

**cell membranes and their principal function.**



# outline

1. The cell membrane
2. Biological components of cell membrane
3. Tasks of membrane proteins
4. Function
5. transport mechanism

# . Cell membrane

- Cell membrane also called the plasma membrane is a biological membrane separating the interior of a cell from the outside environment
- The outer line of any cell which serves to protect the cell and control passage of ions and molecules in and out of the cell.
- The exchange processes between the cell and its environment take place on the outer cell envelope, the cell membrane

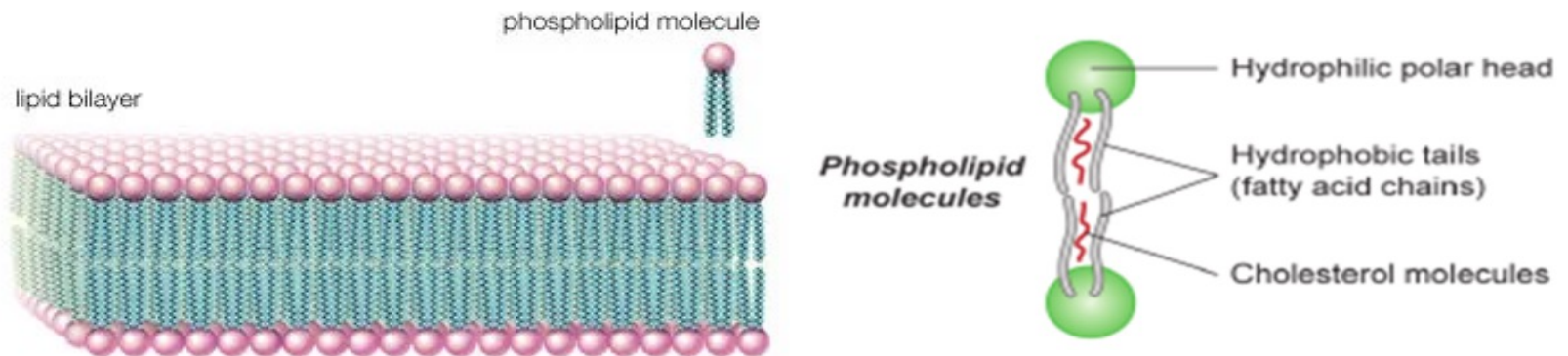
# Biological components of cell membrane

- **1- Lipid:**

- form about 30% of cell membrane biological components.
- Present in two forms:

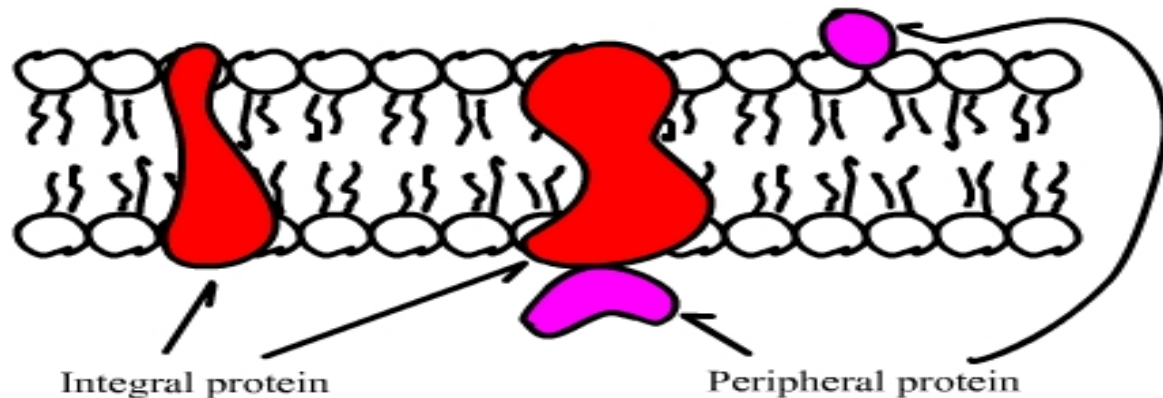
a) **Phospholipid bilayer:** each phospholipid molecule has 1- a **hydrophilic head(polar)** facing outward, contains a phosphate group and glycerol. 2- a **hydrophobic tail(non polar)** facing inward, contains 2 fatty acid chains .

b) **Cholesterol** between tails of phospholipids.



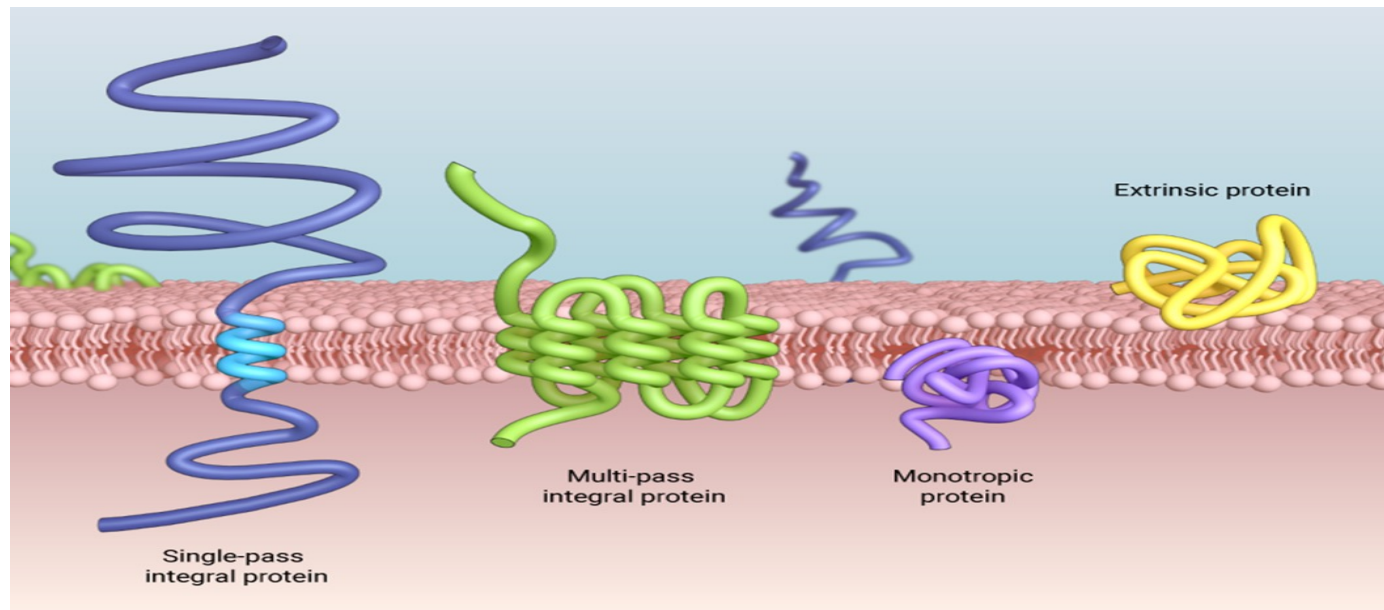
## 2- Proteins:

- form about 60% of cell membrane biological components.
- With two types: **a)integral proteins:** These are embedded membrane proteins that are immersed in the plasma membrane and extend their ends to appear on both sides of the membrane.
- **b)peripheral proteins:** They are proteins that do not bind directly to the cell membrane, but rather bind to other proteins in the membrane.



# Tasks of membrane proteins

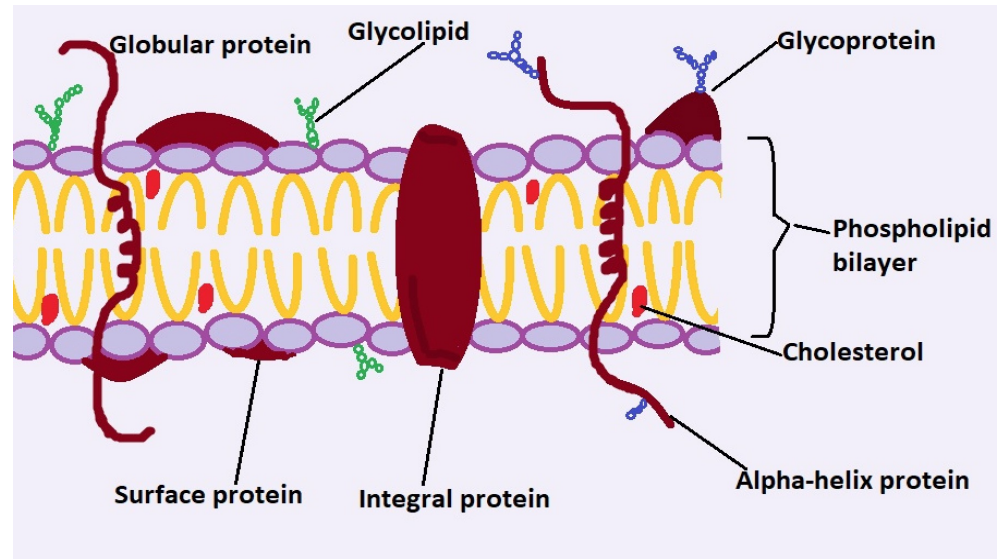
- The plasma membrane and the membrane of different organelles each have a characteristic protein configuration
- They act as carrier and transport molecules
- They break through the water-insoluble lipid layer and thereby create pores and channels
- They participate in the metabolism of the cell
- They contribute to the strength of the membrane





# 3-Carbohydrates:

- It is **located** on the outer surface of the membrane.
- **10%** of cell membrane biological components.
- present in a conjugated form with lipids (**Glycolipids**) and proteins (**Glycoproteins**).
- Carbohydrates **play** a large and major role in that they are a distinct cellular marker similar to molecular identification badges; That is, it allows the cells of the immune system to recognize each other and distinguish between body cells and foreign bodies that enter it and must attack them.



# Function of cell membrane

- The cell membrane is selectively permeable: various substances are selectively let through or blocked
- Protection: isolates the intracellular env. from extracellular env.
- Cell shape: anchors the cytoskeleton and provides attachment with adjacent cells and basement membrane to provide a particular shape to the cell.
- Receptors: it has receptors for specific molecules, such (hormones).



# transport mechanism in cell membrane

- **1- Passive transport mechanisms are:**

It is the diffusion of substances from high concentration to low concentration. It is down concentration gradients without the need for energy.

## **Types the Passive transport**

- **diffusion:**It is the transfer of solutes from **high** to **low** concentration to reach a state of **equilibrium**
- **Facilitated Diffusion:**It is the transfer of solutes from high to low concentration with the **help of transport proteins** without the need for energy
- **Osmosis:**It is the transfer of solutions from the **hypotonic** to the **hypertonic** until these solutions become **isotonic**

# transport mechanism

- **2-Active transport mechanisms are:**

It is the transfer of solute molecules from low to high concentrations **against** concentration gradients with energy use

**transport small particle:**

- **Ion pumps** in which certain ions are transported against their respective concentration gradients with the use of energy of ATP. For example, the sodium-potassium pump and the proton pump
- **transport large particle:**
- **Endocytosis:** the transfer of substances from outside the cell to its interior within vesicles.
- **Exocytosis:** the transport of substances outside the cell through secretory vesicles.

# transport mechanism

