

Transgenerational Effects in Mice Exposed to Continuous Low-Dose-Rate Gamma-Rays – Pathological Study –

Satoshi TANAKA,* Ignacia BRAGA-TANAKA III,* Keiji Ogura,* Kazuaki ICHINOHE,*
Yoichi OGHISO,* Fumiaki SATO,** Kimio TANAKA*
*Department of Radiobiology, **General Advisor

Abstract

To study the effects of continuous low-dose-rate gamma-ray irradiation on the progeny of mice, males (sires) were irradiated for 400 days with ^{137}Cs gamma-rays at low-dose-rates of 20 mGy/22 h/day, 1 mGy/22 h/day, and 0.05 mGy/22 h/day, with accumulated doses equivalent to 8000 mGy, 400 mGy, and 20 mGy, respectively. Immediately after completion of irradiation, the male mice were bred with non-irradiated females to produce F1 mice. Randomly selected F1 males and females were bred to produce F2 mice. All mice except dams of F1 mice, were subjected to pathological examination upon natural death. Lifespan, cancer incidence and number of offspring were used as parameters to evaluate the biological effects of low-dose-rate irradiation. Partial results show that there was no significant difference in the pregnancy rate and weaning rate in the parent generation (Fig. 1a, 1c). There were, however, a significant decreases in the mean litter size (Fig. 1b, $P=0.029$) as well as the mean number of weaned pups (Fig. 1d, $P=0.023$) per female mated to males exposed to 20 mGy/22h/day compared to the non-irradiated controls. Significant decreases in the lifespan of male parent mice (F0) exposed to 20 mGy/22 h/day and their male (F1) progeny were observed. No significant difference was found in cause of death and cancer incidence in F1 and F2 progeny mice.

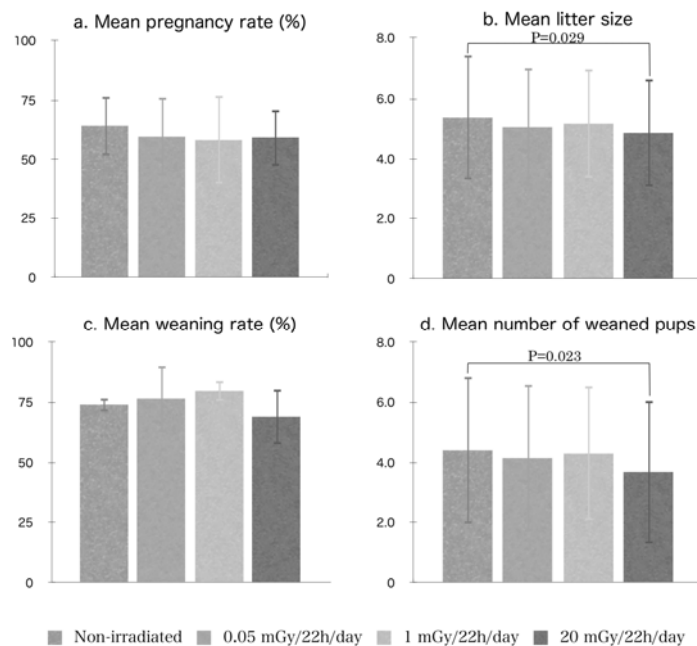


Fig. 1 Effects of gamma-rays on reproductive outcomes (F1) in mice after continuous low dose-rate irradiation of males.