

# PLASMA MEMBRANE

## 1. INTRODUCTION :-

- Term Plasma Lemma was given by J. Q. Plowe (1885).
- Term Plasma membrane was given by Nagelli (1931).
- Term Unit membrane was given by Robertson.
- At first, structure of cell membrane was studied by Overton (1895).
- Overton postulated that cell membrane is composed of a layer of lipid material.
- Plasma membrane is also called cell membrane or unit membrane.
- It is outermost boundary of animal cell.

## 2. SPECIAL POINT :-

- Plasma membrane is a thin live membrane.
- It is flexible and porous membrane.
- In this layer protein coated with small pores are found,  $7 \text{ \AA}$  in diameter.
- Plasma lemma of animal cell is elastic due to the presence of Lipids.

## 3. MODEL OF PLASMA MEMBRANE :-

To describe structure of Plasma membrane, numerous models have been proposed which are as follow :-

A. GORTER AND GRANDEL'S LIPID BIOMOLECULAR MODEL (1925)  
This postulated that membrane are

Composed of Lipid bilayer only.

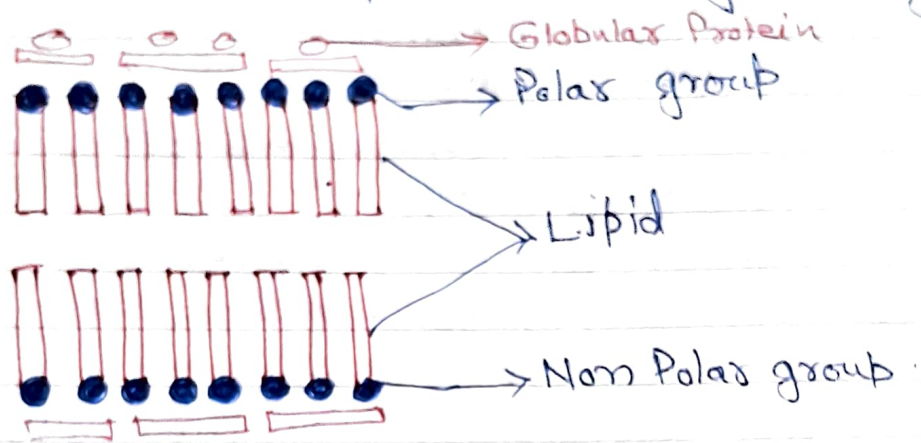


Fig:- Gorter - Grendel and Davson Danielli Model.

### B. LAMELLAR MODEL:-

- This model was proposed by Danielli and Davidson in 1935.
- It is also called Trilayer, Trilamellar or Sandwich model.
- According to this model Plasma membrane is a trilayered structure composed of lipoprotein.
- The bilayered Phospholipid is sandwiched in between two layers of a Protein molecule.
- The bilayered lipid is  $35 \text{ \AA}$  thick whereas, each layer of Protein is  $20 \text{ \AA}$  thick. So Plasma membrane is  $75 \text{ \AA}$  thick.
- The polar heads of the Phospholipid molecules are directed towards protein. The two are held together by electrostatic forces.
- The non polar tails of the two lipid layer is directed towards the centre where they are held together by Vander Waals forces.

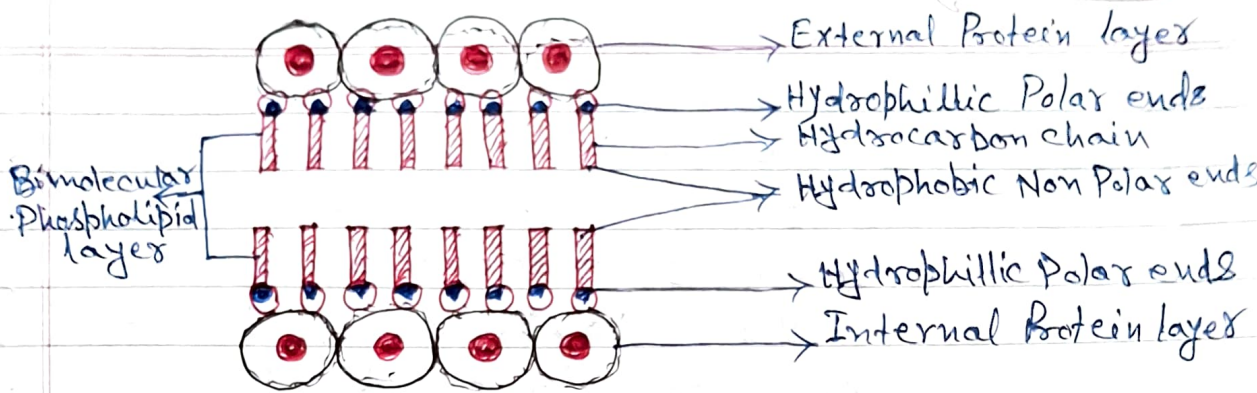


Fig :- SANDWICH MODEL.

### C. UNIT MEMBRANE MODEL :-

- It was proposed by J. David Robertson (1959 AD)
- Robertson coin the term unit membrane
- Robertson supported and modified Danielli and Davidson model.
- This model states that protein molecules are extended  $\beta$ -Protein or fibrous not  $\alpha$  or globular.

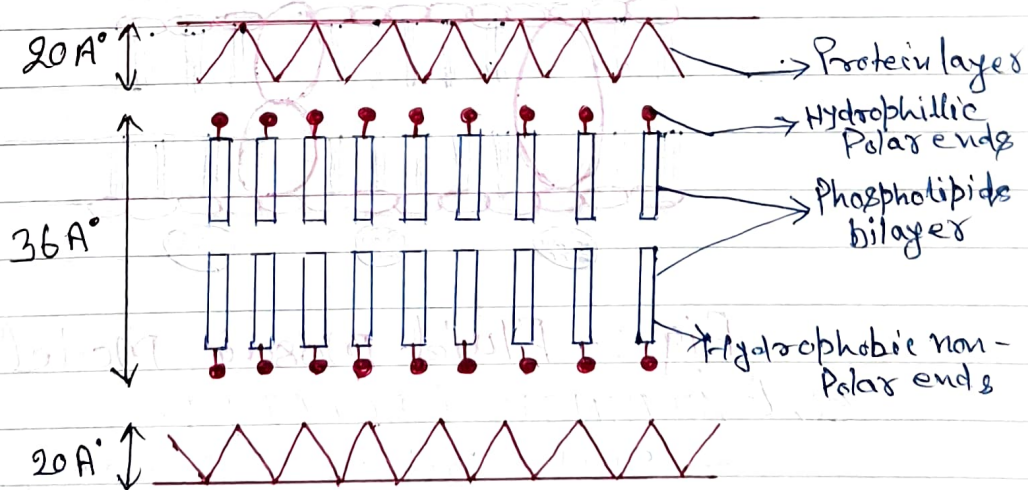


Fig :- UNIT MEMBRANE MODEL.

### D. FLUID MOSAIC MODEL :-

- This model was proposed by Singer and Nicholson in 1972.

- It described Proteins as ice bergs in a sea of Lipids.
- It is the most accepted model.
- There is a central bilipid layer (2 layers) composed of phospholipids arranged in a specific manner.
- Hydrophilic Polar head constitute top and bottom surfaces.
- Hydrophobic non Polar end are buried in the membrane.
- Within Phospholipids, Proteins are arranged in two forms
  - (a) Extrinsic Protein
  - (b) Intrinsic Protein

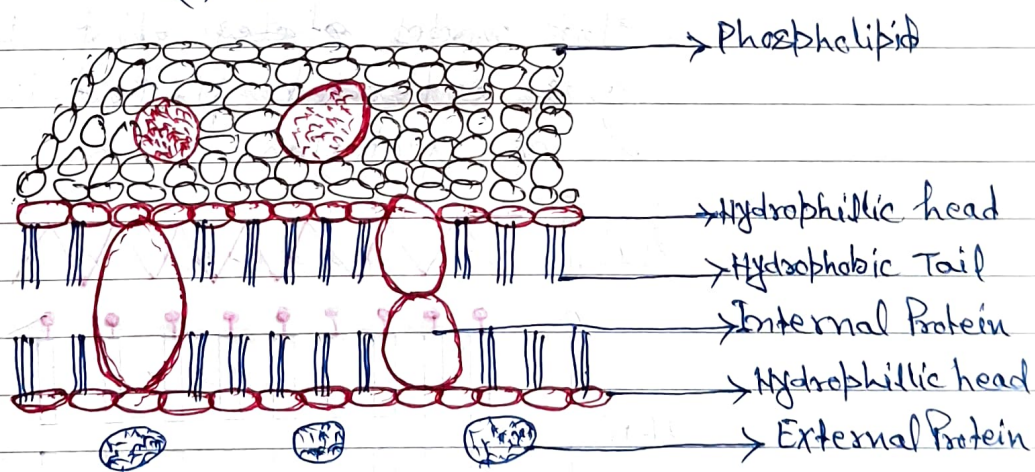


Fig.:- Fluid Mosaic Model.

#### (a) EXTRINSIC PROTEIN :-

- Such Proteins are arranged superficially on the outer and inner surface of membrane.
- Such Proteins are soluble and unstable.
- Such Proteins can be separated by change in pH.
- It is 30% of the whole Protein.
- Spectrin, acetylcholine, cytochromes is its Example.