Evaluation of Fe:Eu nanoparticles as imaging probes of cervical cancer cells

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The purpose of this work is the synthesis of bimetallic hybrid Fe:Eu nanoparticles, their structural and morphological characterization as well as their biological evaluation. The combination of iron oxide nanoparticles' superparamagnetic properties and europium's optical properties could lead to a plethora of biological applications including imaging of cancer. Nanoparticles' development was carried out through the *co*-precipitation method performing synthesis of magnetic iron oxide nanoparticles coated with citrate and subsequently addition of europium at different Fe:Eu ratios (1:3, 1:1, 1:0.25). For the structural and morphological characterization of the nanoparticles, different techniques were carried out. DLS results confirmed the colloidal stability of the nanoparticles.[1] FT-IR and PXRD analyses confirmed the formation of magnetite and indicated the presence of europium hydroxide rods.[2] Elemental analysis by TEM proves the coexistence of iron and europium in the nanoparticles, whilst PL measurements demonstrate the fluorescence capability of the nanoparticles. Biologically, it was affirmed that the nanoparticles' internalization enhanced the *in vitro* fluorescence of cervical cancer cells. Moreover, nanoparticles of Fe:Eu ratio 1:3 appear to be biocompatible with the healthy human embryonic kidney cells, whereas they lead cervical cancer cells to apoptosis due to excessive ROS production.

References:

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2.J. G. Kang, Y. Jung, B. K. Min, Y. Sohn, Appl. Surf. Sci. 314 (2014) 158 – 165.