산양삼의 TLR2/4 의존성 MAPK, NF-κB 및 PI3K/AKT 신호전달 활성화를 통한 면역증진활성

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Immune-Enhancing Activity of Wild Simulated Ginseng through TRL2/4-Dependent Activation of MAPK, NF-κB and PI3K/AKT Pathways

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Ginseng (Panax ginseng Meyer) is a very well-known traditional herbal medicine that has long been used to enhance the body's immunity. Because it is a type of ginseng, it is believed that wild simulated ginseng (WSG) also has immune-enhancing activity. However, study on the immune-enhancing activity of WSG is quite insufficient compared to ginseng. In this study, we evaluated immune-enhancing activity of WSG through macrophage activation to provide a scientific basis for the immune enhancing activity of WSG. WSG increased the production of immunomodulators such as NO, iNOS, COX-2, IL-1β, IL-6 and TNF-α and activated phagocytosis in mouse macrophages RAW264.7 cells. Inhibition of TLR2 and TLR4 reduced the production of immunomodulators induced by WSG. WSG activated MAPK, NF-κB and PI3K/AKT signaling pathways, and inhibition of such signaling activation blocked WSG-mediated production of immunomodulators. In addition, activation of MAPK, NF-κB and PI3K/AKT signaling pathways by WSG was reversed by TLR2 or TLR4 inhibition. Based on the results of this study, WSG is thought to activate macrophages through the production of immunomodulators and phagocytosis activation through TLR2/4-dependent MAPK, NF-κB and PI3K/AKT signaling pathways. Therefore, it is thought that WSG have the potential to be used as an agent for enhancing immunity.

Key words: Immune enhancement; Immunomodulators; Macrophages; Wild simulated ginseng

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