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Mayo Clinic finds new bacterium causing tick-borne illness ehrlichiosis in Wisconsin and Minnesota

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A new tick-borne bacterium infecting humans with ehrlichiosis has been discovered in Wisconsin and Minnesota. It was identified as a new strain of bacteria through DNA testing conducted at Mayo Clinic. The findings appear in the Aug. 4 edition of the *New England Journal of Medicine*.

Doctors at Mayo Clinic, the Centers for Disease Control and Prevention (CDC), the University of Minnesota, the University of Wisconsin, and state and local health departments say the new species from the Ehrlichia genus can cause a feverish illness in humans. The new bacterium, not yet named, has been identified in more than 25 people and found in black-legged ticks, also known as deer ticks (Ixodes scapularis), in Minnesota and Wisconsin. Researchers used culture and genetic analyses.

"Before this report, human ehrlichiosis was thought to be very rare or absent in Minnesota and Wisconsin," says Bobbi Pritt, M.D., a Mayo Clinic microbiologist and director of the Clinical Parasitology and Virology Laboratories who helped coordinate the multi-agency team. "Therefore, physicians might not know to look for Ehrlichia infections at all."

Ehrlichia infect and kill white blood cells and may cause fever, body aches, headache and fatigue. More severe disease may involve multiple organs such as the lungs, kidneys and brain and require hospitalization. Ehrliochosis rarely results in death.

All four patients described in the New England Journal of Medicine article suffered fever and fatigue. One patient, who had already received a bilateral lung transplant, was hospitalized briefly for his illness. All four patients recovered following antibiotic treatment with doxycycline, the drug of choice for treating ehrlichiosis. Although more than 25 cases have been identified, many more have likely been missed or unreported, Dr. Pritt says.

The investigation began after Carol Werner, then a technologist at Mayo Clinic Health System's Eau Claire hospital, noted an abnormal Ehrlichia Polymerace Chain Reaction (PCR) result in 2009 and raised the first red flag. Mayo Clinic then began investigating with the CDC, the universities and several public health departments. The Minnesota Department of Health last year put out a health advisory alerting people that it and its Wisconsin counterpart were seeing increasing reports of ehrlichiosis in humans.

"As the deer tick population continues to spread and increase across Wisconsin, we are likely to see increasing incidence of this new infection, just as we have seen with Lyme disease and anaplasmosis which are transmitted by the same tick species," says co-author Susan Paskewitz, Ph.D, an entomologist at the University of Wisconsin-Madison.

To date, thousands of blood samples from across the United States have been screened by Mayo Clinic laboratory technologists, and the bacterium has been detected only in specimens collected from Wisconsin and Minnesota. Thousands of ticks across the country have also been analyzed, and only those from the two states have been carriers.

Because the bacterium is likely transmitted through the bite of an infected tick, Dr. Pritt cautions that people should apply insect repellent

and wear pants and long-sleeved shirts when active outdoors.

Doctors need to know to test for ehrlichiosis in the two states so the diagnosis is not missed. However, traditional blood antibody tests may offer misleading results and fail to accurately identify the new species. A specific antibody test for the new bacterium has been developed by the CDC but isn't widely available. Instead, a molecular blood test that detects DNA from the new Ehrlichia species is the preferred method for detecting this disease in symptomatic patients.

When testing for this new Ehrlichia species, physicians should also consider testing for other tick-borne diseases, such as Lyme disease, babesiosis and anaplasmosis, all prevalent in Minnesota and Wisconsin, Dr. Pritt says.

Genetically, the new bacterium bears closest similarity to another species of Ehrlichia -- E. muris -- that infects small rodents and deer in Eastern Europe and Asia. E. muris rarely infects humans, and no cases have been reported in North America.

Provided by Mayo Clinic