

ЛД-16 ИН

Federal State Budgetary Educational Institution of Higher Education  
«North-Ossetia State Medical Academy»  
of the Ministry of Healthcare of the Russian Federation

**Department of Biology and Histology**

**Approved by  
The protocol of the meeting of the  
Central Coordination Training and  
Methodological Council  
№5 in 23.05.23**

**ASSESSMENT TESTS**

**«Biology»  
the main professional educational program of higher education - specialty program in the  
specialty 31.05.01 General Medicine, approved in 24.05.23**

For the first year students who study in English

Considered and approved at the meeting of the department  
22.05.23 (protocol №10)

## Cell biology.

1. In human beings 45,XO abnormality causes
  1. Down's syndrome
  2. Klinefelter's syndrome
  - 3. Turner's syndrome**
  4. Edward's syndrome
  
2. Down's syndrome is due to
  1. crossing over
  2. linkage
  3. sex-linked inheritance
  - 4. nondisjunction of chromosomes.**
  
3. The colour blindness is more likely to occur in males than in females because
  1. the Y-chromosome of males have the genes for distinguishing colours
  - 2. genes for characters are located on the X- chromosomes**
  3. the trait is dominant in males and recessive in females
  4. none of the above.
  
4. An abnormal human male phenotype involving an extra X-chromosome (XXY) is a case of
  1. Edward's syndrome
  - 2. Klinefelter's syndrome**
  3. intersex
  4. Down's syndrome
  
5. Down's syndrome in humans is due to
  1. three X chromosome
  - 2. three copies of chromosome 21**
  3. monosomy
  4. two Y chromosomes
  
6. A person with the sex chromosomes XXY suffers from
  1. gynandromorphism
  - 2. Klinefelter's syndrome**
  3. Down's syndrome
  4. Turner's syndrome.
  
7. XO chromosomal abnormality in human beings causes
  - 1. Turner's syndrome**
  2. Down's syndrome
  3. Klinefelter's syndrome
  4. Edward's syndrome

8. XXY chromosomal abnormality in human beings causes

1. Turner's syndrome
2. Down's syndrome
- 3. Klinefelter's syndrome**
4. Edward's syndrome

9. In human beings 47,XY,+13 abnormality causes

1. Down's syndrome
- 2. Patau syndrome**
3. Turner's syndrome
4. Edward's syndrome

10. 47,XY,+18 chromosomal abnormality in human beings causes

1. Turner's syndrome
2. Down's syndrome
3. Klinefelter's syndrome
- 4. Edward's syndrome**

11. The example of point mutation is found in a disease called

1. Down's syndrome
- 2. sickle cell anaemia**
3. Klinefelter's syndrome
4. night blindness.

12. In which of the following diseases, the man has an extra X-chromosome?

1. Turner's syndrome
- 2. Klinefelter's syndrome**
3. Down's syndrome
4. haemophilia.

13. Mongolian Idiocy due to 47,XY,+21 chromosome abnormality is called

- 1. Down's syndrome**
2. Turner's syndrome
3. Klinefelter's syndrome
4. Triple X syndrome.

14. Number of Barr bodies in XXXX female is

1. 1
2. 2
- 3. 3**
4. 4

15. A girl with 47 chromosomes due to three copies of chromosome 18 is characterized by

1. super femaleness
- 2. Edward's syndrome**

3. Turner's syndrome
4. Down's syndrome.

16. Cri-du-chat syndrome in humans is caused by the

1. trisomy of 13th chromosome
2. fertilization of an XX egg by a normal Y-bearing sperm
- 3. loss of half of the short arm of chromosome 5**
4. missense mutation

17. The chromosome with the equal arms and centromere in the middle is:

- 1. Metacentric**
2. Submetacentric
3. Acrocentric
4. Telocentric

18. If the centromere is slightly offset from the center of the chromosome, and the arms slightly unequal, this chromosome is called:

1. Metacentric
- 2. Submetacentric**
3. Acrocentric
4. Telocentric

19. If the centromere is near one end of the chromosome, and arms are very unequal, this chromosome is called:

1. Metacentric
- 2. Submetacentric**
3. Acrocentric
4. Telocentric

20. If the centromere is at one end of the chromosome, and the arms are on one side only, this chromosome is called:

1. Metacentric
2. Submetacentric
3. Acrocentric
- 4. Telocentric**

21. Which of the following must happen first in order for DNA replication to occur?

- 1) DNA polymerase binds to the leading strand
- 2) Helicase begins to break the hydrogen bonds**
- 3) Hydrogen bonds form between bases
- 4) Chromosomes condense

22. Okazaki fragments form on the:

- 1) lagging strand**
- 2) leading strand
- 3) base-pairs
- 4) 5' end

23. Which of the following is required for DNA replication to occur?

- 1) DNA helicase
- 2) DNA ligase
- 3) DNA polymerase
- 4) all of these**

24. A nucleotide consists of:

- 1) a nitrogen base
- 2) a nitrogen base and a sugar
- 3) a nitrogen base, sugar, and phosphate**
- 4) nitrogen base, a sugar, and three phosphates

25. Which of the following would be classified as the purines?

- 1) Adenine and Thymine
- 2) Adenine and Guanine**
- 3) Adenine and Cytosine
- 4) Thymine and Cytosine

26. The backbone of the DNA structure is made up of...

- 1) Alternating phosphates and sugar molecules**
- 2) Nitrogen-containing bases
- 3) Alternating bases and sugars
- 4) Alternating phosphates and bases

27. A DNA strand has the following bases: A A G C C A. What are the bases on its complimentary strand?

- 1) A A G C C A
- 2) A C C G A A
- 3) T T C G G T**
- 4) C C A T T C

28. Universality of the genetic code:

1. each amino acid is encoded by 3 nucleotides
2. each nucleotide is part of only one triplet.
- 3. the genetic code is the same for all living organisms.**
4. each triplet encodes a strictly defined amino acid

29. If the protein consists of 500 amino acids, then the number of nucleotides in it's gene is:

1. 300
2. 600
3. 900
- 4. 1500**

30. Which of the following is TRUE about gene mutation

1. The exchange of DNA between chromosomes during meiosis.
2. The movement of a ribosome from one reading frame to another at an internal position within a gene
3. A DNA repair process that corrects various types of DNA damage by excising and resynthesizing a region of polynucleotide
4. **Permanent, heritable alterations in the base sequence of the DNA.**

31. Change in one amino acid in a protein, arising from a point mutation in a single nucleotide is:

1. Nonsense mutation
2. Frameshift mutation
3. Silent mutations
4. **Missense mutation**

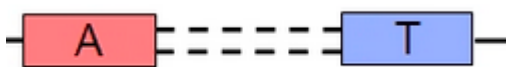
32. Constitutive heterochromatin containing

1. the genes that are actively transcribed
2. **the genes that are always transcriptionally inactive**
3. the genes of prokaryotes
4. the Barr body

33. DNA is replicated during:

1. Metaphase
2. **Interphase**
3. Prophase
4. Anaphase

34. The dashed lines between the two bases represents...



1. Ionic bonding
2. Pyrimidial bonding
3. Phosphate-sugar bonds
4. **Hydrogen bonds**

35. Which of the following best represents Chargraff's rule of base pairing?

1. **A bonds with T, C bonds with G always**
2. A and G will always have double rings in their molecules
3. A bonds with C and G bonds with T
4. No such rule exists

36. Genetic Code is non-ambiguity. It means that:

1. each amino acid is encoded by 3 nucleotides
2. each nucleotide is part of only one triplet.
3. the genetic code is the same for all living organisms.
4. **each triplet encodes a strictly defined amino acid**

37. Protein consists of 120 amino acids. How many nucleotides has the gene in which this protein is encoded?

1. 60
2. 120
3. 240
4. **360**

38. Gene mutation is best described as

1. The formation of a DNA molecule
2. **A change in DNA sequence**
3. A change in number of DNA molecules
4. A nucleotide in the DNA molecule

39. An alteration in a nucleotide sequence that leads to replacement of all amino acids in a protein is....

1. Nonsense mutation
2. **Frameshift mutation**
3. Silent mutations
4. Missense mutation

40. All human BODY CELLS contain this many chromosomes

1. 23
2. **46**
3. 8
4. 45

41. Adjacent nucleotides in DNA strand are linked by:

1. a hydrogen bond
2. **a phosphodiester bond**
3. an ionic bond
4. a double bond

42. The amount of adenine is always equal to the amount of \_\_\_\_\_ in DNA.

1. Cytosine
2. Uracil

3. Guanine
- 4. Thymine**

43. Degeneracy of the genetic code:

1. each amino acid is encoded by 3 nucleotides
- 2. amino acids can be encoded by several triplets.**
3. the genetic code is the same for all living organisms.
4. nucleotides can be part of several triplets.

44. What is the number of nucleotides in a gene region that encodes the primary structure of a 300 amino acid in protein?

1. 100
2. 300
3. 600
- 4. 900**

45. An alteration in a nucleotide sequence that do not have an observable effect on the organism's phenotype is.....

1. Nonsense mutation
2. Frameshift mutation
- 3. Silent mutations**
4. Missense mutation

46. Aneuploidy is best described as

1. The formation of a DNA molecule
2. A change in DNA sequence
- 3. A change in number of chromosomes**
4. A nucleotide in the DNA molecule

47. How many pairs of chromosomes are in a human body cell?

1. 46
2. 12
- 3. 23**
4. 8

48. Which of the following phrases describes chromatin fibers (solenoid)?

1. Single ribosomes attached to mRNA
2. Complexes of DNA and all the histones except H4
- 3. H1 provide retraction adjacent nucleosomes**
4. Complexes of protein and the 45S rRNA precursors found in the nucleolus



49. Match the types of nucleic acids and their signs.

**SIGNS OF NUCLEIC ACIDS**

- A. consists of two polynucleotide chains twisted into a spiral
- B. consists of one polynucleotide chain
- C. transfers hereditary information from the nucleus to the ribosome
- D. is formed during transcription
- E. consists of nucleotides A, U, G, C

**TYPES OF NUCLEIC ACIDS**

- 1) DNA
- 2) mRNA

A	B	C	D	E
1	2	2	2	2

50. Match the items listed in column I with suitable items from column II.

**CHARACTERISTICS**

- A. centromere is at the middle of the chromosome
- B. the centromere is slightly offset from the center of the chromosome
- C. the centromere is near one end of the chromosome
- D. Arms are slightly unequal
- E. Arms are equal

**TYPES OF CHROMOSOMES**

- 1.submetacentric
- 2.metacentric
- 3.acrocentric

A	B	C	D	E
2	1	3	1	2

51. Match the items listed in column I with suitable items from column II.

**CHARACTERISTICS**

- A. centromere is at the middle of the chromosome
- B. the centromere is slightly offset from the center of the chromosome
- C. the arms are on one side only
- D. Arms are slightly unequal
- E. Arms are equal

**TYPES OF CHROMOSOMES**

- 1. telocentric
- 2. submetacentric
- 3. metacentric

A	B	C	D	E
3	2	1	2	3

52. Match the types of nucleic acids and their signs.

**SIGNS OF NUCLEIC ACIDS**

- A. has the shape of a clover leaf
- B. copies information about the structure of the protein from DNA

**TYPES OF NUCLEIC ACIDS**

- 1) mRNA
- 2) tRNA

- C. one of the triplets is an anticodon
- D. serves as a template in the process of translation.
- E. has the smallest size of nucleic acids

A	B	C	D	E
2	1	2	1	2

53. Match the types of nucleic acids and their signs.

**SIGNS OF NUCLEIC ACIDS**

- A. consists of nucleotides A, U, G and C
- B. transports amino acids to the ribosomes
- C. is the template for transcription
- D. deoxyribose is a part of it's nucleotide
- E. the secondary structure has the form of a clover leaf.

**TYPES OF NUCLEIC ACIDS**

- 1) DNA
- 2) tRNA

A	B	C	D	E
2	2	1	1	2

54. Match the types of nucleic acids and their signs.

**SIGNS OF NUCLEIC ACIDS**

- A. transports amino acids to the ribosomes
- B. serves as a template in the process of translation
- C. one of the triplets is an anticodon
- D. forms ribosomes
- E. has the form of a clover leaf.

**TYPES OF NUCLEIC ACIDS**

- 1) mRNA
- 2) tRNA
- 3) rRNA

A	B	C	D	E
2	1	2	3	2

55. Match the items listed in column I with suitable items from column II.

**CELL FORMS**

- A. Primary spermatocyte
- B. Secondary spermatocyte
- C. Spermatogonia
- D. Spermatids
- E. Spermatozoon

**AMOUNT OF HEREDITARY MATERIAL**

- 1)  $2n2c$
- 2)  $2n4c$
- 3)  $n2c$
- 4)  $nc$

A	B	C	D	E
2	3	1	4	4

56. Match the items listed in column I with suitable items from column II.

CELL FORMS

- A. Spermatozoon
- B. Primary spermatocyte
- C. Secondary spermatocyte
- D. Spermatogonia
- E. Spermatid

STAGES OF SPERMATOGENESIS

- 1) growth
- 2) formation
- 3) multiplication
- 4) maturation

A	B	C	D	E
2	3	1	4	4

57. Match the items listed in column I with suitable items from column II.

CELL FORMS

- A. Spermatogonia
- B. Primary spermatocyte
- C. Secondary spermatocyte
- D. Spermatids
- E. Spermatozoon

AMOUNT OF HEREDITARY MATERIAL

- 1) nc
- 2) n2c
- 3) 2n2c
- 4) 2n4c

A	B	C	D	E
3	4	2	1	1

58. Match the names of cells formed during spermatogenesis and its stage.

FORMED CELLS:

- A. secondary spermatocytes
- B. Sperm
- C. Spermatogonia
- D. primary spermatocytes
- E. Spermatids

STAGE:

- 1) Growth phase
- 2) multiplication phase
- 3) Spermiogenesis
- 4) Maturation phase

A	B	C	D	E
4	3	2	1	4

59. Match the characteristic and the type of cell division to which it belongs.

CHARACTERISTIC

- A) the formation of daughter cells identical to the maternal
- B) homologous chromosomes move to opposite poles of the cell
- C) homologous chromosomes pair up to each other
- D) gene exchange occurs between homologous chromosomes
- E) division underlies vegetative reproduction of plants.

FORM OF CELL DIVISION

1) mitosis

2) meiosis

A	B	C	D	E
1	2	2	2	1

60. Match the names of the cells formed in the process of spermatogenesis, and the amount of hereditary material in them.

FORMED CELLS:

A. secondary spermatocytes

B. Sperm

C. Spermatogonia

D. primary spermatocytes

E. Spermatids

STAGE:

1)  $2n2c$

2)  $nc$

3)  $n2c$

4)  $2n4c$

A	B	C	D	E
3	2	1	4	2

61. Match the characteristic and the type of cell division to which it belongs.

CHARACTERISTIC

A) haploid cells are formed with double-chromatid chromosomes

B) sister chromatids moves to different poles of the cell

C) crossing over occurs

D) bivalents line up at the equator

E) haploid set of chromosomes in prophase

F) in anaphase set of chromosomes is  $2n2c$

FORM OF CELL DIVISION

1) meiosis 1

2) meiosis 2

A	B	C	D	E	F
1	2	1	1	2	2

62. Match the processes occurring in spermatogenesis with the stages of spermatogenesis

PROCESS

A. first division of meiosis

B. cell division by mitosis

C. formation of spermatogonia

D. formation of primary spermatocytes

E. second division of meiosis

F. Acrosome and tail formation in sperm

STAGE:

1) Growth phase

2) multiplication phase

3) Spermiogenesis

4) Maturation phase

A	B	C	D	E
4	2	2	1	3

63. Match the characteristic of the process and the method of dividing the cell, which it illustrates.

CHARACTERISTIC

- A) movement of homologous chromosomes to the opposite poles
- B) conjugation of homologous chromosomes
- C) the formation of four haploid daughter cells
- D) the formation of two daughter cells with the number of chromosomes equal to the parent cell
- E) gene exchange between chromatids of homologous chromosomes

FORM OF CELL DIVISION

- 1) meiosis
- 2) mitosis

A	B	C	D	E
1	1	1	2	1

64. Match the names of the cells formed in the process of spermatogenesis, and the amount of hereditary material in them.

FORMED CELLS:

- A. secondary oocyte
- B. second polar body
- C. Oogonia
- D. primary oocyte
- E. ovum

STAGE:

- 1)  $2n2c$
- 2)  $nc$
- 3)  $n2c$
- 4)  $2n4c$

A	B	C	D	E
3	2	1	4	2

65. Match the feature of cell division and the method of division for which it is characteristic.

FEATURE OF DIVISION

- A) two diploid daughter cells are formed
- B) the maturation of gametes in animals
- C) maintains the constancy of the number of chromosomes in the cells.
- D) recombination of genes in chromosomes occurs
- E) serves as a method for asexual reproduction of protozoa.

FORM OF CELL DIVISION

- 1) mitosis

2) meiosis

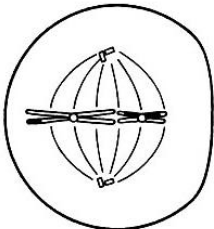
A	B	C	D	E
1	2	1	2	1

66. For the cell division phase shown in the figure, it is characteristic:



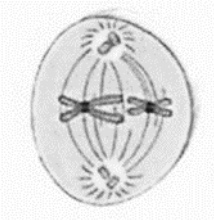
Form of division	<b>mitosis</b>
Division phase	<b>metaphase</b>
Set of genetic material	<b>2n4c</b>

67. For the cell division phase shown in the figure, it is characteristic:



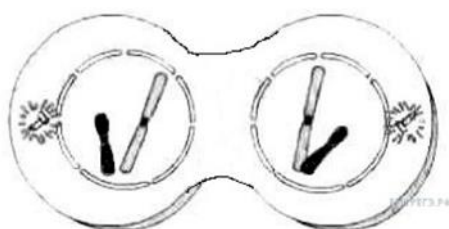
Form of division	<b>Meiosis II</b>
Division phase	<b>Metaphase II</b>
Set of genetic material	<b>N2c</b>

68. For the cell division phase shown in the figure, it is characteristic:



Form of division	Meiosis 2
Division phase	Metaphase 2
Set of genetic material	N2c

69. For the cell division phase shown in the figure, it is characteristic:



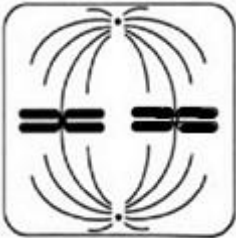
Form of division	Meiosis 2
Division phase	telophase
Set of genetic material in each cell	nc

70. For the cell division phase shown in the figure, it is characteristic:



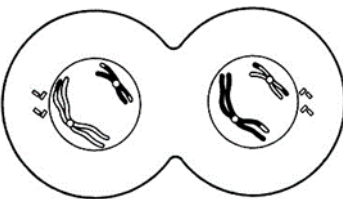
Form of division	Meiosis 1
Division phase	Anaphase 1
Set of genetic material	2n4c

71. For the cell division phase shown in the figure, it is characteristic:



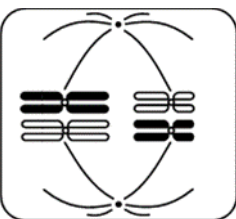
Form of division	mitosis
Division phase	metaphase
Set of genetic material	2n4c

72. For the cell division phase shown in the figure, it is characteristic:



Form of division	Meiosis 1
Division phase	Telophase 1
Set of genetic material in each new cell	N2c

73. For the cell division phase shown in the figure, it is characteristic:



Form of division	Meiosis 1
Division phase	Metaphase 1
Set of genetic material	2n4c

74. For the cell division phase shown in the figure, it is characteristic:



Form of division	Meiosis 2
Division phase	anaphase 2
Set of genetic material	2n2c

75. Determine the correct sequence of listed processes of protein synthesis

- 1) recognition of terminator by RNA-polymerase
- 2) enter of tRNA with methionine in the P-site of the ribosome
- 3) detection of promoter by RNA-polymerase
- 4) 5' cap addition to mRNA
- 5) peptide bond formation
- 6) detection of a stop codon

**314256**

76. Determine the correct sequence of listed processes of protein synthesis

- 1) enter of tRNA carrying methionine in the P-site of the ribosome
- 2) enter of second tRNA into the A-site of the ribosome
- 3) addition of amino acid to the acceptor end of tRNA
- 4) movement of tRNA with an amino acid to the ribosome
- 5) tRNA release from the ribosome

**34125**

77. Determine the correct sequence of following list of protein structure.

- 1) polypeptide chain
- 2) globule
- 3) the formation of hydrogen bonds between different turns of the helix
- 4) structure of several subunits

**1324**

78. Determine the correct sequence of listed processes of protein synthesis.

- 1) unwinding of the DNA molecule
- 2) formation of peptide bonds between amino acids



- 3) enter of tRNA with methionine in the P-site of the ribosome
- 4) detection of promoter by RNA-polymerase
- 5) splicing of mRNA
- 6) transcription

**146532**

79. Determine the correct sequence of listed processes of protein synthesis.

- 1) movement of tRNA with an amino acid to the ribosome
- 2) enter of tRNA carrying methionine in the P-site of the ribosome
- 3) enter of second tRNA into the A-site of the ribosome
- 4) addition of amino acid to the acceptor end of tRNA
- 5) tRNA release from the ribosome

41235

80. Determine the correct sequence of listed stages of prophase 1.

- 1) zygotene
- 2) leptotene
- 3) diplotene
- 4) pachytene
- 5) diakinesis

**21435**

81. Determine the correct sequence of listed processes of meiosis.

- 1) the formation of two cells with a set of  $n2c$
- 2) the separation of homologous chromosomes
- 3) a set of genetic information in the cell  $2n2c$
- 4) the arrangement of bivalents in the equatorial plate
- 5) conjugation, crossing over homologous chromosomes

**54213**

82. Determine the correct sequence of listed processes of protein synthesis.

1. enter of second tRNA into the A-site of the ribosome
2. formation of peptide bonds between amino acids
3. enter of tRNA with methionine in the P-site of the ribosome
4. detection of promoter by RNA-polymerase
5. splicing of mRNA
6. transcription

**465312**

83. Arrange this stages of prophase 1 in correct sequence.

- 1) zygotene

- 2) pachytene
  - 3) leptotene
  - 4) diplotene
  - 5) diakinesis
- 31245

84. Determine the correct sequence of following list of protein structure.

- 1) structure of several subunits
  - 2) polypeptide chain
  - 3) globule
  - 4) the formation of hydrogen bonds between different turns of the helix
- 2431

85. Determine the correct sequence of listed processes of meiosis.

- 1) the location of pairs of homologous chromosomes in the equatorial plane
  - 2) conjugation, crossing over homologous chromosomes
  - 3) the separation of chromatids
  - 4) the formation of four haploid nuclei
  - 5) the homologous double-chromatid chromosomes move to the opposite poles of cell
- 21534**

86. Determine the correct sequence of listed processes of protein synthesis.

- 1) enter of tRNA with methionine in the P-site of the ribosome
  - 2) enter of second tRNA into the A-site of the ribosome
  - 3) transcription
  - 4) formation of peptide bonds between amino acids
  - 5) unwinding of the DNA molecule
  - 6) splicing of mRNA
- 536124**

## ONTOGENESIS

1. What are the components of spermatozoon middle piece?
  1. nucleus
  2. axial fibers
  3. acrosome
  - 4. mitochondria**
2. What is pronucleus?
  1. nucleus nc
  - 2. nucleus n2c**
  3. zygote nucleus
  4. polar body nucleus
3. What is zygote?
  1. unicellular organism with male and female pronuclei
  2. double cellular organism with diploid chromosomal set
  - 3. unicellular organism with diploid chromosomal set**
  4. double cellular organism with haploid chromosomal set
4. Which structure is bigger?
  1. oocyte
  2. zygote
  3. morula
  - 4. all are equal**
5. Types of oocytes on the basis of the amount of yolk:
  1. Isolecithal, alecithal
  2. Centrolecithal, mesolecithal, telolecithal
  3. Centrolecithal, alecithal, polylecithal
  - 4. Alecithal, oligolecithal, mesolecithal, polylecithal**
6. What is the type of amphioxus cleavage?
  1. Meroblastic, synchronic, unequal
  2. Meroblastic, asynchronous, unequal
  - 3. Holoblastic, synchronic, equal**
  4. Holoblastic, asynchronous, unequal
7. What is the type of bird blastula?
  1. coeloblastula
  2. blastocyst
  3. amphyblastula
  - 4. discoblastula**
8. Which layers of 7-14 days germ disk do you know?
  - 1. Epiblast and hypoblast**
  2. Cytotrophoblast and syncytiotrophoblast
  3. Embryoblast and trophoblast
  4. Ectoderm, mesoderm and entoderm

9. What does acrosome mean?
1. Special granules in sperm
  2. Mitochondria in the middle piece of sperm
  3. Inclusions in the neck of sperm
  - 4. Changed Golgi body at the tip of the head of sperm**
10. Usual place of fertilization:
1. in ovary
  2. in uterine
  - 3. in uterine tube**
  4. in uterine mucosa
11. When does implantation begin in humans?
1. During the 1<sup>st</sup> day after fertilization
  2. During 3<sup>rd</sup> day after fertilization
  3. During 12<sup>th</sup> day after fertilization
  - 4. During 6<sup>th</sup> day after fertilization**
12. Types of oocytes on the basis of the amount of yolk:
1. Alecithal, oligolecithal, mesolecithal, telolecithal
  - 2. Alecithal, oligolecithal, mesolecithal, polylecithal**
  3. Centrolecithal, telolecithal, isolecithal
  4. Centrolecithal, alecithal, polylecithal
13. What is the type of amphibians cleavage?
1. Meroblastic, asynchronous, unequal
  2. Meroblastic, discoidal
  3. Holoblastic, synchronous, equal
  - 4. Holoblastic, asynchronous, unequal**
14. What is the type of amphioxus blastula?
- 1. coeloblastula**
  2. periblastula
  3. amphyblastula
  4. discoblastula
15. Which types of cells in blastocyst do you know?
1. Epiblast and hypoblast
  - 2. Embryoblast and trophoblast**
  3. Cytotrophoblast and syncytiotrophoblast
  4. Oocyte and spermatozoa
16. Which structures lie in the head of spermatozoon?
- 1. acrosome and nucleus**
  2. acrosome and proximal centriole
  3. distant centriole and nucleus
  4. microtubules and nucleus
17. How many chromosomes does human egg cell have?

1. 22 autosomes + 1 X or Y sex chromosome
  2. 22 autosomes + 1 Y sex chromosome
  - 3. 22 autosomes + 1 X sex chromosome**
  4. 22 pairs autosomes+ 1 pair sex chromosome
18. Types of oocytes on the basis of the distribution of yolk:
1. Alecithal, oligolecithal, mesolecithal, telolecithal
  2. Alecithal, oligolecithal, mesolecithal, polylecithal
  - 3. Centrolecithal, telolecithal, isolecithal**
  4. Centrolecithal, Alecithal, polylecithal
19. What is the type of reptiles cleavage?
1. Meroblastic, synchronic, unequal
  - 2. Meroblastic, discoidal**
  3. Holoblastic, synchronic, equal
  4. Holoblastic, asynchronic, unequal
20. What is the type of human blastula?
1. celoblastula
  - 2. blastocyst**
  3. amphyblastula
  4. discoblastula
21. When does late gastrulation in humans begin?
1. During 3<sup>rd</sup> – 4<sup>th</sup> day after fertilization
  2. During 1<sup>st</sup> – 2<sup>th</sup> day after fertilization
  - 3. During 14<sup>th</sup> – 15<sup>th</sup> day after fertilization**
  4. During 27<sup>th</sup> – 28<sup>th</sup> day after fertilization
22. Which cells are motile?
1. oocytes
  - 2. spermatozoa**
  3. spermatocytes
  4. spermatids
23. Main result of fertilization is:
1. formation of blastula
  2. nourishment of zygote
  - 3. renewing of diploid chromosomal set**
  4. formation of sperm cell
24. What does acrosome reaction mean?
1. disappearance of granulosa cells
  - 2. sperm penetration of the zona pellucida**
  3. releasing of cortical granules into the perivitelline space
  4. second meiotic division of oocyte
25. Early embryo during cleavage is nourished by:
1. surrounding tissues

- 2. mucous
- 3. yolk inclusions**
- 4. cortical granules

26. Types of oocytes on the basis of the distribution of yolk:

- 1. Alecithal, oligolecithal, mesolecithal, telolecithal
- 2. Isolecithal, telolecithal, centrolecithal**
- 3. Alecithal, oligolecithal, mesolecithal, polylecithal
- 4. Centrolecithal, telolecithal, polylecithal

27. What is the type of human cleavage?

- 1. Meroblastic, synchronic
- 2. Meroblastic, asynchronic
- 3. Holoblastic, synchronic
- 4. Holoblastic, asynchronic**

28. What is the type of amphibian blastula?

- 1. celoblastula
- 2. blastocyst
- 3. amphyblastula**
- 4. discoblastula

29. When does early gastrulation in humans begin?

- 1. During 3<sup>rd</sup> day after fertilization
- 2. During 1<sup>st</sup> day after fertilization
- 3. During 14<sup>th</sup> day after fertilization
- 4. During 7<sup>th</sup> day after fertilization**

30. Match the embryonic structures, and the germ layers, which give rise to them.

EMBRYONIC STRUCTURES:

- A. nervous system
- B. muscles
- C. kidneys
- D. cornea
- E. nasal epithelium

GERM LAYERS:

- 1) ectoderm
- 2) mesoderm

A	B	C	D	E
1	2	2	1	1

31. Match the embryonic structures, and the germ layers, which give rise to them.

EMBRYONIC STRUCTURES:

- A. liver
- B. dermis
- C. gonads
- D. thyroid gland
- E. pleura

GERM LAYERS:

- 1) endoderm
- 2) mesoderm

A	B	C	D	E
1	2	2	1	2

32. Match the embryonic structures, and the germ layers, which give rise to them.

- |                                |             |
|--------------------------------|-------------|
| EMBRYONIC                      | GERM        |
| STRUCTURES:                    | LAYERS:     |
| A. primordial germ cells       | 1) ectoderm |
| B. respiratory epithelium      | 2) endoderm |
| C. the epithelium of stomodeum |             |
| D. nervous system              |             |
| E. pancreas                    |             |

A	B	C	D	E
2	2	1	1	2

33. Match the embryonic structures, and the germ layers, which give rise to them.

- |                                     |              |
|-------------------------------------|--------------|
| EMBRYONIC STRUCTURES:               | GERM LAYERS: |
| A. peritoneum                       | 1) mesoderm  |
| B. blood and lymph vessels          | 2) endoderm  |
| C. parathyroid gland                |              |
| D. gonads                           |              |
| E. anterior lobe of pituitary gland |              |

A	B	C	D	E
1	1	2	1	2

34. Match the embryonic structures, and the germ layers, which give rise to them.

- |                                |             |
|--------------------------------|-------------|
| EMBRYONIC                      | GERM        |
| STRUCTURES:                    | LAYERS:     |
| A. eye lens                    | 1) ectoderm |
| B. respiratory epithelium      | 2) endoderm |
| C. the epithelium of stomodeum |             |
| D. nervous system              |             |
| E. pancreas                    |             |

A	B	C	D	E
1	2	1	1	2

35. Match the embryonic structures, and the germ layers, which give rise to them.

- |                                     |              |
|-------------------------------------|--------------|
| EMBRYONIC STRUCTURES:               | GERM LAYERS: |
| A. gastric and intestinal glands    | 1) mesoderm  |
| B. blood and lymph vessels          | 2) endoderm  |
| C. parathyroid gland                |              |
| D. gonads                           |              |
| E. anterior lobe of pituitary gland |              |

A	B	C	D	E
2	1	2	1	2

36. Match the embryonic structures, and the germ layers, which give rise to them.

- |             |         |
|-------------|---------|
| EMBRYONIC   | GERM    |
| STRUCTURES: | LAYERS: |

- A. thymus gland                    1) ectoderm
- B. respiratory epithelium        2) endoderm
- C. the epithelium of stomodeum
- D. nervous system
- E. pancreas

A	B	C	D	E
2	2	1	1	2

37. Match the embryonic structures, and the germ layers, which give rise to them.

- |   |   |
|---|---|
| <b>EMBRYONIC STRUCTURES:</b><br>A. cortex of adrenal glands<br>B. blood and lymph vessels<br>C. parathyroid gland<br>D. gonads<br>E. anterior lobe of pituitary gland | <b>GERM LAYERS:</b><br>1) mesoderm<br>2) endoderm |
|---|---|

A	B	C	D	E
1	1	2	1	2

38. Match the embryonic structures, and the germ layers, which give rise to them.

- |   |   |
|---|---|
| <b>EMBRYONIC STRUCTURES:</b><br>A. retina<br>B. muscles<br>C. kidneys<br>D. cornea<br>E. nasal epithelium | <b>GERM LAYERS:</b><br>1) ectoderm<br>2) mesoderm |
|---|---|

A	B	C	D	E
1	2	2	1	1

39. Match the embryonic structures, and the germ layers, which give rise to them.

- |   |   |
|---|---|
| <b>EMBRYONIC STRUCTURES:</b><br>A. lining of gut<br>B. dermis<br>C. gonads<br>D. thyroid gland<br>E. pleura | <b>GERM LAYERS:</b><br>1) endoderm<br>2) mesoderm |
|---|---|

A	B	C	D	E
1	2	2	1	2

40. Match the embryonic structures, and the germ layers, which give rise to them.

- |   |   |
|---|---|
| <b>EMBRYONIC STRUCTURES:</b><br>A. cornea<br>B. respiratory epithelium<br>C. the epithelium of stomodeum<br>D. nervous system | <b>GERM LAYERS:</b><br>1) ectoderm<br>2) endoderm |
|---|---|

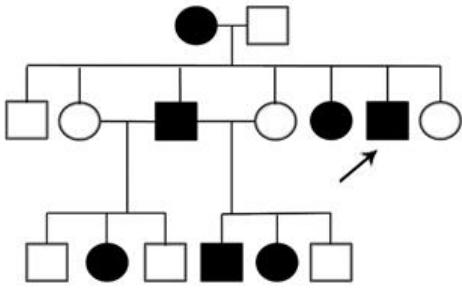


E. pancreas

A	B	C	D	E
1	2	1	1	2

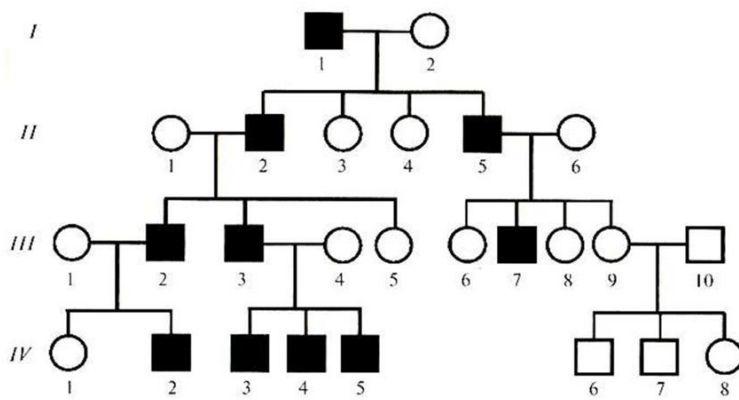
## GENETICS

1. What is the most likely mode of inheritance for this pedigree?



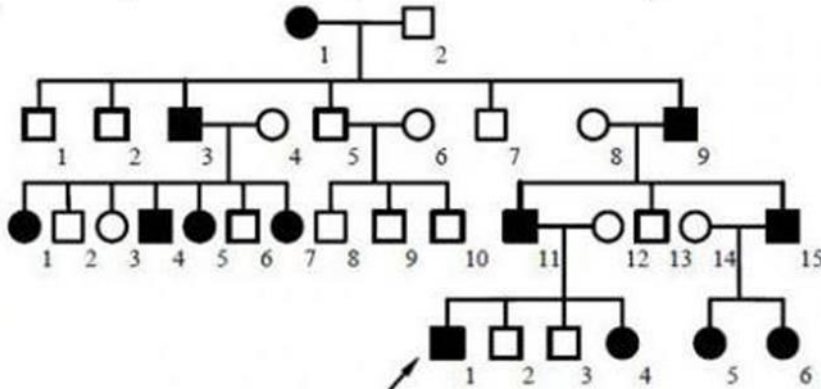
Autosomal dominant

2. What is the most likely mode of inheritance for this pedigree?



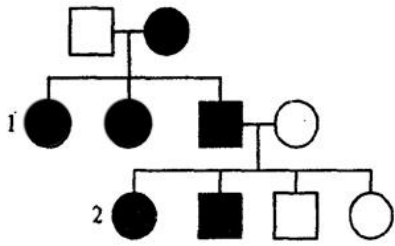
Y-linked

3. What is the most likely mode of inheritance for this pedigree?



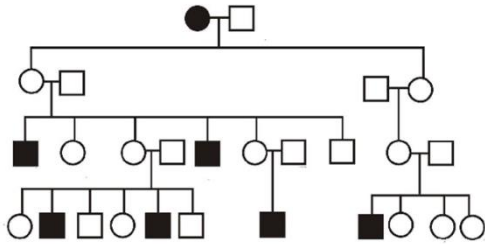
Autosomal dominant

4. What is the most likely mode of inheritance for this pedigree?



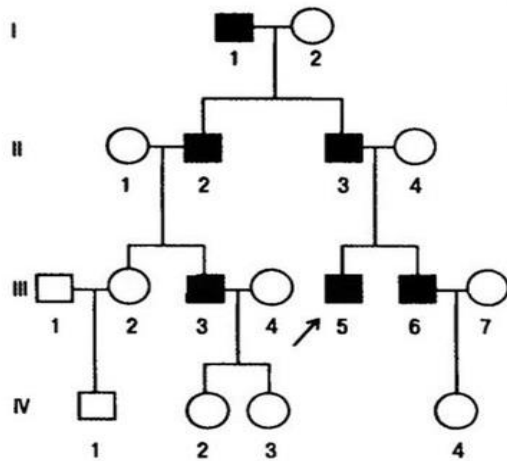
**Autosomal dominant**

5. What is the most likely mode of inheritance for this pedigree?



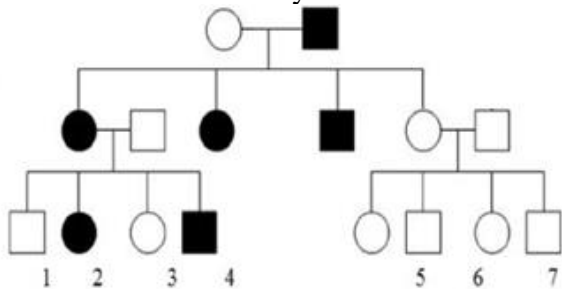
**X-linked recessive**

6. What is the most likely mode of inheritance for this pedigree?



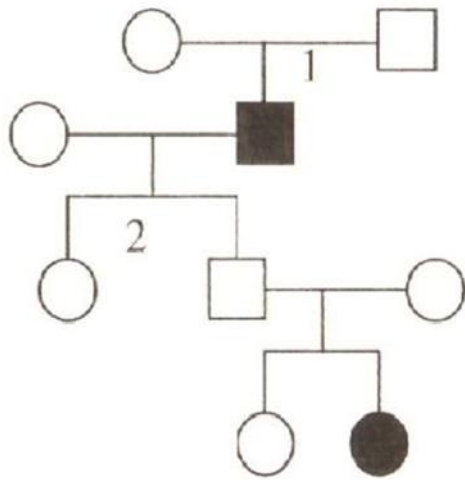
**Y-linked**

7. What is the most likely mode of inheritance for this pedigree?



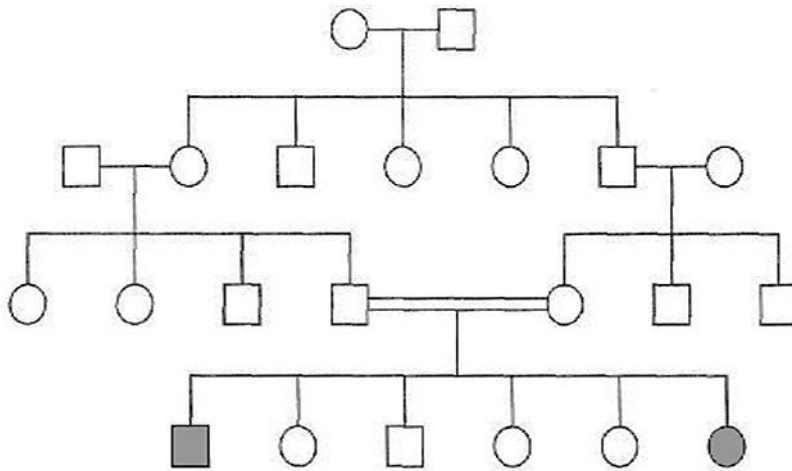
**Autosomal dominant**

8. What is the most likely mode of inheritance for this pedigree?



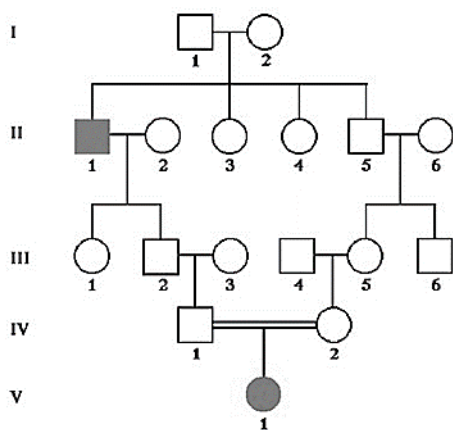
autosomal-recessive

9. What is the most likely mode of inheritance for this pedigree?



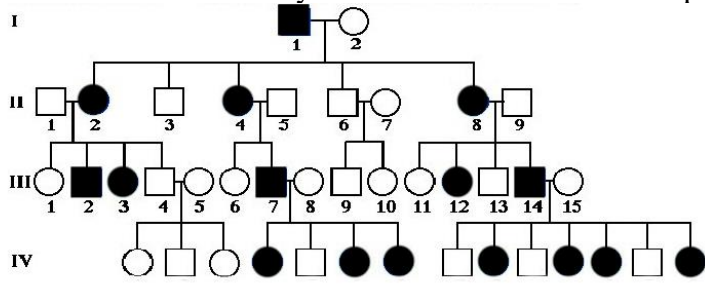
autosomal-recessive

10. What is the most likely mode of inheritance for this pedigree?



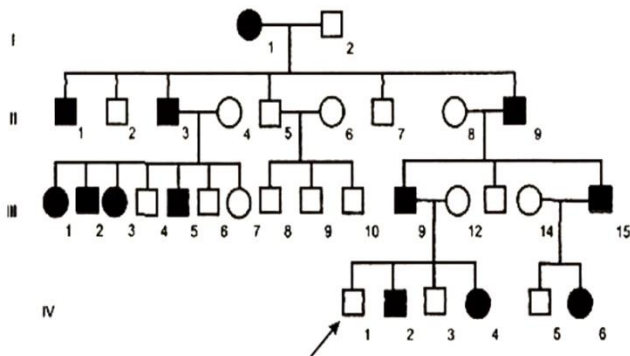
autosomal-recessive

11. What is the most likely mode of inheritance for this pedigree?



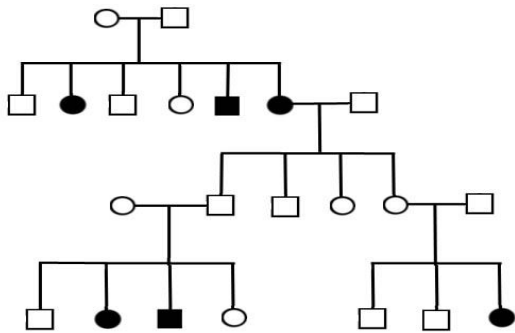
**X-linked dominant**

12. What is the most likely mode of inheritance for this pedigree?



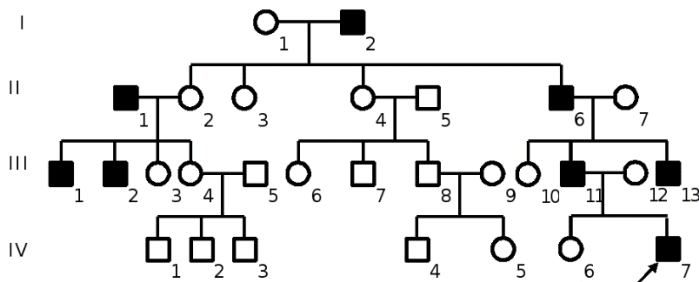
**Autosomal dominant**

13. What is the most likely mode of inheritance for this pedigree?



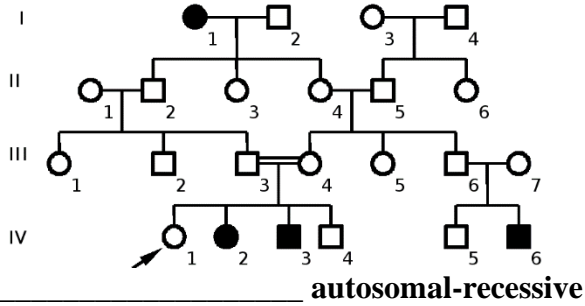
**autosomal-recessive**

14. What is the most likely mode of inheritance for this pedigree?

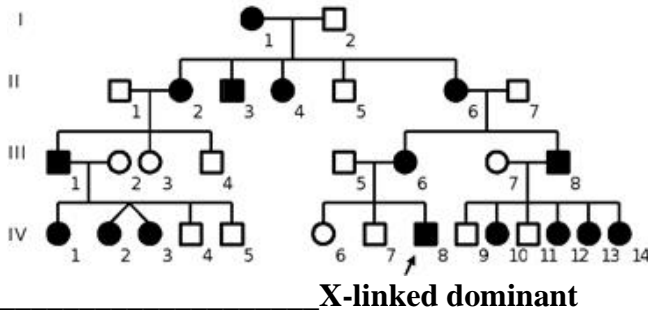


**Y-linked**

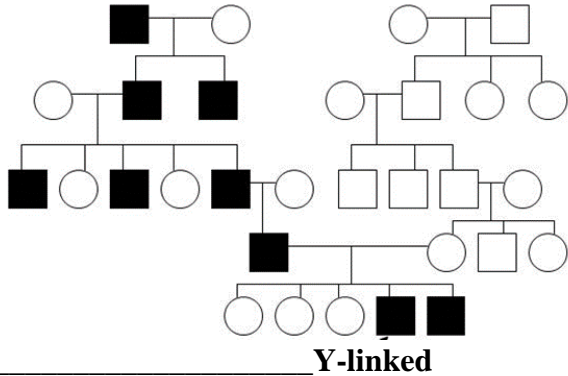
15. What is the most likely mode of inheritance for this pedigree?



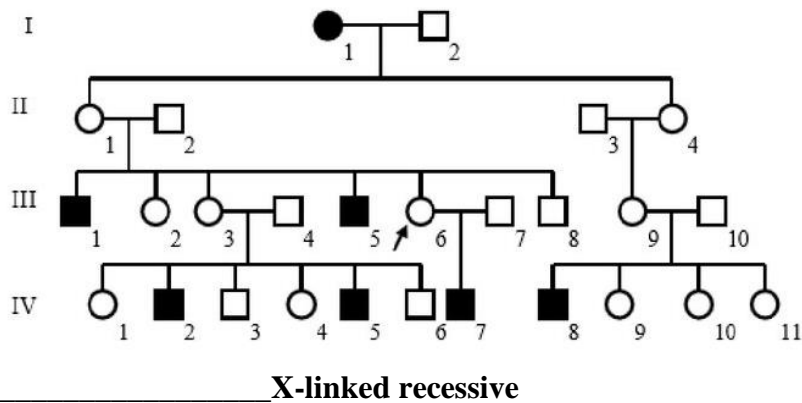
16. What is the most likely mode of inheritance for this pedigree?



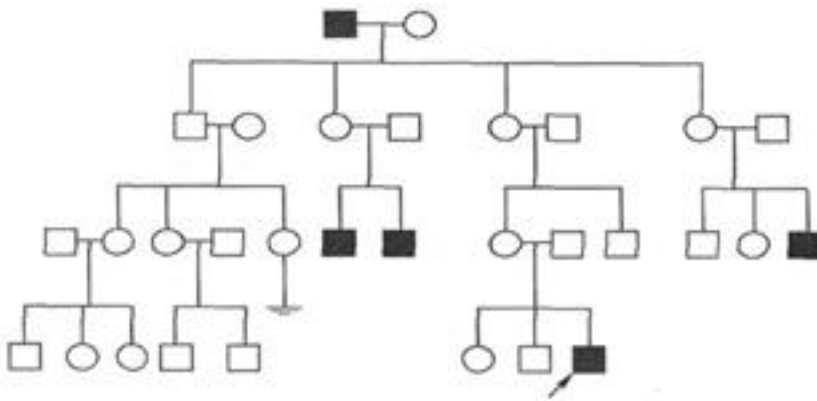
17. What is the most likely mode of inheritance for this pedigree?



18. What is the most likely mode of inheritance for this pedigree?

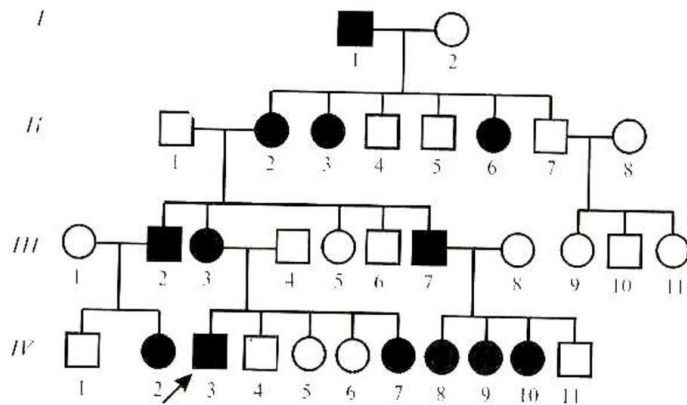


19. What is the most likely mode of inheritance for this pedigree?



X-linked recessive

20. What is the most likely mode of inheritance for this pedigree?



X-linked dominant

## Fundamentals of General and medical ecology.

1. The transmitter of *Trypanosoma cruzi* is:
  1. mosquitoes;
  2. Tsetse fly;
  3. **Reduviid bug;**
  4. Housefly.
  
2. For the diagnosis of visceral leishmaniasis can be used:
  1. **A bone marrow puncture;**
  2. A Thick drop of blood;
  3. Microscopy of ulcer tissue;
  4. Microscopy of a blood smear;
  
3. The way of infection in congenital toxoplasmosis
  1. percutaneous
  2. transmissible
  3. alimentary
  4. **transplacental**
  
4. The definitive hosts of toxoplasma is:
  1. chicken
  2. **cat**
  3. human
  4. pig
  
5. Which of the following protozoans is transmitted primarily by the motile trophozoite form?
  1. *Balantidium coli*
  2. *Entamoeba histolytica*
  3. *Giardia lamblia*
  4. ***Trichomonas vaginalis***
  
6. The transmitter of *Leishmania donovani* is:
  1. **Phlebotomus sandfly;**
  2. *Glossina palpalis*;
  3. *Glossina morsitans*;
  4. Reduviid bug;
  
7. The causative agent of sleeping sickness is:
  1. **trypanosoma;**
  2. tsetse fly;
  3. mosquito;
  4. leishmania.
  
8. The infective stage of toxoplasma for human is:
  1. **oocysts with sporozoites**
  2. schizont



3. merozoite
  4. micro - and macrogametocyte
9. Intermediate hosts in the cycle of Toxoplasma are not:
1. humans
  2. birds
  3. mammals
  4. **amphibians**
10. A rural subsistence farmer from Brazil dies of heart failure. His autopsy shows a greatly enlarged heart. What was the vector for the most likely infectious agent that may have been responsible for his death?
1. Ixodes tick
  2. Mosquito
  3. **Reduviid bug**
  4. Tsetse fly
11. The carrier of Trypanosoma brucei gambiense is:
1. Phlebotomus sandfly;
  2. **Glossina palpalis;**
  3. Glossina morsitans;
  4. Reduviid bug;
12. For the diagnosis of cutaneous leishmaniasis use:
1. A bone marrow puncture;
  2. A Thick drop of blood;
  3. **Microscopy of ulcer tissue;**
  4. Microscopy of a blood smear;
13. Select the true statement regarding toxoplasmosis in humans:
1. Acute infection could be transmitted from mother to fetus
  2. Is mainly diagnosed by serological tests
  3. Is transmitted by ingestion of cysts in undercooked meat
  4. **All of the above**
14. Diagnostic tests of malaria:
1. liver biopsy
  2. **smear or thick drop of blood**
  3. cerebrospinal fluid microscopy
  4. biopsy of lymph nodes
15. Infection with American trypanosomiasis occurs:
1. **When the feces of the Reduviid (“kissing”) Bug are rubbed into the bite site;**
  2. The bite of the Anopheles mosquito;
  3. By the bite of sand fly;
  4. By the bite of a tsetse fly;
16. Wild antelopes are the main natural reservoir for:
1. Leishmania donovani;

2. Trypanasoma cruzi;
  - 3. Trypanasoma brucei rhodesiense;**
  4. Trypanasoma brucei gambiense;
17. Localization of Toxoplasma in the human body
1. liver, pancreas, stomach
  2. heart, upper airways
  - 3. brain, lymph nodes, fetal membranes**
  4. all answers are correct
18. The infective stage of toxoplasma for human is:
1. micro - and macrogametocyte
  2. schizont
  3. merozoite
  - 4. oocysts with sporozoites**
19. Mosquito responsible for malaria transmission
1. Aedes aegypti
  2. Aedes albopictus
  - 3. Anopheles**
  4. Haemagogus
20. Leishmanial forms (amastigote) is characterized by:
1. An Elongated body shape;
  - 2. Round shape;**
  3. Well-developed undulating membrane;
  - 4. The Absence of a flagellum;**
  5. Long flagella;
  - 6. Large round nucleus.**
21. BALANTIDIUM COLI:
1. non-pathogenic;
  - 2. causative agent of balantidiasis;**
  3. localizes in the blood;
  - 4. localizes in the large intestine;**
  - 5. infection occurs by cysts through contaminated water, food, hands;**
  6. infection occurs in contact with the patient.
22. ENTAMOEBIA HISTOLYTICA IS CHARACTERIZED BY:
- 1. occurs in the form of cysts, small, large and tissue trophozoite;**
  2. life cycle with change of hosts;
  3. cyst has a dense cover and 8 nuclei;
  - 4. cyst has 4 nuclei;**
  5. inhabits the small intestine;
  - 6. feeds on red blood cells.**
23. Trypomastigote is characterized by:
- 1. An Elongated body shape;**
  2. Round shape;

- 3. **Well-developed undulating membrane;**
- 4. **Long flagella;**
- 5. The Absence of a flagellum;
- 6. Large round nucleus.

24. Leishmania tropica is characterized by:

- 1. cyst is 4-nucleic;
- 2. feeds on red blood cells;
- 3. **sand flies are vectors;**
- 4. **amastigote stage in human;**
- 5. localizes in small intestine;
- 6. **causes a dry type of cutaneous lesion.**

25. Morphological forms of Trypanosoma brucei

- 1. Amastigote
- 2. Promastigote
- 3. **Epimastigote**
- 4. **Trypomastigote**
- 5. **Metacyclic trypomastigote**
- 6. Cysts

26. Balantidium coli is characterized by:

- 1. **cyst with contractile vacuoles;**
- 2. **secretes a proteolytic enzyme;**
- 3. sand flies are vectors;
- 4. **organelles of locomotion are cilia ;**
- 5. localizes in small intestine;
- 6. causes a dry type of cutaneous lesion.

27. Match the disease and the causative agent:

- |                            |                        |
|----------------------------|------------------------|
| A. Sleeping sickness       | 1) Leishmania donovani |
| B. Visceral leishmaniasis  | 2) Trypanosoma cruzi   |
| C. Cutaneous leishmaniasis | 3) Trypanosoma brucei  |
| D. Chagas Disease          | 4) Leishmania tropica  |
| E.                         |                        |

A	B	C	D

28. RELATE SIGNS OF PARASITES:

- |   |                          |
|---|--------------------------|
| Signs:                                  | Parasites:               |
| A. trophozoite is covered with pellicle | 1. Entamoeba histolytica |
| B. trophozoite has 2 nuclei             | 2. Balantidium coli      |
| C. the reservoir host is pig            |                          |
| D. has an inconstant body shape.        |                          |

- E. In the large intestine form magna is present.
- F. f. Invasive stage is a 4-nuclear cyst.

a	b	c	d	e	f

29. Match the disease and the causative agent:

- A. Visceral leishmaniasis            1) Leishmania donovani
- B. Sleeping sickness                2) Trypanosoma cruzi
- C. Cutaneous leishmaniasis        3) Trypanosoma brucei
- 4) Leishmania tropica
- D. Chagas Disease

A	B	C	D

30. MATCH THE CHARACTERISTICS OF THE CLASSES OF PROTOZOA:

Attributes:

Classes:

- a) organelles of locomotion - pseudopodia.    1. Sarcodina
- b) organelles of locomotion - cilia            2. Ciliophora
- c) some representatives live in dental deposits.
- d) body is covered with pellicle.
- e) trophozoites contain 2 nuclei
- f) undigested food particles are released in any part of the cell wall.

a	b	c	d	e	f

31. Match the disease and the causative agent:

- E. Visceral leishmaniasis            1) Leishmania donovani
- F. Sleeping sickness                2) Trypanosoma cruzi
- G. Skin leishmaniasis                3) Trypanosoma brucei
- H. Chagas Disease                    4) Leishmania tropica

A	B	C	D

32. MATCH PARASITES AND THEIR SIGNS:

Signs

Parasites:

- a. trophozoite is covered with pellicle            1. Entamoeba histolytica
- b. trophozoite has a sucking disc                    2. Giardia lamblia
- c. jumble of axonemes in cyst
- d. has an inconstant body shape.
- e. In the large intestine form magna is present.

f. forms focal ulceration of the intestinal mucosa.:

a	b	c	d	e	f

33. Match the disease and the causative agent:

- |                            |                        |
|----------------------------|------------------------|
| A. Visceral leishmaniasis  | 1) Leishmania donovani |
| B. Cutaneous leishmaniasis | 2) Trypanosoma cruzi   |
| C. Chagas Disease          | 3) Trypanosoma brucei  |
| D. Sleeping sickness       | 4) Leishmania tropica  |

A	B	C	D

34. RELATE SIGNS SARCODINA AND CILIATES WITH THE CLASSES TO WHICH THEY BELONG:

- |   |               |
|---|---------------|
| Attributes:   | Classes:      |
| a) body shape non-constant                              | 1. Sarcodina  |
| b) the shape of the body is constant.                   | 2. Ciliophora |
| c) Food comes through the cytostome.                    |               |
| d) one of the class representatives is Balantidium coli |               |
| e) 2-nuclear.   |               |
| f) 1-nuclear.   |               |

a	b	c	d	e	f

35. What is a personal prevention of fascioliasis?

1. **Do not drink unboiled water from open reservoirs**
2. Do not eat improperly salted fish
3. Do not eat raw crayfish and crabs
4. Do not eat bad pork meat

36. Put correct order of the stages for Paragonimus westermani life cycle:

1. Egg – larva – mature individuals
2. **Egg – miracidium – sporocyst – redia – cercaria – metacercaria**
3. Egg - sporocyst - miracidium — redia – cercaria – mature individuals
4. Egg - Sporocyst – miracidium – cercaria – redia

37. Specify the localization of Schistosoma mansoni in the human body:

1. The lumen of small intestine
2. The veins of the urogenital system
3. The gallbladder
4. **In mesenteric vein**

38. The laboratory examinations of Echinococcosis is based on:

1. Ovoscropy of faeces
2. Ovoscropy of urine
- 3. Serologic reactions**
4. Finding parasites and their eggs in a scrape of perianal zone

39. Autoinvasion by helminthes is possible in the case of:

1. Taeniarhynchosis
- 2. Heminolepidosis**
3. Echinococcosis
4. Ascariasis

40. What is diagnostic method of ancylostomiasis?

1. Finding eggs on perianal region
2. Finding rhabditiform larva in feces
3. Finding microfilaria in feces
- 4. Finding eggs in feces**

41. The localization of Trichocephalus trichiurus in human's body is:

1. Liver
2. Pancreas
- 3. Caecum**
4. Small intestine

42. What is invasive stage of Enterobius vermicularis for humans?

1. Encapsulated larva
- 2. Eggs with larva**
3. Rhabditiform larva
4. Adult worm

43. Dracunculiasis is caused by the \_\_\_\_\_ worm and transmitted by the \_\_\_\_\_ vector.

1. Dracunculus medinensis; mollusc.
2. Mycobacterium ulcerans; fresh water crustacean.
3. Mycobacterium ulcerans; mollusc.
- 4. Dracunculus medinensis; fresh water crustacean**

44. What is a pathogenicity of Wuchereria bancrofti?

- 1. Elephantiasis**
2. Pressure, atrophy of the affected tissue
3. Pruritus
4. Liver damage

45. Onchocerciasis is caused by the filarial worm *Onchocerca volvulus*. Which of the following statements about *O. volvulus* is false?

1. **Sand flies transmit the larval forms of *O. volvulus* to humans**
2. Female worms produce embryonic microfilariae that swarm underneath of the epidermis and can enter the eye
3. Infection with *O. volvulus* causes itchy cutaneous lesions, skin rashes and depigmentation
4. The worm is encased in fibrous tissue that can present clinically as palpable subcutaneous nodules

46. What kind of worms can develop only with change of the hosts?

1. *Enterobius vermicularis*
2. *Ancylostoma duodenale*
3. ***Trichinella spiralis***
4. *Trichuris trichiura*

47. What stage is invasive for the final host of the of *Fasciola hepatica*?

1. Redia
2. Metacercaria in freshwater fish
3. Sporocyst
4. **Metacercaria on aquatic plants**

49. Put correct order of the stages for *Opisthorchis felinus* life cycle:

1. Egg - sporocyst - miracidium — redia – cercaria – mature individuals
2. Egg - Sporocyst – miracidium – cercaria – redia
3. **Egg – miracidium – sporocyst – redia – cercaria – metacercaria**
4. Egg - Metacercaria – cercaria – sporocyst – redia

50. Which of the following is true regarding urinary Schistosomiasis?

1. Adult worms are found in the urinary bladder
2. It is marked by diarrhea and hepatosplenomegaly
3. It is caused by the parasite *Schistosoma mansoni*
4. **It is transmitted by the *Bulinus* species of mollusc**

51. By which Cestoda human being can be invaded if he consumes improperly cooked meat?

1. *Fasciola hepatica*
2. *Schistosoma hematobium*
3. *Echinococcus granulosus*
4. ***Taenia solium***

52. Which parasite requires water for development of some stages?

1. Hymenolepis nana
2. Echinococcus granulosus
- 3. Diphylobothrium latum**
4. Ancylostoma duodenale

53. What is geographical distribution of Enterobius vermicularis?

- 1. Cosmopolitan**
2. East Africa
3. West Africa
4. India

54. Specify the localization of Ancylostoma in the human's body:

1. Liver
- 2. Duodenum**
3. Large intestine
4. Skin

55. What is personal preventive measure of ascariasis?

- 1. Washing hands before meals**
2. Regular examinations of preschool children
3. Wearing shoes and other protective clothes
4. Inspection and cooking or freezing of pork

56. All of the following are symptoms of Dracunculiasis infection except:

1. Ulcer
2. Painful edema
3. Septic arthritis
- 4. Facial redness**

57. What kind of nematodes is transmitted by bite of mosquito?

1. Dracunculus medinensis
2. Onchocerca volvulus
3. Ancylostoma duodenale
- 4. Wuchereria bancrofti**

58. Which of the following does not accurately describe Lymphatic filariasis?

1. Elephantiasis is the most common manifestation
- 2. The intermediate vector is the blackfly**
3. It is caused by the parasitic worms Wuchereria bancrofti and Brugia malayi
4. Adult worms are found in the lymphatic system



59. Which of the following statements about soil-transmitted helminthiases is false?
1. Hookworms can cause intestinal blood loss
  2. *Trichuris trichiura* is located in the cecum
  3. *Ascaris lumbricoides* females range from 20 to 35 cm in length
  4. **Pinworms are Biohelminthes**
60. Put correct order of the stages for *Fasciola hepatica* life cycle:
1. Egg - sporocyst - miracidium — redia – cercaria
  2. Egg - Sporocyst – miracidium – cercaria – redia
  3. **Egg – miracidium – sporocyst – redia – cercaria – metacercaria**
  4. Egg - Metacercaria – cercaria – sporocyst – redia
61. Localization of *Dicrocoelium dendriticum* in humans is:
1. The blood vessels of the urinary bladder
  2. **Liver**
  3. The blood vessels of the intestine
  4. Urinary bladder
62. Which of the following strategies is best suited to control the spread of Schistosomiasis?
1. To cook meat properly
  2. Mosquito nets
  3. To wash vegetables properly
  4. **Treating water with molluscicides**
63. One of these statements is true regarding tapeworms:
1. Long thin unsegmented tube-like bodies with anterior mouths and longitudinal digestive tracts.
  2. All tapeworms have separate sexes with well-developed reproductive systems.
  3. **long flat ribbon-like bodies with a single anterior holdfast organ (scolex)**
  4. An oral sucker surrounding the mouth
64. What can be done to prevent the Echinococcosis?
1. Avoid consuming improperly cooked fish
  2. **Wash hands before eating**
  3. Processing of water reservoirs by spraying of certain preparations
  4. Destruction of vectors.
65. Indicate the invasive stage of *Trichuris trichiura* for human?
1. **Eggs with larva**
  2. Rhabditiform larva
  3. Adult worm
  4. Filariform larva
66. What kind of Nematode can be acquired by percutaneous invasion?
1. **Ancylostoma duodenale**
  2. *Trichuris trichiura*
  3. *Enterobius vermicularis*
  4. *Diphyllobothrium latum*

67. What is the infective stage of *Trichinella spiralis*?
1. Cercaria
  2. **Encysted larva**
  3. Miracidium
  4. Eggs
68. Who is the intermediate host for *Dracunculus medinensis*?
1. Mosquito
  2. Man
  3. **Cyclops**
  4. Blackfly
69. What is the infective stage of *Wuchereria bancrofti*?
1. **Microfilaria**
  2. Egg
  3. Adult form
  4. Metacercaria
70. What kind of worms can develop only with change of the hosts?
1. *Ancylostoma duodenale*
  2. *Trichuris trichiura*
  3. *Enterobius vermicularis*
  4. ***Diphyllobothrium latum***
71. The main characteristics of the Trematodes class are:
1. **The excretory system protonephridia's type**
  2. Have the primary body cavity
  3. Sexually separated
  4. Open circulatory system
72. The patient is suspected with opisthorchosis. What makes it possible to diagnose the disease?
1. Detection of parasite eggs in the sputum
  2. Detection miracidiums in faeces
  3. **Detection of eggs in the faeces**
  4. Detection of eggs in the urine sediment
73. What are the main features of mature proglottides?
1. are filled with fertilized eggs
  2. **contain males and females reproductive organs**
  3. contain only testes
  4. have well-developed ovaries
74. What are the main features of gravid proglottides?
1. **are filled with fertilized eggs**

2. contain males and females reproductive organs
3. contain only testes
4. have well-developed ovaries

75. Associate *Diphyllobotrium latum* with its larval stage:

1. **Plerocercoid larva**
2. Cercaria
3. Filariform larva
4. Redia

76. After what time eggs of *Ascaris lumbricoides* become invasive?

1. **21 days**
2. 4-6 hours
3. 7 days
4. 1 hour

77. What stage of *Ancylostoma duodenale* is invasive to humans?

1. Egg
2. **Filariform larva**
3. Rhabditiform larva
4. Adult worm

78. The laboratory examination of *Trichinella spiralis* is based on?

1. Detection of larvae in blood
2. Lumbar puncture
3. Stool examination
4. **Muscle biopsy**

79. What is diagnostic stage of *Dracunculus medinensis*?

1. **Worm under the skin**
2. Miracidium
3. Eggs in faeces
4. Eggs in sputum

80. What kind of nematodes is transmitted by bite of blackfly?

1. *Wuchereria bancrofti*
2. ***Onchocerca volvulus***
3. *Ancylostoma duodenale*
4. *Dracunculus medinensis*

81. Specify the location of *Wuchereria bancrofti* in the human's body:

1. Subcutaneous tissues
2. **Lymphatic vessels**
3. Lungs
4. Duodenum

82. How a person can become infected with *Sarcoptes scabiei*?

1. Insect bites
2. **Contact with sick people**
3. Passing of hemolymph with rickettsia into a wound on the skin
4. Crushing lice and passing of hemolymph into the wound

83. Larvae of ticks have:

1. **Three pairs of walking limbs**
2. Underdeveloped mouthparts
3. Size 6-8 mm
4. Four pairs of walking limbs

84. After walk through the forest, a man found a dark brown tick with dorsal scutum which was sucking his leg. Specify the family of this tick?

1. Family Gamasoidae
2. **Family Ixodidae**
3. Family Aranei
4. Family Argasidae

85. What kind of mites which found in countries with warm climates, has an oval body, no dorsal shield and live in caves?

1. **Ornithodoros papillipes**
2. *Ixodes ricinus*
3. *Dermacentor pictus*
4. *Ixodes persulcatus*

86. What kind of these ticks can carry tularemia?

1. ***Ixodes ricinus*, *Dermacentor pictus***
2. *Ixodes ricinus*, *Demodex folliculorum*
3. *Ixodes ricinus*, *Ornithodoros papillipes*
4. *Ixodes persulcatus*, *Sarcoptes scabiei*

87. A scabies causative agent gets into the body during:

1. **Contact with clothes of sick people**
2. Insect bites
3. Passing of hemolymph with rickettsia into a wound on the skin
4. Crushing lice and passing of hemolymph into the wound

88. The child complains of itching between the fingers and the lower abdomen which is worse at night. Skin analyzing revealed tick size of 0.3 - 0.4 mm. Specify the type of parasite:

1. *Ixodes persulcatus*
2. ***Sarcoptes scabiei***
3. *Pulex irritans*
4. *Ornithodoros papillipes*

89. What is pediculosis?

1. Pediculosis - skin disease caused by being infected with ticks
2. **Pediculosis -heavy infestation of hair with lice**
3. Pediculosis - skin disease caused by being infected with fleas
4. Pediculosis - skin disease caused by being infected with itch mites

90. Life cycle of fleas going through the stage:

1. **Egg – larva – pupa – imago**
2. Egg – larva –imago
3. Egg – pupa – imago
4. Egg– adult organism

91. A man diagnosed with phtiriasis. Specify where is the localization of the parasite:

1. On the skin of head
2. In the folds of clothes and underwear
3. **At the hairy areas of the skin, except head**
4. In the horny layer of the epidermis

92. Residents of the house noticed in their dark apartments wingless insect with a flattened laterally body. Determine the insects and what can they carry?

1. The bugs, vectors of Chagas' disease
2. Mites that carry the spirochete
3. **The fleas that carry the plague bacteria**
4. Cockroaches, vectors of pathogens of intestinal infections

93. The patient was diagnosed with Chagas' disease. Who is a carrier of this disease?

1. *Cimex lectularius*
2. *Phthirus pubis*
3. *Pulex irritans*
4. ***Triatoma infestans***

94. A woman pays attention to the small wingless insects that jump, and in the morning on the body noticed the bite marks. Determine who is it?

1. *Pediculus humanus capitis*
2. *Phthirus pubis*
3. *Pediculus humanus corporis*
4. ***Pulex irritans***

95. A woman was bitten by *Anopheles maculipennis*. What kind of helminths can transmit this mosquito?

1. *Ancylostoma duodenale* and *Trichocephalus trichiurus*
2. ***Wuchereria bancrofti* and *Brugia malayi***
3. *Loa loa* and *Onchocerca volvulus*
4. *Dracunculus medinensis* and *Trichinella spiralis*

96. Adult insect makes angle 45 degrees to the surface, has spotted wings and long maxillary palps. Determine what kind of insect is it:

1. Mosquito *Culex*
2. **Mosquito *Anopheles***
3. *Pulex irritans*
4. Black fly

97. Mosquito's larvae which did not have respiratory tubes and therefore placed on the surface of the water horizontally belongs to:

1. *Culex*
2. *Muscidae*
3. *Chrysops*
4. ***Anopheles***

98. What features are typical to development of *Culex*?

1. Imago has dark spots on the wings
2. Eggs of mosquitoes have air belts
3. **The larvae have a breathing siphon and placed in the water at an angle**
4. Pupae have conical breathing trumpets

99. The larvae of *Anopheles* mosquitoes:

1. Have a conical respiratory siphon
2. **Haven't a respiratory siphon**
3. Have a respiratory siphon, which arranged at an angle to the surface
4. Have a cylindrical respiratory siphon

100. The patient lives in Central Asia. He has a cutaneous leishmaniasis. What insects are carriers of this disease?

1. *Anopheles*

2. Simuliidae
3. **Phlebotomus**
4. Culex

101. The larvae of Anopheles mosquitoes live in:

1. Contaminated pools, which well heated by the sun
2. Gutter
3. Damp basements premises
4. **Exclusively in pure or nearly pure waters**

## Examination questions

1. The types of cell organization. Prokaryotic cells, their structure and typical features.
2. Trichinellosis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trichinellosis.
3. The types of cell organization. Eukaryotic cells, their structure and typical features.
4. Nucleic acids, structure and functions in the cell. Mechanism of DNA replication.
5. Morphological structure of metaphase chromosome. Types of chromosomes. Human karyotype.
6. Genetic code and its properties.
7. Protein biosynthesis as the process of realization of biological information in the cell.
8. Mitotic cycle, its division into periods. Interphase, its stages and their biological role.
9. Characteristics of mitotic stages. Significance of mitosis.
10. Meiosis and its mechanisms. Biological role of meiosis.
11. Gametogenesis, its biological significance. Spermatogenesis.
12. Morphological features of spermatozoa and ova. Types of ova.
13. Cleavage, types. Blastula.
14. Gastrulation, types.
15. Neurulation. Histo- and organogenesis.
16. Provisory organs of vertebrate embryos.
17. Monohybrid cross. The principles of Uniformity (Dominance) and Segregation.
18. Di- and polyhybrid cross. The principle of independent assortment.
19. The role of chromosomes in determination of sex. Sex-linked inheritance.
20. Phenomenon of linkage. Complete and incomplete linkage.
21. The main states of the chromosome theory of inheritance.
22. Interaction of allelic genes. Complete dominance. Incomplete dominance. Codominance.
23. The inheritance of blood groups of ABO system in human.
24. Interaction of non-allelic genes.
25. Modificational variability, its significance in ontogenesis.
26. Combinative variability: mechanisms and significance.
27. Mutational variability. Gene mutations.
28. Mutational variability. Chromosome mutations.
29. Mutational variability. Genome mutations.
30. The main methods in human genetics.



31. Amebic dysentery: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of amebiasis.
32. Balantidiasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of balantidiasis.
33. Giardiasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of giardiasis.
34. Malaria parasites: latin names, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of malaria.
35. American trypanosomiasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trypanosomiasis.
36. Toxoplasmosis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of toxoplasmosis.
37. Vaginal trichomoniasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trichomoniasis.
38. African trypanosomiasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trypanosomiasis.
39. Visceral leishmaniasis: latin name of parasite morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of leishmaniasis.
40. Lymphatic filariasis: latin names of parasites, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of filariasis.
41. Trichinellosis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trichinellosis.
42. Lung fluke: latin name, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of paragonimiasis.
43. Dwarf tapeworm: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of hymenolepiasis.
44. Ascariasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of ascariasis.
45. Lice: latin name of human lice, morphology, life cycle. Medical importance, prevention of the infestation.
46. Pork tapeworm and beef tapeworm: latin names, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of taeniasis and cysticercosis.
47. Pinworm: latin name, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of enterobiasis.
48. Whipworm: latin name, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trichuriasis.
49. Dwarf tapeworm: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of hymenolepiasis.

50. Hookworms: latin names, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of ancylostomiasis (necatoriasis).
51. Echinococcosis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of echinococcosis.
52. Ixodid ticks: morphology, life cycle. Medical importance, prevention of the infestation.
53. Medical importance of mosquitoes and prevention of the infestation. Differences between Culex and Anopheles mosquitoes.
54. Itch mite: latin name, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of scabies.
55. Blood flukes: latin names, morphology, life cycle.
56. Guinea worm: latin name, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of dracunculiasis.
57. Argasid ticks: morphology, life cycle. Medical importance, prevention of the infestation.
58. Vaginal trichomoniasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trichomoniasis.
59. Vaginal trichomoniasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trichomoniasis.
60. African trypanosomiasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of trypanosomiasis.
61. Argasid ticks: morphology, life cycle. Medical importance, prevention of the infestation.
62. Cutaneous leishmaniasis: latin name of parasite, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of leishmaniasis.
63. Fish tapeworm: latin name, morphology, life cycle. Symptoms, pathogenesis, laboratory diagnosis and prevention of diphyllbothriasis.
64. Fleas: latin name of human flea, morphology, life cycle. Medical importance, prevention of the infestation.

### Examination genetic problems

1. The albinism is inherited as an autosome recessive character. Woman has albinism and IV(AB) blood group, her husband is healthy (heterozygous) and I(0) blood group. Determine the probability of the birth of healthy children with II(A) blood group.
2. Phenylketonuria (PKU) is inherited as an autosome recessive disease. Both parents are healthy and have the daughter with PKU. Mother has III(B) blood group and homozygous, father has II(A) blood group and homozygous. Determine the probability of the birth of healthy children. What blood group will they have?
3. Polydactyly is inherited as autosome dominant character. Both parents are affected and heterozygous. Mother has I(0) blood group, father – III(B) blood group and homozygous. Determine the probability of the birth of healthy children. What blood group will they have?
4. Polydactyly is inherited as autosome dominant character. Both parents are affected and heterozygous. Mother has I(0) blood group, father – II(A) blood group and homozygous. Determine the probability of the birth of children with polydactyly. What blood group will they have?
5. The blindness is inherited as an autosome recessive disease. Blind woman has IV(AB) blood group, her husband is healthy (homozygous) and has also IV(AB) blood group. Determine the probability of the birth of healthy children with III(B) blood group.
6. Phenylketonuria (PKU) is inherited as an autosome recessive disease. Both parents are healthy and have the daughter with PKU. Mother has II(A) blood group and homozygous, father has III(B) blood group and homozygous. Determine the probability of the birth of healthy children. What blood group will they have?
7. The albinism is inherited as an autosome recessive character. Man has albinism and IV(AB) blood group, his wife is healthy (heterozygous) and I(0) blood group. Determine the probability of the birth of children with III(B) blood group and albinism.
8. The blindness is inherited as an autosome recessive disease. Blind woman has IV(AB) blood group, her husband is healthy (heterozygous) and has I(0) blood group. Determine the probability of the birth of affected children with II(A) blood group.
9. Phenylketonuria (PKU) is inherited as an autosome recessive disease. The man is suffered from PKU and has IV(AB) blood group. The woman is healthy and has the son with PKU; her blood group is I(0). Determine the probability of the birth of children with PKU. What blood group will they have?
10. Polydactyly is inherited as autosome dominant character. The man is healthy and has II(A) blood group (homozygous). His wife has polydactyly (heterozygous) and IV(AB) blood group. Determine the probability of the birth of affected children. What blood groups will they have?
11. The albinism is inherited as an autosome recessive character. Mother has albinism and I(0) blood group, father is healthy and has III(B) blood group (diheterozygous). Determine the probability of the birth of children with albinism and I(0) blood group.
12. The blindness is inherited as an autosome recessive disease. Blind woman has IV(AB) blood group, her husband is healthy (homozygous) and has also IV(AB) blood group. Determine the probability of the birth of healthy children with III(B) blood group.
13. Phenylketonuria (PKU) is inherited as an autosome recessive disease. Both parents are healthy and have the son with PKU. Mother has III(B) blood group and homozygous, father has I(0) blood group. Determine the probability of the birth of children with PKU. What blood group will they have?
14. Polydactyly is inherited as autosome dominant character. The man is affected and has II(A) blood group (his mother was healthy and had I(0) blood group). His wife has normal structure

- of hands and I(0) blood group. Determine the probability of the birth of healthy children. What blood groups will they have? 2.
15. The albinism is inherited as an autosome recessive character. Woman has albinism and IV(AB) blood group, her husband is healthy (heterozygous) and I(0) blood group. Determine the probability of the birth of healthy children with II(A) blood group.
  16. Phenylketonuria (PKU) is inherited as an autosome recessive disease. Both parents are healthy and have the daughter with PKU. Mother has III(B) blood group and homozygous, father has II(A) blood group and homozygous. Determine the probability of the birth of healthy children. What blood group will they have? 3. Polydactyly is inherited as autosome dominant character. Both parents are affected and heterozygous. Mother has I(0) blood group, father – III(B) blood group and homozygous. Determine the probability of the birth of healthy children. What blood group will they have?
  17. Polydactyly is inherited as autosome dominant character. Both parents are affected and heterozygous. Mother has I(0) blood group, father – II(A) blood group and homozygous. Determine the probability of the birth of children with polydactyly. What blood group will they have?
  18. The blindness is inherited as an autosome recessive disease. Blind woman has IV(AB) blood group, her husband is healthy (homozygous) and has also IV(AB) blood group. Determine the probability of the birth of healthy children with III(B) blood group.
  19. Phenylketonuria (PKU) is inherited as an autosome recessive disease. Both parents are healthy and have the daughter with PKU. Mother has II(A) blood group and homozygous, father has III(B) blood group and homozygous. Determine the probability of the birth of healthy children. What blood group will they have?
  20. The albinism is inherited as an autosome recessive character. Man has albinism and IV(AB) blood group, his wife is healthy (heterozygous) and I(0) blood group. Determine the probability of the birth of children with III(B) blood group and albinism. Polydactyly is inherited as autosome dominant character. The man is affected and has III(B) blood group (his mother was healthy and had I(0) blood group). His wife has normal structure of hands and I(0) blood group. Determine the probability of the birth of children with polydactyly. What blood groups will they have?
  21. The blindness is inherited as an autosome recessive disease. Blind woman has IV(AB) blood group, her husband is healthy (heterozygous) and has I(0) blood group. Determine the probability of the birth of affected children with II(A) blood group. Phenylketonuria (PKU) is inherited as an autosome recessive disease. The man is suffered from PKU and has IV(AB) blood group. The woman is healthy and has the son with PKU; her blood group is I(0). Determine the probability of the birth of children with PKU. What blood group will they have? Polydactyly is inherited as autosome dominant character. The man is healthy and has II(A) blood group (homozygous). His wife has polydactyly (heterozygous) and IV(AB) blood group. Determine the probability of the birth of affected children. What blood groups will they have?
  22. The albinism is inherited as an autosome recessive character. Mother has albinism and I(0) blood group, father is healthy and has III(B) blood group (diheterozygous). Determine the probability of the birth of children with albinism and I(0) blood group.
  23. The blindness is inherited as an autosome recessive disease. Blind woman has IV(AB) blood group, her husband is healthy (homozygous) and has also IV(AB) blood group. Determine the probability of the birth of healthy children with III(B) blood group.
  24. Phenylketonuria (PKU) is inherited as an autosome recessive disease. Both parents are healthy and have the son with PKU. Mother has III(B) blood group and homozygous, father has I(0)

blood group. Determine the probability of the birth of children with PKU. What blood group will they have?

## Questions to part

### «Cytology»

1. What is a cell? Types of cellular organization. Structural features of Pro- and eukaryotes.
2. What are the main provisions of cell theory?
3. Structure and composition of the core.
4. Structure and composition of the cell membrane.
5. The structure and composition of the cytoplasm.
6. The structure and function of membrane organelles:
  - Mitochondria
  - ER
  - The Golgi Complex
  - Lysosomes
7. Structure and functions of non-membrane organelles.
  - Ribosomes
  - Cell center
  - Microtubules
8. Inclusions, their types and meaning.
9. Nucleic acid. Nucleotide, its constituent parts.
10. Spatial organization of nucleic acid molecules. Primary, secondary, tertiary DNA structures (complementarity, antiparallel).
11. Replication of DNA.
12. The types of RNA. Their structure and function
13. Gene level of organization of hereditary material. Gene, definition. Simple and complex features.
14. Genetic code and its properties.
15. The protein biosynthesis in the cell-transcription. processing
16. Translation: initiation, elongation, termination of polypeptide molecule Assembly.
17. Gene mutations, their mechanisms and effects on the body. Examples of gene diseases.
18. Describe the different types of chromatin. What is a sex chromatin? How is it defined?
19. The structure and shape of chromosomes during cell division.
20. Give the definition of the karyotype, genotype, gene. Describe the human karyotype.

21. What are chromosomal aberrations, their varieties? What are the mechanisms of their occurrence? Examples of diseases caused by chromosomal mutations.
22. What is a genome mutation? Classification of genomic mutations.
23. Mechanisms of genomic mutations? Diseases caused by genomic mutations.
24. Cytogenetic research method? When is it applied?
25. What is interphase? What processes occur in:
- G1-period
  - S-period
  - G2-period
26. What is mitosis? Biological meaning of mitosis.
27. What is reproduction? Methods and forms of reproduction.
28. The features of sexual reproduction.
29. What are gametes? How do they differ from other cells in the body?
30. Describe the structure and function of the male gametes.
31. Structure and functions of the female gametes.
32. What is gametogenesis? In what organs does it occur? To characterize the stages of gametogenesis.
33. What is meiosis? At what stage of gametogenesis does it occur? Signification of meiosis.

## Questions to part

### «Genetics»

1. What are allelic genes? How many different alleles of the same gene can be present in the genotype of the body? Dominant and recessive allele?
2. What are the laws of inheritance discovered by Mendel:
  - a) Give the wording of the law I. Cytological basis.
  - b) Give the wording of the law II. Cytological basis.
3. Formulate the hypothesis of purity of gametes.
4. What is crossbreeding analysis? In what cases is it used?
5. Chromosomal mechanisms for sex determination? Features of male and female karyotypes.
6. What is characterized by the inheritance of signs linked to x and y chromosomes?
7. What is the genealogical method and what are its possibilities?
8. Characteristics of the autosomal dominant type of inheritance.
9. Characteristics of the autosomal recessive type of inheritance.
10. Characteristic of x-linked inheritance.
11. Characteristic of the holandric type of inheritance.
12. Formulate the law of independent inheritance features (the third law of Mendel). Cytological basis of Mendel's law III.
13. The mechanism of formation of gametes in the independent inheritance of features. How this is determined by the number of gametes.
14. What are the cytological mechanisms of combinative variability?
15. Chromosome theory of inheritance. The main provisions of chromosomal theory.
16. In some cases, genes are inherited independently, and in some – linked? In some cases, there is a complete and incomplete adhesion of genes?
17. What is the gene balance of the body and what are the consequences of its violations?
18. What is incomplete dominance?
19. What is codominance?
20. To characterize the phenomenon of multiple allelism.
21. How does the inheritance of blood groups in the ABO system in humans?
22. What is epistasis? Give examples of dominant and recessive epistasis.
23. What is complementarity?
24. Explain the phenomenon of polymer (polygenic inheritance).



25. What is pleiotropy?
26. What is variability? Biological significance of variability, classification.
27. Modification variability. Characteristics of modifications.
28. What is the modification and heritability?
29. Norm of reaction and the statistical laws of modification: the variation number and the variation curve, the law of Quetelet.
30. The penetrance and expressivity.
31. Mutational variability. Characteristics of mutations. Mutagenic factors.
32. Features of man as an object of genetic research
33. Genealogical method and its application in medical genetic counseling.
34. What is the twin method of human genetics and for what purpose it is used? Monozygous and dizygotic twins. Give the definition of "concordance and discordance»
35. Population-statistical method. Hardy-Weinberg Law.
36. Biochemical research method. Scope of application.

## Questions to part

### «Ontogenesis»

1. Ontogenesis, definition, periodization, types of postnatal ontogenesis.
2. Fertilization, definition, stages, biological essence.
3. Fragmentation, mechanisms and value.
4. Dependence of the crushing method on the type of egg cell. The main types of blasto
5. Features of crushing in placental and human.
6. What is gastrulation? What are the cellular mechanisms?
7. Describe the ways of laying two embryonic leaves.
8. Describe the methods of laying mesoderm.
9. List the features of gastrulation in placental mammals and humans.
10. What disorders of the embryo may occur at the stage of gastrulation? What are their consequences?
11. What is organogenesis? To characterize the initial stage of organogenesis is neurulation, the.
12. What disorders of the embryo may occur at the stage of neurulation? What are their consequences?
13. What is embryonic induction.
14. Give the definition of "determination", "totipotency".
15. List the derivatives of germ leaves:
  - a. Derivatives of ectoderm;
  - b. Derivatives of endoderm;
  - c. Derivatives of the mesoderm.
16. Describe group: anamnia and amniota.
17. What bodies are referred to as provisional? List the provisory bodies Amyot and Anani.
18. Amnion. As and when the formation of the amnion. Features of the formation of amnion in humans. The value of the amnion. Pathology of the amnion.
19. Yolk sac. The formation of the yolk SAC. Value of yolk SAC.
20. Features of the yolk SAC in humans, developmental pathology.
21. Allantois, characteristic, value,.
22. Features of allantois in humans, pathology
23. Serosis, characteristic, value., especially in humans.
24. What is regeneration? What types of regeneration do you know?
25. Mechanisms of physiological regeneration.

26.Reparative regeneration:

- Epimorphosis
- Morphallaxis
- epithelialization

27.Atypical regeneration:

- Hypomorphosis
- Heteromorphosis
- Excessive regeneration

28.The concept of homeostasis. Mechanisms of homeostasis:

- At cellular level
- At the molecular-genetic level
- At system level

## Questions to part

### «Protozoology»

1. Describe the types of biotic bonds. Given example.
2. What is parasitism? Classification of parasitism and parasites. Classification of owners.
3. Describe the methods of transmission of the pathogen.
4. Give a General description of the Simplest type. Taxonomy of type.
5. To characterize the class Sarcodina. Which members of the class are human commensals?
6. To characterize the morphological forms of *Entamoeba histolytica*. Describe the life cycle of *Entamoeba histolytica*. Symptoms of amoebiasis.
7. To characterize the class of Infusoria (on the example of the structure and activity of the infusoria of the slipper).
8. Describe the morphology and life cycle of *Balantidium*. Symptoms of balantidiasis. Diagnosis and prevention.
9. Give a General description of the class of Sporozoa.
10. The Group Of Coccidia. Describe the structure of Coccidia on the example of *Toxoplasma*. Describe the life cycle of *Toxoplasma*. Symptom of disease.
11. To give a General characterization of the class of Flagellates. List the parasitic representatives of the order Novogalenovye.
12. To characterize the morphology of *Giardia*. What is the life cycle of *Giardia*? Describe the pathogenic effect of *Giardia* and symptoms of giardiasis.
13. What is the structure of oral, urogenital and intestinal *Trichomonas*? What medical significance do they have? Diagnosis and prevention of trichomoniasis.

## Questions to part

### «Helminthology»

1. Give a General description of the type of Flat worms. What are the classes divided? What are the examples of the type of parasites in humans?
2. To give a General characterization of the class of Flukes.
3. Describe the structure, life cycle of the liver Fluke, symptoms of fascioliasis
4. What are the features of morphology, life cycle of the lung Fluke? Symptoms paragonimoz
5. To characterize the structure, life cycle of the cat fluffer.
6. To characterize the structure and life cycle of the lanceolate Fluke.
7. What is the pathogenic effect of feline and Lancet flukes?
8. Give a General description of the class of Tapeworms. What features of the morphology of representatives of this class are associated with a parasitic lifestyle?
9. To characterize the structure of scolecs, hermaphrodite and Mature segments of pork and bovine chains.
10. Describe the life cycle of a bull chain. What is the pathogenic effect of bovine tapeworm? The symptoms of beef tapeworm infection.
11. Describe the life cycle of a pork tapeworm. What is the pathogenic effect of pork tapeworm?
12. Which of the two chains is more dangerous to humans? Why? What are the symptoms of teniosis and cysticercosis? How do people become infected with cysticercosis?
13. List the methods of diagnosis and prevention of teniasis, beef tapeworm infection and cysticercosis.
14. What are the features of morphology, the life cycle of the dwarf chain?
15. Ways of infection with gimenolepidoz, methods of prevention and methods of diagnosis.
16. Features of the organization of representatives of the Type of roundworms.
17. The structure and reproduction of human Ascaris.
18. Pathogenic effect of Ascaris on the body of an adult / child.
19. Diagnosis and prevention of ascariasis. The structural features of the roundworm eggs.
20. The morphology and biology of whipworm.
21. Pathogenic effect of vlasoglav on the body of an adult / child; symptoms of trichocephalosis; diagnosis and prevention, prevalence of trichocephalosis.
22. Morphology and biology of pinworms.
23. Ways of infection with enterobiasis; prevalence, diagnosis and prevention of enterobiasis.
24. Features of morphology and development cycle of Trichinella.
25. How does the trichinellosis invasion circulate in the natural and synanthropic foci?

26. What is the pathogenic effect of *Trichinella* and symptoms of trichinosis?