*ACTIVE TRANSPORT - The movement of particles against a concentration gradient, ~~using~~ by a protein carrier, using energy from respiration

Osmosis and diffusion

Water and dissolved substances ~~move~~ move from high concentrations to low concentrations of solutes - along a concentration gradient. Osmosis → through partially permeable membrane.

Active Transport

Substances absorbed against a concentration gradient using energy from respiration. Opposite direction to normal diffusion. (use of protein carrier)

- Plants absorb ions from very dilute solutions by active transport.
- Humans - sugar can be absorbed from the intestine and from the kidney tubules by active transport.

Villi in Small Intestine

- Thin walls - ~~short distance for diffusion~~
- Villi line the walls of small intestine.
- Have massive surface area - increase rate of diffusion
- Have an extensive network of capillaries - ~~quicker~~ + oxygen supplied for respiration to produce energy for active transport (rich blood supply produces a steep concentration gradient for diffusion.)

Large food molecules must be digested into smaller molecules before they can be used in the body.

- Physical digestion from teeth, gut movement and bile.
- Chemical digestion by enzymes.

PROTEIN $\xrightarrow[\text{pepsin}]{\text{protease}}$ AMINO ACIDS.

CARBOHYDRATES $\xrightarrow[\text{amylase}]{\text{carbohydrase}}$ GLUCOSE and SIMPLE SUGARS.

FATS $\xrightarrow{\text{lipase}}$ FATTY ACIDS and GLYCEROL.

Digested food molecules and your blood stream.

- Digested food molecules are soluable in water.
- They move across wall of small intestine into your blood by diffusion along a concentration gradient.