

TITLE

Iron oxide nanoparticles accelerate apoptotic death of human neutrophils

**Diana Couto¹, Marisa Freitas¹,
M. Arturo Lopez-Quintela²,
José Rivas³, Paulo Freitas³,
Félix Carvalho⁴ and Eduarda
Fernandes¹**

¹ University of Porto, Portugal

² University of Santiago de Compostela, Spain

³ International Iberian Nanotechnology
Laboratory, Braga, Portugal

⁴ University of Porto, Portugal

Nowadays, iron oxide nanoparticles have a great potential for being used in several areas of medicine, namely in drug delivery, cancer therapy and as contrast agents in imagiologic techniques, such as magnetic resonance imaging. However, the studies assessing the toxicity of these nanoparticles to the human health are scarce.

Neutrophils are the first line of innate defense of the organism, and are essential in the defense of the organism against pro-inflammatory foreign bodies. Therefore, the aim of this study was to evaluate the effect of super paramagnetic iron oxide nanoparticles (magnetite form) on human neutrophils, namely its capacity to induce deleterious effects in these cells.

For this purpose, necrotic cell death was measured by the trypan blue assay and lactate dehydrogenase leakage, apoptosis was evaluated by morphologic analysis, and the putative effect on mitochondrial membrane potential by using the probe 3,3'-dihexyloxacarbocyanine iodide. Finally, the modulation of the neutrophils' oxidative burst was studied using the probes dihydrorhodamine 123 and 2',7'-dichlorofluorescein-diacetate. The obtained results suggest that these nanoparticles have the ability to accelerate the neutrophils' apoptotic process. Thus, these results could have important implications in the innate defense of the organism, during the above mentioned application of iron oxide nanoparticles for medical purposes.

Biography

Diana Couto, PharmD, is a PhD student at the Faculty of Pharmacy, University of Porto, Portugal.