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Mesoporous silica nanoparticles as cutting-edge theranostics: Advancement from merely a carrier to tailor-made smart delivery platform

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Abstract

Large surface area, uniform and tunable pore size, high pore volume and low mass density- such attractive features of Mesoporous silica nanoparticles (MSNPs) have compelled researchers to explore the biomedical potential of this nano-material. Recently gained interest in MSNPs have been due to their tremendous potential in cancer therapy and imaging. Last several years have witnessed a rapid development in engineering functionalized MSNPs with various types of functional groups integrated into the system for imaging and therapeutic applications. Although their potential for drug delivery application has been studied since the year 2000, still a major challenge is to improve drug loading capacity and *in vivo* targeting with minimal side-effects to major organs. In this review article, the recent development of MSNPs as a therapeutic and diagnostic platform has been detailed out with emphasis on drug and bio-macromolecule delivery/co-delivery, bio-imaging and detoxification.

Keywords: Mesoporous silica; Drug/biomacromolecule delivery; Co-delivery; Bio-imaging; Detoxification.

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