

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## A Day in the Organelle Office: Advanced 7th Grade Cell Operations

Evaluate 10 complex scenarios where cellular efficiency depends on specialized organelle interactions rather than just identifying parts and pieces.

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**1. A scientist treats a cell with a chemical that prevents the Golgi apparatus from functioning. Which immediate outcome would likely occur within the cell's transport system?**

- A. ATP production will increase to compensate for transport failure.
- B. Proteins will be synthesized by ribosomes but remain improperly tagged and stuck.
- C. The cell membrane will immediately lose its selective permeability.
- D. The nucleus will stop producing RNA to protect the genetic code.

**2. True or False: In a scenario where a cell requires rapid energy for movement, the mitochondria and cell membrane must work together to maintain a specific ion gradient for ATP synthesis.**

- A. True
- B. False

**3. If a specialized liver cell is tasked with detoxifying a high volume of chemicals, it will likely exhibit a higher quantity of \_\_\_\_\_ compared to a standard skin cell.**

- A. Chloroplasts
- B. Rough Endoplasmic Reticulum
- C. Smooth Endoplasmic Reticulum
- D. Nucleoli

**4. A patient has a condition where their white blood cells cannot break down engulfed pathogens. Which organelle is most likely malfunctioning in this scenario?**

- A. Ribosome
- B. Lysosome
- C. Mitochondrion
- D. Nucleus

**5. True or False: The cell membrane's role in conductivity is independent of the protein synthesis occurring in the Rough ER.**

- A. True
- B. False

**6. The process of metabolic absorption relies on the \_\_\_\_\_ to selectively allow nutrients to pass into the cytoplasm based on the cell's current homeostatic needs.**

- A. Cell Membrane
- B. Cell Wall
- C. Cytoskeleton

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D. Vacuole

**7. Compare the energy needs of a cardiac muscle cell to a dormant seed cell. How would the organelle composition reflect this difference?**

- A. The seed cell would have more Golgi bodies to store energy.
- B. The muscle cell would have a significantly higher density of mitochondria.
- C. The muscle cell would have more lysosomes to produce ATP.
- D. Both would have an equal amount of ribosomes to maintain homeostasis.

**8. Within the nucleus, the regulation of \_\_\_\_\_ is the primary mechanism that controls a cell's ability to undergo reproduction and direct protein synthesis.**

- A. Enzymatic Digestion
- B. Gene Expression
- C. Active Transport
- D. Glucose Oxidation

**9. True or False: Secretion by the Golgi apparatus is a form of active transport that requires the energy produced by the mitochondria.**

- A. True
- B. False

**10. Analyze the relationship between ribosomes and the Golgi apparatus. What happens if ribosomes increase their output without a corresponding increase in Golgi activity?**

- A. The cell will run out of DNA.
- B. There will be a buildup of unprocessed proteins within the Endoplasmic Reticulum.
- C. The cell will shrink due to a lack of water.
- D. Mitochondria will stop performing cellular respiration.