Chitosan Nanospheres for Oral Mucosa Cell Permeation and Controlled Drug Release

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ABSTRACT

In this study, the effects of crosslinking on absorption properties of acetaminophen loaded chitosan (CS) nanosperes (NPs) were investigated on an in vitro model of buccal epithelium (KOSC-3 cells). Acetaminophen genipin-cross-linked CS NPs were prepared by adjusting the pH of chitosan HCl solutions to 6.4, and then mixing with acetaminophen and genipin. The samples were analyzed by transmission electron microscope (TEM) and dynamic light scattering (DLS). It was found that the size of a majority of the CS NPs ranged between 19 and 40 nm with a zeta potential between +45 and +65 mV. The cytotoxicity of CS NPs was determined by MTT assay. No observable differences in toxicity were noted on KOSC-3 cells by incubation with CS NPs of various genipin contents. CS NPs, like chitosan, possessed mucoadhesive properties. In vitro studies performed on KOSC-3 cell showed a pronounced reduction in transepithilial electrical resistance (TEER). The reduction in TEER is an indication of the opening of the cell junctions located between cells. Opening of the junctions will results in enhancement of absorption via the paracellular route. The release profile of acetaminophen from CS NPs presented that these NPs can be proposed as controlled release delivery system.

Keywords : chitosan nanosheres、KOSC-3、histological、drug release

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