

# Measuring of Physiological Activities of Substances in Serum from Chronic Gamma-Ray-Irradiated Mice

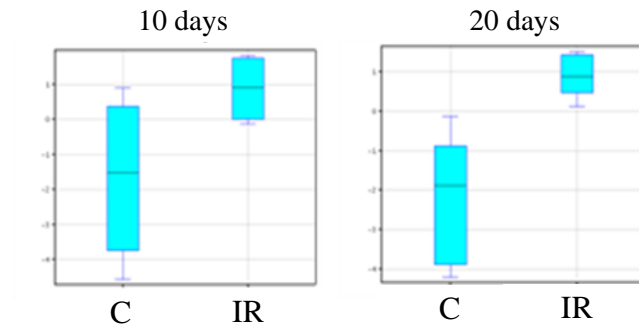
Takashi SUGIHARA, Kimio TANAKA

*Department of Radiobiology*

## Abstract

In previous experiments, we observed p53-dependent decrease of numbers of white blood cells in mice irradiated with gamma-rays at medium-dose-rate (MDR) (400 mGy/22h/day (18.2 mGy/h)). However, the biological effects of secreted molecules in serum from mice irradiated with low-dose-rate (LDR) or MDR gamma-rays were not well investigated. Serum samples from mice irradiated with LDR or MDR gamma-rays were characterized by cell-based-assay using mouse embryonic fibroblasts (MEFs), which is a new method for measuring physiological activity of substances in serum. Genes having two-fold higher expressions levels in MDR-irradiated mice to compare with those in non-irradiated mice were analyzed by gene-expression profiles. Moreover, the serum samples from LDR-irradiated mice ((20 mGy/22h/day (0.91 mGy/h) for 400 days in total) were also used for the analysis. Numbers of identified genes in mice irradiated with MDR gamma-rays for 10 and 20 days were 613 and 1202, respectively. These results are indicating that the method is applicable for quantitative measurements of bio-activity. Activity of secreted molecules in serum induced by chronic gamma ray irradiations will need further qualitative analysis.

## Microarray analysis for a gene expression of *Lcn2*



## Real Time PCR data

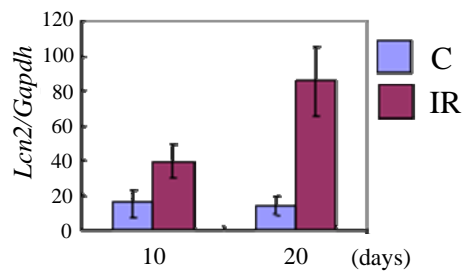


Fig. 1 Gene expressions of lipocalin2 (*Lcn2*) detected by a microarray method at medium-dose-rate (400mGy/22h/day)  $\gamma$ -ray irradiation (Up). The expression of *Lcn2* in the irradiated mice group was higher than that in the non-irradiated group. Gene expressions of *Lcn2* were detected by real-time PCR (Low). The gene expression of *Lcn2* by real-time PCR was confirmed by the microarray results. Quantity of *Lcn2* expression was divided by that of *Gapdh* expression to obtain the relative ratio (*Lcn2/Gapdh*). C: Non-irradiation, IR: Medium-dose-rate irradiation.