Influence of Zinc on Antigen Processing and Presentation via MHC class II Molecules

Professional antigen presenting cells, such as dendritic cells, macrophages, and B cells express Major Histocompatibility (MHC) class II molecules. These molecules are able to bind specific antigens and present them to $CD4^+$ T cells. This is a very critical process that links the innate with the adaptive immune response. Understanding the intricacies of antigen processing and presentation will result in additional targets for manipulation of the immune system. Our work focuses on how zinc is involved in antigen processing and presentation by murine macrophages. Zinc is an important component of many proteins and enzymes and in its free form it influences many cellular processes. Its homeostasis is critical for sustaining proper immune function. The differential modulation of zinc within macrophages depends on various stimuli and the response varies between different infectious agents. Some studies suggest that zinc deficiency impairs phagocytosis in macrophages, a function that is restored by supplementation. Yet it is still not fully understood how zinc affects the macrophage's ability to phagocytose and kill organisms. The aim of my thesis is to investigate the effect of zinc deficiency and supplementation on the process of antigen processing and presentation via MHC class II molecules, which is being accomplished using various methods such as recombinant protein production, enzyme assays, FACS analysis, fluorescence microscopy amongst other techniques.