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## Response of the antioxidant enzymes of rats following oral administration of metal-oxide nanoparticles $(Al_2O_3, CuO, TiO_2)$

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Metal-oxide nanoparticle (NP), as new emerging technological compounds, promise a wide range of usage areas and consequently have the potential to cause environmental toxicology (1, 2). In the present work, aluminum ( $Al_2O_3$ ), copper (CuO) and titanium (TiO<sub>2</sub>) nanoparticles (NPs) were administered via oral gavage to mature female rats (*Rattus* norvegicus var. albinos) for 14 days with a dose series of 0 (control), 0.5, 5, 50 (mg/kg b.w./day). Enzyme activities of the antioxidant system such as catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione S-transferase (GST) and glutathione reductase (GR) in the liver were measured. Data showed that all NPs caused some significant (P>0.05) alterations in the activities of antioxidant enzymes. CAT activity increased after CuO and TiO<sub>2</sub> administrations, while SOD activity decreased after  $Al_2O_3$  administration. The activities of enzymes associated with glutathione (GR, GPx, GST) metabolisms were also significantly altered by NPs. GPx activity increased in rats received  $Al_2O_3$ , CuO NPs, while GR activity increased only by  $Al_2O_3$  only. However, there were increases (TiO<sub>2</sub>) and decreases (CuO) in GST activity in the liver of rats. The present work was supported by previous studies demonstrating the effects of NPs on the antioxidant enzymes (3, 4, 5). This study demonstrated that the antioxidant enzymes in the liver of rats were affected by all NPs, suggesting the antioxidant system of rats suffered after NP administration.

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