

**Induced genome instability and bystander effect caused by the radiation originating from Chernobyl catastrophe**

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Many environmental factors (ultra-violet and ionizing radiation (IR), emotional stress, infections, hyperthermia, tumor toxins, strong medical products, intensive noise and vibration, etc.) can have toxic influence on cellular genome. Named agents can induce the development of oxidizing stress with activation of early regulatory and late structural genes. As a result, there appear de novo chromosome aberrations and genetic mutations with high frequency during many generations in certain part of cells. Only in some cases this is the cause of increased cellular death rate by apoptosis. These different effects of irradiation are known as radiation induced instability of genome which is associated with epigenetic changes of an oxidation-reduction metabolism in descendants of irradiated cells. The augmentation of DNA sensitivity to oxyradicals and other genome toxins and strengthening of the generation of active forms of oxygen is typical. Moreover, the irradiated cells cause in not irradiated cells-neighbours changes typical for irradiated cells (such as: increase of oxygen active forms, frequencies sisterly chromatid exchanges, so called "Bystander effect", BsEf) through cytokines and other factors of the protein nature. We investigated the influence of irradiation (dose 5 Sv during 16 hours) in female mice Balb/c (LD 50/30 5,85 Sv) and C57BL/6 (LD 50/30 6,70 Sv). We studied the levels of single strand breaks of DNA (SSB DNA) and BsEf. BsEf is characterized by the ability of irradiated animals cells (taken from various tissues and organs, such as peripheral blood, spleen, liver and brain) to induce increased quantity of SSB DNA in the cells taken from not irradiated animals. The analysis was done during first hours, in one and three weeks after exposure with help of DNA labeled by fluorescent dye Picogreen technique. Subsequently the speed of its unwinding was estimated. Damaging influence of the irradiated cells on not irradiated ones was investigated after addition to them the culture medium from irradiated cells. At the irradiated animals cells levels of SSB DNA in the first day after irradiation grew in all kinds of researched cells. In C57BL/6 mice (which are more resistant to irradiation) the level of SSB DNA was much lower and the culture medium from the cells obtained from irradiated animals practically did not possess ability to induce increase of SSB DNA in not irradiated cells. Conclusion: in line of mice, more resistant to irradiation, the levels of expression SSB DNA and Bystander effect was much lower.