Using of Cytogenetic Method in Radiation Researches

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Analysis of chromosome aberrations in lymphocytes of peripheral blood has been long successfully used in radiation researches for biological indication and quantitative estimation of radiation influence on a human organism. "Biological doses" calculated on the basis of cytogenetic research data take into account individual radiosensitivity of the organism and its state at the moment of radiation, and this, in its turn, allows to forecast early and more distant consequences of radiation more precisely. Frequency of chromosome aberrations in lymphocytes of peripheral blood is also one of the most frequently used indices in studying the process of mutagenesis in somatic cells. There are data on the possible connection between the increased level of chromosome aberrations in lymphocytes of peripheral blood and the risk of development of oncological diseases. That's why the frequency of chromosome aberrations in lymphocytes of peripheral blood may be regarded as an integral biological marker of the risk of development of pathological states, first of all, oncological diseases. On the one hand this marker reflects in the influence of genotoxic factor on a human organism, and, on the other hand, individual diathesis to cancer genesis. That's why it is considered extremely important to carry out cytogenetic examination of people exposed to radiation as a result of extraordinary and emergency situations. Results of the researches allow to estimate the influence of radiation on the genome of a human being, as well as forecast the risk of development of unfavorable consequences of radiation. Results of long-term cytogenetic monitoring of the Chernobyl clean-up workers (liquidators) and the results of cytogenetic examination of the cosmonauts who took part in long flight at "Mir" and ICS stations will be presented in the report. Summing up the data received one should note the following: - During the whole period of research (for more than 20 years) the average frequency of chromosome aberrations in lymphocytes of peripheral blood of the liquidators was significantly higher than the control level. The frequency of dicentrics and centric rings - markers of radiation was higher than the analogous indices in the control group 3,5 - 7 times depending on the period of work and staying in the zone of Chernobyl accident. - Long space flights lead to increasing chromosome aberrations in lymphocytes of cosmonaut's peripheral blood and the frequency of dicentrics and centric rings depends on the duration of a space flight and the amount of the accumulated dose of radiation.

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