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In vivo effects of *panax ginseng* extracts on the cytochrome p450-dependent monooxygenase system in the liver of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin-exposed guinea pig

Hyung-Chul Lee[a], Sang-Gu Hwang[a], Young-Gu Lee[b], Hyung-Ok Sohn[b], Dong-Wook Lee[b], Yi-Swong Kwak[c], Jae-Joon Wee[c], Woo-Hong Joo[a,d], Yong-Kweon Cho[a,e], Ja-Young Moon[a,e*]

[a]Institute of Genetic Engineering, Changwon National University, Changwon 641-773, Korea
[b]Laboratory of Biochemistry, Korea Ginseng & Tobacco Research Institute, Taejon, 305-345, Korea
[c]Division of Ginseng Pharmacology, Korea Ginseng & Tobacco Research Institute, Taejon, 305-345, Korea
[d]Department of Biology, College of Natural Sciences, Changwon National University, Changwon, 641-773, Korea
[e]Department of Biochemistry and Health Sciences, College of Natural Sciences, Changwon National University, Changwon, 641-773, Korea

Abstract

The effects of the subchronic administration of *panax ginseng* extracts were examined on the hepatic cytochrome P450-dependent monooxygenase system of guinea pigs pre-exposed to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). *Panax ginseng* extracts were intraperitoneally administered to guinea pigs at 100 mg/kg/day for 14 days from 1 week after a single intraperitoneal injection of 1 μg of TCDD/kg of body weight. TCDD treatment increased the total cytochrome P450 content 2.86-fold, and this was remarkably inhibited by the administration of *panax ginseng* extracts. Treatment with ginseng extract alone also decreased the contents of cytochrome P450 by 33%, but both TCDD and

ginseng extracts had no effect on cytochrome b5 content. The administration of TCDD resulted in a 1.73-fold increase in microsomal NADPH-cytochrome P450 reductase activity in the guinea pig liver, and this was significantly inhibited by ginseng extracts, but treatment with ginseng extracts alone had no effect on its activity, and no statistical changes in the activity of NADPH-cytochrome b_5 reductase were observed in guinea pig liver due to TCDD and/or ginseng extract administration. Compared to the control, ECOD activity remarkably (1.76-fold) increased after TCDD administration, but this increase was completely inhibited by treatment with ginseng extract. Treatment with ginseng extract alone resulted in a 50% reduction of ECOD activity. TCDD administration remarkably induced benzphetamine demethylation (BPDM) activity, while ginseng extract also slightly increased the enzymes activity, but the induction attributed to ginseng extracts was not statistically significant. Even though administration of ginseng extracts slightly inhibited TCDD-induced BPDM activity, the inhibition was not statistically significant. These results indicate that ginseng extract exerts different effect on the induction of P450 isozymes. From these results, we suggest that *panax ginseng* extracts may act as an inhibitor of CYP1A rather than that of CYP2B.