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# Development and Characterization of Site Specific Peptide Conjugated Polymeric Nanoparticles for Efficient Delivery of Paclitaxel

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**Abstract :** CD13 receptors are abundantly overexpressed in tumor cells as well as in neovasculature. The CD13 receptors were selected as a targeted site and polymeric nanoparticles (NPs) as a targeted delivery system. By combining these, a cyclic NGR (cNGR) peptide ligand was coupled on the terminal end of polyethylene glycol-b-poly(lactic-co-glycolic acid) (PEG-b-PLGA) and prepared the dual targeted-NPs (cNGR-PEG-PTX-NPs) to enhance the intracellular delivery of anticancer drug to tumor cells and tumor endothelial cells via ligand-receptor interaction. In-vitro cytotoxicity studies confirmed that the presence of cNGR enhanced the cytotoxic efficiency by 2.8 folds in Human Umbilical Vein Endothelial (HUVEC) cells, while cytotoxicity was improved by 2.6 folds in human fibrosarcoma (HT-1080) cells as compared to non-specific stealth NPs. Compared with other tested NPs, cNGR-PEG-PTX-NPs revealed more cytotoxicity by inducing more apoptosis and higher intracellular uptake. The tumor volume inhibition rate was 59.7% in case of cNGR-PEG-PTX-NPs that was comparatively more with other formulations, indicating that cNGR-PEG-PTX-NPs could more effectively inhibit tumor growth. As a consequence, the cNGR-PEG-PTX-NPs play a key role in enhancing tumor therapeutic efficiency for treatment of CD13 receptor specific solid tumor.

**Keywords :** cyclic NGR, CD13 receptor, targeted polymeric NPs, solid tumor, intracellular delivery
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