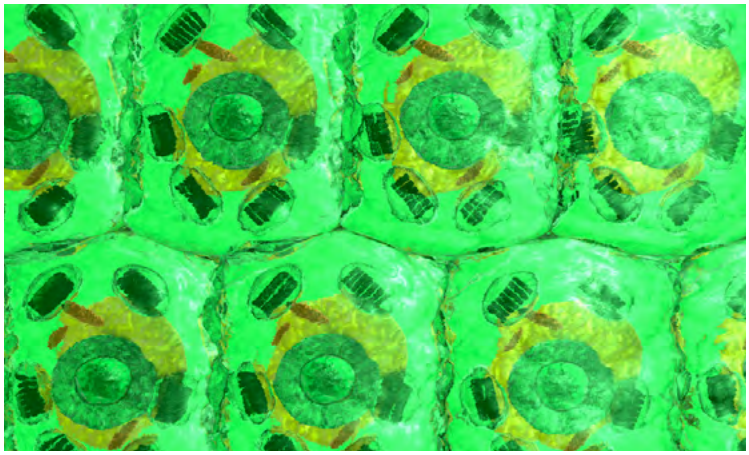
Chapter 3

The Cell



3.6 Cell Organelles

The cytoplasm of eukaryotic cells contains many *organelles* that are attached to the cytoskeleton. You can see cell organelles in the cell diagrams in Figure 3.8. These are called organelles because, like the organs of the body, each performs a specific function in the cell. Each organelle, except for the ribosomes, is also surrounded by a membrane. Let's consider the organelles one at a time.

Ribosomes are organelles that assemble proteins. Some ribosomes are suspended in the fluid of the cytoplasm. These make proteins that will remain inside the cell.

Other ribosomes are attached to an organelle called the *rough endoplasmic reticulum*. These ribosomes assemble proteins that will go to the cell membrane or be exported from the cell. The rough endoplasmic reticulum appears "rough" because of the ribosomes embedded within it.

The *smooth endoplasmic reticulum* assembles membranes and, depending on the cell, may have additional functions. For example, the smooth endoplasmic reticulum of liver cells detoxifies drugs and other poisons.

The *Golgi apparatus* is sometimes described as the "post office" of a cell. It receives products from the endoplasmic reticulum, modifies them, and packages them for transport within or out of the cell.

Lysosomes are the garbage disposals of a cell. These organelles break down organic materials, such as damaged or worn-out organelles. Certain white blood cells of the immune system use lysosomes to destroy the bacteria they have engulfed.

Vacuoles are sacs surrounded by membrane. Plant cells usually have a single large vacuole that can be used to store nutrients or other materials. In flowers, vacuoles store the pigments that provide color. Animal cells typically have smaller vacuoles, sometimes called *vesicles*, that are used to hold or transport a wide array of products. For example, neurons have many vesicles that contain the chemicals they use to communicate with other neurons.

Mitochondria are organelles that break down organic molecules to obtain energy in a form that cells can use. We will look at mitochondria and their function in more detail in the next chapter.

In plants, organelles called *chloroplasts* capture energy from sunlight and use it to build organic molecules. We will study this process, known as photosynthesis, also in the next chapter.

Table 3.1 Major Features of Eukaryotic Cells.

Nucleus	Contains the cell's DNA
Ribosome	Assembles proteins for the cell
Rough endoplasmic reticulum	Assembles proteins destined either to go to the cell membrane or to leave the cell
Smooth endoplasmic reticulum	Assembles membranes and performs other functions in specific cells
Golgi apparatus	Receives products from the endoplasmic reticulum and packages them for transport
Lysosome	Breaks down organic material
Mitochondrion	Obtains energy for the cell to use
Chloroplast	In plant cells, captures energy from sunlight to build organic molecules
Cytoskeleton	Helps cell hold its shape

Table 3.1 summarizes the major organelles and features of eukaryotic cells.

READING CHECK

What are two places in which ribosomes are found in cell?

CHECK YOUR ANSWER

Some ribosomes are found in the cytoplasm—these ribosomes assemble proteins that will remain in the cell. Other ribosomes are embedded in the rough endoplasmic reticulum—these ribosomes assemble proteins that will be sent to the cell membrane or exported by the cell.

To review cell organelles and learn more about them, go to this website:

https://microbenotes.com/cell-organelles/