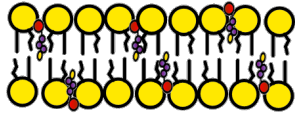
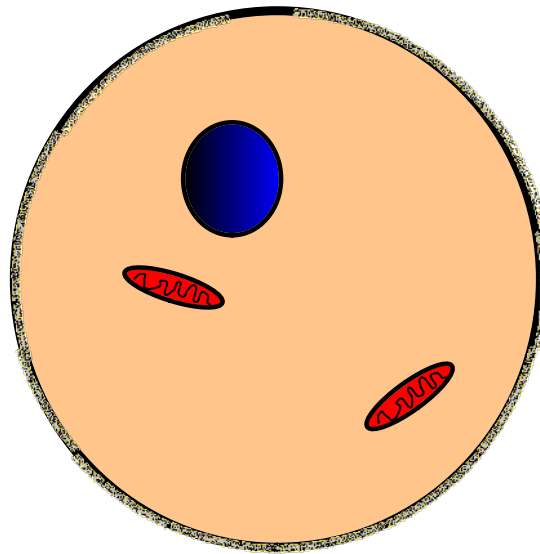


Structure of the plasma membrane



Phospholipid bilayer



3.3 Cell Membrane

- I. Cell membranes are composed of *two* phospholipid molecule layers.

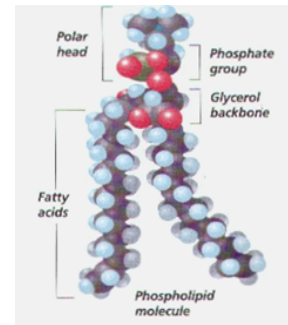
The cell membrane has *two major functions*.

It forms a *boundary between inside and outside* of the cell

controls passage of materials

A. Components of a phospholipid molecule:

- a. *one glycerol molecule*
- b. *two fatty acid chains*
- c. *one charged phosphate group*

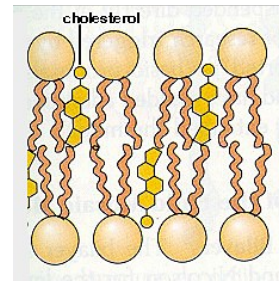


B. Structure of the Plasma Membrane

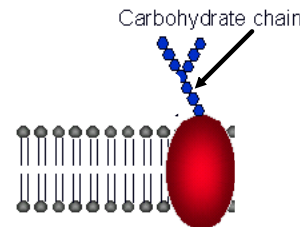
1. *Phospholipid bilayer* = formation and function of plasma membrane.
 - a. Phospholipid molecule
 1. *polar head* - attracts water and other polar molecules (*hydrophilic*)
 2. *nonpolar tail* - repels water and polar molecules (*hydrophobic*)
i.e. sugar, proteins, ions, cell wastes

C. Cholesterol = helps *prevent the tails* of the phospholipids from *sticking together*.

*Some cholesterol in your diet is necessary for health of cells.



D. *Carbohydrates* attach to the membrane proteins to tag or *identify the cell type*



II. Cells must control materials

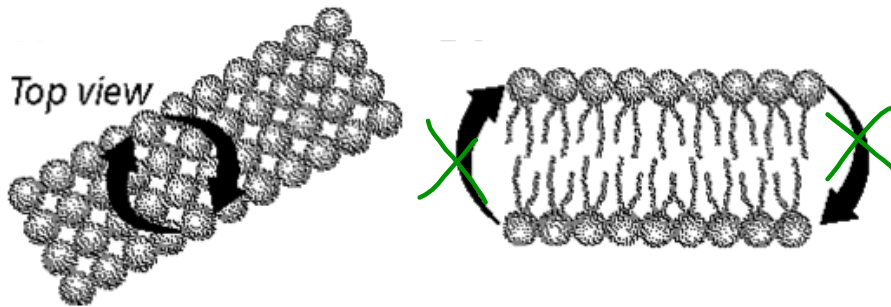
A. Plasma membrane = *flexible boundary* between the cell and its environment.

*Allows materials (glucose, amino acids, lipids) to *enter* cell regardless of environment.

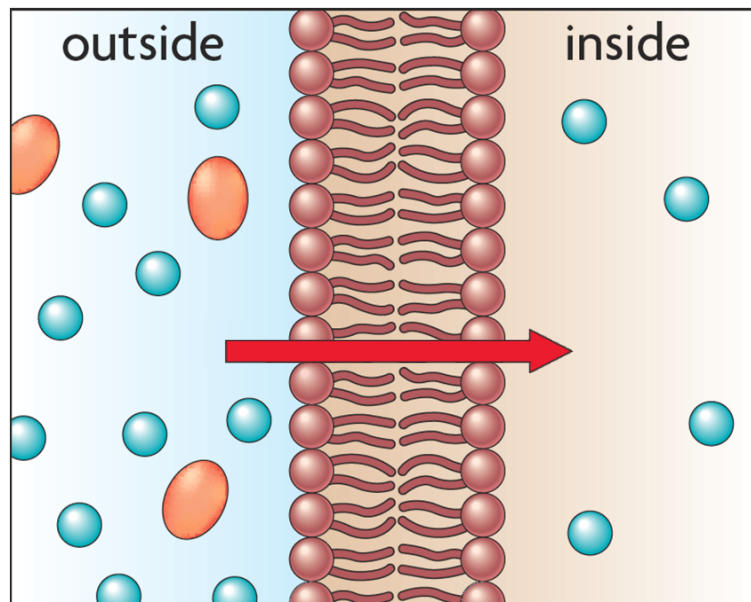
*Wastes and excess materials are *removed* to maintain *homeostasis*.

1. **Selective permeability** = *allows some materials* into the cell while keeping others out.

** Because of this quality the plasma membrane is in two layers with the *nonpolar tails* facing inward towards each other.



2. The interaction between the heads and tails make the phospholipid bilayer *fluid* (flexible). Often referred to as a "*fluid mosaic model*".



B. Chemical signals are transmitted across the cell membrane.

Receptors bind with ligands and change shape.

A **receptor** is *protein that detects a signal* molecule & *performs an action in response*.

A **ligand** is a small molecule, that forms a *bond with a biomolecule* to serve a biological purpose.

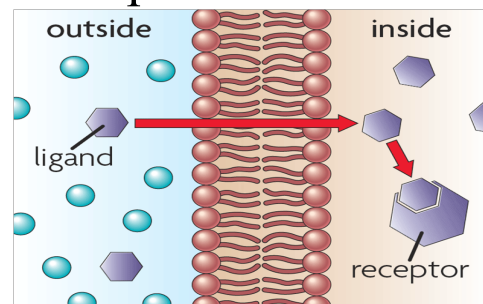
In protein-ligand binding, the ligand is usually a signal-triggering molecule, binding to a site on a target protein.

Hormones are chemicals that work this way.

- There are two types of receptors.

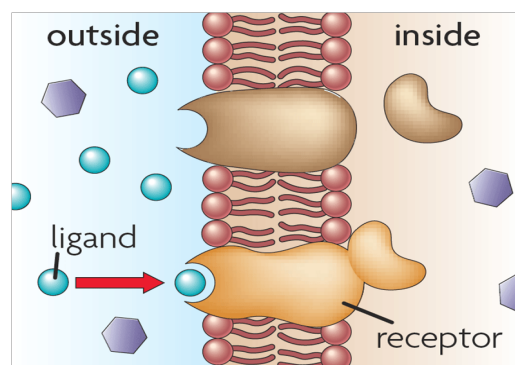
1. *intracellular* receptor

ex: *kidney cells*



2. *membrane* receptor

ex: *CO₂ in red blood cells*



C. Other proteins embedded within phospholipid membrane, enable cells to communicate.

Types =

1. **Transport** - Pass Through the Membrane
 - a. doughnut-shaped channel through bilayer.
 - b. **Polar** molecules can pass through.
 - c. Channels are **specific**.

2. **Markers** Identify Cells
 - a. Exterior arms with **carbohydrate** chain extensions.
 - b. Can also convey information as in **immune** system.

