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Cyclic NGR peptide anchored block co-polymeric nanoparticles as dual targeting drug delivery system for solid tumor therapy

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Certain tumor cells overexpress a membrane-spanning molecule aminopeptidase N (CD13) isoform, which is the receptor for peptides containing the NGR motif. NGR-modified docetaxel (DTX)-loaded PEG-b-PLGA polymeric nanoparticles (cNGR-DNB-NPs) were developed and evaluated for their *in vitro* potential in HT-1080 cell line. The cNGR-DNB-NPs 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 cNGR-DNB-NPs, revealing the mechanism of receptor mediated endocytosis. *In vitro* cytotoxicity studies demonstrated that cNGR-DNB-NPs, formulation was more cytotoxic than unconjugated one, which were consistent well with the observation of cellular uptake. Hence, the selective delivery of cNGR-DNB-NPs 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.

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