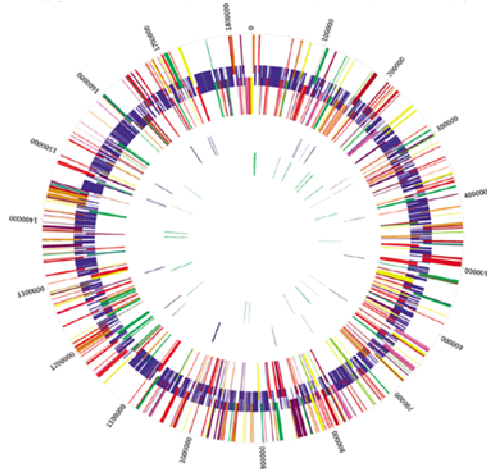


Chapter 18 – Genomics



1. In the field of genetic technology, what is the difference between a **genetic map** and a **physical map**?

2. Briefly describe the 3 types of physical maps:

a. **Restriction maps** _____

b. **Cytogenic maps of chromosome banding** _____

c. **Radiation hybrid maps** _____

3. Distances between "landmarks" on a physical map are measured in _____.

4. What type of enzyme is used when creating physical maps? _____.

5. What is an **STS**? How do they help in assembling genome sequences?

6. Distances on a genetic map are measured in _____.

7. Complete the following: 1 _____ corresponds to 1% recombination between 2 loci.

8. Discuss two limitations to genetic maps.

9. How are genetic maps connected to physical maps?

10. What is the "ultimate physical map"?

11. What has allowed scientists to clone larger pieces of DNA?

12. Briefly discuss the two ways of approaching whole-genome sequencing:

a. **Clone-by-clone** _____

b. **Shotgun** _____

13. What was the goal of the Human Genome Project?

14. List some of the most important things we learned by completing the Human Genome Project.

15. What is meant by "**bioinformatics**"? _____

16. Describe the following types of *protein-encoding* DNA in eukaryotes:

a. **Single-copy genes** _____

b. **Segmental duplications** _____

c. **Multigene families** _____

d. **Tandem clusters** _____

17. Describe the following types of *noncoding* DNA in eukaryotes:

a. **Noncoding DNA within genes** _____

b. **Structural DNA** _____

c. **Simple sequence repeats** _____

d. **Segmental duplications** _____

e. **Pseudogenes** _____

f. **Transposable elements** _____

18. Describe the following types of transposable elements:

a. **LINES** _____

b. **SINEs** _____

c. **LTRs** _____

d. **Dead transposons** _____

19. How can the number and location of expressed genes be estimated?

20. What is a **single-nucleotide polymorphism (SNP)**? What practical use do they have?

21. What is a **haplotype**? Why is the Human Genome Project currently working on a haplotype map of the genome?

22. What is **synteny**? How does it help the field of **comparative genomics**?

23. Why can mitochondria and chloroplasts replicate themselves?

24. Why has the DNA of the chloroplast evolved at a more conservative pace as compared to the plant cell nucleus?

25. What is a **DNA microarray (gene chip)**? One exciting use of DNA chips has been the profiling of gene expression patterns in human cancers. What do the florescent spots indicate when the chip is read?

26. What is meant by "**proteomics**"?

27. Genomics is a fascinating field of research today and its applications are amazing! Briefly discuss some of its uses today.

28. Discuss several ethical dilemmas facing genomics.
