

The Natural History of Dendritic cells in Peripheral Lymphoid Organs of Mice

Kang Liu, PhD
Research Associate
Laboratory of Molecular Immunology
The Rockefeller University, USA

Abstract

Dendritic cells (DCs) are immune sentinels in most tissues that orchestrate immunity and tolerance toward invading pathogens, tumors and self-antigens. These roles are facilitated by the capacity of DCs to capture antigens in the periphery and migrate to lymphoid organs, where they present antigens to T cells. Like T and B cells, DCs originate from bone marrow hematopoietic stem cells. However, the details of every stage along the DC differentiation pathway and homeostasis regulation are not clear. Here I present our study on the natural history of DC differentiation in mice. We have established methods to study the phenotype, number and division of progenitors, precursors and differentiated DCs in the bone marrow, blood and peripheral lymphoid organs. We observe that in the steady state, DC homeostasis in the peripheral lymphoid organs requires constant replenishment from the blood at a rate of ~4,300 cells/hour. In addition, DC precursors have a short half-life in blood stream and are rapidly cleared from circulation. We also found that Fms-like tyrosine kinase 2 (Flk2) plays important roles in regulating DC homeostasis in both bone marrow and peripheral lymphoid organs. We propose to apply knowledge of DC differentiation to the development of an HIV vaccine.