

Membranes and membrane transport

What does amphipathic mean?

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Why do phospholipids form bilayers in water?

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Why is a lipid bilayer a barrier to ions and polar molecules?

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Name two molecules that cross membranes by simple diffusion between phospholipids.

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Define osmosis.

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What are aquaporins?

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How do channel proteins make membranes selectively permeable?

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What do pump proteins use to move particles against a concentration gradient?

Hydrophilic heads face the water on both sides and the hydrophobic tails point inwards, away from water, forming the core.

Having a hydrophilic part and a hydrophobic part, like a phospholipid with its phosphate head and hydrocarbon tails.

Oxygen and carbon dioxide (small, non-polar molecules).

Its hydrophobic hydrocarbon core has low permeability to hydrophilic particles and large molecules.

Integral channel proteins that let water molecules cross the membrane rapidly, in single file.

The net movement of water across a partially permeable membrane from a lower to a higher solute concentration.

Energy from ATP (active transport).

The size and charges of the pore let only specific ions through, and only when the channel is open.

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What does permeability by simple diffusion depend on?

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Distinguish integral and peripheral proteins.

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Where are the carbohydrate chains of glycoproteins and glycolipids?

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Give two roles of glycoproteins and glycolipids.

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What should a drawing of the fluid mosaic model include?

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Why do unsaturated fatty acids keep membranes fluid?

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Give an example of membrane composition adapted to habitat.

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How does cholesterol modulate membrane fluidity?

Integral proteins are embedded in one or both lipid layers. Peripheral proteins are attached to one surface of the bilayer.

Only the size of the particle and whether it is hydrophilic or hydrophobic. It is not selective.

Cell recognition and cell adhesion.

On the extracellular side of the plasma membrane.

Cis double bonds kink their chains so they pack loosely, giving lower melting points.

Phospholipid bilayer, integral and peripheral proteins, glycoproteins, cholesterol, and labelled hydrophilic and hydrophobic regions.

It stabilises membranes at higher temperatures and prevents stiffening at lower temperatures.

Antarctic fish have more unsaturated fatty acids in their membranes than related fish from warmer waters, keeping membranes fluid in the cold.

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Distinguish endocytosis and exocytosis.

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Give an example of a neurotransmitter-gated ion channel.

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Name two voltage-gated channels in neurons.

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What does one cycle of the sodium-potassium pump do?

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Why is sodium-dependent glucose cotransport called indirect active transport?

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Where are sodium-dependent glucose cotransporters important?

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What are CAMs?

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Do all cell-cell junctions use the same CAM?

The nicotinic acetylcholine receptor, which opens when acetylcholine binds, letting Na^+ in.

Endocytosis: membrane folds in to form a vesicle, taking material in. Exocytosis: a vesicle fuses with the plasma membrane, releasing its contents.

Uses one ATP to pump three Na^+ out of the cell and two K^+ in.

Voltage-gated sodium channels and voltage-gated potassium channels.

Glucose absorption by small intestine cells and glucose reabsorption by proximal convoluted tubule cells in the nephron.

It uses the Na^+ gradient made by the ATP-driven sodium-potassium pump, not ATP directly, to move glucose against its gradient.

No. Different forms of CAM are used for different types of cell-cell junction.

Cell-adhesion molecules: membrane proteins that bind cells together to form tissues.

What kind of molecules are most CAMs?

Membrane glycoproteins that project from the cell surface and bind to CAMs on neighbouring cells.