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# Gene Expression Profiles in Respond to Cadmium Exposure in Human Breast Cell Lines using cDNA Microarray

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Cadmium, a human carcinogen, can induce toxicity in various cell lines and organs. Despite extensive research, the mechanism of cadmium-induced cell toxicity was not clearly defined. Interestingly, cadmium can induce estrogenic effect in estrogen responsive cells and tissues through binding and activating estrogen receptors (ER). In previous study, MCF-7 cells were more susceptible to cadmium than MDA-MB-231 cells in viability test. To identify the possible relationship between ER activation and cell death induction of cadmium, differential gene expressions in 0.1, 1, 50 or 100 μM $CdCl_2$ treated ER (+) MCF-7 cells and ER (-) MDA-MB-231 cells were investigated using cDNA microarray. Above 50 μM $CdCl_2$ treatment, the expression of metal binding protein, metallothionein, and stress responsible protein, heat shock protein, was significantly increased in both cell lines. In relation to estrogen receptor, expressions of genes related with inhibition of estrogenic effect (repressor of estrogen activity, sulfotransferase and hydroxysteroid-17β -dehydrogenase 2) were significantly increased in ER (+) MCF-7 cells. Moreover, anti-oxidation-related gene expressions (heme oxygenase 1, selenoprotein, thioredoxin 2 and peroxiredoxin 1) were up-regulated in MCF-7 cells. These suggest that cadmium-induced cell death in ER (+) cells are mediated by oxidative stress as well as estrogen receptor-related pathway.

**Keyword:** Cadmium, cDNA microarray, cell death, estrogen receptor, human breast cell lines