

Bio12-Q2W7-H.W-Biotechnology

Multiple Choice

Identify the choice that best completes the statement or answers the question.

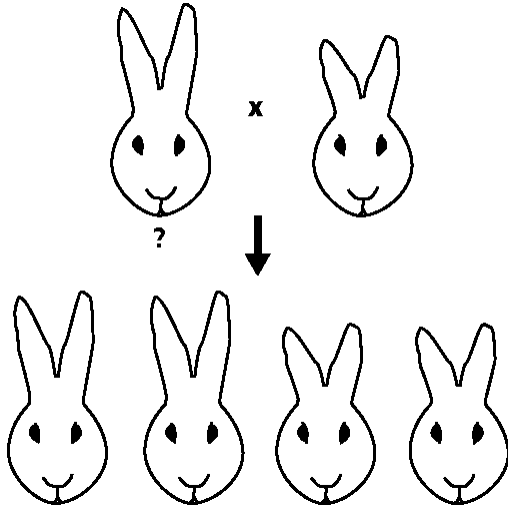


Figure 13-4

- ____ 1. What would be the result of the test cross in Figure 13-4 if the unknown were homozygous long ears?
- all of the offspring would have short ears
 - 1/4 of the offspring would have short ears
 - all of the offspring would have long ears
 - 1/2 of the offspring would have long ears
- ____ 2. What is the genotype of the unknown rabbit in Figure 13-4?
- recessive
 - homozygous short ears
 - homozygous long ears
 - heterozygous

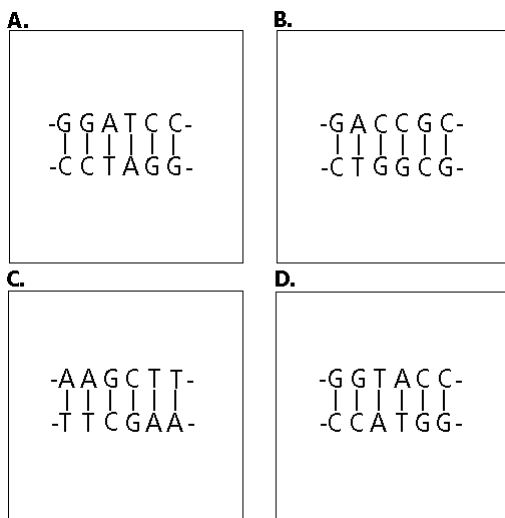


Figure 13-6

- _____ 3. Which segment in Figure 13-6 is not a palidrome?
- a. C
 - b. B
 - c. D
 - d. A
- _____ 4. Which segment in Figure 13-6 will attach to genetic material with the sequence TCGA?
- a. B
 - b. C
 - c. A
 - d. D
- _____ 5. If the segments in Figure 13-6 are mixed with several restriction enzymes, which will not be cleaved?
- a. A
 - b. C
 - c. B
 - d. D
- _____ 6. Listed below are procedures involved in the production of a transgenic organism. From the choices provided, select the sequence that represents the proper order of events.
- 1. Recombinant DNA is transferred into a bacterial cell.
 - 2. A specific gene is identified in a DNA sequence.
 - 3. The DNA fragment is recombined into a vector.
 - 4. The DNA fragment to be inserted is isolated.
- a. 2, 4, 3, 1
 - b. 4, 1, 2, 3
 - c. 1, 2, 3, 4
 - d. 2, 3, 1, 4
- _____ 7. An application of using DNA technology to help environmental scientists would be _____.
- a. make transgenic bacteria that can be used to clean up oil spills more quickly than do the natural bacteria
 - b. use PCR to analyze DNA at a crime scene
 - c. clone the gene for human growth hormone to treat pituitary dwarfism
 - d. create a tobacco plant that glows in the dark
- _____ 8. In 1974, Stanley Cohen and Herbert Boyer inserted a gene from an African clawed frog into a bacterium. The bacterium produced the protein coded for by the inserted frog gene. This insertion of a small fragment of frog DNA into the DNA of another species can most accurately be called _____.
- a. cloning
 - b. electrophoresis
 - c. genetic engineering
 - d. gene therapy
- _____ 9. The Human Genome Project has involved sequencing and mapping the human genome. The most important benefit of this information has been the diagnosis of genetic disorders. Once a genetic disorder is diagnosed, _____ can be used as a possible treatment.
- a. gene therapy
 - b. cell cultures
 - c. DNA fingerprinting
 - d. PCR

____ 10. According to Figure 13-7, which DNA sequence will be cleaved by EcoRI, which cuts AATT/TTAA?



Figure 13-7

- a. B
b. A
c. D
d. C
- ____ 11. The process used to separate DNA segments of different lengths is _____.
a. gel electrophoresis
b. PCR
c. gene amplification
d. all of these

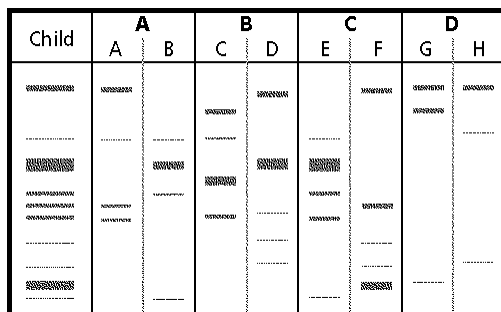


Figure 13-8

- ____ 12. According to Figure 13-8, which parents might give a false positive if only the longer DNA fragments were analyzed?
a. B
b. D
c. A
d. C
- ____ 13. According to Figure 13-8, which are the parents of the child?
a. D
b. B
c. A
d. C
- ____ 14. Recombinant DNA are currently used to produce _____.
a. human antibodies and vaccines
b. all of these
c. crops that test better and stay fresh longer
d. clothing dye, cheese, and laundry products

- ____ 15. In 1974, Stanley Cohen and Herbert Boyer inserted a gene from an African clawed frog into a bacterium. The bacterium produced the protein coded for by the inserted frog gene. The bacterium containing functional frog DNA would be classified as a ____.
- a. plasmid
b. DNA fingerprint
c. clone
d. transgenic organism
- ____ 16. Examine the pieces of DNA represented in Figure 13-1. Why are the nucleotide sequences on both strands referred to as palindromes?

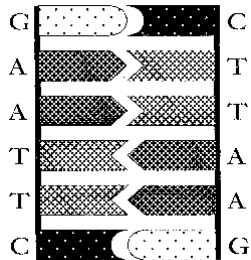


Figure 13-1

- a. each nucleotide is represented
b. the sequences are the same but run in opposite directions
c. the sequences show chromosome mutation
d. the DNA is an example of a transgenic codon
- ____ 17. A small amount of DNA obtained from a mummy or from frozen remains of a human may be cloned. In order to clone small amounts of DNA, ____ needs to be used to generate larger quantities of the DNA.
- a. DNA fingerprinting
b. gel electrophoresis
c. gene splicing
d. polymerase chain reaction techniques
- ____ 18. The effort to completely map and sequence the human genome will likely result in knowing the sequence of the approximately ____ genes on the 46 human chromosomes.
- a. 3 billion
b. 10 000
c. 46
d. 35 000 to 40 000
- ____ 19. A virus isolated from monkeys contains a circular double strand of DNA. The virus, called Simian Virus 40, interests scientists because it causes cancer in laboratory animals. Using a restriction enzyme, the strand is separated into six unequal segments, as shown in Figure 13-2. A scientist hypothesizes that the segment of DNA causing cancer can contain no fewer than 600 base pairs. Using Figure 13-2, decide which segments of the virus have the highest chance of containing the segment of interest. Identify in DESCENDING order, from the HIGHEST chance to the LOWEST.

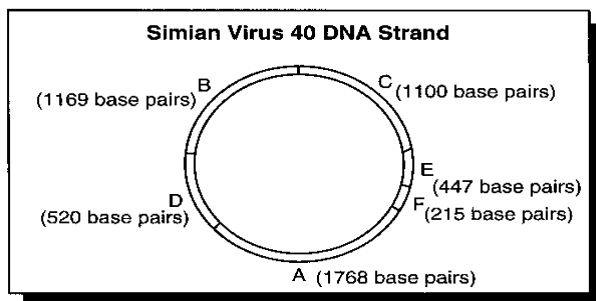


Figure 13-2

- a. F, E, D
b. C, B, A
c. A, B, C
d. D, E, F

- ____ 20. A technique that may be employed in the Human Genome Project is ____.
- gel electrophoresis
 - PCR
 - automated gene sequencers
 - all of these
- ____ 21. Which of the following would be an example of gene therapy technology?
- modifying *E. coli* to produce indigo dye for coloring denim blue jeans
 - cutting DNA into fragments with restriction enzymes
 - development of a nasal spray that contains copies of the normal gene that is defective in persons with cystic fibrosis
 - separation DNA fragments using gel electrophoresis
- ____ 22. Gel electrophoresis is a technique used to ____.
- inject foreign DNA into animal and plant cells
 - cut DNA into fragments of various sizes
 - clone chromosomes of various species
 - separate DNA fragments by charge and length
- ____ 23. What must be on either end of any genetic material that is inserted into the cleaved DNA in Figure 13-5?

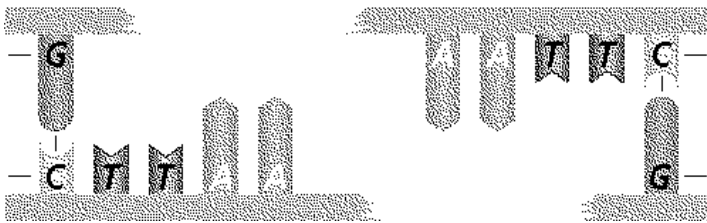


Figure 13-5

- AATT
 - CCGG
 - CGCG
 - ATAT
- ____ 24. The Human Genome Project may make use of which of the following to diagnose genetic disorders before birth?
- PCR
 - gel electrophoresis
 - cell cultures
 - all of the above
- ____ 25. The historical method used to assign genes to particular human chromosome was to ____.
- use biotechnology
 - conduct mating experiments
 - study linkage data from human pedigrees
 - use linkage maps

Matching

Match each item with the correct statement below.

A. recombinant DNA

B. vector

C. restriction enzymes

D. plasmid

E. transgenic organisms

F. genetic engineering or recombinant DNA technology

- ____ 26. Is made by connecting segments of DNA from different sources
- ____ 27. Bacterial proteins that have the ability to cut both strands of the DNA molecule at certain points
- ____ 28. The procedure for cleaving DNA from an organism into small segments, and inserting the segments into another organism
- ____ 29. Contain foreign DNA
- ____ 30. General term for a carrier used to transfer a foreign DNA fragment into a host cell

Completion

Complete each statement.

- A. test cross
- B. cell culture
- C. vectors
- D. plasmid
- E. Restriction enzymes
- F. human genome
- G. Gene therapy
- H. linkage map
- I. Inbreeding
- J. Transgenic organisms
- K. heterozygous
- L. Hybrids
- M. homozygous recessive

31. A(n) _____ is a small ring of DNA found in a bacterial cell.
32. To determine if an individual with a dominant phenotype is homozygous or heterozygous, a _____ is used.
33. A _____ determines whether an organism is heterozygous or homozygous dominant for a trait.
34. When two cultivars are crossed, their offspring will be _____.
35. _____ are used to cleave DNA into fragments.
36. Usually the parent with the known genotype is _____ for the trait in question.
37. _____ are produced when DNA from another species is inserted into the genome of an organism, which then begins to produce the protein encoded on the recombinant DNA.
38. For the diagnosis of a genetic disorder, many cells are required, but only a few need to be taken from the individual. These cells are grown in a _____ so that enough DNA can be obtained to run the necessary tests.
39. A gene gun and a virus may both be classified as _____ because they are mechanisms by which foreign DNA may be transferred into a host cell.
40. The entire collection of genes within human cells is referred to as the _____.
41. _____ is an application of the Human Genome Project that involves the insertion of normal genes into cells with defective genes in an attempt to correct genetic disorders.
42. A(n) _____ shows the relative location of genes on a chromosome.
43. Organisms that are homozygous dominant and those that are _____ for a trait controlled by Mendelian inheritance have the same phenotype.
44. Many crop plants such as wheat and corn have been developed as _____ in order to develop larger and stronger plants.
45. _____ is used to develop pure breeds.

=====