SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations (IP)

Author: Mr. Anand Narayanan
Texas A&M University Health Science Center, United States, anarayan09@gmail.com

Dr. Susan Bloomfield
Texas A&M University, United States, sbloom@exchange.tamu.edu
Dr. Karen Newell-Rogers
Texas A&M University - Health Science Center, United States, mknewell@gmail.com
Dr. David Zawieja
Texas A&M University - Health Science Center, United States, dcz@tamu.edu

AN INVESTIGATION OF SYSTEMIC VERSUS LOCAL INFLAMMATION IN SIMULATED MICROGRAVITY

Abstract

The immune system protects the body from harm due to internal or external agents. Transport of these agents, including components of the immune system such as cells and cytokines, is supported via the lymphatic system. Proper transport of immunological factors via the lymphatics maintains immune homeostasis. Impaired lymphatic function however can directly lead to inflammation and pathology. Previously we have shown using a rodent model of simulated microgravity that the lymphatic system is impaired systemically. We have further characterized local inflammation in simulated microgravity akin to what is seen in specific auto-immune conditions. Immune dysfunction has been long reported in rodents undergoing both simulated microgravity and spaceflight, however focusing on systemic measures of immunity. The local physiological adaptations driven by immune and lymphatic dysfunction in microgravity have not been explored extensively. The aim of this work is to further characterize local versus systemic immunological shifts to 1) identify immune factors that could lead to immunologically driven physiological adaptations in various organ beds and 2) identify the directionality of the immune response in association with lymphatic tissues (i.e. vessels and nodes). We have begun our investigation by characterizing immunological shifts of systemic (spleen, SPL) versus local (cervical lymph node, CLN, mesenteric lymph node, MLN, inguinal lymph node, ILN, and popliteal lymph node, PLN) changes in female, C57BL\6 mice undergoing simulated microgravity for 4-weeks (HU). We compared HU mice versus corresponding matched controls (CON) by flow cytometric analysis of innate and adaptive immune cell populations. Preliminary results exploring ILN immune cell changes note decreased % population of cells responsible for transporting antigen, i.e. immunological data, to the node, coupled with an elevated % population of cells responsible for regulating immune responses. Further analyses of all aforementioned lymph node populations to compare with spleen immune cells is currently underway and will be presented at the International Astronautical Congress. A. Narayanan was supported by the NASA NSBRI Predoctoral Fellowship.