OCR (A) Biology A-level

Topic 2.5: Biological membranes

Notes

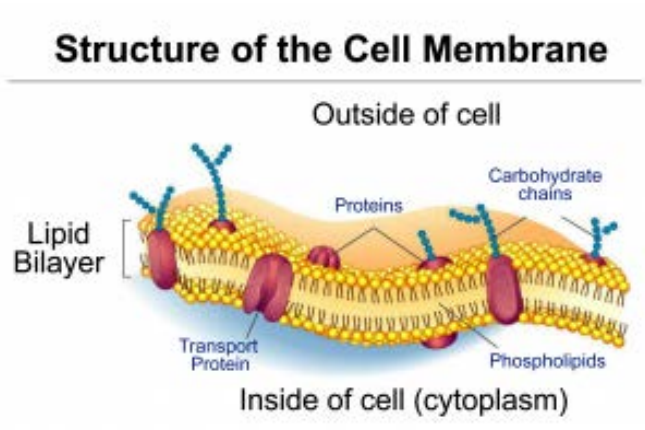

Figure: Biology Course

All cells and organelles are surrounded by a partially permeable membrane composed of a sea of phospholipids with protein molecules between the phospholipid molecules. The main function of the membrane is controlling the movement of substances in and out of the cell/organelle. However, it also contains receptors for other molecules such as hormones and enables adjacent cells to stick together. The fluidity of the membrane and the mosaic arrangement of the protein give the structure of the membrane its name – **fluid mosaic model**.

The movement of molecules through cell membrane depends on the properties of the molecule as well as the requirements of the cell. There are several types of movement:

- **Diffusion** is the passive movement of small, non-polar lipid soluble molecules such as carbon dioxide and oxygen from an area of high concentration to an area of low concentration. The molecules move directly through the phospholipid bilayer.

- **Facilitated diffusion** requires a **channel protein** in the cell membrane to transport polar molecules, charged and water soluble molecules across the membrane.

- **Osmosis** is the diffusion of water molecules from an area of low solute concentration to an area of high solute concentration through a partially permeable membrane.

- **Osmosis** is the diffusion of water molecules from an area of high water potential to an area of low water potential through a partially permeable membrane.
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- **Active transport** can transport all types of molecules through carrier proteins from an area of low concentration to an area of high concentration. However, this process requires energy in the form of ATP.

- **Exocytosis** and endocytosis transport large particles and bulk transport . The particles are enclosed in vesicles made from the cell surface membrane and transported into the cell in endocytosis. In exocytosis, vesicles containing large particles are fused with the cell surface membrane.

The rate of **gas exchange** by diffusion becomes more rapid as:

- **Surface area** of the surface increases
- **Diffusion distance** decreases
- **Diffusion gradient** becomes more steep