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Silver nanoparticles induce cardiovascular toxicity in human endothelial cells and zebrafish embryos

Silver nanoparticles (AgNPs) have distinctive physicochemical properties that make them attractive in a variety of applications. These uses are rapidly expanding. Thus, the exposure of human and other organisms, especially aquatic organisms, to AgNPs is obviously increased. In order to gain new insights into the toxicity of silver nanoparticles, the study of cardiovascular effects was investigated *in vitro* and *in vivo*. *In vivo* study, we found that AgNPs caused mortality, and malformations in zebrafish embryos. These malformations included pericardial edema, yolk sac edema, sluggish circulation, bent tail, and heart and head malformations. The investigation of AgNP exposure to human umbilical vein endothelial cells (HUVECs) showed that AgNPs induce some level of cell cytotoxicity, however, after alkaline phosphatase staining, we found no defect on sub-intestinal vessels (SIVs) in AgNP-exposed embryos. In addition, we also revealed a novel defect of AgNPs on erythropoiesis in zebrafish embryos.

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