

Lab : 6/ Second semester (Medical Biology)

Dep: Clinical laboratories / first stage

### **Passive transport**

The movement of a substance across the membrane with no energy investment .

Include :

1-Diffusion

2- Osmosis

3- facilitated diffusion

### **Active transport**

Process uses energy to move solute across the membrane ( against their gradients)

Include :

1-solute pump

2-Exocytosis

3- Endocytosis – phagocytosis and pinocytosis

### **Diffusion**

Spontaneous process by which molecule move from a region where they are highly concentrated to a region in which their concentration is lower.

Passive process that move molecules from high concentration to low (across cell membranes when permeable ).

### **Osmosis :**

Diffusion of water across a selectively permeable membrane .

Water moves from its highest concentration or potential to its lowest concentration or potential .

Pure water has the highest potential , the more solute dissolved in water the lower potential .

**Based on osmosis the solution can be divided into three kinds are the**

**Isotonic solution :**

**Iso** means the same . if the concentration of solute (salt) is equal in both side , the water will move back in forth but it won't have any result on the overall amount of water on either side .

**Hypotonic solution :**

The word **hypo** means less . in this case there are less solute (salt) molecules outside the cell , (and more water molecules) .therefore , water move from highest concentration outside the cell into the cell .

The cell will gain water and grow larger .

**When placed in hypotonic solution:**

Animal cells lacking a rigid cell wall , are in danger of bursting called hemolysis . in some cases organelles called contractile vacuole will pump water out of the cell to prevent this .

In plant cell the central vacuole will fill and the plant becomes stiff and rigid ( called turgor) the cell wall keeps the plant cell from bursting .

**Hypertonic solution:**

The word **hyper** means more . in this case there are more solute (salt) molecules outside the cell , which causes the water to leave the cell ( again moving from high water concentration inside the cell to lower concentration outside the cell ) .

**When placed in hypertonic solution**

In plant cells the central vacuole losses water and the cell shrink , causing wilting , but in animal cells the cell also shrink called crenation . in both cases the cell may be die .

**Active transport**

Energy is expended by the cell to move a molecule across its membrane against its concentration gradient ( moving it from low concentration to high concentration ) .

Important in maintaining ion concentration and water balance in many cells . organism living in fresh water are immersed in a hypotonic solution .

Water moves into their cells . some cell handle this by actively removing the water . ATP is expended to move water out of cell against its concentration gradient ( low concentration of water inside the cell , high the concentration of water outside the cell )

#### Procedure

- 1- use three clean and sterilize test tube .
- 2- test tube A contain 2 ml from distal water .
- 3- test tube B contain 2 ml from 0.9% of NaCl .
- 4- test tube C contain 2 ml from 1.5 % of NaCl.
- 5- add one drop from blood to each tube and very shaker .
- 6- examine one drop from each tubes under the microscope to define the change that occurs in all tubes and to define any solution is (Iso , Hypo and Hyper ) .