

Preparation and Characterization of Silk Fibroin Nanoparticles

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Nanoparticles have been extensively studied in various fields of life sciences such as separation technologies, histological studies, clinical diagnostic assays, drug delivery systems and cosmetics. The merits of nanoparticles used in the fields of pharmaceuticals are the potential to perform sustained drug release and to deliver drugs to tumor sites. Nanoparticles prepared from natural polymer, for instance protein, are expected to be metabolized and to incorporate a great variety of drugs in a relatively nonspecific fashion.

SF is a traditional natural biomedical polymer produced by insect, *Bombyx mori* silkworm. SF is a promising resource of biotechnology and biomedical materials due to its good biocompatibility, good oxygen and water vapor permeability, biodegradability, and minimal inflammatory reaction. Moreover, SF is composed of hydrophilic and hydrophobic block-like structure. Poly(ethylene glycol)(PEG), soluble both in aqueous and various organic solvents, is a unique biological characteristics including nontoxic and non-immunogenic properties. PEG stabilizes the physiological function of protein and bioactive substances.

In this study, self-assembled SF nanoparticles were prepared and characterized to evaluate the potential as the delivery vehicles for bioactive materials. The physicochemical properties of SF nanoparticles were investigated. Therefore, SF nanoparticles will be expected to the powerful vehicle to deliver useful materials such as drug.