Effect of malnutrition on ICAM-1 (intercellular adhesion molecule 1) expression in mouse High Endothelial Venules.

Lauren Bowman, Syreen Goulmamine, David Gibson, Amie Little, Melanie Gubbels Bupp.
Department of Biology. Randolph-Macon College; Ashland, VA 23005.

Previous work has suggested that glucocorticoids upregulate expression of the IL-7 receptor component, CD127 on peripheral T cells, even though the total number of peripheral T cells declines dramatically during malnourishment. We have proposed that CD127 up-regulation contributes to peripheral T cell diminishment by increasing the scavenge rate of IL-7 and thereby providing a mechanism to rapidly adjust the total number of T cells during malnutrition. As such, each malnourished T cell would receive a higher dose of IL-7 than control T cells. We next wondered if increased exposure to IL-7 during malnourishment might confer additional energy-saving behaviors. T cell migration across HEV's may be a high energy-consuming activity. Thus, we compared lymph node entry rates of adoptively-transferred malnourished and control T cells in malnourished and control recipients. As expected, control CD4+ T cells were more efficient than control CD8+ T cells at entering the lymph nodes. Interestingly, regardless of recipient diet, malnourished CD4+ and CD8+T cells entered the lymph nodes at equivalent rates. The molecular events that enable faster CD4+ T cell entry into lymph nodes in control mice is currently unknown. We next analyzed the expression of proteins known to be involved in T cell migration. Malnutrition causes significant reductions in CD4+ and CD8+ T cell expression of both components of LFA-1 (CD18 and CD11a), CD49d (a component of VLA-4), and S1PR1 as determined by flow cytometry. We also compared expression levels of ICAM-1 (CD54), a protein expressed in HEV's which binds to LFA-1 on migrating T cells, in malnourished and control lymph node tissue via confocal microscopy. An improved understanding of changes in migration molecule expression that occur during malnourishment should enhance our knowledge of the energy-conserving behavior of T cells, as well as uncover strategies to improve vaccination responses in malnourished children.