

Effects of Ginseng Total Saponin on Morphine-induced immunosuppression

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Morphine produces wide-spread immunosuppression, such as lymphokine production, phagocytic activity, natural killer cell activity, cell proliferation, and cell-mediated immunity. On the other hand, one of the representative pharmacological actions of *Panax ginseng* is immune enhancement. In this study, we investigated the effects of ginseng total saponin (GTS), and Adaptagen (trade name of ginseng product) on morphine-induced immunosuppression.

Morphine hydrochloride (10 mg/kg, sc), GTS (400 mg/kg, oral), Adaptagen (400 mg/kg, oral) were administered to mice for 14 consecutive days. Morphine impaired body weight increases and spleen weight to body weight ratio. GTS and Adaptagen restored spleen weight to body weight ratio in a dose dependent manner, but did not recover the decrease in body weight induced by morphine. Morphine decreased hemagglutinin titer, complement-dependent hemolysis titer, and antibody production, suggesting that B-cell functions were affected. These morphine-induced impairment of B cell functions were recovered by GTS. T-cell functions studied by type IV hypersensitivity test were most markedly affected by morphine treatment. As in B cell functions, GTS fully recovered reduced cell-mediated immunity. These results suggest that ginseng product could be very helpful for the treatment of impaired immune functions occurring in morphine abusers.