

Even after Lyme disease is gone, its remains may perpetuate inflammation

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(Medical Xpress) -- Non-infectious proteins of the species of bacteria that causes Lyme disease can remain in the body for a long time after antibiotic therapy, and are capable of causing an inflammatory immune reaction that could contribute to the development of antibiotic-resistant arthritis, Yale researchers have found. The study appears in the online *Journal of Clinical Investigation*.

Although Lyme disease is quickly responsive to antibiotics, up to 25 percent of patients experience prolonged musculoskeletal symptoms that linger after treatment, and some develop an arthritis that no longer responds to antibiotics. Lyme patients who develop persistent, painful joint inflammation after treatment may be suffering from an immune response to these proteins rather than a lingering bacterial infection, say the researchers.

The Yale team infected [laboratory mice](#) with [Borrelia burgdorferi](#), the tick-transmitted spirochete that causes Lyme disease in the United States. Using state-of-the-art microscopy (known as two-photon intravital imaging) to visualize spirochetes in living mice, the researchers found that the vast majority of bacteria were killed within the first day or two of treatment. After finishing a course of antibiotic treatment, the mice were free of the [infectious bacteria](#), the researchers found.

However, researchers did find traces of proteins from the spirochete within joints and adjacent to cartilage of the antibiotic-treated mice. They also found that these proteins could make cells from the mice produce substances found in a large-scale immune system attack on a pathogen such as *B. burgdorferi*.

"This study provides the first direct evidence that spirochete proteins can remain long after the bacterium is gone, and in places where people can experience symptoms after treatment for Lyme disease," said lead author Linda K. Bockenstedt, M.D., the Harold W. Jockers Professor of Medicine and Rheumatology at Yale School of Medicine. "These symptoms after treatment may not be caused by the Lyme bacterium itself, but by an immune system that is slowly removing the non-viable remains of the long-dead bacterium."

Provided by Yale University

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