

Cytotoxicity of Fe₂O₃ nanoparticles in cultured lymphoblast cell

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The field of nanotoxicology of nanoparticles is still in its infancy, with very limited literature regarding the potential health effects. Cellular endocytosis, subsequent translocation and degradation kinetics are largely dependent on nanoparticle's size, shape, and surface chemistry. A larger surface area per unit mass compared with larger-sized particles of the same chemistry renders nanoparticles a higher bioactivity. Fe₂O₃ nanoparticle is frequently used as a contrast agent of MRI because of its ferromagnetism. But Fe₂O₃ may cause cytotoxicity, so it is coated with silica oxide to prevent this problem. In this study, this core/shell nanoparticle was fabricated and characterized for mean diameter (17.9 nm) and surface area (161.2 m²/g) by TEM and BET, respectively. To evaluate cytotoxicity and genotoxicity, we used MTS assay and Comet assay in the lymphoblast cells with different concentrations of the nanoparticles. The result analyzed by Dunn's method of one way ANOVA indicated a low hazard potential of silica-coated Fe₂O₃ nanoparticle below 2.5 mg/ml.