ДОКУМЕНТ ПОДПИСАН
ЭЛЕКТРОННОЙ ПОДПИСЬЮ

Сведения о сертификате ЭП

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ФГБОУ ВО Университет биотехнологий

Кафедра ветеринарной генетики и биотехнологии

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УТВЕРЖДЕН

на заседании кафедры

Протокол от «14» 01 2026 г.№ 5

И.о Заведующего кафедрой

М.В. Стрижкова

(подпись)

ФОНД

ОЦЕНОЧНЫХ СРЕДСТВ

ФТД.В.01 Veterinary genetics

36.05.01 Ветеринария (уровень специалитета)

виды деятельности: **врачебная, экспертно-контрольная; научно-образовательная**

Новосибирск 2026

Паспорт

фонда оценочных средств

№ п/п	Контролируемые разделы дисциплины	Код контролируемой компетенции (или ее части)	Наименование оценочного средства
1 1.1 1.2	**Introduction** Introduction to genetics Mitosis and meiosis	ИУК-4.2	Тест, опрос
2. 2.1 2.2 2.3	**Mendelian genetics** Monohybrid cross. Postulates of Mendel's Dihybrid cross, chi-square ($\chi 2$) analysis Modification of Mendelian ratio	ИУК-4.2, ИОПК-2.3	Тест, опрос
3. 3.1	**Sex determination** Sex determination and sex-linked characteristics	ИУК-4.2, ИОПК-2.3	Тест, опрос
4. 4.1	**Applications and Genetic Testing** Applications and genetic testing, pedigree analysis	ИУК-4.2, ИОПК-2.3	Тест, опрос
5. 5.1	**Quantitative genetics** Quantitative genetics, quantitative traits	ИУК-4.2, ИОПК-2.3	Тест, опрос
6. 6.1	**Chromosome mapping and linkage** Chromosome mapping and linkage in eukaryotes	ИУК-4.2, ИОПК-2.3	Тест, опрос
7. 7.1	**Genetic systems and gene mapping** Bacterial and viral genetic systems, gene mapping	ИУК-4.2, ИОПК-2.3	Тест, опрос
8. 8.1	**Chromosomal variation** Chromosomal variation, aneuploidy, polyploidy	ИУК-4.2, ИОПК-2.3	Тест, опрос
9. 9.1 9.2	**Genetic information** DNA Replication and recombination, DNA repair, transcription The Genetic code and translation	ИУК-4.2, ИОПК-2.3	Тест, опрос
10. 10.1	**Control of gene expression**	ИУК-4.2, ИОПК-	Тест, опрос

	Control of gene expression in prokaryotes and eukaryotes, operons	2.3	
11. 11.1	**DNA repair systems** DNA repair systems and gene mutations	ИУК-4.2, ИОПК-2.3	Тест, опрос
12. 12.1	**Genomics and proteomics** Genomics and proteomics, genetic map, physical map, bioinformatics	ИУК-4.2, ИОПК-2.3	Тест, опрос
13. 13.1	**Immunogenetics** Immunogenetics and developmental genetics	ИУК-4.2, ИОПК-2.3	Тест, опрос
14. 14.1	**Population genetics** Population genetics, mutation, migration, natural selection	ИУК-4.2, ИОПК-2.3	Тест, опрос
15. 15.1	**Evolutionary genetics** Evolutionary genetics, DNA sequence variation, rates of molecular evolution	ИУК-4.2, ИОПК-2.3	Тест, опрос
16. 16.1 16.2	**Environmental control of inherited disorders** Single-gene disorders, genetic control Familial disorders not due to a single gene	ИУК-4.2, ИОПК-2.3	Тест, опрос
17. 17.1	**Pharmacogenetics** Pharmacogenetics, genetically engineered	ИУК-4.2, ИОПК-2.3	Тест, опрос
	Зачет		Вопросы для зачета

ФГБОУ ВО Университет биотехнологий
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Тестовые задания
по дисциплине «Veterinary genetics»

Входной контроль

Раздел 1 «Introduction»

1. What are some of the implications of all organisms having similar genetic systems?
a) That all life forms are genetically related;
b) That research finding on one organism's gene can often be applied to other organisms;
c) That genes from one organism can often exist and thrive in another organism;
d) All of the above;

2. Whould the horse make a good model genetic organism?

3. How did developments in cytology in the nineteenth centure contribute to our modern understanding of genetics?

4. Diploid cell have
a) two chromosomes;
b) two sets of chromosomes;
c) one set of chromosomes;
d) two pairs of homologous chromosomes.

5. Which is correct order of stages in the cycle?
a) G_1, S, prophase, metaphase, anaphase;
b) S, G_1, prophase, metaphase, anaphase;
c) Prophase, S, G_1, metaphase, anaphase;
d) S, G_1, anaphase, prophase, metaphase.

6. Which of following events takes palace in meiosis II but not meiosis I
a) Crossing over;
b) Contraction of chromosomes;
c) Separation of homologous chromosomes;
d) Separation of chromatids.

7. A secondary spermatocyte has 12 chromosomes. How many chromosomes will be found in primary shermatocyte that gave rise to it?
a) 6; b) 12; c)18; d) 24

8. Which structure is diploid?
a) Microspore; b)Egg; c) Megaspore; d) Microsporocyte.

Раздел 2. Mendelian Genetics.

1) The cross is Ll x Ll, where l is an allele for long fingers and L is an allele for normal fingers. The probability that the child will possess the genotype for long fingers (ll) is 1/4, or 0,25. The trait has a penetrance of 80% which indicates that a person with genotype for long fingers has a probability of 0,8 of actually having long fingers. The probability that the child will have long fingers is found by multiplying the probability of the genotype by the probability that a person with that genotype will express the trait: 0,25 x 0,8 = 0,2;

2) A 2:1 ratio is usually due to a lethal gene. The cross is Ww x Ww→ 1/4 WW, 1/2 Ww, and 1/4 ww. One of the homozygotes dies dies, yielding 2/3 Ww (green) and 1/3 ww (white). The green progeny are therefore heterozygous (Ww).

Раздел 3. Sex Determination and Sex-Linked Treits.
1) All male offspring will have hemophilia, and all female offspring will not have hemophilia; so the overall probability of hemophilia in the offspring is 1/2. Two Darr bodies. A Barr body is an inactivated X chromosome.

Раздел 5. Lincage and Chromosome Mapping in Eukaryotes.
1) A test cross between a homozygote and heterozygote produces 1/2 heterozygous progeny

Раздел 6. Bacterial and Viral Genetic System.
1. Which is true of plasmids?
a) they are composed of RNA;
b) they normally exist outside of bacterial cells;
c) theyposses only a single strand of DNA;
d) they replicate independently of the bacterial chromosome.

2. Which pocess of DNA transfer in bacteria requires a virus?
a) conjugation;
b) transduction;
c) transformation;
d) all of the above.

3. Conjugation between an F^+ and F^- cell usually resalt in?
a) Two F^+ cells;
b) Two F^- cells;
c) an F^+ and an F^- cell;
d) anHfr cell and an F+ cell.

4. In which bacteriophage life cycle does the phage DNA become incorporated intj the bacterial chromosome?
a) Lytic;
b) Lysogenic;
c) Both lytic and lysogenic;
d) Neither lytic or lysogenic.

Раздел 7. Chromosomal variation.

1. Chromosome duplications often result in abnormal phenotypes because:
a) developmental process depend on the relative amounts of proteins encoded by different genes;
b) extra copies of the genes within the duplicated region do not pair in meiosis;
c) the chromosome is more likely to break when it loops in meiosis;
d) extrz DNA must be replicated, which slow down cell division.

2. What is the outcome of a Robertsonian Translocation?
a) Two acrocentric chromosomes;
b) One metacentric chromosome and one chromosome with two very short arms;
c) One metacentric chromosomes and one acrocentric chromosome;
d) Two metacentric chromosomes.

Раздел 8. DNA, RNA Structure and Analysis.

1. What did Watson and Crick use to help solve the structure of DNA?
a) X-ray diffraction;
b) Laws of structural chemistry;
c) Models of DNA;
d) All the above.

2. How do the sugars of RNA and DNA differ?
a) RNA has a six-carbon sugar; DNA has a five-carbon sugar;
b) The sugar of RNA has a hydroxyl group that is not found in the sugar of DNA;
c) RNA contains uracil; DNA contain thymin;
d)Dna's sugar has a phosphorous atom; RNA's sugar does not.

3. The antiparallel nature of DNA refers to:
a) its charged phosphate groups;
b) the pairing of bases on one strand with bases on the other strand;
c) the formation of hydrogen bonds between bases from opposite strands;
d) the opposite direction of the two strands of nucleotides.

4. Primers are synthesized where on the lagging strand?
a) Only at the 5 end of the newly synthesized strand;
b) Only at the 3 end of thenewly synthesized strand;
c) At the beginning of every Okazaki fragment;
d) At the multiple places within an Okazaki fragment.

5. What would be the result if an organism's telomerase were mutated and nonfunction
a) No DNA replication would take plase;
b) The DNA polymerase enzyme would stall at the telomere;
c) Chromosomes would shorten each generation;
d) RNA primers could not be removed.

6. Which class of RNA is correctly paired with its function?
a) Small nuclear RNA (snRNA): processes rRNA;
b) Transfer RNA (tRNA): attaches to an amino acid;
c) MicroRNA (miRNA): carries information for the amino acid sequence of a protein;
d) Ribosomal RNA (rRNA): carries out RNA interference.

7. A codon is
a) one of three nucleotides that encode an amino acid;
b) three nucleotides that encode an amino acid;
c) three amino acids that encode a nucleotide;
d) one of four bases in DNA.

8. Amino acid bind to which part of the tRNA?
a) anticodon; b) DHU arm; c) 3' end; d) 5' end.

9. In elongation, the creation of peptide bonds between amino acids is catalyzed by
a) rRNA; b) protein in the small subunit; c) protein in the large subunit; d)tRNA.

10. In a polyribocome, the polypeptides associated with which ribosomes will be the longest
a) Thos at the 5' end of mRNA;

b) Thus at the 3' end of mRNA;
c) Thus in the middle of mRNA;
d) All polypeptides will be the same length.

11. How do amino asids in DNA-binding proteins intract with DNA?
a) By forming covalent bonds with DNA bases;
b) By forming hydrogen bonds with DNA bases;
c) By forming covalent bonds with DNA sugars.

12. What is the difference between a structural gene and a regulator gene?
a) Structural genes are transcribed into mRNA, but regulator gene aren' t;
b) Structural genes have complex structures; regulator gene have simple structures;
c) Structural genes encode proteins that function in the structure of the cell; regulator genes carry out metabolic reaction;
d) Structural genes encode proteins; regulator genes control the transcription of structural genes.

Раздел 9. Control of the Gene Expression in Procaryotes and Eukariotes

1. Which of the following changes is a transition base subtitution?
a) Adenine is replaced by thymine;
b)Cytosine is replaced by adenine;
c) Guanine is replaced by adenine;
d) Three nucleotide pairs are inserted unto DNA.

2. Base analogs are mutagenic because of which characteristic?
a) They produce changes in DNA polymerase that cause in to malfunction;
b) They distort the structure of DNA;
c) They similar in structure to the normal bases;
d) They chemically modify the normal bases.

3. Mismatch repair in bacteria distinguishes between old and new strands of DNA on the basic of
a) differences in base composition of the two strands;
b) modification of histone proteins;
c) base analogs on the new strand;
d) methyl groups on the old strand.

Раздел 10. Gene Mutations and DNA Repair.
1. How is a supressor mutation different from a reverse mutation?
2. What three factors affect mutation rates?

Раздел 11. GenomicsandProteomics.

1. A config is
a) aset of molecular markers used in genetic mapping;
b) a set of overlapping fragments that form a continuous stretch ofDNA;
c) a set of fragments generated by a restriction enzyme;
d) a small DNA used in sequencing.

2. The Human Genome Sequencing Consortium used which approach in sequencing the human genome?
a) Whole-genome shotgun sequencing;

b) Map-based sequencing;
c) A combination of whole-genome shotgun sequencing and map-based sequencing.

3. What is the difference between orthologs and paralogs?
a) Orthologs are homologous sequences; paralogs are analogous sequences;
b) Orthologs are more similar than paralogs;
c) Orthologs are in the same organism, paralogs are in different organisms;
d) Orthologs are in different organisms; paralogs are in the same organism.

4. Which is the correct order of steps in a mutagenesis screen?
a) Positional cloning, mutagenesis, identify mutants, verify genetic basis;
b) Mutagenesis, positional cloning, identify mutants, verify genetic basis;
c) Mutagenesis, identify mutants, verify genetic basis, positional cloning;
d) Identify mutants, positional cloning, mutagenesis, verify genetic basis.

5. What is the ralation between genome size and gene number in prokaryotes?

6. Segmental duplications play an important role in evolution by
a) giving rise to new genes and multigene families;
b) keeping the number of genes in a genome constant;
c) eliminating repetitive sequences produces by transposition;
d) controlling the G + C content of the genome.

Раздел 12. Developmental Genetics and Immunogenetics.

1. Scientists have cloned some animals by ingecting a nucleus from an early embryo into an enucleated egg cell. The resulting animals are genetically identical with the donor of the nucleus. Does this outcome prove that genetic material is not lost during development? Whyorwhynot?

2. The correct sequence in which the segmentation genes act is:
a) segment-polarity genes→ gap genes→ pair-rule genes;
b) gap genes→ pair-rule genes → segment-polarity genes;
c) segment-polarity genes→ pair-rule genes → gap genes;
d) gap genes→ segment-polarity genes → pair-rule genes.

3. How does cell geath from apoptosis differ from cell death from necrosis?

Раздел 13. PopularGenetics.
1. The measurements of a distribution with a higher – will be more spread out.
a) Mean; b) Variance; c) Standard deviation; d) Both and above.

2. In Lubbock, Texas, rainfall and temperature exhibit a significant correlation of – 0.7. Which conclusion is correct?
a) There is usually rainfall when the temperature is high;
b) There is usually rainfall when the temperature is low;
c) Rrainfall is equally likely when the temperature is high or low.

3. If the environmental variance (V_E) increases and all other variance components remain the same, what will the effect be?
a) Broad-sense heritability will decrease;
b) Broad-sense heritability will increase;
c) Narrow-sense heritability will increase;

d) Broad-sense heritability will increase, but narrow-sense heritability will decrease.

4. Suppose that you just learned that the narrow-sense heritability of blood pressure measured among a group of African Americans in Detroit, Michgan, is 0,40. What does this heritability tell us about genetic and environmental contributions to blood pressure?

5. The narrow-sense heritability for a trait is 0.4 and the selection differential is 0.5. What is the predicted response to selection?

6. In a herd of dairy cattle, milk yield and the percentage of butterfat exhibit a genetic correlation of – 0.38. If greater milk yield is selected in this herd, what will be the effect on the percentage of butterfat?

7. Which statement is not an assumption of Hardy-Weinberg law?
a) The allelic frequencies (p and q);
b) The population is randomly mating;
c) The population is large;
d) Natural selection has no effect.

8. What is expected frequency of heterozygotes in population with allelic frequencies x and y is in Hardy-Weinberg equilibrium?
a) x+y; b) xy; c) 2xy; d) $(x - y)^2$.

9. In cats, all-white color is dominant over not all-white. In a population of 100 cats, 19 are all-white cats. Assuming that the population is in Hardy-Weinberg equilibrium, what is the frequency of the all-white allele in this population?

10. What is the effect of outcrossing on a population?
a) Allelic frequencies change;
b) There will be more heterozygotes than predicted by the Hardy-Weinberg law;
c) Where will be fewer heterozygotes than predicted by Hardy-Weinberg low.
d) Genotypic frequency will equal those predicted by the Hardy-Weinberg law.

11. What will be the equilibrium frequency of an allele if its forward and reverse mutation rates aht 0.6×10^{-6} and 0.2×10^{-6}, respectively. Assume that no other evilutionary forces are present.
a) 0,80 ; b) 0,75; c) 0,25; d) 0,12.

12. Each generation, 10 random individuals migrate from population A to population B. What will happen to allelic frequency q as a result of migration when q is equal in populations A and B?
a) q in A will decrease;
b) q in B will increase;
c) q will not change in either A or B;
d) q in B will become q^2.

13. The average numbers of offspring produced by three genotypes are: GG = 6; Gg = 3; gg = 2.Wtat is the fitness of Gg?
a) 3; b) 0,5; c) 0,3; d) 0,27.

14. How does overdominance differ from directional selection?

Раздел 14. EvolutionaryGenetics.

1. Which statement is true of the neutral-mutation hypothesis?

a) All proteins are functionless;
b) Natural selection plays no role in evolution;
c) Most molecular variants are functionally equivalent;
d) All of the above.

Раздел 15. Genetic and enviromental control of inherited disorders.

1. Which statement is true of theneutral-mutation hypothesis?

2. What are some of the advantages of using microsatellites for evolutionary studies?

3. Which statement is example of postzygotic reproductive isolation?

a) Sperm of species A dies in the oviduct of species B before fertilization can take place;
b) Hybrid zygotes between species A and B are spontaneously aborted early in development;
c) The matting seasons of species A and B do not overlap;
d) Males of species A are not attracted to the pheromones produced by the female of species B.

4. In general, which types of sequences are expected to exhibit the slowest evolutionary change?

a) Synonymous change in amino acid coding regions of exon;
b) Nonsynonymous change in amino acid coding regions of exon;
c) Introns;
d) Pseudogenes.

Критерии оценки

Показателем прохождения входного контроля обучающимся является % правильно выполненных заданий, который составляет не менее 60.

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Тест для проверки уровня сформированности компетенций
по дисциплине «Veterinary genetics»

1.Which is correct order of stages in the cycle? (УК-4.2)
a) G_1, S, prophase, metaphase, anaphase;
b) S, G_1, prophase, metaphase, anaphase;
c) Prophase, S, G_1, metaphase, anaphase;
d) S, G_1, anaphase, prophase, metaphase.

2.Which of following events takes palace in meiosis II but not meiosis I (УК-4.2)
a) Crossing over;
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6; b) 12; c)18; d) 24

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a) they are composed of RNA;
b) they normally exist outside of bacterial cells;
c) they posses only a single strand of DNA;
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5.Which pocess of DNA transfer in bacteria requires a virus? (УК-4.2)
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b) transduction;
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6.Conjugation between an F^+ and F^- cell usually resalt in?(ИОПК-2.3)
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9.What did Watson and Crick use to help solve the structure of DNA? (УК-4.2)
a) X-ray diffraction;
b) Laws of structural chemistry;
c) Models of DNA;
d) All the above.

10.Primers are synthesized where on the lagging strand?(ИОПК-2.3)
a) Only at the 5 end of the newly synthesized strand;
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14.Which is the correct order of steps in a mutagenesis screen? (ИОПК-2.3)
a) Positional cloning, mutagenesis, identify mutants, verify genetic basis;
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c) Mutagenesis, identify mutants, verify genetic basis, positional cloning;
d) Identify mutants, positional cloning, mutagenesis, verify genetic basis.

15.Segmental duplications play an important role in evolution by (ИОПК-2.3)
a) giving rise to new genes and multigene families;
b) keeping the number of genes in a genome constant;
c) eliminating repetitive sequences produces by transposition;
d) controlling the G + C content of the genome.

16.If the environmental variance (V_E) increases and all other variance components remain the same, what will the effect be? (ИОПК-2.3)
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b) Broad-sense heritability will increase;
c) Narrow-sense heritability will increase;
d) Broad-sense heritability will increase, but narrow-sense heritability will decrease.

17.What is expected frequency of heterozygotes in population with allelic frequencies x and y is in Hardy-Weinberg equilibrium? (ИОПК-2.3)
x+y; b) xy; c) 2xy; d) $(x - y)^2$.

18.What is the effect of outcrossing on a population? (ИОПК-2.3)
a) Allelic frequencies change;
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c) Where will be fewer heterozygotes than predicted by Hardy-Weinberg low.
d) Genotypic frequency will equal those predicted by the Hardy-Weinberg law.

19. Each generation, 10 random individuals migrate from population A to population B. What will happen to allelic frequency q as a result of migration when q is equal in populations A and B? (ИОПК-2.3)
a) q in A will decrease;
b) q in B will increase;
c) q will not change in either A or B;
d) q in B will become q^2.

20.The average numbers of offspring produced by three genotypes are: GG = 6; Gg = 3; gg = 2.Wtat is the fitness of Gg?(ИОПК-2.3)
a) 3; b) 0,5; c) 0,3; d) 0,27.

21. Which statement is true of the neutral-mutation hypothesis? (УК-4)
a) All proteins are functionless;
b) Natural selection plays no role in evolution;
c) Most molecular variants are functionally equivalent;
d) All of the above.

22.Which statement is example of postzygotic reproductive isolation? (УК-4)
a) Sperm of species A dies in the oviduct of species B before fertilization can take place;
b) Hybrid zygotes between species A and B are spontaneously aborted early in development;
c) The matting seasons of species A and B do not overlap;
d) Males of species A are not attracted to the pheromones produced by the female of species B.

23. In general, which types of sequences are expected to exhibit the slowest evolutionary change? (УК-4)
a) Synonymous change in amino acid coding regions of exon;
b) Nonsynonymous change in amino acid coding regions of exon;
c) Introns;
d) Pseudogenes.

Вопросы открытого типа

1. Describe the correct sequence of stages in the cell cycle and explain why the order G1 → S → prophase → metaphase → anaphase is correct.
Ответ: The cell first grows (G1), then replicates its DNA (S), after which chromosomes condense and separate during mitosis.

2. Which event takes place in meiosis II but not in meiosis I? Explain the difference between the separation of homologous chromosomes and the separation of chromatids.
Ответ: Separation of chromatids. In meiosis I homologous chromosomes separate, whereas in meiosis II sister chromatids separate.

3. A secondary spermatocyte has 12 chromosomes. Determine how many chromosomes were present in the primary spermatocyte that gave rise to it, and explain your reasoning.

Ответ: 24 chromosomes. The primary spermatocyte is diploid (2n); after meiosis I a haploid secondary spermatocyte is formed (n = 12), so 2n = 24.

4. Characterize plasmids: what are they composed of, where are they located, and how do they replicate? Why are they important for bacteria?

Ответ: Plasmids are small circular double-stranded DNA molecules located in the bacterial cytoplasm; they replicate independently of the bacterial chromosome and carry useful genes (e.g., antibiotic resistance).

5. Name the three processes of DNA transfer in bacteria (conjugation, transduction, transformation) and explain which of them requires a virus.

Ответ: Conjugation, transduction, transformation. A virus is required for transduction.

6. What happens during conjugation between an F+ and an F− cell? Explain why the result is usually two F+ cells.

Ответ: Two F+ cells are formed: the F plasmid is transferred from F+ to F−, and after synthesis of the second strand both cells become F+.

7. Compare the lytic and lysogenic cycles of a bacteriophage. In which of them does the phage DNA become incorporated into the bacterial chromosome?

Ответ: In the lysogenic cycle the phage DNA becomes incorporated into the bacterial chromosome (prophage); in the lytic cycle the cell is lysed.

8. Why do chromosome duplications often result in abnormal phenotypes? Explain the role of the relative amounts of proteins encoded by different genes.

Ответ: Duplication changes gene dosage, disrupting the ratio of protein amounts, which interferes with developmental processes and produces an abnormal phenotype.

9. What methods and data did Watson and Crick use to help solve the structure of DNA? Name at least three sources of information.

Ответ: X-ray diffraction (data from Wilkins and Franklin), laws of structural chemistry (Chargaff's rules, base complementarity), and building models of DNA.

10. What would happen to chromosomes if telomerase were mutated and nonfunctional? Explain the relationship between telomerase and chromosome shortening with each cell division.

Ответ: Chromosomes would shorten each generation because telomerase does not restore the terminal DNA regions during replication.

Критерии оценки

Показателем прохождения входного контроля обучающимся является % правильно выполненных заданий, который составляет не менее 60.

ФГБОУ ВО Университет биотехнологий
Кафедра ветеринарной генетики и биотехнологии

Список вопросов для подготовки к зачету
по дисциплине «Veterinary genetics»

1. What is genetics?
2. What molecules combine to form a nucleotide
3. What is the difference between transcription and translation?
4. What is a veterinary genetics?
5. What are the principal differences between prokaryotic and eukaryotic cells?
6. What type of cells are haploid? What types of cells are diploid?
7. Does crossing over before or after chromosome duplication in cells going through meiosis?
8. Which typically last longer, interphase or M phase?
9. In human being , the gene for β-globin is located on chromosome 11, and the gene for α-globin, which is component of the hemoglobin protein, is located on chromosome 16. Would these two chromosomes be expected to pair with each other during meiosis? Explain your answer.
10. What is a monohybrid cross? What is a dihybrid cross?
11. What is principle of dominance?
12. What is the principle of segregation?
13. What is the principle of independent assortment (segregate)?
14. How many different kinds of F_1 genotypes and F_2 phenotypes would be expected from the following crosses: AA x aa; Aa x Aa; Aabb x aaBB?
15. In a family of children, what is the chance that at three are girls?
16. What blood types could be in a children born to a woman who has blood type N and man who has blood type N/N?
17. What phenotypes and ratios are expected from the following matings: I^AI^A x ii; I^AI^B x ii; I^Ai x I^Bi; I^AI^B x I^AI^B?
18. In shorthorn cattle, the heterozygous condition of the alleles for red color (C^R) and hite coat color (C^W) is roan (чалый) coat color. How many different kinds of gametes, genotypes and phenotypes would be expected from the roan cattle?
19. In poultry, the dominant alleles for rose comb (P), if present together, give walnut comb. The recessive alleles of each gene, when present together in homozygous state (rrpp), give single comb will be the comb character of the offspring of the following crosses: R/RPP x rrPp; RrPp x rrpp;rrPP x RRpp?
20. What are the genetic differences between male- and female- determining sperm in animals with heterogametic males?

21. What are sexual phenotypes of the following penotypes in Drosophila: XX, XY, XXX, XXY, XO?

22. How do the chromosomal mechanisms of sex determination differ between cattle and Drosophila?

23. Color blindeness is determined by an X-linked recessive gene. A man who has normal color vision has children with a woman whose father had color blindues. What are the genotype of the man and woman? What proportion of the children will have color blindness?

24. What is epistasis?

25. Labrador retrivers may be black (B-E-), brown (BBE-) and golden (--ee) in color. What genetypes would be expected from the following crosses: black x black (9/16 black : 4/16 golden : 3/16 brown); black x golden (2/4 golden : 1/4 black : 1/4 brown)?

26. Genes A and B are linked with 10 percent recombination. Would be the phenotypes and the probability of each, among progety of the following cross: aB/Ab x ab/ab?

27. How do bactecia differ from the viruses?

28. What is a chromosome mutations?

29. For a species with a diploid number of 20, indicate how many chromosomes will be present in the somatic nuclei of individual are haploid, triploid, tetraploid, trisomic and monosomic?

30. What are the difference beyween DNA and RNA?

31. What is a transcription and RNA processing?

32. What is the central dogma of molecular genetics?

33. What is genetic code? Why is genetic code a triplet code instead ofsinglet or doublet code? How many different amino acids are specified by the genetic code?

34. What is a genome?

35. What is the transposable genetic element?

36. Distinguish between a genetic map, a cytogenetic map and physical map.

37. Bioinformatics is the science of gathering, manipulation, storing retrieving and classifying of genetic and other biological information use computer and statistical techniques.

38. How are transgenic and other animals produced?

39. What is a immune sistem?

40. What are antibodies and how do they protect you from viruses, bacteria and other pathogens?

41. What are primary and secondary immune responses?

42. What class of immunoglobulin do you know?

43. The genes of the MHC locus of human and animals are said to be higly polymorphic. What does this mean of what significance in this fields of medicine and veterinary?

44. Mitosis and meiosis.
45. Hereditary diseases.
46. Diseases with hereditary predisposition.
47. Autoimmune diseases.
48. Cell cycle.
49. Chromosome map.
50. Quantative in heritance.
51. Genome of bacteries.
52. Histocompatibility complex: BoLA, SLA.
53. Karyotypes in different species.

Критерии оценки

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МАТРИЦА СООТВЕТСТВИЯ КРИТЕРИЕВ ОЦЕНКИ УРОВНЮ СФОРМИРОВАННОСТИ КОМПЕТЕНЦИЙ

Критерии оценки	Уровень сформированности компетенций
Оценка по системе «зачет–незачет»	
«Зачтено»	*«Достаточный»*
«Незачтено»	*«Недостаточный»*

Методические материалы, определяющие процедуру оценивания знаний, умений, навыков и (или) опыта деятельности, характеризующих этапы формирования компетенций

1. Положение «О балльно-рейтинговой системе аттестации студентов»: СМК ПНД 08-01-2026 (https://edubiotech.ru/sveden/document/lokalnye-akty/?ysclid=mnfnl4uzus606249516: режим доступа свободный);

2. Положение «О проведении текущего контроля и промежуточной аттестации обучающихся ФГБОУ ВО Университет биотехнологий»: СМК ПНД 77-01-2026 (https://edubiotech.ru/sveden/document/lokalnye-akty/?ysclid=mnfnl4uzus606249516: режим доступа свободный).

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