Anti-tumor action of Maitake MD-Fraction

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We extracted β-1,3-branched β-1,6-glucan named as MD-Fraction in the fruit-body of the maitake mushroom. It expressed anti-tumor effect by oral or intraperitoneal administration of MD-Fraction to tumor-bearing mice. In intraperitoneal administration we found MD-Fraction expressed an anti-tumor effect by induction of Th-1 dominant immune response, that was enhanced with interleukin (IL)-12 produced peritoneal macrophages. On the one hand, by oral administration, most of β-glucan in mushrooms can't induce immune response, however, MD-Fraction indicated an anti-tumor effect orally. We assumed that an anti-tumor effect of MD-Fraction was involved in gut immunity when orally administrated. Therefore, we investigated that Peyer's patches (PP) activated by MD-Fraction or not.

After oral consecutive administration of MD-Fraction (2 mg/head/day), we examined IL-12 production in supernatant cultured for 24 h of PP cells (1×10^6 cells/well) obtained from the tumor-bearing mice on day 5, day 10, day 15, and day 20. After tumor implantation on 20 days the level of IL-12 indicated about nine times as non MD-Fraction treatment mice.

Next, PP cells (2×10^5 cells/well) in normal mice having orally MD-Fraction (1 mg/head/day for 5 consecutive days) or in mice received for consecutive 5 days orally and 5 days after tumor inoculations were cultured for 24 h. It was resulted that IL-12 production by PP cells was enhanced prior to tumor inoculation. Additionally, MD-Fraction enhanced not only the production of IL-12 in intraperitoneal cells but the proliferation in spleen cells and bone marrow cells.

In this study, we estimated that orally administrated MD-Fraction increased cytokine productions of PP cells, and also immunocytes activations of peritoneal, spleen, and bone marrow were elevated, and resultingly anti-tumor effect was observed.