Multiplex cytokine assay for evaluation of immuno-inflammatory activity of biomedical materials concerned with various inflammatory proteins of macrophages

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Various cytokines released from biomaterial-induced Raw 264.7 mouse macrophages were measured in the cell culture supernatants using a multiplex cytokine assay (MCA) based on xMAP technology. Myristicin (1-allyl-5-methoxy-3,4-methylenedioxybenzene) significantly inhibited the production of IL-6, IL-10, IP-10, MCP-1, MCP-3, GM-CSF, MIP-1α, MIP-1β, LIF, calcium, and nitric oxide in dsRNA [polyinosinic-polycytidylic acid]-induced RAW 264.7 cells. Scutellariae Radix water extract significantly inhibited the production of IL-3, IL-6, IL-10, IL-12p40, IL-17, IP-10, KC, VEGF, and nitric oxide in LPS-induced RAW 264.7 cells, whereas Epimedium brevicornum water extract significantly inhibited the production of IL-3, IL-10, IL-12p40, IP-10, KC, VEGF, MCP-1, GM-CSF, and nitric oxide in LPS-induced RAW 264.7 cells. Laminarin, a storage glucan, significantly increased the release of MCP-1, VEGF, LIF, G-CSF, hydrogen peroxide, calcium, and nitric oxide with enhancing expression of STAT1, STAT3, c-Jun, c-Fos, and COX-2 mRNA in RAW 264.7 cells. Additionally, gold nanorod and silica-coated gold nanorod significantly increased the release of IL-1α, IL-1β, IL-6, IL-10, IP-10, MCP-1, MCP-3, TNF-α, RANTES, G-CSF, GM-CSF, LIF, MIP-2, VEGF, PGE2, calcium, hydrogen peroxide, and nitric oxide with enhancing expression of STAT1, STAT3, c-Fos, and COX-2 mRNA in RAW 264.7 cells. Based on MCA, these data could be evaluated with quantitative and statistical significance (P < 0.05). Finally, it can be suggested that MCA be a useful and effective method for evaluation of immuno-inflammatory activity of biomedical materials concerned with various inflammatory proteins of macrophages.

Biography

Wansu Park, Medical Doctor of Oriental Medicine in South Korea, received his Ph.D. degree at the age of 33 years from Kyung Hee University in 2002. From 1996 to 2007, He worked for Korean Military Hospital as Army Doctor. He became the professor of Oriental Medical Pathology in 2007 and has performed the Head of Oriental Medicine since 2008 in College of Oriental Medicine, Gachon University. He has published more than 12 papers in reputed journals concerned with immuno-inflammatory mediators. Recently, he focused on evaluation of biomedical materials’ immuno-inflammatory activity using multiplex cytokine profiling assay.