

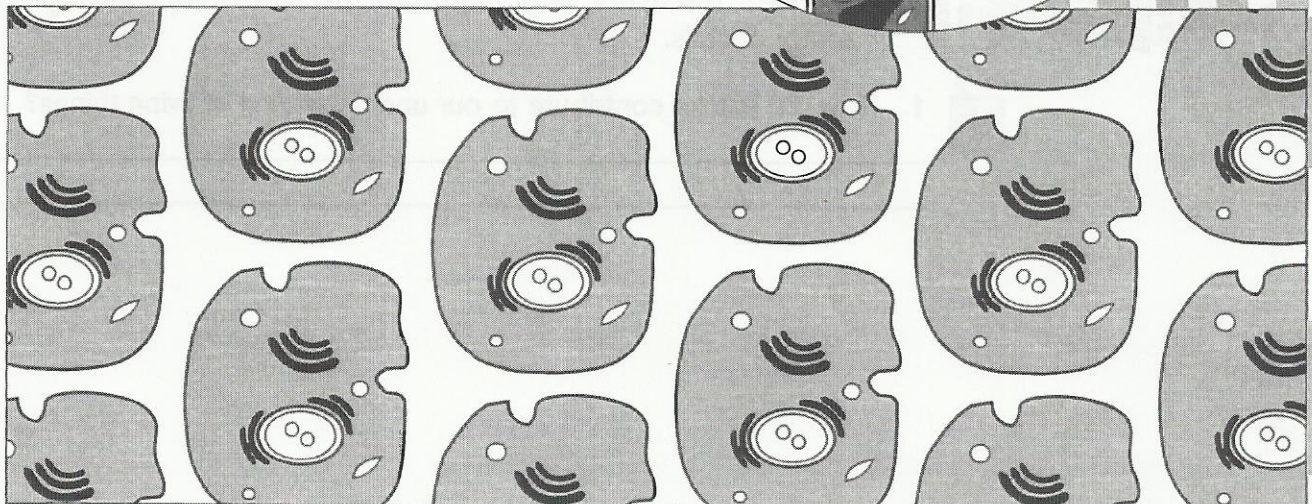
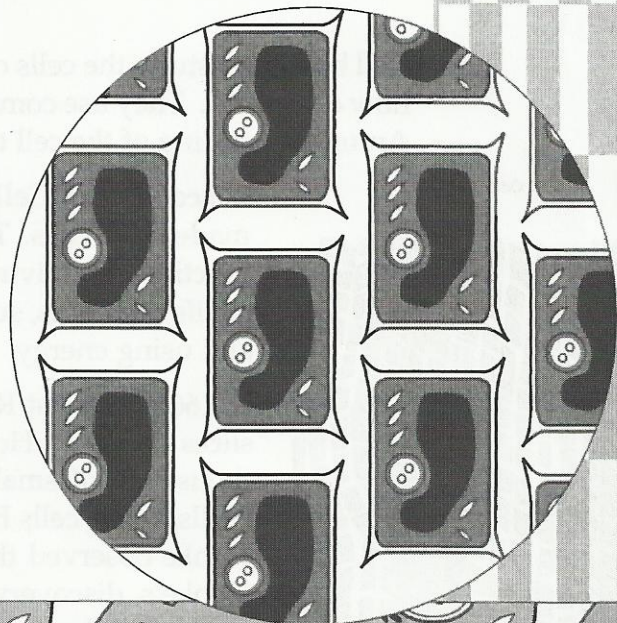
Cells and the Chemistry of Life

UNIT

1

Have you ever had the chance to watch a pet grow from a baby to an adult? If so, you've seen the pet go through remarkable changes as it got older. Animals, plants, even you, grow in height and weight with each passing year. These changes result from an increase in the number and size of cells in the organism's body.

All living things are made up of basic units called cells. Your body contains trillions of cells. At this very minute, some of your cells are dying. But don't worry, your body constantly makes new cells to replace them. Your body also supplies its cells with the materials they need to live and removes waste products from your cells. Day after day, your body takes care of itself by carrying out these processes.



The Cell Theory

Key Words

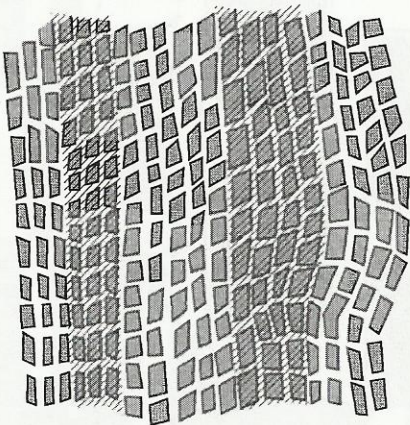
cell: basic unit of structure and function of all living things
protoplasm: living material

KEY IDEAS

The development of the microscope allowed scientists to observe traits of living things that could not be seen with the naked eye. Their observations led to the discovery of the cell. The cell is the basic unit of structure and function of all living things.

Cell biologists study the cells of living things. Cell biologists try to discover how cells work. They use complex tools to observe the life processes of cells. An understanding of the cell theory is vital to the work of cell biologists.

Fig. 1-1 Cork cells



Discovery of Cells. Today we know that all organisms are made up of cells. The cell (seh1) is the basic unit of structure and function of all living things. It is the smallest unit that performs all life processes, such as growth, reproduction, transport, storing and using energy.

In 1665, scientist Robert Hooke used a microscope to view thin slices of cork. Hooke noticed that the cork was divided into thousands of small walled sections. He called these sections "cells." The cells Hooke observed were not living cells. Rather, Hooke observed the cell walls of dead plant cells. See Fig. 1-1. Hooke's discovery was important because it opened up the study of cells.



1. How did Hooke contribute to our understanding of living things?

Almost 200 years later, Matthias Schleiden (mah-TEE-ahs SHLY-duhn) looked at plant parts through a microscope. He discovered that living plants are made up of cells. At about the same time, another scientist, Theodor Schwann (TAY-oh-dohr SHVAHN) used the microscope to view parts of animals. He discovered that animals also are made up of cells. As a result of these studies, scientists concluded that all living things are made up of cells.

Soon after the discoveries of Schwann and Schleiden, another scientist, Rudolf Virchow (ROO-dawlf FIHR-khoh), added to their findings. By studying microscopic organisms, Virchow showed that all cells come from other living cells. He said that this occurs when the living cells divide to form new cells.



2. What contribution did Virchow make to the cell theory?

Protoplasm. At the time of the discoveries scientists called all the living substance inside a cell **protoplasm** (PROHT-oh-plaz-uhm). They believed that protoplasm was the same in all cells. As time went on, the tools people used to view cells improved. Scientists were able to see the inside of a cell more clearly. Today, we know that protoplasm is not one single substance but many different substances and structures. We also know that protoplasm contains different things in different kinds of cells. For example, special food-making structures are found in the protoplasm of plant cells but not in the protoplasm of animal cells. Now, the term protoplasm is sometimes used to describe any living material.



3. What is protoplasm?

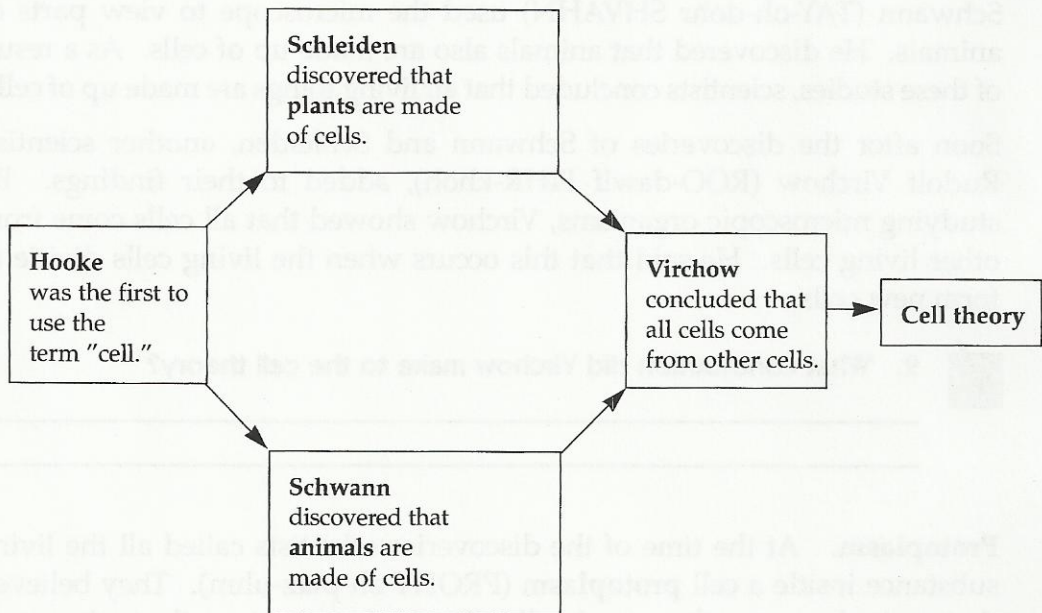
Cell Theory. Early scientists made many correct discoveries about the cell. The conclusions of these people were blended to form the modern cell theory. The cell theory states:

- All living things are made up of cells.
- Cells are the basic units of structure and function in living things.
- All cells come from other cells.

TAKE ANOTHER LOOK

Fig. 1-2 shows the contributions that formed the cell theory.

Fig. 1-2

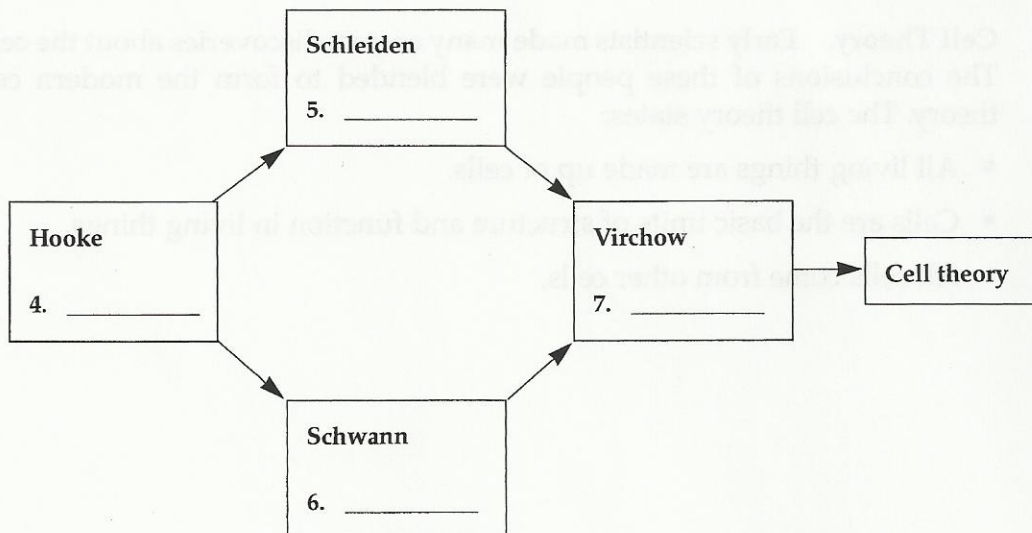


Check Your Understanding

Complete Fig. 1-3 by writing the letter of the statement that correctly explains what each scientist discovered:

- He concluded that cells come from other living cells.
- He discovered that living plants are made of cells.
- He discovered that animals are made of cells.
- He was the first to use the word "cells."

Fig. 1-3



What Do You Know?

8. What is a cell? _____

9. How were the discoveries of Schleiden and Schwann alike? How did they differ? _____

10. What is the cell theory? _____

11. Early scientists formed an idea about cells that proved to be false. What was this idea? _____

12. Which is more useful, the study of dead cells or living cells? Why? _____

