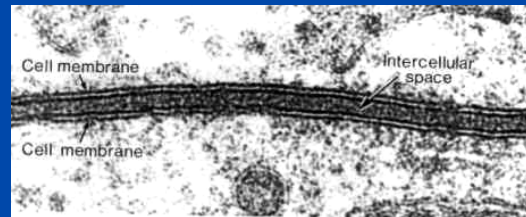
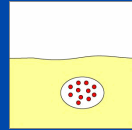


Food Color!

- 1) What initially happened when the food coloring was added to the water?
- 2) Over time, what happened to the food coloring in the water? Be descriptive in your response.
- 3) What were the similarities and differences between the movements of food coloring in the different temperature of water?
- 4) Based on your observations, explain what was going on. Why do you think this occurred?

Cellular Transport Notes

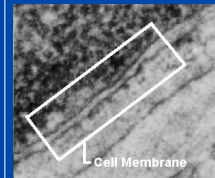


Vocab!

- **Solute**- substance dissolved into another substance.
- **Solvent**- the substance a solute is dissolved in.
- **Solution**- is the mixture of a solute and a solvent

About Cell Membranes

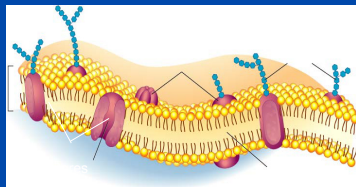
1. All cells have a cell membrane
2. **Functions:**
 - a. Controls what enters and exits the cell to maintain an internal balance called **homeostasis**
 - b. Provides protection and support for the cell



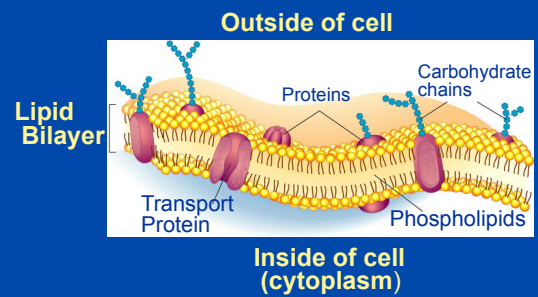
TEM picture of a real cell membrane.

About Cell Membranes (continued)

- 4. Cell membranes have pores (holes) in it
 - a. **Selectively permeable:** Allows some molecules in and keeps other molecules out
 - b. The structure helps it be selective!



Structure of the Cell Membrane



Go to Section.

Types of Cellular Transport

- Passive Transport**
 cell doesn't use energy
 - Diffusion
 - Facilitated Diffusion
 - Osmosis
- Active Transport**
 cell does use energy
 - Protein Pumps
 - Endocytosis
 - Exocytosis

Passive Transport

- cell **uses no energy**
- molecules move randomly
- Molecules spread out **from an area of high concentration to an area of low concentration.**
- (High → Low)
- Three types:

3 Types of Passive Transport

- Diffusion**
- Facilitative Diffusion** – diffusion with the help of transport proteins
- Osmosis** – diffusion of water

Passive Transport: 1. Diffusion

Simple Diffusion
• Cell diffusion

- Diffusion:** movement of particles from an area of **high** concentration to an area of **low** concentration.

- A concentration **gradient** occurs when there is a difference in the # of molecules in different areas
- Diffusion ends when all areas are in **equilibrium**.
- Note:** molecules will still move around but stay spread out.

http://bob.wilsons.edu/borg/Free.html

Passive Transport: 2. Facilitated Diffusion

Facilitated diffusion

- Facilitated diffusion:** diffusion of specific particles through **carrier proteins** found in the membrane
 - Carrier Proteins are **specific** – they “select” only certain molecules to cross the membrane
 - Transports larger or charged molecules

Facilitated diffusion (Channel Protein) Diffusion (Lipid Bilayer)

Carrier Protein

Passive Transport: 2. Facilitated Diffusion

Cellular Transport From a **High** Concentration

↓

Cell Membrane

↓

Low Concentration

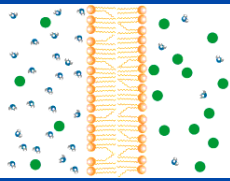
Through a → Carrier Protein

- Channel Proteins animations

Go to Section.

Passive Transport: 3. Osmosis


- **3. Osmosis:** diffusion of *water* through a selectively permeable membrane
- Water moves from high to low concentrations



- Water moves freely through pores.
- Cell membrane won't let the solute (green) **diffuse** into the cell.

Isotonic Solution

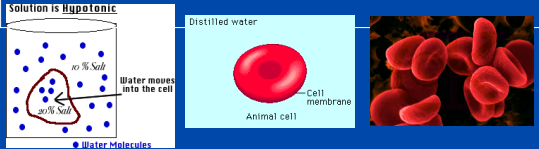
Isotonic: The concentration of solutes in the solution is equal to the concentration of solutes inside the cell.



Result: Water moves equally in both directions and the cell remains same size! (**Dynamic Equilibrium**)

Hypotonic Solution


Hypotonic: -Occurs when the concentration of solute particles outside the cell is **lower** than inside the cell (higher concentration of water inside the cell than outside)



Result: Water moves from the solution to inside the cell. Cell Swells and bursts open (**cytolysis**)!

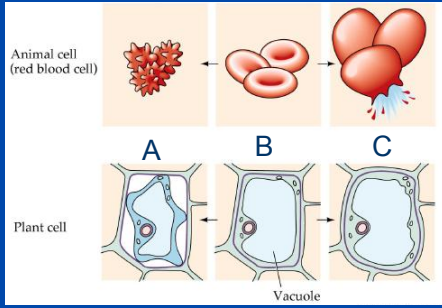
Hypertonic Solution

Hypertonic: - Occurs when the concentration of solutes outside the cell is greater than inside the cell (lower concentration of water inside the cell than outside)



Result: Water moves from inside the cell into the solution: Cell shrinks (**Plasmolysis**)!

What type of solution are these cells in?



Hypertonic Isotonic Hypotonic

Osmosis animation

VI. ACTIVE TRANSPORT

- Movement of molecules from an area of **LOW** to an area of **HIGH** concentration. (opposite of passive transport!)
- **REQUIRES cellular energy!**
- Moves large, complex molecules such as proteins across the cell membrane

VI. ACTIVE TRANSPORT

- Large molecules, food, or fluid droplets are packaged in membrane-bound sacs called **vesicles**

2 types of active transport:

- Endocytosis** = process by which a cell surrounds and takes in material from its environment
 - Used by **ameba** to feed & **white blood cells** to kill bacteria

2 Types of Endocytosis

(pump and endo animations)

- Phagocytosis** – “to devour” – **Solid particles** are ingested into the cell.
- Pinocytosis** – “cell drinking” – **liquids** taken into the cell.

Endocytosis

2 types of active transport:

- Exocytosis** = expels materials out of the cell, reverse of endocytosis
 - used to remove **wastes, mucus, & cell products**
 - Proteins** made by ribosomes in a cell are packaged into transport vesicles by the Golgi Apparatus
 - Transport vesicles fuse with the cell membrane and then the proteins are secreted out of the cell (ex: insulin)

Exocytosis

