

CELL STRUCTURE

CHAPTER 7

Introduction to Cells

Section 7-1

THE DISCOVERY OF CELLS

Key Idea: Microscope observations of organisms led to the discovery of the basic characteristics common to **all living things.**

CELL THEORY

- Observations made by scientists using more powerful microscopes in the 1800s led to the formation of the cell theory.

LOOKING AT CELLS

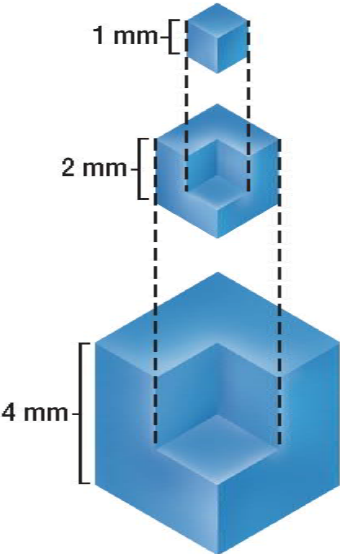
Key Idea: A cell's shape reflects **its function**.

The word **dimension** means cells can be branched, flat, round, or rectangular.

CELL SIZE

- Cell size is limited by a cell's surface area-to-volume ratio.
- Cells with greater surface area-to-volume ratio can exchange substances more efficiently.

RELATIONSHIP BETWEEN SURFACE AREA AND VOLUME

	Side length	Surface area	Volume	Surface area/ volume ratio
	1 mm	6 mm ²	1 mm ³	6:1
	2 mm	24 mm ²	8 mm ³	3:1
	4 mm	96 mm ²	64 mm ³	3:2

CELL SHAPE

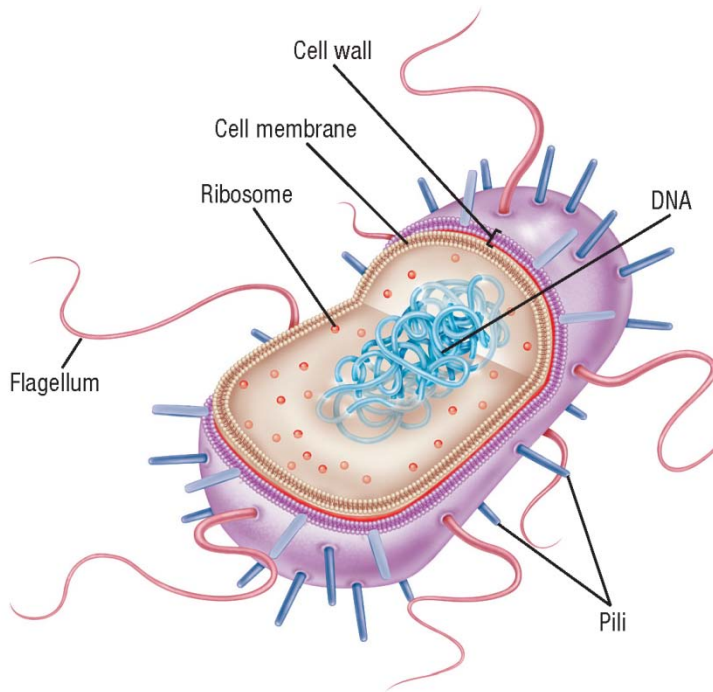
- Small cells have greater surface area-to-volume ratios than large cells.
- So, small cells function more efficiently than large cells.

CELL FEATURES

Key Idea: All cells have common structural features including a cell membrane, cytoplasm, ribosomes, and DNA.

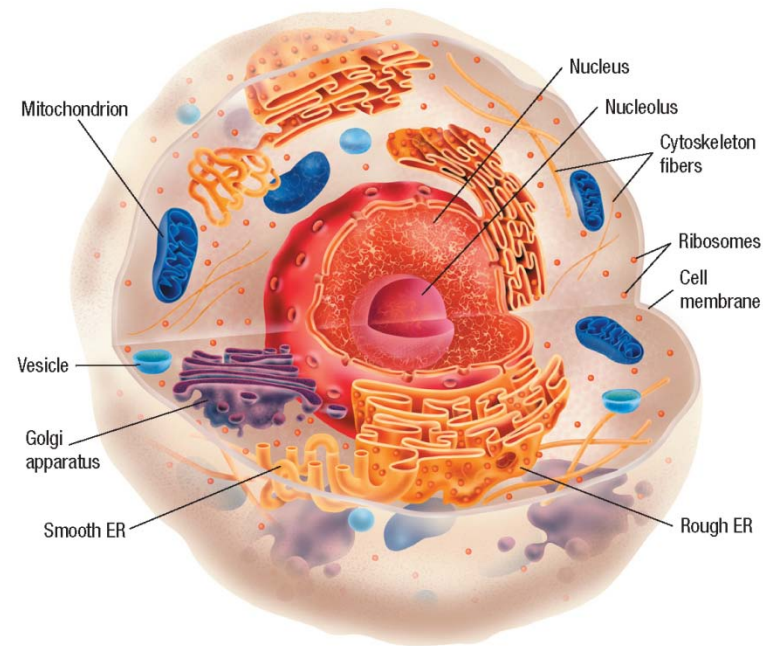
- ◉ A **cell membrane** is the outer layer that covers a cell's surface and acts as a barrier between the outside environment and the inside of the cell.
- ◉ **Cytoplasm** is the region of the cell within the cell membrane. The cytoplasm includes the fluid inside the cell called the *cytosol*.
- ◉ A **ribosome** is a cellular structure that makes proteins.

FEATURES OF PROKARYOTIC AND EUKARYOTIC CELLS



Prokaryotic Cell

Animal cell



Eukaryotic Cell

- A **prokaryote** is an organism that is a single prokaryotic cell.
- A **eukaryote** is an organism that is made up of one or more eukaryotic cells.

- ◉ The **nucleus** is an internal compartment of the cell that contains the DNA of a eukaryotic cell.
- ◉ An **organelle** is a small structure found in the cytoplasm that carries out specific activities inside the cell.

PROKARYOTIC CELLS

- Prokaryotic cells do not have a nucleus or other internal compartments.
- The genetic material of a prokaryotic cell is a single loop of DNA.

EUKARYOTIC CELLS

- ◉ Each organelle in a eukaryotic cell performs distinct functions.
- ◉ The complex organization of eukaryotic cells enables them to carry out more specialized functions than prokaryotic cells.