

## Biomolecules Quiz Questions and Answers PDF

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#### Which level of protein structure involves the sequence of amino acids?

- Primary ✓
- Secondary
- Tertiary
- Quaternary

The primary structure of a protein refers to its unique sequence of amino acids, which determines the protein's overall structure and function.

#### Which of the following is a disaccharide?

- Glucose
- Fructose
- Sucrose ✓
- Starch

A disaccharide is a carbohydrate composed of two monosaccharide units. Common examples include sucrose, lactose, and maltose.

#### Discuss the impact of protein misfolds on human health, providing an example.

Protein misfolds significantly impact human health by causing diseases such as Alzheimer's, where misfolds of amyloid-beta lead to plaque formation in the brain, resulting in neurodegeneration and cognitive decline.

Which of the following is a component of nucleic acids?

- Amino acids
- Fatty acids
- Nucleotides ✓
- Monosaccharides

Nucleic acids, such as DNA and RNA, are primarily composed of nucleotides, which consist of a sugar, a phosphate group, and a nitrogenous base. These components are essential for the storage and transmission of genetic information.

How do enzymes lower the activation energy of biochemical reactions?

Enzymes lower the activation energy by binding to substrates and stabilizing the transition state, making it easier for the reaction to occur.

Which molecule is known as the "energy currency" of the cell?

- DNA
- ATP ✓
- RNA
- Glucose

Adenosine triphosphate (ATP) is the primary energy carrier in cells, facilitating various biochemical reactions by providing the necessary energy. It is produced during cellular respiration and is essential for many cellular processes.

Which of the following is NOT a function of proteins?

- Catalysis
- Energy storage ✓
- Transport
- Immune response

Proteins serve various essential functions in the body, including catalyzing biochemical reactions, providing structural support, and facilitating communication between cells. However, they do not serve as a primary source of energy, which is a function more associated with carbohydrates and fats.

**Explain the role of ATP in cellular metabolism.**

**ATP (adenosine triphosphate) plays a crucial role in cellular metabolism by providing the energy required for biochemical reactions, including synthesis of macromolecules, muscle contraction, and active transport across membranes.**

**Which processes are involved in gene expression? (Select all that apply)**

- Transcription ✓
- Translation ✓
- Replication
- Glycolysis

Gene expression involves several key processes including transcription, RNA processing, and translation. These processes work together to convert genetic information from DNA into functional proteins.

**Describe the central dogma of molecular biology and its significance.**

The central dogma of molecular biology states that genetic information flows from DNA to RNA through transcription, and from RNA to protein through translation, which is essential for cellular function and gene expression.

Which of the following are functions of lipids? (Select all that apply)

- Energy storage ✓
- Genetic information storage
- Membrane structure ✓
- Hormone production ✓

Lipids serve several essential functions in the body, including energy storage, forming cell membranes, and acting as signaling molecules. They also play a role in insulation and protection of organs.

Which factors can affect enzyme activity? (Select all that apply)

- Temperature ✓
- pH ✓
- Substrate concentration ✓
- Light intensity

Enzyme activity can be influenced by several factors including temperature, pH, substrate concentration, and the presence of inhibitors or activators. These factors can either enhance or inhibit the enzyme's ability to catalyze reactions effectively.

Which of the following are structural components of proteins? (Select all that apply)

- Amino acids ✓
- Nucleotides
- Peptide bonds ✓
- Fatty acids

Proteins are primarily composed of amino acids, which are the fundamental building blocks that determine their structure and function. Other structural components may include peptide bonds and

specific arrangements of these amino acids into secondary, tertiary, and quaternary structures.

### What is the primary function of carbohydrates in the body?

- Energy storage ✓
- Genetic information storage
- Catalysis
- Hormone production

Carbohydrates primarily serve as a source of energy for the body, providing fuel for physical activity and essential functions. They are broken down into glucose, which is used by cells for energy production.

### Which type of biomolecule is primarily responsible for catalyzing biochemical reactions?

- Carbohydrates
- Lipids
- Proteins ✓
- Nucleic acids

Enzymes, which are a type of protein, are the biomolecules primarily responsible for catalyzing biochemical reactions in living organisms. They lower the activation energy required for reactions, thereby increasing the rate at which they occur.

### What is the main structural component of cell membranes?

- Proteins
- Phospholipids ✓
- Carbohydrates
- Nucleic acids

The main structural component of cell membranes is phospholipids, which form a bilayer that provides a barrier and fluidity to the membrane. This bilayer is essential for the functionality and integrity of the cell.

### Explain how the structure of the phospholipid bilayer contributes to its function in the cell membrane.

The structure of the phospholipid bilayer, consisting of hydrophilic phosphate heads and hydrophobic fatty acid tails, allows it to form a stable barrier that separates the internal environment of the cell from the external environment, facilitating selective permeability and fluidity.

Which of the following are components of the cell membrane? (Select all that apply)

- Phospholipids ✓
- Proteins ✓
- Nucleotides
- Cholesterol ✓

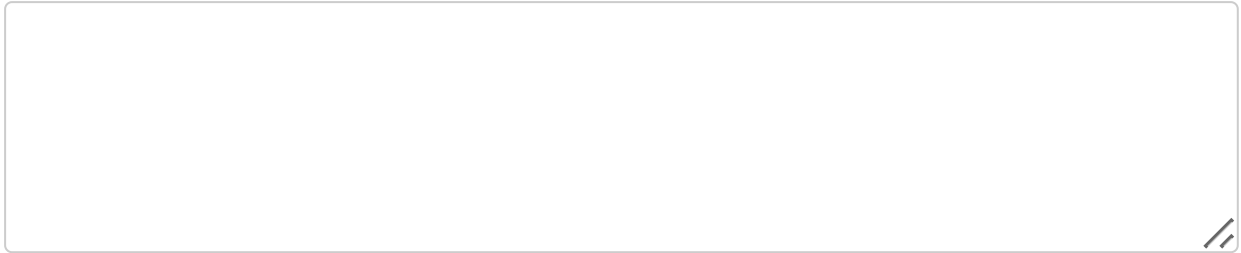
The cell membrane is primarily composed of a phospholipid bilayer, proteins, cholesterol, and carbohydrates, which work together to maintain the structure and function of the cell. These components play crucial roles in cell signaling, transport, and maintaining homeostasis.

Which of the following are types of RNA? (Select all that apply)

- mRNA ✓
- tRNA ✓
- rRNA ✓
- dRNA

The main types of RNA include messenger RNA (mRNA), transfer RNA (tRNA), and ribosomal RNA (rRNA). These RNA types play crucial roles in the process of protein synthesis within cells.

What are the structural differences between DNA and RNA, and how do these differences relate to their functions?



**The structural differences between DNA and RNA include DNA being double-stranded with deoxyribose sugar and RNA being single-stranded with ribose sugar. These differences relate to their functions, with DNA serving as the long-term storage of genetic information and RNA being involved in translating that information into proteins.**