

BLUE PROTEIN - LIGHT - LIFE

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Ceruloplasmin (CP, ferrooxidase, KF 1.16.3.1) - blue multifunctional copper-containing protein of the mammalian blood plasma from the family of blue oxidases. 6 atoms of copper are the integral part of the molecule of the CP. Due to various optical, magnetic, and redox properties copper-containing active centers in the CP are referred to three or, probably, four basic types. Copper-containing active centers of the CP are associated with such vital biological functions, as electron transport, metabolism of iron, and others. The basic scheme of the intramolecular chain of electron transfer in the CP between four cooperating nearby ions of copper of different types is proposed.

Unusual as compared with other proteins in similar systems, antioxidant properties of CP can have great importance *in vivo*, but the mechanism of action of CP in such complex systems is not clear since antioxidant action of CP can depend on ferrooxidase activity, ascorbatoxidase activity, and activity on $O_2^{\bullet-}$ removal.

Investigations were carried out to study the action of He-Ne laser irradiation ($\lambda = 632.8$ nm) of various dozes on POL processes, and on activity of enzyme system of antioxidant protection in blood. As a result of irradiation of blood by He-Ne laser with a total doze of irradiation equal to 2.7 and 5.4 J to 20 cm³, reduction of a stationary level of primary metabolites of POL, dienic conjugates (DC), as well as one of final products - malonic dialdehydes (MDA) in blood plasma was observed. The study of activity of copper-containing "blue" ferments has shown that the specific activity of SOD erythrocytes (in account on milligrams of protein) authentically did not change at dozes of irradiation from 0.9 up to 5.4 J. Oxidase activity of CP raised insignificantly. The SOD-activity of plasma authentically increased on 16% beginning from the doze of irradiation equal to 2.7 J, and remained at this level with the further increase of irradiation dose. The obtained data testify that the irradiation of blood by He-Ne laser in dozes equal to 2.7 and 5.4 J reduces POL intensity, that increases lipid stability of plasma to induced oxidation, influences on fermentative system, raising it's antioxidant activity, so that the POL processes are inhibited.