

2.2.6 Movement through Cell Membranes

Permeability

Membranes can be

Permeable – let everything in and out

Semi Permeable - let some things in and out

Impermeable – let nothing in and out

Diffusion

The movement of [gas or liquid] molecules from a region of high concentration to a region of low concentration.

Examples of diffusion

- gaseous exchange in alveoli and leaves
- absorption of digested food in the small intestine
- Absorption of minerals by root hairs
- transpiration through stomata

Osmosis

The movement of water molecules from a region of high (water) concentration to a region of low (water) concentration across a S.P.M.

Osmosis is a special case of diffusion – does not require energy (is passive).

Examples of osmosis

- Water entering root hair cell
- Water moving from cell to cell in transpiration
- Water moving between our body cells and blood
- Water re-absorption in the nephron

Osmosis & Food Preservation

SALTING - causes water to be drawn from bacterial cells and denatures bacterial enzymes - kills all bacteria.

Fish and Meat (bacon) may be stored in a salty solution.

SUGAR - in high concentrations causes water to be drawn from bacterial cells - kills all bacteria. Jams and tinned fruits are stored in a sugary solution.

Osmosis and Plant Cells

Cell walls are fully permeable and will allow all substances in and out of the cell.

If a plant cell is surrounded by a less concentrated solution then water from outside will move into the cytoplasm and vacuole of plant cells.

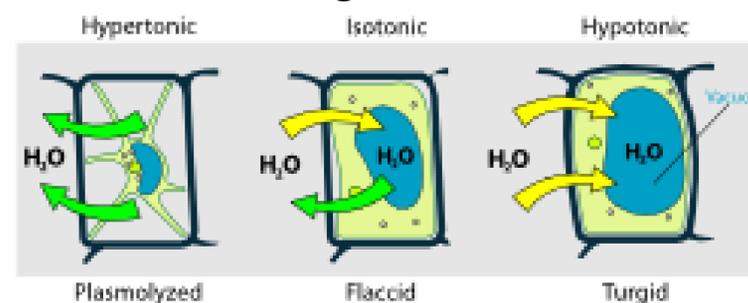
This is how roots absorb water by **osmosis**.

Turgor

When the outside water enters the plant cell the vacuole becomes bigger and the cytoplasm swells.

This causes the membrane to be pushed out towards the cell wall.

When cells are fully “swelled” like this with the membranes pushing against the cell wall they are described as **Turgid**.

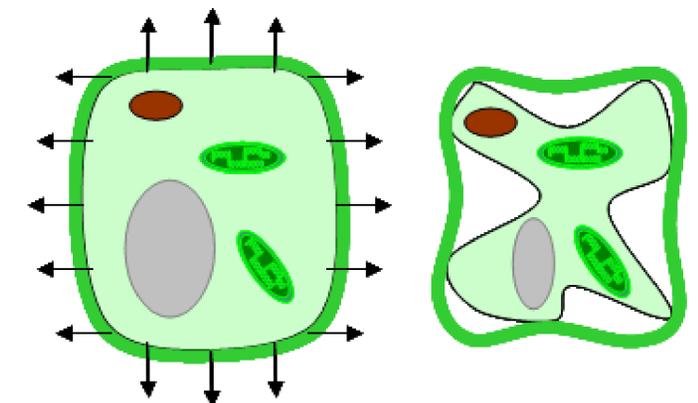


Turgor pressure

This turgor pressure gives plants their strength. If plants did not have this they would be wilted. Plants that don't have wood such as lettuce and house plants rely on turgor pressure for strength.

Plant cells in a more concentrated solution

- If plant cells are surrounded by a more concentrated solution (for example if plant cells were surrounded by salt water) the water inside the cell would move out to the more concentrated solution outside.



- When this happens the cell wall stays intact but the membrane shrivels up away from it.

- This is called **Plasmolysis**.

- Cells in this condition are called **plasmolysed** cells.