What is Cell Biology?

Worksheet

Cell biology studies the structure, function and life cycle of cells, from single-celled bacteria to the trillions of specialized cells that make up the human body.

Questions

1. Which structure controls what enters and exits a cell?

A) Nucleus
B) Cell membrane
C) Mitochondria
D) Ribosome

2. Which organelle is the site of ATP production?

A) Golgi apparatus
B) Lysosome
C) Mitochondrion
D) Nucleolus

3. What distinguishes eukaryotic cells from prokaryotic cells?

A) Presence of a cell wall
B) Presence of a membrane-bound nucleus
C) Presence of DNA
D) Presence of a cell membrane

4. Which organelle modifies, sorts and packages proteins for secretion?

A) Golgi apparatus
B) Mitochondrion
C) Ribosome
D) Nucleus

5. Identify whether a bacterial cell is prokaryotic or eukaryotic and explain why.

6. Which organelle produces most of a cell's ATP, and why is it called the 'powerhouse'?

7. Explain why a red blood cell (no nucleus) can still function despite lacking DNA.

8. Define: What is a cell?

9. Define: What is the difference between prokaryotic and eukaryotic cells?

10. Define: What does the cell membrane do?

Answer Key

1. B) Cell membrane - The selectively permeable cell membrane regulates the movement of substances.

2. C) Mitochondrion - Mitochondria perform cellular respiration to produce ATP.

3. B) Presence of a membrane-bound nucleus - Eukaryotes have a true, membrane-bound nucleus; prokaryotes don't.

4. A) Golgi apparatus - The Golgi apparatus processes and packages proteins from the ER for delivery.

5. Bacteria lack a nucleus and membrane-bound organelles Their DNA floats freely in the cytoplasm (nucleoid region) Therefore bacteria are prokaryotic cells

6. Mitochondria contain enzymes for the Krebs cycle and electron transport chain These processes use oxygen and glucose breakdown products to generate ATP Because they supply most of the cell's usable energy, mitochondria are called the powerhouse of the cell

7. Red blood cells expel their nucleus during maturation to make room for hemoglobin They rely on proteins made before enucleation They survive about 120 days, then are recycled, since they can't repair or replicate DNA

8. The basic structural and functional unit of all living organisms.

9. Prokaryotic cells lack a nucleus and membrane-bound organelles; eukaryotic cells have both.

10. Controls what enters and exits the cell, maintaining a stable internal environment.