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Analysis of Immunomodulating Gene Expression by cDNA Microarray in β-Glucan-treated Murine Macrophage

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β-(1,3)-D-Glucans have been known to exhibit antitumor and antimicrobial activities. The presence of dectin-1,α, β-glucan receptor of dendritic cell, on macrophage has been controvertial. RT-PCR analysis led to the detection of dectin-1α and β in murine macrophage Raw264.7 cell line. Among the various organs of mouse, dectin-1α and β were detected in the thymus, lung, spleen, stomach and intestine. To analyze gene expression modulated by β-glucan treated murine Raw264.7 macrophage, total mRNA was applied to cDNA microarray to interrogate the expression of 7,000 known genes. cDNA chip analysis showed that β-glucan of *P. osteatus* increased gene expressions of immunomodulating genes, membrane antigenic proteins, chemokine ligands, complements, cytokines, various kinases, lectin associated genes and oncogenes in Raw 264.7 cell line. When treated with β-glucan of *P. osteatus* and LPS, induction of gene expression of TNF-α and IFN-R1 was confirmed by RT-PCR analysis. Induction of TNF-R type II expression was confirmed by FACS analysis. IL-6 expression was abolished by EDTA in β-glucan and LPS treated Raw264.7 cell line, indicating that β-glucan binds to dectin-1 in a Ca^{++}-dependent manner. To increase antitumor efficacy of β-glucan, ginsenoside Rh2 (GRh2) was co-treated with β-glucan *in vivo* and *in vitro* tests. IC_{50} values of GRh2 were 20 and 25 ug/ml in SNU-1 and B16 melanoma F10 cell line, respectively. Co-treatment with β-glucan and GRh2 showed synergistic antitumor activity with cisplatin and mitomycin C both *in vitro* and *in vivo*. Single or co-treatment with β-glucan and GRh2 increased tumor bearing mouse life span. Co-treatment with β-glucan and GRh2 showed more increased life span with mitomycin C than that with cisplatin. Antitumor activities were 67% and 72 % by co-injection with β-glucan and GRh2 in the absence or presence of mitomycin C, respectively. [*This study was supported by a grant of the Korea Health 21 R&D Project, Ministry of Health & Welfare, Republic of Korea. 02-PJ1-PG11-VN01-SV04 -0049*]