

Frequencies of Chromosomal Translocation and Clone Formation in Splenocytes from Mice Continuously Irradiated with Low-Dose-Rate Gamma-Rays

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Abstract

Chromosomal translocations and clones in splenic lymphocytes of female specific pathogen free (SPF) C3H mice exposed to low-dose-rates (LDRs: 1 mGy/22 h/day and 0.05 mGy/22 h/day) of ^{137}Cs - γ -rays continuously from 8 weeks of age to a maximum of 720 days were analyzed. Splenic lymphocytes from irradiated and non-irradiated mice were cultured for 46 h in the presence of LPS, Con A, and 2-ME to obtain metaphase spreads, and translocations were identified using the multiplex-fluorescence *in situ* hybridization (M-FISH) method. The frequencies of translocations were similar in both non-irradiated and irradiated mice continuously exposed to LDR (0.05 mGy/22 h/day) wherein it increased rapidly with aging from 512 days (565 days after birth). However, in mice continuously exposed to LDR (1 mGy/22 h/day), the frequency of translocations increased almost linearly in relation to the irradiated dose and aging from 8 weeks of age up to the 617 days of irradiation. Splenic lymphocyte clones were detected from 407 days and 617 days of irradiation in mice exposed to 1 mGy/22 h/day and 0.05 mGy/22 h/day, respectively. In non-irradiated mice, however, clones were detected from 407 days of age. Clones were detected earlier as dose rate was increased. These results will be helpful for risk assessment for low-dose radiation as well as for establishing a biodosimetry method for long-term exposures at low-dose-rates.

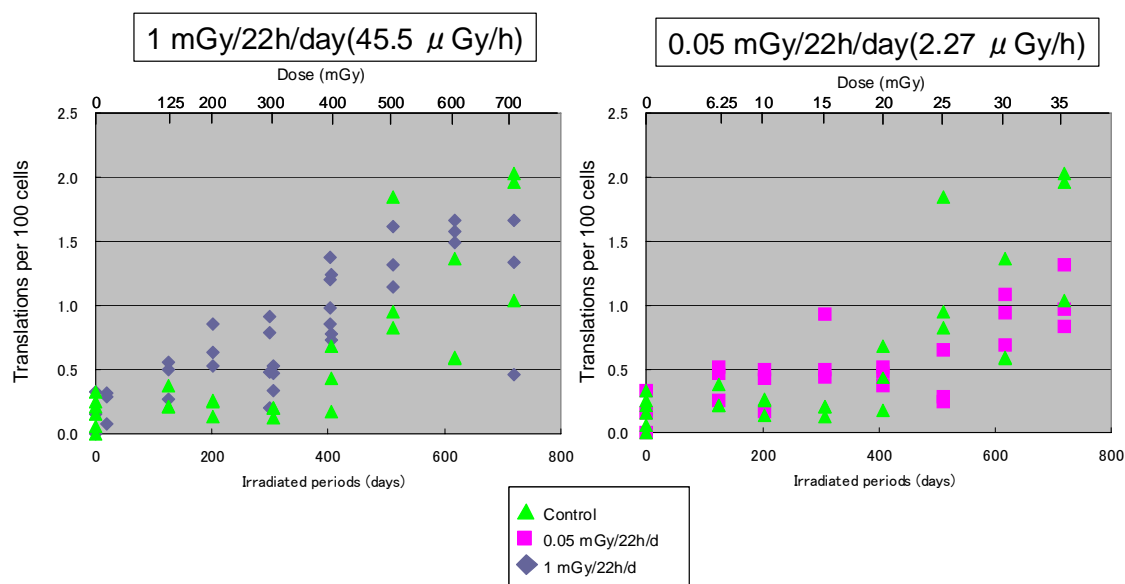


Fig.1 Frequencies of chromosomal translocations in splenic lymphocytes from mice continuously irradiated with low-dose-rate (1 mGy/22 h/day and 0.05 mGy/22 h/day) gamma-rays. Each symbol indicates a value for an individual mouse.