

Immunomodulating effects of the β -glucan from *Pleurotus cornucopiae* mushroom on macrophage actions

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Many edible mushrooms have become attractive as health food and as source materials for immunomodulators. Recently, the polysaccharide (PCPS) from *Pleurotus citrinopileatus* mushroom has been identified as a β -glucan which activates dendritic cells (DCs) by upregulation of the secretion or expression of many pro-inflammatory mediators. Moreover, it has been shown that the PCPS has the capacity to activate the cells via multiple pathways. In this study, we set out to investigate the immune modulating properties of the PCPS using macrophage-like cells derived from a THP-1 cell line as well as DCs. The PCPS stimulated the THP-1 macrophages to secrete significant levels of TNF. Moreover, the mRNA expression of TNF and IL-1 β were significantly enhanced by the PCPS treatment. However, the glucan did not induce to express both IL-12 and IL-10 mRNA in the macrophages. Next, in vivo experiments, the *P. cornucopiae* extract (containing mainly PCPS) treatment against BALB/c mice showed significant increases in TNF and IL-1 β mRNA expressions in the peritoneal macrophages of them. These results

suggested that the PCPS could induce pro-inflammatory action in an innate immune response. Meanwhile, the PCPS-treatment did not show any influence on an expression of IFN γ mRNA in the lymphocytes of the mice spleen despite it inhibited an expression of IL-4, an anti-inflammatory cytokine, mRNA in this study. Moreover, interestingly, regarding the influence of the PCPS on macrophage differentiation, the glucan suppressed the secretion of pro-inflammatory cytokines, such as TNF and IL-6, from differentiated macrophages, suggesting that the PCPS could promote monocyte to differentiate into M2 macrophage. These findings suggested that this edible mushroom, *P. cornucopiae*, could pleiotropically regulate macrophage activities by the β -glucan.

Biography

Ken-ichiro Minato is working as an Associate Professor at Department of Applied Biological Chemistry, Meijo University, Japan. Ken-ichiro Minato devotes to find a suitable functional food which could maintain our immune system. His own research interest has been how food factors, such as polysaccharides and polyphenols, act as an immunomodulator for monocyte, macrophages and dendritic cells in an innate immune system. His current targets are both pro- and anti-inflammatory effects of β -glucan in edible mushrooms on activities of those innate immunocompetent cells. Another his interest is a differentiation of macrophage toward M1/M2 and their activities. Macrophages develop from hematopoietic stem cells through common myeloid progenitors in the bone marrow, and repopulate in peripheral tissues. Currently it is thought that macrophages can be classified into several different phenotypes, based on their reactions to different microenvironments. The heterogeneity of undifferentiated circulating monocytes may affect their polarization once they arrive in inflamed tissues. He hopes to find a suitable functional food, which could prevent inflammatory diseases.

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