

Radiation-induced Menopause and Body Weight Gain Are Dependent on Dose and Age at the Time of Exposure

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Abstract

We have shown that excess body weight gain and premature menopause occur simultaneously in female SPF B6C3F1 mice continuously irradiated with gamma-rays at a low dose-rate of 20 mGy/22h/day from 9 weeks of age. In the present work, we investigated the effect of radiation dose and age at the time of exposure on radiation-induced menopause and weight gain by continuously irradiating female B6C3F1 mice at 20 mGy/22h/day either from 9 weeks of age or 30 weeks of age to total accumulated doses of 1.5, 2.5, 3 and 5 Gy. A significant number of mice continuously irradiated at total accumulated doses of 2.5, 3 and 5 Gy exhibited premature menopause and body weight gain at 34 weeks of age, as compared to 55 weeks of age (21 weeks later) in mice that received a total dose of 1.5 Gy from 9 weeks of age. There was no significant difference in body weight among the 2.5, 3 and 5 Gy irradiated groups. At total accumulated doses of 2.5, 3 and 5 Gy, mice irradiated from 30 weeks of age showed significant weight gain 11 weeks earlier as compared to those irradiated from 9 weeks of age. Our results show that the excess body weight gain in mice continuously exposed to 20 mGy/22h/day is related to radiation-induced menopause.

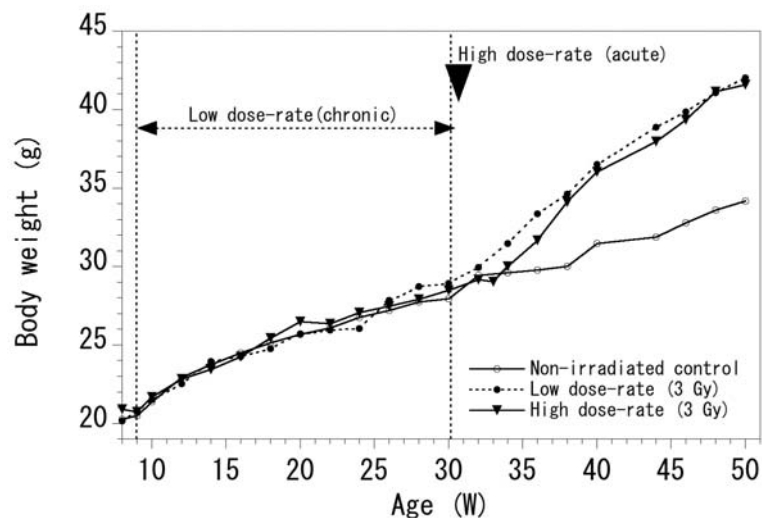


Fig. 1 Time course for alternations of body weight in mice irradiated with 3 Gy at low-dose rate or high-dose rate.

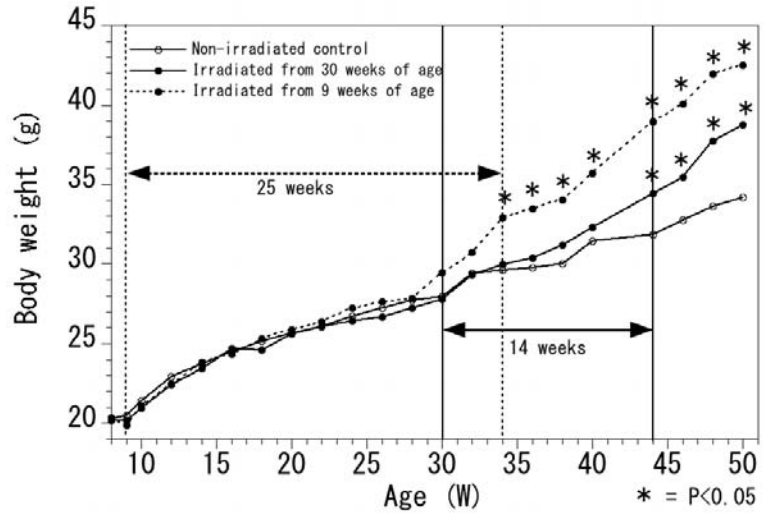


Fig. 2 Time course for alternations of body weight in mice continuously irradiated at low-dose rate from 9 or 30 weeks of age.