

Immunopotentiality by plant sterol

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Cancer is the leading cause of death in Japan, and many approaches have been investigated for fighting against cancer. Chemoprevention is a research field for food and drug science. We previously demonstrated that intravenous injection of lower number of metastatic tumor cells could be failed to form metastatic colonies in the target organ, whereas larger number of them could complete tumor metastasis, suggesting that immune surveillance in the host plays an important role in the initial stage of tumor metastasis. Moreover, we previously observed that immune surveillance was weakened along with aging, and this deterioration was cancelled by tea catechin intake. These changes in immune strength became apparent in experimental metastasis studies: Metastatic potential decreases by increasing immune strength. In here we investigated the chemopreventive effect of plant sterol against experimental metastasis.

Phytosterol is a constituent component of plant cells. It has been estimated that Asian diet contains 300-400 mg of phytosterol per day. It has been reported that phytosterols have the ability to lower plasma cholesterol concentration, and to improve diabetes and various cancers.

However, there have been problems regarding to the solubility of the compounds. In this study, β -sitosterol (the most abundant phytosterol) was liposomolyzed for the purpose of oral delivery of the sterol. Although orally administered β -sitosterol was not absorbed into plasma, the amount of immune response cytokines such as IL-12 and IL-18 was increased in the small intestine after the liposome intake. Moreover, daily oral administration of the liposome potentiated natural killer (NK) activity, suggesting that the immune surveillance activity of mice was enhanced by the liposomal β -sitosterol intake. In fact, the metastasis of B16BL6 melanoma cells was suppressed after sequential administration of liposomal β -sitosterol for 7 days. These results suggest that daily liposomal β -sitosterol intake prevents tumor metastasis through the enhancement of gut immune surveillance systems.