

Possible Biomarkers for Ionizing Radiation Exposure in the primary cultured human fibroblasts

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Many studies have been performed to assess the development and application of potentially useful techniques for biodosimetry. Although chromosome dicentric assay has been used to estimate dose, the technique has limited dose ranges for detection from 0.2 to 4 Gy. In biodosimetry field, specific biomarkers were needed to detect the responses at low dose less than 0.2Gy. We have investigated the altered patterns of genomic DNA methylation in the primary cultured fibroblast cells by low dose (5 and 500mGy) gamma irradiation. Irradiated fibroblast cells were harvested after 4 ~ 72 hrs and methylation status of gene promoter was analyzed by Illumina Methylation Array Chip. Hypermethylation, no-changes, or hypomethylation were detected by the dose and time in the screen. Regions of the stably hypermethylated and hypomethylated promoter by radiation were reexamined by the methylation-specific polymerase chain reaction (MSP) with selected candidates. Through this analysis, we selected potential -biomarkers for biodosimetry study. This is the first report which introduces the application of promoter methylation analysis to biodosimetry field.