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Stress-responsive gene expression alterations in human embryonic stem cells after ultra low dose diagnostic ct scan procedures

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The molecular mechanisms and pathways elicited by Ultra-Low Doses of Ionizing Radiation (ULDIR) exposures in humans are still far from being comprehensively understood, partly due to the lack of appropriate sensitive model systems. We developed a novel, human Embryonic Stem Cell (hESC) culture model to examine such ULDIR effects in human cells. The discrepancies and controversies inherent to current state of ULDIR radiobiology is in a marked contrast to urgent socioeconomical needs to predict health risks emerging from diagnostic radiation in clinic, natural background radiation, and environmental radiological accident exposures. In our present study, we aimed to examine the whole genome gene expression alterations in a panel of hESC lines after ULDIR of 0.01 Gy of X-rays CT scan exposures. The responses of hESCs to high 1 Gy dose of radiation served as a positive control. We employed systems biology approaches, such as DNA microarrays, to examine whole genome gene expression changes in hESC lines; and, we elucidate the involvement of some well-known radiation-responsive set of genes, such as *CDKN1A*, *GDF15*, *GADD45A*, etc. in more detailed studies in hESCs. The results of our analysis will be presented and discussed.

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