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Unauthorized biography of magnetic nanoparticles for biomedical applications: following their transformations from their synthesis to their degradation

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Abstract:

Magnetic nanoparticles (MNPs), and in particular iron oxide nanoparticles (mainly magnetite and maghemite), appeared more than two decades ago as promising tools for biomedical applications [1] such as contrast agents for magnetic resonance imaging (MRI), drug delivery systems or heating mediators for magnetic-fluid hyperthermia cancer treatment. These materials are routinely produced by several synthesis routes, resulting in a compendium of procedures that allow the fine-tuning of the nanoparticles size, shape, and aggregation producing an extremely broad set of materials with different properties [2].

In this talk the main aspects from the circle of life of magnetic nanoparticles will be covered, from novel synthesis procedures to the transformations nanoparticles suffer in biological matrices. Special attention will be provided to the use of AC magnetic susceptibility measurements as a powerful tool to investigate the transformations of very small amount of nanoparticles in animal models [3]. Finally, results from ongoing experiments on the use of magnetic nanoparticles as heat mediators for hyperthermia, and the effect they have on the extracellular matrix of tumor cells will be provided.

References:

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