Frequently Asked Questions (FAQ's)

Q1. Define biological membrane?

Ans: A biological membrane or biomembrane is an enclosing or separating membrane that acts as a selective barrier, within or around a cell.

Q2. What is the composition of biological membrane?

Ans: Chemically, the biological membrane is composed of 60% proteins and 40% lipids (by dry weight). However, the percentage of protein may be as low as 20% (human myelin) or as high as 70% (rat liver mitochondria). The percentage of carbohydrates ranges from 2-10% which are in the form of glycoproteins or glycolipids.

Q3. Differentiate the integral and peripheral proteins?

Ans: Membrane proteins have been classified as integral (intrinsic) or peripheral (extrinsic) according to the degree of their association with the membrane. The integral proteins remain buried in lipid bilayer and remain associated with lipids when solubilized. They cannot be isolated by mild agents, e.g. membrane bound enzymes, antigens and hormone receptors. On the other hand, the peripheral proteins are found on the surface of the membrane and are free of lipids when solubilized. They can be isolated by mild treatment, e.g. Cytochrome C and ATPase of mitochondria, spectrin of RBCs.

Q4. What is the structure of plasma membrane?

Ans: The plasma membrane is formed of bilayer of lipids in to which protein complexes are embedded in a kind of mosaic arrangement.

Q5. What are the main lipid components of the plasma membrane?

Ans: The main lipid components of the plasma membrane are phospholipids, cholesterol and galactolipids.

Q6. What are the two types of proteins of the plasma membrane on the basis of their association with the membrane and their stability?

Ans: The two types of proteins of the plasma membrane are the integral or intrinsic and peripheral or extrinsic.

Q7. Who postulated that plasma membrane is composed of a thin layer of lipid?

Ans: Overton in 1902 postulated that plasma membrane is composed of a thin layer of lipid.

Q8. Define active transport?

Ans: The pumping of individual ions and other molecules across a cellular membrane from a region of lower concentration to one of higher concentration (i.e. against a concentration gradient) is called active transport. The process requires energy, which is typically supplied by the expenditure of ATP.

Q9. What are the most constantly found enzymes in the plasma membrane?

Ans: The most constantly found enzymes in the plasma membrane are 5`-nucleotidase, Mg^{2+} ATPase, Na^{+}-K^{+} ATPase, alkaline phosphatase, adenyl cyclase, acid phosphomonoestrase and RNAase

Q10. What is Na^{+}-K^{+} ATPase?

Ans: It is an ion pump or cation exchange pump which is driven by energy of one ATP molecule to export three Na^{+} ions outside the cell in exchange of the import of two K^{+} ions inside the cell. It is a transmembrane protein.

Q11. Differentiate between simple diffusion and facilitated diffusion?

Ans: Diffusion is the net movement of substances to regions of lower concentration as a result of random spontaneous motion. It tends to distribute substances uniformly. In simple diffusion, transport across the membrane takes place without the help of any permeases or a carrier, i.e. diffusion occurs unaided. On the other hand, facilitated diffusion is the transport of molecules and ions across a membrane by specific carriers in the direction of lower concentration of those molecules or ions.

Q 12. What is pinocytosis?

Ans: Uptake of small droplets of extracellular fluid by pinosome or endocytic vacuoles is called pinocytosis.

Q13. What is phagocytosis?

Ans: Process of ingestion of large sized food particles by the cell through the plasma membrane is called phagocytosis.

Q14. What are amphipathic molecules?

Ans: The amphipathic molecule refers to the presence of both hydrophilic and hydrophobic groups within the same molecule. The term amphipathy was coined by Hartley in 1936.

Q15. What are the various functions of plasma membranes?

Ans: The plasma membrane perform several important functions like transport of minerals, respiration, hormone and antigen specificity, exocytosis and endocytosis, general secretion and response to chemical stimuli.