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# The Absence of Cytochrome P4501A1 in Normal Bronchial Epithelial Cells Is a Major Cause for the Deficiency of Benzo[a]pyrene-evoked Cytotoxicity

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Cigarette smoke and diesel(fuel) exhaust gas contain a considerable amount of benzo[a] pyrene(BaP) which has been revealed to associate with mutagenesis and carcinogenesis of several normal epithelial cells. The purpose of this study was to investigate the potential actions of BaP in normal bronchial epithelial cell, NL20. Various concentrations of BaP (0.01-100 $\mu$M) treatment to the cells did not alter any cell cycle patterns during 48 hrs compared to those of controls. BaP-7,8-dihydrodiol(BaP-diol; 0.1-100 $\mu$M), a metabolite of BaP by CYP1A1/1B1 and epoxide hydrolase, also had no influence on cell cycle. However, BaP-7,8-dihydrodiol-9,10-epoxide(BPDE) treatment(0.1 $\mu$M), a terminally processed metabolite of BaP by CYP1A1, evokes cell cycle change as well as cell death. BaP (10 $\mu$M) treatment however reduced aryl hydrocarbon receptor (AhR) protein significantly. Importantly, CYP1A1 protein and its activity were not detectable in NL20 cells, which indicate that BaP may not be able to convert to its metabolites in the cells. The other significant fact was that NL20 cells retain an abundant p53 which is a well known checkpoint protein during the cell cycle progression. The p53 protein content remained unchanged during the BaP treatment. Finally, BPDE-induced cell death was mediated by caspase activation, and involved with depolarization of mitochondrial membrane potential. In conclusion, an epithelial bronchial cell NL20 can not mediate the BaP signal probably because the cells might lack of the capability for CYP1A1 expression through AhR-Arnt transcriptional activation.

**Keyword** : benzo[a]pyrene, lung cell, CYP1A1