

Transgenerational Phenomenon of Genomic Instability in Children of Irradiated Parents during ChNPPA. Aghajanyan^a and I.I. Suskov^b^a*N.I. Vavilov Institute of General Genetics Russian, Gubkin St. 3, 119991 Moscow, Russian Federation;* ^b*N.I. Vavilov Institute of General Genetics, Russian, Gubkin st. 3, 119991 Moscow, Russian Federation**ann-aghajanyan@yandex.ru*

Study of families irradiated during the accident at the Chernobyl nuclear power plant revealed significantly increased levels of aberrant genomes not only in irradiated of low doses parents (fathers-liquidators, fathers and mothers from territories contaminated with radionuclides (n=106, p<0.01)), but also in their children born in 1987-2004 after the accident (n=159, p<0.05). These children with different somatic pathologies were examined in the Children's Center of Radiation Protection of the Institute of Pediatrics and Children's Surgery of the RF Ministry of Public Health (head. - prof. Baleva L. S.). This is indicative of the transgenerational phenomenon of genomic instability. To elucidate this phenomenon, experiments were undertaken to model genomic instability by using fractionated in vitro γ -irradiation (¹³⁷Cs) of peripheral blood lymphocytes samples of the children and their parents at doses of 10, 20 and 30 cGy. The spectrum and frequency of chromosomes aberrations were studied in the 1st and 2nd cell generations. The children of irradiated parents (n=6). Children born from unirradiated parents (n=3) served as a control. Parents: irradiated fathers (n=3) and unirradiated mothers (n=3). Single doses were 10 cGy, 20 cGy, 30 cGy. Fractional doses were 10 cGy + 10 cGy and 10 cGy + 10 cGy + 10 cGy. Blood samples were irradiated at 24 h intervals. Before culturing all blood samples were stored at 370 C. Cultivation of lymphocytes was carried out for 48 h and 72 h with the use of 5-BrdU added to differentiate between mitosis 1 and mitosis 2. Average frequency of aberrant genomes were significantly increased at all doses in the children of irradiated parents, as compared to the children born from un-irradiated parents. The magnitude of the elevation of the individual frequencies of aberrant genomes is accordance on the initial levels of the genome aberrations. This is indicative of individual radiosensitivity probably depending on genotypic peculiarities, initial state (sensitivity) of the genome, pathophysiological processes in the organism of children. Amplification of cells with single-break chromosome aberrations in the mitosis 2, as compared to mitosis 1 suggests the replication mechanism of realization of potential damage in DNA and the occurrence of genomic instability in succeeding cell generations.