Preparation and Evaluation of Heparin-Functionalized PLGA Nanoparticles for Controlled Drug Delivery Strategy

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Heparin-functionalized PLGA nanoparticles were prepared by a solvent-diffusion method for an efficient delivery of heparin-binding proteins. Their size distributions, surface charge and constitutional ratio of each components were evaluated. The entrapment of heparin molecules was confirmed by a negatively increased zeta potential value. Average diameter and surface charge of nanoparticles were ranged from 123.1±2.0 to 188.1±3.9 nm and from −26.0±1.1 to −44.4±1.2 mV by varying the amount of heparin, PLGA, and Pluronic. Constitutional ratio, evaluated by 1H NMR and anti-Xa heparin activity assay, revealed that the amount of heparin entrapped increased from 0 to 4.4 % for a fixed mole ratio of PLGA and Pluronic as the amount of heparin increased during the preparation of nanoparticles. As a model in vitro release experiment, lysozyme was loaded into heparin-functionalized nanoparticles, and a sustained release profile over two weeks was obtained.