

Mutagenesis, Oxidative Stress Induction and Blood Cytokine Profile in First Generation Male Rats Whose Parents Were Exposed to Radiation and Hexavalent Chromium

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Abstract : Stochastic effects, which are currently largely associated with exposure to ionizing radiation or a combination of ionizing radiation with other chemical, physical, and biological agents, are expressed in the form of various mutations. In the first stage of the study, rats of both sexes were divided into 3 groups. 1st - control group, animals of the 2nd group were exposed to gamma radiation at a dose of 0.2 Gy. The third group received hexavalent chromium in a dose of 180 mg/l with drinking water for a month before irradiation and a day after the end of chromium consumption and was subjected to total gamma irradiation at a dose of 0.2 Gy. The second stage of the experiment. After 3 days, the males were mated with the females. The obtained offspring were studied for peroxidation, cytokine profile and micronucleus in the nuclei. This study shows that 5-month-old offspring whose parents were exposed to combined exposure to chromium and γ -irradiation exhibit hereditary instability of the genome, decreased activity of antioxidant enzymes and sulfhydryl blood groups, and increased levels of lipid peroxidation. There is also an increase in the level of inflammatory markers (IL-6 and TNF) in the blood plasma against the background of a decrease in anti-inflammatory cytokine (IL-10). Thus, the combined effect of hexavalent chromium and ionizing radiation can lead to the development of an oncological process.

Keywords : hexavalent chromium, ionizing radiation, first generation, oxidative stress, cytokines, mutagenesis, cancer

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