

Concept 6.1

All organisms are made of cells.

The Cell Theory:

- Light Microscope first developed around 1600.
- In 1665 **Robert Hooke** observed “compartments” in a thin slice of cork and called the **cells**.
- In 1700 **Antom van Leeuwenhoek** developed simple light microscopes with high-quality lenses. He observed tiny organisms in pond water he referred to as “animalcules”.

Cell Theory:

- All living things are composed of cells
- Cells are the basic unit of structure and function in living things.
- All cells come from pre-existing cells.

Microscopes as Windows to Cells:

Types of Microscopes:

Light microscopes (LM) - magnify up to 1000X

Electron microscopes - magnify 1,000,000X

- Scanning electron microscope (SEM)
Study the surface structures of cells

- Transmission electron microscope (TEM)
Study internal structure of cells.
- For both types of electron microscopes the specimens must be killed and preserved before they can be examined.

An Overview of Animal and Plant Cells:

There are more similarities between animal and plant cells than there are differences.

Both plant and animal cells have.

Organelle - “mini-organ” Part of a cell with a specific job to do.

Plasma membrane - defines cell boundary and regulates the traffic of chemicals between the cell and its surroundings.

Nucleus - houses the cell’s genetic material in the form of DNA.

Cytoplasm - entire region of the cell between the nucleus and the plasma membrane.

A few key differences between plant cells and animal cells is that plant cells have.

Chloroplasts - where photosynthesis occurs.

Cell wall - protects plant cell and maintains its shape.

Two Major Classes of Cells:

Prokaryotic - lacks a nucleus
ex. Bacteria and Archaea

Eukaryotic - has a nucleus surrounded by its own membrane, and has other internal organelles bound by membranes.
ex. Fungi, Plants, Animals, Protists

Major differences :

- prokaryotic cells lack a true nucleus and organelles
- prokaryotic cells are much simpler in structure
- DNA in a prokaryotic cell is concentrated in an area called the nucleoid region
- Size most bacteria are 1-10 micrometers in diameter whereas eukaryotic cells are typically 10 - 100 micrometers in diameter