NIH awards $3.5 Million for Novel Lyme Disease Vaccine Study

With a new $3.5 million grant from the National Institutes of Health (NIH), Utpal Pal, PhD, professor in Veterinary Medicine at the University of Maryland (UMD) will be partnering with Matthias Schnell, director of the Jefferson Vaccine Center at Thomas Jefferson University to develop a novel “next-generation” Lyme disease vaccine.

Pal, a tick immunobiologist, and Schnell, whose lab studies rabies virus as a platform for vaccination, will adapt the rabies virus platform to fight Lyme disease. The inactivated rabies virus, which helps the body produce antibodies to fight rabies, will be repurposed to produce other types of proteins that can fight Borrelia burgdorferi, the Lyme disease bacteria, a technique found effective for other viral vaccinations.

This study will test the four already identified vaccine candidate proteins, as well as the three major types of rabies vaccine platforms– using live attenuated virus, inactivated virus, and the shell of a virus with viral proteins on the outside but no virus inside to trick the body. Pal is also studying both Borrelia proteins and the tick proteins that keep the Borrelia alive so it can be transmitted to humans.

Read more about this project here – (prweb.com)

Utpal Pal, PhD lectured at LDA’s 2018 Annual Scientific Conference – Immune Evasion of Lyme Disease Agents
Study Reveals Some Tick-Borne Pathogens Found in Fleas

In a recent study conducted in central Pennsylvania, evidence of emerging pathogens, some also common to ticks, have been found in fleas. Various pathogens can be spread by ectoparasites among animal host populations in nature. Along with ticks, fleas are found to commonly infest small mammals. The role of pathogen transmission cycles for these vectors is unknown.

In this study, small mammals were captured and fleas were collected in an effort to better understand the enzootic cycle of flea-borne pathogens in central Pennsylvania. Pathogen testing was conducted in both the small mammal hosts and the fleas collected.
Seven species of small mammals were captured of which white-footed mice (Peromyscus leucopus) and southern red-backed voles (Myodes gapperi) accounted for over 94% of the captures. Only P. leucopus tested positive for the blood-borne pathogens examined, with 47 (18.1%) positive for Anaplasma phagocytophilum and ten (4.8%) positive for Babesia microti.

Of the 61 fleas collected from small mammals and tested for pathogens, Orchopeas leucopus was the most common flea species. Pathogenic bacteria and parasites were detected in 33.3% of total fleas collected, and included Bartonella vinsonii subspecies arupensis, B. microti, and a Rickettsia felis-like bacterium. Researchers believe this to be the first report of B. microti DNA detected from a flea, as well as the first report of a R. felis-like bacterium from rodent fleas in eastern North America.

At this time, only plague (Yersinia pestis) is a nationally reportable flea-borne disease in the United States. Like tick-borne diseases, under-reporting of flea-borne illnesses limits understanding of the burden of disease from these vectors. The potential for new and re-emerging pathogens in fleas as well as the potential for fleas to play a role in natural transmission cycles of tick-borne pathogens is not understood. This study elucidates that further investigation is needed to understand the ecology of flea-borne disease transmission cycles, vector competence of fleas for tick-borne pathogens, and the risk to human health.

Read full article: Host distribution and pathogen infection of fleas (Siphonaptera) recovered from small mammals in Pennsylvania
Severe Fever with Thrombocytopenia Syndrome (SFTS) cases first appeared in April 2020 in China and since then, 37 more cases have occurred in Jiangsu and 23 in Anhui Provinces in China. SFTS is a haemorrhagic fever transmitted by the Haemaphysalis longicornis tick (Asian longhorned tick). The disease spreads rapidly and has a high fatality rate so is of high concern to the World Health Organization (WHO). SFTS is a Phlebovirus.

Experts are now indicating possible transmission from humans via blood, the respiratory tract, and wounds and from infected animals to humans.
According to CDC, Emerging Infectious Diseases, outbreaks have been reported in China in 2009 and in S. Korea in 2012. See https://wwwnc.cdc.gov/eid/article/24/11/17-0756_article

Another Phlebovirus, Heartland virus, is found in the US. It is apparently transmitted by the lone star tick and is most similar to the SFTS virus. The Asian longhorned tick, which is transmitting SFTS virus in Asia, is found in the US in 12 states.

**Novel bunyavirus re-emerges in China** – News.com.au

**Tick-borne bunyavirus causing fever, hemorrhages spreading in China: Everything we know so far** – Firstpost.com

**Asian Longhorned Tick Continues to Multiply, Can transmit to Animals in the Lab** – LDA website

**Heartland virus disease** – CDC website

---

**Asian Longhorned Tick Continues to Multiply, Can transmit to Animals in the Lab**
These pictures of the *Haemaphysalis longicornis* (Asian longhorned) were taken recently by LDA’s Scientific & Professional Advisory Board member James L. Occi, Rutgers, in Bergen County NJ. The invasive tick was first discovered on a NJ farm on a sheep in 2017. The tick probably came from Asia, where it is able to transmit diseases to cattle, other animals, and to humans and is now found in 12 states. One of the greatest concerns is about its parthenogenetic ability, the female reproduces without the male. This enables the tick to quickly become an established species in an area. It has already killed cattle in a couple states where more than a thousand ticks were found on each of the deceased animals.

To date, the Asian longhorned tick has been found in the laboratory to be able to acquire and transmit *Rickettsia rickettsii*, the agent of Rocky Mountain spotted fever (RMSF) and was also found to be able to transmit *R. rickettsii* through the ova (Stanley et al, 2020).* The Asian longhorned tick has not been found to transmit to humans outside the lab at this time in North America.

However, we need to be cautious, since until several years
ago, the government indicated that brown dog ticks only fed upon dogs, not people. Therefore humans did not have to worry about getting RMSF from a brown dog tick. Now we know that human transmission is happening from the brown dog tick, since we know they are biting humans, especially in the Southwest.

*https://academic.oup.com/jme/article/doi/10.1093/jme/tjaa076/5822589*


---

**About Lyme Disease Symptoms**

**Lyme Disease Symptoms & Signs**

Lyme disease symptoms can affect any system in the body and can mimic symptoms of many different diseases.
Lyme Disease Symptoms Compiled by the LDA

As listed in the **LDA LymeR Primer Available for online ordering**

As listed in the **LDA Spanish LymeR Primer Available for Downloading**

Click dropdown arrows for symptoms

Lyme Disease Symptoms Compiled by the LDA

As listed in the **LDA LymeR Primer Available for online ordering**

As listed in the **LDA Spanish LymeR Primer Available for Downloading**

Click dropdown arrows for symptoms
Internal anatomy of the heart

- Superior vena cava
- Right pulmonary artery
- Right pulmonary veins
- Right atrium
- Right AV valve
- Inferior vena cava
- Pulmonary valve
- Right ventricle
- Aorta
- Aortic valve
- Left pulmonary artery
- Left pulmonary veins
- Left atrium
- Left AV valve
- Left ventricle
Cardiac/Pulmonary

- Click for Symptoms
  
  chest pain or rib soreness, shortness of breath, heart palpitations, pulse skips, heart block, heart murmur

Lyme Rash
Only about 9% get the classic bull’s eye rash. Others may get another type of Erythema Migrans (EM) rash or may get no rash at all. Rash at other than bite site may be disseminated disease. Symptoms may occur days or months after a tick bite.

According to the Centers for Disease Control & Prevention (CDC) surveillance criteria, an erythema migrans (EM) rash in an endemic area, means Lyme disease. In a non-endemic area, a rash requires a positive test. The CDC criteria are for surveillance purposes, not diagnosis.
Gastrointestinal

- Click for Symptoms

nausea or vomiting, GERD, change in bowel function (constipation, diarrhea), gastritis, abdominal cramping, cystitis, irritable bladder or bladder dysfunction, newly diagnosed irritable bowel syndrome (IBS)
Musculoskeletal

- Click for Symptoms

  joint/muscle pain in feet, ankle pain, shin splints, joint pain or swelling, stiffness of the joints, neck or back, muscle pain or cramps that migrate, Temporomandibular joint dysfunction (TMJ/TMJD jaw pain), neck creaks & cracks, neck stiffness.
Neurological

- Click for Symptoms

  muscle twitching, headache, tingling, numbness, burning or stabbing sensations, facial paralysis (Bell’s palsy), dizziness, poor balance, increased motion sickness, light-headedness, wooziness, difficulty walking, tremor, confusion, difficulty thinking/concentrating/reading, forgetfulness, poor short-term memory, disorientation (getting lost, going to wrong place), difficulty with
speech, double or blurry vision, eye pain, blindness, increased floaters, increased sensitivity to light or sound, buzzing or ringing in ears, ear pain, decreased hearing, seizure activity, white matter lesions, low blood pressure.

Neuropsychiatric

- Click for Symptoms
  mood swings, violent outbursts, irritability,
depression, disturbed sleep (too much, too little, early awakening), personality changes, obsessive – compulsive disorder (OCD), paranoia, panic/anxiety attacks, hallucinations.

Reproductive

- Click for Symptoms

testicular pain/pelvic pain, menstrual irregularity, milk production (lactation), sexual dysfunction or loss
Other Symptoms

- Click for Symptoms

fever, sweats, or chills, weight change (loss or gain), fatigue, tiredness, hair loss, swollen glands, sore throat, difficulty swallowing, swelling around the eyes, burning in feet, swelling
Lyme Transmission

- Click for Info

Not all patients recall a tick bite. Studies vary as to how long the tick must be attached in order to transmit Lyme disease. The longer an infected tick is attached, the greater the chance of contracting Lyme disease. Lyme can be transmitted through the placenta.
Lyme from *Borrelia mayonii*

Another strain of *Borrelia* that causes Lyme

Early symptoms: fever, headaches, rash, neck pain Later: arthritis. Difference from *Borrelia burgdorferi* may include nausea & vomiting, diffuse rashes, higher concentration of bacteria in blood

_Symptoms reviewed by Elizabeth Maloney, MD; President, Partnership for Tick-Borne Diseases Education_
Other Tick-Borne Diseases & Conditions:

Patients may also contract other tick-borne diseases (co-infections) from a tick bite along with Lyme disease.

Visit LDA website Other Tick-Borne Diseases page

Other Resources for Lyme Disease Symptoms:

Columbia Lyme Rash Poster

Dr. Joseph Burrascano’s 2005 Lyme Disease Symptom List Chart

“En Espanol Enfermedad De Lyme” Spanish Patient Intake, Printable PDF

LDA Cardiac (Heart) Poster

LDA Lyme Disease Medical Photos Including Rashes

LDA LymeLiteracy LDA President’s Blog

LDA “LymeR Primer” Detailed LDA Printable Brochure

En Española – “LymeR Primer” Folleto de Sensibilización

ILADS Treatment Guidelines International Lyme & Associated Diseases Society

Columbia Lyme & Tick-Borne Diseases Research Center – Treatment Page Columbia University, Irving Medical Center

© LDA. 2015, 2016, 2020. This website provides practical and useful information on the subject matters covered. It is distributed with the understanding that LDA is not engaged in rendering medical or other professional services. Seek professional services if necessary.
Clinical practice treatment guidelines are often used as reference by physicians for Lyme disease treatment and treatment of other tick-borne diseases. The LDA provides some links here for informational purposes only, as LDA does not make specific treatment recommendations.

The only Lyme disease treatment guidelines that were
posted on the National Guidelines Clearinghouse (NGC), under the auspices of the US Department of Health & Human Services, are those adhering to newly revised National Academy of Medicine (NAM), formerly the Institute of Medicine (IOM), standards for guidelines: the International Lyme & Associated Diseases Society (ILADS) Lyme Guidelines, which address usefulness of antibiotic prophylaxis for tick bite, effectiveness of EM treatment, and antibiotics’ role in treatment of persistent Lyme disease symptoms. **Note: Funding to support AHRQ’s NGC contract ended on July 16, 2018. View update [here](#).**

You can also checkout our [handy infographic for treatment guidelines](#).

**ILADS Guidelines for the Management of Lyme Disease**

**ILADS press release on the new guidelines**

You can also review [Chronic Lyme Disease: An Evidence-Based Definition by the ILADS Working Group](#).

Other Lyme treatment guidelines of note are those developed by one of the most recognized pioneers in Lyme treatment, Dr. Joseph Burrascano, now retired as a treating physician.

Link: [Burrascano Diagnostic Hints & Guidelines*](#) (16th edition, 10/2008)

Primary care physicians and other healthcare providers seeking continuing medical education (CME) credits for Lyme disease diagnosis and treatment can now approach the non-profit Partnership for Tick-Borne Diseases Education (PTDE) led by Elizabeth Maloney, MD, a physician with longstanding experience in speaking about tick-borne diseases, organizing Lyme disease conferences, and co-authoring treatment guidelines on Lyme and other tick-borne diseases.

[Partnership for Tick-Borne Diseases Education, CME for Doctors](#)
How CDC Surveillance Criteria Impact Lyme Treatment

The Centers for Disease Control & Prevention (CDC) has a case definition for Lyme disease which is developed by the Council of State & Territorial Epidemiologists (CSTE). This definition is meant to be used for surveillance purposes only, not for diagnosis. Surveillance is the collection, analysis and interpretation of data for public health, e.g., comparing case numbers in different states: In 2015, PA is number one in Lyme case numbers, NJ is number two, etc. Below, is the current case definition used for surveillance.

Depending upon what state you live in, surveillance reporting of cases might be mandatory. Some states require doctors to report cases that meet this surveillance criteria to the State, and some also require laboratories to report these Lyme cases or maybe only labs who do electronic reporting.

Doctors are not supposed to use the surveillance criteria to diagnose so Lyme treatment should not be based on surveillance criteria. Insurance companies should not base their payment on surveillance criteria.

Click here: Lyme Disease | 2017 Case Definition

DISCLAIMER: The LDA is not a medical organization. The LDA does not make specific recommendations for treatment. Whenever medical advice is needed, the services of a qualified medical provider should be sought. The guidelines on the web sites above are the products of the guidelines’ authors who are solely responsible for their content.
GAO Investigation of Ticks/Vector-Borne Agents’ Biowarfare Experiments Passes House

Kris Newby, Stanford University Science Writer, “Bitten”

Update July 29, 2020: The Bill and passed amendments such as this one (below) has now moved to the conference committee where the House and Senate will work to decide what language goes into the final product. The LDA provided input into the amendment language and has been working to get Senators to champion the inclusion of this GAO Investigation Amendment into the final bill.

Said LDA president Pat Smith: “We thank Congressmen Smith & Peterson for championing this investigation. Lyme and tick-borne diseases (TBD) patients and the public are entitled to know the truth about what past government research may reveal not only about the documented tick releases along the Atlantic bird flyway but also about research on the mysterious ‘Swiss
agent’ which Dr. Willy Burgdorfer identified as a new Rickettsia strain in his work for the US Government at Rocky Mountain Labs and in Switzerland. Perhaps it may uncover clues to help stop this epidemic of tick-borne diseases.”

Rep. Smith (NJ-04) NDAA FY 2021 Lyme Disease Amendment Floor Speech
Jul 21, 2020


There is information in various publications that such activities did occur, especially in the book “Bitten” by Kris Newby – a science writer at Stanford University - a book, which
explores the evidence through actual government documents and interviews with some researchers who were involved that document such experiments.

Said LDA president Pat Smith: “Lyme and tick-borne diseases (TBD) patients and the public are entitled to know the truth about what past government research may reveal not only about the documented tick releases along the Atlantic bird flyway but also about research on the mysterious ‘Swiss agent’ which Dr. Willy Burgdorfer identified as a new Rickettsia strain in his work for the US Government– at Rocky Mountain Labs and in Switzerland. The book indicates there is speculation that this pathogen, if crossed with Borrelia, might well complicate treatment and thus be a candidate for biowarfare.” She added, “There is the possibility that any uncovered information could lead to facts which could shed light on the current epidemic of Lyme and other TBD and help develop solutions. We thank Congressmen Smith and Peterson for their continued push to make the truth known and the US House of Representatives for their vote to approve the amendment.”

Some things author Newby revealed for the first time were: that ticks were developed and deployed as stealth biological weapons during the Cold War, and that Willy Burgdorfer, the scientist the Lyme bacteria, Borrelia burgdorferi, was named after, was at the center of this program. According to Newby, specific revelations she makes in book include:

- A 1962 pilot study where infected ticks were dropped on Cuba sugar workers.
- Releases of hundreds of thousands of radioactive, aggressive Lone Star ticks on the Atlantic coastal bird flyway.
- Omissions of other microbes transmitted with Lyme-carrying ticks during the original outbreak (‘Swiss Agent’).
- Documentation of military studies where live disease-causing bacteria, some which can be spread by ticks,
were sprayed from planes, boats and vehicles on the unsuspecting American public.

In 2019, a similar amendment was introduced and passed the House unanimously but there was no senate support for it.

The Lyme Disease Association (LDA) has been encouraging Lyme advocates across the country to contact both of their US Senators to champion and support this amendment. It is being heard in the Senate this week. LDA thanks those leaders who have made calls and sent emails to garner support.

More Information

New Jersey Globe: House passes Chris Smith measure to probe if government turned ticks into bioweapons

Chris Smith website: Chris Smith’s Lyme Disease Amendment Passes House, Tells DOD IG to Investigate the ‘Bioweaponization’ of Ticks

NJ101.5.com: NJ Rep. Chris Smith — did our government release diseased ticks?

MoreMonmouthMusings.net: House passes Smith’s Amendment which could lead to a Lyme disease cure

Here is a very similar Smith amendment that passed the House unanimously in 2019 but did not make it through the Senate.

https://lymediseaseassociation.org/government/urgent-help-needed-for-biowarfare-investigation/

Kris Newby’s Bitten: LDA book review

All about Kris Newby, the book and access some of the documents used in book.
Valneva announced that the vaccine candidate against Lyme disease, VLA15-201, showed positive initial results meeting its endpoints in the Phase 2 study. They stated in the July 22, 2020 press release that “compared to Phase 1, the higher doses used in this trial elicited higher antibody responses across all serotypes.” Of particular note was the the immunological response found in older adults (50-65 years), one of the main target groups for a Lyme vaccine. The vaccine candidate is described as “generally safe across all dose and age groups tested”, finding no Serious Adverse Events (SAEs) associated with VLA15. This is an important finding given the history of vaccines and serious concerns that have been generated regarding patient safety and vaccines in the Lyme community.

VLA15 is the only active Lyme disease vaccine candidate in clinical development today, covering six serotypes of Lyme disease prevalent in North America and Europe. It was granted Fast Track designation by the U.S. Food and Drug Administration (FDA) in July 2017. In a few months, Valneva expects to report top-line results for the second Phase 2 study, VLA15-202. Valneva and Pfizer are collaborating for development and commercialization of VLA15.

Read full July 22, 2020 press release here
Rickettsia Found in New Jersey Ticks

The picture in New Jersey of spotted fever group rickettsiosisis (SFGR), which includes Rocky Mountain Spotted fever (RMSF), is complex. In this latest study from the *Am. Journal of Tropical Medicine and Hygiene* (James Occi, Rutgers University, et al, ), the researchers tested American dog ticks and lone star ticks in NJ to determine which *Rickettsia* are found in these two NJ ticks. They did not find the *Rickettsia* for RMSF in either of those ticks; however, they did find other *Rickettsia* in those ticks.


James Occi is a member of the Lyme Disease Association’s Scientific and Professional Advisory Board. Thanks to him for below picture of Dermacentor variabilis, American dog ticks: female, male, and engorged female laying eggs.
Elizabeth L. Maloney, MD Publishes on Reducing the Burden of Lyme Disease
Elizabeth L. Maloney, MD, President of the Partnership for Tick-Borne Diseases Education and Family Medicine Physician in Wyoming, MN published a paper titled “Reducing the Burden of Lyme Disease” in *Minnesota Family Physician*. It includes discussion of tick bite management, early treatment, and shared decision-making.

In the article, Dr. Maloney highlights the expensive cost of Lyme disease, stating that, “Nationwide, the annual direct medical costs could reach 1.3 billion dollars” and calls attention to the disadvantages in research the illness has suffered, as well as clinical trial evidence that is “generally scant and/or of low quality”.

The author advises that, “Blacklegged tick bites acquired in Minnesota carry a significant risk of Lyme disease,” and offers guidance for making decisions regarding antibiotic prophylaxis of asymptomatic bites.
Maloney stresses the importance of early treatment and writes, “Early Lyme disease, when promptly diagnosed and appropriately treated with antibiotics, is curable.” Above all, she states, “the risks and benefits of all options should be discussed with patients in the setting of shared decision-making in order to arrive at a therapeutic plan that fits both the clinical circumstances and the patient’s goals and values.”

Read Elizabeth L. Maloney, MD’s article in Minnesota Family Physician.

This article posted with permission from Minnesota Family Physician.