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MINISTRY OF EDUCATION, SCIENCE, YOUTH, AND SPORTS OF UKRAINE
SUMY STATE UNIVERSITY
MEDICAL INSTITUTE

Test Items for Licensing Examination

Krok-1 General Medical Training

MEDICAL BIOLOGY

for medical students

Sumy
2011

Test Items for Licensing Examination: “Krok-1 General Medical Training: Medical Biology” (For Medical Students) / Compiler O. Yu. Smirnov. – Sumy: Electronic Edition, 2011. – 74 pp.

Physiology and Pathophysiology Department

Medical Institute of the Sumy State University

This book includes 293 test items in cytogenetics, classical genetics, molecular genetics, medical genetics, population genetics, general biology, protozoology, helminthology, and entomology.

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

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INTRODUCTION

All tests were received from the Testing center of Ministry of Public Health of Ukraine during exams and from the *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 then were reviewed and reorganized. 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.

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

Year in which certain question was used during State examination "Krok-1" is given in brackets.

Oleg Smirnov

CYTOLOGY AND CYTOGENETICS

1. *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 at their utilization?* (2003)

+ Lysosomes
– Endoplasmic reticulum
– Ribosome
– Golgi complex
– Cells centre

2. *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?* (2003, 2005, 2006)[1]

– Telophase
+ Anaphase
– Prophase
– Metaphase
– Interphase

[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?*

3. *During the postsynthetic period of mitotic cycle the synthesis of proteins – tubulins, which take part in the mitosis formation, was destroyed. It can cause the impairment of:* (2004)

– duration of mitosis
– chromosome spiralization
– chromosome despiralization
+ chromosome separation
– cytokinesis

4. *Karyotyping of healthy man cells is carried out. A small acrocentric odd chromosome was found in the karyotype. What chromosome is it?* (2004)

– Group A chromosome
– Group B chromosome
– X chromosome
+ Y chromosome
– Group C chromosome

5. *The study of mitotic cycle phases of an onion root revealed the cell, in which the chromosomes are situated in the equatorial plane, forming a star. What stage of the cell mitosis is it?* (2004)[1]

– Interphase
+ Metaphase
– Prophase
– Anaphase
– Telophase

6. *Oval and round organelles with double wall are seen at the electron micrograph. The outer membrane is smooth, the inner membrane folded into cristae contains the enzyme ATP synthetase. These are:* (2005)[2]

– ribosomes
– centrioles
– Golgi complex
– lysosomes
+ mitochondria

7. *A tissue sample of benign tumor was studied under the electron microscope. A lot of small (15–20 nm) spherical bodies, consist-*

[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] 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?*

ing of two unequal subunits were detected. These are: (2005, 2006)
– microtubules
– Golgi complex
– mitochondria
+ ribosomes
– smooth endoplasmic reticulum

8. *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?* (2006)
– Genetic disorders of fetus development
– Development of male fetus
– Polyploidy
+ Development of female fetus
– Trisomy

9. *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?* (2007)
– Ribosomes
+ Lysosomes
– Granular endoplasmic reticulum
– Golgi apparatus
– Mitochondrions

10. *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?* (2008)
– Active transport
– All answers are false
– Facilitated diffusion
+ Exocytosis
– Endocytosis

11. *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:* (2008, 2009)
– G_1
– G_2
+ S
– G_0
– M

12. *While studying maximally spiralized chromosomes of human*

karyotype the process of cell division was stopped in the following phase: (2008, 2011)[1]

– prophase
– anaphase
– interphase
+ metaphase
– telophase

13. *Normal actively dividing cells of human red bone marrow are analyzed. What number of cell's chromosomes is typical for G_1 period?* (2010)

+ 46
– 48
– 23
– 45
– 47

14. *A cell at the stage of mitotic anaphase was treated by colchicine that inhibits chromosome separation to the poles. What type of mutation will be caused?* (2010)

– Duplication
– Inversion
– Translocation
+ Polyploidy
– Deletion

15. *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?* (2011)

– Chromosome
– Elementary fibril
+ Nucleosome
– Chromatid
– Half-chromatid

16. *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 (G_1) of interphase
+ Synthesis period (S) of interphase
– Mitosis

[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?*

– Premitotic period of interphase
– Postsynthesis period (G_2) of interphase

17. *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

18. *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

19. *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

20. *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

21. *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 (G_2) of interphase
– Presynthesis period (G_1) of interphase

22. *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

23. *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

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

– Centriole
– Mitochondrion
+ Endoplasmic reticulum
– Lysosome
– Peroxisome

25. *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?*[1]

– Endoplasmic reticulum
– Centriole
+ Lysosome
– Ribosome

[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?*

– Mitochondrion

26. *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[1]
– Lysosome

27. *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?*

– 23
– 92
+ 46
– 69
– 48

28. *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

29. *During anaphase chromosomes (each containing one chromatid)[2] are placed on the poles of the cell. How many chromosomes does the cell have during the anaphase?*

– 96
– 46
– 23
– 69
+ 92

[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**.

[2] There is a mistake in this question in the book "Collection of tasks…" – incorrect word combination "monochromatic chromosomes" is used in this book.

30. *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

31. *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

32. *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

33. *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

34. *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

35. *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

36. *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?*
– Mitochondria
– Nuclear membrane
– Ribosomes
+ Chromosomes
– Cell membranes

37. *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

38. *During the G_2 phase (postsynthesis period) of the cell cycle the synthesis of tubulin proteins which take part in the production of the division spindle was impaired. What process can be disturbed?*
– Chromosome despiralization
– Chromosome spiralization
+ Disjunction[1] of daughter chromosomes
– Formation of ribosome subunits
– Formation of nucleolus

39. *A patient has an acute pancreatitis which can develop into pancreas autolysis. The dysfunction of what organelles can cause this pathology?*

[1] In the book "Collection of tasks…" the term "divergence" is used (this is a mistake).

+ Lysosomes
– Mitochondria
– Ribosomes
– Centrioles
– Microtubules

40. *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

41. *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

42. *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

43. *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

44. *Under the influence of gamma-radiation a fragment of a chromosome was lost. What chromosomal mutation is it?*

[1] In the book "Collection of tasks…" the term "divergency" is used (this is a mistake).

+ Deletion
– Duplication
– Inversion
– Intrachromosomal translocation
– Interchromosomal translocation

45. *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

46. *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[1]
+ Submetacentric
– Acrocentric
– Metacentric

[1] such term is not used in the world.

CLASSICAL GENETICS

47. *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?* (2004)

– 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

48. *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?* (2006)

+ Recessive epistasis
– Polymery
– Complementation
– Codominance
– Incomplete dominance

49. *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?* (2005)

– 25%
+ 0%
– 100%
– 75%
– 50%

50. *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:* (2010)

– phenocopy
– phenotypic
– genocopy
– mutational
+ combinative

51. *A woman with III (B) rh$^-$ blood group has borne a child with II (A) blood group. The child is diagnosed with hemolytic disease of newborn as a result of rhesus incompatibility. What blood group*

is the child's father likely to have? (2007)

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

52. *Hypertrichosis of auricles is caused by a gene that is localized in Y-chromosome*[1]*. Father has this feature. What is the probability that son will have this anomaly?* (2006)[2]

– 25%
– 35%
– 0%
+ 100%
– 75%

53. *Hartnup disease is caused by point mutation of only one gene which results in disturbance of tryptophane absorption in the bowels and its resorption in the renal tubules. It is the reason for disorder of both digestive and urination systems. What genetic phenomenon is observed in this case?* (2008)

+ Pleiotropy
– Semidominance[3]
– Complementary interaction
– Codominance
– Polymery

54. *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:* (2010)[4]

– *aa* × *aa*

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[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 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.

[3] Incomplete dominance.

[4] 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?*

– *Aa* × *aa*
– *Aa* × *AA*
– *AA* × *AA*
+ *Aa* × *Aa*

55. *One of the parents is suspected of having phenylketonuria recessive gene. What is the risk of giving birth to a child with inborn phenylketonuria?* (2011)
– 50%
+ 0%
– 100%
– 25%
– 75%

56. *A boy has I (*I^0I^0*) blood group and his sister has IV (*I^AI^B*) blood group. What blood groups do their parents have?* (2008)
+ II (I^AI^0) and III (I^BI^0)
– II (I^AI^A) and III (I^BI^0)
– I (I^0I^0) and III (I^BI^0)
– I (I^0I^0) and IV (I^AI^B)
– III (I^BI^0) and IV (I^AI^B)

57. *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
– Pleiotropy

58. *Children with normal hearing have been born by deaf and dumb parents with the genotype* DDee *and* ddEE. *What is the form of gene interaction between the genes* D *and* E?
+ Complementarity
– Complete dominance
– Epistasis
– Polymery
– Codominance

59. *Some people with good clinical health can feel anemia symptoms in the conditions of high mountains. During their blood test we can find sickle-shaped erythrocytes. What genotype can a person with occasional symptoms of sickle-cell anemia have?*
– X^cX^c

– *aa*
– *AA*
+ *Aa*
– X^cY [1]

60. *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 phenotypic manifestation of the character controlled by a definite gene?*
– Inheritance
– Penetrance
+ Gene expression[2]
– Mutation
– Polymery

61. *A husband is a homozygous 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[3]
– The law of independent assortment
– Linkage of genes
– Sex-linked inheritance

62. *Healthy parents have a son with phenylketonuria[4], 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

63. *Parents with a normal phenotype gave birth to an ill with albinism child (the feature that is inherited by the autosomal reces-*

[1] Other possible answers: X^CX^c, X^CY.
[2] This answer (in the book "Collection of tasks…") is not good. The answer "expressivity" is better.
[3] 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.
[4] 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.

sive type). What genotype do the parents have?
– *AA* and *aa*
– *AA* and *AA*
– *AA* and *Aa*
+ *Aa* and *Aa*
– *aa* and *aa*

64. *Alcaptonuria*[1] *is inherited as an autosomal recessive feature. Parents with a normal phenotype have a baby with alcaptonuria. What genotype do parents have?*
– *aa* and *aa*
– *AA* and *AA*
– *AA* and *Aa*
– *Aa* and *aa*
+ *Aa* and *Aa*

65. *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 become more intensive. What do we call this type of genes' interaction?*
– Epistasis
– Pleiotropy
+ Polymery
– Codominance
– Complementary

66. *A child is ill with phenylketonuria. The child's parents are healthy. What genotype may the parents have?*
– *AA* and *aa*
+ *Aa* and *Aa*
– *aa* and *aa*
– *Aa* and *aa*
– *Aa* and *AA*

67. *Endemic goiter is widespread among Transcarpathian population due to iodine deficiency in food. What form of variability is this case based on?*
– Mutation
+ Modification
– Combinative
– Hereditary
– Genotypical

[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?*

MOLECULAR GENETICS

68. *RNA polymerase II is blocked due to amanitine poisoning (poison of death-cup). It disturbs:* (2003, 2006)

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

69. *Genetic structure of eukaryote is "exon–intron–exon". This structure-functional organization of gene caused transcription peculiarities. What will be pro-mRNA according to the scheme?* (2003, 2004)

– Exon-exon-intron
– Intron-exon
– Exon-intron-exon
– Exon-intron
+ Exon-exon

70. *Part of the DNA chain turned 180 degrees as a result of gamma radiation. What type of mutation took place in the DNA chain?* (2003, 2005, 2006)

+ Inversion
– Deletion
– Translocation
– Doubling
– Replication

71. *An experiment proved that UV-radiated cells of patients with xeroderma pigmentosum restore the native DNA structure slower than cells of healthy individuals as a result of repair enzyme defect. What enzyme helps this process?* (2006)

– Primase
– RNA ligase
– DNA polymerase III
+ Endonuclease
– DNA gyrase

72. *Nowadays about 50 minor bases have been found in the tRNA structure besides the main four nitrogenous bases. Choose the minor nitrogenous base:* (2006)

– cysteine
+ dihydrouracil
– cytosine
– uracil

– adenine

73. *A patient's organism has decreased concentration of magnesium ions that are necessary for attachment of ribosomes to the granular endoplasmic reticulum. It is known that it causes disturbance of protein biosynthesis. What stage of protein biosynthesis will be disturbed?* (2007, 2008, 2009, 2010)

– Amino acid activation
– Termination
– Transcription
– Replication
+ Translation

74. *RNA of the AIDS virus penetrated into a leucocyte and forced a cell to synthetize a viral DNA by means of reverse transcriptase. This process is based upon:* (2007)

– replication
+ reverse transcription
– operon repression
– reverse translation
– operon depression

75. *Labelled amino acids alanine and tryptophane were injected to a mouse in order to study localization of protein synthesis in its cells. The labelled amino acids will be accumulated near the following organellas:* (2007, 2008, 2010)

– agranular (smooth) endoplasmic reticulum
– lysosomes
– Golgi apparatus
+ ribosomes
– cell center

76. *In some regions of South Africa there is a spread of sickle-cell anemia, in which erythrocytes have shape of a sickle as a result of substitution of glutamic acid by valine in the hemoglobin molecule. What is the cause of this disease?* (2007)

– Genomic mutation
– Crossing over
– Transduction
– Disturbance of mechanisms of genetic information realization
+ Gene mutation

77. *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?* (2008, 2011)

+ Transcription
– Replication
– Translation
– Processing
– Repair

78. *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:* (2008)
– initiation
– replication
+ processing
– repair
– mutation

79. *It was revealed that T lymphocytes were affected by HIV. Virus enzyme – reverse transcriptase (RNA-dependent DNA polymerase) – catalyzes the synthesis of:* (2008, 2011)
– 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

80. *You are studying functioning of a bacterial operon. The operator has been released from the repressor. Immediately after this the following process will start in the cell:* (2009)
– processing
+ transcription
– replication
– translation
– repression

81. *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?* (2010)[1]
+ Semiconservative
– Analogous
– Dispersed

[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?*

– Identical
– Conservative

82. *Protein synthesis includes several subsequent stages. It is preceded by the synthesis of immature mRNA. What do we call this process?*
– Termination
– Replication
– Elongation
– Translation
+ Transcription

83. *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

84. *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[1]

85. *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 [2]

86. *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?*

[1] or colinearity.
[2] There is a mistake in this question. Correct answer must be 55 because we must add the stop codon.

– Transduction
– Transcription
– Replication
+ Repair
– Transformation

87. *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

88. *One of the main characteristics of a living being is an 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

89. *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

90. *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

91. *According to the hypothesis of lactose operon (Jacob, Mono, 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

92. *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

93. *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[2]

94. *Protein-repressor has been found in a cell. What gene codifies the amino acid sequence of this protein?*[3]

– Promoter
– Terminator
+ Regulator
– Modifier
– Operator

95. *The gene which codifies 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] In the book "Collection of tasks…" – the term "operator gene" is used. Correct term is "gene operator" or "operator".
[2] or colinearity.
[3] It should be emphasised that promoter, terminator, and operator are NOT genes, but they are regulatory regions of genes!

– 1 exon and 1 intron
+ 4 exons
– 4 exons and 3 introns

96. *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

97. *The work of bacterium operon is being studied. A gene operator has been released from the protein-repressor. What do we call the process which begins right after that?*
– Amino acids activation
– Translation
– Replication
– Processing
+ Transcription

98. *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 4 types of nucleotides in the DNA molecule. Different amino acids are codified by a different number of triplets – from one to six. What do we call this property of the genetic code?*
– Triplet nature
– Universality
– Collinearity[1]
+ Degeneracy
– Specificity

99. *The operator 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 consequences could it have?*
+ Lack of protein synthesis
– Formation of abnormal proteins
– Synthesis of protein in unlimited quantities
– Formation of normal protein

[1] or colinearity.

– Short finish of protein synthesis

100. *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

101. *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

102. *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

[1] In the book "Collection of tasks…" the word "destroyed" is used (this is a mistake).

MEDICAL GENETICS

103. *Patient experienced increased susceptibility of the skin to the sunlight. His urine after some time became dark-red. What is the most likely cause of this?* (2003)

– Pellagra
– Albinism
– Hemolytic jaundice
+ Alkaptonuria
– Porphyria

104. *Examination of initial molecular structure of hemoglobin revealed substitution of the glutamic acid by valine. What inherited pathology is it typical for?* (2003, 2004, 2005, 2006)

– Thalassemia
+ Sickle-cell anemia
– Hemoglobinosis
– Minkowsky–Shauffard disease
– Favism

105. *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 joining a part of chromosome of the 21 pair*[1]*. What type of mutation does this girl have?* (2003)

– Insufficiency[2]
– Deletion
– Duplication
– Inversion
+ Translocation

106. *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?* (2003, 2006)

– Population-statistical
– Cytological
– Twin study (Gemellary)
– Genealogical
+ Biochemical

[1] During the exam in 2003, this question had the phrase "due to connected chromosome from the 21 pair", but in this case karyotype must have 45 chromosomes (apparent mistake). We changed this question according the book "Collection of tasks…" (question No. 103).
[2] Another possible answer – "aneuploidy".

107. *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?* (2004)

– Population-statistic
– Dermatoglyphics
– Biochemical
+ Cytological
– Clinico-genealogical

108. *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 syndrom. What method of medical genetics can confirm the diagnosis?* (2004)[1]

– Dermatoglyphics
– Population-statistic
– Genealogic
+ Cytogenetic
– Twin study

109. *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?* (2004)

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

110. *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:* (2005)

– genocopy
– Down's syndrom

[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. Also in this book another similar question is present: *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?*

– Edwards' syndrom
– Patau's syndrom
+ phenocopy

111. *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?* (2005, 2006)

– Alkaptonuria
+ Down's syndrome
– Super male
– Turner's syndrome
– Klinefelter's syndrome

112. *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:* (2007)

– spermatogenesis
– genealogy
– blood group
+ karyotype
– leukogram

113. *Autopsy of a newborn boy revealed polydactylia, microcephaly, cheiloschisis 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?* (2007)[1]

– Partial monosomy
+ Trisomy of the 13th chromosome
– Nondisjunction of sex chromosomes
– Trisomy of the 21th chromosome
– Trisomy of the 18th chromosome

114. *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*

[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.

typical for? (2007)
– Galactosemia
– Phenylketonuria
+ Tay–Sachs disease
– Gout
– Wilson disease

115. *Examination of a 12-year-old boy with developmental lag revealed 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:* (2008, 2011)
– congenital
– acquired
– inherited, sex-linked
– inherited, recessive
+ inherited, dominant

116. *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 with this disease?* (2009, 2011)
+ 47, XXY
– 47, XXX
– 46, XY
– 46, XX
– 45, XO

117. *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:* (2009)[1]
– albinism
– xanthinuria
+ phenylketonuria

[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.

– alkaptonuria
– tyrosinosis

118. *A 28-year-old female patient consulted a gynecologist about sterility. Examination revealed underdeveloped ovaries and uterus, irregular menstrual cycle. Analysis of the sex chromatin revealed two Barr's bodies in most somatic cells. What chromosome disease is most likely?* (2009, 2011)[1]

– Turner's syndrom
+ Triple X syndrom
– Klinefelter's syndrom
– Patau's syndrom
– Edwards' syndrom

119. *A couple had a child with Down's syndrom. Mother is 42 years old. This disease is most probably caused by the following impairment of prenatal development:* (2010)

– blastopathy
+ gametopathy
– embryopathy
– non-specific fetopathy
– specific fetopathy

120. *Cytogenetic examination of the patient with reproductive dysfunction revealed normal karyotype 46,XY in some cells, but most cells have karyotype of Klinefelter's syndrom – 47,XXY. Such cell heterogeneity is called:* (2010, 2011)

+ mosaicism
– duplication
– inversion
– monomorphism
– transposition

121. *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?* (2003, 2006, 2009)

– Autosomal dominant
– Sex-linked dominant

[1] 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?*

+ Sex-linked recessive
– Autosomal recessive
– Incomplete dominance[1]

122. *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:* (2009)
– daughters only
– all the children
– half of daughters
+ half of sons
– both sons and daughters

123. *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?* (2003, 2004, 2005)[2]
– Autosomal-recessive
– X-linked recessive
+ Y-linked[3]
– Autosomal-dominant
– X-linked dominant

124. *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?* (2004)[4]
+ Autosomal-dominant inheritance
– X-linked dominant inheritance
– X-linked recessive inheritance
– Autosomal-recessive inheritance
– Y-linked inheritance

125. *A healthy woman has three sons affected by color blindness*

[1] In the book "Collection of tasks…" – "semidominance".
[2] 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?*
[3] This information is out of date. According to more careful study, this trait is autosomal.
[4] 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?*

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? (2005)

+ X-linked recessive
– Autosomal-recessive
– Y-linked
– Autosomal-dominant
– X-linked dominant

126. *A geneticist analyzed the genealogy of a family and found that both males and females may have the illness, not across all the generations, and that healthy parents may have ill children. What is the type of illness inheritance?* (2006)

+ Autosomal-recessive
– Y-linked
– X-linked recessive
– Autosomal-dominant
– X-linked dominant

127. *As a result of prophylactic medical examination a 7 year old boy was diagnosed with Lesch–Nyhan syndrome (only boys fall ill with it). The boy's parents are healthy but his grandfather by his mother's side suffers from the same disease. What type of disease inheritance is it?* (2008)

– Autosomal recessive
– Dominant, sex-linked
– Autosomal dominant
+ Recessive, sex-linked
– Y-linked

128. *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?* (2011)

– Patau's syndrome
+ Turner's syndrome
– Cat cry syndrome
– Edwards' syndrome
– Down's syndrome

129. *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?* (2009)

– Autosomal recessive

– Y-linked
– Recessive, X-linked
+ Dominant, X-linked
– Autosomal dominant

130. *During the examination of the woman's epithelium of the cheek mucosa it was established that in most cells the nuclei had two Barr bodies. What provisional diagnosis can we make in this case?*

– Trisomy on the 13th chromosome
– Trisomy on the 21st chromosome
+ Trisomy on X chromosome
– Trisomy on the 18th chromosome
– Monosomy on X chromosome

131. *As a result of the abnormalities in the chromosomes disjunction*[1] *in meiosis, a secondary oocyte, 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?*

– Klinefelter's syndrome
+ Turner's syndrome
– Trisomy on the X-chromosome
– Down's syndrome
– Edwards' syndrome

132. *During the observation 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

133. *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

[1] In the book "Collection of tasks…" the term "divergence" is used (this is a mistake).

– Trisomy on X chromosome
– Down's syndrome
– Edwards' syndrome

134. *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

135. *One of the forms of rickets is inherited in the autosomal dominant way. This disease is a result of:*[1]
– Aneuploidy
– Changes in the number of chromosomes
– Chromosomal mutations
– Polyploidy
+ Gene mutations

136. *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

137. *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

138. *The first step in diagnosing diseases provoked by the disor-*

[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.

der 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?*

+ Biochemical
– Study of twins
– Cytogenetic
– Population-statistical
– Hybridization of somatic cells

139. *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

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

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

141. *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?*

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

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[1] quick tests.
[2] There is a mistake in this question in the book "Collection of tasks…" – the word "plate" is used in this book.

142. *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

143. *An 18-year-old girl has a body disproportion: wide shoulders, a narrow pelvis, shortened low extremities, aliform skin folds on the neck, underdevelopment of the ovaries. During the laboratory analysis neither "drumsticks" in the neutrophil nuclei nor Barr bodies in the nuclei of the buccal epithelium cells were found. Using the dermatoglyphics method it was determined that the atd palmar angle was equal to 66°. What provisional diagnosis can we make?*[1]

+ Turner's syndrome
– Down's syndrome
– Klinefelter's syndrome
– Patau syndrome
– Edwards' syndrome[2]

144. *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

145. *Three forms of Down's syndrome – trisomic, translocation,*

[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: Morris's syndrome.

and mosaic – are known. What genetic method do we have to use to distinguish these forms?

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

146. *The checkup of an 18-year-old girl showed underdevelopment of the ovaries, wide shoulders, a narrow pelvis, shortened extremities, and a "neck of sphinx". The girl was mentally healthy. The case was diagnosed as Turner's syndrome. What changes in the chromosomes' quantity is this disease connected with?*

– Trisomy on the 18th chromosome
– Trisomy on X chromosome
– Trisomy on the 13th chromosome
+ Monosomy on X chromosome
– Trisomy on the 21st chromosome

147. *A proband, his three sons, his brother and father have ichthyosis. 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

148. *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

149. *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

150. *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

151. *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 syndrom is it typical of?*
– Patau syndrome
– Turner's syndrome
+ Klinefelter's syndrome
– Down's syndrome
– Edwards' syndrome

152. *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
+ Cytogenetic
– Hybrid
– Biochemical
– Study of twins

153. *Pedigree analysis showed that the proband's disease occurred in each generation, affected a relatively big number of sibs, both men and women. What type of inheritance does it point out?*
– Y-linked
– Autosomal recessive
– Dominant, X-linked
– Recessive, X-linked
+ Autosomal dominant

154. *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

155. *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

156. *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 21st chromosome. What do we call the disease which is caused by this chromosomal abnormality?*

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

157. *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

158. *During the cytogenetic analysis in the cells of an abortive fe-*

[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: Shereshevskiy–Turner syndrome; Down's syndrome; Recklinghausen's disease; Klinefelter's syndrome; trisomy on X chromosome.

tus 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

159. *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

160. *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

161. *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

162. *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

163. *During the examination of a newborn the diagnosis of Down's syndrome was made. What is the main cause of this pathology?*
– Trisomy on the 13th chromosome
+ Trisomy on the 21st chromosome
– Trisomy on X chromosome
– Monosomy on the 1st chromosome
– Nondisjunction[1] of sex chromosomes.

164. *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

165. *The male karyotype is 47, XXY. He has endocrine hypertrophy: 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

166. *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?*
– Y-linked
– Autosomal recessive
– Dominant, X-linked
+ Recessive, X-linked
– Autosomal dominant

167. *In a maternity hospital a child with numerous development anomalies of the internal organs, such as the heart, kidneys, di-*

[1] Attention! Incorrect word *"undivergence"* is used in the book "Collection of tasks…" (this is a mistake, this word does not exist).

gestive system, was born. A doctor suspected Edwards' syndrome. What genetic method can confirm this diagnosis?

– Biochemical
– Dermatoglyphic
– Study of twins
– Pedigree analysis
+ Cytogenetic

168. *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

169. *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

170. *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

171. *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

172. *During the pedigree analysis of a family with such an inher-*

ited 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

173. *"Cat's cry" syndrome is characterized by the underdevelopment of laryngeal muscles, "miaowing" voice timbre, psychomotoric immaturity[1] of a child. This disease is the result of:*

– duplication of a fragment of the 5th chromosome
– translocation of the 21st chromosome on the 15th
+ deletion of the short arm of the 5th chromosome
– deletion of the short arm of the 21st chromosome
– inversion of a fragment of the 21st chromosome

174. *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

175. *What method of genetic examination most likely makes it possible to diagnose Shereshevskiy–Turner syndrome?*

– Genealogical
– Demographic-statistical
+ Identification of sex chromatin
– Bigeminal
– Dermatoglyphics

176. *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?*

[1] Attention! In the book "Collection of tasks…" the incorrect word "immaturation" is used (this word does not exist).

– Shereshevskiy–Turner
– Whiskott–Oldrich
– Loui–Barr
+ Klinefelter
– Down's syndrome

177. *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

178. *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
– Cysteine
– Alanine
– Urea

POPULATION GENETICS AND EVOLUTION

179. *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?* (2009)

– The same as throughout the population
– Lower than throughout the population
– 100%
+ Higher than throughout the population
– 50%

180. *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?* (2004)

– Artificial
– Sexual
+ Cutting
– Moving
– Stabilizing

GENERAL BIOLOGY

181. *On autopsy of a still-born infant 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?* (2005)

– Fishes
– Birds
– Mammals
+ Amphibian
– Reptiles

182. *At the laboratory experiment the leukocyte culture was mixed with staphylococci. Neutrophile leukocytes engulfed and digested bacterial cells. This process is termed:* (2005)

– facilitated diffusion
– diffusion
– osmosis
+ phagocytosis
– pinocytosis

183. *Examination of a newborn boy's genitalia revealed an urethral hiatus that opens on the underside of his penis. What malformation is it?* (2010)

– Cryptorchidism
– Monorchism
– Epispadia
– Hermaphroditism
+ Hypospadias

184. *A highly injured person has gradually died. Please choose the indicator of biological death:* (2005)

– disarray of chemical processes
+ autolysis and decay of the cells
– absence of movements
– absence of palpitation and breathing
– loss of consciousness

185. *A woman who was infected with toxoplasmosis during pregnancy has born a child with multiple congenital defects. This is a result of:* (2005, 2006)

+ teratogenesis
– chemical mutagenesis
– biological mutagenesis
– recombination
– cancerogenesis

186. *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 type is it?* (2008)

– Isotransplantation
+ Autotransplantation
– Allotransplantation
– Heterotransplantation
– Xenotransplantation

187. *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?* (2008)

– Mutagenic effect
– Blastomogenic effect
+ Teratogenic effect
– Fetotoxical effect
– Embryotoxical effect

188. *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?* (2009)

+ Epispadia
– Phimosis
– Hypospadia
– Hermaphroditism
– Paraphimosis

189. *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:* (2010)

+ immunosuppressors
– X-ray therapy
– chemotherapy
– enzymes
– ultrasound

190. *An alcoholic woman has born a girl with mental and physical developmental lag. Doctors diagnosed the girl with fetal alcohol syndrom. What effect is the cause of the girl's state?* (2010)

– Malignization
– Carcinogenic

– Mechanic
+ Teratogenic
– Mutagenic

191. *At a definite stage of embryogenesis the mother's and fetus's circulatory systems are becoming physiologically connected. What provisional organ fulfils this function?*
– Amnion
– Yolk sac
+ Placenta
– Serosa
– Allantois

192. *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

193. *In a human embryo the anlage of axis organs has begun. What is this development stage called?*
– Blastula
– Zygote
– Cleavage
+ Neurula
– Gastrula

194. *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

195. *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

196. *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

197. *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 way of transplantation is it?*
– Homotransplantation
– Explantation
– Allotransplantation
– Xenotransplantation
+ Autotransplantation

198. *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

199. *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

200. *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

201. *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

202. *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

203. *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
– First mature

PROTOZOANS

204. *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?* (2003, 2006)

+ Visceral leishmaniasis
– Toxoplasmosis
– Amebiasis
– Lambliasis
– Balantidiasis

205. *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?* (2003, 2004)

– *Balantidium*
+ Dysenteric amoeba
– *Lamblia*
– Intestinal amoeba
– *Trichomonas*

206. *Two weeks since the blood transfusion a recipient has developed fever. What protozoal disease can it be?* (2004)

– Trypanosomiasis
+ Malaria
– Leishmaniasis
– Toxoplasmosis
– Amebiasis

207. *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?* (2005)

– Sporozoites
– Schizonts
+ Gametocytes
– Merozoites
– Microgamete

208. *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? (2005, 2006)

+ *Balantidium*
– *Lamblia*
– Intestinal amoeba
– *Trichomonas*
– Dysenteric amoeba

209. *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?* (2005, 2006)

– 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

210. *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?* (2006)[1]

– Dysentery ameba
– Intestinal ameba
– *Trichomonas*
+ *Lamblia*
– *Balantidium*

211. *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?* (2007)

– Visceral leishmania
+ Toxoplasmas
– Malarial plasmodia
– Trypanosomes

[1] In the book "Collection of tasks…" this question is written as follows: *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. On a large scale there were 2 symmetrically placed nuclei. Which of the protozoans parasitized within the patient's body?* Answers: *Entamoeba coli; Entamoeba histolytica; Trichomonas hominis; Giardia intestinalis*; *Balantidium coli.*

– Dermotropic leishmania

212. *A patient has symptoms of inflammation of urogenital tracts. Examination of a vaginal smear revealed big mononuclear, pear-shaped organisms with the pointed spike at the posterior end of the body, big nucleus and undulating membrane. What protozoa were found in the smear?* (2007)

– *Trypanosoma gambiense*
– *Trichomonas hominis*
+ *Trichomonas vaginalis*
– *Trichomonas buccalis*
– *Lamblia intestinalis*

213. *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?* (2008)

+ Urogenital trichomoniasis
– Intestinal trichomoniasis
– Toxoplasmosis
– Balantidiasis
– Lambliasis

214. *A woman delivered a dead child with multiple developmental defects. What protozoan disease might have caused the intrauterine death?* (2009)[1]

– Leishmaniasis
+ Toxoplasmosis
– Amebiasis
– Lambliasis[2]
– Malaria

215. *A patient working at a pig farm complains about 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?* (2010, 2011)

– Amebiasis
– Lambliasis

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[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".

+ Balantidiasis
– Toxoplasmosis
– Trichomoniasis

216. *The examination of a patient showed that he had toxoplasmosis. Which material was used for diagnosing the disease?*
– Feces
+ Blood
– Urine
– Duodenal contents
– Phlegm

217. *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*

218. *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

219. *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 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*

[1] Similar question can have answers with common English names of causative agents.

+ *Entamoeba histolytica*

220. *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[1]
– Agent of toxoplasmosis
+ Agent of tertian malaria[2]

221. *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

222. *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*

223. *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
– Dangerous to other antelopes
– Dangerous only to predators

224. *Having returned from Turkmenia, a patient with ulcers on his face came to a doctor. The doctor diagnosed cutaneous leishma-*

[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.

niasis. 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

225. *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*

226. *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?*
– Ookinete
– Oocysts
– Sporozoites
– Sporocysts
+ Merozoites[1]

227. *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

228. *A woman who had two miscarriages came to a maternity welfare centre*[2]*. Which protozoan illness could provoke the miscarriages?*
– Balantidiasis

[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".
[2] In the book "Collection of tasks…" incorrect word combination "women's consultating centre" is used.

– Trichomoniasis
+ Toxoplasmosis
– Giardiasis
– Amebiasis

229. *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*

230. *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

231. *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*
– *Balantidium coli*
– *Trichomonas hominis*
+ *Toxoplasma gondii*

232. *During the checkup of restaurant workers doctors often notice as-symptomatic 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*

HELMINTHS

233. *During regular examination of schoolchildren it was revealed that a 10 year old girl had asymmetric oval eggs with a larva in the scrape from her perianal folds. What diagnosis should be made?* (2010)

– Ascariasis
– Trichocephalosis
+ Enterobiosis
– Amebiasis
– Ankylostomiasis

234. *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?* (2003, 2006)

– Enterobiosis
– Paragonimiasis
+ Ascariasis
– Opisthorchiasis
– Trichocephaliasis

235. *The guide of the scientific expedition in India was native who always was with his dog. What invasive disease can be transmitted by the dog if it is the source of invasion?* (2003)

– Dicroceliasis
– Teniasis
+ Echinococcosis
– Fascioliasis
– Paragonimiasis

236. *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?* (2003, 2005)

– *Ascaris lumbricoides*
– *Ancylostoma duodenale*
– Trichina
+ *Enterobius vermicularis*
– *Trichuris*

237. *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 an-*

amnesis that while living in the Far East the patient used to eat freshly salted caviar. Some relatives living with her had the similar condition. What is the most likely diagnosis? (2004, 2009)[1]

– Ascariasis
– Trichiniasis
– Echinococcosis
– Teniasis
+ Diphyllobothriasis

238. *The examination of a foreigner revealed intestinal schistosomiasis. How could the patient be infected?* (2004)

– Through dirty hands
– While eating meat
– While eating fish
+ During river swimming
– Through insects bites

239. *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?* (2004)

+ Trichinosis
– Teniasis
– Filariasis
– Taeniarhynchosis
– Cysticercosis

240. *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?* (2009, 2011)

– Intestinal schistosomiasis
+ Urogenital schistosomiasis
– Opisthorchiasis
– Dicroceliasis
– Japanese schistosomiasis

[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 B_{12} 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?*

241. *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?* (2009)

– Enterobiasis
– Trichocephaliasis
+ Filariasis
– Diphyllobothriasis
– Ascariasis

242. *In the perianal folds of a 5-year-old girl, her mother has found some white "worms" that caused itch and anxiety in the child. The "worms" were sent to the laboratory. During examination the physician saw white filiform helminths 0.5–1 cm long, with pointed ends, some helminths had twisted ends. What is the most likely diagnosis?* (2009)

– Ascariasis
– Opisthorchiasis
– Diphyllobothriasis
– Teniasis
+ Enterobiasis

243. *Two days after consumption of smoked pork a patient got face and eyelid edemata, gastrointestinal disturbances, abrupt temperature rise, muscle pain. Blood analysis showed full-blown eosinophilia. What helminth could the patient is infected with?* (2007)

– Ascarid
– Whipworm
+ Trichina
– Pinworm
– Hookworm

244. *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?* (2007)

+ Opisthorchiasis
– Diphyllobothriasis
– Teniasis
– Beef tapeworm infection
– Echinococcosis

245. *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:* (2007)

– duodenal contents analysis
– roentgenoscopy
– immune diagnostics
– biopsy of muscle tissue
+ scraping from perianal folds

246. *A male patient has fever and enanthesis. As a result of the examination involving serological tests he has been diagnosed with Fasciola hepatica. It was found out that the patient had been infected through raw river water. Which stage of Fasciola life cycle is invasive for humans?* (2011)

+ Adolescaria
– Cysticercus
– Metacercaria
– Miracidium
– Ovum

247. *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*

248. *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*

249. *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

250. *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*

251. *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

252. *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*

253. *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*

254. *A 35-year-old man came to a doctor complaining of epigas-*

[1] In the book "Collection of tasks…" – "cysticercus were found" (this is a mistake).

tric 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

255. *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*

256. *Fragments of a helminth were found in the feces of a patient after drug treatment. These fragments had a tapelike 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*

257. *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

258. *A 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*

259. *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

260. *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

261. *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

262. *A woman came to a doctor complaining of indigestion. In her feces flat white moving segments constantly appeared. Laboratory examination revealed that they were long, narrow proglottids with a longitudinal canal of the uterus which had 17–35 lateral branches on each side. Which of the helminths did the woman have in her intestines?*

– *Hymenolepis nana*

– *Taenia solium*
+ *Taenia saginata*
– *Diphyllobothrium latum*
– *Echinococcus granulosus*

263. *A hunter drank raw water from a pond. Which of helminthiasis may the man get?*
– Opisthorchiasis
+ Fascioliasis
– Paragonimiasis
– Clonorchiasis
– Taeniasis

264. *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*

265. *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*

266. *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

267. *During the examination a patient was diagnosed with opisthorchiasis. With what food could the patient get the agent of op-*

isthorchiasis?
– Cysticercosis beef
– Dirty vegetables
– Cysticercosis pork
– Dirty fruit
+ Undercooked fish

268. *A patient, who came to Ukraine from Australia, consulted a doctor complaining of pain during urination. The analysis of his day urine specimens revealed large terminally spitted eggs. What helminth did the patient have?*
– *Opisthorchis felineus*
– *Schistosoma mansoni*
– *Schistosoma japonicum*
+ *Schistosoma haematobium*
– *Dicrocoelium lanceatum*

269. *During the examination of a man who has recently come back from Africa schistosomiasis is diagnosed. How could the pathogenic organism penetrate into the organism of the patient?*
– While eating pork
– While eating fish
+ While swimming in the river
– Through dirty hands
– In case of mosquitoes' bites

270. *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

271. *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*

272. *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*

ARTHROPODS

273. *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?* (2005, 2006)

– Scabies
– Malaria
– Plague
– Tularemia
+ Epidemic typhus

274. *During the examination of a patient with bleeding wounds the doctor found out that the tissue was damaged by maggots, there were local maturations. The diagnosis of what insect caused the disease?* (2004)

– House fly
– Tsetse fly
– Stable fly
+ Blow fly (Wohlfahrtia magnifica)
– Triatomic bug

275. *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?* (2005, 2006)

+ Lice
– Spiders
– Houseflies
– Bedbugs
– Cockroaches

276. *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:* (2007)

+ *Anopheles*
– *Mansonia*
– *Aëdes*
– *Culex*
– *Culiseta*

277. *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: (2008, 2009)
– Solpuga
+ Karakurt spider
– Scorpion
– Mite
– Tarantula

278. *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?* (2008, 2010, 2011)
– Pediculosis
– Myiasis
– Scabies
+ Demodicosis
– Phthiriasis

279. *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:* (2010)
– malarial mosquito
– kissing bug
+ Wohlfahrtia fly
– sand fly[1]
– stable fly *(Stomoxys calcitrans)*

280. *A patient came to a doctor with complaints of itchy skin especially between the fingers and at the bottom of his abdomen. Sinuous passages with disseminations on their ends were found on the patient's skin. What disease did these symptoms point out?*
– Pediculosis
+ Scabies
– Toxoplasmosis
– Malaria
– Myiasis

281. *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

[1] During the exam in 2010, this answer was "mosquito", but in appropriate Russian question answer was "sand fly" *(Phlebotomus).*

– *Simulium* black fly
+ *Anopheles* mosquito
– *Aëdes* mosquito

282. *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*

283. *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
– Gadflies
+ Sand flies
– Stable flies

284. *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*

285. *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

286. *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*
– *Ornithodorus papillipes*
– *Dermacentor pictus*
– *Ixodes persulcatus*

287. *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*

288. *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

289. *After the examination a patient was diagnosed with Russian spring-summer encephalitis. How was the patient infected?*
– By means of an itch mite's bite
– By means of a malaria mosquito's bite
– By means of a soft tick's bite
– By means of a sand fly's bite
+ By means of a hard tick's bite

290. *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 parasitic arachnids were found. What animal infected the patient?*
+ Follicle mite
– Itch mite
– Human flea
– Bedbug
– Wohlfahrtia fly

MIXED QUESTIONS ON PARASITOLOGY

291. *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

292. *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

293. *During the checkup of schoolgirls colorless asymmetric oval eggs with larvae inside were found in the scrape of perianal folds of a 10-year-old girl. What disease does it indicate?*

– Amebiasis
– Ascariasis
+ Enterobiasis
– Trichuriasis
– Ancylostomiasis

ЕЛЕКТРОННЕ НАВЧАЛЬНЕ ВИДАННЯ

ТЕСТОВІ ЗАВДАННЯ
для складання державного ліцензійного іспиту "Крок-1. Загальна лікарська підготовка"
З МЕДИЧНОЇ БІОЛОГІЇ
(англійською мовою)

для самостійної роботи студентів спеціальності 7.110101 "Лікувальна справа"

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