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Efficiencies of formation and repair of 3-NBA-induced DNA adducts

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The urban air contaminant 3-nitrobenzanthrone (3-NBA) is thought to induce mutation and cancer through forming several DNA adducts. In previous research, we quantified NBA-DNA adducts in human cultured cells using LC/MS/MS and 3P-postlabeling methods. dG-N3-ABA and dG-C8-N-ABA were detected as major adducts in the LC/MS/MS, while dA-N2-ABA was detected as a major adduct in the 3P-postlabeling analysis. In the present study, therefore, to explain this discrepancy between two analyses, we measured detection efficiency of the adducts in each method. In this study, known amounts of oligonucleotides containing single adduct site-specifically were analyzed by both methods and detection efficiencies were determined. Using these efficiencies we quantified the amount of the adducts in the cells. Finally, we elucidate the mechanism of NBI-mutagenesis through adduct formation, repair and TLS using data of repair efficiencies and mutation frequencies of these adducts.

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Tumor promoting activity of polycyclic aromatic compounds

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Polycyclic aromatic compounds in diesel exhaust particles are thought to be relevant to lung and bladder cancer in several epidemiologic studies. Although many studies about carcinogenicity, mutagenicity and tumor initiating activity of these compounds were reported, the study about their promoting activity was few (S. Asada et al. Mutat. Res., 2005). In this study, using mouse embryo fibroblast cells transfected with v-Ha-ras gene (Bhas 42 cells) (K. Ohmori et al. Mutat. Res., 2004), transformation assay for promoting activity was done for 6 polycyclic aromatic hydrocarbons (PAHs) and 7 oxygenated PAHs which exist in diesel exhaust particles. It was first found that PAHs such as benzo[a]fluoranthene and benzo[b]fluoranthene have significantly high, and oxygenated PAHs such as 1,2-naphthquinone and benzo[a]fluorenone have high promoting activities by this method. Additionally, it is scheduled to examine the relevance of promoting activity for polycyclic aromatic compounds with the formation of reactive oxygen species and other factors (aryl hydrocarbon receptor (AhR) activity etc.).