Preliminary Experiments for Examining 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) γ-rays. Our results have shown 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 between HDR and LDR to determine the boundary region where dose-rate effect appears. For the first year, we studied the frequency of the chromosome aberrations in mice exposed to a fixed total accumulated dose of 1000 mGy at various dose-rates (149, 33.3, 8, 1.5, and 0.3 mGy/min). We observed that the chromosome aberrations gradually decreased as the dose-rate decreased throughout the entire range of dose-rates we examined, which suggests that the boundary region is wide.

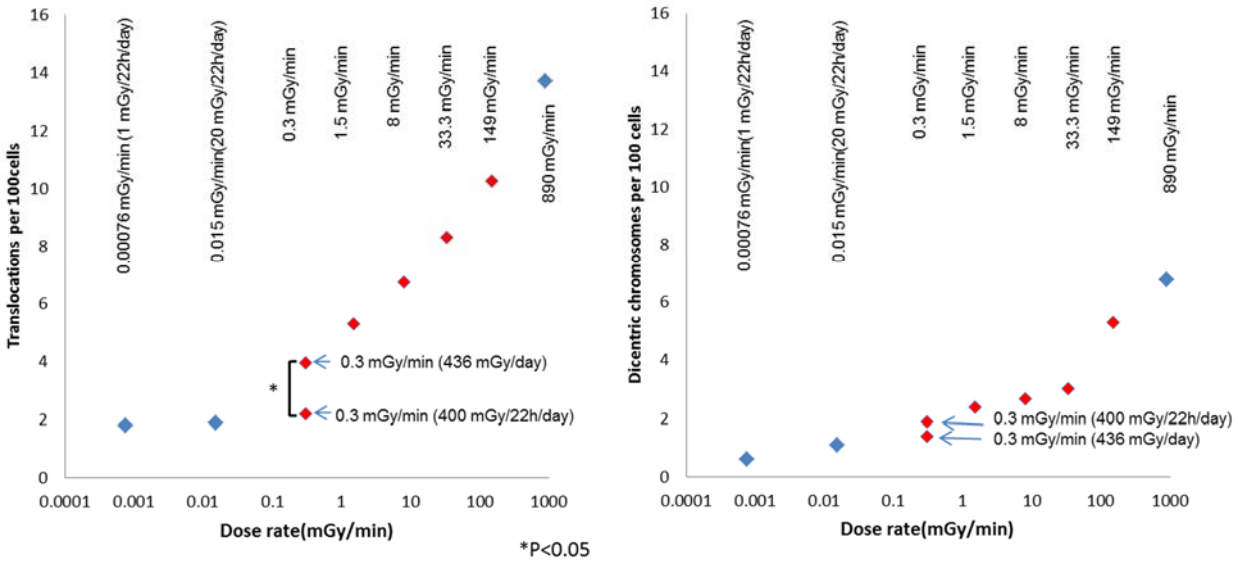

Fig. 1 Frequency of chromosome aberrations (translocations and dicentric chromosomes) in mice exposed to 1000 mGy γ-rays at different dose-rates.