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Evaluation of Dietary Plant Flavonoids against BKF-induced CYP1B1 Gene Expression in MCF-7 Human Breast Carcinoma Cells

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Polycyclic aromatic hydrocarbons (PAHs) are established cancer initiators that can be found in our food and environment. Some dietary plant polyphenols are strong inhibitors to PAH-induced mutagenesis, whereas others may not be as effective. To identify the chemopreventive compounds from dietary components, the development of an efficient screening method is required. In this study, we examined the MCF-7 human breast carcinoma cells to evaluate bioactivity of PAHs and to screen the effectiveness of some flavonoids in reducing PAH-induced CYP1B1 expression. Cytochrome P450 1B1 (CYP1B1) metabolizes estradiol to 3,4-catechol estrogen and also catalyzes the bioactivation of numerous procarcinogens and it is expressed in tumor cells, including human breast cancer cells. MCF-7 human breast carcinoma cells were transfected with hCYP1B1-Luc plasmid transiently and treated with benzo(k)fluoranthene (BKF; 1 uM), several of flavonoids like genistein, chrysin, daidzein, morin, and naringenin (0.01-100 uM), or 0.1% dimethylsulfoxide (DMSO ; vehicle control). Luciferase assay was conducted using luciferin in cell lysate. The results of CYP1B1-luciferase reporter assay suggested that these flavonoids were effective in reducing BKF-induced CYP1B1 expression at concentrations of between 1uM and 0.01uM. RT-PCR analysis also indicated that PAHs significantly up-regulate the level of CYP1B1 mRNA and flavonoids were effective in reducing BKF-induced CYP1B1 expression at the same concentrations.[This research was supported by 2004 KNTP]
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