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Perspective

Semipermeable Membrane and Biological Membrane: An Overview

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ABOUT THE STUDY

Semipermeable membrane is a type of biological and polymeric membrane that will allow certain molecules to pass through it by reverse osmosis. The rate of passage depends on the pressure, and temperature of the molecules on both side, as well as the permeability of the membrane to each solute. Depending on the membrane and the solute, permeability may also depend on solubility, and properties. How the membrane is constructed to be selective in its permeability will determine the rate and the permeability. Semipermeable membrane or Biological membranes are selectively permeable, with the passage of molecules controlled by facilitated diffusion, passive transport regulated through proteins embedded in the membrane.

An example of a semi-permeable membrane is the lipid bilayer, which is based on the plasma membrane that surrounds all biological cells. A group of phospholipids arranged into a double layer, the phospholipid bilayer is a semipermeable membrane that is very specific in its permeability. The hydrophilic phosphate heads are in the outside layer and exposed to the water content outside and within the cell. The main function of a biological semi-permeable membrane in cells is to separate the cell from the environment while allowing for the controlled transport of molecules in and out of the cell. A biological semipermeable membrane allows some molecules. It is depending on the attributes of the molecules including size or quantity.

An example of a semipermeable membrane is a cell membrane. By keeping the inside of a cell at low concentration, it can keep absorbing the molecules it needs. This is used by most cells, which includes the roots of plants, which use osmosis to absorb the water. The membrane is selectively permeable because materials do not cross it indiscriminately. Some molecules including hydrocarbons and oxygen can cross the membrane. The cell membrane is selectively permeable. It is made of a phospholipid bilayer, along with other various lipids, and carbohydrates. It is a barrier that will allow some molecules to pass through while blocking the passage of different molecules.

A semipermeable barrier is essentially acts as a filter. Different types of semipermeable membranes can block out different sized molecules and it can be made out of biological material. A semipermeable membrane may also be known as a deferentially permeable membrane. Diffusion is generally occurs when molecules in a high concentration move to the other side of the membrane where there is a low concentration of those molecules. There are different types of biological semipermeable membranes, both organic and inorganic. An example of a biological semipermeable membrane is kidney tissue. Kidneys allow for molecules to pass through them while blocking others which include human waste products. Synthetic versions of a semipermeable membrane are those used for water filtration. Synthetic semipermeable membranes are usually polymers, but they can be made out of different materials.

Artificial membranes have been used in the laboratory to show the effects of osmolality on cells. Much like cell membranes, a biological semipermeable membrane created artificially will only allow water pass, while restricting the solutes dissolved in the solution. If solution is connected through a semipermeable membrane, water will flow between them, but the solutes can be restricted to the side of the membrane they started on. There are three types of permeability: effective permeability, absolute permeability, and relative permeability. Effective permeability is the ability of fluids to pass through pores of rocks in the presence of different fluids in the medium. When referring to membrane permeability there is found in living things: semi-permeable and selectively permeable both allow molecules and water to move in and out of the cell, as needed to maintain homeostasis.

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