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Orally administered gold nanoparticles caused mild oxidative stress in the lungs and liver of Wistar rats

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Abstract

Gold nanoparticles (AuNPs) are increasingly being used in real clinical settings for drug delivery, gene transfer, cancer cell detection, phototherapy, and antiviral and anti-inflammatory activities, among other uses. Hence, knowledge about their potential toxicity and health impact is essential. This study therefore investigated the biochemical effects of gold nanoparticles in Wistar rats. Sixteen (16) Wistar rats were grouped into 4 (*n* = 4). Animals in the negative control group were orally administered 0.3 ml of distilled water (vehicle) while other treatment groups were respectively given oral administration of 0.3 ml each of 1, 10, and 20 mg/kg b.w. AuNPs for 7 days. Biochemical measurements of oxidative stress indices in rat plasma and tissue homogenates were recorded on a UV/Vis spectrophotometer. There was no significant (*p* > 0.05) difference in the plasma and brain for all the biochemical parameters measured, when compared with the negative control group. Conversely, AuNPs at 20 mg/kg b.w. significantly (*p* < 0.001) raised protein carbonyl and lipid peroxidation levels in the lungs and percentage (%) DNA fragmented levels in the liver (*p* < 0.05). These results indicate that AuNPs particularly at 20 mg/kg b.w. might predispose to oxidative stress.