EFFECT OF CHITOSAN ON ABSORPTION PROFILES OF INSOLUBLE DRUGS AFTER ORAL ADMINISTRATION IN RATS

Chiharu Tajiri1, Masayuki Nadai1, Keita Urasaki1, Takaaki Hasegawa2 and Hideo Yoshizumi1

1Faculty of Pharmacy, Meijo University, 150 Yagotoyama, Tenpaku-ku, Nagoya 468-8503 and 2Department of Medical Technology, Nagoya University School of Health Sciences, 1-1-20 Daikominami, Higashi-ku, Nagoya 461-8673, Japan

Chitosan, a cationic and viscous polysaccharide, acts as a weak anion exchange resin and consequently might be expected to bind bile acid. Chitosan is generally used as a dietary supplement in Japan. It is well known that bile acid increases the intestinal absorption of certain insoluble drugs such as indomethacin (IM) and griseofulvin (GF) by enhancing their solubility. Therefore, chitosan-induced decrease in the concentrations of bile acid in the small intestine might disrupt the solubilization of insoluble drugs and alter the absorption profile from the small intestine. In addition, it is considered that chitosan binds directly to anionic drugs as well as bile acid, and affects their absorption profiles. Also, it is possible that chitosan prolongs the gastric emptying rate and delays the absorption of drugs from the small intestine because of its substantial viscosity. In this study, we examined the effect of chitosan on the absorption profiles of the insoluble drugs IM, GF, the soluble drugs theophylline (TP), acetaminophen (APAP) and cephalexin (CEX) in rats. Rats received chitosan (25 mg/kg) dissolved in 5% acetic acid 15 min before the administration of the tested drugs. Pretreatment with chitosan significantly decreased the plasma concentrations of IM and GF at same sampling points and prolonged their Tmax than those in the pretreatment with vehicle. Contrary to IM and GF, the absorption profiles of TP, CEX and APAP was not influenced by chitosan. These findings suggest that chitosan alters the absorption profiles of IM and GF by decreasing the surfactant-like effect of bile acid.