

Chapter: Magnetic nanoparticles: Role in next generation nanomedicine

Book: Handbook of Research on Nano-Strategies for Combatting Antimicrobial Resistance and Cancer

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Abstract

The magnetic nanoparticles are said to be a class of nanoparticles or nanomaterials that can be manipulated by the help of externally applied magnetic field. These magnetic nanoparticles constitute materials such as nickel, cobalt, iron, and their derivatives. These are normally smaller than 1 μm in diameter possess wide range of properties and attractive characteristics suitable for biomedical such as used as hyperthermia, enhancing magnetic resonance imaging (MRI) data, supplementing tissue engineering efforts, and improving the target-based drug delivery and many other technological applications. In the field of cancer research, the role of nanoparticles and nanotechnology-based methods and novel strategies have been increasing swiftly for cancer identification and cancer therapy. The iron oxide (Fe_3O_4 , $\gamma\text{-Fe}_2\text{O}_3$) nanoparticles (NPs) are widely used for the drug delivery, magnetic nanoparticle-enhanced hyperthermia, and also as MRI contrast agents due to its biocompatibility, low toxicity, etc. lead to the growth of novel biopharmaceutical technologies.