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Dual targeted polymeric nanoparticles based on tumor endothelium and tumor cells for enhanced antitumor drug delivery

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Certain tumor cells over express a membrane-spanning molecule, amino peptidase N (CD13) isoform which is the receptor for peptides containing the NGR motif. NGR-modified docetaxel (DTX)-loaded PEG-b-PLGA polymeric nanoparticles (NGR-NP-DTX) were developed and evaluated for their in vitro potential in HT-1080 cell line. The NGR-NP-DTX containing particles were about 148 nm in diameter with spherical shape and high encapsulation efficiency. Cellular uptake was confirmed both qualitatively and quantitatively by confocal laser scanning microscopy (CLSM) and flow cytometry. Both quantitatively and qualitatively results confirmed the NGR conjugated nanoparticles revealed the higher uptake of nanoparticles by CD13-overexpressed tumor cells. Free NGR inhibited the cellular uptake of NGR-NP-DTX revealing the mechanism of receptor mediated endocytosis. In vitro cytotoxicity studies demonstrated that NGR-NP-DTX formulation was more cytotoxic than unconjugated one which was consistent well with the observation of cellular uptake. Hence, the selective delivery of NGR-NP-DTX formulation in CD13-overexpressing tumors represents a potential approach for the design of nanocarrier-based dual targeted delivery systems for targeting the tumor cells and vasculature.

Biography

Madhu Gupta is a Research Associate in the Department of Pharmaceutical Sciences at Dr. Hari Singh Gour Vishwavidyalaya and an Assistant Professor in Shri Rawat Pura Sarkar Institute of Pharmacy, India. She has about 10 years of research experience and teaching experience. She is pioneer Scientist in the field of Nanotechnology and Drug Delivery field. She has judiciously exploited bio-ligands for targeting of bioactives and drug moiety. She has over 30 research publications to her credit published in journals of high scientific impact and contributed 08 chapters in various renowned books and to several international and national books. She was awarded a National Doctoral fellowship at Department of Pharmaceutical Sciences, India. She is a recipient of best poster award in the nano-medicine field for 2nd International Science Congress held in Mathura (India) and other national conferences. She is an Active Member of APTI in India. She is an acclaimed academician and researcher of high repute. She serves on the potential reviewer of various high repute journals. She is widely visited scientist and delivered invited/popular/keynote addresses in national conferences in India.

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