Innate Immune Responses to Viral and Bacterial Infections

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Abstract
The seminar will cover the molecular evolution of Zika viruses and development of a novel broad antiviral strategy against emerging viral pathogens based on host Type I interferon response. It will also discuss the anti-inflammatory functions of Type I interferon including its beneficial roles in protecting tissue injury and inflammatory diseases as well as its detrimental roles in causing secondary bacterial infection and chronic viral or bacterial infection.

About the speaker
My research at UCLA is aimed towards understanding innate and adaptive immune responses in host defense against infections and cancers, as well as their associations with inflammatory and metabolic diseases. Upon recognizing pathogenic infections and other environmental challenges, host cellular receptors can trigger a series of signal transduction and gene expression networks (gene programs) to initiate innate immune responses. These responses can, for example, control the replication and spread of bacteria and viruses by activating phagocytes and inducing the release of antimicrobial proteins and/or type I interferons. In addition, innate immune responses are essential in the development of adaptive immunity by enhancing antigen presentation, upregulating co-stimulatory molecules, and instructing Th1 or Th2 responses. A defect at any step of this well-coordinated process can increase host susceptibility to infection. On the other hand, overactive immune responses can also lead to multiple inflammatory disorders and metabolic syndromes. We hope to understand both the similarities and differences in host immune responses to infections by different types of pathogens. We also hope to better appreciate how we balance immune and inflammatory responses, and how these responses influence other homeostatic and metabolic processes. Our goal is to develop novel strategies to enhance our immunity against infections and tumor challenges, while preventing or inhibiting inflammatory and metabolic diseases.