

# Cell Structure

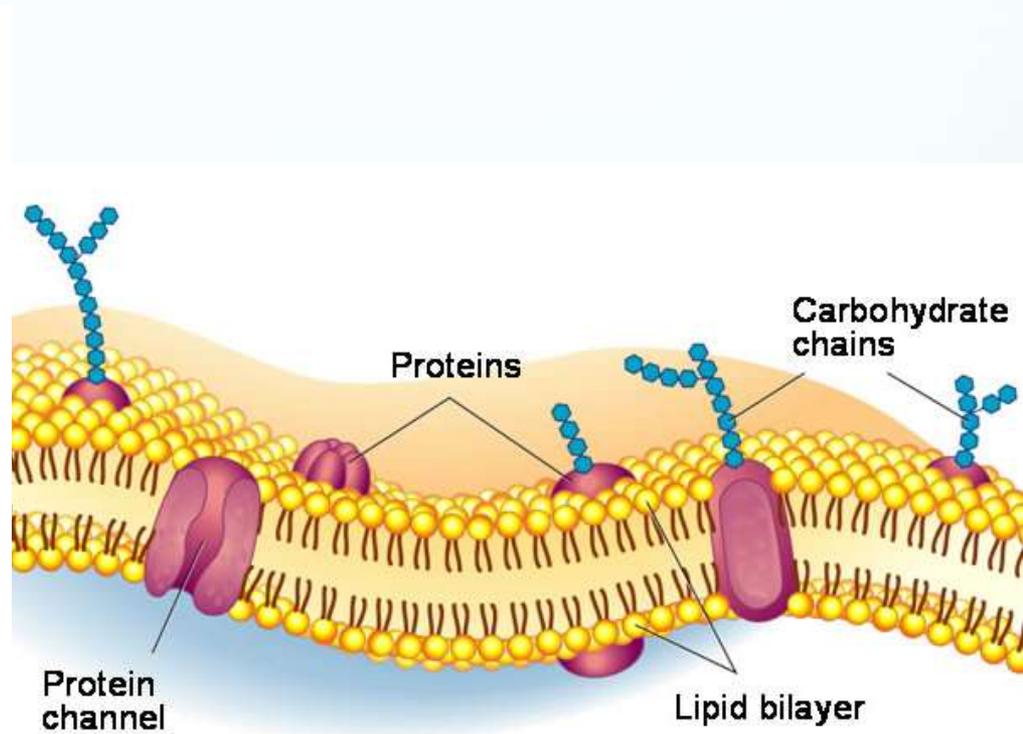
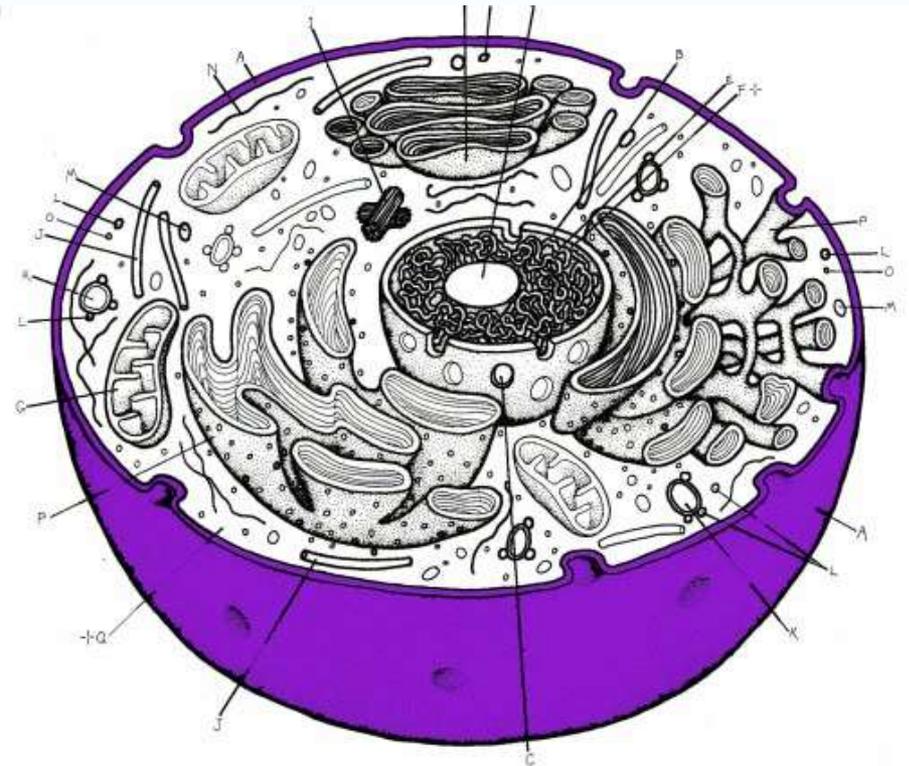
Understand that all organisms are composed of cells that carry on the many functions need to sustain life.

# Cell Theory

1. All living things are composed of one or more cells.
2. Cells are the basic unit of structure and function of any organism.
3. All cells come from pre-existing cells.
4. The activity of an organism as a whole depends on the total activity of all its cells.

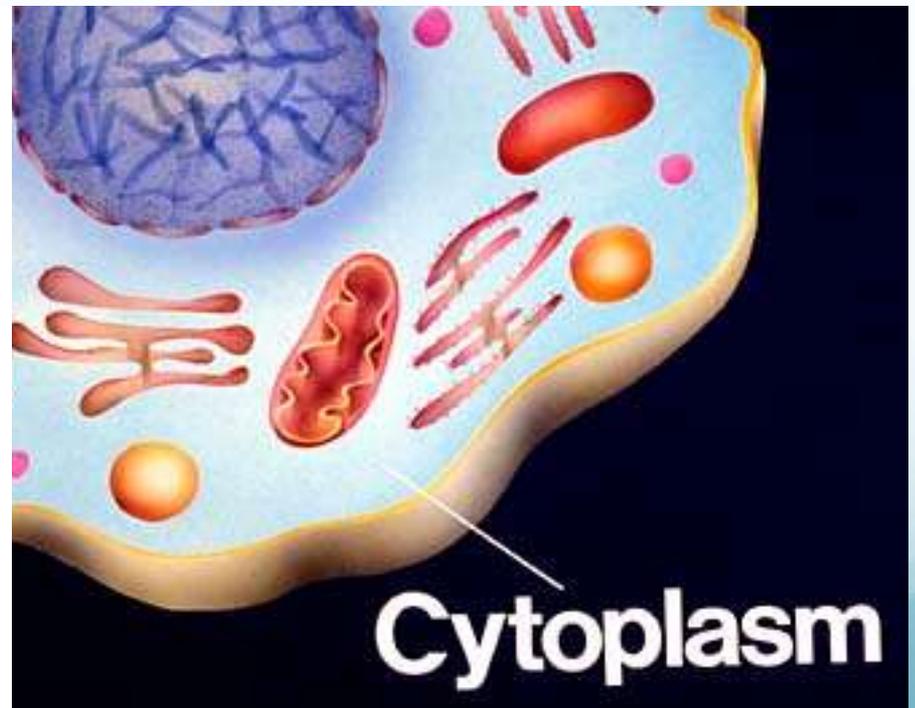
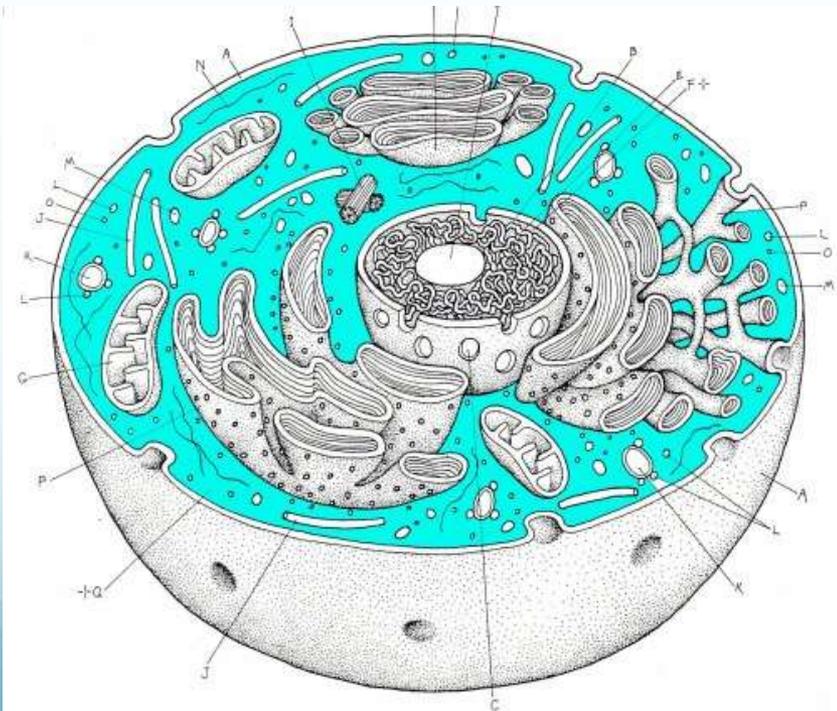
# Cell Membrane

- A living structure that surrounds a cell and allows certain materials in and out.



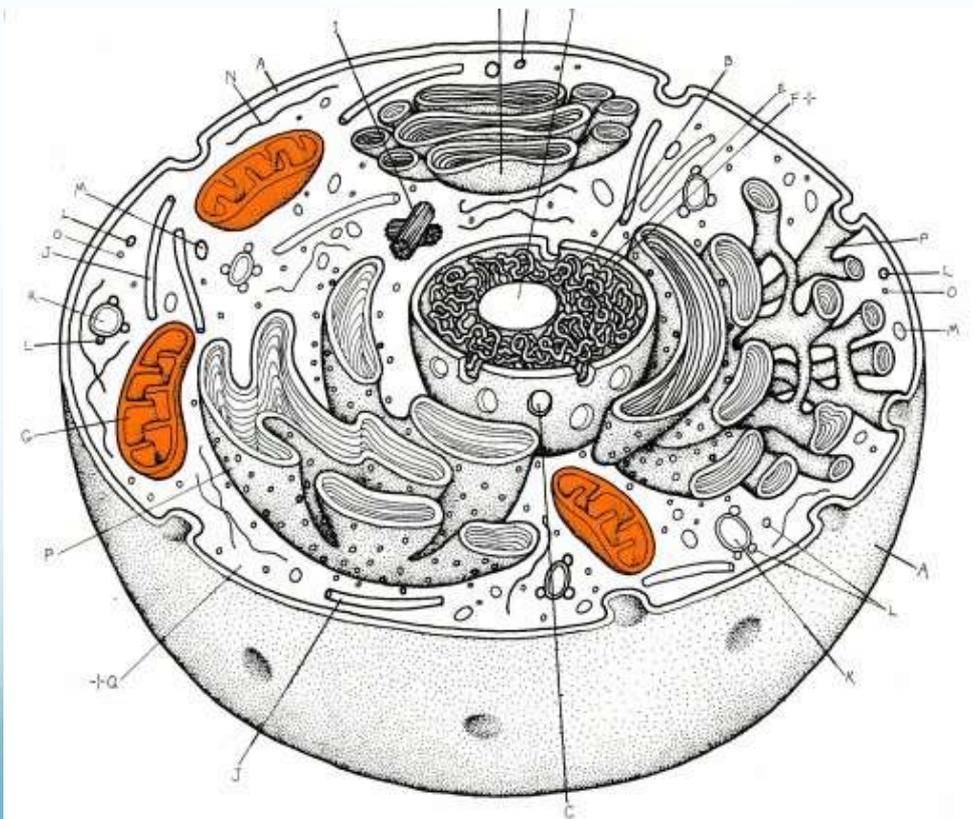
# Cytoplasm

- A fluid-like material within a cell that supports the internal structure of the cell.

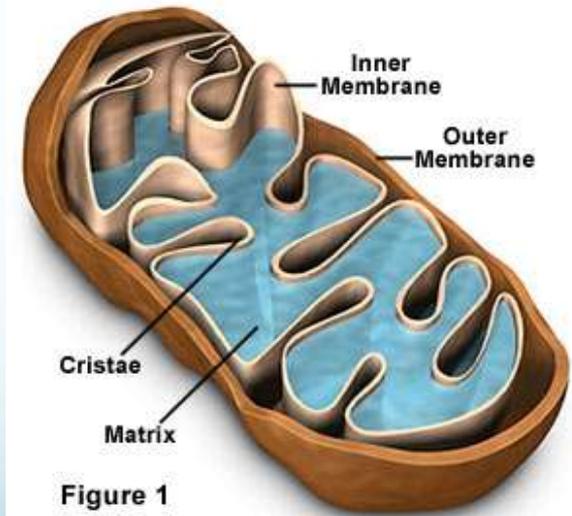


# Mitochondria

- The location of energy production, converting nutrients and oxygen into useable energy.

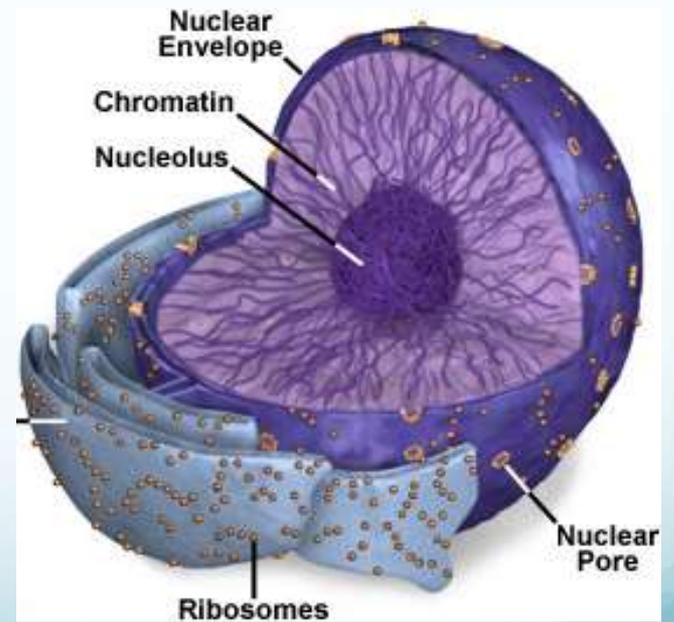
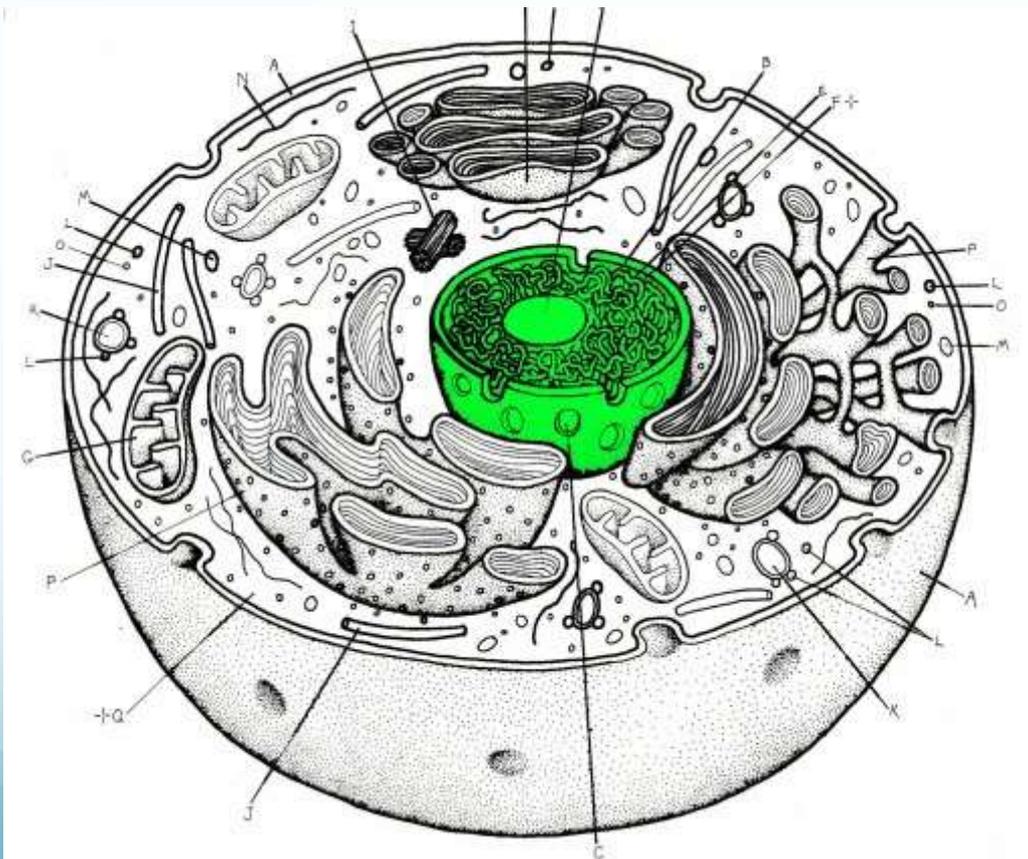


**Mitochondria Inner Structure**



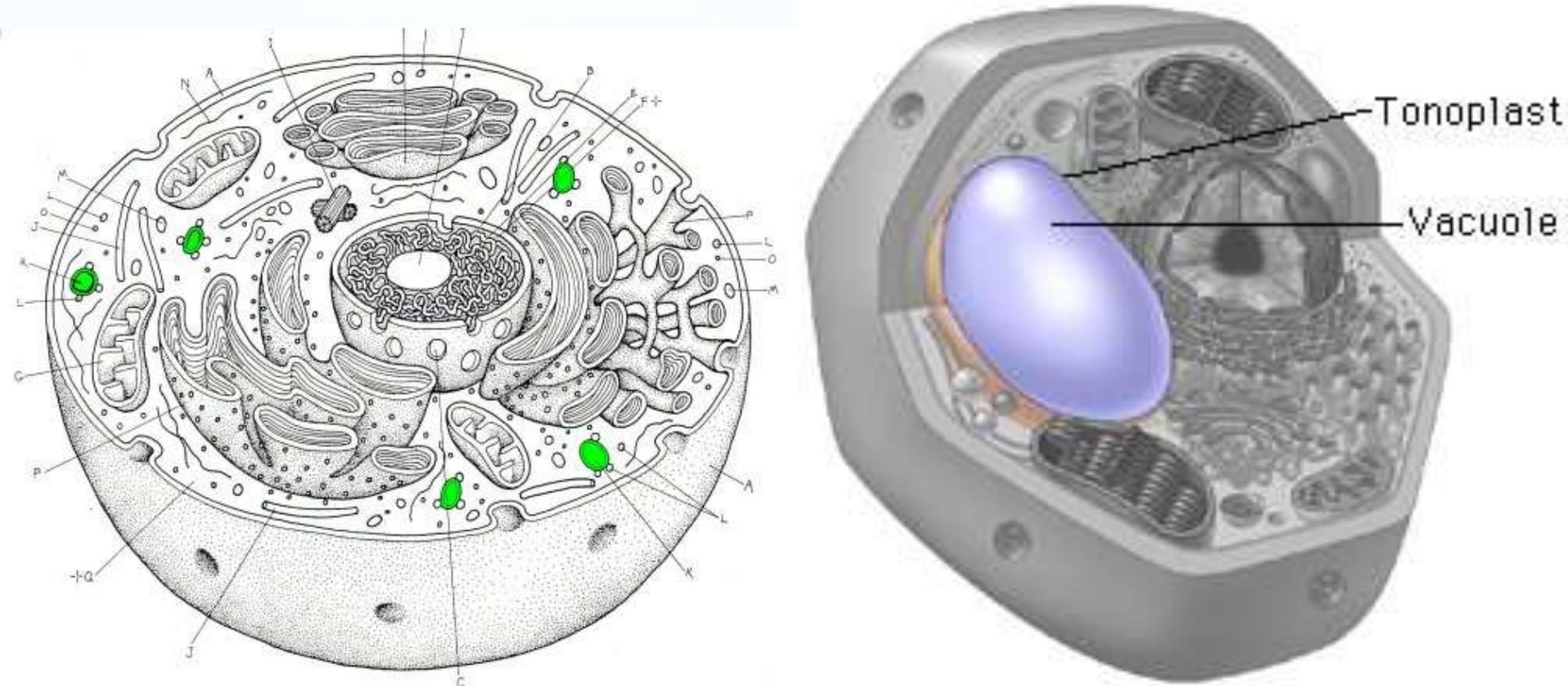
# Nucleus

- The control center of the cell.



# Vacuoles

- Storage structures for water, minerals, nutrients, and wastes.



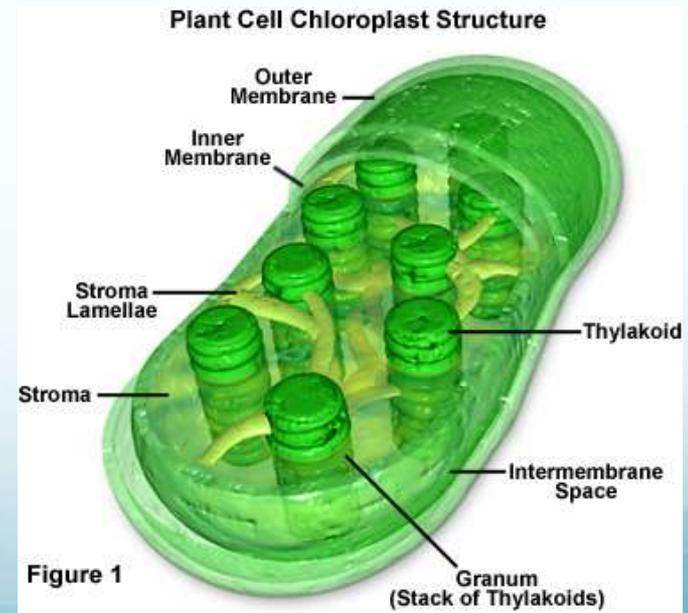
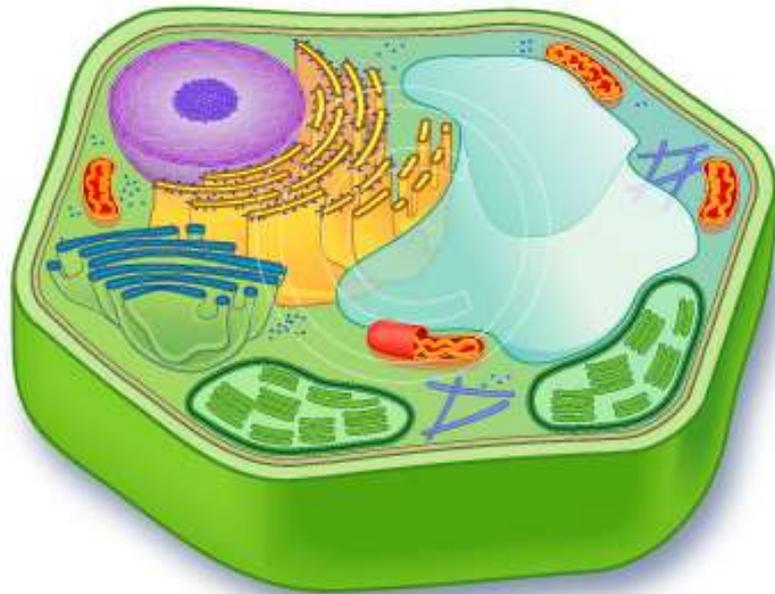
# Cell Wall

- Found in the plant cell only.
- The non-living cellulose structure that surrounds a cell and provides support.



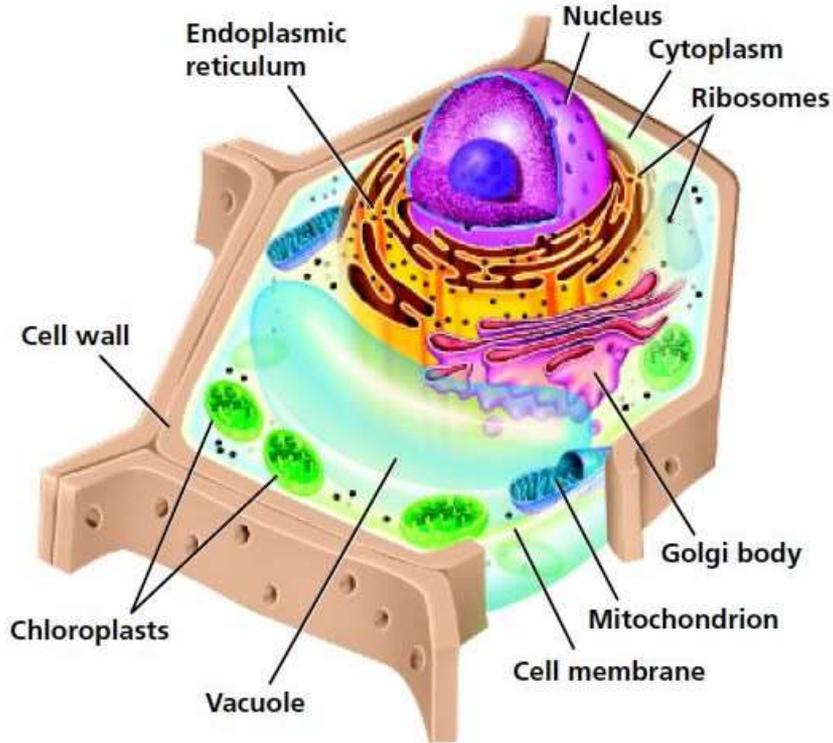
# Chloroplasts

- Found in the plant cell only.
- Contains chlorophyll, structures that convert light energy into useable chemical energy.

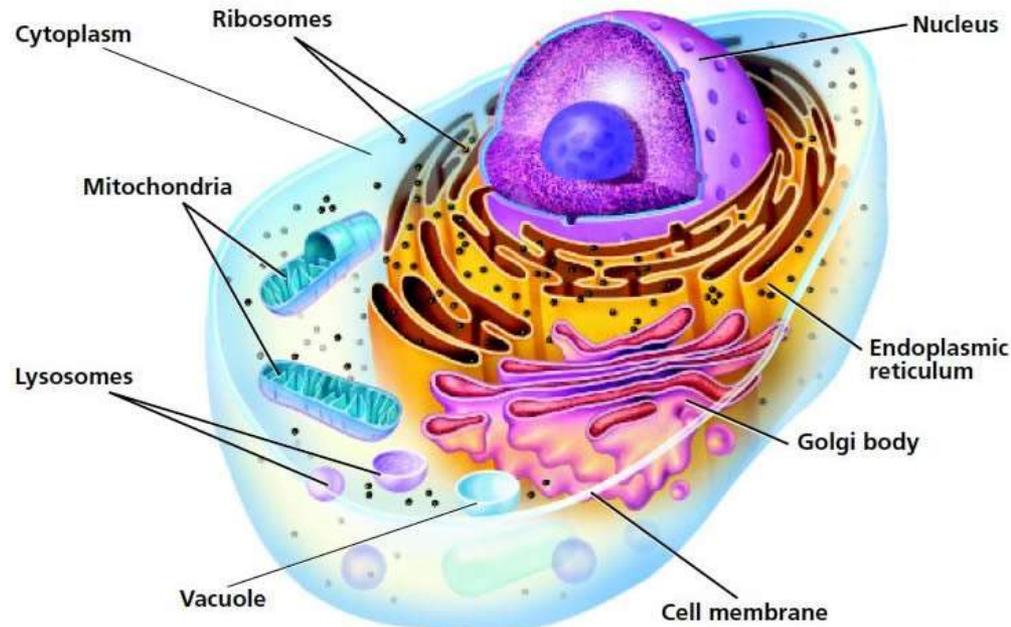


# Comparison

## Plant Cells



## Animal Cells



# Comparison

- Both have mitochondria, a cell membrane, cytoplasm, and a nucleus.

## Plant Cells

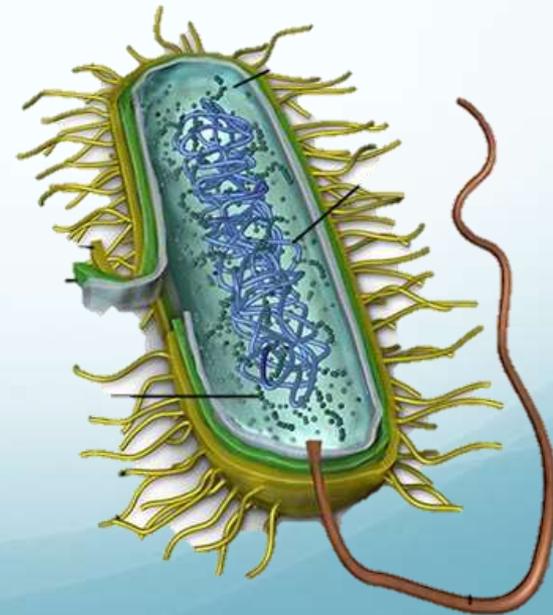
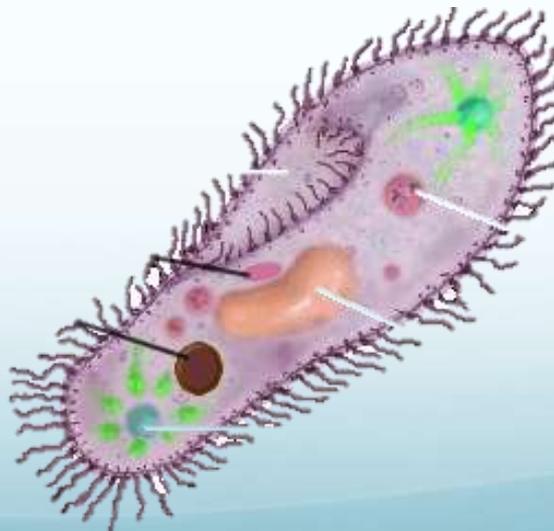
- Thick outer walls that provide support.
- Large vacuoles for water and mineral storage.
- Chloroplasts for food production.

## Animal Cells

- Thin, flexible membrane.
- Many small vacuoles.
- No Chloroplasts.

# Single-Cellular Organisms

- Their body is made up of just one cell.
- Ex. Amoeba, Paramecium, and Euglena.
- Invisible to the naked eye.



# Multi-Cellular Organisms

- Made up of more than one cell.
- All of the cells coordinate to regulate various functions.



# Single- vs. Multi- Cellular

## Unicellular and Multicellular Organisms

**Unicellular**  
(single celled)

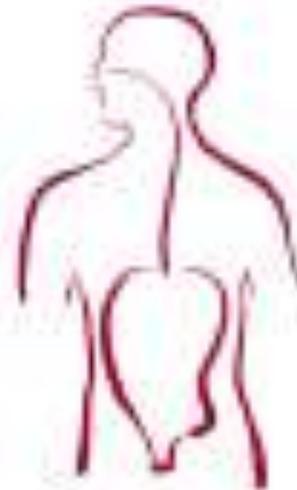


amoeba



paramecium

**Multicellular**  
(many celled)



human



tree

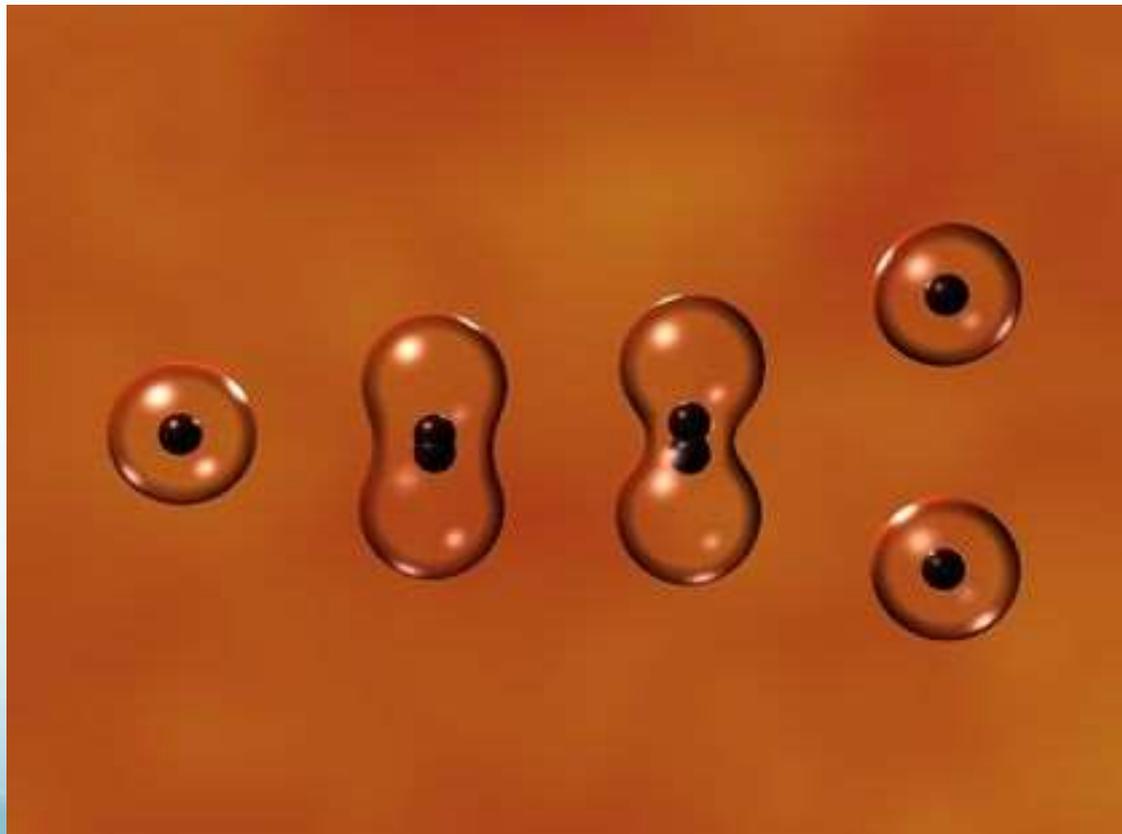
# Chemical Energy

- Cells convert energy from food for the production of molecules necessary for life.



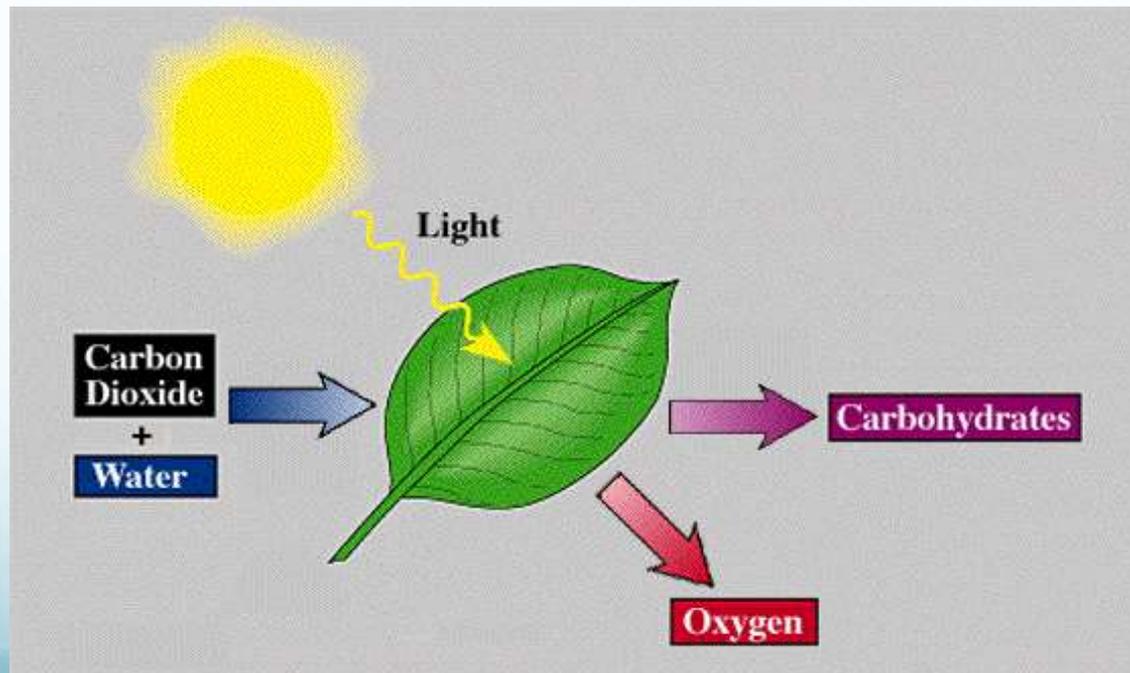
# Chemical Energy

- This energy is used for all life processes including cell growth and cell division.



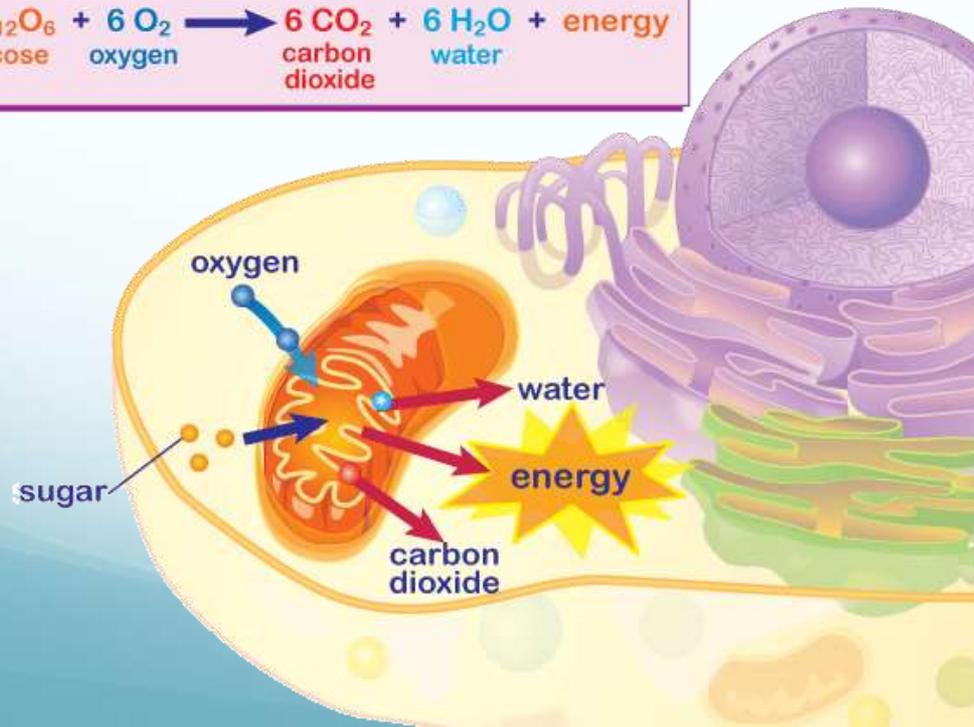
# Photosynthesis

- Green chlorophyll in plants take sunlight to convert carbon dioxide and water into food (carbon chains).
- This reaction also produces oxygen as a by-product.

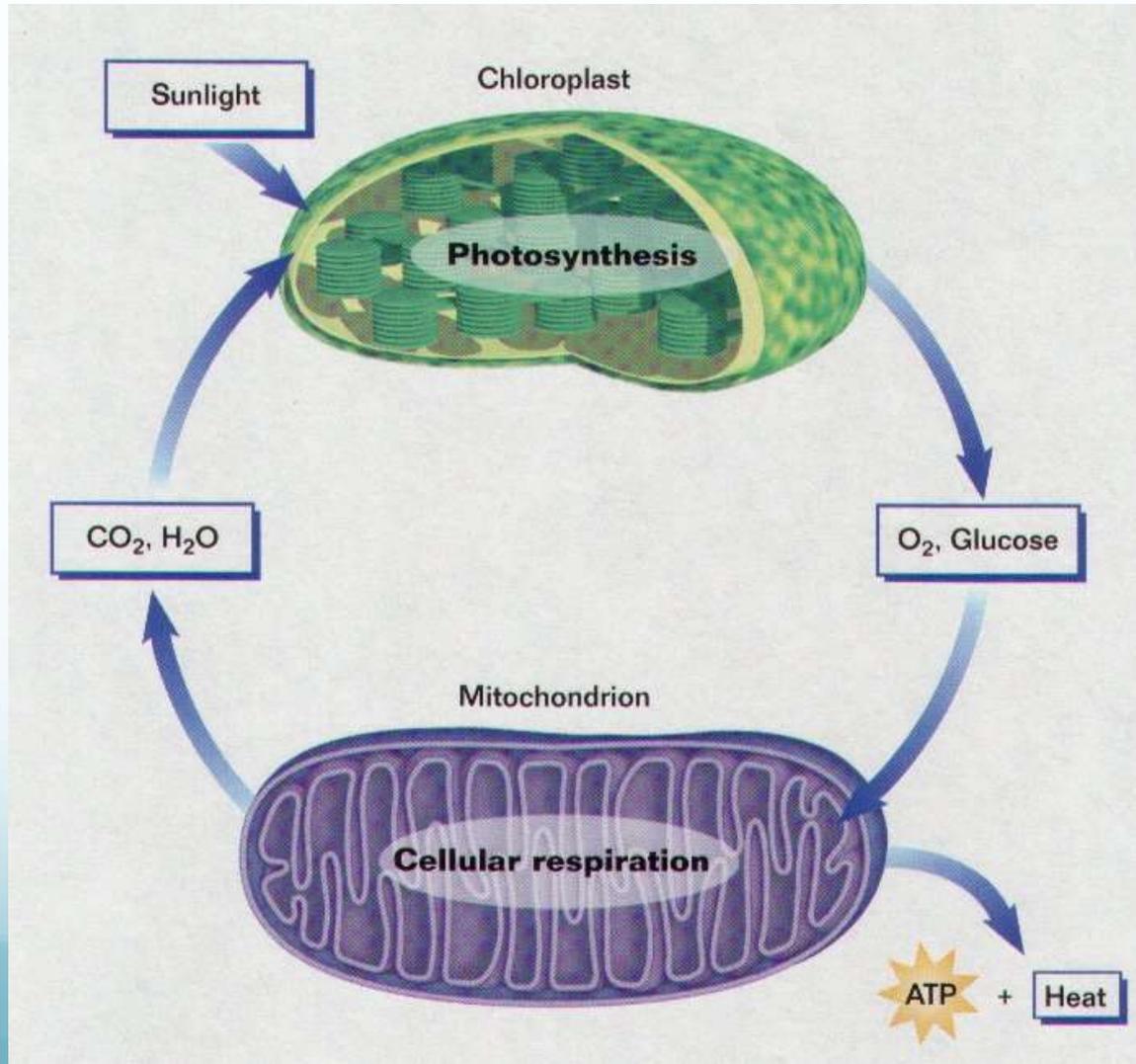


# Cellular Respiration

- Animal cells take the carbon chains from food, and oxygen to create energy (ATP).
- This reaction also produces water, and carbon dioxide as a by-product.

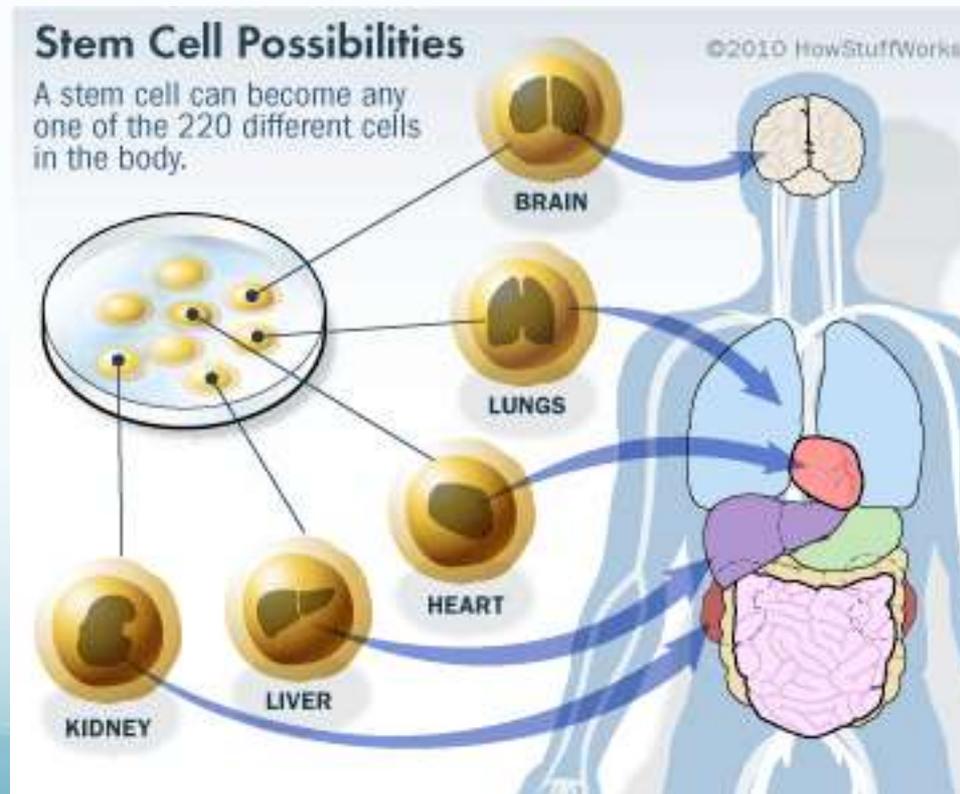


# Chemical Energy



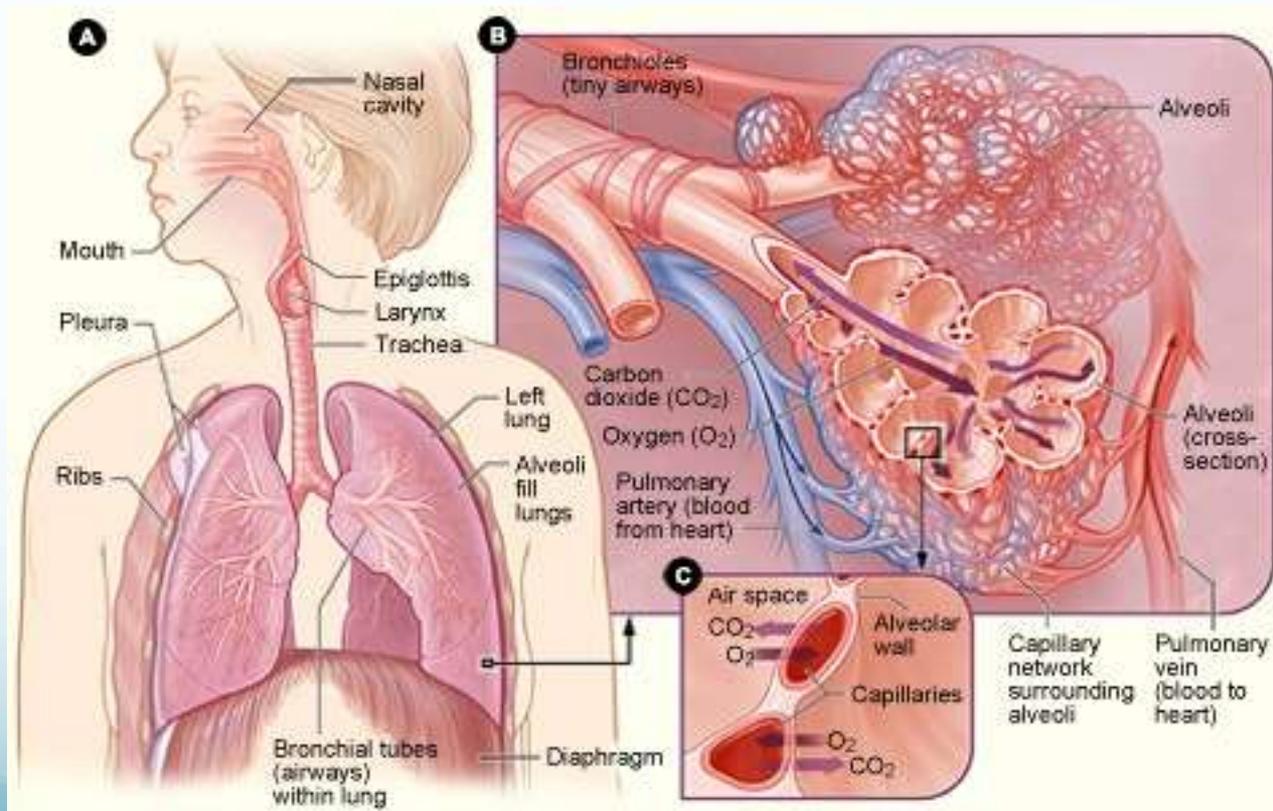
# Cell Specialization

- Specialization is needed because all cells in a complex organism do not have access to the external environment.



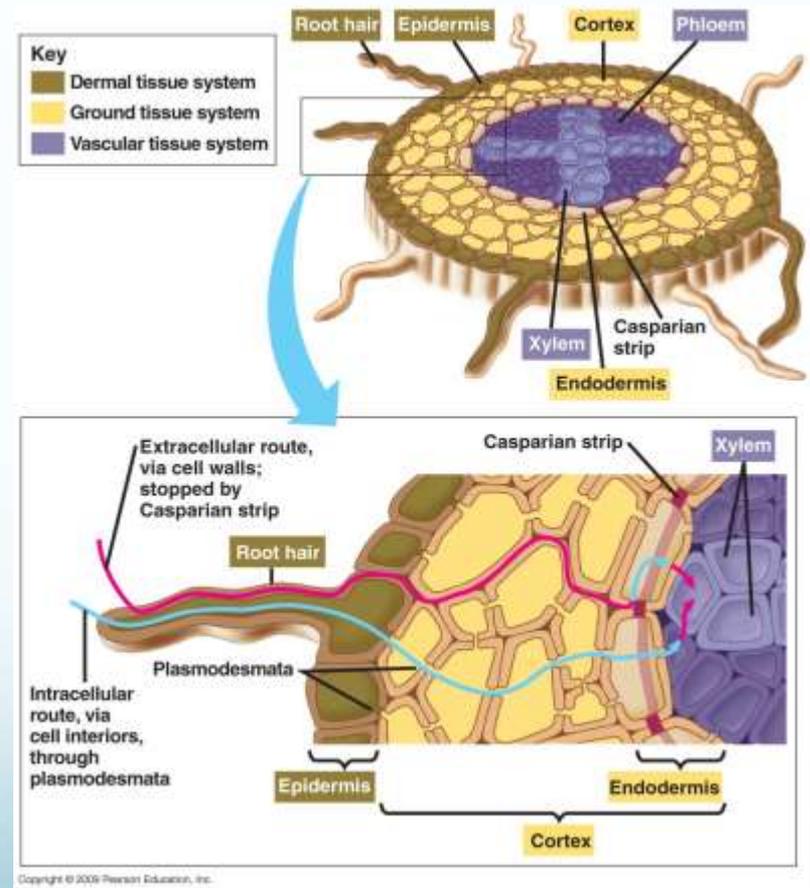
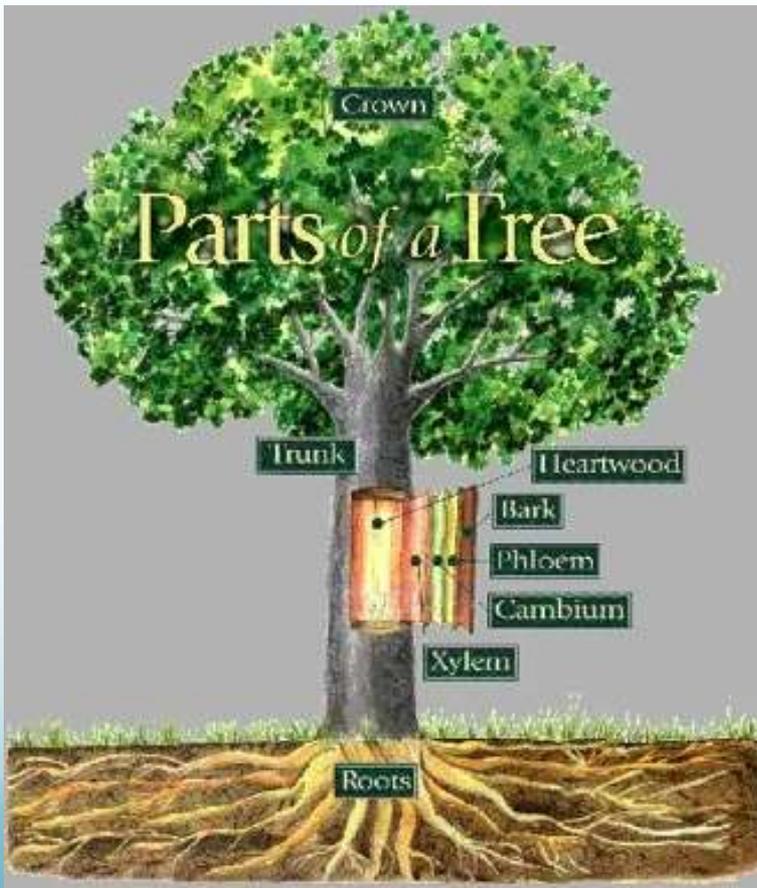
# Delivery and Removal

- All cells need to receive nutrients and oxygen and get rid of wastes.



# Plant Cells

- Examples include xylem cells in plants.



# Plant Cells



# Animal Cells

- Examples include blood, nerve, and muscle cells.

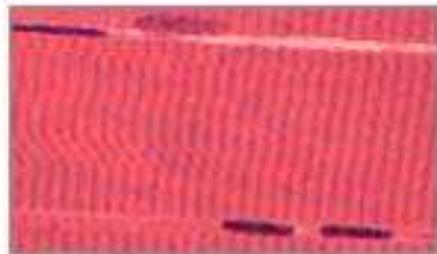
Four types of tissue



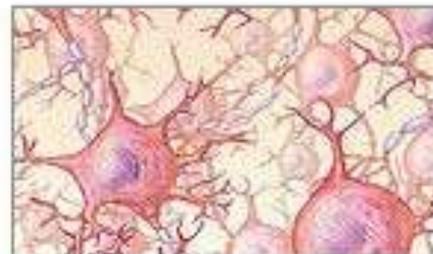
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue

# Key Concepts

- Cells are the fundamental units of life (and differentiate between plant and animal cells).
- Distinguish between single-cellular and multi-cellular organisms.
- Cells convert energy from food for life processes including cell growth and cell division.
- Recognize that specialized cells in multi-cellular organisms perform specialized functions.

# Lab – Structure & Function

