

The material covered on Exam 3 includes lecture since the last exam and text chapters 13-21. Be sure that you read chapter 19, which was not represented in the notes.

1. Which of the following is an enveloped retrovirus?

- a. T4 bacteriophage
- b. lambda bacteriophage
- c. Esherichia coli
- d. HIV
- e. none of the above

2. A lysogenic bacteriophage is one that:

- a. has tail fibers
- b. is usually lytic.
- c. is usually temperate.
- d. carries DNA rather than RNA

3. The RNA transcripts of a retrovirus serve as both:

- a. capsid and envelope
- b. genome and messenger RNA
- c. ribozyme and messenger RNA
- d. ribosome and genome

4. The process of conjugation in bacteria is analogous to gametic sex because:

- a. two haploid cells become one diploid cell.
- b. new combinations of alleles result.
- c. two bacteria become one zygote.
- d. all of the above

In the following three questions, match the descriptions to the answers below. Answers may be used more than once.

- a. prokaryote
- b. eukaryote
- c. both prokaryote and eukaryote

5. Coordinated genes are usually physically adjacent to one another.

6. mRNA processing removes introns

7. Coordinated gene expression involves multiple enhancer sites.

8. Genetic elements that move from place to place in the genome without replication are called

- a. Transposase
- b. Transposons
- c. Retrotransposons

9. What are the two major classes of repetitive DNA in eukaryote genomes?

- a. Microsatellite and minisatellite
- b. Alu elements and Alu isotopes
- c. Tandem and interspersed
- d. Complex and simple
- e. Exons and introns

10. Which of the following classes of eukaryote DNA are translated into proteins?

- a. introns
- b. telomeres
- c. promoters
- d. satellite DNA
- e. none of the above

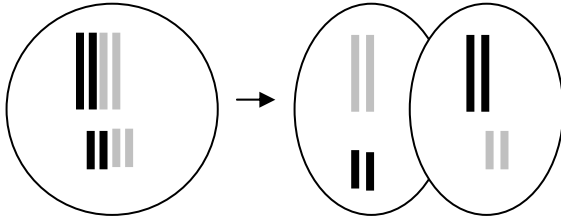
11. Satellite DNA is:

- a. not found near the centromere
- b. tandem repetitive sequences
- c. transcribed and translated
- d. not very common

12. The flowering plant life cycle contains two stages that differ in ploidy. The multicellular haploid stage is called the:

- a. flower
- b. pistil
- c. sporophyte
- d. gametophyte
- e. spore

The next question refers to the diagram below:



13. The sketch represents:

- a. the first division in meiosis.
- b. the second division in meiosis.
- c. the division in mitosis.
- d. the replication of the DNA.

14. Replication of the DNA results in pairs of:

- a. homologous chromosomes.
- b. sister chromatids.
- c. daughter chromosomes.
- d. designer genes.

15. The division and separation of the centromeres results in:

- a. crossing over
- b. replication of the DNA
- c. homologous chromosomes
- d. sister chromatids
- e. daughter chromosomes

16. As a result of mitosis:

- a. one diploid cell becomes 2 diploid cells.
- b. one diploid cell becomes 4 haploid cells.
- c. one haploid cell becomes 2 diploid cells.
- d. one haploid cell becomes 3 haploid cells.
- e. none of the above

17. Which of the following processes creates a cell or cells with a different number of chromosomes than before?

- a. DNA replication.
- b. meiosis.
- c. fertilization.
- d. Both b and c.
- e. All of the above.

18. Colchicine is a chemical that inhibits microtubule formation. Therefore, it should also inhibit:

- a. DNA synthesis.
- b. translation.
- c. chromosome movement.
- d. nuclear membrane synthesis.
- e. crossing over.

19. A genetic mutation usually results from an error in:

- a. replication.
- b. glycolysis.
- c. transcription.
- d. translation.
- e. judgement.

20. The phenotype of an organism is determined by its:

- a. genotype.
- b. environment.
- c. both a and b

21. Mendel studied peas because he:

- a. wanted to understand heredity.
- b. found pea plants convenient for study.
- c. could cause self-fertilization in peas.
- d. found several heritable variations for study.
- e. all of the above.

22. An individual with identical DNA sequences at a locus on each member of a homologous pair of chromosomes, is described as:

- a. epistatic.
- b. pleiotropic.
- c. polygenic.
- d. heterozygous.
- e. homozygous.

23. A recessive allele is one that:

- a. is rare in the population.
- b. never affects the phenotype.
- c. codes for a non-functional protein.
- d. is not expressed if dominant allele present.
- e. all of the above.

24. The processes that result in genetic recombination include:

- a. crossing over
- b. independent assortment
- c. fertilization
- d. all of the above
- e. none of the above

25. The expected phenotypic result of a cross between two heterozygous individuals bearing a dominant and a recessive allele is:

- a. 3:1 dominant:recessive.
- b. 3:1 recessive:dominant.
- c. all dominant.
- d. all recessive.

26. Mendel could be certain that the parents of a pea had identical genes by:

- a. using plants with the same phenotypes.
- b. using plants with different phenotypes.
- c. allowing a plant to self-fertilize.
- d. examining the gene banding patterns.
- e. comparing gene nucleotide sequences.

27. The expected offspring phenotypes from a cross between a homozygous, dominant individual and a homozygous recessive individual is:

- a. 3:1 dominant:recessive.
- b. 3:1 recessive:dominant.
- c. all dominant.
- d. all recessive.

28. Which of the following describes incomplete dominance between alleles?

- a. phenotype of heterozygotes is the same as that of homozygous dominant individuals.
- b. heterozygotes have intermediate phenotype
- c. heterozygote expresses both alleles

29. Which of the following combinations parental and offspring ABO blood group phenotypes is not possible?

- a. Parents: A and B, Child: O
- b. Parents: A and AB, Child: B
- c. Parents: O and AB, Child: B
- d. Parents: O and O, Child: AB

Assume that mouse fur is affected by two gene loci with two possible alleles at each: S=silky s=rough; B=black b=brown. (Upper case indicates the dominant alleles.) Consider the following cross: SsBB X ssbb. Use the choices below to answer the next three questions.

- a. 1/2
- b. 9/16
- c. 3/16
- d. 1/16
- e. 0

30. What is the expected proportion of silky black offspring?

31. What is the expected proportion of rough black offspring?

32. What is the expected proportion of silky brown offspring?

33. If a new allele is to be passed on to the next generation, it must be present in a(n):

- a. intron
- b. operon
- c. germ cell
- d. cancer cell
- e. somatic cell

34. Which statement is false, regarding Alu elements?

- a. Each is about 300 base pairs long
- b. Each Alu element is transcribed simultaneously
- c. About 10% of human DNA consists of Alu elements
- d. Alu elements probably resulted from retrotransposition

35. Alternative RNA splicing means that:

- a. Oncogenes can be turned off
- b. Introns sometimes get translated
- c. Proteosomes may not work on RNA as well as on proteins
- d. Eukaryotes might make fewer kinds of proteins than the number of genes
- e. All of the above

36. Somatic recombination:

- a. Happens in developing lymphocytes.
- b. is important in resisting disease.
- c. results in unique immunoglobins.
- d. rearranges parts of a gene.
- e. all of the above

37. The α -globin and β -globin families of genes:

- a. are descended from a shared ancestor
- b. are on different chromosomes
- c. include some pseudogenes
- d. include hemoglobin genes
- e. all of the above

38. Recombinant DNA technology is used to:

- a. insert genes from one cell into another.
- b. selectively destroy genes within bacteria.
- c. make copies of DNA in cell-free systems.
- d. all of the above
- e. none of the above

39. A mutation in the gene for Ras protein tends to (indirectly) stimulate cell division. This is an example of a(n):

- a. SINE
- b. oncogene
- c. microsatellite
- d. retrotransposon
- e. tumor suppressor gene

40. If a eukaryote gene is to be translated by prokaryote cells it may be necessary to use _____ for recombination, in order to exclude introns.

- a. cDNA
- b. lambda phage
- c. retrotransposition
- d. gel electrophoresis
- e. reverse transcriptase

41. In the discussion of cloning a gene using bacterial plasmids, the purpose of the LacZ (galactosidase) gene in the plasmid was to:

- a. Indicate if the gene of interest was present
- b. Show if the plasmid was present in a clone
- c. Indicate if the clone plasmids were recombinant
- d. Allow bacteria to grow in the presence of ampicillin

42. Which is false regarding restriction enzymes?

- a. They cut both DNA strands
- b. There are only 4 different kinds
- c. They cut DNA at specific recognition sites
- d. Most restriction enzymes leave staggered ends
- e. They are derived mainly from bacteria and viruses

43. The transduction method of inserting foreign DNA into a cell uses:

- a. Virus particles
- b. An electrical current
- c. Plasmids and detergent
- d. A gun with tiny bullets

44. Which determines what portion of the DNA will be amplified by PCR?

- a. Heating
- b. Cooling
- c. Primers
- d. DNA polymerase
- e. Nucleoside triphosphates

45. The Southern Blot method is used to:

- a. Label specific DNA sequences on an electrophoresis gel
- b. Slow movement of molecules in an electrophoresis gel
- c. Isolate messenger RNA from cells
- d. Clean up spills

46. The purpose of primers in PCR is to:

- a. Catalyze DNA polymerization
- b. Select the region to be amplified
- c. Cause the DNA strands to separate
- d. Activate the Taq polymerase

47. Both human and fruit fly the production of sequential sets of body parts during development is controlled by:

- a. Restriction alleles
- b. Homeotic genes
- c. Morphogens
- d. Stem cells

48. Positional information in development is the result of:

- a. Restriction alleles
- b. Homeotic genes
- c. Morphogens
- d. Stem cells

49. Which of the following organisms produces an insecticidal protein?

- a. *Thermus aquaticus*
- b. *Agrobacterium tumefaciens*
- c. *Bacillus thuringensis*
- d. *Arthrobacter luteus*
- e. *Drosophila melanogaster*

50. Persons skeptical of Roundup Ready crops believe that they are a scheme to sell more:

- a. soybeans
- b. insurance
- c. herbicides
- d. insecticides

1 d	26 c
2 c	27 c
3 b	28 b
4 b	29 d
5 a	30 a
6 b	31 a
7 b	32 e
8 b	33 c
9 c	34 b
10 e	35 b (rare though)
11 b	36 e
12 d	37 e
13 a	38 a
14 b	39 b
15 e	40 a
16 a	41 c
17 d	42 b
18 c	43 a
19 a	44 c
20 c	45 a
21 e	46 b
22 e	47 b
23 d	48 c
24 d	49 c
25 a	50 c