Multiple Choice Questions

1. What is the primary function of proteins in living organisms?

A) To store genetic information
B) To provide structural support and catalyze reactions
C) To serve as a primary source of energy
D) To form cell membranes

2. Which of the following is a characteristic of DNA?

A) It is a single-stranded molecule
B) It contains the sugar ribose
C) It has a double helix structure
D) It is composed of lipids

3. What type of biological molecule is primarily responsible for storing genetic information?

A) Carbohydrates
B) Lipids
C) Nucleic acids
D) Proteins

4. Which carbohydrate serves as the primary source of energy for cells?

A) Starch
B) Cellulose
C) Glucose
D) Chitin

5. What is the function of enzymes, which are a type of protein?

A) To store genetic information
B) To provide structural support to cells
C) To catalyze chemical reactions
D) To form cell membranes

6. Which part of the DNA molecule contains genetic information?

A) Sugar molecules
B) Phosphate groups
C) Nitrogenous bases
D) Hydrogen bonds

7. What is the primary function of lipids in biological systems?

A) To store genetic information
B) To catalyze chemical reactions
C) To form cell membranes and store energy
D) To provide structural support

8. Which of the following is a type of lipid?

A) Glucose
B) Starch
C) Cholesterol
D) Protein

9. What is the role of carbohydrates in living organisms?

A) To store genetic information
B) To catalyze chemical reactions
C) To provide energy and structural support
D) To form cell membranes

10. Which of the following is a characteristic of proteins?

A) They are composed of nucleotides
B) They are primarily used for energy storage
C) They are composed of amino acids
D) They form the cell wall in plants

11. What is the term for the process by which cells synthesize proteins from amino acids?

A) Respiration
B) Photosynthesis
C) Protein synthesis
D) Fermentation

12. Which type of carbohydrate is found in plant cell walls?

A) Starch
B) Cellulose
C) Chitin
D) Glycogen

13. What is the function of the plasma membrane, which is primarily composed of lipids and proteins?

A) To store genetic information
B) To provide structural support
C) To regulate what enters and leaves the cell
D) To catalyze chemical reactions

14. Which of the following is a type of nucleic acid?

A) Carbohydrate
B) Lipid
C) DNA
D) Protein

15. What is the role of hormones, which are often proteins or derived from lipids?

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A) To store genetic information
B) To provide structural support
C) To signal between cells
D) To form cell membranes

16. Which of the following biological molecules is not typically used for energy storage?
A) Carbohydrates
B) Lipids
C) Proteins
D) Nucleic acids

17. What is the term for the sequence of nitrogenous bases in DNA that determines genetic information?
A) Genetic code
B) Genetic sequence
C) Amino acid sequence
D) Protein structure

18. Which type of lipid is essential for brain function and hormone production?
A) Phospholipid
B) Steroid
C) Triglyceride
D) Waxes

19. What is the primary function of glycogen in animals?
A) To provide structural support
B) To form cell membranes
C) To store energy
D) To catalyze chemical reactions

20. Which of the following is a characteristic of nucleic acids?
A) They are composed of amino acids
B) They are primarily used for energy storage
C) They contain nitrogenous bases
D) They form cell membranes

True/False Questions

1. **True or False**: Proteins are primarily composed of carbohydrates.
    - **Suggestion**: Proteins are composed of amino acids.
2. **True or False**: DNA is a single-stranded molecule.
    - **Suggestion**: DNA has a double helix structure.
3. **True or False**: Carbohydrates are the primary source of genetic information in cells.
    - **Suggestion**: Nucleic acids store genetic information.
4. **True or False**: Lipids are essential for forming cell membranes.
    - **Suggestion**: Lipids, particularly phospholipids, form the bilayer of cell membranes.
5. **True or False**: Enzymes are a type of lipid.
    - **Suggestion**: Enzymes are proteins that catalyze chemical reactions.
6. **True or False**: The nitrogenous bases in DNA are adenine, guanine, cytosine, and uracil.
    - **Suggestion**: In DNA, the bases are adenine, guanine, cytosine, and thymine.
7. **True or False**: Proteins can serve as hormones to signal between cells.
    - **Suggestion**: Some proteins act as hormones.
8. **True or False**: Cellulose is a type of lipid found in plant cell walls.
    - **Suggestion**: Cellulose is a carbohydrate.
9. **True or False**: The plasma membrane is primarily composed of carbohydrates.

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- **Suggestion**: The plasma membrane is primarily composed of lipids and proteins.

10. **True or False**: DNA replication involves the synthesis of a new complementary strand.

    - **Suggestion**: During replication, a new strand is synthesized that is complementary to the template strand.

11. **True or False**: Glycogen is used for energy storage in plants.

    - **Suggestion**: Glycogen is used for energy storage in animals.

12. **True or False**: All biological molecules are essential for storing genetic information.

    - **Suggestion**: Only nucleic acids store genetic information.

13. **True or False**: Steroids are a type of carbohydrate.

    - **Suggestion**: Steroids are a type of lipid.

14. **True or False**: The genetic code is determined by the sequence of amino acids in proteins.

    - **Suggestion**: The genetic code is determined by the sequence of nitrogenous bases in DNA.

15. **True or False**: Nucleic acids are primarily used for energy storage.

    - **Suggestion**: Nucleic acids store genetic information, not energy.

Short Answer Questions

1. **Describe the primary functions of proteins in living organisms.**

Answer: Proteins perform a wide range of functions, including structural support, catalyzing metabolic reactions as enzymes, acting as hormones to signal between cells, and forming antibodies to defend against pathogens.

2. **Explain the significance of the double helix structure of DNA.**

Answer: The double helix structure of DNA is significant because it allows for the efficient storage of genetic information. The twisted ladder-like structure, with sugar and phosphate molecules forming the backbone and nitrogenous bases paired in the center, facilitates replication and transcription processes.

3. **Discuss the role of nucleotides in DNA.**

Answer: Nucleotides are the building blocks of DNA, consisting of a sugar molecule (deoxyribose), a phosphate group, and one of four nitrogenous bases (adenine, thymine, cytosine, guanine). These nucleotides are linked together to form the DNA molecule, with the sequence of bases determining genetic information.

4. **Describe how proteins are synthesized in cells.**

Answer: Protein synthesis involves transcription of DNA into mRNA, followed by translation of mRNA into a polypeptide chain. During translation, ribosomes read the sequence of mRNA and assemble amino acids into a protein based on the genetic code.

5. **Explain the concept of base pairing in DNA.**

Answer: In DNA, base pairing refers to the specific pairing of nitrogenous bases: adenine (A) pairs with thymine (T), and cytosine (C) pairs with guanine (G). This pairing is crucial for maintaining the stability of the double helix structure and ensuring accurate replication of genetic material.

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Fill-in-the-Blank Questions

1. The _ structure of DNA allows for efficient replication and transcription of genetic information.

Answer:

2. Proteins are composed of long chains of _, which are linked together by peptide bonds.

Answer:

3. The process of creating a complementary RNA copy from DNA is known as _.

Answer:

4. The sequence of _ in DNA determines the genetic code for protein synthesis.

Answer:

5. _ are the building blocks of proteins, and they are linked together by peptide bonds.

Answer:

6. The _ is responsible for translating mRNA into a polypeptide chain during protein synthesis.

Answer:

7. In DNA, _ pairs with thymine, while _ pairs with guanine.

Answer:

8. The _ of a protein determines its function, with different structures enabling different activities.

Answer:

9. _ are enzymes that speed up chemical reactions in cells without being consumed by the reaction.

Answer:

10. The _ is the molecule that carries genetic information from DNA to the ribosome for protein synthesis.

Answer:

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