Transplantability of Tumor Cells to Syngeneic B6C3F1 Mice Continuously Irradiated with Low-Dose-Rate Gamma-Rays

Daisaku TAKAI, Kazuaki ICHINOHE, Kimio TANAKA, Yoichi OGHISO
Department of Radiobiology

Abstract

Significant life-shortening due to early neoplastic death was seen in specific-pathogen-free (SPF) $B6C3F_1$ mice continuously irradiated with low-dose-rate (20 mGy/22h/day) gamma-rays accumulating to a high dose (8000 mGy) as has been reported previously. To understand the mechanisms for this life-shortening, female $B6C3F_1$ mice were continuously exposed to low-dose-rate (20 mGy/22h/day) gamma-rays under SPF conditions for 400 days. OV3121 cells, which are derived from an ovarian granulosa cell tumor arose in irradiated $B6C3F_1$ mice, were inoculated into irradiated and age-matched, non-irradiated control mice. We found that tumor formation of subcutaneously inoculated tumor cells occurred earlier in irradiated mice than in non-irradiated mice. Proliferative activity of draining lymph node lymphocytes against transplanted tumor cells was significantly reduced in irradiated mice compared to non-irradiated mice. These results suggest the possibility that tumor-specific immune suppression due to continuous low-dose-rate gamma-ray irradiation may enhance tumorigenesis resulting in early neoplastic death of mice after continuous low-dose-rate gamma-ray irradiation.

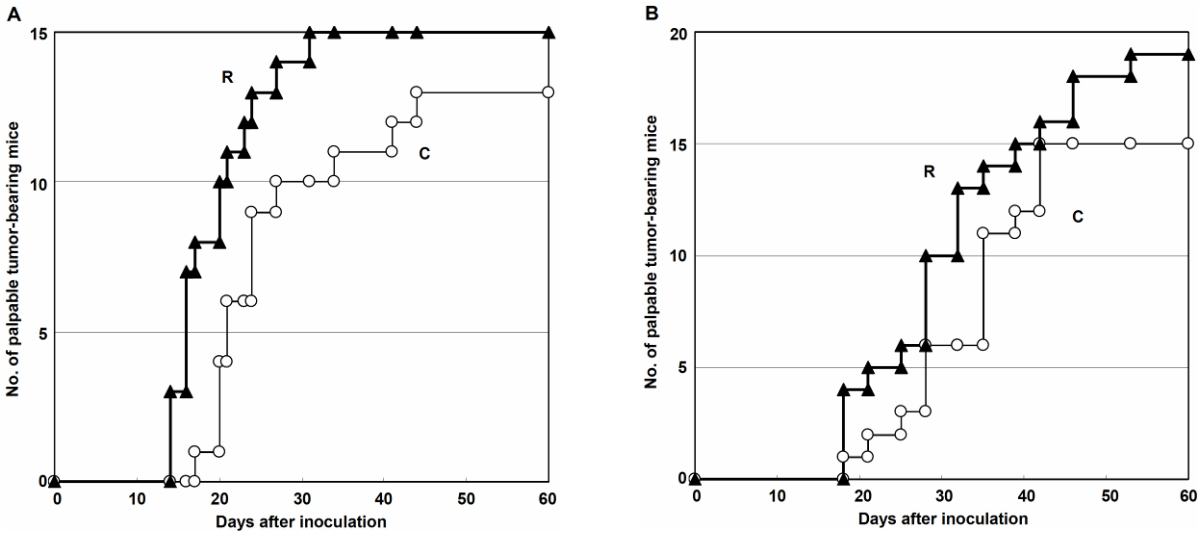

Fig. 1 Tumor cell transplantability to $B6C3F_1$ mice. OV3121 cells were inoculated into age-matched, non-irradiated control (C, open circles) and irradiated (R, black triangles) mice at 400 days after continuous irradiation with a total accumulated dose of 8000 mGy (A) and at 200 days after continuous irradiation with a total accumulated dose of 4000 mGy (B).

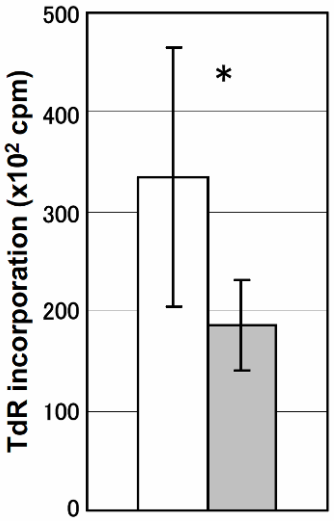

Fig. 2 Proliferative activities of draining lymph node (DLN) lymphocytes against OV3121 cells were compared between age-matched, non-irradiated control (□) and irradiated (■) mice with total accumulated dose of 8000 mGy. Each value represents mean ± SD. *, $p<0.05$.