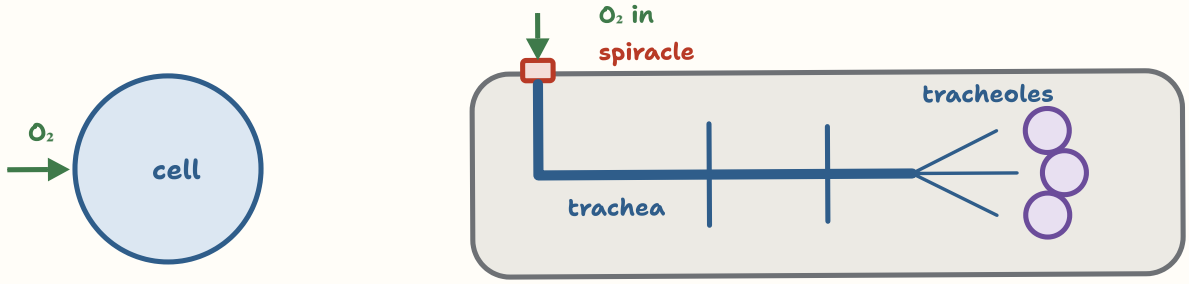
Gas Exchange: Single Cells and Insects

Single-celled organisms exchange gases across the cell surface; insects use a tracheal system of spiracles, tracheae and tracheoles.

Single cell: diffusion across the membrane. Insect: spiracles, tracheae, tracheoles



large SA:V: direct diffusion

tracheoles end at respiring cells;
O_2 diffuses down its concentration gradient

Key terms

single-celled organism	has a large surface area to volume ratio, so gases diffuse directly across the cell surface membrane.
spiracle	a pore on the insect's body surface where air enters (it can open and close).
trachea	a large air-filled tube that carries air into the insect's body.
tracheole	a small branch of a trachea that ends next to respiring cells.
tracheal system	the network of air-filled tubes that delivers oxygen straight to the cells.
diffusion	oxygen moves from higher to lower concentration, so no energy is used.

I can...

- ☐ Gas exchange across the body surface of a single-celled organism
- ☐ Tracheal system of an insect: tracheae, tracheoles, spiracles

EXAM TRAP

Insects do not carry oxygen in the blood. Air passes in through spiracles and along tracheae to tracheoles, and oxygen then diffuses to the cells. Never say active transport or lungs.

4 marks: what earns them

1. Single-celled organism: large surface area to volume ratio, so oxygen diffuses directly across the cell surface membrane
   Not: absorbed by active transport; breathes through lungs/gills
2. Insect: air enters through the spiracles
   Not: mouth; lungs; air enters the blood
3. Air passes along the tracheae into the (smaller) tracheoles
   Not: oxygen carried in blood / haemolymph
4. Tracheoles reach / end next to respiring cells, and oxygen diffuses down its concentration gradient into the cells
   Not: active transport; oxygen is pumped to the cells

Remember

Spiracle, trachea, tracheole.
Tubes end at the cells.
Oxygen diffuses, it is never pumped.

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