

The changes of affinity of haemoglobin to oxygen as regulator of haemoglobin haemoporphyrin conformation and application under the coronary heart disease

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Using Raman spectroscopy the changes in conformation of haemoglobin haemoporphyrin (HH) under haemoglobin (Hb) affinity to O_2 modifications (acidic pH, 2,3-diphosphoglycerate (2,3-DPG)) was investigated. The typical Raman spectra of HH at pH 7.4 (dotted line) and pH 5 (solid line) is shown in figure A. We have shown that acidic pH and 2,3-DPG actions changes of HH conformation and decreases Hb affinity to oxygen. These changes are caused of different reasons: under the acidic pH the HH conformation was with low efficacy of oxygen binding by Hb, but at the 2,3-DPG action the HH conformation was with high efficacy of oxygen release by Hb.

The case of Hb affinity to O_2 disturbance also may occur under the different human physiological conditions, for example, under the hypoxia. These changes may affect the effectiveness of oxygen transfer by erythrocytes. Analysis of Raman spectra of whole blood samples of patients with coronary heart disease (physiological pH range 7,2-7,4) was carried out. The HH conformation changes will be discussed (fig. B).

