

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

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Abstract

We have shown that premature menopause and body weight gain in female mice chronically exposed to low dose-rate (20 mGy/ day) γ rays were significantly suppressed by transplantation of the normal ovaries from age-matched non-irradiated mice. We focus on the relationships of radiation-induced ovarian dysfunction (premature menopause) on life span and neoplasm incidence rates in the lung, liver and adrenal glands. Female B6C3F1 mice (n=1280) were divided into 4 groups of 320 animals each (non-irradiated + sham-ovariectomy, non-irradiated + ovariectomy (OVX), 3 Gy-irradiated + sham-ovariectomy, 3 Gy-irradiated + ovarian transplant (OVT)). Surgery (sham-ovariectomy, ovariectomy and transplantation) was performed after completion of the 150-day irradiation period. The mice were sacrificed at 95 weeks of age or allowed to die a natural death, and subjected to pathological examination or life span examination, respectively. Incidence rates for adenomas of the adrenal glands and liver in 3 Gy-irradiated + ovarian transplant group were significantly lower compared with those of 3 Gy-irradiated + sham - ovariectomy group. On the other hand, incidence rates for liver and lung tended to decline after ovarian transplantation, the differences were not significantly. Although the mean life span was significantly shortened in both irradiated groups as compared to non-irradiated+sham-ovariectomy group, the life span of 3 Gy-irradiated + ovarian transplanted group was significantly longer than that of 3 Gy-irradiated+sham-ovariectomy group.

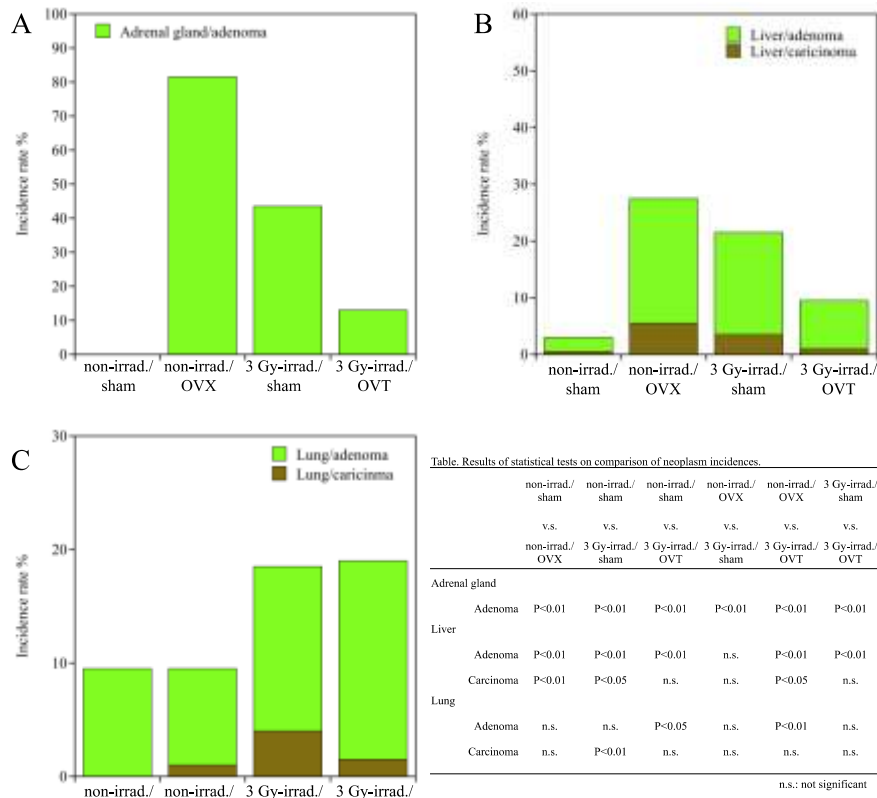


Fig. 1 Relationship between ovarian dysfunction and neoplasm incidence rates. A: adrenal gland, B: liver, C: lung. The table shows the results of statistical tests between experimental groups for neoplasm incidences

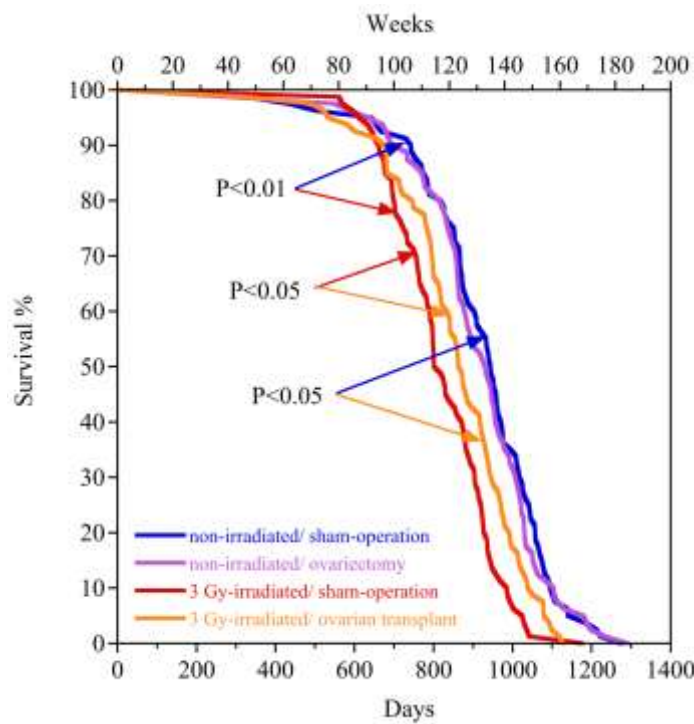


Fig. 2 Survival curves of non-irradiated, irradiated, ovariectomized and ovarian transplanted mice.