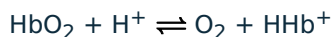


Bohr effect

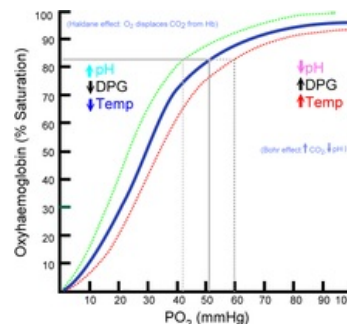
The **Bohr effect** describes the dependence of the saturation of hemoglobin on changes in **CO₂ concentration, pH, and temperature** in tissues. The tissues produce higher amount of carbon dioxide at work than under resting conditions. In the blood, CO₂ is converted to bicarbonate anion and hydrogen cation. This leads to a **decrease of pH** in tissues and to **an increase in the desaturation of hemoglobin** (the release of oxygen from binding with Hb). This is due to the fact that **deoxygenated Hb is a stronger base than an oxygenated one** and therefore better accepting of H⁺.



Carbonate dehydratase in erythrocytes catalyzes the reaction: $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{H}^+ + \text{HCO}_3^-$. The resulting proton binds to the "less acidic" deoxygenated Hb. Bicarbonate anion **escapes along the concentration gradient** from erythrocytes.

The charge compensation is provided by **antiport Cl⁻/HCO₃⁻** (Hamburgerův efekt).

This mechanism ensures that tissues with high metabolic activity receive a preferential supply of oxygen, while allowing the removal of the acidic proton.



A more acidic environment shifts the oxyhaemoglobin dissociation curve to the right

References

Related articles

- Binding of oxygen to hemoglobin
- Hemoglobin and its derivatives
- Transport of O₂ and CO₂ in the blood
- 2,3-bisphosphoglycerate

External references

- Bohr effect [1] (http://147.33.74.135/knihy/uid_es-002/figures/efekt_bohruv.01.jpg)

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- KITTNAR, Otomar, et al. *Lékařská fyziologie*. 1. edition. Praha : Grada, 2003. 790 pp. ISBN 978-80-247-3068-4.