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Abstract
Cordyceps sinensis （CS） is a fungal parasite on the larvae of Lepidoptera and has been used as a tonicherb in Chinese traditional medicine. A variety of pharmacological effects of CS have been reported. Therefore, CS always becomes a great draws of oriental society. However, the productivity of Cordyceps sinensis is limited because of the shortage of planting area and the difficulties in cultivation. Therefore, the supply of Cordyceps sinensis falls short of demand in the market. Utilizing modern biotechnology, the mycelium of Cordyceps sinensis can be cultivated in specialized medium and specified fermentation condition. Production of metabolite and mycelium with health promotion activities has already become the best replacement of natural Cordyceps sinensis.

The fermentation and water extract of its cultivated mycelium from Cordyceps sp. demonstrated significantly growth-inhibitory effect on human breast carcinoma cell (MCF-7) evaluated by MTT-microculture tetrazolium assay, and the mechanism of the growth-inhibition was due to apoptosis pathway evaluated by flow cytometry. The results have showed that there were diversity of biological activities due to different kinds of fermentation filtrate and water extract from different cultivated Cordyceps mycelium. Moreover, there was another effect of auxiliary Doxorubicin which can inhibit the cell growth on MCF-7 cells due to apoptosis.

The anti-metastasis was conducted by gelatin zymography analysis, and the results showed that the secretion of protein expression in MMP-9 (matrix metalloptoteinase) and -2 was significantly suppressed while HT-1080 cells were treated with the hot water extract of mycelium and fruiting bodies. Furthermore, RT-PCR assays was also used to evaluated the effect of anti-metastasis and showed the significantly inhibitory effect of mRNA expression in MMP-9 and -2. The immunomodulatory activities on macrophage cells (Raw264.7) stimulated by the polysaccharide extracted from fermentation filtrate of its cultivated mycelium were conducted by RT-PCR assays. The results have showed polysaccharide could stimulate macrophage cells (Raw264.7) to secrete cytokines such as TNF-α, iNOs, IL-1β, and IL-6. Moreover, the fermentation filtrate and water extract of its cultivated mycelium demonstrated that these products could remove the excess free radical which was evaluated by flow cytometry.

All results, in this study, suggested that the products from Cordyceps indeed possess some biological activities. Hopefully, these findings are useful to further studies.
Advisory Committee Chen Jian-Chyi - advisor

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