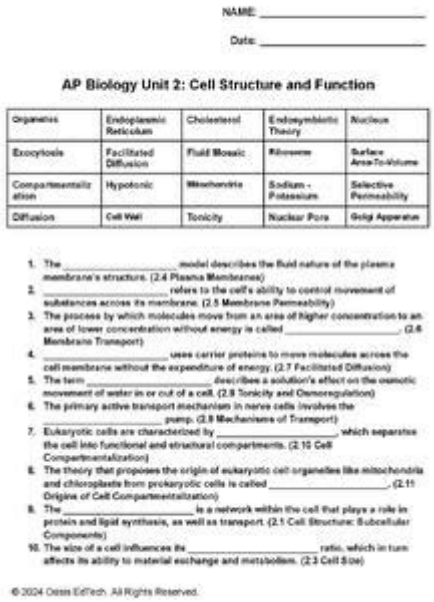
Ap Biology Cell Structure And Function Practice Test



NAME: _____

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AP Biology Unit 2: Cell Structure and Function

Organelles	Endoplasmic Reticulum	Cholesterol	Endosymbiotic Theory	Nucleus
Exocytosis	Facilitated Diffusion	Fluid Mosaic	Ribosome	Surface Area-To-Volume
Compartmentalization	Hypotonic	Mitochondria	Sodium - Potassium	Selective Permeability
Diffusion	Cell Wall	Tonicity	Nuclear Pore	Golgi Apparatus

1. The _____ model describes the fluid nature of the plasma membrane's structure. (2.4 Plasma Membranes)
2. _____ refers to the cell's ability to control movement of substances across its membrane. (2.5 Membrane Permeability)
3. The process by which molecules move from an area of higher concentration to an area of lower concentration without energy is called _____. (2.6 Membrane Transport)
4. _____ uses carrier proteins to move molecules across the cell membrane without the expenditure of energy. (2.7 Facilitated Diffusion)
5. The term _____ describes a solution's effect on the osmotic movement of water in or out of a cell. (2.8 Tonicity and Osmoregulation)
6. The primary active transport mechanism in nerve cells involves the _____ pump. (2.9 Mechanisms of Transport)
7. Eukaryotic cells are characterized by _____, which separates the cell into functional and structural compartments. (2.10 Cell Compartmentalization)
8. The theory that proposes the origin of eukaryotic cell organelles like mitochondria and chloroplasts from prokaryotic cells is called _____. (2.11 Origins of Cell Compartmentalization)
9. The _____ is a network within the cell that plays a role in protein and lipid synthesis, as well as transport. (2.1 Cell Structure: Subcellular Components)
10. The size of a cell influences its _____ ratio, which in turn affects its ability to material exchange and metabolism. (2.3 Cell Size)

AP Biology cell structure and function practice test is an essential tool for students preparing for the Advanced Placement Biology examination. Understanding the intricate details of cellular anatomy and the roles of various organelles is fundamental in both AP Biology and higher-level biological studies. This article provides a comprehensive overview of key concepts related to cell structure and function, while also offering practice questions that can help students assess their understanding and readiness for the AP exam.

Understanding Cell Structure

Cells are the basic unit of life and are classified into two primary types: prokaryotic and eukaryotic cells. Each type has distinct structural features that serve various functions.

Prokaryotic Cells

- Definition: Prokaryotic cells are simpler and smaller than eukaryotic cells. They lack a nucleus and membrane-bound organelles.
- Examples: Bacteria and Archaea.
- Key Features:
- Nucleoid region: Contains the cell's genetic material.
- Ribosomes: Sites of protein synthesis, smaller than those found in eukaryotic cells.
- Cell membrane: Semi-permeable barrier that regulates the entry and exit of

substances.
- Cell wall: Provides structural support and protection (made of peptidoglycan in bacteria).
- Flagella: Long, whip-like structures used for locomotion.

Eukaryotic Cells

- Definition: Eukaryotic cells are more complex and larger, featuring a nucleus and various membrane-bound organelles.
- Examples: Plant cells, animal cells, fungi, and protists.
- Key Features:
- Nucleus: Contains the cell's DNA, surrounded by a nuclear envelope.
- Mitochondria: Known as the powerhouse of the cell, responsible for ATP production through cellular respiration.
- Endoplasmic Reticulum (ER):
- Rough ER: Studded with ribosomes; involved in protein synthesis and modification.
- Smooth ER: Lacks ribosomes; involved in lipid synthesis and detoxification.
- Golgi Apparatus: Modifies, sorts, and packages proteins and lipids for secretion or delivery to other organelles.
- Lysosomes: Contain digestive enzymes for breaking down waste materials and cellular debris.
- Chloroplasts: Found in plant cells; sites of photosynthesis, converting solar energy into chemical energy.

Function of Cell Structures

Each component of the cell contributes to its overall function. Understanding these roles is crucial for mastering cell biology.

Organelles and Their Functions

1. Nucleus: Controls cellular activities and houses genetic material.
2. Mitochondria: Convert glucose and oxygen into ATP through cellular respiration.
3. Ribosomes: Synthesize proteins by translating mRNA.
4. Endoplasmic Reticulum:
- Rough ER: Produces and processes proteins.
- Smooth ER: Synthesizes lipids and detoxifies drugs.
5. Golgi Apparatus: Modifies proteins and lipids received from the ER and directs them to their destinations.
6. Lysosomes: Digest macromolecules and recycle cellular components.
7. Chloroplasts: Capture light energy to produce glucose during photosynthesis in plant cells.
8. Cell Membrane: Regulates the movement of substances in and out of the cell, maintaining homeostasis.

Cell Membrane Structure and Function

The cell membrane is a vital component of both prokaryotic and eukaryotic

cells. It plays a crucial role in maintaining the integrity of the cell and facilitating communication.

Structure of the Cell Membrane

- Phospholipid Bilayer: Composed of hydrophilic heads and hydrophobic tails, creating a semi-permeable barrier.
- Proteins: Embedded in the membrane, these proteins serve as channels, receptors, and enzymes.
- Carbohydrates: Attached to proteins or lipids, they function in cell recognition and signaling.

Functions of the Cell Membrane

- Selective Permeability: Allows certain substances to pass while restricting others.
- Communication: Receptor proteins transmit signals from the external environment to the cell's interior.
- Transport: Various mechanisms (diffusion, osmosis, active transport) facilitate the movement of materials across the membrane.

Practice Questions for AP Biology

Testing your knowledge through practice questions can greatly enhance your understanding. Here are some practice questions focused on cell structure and function:

Multiple Choice Questions

1. Which organelle is responsible for ATP production?
- A) Ribosome
- B) Nucleus
- C) Mitochondria
- D) Golgi Apparatus
- Answer: C) Mitochondria

2. What structure is primarily responsible for the selective permeability of the cell?
- A) Cell wall
- B) Cytoplasm
- C) Cell membrane
- D) Nucleus
- Answer: C) Cell membrane

3. Which of the following is NOT found in prokaryotic cells?
- A) Ribosomes
- B) DNA
- C) Nucleus
- D) Cell membrane
- Answer: C) Nucleus

Short Answer Questions

1. Describe the function of the Golgi apparatus in a eukaryotic cell.
- Answer: The Golgi apparatus modifies, sorts, and packages proteins and lipids received from the endoplasmic reticulum for secretion or delivery to other organelles.

2. Explain the role of chloroplasts in plant cells.
- Answer: Chloroplasts capture light energy and convert it into chemical energy through photosynthesis, producing glucose and oxygen as byproducts.

True or False

1. The smooth endoplasmic reticulum is involved in protein synthesis.
- Answer: False (The rough endoplasmic reticulum is involved in protein synthesis; the smooth ER is involved in lipid synthesis and detoxification).

2. Lysosomes are known as the "powerhouse of the cell."
- Answer: False (Mitochondria are known as the "powerhouse of the cell"; lysosomes contain digestive enzymes).

Conclusion

Understanding cell structure and function is a crucial component of AP Biology. Through the exploration of prokaryotic and eukaryotic cells, their organelles, and the functions they serve, students can develop a comprehensive understanding of cellular biology. Utilizing practice tests is an effective way to reinforce this knowledge, preparing students for success on the AP exam. By mastering these concepts, students will not only perform well academically but also lay a strong foundation for future studies in biology and related fields.

Frequently Asked Questions

What is the primary function of the cell membrane?

The primary function of the cell membrane is to regulate the movement of substances in and out of the cell, maintaining homeostasis.

What organelle is responsible for producing ATP in eukaryotic cells?

Mitochondria are responsible for producing ATP through cellular respiration in eukaryotic cells.

How do ribosomes contribute to protein synthesis?

Ribosomes facilitate the translation of messenger RNA (mRNA) into polypeptide chains, thus playing a crucial role in protein synthesis.

What structure distinguishes plant cells from animal cells?

The cell wall is a structure that distinguishes plant cells from animal cells, providing rigidity and support.

What is the function of lysosomes in a cell?

Lysosomes contain enzymes that break down waste materials and cellular debris, acting as the cell's waste disposal system.

What role does the endoplasmic reticulum play in the cell?

The endoplasmic reticulum (ER) is involved in the synthesis of proteins and lipids; the rough ER is studded with ribosomes for protein synthesis, while the smooth ER is involved in lipid synthesis and detoxification.

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