Can Yeast Help Boost the Immune Response to Cancer?

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The purpose of this project was to determine the effect of yeast-derived beta-glucan stimulation on the cytokine production and tumoricidal effect of macrophages. It was hypothesized that beta-glucan stimulation of macrophages would increase pro-inflammatory cytokine production and cytotoxicity. The murine macrophage cell line RAW 264.7 and the tumor cell line EL-4 were used. For cytokine analysis, RAW cells were cultured with beta-glucan and/or EL-4 for varying time periods. The supernatant was harvested and analyzed using the ELISA assay. For cytotoxicity analysis, the macrophages were co-cultured with EL-4 tumor cells in 24-well plates. There were three groups of co-cultured cells: macrophages and tumor cells; macrophages, tumor cells, and anti-CD47 antibodies; and macrophages, beta-glucans, tumor cells, and anti-CD47 antibodies. The results showed that beta-glucan-stimulated macrophages produced larger quantities of the pro-inflammatory cytokines TNF α and IL-6 than non-stimulated macrophages across all time periods of stimulation. In addition, percentage of dead tumor cells co-cultured with beta-glucan-stimulated macrophages was greater than percentage of dead tumor cells co-cultured with non-stimulated macrophages. Data was analyzed with PRISM 6.0 and t-tests were used. This study showed that beta-glucan stimulation causes macrophages to increase production of pro-inflammatory cytokines. This in turn causes an increase in the tumoricidal effect of the macrophages. The findings of this study are an important step towards determining the viability of beta-glucan supplements as a way to upregulate the immune system in the fight against cancer.