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Toxic effects of zinc oxide nanoparticles and histopathological and caspase-9 expression changes in the liver and lung tissues of male mice model

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Abstract

In this study, the toxic effects of zinc oxide nanoparticles (ZnONPs) at different doses and periods were evaluated, and the histopathological changes and caspase-9 and -8 expression levels in liver and lung tissues of thirty-three male mice model, were determined. The mice model was divided into the treatment groups which were injected intraperitoneally with 0.5 ml of ZnONPs (100 and 300 mg/kg) for 15, 20, and 25 days; and a control group that was injected with 0.5 ml of 0.9% physiological solution for 15, 20, and 25 days. The ZnONPs were shown to cause histopathological effects in the liver and lung tissues which include reversible changes such as hypertrophy, degeneration, and others that were diagnostic in histological sections; and irreversible changes like

necrosis. The ZnONPs at 300 mg/kg after 25 days had caused a significant decrease in caspase-9 expression levels (two–fourfold lower than Control) in both liver and lung tissues. However, there was no significant difference in caspase-8 in both liver and lung tissues, suggesting that the intrinsic pathway of apoptosis, rather than the extrinsic pathway, may be inhibited. ZnONPs were, therefore, exhibited to inhibit programmed cell death, and also induced irreversible phenotypic necrosis, in a dose- and time-dependent manner.

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