

Title: Synthesis and Characterization of Polymeric Micelles Formed with Dextran-g-Lauric Acid as IKK Complex Inhibitor Carrier

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Self-assembly of micelles occurs through the interaction of hydrophilic and hydrophobic regions of the copolymer. The goal of this study is to synthesize copolymeric micelles dextran-*g*-lauric acid that carries an IκB kinase B inhibitor, IMD-0354, to form a drug delivery system and to verify its effect on drug loading and encapsulation efficiency. Dextran was modified by lauric acid via an esterification process between the hydroxyl group of dextran and the carboxyl group of lauric acid. The hydrophilic dextran acts as a framework of dextran-*g*-lauric acid and lauric acid was grafted to its branches, forming an amphiphilic polymer. Fourier transform-infrared spectrometry and ^{1}H nuclear magnetic resonance were used to confirm and calculate the grafting percentage of dextran-*g*-lauric acid. The critical micelle concentration (CMC) values were obtained using ultraviolet-visible spectrophotometry and particle size was measured using dynamic light scattering and transmission electron microscopy (TEM). The effect of drug-loaded micelles was verified using cell viability and immunofluorescence staining. TEM images indicated that the self-assembled micelles are spherical in shape. The drug loading percentage of micelles was 0.76% to 4.67% and the encapsulation efficiency was 15.4% to 93.75%. Regulating the hydrophilic and hydrophobic fragments of dextran-*g*-lauric acid changed the particle size, grafting rate, CMC, drug loading, and encapsulation efficiency of the polymer. IMD-0354-loaded micelles showed higher apoptosis expression in melanoma than free IMD-0354. This shows that controlled interactions of hydrophilic and hydrophobic regions on dextran-*g*-lauric acid may have profound effects on drug delivery for cancer treatment.

Biography

Tzong Rong Ger received PhD degree in Power Mechanical Engineering from National Tsing Hua University of Taiwan in 2013. He is Assistant Professor in Department of Biomedical Engineering ,Chung Yuan Christian University of Taiwan. He has published more than 25 papers in reputed journals. His research interests functional polymers and magnetic biomaterials for biomedical and cell engineering applications.

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