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Commentary

Polymers for the Semi-permeable Membrane Devices

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DESCRIPTION

Semipermeable membranes are a type of biological or synthetic polymer membrane that allows a particular molecule or ion to pass through it by osmosis. Permeability depends on the pressure, concentration, temperature of the molecules or solutes on both sides, and the permeability of the membrane to each solute. Depending on the membrane and solute, permeability may depend on the size, solubility, properties, or chemistry of the solute. The method of designing the membrane for selective permeability determines velocity and permeability. Many natural and synthetic materials that are quite thick are also semi-transparent. An example of this is the thin film inside the egg.

Semipermeable membranes are barriers that allow only some molecules to pass through while blocking the passage of other molecules. The translucent barrier essentially acts as a filter. Different types of semipermeable membranes can block molecules of different sizes. Cell membranes are translucent or selectively permeable. It is composed of a phospholipid bilayer, along with various other lipids, proteins and carbohydrates. An example of a semipermeable membrane is a cell membrane. By keeping the intracellular concentration low, you can continue to take up the necessary molecules. It is used in most cells, including plant roots, which use osmosis to take up the necessary water and nutrients.

A semipermeable membrane is also called as a selective or partially permeable membranes, allow specific molecules or ions to pass through diffusion. Diffusion transports substances across the membrane into the cell, while osmosis transports only water across the membrane. Biological membranes are selectively permeable and involve the passage of molecules controlled by facilitated diffusion, passive transport, or active transport controlled by proteins embedded in the membrane. An example of a biological semipermeable membrane is the lipid bilayer that underlies the plasma membrane that surrounds all biological cells.

A group of phospholipids consisting of a phosphate head and two fatty acid tails 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 hydrophobic tails are the layer hidden in the inside of the semipermeable membrane. The phospholipid bilayer is the most permeable to small and uncharged solutes. Protein channels are embedded in phospholipids, and collectively, this model is known as the fluid mosaic model. Aquaporin's are the pores of protein channels that allow water to pass through.

Cholesterol has the same function. It is called as partially permeable or semi-permeable because it only allows small, non-polar molecules to pass through. These ions and molecules, which are restricted by phospholipids, enter and leave cells through membrane proteins. Note that semipermeable membranes are not the same as selective permeable membranes. Semipermeable membranes represent membranes that allow some particles to pass through by size, while selectively permeable membranes "choose" what happens size is not a factor. The basic concept of cell biology is a semipermeable membrane, which allows some substances to pass through and others to be blocked. The translucency of cell membranes allows cells to exchange nutrients and waste products with blood while otherwise maintaining control of their contents.

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