

Effects of Gamma-Tocotrienol Supplementation on T-Regulatory Cells in Syngeneic Mouse Model of Breast Cancer

Authors : S. Subramaniam, J. S. A. Rao, P. Ramdas, K. R. Selvaduray, N. M. Han, M. K. Kutty, A. K. Radhakrishnan

Abstract : Immune system is a complex system where the immune cells have the capability to respond against a wide range of immune challenges including cancer progression. However, in the event of cancer development, tumour cells trigger immunosuppressive environment via activation of myeloid-derived suppressor cells and T regulatory (Treg) cells. The Treg cells are subset of CD4+ T lymphocytes, known to have crucial roles in regulating immune homeostasis and promoting the establishment and maintenance of peripheral tolerance. Dysregulation of these mechanisms could lead to cancer progression and immune suppression. Recently, there are many studies reporting on the effects of natural bioactive compounds on immune responses against cancer. It was known that tocotrienol-rich-fraction consisting 70% tocotrienols and 30% α -tocopherol is able to exhibit immunomodulatory as well as anti-cancer properties. Hence, this study was designed to evaluate the effects of gamma-tocotrienol (G-T3) supplementation on T-reg cells in a syngeneic mouse model of breast cancer. In this study, female BALB/c mice were divided into two groups and fed with either soy oil (vehicle) or gamma-tocotrienol (G-T3) for two weeks followed by inoculation with tumour cells. All the mice continued to receive the same supplementation until day 49. The results showed a significant reduction in tumour volume and weight in G-T3 fed mice compared to vehicle-fed mice. Lung and liver histology showed reduced evidence of metastasis in tumour-bearing G-T3 fed mice. Besides that, flow cytometry analysis revealed T-helper cell population was increased, and T-regulatory cell population was suppressed following G-T3 supplementation. Moreover, immunohistochemistry analysis showed that there was a marked decrease in the expression of FOXP3 in the G-T3 fed tumour bearing mice. In conclusion, the G-T3 supplementation showed good prognosis towards breast cancer by enhancing the immune response in tumour-bearing mice. Therefore, gamma-T3 can be used as immunotherapy agent for the treatment of breast cancer.

Keywords : breast cancer, gamma tocotrienol, immune suppression, supplement

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