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Pharmacokinetic evaluation of ginsenoside Rh2 and Rg3 epimers after oral administration of BST204, a purified ginseng dry extract, in rats

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The ginsenosides Rh2 and Rg3 are recognized anti-cancer compounds. However, the ginsenosides Rh2 and Rg3 are not detected, even in trace amounts, in fresh and dried ginseng roots. BST204, a purified ginseng dry extract containing a high concentration of racemic Rh2 and Rg3 mixtures, is being developed for supportive care use in cancer patients in Korea. It is derived from crude ginseng by treatment with ginsenoside- β -glucosidase and acid hydrolysis to enrich both 20(S)- and 20(R)-ginsenoside Rh2 and 20(S)- and 20(R)-ginsenoside Rg3 (S-Rh2, R-Rh2, S-Rg3, and R-Rg3), which have anti-tumorigenic effects. These four ginsenosides (S-Rh2, R-Rh2, S-Rg3, and R-Rg3) probably account for the spectrum of medicinal properties of ginseng, and they are viewed as bioactive markers of its extracts. This study investigates the pharmacokinetic properties of BST204 in rats. Here, the pharmacokinetic profiles of S-Rh2, R-Rh2, S-Rg3, and R-Rg3 after single oral administration of BST204, a purified ginseng dry extract, at various doses in rats is evaluated. It was also investigated the pharmacokinetic properties following equivalent doses of individual pure compounds (S-Rh2, R-Rh2, S-Rg3, and R-Rg3), respectively, and compared their pharmacokinetics with those of BST204 extract in rats. After oral administration of BST204, only the S epimers, S-Rh2 and S-Rg3, could be determined in rat plasma. The poor absorption of the R-epimers, R-Rh2 and R-Rg3, may be attributed to lower membrane permeability and extensive intestinal oxygenation and/or deglycosylation into metabolites. The AUC and C_{max} values of both S-Rh2 and S-Rg3 after BST204 oral administration were proportional to the administered BST204 doses ranged from 400 mg/kg to 2000 mg/kg, which suggested linear pharmacokinetic properties. There were no statistically significant differences in the pharmacokinetics of S-Rh2 and S-Rg3 after oral administration of pure S-Rh2 (31.5 mg/kg) and S-Rg3 (68 mg/kg) compared with oral administration of BST204, 1000 mg/kg. These indicated that the presence of other components of BST204 extract did not influence the pharmacokinetic behavior of S-Rh2 and S-Rg3. Our finding may help to understand pharmacokinetic characteristics of S-Rh2, R-Rh2, S-Rg3, and R-Rg3, comprehensively, and provide useful information in clinical application of BST204.

Biography

Soo Kyung Bae graduated and obtained her Bachelor of Pharmacy degree from Seoul National University in 2001 and earned her PhD in pharmacokinetics from Seoul National University in 2006. She worked as a full-time lecturer in the department of clinical pharmacology of Busan Paik Hospital from 2007-2010. Since September 2010, she is working as an assistant professor in the department of pharmacology of The Catholic University of Korea

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