# Latency Period of Malignant Lymphoma and Its Potential Biomarkers in Mice Exposed to Continuous Low-Dose-Rate Gamma-Rays
## – Pathological Study –

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## Abstract

Late effects of low-dose and low-dose-rate (LDR) ionizing radiation are potential hazards, and they have become a serious concern in the recent turn of events. Chronic exposure of 4000 mice to LDR gamma rays showed that life spans of female mice irradiated at 21 mGy/22 h/day (909 μGy/h) for 400 days (total dose: 8000 mGy) was shortened by about 120 days due to premature death from various neoplasms including malignant lymphomas. These suggest that long-term exposure to LDR gamma-rays cause early onset or increased progression of neoplasms. A cross-sectional study to observe the development and progression of neoplasia and non-neoplastic lesions is underway.

Preliminary findings showed increased incidences ($P$<0.05) and early emergence of malignant tumors of liver and lung origins in the irradiated group (20 mGy/22 h/day). Malignant lymphomas and benign tumors of the liver appeared at the same age in both irradiated and non-irradiated groups. Non-neoplastic lesions (ovarian atrophy) were increased significantly ($P$<0.01) in exposed mice for 200 days (total dose: 4000 mGy). These suggest that the effects of LDR irradiation on neoplastic and non-neoplastic lesions vary depending on the organ and/or tissue.

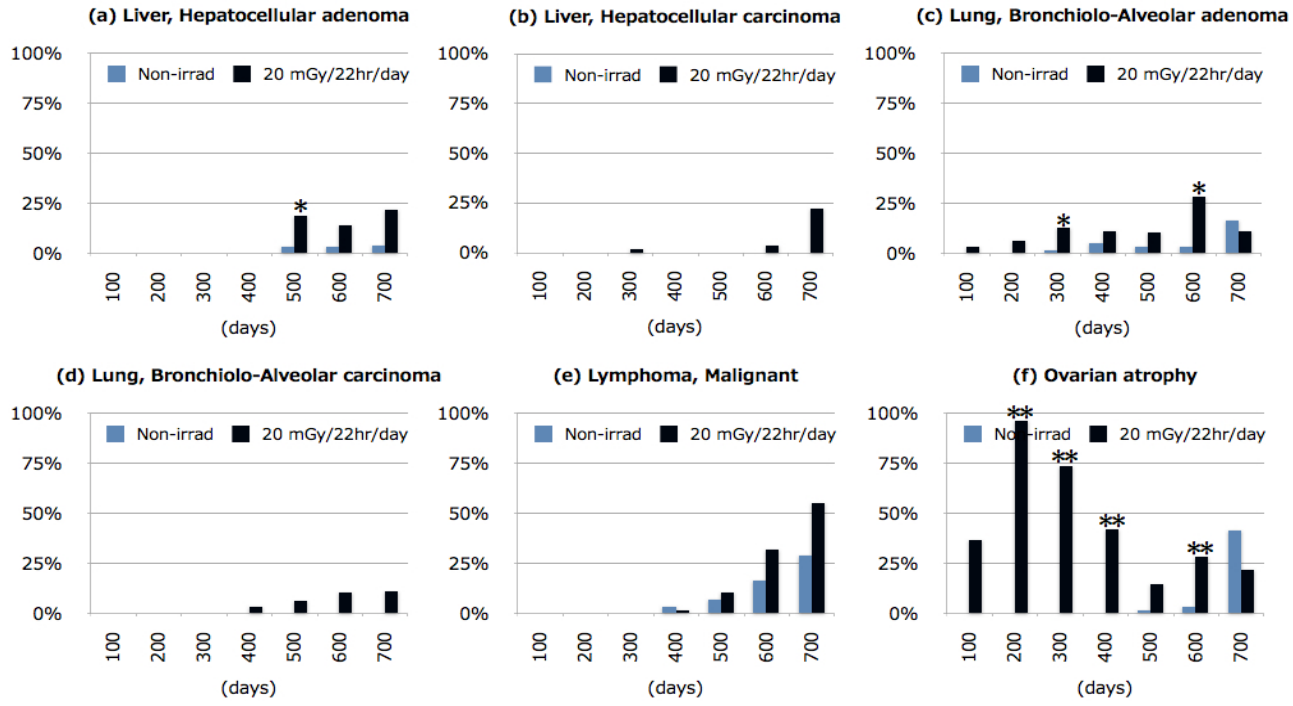


Fig. 1 Incidence of (a) Liver, Hepatocellular adenoma, (b) Liver, Hepatocellular carcinoma, (c) Lung, Bronchiolo-Alveolar adenoma, (d) Lung, Bronchiolo-Alveolar carcinoma, (e) Lymphoma, Malignant and (f) Ovarian atrophy (*:$P$<0.05, **:$P$<0.01).