Chapter 17 Exercises

Review Questions

1. GMOs are created by _____.
- **a.** generating genomic DNA fragments with restriction endonucleases
- **b.** introducing recombinant DNA into an organism by any means
- **c.** overexpressing proteins in *E. coli*
- **d.** all of these

2. Gene therapy can be used to introduce foreign DNA into cells _____.
- **a.** for molecular cloning
- **b.** by PCR
- **c.** of tissues to cure inheritable disease
- **d.** all of these

3. Insulin produced by molecular cloning _____.
- **a.** is of pig origin
- **b.** is a recombinant protein
- **c.** is made by the human pancreas
- **d.** is recombinant DNA

4. Bt toxin is considered to be _____.
- **a.** a gene for modifying insect DNA
- **b.** an organic insecticide produced by bacteria
- **c.** useful for humans to fight against insects
- **d.** a recombinant protein

5. The Flavr Savr tomato _____.
- **a.** is a variety of vine-ripened tomato in the supermarket
- **b.** was created to have better flavor and shelf life
- **c.** does not undergo soft rot
- **d.** all of these

6. ESTs are _____.
- **a.** generated after a cDNA library is made
- **b.** unique sequences in the genome
- **c.** useful for mapping using sequence information
- **d.** all of these

7. Linkage analysis _____.
- **a.** is used to create a physical map
- **b.** is based on the natural recombination process
- **c.** requires radiation hybrid mapping
- **d.** involves breaking and rejoining of DNA artificially

8. Genetic recombination occurs by which process?
- **a.** independent assortment
- **b.** crossing over
- **c.** chromosome segregation
- **d.** sister chromatids

9. Individual genetic maps in a given species are _____.
- **a.** genetically similar
- **b.** genetically identical
- **c.** genetically dissimilar
- **d.** not useful in species analysis

10. Information obtained by microscopic analysis of stained chromosomes is used in _____.
- **a.** radiation hybrid mapping
- **b.** sequence mapping
- **c.** RFLP mapping
- **d.** cytogenetic mapping

11. The chain termination method of sequencing _____.
- **a.** uses labeled ddNTPs
- **b.** uses only dideoxynucleotides
- **c.** uses only deoxynucleotides
- **d.** uses labeled dNTPs

12. Whole-genome sequencing can be used for advances in _____.
- **a.** the medical field
- **b.** agriculture
- **c.** biofuels
- **d.** all of these

13. Sequencing an individual person's genome _____.
- **a.** is currently possible
- **b.** could lead to legal issues regarding discrimination and privacy
- **c.** could help make informed choices about medical treatment
- **d.** all of these

14. What is the most challenging issue facing genome sequencing?
- **a.** the inability to develop fast and accurate sequencing techniques
- **b.** the ethics of using information from genomes at the individual level
- **c.** the availability and stability of DNA
- **d.** all of these

15. Genomics can be used in agriculture to _____.
- **a.** generate new hybrid strains
- **b.** improve disease resistance
- **c.** improve yield
- **d.** all of these

16. Genomics can be used on a personal level to _____.
- **a.** decrease transplant rejection
- **b.** predict genetic diseases that a person may have inherited
- **c.** determine the risks of genetic diseases for an individual's children
- **d.** all of these

17. What is a biomarker?
- **a.** the color coding of different genes
- **b.** a protein that is uniquely produced in a diseased state
- **c.** a molecule in the genome or proteome
- **d.** a marker that is genetically inherited

18. A protein signature is _____.
- **a.** the path followed by a protein after it is synthesized in the nucleus
- **b.** the path followed by a protein in the cytoplasm
- **c.** a protein expressed on the cell surface
- **d.** a unique set of proteins present in a diseased state

Critical Thinking Questions

19. Describe the process of Southern blotting.

20. A researcher wants to study cancer cells from a patient with breast cancer. Is cloning the cancer cells an option?

21. How would a scientist introduce a gene for herbicide resistance into a plant?

22. If you had a chance to get your genome sequenced, what are some questions you might be able to have answered about yourself?

23. Why is so much effort being poured into genome mapping applications?

24. How could a genetic map of the human genome help find a cure for cancer?

25. Explain why metagenomics is probably the most revolutionary application of genomics.

26. How can genomics be used to predict disease risk and treatment options?

27. How has proteomics been used in cancer detection and treatment?

28. What is personalized medicine?