

# Magnetic Resonance as a Key Technique for Investigating Nanosized Particles in Magnetic Drug Delivery Systems

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The successful development of a nanosized magnetic drug delivery system (MDDS) requires the joint effort of professionals with different backgrounds. The pre-clinical tests and clinical trials of a new drug delivery system is expected to be supported by the very knowledge (computer simulation for instance) of the interaction between the drug itself and the surface of the material system that carries the drug. In between these two ends we found the synthesis and the physical characterization of the drug delivery system. This talk is focused onto two aspects referring magnetic drug delivery systems. First, the use of the magnetic resonance (MR) as an important physical characterization technique [1] of a universal class of precursors used for preparing more complex MDDS, namely non-functionalized [2] and functionalized [3] magnetic nanoparticles suspended as magnetic fluids (MFs). Second, the use of MR as a successful technique for probing biodistribution of magnetic nanoparticle-based systems administered in animals, providing important information in regard to the pharmacokinetic aspects of biological evaluations [4]. It will be presented and discussed MR results and how these data provide valuable information for both the core and the shell region of the magnetic nanoparticles. Among the MDDS systems based on MFs we want to emphasize magnetoliposomes [5], biocompatible magnetic nanocapsules [6], and biocompatible magnetic nanoemulsions [7]. Targets for the MDDS considered here span from photodynamic therapy up to magnetohyperthermia of magnetically-labeled cancer cells and tissues.

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