Studies on the Permeability of Chitosan Nanoparticle in Oral Mucosa Cell

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ABSTRACT

Five solutions of 5 mg/mL chitosan hydrochloride with different concentration (0, 0.25, 0.5, 0.75, and 1 mg/mL) genipin as crosslinking agent were prepared. These solutions were spray-dried to obtain chitosan hydrochloride particles A, B, C, D, and E, respectively. These particles were characterized by field emission scanning electron microscopy (FESEM). The FESEM indicated that the average size of the chitosan hydrochloride particles ranged between 223 and 264 nm. It was found that the particle size decreased and formed a folded surface morphology with increasing crosslinking agent concentration. Phase-contrast images of the filter-grown human squamous cell carcinoma KOSC-3 indicated that the cells appeared to be squamous cell. Results after KOSC-3 inoculation, 2~4 days was logarithmic growth phase. The MTT assay was used to test cytotoxicity of five samples to cultured cells. The experiments showed that crosslinked particles with a concentration less than 100 μg/mL in the culture medium were nontoxic to cell. The microscopic features displayed in the KOSC-3 histological sections showed the morphology similar to stratified squamous epithelium. Most cells tend to be unstable, and easily to languish. From the TEER results, the nanoparticles were found to cause the opening of cell junctions. The TEER tests had no deleterious effects on the cells as determined by trypan blue exclusion. Results showed that chitosan hydrochloride nanoparticles were capable to increase the permeability on the cells.

Keywords : chitosan hydrochloride ; KOSC-3 ; histological ; permeability

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