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Review

Magnetism in drug delivery: The marvels of iron oxides and substituted ferrites nanoparticles

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ABSTRACT

In modern drug delivery, seeking a drug delivery system (DDS) with a modifiable skeleton for proper targeting of loaded actives to specific sites in the body is of extreme importance for a successful therapy. Magnetically guided nanosystems, where particles such as iron oxides are guided to specific regions using an external magnetic field, can provide magnetic resonance imaging (MRI) while delivering a therapeutic payload at the same time, which represents a breakthrough in disease therapy and make MNPs excellent candidates for several biomedical applications. In this review, magnetic nanoparticles (MNPs) along with their distinguishable properties, including pharmacokinetics and toxicity, especially in cancer therapy will be discussed. The potential perspective of using other elements within the MNP system to reduce toxicity, improve pharmacokinetics, increase the magnetization ability, improve physical targeting precision and/or widen the scope of its biomedical application will be also discussed.