



National Research  
Fund for Tick-Borne  
Diseases, Inc.

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## Research Foundation for Tick-Borne Diseases to Fund Four Pilot Studies

The National Research Fund for Tick-Borne Diseases (NRFTD) today announced grant awards totaling \$240,000 to four investigators in North America to study key aspects of Lyme disease, Southern Tick-Associated Rash Illness (STARI) and human granulocytic anaplasmosis (HGA). The NRFTD is the nation's only non-profit organization dedicated solely to funding scientific research in the rapidly expanding field of tick-borne infections.

"As usual, the quality of the applications was extremely high," said Cathy Morrissey, founder of the NRFTD and a member of its Research Board. "But thanks to the generosity of our donors, we are able to provide support for four projects that we hope will eventually translate into tangible benefits for patients."

The four \$60,000 grant winners were selected following a rigorous peer-review process by the NRFTD's distinguished five-member Scientific Advisory Board using guidelines akin to those established by the National Institutes of Health. Three ad hoc reviewers from prestigious national academic institutions provided additional expertise in the review of the applications.

Dr. Linda Bockenstedt of Yale University's Department of Internal Medicine has been awarded a grant to study modulation of the mammalian immune response to infection by *Borrelia burgdorferi*, the causative agent of Lyme disease. Up to 30% of human patients treated with antibiotics early in the course of their Lyme disease infection do not experience full recovery within 3 months, and 10% of those with Lyme arthritis experience continued joint inflammation after treatment. While the induction of the immune response in Lyme disease has been well studied, there are deficiencies in our understanding of its regulation. Dr. Bockenstedt's award will enable her to investigate the role of a recently discovered immune regulatory pathway, known as the TAM pathway, in controlling *B. burgdorferi*-induced inflammation and disease in the mouse model. This work will set the stage for future studies of the TAM pathway in human Lyme disease.

A Lyme disease grant has also been awarded to Dr. Tara Moriarty of the University of Toronto, who will investigate the possible role of metabolic syndrome in some cases of unresolved Lyme disease. Metabolic syndrome is a combination of clinical factors that increase the risk of cardiovascular disease and diabetes, and its incidence has grown dramatically over the last few decades. Preliminary work in Dr. Moriarty's lab indicates that when mice are given a high fat diet that induces atherosclerosis, obesity and hyperglycemia, they experience a higher burden of infection when exposed to *B. burgdorferi* than do mice with normal metabolism. Dr. Moriarty will continue this work in an attempt to tease out the specific metabolic factors that increase host susceptibility to disseminated Lyme disease; this may lead to novel treatments for human patients with unresolved illness.

The lone star tick, *Amblyomma americanum*, is the vector of the Lyme-like illness known as Southern Tick-Associated Rash Illness, or STARI. Despite intensive efforts to identify a causative agent, researchers have so far been unable to isolate a

microorganism that can be convincingly linked to the disease. Now, with NRFTD funding, Dr. Charles Chiu of the School of Medicine at the University of California, San Francisco will employ a genomic approach in the form of a comprehensive microarray tool, called the TickChip, to search for tick-borne pathogens in both *Amblyomma* ticks and blood samples from patients diagnosed with STARI. Detailed molecular and epidemiological studies will then be performed in order to establish an association between possible infectious agents and the disease. Once the cause of STARI has been established, further research on the pathogen can be pursued and useful diagnostic tests can be developed to definitively distinguish STARI from Lyme disease.

The fourth NRFTD grant has been awarded to Dr. Mingqun Lin of the Department of Veterinary Sciences at The Ohio State University. Dr. Lin will pursue a project focusing on the ability of *Anaplasma phagocytophilum*, the causative agent of human granulocytic anaplasmosis (HGA), to manipulate the cytoskeleton (the cellular protein "scaffolding") of the host cells it invades. HGA is the second most common tick-borne infection in the U.S. after Lyme disease, and can occasionally be fatal; therefore, it is crucial to advance our understanding of the pathogenesis of this illness. Dr. Lin's project will examine the underlying mechanisms by which a secreted bacterial protein regulates the host cytoskeleton in order to ensure bacterial survival and release, and an understanding of these mechanisms may lead to novel treatments for HGA and other intracellular infections.

All four NRFTD projects are expected to begin in early 2012 and to be completed in one year.

#### **About the National Research Fund for Tick-Borne Diseases, Inc.**

The NRFTD is a nonprofit, tax-exempt organization devoted strictly to raising funds in support of scientific research on tick-borne diseases. It aims to advance scientific understanding of these complicated infections by sponsoring innovative research at premier institutions throughout the world.

The NRFTD was founded in 1999 to address the complex and critical research questions raised by thousands of patients afflicted with emerging tick-borne diseases, including Lyme disease, relapsing fever, babesiosis, ehrlichiosis and anaplasmosis. The need for answers has grown markedly as Lyme disease continues to spread throughout the country and as other tick-borne infections have been recognized as public health threats.

For more information about the NRFTD, or to make a tax-deductible donation, please visit [www.nrftd.org](http://www.nrftd.org).