



Application of Antibody-Conjugated Magnetic Nanoparticle in Drug Delivery: A Systematic Review

Tuba Zendejboudi¹, Neda Baghban^{2*}

¹Student Research and Technology Committee, Bushehr University of Medical Sciences, Bushehr, Iran

²Bushehr University of Medical Sciences, Bushehr, Iran

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*Corresponding Author:

Bushehr University of Medical
Sciences, Bushehr, Iran

ABSTRACT

Introduction: Magnetic nanoparticles (MNPs) have gained considerable attention as drug delivery vehicles due to their unique magnetic properties and high surface area. Antibody-conjugated MNPs have been developed as a targeted drug delivery system, enabling the specific delivery of drugs to target cells or tissues. This systematic review aimed to evaluate the current knowledge on the application of antibody-conjugated MNPs in drug delivery, including their synthesis, characterization, and efficacy in vitro and in vivo.

Search Study: A comprehensive literature search was conducted using the PubMed database. The search strategy included the keywords "delivery[Title/Abstract]" AND "antibody[Title/Abstract]" AND "magnetic[Title/Abstract]" OR "iron[Title/Abstract]". Only studies published between 2020 and 2023 were included in the review.

Results: A total of 84 studies were included in this review. The studies investigated the synthesis, characterization, and efficacy of antibody-conjugated MNPs in drug delivery for various diseases, including cancer, cardiovascular diseases, and infectious diseases. The results showed that antibody-conjugated MNPs can enhance the specificity and efficacy of drug delivery by targeting specific cells or tissues. Moreover, the physicochemical properties of MNPs, such as size, shape, and surface charge, can affect their efficacy in drug delivery. Several in vitro and in vivo studies have demonstrated the potential of antibody-conjugated MNPs in targeted drug delivery, with promising results.

Conclusion and Discussion: The findings of this systematic review suggest that antibody-conjugated MNPs have potential as a targeted drug delivery system for various diseases. The physicochemical properties of MNPs and the choice of antibody and drug can affect the efficacy of drug delivery. However, further research is needed to optimize the synthesis and characterization of antibody-conjugated MNPs, to evaluate their safety and efficacy in human clinical trials, and to explore their potential combination with other drug delivery systems.

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