

04_Cell Structure and Function Answers

For all questions select all answers that apply (some questions may have more than one correct answer)

1) Which is not a function a protein?

- A) Helps make up a membrane
- B) Carries the code for translation from the nucleus to the ribosome
- C) Can be a hormone
- D) Speeds chemical reactions

2) Which of the following best describes the arrangement of phospholipids in a typical cell membrane?

- A) Phospholipids are arranged in a single layer with hydrophilic heads facing inward.
- B) Phospholipids are arranged in a single layer with hydrophobic tails facing inward.
- C) Phospholipids are arranged in a bilayer with hydrophilic heads facing outward and inward.
- D) Phospholipids are randomly distributed throughout the membrane.

Explanation: The phospholipid bilayer consists of two layers of phospholipids arranged with their hydrophilic heads facing outward, interacting with the aqueous extracellular and intracellular environments, while their hydrophobic tails face inward, away from water. This arrangement provides a stable barrier for the cell. Options A and B describe incorrect arrangements, while option D is inaccurate as phospholipids are specifically organized in a bilayer.

3) In comparison to eukaryotes, prokaryotes _____.

- A) are more structurally complex
- B) are larger
- C) are smaller
- D) do not have membranes

Explanation: Prokaryotic cells are generally smaller and simpler in structure compared to eukaryotic cells. Prokaryotic cells lack a membrane-bound nucleus and organelles, which are characteristic features of eukaryotic cells. This lack of internal membrane-bound compartments contributes to their smaller size and simpler organization.

4) Which of the following processes involves the polymerization of nucleotides to form a nucleic acid molecule?

- A) Translation
- B) Transcription
- C) Replication
- D) Mutation

Explanation: Replication and transcription involve the polymerization of nucleotides to form nucleic acid molecules. Replication involves the copying of DNA to produce two identical DNA molecules, while transcription involves the synthesis of RNA from a DNA template. Both replication and transcription are processes that involve nucleotide polymerization. Translation is the polymerisation of amino acids.

5) You have just discovered a new organelle called the "proteasome". This organelle is in charge of breaking down proteins that are no longer useful or ones that are damaged. What kind of reactions are likely utilized in this organelle?

- A) Hydrolysis reactions
- B) Oxidation reactions
- C) Reduction reactions
- D) Dehydration reactions
- E) Photosynthesis reactions

Explanation: The process of breaking down proteins into amino acid monomers is typically through hydrolysis reactions. Hydrolysis involves the addition of water molecules to peptide bonds within proteins, causing them to break apart. This breakdown of peptide bonds releases individual amino acids from the protein polymer.

6) The cell where you discovered the proteasome (above) is likely a _____ cell.

- A) Eukaryotic cell
- B) Prokaryotic cell

7) Which of the following statements accurately describes a feature of active transport in cells?

- A) Active transport moves substances across the cell membrane from areas of higher concentration to areas of lower concentration.
- B) Active transport requires energy input in the form of ATP to move substances against their concentration gradient.
- C) Active transport relies solely on diffusion to move molecules across the cell membrane.
- D) Active transport involves the movement of substances across the cell membrane through protein channels without the need for energy input.

Explanation: Active transport is a cellular process that moves substances across the cell membrane against their concentration gradient, from areas of lower concentration to areas of higher concentration. This process requires energy input from ATP.