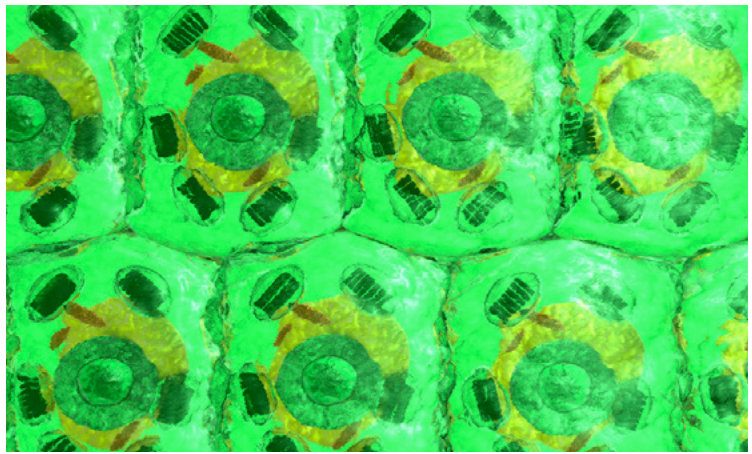


The Cell

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Summary of Terms

- **Cell membrane** The structure that separates the inside of the cell from the outside of the cell.
- **Cells** The basic units of life that make up all living organisms.
- **Chromosomes** The DNA-containing structures within cells.
- **Cytoplasm** The part of a cell that is inside the cell membrane but outside the nucleus.
- **Electron Microscope** A device able to resolve structures down to a nanometer in size by using electron waves as a source of illumination rather than light.
- **Eukaryotes** Organisms whose cells have a true nucleus, such as protists, animals, plants, and fungi.
- **Light microscope** A device that produces a magnified image of a specimen by passing visible light through a specimen and then through a series of lenses.
- **Nucleus** A structure within eukaryotic cells that is surrounded by a double membrane and that contains the cell's DNA.
- **Organelles** Structures within the cytoplasm of eukaryotic cells that perform specific functions in the cell.
- **Prokaryotes** Single-celled organisms, such as bacteria and archaea, whose cells lack a nucleus.

Detailed Chapter Summary

A cell is the basic unit of life. Life on Earth includes two types of organisms, prokaryotes and eukaryotes. Prokaryotes such as bacteria and archaea are made up of prokaryotic cells. Eukaryotes, which include plants, animals, fungi, and a diverse group called protists, are made up of eukaryotic cells. Prokaryotic cells have existed far longer than eukaryotic cells. Prokaryotic cells are also smaller and have their DNA in a single circular chromosome. Eukaryotic cells are larger and have a special structure called a nucleus that contains DNA. The DNA of eukaryotes is found in linear chromosomes. Eukaryotic cells also have a number of organelles that are not found in prokaryotes.



Cell theory emphasizes that cells are the basic units of life. Cell theory tells us two things: First, that all living things are made up of one or more cells. And second, that all cells come from other cells.

Microscopes allow us to see into the world of the cell. Light microscopes allow us to see cells and the larger features within them. Electron microscopes are needed to obtain detailed views of the structures inside cells. Scanning electron microscopes create a three-dimensional image of the surface of a specimen, whereas transmission electron microscopes make images of thin sections through a specimen

Eukaryotic cells have a number of key features. They have a cell membrane that separates the inside of the cell from the outside of the cell. Plant cells also have a cell wall outside the cell membrane. Eukaryotic cells have a nucleus that holds their DNA. The portion of the cell between the nucleus and cell membrane is called the cytoplasm, and it is supported by the criss-crossing fibers of the cytoskeleton. Organelles of eukaryotic cells include ribosomes, the rough endoplasmic reticulum, the smooth endoplasmic reticulum, the Golgi apparatus, lysosomes (in animal cells only), mitochondria, and chloroplasts (in plant cells only).

The cell membrane is composed of phospholipids, membrane proteins, and short carbohydrates. The phospholipids are arranged in a bilayer with their hydrophobic heads pointing to the outside and inside of the cell and the hydrophobic tails sandwiched between. Membrane proteins serve a variety of functions, including cell communication and the transport of molecules into and out of the cell. Short carbohydrates play a role in cell recognition. The cell membrane is often described as a fluid mosaic.

