Analysis of Biological Responses to Low Dose-rate Radiation at the Molecular Level - Expression of Fatty Liver-related Genes

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Abstract

Previously, we have shown that the exposure of female mice to low dose-rate (LDR: 20 mGy/day) radiation induced various changes including obesity and fatty liver. To elucidate the molecular changes associated with the induction of fatty liver by LDR irradiation, we analyzed the expression of several metabolism-related genes in the liver of LDR-irradiated female mice. LDR irradiation did not change the expression of the genes for a fatty acid transporter and β-oxidation enzymes, which are controlled by the transcription factor Pparα, whereas it changed the expression of the gene for Cidec, which is controlled by the transcription factor Pparγ, and of the gene for Igfbp1. These results suggested that LDR irradiation to female mice might induce metabolic changes that resemble those reported for humans with type 2 diabetes.

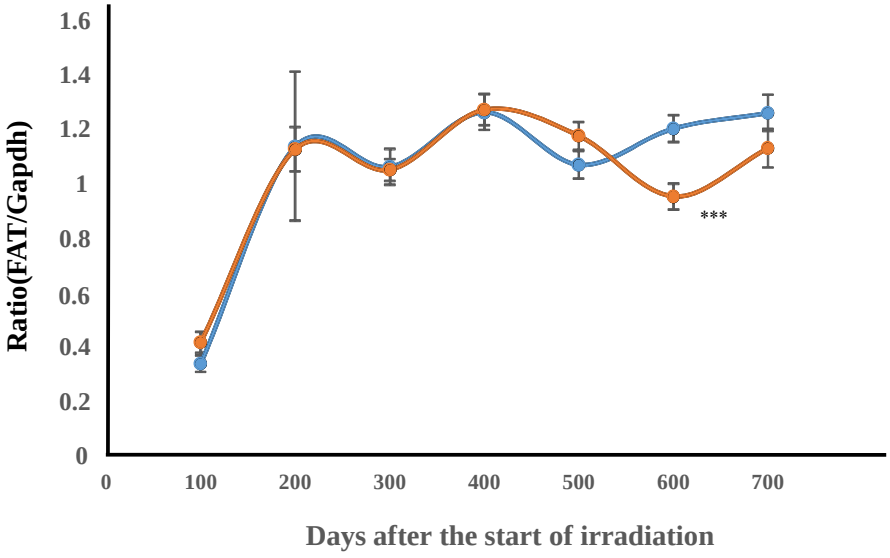

Fig.1 Changes in the expression of the gene for FAT (fatty acid translocase).
Blue: non-irradiated (n=20-30); orange: irradiated, (n=20-30).
***: P<0.001.

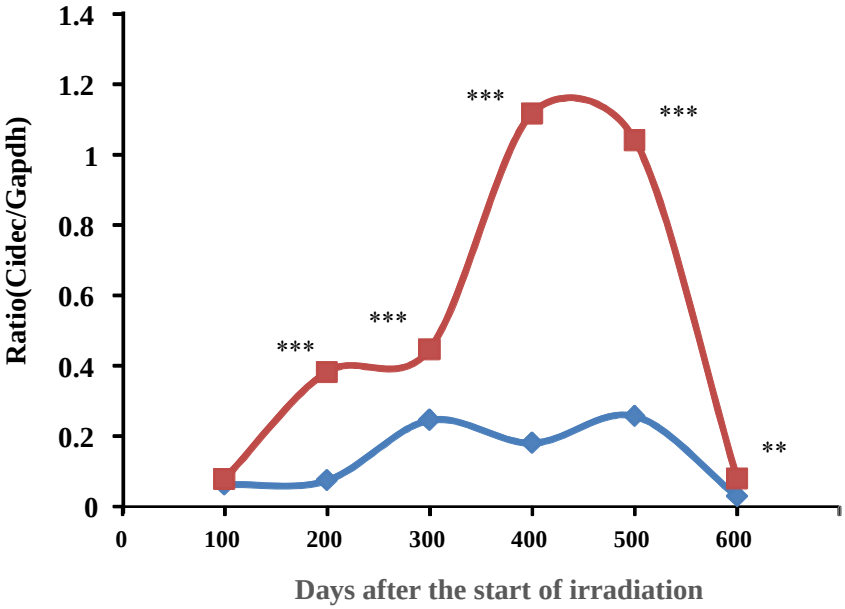

Fig.2 Changes in the expression of the gene for Cidec (cell death-inducing DFFA-like effector C).

Blue: non-irradiated (n=20-30); orange: irradiated (n=20-30).

**: P<0.01, ***: P<0.001.