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難吸収性薬物の消化管吸収に及ぼすキトサンナノパーティクルの影響

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Purpose. In general, intestinal absorption of hydrophilic and macromolecular drugs was very poor because of the low permeability across the intestinal biological membranes. The purpose of the current study was to investigate the absorption enhancing effects of chitosan nanoparticles on the intestinal absorption of poorly absorbable drugs.

Methods. In this study, insulin and fluorescein isothiocyanate-labeled dextrans (FDs) were chosen as model drugs. These drugs loaded chitosan nanoparticles were obtained by the process of ionotropic gelation. The absorption enhancing effects of chitosan nanoparticles on the intestinal absorption of poorly absorbable drugs and the effect of chitosan nanoparticles on the intestinal membrane damage were studied by an in situ closed loop method in rats.

Results. The results showed that chitosan nanoparticles significantly improved the absorption of insulin and FDs in different intestinal regions (jejunum, ileum and colon). The findings suggest that chitosan nanoparticles were useful carriers for the delivery of poorly absorbable drugs due to their prolonged the retention in the intestinal and penetration into the mucus layer. In the toxicity studies, we found no significant increase in the release of total protein and activity of lactate dehydrogenase (LDH) from the intestinal epithelium in the presence of chitosan nanoparticles, indicating that chitosan nanoparticles were safe carriers for improving the intestinal absorption of poorly absorbable drugs.