

pH-Dependent Behavior of Micelle with Cross-linked Core formed from Polyaspartamide Derivatives for Drug Delivery

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A series of polyaspartamide derivatives were synthesized by grafting O-(2-aminoethyl)-O'-methylpoly(ethylene glycol)5000 (MPEG), 1-(3-aminopropyl)imidazole (API), and cinnamoyl on polysuccinimide. New pH-sensitive polymeric micelle based on the synthesized polymer with cross-linked core was prepared and characterized. The degrees of substitution of MPEG, API and cinnamoyl were adjusted by the feed molar ratio, and the structure of the prepared polymer was confirmed using FT-IR and HNMR spectroscopy. Their pH-sensitive properties were characterized by light transmittance measurements, and the particle size and their distribution were investigated by dynamic light scattering measurement through varying pH values. The pH-dependent phase transition was clearly observed in polymer solutions before UV cross-linking. The core cross-linked micelles showed high stability in a wider pH range, and displayed obvious pH-dependent swelling-shrinking behaviors. This micelle system overcame the drawback of easily disintegrating of normal polymeric micelles and with a particle size rang changing from 80nm to 200nm, indicating a perfect candidate for intracellular drug carrier triggered by pH changes.