Impact of colon cancer stem cells on immune response by peripheral blood mononuclear cells

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Abstract
Introduction and Aim: Soluble factors, chemokines and cytokines of tumor cells lead to inflammation, and the cells recruited to the tumor microenvironment are macrophage and mast cells. Studies indicate that inflammation accelerates tumor progression. on the other hand, immune cells can also increase anti-tumor immunity. Existence of the immune cells and soluble factors maintain a balance between tumor promoting inflammation and anti-tumor immunity. Macrophage infiltration has been associated with poor prognosis in different cancers, such as breast cancer, and cervical cancer. But at the invasive stages of colorectal cancer, it was associated with improved prognosis. In this study, effect of colorectal cancer stem cell (HT-29) in an immune response produced by peripheral blood mononuclear cells (PBMNCs) was evaluated.
Material and Methods: First, peripheral blood was collected, and PBMNCs were isolated with ficoll, and cultured in test and control flasks. Then, peripheral blood monocytes were isolated. After24 hours, monocytes treated with the HT-29′s condition media. RNA extraction and cDNA synthesis of monocytes were performed after 72 and 96 hours. Finally, the gene expression of proinflammatory M1 macrophage (IL-6, IL-12b, TNF-α) were examined by real time PCR.
Results: In the test flasks in compare with controls, increasing of the IL-6, IL-12b, TNF-α was observed. Indicating that, secreted cytokines from HT-29 induced the differentiation of monocytes to macrophages, especially into proinflammatory M1 macrophages.
Conclusion: Presence of secreted cytokines of cancer stem cells lead to change gene expression macrophages and mostly differentiated to M1 phenotype. It suggests that secretion of proinflammatory cytokines by M1 macrophages, stimulate the immune system to anti-tumor immunity response. Since immunotherapy approaches are based on improvement in immune system, choosing the treatment to enhance anti-tumor immunity in patients by using PBMNCs, such as M1 macrophages increase hope of life expectancy.
Keywords: HT-29, PBMNCs, monocyte,M1 macrophage, IL-6, IL-12b, TNF-α