

Ni-INDUCED STRUCTURAL MODIFICATION OF ERYTHROCYTE MEMBRANES

Lukyanenko L.M., Slobozhanina E.I.

Institute of Biophysics and Cell Engineering of NAS of Belarus, Minsk, Belarus

Nickel compounds have been classified as carcinogens class I by WHO and the International Agency for Research on Cancer. Entering body via food consumption, inhalation and skin contact nickel can induce respiratory system diseases, skin diseases and other pathologies. In this study the effect of 1-10 mM nickel(II) chloride on human erythrocytes in vitro was investigated. Using inductively coupled plasma atomic emission spectroscopy it was shown that after erythrocyte incubation with 1-10mM nickel chloride at 37°C for 1h nickel is accumulated in cells in a concentration-dependent manner. It was shown increases 1-(4-trimethyl-ammonium-phenyl)-6-phenyl-1,3,5-hexatriene fluorescence polarization to 5-20%, and decreases pyren excimerization coefficient to 10-20% of control values. It was shown that nickel induces lipid peroxidation in the erythrocytes membranes, change activity of some antioxidant enzymes. Nickel-induced changes in the microviscosity of the lipid bilayer of erythrocyte membranes are due to lipid peroxidation. Detected fluorescence intensity reduction of fluorescamine under exposure of erythrocyte to 1-10mM nickel chloride indicates that such nickel concentrations induce protein structural modification in erythrocyte membranes. The obtained data confirmed microviscosity change in erythrocyte membrane lipid bilayer exposed to sublytic nickel chloride concentration. Thus it was found on erythrocyte model that nickel ions have membrane-acting effect.