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Exposure to polycyclic aromatic hydrocarbons derived from vehicle air pollutants in work environment and bronchus epithelial cell line (BEAS-2B)

Measurements of polycyclic aromatic hydrocarbons (PAHs) derived from diesel exhaust in work environment and DNA-binding of PAHs in lymphocytes and BEAS-2B cells was investigated. Exhaust particles and volatile compounds were collected on filters and polyurethane foam and PAH analysis and cell exposures were carried out using extracts of organic fraction. Air PAH concentrations and urinary metabolites were measured using HPLC and DNA adducts by ³²P-postlabeling assay. Workplace exposure to non-carcinogenic PAHs was low, consisting 97% of vapour phase compounds. Concentrations of 15 PAHs were 2241 and 1245 ng/m³ for exposed and 254 and 275 ng/m³ for control persons in winter and summer respectively. Seasonal variation of DNA adducts and urinary metabolites showed low internal exposure to diesel exhaust associated PAHs. After exposing BEAS-2B cells to benzo[a]pyrene, SRM 1650 diesel particulate and gasoline extracts a time- and dose-dependent adduct formation was obtained. Dose-dependent DNA adduct formation in BEAS-2B cells and PAHs analyzed in extracts correlated significantly. Biomarkers and BEAS-2B cell culture are useful tools to study diesel particulate exposure in assessing effects of carcinogenic compounds. (Supported by Finnish Academy, Fortum Oil and Gas and TEKES)

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