



# HerbClip™

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**FILE: ■ Maitake Mushroom  
■ Immune Stimulation**

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**RE: NK Enhancement by Beta-glucan D Fraction in Maitake Mushroom**

Kodama N, Komuta K, Nanba H. Effect of maitake (*Grifola frondosa*) D-fraction on the activation of NK cells in cancer patients. *Journal of Medicinal Food*. 2003;6(4):371-377.

Maitake mushrooms are thought to possess immune-boosting properties. The beta-glucan D-Fraction, extracted from the mushrooms, has been reported to exert an antitumor effect in tumor-bearing mice by enhancing the immune system through activation of macrophages, T cells, and natural killer (NK) cells. The functions of natural killer cells are varied, from immunologic monitoring of tumors, providing defense against pathogens, and inducing proliferation of stem cells, to rejecting transplanted organs. The decrease in NK cell activity observed in cancer patients is closely related to disease progression and declining immune function; thus changes in NK cell activity may be an effective clinical marker of disease progression in cancer patients.

Orally administered D-Fraction has also been shown to reduce tumor size in mice without causing unwanted side effects. In a previous non-randomized clinical study, the authors found that D-Fraction enhanced and maintained the peripheral blood NK cell and IL-2 activity in cancer patients after administration. It has also been reported to be effective for HIV infection. These results indicate that one mechanism by which D-Fraction enhances the antitumor immune response is stimulation of adaptive immunity, in particular, enhancement of cytotoxic T cell activation. D-Fraction is widely sold as a nutritional supplement and touted as beneficial for health in Japan.

In this study, D-Fraction was administered to six male and four female patients between the ages of 46 and 84 years, with stage II-IV lung, breast, lingual, or gastric cancer who were not undergoing conventional treatments such as chemotherapy or radiotherapy. The dried powder made from the fruit body of maitake mushrooms was purchased from Yukiguni Maitake Co., Ltd. (Niigata, Japan). Patients were given doses ranging from 40mg-150mg twice a day from 1-63 months. Disease progression was monitored by measuring CD4<sup>+</sup>/CD8<sup>+</sup> cell numbers, NK cell activity, levels of soluble IL-2 receptor and expression of tumor markers. D-Fraction appeared to lessen the expression of tumor

markers and increased NK cell activity in all patients examined. Declines in NK cell activity in two patients, correlated with their deaths. Only one new metastases was found during the 50-month follow-up; however, the occurrence was in one of the patients who died.

The authors conclude that D-Fraction appears to repress lung and breast cancer progression, primarily exerting its effect through stimulation of NK activity, even without adjunct therapies. Oral administration of D-Fraction is a pain-free treatment method for the patient and may be an effective method of stimulating the immune system to fight cancer, although further research on different types of cancers is needed.

*-Densie Webb, PhD*

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