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Immunostimulatory Effect of Theobromine via the Enhanced Production of Cytokines and MAPK Phosphorylation on RAW 264.7 Macrophages

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Theobromine is a type of alkaloid in cacao, which is mainly found in tea leaves, cola nut and dark chocolate. In recent study, theobromine has been reported to have various biological effects such as diuretic, respiratory tract expansion, vasodilation, and anti-obesity. However, there are no reports of immunomodulatory effect of theobromine. In this study, we examined the immunostimulatory effect of theobromine in RAW 264.7 macrophage cell line and primary murine peritoneal macrophages. The cells were incubated with theobromine with various concentrations. Using the Griess colorimetric method, we showed that theobromine induces the production of Nitric oxide in macrophages. In addition, qRT-PCR and ELISA analyses demonstrated that the level of inflammatory cytokines such as TNF- α and IL-6 was enhanced in theobromine-treated cells. Western blot analysis also showed that theobromine treatment resulted in increase in the expression of MAPKs and NF- κ B in a time and concentration-dependent manners. Collectively, these results indicate that theobromine induces the immunostimulatory effect through MAPKs and NF- κ B pathways, suggesting that theobromine could be considered a potential immunomodulatory agent.

Biography:

I majored in life sciences as a bachelor's degree and majored in school of pharmacy as a master's degree in south korea. I am now studying in Cell Immunology as Ph.D. in school of Pharmacy, Sungkyunkwan University. I participated in a variety of academic societies including Immunology and Experimental Biology. I have been very helpful in researching inflammation and obesity through these various conferences. I am currently conducting research on inflammatory diseases, obesity and diabetes, and I have been submitting papers related to these study.