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Influence of carbacylamidophosphates, urea derivatives and their combinations with C_{60} fullerene on the hemolysis of erythrocytes

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Important problems of the medical and pharmaceutical research are the extension of range of modern drugs via the development of new biologically active compounds. Structural analogues of β-diketones are interesting objects, specifically carbacylamidophosphates and urea derivatives. Change of membrane permeability of erythrocytes at the action of various chemical compounds is important index. The aim of the study was to estimate the influence of carbacylamidophosphates (dimorpholinylbenzoylphosphoramidate and 2,2,2-trichloro-N-dimorpholinylphosphoramidate) and urea derivatives (dimethyl pyridin-2-ylcarbamoylphosphoramidate and dimethyl (1,3-thiazole-2-ylcarbamoylphosphoramidate)) and their combinations with C_{60} fullerene on the hemolysis rat`s erythrocytes.

The structure and physicochemical properties of the membrane of red blood cells by the action of 2.5 mM dimethyl (1,3-thiazole-2-ylcarbamoylphosphoramidate) and 2,2,2-trichloro-N-dimorpholinylphosphoramidate changed. In particular, the resistance of erythrocytes to hemolytic decreased. 2,2,2-trichloro-N-dimorpholinylphosphoramidate characterized by the highest hemolytic activity. While the dimethyl pyridin-2-ylcarbamoylphosphoramidate and dimorpholinylbenzoylphosphoramidate compounds at (1,25-2,5) mM concentration exhibited a stabilizing effect on the membrane structure of red blood cells and increased their resistance to hemolysis.

C_{60} fullerene can be a modulator of biological action of the above compounds. So, the resistance of erythrocytes to hemolysis increased at preincubation of chemical compounds in the presence of C_{60} fullerene: the hemolysis slowed and rate of hemolyzed erythrocytes decreased.

Thus, the investigated compounds are promising for applications in nanobiotechnology.