**Cell Transport Notes**

All cells have a cell membrane

The cell membrane controls what enters and exits the cell to maintain an internal balance called **homeostasis**. Cell membranes have pores (holes) in it.

Cell membranes are **selectively permeable**: Allows some molecules in and keeps other molecules out. The structure of cell membranes helps it be selective!

Types of Cellular Transport

A. **Passive Transport** : cell doesn’t use ATP energy; High to Low concentration

1.Diffusion

2.Facilitated Diffusion

3.Osmosis

B. **Active Transport**: cell does use ATP energy; Low to High concentration (against the concentration gradient)

1.Protein Pumps

2.Endocytosis

3.Exocytosis

**A. 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:**

1.**Diffusion**: random movement of particles **from an area of high concentration to an area of low concentration**. (***High to Low*)**

Diffusion continues until all molecules are evenly spaced (**equilibrium** is reached)-***Note:*** molecules will still move around but stay spread out.

Example: Oxygen and carbon dioxide move in or out of the cell using diffusion.

2.**Osmosis**: diffusion of *water* through a selectively permeable membrane

Water moves from high to low concentrations.

**The three situations a cell can find itself ….**

***Hypotonic Solution***: The solution has a lower concentration of solutes (dissolved substance) and a higher concentration of water than inside the cell. **(Low solute; High water)**

Result: Water moves from the solution to inside the cell: Cell Swells and bursts open!

***Hypertonic Solution***: The solution has a higher concentration of solutes and a lower concentration of water than inside the cell. **(High solute; Low water)**

Result: Water moves from inside the cell into the solution: Cell shrinks

***Isotonic Solution***: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)

**3. Facilitated diffusion**: diffusion of specific particles **through transport proteins** found in the membrane

a.Transport Proteins are specific – they “select” only certain molecules to cross the membrane

Transports larger or charged molecules

**B. Active Transport**

cell **uses energy**

Movement **from an area of low concentration to an area of high concentration**

**(Low** 🡪 **High)** (against the concentration gradient)

**Three types:**

1. **Protein Pumps** -transport proteins that require energy to do work

Example: Sodium / Potassium Pumps are important in nerve responses.

2. **Endocytosis**: taking bulky material into a cell

•Uses energy

•Cell membrane in-folds around food particle

•“*cell eating*”

•forms food vacuole & digests food

•This is how white blood cells eat bacteria!

•Endocytosis: (Endo - means to bring in) Energy requiring process where a cell engulfs a particle.

**3. Exocytosis**: Forces material out of cell in bulk

•membrane surrounding the material fuses with cell membrane

•Cell changes shape – requires energy

•EX: Hormones or wastes released from cell

•Exocytosis: (Exo - means to take out) Cell releases particles. Uses energy.