The Osmotic conduction

The term **osmosis** describes the movement of water molecules from solution with lower solute concentration (hypotonic solution) to the solution with higher solute concentration (hypertonic solution) through a selectively permeable membrane.
The movement takes place due to the osmotic gradient created by difference in concentration of the solutions on both sides of the membrane and the end result is a state where osmotic equilibrium is reached wherein movement of the fluid ceases.

Some major examples of osmosis:

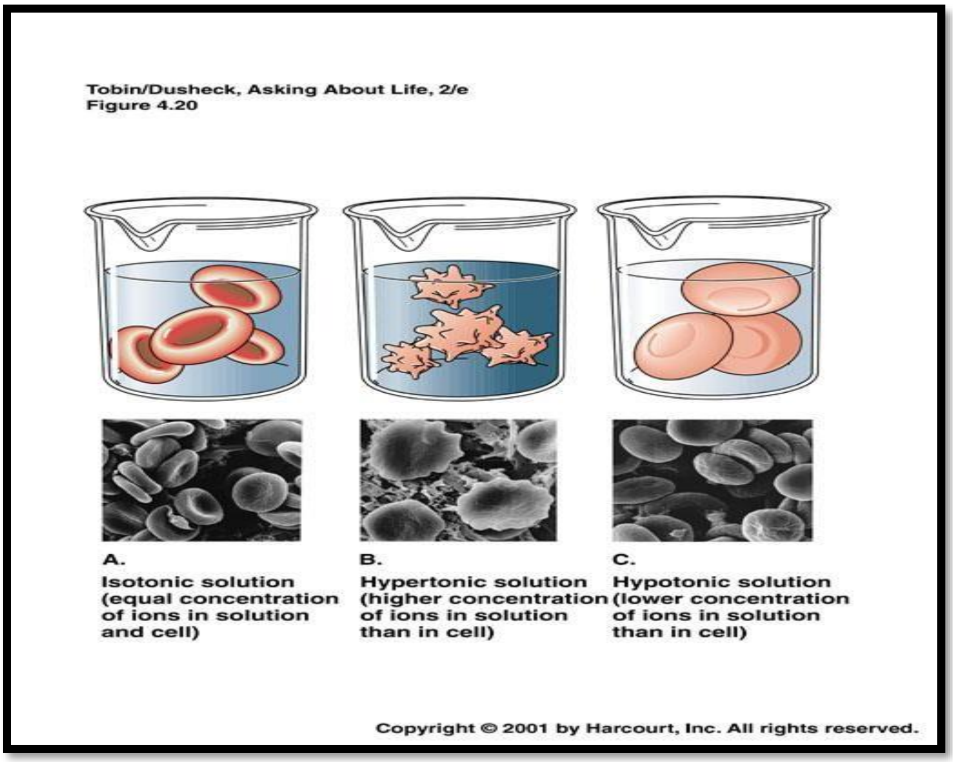
1. Absorption of water by plant roots.
2. Reabsorption of water by the proximal and distal convoluted tubules of the nephron.
3. Reabsorption of tissue fluid into the venule ends of the blood capillaries الشعيرا الدموية.
4. Absorption of water by the alimentary canal القناة الهضمية — stomach, small intestine and the colon.

Osmosis Examples in the Body

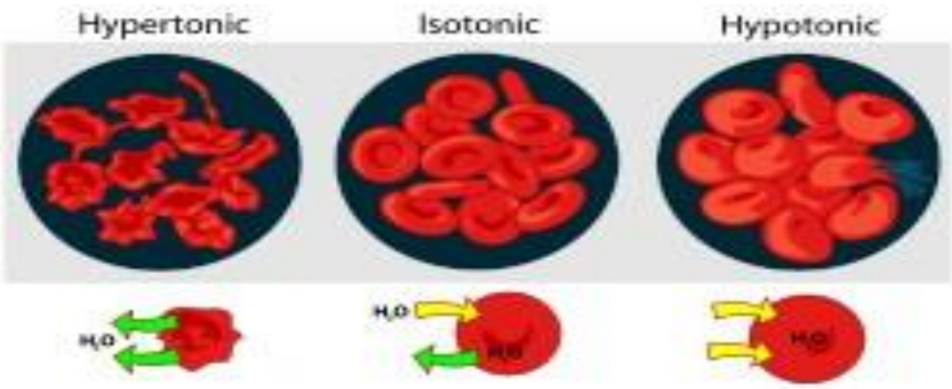
1. Salts and minerals from water are transferred through osmosis. Water flows through the plasma membrane of cells and due to osmosis concentration of water, glucose and salt is maintained inside the body. Thus osmotic filtration is important in preventing cell damage.
2. Freshwater fish maintain fluid balance in their body through osmosis. Since the salt concentration in their body is higher than the surrounding water, they do not need to drink water. This is because water is spontaneously absorbed by the salt present in their body
3. Kidney dialysis is example of osmosis. It is for patients suffering from kidney diseases, the dialyzer removes waste products from a patient's blood through a dialyzing membrane, and passes them into the dialysis solution tank. by the process of osmosis waste materials are continuously removed from the blood.

Three types of environments can exist outside cells to effect the internal environment

- **Isotonic** – concentration of solute is the same both in and out of cell, water movement is equal
- **Hypertonic** – concentration of solute is greater outside the cell, water moves to the outside of cell to balance out (possibly resulting in cell shriveling)
- **Hypotonic** - concentration of solute is lower outside the cell, water moves into the cell to balance out (possibly resulting in cell explosion)



As example the cells swellتَورم if they are placed in a solution containing less dissolved substance than blood (*hypotonic*), and shrinkيَنكمش in more concentrated (*hypertonic*)solutions. as shown above



- **Kidney functions** : Blood contains particles of many different sizes, shapes, and polarity. Some of these particles (e.g., proteins) are essential for the body; some (e.g., urea) must be removed from the blood and the body; others (e.g., many ions) must be maintained at certain concentrations.
- The main function of the kidneys is to filter our blood and remove waste as urine. Both kidneys do the same job. Each kidney is made up of about a million filtering units called nephrons. Each nephron filters a small amount of blood. The nephron includes a filter, called the glomerulus, and a tubuleفالترصغيرة متصلة بالانبيب. The glomerulus lets fluid and waste products pass through it; however, it prevents blood cells and large molecules, mostly proteins, from passing. The filtered fluid then passes through the tubule, which sends needed minerals back to the bloodstream and removes wastes. The final product

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becomes urine.. Blood is taken to the kidneys by the renal arteryالشريان الكلوي and when it is cleaned, it is returned to the heart by the renal veinالوريد الكلوي. The urine is taken to the bladderالمثانة by the ureterالحالب.