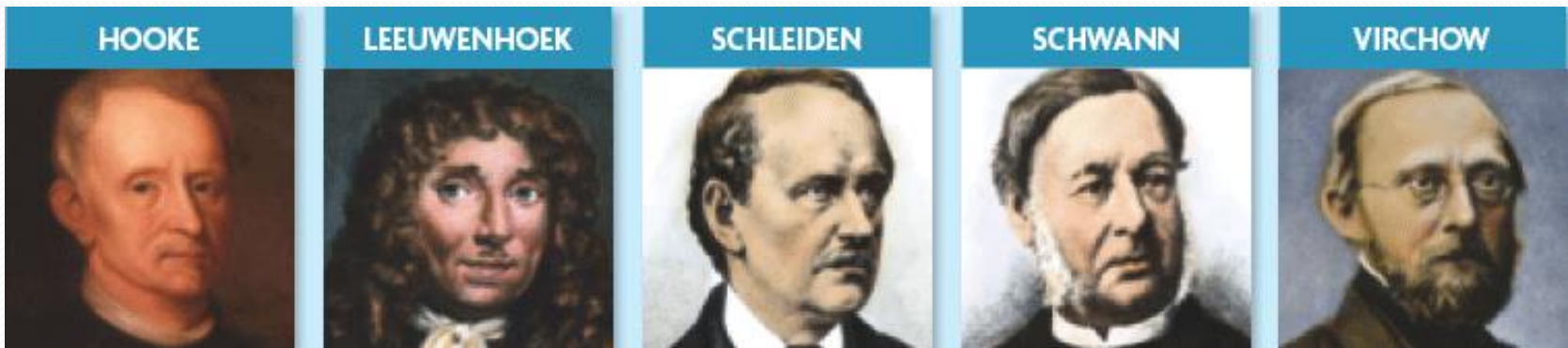


Unit 2 - Cells

Chapter 3

The Cell Theory

- Many scientists contributed to the cell theory.
 - The cell theory grew out of the work of many scientists and improvements in the microscope.



- The cell theory is a unifying concept in biological sciences

The Cell Theory

- A cell is the basic unit of life
 - All living things are composed of cells
- As microscopes improved, more information was determined about cells:
 - Year 1838
 - All plants are made of cells
 - Year 1839
 - All animals are made of cells
 - Year 1855
 - Cells could only come from preexisting cells

The Cell Theory

- The Cell Theory has 3 parts:
 1. All living things are composed of cells.
 2. Cells are the basic units of structure and functions in living things.
 3. New cells are produced from existing cells.

The Cell Theory

- Let's compare a prokaryotic cell to a eukaryotic cell
 - Prokaryote
 - Lacks a nucleus
 - Eukaryote
 - Has a nucleus

Prokaryote

Eukaryote

**Smaller &
Simpler**

**Genetic Material
NOT in Nucleus**

Bacteria

Able to Move

**Grow & Respond to
Reproduce Environment**

**Have Genetic
Information
(DNA/RNA)**

**Larger &
More Complex**

**Genetic Material
IN Nucleus**

**Plants, Animals,
Fungi, & Protists**

Cell Organelles

- Cells have an internal structure.
 - The cytoskeleton has many functions.
 - supports and shapes cell
 - helps position and transport organelles
 - provides strength
 - assists in cell division
 - aids in cell movement



Cell Organelles

The organelles in an animal cell are:

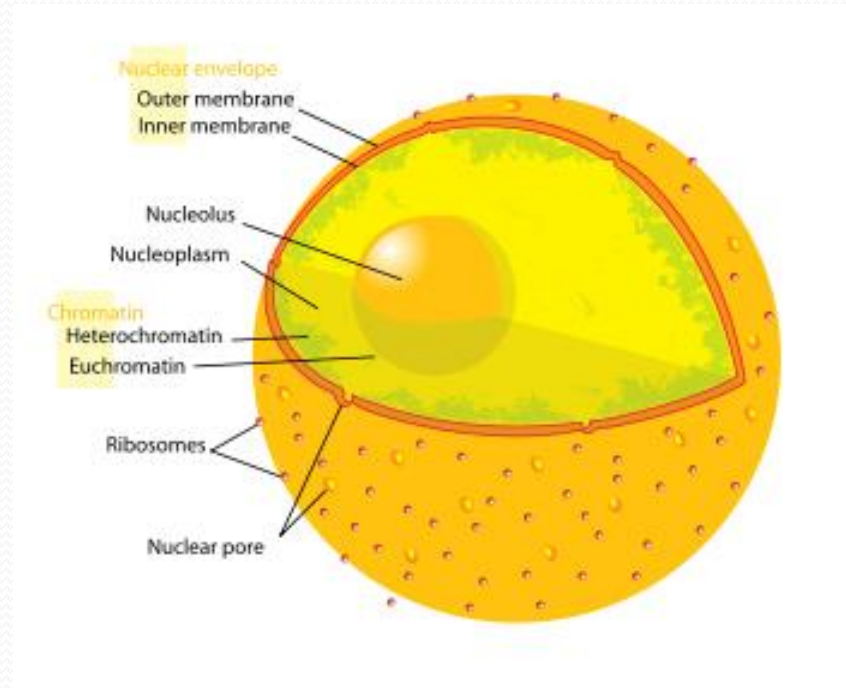
- Centrioles
- Vacuole
- Nucleus
- Nucleolus
- Nuclear Membrane
- Mitochondria
- Cell Membrane
- Cytoplasm
- Lysosome
- Golgi Body/Apparatus
- Endoplasmic Reticulum
 - Rough
 - Smooth
- Ribosome

Cell Organelles

- The most important is the **nucleus**
 - Contains nearly all the cell's DNA
 - Makes proteins and other important molecules
 - Control center of the cell
- Inside the nucleus is the **nucleolus**
 - Region in the nucleus in which the assembly of proteins begins
- Around the nucleus is the **nuclear membrane/envelope**
 - Protects the nucleus and regulate what enters & leaves

Cell Organelles

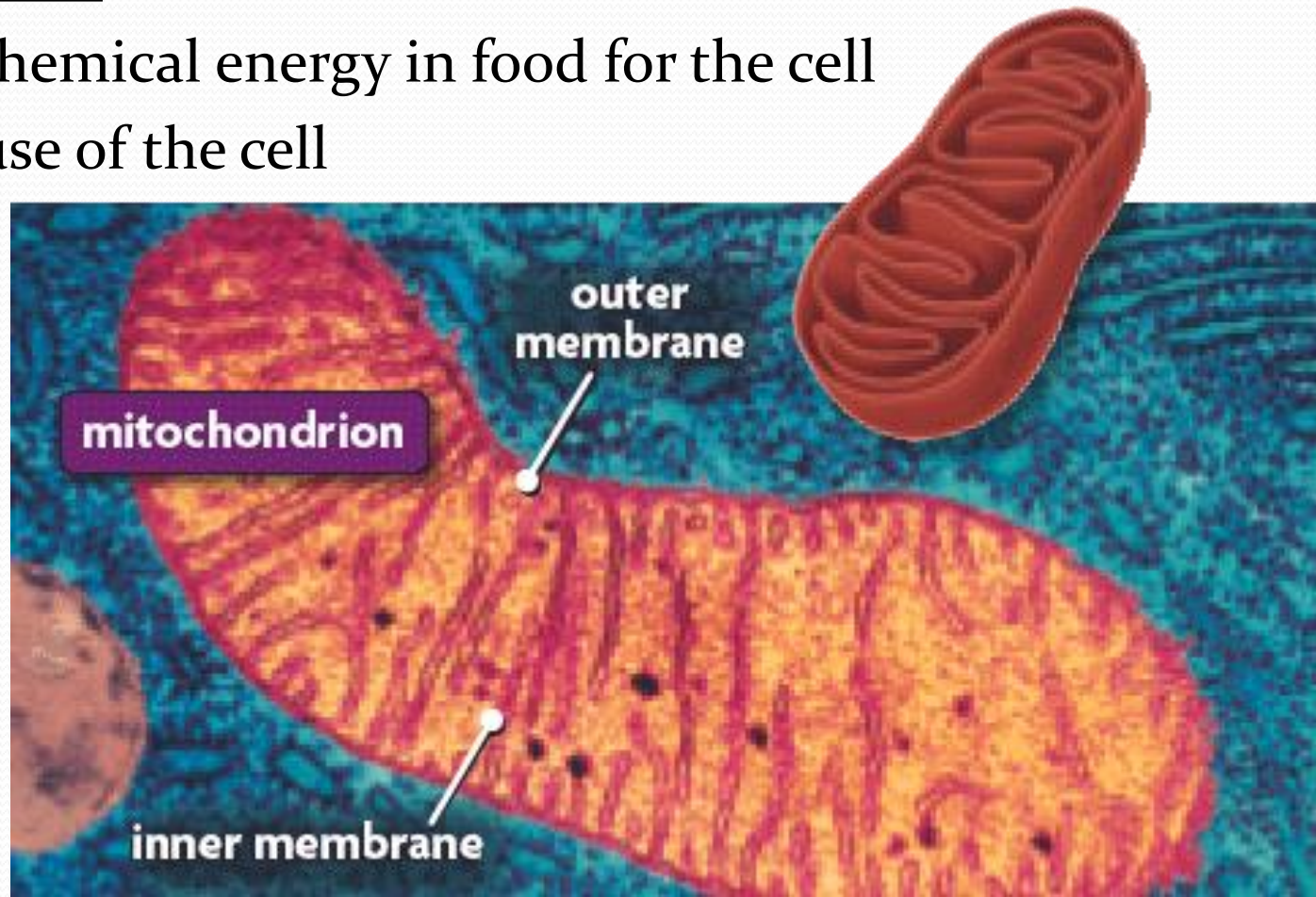
- Nucleus
- Nuclear Membrane
- Nucleolus



Cell Organelles

- Mitochondria

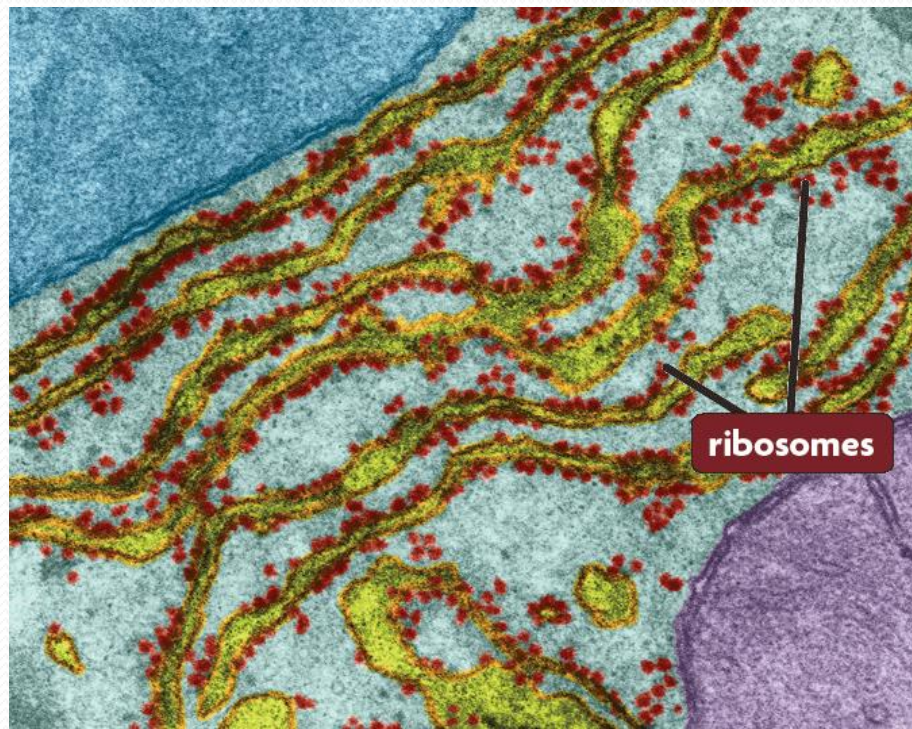
- Convert chemical energy in food for the cell
- Powerhouse of the cell



Cell Organelles

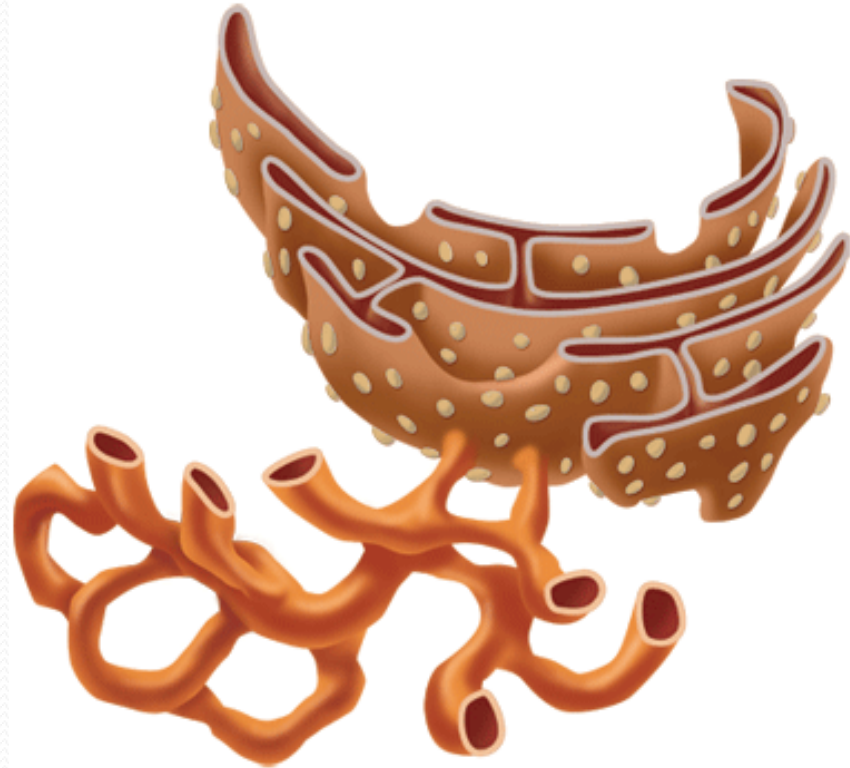
- **Ribosomes**

- Link amino acids to form proteins
- Can be found in the cytoplasm or on rough endoplasmic reticulum



Cell Organelles

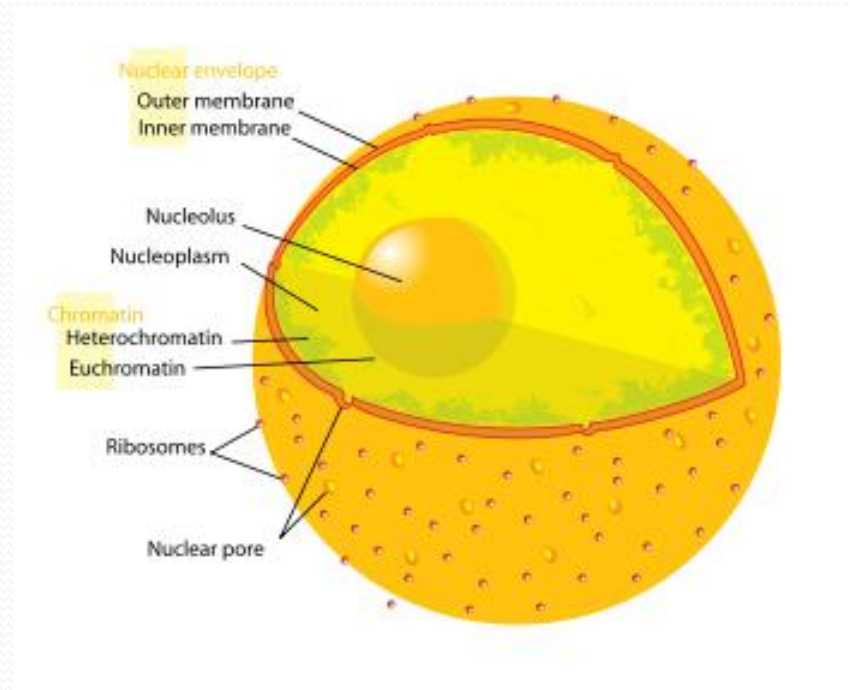
- Endoplasmic Reticulum (ER)
 - 2 types
 - Rough ER
 - making and releasing protein into the cells
 - Smooth ER
 - synthesis of membrane lipids and detoxification of drugs



Cell Organelles

- Cytoplasm

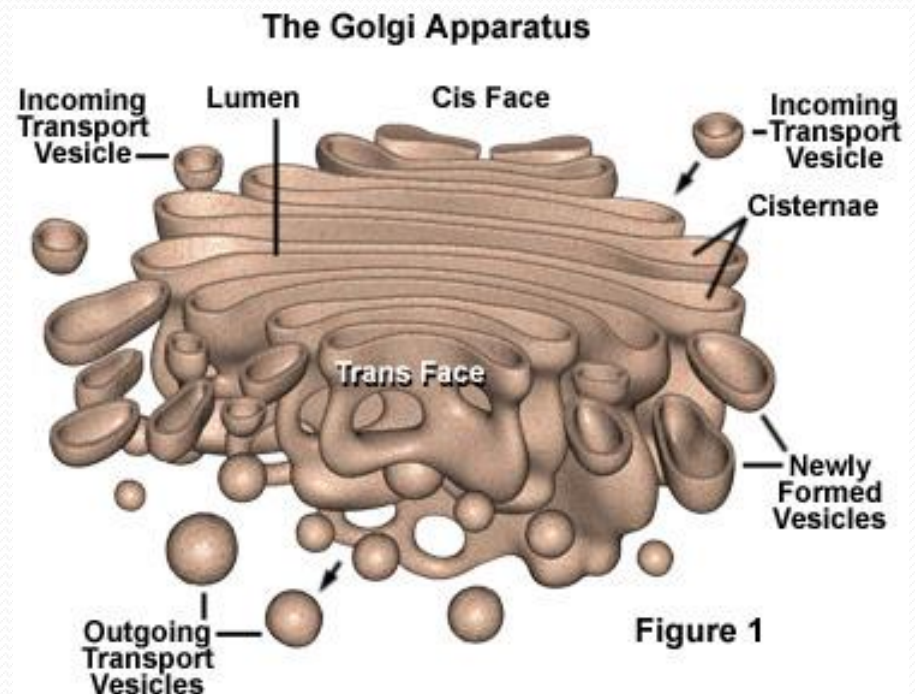
- Holds all the material inside of the cell
- Jell-O like



Cell Organelles

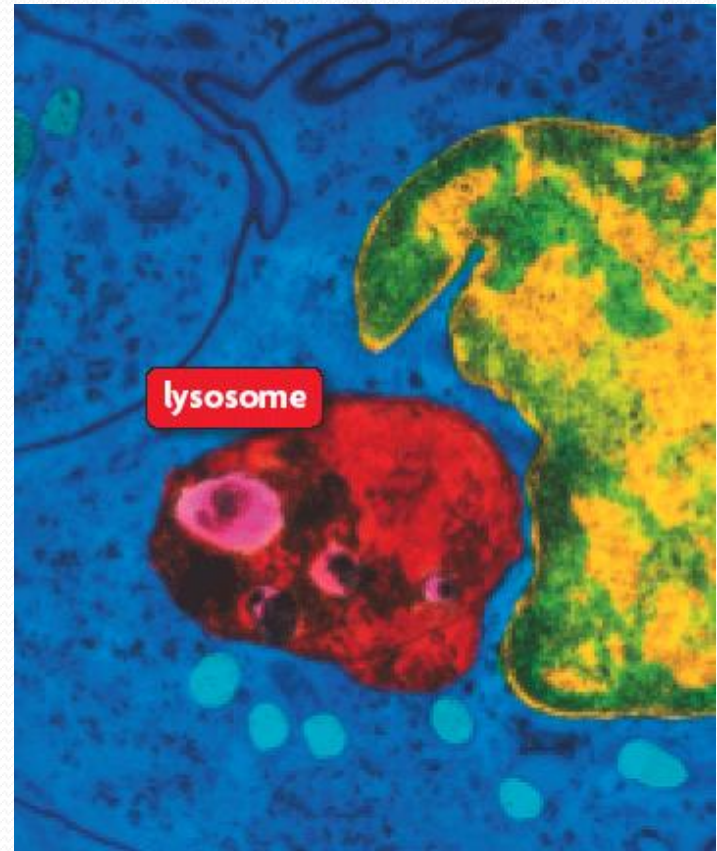
- Golgi Body/Apparatus

- Modify, sort, and package proteins and other materials from ER for storage in cell or secretion



Cell Organelles

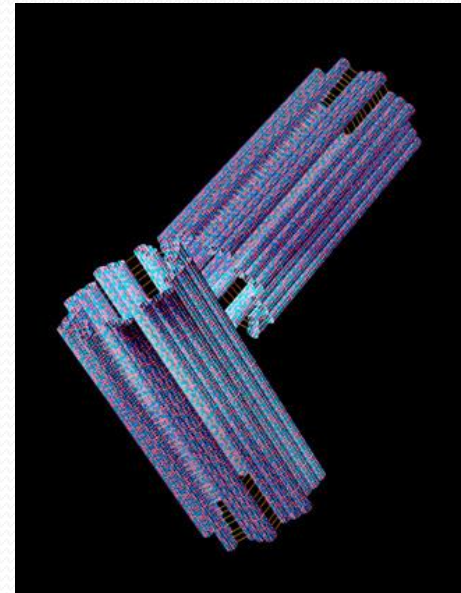
- Lysosomes
 - Breakdown of lipids, carbohydrates & proteins into smaller molecules



Cell Organelles

- **Centrioles**

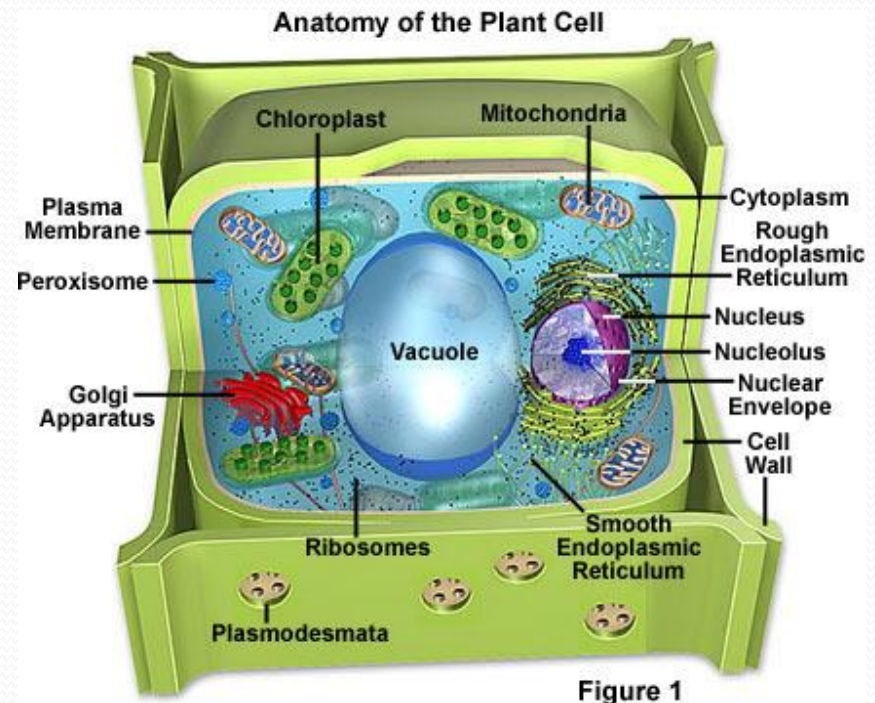
- Helps with cell division in animal cell
 - Primarily DNA
- Form cilia & flagella (for cell movement)
- Animal Cell only



Cell Organelles

- Cell Membrane

- Separates the contents of a cell with the outside stuff

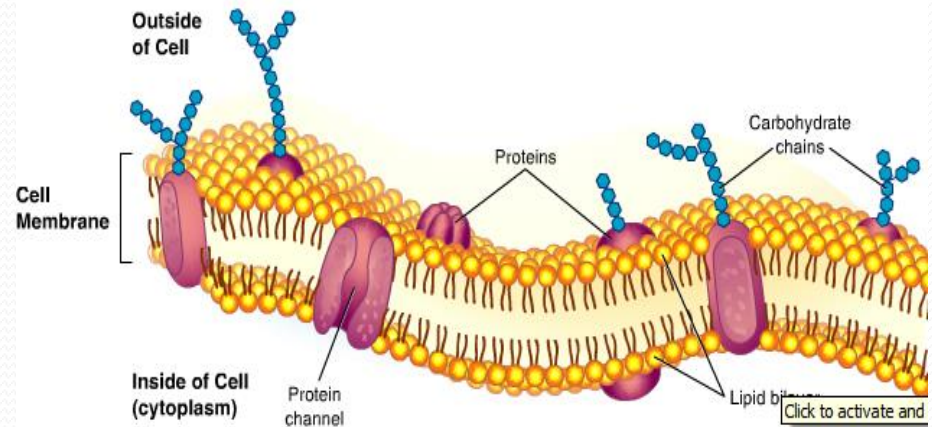


Cell Membrane

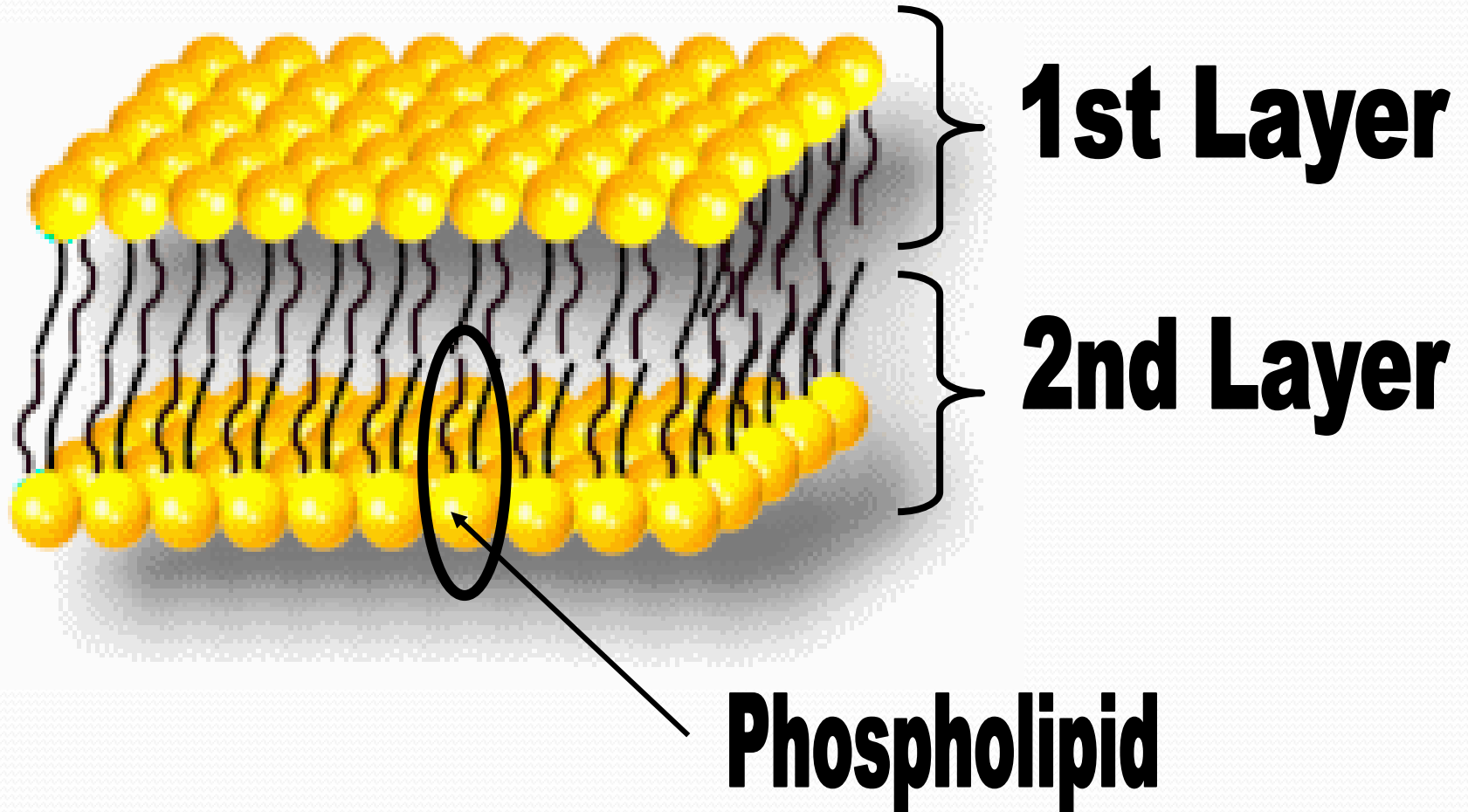
- Functions:
 - Controls what enters and leaves the cell
 - Provides support and protection
- What makes up the cell membrane?
 - Double layered sheet → Lipid Bilayer
 - 2 Layers of Lipids
 - Gives the cell membrane a flexible structure that forms a strong barrier between the cell and its surroundings

Cell Membrane

- Cell Membranes contain:
 - Lipids
 - Proteins
 - Carbohydrates

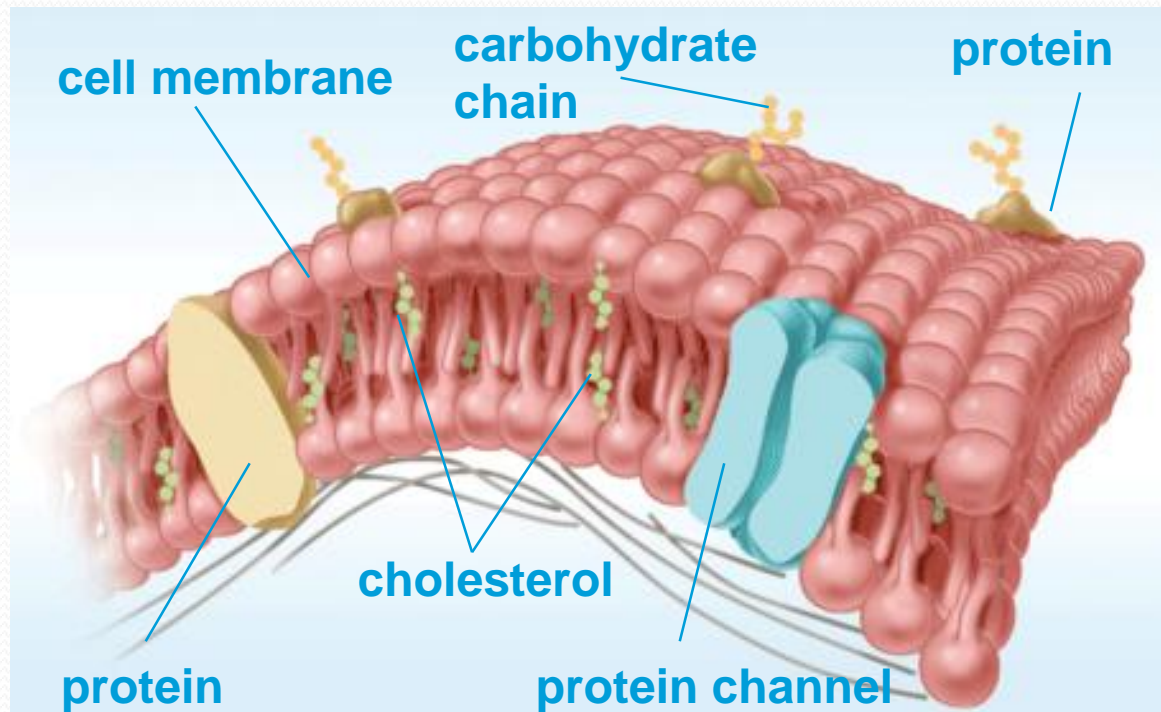


Cell Membrane



Cell Membrane

- The cell membrane is made of a phospholipid bilayer.
- There are other molecules embedded in the membrane.
- The fluid mosaic model describes the membrane.



Cell Membrane

- Diffusion through cell boundaries
 - Every living thing exists in a liquid environment that it needs to live
 - Cytoplasm
 - Contains a solution of many different substances in water
 - Solute
 - Substances dissolved in the solution