

Analysis of the Dose-rate Effect of Radiation on Chromosome Aberrations at Intermediate Dose-rates

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Abstract

In our previous study, we analyzed the frequencies of chromosome aberrations (translocations and dicentric chromosomes) in splenocytes of mice exposed to high dose-rate (HDR, 890 mGy/min) or to low dose-rate (LDR, 20 and 1 mGy/day) gamma-rays. Our results showed a large disparity between the effect of HDR radiation and that of LDR. In the present study, we are examining the dose and dose-rate dependency of the frequency of chromosome aberrations in the intermediate dose-rate range (149 – 0.3 mGy/min) between HDR and LDR to determine the boundary region where the dose-rate effect appears. This fiscal year, we studied the frequency of the chromosome aberrations in mice exposed to total accumulated doses from 0 to 1000 mGy at two dose-rates (33.3 and 1.5 mGy/min). The dose-response relationship at the dose rate of 33.3 mGy/min seemed to be described by a linear-quadratic function, while the relationship at the dose rate of 1.5 mGy/min seemed almost linear. The results were consistent with a gradual change between a HDR-type response and a LDR-type response throughout the entire range of dose-rates we are examining.

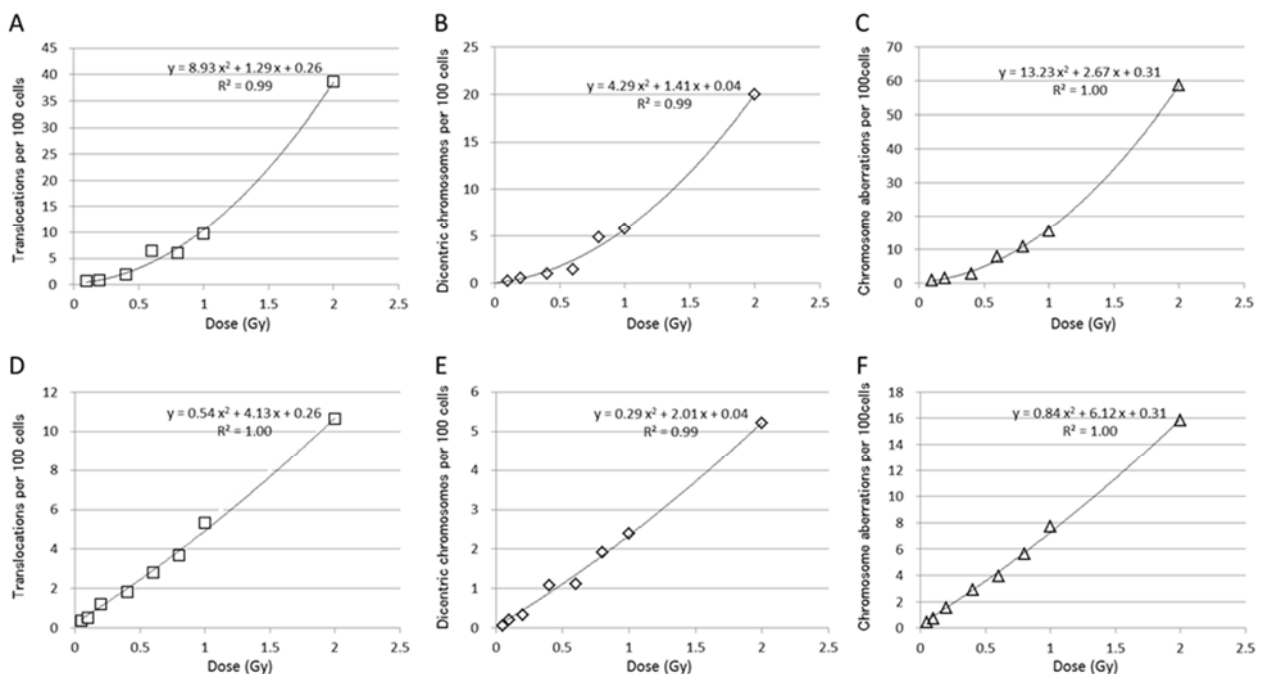


Fig. 1 Frequency of chromosome aberrations (translocations and dicentric chromosomes) in mice irradiated at the dose-rates of 33.3 mGy/min (A - C) and 1.5 mGy/min (D - F). Each point is the average of 3 mice.