

DNA Homework Questions

1. What is the principal nucleic acid of which chromosomes are composed?
 - a. DNA
 - b. Ribosomal RNA
 - c. Transfer RNA
 - d. Messenger RNA

2. Define a nucleoside of DNA.
 - a. Deoxyribose sugar
 - b. Deoxyribose sugar attached to a phosphate
 - c. Deoxyribose molecule plus the attached purine or pyrimidine
 - d. Deoxyribose phosphate unit plus the attached purine or pyrimidine
 - e. Phosphate unit with attached purine or pyrimidine

3. Name the main chemical components of chromosomes of eukaryotes.
 - a. DNA, RNA, proteins
 - b. DNA, protein, lipids
 - c. DNA, RNA, carbohydrates
 - d. DNA, RNA, 6 carbon sugars

4. Name the researcher(s) who identified DNA in transformation.
 - a. Avery, MacLeod, and McCarty
 - b. Hershey and Chase
 - c. Meselson and Stahl
 - d. Watson, Crick, and Wilkins
 - e. Griffith

5. Which statement below correctly describes what happens during replication of DNA?
 - a. The two strands of DNA stay together
 - b. The nucleotides separate and then reform into DNA strands
 - c. The DNA polymerase forms a new double helix from an intact old double helix
 - d. The two strands separate and are replicated

6. This question is based on an experiment in which phages are labeled with either radioactive Phosphorus (P) or Sulfur (S) and allowed to infect bacteria. Possible results are as follows:
 - I. P enters bacterial cell
 - II. S enters bacterial cell
 - III. P remains outside bacterial cell
 - IV. S remains outside bacterial cell

Which would be evidence that only DNA from a phage enters a bacterial cell? Result (s):

- a. I only
- b. II only
- c. I and II
- d. I and IV
- e. II and III

7. Twenty percent of the nucleotides of a particular double stranded DNA are adenine. Which list below contains possible percentages of the other bases?

	Thymine	Cytosine	Guanine
a.	30	20	30
b.	30	25	25
c.	20	40	20
d.	20	30	30

8. Why are the two strands in DNA double helices said to be antiparallel to each other?
- Synthesis during replication goes 3' to 5' in one strand and 5' to 3' in the other strand
 - One strand is 3' to 5' and the other strand is 5' to 3' when viewed together
 - The direction of synthesis (5' → 3') is determined by which end (pole) synthesis starts from
 - Only one strand is synthesized at a time
9. Using the semiconservative model of DNA replication, which of the following statements is correct?
- At the end of a single replication each helix contains one new and one old strand
 - At the end of two replication cycles each helix contains one strand that is partly old and partly new while the other strand is entirely new
 - At the end of a single replication, each helix contains two strands each of which is partly old and partly new
 - At the end of a single replication, one helix contains two old strands and the other helix contains two new strands
10. What does the chromosome of a bacterial cell contain?
- DNA
 - RNA
 - Histones
 - Acidic proteins
11. Which of the statements below correctly characterizes RNA?
- RNA contains deoxyribose instead of ribose
 - RNA contains uracil instead of thymine
 - RNA has the same polarity problems during replication that DNA does
 - RNA is the hereditary material in only a few eucaryotes
12. Working with bacteria, grown in heavy (N^{15}) and switched to light (N^{14}) nitrogen, what did Meselson and Stahl show?
- After one replication one-half the DNA molecules are light and one-half heavy
 - The first replication produced DNA molecules all of which were light
 - After two generations all of the DNA molecules were of the same intermediate density
 - After two generations DNA molecules of two densities, light and intermediate were present
13. How has the presence of Okazaki segments (short segments of DNA) during replication been interpreted?
- Chromosomes break into short segments, replicate, then recombine

- b. Replication in at least one direction is discontinuous
 - c. Circular DNA replicates by excising unnecessary DNA which accumulates during each generation
 - d. Replication precedes synthesis of new DNA
14. Draw the eucaryotic chromosome as one would appear at metaphase of mitosis. Label the various parts.
15. Replication of the hereditary material is an essential feature. Explain how DNA replicates in some detail.
16. Relate the Watson-Crick model for DNA to the eucaryotic chromosome structure as it is currently understood.
17. Describe their principal experiments, which lead to the conclusion that DNA is the hereditary material in bacteria.
18. Outline the experiments that showed that DNA replication is semiconservative.