

Name: _____ Date: _____

Your Blueprint for Cellular Survival: A 9th Grade Assessment

Bridge the gap between molecular anatomy and physiological systems as you analyze how specialized organelles sustain complex multicellular life.

1. In the context of cellular energetics, which scenario best illustrates the functional relationship between the chloroplast and mitochondria in a C3 plant cell?

- A. Chloroplasts synthesize glucose; mitochondria convert that glucose into ATP.
- B. Mitochondria create sunlight; chloroplasts store that energy as starch.
- C. Chloroplasts pump water out; mitochondria pump minerals inside.
- D. Mitochondria produce CO₂ for the cell wall; chloroplasts absorb it.

2. The _____ is an extensive network of membranes that serves as the primary site for the synthesis of integral membrane proteins and lipids destined for secretion.

- A. Endoplasmic Reticulum
- B. Cytoskeletal matrix
- C. Centriole bundle
- D. Nucleolus

3. The selectively permeable nature of the phospholipid bilayer allows the cell to maintain homeostasis by controlling the rate of diffusion and active transport.

- A. True
- B. False

4. An athlete experiences muscle fatigue due to a lack of energy availability at the molecular level. Which organelle is likely failing to meet the demand for oxidative phosphorylation?

- A. Peroxisome
- B. Mitochondrion
- C. Vacuole
- D. Ribosome

5. A biologist observes a cell under a microscope and notices a large central _____, a structure primarily used for maintaining turgor pressure and storing secondary metabolites.

- A. Cytoplasm
- B. Vesicle
- C. Vacuole
- D. Plasmids

6. Which organelle serves as the 'sorting station' where proteins received from the ER are modified with carbohydrate tags to ensure they reach their correct destination?

- A. Lysosome

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- B. Centrosome
- C. Golgi Apparatus
- D. Nuclear Envelope

7. Prokaryotic cells, such as bacteria, lack a membrane-bound nucleus but still contain ribosomes for protein synthesis.

- A. True
- B. False

8. If a cell's lysosomes were to rupture and release their contents into the cytoplasm, what would be the most immediate consequence for the cell?

- A. Increased lipid synthesis
- B. Uncontrolled DNA replication
- C. Digestive enzymes would begin to degrade cellular components
- D. Atmospheric oxygen would be converted into glucose

9. The _____ provides structural support and facilitates the intracellular movement of organelles via a network of microfilaments and microtubules.

- A. Cytoskeleton
- B. Plasma Membrane
- C. Phloem
- D. Nuclear Matrix

10. The nucleolus is the specific region within the nucleus where ribosomal RNA (rRNA) is synthesized and assembled with proteins.

- A. True
- B. False