Magnetic Nanoparticles: Recent advancements for Biomedical applications

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Materials commonly used in biosensing and nanomedicine are magnetic nanoparticles (MNPs). Magnetic separation, biological diagnostics, therapy, and other fields all make extensive use of MNPs. (1) Magnetic nanoparticles have special properties for drug and gene delivery in the healthcare sector. The study of the advancements in magnetic nanoparticles for biomedical applications over the past ten years shows, these nanoparticles have an average diameter of 1 to 100 nm, making them appropriate for use in gene delivery to particular cells or organs. In addition to gene delivery, magnetic nanoparticles in the form of liposomes and polysomal systems improve drug dispersion. Likewise, it finds extensive application in molecular imaging, detecting, and diagnosing diverse bacterial, fungal, and viral ailments. Therefore, this poster provides a thorough understanding of the continuous process improvement of MNP surface functionalization for biological applications. Furthermore, included are numerous newly created MNP-based imaging techniques, lab-on-a-chip, magnetic bio-separation, recent advancements in the treatment of hyperthermia, and a range of magnetic nanocomposite (MNC) for smart drug administration. The coronavirus disease (COVID-19), which has wreaked havoc around the world in recent years, may also be treated and diagnosed with these nanoparticles as prospective therapeutic agents. A thorough analysis of the toxicity, difficulties, and most current developments in MNP clinical trials is presented to pave the way for a variety of future directions in MNP research for biological applications. (2)

Keywords: Magnetic Nanoparticles, toxicity of magnetic nanoparticles, drug delivery

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