

Diffusion is an example of passive transport.

Simple Diffusion:

All movement involves energy but diffusion is passive in the sense that the energy comes from the natural, inbuilt motion of particles rather than from an external source such as ATP.

Diffusion is defined as: The net movement of molecules or ions from a region where they are more highly concentrated to one where their concentration is lower until evenly distributed.

To help understand diffusion it is important to know:

All particles are constantly in motion due to the kinetic energy that they possess

This motion is random, with no set pattern to the way the particles move around

Particles are constantly bouncing off one another as well as of other objects.

Facilitated Diffusion:

Only small, non-polar molecules like oxygen can diffuse across plasma membranes easily. Charged ions and polar molecules do not diffuse easily. The movement of these molecules is made easier (facilitated) by transmembrane channels and carriers that span the membrane. This process is facilitated diffusion.

This is a passive process. Like diffusion, it occurs down a concentration gradient, but it differs in that it occurs at specific points on the plasma membrane where there are special protein molecules (protein channels/carrier proteins).

Protein Channels:

These proteins form water-filled hydrophilic channels across the membrane. They allow specific water-soluble ions to pass through. The channels are selective, each opening in the presence of a specific ion. If this particular ion isn't present, the channel remains closed.

There is control over the entry and exit of ions. The ions bind with the protein causing it to change shape in a way that closes it to one side on the membrane and opens it to the other side.

Carrier Proteins:

An alternative form of facilitated diffusion. When a molecule such as glucose that is specific to the protein is present, it binds with the protein. This causes it to change shape in such a way that the molecule is released to the inside of the membrane. No external energy is needed. The molecules move from a region where they are highly concentrated to one of a lower concentration, using only the kinetic energy of the molecules themselves.

