

Carbon nanostructures for drug delivery systems

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Since carbon nanotubes (CNTs) discovery in the early 1990s, they have become an area of a wide ranging research activity due to their exceptional chemical and physical properties. The development of new and efficient drug delivery system has fundamental importance to improve the pharmacological profiles of many classes of therapeutic molecules. Many different types of drug delivery systems are currently available. Within the family of nanomaterials, CNTs have emerged as a new alternative and efficient tool for transporting and translocating therapeutic molecules. CNTs possess many intriguing features that make them attractive drug delivery carriers.

Doxorubicin hydrochloride (DOX), an anthracycline ring antibiotic, is a highly effective anti-neoplastic agent used in leukemia chemotherapy. However, the severe toxic side effects such as cardiotoxicity, alopecia, vomiting, leucopenia and stomatitis have hampered the successful use of DOX. To reduce the undesired effects without reducing drug potency, DOX is usually encapsulated into drug delivery vehicles that have the ability to protect the molecule of interest and selectively target specific compartments without adversely affecting the surrounding tissues.

Summary

A highly effective drug-delivery system based on MWNTs coated with Doxorubicin is developed, which improves the loading and release efficiency of the drug. The prepared MWNTs conjugated with the drug exhibit a dramatic pH=5 responsive drug release behavior and is stable at physiological conditions.

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