

Purpose: In this study nanoparticles of gadolinium oxide have been investigated for intracellular uptake and capacity to generate a positive contrast. For this purpose two novel composed of a) silicon-based nanocomposite polymer(NCP), b) Diethylene glycol (DEG) based coating material, both loaded with gadolinium(III) oxide (Gd₂O₃) nanoparticles were used. **Method and Materials:** This study would be involved with nanoparticles composed gadolinium (III) oxide, a) emulsified with a silicon-based nanocomposite polymer and b) capped with Diethylene glycol (DEG) by polyol method starting from of Gd₂O₃ large particles, leading to Gd₂O₃ nano size capping with polymers. Properties evaluation of nanoparticles were assessed previously by this group. Presently, cytotoxicity of gadolinium oxide nanoparticles in U-87 MG cancer cells was evaluated. Furthermore relaxivity of particles in U-87 cells were compared to particles in cell culture medium. **Results:** The results showed that Gd₂O₃-labeled cells have shorter T₁ and T₂ relaxation times compared with untreated cells. The slope of r₁ relaxivity (1/T₁) vs. concentration curve in cell samples and ccm of Gd₂O₃ (NCP) were 10.87 and 10.60 s⁻¹mM⁻¹ and for Gd₂O₃ (deg) were 13.99, 13.66 s⁻¹mM⁻¹ respectively. The slope of r₂ relaxivity (1/T₂) vs. concentration curve in cell samples and ccm of Gd₂O₃ (NCP) were 17.26 and 15.13s⁻¹mM⁻¹ and for Gd₂O₃ (deg) were 16.35, 14.62 s⁻¹mM⁻¹ respectively. **Conclusion:** A prominent difference in signal intensity was observed, indicating that Gd₂O₃ nanoparticles can be used as a positive contrast agent for cell labeling. No appreciable toxicity was observed with a Gd₂O₃ nanoparticles.

Conclusion: Gadolinium-Nanocomposite Polymer Emulsion is well characterised and potentially useful positive contrast agent for magnetic resonance molecular imaging.