

# Plasma Membrane Encyclopedia Article

## Plasma Membrane

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# Contents

<a href="#">Plasma Membrane Encyclopedia Article.....</a>	<a href="#">1</a>
<a href="#">Contents.....</a>	<a href="#">2</a>
<a href="#">Plasma Membrane.....</a>	<a href="#">3</a>



# Plasma Membrane

The plasma membrane is a very thin, continuous sheet of phospholipids and proteins that surrounds all living cells and separates them from their external environment. This membranous barrier maintains conditions within the cell and creates an internal chemical environment essential for life. It is one of the few structures common to every living cell. Invisible except in an electron microscope, a plasma membrane is typically only 4-5 nm thick. In spite of its thinness, however, the plasma membrane is surprisingly strong, flexible, and stretchable. It has a high electrical insulating capacity, and a remarkable ability to self-assemble to repair breaks and damage.

Structurally, almost all plasma membranes are composed of a double layer of phospholipid molecules arranged with their hydrophobic (water-hating) lipid tails oriented toward the membrane interior and their hydrophilic (water-loving) heads making up the opposing membrane surfaces. A wide variety of globular proteins are embedded in or on this biomolecular lipid leaflet structure, some of them reaching completely across the membrane while others are implanted in or attached to either the extra-cellular or intra-cellular surface. These proteins not only help create the structure of the membrane but also carry out enzyme reactions or provide channels for transport of selected materials into or out of the cell. Integral membrane proteins can serve as recognition and binding sites for the cell to its neighbors or substrates. They also act as receptors for extracellular molecules that serve as signals, nutrients, or serve other important functions.