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# Lyme Disease Bacteria Craftier Than Thought

By Fran Berger  
HealthScout Reporter

THURSDAY, Jan. 18 (HealthScout) -- The tick-borne bacteria that cause Lyme disease may be craftier than previously thought, which could make developing a new vaccine a daunting task, a new study says.

Lyme disease is carried by an infected tick, which transmits the bacterium *Borrelia burgdorferi* as the tick feasts on a host's blood. During the meal, the tick's saliva transmits the infection-causing bacteria.

"What was thought previously is, as the bacteria move from the tick to the host, they switch surface proteins," says Aravinda M. de Silva, the study's lead author and assistant professor of microbiology and immunology at the University of North Carolina at Chapel Hill School of Medicine.

Instead, de Silva says, what happens is much more complex.

"We know that before the tick takes the blood meal, the bacteria living inside the gut of the tick are fairly uniform," he says. By the time the bacteria get inside the host, "we now know there are about 150 proteins, and we were just looking at two."

The many possible combinations, says de Silva, makes developing a vaccine more complicated.

Two types of vaccines could be developed, says de Silva. One would be a transmission blocker that goes after the antigens produced within the tick in the early stages, before the bacteria diversify. A vaccine of this type is currently on the market.

The second kind, the study suggests, would be based on surface proteins that are common to all the bacteria entering the host.

The challenge is to discover which of the 150 surface proteins are present in all the bacteria.

"The bacteria adapt to infect the person or the mouse; the variability is highly advantageous to the bacteria in terms of

fighting the immune response," says de Silva. "If they all came in looking the same, the host could control the infection."

Although the current vaccine has been reported to protect between 75 percent and 80 percent of people in clinical trials, its long-term efficacy has not been proven.

"Understanding more about the biology of transmission may lead to better vaccines that complement or replace," what's now in use, de Silva says.

The results of the study are reported in the current issue of the *Proceedings of the National Academy of Sciences*.

Lyme disease, which is treatable in its early stages with oral antibiotics, is characterized by a bull's eye-shaped skin rash and flu-like symptoms. Some people experience body pain, aching joints and headaches. Left untreated, it can result in chronic joint pain and other ailments of the skin, joint and nervous systems.

## What To Do

"We know it takes the bacteria at least 36 to 48 hours to change the surface proteins," says David Weld, executive director of American Lyme Disease Foundation. "As a result, it's extremely important to do daily tick checks, and to remove them promptly and properly."

Since the tick is the size of a pinhead, you'll need to carefully go over each part of your body, including your scalp -- running a fine-tooth comb through your hair. If you find a tick, "use a pair of fine-tipped tweezers, grab it, parallel to the skin, and pull it out gently, but firmly," says Weld.

If you're in areas with high tick populations, which include the Northeast and north central states for the deer tick and the Western states for the mouse ticks, apply a repellent containing DEET before venturing outside. Be sure to cover up; wear socks, tuck in your pant legs and secure them with masking tape or a rubber band, and wear long sleeves and a hat.

Read up on Lyme disease at the [Centers for Disease Control and Prevention](#).

Learn to spot Lyme disease with these [pictures of ticks and rashes](#).

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