

DNA Damage-related Gene Expression as Biomarkers to Assess Low Dose Radiation Exposure

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According to the UNSCEAR, the natural rays from the Sun and the Earth transmit about 2,4 mSv to each individual every year. Human activities expose us to an additional radiation dose (1,2 mSv/year), especially the techniques used in non-invasive medical imaging (radiography, CT scanners). Ionizing radiation can induce a large spectrum of DNA lesions, but under optimal DNA repair conditions, the principal residual lesions of importance are misrepaired double-strand breaks / 1 /. Predictive markers of intrinsic radio sensitivity in healthy individuals are needed in monitoring their occupational or environmental radiation exposure and may predict a patient's response to radiotherapy. Radiation protection requires a thorough understanding of low dose ionizing radiation. Currently extrapolation from high doses is necessary to estimate the effects of low doses. Furthermore, it is critically important to have an appreciation of the variation in individual responses to radiation among the human population / 2 /. Appearance of mutations consist one of more prominent consequence of the radiation action. The aim of our study consisted in the restriction fragment's length polymorphism (RFLP) analysis of pERT87-8/Tag1 and 16intron/Tag1 loci with determining of presence or absence of restriction site in the group of radiologists and in control group. It was demonstrated that the pERT87-8/Tag1 allele frequency on "mutant" chromosome was 2,4 fold higher than the frequency of this allele on "normal" chromosome (45,1% in compare with 18,5%, $X^2=27,7$, $df=1$, $p<0.01$). Therefore, in radiologists was revealed statistically significant difference of the frequency of polymorphic site pERT87-8/Tag1 compared to healthy donors. As for 16intron/Tag1 system it have been elucidated that the without restriction allele frequency site on "normal" chromosome was 2,0 fold higher than the frequency of this allele on "mutant" chromosome (71,5% in compare with 34,8%) $\chi^2=78,3$, $df=1$, $p<0,01$). In the conclusion it is necessary to mention that there are significant difference in the frequency of the polymorph sites pERT87-8/Tag1 and 16intron/Tag1 in the group of radiologists in compare with the control group. Reference 1. Karine Bishay et al. DNA damage-related RNA expression to assess individual sensitivity to ionizing radiation // *Carcinogenesis*, Vol. 22, No. 8, 1179-1183, 2001. 2. Robert C. Millikan et al. Polymorphisms in DNA Repair Genes, Medical Exposure to Ionizing Radiation, and Breast Cancer Risk // *Cancer Epidemiology Biomarkers & Prevention* Vol. 14, 2326-2334, October 2005.