

The Relationship(s) of Ovarian Dysfunction with Neoplasia and Life Span in Female B6C3F1 Mice Exposed to Chronic Low Dose-rate Radiation

Shingo NAKAMURA, Ignacia TANAKA, Jun-ichiro KOMURA, Satoshi TANAKA

Department of Radiobiology

Abstract

Premature menopause brought about by ovarian atrophy in female B6C3F1 mice continuously exposed to low dose-rate (20 mGy/day) γ rays is due to the decreased numbers of oocytes. This study aims at clarifying the relationship(s) between ovarian dysfunction (premature menopause) and weight gain, tumorigenesis of lung, liver and adrenal glands, and, life shortening in irradiated female mice. A total of 1280 B6C3F1 female mice were divided into 4 groups of 320 animals each: (1) 3 Gy irradiated/sham-operation; (2) non-irradiated/ovariectomy; (3) non-irradiated/sham-operation; and (4) 3 Gy irradiated/ovary transplant. Estrus cycle monitoring (vaginal smear) and body weight measurements were taken at predetermined intervals during the experimental period (mice were 9 to 60 weeks old). A total of 640 mice with abnormal estrus cycles and body weight changes were examined in this fiscal year. Preliminary results showed that ovary transplantation to irradiated mice (3 Gy irradiated/ovarian transplant group) significantly delays premature menopause and body weight gain compared to the 3 Gy irradiation/sham-operation group. Results suggested that excess body weight gain in female mice is related to ovarian dysfunction brought about by low dose-rate radiation exposure. Henceforth, we plan to examine the relationship of ovarian dysfunction to carcinogenesis and lifespan.

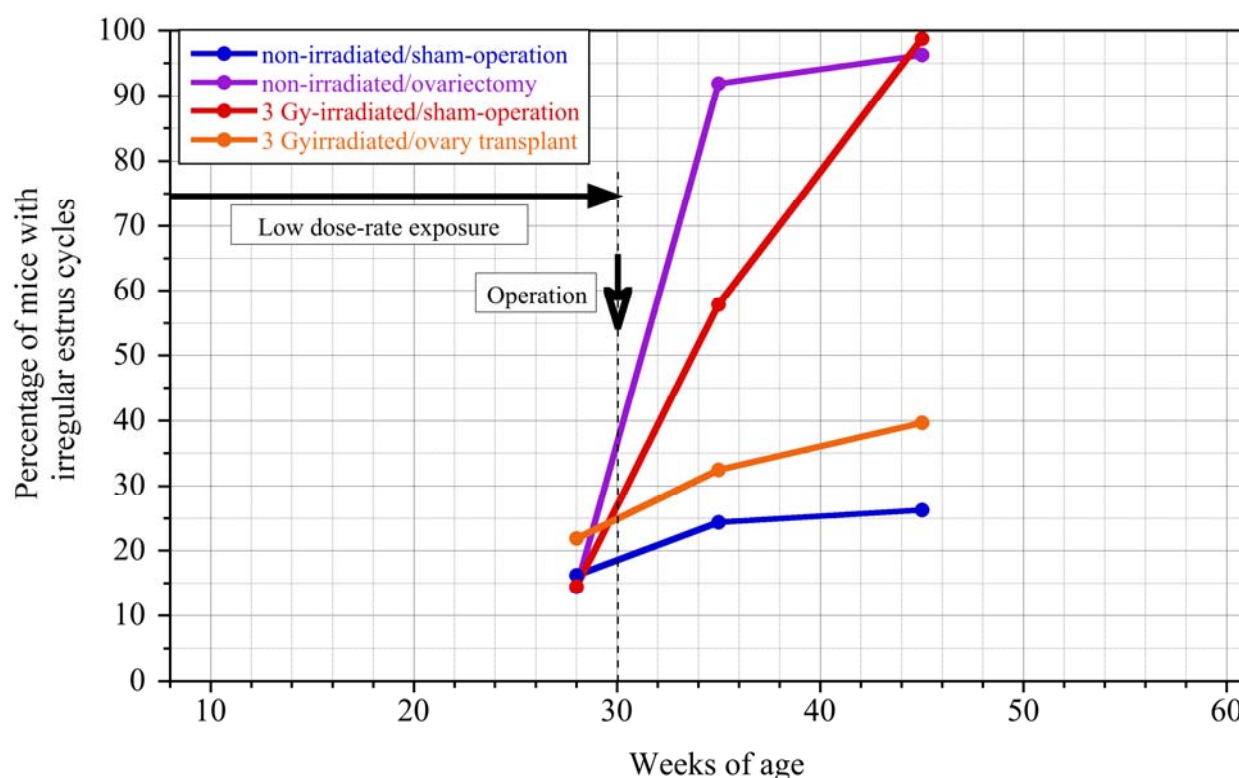


Fig. 1 Irregular estrus cycles in irradiated, ovariectomized, and ovary-transplanted mice

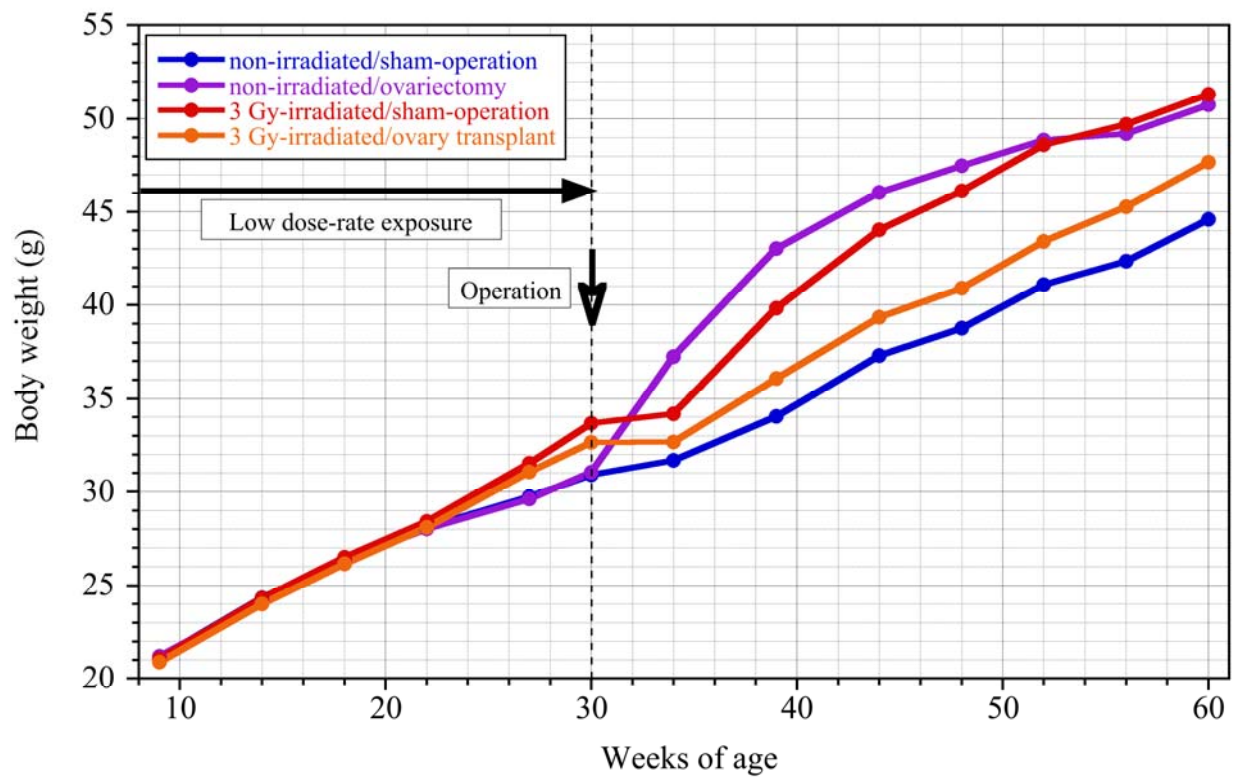


Fig. 2 Weight gain in irradiated, ovariectomized, and ovary-transplanted mice