

# **PLASMA MEMBRANE**

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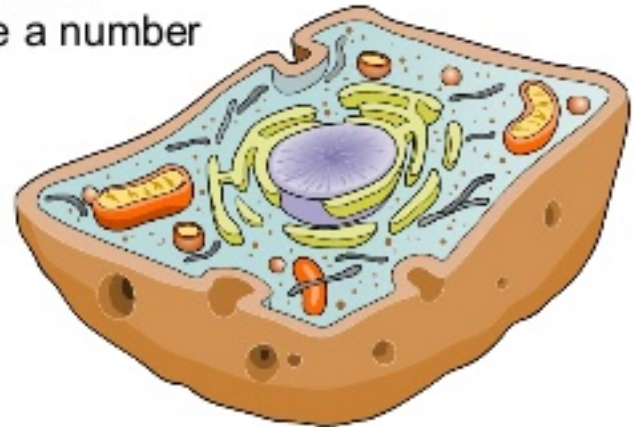
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# What are membranes?

**Membranes** cover the surface of every cell, and also surround most organelles within cells. They have a number of functions, such as:

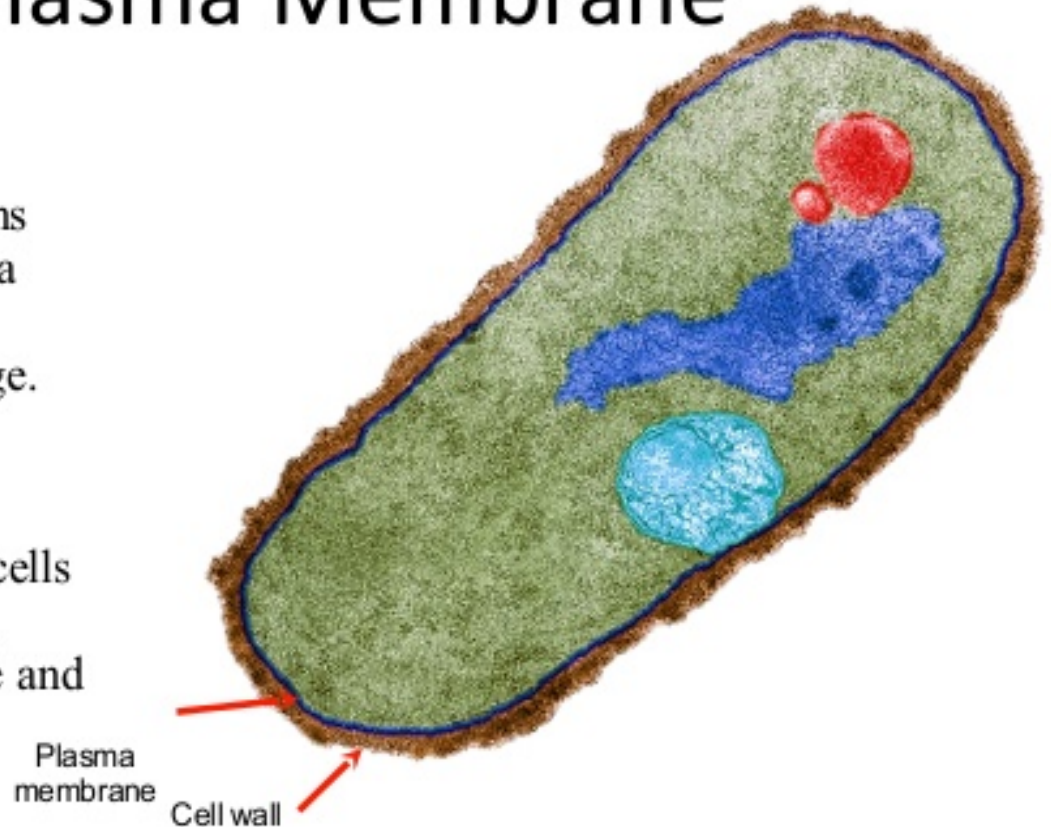


- keeping all cellular components inside the cell
- allowing selected molecules to move in and out of the cell
- isolating organelles from the rest of the cytoplasm, allowing cellular processes to occur separately.
- a site for biochemical reactions
- allowing a cell to change shape.



# The Plasma Membrane

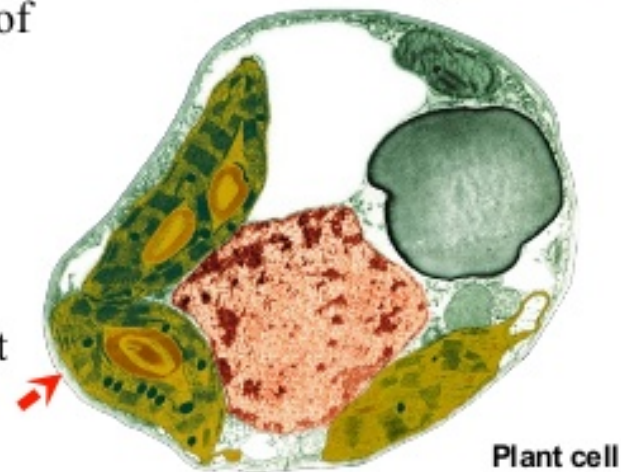
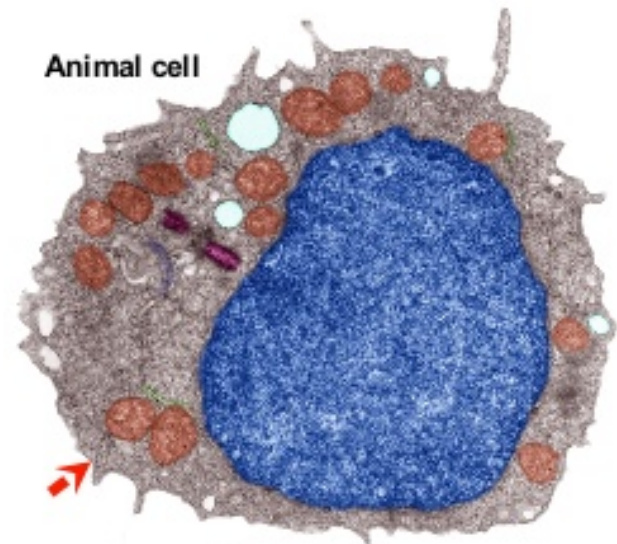
- A **plasma membrane** is common to all cells. It forms their **outer limit**. It forms a boundary for dissolved substances-allows exchange. Allows cells to maintain themselves
- Bacteria, fungi, and plant cells have a **cell wall**, but it is a structurally distinct feature and lies outside the plasma membrane.



This colored *Bacillus megaterium* cell clearly shows the plasma membrane, which lies inside the distinct structure of the cell wall.

# Cells and Membranes

- The membrane surrounding a cell, called the **plasma membrane**, forms the boundary that separates the living cell from its non-living surroundings.
- Although the plasma membrane (arrowed) is only about 8 nm (0.01 micrometers) thick, it:
  - selectively controls the movement of materials into and out of the cell (selectively permeable)
  - is responsible for cell-cell recognition (e.g. when cells aggregate into tissues)
  - is a dynamic structure, with distinct inside and outside faces.

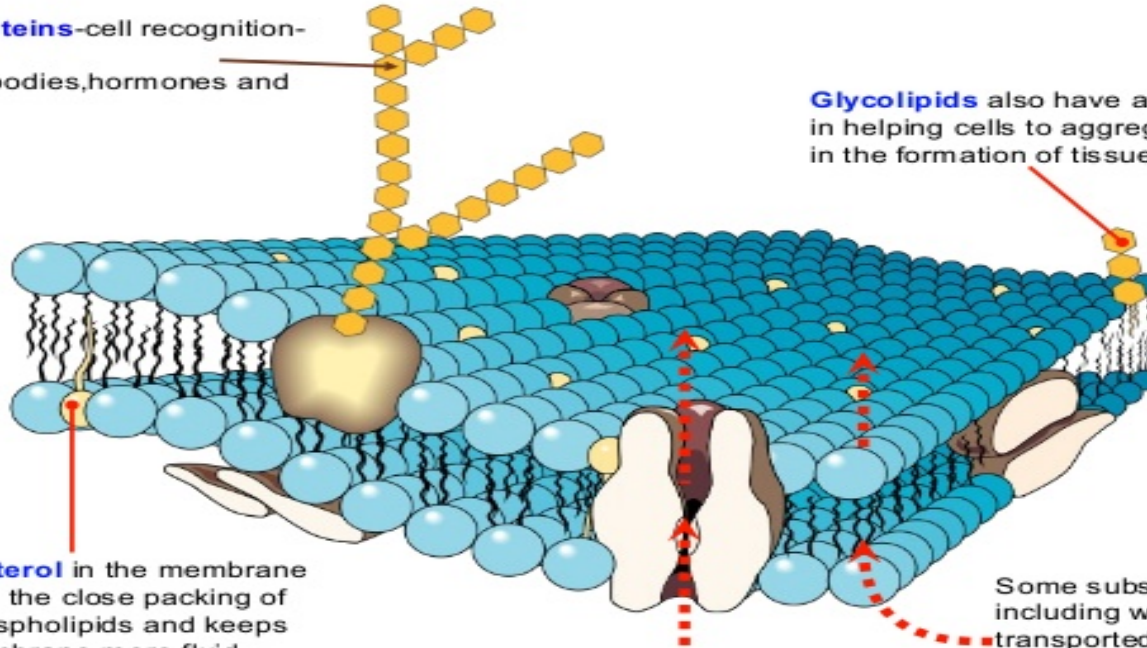


# TRILAMINAR MODEL

## Membrane Structure

**Glycoproteins**-cell recognition-  
between  
cells, antibodies, hormones and  
viruses

**Glycolipids** also have a role  
in helping cells to aggregate  
in the formation of tissues.



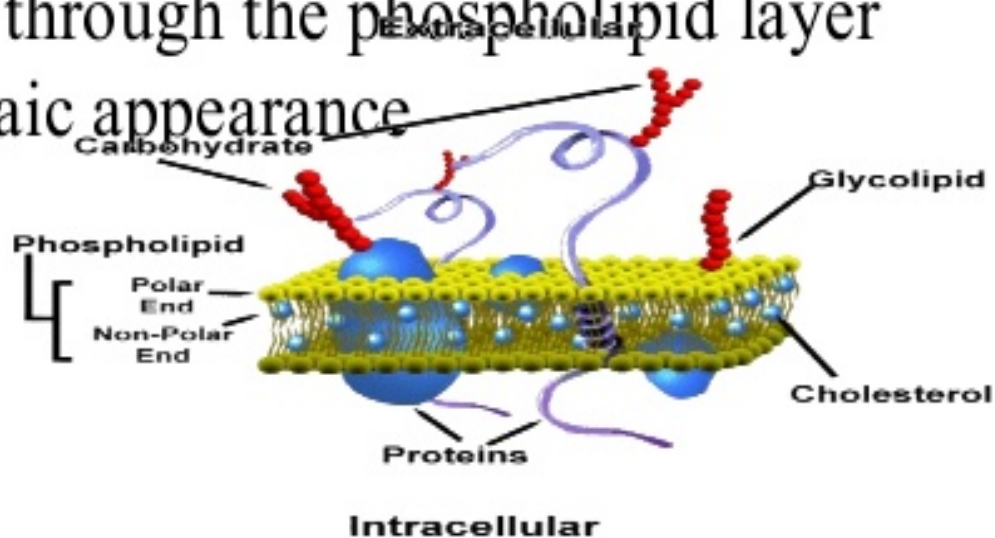
**Cholesterol** in the membrane  
disturbs the close packing of  
the phospholipids and keeps  
the membrane more fluid.  
Provides rigidity and water  
resistance. Membranes would  
break down without it. Plants  
have phytosterol.

Some substances, particularly  
ions and carbohydrates, are  
transported across the  
membrane via the proteins.

Some substances,  
including water, are  
transported directly through  
the **phospholipid bilayer**.  
**But mostly impermeable  
to water soluble (polar)  
molecules-most  
movement via proteins.**

# Fluid –Mosaic model

- **Fluid**- individual phospholipids and some proteins can move sideways(laterally) in each layer-therefore FLUID
- **Mosaic**-range of different proteins resting on the surface or through the phospholipid layer gives it a mosaic appearance



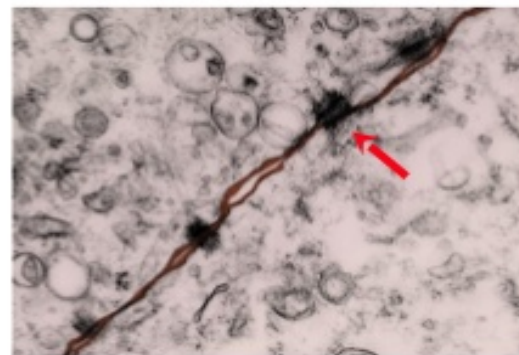
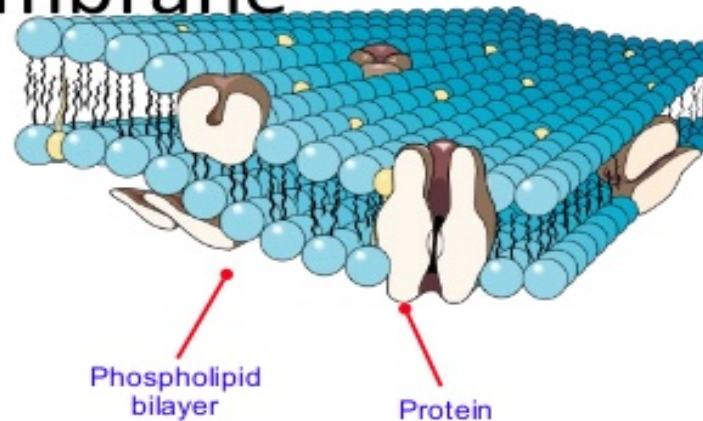
# Plasma Membrane

● **Located:**  
Surrounds the cell forming a boundary between the cell contents and the extracellular environment.

● **Structure:**  
Semi-fluid phospholipid bilayer in which proteins are embedded. Some of the proteins fully span the membrane.

● **Function:**  
● Forms the boundary between the cell and the extracellular environment.

● Regulates movement



The plasma membranes of two adjacent cells joined with **desmosomes**

# Bimolecular leaflet model

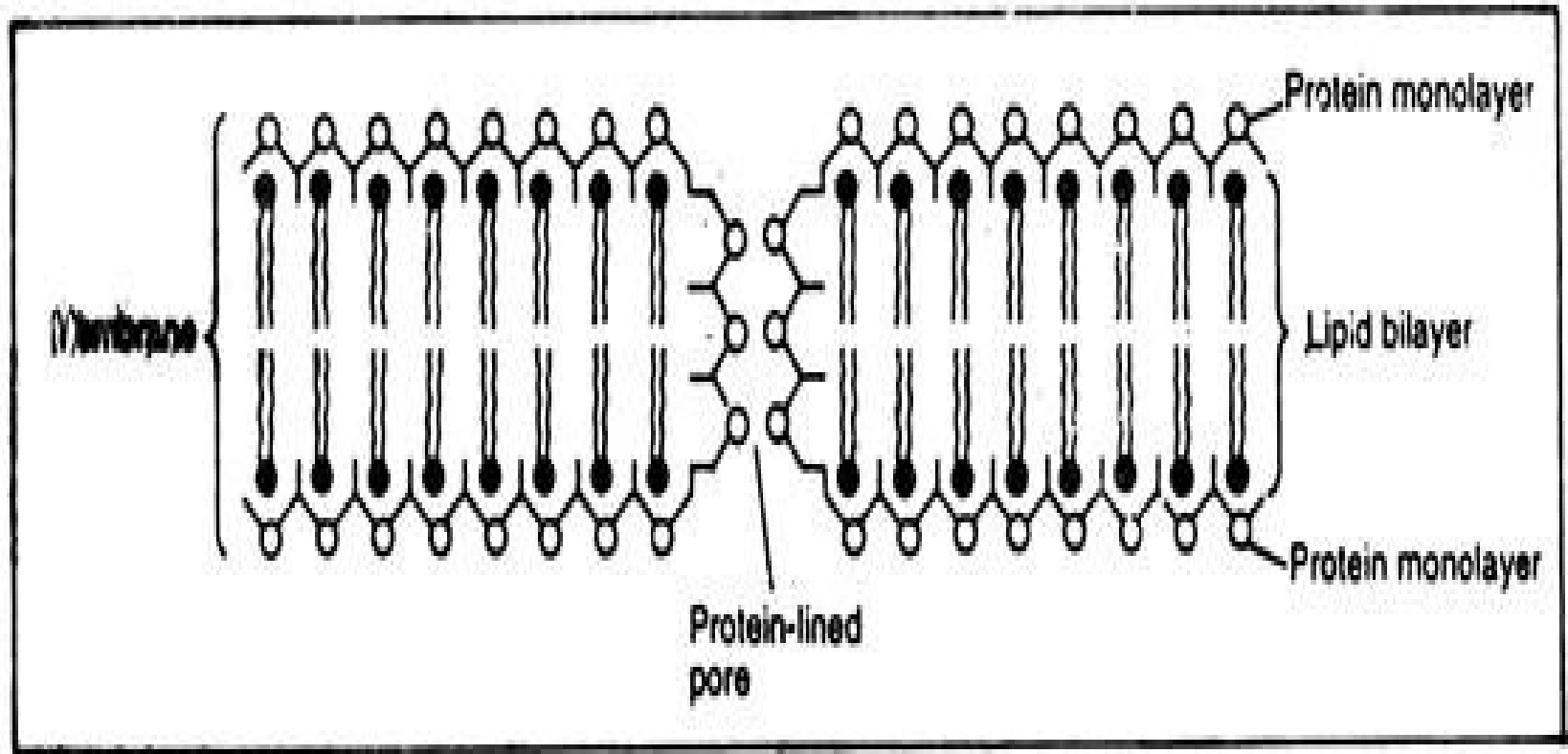
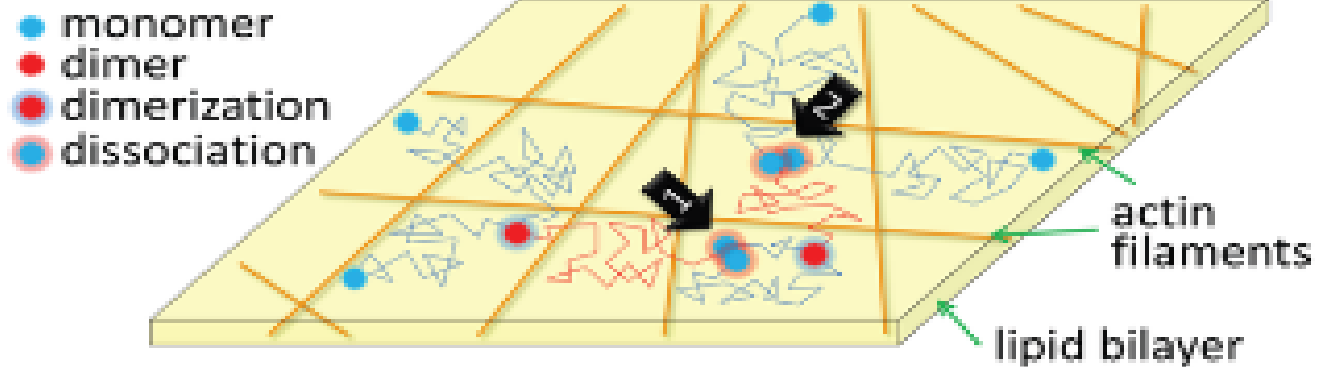


Fig. 2.3: Danielli-Davson Model.

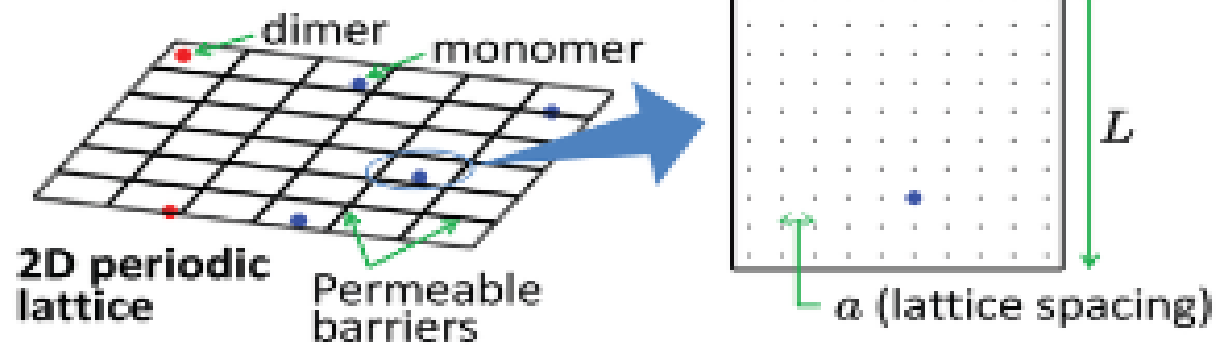


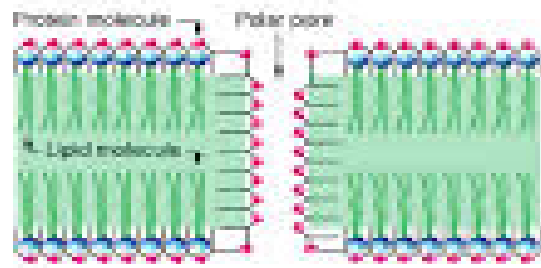
# LATTICE MODEL

## a. Biological model

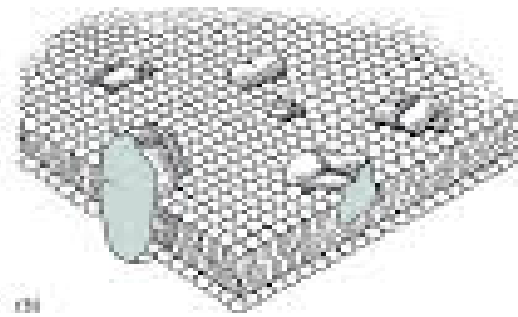


## b. Mathematical model

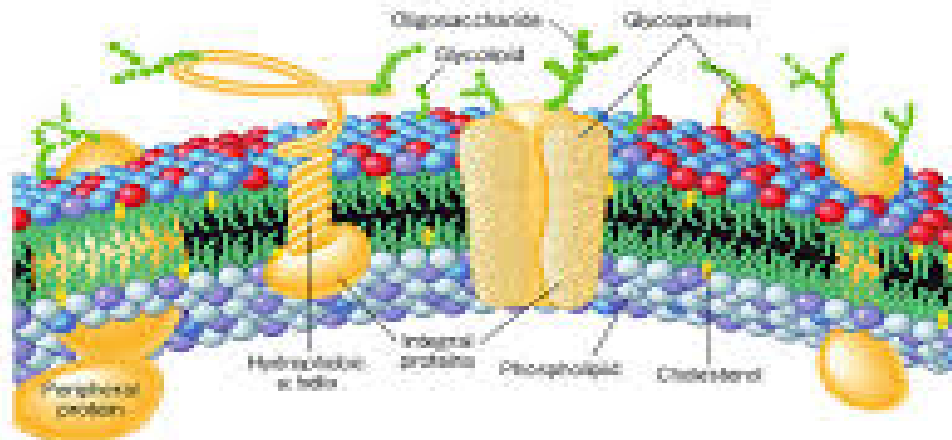




(b)



(c)



(d)

## 2. MICELLAR MODEL

MODELS BASED ON GLOBULAR ARRANGEMENT

