Dietary Impact on Memory T Cells

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As evidenced by the COVID-19 pandemic, infectious diseases have a dire impact on society. There is an urgent demand for developing strategies against infections. Dietary supplements, such as zinc and selenium, have been linked to the outcome after COVID-19 infection. However, there is insufficient scientific evidence that supports zinc or selenium's impact on host immunity. The purpose of my study is to directly test the effects of these minerals on the immunity conferred by T cells, an important type of immune cells. The T cells expressing CD8 (CD8 T cells) are adaptive immune cells that specialize in directly attacking and killing pathogens. After the initial infection, naïve CD8 T cells are "educated" and activated to recognize and kill the pathogens. Subsequently, a subset of T cells become memory T cells, which carry the "memory" of the pathogen and have the potential to confer long-term immunity and allow rapid and potent response upon secondary challenges from the same infection. In my research, I isolated CD8 T cells from the spleen of mice whose T cells are engineered to recognize the LCMV viral antigen gp33-41. These T cells can be activated with gp33-41 (mimics pathogen infection) and cytokine IL-2. Three days after activation, I treated CD8 T cells with cytokine IL-15 to assess memory T cell production. The levels of T cell activation or memory T cell differentiation were determined by flow cytometry analysis of surface markers. I found that, at certain concentrations, zinc enhances CD8 T cell activation but does not affect memory T cell development, while selenium promotes memory T cell differentiation but has minimal effect on T cell activation. Thus, zinc and selenium supplementation may be beneficial, at different stages, to enhance anti-viral immunity.

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