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Proteins

Depending upon the ease of extraction, the ratio of protein and lipid varies considerably in different cell types. In human beings, the membrane of the erythrocytes (RBCs) has approximately 52% protein and 40% lipid.

The membrane proteins can be classified as

- (i) Integral Proteins (intrinsic protein) They have stronger association and bound firmly to the membrane. These proteins are buried partially or totally in the phospholipid bilayer.
- (ii) Peripheral Proteins (extrinsic protein) They have weaker association and are bound to lipids of membrane by electrostatic interactions.

Carbohydrates

These constitute about 1-5% of chemical composition of plasma membrane. These are associated with the phospholipids or with the peripheral proteins to form glycolipids and glycoproteins respectively.

To understand the structure of plasma membrane various models are given out of which the most accepted model is Fluid Mosaic Model.

Fluid Mosaic Model

This model was given by Singer and Nicholson (1972). According to this model, the lipid bilayer and integral proteins appear like a mosaic arrangement and the quasi-fluid nature of lipid enables the lateral movement of the proteins within the overall bilayer.

This ability of proteins to move within the membrane indicate the fluidity of the lipid part.

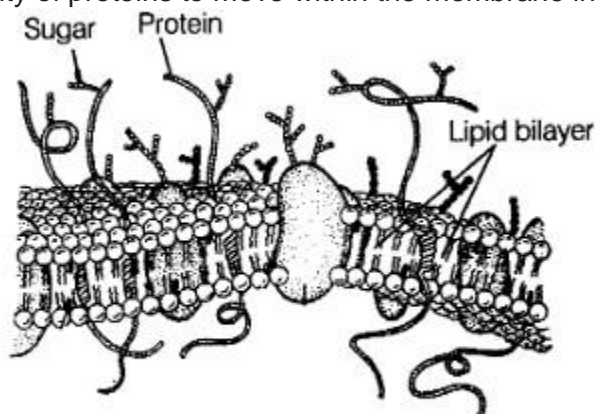


Fig.8.6 Fluid mosaic model of plasma membrane

Fluidity of Membrane

The fluid nature of the membrane is important from the point of view of interactions of molecules within the membrane as well as other functions like formation of inter cellular junctions, cell growth, secretion,

endocytosis, cell division, etc.

Passage of substances across the membrane occurs mainly by two methods

i- Active Transport

Active transport is the movement of the molecules across the membrane against their concentration gradient, i.e., from lower to the Higher concentration. It is an energy dependent process, in which ATP is utilised. It occurs in few ions and molecules, e.g., Na⁺ / K⁺ pump.

Polar molecules requires a carrier protein of the membrane to facilitate their transport across the membrane because they cannot pass through the non-polar lipid bi-layer.

ii- Passive Transport

Passive transport is the mode of movement of molecules or substances across the membrane without any requirement of energy.