

Relationship Between Plasma Glutathione Levels and Lipid Antioxidants of People Exposed to Low Doses of Radiation

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This work presents the results of biochemical examination of people exposed to irradiation as a result of the Chernobyl catastrophe. In remote periods (in 4, 5, 6, and 7 years) after the Chernobyl accident we studied the state of the redox system of glutathione and the response of the system of nonreplaceable lipid antioxidants in blood plasma of people of various ages. The cumulative doses for the examined group of children received by their mothers (from 0.1 to 70cSv) and liquidators received, on average, the highest irradiation doses (from 0.1 to 150 cSv). It is very important that the highest deviations reduced glutathione (GSH) level of human population were observed in the dose range up to 20 cSv. It should be noted that decreased level of GSH (a water-soluble antioxidant) under the influence of low-level radiation (below 20 cSv) is accompanied by acceleration consumption of vitamin E (a liposoluble antioxidant) and increases the level lipid peroxidation products in human plasma. The deficiency of lipo- and water-soluble antioxidant revealed long after the accident (4-7 years) in the liquidators and children of exposed mothers is an important health marker of populations exposed to chronic low-level in radiation. Along with of the lipid nature thiols have the important role in protection of cellular structure from oxidation stress. Glutathione is extremely important in the process of structural mutation of membrane of erythrocytes. The presence of GSH in blood red cells protects them from hemolysis. An experimental investigation to study the influence of synthetic antioxidant phenozan [1- β -4-oxy (3,5-diterbutyl-phenyl-1) propionate K] synthesized at Emanuel Institute of Biochemical Physics on the parameters of peroxide lipid oxidation and structural state of membranes of erythrocytes of mice during single γ -radiation at total dose of 1,2 cGy and power of 0,6 cGy/day. Results obtained are of practical importance for application of phenozan in low doses as preventative radiation protective medication. For the solution of the problem of determining an adverse effect of chronic low-level low-dose irradiation and for individual assessment of degrees of radiation-induced disturbance, it is important to use biochemical and biophysical tests.