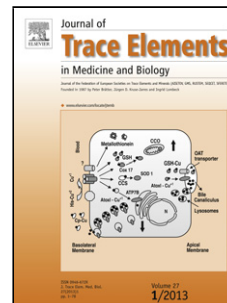


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Evidence of the direct adsorption of mercury in human hair during occupational exposure to mercury vapour.

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Abstract

We have found clear evidence of direct adsorption of mercury in human hair after the occupational exposure to mercury vapour. We have performed both longitudinal analysis of human hair by Laser Ablation ICP-MS and speciation analysis by Gas Chromatography ICP-MS in single hair strands of 5 individuals which were occupationally exposed to high levels of mercury vapour and showed acute mercury poisoning symptoms. Hair samples, between 3.5 and 11 cm long depending on the individual, were taken ca. three months after exposure. Single point laser ablation samples of 50 μm diameter were taken at 1 mm intervals starting from the root of the hairs. Sulfur-34 was used as internal standard. The ratio $^{202}\text{Hg}/^{34}\text{S}$ showed a distinct pattern of mercury concentration with much lower levels of mercury near the root of the hair and high levels of mercury near the end of the hair. In all cases a big jump in the concentration of mercury in hair occurred at a given distance from the root, between 32 and 42 mm depending on the individual, with a high and almost constant concentration of mercury for longer distances to the root. When we took into account the rate of hair growth in humans, 9 to 15 mm/month, the jump in mercury concentration agreed approximately with the dates when the contamination occurred with the new growing hair showing much lower mercury concentration. In some cases the concentration of mercury at the tip of the hair was ca. 1000 times higher than that near the root. Additionally, speciation studies confirmed that mercury in all hair samples was present as inorganic mercury. The only explanation for these results was the direct adsorption of mercury vapour in hair at the time of exposure.

Keywords

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