Metabolism of Ginsenoside Re by Human Intestinal Microflora and Its Estrogenic Effect

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To understand the relationship between the metabolism and biological activity of ginsenoside Re, a main protopanaxatriol saponin in *Panax ginseng* C.A. Meyer, its metabolic pathway and estrogenic effect by human intestinal microflora were investigated. All human fecal specimens metabolized ginsenoside Re, mainly to ginsenoside Rh1 and ginsenoside F1, via ginsenoside Rg1, with protopanaxadiol as a minor component. Almost all isolated ginsenoside Re-metabolizing intestinal bacteria (GHIB) also metabolized ginsenoside Re, mainly to ginsenosides Rh1 and F1, via ginsenoside Rg1. α-Rhamnosidase and β-glucosidase, partially purified from the most potent GHIB, *Bacteroides* JY-6, hydrolyzed ginsenoside Re and ginsenoside Rg1, respectively; however, they did not hydrolyze ginsenosides Rh1 and F1. These findings suggest that the ginsenosides Rh1 and/or F1 for of intestinal bacteria, particularly *Bacteroides* JY-6, may not be suitable substrates. The estrogenic effects of ginsenoside Re and its main metabolites, ginsenosides Rg1 and Rh1, were also investigated. Ginsenoside Rh1 showed the greatest estrogenic effect in human breast carcinoma MCF-7 cells. Based on these findings, the estrogenic effect of ginsenoside Re may be expressed by intestinal microflora.