

**Adaptive Response and Radiosensitivity at Low Doses**E. Khandogina<sup>a</sup> and G. Mutovin<sup>b</sup><sup>a</sup>*Nuclear Safety Institute RAS, 52, B.Tulskaya, 115191 Moscow, Russian Federation;*<sup>b</sup>*Russian State Medical University, 1, Ostrovityanova, 117997 Moscow, Russian Federation**e.khan@ibrae.ac.ru*

Some problems are hindrances to an adequate estimate of low-dose ionizing radiation effects on humans. The most important issue is the lack of a precise definition of the term "low doses". Radiobiological experiments deal with the dose range of one or more centigrams but their results are often extrapolated to the situations in radio-contaminated regions where extra doses do not exceed 1 mSv; therefore, the concepts are substituted. In epidemiological investigations radiological effects appear at doses above 20 cGy, thereby indicating the inexactitude of the extrapolation of experimental data on the human population. The Adaptive Response (AR) phenomenon is often referred to as an argument, when discussing radiation effects on a human being. Some researchers, in particular, the opponents to the linear non-threshold conception, consider this phenomenon as an evidence of "useful" effects of low-dose radiation. Other investigators, using a play upon words, associate the AR lack in the cells of individuals who were previously irradiated by low doses with potential negative changes in their health. In their expert opinion, it certifies that low doses are extremely hazardous. The authors of this paper analyze some AR peculiarities described in their own earlier articles or in numerous publications of other researches. Irradiation conditions affect the AR induction of one and the same person. Any change in the experimental protocol may provoke the AR loss or even bring to sensitization after the preliminary irradiation. The cells of some individuals from the human population do not develop the AR during standard researches; however, these persons might lack the "appropriate" protocol. The AR potential induction is genetically determined. The AR lack is observed in the cells of the patients with chromosome instability syndromes characterized by extreme radiosensitivity values in the human population. It is also of interest that cell radiosensitivity increases only in abnormal cells of the DS patient with a mosaic form of the disease while the AR is lacking in the both cell lines. Therefore, the level of control and the mechanisms of these processes differ. The AR phenomenon cannot be presently used as a screening test during cytogenetic investigations in contaminated regions as its mechanisms still remain unrevealed, while its manifestation depends on experimental conditions.