

Name: _____ Date: _____

Answer Key: Nail Cell Structure Concepts for College Biology

Examine sub-cellular organization and membrane dynamics beyond general definitions. This quiz focuses on the specific metabolic roles of specialized organelles and the cytoskeleton.

1. Which organelle is characterized by a double membrane and is responsible for the final stages of aerobic cellular respiration in eukaryotic cells?

Answer: B) Mitochondrion

Mitochondria are the primary site of ATP production via aerobic respiration and possess an inner and outer membrane structure.

2. The Fluid Mosaic Model describes the cell membrane as a static, rigid layer of proteins that prevents the movement of lipids.

Answer: B) False

The Fluid Mosaic Model emphasizes that the membrane is dynamic and fluid, allowing lateral movement of lipids and proteins.

3. In secretory cells, like those in the pancreas, the ____ is highly developed to modify, sort, and package proteins into vesicles.

Answer: A) Golgi apparatus

The Golgi apparatus acts as the post office of the cell, processing proteins for secretion or delivery to other organelles.

4. What is the primary function of the rough endoplasmic reticulum (RER) in specialized executive cells?

Answer: B) Synthesis of membrane-bound and secreted proteins

The RER is 'rough' because of attached ribosomes, which synthesize proteins destined for the membrane or outside the cell.

5. Lysosomes originate from the Golgi apparatus and contain hydrolytic enzymes that function best at an acidic pH.

Answer: A) True

Lysosomes maintain an acidic internal environment to facilitate the breakdown of cellular waste and macromolecules.

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6. The ____ is an organelle that lacks ribosomes and is primarily involved in lipid synthesis and the detoxification of drugs and poisons.

Answer: B) Smooth ER

The Smooth ER is essential for synthesizing lipids (like steroids) and neutralizing toxins, particularly in liver cells.

7. Which component of the cytoskeleton is responsible for providing high tensile strength and anchoring organelles like the nucleus in place?

Answer: C) Intermediate filaments

Intermediate filaments, like keratin, provide structural stability and are more permanent than other cytoskeletal elements.

8. Cilia and flagella both share a common '9+2' arrangement of microtubules in eukaryotic cells.

Answer: A) True

The 9+2 microtubule structure is the standard architectural design for motility-related organelles in eukaryotes.

9. The dense region within the nucleus where ribosomal RNA (rRNA) is synthesized and assembled with proteins is called the ____.

Answer: C) Nucleolus

The nucleolus is a non-membrane-bound structure that specialized in fast-tracking the assembly of ribosomal subunits.

10. Which of the following is a primary role of peroxisomes in eukaryotic metabolism?

Answer: C) Breaking down long-chain fatty acids and detoxifying alcohol

Peroxisomes contain enzymes that transfer hydrogen to oxygen, creating hydrogen peroxide as a byproduct while breaking down fats.