EFFECT OF SILVER NANOPARTICLES ON HUMAN LIVER CARCINOMA CELLS

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Abstract: Silver is used in many forms and capacities in industry, medicine and dentistry. Although most of the salts from silver are poisonous, the actual silver metal is not considered to be toxic. Silver is no longer considered a metal once it reaches the nanoparticle level (1 nm equal to one billionth of a meter). Despite the huge potential benefits of silver nanoparticles (AgNPs) in the field of biomedical and industrial applications, studies are ongoing to determine the cytotoxic effects and bioavailability in cells. Although the cellular effects of AgNPs have been investigated in various cell models including keratinocytes, fibroblasts, monocytes, colon, and lung cells, the literature is scarce regarding their hepatotoxicity. Considering the fact that oral intake may constitute a major route of AgNPs exposure and the liver being the primary metabolic organ after gastro-intestinal absorption of chemicals, it is important to investigate the hepatocellular effects of AgNPs, with a special emphasis on the elucidation of their molecular mechanisms of toxicity. The present research provides insight into the potential toxicity and bioavailability of silver nanoparticles using Human Liver Carcinoma Cells (HEPG2) as a model to evaluate the cytotoxicity based on the MTT (colorimetric) assay. Data obtained from this assay indicated that AgNPs significantly reduced the viability of HepG2 cells, showing LD50 value of 4.5µg/ml at 24 hours of exposure, indicating a dose-dependent response relationship. Further studies are underway to determine if AgNPs induce oxidative stress and thereby lead to DNA damage. These studies will provide new insights into the mechanisms of action of silver nanoparticles in vitro, as well as provide relevant scientific information for the possible use in drug therapy management.

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