

The effect of different doses of zinc oxide nanoparticles on the oxidation status of mice

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Background and aim:

Humans are easily in contact with zinc oxide nanoparticles (ZnO NPs) as they are widely used in several fields. Some studies have reported their toxic effects on various cells and proteins. Therefore, we aimed to study their effects on antioxidant markers including superoxide dismutase (SOD) and glutathione peroxidase (GPX), as well as oxidative stress marker malondialdehyde (MDA) on male mice.

Materials and methods:

A total of 30 adult NMRI male mice, with two months of age and 28-32 g in weight were used in this study. The mice were divided in five groups, each consisting of 6 mice. Of these, one was the control group, one was the sham group which received only distilled water, and one was the treatment group which received intraperitoneal injection of ZnO NPs at 250, 500, and 700 mg/kg/day. Upon 7 days of treatment, heart blood was collected to measure SOD, GPX, and MDA levels. One-way ANOVA test was used for statistical analysis.

Results:

In male mice exposed to ZnO NPs, SOD levels increased significantly in a dose-dependent manner ($P < 0.05$). GPX levels showed a significant following 250 and 700 mg/kg/day ZnO NP treatment. Finally, an insignificant reduction in MDA level was observed following treatment with 250 and 500 mg/kg/day ZnO NPs, while a significant elevation was observed following treatment with 700 mg/kg/day ZnO NP.

Conclusion:

High dosages of ZnO NPs should be used with great cautious as they might have cytotoxic activities leading to irreversible defects. Further studies are required to elucidate the exact mechanisms of ZnO NPs on oxidative stress in cells.

Key words:

zinc oxide, nanoparticles, SOD, GPX, MDA

Biography:

I am Dr. Ziba Mozaffari, 38 years old and I live in Iran and I am a member of the faculty of the Islamic Azad University, Sanandaj Branch in Kurdistan Province, Iran. I currently hold a Ph.D. in animal sciences-developmental sciences from the University. I am an Islamic Azad of Tehran Science and Research Branch.

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