

## **Lab 5 : Diffusion and osmosis**

### **Diffusion :**

is the movement of molecules from a higher to a lower concentration until equilibrium is achieved.

### **Osmosis :**

is the diffusion of water into and out of cells through a differentially permeable membrane .

### **Isotonic Solutions :**

The solute concentration is the same on both side of membrane therefore that is no gain or loss of water . (Tap water , normal saline 0.9% Na cl)

### **Hypotonic Solution :**

Transfers to a solution with a lower percentage of solute (more water ) than the cell. If a cell placed in a hypotonic solution water enter the cell; The not movement of water is from the outside to inside the cell. The solution cause cells to swell or burst (Turgor , Distilled water )

### **Hypertonic Solution :**

Transfers to the solutions that lead cells to Shrink or Shriveling That's due to a loss of water it transfers to a solutions with a higher percentage of solute (less water ) than these if the cell is placed in hypertonic solution water leaves the cell; the net movement of water is from the inside to the outside of cell. This solution cause cells to shrink (very saintly water).

## **Osmosis in animal cells and plant cells :**

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The arrows indicate the net movement of water in an isotonic solution , a cell neither gains nor loss water , in a hypotonic solution , a cell gains water and in a hypertonic solution , a cell loses water .

- 1- Water leaves the cell, if a cell is placed in a hypertonic solution .
- 2- water enters the cell, if a cell is placed in hypotonic solution .
- 3- in an isotonic solution , a cell neither gains nor loses water.

In a hypertonic solution , a cell loses water and the cytoplasm shrinks or shrivel plasmolysis.

## **The Cellular Transport :**

The movement through cell membranes consists the following Processes :

Processes	Characteristics	Energy source	Example
Simple diffusion	Tendency of molecules to move from regions of high concentration to regions of lower concentration	Molecular motion	-Respiratory Gases exchanged in lungs -Water
Facilitated diffusion	Diffusion of molecules through semipermeable membrane with the aid of membrane carries	Carrier energy and molecular motion	Glucose enters cell attached to carrier protein
Osmosis	Passive movement of water molecules through semipermeable membrane from regions of lower water concentration	Molecular motion	Water moves through cell membrane to maintain constant turgidity of cell
Filtration	Movement of molecules from regions of high pressure to regions of lower pressure as result of hydrostatic pressure	Blood Pressure	Wastes are removed from blood with kidneys
Active Transport	Carrier – mediated transport of solutes from regions of their low concentration to regions of their higher concentration (against their concentration gradient )	Cellular energy (ATP)	Glucose and amino-acids move through membranes
Endocytosis phagocytosis	Process in which membrane engulfs solid particles from extracellular environmental	Cellular energy	White blood cell membrane engulfs bacterial cell
Endocytosis pinocytosis	Process in which membrane engulfs minute	Cellular energy	Membrane forms vacuoles containing solute and solvent
Exocytosis	Release of molecules from cell as vesicles rupture	Cellular energy	Hormones and mucus are secreted out cell neurotransmitters are released at synapse