

## **Nanoparticles for Cancer Cell Imaging and Killing**

**by**

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The new field of nano-medicine has very high impact and potential in diagnosing and treatment of disease. At the nanoscale, materials have very interesting physical and chemical properties that can be exploited for cancer cell imaging and cell killing. In an effort to make a multimodal contrast agent for MRI and fluorescence imaging, we have synthesized  $Gd_2O_3$  and  $Gd_2O_3$  doped with Europium (2-10%) using the chemical technique. The synthesized nanoparticles were characterized by XRD, FESEM, TEM, EDX techniques. The magnetic resonance imaging (MRI) contrast enhancement due to  $Gd_2O_3$  was compared to DOTAREM commercial contrast agent at similar concentrations of Gadolinium and provided similar contrast enhancement. Europium doping of  $Gd_2O_3$  produced very strong red luminescence that can be exploited for in vitro cancer cell fluorescent imaging. However, the incorporation of Europium decreased the MRI contrast due to replacement of Gadolinium by Europium atoms. The synthesized nanoparticles will be further modified to achieve biocompatibility and cancer cell targeting.