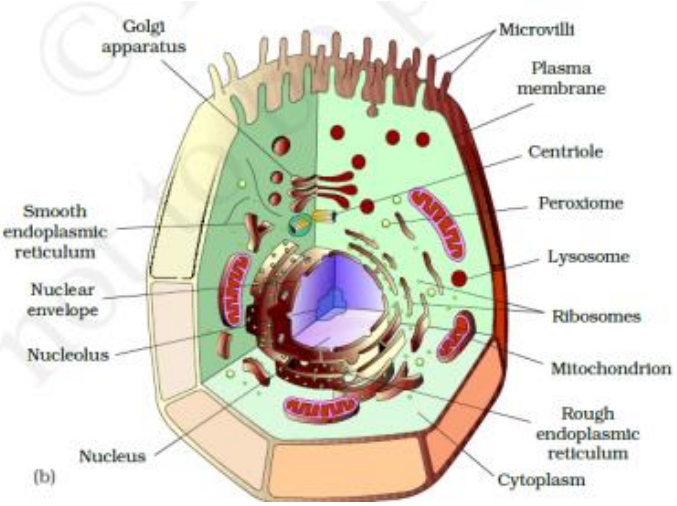
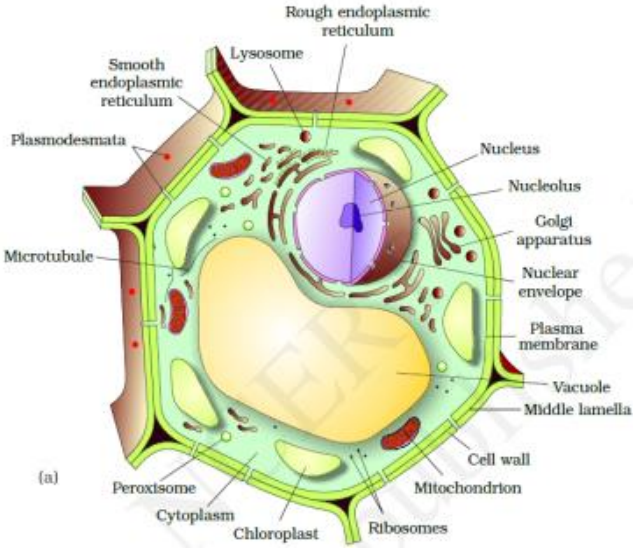
Eukaryotic Cell

- Found in Protista, Plants, Animals, and Fungi.
- Nuclear Membrane Present, Cytoplasm is divided into compartments due to presence of membrane-bounded organelles.
- The genetic materials are arranged in chromosomes.

Animal cell

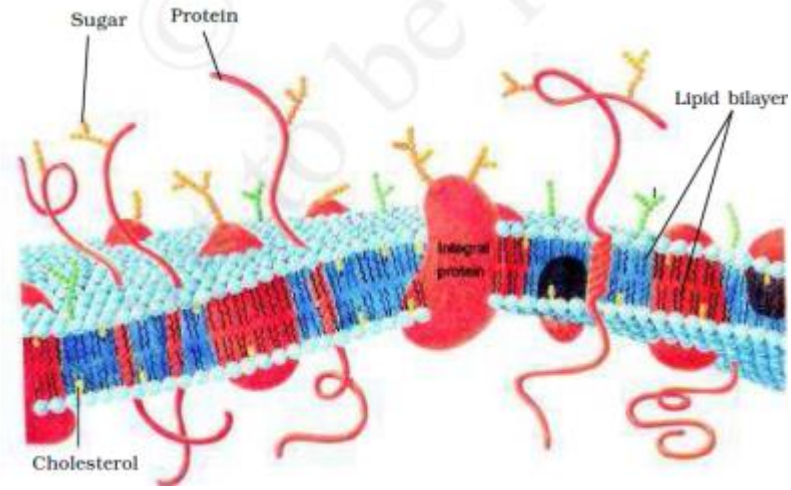


Plant cell



Cell membrane -composed of bilayer of lipids (phospholipids) and protein.

- Singer and Nicholson (1972) proposed **fluid mosaic model.**
- In bilayer of lipids polar head is outwards and hydrophobic (Non-polar) tail of hydrocarbon towards inwards.
- Membrane protein may be integral (buried in membrane) or peripheral (lies on the surface).
- With lipids membrane also possess protein, carbohydrates and some amount of cholesterol.
- The quasi-fluid nature of lipid enables lateral movement of protein within the bilayer of lipids-termed as Fluidity.



- It is selectively permeable membrane as is allows the transport of some molecules (only) across it.
- It protects the cell from injury.
- Types of transport: Active Transport, Passive Transport and Facilitate Transport.
- **Facilitate Transport:** Polar Molecules can not pass through non-polar lipids bilayer, hence require Carrier protein to facilitates their transport.

Active Transport	**Passive Transport**
1. The transport requires energy. 2. It occurs against the concentration gradient. 3. It is a rapid process. 4. Ex: Na+/K+ pump.	1. No energy is required. 2. It is along the concentration gradient. 3. It is comparatively slow process. 4. Ex: Neutral Molecules- by diffusion Water – through Osmosis

- The movement of water from higher concentration to lower concentration by diffusion is called **osmosis**.
- Endosmosis : The process in which the water molecules enter into the cell.
- Exosmosis : The process in which the water molecules move out of the cell.
- Isotonic solution- The same concentration of solutes both inside and outside the cell.
- Hypertonic solution- The higher solute concentration outside the cell than inside.
- A hypotonic solution- The higher solute concentration inside the cell than outside.

Que: Why is fluid nature of membrane is important?
Ans: It is important for functions like cell growth, formation of intracellular junction, secretions, endocytosis, cell division etc.

Cell Wall- Discovered by Robert Hooke (1665).

- A rigid and a non-living structure, forms an outer covering of the plasma membrane in plants and fungi. It is absent in animal cells.
- Give shape to cell, protects from mechanical injury and infection.
- Provide cell to cell interaction and provide barrier to undesirable macro-molecules.
- In young plant **primary cell wall**- capable of growth. Gradually diminishes as cell mature.
- Secondary cell wall forms towards inner side.
- Chemical Composition -**Algae** -cellulose, galactans, mannans and minerals like calcium carbonate, etc.
  Plant - cellulose, hemicellulose, pectins and proteins.
  Fungi – Chitin
- Plasmodesmata connects the cytoplasm of neighboring cells.
- Middle lamella (made of calcium pectate) holds neighbouring cells together.