SERUM AMINOTRANSFERASES AND ALKALINE PHOSPHATASES AS BIOMARKERS OF HEPATOTOXICITY IN SPRAGUE-DAWLEY RATS EXPOSED TO SILVER NANOPARTICLES

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Abstract: Nanoparticles are small scale substances (<100 nm) used in biomedical applications, electronics, and energy production. Increased exposure to nanoparticles being produced in large scale industry facilities elicits concerns for the toxicity of certain classes of nanoparticles. In particular, the oral toxicity of silver nanoparticles is of concern to ensure public and consumer health. Due to the intensive commercial application of silver nanoparticles (Ag-NPs), health risk assessment of this nanoparticle is of great importance. The previous in vitro studies demonstrated that Ag-NPs caused toxicity in various cell-lines. However, toxicity of Ag-NPs in vivo is largely lacking. This study evaluated the effect of Ag-NPs on the activities of specific liver enzymes such as aminotransferases (GOT/GPT), and alkaline phosphatases (ALP) which may be useful as biomarkers of hepatotoxicity. Four groups of five male rats each weighing approximately 80 ± 2 g were orally administered once a day for five days with doses of 5, 25, 50 and 100 mg/kg BW of silver nanoparticles. A control group was also made of 5 rats. At the end of the experiment, serum samples were collected following standard protocols. The data obtained from the hepatotoxicity study clearly show that highest two dose 50 and 100 mg/kg of silver nanoparticles has statistically significantly increased the activity of serum aminotransferases (GOT and GPT) and alkaline phosphatases (ALP) when compared to control. The results demonstrate that Ag-NPs have the potential to induce hepatotoxicity in Sprague-Dawley rats. Our result does not imply that silver nanoparticles should be banned from use but more in vivo studies with histopathological characterization should be designed to confirm the results of this study.

Keywords: silver nanoparticles, serum aminotransferases, alkaline phosphatases, Sprague-Dawley rats, hepatotoxicity

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