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IMMUNOMODULATORY EFFECT OF LOW MOLECULAR WEIGHT GARLIC PROTEINS IN CROSSTALK BETWEEN PERIPHERAL BLOOD MONONUCLEAR CELLS AND COLON CANCER CELLS

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Cancer is one of the non-infectious diseases with high mortality and colorectal cancer is the third common cancer worldwide. Herbal medicine can use as a supplement in cancer. Among the various type of herbal medicine, garlic has different medicinal properties and biological effects. Garlic active ingredients can improve the immune system to defend against different microorganism and also cancer. In this study, the immunomodulatory effect of low molecular proteins of garlic was evaluated in the co-culture of peripheral blood mononuclear cell (PBMCs) and colorectal cancer cell lines SW48 and SW837. After extraction from garlic cloves, protein fractions were purified by G-75 gel filtration chromatography and confirmed by SDS-PAGE. To define the protein identity, MALDI-TOF spectrometry was done. In the cell culture phase, PBMCs and cell lines alone and in co-culture were treated with desired protein and PBMCs proliferation was assayed by CFSE. Also, cell culture supernatants were collected to evaluate the secretion of mediators by ELISA test. Finally, the rate of T regulatory and MDSC in co-culture medium was measured by flow cytometry. The result shows that purified protein fraction was a lectin binding protein with 11-16 kDa molecular weight. In proliferation assay, these proteins were able to stimulate PBMCs alone and in co-culture with tumour cell lines ($p<0.05$). In cytokine assay, PBMC treatment with protein fraction caused reduction in TGF-β and Galectin-3 secretion; in opposite IL-6 and IFN- secretion level was upregulated and it has no significant effect on IL-10 secretion in comparison with a negative control($p<0.05$). Also, the result shows that this garlic fraction could decrease T regulatory induction in the co-culture milieu ($p<0.05$). By stimulating PBMCs proliferation, inhibiting suppressor cell induction and upregulating inflammatory cytokine and reversely reducing inhibitory mediators; low molecular weight garlic proteins may use as an immunomodulatory supplement in cancer treatment. Also, the *in vivo* study should be done.

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