

Active transport

Revision notes · Active transport moves particles against a concentration gradient using energy from respiration and protein carriers.

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Active transport Spec 3.3

Active transport Spec 3.3.1, 3.3.2, 3.3.3

Active transport

The movement of particles through a cell membrane from a region of lower concentration to a region of higher concentration (i.e. against a concentration gradient), using energy from respiration.

Diffusion and osmosis are passive: they need no energy from the cell. Active transport needs **energy from respiration**, so it stops if respiration stops.

Supplement

Why active transport is important

Supplement

Active transport lets cells take in useful molecules or ions even when they are in a lower concentration outside the cell than inside. It also lets cells move molecules or ions out of the cell against a gradient.

Supplement

An example is **ion uptake by root hairs**. The soil contains very low concentrations of mineral ions such as nitrate. Root hair cells absorb these ions against their concentration gradient. The plant needs them for healthy growth. Root hair cells have many mitochondria to release the energy needed.

Supplement

Protein carriers

Supplement

Active transport uses **protein carriers** in the cell membrane to move molecules or ions across the membrane.

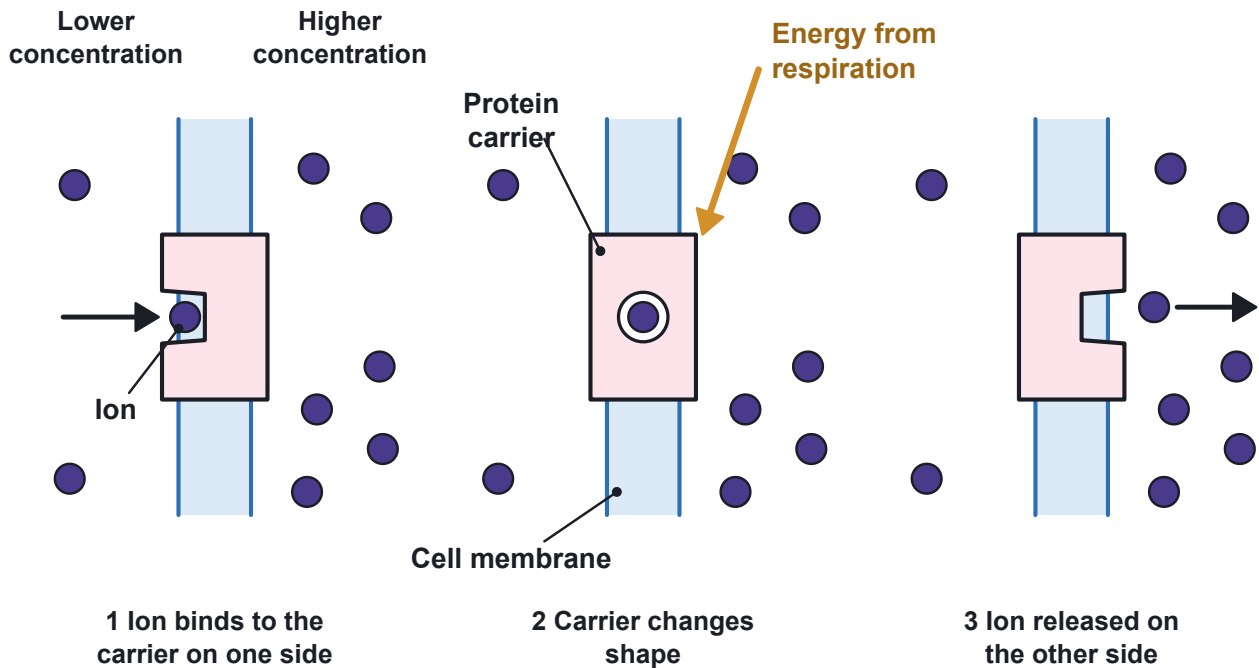
Supplement

1. A molecule or ion binds to a carrier protein on one side of the membrane.
2. The carrier uses energy from respiration and changes shape.
3. The molecule or ion is released on the other side of the membrane, against its concentration gradient.

Diffusion and active transport

	Diffusion	Active transport
Direction	Down a concentration gradient	Against a concentration gradient
Energy from respiration	Not needed	Needed

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A **protein carrier** uses **energy from respiration** to move an ion against its concentration gradient.

Exam tip: Compare in the same way each time: 'active transport needs energy from respiration whereas diffusion does not'. Never say active transport 'makes' energy.

Quick check

1. Define active transport.
2. Where does the energy for active transport come from?
3. **Supplement** Give an example of active transport in plants.
4. **Supplement** What moves molecules or ions across a membrane in active transport?

Quick check answers

Active transport

- 1 . The movement of particles through a cell membrane from a region of lower concentration to a region of higher concentration (i.e. against a concentration gradient), using energy from respiration.
- 2 . Respiration.
- 3 . Ion uptake by root hairs.
- 4 . Protein carriers.