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The effect of PAHs on the regualtion of CYP1 gene
in ZR-75-1 and MCF7 human breast cancer cells

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Recent industrial society has human widely exposed to PAHs that are coming from the incomplete combustion of organic material as widespread environmental contaminants. Biological activities of PAHs are not known although PAHs are considered as carcinogens. The mechanism of action of PAHs has been studied extensively, however it is not clear how PAHs turn on CYP1A1 in human breast cancer. Our laboratory have been studied the effect of PAHs in the human breast cancer cells, MCF-7. In this study, we examined the ZR-75-1, human breast cancer cells, as a new system to evaluate bioactivity of PAHs and to compare the PAHs action with that of MCF-7 cells. ZR-75-1 human breast cancer cell line is responsible to estrogen and progesterone. We have been able to establish long term culture system of this cells then used for the study to the effect of 13 different PAHs and environmental samples. We demonstrate that PAHs induced the CYP1A1 promoter and 7-ethoxyresorufin O-deethylase (EROD) activity in a concentration-dependent manner. RT-PCR analysis indicated that PAHs significantly up-regulate the level of CYP1A1 mRNA. Some of PAHs showed stronger stimulatory effect on CYP1 gene expression than TCDD. Apparently, ZR-75-1 cells have Aryl hydrocarbon receptors (AhR), therefore it would be a good experimental tool to study the cross-talk between PAHs and steroid actions.