

Facilitated diffusion

- Ions and other particles cannot diffuse between phospholipids, they can pass into or out of the cell through channels in the plasma membrane.
- These channels are holes with a very narrow diameter.
- Their walls consist of protein.
- The diameter and chemical properties of the channel ensure that only one type of particle passes through.
- Cells can control which types of channel are synthesized and placed in the plasma membrane and in this way control which substances diffuse in and out.

Osmosis

- Osmosis is due to differences in the concentration of substances dissolved in water
- Regions with a higher solute concentration have a lower concentration of water molecules free to move.
- There is a net movement of water from regions of low solute concentration to regions with higher solute concentration.
- Osmosis can happen in all cells because water molecules are small enough to pass through the phospholipid bilayer.
- Some cells have channels called **aquaporins** which greatly increase membrane permeability to water.

Active transport

- Cells take substances even though there is already a higher concentration inside than outside.
- The substance is absorbed against the concentration gradient.
- Sometimes cells pump substances outside the cell even though there is a higher concentration outside.
- ATP is needed.
- Carried by globular proteins in membranes, usually called pump proteins.
- They allow the cell to control the content of its cytoplasm precisely

Active transport of sodium and potassium in axons

Structure and function of sodium-potassium pumps for active transport.

- An axon is part of a neurone cell and consist of a tubular membrane with cytoplasm inside.
- Their function is to convey messages rapidly from one part of the body to another in an electrical form called nerve impulse.
- A nerve impulse involves rapid movements of sodium and then potassium ions across the axon membrane.
- This movements occur by facilitated diffusion through sodium and potassium channels.
- They occur because of concentration gradients built up by active transport inside and outside the cell and are carried out by a sodium-potassium pump.
- It follows a repeating cycle of steps that result in 3 sodium ions being pumped out of the axon and two potassium ions being pumped in.