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Abstract

Synthesis and Characterizations of Folate-Conjugated PLGA-PEG Nanoparticles Loaded with Dual Agents †

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Abstract: The purpose of this study is that the formulation and characterization of folate-conjugated poly(lactide-co-glycolide)-block-poly(ethyleneglycol)(PLGA-PEG-Folate) nanoparticles loaded with the dual agents; vincristine sulfate(VS) and ε-viniferine(EV). Folate-conjugated nanoparticles are useful vehicles to facilitate active targeting of varies chemotherapeutic agents to cancer cells. PLGA-PEG-folate was synthesized four stages; folic acid activation, PLGA activation, synthesis of folate-PEG-NH_2 and synthesis of PLGA-PEG-folate conjugate copolymer. Characterization of the conjugates was performed using FTIR and H–NMR. Drug loaded nanoparticles was prepared by the nanoprecipitation method. After the formulation of nanoparticles, particle size, polydispersity index and zeta potential were measured using both non-lyophilise and lyophilise formulations. The results were found to be 82.76 ± 22.42/342.2 ± 20.7 nm, 0.311 ± 0.015/0.394 ± 0.04 and −8.33 ± 3.68/8.05 ± 1.69 mV respectively. The drug-loading percentages were found to be 8.87 ± 0.68 and 2.60 ± 0.20 (mean ± SE) for EV and VS, respectively. The free EV was found about 12.00% and EV release from nanoparticles was determined 31.83% at 6 h. In the other hand, VS release did not occur from nanoparticles while free VS reached 100% in same duration. These results suggest that VS and EV loaded PLGA-PEG-folate nanoparticles could be potential delivery system for targeting the drugs to cancer cells. Therefore, in vitro studies with these nanoparticles are already carrying out in our laboratory using varies cancer cells.

Keywords: Nanoparticle; PLGA-PEG-Folate; Vincristine sulfate

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