

Name: _____ Date: _____

Cells Among Us: 8th Grade Organelle Imposter Mission

Synthesize complex cellular interactions and identify structural anomalies to prevent biological system failure in this advanced organelle function challenge.

1. A researcher discovers a specialized cell in an deep-sea organism that lacks a nucleolus. Which cellular process would be most immediately and severely impaired by this structural deficiency?

- A. ATP production via the electron transport chain
- B. Assembly of ribosomal subunits for protein synthesis
- C. The detoxification of lipid-soluble drugs
- D. Storage of calcium ions for cellular signaling

2. The _____ theory proposes that mitochondria and chloroplasts originated as independent prokaryotic organisms before being engulfed by a larger host cell in a symbiotic relationship.

- A. Evolutionary Synthesis
- B. Endosymbiotic
- C. Organelle Sequestration
- D. Intracellular Integration

3. True or False: In highly active secretory cells, such as those found in the human pancreas, the volume of the Golgi apparatus is generally larger compared to that of a dormant storage cell.

- A. True
- B. False

4. If a plant cell is placed in a hypertonic solution, the central vacuole loses water, causing the plasma membrane to pull away from the cell wall. This specific biological phenomenon is known as:

- A. Facilitated Diffusion
- B. Cytolysis
- C. Plasmolysis
- D. Phagocytosis

5. The _____, a network of protein fibers including microfilaments and microtubules, provides mechanical support and facilitates the movement of motor proteins carrying vesicles.

- A. Cytoplasmic Matrix
- B. Extracellular Matrix
- C. Cytoskeleton
- D. Intermediate Lamina

6. True or False: Prokaryotic cells, such as those found in extremophile bacteria, contain mitochondria but lack a membrane-bound nucleus.

- A. True

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B. False

7. Comparing the Smooth Endoplasmic Reticulum (SER) to the Rough Endoplasmic Reticulum (RER), which of the following is an exclusive function of the SER in mammalian liver cells?

- A. Synthesis of secretory proteins
- B. Detoxification of metabolic byproducts and toxins
- C. Attachment of carbohydrates to glycoproteins
- D. Production of ribosomal RNA

8. In the Fluid Mosaic Model of the cell membrane, _____ molecules act as 'temperature buffers' to maintain membrane fluidity in varying environmental conditions.

- A. Phospholipid
- B. Peripheral Protein
- C. Cholesterol
- D. Glycolipid

9. True or False: Peroxisomes are specialized organelles that utilize enzymes to break down fatty acids and neutralize hydrogen peroxide into water and oxygen.

- A. True
- B. False

10. When a macrophage (immune cell) engulfs a pathogen, which organelle must fuse with the phagocytic vesicle to digest the intruder using hydrolytic enzymes?

- A. Golgi Apparatus
- B. Mitochondrion
- C. Lysosome
- D. Centriole