



Bio-hybrid of silica nanoparticles and sodium alginate as drug carrier for doxorubicin

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Abstract:

Mesoporous silica nanoparticles (MSNs) have been widely used as drug carriers [1]. Beneficial characteristic like high surface area, biocompatibility, ease of functionalization and high drug loading capability, make silica NPs promising drug carriers [2]. However, there are some limitations associated with MSNs which discourages its application like large scale production of MSNs, functionalization of MSNs that causes immunogenicity and poor penetration capability within the tumor mass [3]. To overcome, the limitations associated with MSNs and improve its efficacy, a bio-hybrid of silica nanoparticles and biopolymer could be pivotal.

In this study, an efficient and simple route of spray drying using evaporation induced self-assembly process was devised to synthesize a drug carrier of silica nanoparticles-sodium alginate entrapped with doxorubicin (Dox), a conventional chemotherapeutic drug. The successfully synthesized carriers were characterized by SEM, FTIR, DLS and drug loading efficiency was studied. Drug release profile of the entrapped Dox was studied at two different pH i.e. at pH 7.4 (physiological pH) and at pH 5.4 (pH in tumor microenvironment). The in vitro cellular uptake and in vitro cytotoxicity of Dox-loaded bio-hybrid carrier were analyzed against A549 lung carcinoma cells.

Biography:

Dr. Archana Mishra is currently Scientific Officer E in Bioscience Group, Bhabha Atomic Research Centre, Mumbai, India. She obtained her M. Sc. Biotechnology Degree from Banaras Hindu University, India in 2009 and received her Ph.D. from Homi Bhabha National Institute, Mumbai India in Life Sciences. Her research is focused in the area of development of novel



silica based biohybrid materials, nanomaterials, hybrid materials and their further applications in biosensor, environmental biotechnology, bioprocess development and drug delivery. Dr. Mishra has published high quality international peer-reviewed articles, reviews, book chapters and has developed technology in her area of research.

Recent Publications:

- Archana Mishra ,Oncotarget.2020
- Archana Mishra , Psychopharmacology.2020
- Archana Mishra ,Tropical Plant Research. 2020
- Archana Mishra , Inflammopharmacology. 2020
- Archana Mishra ,Cancer Research. 2018

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