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The Effects of Dietary Flavonoids on the Benzo(K)Fluoranthene-Induced CYP1A1 Gene Expression

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In the recent industrial society, human has widely exposed to PAHs that are coming from the incomplete combustion of organic material as widespread environmental contaminants. PAHs refer to a group of a few hundreds of compounds with two or more fused benzene rings. In addition to carcinogenic and mutagenic properties of the compounds, it is shown that PAHs are ligands of the Ah (aryl hydrocarbon) receptor. In this study we investigated the effects of dietary flavonoids, such as genistein, daidzein, chrysin, naringenin and morin on CYP1A1 promoter activity, 7-ethoxyresorufin O-deethylase (EROD) activity and CYP1A1 mRNA expression induced by benzo(k)fluoranthene(BkF) in MCF-7 cells. We found that BkF significantly up-regulate the level of 1A1 promoter activity, EROD and CYP 1A1 mRNA. When cells were treated genistein, daidzein, chrysin, naringenin and morin alone, CYP 1A1 promoter activity was not changed, compared to that of control. However these flavonoids inhibited the BkF-induced transcription of a reporter vector containing the CYP1A1 promoter when cells were pretreated with these flavonoids before the BkF treatment. All five flavonoids exhibited inhibitory effects on EROD activity stimulated by BkF in MCF-7 cells. And these flavonoids also inhibited the induction of CYP1A1 mRNA stimulated by BkF, in a dose-dependent manner. This data suggested that flavonoids might interfere the action of BkF with AhR system to stimulate CYP gene expression. [This research was supported 2004 KNTP, KFDA]

Keyword : PAHs, flavonoid, luciciferase assay, EROD, CYP 1A1 mRNA, MCF-7