Quiz: DNA Structure and Replication

Read each question. Circle the letter of the correct answer.

1. DNA stores _____.

A. fat

B. energy

C. carbohydrates

D. hereditary information

2. Combining the work of other scientists with their own research, Watson and Crick discovered that two strands of DNA join together to form a(n) _____.

A. nucleotide

B. X in a circle

C. double helix

D. covalent bond

3. The two strands of a DNA molecule are held together by _____.

A. ionic bonds

B. hydrogen bonds

C. peptide bonds

D. covalent bonds

4. An important factor in Oswald Avery's ability to identify the "transforming principle" as DNA was the fact that proteins _____.

A. do not react with enzymes

B. contain very little phosphorus

C. were present in the extract made from S bacteria

D. could be observed in the extract made from R bacteria

5. Which of the following is not part of a nucleotide in a DNA molecule?

A. a base

B. a sugar

C. a phosphate group

D. three phosphate groups

6. A specific cell is unable to make the enzyme helicase. Because of this deficiency, what would the cell most directly be unable to accomplish?

A. The cell would not be able to add new nucleotides.

B. The cell would not be able to unzip the double helix.

C. The cell would not be able to fix mistakes in the DNA.

D. The cell would not be able to add the primer to the DNA strand.

7. When comparing the leading and the lagging strand in DNA replication, which statement is false?

A. Nucleotides are added by DNA polymerase III in both strands.

B. The enzyme primase adds an RNA primer to both DNA strands.

C. Replication occurs continuously in opposite directions in the two strands.

D. In the lagging strand only, the enzyme ligase binds DNA fragments together.

8. Hershey and Chase chose to use bacteriophages in their experiments because these viruses _____.

A. will not grow in radioactive culture

B. can be seen with a light microscope

C. can infect only bacteria, not humans

D. contain little more than DNA and protein

9. As a result of the Hershey and Chase experiments, scientists believe that _____.

A. the 'transforming principle' is DNA

B. radioactive isotopes can be used safely

C. viruses use bacterial DNA to reproduce

D. bacteriophages can be grown in culture media

10. The four types of nucleotides that make up DNA are named for their _____.

A. hydrogen bonds

B. phosphate groups

C. ring-shaped sugars

D. nitrogen-containing bases

Read each statement. Write your answer on the lines.

11. Explain what is meant when DNA replication is said to be semiconservative.

12. Describe how a molecule of DNA is replicated.

13. Briefly describe Frederick Griffith's series of experiments that led him to identify a transforming principle. Why is the name he chose for his mystery material so appropriate? In your answer:

Briefly describe each of the four experiments that Griffith performed using the deadly S form of a bacterium and the R form, which is not deadly.

Explain what was transformed in the experiment, leading to the term *transforming principle*.

14. Alfred Hershey and Martha Chase designed an experiment to determine the chemical makeup of Griffith's transforming principle. Briefly describe the experiment they performed. How did the results of the experiment support their conclusion that the transforming principle is DNA? In your answer:

Define the term *bacteriophage* and explain why this organism was a good choice for this particular experiment.

Describe the procedure of the experiment using the terms *bacteriophage*, *DNA*, and *protein* in your answer.

Describe the results of the experiment and connect them to Hershey and Chase's conclusion.

15. The DNA molecule is described as a double helix. Describe the meaning of this expression and the general structure of a DNA molecule.