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# A Study of Pharmacological Components from Submerged Culture Mycelia of *Phellinus linteus* (Berk. et Curt.) Teng

*Tomoyuki Nakamura,[1] Yukihito Akiyama,[1] & Hirokazu Kawagishi[2]*

[1]Applied Fungi Institute, IBI Corporation, 7841 Anayama-cyo, Nirasaki-shi, Yamanashi 407-0263, Japan; [2]Faculty of Agriculture, Shizuoka University, 836 Ohya, Shizuoka 422-8529, Japan

*Phellinus linteus* is a polypore of class Hymenomycetes and a heart-rot fungus occurring especially in groves of *Morus bombycis* Koidz. In Japan this fungus has been named Meshimakobu because it was found mainly in Meshima of the Danjo Islands in Nagasaki Prefecture. In Chinese medicine it has been called Souou and is used as a medicinal ingredient. About 30 years ago, certain pharmacological effects of this fungus were examined, and it was revealed that this fungus exhibited the highest antitumor activity among the Hymenomycetes mushrooms (Ikekawa et al., 1968). In this study, we found some biological activities of the mycelia extract and succeeded in isolation and structure-determination of the active principles in the extract (Nakamura et al., 2000, 2002). The results are as follows:

- The scavenging activity of superoxide anion radicals of the extracts was detected. As a result, caffeic acid was isolated as an antioxidant (Nakamura et al., 2002). The $IC_{50}$ of this principle was 3.05 μg/mL (16.9 μM). This was the first report in which caffeic acid was isolated from mushroom mycelia. It was proposed that caffeic acid may partly contribute to the pharmacological activity of *Ph. linteus*.

- The anti-allergic activity of the extracts was demonstrated by *in vivo* assay using NC/Nga/mice. Oral administration of mycelial extracts of *Ph. linteus* exerted type-I allergy suppressive effects by inhibiting the production of serum IgE and inhibiting the formation of dermatitis-like skin lesions. Hot-water extracts of the mycelia was more active than the culture filtrates.

- The antitumor activity of the extracts was examined by using Sarcoma 180/mice, p.o. As a result, all the fractions of *Ph. linteus* mycelia showed antitumor activity in the solid tumors implanted in mice. The highest antitumor activity (81.2%) was observed in the protein/glucan complex obtained by the precipitation of 24% NaOH extract at pH 6.0. The protein/glucan complex consisted of 39.3% polysaccharide and 49.4% protein. Its $^{13}C$ and $^{1}H$ NMR data showed that the main glucan part of the complex was primarily α-1,3-glucan chains (Nakamura et al., 2004).

It was demonstrated that the mycelia component of *Ph. linteus* showed useful activity for the treatment of allergic disease and cancer. These two diseases are recognized as very serious illnesses in Japan. The antioxidant activity (superoxide scavenging activity) of the mycelia component may contribute to keeping people's health.

## REFERENCES

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