Researchers track Lyme disease spirochetes

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Microbiologists at the University of Calgary have demonstrated the first direct visualization of the dissemination of Borrelia burgdorferi, the bacterium that causes Lyme disease. This real-time, three-dimensional look at spirochete dissemination in a living mammalian host is published June 20th in the open-access journal *PLoS Pathogens*.

Pathogenic spirochetes are a group of bacteria that cause a number of emerging and re-emerging diseases worldwide, including syphilis, leptospirosis, relapsing fever, and Lyme disease. The mechanism by which they disseminate from the blood to target sites is unknown. Direct visualization of these bacteria may yield critical insight into resultant disease processes.

The team therefore set out to directly observe these bacteria at the single-cell level in a living host, using an engineered fluorescent strain of B. burgdorferi as an example bacterium. Using conventional and spinning disk confocal microscopy, the investigators were able to track the movement of the bacteria and the interaction of the bacteria with the vascular wall in mice. They found that vascular escape is a multi-stage process and that spirochete movement appears to play an integral role in dissemination from the blood to target tissue sites.

This use of high-resolution, 3D imaging to visualize the dissemination of a bacterial pathogen in vivo lays the groundwork for a better understanding of the mechanisms by which these and other bacteria disseminate throughout the body to cause disease.

Source: Public Library of Science
www.plospathogens.org/doi/ppat.1000090