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Development of a statistical analysis system for a new research program to study biological effects of low doses of ionizing radiation

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The research program to be initiated aims at experimentally studying biological effects of ionizing radiation. It is designed to expose totally 4,000 SPF mice to Cs-137 sources at dose rates of 0, 0.05, 1.0 and 20 mGy/22hr/day for consecutive 400 days and to obtain endpoints of life span and histopathologic findings. To advance the program, a preliminary effort was made for developing a statistical analysis system including a computerized database, which enables to accumulate a number of data on the records of individual mice as well as codes of diseases specific to the mouse. This system is expected to facilitate more effective use of the SAS®.

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Genetical instability induced by low doses of radiations

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We have reported that chronic radiations with low doses of X-rays affected to several biological responses in human cells. For example, repeated-irradiation with 1 cGy per week of gamma-rays was significantly prolonged over that of control. Although non-irradiated control and acute irradiated cells at passage 26 (about 10 passages to senescence) were normal karyotype and number, chronic-irradiated cells at the same passage showed numerical, rather than structural, abnormalities. These results can best be interpreted by assuming that ionizing radiation at low doses induces a stress response, probably an epigenetic one, which is responsible for the majority of the genetic instability.