

- 117 Modulation of Gene Expression in Mouse Cultured Cells Following Low-Dose/Low-Dose-Rate Ionizing Radiation.

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We examined the modulation of gene expression in mouse ATM-deficient cell line and its parent cells (gift from Prof. Niwa, RBC) by low-dose/low-dose-rate irradiation.

Method: Low-dose-rate irradiation was performed using the long-term low dose rate irradiation facility at CRIEPI with ¹³⁷Cs source (370 GBq) at a dose rate of 1 mGy/hr. High-dose-rate irradiation was performed using an X-ray machine (MBR-1505R2, Hitachi Medico) operating at 150 kVp and 5 mA and equipped with an external filter of 0.2 mm Cu and 1 mm Al at a dose rate of 0.2 Gy/min.

RNA was extracted and analyzed with Atlas Glass Mouse 1.0 Microarray (CLONTECH). Modulation of protein was examined with Western blotting.

Result: In preliminary experiments of ATM-proficient cells irradiated with high-dose X-rays, we observed that gene expression of some genes (e.g. CDK5) increased significantly at 4 hr following exposure to 4 Gy, while the extent of modulation of GAPDH as house keeping gene was less than 1.3 times.

We will report the modulation of gene expression by low-dose/low-dose-rate irradiation, comparing ATM-deficient cells.

- 118 Cell Response and Gene Expression due to the Slight Oxidative Stress in Cultured Glial Cells

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Oxidative stress causes various damages and cell death. However, the slight oxidative stress, which does not damage seriously cells, also gives rise to some responses of cultured cells. We have reported that low dose radiation (0.1 Gy of X-irradiation) caused radiation adaptive response in glial cells cultured from young rats, but not from aged rats. In the present study, we examined the effects of low dose hydrogen peroxide on the growth inhibition due to X-irradiation, and discussed the mechanism of adaptive response and the effect of aging.

As a result, the exposure to low doses of hydrogen peroxide (0.5 and 1 μ M) suppressed the growth inhibition due to X-irradiation in glial cells cultured from young rats, while the adaptive response was not shown in glial cells from aged rats, similarly to low dose radiation.

- 119 Changes in Hepatic Endogenous Antioxidants in Acatalasemic Mice after 0.5 Gy X-Irradiation

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The effects of X-irradiation of 0.5 Gy was analyzed on the levels of lipid peroxide and endogenous antioxidants, including catalase and glutathione, in the liver of acatalasemic mice (C3H/AnLCs^bCs^b). The mouse has a lower level of catalase activity than normal mouse (C3H/AnLCs^aCs^a). The catalase activity in both mice also increased after the irradiation and remained at high level. The lipid peroxide level after the irradiation decreased to about 80% of sham level in acatalasemic and normal mice. The total glutathione content in acatalasemic mice decreased, showing a valley at 6 hr after the irradiation. On the other hand, the increase was observed in normal mice at 6 hr of the peak after irradiation. These results suggested that antioxidant mechanism in acatalasemic mouse might differ from other mouse, such as ICR, C3H/HeN, and C57BL/6N.