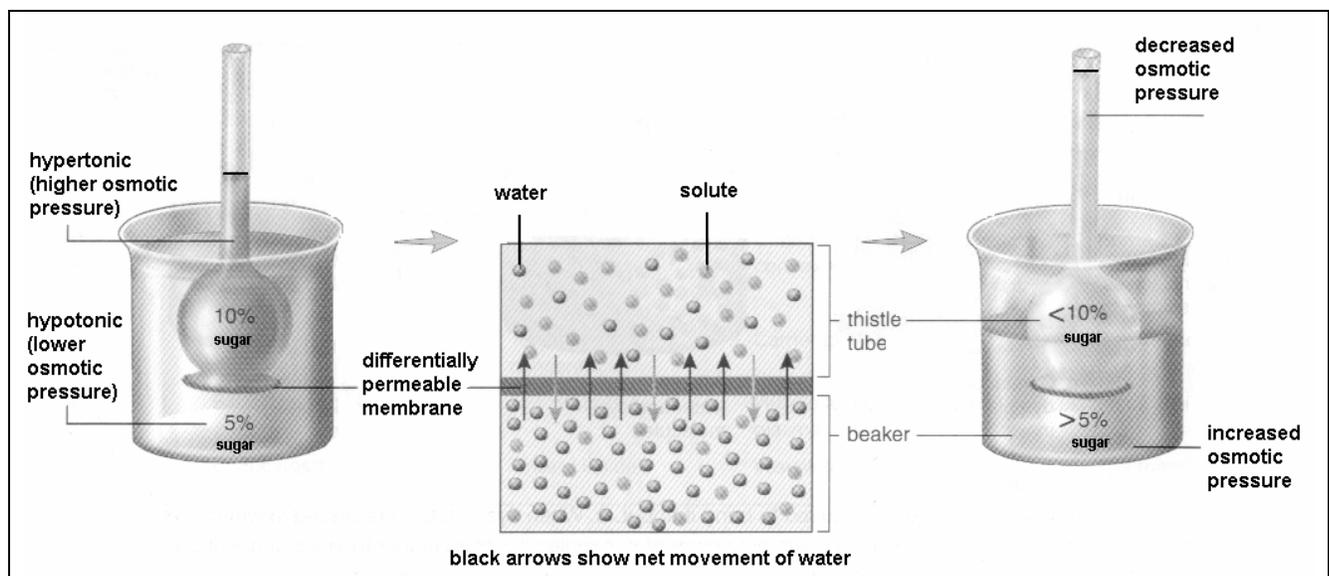


A Review of Diffusion, Osmosis, Active Transport

Molecules and ions enter and leave cells through membranes in the body by two basic processes: passive transport and active transport. It is important to review these processes in order to understand nephron function.

A. **Passive transport** is movement that does not rely on energy expenditure by the cell. One example is *diffusion*. This is movement of molecules or ions from an area of high concentration to one of lower concentration; that is, it is movement *along* the concentration gradient. The energy for this movement comes from the motion of the particles themselves and not from the ATP supplies in the cell.

Osmosis is a special kind of diffusion, involving water and a membrane. Water (solvent) molecules diffuse across a differentially permeable membrane from a hypotonic solution (lower solute concentration) to a hypertonic solution (higher solute concentration). Osmotic pressure can be thought of as the tendency of a solution to gain water by osmosis. Thus, the hypertonic solution has a higher osmotic pressure than the hypotonic solution. As solute concentration is decreased, osmotic pressure is decreased.



Another example of passive transport is movement caused by *electrostatic attractions*. For example, negatively charged ions follow the movement of positive ions as they are pumped across a membrane, because of the attraction between unlike charges. The movement of the negative ions is passive because they merely “tag along” as the positive ions are actively transported.

B. **Active Transport** involves movement that is powered by the ATP supplies in the cell. Molecules are pumped across a cell membrane from an area of low concentration to one of higher concentration. This process is energy-absorbing because the movement of particles is against the concentration gradient.