ROBO DYNAMICS

Session 1
Fundamental Unit of Life
Cell Membrane

Session Objectives

- Cell Membrane
  - Osmosis
- Cell Wall
  - Nucleus
-

Cell Membrane

- Cell membrane is also called as plasma Membrane or Plasma lemma.
- It is the limiting boundary of each cell which separates the cytoplasm from its surroundings.
- It is found in both plant as well as animal cells.
- It is the outer most covering of a cell in case of animals and lies below the cell wall in case of plants.

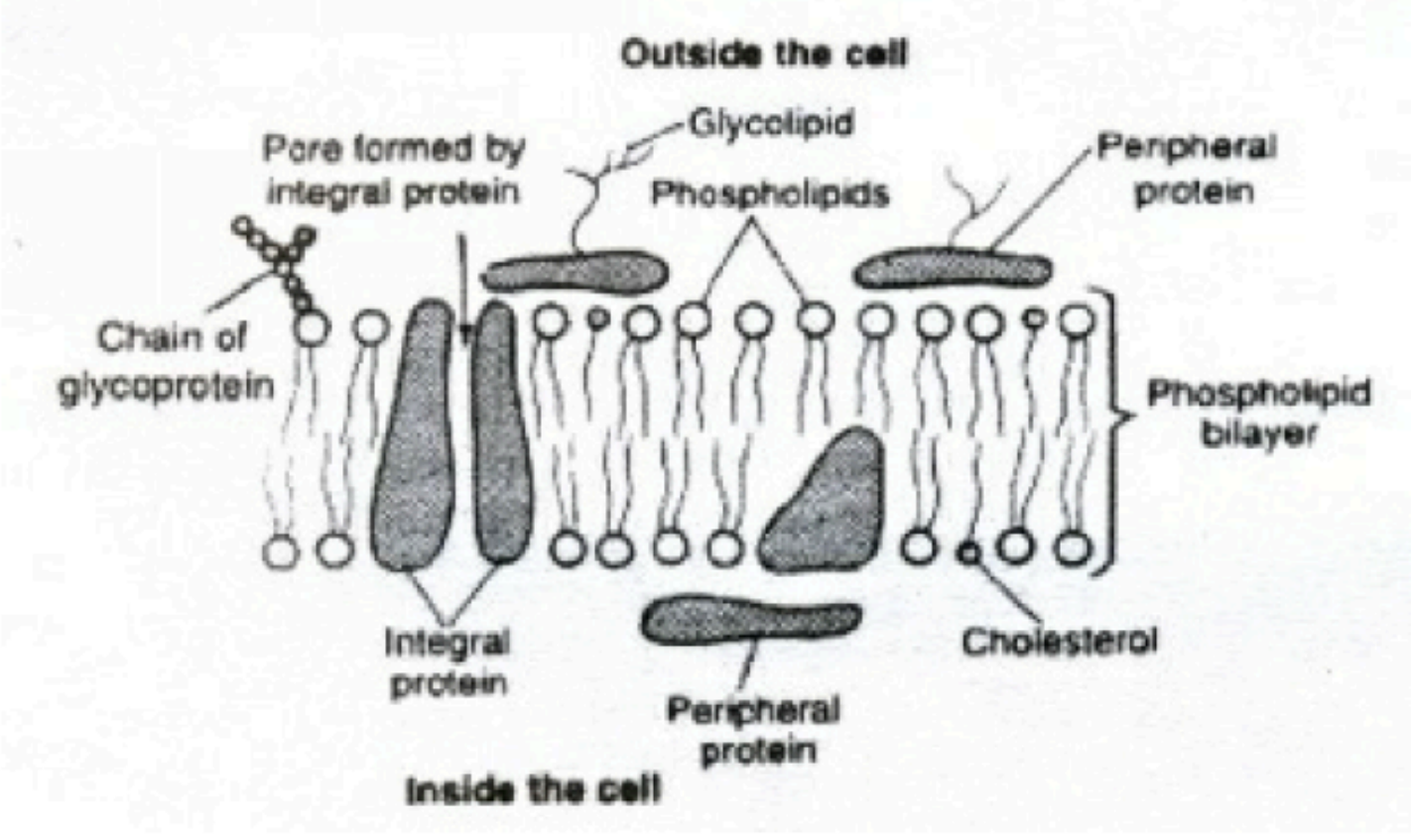
Cell Membrane

- It is made up of proteins and lipids where proteins are sandwiched between bilayer of lipids.
- Plasma membrane name was given by Nageli.
- Plasma membrane is selectively permeable in nature. It allows or permits the entry and exit of some materials in and out of the cell.

Cell Membrane

- Singer and Nicholson gave the fluid mosaic model of plasma
- membrane according to him it consists of a protein layer sandwiched between two layers of lipids. It is in quasifluid state. It is 75A thick.
- It is flexible and can be folded, broken and reunited.

Cell Membrane



Function of plasma membrane

- It regulates the movement of molecules inside and outside the cell.
- It helps in maintaining the distinct composition of the cell.

Transportation of molecules across the plasma membrane

- This can be done by following ways:
  - **Diffusion**: Movement of solutes or ions from higher concentration to lower concentration is called as diffusion. It does not require energy therefore it is called as passive transport
  - **Osmosis**: The movement of solvent or water from higher concentration (solvent) to lower concentration (solvent) through a semipermeable membrane is called as osmosis. Or The movement of solvent or water from lower concentration to higher concentration of solution through a semipermeable membrane is called as osmosis.
  - Osmosis can also be called as diffusion of solvents".

Transportation of molecules across the plasma membrane

- **Endosmosis**: Movement of solvent into the cell is called as Endosmosis.
- **Endosmosis**: Movement of solvent outside the cell is called as Endosmosis.

Types of solution on the basis of concentration

- **Isotonic solution**: When the concent, ation of the solution outside the equal to the
- Concentration of cytoplasm of the cell it is called as isotonic solution.
- **Hypertonic solution**: When the of concentration of the
- solution outside the cell is more than that inside the cell.
- Due to this cell looses water and becomes plasmolysed.
- **Hypotonic solution**: When the of concentration of the
- solution outside the cell is lesser than that of cytoplasm of cell. Due to this cell swells up and bursts

Cell Wall

- It is the outermost covering of the plant cells.
- It is absent in animal cells.
- Cell wall is rigid, strong, thick, porous and non living structure.
- It is made up of cellulose and hemicelluloses. Cell walls of two adjacent cells are joined by a layer called middle lamellae. It is made up of calcium and magnesium pectate.

Functions of cell wall

- It provides definite shape to the cell.
- It provides strength to the cell.
- It is permeable and allows entry of molecules of different sizes.
- It is antigen specific.
- It has the characteristics of repair and regeneration

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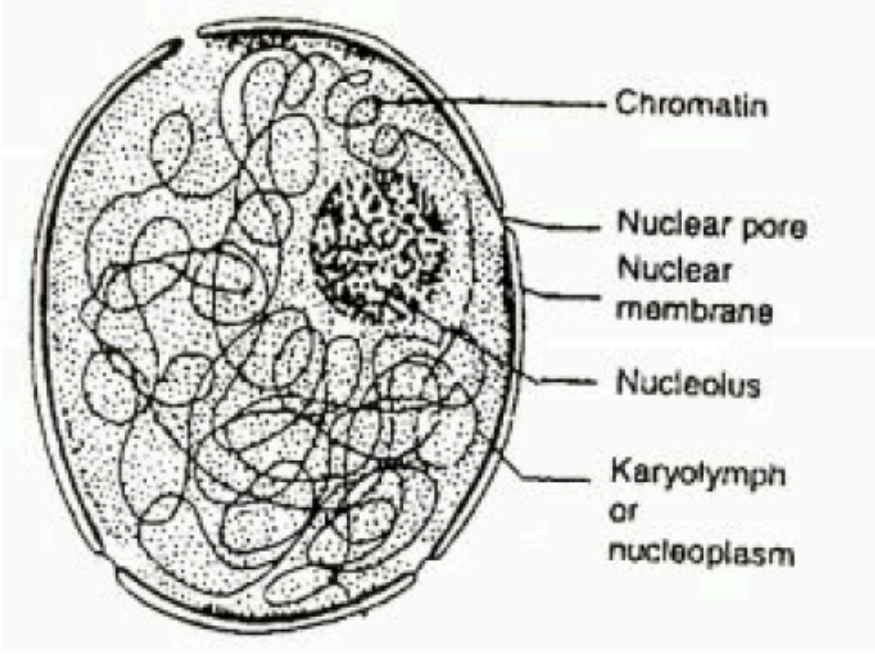

Figure: Nucleus

Nucleus:

- Nucleus is the most important cell organelle which directs and controls all its cellular activities.
- It is called as “Headquarter of the cell”.
- It was discovered by “Robert Brown in 1831”.
- In eukaryotes a well defined nucleus is present while in prokaryotes a well defined nucleus is absent.
- Prokaryotes contain a primitive nucleus.
- It has double layered covering called as nuclear membrane.
- Nuclear membrane has pores which regulate the movement of materials of materials in & out of the cell

Nucleus:

- Besides nuclear membrane nucleus also contains nucleolus and
- chromatin material and the substance filled inside the nucleus is
- nucleolus or karyolymph.
- Chromosomes or chromatin material consists of DNA which stores and transmits hereditary information for the cell to function, grow and reproduce

Function of the nucleus

- It controls all the metabolic activities of the cell and regulates the cell cycle
- It helps in transmission of hereditary characters from parents to off springs.