

Chapter Three: Cells: The Basic Units of Life

Section 1: The Diversity of Cells

All living things are made up of cells

- **Cells:** smallest unit that can perform all the processes necessary for life

Robert Hooke...1665

- 1st person to describe cells
- Invented the microscope to look at tiny objects
- Looked at cork cells
 - He was looking at dead cork cells
- He saw little boxes and called it cells...meaning “little rooms”
- Also looked at living plants, feathers, fish scales, and eyes of houseflies

Anton Van Leeuwenhoek...1673

- Looked at pond scum and found small organisms
 - called it *animalcules* or “little animals”
 - today these are called protists (single-celled organisms)
- Also looked at animal blood
- 1st person to see bacteria

200 years passed before scientists concluded that cells are present in all living things

Mattias Schlieden...1838

- Studied plants
- Stated that all plant parts were made up of cells

Theodore Schwann...1839

- Studied animals
- Stated that all animal tissues were made of cells
- Wrote the 1st two parts to what we call the cell theory
 - All organisms are made of one or more cells
 - The cell is the basic unit of a living thing

Rudolf Virchow...1858

- Doctor
- Wrote the last part of the cell theory
 - All cells come from existing cells

Cell Size

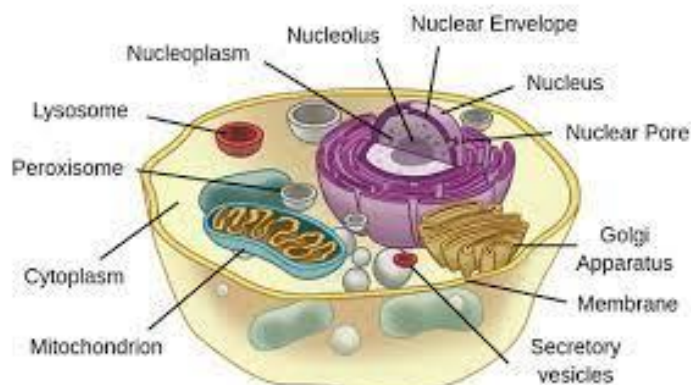
- Most cells are too small to be seen without a microscope
 - Exception is the egg – it is one big cell
- Cells need to get food and get rid of wastes
 - If the surface is too small, it will not get enough food
 - The area of a cell's surface compared to its volume limits its size

Major Parts of a Cell

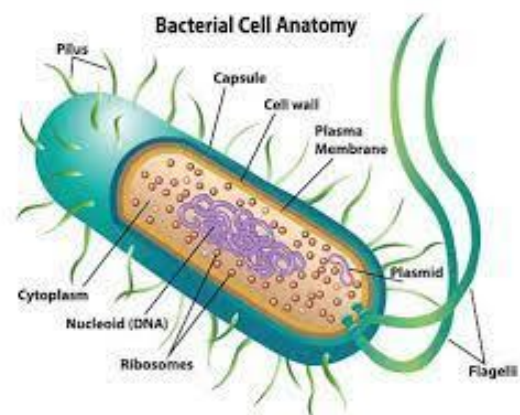
1. **Cell membrane:** protective layer that covers the cell's surface and acts as a barrier
 - a. controls materials going into and out of the cell
2. **Cytoplasm:** fluid like substance in the cell and all its contents
3. **Organelles:** structures that perform specific functions within the cell
4. **Genetic material:** all cells contain DNA (**D**eoxyribo**N**ucleic **A**cid)
 - a. Nucleus: a membrane-bound organelle that contains the cell's DNA

Two Kinds of Cells

1. **Prokaryotic:** cells with no nucleus; single-celled organisms with no membrane-bound organelles
 - a. Eubacteria: also known as bacteria
 - i. World's smallest cells
 - ii. Live everywhere, have DNA, and have a strong weblike exterior cell wall
 - b. Archaeobacteria: also called archaea
 - i. 3 types: heat-loving, salt-loving, and methane-making
 1. Sometimes called extremophiles (live in extreme conditions)
2. **Eukaryotic:** cells that have a nucleus
 - a. Largest cells
 - b. Multicellular...meaning "many cells"
 - c. Examples include animals, plants, green algae, and fungi (mushrooms)



Eukaryotic cell



Prokaryotic cell