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STUDY OF GENETIC EFFECTS IN BIOASSAYS ARISING FROM RADIATION THERAPY USING A LINEAR ACCELERATOR ELEKTA AXESSE

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Currently, gamma radiation is widely used in the treatment of cancer. In particular, in the treatment of oncological diseases, the ELEKTA AXESSE medical linear accelerator is used, which forms beams of gamma rays with energies of 10 MeV and 15 MeV. Gamma radiation of such energies is highly penetrating and thus capable of being absorbed in a sufficiently large volume of biological material. Thus, in this work, the aim is to study the appearance of radiation defects from various doses of irradiation with gamma rays with energies of 10 MeV and 15 MeV. Such a study is of interest in studying the prolonged effect of gamma therapy on body cells. This paper presents the results on the frequency of mutations induced by beams of gamma rays with energies of 10 and 15 MeV. The relative exposure doses were 2Gy, 5Gy, 10Gy, 15Gy, 20Gy and 30Gy. The electronic accelerator Elekta Axesse of the oncological center "Sunkar" (Almaty) was used as a source of gamma quanta. A study of the genotoxic effects of gamma radiation was carried out using Drosophilamelanogaster. A series of fly larvae after irradiation were placed in test tubes with a medium for crossing irradiated adults. Each tube in the tests was subjected to visual analysis after the complete departure of the generation to identify mutations. Morphoses were chosen as the main criterion for assessing the mutagenic and teratogenic effects of gamma radiation on Drosophila. The formation of morphoses is one of the properties of conditional mutations that are not associated with the primary structure of DNA and occur in regulatory genes responsible for the formation of traits of intraspecific similarity. In this case, the stress factor was gamma radiation, and the appearance of morphoses demonstrated teratogenic effects or disturbances in the genetic development program. In addition to morphoses, cases of sterility or a decrease in the fertility of adults were found, which is evidence of the mutagenic effect of irradiation, since such a phenomenon was not observed in the control. The teratogenic properties of gamma radiation were revealed, expressed in the appearance of morphoses or asymmetric ugly disorders of the soma morphology. The data obtained indicate that gamma quanta have pronounced mutagenic and teratogenic properties, i.e. is genotoxic. As a result of the experiments, the types of induced mutations were determined, and the significance of genetic effects for various energies of gamma rays was assessed.
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Section

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