

Analyze DNA Methylation in the Liver of Low Dose-Rate-Irradiated Mice

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Abstract

We have previously observed extensive alterations in gene expression in livers of mice exposed to low dose-rate radiation. The purpose of the present project is to identify epigenetic mechanisms (e.g., DNA methylation) responsible for these alterations in gene expression and their possible relationship to the development of diseases such as fatty liver. We have been collecting liver (normal and fatty) samples from both non-irradiated and low dose-rate (20 mGy/day) irradiated mice at various ages. Analysis of gene expression, in the samples so far obtained, by microarray and quantitative PCR suggested that changes in the expression of *Cidea* and *Cidec* (*cell death-inducing DFFA-like effector A and C*) genes are associated with the development of fatty liver disease. Further analysis showed high expression levels of the *Cidea* gene in severe fatty livers from irradiated mice. Preliminary analysis suggested that changes in DNA methylation in the *Cidea* and *Cidec* genes are age- and irradiation-related. In the next fiscal year, we will continue to collect tissue samples from mice for further DNA methylation analyses.

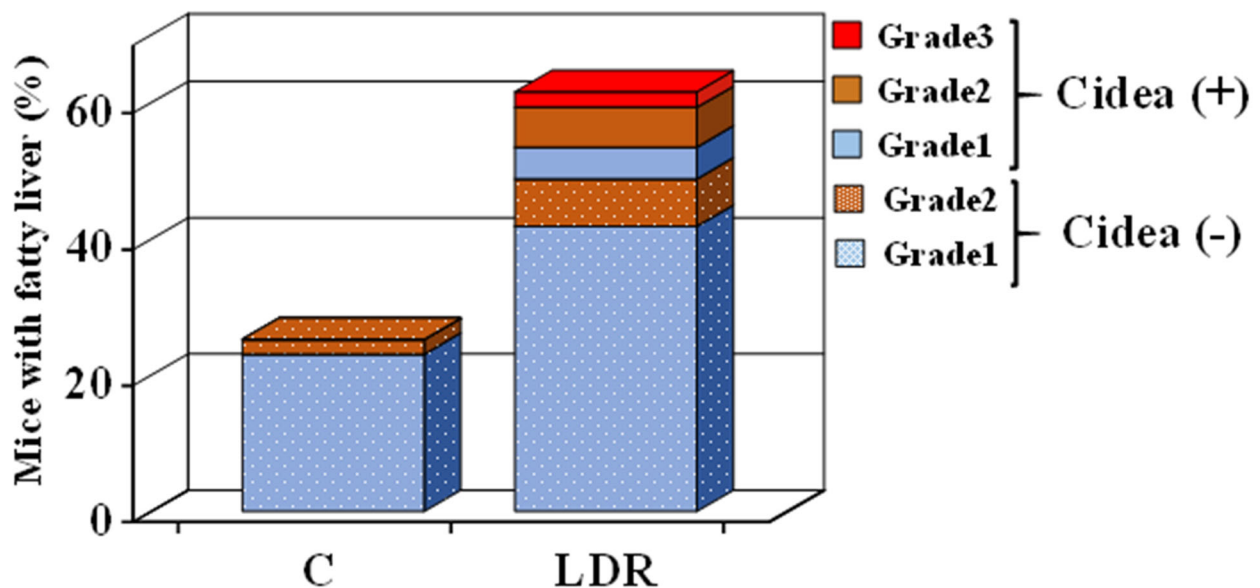
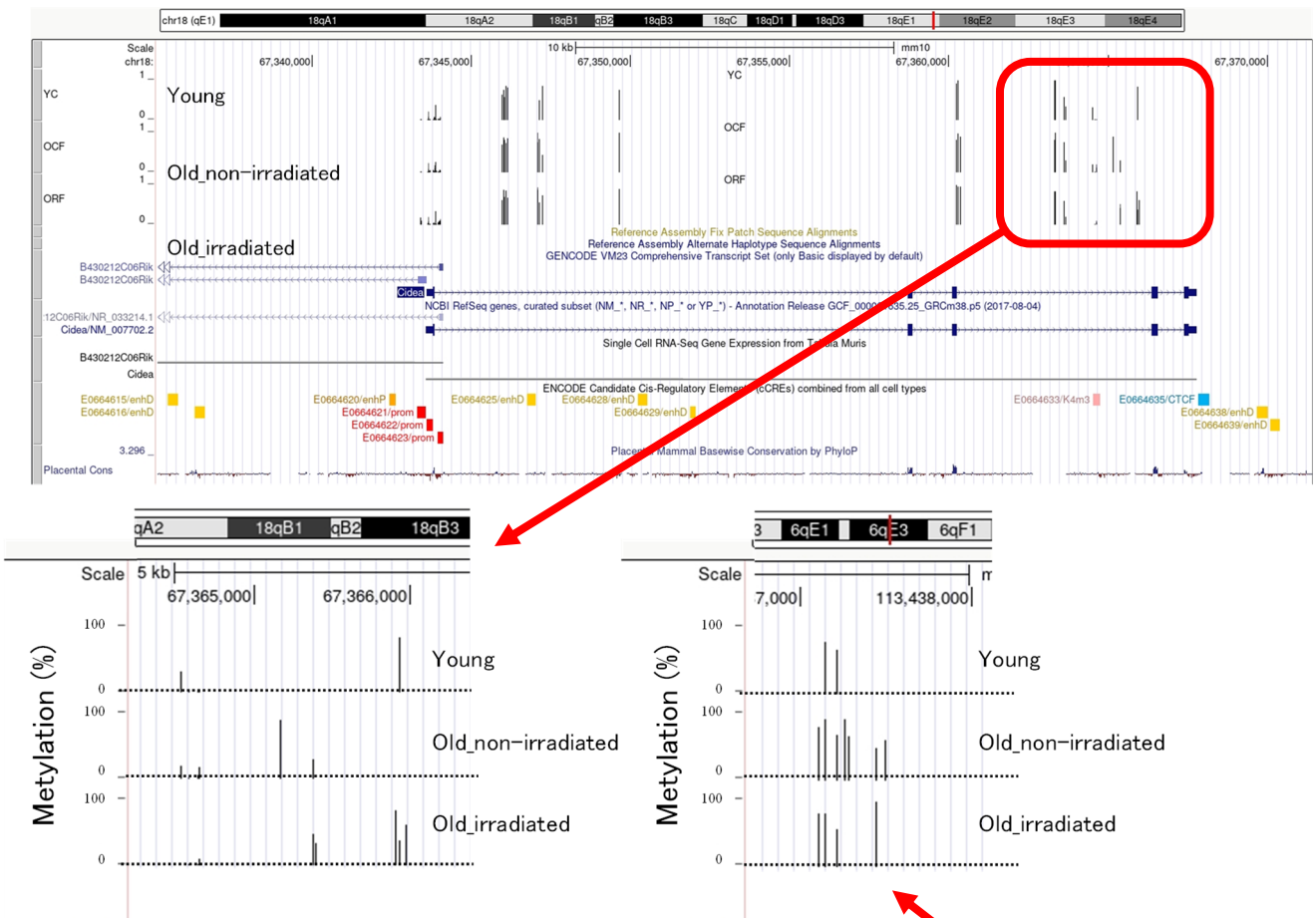


Fig. 1 *Cidea* gene expression and severity (grade) of fatty livers in non-irradiated (C) and irradiated (LDR) female mice.

Cidea



Cidec

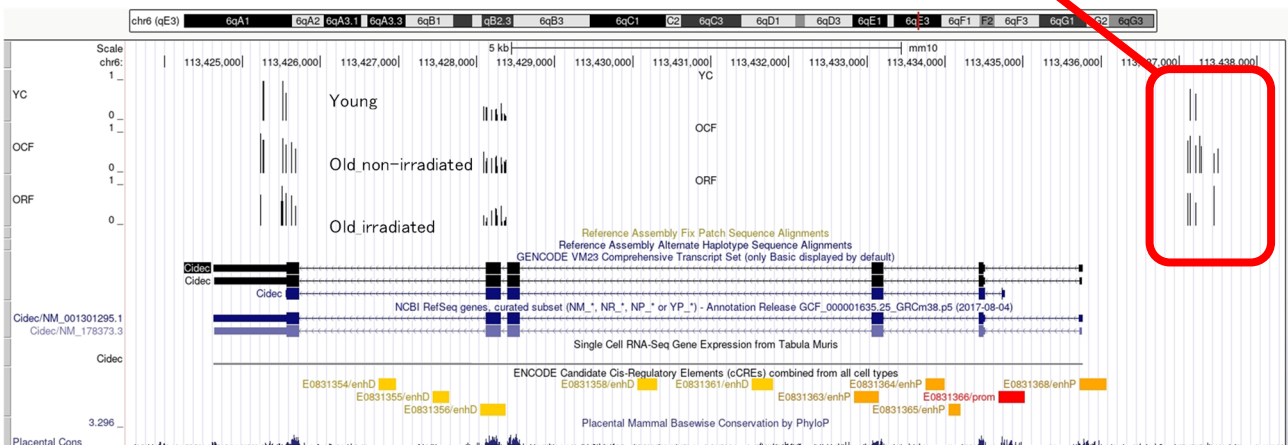


Fig.2 DNA methylation levels in the *Cidea* (top) and *Cidec* (bottom) gene regions.

Young (63 days old) non-irradiated mice, old (656 days old) non-irradiated mice, and old (656 days old) irradiated (at 20 mGy/day for 400 days from 56 days old) mice were used.