ Endemic typhus
- Anthrax
- Epidemic relapsing fever
- Scabies

1475. The patient who was in business trip in Brazil for long time got to hospital. In preparations of blood and cerebrospinal fluid, trypanosomes were revealed. What arthropod could infect him
with this parasite?
– Buffalo gnats
– Tsetse fly
– Mosquito
+ Kissing bug
– Flea

1476. In the Crimea the papataci fever is distributed (temperature 40°, pains in muscle, joints, and eyes; headache, change in number of blood cells are observed for 2–5 days). What insects carry a disease?
– Buffalo gnats
– Gadflies
– Mosquitoes
+ Sand flies
– Typhoid and screwworm flies

1477. After the examination, a patient was diagnosed with Russian spring-summer encephalitis. How was the patient infected?
– By means of itch mite’s bite
– By means of malaria mosquito’s bite
– By means of soft tick’s bite
– By means of sand fly’s bite
+ By means of hard tick’s bite

1478. What insects are capable to distribute cutaneous and visceral leishmaniasis?
+ Sand flies of genus *Phlebotomus*
– *Anopheles* mosquitoes
– buffalo gnats of genus *Simulium*
– Biting midges of Ceratopogonidae family
– Gadflies of Tabanidae family

1479. A 40-year-old man who lives in a pise-walled house came to a laboratory. He found dark-grey arthropods with a long oval body and a somewhat pointed front end in the wall chink. The mouth apparatus of the arthropod were placed in the notch of the abdomen surface. The arthropod had 4 pairs of ambulatory legs, the sexual opening was placed at the level of the first pair of legs. What arthropod is it?
– *Ixodes ricinus*
– *Ixodes persulcatus*
+ *Ornithodorus papillipes*
– *Sarcoptes scabiei*
– *Dermacentor nuttali*
1480. Grey arthropods measuring 3 mm in length with three pairs of legs were found on a patient's head. The arthropods had deep incisures on each side of the body. What arthropods did the patient have?
   – Cimex lectularius
   – Sarcoptes scabiei
   + Pediculus humanus capitis
   – Pulex irritans
   – Demodex folliculorum

1481. In laboratories of research institute owing to insufficient disinfection of research materials of human ectoparasites, there were live certain stages of their development. What stages of the listed arthropods are epidemiologically danger?
   – Nits of clothes louse
   – Eggs of itch mite
   + Eggs of dog tick
   – Nits of pubic louse
   – Larvae of rat flea

1482. The patient who came to reception complains of an itch between fingers. The doctor made the diagnosis – scabies. What arthropod can serve as the cause of this disease?
   – Dog tick
   – Taiga tick
   – Dermacentor
   + Itch mite
   – Ornithodorus

1483. A doctor revealed tissues injury on patient's scalp with localized suppurations and diagnosed his disease as myiasis. This infestation is caused by larvae of the following insect:
   – malarial mosquito
   – kissing bug
   + Wohlfahrtia fly
   – sand fly¹
   – stable fly (Stomoxys calcitrans)

1484. During examination, spots of blue color with a steel shade and traces of scratches are revealed in inguinal area of the pa-

¹ During the exam in 2010 and in the site http://testcentr.org.ua/ (2013), this answer was "mosquito", but in appropriate Russian question, answer was "sand fly" (Phlebotomus). Answers "mosquito" and "malarial mosquito" are very similar. During the exam in 2004, answers were as follows: house fly, tsetse fly, stable fly, blow fly (Wohlfahrtia magnifica), and triatomic bug.
tient's body. Arthropods of 1–1.5 mm in size were removed from hair of a pubic zone. Their body is short and flattened in the dorsoventral direction, with three pairs of extremities. Define a species of a parasite:
+ pubic louse
– itch mite
– clothes louse
– head louse
– flea

1485. A child complained of itching in the occipital and temporal parts of the head. After the examination of his head, surface ulcers on the head skin and white nits on the hair were found. What arthropod was parasitizing on the child's head?
– Wohlfahrtia fly
– Body louse
– Human flea
+ Head louse
– Crab louse

1486. There are many arthropods that are mechanical and specific vectors of causative agents of diseases as well as causative agents of diseases. An arthropod causing human disease is:
– dog tick
– taiga tick
– Dermacentor
– Ornithodorus
+ itch mite

1487. What of the listed ticks is capable to transmit causative agents of tularemia?
– Taiga tick
– Ornithodorus
– Itch mite
+ Dog tick
– Follicle mite

1488. Spirochetes and rickettsia are accumulated in different parts of a louse's body. How the person is infected with relapsing fever?
+ By crush of louses and rubbing in their hemolymph in a place of a sting
– During sting of louses with their saliva
– By rubbing in of excrements in places of scratches
– By penetration of causative agents into blood through mucous membranes

1 Another answer: "Screwworm fly".
of a nose
– By penetration of causative agents into blood through a conjunctiva of eyes

1489. A patient came to a dermatologist complaining of ulcers which appeared on his face and neck skin surface. After the laboratory examination of the ulcers, mobile wormlike parasites were found. Specify a causative agent that caused this disease.
+ Follicle mite
– Itch mite
– Human flea
– Bedbug
– Larva of Wohlfahrtia fly

1490. A crimson papule has appeared on the face of student who came back from Turkmenistan, and this papule has turned into an ulcer in 10 days. Cutaneous leishmaniasis is revealed in the patient. What representative of arthropods is a carrier of the causative agent of this disease?
– Wohlfahrtia
+ Sand fly
– Tsetse fly
– Malaria mosquito
– Human flea

1491. The typhoid fly got to a hospital office. What causative agents of diseases it can mechanically transmit?
+ Cholera, dysentery, typhoid fever
– Relapsing fever
– Typhus
– Encephalitis
– Leishmaniasis

1492. Rodents are the reservoirs of causative agents of leishmaniases – diseases that are natural and transmissible. If the person got to the leishmaniasis natural focus, he needs to avoid stings of:
– fleas
+ sand flies
– ticks
– mosquitoes
– blood-sucking flies

1493. The homeless person with wounds on the head is hospitalized in city policlinic. During management of wound, larvae of insects were revealed. Choose an insect which larvae parasitize on a body of people:
mosquito
– flea
– louse
+ Wohlfahrtia
– sand fly

1494. In laboratories of rickettsial diseases, volunteers as source of food for louses are used for studying of biology of the causative agent of typhus. Feeding of the louses that are infected with the causative agent of typhus occurs through a special grid in which cells louses are placed. Putting a grid to a hip of the donor, louses are given the chance to suck his blood; however, infection of the person with typhus thus does not happen. It is explained by:
– resistance of the donor
– lack of an invasive stage of the causative agent
+ lack of the mechanism of infection – rubbing in of excrements in the injured skin
– lack of enough causative agent
– different antigenic structure of the causative agent and donor

1495. The littered, uncleaned cellars and attics often serve as habitats of homeless cats. After visit of such room, the girl felt many stings and an intolerable itch in feet. What arthropods used this girl as the source of food?
+ Fleas
– Louses
– Ticks
– Mosquitoes
– Bugs

1496. During routine inspection of schoolchildren, the doctor has found white bright eggs that are densely glued to hair on the head of several pupils of one class. What representative is the causative agent of this disease?
+ Head louse
– Human flea
– Pubic louse
– Bed bug
– Typhoid fly

1497. A patient has acne and inflammatory alterations on facial skin. Microscopic examination of scrapings from the affected areas has revealed living porrect vermiform arthropods 0.2–0.5 mm large with four pairs of short extremities in the front part of their bodies. What is the laboratory diagnosis?
– Pediculosis
– Myiasis
– Scabies
+ Demodicosis
– Phthiriasis

1498. What arthropods suck blood?
+ Ticks of Ixodidae family
– Sarcopes scabiei
– Scorpions
– House flies
– Spiders

1499. A patient with suspicion on epidemic typhus was admitted to the hospital. Some arachnids and insects have been found in his flat. Which of them may be a carrier of the pathogen of epidemic typhus?
+ Lice
– Spiders
– Houseflies
– Bedbugs
– Cockroaches

1500. At examination of the patient who lived in Central Asia, the diagnosis – a tick-borne relapsing fever was made. The causative agent of this disease could get to the patient's organism through a sting of:
– dog tick
+ Ornithodorus
– Dermacentor
– taiga tick
– malaria mosquito

1501. While on holiday in the countryside, a boy found a spider with the following morphological characteristics: body length of 2 cm, round black abdomen with two rows of red dots on its dorsal side; four pairs of segmented extremities covered with tiny black hairs. Identify this arthropod:
– Solpuga
+ Karakurte (Latrodectus)
– Scorpion
– Mite
– Tarantula

1502. The patient consult the doctor about abdominalgia, vomiting, disturbance of defecation. The doctor made the diagnosis of
intestinal myiasis which arises when larvae of typhoid and house flies get to intestines. How an infection with intestinal myiasis occurs?

+ Due to non-observance of rules of food storage
  – By the use of unboiled water
  – By the use of insufficiently fried fish
  – When using of fresh-salted caviar
  – Due to non-observance of rules of personal hygiene

1503. The parasitologist M. I. Latyshev for the first time carried out successful attempt of the experimental solution of a question concerning vectors of causative agents of infectious diseases in Central Asia. He voluntary fed on himself several Ornithodorus ticks which were gathered in the house where patients with infectious diseases were present. What disease the courageous researcher caught?

  – Tick-borne typhus
  – Japanese encephalitis
  + Tick-borne relapsing fever
  – Russian spring-summer encephalitis
  – Anthrax

1504. The young man had purulent face blackheads, skin became wrinkled and hyperemic, eyebrows and eyelashes drop out. A doctor has made the diagnosis of demodicosis (demodectic mange). What is prevention of this disease?

  – Protection against bites of ticks
  – Application of repellents
  + Maintaining personal hygiene
  – Processing of rooms by insecticides
  – Careful check of donor’s blood during hemotransfusion

1505. In the region where natural disaster (tsunami) took place, a threat of outbreak of plague appeared. What arthropods this epidemic is connected with?

  – Head louse
  – Typhoid fly
  – Clothes louse
  – Sand fly
  + Human flea

1506. Man who returned from spring research expedition has weakness, nausea, sleep disorder, increasing of body temperature, symptoms of paralysis of muscles of neck and shoulder girdle. During laboratory diagnostics, the diagnosis – Russian
spring-summer encephalitis is made. What way of infection of the patient?
+ Transmissible
  – Percutaneous
  – Peroral
  – Sexual
  – Contact and household

1507. There are causative agents of invasive diseases among ticks. What of the diseases listed below is caused by the representative of ticks?
– Taiga encephalitis
– Tularemia
– Tick-borne typhus
+ Scabies
– Brucellosis

1508. Among representatives of the family Muscidae there are mechanical and biological vectors of causative agents of diseases. A biological vector of the causative agent of an invasive disease is:
+ tsetse fly
– blue flesh fly
– stable fly
– house fly
– Wohlfahrtia

1509. Some of insects can parasitize either at imaginal or at larval stage of development. What of insects parasitizes at larval stage?
– Malaria mosquito
– Sand fly
– Tsetse fly
– Stable fly
+ Wohlfahrtia

1510. The patient has an open wound of a face with uneven edges; the necrosis of tissues with gradual partial gangrenous process which almost reaches a bone tissue are observed. Due to detailed examination, live larvae are revealed in a wound. The diagnosis "tissue myiasis" is made to the patient. What larvae of flies caused this disease?
– Glossina palpalis
– Musca domestica
+ Wohlfahrtia magnifica
– Phlebotomus papatasii
– Stomoxys calcitrans
1511. During expedition to Central Asia students found an invertebrate animal 7 cm long. The body is divided into a cephalothorax with 4 pairs of walking legs and the segmented abdomen. In the last tail segment poisonous gland is present that opens at the end of a sting. The animal is a night predator and poisonous for human. This animal belongs to group:

- spiders (Aranei)
- ticks (Acarina)
- solpugids (Solifugae)
+ scorpions (Scorpiones)
- fleas (Siphonaptera)

1512. The pensioner who did not happen in a taiga but often worked for himself at dacha consulted the hospital in Vladivostok. He denied the sting of a tick and he was not vaccinated. He considered himself as a patient since when he had headaches, high temperature, the phenomena of a left-side hemiparesis. He appealed for the help for the 10th day of a disease. During examination of a body of the patient, the doctor noticed an erythema in armpits about 5 cm in the diameter with a sting trace. What diagnosis is most probable?

- Demodicosis
+ Taiga tick-borne encephalitis
- Scabies
- Malaria
- Trypanosomosis

1513. In the armpits of a patient, the small (1–1.5 mm), dorso-ventrally flattened, wingless, blood-sucking insects are found. Their larvae are developed in the armpits too. What disease is caused by these insects?

- Sleeping sickness
- Chagas' disease
- Plague
+ Phthiriasis
- Relapsing fever

1514. Mother of a boy who had recently returned from a summer camp found some small whitish insects up to 3 mm long on the child's clothing. Specify the parasite.

- Phthirus pubis
- Pulex irritans
+ Pediculus humanus humanus
- Cimex lectularius
– *Blattella germanica*

1515. The patient with complaints to disorder of digestion, weakness, vomiting, pains in intestines consulted the gastroenterologist. During analysis of gastric contents larvae of botflies are revealed, during analysis of a mucous membrane of a stomach its inflammation is revealed. What disease is most probable for this patient?
– Cutaneous myiasis
+ Intestinal myiasis
– Phthiriasis
– Wuchereriasis
– Trypanosomosis

1516. At medical examination on the head of some patients insects of 2–3 mm in size of gray color with deep cuts on each side of a body were revealed. What are these ectoparasites?
– Ticks
+ Head louses
– Fleas
– Bed bugs
– Clothes louses

1517. In fur farms and zoos, fleas quite often bite the workers who are looking after animals. Causative agents of what disease they can transmit?
– Cholera
– Relapsing fever
+ Plague
– Dysentery
– Typhus

1518. Among insects that can be in housing constantly or temporarily, specific and mechanical carriers of causative agents of diseases exist. What arthropod among listed below is a mechanical carrier of the causative agent of diseases?
– Human flea
– Head louse
– Bed bug
+ German cockroach
– Clothes louse

1519. Medical examination of some youths revealed in their axillary regions grey insects 1.0–1.5 mm large, with short broad body covered with hairs. What insects were revealed?
– Flea
– Head louse
– Bed bug
+ Pubic louse
– Itch mite¹

1520. According to the data of WHO, for about 250 millions of Earth population fall ill with malaria. This disease is mostly spread in tropical and subtropical regions. Range of its spread falls into the areal of the following mosquitoes:
+ Anopheles
– Mansonia
– Aëdes
– Culex
– Culiseta

1521. After a thorough examination the patient who had returned from Central Asia to Ukraine was diagnosed with spring-summer encephalitis. Its pathogen might have entered the body through the bite of the following arthropod:
– dog louse²
– mosquito
– itch mite
– Ornithodorus papillipes
+ taiga tick

1522. Workers consulted a hospital on the fact that they found parasites of gray color, about 3 mm long on their bodies. They caused unpleasant irritation of skin, there were itch, pain, papules of blue color, and hemorrhages in places of stings. At certain workers temperature rose. What disease is most probable?
– Itch
+ Pediculosis
– Sarcoptidosis
– Cutaneous myiasis
– Phthiriasis

1523. A man lives in the area of dermal leishmaniasis distribution. He hasn’t been inoculated against this disease because of his having contraindication against it. What insects' bites should this man avoid?
– Mosquitoes
– Fleas

¹ Another possible answer: clothes louse.
² During exam for students studying stomatology (in 2013), this answer was indicated as correct one, but this is a mistake! Dog louse Linognathus piliferus does not transmit encephalitis.
- Gadflies
+ Sand flies
- Stable flies
MIXED QUESTIONS ON PARASITOLOGY

1524. During the examination of a patient a doctor found small ulcers with rough edges on the patient’s skin. The patient had just returned from an Asian country where there were a lot of mosquitoes. What disease can be suspected?

- Trypanosomiasis
- Toxoplasmosis
- Malaria
+ Cutaneous leishmaniasis
- Scabies

1525. The patient has complaints to pains in the bottom of an abdomen which enhance during urination. Impurity of blood and egg of parasites are found in urine. Of what disease it is necessary to think?

- Clonorchiasis
- Trypanosomosis
- Trichinosis
+ Schistosomiasis
- Trichomoniasis

1526. A married couple applied to the genetic consultation in order to consult about their child with multiple abnormalities (microcephaly, idiocy etc.). Examination of family members did not reveal hereditary pathology, and the karyotype of parents and the child was normal. The woman did not use mutagens and teratogens during pregnancy. The doctor has found that the family keeps a cat in the apartment. What can be a probable cause of malformation of the newborn?

- Woman had dysentery during pregnancy
- Woman had taeniasis during pregnancy
- Woman had an ascariasis during pregnancy
+ Woman had toxoplasmosis during pregnancy
- Woman had an enterobiasis during pregnancy

1527. Patients with edemata of eyelids and faces, fever, muscle pain are hospitalized to the hospital. It became clear that the disease began after the use in food of half-cooked pork which did not pass veterinary sanitary inspection. What diagnosis is most probable?

- Taeniasis
- Toxoplasmosis
- Taeniarhynchosis
A patient with suspicion to liver abscess arrived to surgical office. It was established that the patient was in business trip in Cuba for a long time, frequently had sharp gastrointestinal diseases. What disease can be assumed at the patient, what methods of research need to be used for diagnostics?

- Ascariasis; to study excrements (Kato method) on the presence of eggs (big size, 50–80 microns, mammillated surface)
- Echinococcosis; to carry out roentgenoscopy, X-ray analysis, ultrasonography
- Alveococcosis; to carry out roentgenoscopy, X-ray analysis, ultrasonography
- Giardiasis; to study smears of excrements microscopically
- Amebiasis; to study excrements microscopically

A woman who was infected with toxoplasmosis during pregnancy has born a child with multiple congenital defects. This is a result of:

- teratogenesis
- chemical mutagenesis
- biological mutagenesis
- recombination
- cancerogenesis

40-year-old patient who have lost sight on the left eye earlier, consulted the oculist about deterioration of sight on the right eye. What parasitic disease can be suspected?

- Cysticercosis
- Toxoplasmosis
- Echinococcosis
- Trichinosis
- Leishmaniasis

All hollow organs of the patient are expanded, the traces reminding stings with indurations are present on the body surface. The patient was more than two months in the territory of the South American country where he caught armadillos for a zoo. Define a disease:

- malaria
- echinococcosis
- nervous form of Chagas' disease (trypanosomosis)
- infection with an American hookworm
- allergic reaction to stings of mosquitoes
1532. The patient who arrived 10 months ago from the Asian country where he worked at building of water accumulative constructions was hospitalized in clinic with edema of the right lower extremity. In some days a bubble appeared on a surface of skin, asthmatic attacks, nausea, vomiting, vertigo, and then unconsciousness were developed. What reason of these symptoms?

– Chemical burn
– Ascariasis
– Asthma
– Sting of a scorpion
+ Dracunculosis

1533. The local who never left his favourite dog was the conductor of scientific expedition across India. With what invasive diseases members of expedition can be infected by the contact with this dog as an invasion source?

– Taeniasis, balantidiasis
– Lambliosis, trypanosomosis
+ Echinococcosis
– Dicroceliasis, amebiosis
– Trichomoniasis, fascioliasis

1534. The patient consulted a doctor concerning the increasing signs of lesion of the central nervous system. The patient was in business trip in the Central Africa for a long time. What disease can be assumed?

– Diphyllobothriasis
+ Trypanosomosis
– Ascariasis
– Leishmaniasis
– Trichocephalasis

1535. Choose, what disease is caused by pinworms:

+ enterobiasis
– strongyloidosis
– dracunculosis
– sleeping sickness
– typhoid

1536. The shepherd with head wounds consulted the village medical assistant’s point. During examination of wounds, deep damage of soft tissues with local places of gangrenous changes and larvae of flies were revealed. Choose the name of a disease:

– pediculosis
– skin leishmaniasis
– itch
+ tissue myiasis
– phthiriasis

1537. *Mosquitoes' bites caused the appearance of ulcers on the human's skin; the ulcers were observed under a microscope. The ulcer's contents analysis revealed nonflagellated protozoans. What disease is this?*
+ Cutaneous leishmaniasis
– Visceral leishmaniasis
– Malaria
– Scabies
– Myiasis

1538. *Toxoplasmosis is diagnosed for the pregnant woman. It is known that it can lead to development of malformation in a foetus. With what it can be associated?*
– With possible development of a generative mutation
– With possible development of autoimmune reactions
– With inflammatory processes in tissues of a fetus
+ With teratogenic influence
– With possible development of somatic mutations

1539. *The patient has frequent liquid stool with impurity of blood, pain in a rectum. What parasitic disease needs to be suspected?*
– Cysticercosis
– Loiasis
– Lambliosis
– Malaria
+ Amebiasis

1540. *What species belongs to Arachnoidea?*
– Culex
+ Ixodes persulcatus
– Typhoid fly
– Trichinella spiralis
– Bed bug

1541. *Malignant anemia was found in the patient. Therapy by intramuscular inoculation of B₁₂ vitamin gave short unstable effect of improvement of blood composition. The patient is the inveterate fisherman and often uses fish that he caught and dried. What diagnosis can be assumed?*
– Pernicious anemia (Addison's anemia)
+ Diphyllobothriasis
– Paragonimiasis
– Thalassemia
– Elliptocytosis

1542. The patient to whom the diagnosis "malaria" was made after examination, addressed to policlinic. However, according to the patient, last 5 years he did not visit the countries in which this disease is distributed. Call a possible way of infection:
– fecal and oral
– owing to a sting of the infected sand fly
– owing to a sting of tsetse fly
– contact and household
+ owing to blood transfusion

1543. The man is in the center of dermatotropic leishmaniasis. Immunization against this disease was not carried out because he had existence of contraindications. Stings of what insects the person needs to avoid?
+ Sand flies
– Fleas
– Botflies
– Mosquitoes
– Blood-sicking flies

1544. The medicinal leech which eats blood of fishes, frogs, and mammals and can feed on blood of the human is found in Ukraine. The blood clotting is prevented by the substance containing in a secret of glands which channels open in a throat of a leech. How this substance is called?
– Guanine
– Blood clotting factor
– Hemoglobin
– Glycogen
+ Hirudin

1545. A patient has roundish ulcers on his face, inflammation and enlargement of lymph nodes. During laboratory examination of discharge from face ulcers, unicellular organisms without flagella were revealed. What diagnosis it indicates?
– Toxoplasmosis
– Scabies
+ Dermatotropic leishmaniasis
– Trypanosomiasis
– Myiasis

1546. Mother with 12-year old child consulted gastroenterologist with complaints to loss of appetite at the child, meteorism. During
endoscopic examination, dyskinesia of bile ducts is diagnosed, and cells of a pear-shaped form with many flagella are revealed in duodenal contents. What disease is most probable for the child?

– Balantidiasis
+ Lambliosis
– Ascariasis
– Trichomoniasis
– Enterobiasis

1547. As an example of specific human parasites, one can name Plasmodium falciparum, human pinworm and some others. The source of parasite invasion is always a human. Such specific human parasites cause the diseases that are called:

+ Anthroponoses
– Zoonoses
– Anthropozoonoses
– Infections
– Multifactorial diseases
ТЕСТОВІ ЗАВДАННЯ
для складання державного ліцензійного іспиту
"Крок-1. Загальна лікарська підготовка"
З МЕДИЧНОЇ БІОЛОГІЇ
(англійською мовою)
для самостійної роботи студентів
спеціальностей 7.12010001 "Лікувальна справа",
7.12010003 "Медико-профілактична справа"
і 7.12010005 "Стоматологія" денної форми навчання

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