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EFFECTS OF SOY AND DAIRY FERMENTS ON MONOCYTE VIABILITY, CYTOKINE PRODUCTION AND CELL SURFACE MOLECULE EXPRESSION: IMPACT IN A LOW-SHEAR MODELED MICROGRAVITY SYSTEM

Abstract

Experience with space exploration has raised many questions regarding nutritional requirements for astronauts. As mission durations continue to increase, nutrient imbalances due to alterations in food intake, dietary requirements, bioavailability, or excretion, may become more important. Health challenges such as diminished immunity, bone loss and increase risk of carcinogenesis due to radiation exposure become an issue in the well-being of the astronaut. Shifts in intestinal microflora of these astronauts may be a factor in these problems. Soy-based and dairy milk-based fermented food products could provide a new nutritional approach to help alleviate these challenges by integrating beneficial lactic acid bacteria into the GI tract microflora while also supplying other nutritional advantages such as increased soy isoflavone bioavailibility and biologically active peptides. Immunomodulatory activity of dairy and soy milk ferments containing Streptococcus thermophilus ST5 in combination with either Bifidobacterium longum RO175 or Lactobacillus helveticus RO052 have been evaluated using an in vitro challenge system with the monocyte cell line U937. A rotating wall vessel bioreactor was used to assess effects of a low-shear modeled microgravity system on milk and soy ferment bioactivity. Parameters measured include cell viability, impact on IL-8 and TGF- production, and expression of cell surface markers involved in activation and attachment (CD54, CD58, CD80 and CD86). This approach will allow for determination of immunomodulatory potential for both ground-based and flight-based applications.