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Monodisperse magnetic nanoparticles as an efficient MRI contrast agents for cancer imaging

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Despite of technical advances in many areas of diagnostic radiology, the detection and imaging of human cancer remains poor. In pursuit of this, the role of magnetic nanoparticle architecture has been poorly investigated. Magnetic nanoparticles composed of maghemite cores coated with stevioside were synthesized through simple co-precipitation method. Co-precipitation reaction without stevioside was also carried out as a control. We obtained stable stevioside coated nanostructures ranging from 10 nm to 100 nm. In this study, further long term MRI detection of tumour cells can be achieved due to facile and non toxic cell uptake of these iron oxide nanostructures. Our main focus is to generate the nanoparticle with cooperative magnetic behaviour and highly crystalline maghemite core which will in turn enhance contrast on T2 weighted MR images, while prevailing biocompatibility. If a contrast agent can someday be targeted to a living cancer cell anywhere in the body, then a cytotoxic agent can be targeted as well. In fact, the smaller the detected tumour, the more options will be available to kill it. We will further analyse the physics and chemistry of cancer imaging and highlight the fundamental principles underlying the detection of malignant cells within a background of normal cells.

Biography

Deepika Sharma is DBT Research Associate at Institute of Nanoscience and Technology. Her research interest lies at the interface of engineering, medicine and biology to develop novel platforms for understanding, diagnosing and treating human disease. Specifically, her work is focused on diagnostics and treatments for cancer and is centred on designing and development of targeted nanoparticles to perform complex task such as multimodal, non-invasive tumour imaging; trigger the release of a targeted, therapeutic payload and multifunctional agents for cancer therapies. She has published in reputed journals like *Biotechnology Advances* and *Trends in Biotechnology*.

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