Liegner, Kenneth

Kenneth B. Liegner, MD
Internal & Critical Care Medicine, Private Practice
Pawling, NY

Sunday Morning Facilitator

Dr. Kenneth Liegner is a Board Certified Internist with additional training in Pathology and Critical Care Medicine, practicing in Pawling, New York. He has been actively involved in diagnosis and treatment of Lyme disease and related disorders since 1988. He has published articles on Lyme disease in peer-reviewed scientific journals and has presented poster abstracts and talks at national and international conferences on Lyme disease and other tick-borne diseases. He is the author of In the Crucible of Chronic Lyme Disease, a documentational history of the struggle to characterize the nature of Lyme disease in the late 20th and early 21st centuries. He has cared for many persons seriously ill with chronic and neurologic Lyme disease. His work has focused on the serious morbidity and (occasional) mortality that can eventuate from this aspect of the illness. He has emphasized the urgent need for widespread clinical availability of improved methods of diagnostic testing and for development of improved methods of treatment for Lyme disease in all its stages. He holds the first United States patent issued proposing application of acaricide to deer for area-wide control of deer-tick populations as a means of reducing the incidence of Lyme disease.

Aucott, John
“Measuring the Human Immune Response in Lyme Disease”

Dr. Aucott is an Assistant Professor of Medicine in the Division of Rheumatology at Johns Hopkins University Medical School and the Director of the Johns Hopkins Lyme Disease Research Center. He is principal investigator for the SLICE studies of acute Lyme disease and Post-treatment Lyme disease Syndrome. His research interests center on the pathophysiology, diagnosis and treatment of persistent illness after initial antibiotic treatment of Lyme disease and has resulted in over 20 peer reviewed publications. Dr. Aucott is an internationally recognized authority on Lyme disease and has served on panels sponsored by National Academy of Medicine (NAM), formerly the Institute of Medicine (IOM), the Canadian Institutes of Health Research, and the American Academy for the Advancement of Science.

Conference Lecture Summary

The host immune response plays a critical role in determining the outcome of infectious diseases. In addition, ongoing host immune and inflammatory responses can perpetuate symptoms that persist and drive illness. Studies of the human immune response in Lyme disease are showing the complexity of the interaction between Borrelia burgdorferi and the innate and adaptive immune responses. Data will be presented to show the unique immune responses among patients with early Lyme disease before and after treatment.
Dr. Clark grew up in Louisville, KY, and obtained a bachelor’s degree in public health from Western Kentucky University. He then earned a Masters in Public Health Epidemiology from the University of Alabama at Birmingham, and a Ph.D. in Environmental Health Sciences from the University of South Carolina. His doctoral research included the first ecologic study of Lyme Borrelia spirochetes in that state. For the past 20 years, he has been studying Lyme and other tick-borne diseases in the southern United States. In addition to his research, he teaches graduate and undergraduate courses in epidemiology and environmental health in the Department of Public Health at UNF.

Lyme Disease Research
Dr. Clark’s research is focused on the ecology and epidemiology of Lyme disease and other tick-borne diseases in the southern U.S. He was the first to report finding Lyme disease spirochetes in animals and ticks in South Carolina, and in wild lizards in South Carolina and Florida. He has documented the presence of Lyme disease Borrelia species, Babesia microti, Anaplasma phagocytophilum, Rickettsia species, and other tick-borne pathogens in wild animals, ticks, dogs, and humans in Florida and several other southern states.

The primary objectives of Dr. Clark’s research are:
1. To develop better molecular/DNA based tests for identifying the causative agents of Lyme and associated tick-borne diseases to improve sensitivity and specificity of
detection in both human patients and companion animals;
2. To use improved testing methods to determine the actual frequency of Lyme disease and common coinfections in humans and companion animals, the prevalence of infection in ticks, and the true tick vector species of these diseases to humans and our pets; and
3. To improve awareness and early recognition of tick-borne diseases through dissemination of the research findings and comprehensive education efforts.

Conference Lecture Summary

Lyme disease continues to be a controversial subject in the southern United States. Based solely on 2-tiered serological laboratory confirmation test results, the disease continues to appear to be relatively rare in this region compared to highly endemic areas of the Northeast and Upper Midwest. However, some more recently obtained evidence challenges this belief. *Borrelia burgdorferi* sensu lato (Bbsl) DNA has been detected in scores of human patients and dogs from southern states, many of which have no travel history to other regions. Bbsl has also been isolated in culture from several human patients from Florida and Georgia, most of which have not been described in the scientific literature. DNA evidence of Bbsl continues to be detected in lone star ticks (*Amblyomma americanum*), which may serve as a bridge vector of transmission to humans under certain circumstances. This report summarizes some of the published and unpublished evidence of Lyme *Borrelia* infection in humans, dogs, and ticks from several southern states, attempts to help explain the disparity between surveillance case numbers and observed Lyme-like illness in the southern U.S., and provides insights into better understanding the ecology and epidemiology of Lyme disease in the South.
Lepore, Timothy

Timothy Lepore, MD, FACS
General Surgery, Family Practice Physician
Surgeon, Nantucket Cottage Hospital
Nantucket, MA

“Tularemia”

Dr. Lepore is a graduate of Harvard College and Tufts Medical School. He did a surgical residency at New England Medical Center. He practiced initially at Roger Williams Hospital in Providence, RI. When an opportunity to move to Nantucket opened up he moved with his wife and family and started working at Nantucket Cottage Hospital on January 1, 1983.

He is a solo private practitioner. He had the good fortune to meet Andy Spielman, Sam Telford, Gustave Dammin and Peter Krause all tick borne disease researchers. Recognizing that he was in a hot bed of tick borne diseases he got involved in the research of these issues.

Conference Lecture Summary

Tularemia is a tick borne pathogen traditionally associated with rabbit hunting. Tularemia in Massachusetts has a very definite history, only appearing after 1935 with the introduction of Midwestern rabbits. The islands of Nantucket and Marthas Vineyard have a very different history with Tularemia involving a pneumonic presentation. The discussion will be about the ecology of this atypical presentation.
Dr. Ying Zhang is a Professor at Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health, Baltimore, USA. His research interests are in bacterial persistence, antibiotic resistance, and pathogenesis, and translation of research findings into improved disease control. Although most of his productive research career is on understanding mechanisms of antibiotic resistance and persistence in M. tuberculosis, more recently, he has been working on the problem of persistent Lyme disease.

His group recently identified a range of FDA-approved drugs and drug combinations that have excellent activity against Borrelia burgdorferi persisters. These findings have generated considerable interest and opened up new opportunities for more effective treatment of persistent Lyme disease. In collaboration with colleagues, his group is interested to evaluate the promising drug candidates with high activity against Borrelia persisters and drug combinations in animal models and also in patients for more effective treatment of persistent Lyme disease.

http://www.jhsph.edu/faculty/directory/profile/786/ying-zhang

Conference Lecture Summary

In this presentation, I will discuss the problem of post-treatment Lyme disease syndrome (PTLDS) and its possible causes, the phenomenon of Borrelia persistence despite antibiotic treatment in animal models, the demonstration of Borrelia persister bacteria that are tolerant to current Lyme antibiotics in vitro. I will
then discuss our recent work on identification of FDA-approved drugs that are more active than the current Lyme antibiotics against Borrelia burgdorferi persisters. In addition, I will discuss various drug combinations and their effectiveness to eradicate more resistant Borrelia persisters including round bodies and biofilm-like microcolonies in in vitro systems. The implications of these findings for more effective treatment of persistent Lyme disease will be discussed.

Zatechka, Steve

Steve Zatechka, PhD, MBA
Chief Operating Officer
US BIOLOGIC, Memphis, TN

“A One-Health Path to Prevent Lyme and Other Tick-Borne Diseases”

Steve earned his PhD from the University of Nebraska Medical Center and his MBA from the University of Memphis. He completed his postdoctoral fellowship with the Howard Hughes Medical Institute at St. Jude Children’s Research Hospital. Steve’s research and training focused on the development and utilization of gene targeting technologies for engineering animal models and the development of applied biotechnology-based protocols.

He now directs the research and development of the US BIOLOGIC production platform technology and is the company’s primary investigator for its SBIR-funded programs. He holds several patents in these areas and others across a spectrum of biotechnology foci. Steve publishes and speaks widely on zoonotic diseases and the positive impacts orally delivered vaccines can have on global health.

Conference Lecture Summary
“A One-Health Path to Prevent Zoonotic Disease” – With 75% of all emerging infectious diseases being zoonotic in nature, the need of safe, effective, and cost-efficient prevention methods becomes a necessary endeavor. Recognizing the complexities of addressing a range of species (human, animal, insect), diseases, and ecologies, a One Health approach is best suited to cause an effective change. This talk will focus on one example of a One Health program – effective oral delivery of vaccines and therapeutics to wildlife and food animals. Data will be presented from successful approaches, focusing on a successful orally delivered vaccine targeting the wildlife disease reservoir for Lyme disease, the white-footed mouse.

Tokarz, Rafal

Rafal Tokarz, PhD
Associate Research Scientist
Center for Infection & Immunity
Columbia University Mailman School of Public Health, New York, NY

“Virome Analysis in Ticks”

Dr. Tokarz’s research focuses on microbial discovery and the epidemiology of human infectious diseases. His primary interests center on investigating respiratory and tick-borne pathogens and understanding their roles in human disease.

Dr. Tokarz’s work in the field of tick-borne disease has been driven by two main hypotheses: 1) co-infections in human-biting ticks are common and can result in human poly-microbial infections; and 2) viral infections represent a proportion of undiagnosed tick-transmitted diseases. He designed and implemented one of the first multiplex PCR assays that targeted tick-borne agents and was one of the first scientists to document high rates of pathogen co-infections in ticks within New York State. His recent work has focused on exploring the diversity of the tick virome. He performed the first investigation of the virome of the three main human-biting ticks
in New York State and thus far has discovered over 20 novel tick-associated viruses. He is now examining the potential for transmissibility and pathogenesis of these viruses.

In an effort to understand the etiology of respiratory diseases, Dr. Tokarz has participated in pathogen surveillance studies on specimens originating from Asia, Africa, Europe, South and North America. As part of this work, he used cutting edge molecular platforms to identify and characterize novel viral agents. Dr. Tokarz identified and characterized the first defined cluster of one such virus, enterovirus D68, an emerging agent implicated in a severe outbreak of pediatric respiratory disease in the US in 2014. He performed the first comprehensive phylogenetic characterization of this virus, identified the three main clades circulating worldwide and developed a classification system now employed by investigators in this field. In his current work, Dr. Tokarz is examining the pathogenesis of this virus and how its genetic variation influences the severity of disease.

Conference Lecture Summary

Tick-borne diseases are the most common vector-borne illnesses in the United States. In a proportion of presumed tick bite-associated infections, the etiologic agent is never identified, and the full range of tick-borne pathogens has not yet been explored. In contrast to bacterial pathogens, there is a limited understanding of the diversity of tick-borne viruses and their role in human infection. We are performing a virome analysis of the three main human-biting ticks endemic to the New York metropolitan area, with the goal of uncovering novel viral agents and determining their geographic distribution and prevalence. For novel viruses with homology to known pathogens, we will design serological assays to examine sera from subjects with history of tick bites for evidence of spillover of these viruses into the human population.
Smith, Patricia

Patricia V. Smith, BA
President, Lyme Disease Association, Inc.
Advisory Board Member, Columbia University Lyme & Tick-Borne Diseases Research Center
Programmatic Panel Member, TBD Research Program, DoD Congressionally Directed Medical Research Program
Conference Organizer/Program Committee, Jackson, NJ

“Welcome/Overview of Lyme/Introductions”

Patricia V. Smith, a Monmouth University graduate, is in her 20th year as President of the all-volunteer run national non-profit Lyme Disease Association, Inc., LDA, and is a member of Columbia University’s Lyme & Tick-Borne Diseases Research Center Advisory Committee and has been appointed to the Fiscal Year 2016 (FY16) Programmatic Panel for the Tick-Borne Disease Research Program (TBDRP), a new program in the Department of Defense’s (DoD) Office of Congressionally Directed Medical Research Programs (CDMRP)—a typical 3-year term-of-service. She is a member of the Food & Drug Administration’s (FDA) PESP Partnership to promote avoidance of tick exposure, and member of the Tick IPM Working Group with federal and non-federal members, from the IPM Institute of North America, to eradicate tick-borne diseases.

Ms. Smith is also former Chair, (NJ) Governor’s Lyme Disease Advisory Council. She was EPA’s PESP 2011 Lyme prevention conference session co-chair with CDC. In 2011 she presented a Lyme session to the New Jersey Education Association’s Annual Meeting. She is a member & former officer of ILADS, International Lyme & Associated Diseases Society, a professional medical and research organization.

Ms. Smith is former President/12-year member of the Wall NJ Board of Education where she earned state board member-certified status. She is a former officer of Monmouth County School Boards Assn. and was a member of the Federal Relations Network for New Jersey School Boards Association/National School Boards Assn.

During her LDA presidency, Ms. Smith has led the effort to raise funds for researchers nationally, with more than 100 research grants awarded – research acknowledged in 39 scientific journals. She has organized 17 continuing medical education (CME) accredited Lyme scientific conferences for doctors and researchers
with international faculty, held in different areas of the US, most jointly sponsored by Columbia University. She has spoken at many conferences on Lyme including those presented by the University of New Haven (CT), the American Association for the Advancement of Science (AAAS), and the California Lyme Disease Association (now LymeDisease.org), and the International Lyme & Associated Diseases Society. She has been a speaker at hundreds of public, school, business, & government events.

She led the LDA in its effort with a partner organization, to endow the Columbia Lyme & Tick-Borne Diseases Research Center in New York, which opened in 2007. She developed the ABCs of Lyme Disease pamphlet for parents and educators and also the LymeR Primer brochure now featuring 15 tick-borne diseases, the Tick Mark bookmark, and helped design Tick Awareness cards. More than 2.5 million of these items have been distributed.

Ms. Smith has testified for and secured passage of state and federal bills for Lyme research and physician’s right to treat. She has been invited to state capitals in CT, MA, MD, MN, NH, NJ, NY, PA, RI, to present oral testimony and education on Lyme and has provided written testimony in many others. Based on her written testimony, LDA was recently included in ground breaking Maine legislation as a website resource on Lyme disease on Maine’s DPH website. She was invited to testify on two occasions before the NY Assembly Health Care Committee and also before the Rhode Island (Governor’s) Lyme Disease Advisory Commission and has spoken before the California Lyme Disease Advisory Council. Over time, she has personally met with many State Health Commissioners and with Governors in NH, RI CT on Lyme issues and with then Governor Pataki’s office on many occasions along with several NY state legislators. She has also presented before the Pennsylvania House of Representatives Majority Policy Committee and was an invited speaker for Lyme forums hosted by a member of the Massachusetts House of Representatives and the Majority Caucus Administrator for the Pennsylvania House of Representatives and the Minnesota State Senate Health Committee.

She has twice been invited to present to CDC Vector-Borne Diseases Division, Ft. Collins (2007, 2013); met with then CDC Director Dr. Julie Gerberding/5 Congressmen in DC; organized & led a team that met with HHS Asst. Sec. of Health with CDC/NIH officials teleconferenced in; met with military leaders in DC; and briefed the Senate HELP Committee Members and House Subcommittee on Health. She met several times with US Army CHPPM/Public Health Command at Aberdeen Proving Grounds. She met
in DC with the NIH Program Director and research coordinator and presented educational PowerPoints on Lyme to employees at the Environmental Protection Agency (2008, 2014), to the Dept. of Energy, and to Homeland Security in 2014. In 2014, she helped develop language for a federal bill on Lyme and led the nationwide effort which successfully passed the bill through the House. Ms. Smith spoke at a 2014 press conference with Senator Charles Schumer (NY) on the doxycycline shortage for Lyme patients. In 2012, she testified before the House Foreign Affairs Committee, Africa, Global Health & Human Rights Subcommittee on issues affecting Lyme patients. In 2013, she testified before the House Energy & Commerce Health Subcommittee on HR 610 to establish a federal Lyme & Tick-Borne Diseases Advisory Committee. She co-authored an article which was read into the Congressional Record on Lyme disease research priorities from the patient perspective.

Chosen Jackson NJ’s Chamber of Commerce 2008 Woman of the Year, she has also received commendation from the NJ legislature, a Special Congressional Recognition certificate from RI Cong. Langevin, and had a flag flown over the US Capitol by request of NJ Cong. Chris Smith in honor of her Lyme work. Ms. Smith helped to organize and presented at educational forums held by 3 congressmen (Langevin, Pitts, C. Smith). She has received awards from Dr. Brian Fallon, Columbia, from various Lyme groups, and was given the Courage in Advocacy Award in 2015 from Connecticut based Lyme Connection.

Other activities include providing input into a NJ law requiring teacher education for staff who teach students with Lyme disease, performing school in-services for educators on Lyme disease, and working with parents of students who are classified due to Lyme disease. Working with author Amy Tan, she created LDA’s LymeAid 4 Kids, a fund for children with no health coverage for Lyme, a fund that has awarded $1/4 M for uninsured children to date. Click for Publications

Sellati, Timothy
“Controlling the Inflammatory Response in Lyme Arthritis—What the Mouse Model teaches Us About Human Disease”

Timothy J. Sellati joined the Southern Research Institute as a Senior Research Fellow and Chair of the Department of Infectious Diseases in the Drug Discovery Division November 2015. He received a BA degree in Biology from Dowling College in 1985 and a PhD degree in Cellular and Developmental Biology from the State University of New York at Stony Brook in 1996. Dr. Sellati began postdoctoral training in 1996 at the University of Texas Southwestern Medical Center in Dallas and completed his training in 1999 at the University of Connecticut Health Science Center in Farmington. After joining the Center for Immunology and Microbial Disease at Albany Medical College as an Assistant Professor in December 2000 he was promoted to Associate Professor in 2005 and earned tenure in 2010. In July 2013 through October 2015 Dr. Sellati served as an Associate Member at the Trudeau Institute in Saranac Lake, NY.

During both his graduate and postdoctoral training he studied host responses to the spirochetal pathogens Borrelia burgdorferi and Treponema pallidum, the respective causative agents of Lyme disease and syphilis. Currently the major focus of the Sellati laboratory is to delineate the role of CD14 and TLR2 signaling in innate immunity to B. burgdorferi and Francisella tularensis, the causative agent of tularemia and a CDC Category A biological threat agent. Dr. Sellati was the Immunology Scientific Councilor for the International Endotoxin and Innate Immunity Society, the past President of the Eastern New York Branch of the American Society for Microbiologists, and has served as ad hoc member of a number of NIAID Study Section review panels and reviewer for several scientific journals in the areas of immunology and microbiology.

Conference Lecture Summary

Genotype profoundly influences disease severity in the murine model of Lyme borreliosis, caused by the spirochetal bacterium Borrelia burgdorferi. Infected
C57BL/6 (B6) and C3H/HeN (C3H) mice develop very mild and severe Lyme arthritis, respectively. Expression of the immunosuppressive cytokine interleukin-10 (IL-10) by B6, but not C3H mice has long been associated with these strain differences in disease presentation. However, the underlying mechanism(s) of genotype-specific IL-10 regulation remained elusive. Herein, we reveal a cyclic AMP (cAMP)-mediated mechanism of IL-10 regulation in B6 mice that is absent in C3H mice, which provides insight into the clinical spectrum of human Lyme disease, particularly those suffering from treatment-refractory arthritis. We show that bone marrow-derived monocytes (BMDMs) from B6 mice mount a more tempered, protective immune response to borrelial infection by virtue of the action of cAMP and CD14-p38-MAPK signaling; which, in combination, is responsible for increased production of the anti-inflammatory cytokine IL-10 and decreased production of potent pro-inflammatory and arthritogenic cytokines, including TNF. cAMP relaxes chromatin structure through modification of histones while CD14-dependent p38 MAPK activity increases binding of STAT3 and SP1 to their cognate sites on the now accessible IL-10 promoter, facilitating increased IL-10 production. Thus, cAMP and CD14 regulate IL-10 production and dampen the release of pro-inflammatory mediators elicited by B. burgdorferi by changing the epigenetic ‘landscape’. In stark contrast, arthritis-susceptible C3H mice lack basal levels of cAMP comparable to those of their disease-resistant B6 counterparts and thus are ill equipped to mitigate the damaging consequences of B. burgdorferi-induced TNF through production of IL-10. Intriguingly, reciprocal regulation of IL-10 and TNF by cAMP- and CD14-dependent mechanisms are operative in primary human peripheral blood monocytes and cAMP-enhancing drugs show therapeutic efficacy in our mouse model of Lyme arthritis.

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**Pritt, Bobbi**

Bobbi S. Pritt, MD, MSc, DTM&H  
Director, Clinical Parasitology and Vector-Borne Diseases,  
Associate Professor, Pathology of Laboratory Medicine Division of Clinical Microbiology  
Mayo Clinic, MN
“Borrelia Mayonii: A New Cause of Lyme Disease in the Upper Midwestern US”

Bobbi Pritt, MD, FCAP is an Associate Professor of Pathology and Director of the Clinical Parasitology and Vector-borne Diseases Laboratories in the Division of Clinical Microbiology at Mayo Clinic in Rochester, MN. She is board certified in Anatomic and Clinical Pathology as well as Medical Microbiologist, and holds a Master’s degree in Medical Parasitology from the London School of Hygiene and Tropical Medicine and Diploma in Tropical Medicine from the Royal College of Physicians in London.

Dr. Pritt has presented and published on many topics, including detection and characterization of two new tick-borne organisms, an Ehrlichia and Borrelia species, that infected humans in the midwestern United States.

Conference Lecture Summary

Dr. Bobbi Pritt will describe the discovery of a novel pathogen causing Lyme disease in the upper Midwestern United States. This new bacterium, preliminarily called Borrelia mayonii, causes higher levels of spirochetemia than what is seen with Borrelia burgdorferi, and has been associated with potential neurologic involvement and severe disease. Dr. Pritt will discuss the tests that lead to the detection of B. mayonii, the clinical features observed so far, and the preferred diagnostic methods.