Poster

BIODISTRIBUTION OF MAGNETIC CORE-SHELL NANOPARTICLES USED AS MRI CONTRAST AGENTS

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Magnetic Resonance Imaging (MRI) is one of the most powerful diagnostic tools in medicine, due to its non-invasive nature and high spatial resolution. Although enormous progress has been achieved in the improvement of the technique itself, the development of MRI contrast agents is still a wide research field. Magnetic core-shell nanoparticles are very promising materials to synthesize biocompatible magnetic fluids, able to modify the longitudinal T1 and transversal T2 proton relaxation of water in body tissues. Moreover, the coating not only helps to make the particles biocompatible but also it can be functionalized in order to link the nanoparticle to a biomolecule of interest (antibody, tumor marker receptor, chemotherapeutic drug, etc.) improving the performance of the MRI contrast agent [1].

In this work the viability of three different biocompatible magnetic fluids, containing three different sets of nanoparticles (arc-discharge synthesized Fe@C [2] and dextran-coated Fe_3O_4), as MRI contrast agents has been studied. The experiments have been carried out in *phantoms* as well as in an *in-vivo* preclinical animal model (New Zeeland rabbits). T1 as well as T2-weighted MR coronal and sagittal images of the rabbit abdomen were taken 15 minutes after administration of the dispersion, and periodically repeated along eight months post-injection. The nanoparticles content has been each time evaluated in liver, kidney and muscle tissues. The analysis of the phantoms allowed us to quantify the concentration of nanoparticles in each organ. By means of these experiments the biodistribution of the nanoparticles after injection and its time evolution have been studied. Although in all cases most of the nanoparticles accumulated in the liver, different time-evolution has been observed depending on the type of particle. It has been found that Fe@C particles have longer residence time than the Fe_3O_4 ones.

Our results suggest that the synthesized suspensions can be used as positive as well as negative MRI contrast enhancer agents, mainly for liver MRI.

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