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Chromium-induced histo-architectural alterations in female small Indian mongoose (Herpestes javanicus) inhabiting tannery areas of the Kasur district, Pakistan

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In leather tanning industry, hexavalent chromium (Cr-VI) is a basic component in the tanning process. Many studies conducted so far on human population have highlighted Cr-VI as a reproductive toxicant, however, studies focusing on wild animal species exposed naturally to chromium contaminated environment are lacking. In the current study, we investigated the reproductive toxicity of hexavalent chromium in female Indian mongooses inhabiting tannery areas of Kasur District, Pakistan, famous for having tannery industries (>270 tannery units). Adult female specimens were live trapped each month from February 2015 to January 2016. The captured animals were euthanized in the laboratory and sacrificed to collect blood and ovarian tissues, along with kidney and liver samples. The tannery waste water (from adjoining nullahs) and sludge samples were also collected simultaneously from the area. The Cr levels in soil, water, blood and tissue samples were estimated. Histological analysis of the ovarian tissues of mongooses was performed along with estimation of steroid (progesterone and estradiol) and peptide hormones (FSH, and LH) concentrations. The Cr concentrations were found elevated significantly in the environment (soil and water samples), and in the blood and body tissues of the animals. Histological analysis revealed decreased follicle numbers inside ovaries along with reduced ovarian weights. The hormonal analysis showed decrease in progesterone and estradiol concentrations, while FSH and LH levels were found increased. We conclude that chromium discharged from the tanneries into the environment is up taken by inhabiting wild animals (mongooses), leading to ovarian tissue damage and potential impairment of reproductive functions.

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