

Mesoporous Tussah Silk Fibroin Microspheres for Drug Delivery

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Abstract : Mesoporous Tussah silk fibroin (TSF) spheres were fabricated via the self-assembly of TSF molecules in aqueous solutions. The results showed that TSF particles were approximately three-dimensional spheres with the diameter ranging from 500nm to 6µm without adherence. More importantly, the surface morphology is mesoporous structure with nano-pores of 20nm - 200nm in size. Fourier transform infrared (FT-IR) and X-ray diffraction (XRD) studies demonstrated that mesoporous TSF spheres mainly contained beta-sheet conformation (44.1 %) as well as slight amounts of random coil (13.2 %). Drug release test was performed with 5-fluorouracil (5-Fu) as a model drug and the result indicated the mesoporous TSF microspheres had a good capacity of sustained drug release. It is expected that these stable and high-crystallinity mesoporous TSF sphere produced without organic solvents, which have significantly improved drug release properties, is a very promising material for controlled gene medicines delivery.

Keywords : Tussah silk fibroin, porous materials, microsphere, drug release

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