

The Diversity of Cells Note-taking Guide (Chapter 3: Section 1 Pages 60 – 66)

Cells and the Cell Theory

Who was the first person to see and describe cells? How did he do it? Describe how he made his discovery.

Robert Hooke was the first person to describe cells. In 1665, he built a microscope to look at tiny objects. One day, he looked at a thin slice of cork. Cork is found in the bark of cork trees. The cork looked like it was made of little boxes. Hooke named these boxes *cells*, which means “little rooms” in Latin. Hooke’s cells were really the outer layers of dead cork cells. Hooke’s microscope and his drawing of the cork cells are shown in **Figure 1**.

Draw a picture of the device Hooke built and what he observed with this new tool. (Use figure 1 on page 60 to help you.) Describe how it differs from the Compound Light Microscope we will use.

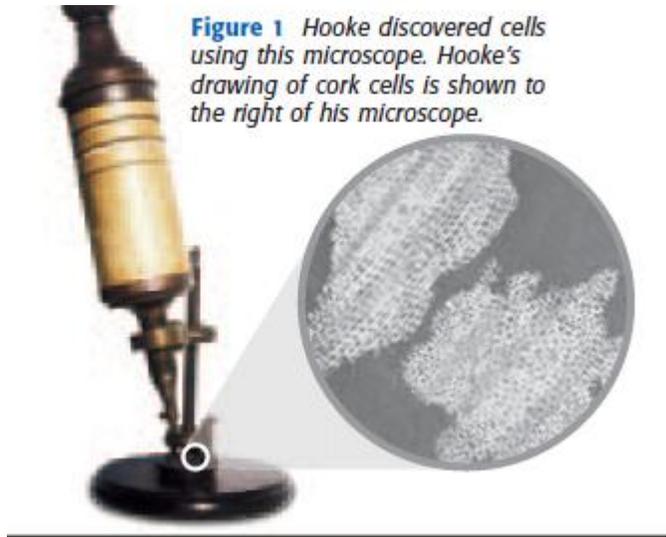


Figure 1 Hooke discovered cells using this microscope. Hooke’s drawing of cork cells is shown to the right of his microscope.

KEY VOCABULARY:

- CELL
- CELL MEMBRANE
- ORGANELLE
- NUCLEUS
- PROKARYOTE
- EUKARYOTE

Who is Anton van Leewenhoek? List and describe at least three things he did to contribute to our current knowledge about cells?

In 1673, Anton van Leeuwenhoek (LAY vuhn HOOK), a Dutch merchant, made his own microscopes. Leeuwenhoek used one of his microscopes to look at pond scum. Leeuwenhoek saw small organisms in the water. He named these organisms *animalcules*, which means “little animals.” Today, we call these single-celled organisms protists (PROH tists).

The Cell Theory

Almost 200 years past from the invention of the first microscope before scientist concluded that cells are present in all living things.

The following three men are credited with developing the *Cell Theory*. Complete the table and list the 3 parts of the *Cell Theory*.

Cell Theorist	Area of Study	Year of Study and Conclusion Made
Mattheis Schleiden	Plants - Botany	1838 – He concluded that all plants were made of cells.
Theodor Schwann	Animals- Zoology	1839 – He concluded that all animal tissues were made of cells.
Rudolf Virchow	Medicine –Doctor	1858 – All cells come from pre-existing cells.

The 3 Parts Cell of the Theory

1. All organisms are made of one or more cells.
2. The cell is the basic unit of all living things.
3. All cells come from pre-existing cells.

Cell Size

What is true about most cells? **Most cells are too small to be seen without a microscope.**

Why can the yoke of an egg be so large? **Because it does not have to take in more nutrients.**

What is the reason why most cells are so small? Cells take in food and get rid of wastes through their outer surface. As a cell gets larger, it needs more food and produces more waste- more materials pass through its outer surface.

As a cell's volume increases, it's surface grows as well. The volume grows faster than its surface area. If the cell gets too large, the cell's surface area will not be large enough to take in nutrients or get rid of enough wastes. The area of a cell's surface compared with the cell's volume limits the cell's size.

Parts of a Cell

Cells come in many shapes and sizes. Cells have many different functions. But ALL cells have the following parts in common.

List/Define/Describe the parts of the cell. Draw one picture to accompany your definitions and label the parts. (Use Figure 4 to help you.)

Cell Membrane	
Organelles	
Nucleus	

Two Kinds of Cells

Complete the table below with a YES or a NO and Important Facts

Cell Type	Have Nucleus	Have Membrane Bound Organelles	Single-celled	Multi-cellular	Have DNA
Prokaryotic Cell <i>Pro=BEFORE</i>	No	NO	Yes	No	Yes
Bacteria Facts The most common prokaryotes are bacteria (singular, <i>bacterium</i>). Bacteria are the smallest cells known. These tiny organisms live almost everywhere. Bacteria do not have a nucleus, but they do have DNA. A bacteria's DNA is a long, circular molecule, shaped like a twisted rubber band. Bacteria have no membrane-covered organelles. But they do have ribosomes. <i>Ribosomes</i> are tiny, round organelles made of protein and other material.			Archaea Facts The second kind of prokaryote are the archaea (singular, <i>archaeon</i>). Archaea are similar to bacteria in some ways. For example, both are single-celled organisms. Both have ribosomes, a cell membrane, and circular DNA. And both lack a nucleus and membrane-bound organelles. But archaea differ from bacteria in some way, too. For example, archaeal ribosomes are different from bacterial ribosomes.		

Cell Type	Have Nucleus	Have Membrane Bound Organelles	Single-celled	Multi-cellular	Have DNA
Eukaryotic Cell <i>Eu = TRUE</i>	Yes	Yes	Yes	Yes	Yes

Eukaryote Facts

Eukaryotic cells are the largest cells. Most eukaryotic cells are still microscopic, but they are about 10 times larger than most bacterial cells. A typical eukaryotic cell is shown in **Figure 8**.

Unlike bacteria and archaea, eukaryotic cells have a nucleus. The nucleus is one kind of membrane-bound organelle. A cell's nucleus holds the cell's DNA. Eukaryotic cells have other membrane-bound organelles as well. Organelles are like the different organs in your body. Each kind of organelle has a specific job in the cell. Together, organelles, such as the ones shown in **Figure 8**, perform all the processes necessary for life.

All living things that are not bacteria or archaea are made of one or more eukaryotic cells. Organisms made of eukaryotic cells are called **eukaryotes**. Many eukaryotes are multicellular. *Multicellular* means "many cells." Multicellular organisms are usually larger than single-cell organisms. So, most organisms you see with your naked eye are eukaryotes. There are many types of eukaryotes. Animals, including humans, are eukaryotes. So are plants. Some protists, such as amoebas, are single-celled eukaryotes. Other protists, including some types of green algae, are multicellular eukaryotes. Fungi are organisms such as mushrooms or yeasts. Mushrooms are multicellular eukaryotes. Yeasts are single-celled eukaryotes.