

Inhibitory effects saponin of *Red ginseng* on lung metastasis of murine melanoma through enhanced immune stimulation and suppression of matrix metalloproteinases

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Abstract

Korea red ginseng has broad efficacious effects against hypertension, diabetes, and cancer, and it improves weakness. Extracts of Korea red ginseng have been shown to possess various biological antitumoral activities. Metastasis is one of the major causes of mortality in cancer. During the metastatic cascade, metastasizing tumor cells interact with various host cells, extracellular matrices and basement membrane components. Therefore, regulation of tumor cell metastasis may help in the development of antimetastatic therapies. Tumor metastasis was evaluated in C57BL/6 mice, an experimental murine model commonly used for metastatic melanoma. In the present study, we examined the inhibitory effect of total ginsenoside, saponin preparation from Korea red ginseng, on lung metastasis produced by highly metastatic tumor cells, B16F10 melanoma in C57BL/6 syngeneic mice. Total ginsenoside significantly reduced the number of lung tumors induced by B16F10 melanoma cell in a dose dependent manner. Total ginsenoside also increased splenic NK cell activity. This result suggesting that a reduction in tumor metastasis by total ginsenoside is mediated through activation of splenic NK cells. Overexpression of matrix metalloproteinases (MMPs), particularly MMP-2 and MMP-9, has been correlated with invasion and metastasis in several cancer types including lung, colon and breast. Treatment of total ginsenoside significantly decreased the expression of MMP-2 and MMP-9 in B16F10 melanoma. These results suggest that total ginsenoside possess an ability to inhibit the lung metastasis of tumor cells, and the mechanism of antimetastatic effects is related to stimulation of splenic NK cells and suppression of MMP-2 and MMP-9.

Key words: saponin of *Red ginseng*, lung metastasis, NK cell, matrix metalloproteinases