J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C1-068

Multifunctional mesoporous silica nanoparticles as nanomedicine against prostate cancer

Aswathy Ravindran Girija
University of South Australia, Australia

In recent years, nanotechnology-based products are garnering huge interest in pharmaceutical industry and biomedicine owing to the innovative solutions they offer for a diverse range of biomedical applications. Mesoporous silica nanoparticles are efficient nanocarriers for successful drug delivery due to their excellent properties such as tunable pore size, large surface area, large pore volume for drug loading and their biocompatibility in biological system. In our study, we developed mesoporous silica nanoparticles of uniform and monodispersed nanoparticles in the size ranging from 200-250nm from composite micelle. The tuning of synthetic parameters offered nanoparticles with pores of two different size. In this study, we have demonstrated the specific intracellular accumulation of targeted nanoparticles in prostate cancer cells. The nanoparticles were decorated with transferrin protein as cancer targeting ligand and studied the internalization of targeted and non-targeted nanoparticles in prostate cancer cells by loading dye in the nanoparticles. The nanoparticles were loaded with anticancer drugs and studied the pH dependent release of drug from nanoparticles. These nanocarriers displayed drug loading capacity supplemented with pH-responsive drug release thus enhancing the efficiency of targeted nanoparticle-based chemo drug delivery. The specificity and superior targeting capability of transferrin conjugated drug loaded nanoformulation confirmed that they can function as potential intracellular drug delivery nanocarriers for androgen independent prostate cancer. Cumulatively the developed mesoporous nanostructures can function as a versatile theranostic agents in both therapeutic and diagnostic regime in the future cancer therapy and diagnostic strategies.

aswathy.ravindrangirija@unisa.edu.au