Long-term and transgeneration effects after g-irradiation of BALB/c male-mice in doze range 1- 6 Gy

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Study of the long-term and transgeneration effects after exposure of ionizing radiation, as manifestation of genomic instability, is very important for predication of emergency radiation situations' consequences. We were investigated exposure of γ-radiation in doze range 1 - 6 Gy on example of amounts of the single-starnd DNA breaks (SSB) in the spleen lymphocytes (SL) of irradiated mice and changes in RAPD- and ISSR-patterns of their progeny. Male mice BALB/c strain were acute irradiated by γ-radiation at doses 1, 2, 3 and 6 Gy on gamma-unit GYPOS (dose rate- 4,5 Gy/min, source- Cs-137). For the study of long-term effects, mice were killed in an 11 months after irradiation. The SSB-level was evaluated using the alkaline comet-assay as described by Singh et al. [1998] with additional exposure of the hydrogen peroxide. The DNA comets analyzed with a fluorescence microscope AxioPhote by using the method of visual estimation [Collins et al., 1995]. For study of transgeneration effects after irradiation and comparison of sensitivity of different stages of spermatogenesis males were crossed with females the same strain in two weeks (post meiotic stage) and in three months (pre meiotic stage) after an irradiation. The offspring in both cases contained in standard conditions and were killed in the 3-4 weeks of age. DNA was isolated from liver by using DNA Prep^{TM} (IZOGEN Lab). Amplification was performed by using lyophilizated PCR-mix DNA Core^{TM} (IZOGEN Lab) on thermocycler PT-48 (TDL Company). Products of amplification were separated in 1,5 % agaroze gel and visualized by ethydium bromide. For detection effects of irradiation was used RAPD- and ISSR-assays. Analysis of offspring patterns carried out on the basis of comparison with parental patterns, with the purpose of registration of new, "not parental" bands, as case of mutation. We are counting mutation frequency per animal in the group and processed these data statistically. Our results are show, that the SL of the animals irradiated dozes 1 - 3 Gy were more resistance to H_2O_2 exposure, but, beginning at dose 1 Gy, mutation frequencies in irradiated offspring is significantly distinguished from the control group. At the same time, change of mutation frequencies is independent of increasing of the irradiation dose. The comparison of sensitivity on different stages of spermatogenesis are indicated, that post-irradiated changes in RAPD- and ISSR-patterns of pre and post meiotic cells have similar character

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