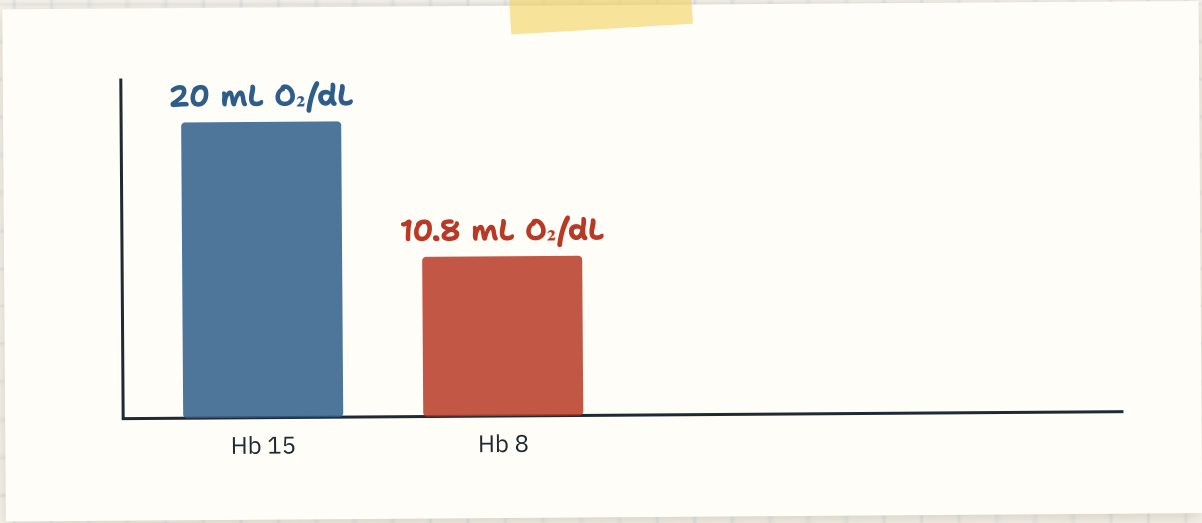
The O_2–hemoglobin curve

P50, shifts and why saturation is not content



Step by step

1. Sigmoid curve: cooperation between the four subunits
2. P50 about 27 mmHg in an adult
3. Flat at high PO_2, steep at tissue PO_2
4. Higher P50 = right shift = oxygen released more easily
5. Saturation is not content

Right (P50 up)	Left (P50 down)
More CO_2	Less CO_2
Acid	Alkalosis
Heat, exercise	Cold
More 2,3-BPG	Less 2,3-BPG
	Fetal hemoglobin

Shifts of the curve

OXYGEN CONTENT

$$CaO_2 = 1.34 \times Hb \times SaO_2 + 0.003 \times PaO_2$$

mL O_2/dL; SaO_2 as a fraction; dissolved O_2 is only about 0.3 mL/dL at PaO_2 100

Rule of thumb

CO_2, acid, heat, 2,3-BPG: shift right

The opposites: shift left

Curve = saturation; equation = content

Exam traps

- A shift of the curve is not movement along it; CO_2, acid, heat and 2,3-BPG move the curve itself.
- Normal SaO_2 and PaO_2 can still hide a low oxygen content.
- Fetal hemoglobin shifts the curve left, not right.

Oxygen-hemoglobin dissociation curve: P50, shifts and content

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/respiratory-physiology/oxygen-hemoglobin-dissociation-curve

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