1.3.3. Active Transport

Recap

We previously learnt about osmosis and how to perform rate calculations, using percentages and plotting, dewing and interpreting graphs.

Key Aims

1. *Active Transport Basics*
2. *Active Transport in Plants*
3. *Active Transport in the Body*

AQA Specification

Active transport moves substances from a more dilute solution to a more concentrated solution (against a concentration gradient).

AQA Specification

Active transport requires energy from respiration.

Study Mind Tip

AQA questions often ask about the distinction between osmosis, diffusion and active transport.

Active transports is another method of transport in cells. It is special as it requires energy as it moves particles against a concentration gradient.

- **Active transport is the movement of substances against a concentration gradient using energy. This energy is provided by respiration.**

Active transport occurs in plants.

- **Active transport occurs in root hair cells.** Plants require mineral ions for growth. Nitrates are especially needed for protein synthesis. They take these in from the soil. Mineral ions are in a higher concentration inside the root hair cells than in the soil. They then move via active transport from the soil into the root hair cells in order to enter the plant.

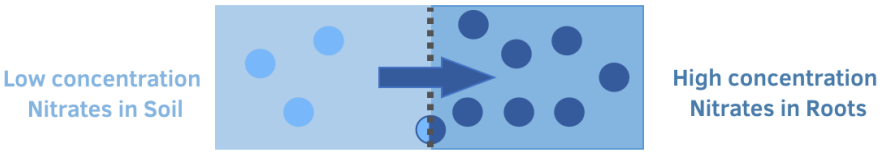

Fig 1. Active Transport of Nitrates.

Active transport also occurs in the body.

- **Active transport occurs in the gut wall.** Active transport helps sugar to be transferred from a low concentration in the gut to a higher concentration in the blood. This allows the glucose from the gut to be absorbed. This glucose is used for respiration.

AQA Specification

Active transport allows mineral ions to be absorbed into plant root hairs from very dilute solutions in the soil. Plants require ions for healthy growth.

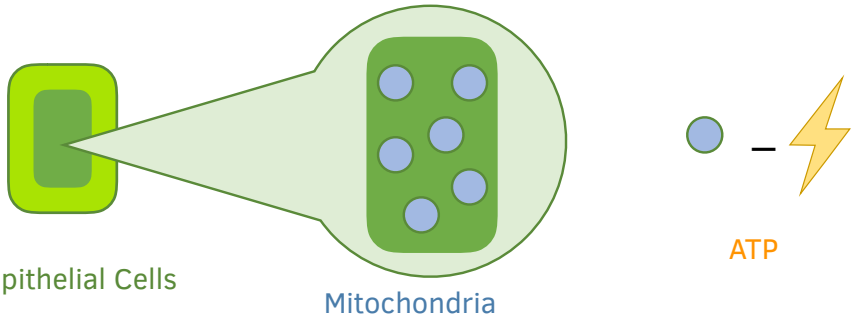

Fig 2. Active Transport in Epithelial cells. Glucose is actively transported into epithelial cells against a concentration gradient.

AQA Specification

It also allows sugar molecules to be absorbed from lower concentrations in the gut into the blood which has a higher sugar concentration. Sugar molecules are used for cell respiration.

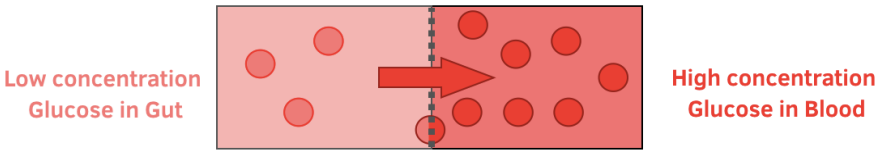

Fig 3. Active Transport of Glucose into the blood. Glucose moves into the blood against a concentration gradient.

Study Mind Tip

Active transport occurs in epithelial cells. AQA questions often ask why they need many mitochondria. Remember that as active transport requires ATP, cells that use active transport require many mitochondria.

Transport

Active Transport	Simple Diffusion	Osmosis
Active	Passive	Passive
Low to High Concentration	High to Low Concentration	High to Low Concentration

Fig 4. Types of Transport in Cells.

Study Mind Tip

Diffusion and osmosis are known as passive processes because they do not require ATP to occur. Active transport, in contrast, is active. AQA questions often give 2 marks for learning these simple definitions