

New Species of Infectious Disease Found in Amazon

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While investigating the tropical disease leptospirosis in the Peruvian Amazon, an infectious disease specialist from the University of California, San Diego School of Medicine has uncovered new, emerging bacteria that may be responsible for up to 40 percent of cases of the disease. Patients with severe forms of leptospirosis have jaundice, renal failure and lung hemorrhage, with high fatality rates.

Joseph Vinetz, M.D., professor of medicine in UC San Diego's Division of Infectious Diseases - working in collaboration with colleagues from Universidad Peruana Cayetano Heredia in Lima, Peru, and others - headed the study that led to discovery of the new species in the family of pathogens, *Leptospira*, which is spread from animals to humans. The findings will be published in the April 1 issue of the Public Library of Science (PLoS) journal *Neglected Tropical Diseases*.

Leptospirosis is a severe, water-borne disease transmitted from animals to humans, with tens of millions of human cases worldwide each year. Fatality rates can range as high as 20 to 25 percent in some regions, and it is particularly prevalent in tropical countries where poor people live under highly crowded condition, or in rural areas where people are exposed to water contaminated by the urine of *Leptospira*-infected animals such as rats.

The new species reflects Amazonian biodiversity, according to Vinetz, and the pathogen has apparently evolved to become an important cause of leptospirosis in the Peruvian Amazon region of Iquitos. There, Vinetz leads an international team of physicians from the U.S. and Peru in an NIH-funded training program studying malaria, leptospirosis and other infectious diseases that impact disadvantaged populations in developing countries.

The researchers found that the new species, *Leptospira licerasiae* - cultured from a very small number of patients, as well as eight rats - is significantly different from other forms of the bacteria at a genomic level and has novel biological features.

"This strain has fundamentally different characteristics," said Vinetz, adding that the next step is to sequence its genome. "We think that hundreds of patients are infected with this pathogen, which is so unique that antibodies for the disease don't react to the regular tests for leptospirosis."

In testing 881 patients in a prospective clinical study of fever, the researchers found that 41 percent of them had antibodies that reacted only to this new strain of the bacteria, showing a much higher incidence of leptospirosis than previously suspected.

"This observation is relevant to other regions of the world where leptospirosis is likely to be common, because it's necessary to identify the right strain of the *Leptospira* in order to make the correct diagnosis," Vinetz said.

Since isolation of the new *Leptospira* in people was rare despite the high prevalence of antibodies to this strain of the bacteria in the Amazonian population, Vinetz theorizes that the individuals with positive cultures may have a previously undiscovered immune system defect, making them more susceptible to the disease.

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