Test Prep Pretest

1. a
2. b
3. a
4. d
5. c
6. c
7. d
8. RNA polymerase
9. repressor
10. transcription factors
11. introns
12. exons
13. DNA
14. chromosome
15. Nonsense mutations lead to a stop codon and a terminated protein. Missense lead to a different codon that codes for a different amino acid.
16. Nondisjunction is due to the failure of chromosmes to properly separate from each other during meiosis. This can lead to polyploidy.
17. Apoptosis is programmed cell death. Cells shut down all functioning and eventually dissintegrate.
18. The *lac* operon consists of a cluster of genes that enables a bacterium to build the proteins needed for lactose metabolism only when lactose is present. Some of the genes determine whether or not other genes will be expressed. The other genes code for enzymes that break down lactose.
19. Eukaryotic regulation contains more steps. Although both prokaryotes and eukaryotes use regulatory proteins, eukaryotes use many more proteins than prokaryotes do, and the interactions are more complex. Instead of using operons, eukaryotic cells have genes with related functions scattered on different chromosomes. Much of the DNA in eukarytoes is not transcribed.
20. In point mutations, one nucleotide in a gene is changed from one kind to another. An insertion is the addition of one or more nucleotide to a gene. When a deletion occurs, one or more nucleotide is deleted from a gene.

Quiz

SECTION: MUTATION AND GENETIC CHANGE

1. d
2. b
3. e
4. c
5. a
6. a
7. b
8. b
9. c
10. b

SECTION: REGULATING GENE EXPRESSION

1. d
2. c
3. a
4. b
5. e
6. a
7. b
8. d
9. b
10. b

SECTION: GENOME INTERACTIONS

1. a
2. c
3. d
4. b
5. b
6. d
7. e
8. c
9. a
10. b

Chapter Test (Basic)

1. F
2. F
3. T
4. T
5. a
6. c
7. b
8. a
9. c
10. a
11. splicing
12. operon
13. repressor
14. *lac*
15. operator
16. promoter
17. transcription
18. intron

Chapter Test (General)

1. a
2. d
3. b
4. a
5. c
6. b
7. b
8. d
9. c
10. d
11. b
12. d
13. f
14. c
15. b
16. a
17. h
18. g
19. e
20. d

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Chapter Test (Advanced)

1. mutagens
2. reading frame
3. deletion mutation or chromosome mutation
4. genetic code
5. repressor, off
6. RNA polymerase
7. eukaryotes
8. genes
9. b
10. d
11. c
12. c
13. b
14. c
15. a
16. b
17. b
18. a
19. Inversions lead to a DNA region being reversed 180 degrees. Translocations involve a piece of one chromosome moving to another chromosome.
20. It suggests that the genetic code is practically universal and the same in all organisms. Organisms use the same code to make proteins.
21. When present in prokaryotic cells, lactose binds to the repressor protein. The repressor prevents RNA polymerase from binding to the promoter. With the blocking effect eliminated, the transcription of genes that code for lactose-metabolizing enzymes proceeds.
22. Introns are segments of nucleotides in eukaryotic genes with no coding information. After transcription, enzymes remove introns from the mRNA molecule.
23. Answers may include two of the following: deletion—a piece of a chromosome breaks off; duplication—a chromosome fragment attaches to its homologous chromosome, which then has two copies of the genes in the fragment; inversion—a chromosome fragment attaches to the same chromosome in the reverse orientation; translocation—a chromosome fragment attaches to another chromosome.
24. Many eukaryotic genes are interrupted by segments of non-coding DNA called introns. The segments of DNA that are expressed are called exons. After transcription, introns are cut out and exons are joined (spliced) together and then translated. Splicing may occur in different ways.
25. Transcription factors are regulatory factors, which control transcription in eukaryotes. Transcription factors initiate transcription by binding to enhancers and RNA polymerases around the promoter region. Some factors are activators and some are repressors.

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