

Plasma membrane structure and functions:

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The plasma membrane (also known as the cell membrane or cytoplasmic membrane) is a biological membrane that separates the interior of a cell from its outside environment.

The primary function of the plasma membrane is to protect the cell from its surroundings. Composed of a phospholipid bilayer with embedded proteins, the plasma membrane is selectively permeable to ions and organic molecules and regulates the movement of substances in and out of cells. Plasma membranes must be very flexible in order to allow certain cells, such as red blood cells and white blood cells, to change shape as they pass through narrow capillaries.

The plasma membrane also plays a role in anchoring the cytoskeleton to provide shape to the cell, and in attaching to the extracellular matrix and other cells to help group cells together to form tissues. The membrane also maintains the cell potential.

In short, if the cell is represented by a castle, the plasma membrane is the wall that provides structure for the buildings inside the wall, regulates which people leave and enter the castle, and conveys messages to and from neighboring castles. Just as a hole in the wall can be a disaster for the castle, a rupture in the plasma membrane causes the cell to lyse and die. The main function of the plasma membrane is to protect the cell from its surrounding environment. It is semi-permeable and regulates the materials that enter and exit the cell. The cells of all living things have plasma membranes.

Functions of the Plasma Membrane

A Physical Barrier

The plasma membrane surrounds all cells and physically separates the [cytoplasm](#), which is the material that makes up the cell, from the [extracellular fluid](#) outside the cell. This protects all the components of the

cell from the outside environment and allows separate activities to occur inside and outside the cell.

The plasma membrane provides structural support to the cell. It tethers the [cytoskeleton](#), which is a network of protein filaments inside the cell that hold all the parts of the cell in place. This gives the cell its shape. Certain organisms such as plants and [fungi](#) have a [cell wall](#) in addition to the membrane. The cell wall is composed of molecules such as cellulose. It provides additional support to the cell, and it is why [plant cells](#) do not burst like [animal cells](#) do if too much water diffuses into them.

Selective Permeability

Plasma membranes are selectively permeable (or semi-permeable), meaning that only certain molecules can pass through them. Water, oxygen, and carbon dioxide can easily travel through the membrane. Generally, ions (e.g. sodium, potassium) and polar molecules cannot pass through the membrane; they must go through specific channels or pores in the membrane instead of freely diffusing through. This way, the membrane can control the rate at which certain molecules can enter and exit the cell.

Endocytosis and Exocytosis

[Endocytosis](#) is when a cell ingests relatively larger contents than the single ions or molecules that pass through channels. Through endocytosis, a cell can take in large quantities of molecules or even whole [bacteria](#) from the extracellular fluid. Exocytosis is when the cell releases these materials. The [cell membrane](#) plays an important role in both of these processes. The shape of the membrane itself changes to allow molecules to enter or exit the cell. It also forms vacuoles, small bubbles of membrane that can transport

many molecules at once, in order to transport materials to different places in the cell.

Cell Signaling

Another important function of the membrane is to facilitate communication and signaling between cells. It does so through the use of various proteins and carbohydrates in the membrane. Proteins on the cell "mark" that cell so that other cells can identify it. The membrane also has receptors that allow it to carry out certain tasks when molecules such as hormones bind to those receptors.