

Chromium Pollution and Its Impact on Human Health

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Abstract: Chromium gets into soil, water, and air both due to geological weathering and due to a broad spectrum of industrial processes, and the health effects of contamination are critically dependent on the oxidation state in which the metal is found. Trivalent chromium is a relatively stable and scarcely absorbed form, whereas hexavalent chromium is able to cross cell membranes easily and produces reactive intermediates that can cause injury to DNA and proteins. The present review reviews the literature, environmental behaviour and toxicological pathways of chromium especially focusing on the mechanisms that lead to the hexavalent chromium causing oxidative stress, genotoxicity and malignancy. The majority of the epidemiological evidence to date associating inhaled chromium(VI) with lung cancer has been obtained in occupational cohorts who are exposed either by electroplating, tanning, or chromate production and this data has been balanced against the more recent results of ingestion exposure. Also addressed in the review are organ-specific impacts on the respiratory system, renal system, hepatic system, dermatological system, reproductive system, and immune system, and concludes with a discussion on monitoring methods, remediation strategies and regulatory systems designed to reduce human exposure. Throughout missing dose-response data of low-level environmental exposure are noted as a priority in future research.

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