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**Topic- Structure and composition of plasma membrane**

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# Structure and composition of plasma membrane

The membrane enclosing a cell is called cell membrane or plasma membrane (animal cells) and plasma lemma (plant cells). It contains proteins and lipids in the ratio of 80 : 20 in bacteria on one extreme and on the other extreme 20 : 80 in some nerve cells. The over all composition of most of the cell membranes is 40-50% protein and 50-60% lipids; both the components vary in their composition.

They have been further classified into different types (Fig. 2.6). The proportion of these lipids varies in different membranes. For example, plasma membrane is composed of 55% phospholipids, 5% glycolipids, 20% steroids and 20% other lipids.

But endoplasmic reticulum contains 65% phospholipids, 30% glycolipids and 5% steroids. The percentage of these lipid types in mitochondrial membranes is 75% (phospholipids), 20% (glycolipids) and 5% (steroids).

Bacterial membrane constrains a high proportion of cholesterol (70%) and a lesser proportion of phospholipids (30%).

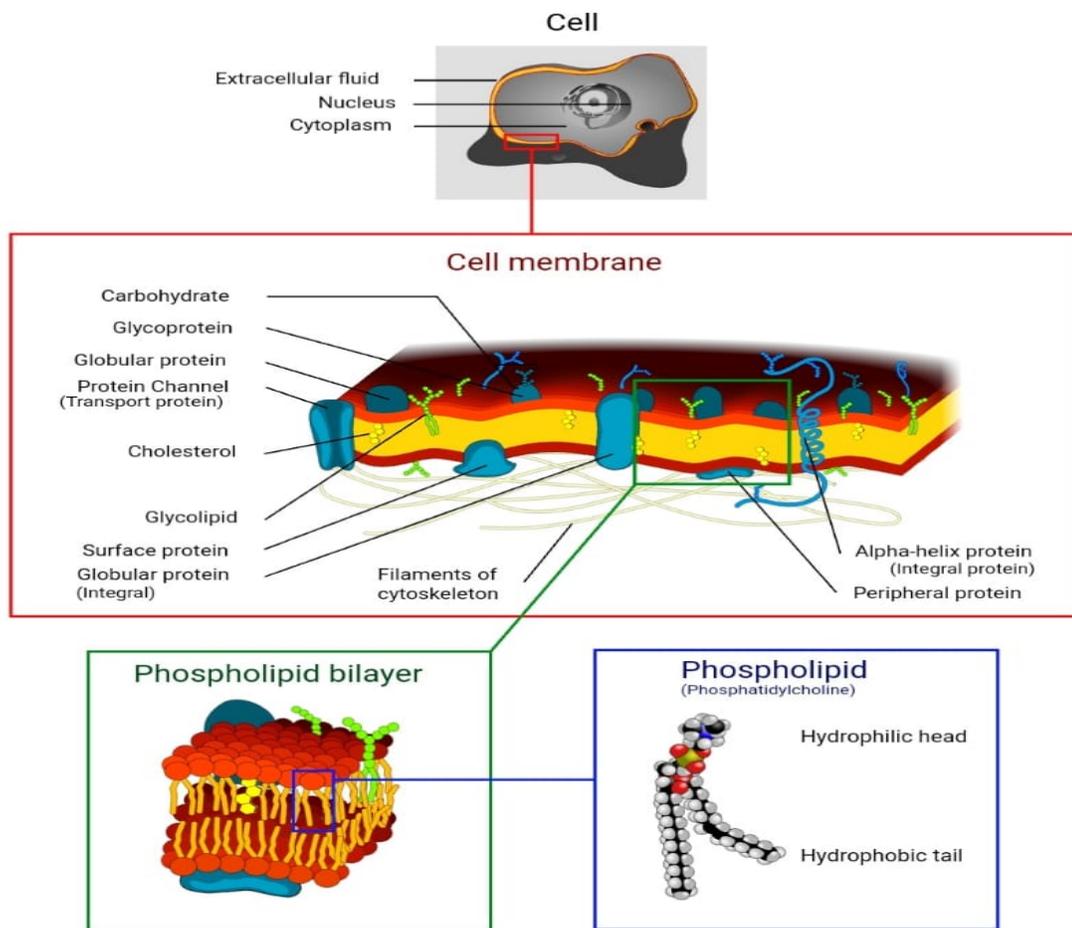
## Structure of Plasma Membranes

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 plasma membrane:** The plasma membrane is composed of phospholipids and proteins that provide a barrier between the external environment and the cell, regulate the transportation of molecules across the membrane, and communicate with other cells via protein receptors.

**Composition of Plasma Membrane:**

Plasma membranes or biological membranes are composed of lipids, proteins and small amounts of carbohydrate. The ratio of proteins to lipid varies considerably among different membranes. Phospholipids are present in almost all the membranes such as Phosphatidylcholine, Phosphatidylserine, Phosphatidyl-ethanol-amine, Sphingomyelin.

Cholesterol is common in the membrane of mammalian cells. Cardiolipin is found only in the inner mitochondrial membrane. The plant plasma membrane has a high sterol to phospholipid molar ratio. Cholesterol and various sterol esters are found in the plant plasma membrane.

Carbohydrates are bound to the membrane in the form of glycoproteins when attached to proteins or glycolipids when attached to lipids. Carbohydrates are found in the membrane of eukaryotic cells. They are not present in the chloroplast lamellae, mitochondrial membrane and other membranes of cell organelles.

The major component of the plant plasma membrane is carbohydrate in the form of glycolipids, glycoproteins and various cell wall polysaccharides. Although the structure and function of the plant plasma membranes is fundamentally similar, but little work has been done on plant plasma membrane as compared to the animal system.

Hence the nature of lipids and proteins is not clearly known in plant system. The plant cell membrane has to perform some other functions than in animal cell, particularly in mediating the transport of solutes into and out of the cell.

Further, it has to perform in synthesizing the cell wall micro fibrils and to transmit hormonal and environmental signals during growth and differentiation. The knowledge of the membrane is based mainly on cells of prokaryotic and animal systems.

#### **Functions of Plasma Membrane:**

- (i) It is selectively permeable membrane;
- (ii) Its principal role is to regulate the flow of materials in and out of the cell;
- (iii) Carrier proteins in the membrane are involved in the transport of certain materials across the plasma membrane;
- (iv) In some cases it protects the inner cytoplasmic inclusions; and
- (v) In some cases it perceives the chemical stimulus.