Cells activation and permeability of chitosan nanoparticle carriers

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ABSTRACT

There were two major objectives in this thesis. First, investigation the process of preparing different molecular weight chitosan hydrochloride and then finding the optimal condition for forming nanoparticle in suspensions and studying the properties of these nanoparticles. Secondly, investigation the activity of chitosan hydrochloride nanoparticles by studying the effect of nanoparticles on Caco-2 in vitro cell cytotoxicity and permeability. Results showed that the molecular weight of chitosan hydrochloride was decreased from 1300 kDa to 730 and 400 kDa by prolonging ultrasonic degradation. The optimal pH value for preparation chitosan hydrochloride nanoparticle suspension was 6.4. Transmittance electron microscope (TEM) images of the suspensions showed that chitosan hydrochloride nanoparticle was spherical with mean diameter in the range of 50~130 nm. The activation and permeability tests of chitosan hydrochloride nanoparticle on Caco-2 proliferating cell and monolayer cell showed that these particles can increase both cells viability and enhance the opening of tight junction between cells and then increase the permeability. It is concluded from this study that chitosan hydrochloride nanoparticle was highly safe with their potential use as drug carriers.

Keywords : chitosan hydrochloride ; ultrasonic degradation ; nanoparticle ; cell activation ; permeability

Table of Contents

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