

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 hypothesized that radiation-induced ovarian endocrine dysfunction (premature menopause) affects neoplasia and life span of female mice chronically exposed to low dose-rate radiation. Female B6C3F1 mice were continuously irradiated with 20 mGy/day of gamma-rays for 150 days to an accumulated dose of 3,000 mGy. Ovariectomy or ovary transplantation was performed immediately after the completion of irradiation with age-matched non-irradiated controls. Neoplastic incidences and lifespans were investigated in four groups of mice: non-irradiated + sham-operated; non-irradiated + ovariectomy; irradiated + sham-operated; and irradiated + ovary transplant. While increased incidences for neoplasms in the liver, ovary and adrenal gland were observed in the non-irradiated + ovariectomy and irradiated + sham-operated groups, the incidences were significantly lower in the irradiated + ovary transplant group than in the irradiated + sham-operated group. These results strongly suggested that neoplasm incidences in the liver, ovary and adrenal gland were affected by ovarian endocrine dysfunction in irradiated mice. Life shortening was observed in both groups of irradiated mice, but was significantly less in the irradiated + ovary transplant group. No significant life shortening was observed in the non-irradiated + ovariectomy group. These results suggested that radiation-induced ovarian endocrine dysfunction as well as additional factors contribute to life shortening in mice continuously irradiated with low dose-rate gamma-rays.

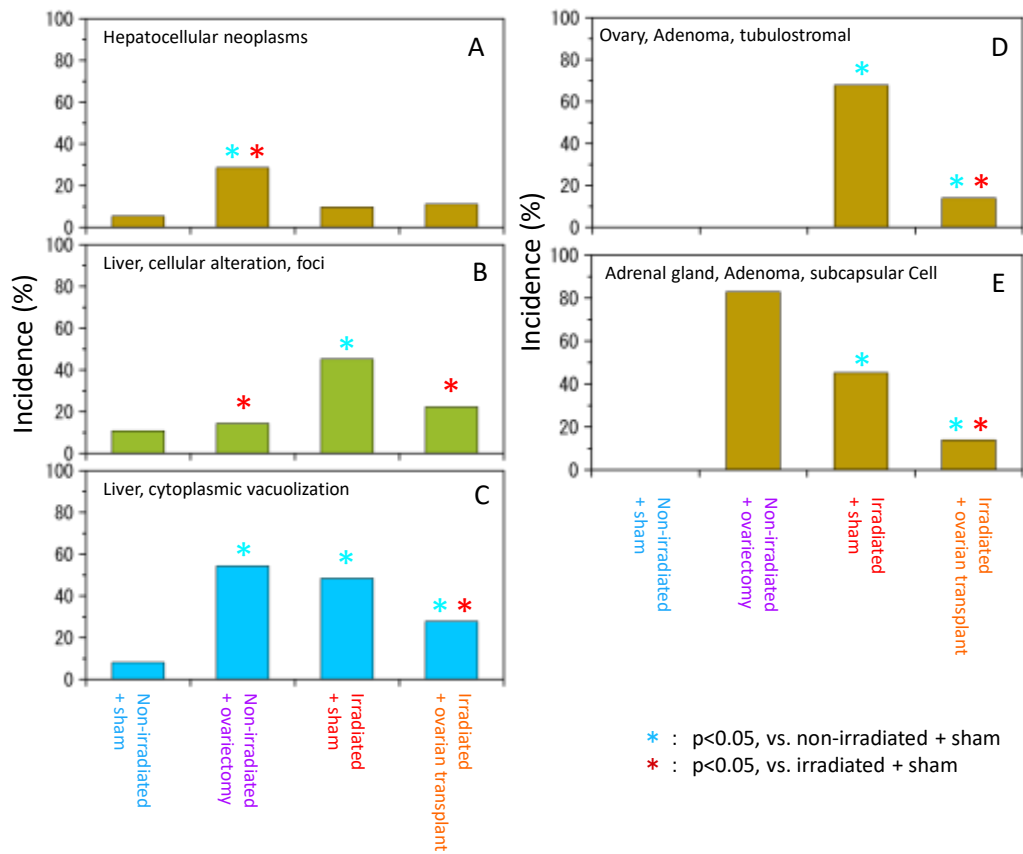


Fig. 1 Relationships between the endocrine dysfunction of the ovary and the incidences of pathological changes in the liver, ovary and adrenal gland.

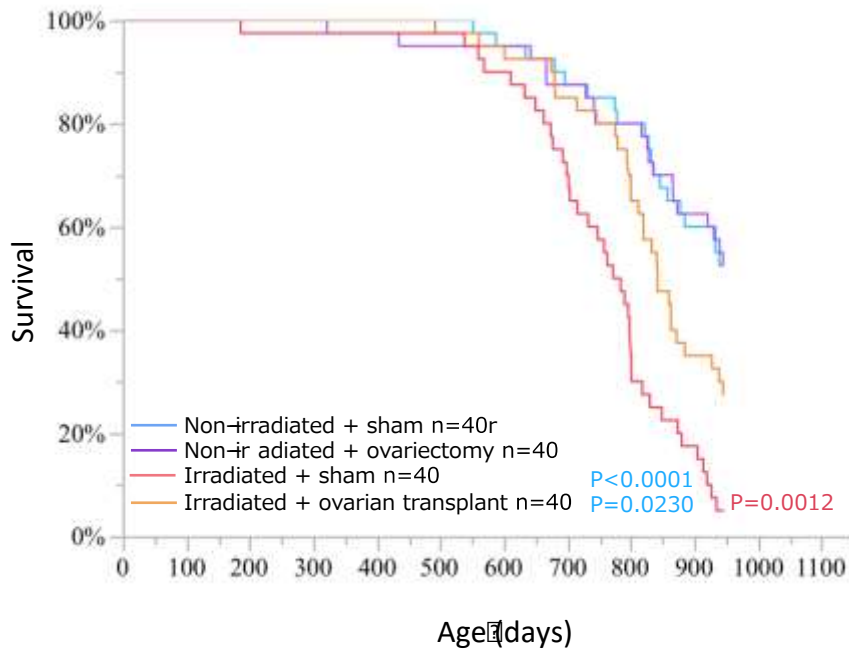


Fig. 2 Survival curves of mice: non-irradiated, irradiated, ovariectomized and with transplanted ovaries.