

431j Preparation and Characterization of Paclitaxel Loaded Polymer Vesicle Formulations

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Vesicles self-assembled from polyethylene oxide-b-poly lactide(PEO-PLA), polyethylene oxide-b-poly caprolactone (PEO-PCL) and polyethylene oxide-b-polybutadiene (PEO-PBD) diblock copolymers were encapsulated with paclitaxel. The morphology of self-assembled PEO-PBD colloids was studied using atomic force microscopy (AFM). It was observed that the structure of these polymer colloids ranged from spherical micelles, worm-like micelles, to polymersomes depending on the diblock composition and preparation method. The in vitro release of paclitaxel in PBS buffer, size distribution, and in vitro stability of paclitaxel loaded polymer vesicles was studied. The loading content of paclitaxel in polymer vesicles was in the range of 4.1-13.5 wt.% depending on the block composition of diblock copolymers, the weight ratio of paclitaxel to block copolymer, and the morphology of the self-assembled diblock copolymer colloids. The in vitro cytotoxicity evaluation of paclitaxel loaded polymer vesicles on MCF7 human breast cancer cells shows that the paclitaxel loaded polymer vesicles exhibit comparable activity to that observed with free paclitaxel at 0.01 $\mu\text{g/mL}$ of paclitaxel.