

3 Review

CHAPTER VOCABULARY

3.1 cell theory
cytoplasm
organelle
prokaryotic cell
eukaryotic cell

3.2 cytoskeleton
nucleus
endoplasmic reticulum
ribosome
Golgi apparatus
vesicle

mitochondrion
vacuole
lysosome
centriole
cell wall
chloroplast

3.3 cell membrane
phospholipid
fluid mosaic model
selective permeability
receptor

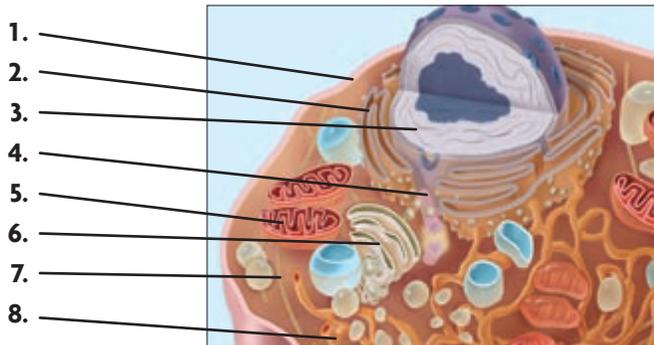
3.4 passive transport
diffusion
concentration gradient
osmosis
isotonic
hypertonic
hypotonic
facilitated diffusion

3.5 active transport
endocytosis
phagocytosis
exocytosis

Reviewing Vocabulary

Labeling Diagrams

In your notebook, write the vocabulary term that matches each numbered item below.



Labeling Diagrams

Describe one similarity and one difference between the two terms in each of the following pairs.

9. eukaryotic, prokaryotic
10. cell wall, cell membrane
11. diffusion, facilitated diffusion

READING TOOLBOX GREEK AND LATIN WORD ORIGINS

12. The word *organelle* is the diminutive, or “tiny,” form of the Latin word for organs of the body. How is an organelle like a tiny organ?
13. The Greek word *karuon* means “nut.” The prefix *pro-* means “before,” and the prefix *eu-* means “true.” Thus, *prokaryote* means “before nut” and *eukaryote* means “true nut.” How do these meanings relate to structural differences between these two cell types?

Reviewing MAIN IDEAS

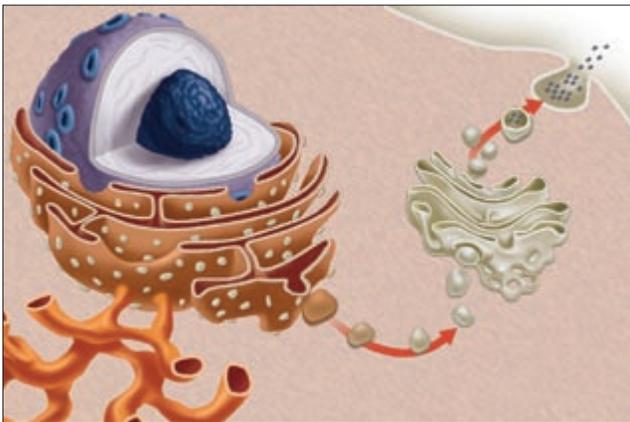
14. According to the cell theory, what is required for an object to be considered alive?
15. What role do membranes play in prokaryotic cells? in eukaryotic cells?
16. How do the cytoskeleton and the cytoplasm contribute to a cell’s shape?
17. You know that many organelles are involved in protein production. Briefly explain where proteins are made, modified, and packaged within a cell.
18. Explain what mitochondria do and why evidence suggests that they might have descended from free-living prokaryotes in the evolutionary past.
19. If you were looking through a microscope at an unknown cell, how might you determine whether it was a plant cell or an animal cell?
20. Cells are surrounded by a watery fluid, and they contain watery cytoplasm. Explain how the structure of the lipid bilayer is related to these two watery environments.
21. How are cells able to respond to signal molecules that are too large to enter the cytoplasm?
22. How do transport proteins make it easier for certain molecules to diffuse across a membrane?
23. Under what conditions would a molecule need to be actively transported across a membrane?
24. Do you think that endocytosis and exocytosis can occur within the same cell? Explain your reasoning.

Critical Thinking

- 25. Summarize** How was the development of cell theory closely tied to advancements in technology?
- 26. Analyze** What structural differences suggest that eukaryotic cells evolved from prokaryotic cells?
- 27. Synthesize** If vesicles are almost constantly pinching off from the ER to carry proteins to the Golgi apparatus, why does the ER not shrink and finally disappear?
- 28. Compare and Contrast** You know that both vesicles and vacuoles are hollow compartments used for storage. How do they differ in function?
- 29. Infer** When cells release ligands, they are sent through the blood stream to every area of the body. Why do you think that only certain types of cells will respond to a particular ligand?
- 30. Provide Examples** What are two ways in which exocytosis might help a cell maintain homeostasis?
- 31. Compare** How is facilitated diffusion similar to both passive transport and active transport?

Interpreting Visuals

Use the diagram to answer the next three questions.



- 32. Apply** What process is occurring in the diagram, and how do you know?
- 33. Predict** If the transport proteins that carry amino acids into this cell stopped working, how might the process shown be affected?
- 34. Infer** What might you conclude about the membrane structure of the final vesicle and the cell membrane?

Analyzing Data Form an Operational Definition

Use the text and table below to answer the next three questions. Reactive oxygen species, or ROS, are clusters of highly reactive oxygen atoms that can damage the body. As people age, the amount of ROS in the body increases, causing a condition called oxidative stress. In one study, researchers studied how the number of mitochondria might be involved in this situation.

- Muscle tissue was obtained from patients.
- Radioactive probes labeled the mitochondria.
- A machine counted the mitochondria per cell.

AGE AND MUSCLE CELL MITOCHONDRIA

Patient	Age	Mitochondria per Muscle Cell
1	47	2026
2	89	2987
3	65	2752
4	38	1989

- 35. Apply** If the independent variable in this study is age, what is the operational definition of the dependent variable?
- 36. Analyze** What do the data show about the relationship between age and number of mitochondria?
- 37. Infer** What might the relationship between age and number of mitochondria indicate about the increase in ROS levels?

Making Connections

- 38. Write an Analogy** The cell membrane regulates what can enter and exit a cell. In eukaryotes, it encloses a complex group of organelles that carry out special jobs. Make an analogy to describe the cell membrane and the variety of organelles and processes that take place inside it. Explain any limitations of your analogy.
- 39. Connect** On the chapter opener, you saw a picture of macrophages eating up bacteria. Identify the ways in which the cytoskeleton helps the macrophage carry out this job.