

Transport of O₂ by blood/High School (nurse)

The organism obtains oxygen from the surrounding environment by diffusion through the alveolo-capillary membrane. This is important for **aerobic metabolism** and the normal functioning of the organism.

Oxygen is bound to hemoglobin → oxyhemoglobin in the blood; in dissolved form, its amount is minimal. → the amount of hemoglobin (Hb) in erythrocytes indicates the *transport capacity* of blood for oxygen.

- **1 g of Hb = 1.39 ml of oxygen** → 150 g of Hb in 1 liter of blood = 200 ml of oxygen → with a cardiac output of 5 l, 1 l of oxygen is transferred per minute.
- Oxygen concentration is expressed by **partial pressure** (pO₂).
- Saturation of Hb with oxygen indicates **saturation**. It is expressed as a percentage.
- The body of an adult at rest consumes approx. 250 ml of oxygen/min.
- **The amount of oxygen in the blood = 1.39 x the amount of Hb in g/l x saturation in %.**

Affecting the binding of oxygen

The binding of oxygen to Hb is affected by:

- **temperature** (tissues, environment),
- **blood pH**
- **pCO₂**,
- → **high pCO₂** and **decreasing pH** reduces the affinity of Hb for oxygen.

During the work of the tissues, a larger amount of CO₂ is released, heat is generated and the pH is reduced due to the formation of acidic substances - all this supports the release of oxygen from Hb. The binding of oxygen therefore depends on the **metabolic demands of the organism**, on its consumption.

An increase in oxygen delivery can be ensured under normal circumstances **by increasing ventilation** (increasing respiratory rate and volume) and by **accelerating the heart rate**. By affecting these parameters, the organism compensates for the increased use of oxygen in the tissues.

An increase in the amount of dissolved oxygen in the blood can be achieved by hyperbaric oxygen therapy.

Links

Related Articles

- Transport of O₂ by blood, binding curve
- Binding of oxygen to hemoglobin
- Oxygen parameters

References

- MOUREK, Jindřich. *Physiology : textbook for medical students*. 1. edition. Praha : Grada, 2005. 204 pp. ISBN 80-247-1190-7.
- VOKURKA, Martin, et al. *Pathophysiology for non-medical directions*. 2. edition. Praha : Karolinum, 2008. 217 pp. ISBN 978-80-246-1561-5.