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Membrane physiology

Animal Physiology

Plasma membrane made mostly of lipids, some proteins, and small amount of carbohydrates.

Hydrophilic polar heads and hydrophobic uncharged tails.

Only lipid soluble molecules can cross.

Amphipatic nature: can interact with water and oils.

Cholesterol: makes membrane water impermeable. Keeps membrane flexible with temperature. Without cholesterol water would sometimes sneak through the hydrophobic tail.

When phospholipids are placed in aqueous solution one of three shapes will form.

-Liposome

-Micelles

-Bilayer sheet

The Fluid Mosaic Model

The phospholipid bilayer is the back bone.

It is a fluid, whose fluidity changes with temperature, cholesterol, and types of lipids (polyunsaturated fatty acids vs saturated fatty acid).

Fatty acids that remain liquid at room temp or higher temp are called polyunsaturated FAs. Those that have high freezing points or remain solid at room temp are saturated FAs.

Carbohydrates attach to proteins and lipids forming glycoproteins and glycolipids.

Functions of membranes

Structural elements (link cytoskeleton to membrane and cell to cell connection such as Cell adhesion molecules, CAMS)

Enzymes,

Receptors

Transporters

Channels: can be open, leaked, voltage gate, ligan gated, etc. Substances can only travel in one direction.

Carriers: carry large molecules and changes conformation in order to transport. Can travel in both directions up or down their concentration gradient.

Self identity markers:

Membrane dynamics

Fick's law of diffusion: