In-Vivo MRI Test using Superparamagnetic Iron Oxide Nanoparticles

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Superparamagnetic iron oxide (USPIO) nanoparticles have attracted increasing interest because they enhance T2 MR images and in turn enable to precisely diagnose a disease such as cancer. A sonochemical method was used to synthesize USPIO nanoparticles for MRI contrast enhancement in the diagnosis of liver disease. The magnetite nanoparticles with a clear crystalline structure were prepared by this method, and they were well dispersed in 1% Chitosan solution. The USPIO nanoparticles must be coated with a biocompatible polymer during or following synthesis to assure non-agglomeration and bio-tolerance for in-vivo applications. The average hydrodynamic particle size was 78 nm in the case of ultrasonic irradiation at 30% power for 1 h. The Chitosan-coated magnetite colloids enhanced the T2 MRI, and showed a low toxicity when tested with New Zealand white rabbits. This synthetic MRI contrast agent can be used in medical diagnostic technique and allow noninvasive visualization by enhancement of T2 MR images.