

response on par with patients suffering from other autoimmune diseases, such as lupus.

6 Understanding the Cause of Chronic Illness Associated With Lyme Disease

Seeded by a grant from LRA in 2008, Dr. John Aucott, MD, of Johns Hopkins University School of Medicine, is the Principal Investigator of the first U.S. study to examine long-term outcomes following acute Lyme disease. The study examines the impact of Lyme disease on the immune system and aims to understand the immunologic response of different patients to the disease in order to discover why some patients experience persistent symptoms even after antibiotic treatment. The results of this longitudinal prospective study are expected to contribute

to an improved understanding of the causes of persistent Lyme disease, which in turn, could assist in the development of new levels of individualized treatment.

7 The Columbia Biorepository

The Columbia biorepository is unique in containing specimens from patients with early and later stages of Lyme—which positions it as a singular resource to advance research both at Columbia and internationally. Specimens from this repository have supported the work of LRA-funded researchers including Dr. Schutzer and Dr. Alaedini, and diagnostic companies developing new assays in the U.S., Great Britain and Germany. This repository continues to be built through our ongoing studies and new studies.

LRA DEPENDS ON DONOR GENEROSITY TO CONTINUE THIS PROGRESS

The first potential drug to treat persistent Lyme disease... identifying post-treatment Lyme disease in cerebral spinal fluid... unraveling the biofilm defenses of the *Borrelia* bacterium... these are some of the real and recent steps forward that would not have been possible without the repeated support of our donors. These studies are ongoing and depend on continued funding by LRA to reach conclusions that will contribute to the future health of every family at risk for Lyme disease, or those who are living with persistent Lyme. It is through donor support that we can continue this critical research.

“Given occasional shortfalls and delays in government funding of research into Lyme and other tick-borne diseases, and without the support of Lyme Research Alliance, these developments in basic science could not have been accomplished. Our future depends on donor support in order to continue to expand the role of LRA as a leader in the private sector.”

– Dr. Harriet Kotsoris
Chief Scientific Officer, Lyme Research Alliance

More information on individual studies is available through our Stamford, CT office.

New Advances Toward Conquering Lyme Disease



LRA-Supported Research By Category

	PREVENTION	DIAGNOSIS	EPIDEMIOLOGY	TREATMENT
Current	Analysis of blood meals THACH, <i>Washington University</i>	ID of unique proteins in post-treatment Lyme SCHUTZER, <i>University of Medicine & Dentistry NJ</i>	L-forms in chronic Lyme ZHANG, <i>Johns Hopkins</i>	Treatment based on self-peptide NEWELL-ROGERS, <i>Texas A&M</i>
	Prevalence of polymicrobial infection TOKARZ, <i>Columbia</i>	Assessing Reasons for False Negative Test Results LUFT, <i>SUNY Stony Brook</i>	Biofilm mechanisms that evade antibiotics SAPI, <i>Univ. of New Haven</i>	
2010		C6 Assay to ID Lyme disease FALLON, <i>Columbia</i>	Role of auto-immune system in persistent Lyme ALAEDINI, <i>Weill Cornell</i>	
2009			Efflux pumps as defense against antibiotics LUFT, <i>SUNY Stony Brook</i>	
2008			Variations in response to infection AUCOTT, <i>Johns Hopkins</i>	



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OUR MISSION

Lyme Research Alliance (formerly known as Time for Lyme) is the leading funding organization for cutting-edge research into the prevention, diagnosis and treatment of Lyme and other tick-borne diseases by universities and major medical institutions around the country.

OUR HISTORY

Since our founding in 1998 as the Greenwich Lyme Disease Task Force, Lyme Research Alliance (LRA) has raised over \$5 million to combat Lyme and other tick-borne diseases. In 2007, LRA (then Time for Lyme) created a partnership with Columbia University Medical Center in New York City and the Lyme Disease Association to endow the nation's first Lyme and Tick-Borne Disease Research Center at Columbia. In addition to supporting work at the Columbia Center, LRA funds breakthrough research teams at academic institutions across the country.

OUR IMPACT

Unparalleled strides made possible through LRA support

LRA has funded unprecedented opportunities to make progress against this often debilitating disease. Evidence has confirmed the potential for persistent infection with the Lyme spirochete, as well as the complicating role played by Babesia, Anaplasma, Ehrlichia, and Bartonella.

Recently funded discoveries include identification of the role cell wall deficient forms, or L-forms, play in chronic bacterial infection — including Lyme disease — and in Borrelia species. We awarded a grant to explore how and why Borrelia behaves in this way and to support development of new antimicrobial agents.



ADVANCES

1 The First-Ever Drug Candidate for Chronic Lyme Disease

The first-ever promising drug candidate to be proposed for study in the treatment of chronic Lyme disease was developed as a result of our funding. In March, 2012, a team led by Dr. Karen Newell-Rogers of Texas A&M University filed a pre-IND briefing document with the FDA, a preparatory step for approval of Stage 1 clinical trials of “VGV-L,” a new drug to target chronic

Lyme Research Alliance has been a leader in the campaign for knowledge about tick-borne illness.

— U.S. Senator
Richard Blumenthal (D-CT)

Lyme disease. This breakthrough derives from earlier work by Dr. Newell-Rogers funded by Lyme Research Alliance, that identified the protein CLIP which impedes white blood cells from controlling the production of antibodies.

“The idea behind our research is that those with a genetic blueprint that does not allow certain self-peptides to be processed or removed tend to mount a chronic inflammatory immune response that is not properly controlled,” said Dr. Newell-Rogers.

As the potential new drug transitions from the laboratory to the bedside, Viral Genetics of San Marino, CA will partner with Dr. Newell-Rogers to conduct the clinical trials phase and if successful, take the new drug into the marketplace.

2 New Proof of the Existence of Post-Treatment Lyme Disease

In spring 2011, Steven Schutzer, MD, a physician-scientist and Professor of Medicine at the University of Medicine and Dentistry of New Jersey, published findings

that, for the first time, identified post-treatment Lyme disease in the laboratory based on unique proteins found in spinal fluid. These findings made the “100 Top Stories of 2011” list in the

January, 2012 issue of Discover magazine. Lyme Research Alliance continues to fund Dr. Schutzer’s work—which is pivotal to understanding the mechanisms associated with post-treatment Lyme disease.

3 Penetrating the Biofilm Protective Shields Formed by Lyme Borrelia

With help from LRA, Dr. Eva Sapi of the University of New Haven is completing the final steps of a project that could lead to significant improvements in the diagnosis and treatment of post-treatment Lyme disease. Previous research by Dr. Sapi and UNH’s Lyme Disease Research Group has already shown that the Borrelia burgdorferi bacterium is capable of resisting antibiotic treatment by “hiding” in a self-made protective layer called biofilm. According to a report previously released by Sapi and the UNH researchers:

“While conventional antibiotic therapy is usually effective against free-floating bacteria, it is frequently ineffective once pathogens have formed biofilms, because biofilm colonies can be up to 1,000 times more resistant to antibiotics.”

Dr. Sapi’s latest project aims to develop the capability to prevent and destroy biofilm formation. Without the protection of the biofilm, the hope is that diagnostic tests and antibiotic treatments for Lyme disease can be made more effective.

LRA’s focus on research has led to major advances on the Lyme front.

— U.S. Representative
Chris Smith (R-NJ)

4 Epidemiology

Supported by a grant towards his post-doctorate study, Rafal Tokarz at Columbia Center for Lyme and Tick-borne Diseases performed a PCR analysis of 286 adult ticks from two counties in New York State. He determined the prevalence of polymicrobial infection by Borrelia, Anaplasma, Ehrlichia, Babesia, and Powassan virus as follows: 71% of the ticks harbored at least one organism; 30% had a polymicrobial infection. Infections with three microbes were detected in 5% of the ticks. One tick was infected with four organisms.

5 Understanding of the Auto-Immune Response in Post-Treatment Lyme

Dr. Armin Alaedini, when at Weill Cornell Medical Center, analyzed serum samples of Lyme patients whose symptoms persisted after antibiotic treatment. Dr. Alaedini’s team demonstrated that patients with persistent symptoms had elevated levels of anti-neural antibodies compared to those whose symptoms were resolved. His findings, published in a March 2010 issue of Brain, Behavior, and Immunity demonstrated that a persistent infection could possibly trigger an ongoing, abnormally activated immune

