

Toxicogenomic Analysis of Alkylphenolic Compounds using Human cDNA Microarray (KISTCHIP-400) Related to Endocrine System

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Estrogen receptors (ERs) are nuclear transcription factors that regulate gene expression in response to estrogen and estrogen-like compounds. Identification of estrogen-regulated genes in target cells is an essential step toward understanding the molecular mechanism of estrogen action.

Bisphenol A (BPA) and 4-nonylphenol (4-NP) are a class of the broader group of compounds known as alkylphenol. These phenolic compounds are used in a number of commercial products and have been reported to be weakly estrogenic in previous studies. To screen and elucidate the endocrine disrupting activity, first of all, E-screen assay was performed with MCF-7 human breast cancer cells with BPA and 4-NP. This *in vitro* assay compares the cell yield between cultures of MCF-7 cells treated with 17 β -estradiol. In this cell proliferation assay, BPA and NP showed estrogenic activity. Also to identify genes elicited by BPA and 4-NP, we carried out a microarray analysis of MCF-7 cells treated with BPA and 4-NP using KISTCHIP-400 including 416 endocrine related genes based on public database and research papers. Of the genes analyzed, 6 genes represented decreased levels of expression while the 2 genes showed increased levels in the cells treated with 10⁻⁶ M BPA. In 10⁻⁶ M 4-NP, 8 genes were down regulated and only 1 gene up-regulated. Among them, especially ATP-binding cassette 3, ESTs, H4(D10S170) were down expressed by BPA and/or 4-NP as 17 β -estradiol. Therefore it suggests that these genes may be associate with estrogenic effect of the alkylphenolic compounds on transcriptional level.