

Immune-Enhancing Effect of *Hibiscus syriacus* Leaves in RAW264.7 Cells and Cyclophosphamided-induced Immunosuppressed Mice

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Under the COVID-19 pandemic, interest in immune enhancement is increasing. Although the immune-enhancing activity of plants of the genus *Hibiscus* has been reported, there is no study on the immune-enhancing activity of *H. syriacus*. Thus, in this study, we investigated the immune-enhancing activity of *Hibiscus syriacus* leaves (HSL) in mouse macrophages, RAW264.7 cells, and immunosuppressed mice. HSL increased the production of immunostimulatory factors such as nitric oxide (NO), inducible nitric oxide synthase (iNOS), interleukin-1 β (IL-1 β), and tumor necrosis factor- α (TNF- α) and activated the phagocytosis in RAW264.7 cells. The HSL-mediated production of immunostimulatory factors was dependent on toll-like receptor 4 (TLR4), p38, and c-Jun N-terminal kinase (JNK) in RAW264.7 cells. In the immunosuppressed mouse model, HSL increased the spleen index, the levels of the cytokines, and the numbers of lymphocytes, neutrophils, and monocytes. Taken together, HSL may be considered to have immune-enhancing activity and be expected to be used as a potential immune-enhancing agent.

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