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The preventive oral supplementation of a selenium nanoparticle-enriched probiotic leads to increase the immune response and life span of 4T1 breast cancer bearing mice

Mohammad Hossein Yazdi

Tehran University of Medical Sciences, Iran

The immunomodulatory effects of lactic acid bacteria have been demonstrated previously. In this study, a *Lactobacillus plantarum* strain was selected and enriched with selenium nanoparticles for use as a new immunomodulating agent for a breast cancer murine model. Thirty female inbred BALB/c mice were equally divided into a test and a control group. Every day for 2 weeks prior to tumor induction, each mouse received an oral administration of 2.5×10^8 CFU/ml of selenium nanoparticle (SeNP)-enriched *L. plantarum*, then 1×10^6 cells of a 4T1 cell line were injected subcutaneously into each mouse. After tumor induction, oral administration was daily followed for three repeated cycles of 7 days on/3 days off. Immunological parameters such as levels of cytokines, NK cell activity, tumor growth, and mouse survival were evaluated. The production of the pro-inflammatory cytokines, IFN- γ , and TNF- α , as well as IL-2 in spleen cell cultures was increased in test mice administered SeNP-enriched *L. plantarum*. The test mice also showed significant increases in NK cell activity when compared to the control mice. The tumor volumes of treated mice were decreased and their survival rate notably increased when compared to mice that received *L. plantarum* alone or control mice that received phosphate buffered saline. Our results suggest that administration of SeNP-enriched *L. plantarum* can induce an efficient immune response through the elevation of the pro-inflammatory cytokines IFN- γ and TNF- α and an increase in IL-2 level as a lymphocyte stimulatory factor and NK cell activity. Therefore, this treatment may result in better cancer prognosis.

Biography

Mohammad Hossein Yazdi has completed his MSc in Medical Microbiology at the age of 25 years from Tehran University of Medical Sciences and became a PhD Student of Pharmaceutical Biotechnology at School of Pharmacy Tehran University of Medical sciences . He is the Cancer researcher in Pharmaceutical Biotechnology research center and has published more than 7 papers in reputed journals in this area in last 3 years. His main interest is Cancer immunotherapy and immunomodulation.

mh-yazdi@razi.tums.ac.ir