

Transgenerational Effects in the Progeny of Mice Exposed to Acute High
Dose-rate and Chronic Low Dose-rate Gamma-rays
– Life Span, Cause of Death, Neoplasm Incidence –

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Abstract

To study the effects of radiation exposure on progeny, male (sires) C57BL/6J mice were irradiated with ^{137}Cs gamma-rays at acute high dose-rate (HDR) of 770 mGy/min to a total accumulated dose of 3000 mGy, or at chronic low dose-rate (LDR) of 20 mGy/day for 150 or 300 days to total accumulated doses of 3000 mGy or 6000 mGy, respectively. After completion of irradiation, the male mice were bred to non-irradiated virgin females to produce F1 mice. All mice, except the dams, were kept until they succumbed to a natural death after which they were subjected to pathological examination. The number of offspring, lifespan and neoplasm incidences were used as parameters to evaluate the biological effects of high and low dose-rate radiation exposures. Results show significant increases in body weight, increased histiocytic sarcoma, and increased frequency of multiple primary neoplasms in male offspring of mice exposed to the high dose rate (770 mGy/min). A significant increase in the incidence of follicular cell adenoma of the thyroid gland was observed in female offspring of mice exposed to the HDR (770 mGy/min). On the other hand, no effect was observed in pups born from male mice exposed to LDR (20 mGy/day) for 150 or 300 days. From these results, it was considered that the above indicators had a dose-rate effect.

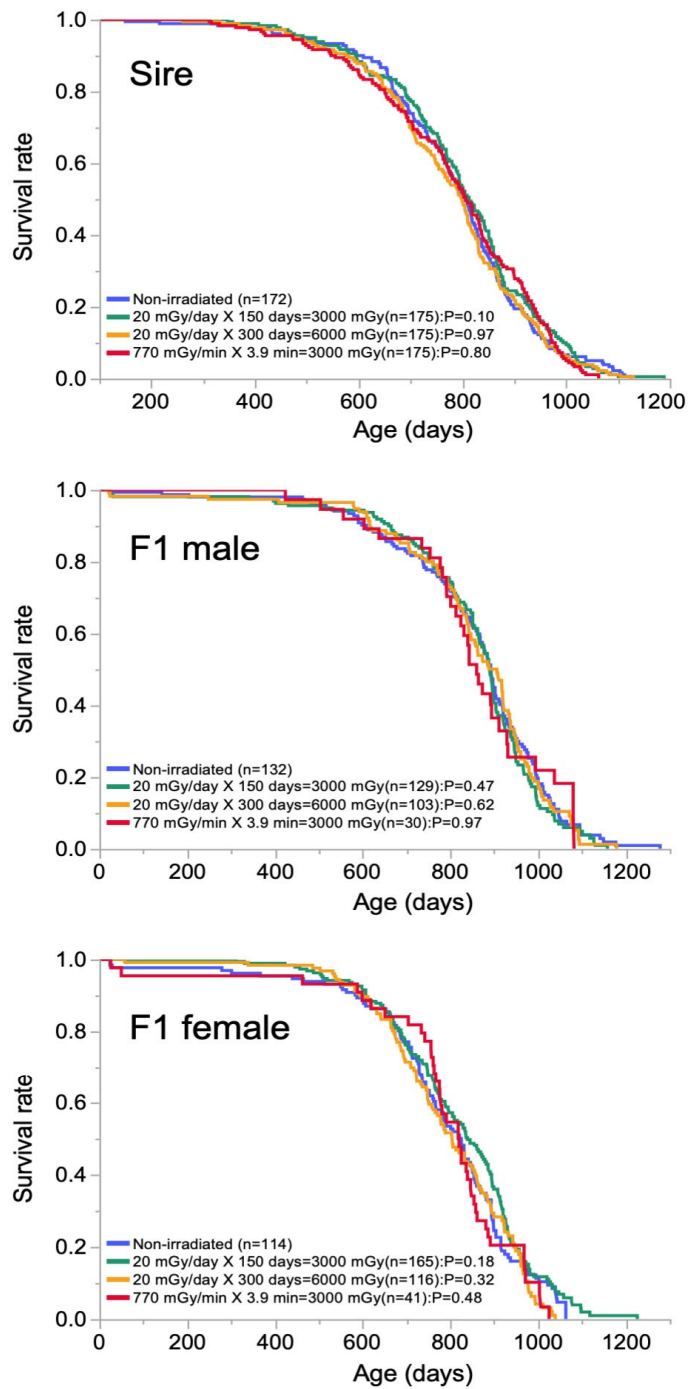


Fig. 1 Survival curves of male parent (Sire), F1 (male and female) mic