

[P-17]

Oxidative DNA damage and its repair enzyme expression induced by welding fume inhalation.

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Welding fume (WF) induces pulmonary disease including pneumoconiosis. To investigate whether reactive oxygen species-induced oxidative DNA damage occurs during welding fume exposure and the upregulation of DNA repair mechanisms is accompanied, SPF SD rats were exposed to welding fumes with the concentrations of 65.6 ± 2.9 mg/m³ (low dose) and 116.8 ± 3.9 mg/m³ (high dose) of total suspended particulate for 2 hrs per day in an inhalation chamber for a total of 2hrs, 15 or 30 days. Dose-response relationships were confirmed in DNA damage levels by immunohistochemistry (immunodetection for 8-hydroxyguanosine and 8-hydroxy-2'- deoxyguanosine) and single cell gel electrophoresis (comet assay) in the SD rat lung tissues. DNA repair enzymes that are involved in base excision repair were upregulated, as shown by RT-PCR. Our results indicate that oxidative DNA damage and its repair increase significantly during welding fume exposure.

Keyword : Welding fumes, lung, rats, oxidative DNA damage