



International Congress on Biological, Physical And Chemical Studies

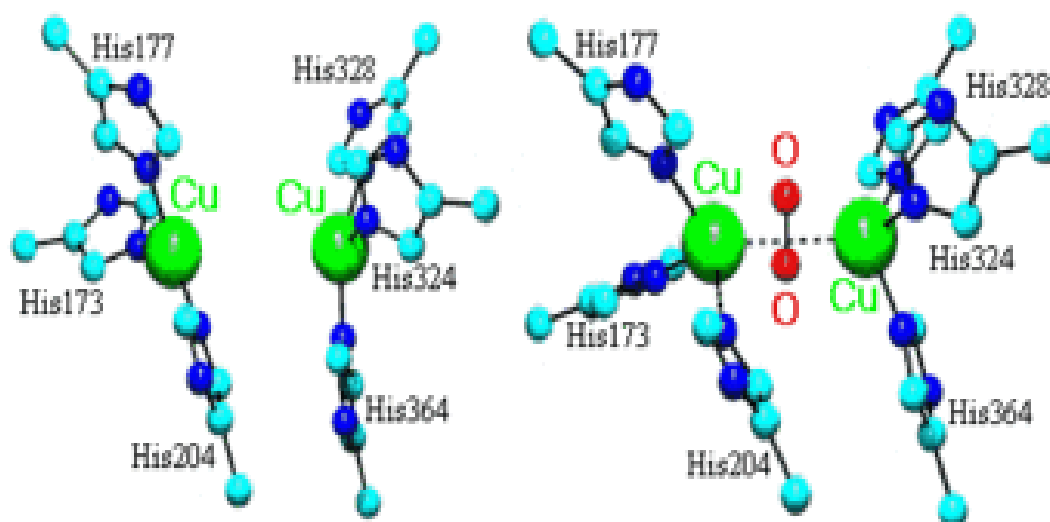
International Congress on Biological, Physical And Chemical Studies - is an international conference platform under open access policy. The conference is led by international expert members who take an objective approach to peer review, ensuring each research paper is reviewed, edited by authors and evaluated on its own scholarly merits and research integration. Publishing and joining on the proceeding of the International Congress on Biological, Physical And Chemical Studies will ensure publishing experience and indexing possibilities on various global indexing.

Characteristics of the Active Center of Hemosian

Aslanova Muhtaram Askarovna, Doniyorov Sadiq Halikovich

Everyone knows that people have red blood in their veins, and blue blood is found only in fairy tales. See, blue blood isn't just for fairy tales. Nature has created spiders, scorpions and crabs with blue blood. How is blue blood different from normal blood? In normal blood, the red color is given by hemoglobin, a red pigment containing iron mixed with protein. Blue blood is not produced by hemoglobin, but by a blue substance containing copper - hemocyanin. The mystery of blue blood has intrigued scientists for a long time. Why did nature replace hemoglobin with hemocyanin? Research shows that spiders cannot live without hemocyanin. Because their body does not have red blood vessels and blue blood vessels that send oxygen throughout the body of people. How can the body be supplied with oxygen without veins? This task is performed by hemocyanin with its complex structure. It releases the required amount of oxygen like a regulator that regulates the movements. At the same time, it adjusts the body temperature to the external conditions.

Hemocyanin (Greek *haima* - blood or *cyanoûs* - air-colored) is an analogue of hemoglobin and belongs to the group of metalloproteins. It contains copper and is found in the blood of molluscs and arthropods. Hemocyanin is common in cephalopods and some gastropods. It is more common in crustaceans and arachnids. In 2003, it was identified in the class of insects. The function of hemocyanin is to deliver oxygen to tissues.



Picture. Structure of the active center of oxygenated and non-oxygenated hemocyanin

The reduced form of hemocyanin is colorless, and the oxidized form is light-colored, and the phenomenon of fluorescence is observed. Hemocyanin in the animal organism is N – Cu – N with the copper +1 cation holding the amino acid – histidine residue, and the distance between Cu – N is 1.9–2.1 Å. distance between copper cations is 4.6 Å. After oxidation, the distance between copper cations is equal to Cu⁺ ion changes to Cu²⁺ ion. Then the distance between Cu – Cu ions decreases to 3.6 Å. Hemocyanin combines not only with oxygen, but also with carbon dioxide to form a complex compound called carboxyhemocyanin.

Hemocyanin catalyzes tyrosine oxidation in animal organisms. Hunter acts as an enzyme. Hemocyanin is involved in the synthesis of melanin in scorpions and spiders. Some arachnids have two types of hemocyanin, one that transports oxygen and the other that catalyzes the oxidation of tyrosine.

In medicine hemocyanin is used in the preparation of vaccines against tumors (cancer).

Bibliography:

1. Alyakrinskaya I. O. Hemoglobiny and hemotsianiny bespozvonochnyx. — Moscow: Nauka, 1979. — 155 p.
2. Jiteneva L. D., Makarov E. V., Rudnitskaya O. V. Evolution blood. — Rostov-na-Donu: Azov nauchno-issledovatel'skiy institut rybnogo khozyaystva (AzNIIRX), 2001. — 104 p.
3. Steed Dj. W., Atwood Dj. L. Supramolecular chemistry. — Moscow: Akademkniga, 2007. — 896 p. — ISBN 978-5-94628-303-8.
4. Yatsenko A. V. Kompleksnye soedineniya v protsessakh dykhaniya jivyx sushchestv.
5. Heinz Decker, Nadja Hellmann, Elmar Jaenicke, Bernhard Lieb, Ulrich Meissner, and Jürgen Markl. Minireview: Recent progress in hemocyanin research (eng.) // Integrative and Comparative Biology. — 2007. — Vol. 47, no. 4. — P. 631-644.
6. Van Holde KE, Miller KI Hemocyanins (Eng.) // Adv Protein Chem. — 1995. — No. 47. — P. 1-81.
7. Bernhard Lieb, Benjamin Altenhein and Jürgen Markle. The Sequence of a Gastropod Hemocyanin (HtH1 from *Haliotis tuberculata*) (eng.) // The Journal of Biological Chemistry. — 2000. — Vol. 275. — P. 5675-5681.
8. CP Mangum, JL Scott, RE Black, KI Miller, and KE Van Holde. Centipedal hemocyanin: its structure and its implications for arthropod phylogeny (eng.) // Proc Natl Acad Sci USA. — 1985. — Vol. 82, no. 11. — P. 3721-3725.