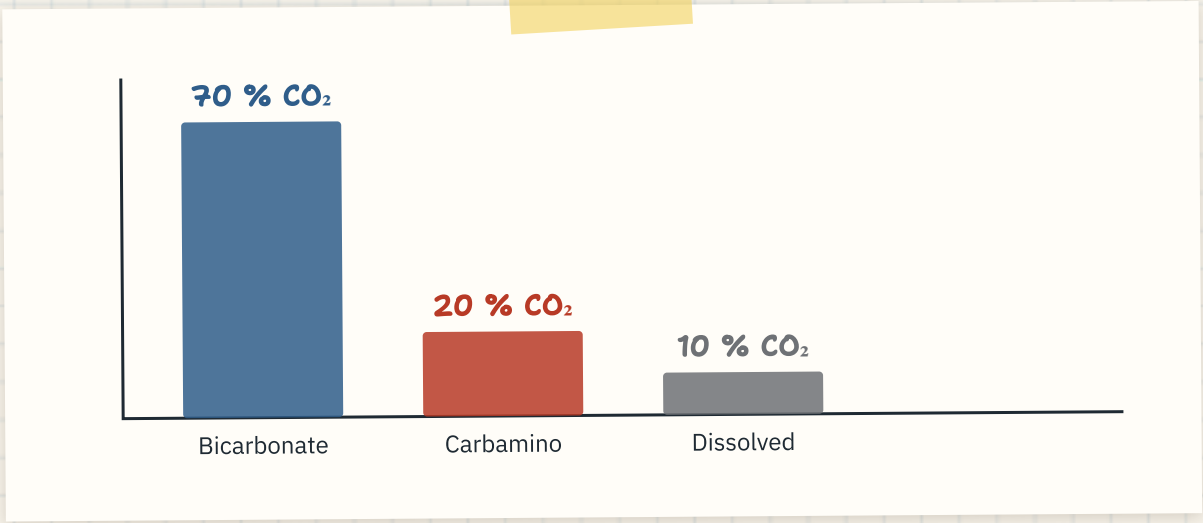
CO_2 transport

Three forms, the chloride shift, Bohr vs Haldane



Step by step

1. CO_2 diffuses into the red cell
2. Carbonic anhydrase makes H^+ and HCO_3^-
3. Deoxyhaemoglobin buffers the H^+
4. HCO_3^- leaves, Cl^- enters
5. In the lungs everything reverses

IN THE RED CELL

$$CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$$

carbonic anhydrase; HCO_3^- out, Cl^- in (chloride shift)

Effect / site	What changes what
Bohr	CO_2 and H^+ change O_2 binding (right shift in tissues)
Haldane	O_2 changes CO_2 and H^+ binding
Tissues (Haldane)	Deoxyhaemoglobin picks up more CO_2 and H^+
Lungs (Haldane)	Oxygenation releases CO_2

Bohr vs Haldane

Rule of thumb

Bohr: carbon dioxide changes oxygen

Haldane: oxygen changes carbon dioxide

Exam traps

- Bohr and Haldane point in opposite directions: check which gas acts on which.
- Usual figure 70 / 20 / 10; 90 / 5 / 5 is total CO_2 in arterial blood. Bicarbonate is always the largest.
- Venous plasma has slightly less chloride than arterial plasma.

For exam study only, not medical advice. Follow local guidelines and your lab's ranges.
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