

번호 07-2

제 목	국문	소각장 근로자에서 환경성 발암물질 대사효소의 유전다형성이 PAH-DNA adduct와 뇨중 PAH 대사산물의 관계에 미치는 영향			
	영문	Association of PAH-DNA adducts and urinary PAH metabolites influenced by genetic polymorphisms of xenobiotic metabolism enzymes in incinerating workers			
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1. 연구 목적

Although workers incinerating industry wastes are exposed to a variety of pyrolysis products including genotoxic compounds like polycyclic aromatic hydrocarbons (PAHs), limited numbers of biomarkers have been measured in these workers. Multiple biomarkers related to PAH exposure were assessed in industry wastes incinerator workers in Korea.

2. 연구 방법

Fifty-one workers including twenty eight employees directly incinerating industry wastes were recruited from a company located in Ansan industry complex. Ambient PAH levels were measured by GC-MS using standard NIOSH method from the personal breathing zone samples of nine individuals working at the incinerator. Levels of urinary 1-hydroxypyrene glucuronide (1-OHPG), as internal dose of PAH exposure, were measured by synchronous fluorescence spectroscopy after immunoaffinity purification using monoclonal antibody 8E11. PAH-DNA adducts in peripheral blood WBC, as biological effective dose of PAH exposure, were quantified by P32-postlabelling method. Variant frequencies of glycophoryn A (GPA) mutation, as marker of the early biological effects, were analyzed by flow cytometry. GSTM1/GSTT1 genotypes were assessed by multiplex PCR. Two different genetic polymorphisms of CYP1A1 were determined by PCR followed by NcoI or MspI enzyme digestion. Information on demographic characteristics, smoking habits, alcohol consumption, diet, job title, use of personal protective equipment, and upper respiratory symptoms were collected by self-administered questionnaire.

### 3. 연구 결과

Urinary 1-OHPG were higher in workers handling industry wastes than in workers with presumed lower exposure to PAHs ( $p=0.08$ , by two-sample Kolmogorov-Smirnov test). There was a statistically significant dose-response increase in urinary 1-OHPG levels with the numbers of cigarettes consumed per day in all workers (Spearman's correlation coefficient=0.40,  $p=0.01$ ). Urinary 1-OHPG levels increased with the number of null GST genotypes, but these differences were not statistically significant ( $p=0.11$ , by ANOVA for log-transformed 1-OHPG). Urinary 1-OHPG levels were the highest in the occupationally exposed smokers compared with the unexposed non-smokers ( $p=0.04$ , by Kruskal-Wallis test). Numbers of cigarettes consumed per day and combined GST genotypes were significant predictors for log-transformed 1-OHPG by multiple regression analysis (overall model R-square=0.23). Concentrations of PAH-DNA adducts were not significantly different either by smoking status, or by different GST genotypes. However, there was a significant correlation between urinary 1-OHPG levels and PAH-DNA adducts concentration in peripheral blood WBC in all study subjects (Spearman's correlation coefficient=0.42,  $p=0.005$ ; Pearson correlation coefficient for log-transformed data=0.41,  $p=0.005$ ).

### 4. 고찰

These results suggest that industry wastes incinerator workers are exposed to significant amount of PAHs and the individual difference in xenobiotic metabolism significantly affects the levels of urinary PAH metabolites. Both genetic as well as environmental factors have to be considered when we interpret biological monitoring data of genotoxic compounds. (This project was supported in part by Seoul National University Research Grant and in part by Seoul National University Hospital Research Grant).