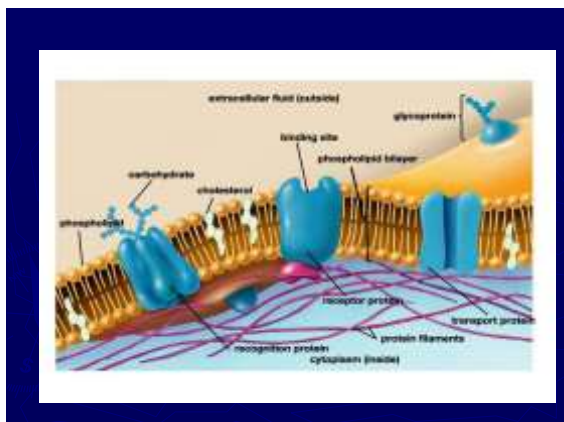
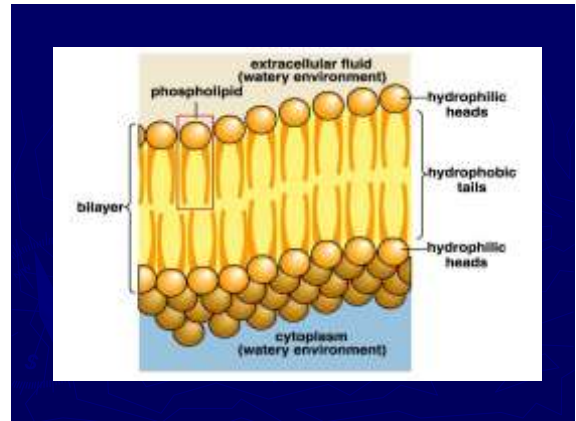
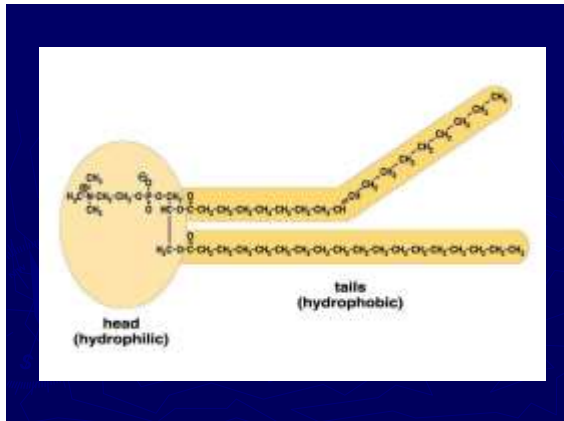


## The Cell Membrane

### Active and Passive Transport

## Cell Membrane

- ▶ Phospholipid bilayer: hydrophilic heads and hydrophobic tails
- ▶ Semi-permeability
- ▶ Transport proteins (passive transport channels)
- ▶ Ion pumps (active transport pumps)
- ▶ Receptor proteins (neurons, hormones, immune system)
- ▶ Carbohydrate chains (identification cards)



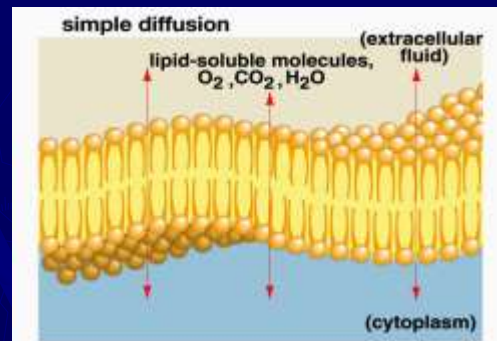
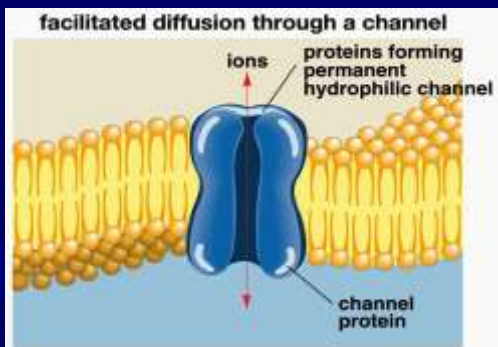
- ▶ What is passive transport? What are the three types of passive transport?

## Passive Transport

- ▶ **Diffusion** - process by which molecules tend to move from an area where they are more concentrated to an area where they are less concentrated

## Passive Transport

- ▶ **In Passive Transport - Molecules move down the concentration gradient (no energy required)**
- ▶ **1) simple diffusion** - molecules are small enough and soluble can pass directly through the lipid bilayer
- ▶ **2) facilitated diffusion** – need transport proteins (molecules are either too large or can't pass through the lipid bilayer themselves)
- ▶ **3) osmosis** – molecules can't pass through lipid bilayer at all, but water can (movement of water)
- ▶ Depends on molecule size, lipid solubility, and concentration gradient



## Passive Diffusion

- ▶ <http://www.youtube.com/watch?v=JShwXBWGMvY>
- ▶ <http://www.youtube.com/watch?v=s0p1ztrbXPY>

## Solutions

- ▶ A mixture of solid particles (solute) and liquid (solvent)
- ▶ Most common solvent is water
- ▶ Cells are surrounded by solutions
- ▶ Three types: isotonic, hypotonic, and hypertonic solutions

## Isotonic Solutions

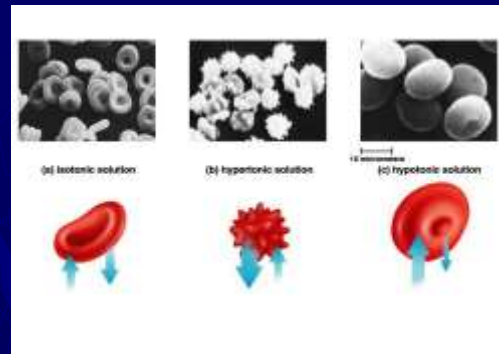
- ▶ Particles are equal inside and outside of the cell
- ▶ Water molecules are equal inside and outside of the cell

## Hypotonic Solutions

- ▶ There are more particles inside than outside
- ▶ There is more water outside the cell
- ▶ Water will move INTO the cell

## Hypertonic Solutions

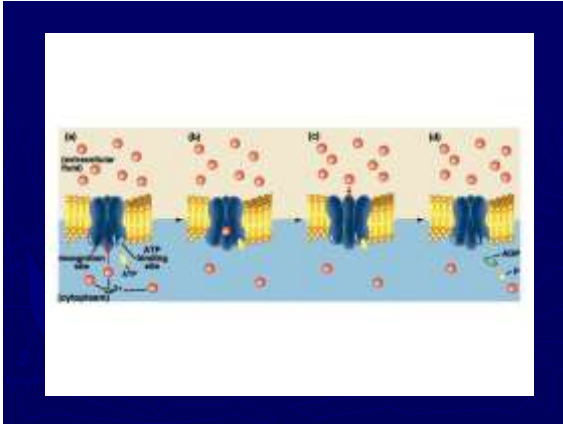
- ▶ There are more particles outside
- ▶ There is more water inside
- ▶ Water will move OUT OF the cell



## Active Transport

- ▶ Molecules move against the concentration gradient (FROM HIGH TO LOW CONCENTRATION!!!)
- ▶ Requires energy
- ▶ ATP IS THE ENERGY USED FOR ACTIVE TRANSPORT!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
- ▶ **1. Solute Pumps** ( $\text{Na}^+$ - $\text{K}^+$ -ATPase pump)
- ▶ **2. Bulk Transport**

- ▶  $\text{Na}^+$ - $\text{K}^+$ -ATPase pump
- ▶ [https://mail.xavierhs.org/exchange/UngerJ/Inbox/No%20Subject-748.EML/07\\_16ActiveTransport\\_A.swf/C58EA28C-18C0-4a97-9AF2-036E93DDAFB3/07\\_16ActiveTransport\\_A.swf?attach=1](https://mail.xavierhs.org/exchange/UngerJ/Inbox/No%20Subject-748.EML/07_16ActiveTransport_A.swf/C58EA28C-18C0-4a97-9AF2-036E93DDAFB3/07_16ActiveTransport_A.swf?attach=1)



## Transport Across The Membrane

- ▶ **Endocytosis** (pinocytosis, phagocytosis): phagocytes (macrophages)- molecules are coming into cells
- ▶ **Exocytosis**: release of proteins, hormones, neurotransmitters- release of proteins, hormones, neurotransmitters
- ▶ <http://www.youtube.com/watch?v=4gLtk8Yc1Zc&NR=1>

