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EDITORIAL

Host defense: basic, disease and translational biology

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To defend against microbial invasion, the mammalian host develops a precisely regulated and complex network of cells and molecules that are also capable of discriminating among self, nonself, or missing-self. This is host immune system. The immune system is comprised of two interlinked and dynamic systems known as the innate and adaptive immune systems, and these consist of various cell-types and effector molecules to eliminate diverse threats to the host. The fundamental understanding of cellular and molecular processes adopted by the host is essential for understanding the pathogenesis and development of therapeutic interventions of disease. This issue of *International Reviews of Immunology* discusses the signaling events that take place during phagocytosis, immune exacerbation leading to respiratory disease, and developments in immunotherapy for blood cancer.

Phagocytosis, or "cellular eating," is mediated by various phagocytic cells of the host and plays a crucial role in various immune and nonimmune processes to maintain physiological homeostasis. The nonimmune process is required for a cleaning of the host by removing dead, old, necrotic, or traumatized cells or cell debris, and also plays an important role in developmental processes of the host. On the other hand, immunological processes are mediated by specialized innate and adaptive phagocytic cells, such as neutrophils, dendritic cells, monocytes, tissue macrophages, and B cells. The key function of these phagocytic cells is eliminating microbial pathogens, inducing inflammation and processing and presentation of microbial antigens to the adaptive immune cells. Phagocytosis is a complex molecular process and the first review article of this issue by Pradhan et al. describes the molecular mechanism of one phagocytic event known as "phagosome maturation," in terms of phagosome and lysosome fusion, the role of calcium ions to trigger the cascade of signaling, and how microbial pathogens subvert this signaling to establish an infection. The article also provides insight into manipulation of calcium ion signaling to combat various infectious disease (Figure 1).

Asthma is an obstructive lung disease characterized by the thickening of airway walls and an overproduction of mucous leading to difficulty in breathing. The asthmatic condition could be triggered by environmental factors, microbial infection, or it is associated with the host genetics. Immunologically, it develops due to an excessive presence of eosinophils and a strong T helper type 2 response through the production of cytokines such as interleukin (IL)-4, IL-5, and IL-13. The second review article in this issue, by Evangelos et al., discusses the correlation between lung infection and asthma in the light of innate immune sensors, particularly toll-like receptors (Figure 1).

Non-Hodgkin Lymphoma (NHL) is a malignant disease of lymphocytes originating from lymphatic tissue.

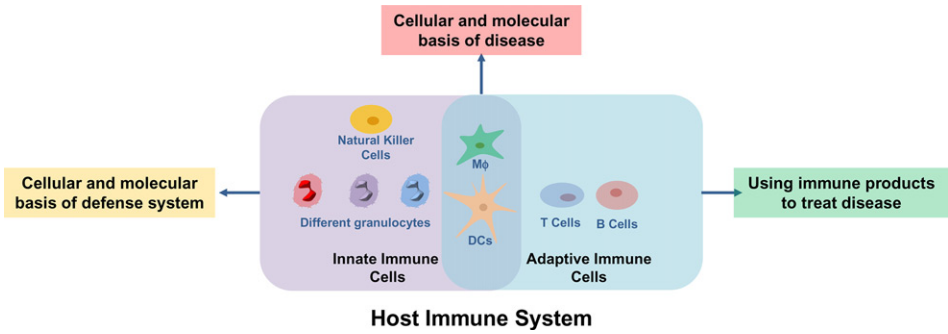

Figure 1. Aspects of Host defense.

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NHL can be treated by various treatment regiments including chemotherapy, radiotherapy, bone marrow transplantation, and radioimmunotherapy (RIT), an application targeting specific monoclonal antibodies which are tagged with radioisotopes. The last review article in this issue by Mahsa et al. discusses the pros and cons associated with RIT for this hematological malignancy. This article is useful to broad readers/researchers associated with onco-immunology and researchers involved in the advancement of RIT with current technologies (Figure 1).

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