

CAIE Biology A-level

Topic 4 - Cell Membranes and Transport

Definitions and Concepts

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Active transport - The active movement of substances from a low concentration to a higher concentration (up their concentration gradient) with the use of energy in the form of ATP.

Antigen - Marker molecule on the cell surface membrane (usually a protein or glycoprotein) that can be detected by antibodies and triggers an immune response.

Carrier protein - Protein involved in active transport that uses energy in the form of ATP to change conformation.

Cell signalling - Cells release chemicals which bind to complementary receptors on their target and trigger specific responses.

Cell surface receptor - A component on the cell membrane which binds to extracellular signals.

Channel proteins - Transmembrane proteins for transporting large or charged substances. Some are involved in facilitated diffusion and do not use ATP; others are involved in active transport and do require energy in the form of ATP.

Cholesterol - A steroid hormone which adds stability to the lipid bilayer.

Diffusion - The passive spreading out of substances from a high concentration to a lower concentration (down their concentration gradient) without the use of energy.

Endocytosis - A method of bulk transport into a cell which relies on invagination of the cell membrane and requires energy in the form of ATP.

Exocytosis - A method of bulk transport out of a cell which occurs when vesicles fuse with the cell membrane and release their contents. It requires energy in the form of ATP.

Facilitated diffusion - The passive movement of substances from a high concentration to a lower concentration (down their concentration gradient) through transport proteins without the use of energy.

Fluid mosaic model - A model that describes membrane structure as a sea of mobile phospholipids studded with various proteins.

Glycolipid - A lipid which is bound to a monosaccharide or oligosaccharide.

Glycoprotein - A protein which is bound to a carbohydrate chain.

Ligand - An ion or molecule that transmits signals within or between cells. It has a role in cellular signalling and recognition.

Osmosis - The passive diffusion of water molecules from a region of high water potential to a region of lower water potential (down a water potential gradient) through a selectively permeable membrane without the use of energy.

Passive transport - The movement of substances without the use of energy.



Phospholipid - The type of lipid which forms the cell surface membrane bilayer. It is formed by the condensation of one molecule of glycerol, two molecules of fatty acid and a phosphate group. The two fatty acid chains are the non-polar hydrophobic tails whilst the phosphate group is the polar hydrophilic head.

Phospholipid bilayer - A polar membrane made of two layers of phospholipid molecules. It is a selectively permeable barrier to the passage of ions and molecules into and out of cells.

Surface area to volume ratio - The volume of an object compared with the amount of area where it contacts its environment. Calculated by dividing the surface area of an object by its volume.

Visking tubing - A semipermeable material which can be used to model the cell surface membrane.

Water potential - A measure of the tendency of water molecules to move from one area to another measured in kilopascals (kPa) and given the symbol Ψ .

