Biocompatible Supramolecular Mesoporous Silica Nanoparticles as the Next-Generation Drug Delivery System

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Abstract

Supramolecular mesoporous silica nanoparticles (MSNs) offer distinct properties as opposed to micron-sized silica particles in terms of their crystal structure, morphology-porosity, toxicity, biological effects, and others. MSN biocompatibility has touched the pharmaceutical realm to exploit its robust synthesis pathway for delivery of various therapeutic molecules including macromolecules and small-molecule drugs. This article provides a brief review of MSN history followed by special emphasis on the influencing factors affecting morphology-porosity characteristics. Its applications as the next-generation drug delivery system (NGDDS) particularly in a controlled release dosage form via an oral drug delivery system are also presented and shall be highlighted as oral delivery is the most convenient route of drug administration with the economical cost of development through to scale-up for clinical trials and market launch.

Keywords

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