Lymphatic Function and the Immune Response to Microbial or Viral Infection

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The National Institute of Allergy and Infectious Diseases (NIAID) is the primary institute within the National Institutes of Health (NIH) that conducts and supports basic and applied research to better understand, treat, and ultimately prevent infectious, immunologic, and allergic diseases. For more than 60 years, NIAID research has led to new therapies, vaccines, diagnostic tests, and other technologies that have improved the health of millions of people in the United States and around the world.

THE LYMPHATIC SYSTEM MAINTAINS the balance of fluids and nutrients in the tissues and blood of the human body. Lymphatic vessels circulate a clear fluid termed lymph, which is generated from the interstitial fluid drained from various tissues, in a uni-directional manner. The lymph transports cells of the immune system, such as dendritic cells, to lymphoid tissues where they can interact with lymphocytes and initiate an adaptive immune response. Abnormal function of the lymphatic system results in disease that is often characterized by the disruption of lymph flow and swelling of affected limbs, which can be debilitating.

Of particular interest to the National Institute of Allergy and Infectious Diseases (NIAID) is the impact of lymphatic function on the immune response to infection or vaccination. Areas of active research include defining the mechanisms that some pathogens use to hijack the lymphatic system in order to evade the immune response or circulate throughout the host, and deciphering the cues that allow leukocyte migration through the lymphatic vessels and into lymph nodes. However, more research is needed to fully appreciate how trafficking immune cells can interact with lymphatic endothelial cells and affect the downstream response in the lymph nodes. A basic understanding of these processes could benefit the development of future vaccines and therapies and have a positive impact on public health.

This publication is dedicated to the proceedings of the NIAID-sponsored workshop titled "Lymphatic Function and the Immune Response to Microbial or Viral Infection", held in Bethesda, Maryland on November 7, 2012. The overall goal of this effort was to provide a comprehensive view of the

state-of-the science on the interface between lymphatic function and the immune response. Scientists with a diverse range of expertise presented data from their respective laboratories. Topics included:

- Lymph node dynamics and lymphatic vessel function during infection or vaccination
- Immune response pathways altered by lymphedema
- Role of lymphatic endothelial cells in disease pathogenesis
- Role of lymphatic fluid in the maintenance of tolerance
- Interactions of immune cells with lymphatic endothelial cells
- Development of animal models to support lymphatics research
- Methods of enhancing lymphatic flow as therapy during illness in the elderly

Coordination of such a diverse range of expertise in topics related to lymphatic biology resulted in the stimulation of cross-talk amongst the researchers.

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