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Silver nanoparticles exhibit coating and dose-dependent neurotoxicity in glutamatergic neurons derived from human embryonic stem cells

Yiling Hong
Western University of Health Sciences, USA

Silver nanoparticles (AgNPs) are used extensively as anti-microbial agents in various products, but little is known about their potential neurotoxic effects. In this study, we used glutamatergic neurons derived from human embryonic stem cells as a cellular model to study 20 nm citrate-coated AgNPs (AgSCs) and Polyvinylpyrrolidone-coated AgNPs (AgSPs) induced neurotoxicity. AgSCs significantly damaged neurite outgrowths; increased the production of reactive oxygen species and Ca2+ influxes; reduced the expression of MAP2, PSD95, vGlut1 and NMDA receptor proteins at concentrations as low as 0.1μg/ml. In contrast, AgSPs exhibited neurotoxicity only at higher concentration. Furthermore, our results showed that AgSCs induced glutamate excitotoxicity by activation of calmodulin and induction of nitric oxide synthase; increased the phosphorylation of glycogen synthase kinase-3 α/β at Tyr^{216} and Tau at Ser^{396} and reduced the expression of Tau46, which are typically observed in Alzheimer's disease. This study indicated that stem cells can provide an excellent platform for studying nanoparticle induced neurotoxicity.

yhong@westernu.edu

Toxicopathological effects of tartrazine on male albino rats

Alaa Fouad Ali, Sherein S AbdEl-Gayed, Osama S EL-Tawil and Adel M Bakeer
Cairo University, Egypt

Tartrazine is organic azo dyes food additives widely used in foods, drugs, and cosmetic. The present study aimed to investigate the toxic effects of tartrazine on kidney and liver biomarkers in addition to investigation of oxidative stress and change of histopathological structure of liver and kidneys in thirty male rats. Tartrazine was orally administrated daily at dose 200mg/ kg bw (1/ 10 LD_{50}) for sixty days. Serum and tissue samples were collected at the end of the experiment to investigate the underlying mechanism of tartrazine through assessment oxidative stress (GSH, SOD, and MDA) and biochemical markers (ALT, AST, Total protein and Urea). Liver and kidneys tissue were collected and preserved in 10% formalin for histopathological examination. The present study indicates that sub-chronic effects of tartrazine not only cause changes in hepatic and renal parameters but also it can induce oxidative stress by formation of free radicals in addition to histopathological changes in liver and kidney.

alaafouad303@yahoo.com