

1. Diagram a nucleosome.
2. Describe an experiment to correlates DNase I hypersensitive sites with active genes.
3. What is ubiquitin? How does it involve in the degradation of cytosolic proteins?
4. Explain the methodological principle employed for Sanger sequencing of DNA.
5. Describe an experiment to show a DNA region is methylated or nonmethylated. Give an example indicating that the methylated gene is always inactive, but the nonmethylated gene is active.
6. Describe a yeast two-hybrid screen for finding an unknown protein that interacts with a known protein.
7. The DNA sequences called minisatellite or VNTR are useful for genome mapping and provide the basis for the technique known as DNA fingerprinting. Please explain the principle of DNA fingerprinting technique.
8. Why is a lambda phage-created lysogen usually 'immune' against re-infection by another lambda phage?
9. Apoptosis can be triggered by activating surface receptors. Diagram this process. Answer should include TNF receptor, Fas receptor, caspase-3, caspase-8, FADD, TRADD, caspase-9, Apaf-1, Bcl-2, Bid, and cytochrome C.
10. Describe the compositions and positions of consensus sequences for the recombination of light and heavy chains of immunoglobulin genes. What are the functions of these consensus sequences during recombination.
11. Bacterial RNA polymerase has two modes of termination. Describe the specific features of these two terminations in terms of the cis elements in DNA or RNA sequence.
12. Several operons related to the biosynthesis of amino acid in bacteria are regulated by attenuation. Describe how the attenuation works?
13. Describe one experiment to identify the following statement: bacterial RNA polymerase only binds one strand of DNA.
14. Plasmids are circular molecules of DNA, and replicate independently within bacterial cells. However, the copy numbers of plasmids within cells are regulated. Describe the mechanism for determination the copy numbers of plasmids within cells.