

【Grant-in-Aid for Scientific Research(S)】
Biological Sciences (Agricultural sciences)



Title of Project : Structure and function of an improving factor in hippocampal impairment originated from the silkworm –parasitic fungus (*Paecilomyces tenuipes*) and practical use for human brain

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Research Area : Agriculture sciences

Keyword : Insect applications · functional use

【Purpose and Background of the Research】

An entomoparasitic fungus, *Paecilomyces tenuipes*, is harvested from dried and dead pupae of the silkworm (*Bombyx mori*). This extract is crucial for analyzing the neuroprotective effects of entomoresource. We found that gliosis occurs in the CA3 area of the hippocampus in aged mice and disappears in the extract-fed aged mice (Fig. 1). The CA3 area is responsible for spatial pattern association and completion, detection of novel situations, and short-term memory. Our finding may facilitate the development of dietary supplementation and therapies to improve age-related learning and memory of impairment of patients with Alzheimer's disease (AD).

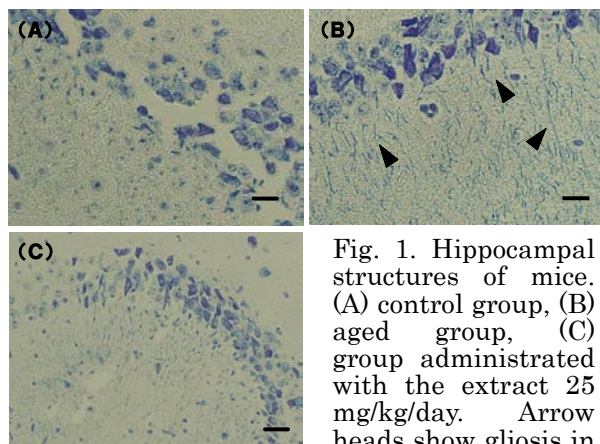


Fig. 1. Hippocampal structures of mice. (A) control group, (B) aged group, (C) group administrated with the extract 25 mg/kg/day. Arrow heads show gliosis in CA3 areas.

【Research Methods】

Our research (Iwate University and Osaka City University) has focused on the identification and mechanism of biologically active molecule(s) originated from the extract of *P. tenuipes*. Another research of patients with AD (Iwate Medical University and Osaka University) is being performed by ADAS-cog assessment and magnetic response methods of MRI, MRS, and fMRI. These evaluation of patients with AD and administrated with the extract is compared with control subjects.

【Expected Research Achievements and Scientific Significance】

A large percentage of the elderly will go on to develop cognitive problems of AD or some other form of dementia and these disorders also are a profound concern among the incidence of Tohoku earthquake. Therefore, it is of significant importance that our previous study of the extract from *P. tenuipes* has caused neural improvement in the aged mice and the present study are being conducted to provide new dietary supplementation and medicinal candidates to prevent or reduce the impact of dementia, especially for reducing the risk of AD (Fig.2).



Fig. 2. Images of food for anti-forgetfulness (left) and medical candidate for Alzheimer's disease (right).

【Publications Relevant to the Project】

1. Tsushima M., Yamamoto K., Goryou M., Suzuki F. and Suzuki K. Howt-water extract of *Paecilomyces tenuipes* from the silkworm pupae improves D-galactose-induced brain aging in mice. *Journal of Insect Biotechnology and Sericology*, 79, 45-51 (2010)
2. Suzuki K. Introduction to insect technology – Current research – Insects : useful resources for new industrial products (eds by Kawasaki K., Noda H., Kikuchi M.) CMCbooks, 3-12 (2005) (in Japanese)

【Term of Project】 FY2011-2015

【Budget Allocation】 159,100 Thousand Yen

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