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Synthesis, characterization and the release kinetics of antiproliferative agents from polyamidoamine conjugates

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Abstract

Polyamidoamine conjugates containing curcumin and bisphosphonate were synthesized via a one-pot aqueous phase Michael addition reaction. In the design of the conjugate, bisphosphonate formed an integral part of the polymer carrier backbone. Curcumin was incorporated onto the polyamidoamine backbone via piperazine linker. The conjugates were characterized by Fourier transform spectroscopy, energy-dispersive X-ray analysis, atomic force spectroscopy and nuclear magnetic resonance spectroscopy and it confirmed the successful incorporation of the antiproliferative agents onto the carriers. The weight percentage incorporation of bisphosphonate to the carriers was found to be between 2.56% and 3.34%. The in vitro release studies of curcumin from the polyamidoamine conjugate were performed in dialysis bag at selected pH values. The release of curcumin was significantly slower at pH 7.4 when compared to pH 5.8. The release profiles indicate that the conjugates are more stable at pH 7.4 and are potential sustained drug-delivery systems for combination therapy.