Module 04: Cellular Function — Study Questions

Cell Theory

1. What are the three main principles of cell theory?
2. Who were some of the scientists that contributed to the development of cell theory?
3. Why is the cell considered the basic unit of life?

Prokaryotic vs. Eukaryotic Cells

1. What is the main structural difference between prokaryotic and eukaryotic cells?
2. Give two examples of organisms that have prokaryotic cells and two that have eukaryotic cells.
3. Why are prokaryotic cells generally smaller than eukaryotic cells?
4. What structures do both prokaryotic and eukaryotic cells have in common?

Cell Organelles

1. What is the function of the nucleus, and why is it sometimes called the "control center" of the cell?
2. How do ribosomes differ from other organelles, and what is their function?
3. Compare the rough endoplasmic reticulum and smooth endoplasmic reticulum. What does each do?
4. What is the role of the Golgi apparatus in processing and packaging proteins?
5. What would happen to a cell if its lysosomes stopped functioning?
6. How do central vacuoles in plant cells differ from vacuoles in animal cells?

Energy Organelles

1. What is the primary function of mitochondria, and why are they called the "powerhouses" of the cell?
2. How are chloroplasts and mitochondria structurally similar? What does this suggest about their evolutionary history?
3. Explain the endosymbiotic theory. What evidence supports it?
4. Why do plant cells have both mitochondria and chloroplasts?

Plant vs. Animal Cells

1. What three structures are found in plant cells but not in typical animal cells?
2. How does the cell wall provide advantages to plant cells?
3. Why don't animal cells need chloroplasts?

Cytoskeleton and Cell Structure

1. What are the three main components of the cytoskeleton, and what does each do?
2. How do cilia and flagella differ in structure and function?
3. How does the cytoskeleton help cells maintain their shape and move materials internally?
4. If a cell's microtubules were damaged, what cellular processes might be affected?
5. Describe one way the cytoskeleton is involved in cell division.