



V 40 *Borrelia* transmission – nip it in the bud

Sukanya Narasimhan

Yale University, Yale School of Medicine, New Haven, Connecticut, U.S.A

Borrelia burgdorferi, the agent of Lyme disease, is transmitted by *Ixodes scapularis* ticks in North America, by *I. ricinus* ticks in Europe, and by *I. persulcatus* ticks in Asia, when an infected tick feeds on a vertebrate host. Two avenues of efforts are ongoing. One aimed to promote a molecular understanding how the pathogen is sustained in the tick and how transmission is facilitated, and another aimed to understand how the tick obtains a blood meal. My presentation will first focus on the tick-host skin interface and our approach to define tick salivary proteins that enable tick feeding. We examine the phenomenon of acquired immunity to ticks and demonstrate that the tick salivary proteome is dynamic, changing during the process of tick feeding. We show that immunity to early tick salivary antigens is critical and sufficient to block tick feeding. We show that blocking early tick salivary antigens also impairs *Borrelia* transmission, emphasizing that tick feeding and pathogen transmission are closely coupled. Ongoing efforts focus on the early tick salivary proteins to define the specific proteins essential for tick feeding. Another related, yet less understood aspect of tick feeding are the events at the tick gut-host interface that maintain the blood meal fluid during the process of feeding. A congealed blood meal might not only derail tick feeding, but would also be detrimental to *Borrelia* growth and replication, a critical event that precedes transmission. We therefore begin to describe tick gut anticoagulation strategies and their potential role in tick feeding and *Borrelia* transmission. It is expected that a concerted unraveling of the molecular events at the two tick-host interfaces will be conducive to the development of strategies to prevent pathogen transmission to the vertebrate host and to control tick populations in endemic areas.