

# TOXICOLOGY & APPLIED PHARMACOLOGY

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## Toxicological evaluation of magnesium hydroxide nanoparticles in rats following 28 days of repeated oral exposure

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The rapidly growing field of nanotechnology has offered innovative discoveries in medical and industrial fields. The potential risks of these nanoparticles have also been identified via environmental and occupational exposure. Magnesium nanoparticles have gained commercial interest in the areas of waste remediation, water treatment, and drug delivery. However, the potential toxic effect of magnesium hydroxide nanoparticles (MgOHNPs) is yet to be unraveled. The present study elucidated the effect of repeated doses of MgOHNPs in rats. Adult Wistar rats were exposed to 0, 50, 100, 200 and 1000 mg/kg body weight of the nanoparticle for 28 days. Exposure to MgOHNPs impaired the functionality of liver and kidney as evidenced by a significant elevation in plasma aspartate aminotransferase (AST), alkaline phosphatase (ALP), magnesium, calcium, potassium, and creatinine levels compared with control. Also, a significant reduction in the plasma concentrations of albumin, total protein, globulin, and chloride was observed at the tested doses. The altered integrity of these organs was corroborated by a significant elevation in the levels of total protein, AST and ALP and reduction in alanine aminotransferase (ALT), was observed in the kidney. Also, there was a significant reduction in the hepatic total protein. Whereas, a dose-dependent significant ( $p < 0.05$ ) increase was observed in the activities ALP, ALT, and AST in the liver. The exposure induced a marked dose-dependent decrease in total cholesterol (TC), triglyceride (TG), and low-density lipoprotein (LDL) and high-density lipoprotein (HDL) cholesterol. However, the blood levels of glucose, ALT and hematological parameters remained unaltered throughout the experimental period. These findings suggest that repeated exposure to MgOHNPs may have consequential effects on the liver and kidney functions.

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