

# Cancer Risk Reduction by Intake of Mushrooms and Clinical Studies on EEM

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An epidemiological survey was carried out concerning farmers producing *Flammulina velutipes* (W.Curt.:Fr.) Singer “Enokitake” from 1972 to 1986 in Nagano prefecture, Japan. Cancer death rates of the farmers were lower than those of the average rate of total Nagano prefecture. Intake of edible mushrooms was suggested as being effective for risk reduction of cancer.

This was an ecological study. Next, a case-control study was made to elucidate the relationship between risk reduction of cancer and intake of edible mushrooms on stomach cancer in the same prefecture from 1998 to 2002. The odds ratio (OR) of subjects who were practically not ingesting mushrooms at all was 1.00; the OR of those ingesting *Hypsizygus marmoreus* (Peck) H.E.Bigelow (Bunashimeji) or *Pholiota nameko* (T.Ito) S.Ito et S.Imai (Nameko) more than once a week was 0.57 and 0.56, respectively. Whereas the OR of subjects taking mushrooms less than once a week was 1.00, the OR of those taking *Flammulina velutipes* more than three times a week was 0.66, and the OR of those taking *Lentinus edodes* (Berk.) Singer “Shiitake” more than three times a week was 0.95. It can be concluded that the intake of *Hypsizygus marmoreus*, *Flammulina velutipes*, and *Pholiota nameko* has the possibility of decreasing stomach cancer incidence.

Studies on antitumor activities of mushrooms were carried out in the National Cancer Center, Japan. Many antitumor polysaccharides and protein-bounded polysaccharides were isolated from mushrooms.

Based on these studies, extracts were made from *Hypsizygus marmoreus* and *Flammulina velutipes*, and a preparation called “EEM” (extracts of edible mushrooms) was supplied. Clinical studies of EEM were performed to investigate the effectiveness for cancer patients. Positive effects of EEM were studied on the cachexia of advanced cancer patients in comparison with MPA (methylacetoxyprogesterone). EEM revealed better results than MPA in clinical response, performance status (PS), and quality of life (QOL). Another clinical study was made with a combination therapy of EEM and cancer chemotherapy agents for advanced cancer patients. The clinical response rate, PS, and QOL of the patients treated with combination therapy (EEM and anticancer drugs) were better than those of the patients treated with anticancer drugs alone. The positive effects of EEM were also investigated for a precancerous lesion on the esophageal mucosa. After the patients of grade II of atypical hyperplasia on the esophageal mucosa were administered EEM tablets for 6 months, a positive effect of EEM was found.