Lesson 4 Types of Cells

Key Words

prokaryotic cells: cells that lack a nucleus

eukaryotic cells: cells that have a nucleus

cell wall: rigid structure that surrounds the cell membrane of plant cells

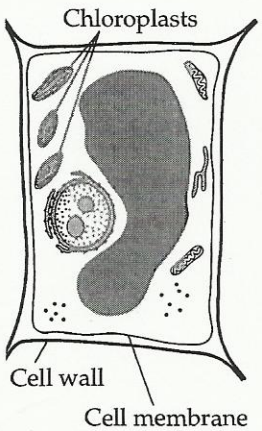
chloroplasts: organelles in a plant cell in which light energy is changed into chemical energy

KEY IDEAS

Many cells share common traits. However, there are some differences among cells. For example, some cells possess a nucleus, while others do not. Plant cells contain structures not found in animal cells. In both plants and animals, cells become specialized to perform certain jobs.

An animal technician assists a veterinarian in the care and treatment of animals. The duties of an animal technician include collecting specimens, performing tests, gathering data, and caring for the animals. Understanding the nature of animal cells is vital to the work of an animal technician.

Fig. 4-1



Differences in Cells. In Lesson 2, you learned about the cell nucleus. Most cells have a nucleus, but some do not. The cells of bacteria, for example, lack a nucleus. Bacteria are **prokaryotic cells** (PROH-kar-ee-YAH-tik sehlz). Cells that have a nucleus are called **eukaryotic cells** (YOO-kar-ee-YAH-tik sehlz). Eukaryotic cells include plant cells and animal cells. In addition to a nucleus, plant cells and animal cells both have a cell membrane and cytoplasm. However, plant cells have a number of structures not found in animal cells.

Plant Cells. Unlike animal cells, plant cells have a cell wall. The **cell wall** (sehl WAHL) is a rigid structure that surrounds the cell membrane. See Fig. 4-1. The cell wall is made up mostly of cellulose. Cellulose is a long

chain of sugar molecules. It is a kind of carbohydrate. The rigid cell wall protects the plant cell and gives it support. Even though the cell wall is tough and rigid, water and other material needed by the cell can pass through it.

Chloroplasts are another structure found in plant cells. These are also shown in Fig. 4-1. **Chloroplasts** (KLAWR-uh-plasts) are green, oval organelles that trap the light energy necessary for photosynthesis. Photosynthesis occurs in the chloroplasts of leaves as light energy from the sun is changed into chemical energy. You'll learn more about photosynthesis in Lesson 7.

1. **How are chloroplasts used in photosynthesis?**

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Specialized Cells. All cells are not alike. In both plants and animals, cells become specialized to do certain jobs. For example, some kinds of cells provide support. Bone cells in humans have special structures that make bone. The human skeleton is made up of bone, which supports the body. In plant cells, support is given to the cell by the cellulose of the cell wall. Some plants also have special cells that make tough fibers for support. For example, stem fibers provide support to certain plants.

Plants and animals also contain cells that are specialized for absorbing and transporting nutrients. Many plants have root cells that absorb water and nutrients from soil into the plant. Specialized cells form transport vessels in plants so that nutrients and water can move up from the soil to the leaves. In humans, cells in the intestines absorb food. Blood vessels, which are made of specialized cells, transport nutrients throughout the body.

Many plants have specialized cells that make up the parts of the flower. These cells are specialized to make sperm and ova for reproduction. Similarly, specialized cells in humans make sperm and eggs for reproduction.

Animal Cells. Most animals have cells not found in plants that perform special functions. For example, animals have nerve cells. These cells send and receive messages to and from the brain. Animals also have muscle cells that allow them to move about in their environment. When you study the human body in Unit 9, you'll learn more about the systems that use specialized cells.

2. **What are two kinds of specialized cells that most animals have that plants do not have?** _____

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TAKE ANOTHER LOOK

Fig. 4-2 compares special cell functions of plants and humans.

Fig. 4-2

Cell Functions	Plants	Humans
Make food	Leaf cells	None
Provide support	Stem fibers	Bone cells
Absorb nutrients	Root cells	Specialized cells in intestines
Transport nutrients	Specialized cells that make transport vessels	Blood vessel cells
Reproduction	Specialized cells that make sperm and ova	Specialized cells that make sperm and eggs
Allow movement	None	Muscle cells
Send and receive messages to and from the brain	None	Nerve cells

Check Your Understanding

Write a sentence explaining the connection between each pair of words.

3. plant cell, cell wall _____

_____

4. human cells, reproduction _____

_____

5. What is the difference between a eukaryotic cell and a prokaryotic cell?

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6. What structures are found in plant cells but not in animal cells?

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7. How do chloroplasts help a plant carry out its life processes?

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8. Give an example of special plant cells and special human cells that absorb nutrients. _____

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9. What function do nerve cells perform in animals?

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10. What function do muscle cells perform in animals?

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