

Transport in cells

Define diffusion.

Transport in cells

Give three substances that move by diffusion in the body.

Transport in cells

Name three factors that affect the rate of diffusion.

Transport in cells

Why does a single-celled organism not need an exchange surface?

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How do you calculate surface area to volume ratio?

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Why do large multicellular organisms need exchange surfaces and a transport system?

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What makes an exchange surface more effective?

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How is the small intestine adapted for exchange?

Oxygen and carbon dioxide in gas exchange, and urea from cells into blood plasma.

The spreading out of the particles of any substance in solution, or particles of a gas, resulting in a net movement from an area of higher concentration to an area of lower concentration.

It has a large surface area to volume ratio, so enough molecules can diffuse in and out.

Concentration gradient, temperature and surface area of the membrane.

Their surface area to volume ratio is small, so diffusion across the outside would not supply all cells.

Surface area $\div$ volume. For a cube: surface area = $6 \times \text{side}^2$, volume = side^3 .

Villi give a large surface area, a thin wall gives a short diffusion path, and a good blood supply carries absorbed molecules away.

Large surface area, thin membrane (short diffusion path), efficient blood supply (animals) and ventilation (animal gas exchange).

Transport in cells

How are the lungs adapted for gas exchange?

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How are the gills of a fish adapted for exchange?

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How are roots and leaves adapted for exchange?

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Define osmosis.

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How do you calculate percentage change in mass?

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Osmosis required practical (RP3 Triple, RP2 Combined): what is measured and what is varied?

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Osmosis required practical: what does a loss in mass show?

Transport in cells

Define active transport.

Many gill filaments with lamellae give a large surface area, thin, with a good blood supply and water flowing over them.

Many alveoli give a large surface area, thin walls, a good blood supply and ventilation.

The diffusion of water from a dilute solution to a concentrated solution through a partially permeable membrane.

Root hairs give a large surface area for water and ions. Leaves are flat and thin with air spaces and stomata for gas exchange.

Measure the mass of plant tissue before and after. Vary the concentration of salt or sugar solution.

$$(\text{final mass} - \text{initial mass}) \div \text{initial mass} \times 100.$$

Movement of substances from a more dilute to a more concentrated solution, against a concentration gradient, using energy from respiration.

Water moved out of the cells by osmosis because the solution was more concentrated than the cell contents.

Transport in cells

Give two examples of active transport.

Transport in cells

How does active transport differ from diffusion?

It moves substances against the concentration gradient and needs energy from respiration.

Mineral ions into plant root hairs from the soil, and sugar from the gut into the blood.