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Oxidative DNA Damages and Its Repair Enzyme Activities in the SD rats by Repeated Inhalation Exposure to the Hexavalent Chromium

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According to the epidemiological studies in chromium workers, hexavalent chromium is associated with the risk of lung cancer. Reactive oxygen species produced by hexavalent chromium exposure may play an important role in the carcinogenesis process. We measured one kind of oxidative DNA damages, 8-hydroxydeoxyguanosine (8-OHdG) and its repair activities as an indicators of cellular oxidative stress in rat lungs by the repeated inhalation exposure to sodium chromate.

The 8-OHdG levels increased significantly in the lung tissues of the rats exposed for one week at the low concentration (0.18 mg/m³, p<0.05) when compared with controls. However, at the higher concentration or over two week exposure, there were no changes in the level of 8-OHdG.

The 8-OHdG repair activities decreased dose-dependantly until the rats were exposed for two weeks while their activities were recovered from 3 week exposure. These results suggest that DNA oxidative damages from hexavalent chromium inhalation could be induced and its repair activity was also suppressed at the same time during the earlier exposure period and they are recovered at some point after that.