2006 Annual Scientific Conference: Seeking Answers through Science

LDA & Columbia University 7th Annual Scientific Conference

Lyme & Other Tick-Borne Diseases: Seeking Answers through Science

Held on October 20, 2006
Crowne Plaza
Philadelphia, PA

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This conference was designed for medical & health professionals & researchers, but it was also open for registration to the general public. Adults only. Scholarships for conference and transportation was available for Medical student; resident; post-doctoral candidate; fellow; nurse practitioner candidate; doctor or nurse practitioner new to practice, i.e., less than 5 years experience; veterinarian with equivalent status to the aforementioned; physician assistant whose sponsoring physician writes a letter of
The conference featured faculty consisting of clinicians and researchers from across the US and other countries. Brian A. Fallon, MD, MPH, Columbia University College of Physicians & Surgeons, the Conference Director, will speak on *Clinical Trials: Biologic & Clinical Measures of Change*. Other speakers include Charles Chiu, MD PhD: *Multi-Omics approaches to diagnosing Lyme & TBD*; George Chaconas, PhD: *Intravital imaging to study Lyme dissemination*; Adrian Baranchuk, MD: *Lyme carditis diagnosis & management*; Emir Hodzic, DVM, PhD: *Post-treatment persistence of Bb in mouse model*; Mark Soloski: PhD, *LD host immune response*; Holly M. Frost, MD: *Pitfalls of LD serologic assays*; Ingeborg Dziedzic, MD: *Lyme disease & the eye*; Lance A. Liotta, MD, PhD: *Shedding of urinary tick pathogen-specific proteins in patients with tick borne diseases*; and Osama Haddad, MD: *Mitral Valve Endocarditis: A Rare Manifestation of Lyme Disease*

Additional speakers were Margaret MacDonald, MD, PhD: *Powassan virus*; Choukri Ben Mamoun, PhD: *Babesia duncani in vitro culture*; Philip Strandwitz, PhD: *The Gut-Brain-Axis – Potential Therapeutic Targets* and J. Stephen Dumler, MD: *Human Granulocytic Anaplasmosis-Emerging Faster than Lyme*; Daniel Sonnenshine, PhD: *Expansion of TBD vectors & implications of spread of TBD*; and Paige Armstrong, MD, MHS: *Rickettsial diseases*; Robert Naviaux MD, PhD: *Lyme & Chronic Fatigue Syndrome*; Eric Storch, PhD: *Obsessive Compulsive Disorder*; Peter Novak, MD, PhD: *Neurological correlates of Post Treatment Lyme Disease Syndrome*; and Joanna Lyon, PharmD, MEd: *The possible association between the human ABCB1 gene and Post Treatment Lyme Disease Syndrome*. Elizabeth Maloney, MD and Sam T. Donta, MD will be conference facilitators.

Speakers represented Columbia University, Johns Hopkins University School of Medicine, Yale School of Medicine, Mayo, Harvard Medical School, Uniformed Services University, CDC,
UCSF School of Medicine, Queens University Canada, University of Calgary Canada, Northeastern University, University of Colorado School of Medicine, UC Davis Veterinary Medicine, Rockefeller University, UCSD School of Medicine, University of Maryland School of Pharmacy, Old Dominion University, George Mason University, University of Oklahoma Health Sciences Center, Baylor College of Medicine and an ophthalmology practice.

Click here for Agenda

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Conference Registration
Exhibitor Registration
Other Conferences

2001 LDA & Columbia University Annual Scientific Conference

Lyme and Other Tick-Borne Diseases: A 21st Century View

Held on November 10, 2001
Doral Forrestal
Princeton, New Jersey

To View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

Note: Dr. Stephen C. Davison NASA Headquarters, replaced Dr Joshua J. Zimmerberg in the faculty of this program.

2000 LDA Annual Scientific Conference

Lyme and Other Tick-Borne Diseases: Focus on Children and Adolescents

Held on November 4, 2000
Doral Forrestal
Princeton, New Jersey

To View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

1999 LDA Annual Scientific Conference at Bard College

Lyme and Other Spirochetal and Tick-Borne Diseases: A Two Day Discussion of the Most Recent Developments in Research and Clinical Management

Held on November 13 & 14, 1999
2003 Annual Scientific Conference: Current Strategies & A Map to the Future

LDA & Columbia University 4th Annual Scientific Conference

Lyme and Other Tick-Borne Diseases: Current Strategies & A Map to the Future

Held on November 14, 2003

Hyatt Regency at Penn’s Landing
Philadelphia, Pennsylvania

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: List of Speakers, Agenda, Program Accreditation and Miscellaneous.

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Note: Dr. Ray Stricker, San Francisco, California, replaced Dr. Jackie Springer in the faculty of this program.
2004 Annual Scientific Conference: Technology Leading the Way

LDA & Columbia University 5th Annual Scientific Conference

Lyme and Other Tick-Borne Diseases: Technology Leading The Way

Held on October 22, 2004
Hilton Rye Town
Rye Brook, New York

View Brochure: List of Speakers, Agenda, Program
Accreditation and Miscellaneous

{simplecaddy code=COMP2004}
2005 Annual Scientific Conference: Emerging Tick-Borne Diseases

LDA & Columbia University 6th Annual Scientific Conference

Lyme and Other Tick-Borne Diseases: Emerging Tick-Borne Diseases

Held on October 28, 2005
Crowne Plaza
Philadelphia, Pennsylvania

View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

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{simplecaddy code=COMP2005}
{simplecaddy code=DVD114}
2007 Annual Scientific Conference: Bridging the Medical Chasm

Co-sponsored by Columbia University & Lyme Disease Association, Inc.

Held on October 26, 2007

Marriott Newton, Boston, Massachusetts

View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

{simplecaddy code=DVD118}
2008 Annual Scientific Conference: Solutions Through Cutting Edge Science

Held on October 17, 2008

Cathedral Hill Hotel

San Francisco, California

View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

DVD of conference – not available

2009 10th Annual Scientific Conference: 34 Years, From
Lyme, CT, Across the Nation

Co-sponsored by Columbia University & Lyme Disease Association, Inc.

Held on October 23, 2009
Gaylord National Hotel & Convention Center, National Harbor, Maryland

View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

Conference Summary Prepared by Columbia University:

Scientific Program Chairs:
Brian Fallon, MD (Columbia University)
Richard T. Marconi, PhD (Virginia Commonwealth University)

Speakers from many disciplines were represented at this annual meeting co-sponsored by the Columbia University Lyme & Tick-Borne Diseases Research Center and the Lyme Disease Association. Outstanding presentations were given on Lyme and other tick-borne diseases: their distribution, pathogenesis, genetics, vaccine development and treatment. The keynote lecture was given by Dr. C. Ben Beard (Chief, Bacterial Diseases Branch of the Division of Vector Borne Infectious Diseases at the Centers for Disease Control) on the topic “Lyme Disease in the United States”. His lecture emphasized that Lyme disease reported cases have steadily increased over the last 15 years, that the geographic distribution has broadened, that prevention and control activities are hampered by the absence of a “silver bullet” and by a number of other complicated factors, including community education and awareness. He stated that studies over the last 20 years indicate that under-reporting is a problem, suggesting that there are actually 3-12 times more cases than actually reported to the CDC. Using the new reporting criteria, the number of definite cases for 2008 was 28,921 and, if probable
cases were included, the number increased to 35,198. He concluded by emphasizing that effective prevention and control require the collaborative efforts of numerous stakeholders including universities, industry, advocacy groups, and public health agencies. A new memorial lecture was established in honor of Dr. Ed Masters – the pioneering family physician and clinical researcher from Missouri who focused national attention on an outbreak of erythema migrans in the southern U.S. and stimulated a national search for its cause. Dr. Kerry Clark (University of North Florida) delivered the Dr. Ed Masters Memorial Lecture: “Southern Tick-Borne Infections”. He reported that an overview of published research findings during the past 20 years reveals extensive evidence of B. burgdorferi sensu lato in ticks and wild vertebrates in the southern United States. Evidence of infection in humans is less extensive due to fewer studies in the South. However, studies of patients with Lyme-like illness (LLI) in several southern states do provide some evidence of human infection with Lyme Borrelia, while evidence implicating B. lonestari as a cause is represented by a single case. New evidence presented showed that over 40% of human patients with LLI across the country tested positive with a flagellin gene PCR specific for Lyme group species. Also, a genetic group of strains distinct from B. burgdorferi sensu stricto appears to be responsible for a significant number of infections detected by PCR and DNA sequencing, and these strains appear to be widely distributed among patients across the United States. Dr. Susan E. Little (Oklahoma State University): “Dogs as Sentinels of Tick-Borne Infection” Dogs are affected by many tick borne diseases that affect humans. Because millions of dogs are routinely tested for these diseases each year, data on rates of infection can be used to provide information about geographic and temporal trends of these diseases in the human population. Surprisingly, foci of active transmission from dog studies have been identified even in areas where Lyme and other TBD are not endemic. In response to questions, Dr. Little indicated that the canine vaccine is 50-85% effective. Dr. Christopher Earnhart (Virginia Commonwealth University): “Lyme Disease Vaccine Development: An Update on Recent Progress”. There have been marked advances in the development of a broadly protective Lyme vaccine in recent years. While Osp-A based vaccines continue to be promising candidates, their acceptance in the market may be limited. Dr. Earnhart provided impressive findings regarding recombinant, chimeric OspC-based vaccines which he described as the newest candidates for the next generation of Lyme vaccine; these have shown great potential in early trials. With rapid progress being made in vaccine development, there is reason to expect that one or more effective and broadly protective Lyme vaccines will be in clinical trials in
Dr. X. Frank Yang (Indiana University): “Genetic Regulation of Borrelia Genes” This talk revealed more about the genetic regulation of spirochetal transmission – controlled by genetic inactivation of the two sets of two-component systems in B. burgdorferi. One set controls spirochetal transmission from ticks to mammals and is essential for Borrelia to establish infection in mammals, whereas the second set is important for spirochetal survival in the tick vector. A number of environmental factors contribute to genetic activation of Bb in mammals, including pH and temperature. Dr. Richard Marconi (Virginia Commonwealth University): “Immune Evasion Mechanisms of Pathogenic Spirochetes” Most spirochetal infections of humans can be chronic and in the absence of treatment can persist indefinitely. In this presentation, recent advances in our understanding of the molecular mechanisms employed by the Lyme disease, Relapsing fever and periodontal disease associated spirochetes to evade the innate immune system and complement mediated destruction were presented. The discussion focused on the role of specific bacterial membrane proteins (such as Factor H binding protein) that bind negative regulators of the complement cascade and then exploit this interaction for the purpose of survival and persistence in mammals. Dr. Amiram Katz (Yale University): “IV Immunoglobulin and Autoimmune Disease in Lyme Peripheral Neuropathy” Although IVig therapy is not routinely indicated for persistent symptoms associated with Lyme disease, it may be indicated in certain cases when Lyme is complicated by immune deficiency or for neurological conditions of an autoimmune nature. Dr. Katz reported on a series of 26 patients with painful neuropathy attributed to either the OspA vaccine (Latov, Wu et al. 2004) or Borrelia infection who had persistent symptoms post-antibiotic treatment. Patients had serologic evidence of OspA and either nerve-conduction study confirmed neuropathy or diminished epidermal nerve fiber density. After open label non-randomized treatment with intravenous immunoglobulin, there was a significant mean increase in epidermal nerve fiber density on repeat testing and all patients reported an improvement in their neuropathic symptoms. Dr. Robert Dantzer (University of Illinois at Urbana-Champaign): “From Inflammation to Sickness Behavior: The Role of Cytokines” Lyme disease patients often present with non-specific symptoms that include pain, fatigue, sleep disturbances, mood disorders and concentration problems. These symptoms are often viewed as the result of persistent psychological distress caused by the disease. However, there is now evidence that the organism itself or inflammation caused by tick bites and Borrelia can either directly or indirectly induce the expression of inflammatory mediators in the brain. These mediators are responsible for the development of the non-specific symptoms of disease of which the intensity and duration can be modulated by psychosocial
stressors and banal infections. Dr. Dantzer concluded by observing that to be ill is normal as long as you recover from it; the problem is that some patients fail to recover – this may be related to the concept of a “glial scar” – that the initial inflammatory event from years earlier (due to infection or trauma) may be reactivated at a later point and, because of that past event, fail to turn off after being reactivated – causing chronic sickness symptoms. Dr. Phyllis Faust (Columbia University): “Tick-Borne Encephalitis-A Fatal Case” A fatal case of deer tick virus encephalitis in a New York State resident was described. The virus identified at autopsy by PCR assay was related to the Powassan virus which can be pathogenic in humans and can cause severe encephalitis. There are 2 distinct lineages of the Powassan virus. Deer tick encephalitis is associated with lineage 2. A preliminary estimate of the infection rate in deer ticks in New England and Wisconsin is 0.6-1.3%. Diagnostic testing for Powassan virus is not routinely done on patients with encephalitis, but would certainly now be recommended for encephalitis of unknown etiology in these tick-infected areas. Diane M Gubernot, MPH (U.S. Food and Drug Administration): “Babesia Infection and the US Donor Blood Supply” Babesiosis is a known transfusion-transmitted disease risk and there is no FDA-licensed test for mass donor screening. Approximately 80 transfusion-associated cases have been reported from 1979 through 2008. Eleven transfusion-related Babesiosis fatalities have also been reported, with ten occurring since 2005. Without a licensed screening test, enhanced clinician awareness of the possibility of Babesiosis in febrile transfusion recipients may facilitate prompt diagnosis, improved prognosis, and more timely investigations to interdict extant infected units. Ms. Gubernot concluded by recommending prompt reporting of Babesiosis donor and transfusion-related events to assist the FDA in assessing the scope of this risk and developing appropriate public health control measures. Dr. Peter Hildenbrand (Harvard University): “Lyme Neuroborreliosis: The Great Neuroimaging Imitator” Due to enhanced community and medical awareness of Lyme Disease, the number of patients who develop imaging discernable manifestation of Lyme Neuroborreliosis is small. The most frequent neuroimaging finding in LNB is cranial nerve enhancement, particularly the 7th cranial nerve. The imaging pattern of LNB and viral facial neuritis is the same. The white matter pattern of involvement in LNB may be sufficiently similar to that of multiple sclerosis to suggest either a common demyelinating pathway or Borrelia subunits as an indirect MS causative antigen. A broadly accepted serologic and/or neuroimaging biomarker of LNB treatment response warrants further collaborative research. Dr. John M. Costello (Harvard University): “Lyme Carditis in Children” Carditis is a rare manifestation of Lyme disease in adults and children, occurring
in 0.8% of cases reported to the Centers for Disease Control and Prevention. Of 207 children treated for early disseminated Lyme disease at Children’s Hospital Boston between 1994 and 2008, 33 (16%) had carditis. Independent predictive factors for Lyme carditis included older age and cardiopulmonary symptoms. All but one carditis patient had other signs and symptoms of early disseminated Lyme disease; most commonly flu-like symptoms, multiple erythema migrans, meningitis and/or cranial nerve palsy. Variable degrees of atrioventricular block were present in the vast majority of patients, including 15% with second degree heart block and 27% with complete heart block. Advanced heart block resolved in all but one patient within a week. Four of 33 patients presented with depressed myocardial function (severe in 3 cases), which completely recovered in all cases. Dr. Patrick McAuliffe (Columbia University): “Neuropsychological Deficits in Children and the School System” Children with post-treatment Lyme disease are at increased risk for long-term problems in cognition and school functioning. Interventions were proposed in terms of minimizing fatigue, modifying the curriculum and providing classroom accommodations for students with post-treatment Lyme disease. Dr. Brian Fallon (Columbia University) the Dr. John Drulle Memorial Lecture “A Critique of Treatment Guidelines” Dr. Fallon reviewed evidence from recent U.S. clinical trials for chronic Lyme disease. He emphasized the difference between treatment efficacy and treatment recommendations. Efficacy is based on whether a treatment is shown to be effective compared to placebo. Recommendations are based on a combination of factors that include side effect risk. He concluded that recent studies of post-treatment Lyme fatigue demonstrate efficacy for repeated antibiotic therapy that was sustained to the 6 month end-point, however the risks associated with repeated IV antibiotic therapy led the authors to not recommend this treatment approach. Presumably if an antibiotic treatment could be identified that worked as well as IV ceftriaxone but was not associated with the risks of an indwelling catheter, then that would be an excellent treatment recommendation for patients with chronic Lyme-related fatigue. It’s not that repeated antibiotic treatment has been shown to be ineffective. Rather, the problems are: a) the risks of IV ceftriaxone mitigate against recommending their use without a very careful cost-benefit discussion; and b) we do not have biomarkers at present to identify those patients who are most likely to benefit from this treatment.
2010 Annual Scientific Conference: The Science & Clinical Implications

Co-sponsored by Columbia University & Lyme Disease Association, Inc.

Held Saturday & Sunday – October 2 & 3, 2010

Hyatt Regency Penns Landing, Philadelphia, PA

View Brochure: List of Speakers, Agenda, Program Accreditation and Miscellaneous

Conference Summary Prepared by Columbia University:

This remarkable two-day conference featured speakers from around the country – representing both basic science and clinical medicine. As in previous years, this conference enabled clinicians, other health care providers and the medically-interested public to learn about the latest research in tick-borne diseases. The speakers generously volunteered their time to participate and the Lyme Disease Association generously provided all administrative back-up and planning. As many speakers presented material that has not yet been published, only information authorized for release by the speakers is summarized below.

Dr. Madeleine Cunningham, Professor of Microbiology & Immunology at Oklahoma University, discussed her research on molecular mimicry, autoimmunity, and infection in inflammatory heart disease and in behavioral and movement disorders, particularly as related to sequela of group A strep infection. Autoantibodies triggered by strep infection can cause damage to the heart and to the brain, a mechanism which is thought to result in neuropsychiatric disorders such as TIC disorders and OCD among susceptible patients. She has begun to study whether patients with chronic symptoms after Lyme disease also have evidence of Bb-induced antibody mediated neuronal cell signaling.

Dr. Diego Cadavid, Associate Director of Experimental Neurology at Biogen Idec and
Consultant in Immunology and Inflammatory Diseases at Massachusetts General Hospital in Boston, discussed his work with mice demonstrating that the relapsing fever spirochete, *Borrelia turicatae*, release lipoproteins that are tissue tropic and can disseminate from the periphery and cross the blood brain barrier to cause inflammation in the brain. The results from these remarkable studies counter the prevailing view in medicine that bacteria must enter the brain to cause inflammation – in this case of *Borrelia turicatae*, the spirochete itself doesn’t need to cross the BBB but rather the neurotropic Vsp1 lipoproteins are sufficient to induce a local CNS reaction.

**Dr. Armin Alaedini** of Cornell Weill Medical College, reported that approximately 50% of patients with chronic Lyme disease have evidence of elevated anti-neuronal antibodies and that the intensity of these antibodies is comparable to that seen in Lupus but much greater than that seen among recovered Lyme patients. Whether these anti-neuronal antibodies are directly related to chronic Lyme symptoms is an area of future investigation.

**Dr. Peter Burbelo** from the National Institute of Craniofacial Research at NIH, described the development of a novel diagnostic technique applicable to Lyme disease – LIPS (luciferase immunoprecipitation systems) antibody profiling. Using a synthetic protein, designated VOVO, consisting of a repeated antigenic peptide sequence, VlsE-OspC-VlsE-OspC, this assay had 98% sensitivity and 100% specificity, performing similarly to the C6 ELISA, but with a much larger dynamic range for the detection of Ab than the C6 ELISA. This appears to be a high throughput, rapid, and highly sensitive and specific technique for both early and later stages of Lyme disease.

**Dr. Ben Luft**, Professor of Medicine at SUNY Stonybrook, discussed the conundrum of chronic Lyme disease and the problems with serologic tests that are based on only one strain of Bb. His recent work, which includes the sequencing of 13 strains of Bb with Claire Fraser and other collaborators, expands the antigenic profile available for test development from the focus on one strain to the expression of 13 strains.

**Dr. Satish Raj**, Assistant Professor at Vanderbilt University and cardiologist at the Vanderbilt Autonomic Dysfunction Center discussed postural tachycardia syndrome (POTS) – an autonomic disorder that can accompany or be triggered by Lyme disease. Characterized by orthostatic tachycardia in the absence of orthostatic hypotension, POTS can be associated with a high degree of functional disability. Patients with
POTS complain of symptoms of tachycardia, exercise intolerance, sleep disturbance, lightheadedness, extreme fatigue, headache and mental clouding. Patients with POTS demonstrate a heart rate increase of ≥30 bpm with prolonged standing (~10 minutes), often have high levels of upright plasma norepinephrine (reflecting sympathetic nervous system activation), and many patients have a low blood volume. Therapies aimed at correcting the hypovolemia and the autonomic imbalance may help relieve the severity of the symptoms.

**Dr. Steven Schutzer**, Professor of Medicine at UMDNJ, reported on the results of his polymicrobial study, in collaboration with IBIS, Inc, of what else might be contained in ticks. Ticks that are known to carry Borrelia burgdorferi have been shown to carry other microbes (e.g., Babesia microti, Borrelia miyamotoi, Anaplasma) and multiple genotypes of B. burgdorferi even in the same tick. These findings were made possible by technological advances that enable the identification of all microorganisms in a specimen without prior knowledge of the likely organism.

**Ellen Stromdahl, MS**, entomologist at the U.S. Army Public Health Command’s Entomological Sciences Program at the Aberdeen Proving Ground, discussed the army’s Tick-borne Diseases Laboratory which both identifies and tests ticks from DOD personnel and disseminates educational materials. Her particular area of interest is the other pathogens found in their most frequently received tick – lone star tick, *Amblyomma Americanum*. PCR analysis of these ticks from MD (APG) revealed a very high prevalence of a spotted fever group (SFG) rickettsia. Restriction fragment length polymorphism (RFLP) and sequence analysis identified “Rickettsia amblyommii”. This organism is not yet described or well studied, and its pathogenicity is unknown; however, investigations of the organism are warranted because of its high prevalence in *A. americanum*. High *R. amblyommii* prevalence in populations of *A. americanum* presage co-infection with other *A. americanum*-borne pathogens. *A. americanum* nymphs and adults from APG were found to be co-infected with *R. amblyommii* and *Borrelia lonestari*, *Ehrlichia chaffeensis* and *Ehrlichia ewingii*, respectively, and larval pools were infected with both *R. amblyommii* and *B. lonestari*. Co-infections can compound effects and complicate diagnosis of tick-borne disease.

**Dr. Edward Breitschwerdt** from the College of Veterinary Medicine at NCSU described new findings related to Bartonella. The genus “Bartonella” is currently comprised of at least 26 species and subspecies of vector-transmitted, fastidious, gram-negative bacteria that are highly adapted to one or more mammalian reservoir hosts. Most Bartonella species have been discovered in the last 15 years. The clinical and
diagnostic challenges posed by Bartonella transmission in nature may be much more complex than is currently appreciated in either human or veterinary medicine. Based upon the annual increase in publications related to Bartonella infections during the past decade, it is clear that members of this genus are receiving increased scrutiny by the medical and scientific communities. The recognized clinical profile of Bartonellosis includes hepatitis, angiomas, endocarditis, myocarditis, arthritis, vasculitis, and seizures; viewed as a silent epidemic, new diagnostic assays enable the organism to be more readily cultured thereby enabling the disease impact on humans to be accurately described.

Dr. Beth Winkelstein, Associate Professor in Bioengineering at University of Pennsylvania addressed “Glia, Inflammation, and Pain”. Pain is a complicated cascade of local and central mechanisms including a wide array of cell types, including the neurons and their supporting glia. Inflammation has an important and potent role in initiating pain via local mediating factors and centrally-modulating synaptic circuits leading to maintenance of chronic pain. In fact, research findings suggest that leveraging inflammatory responses may help in the development of effective treatment and diagnosis of chronic pain states.

Dr. Eugene R Shippen, practitioner in family practice and endocrinology in Shillington PA, spoke on “Vitamin D, Regulatory Hormone of Immunity and Inflammation – Implications in Chronic Infectious Diseases.” Vitamin D deficiency is widespread in the northern latitudes where Lyme disease/co-infections are most prevalent. Because well over 800 genes are modulated by Vitamin D, Dr. Shippen concluded that it was not surprising that most major organ systems and diseases are adversely affected by inadequate or deficient vitamin D status. Vitamin D activity is associated with a) activating the initial “innate” immune response to all new infections increasing resistance to any new infectious invaders; b) reducing inflammatory cytokines and increasing the secondary “adaptive” immunity that helps with antibody formation as well as the autoimmune controlling Treg cells that inhibit autoimmune diseases; and c) increasing production of cellular antimicrobial peptides, the cathelicidins and defensins, that help the body control bacterial, viral and fungal infections both acutely and chronically. Chronic infections frequently increase resistance to vitamin D activities. This makes deficiency worse and increases the need to maintain higher intake or production of vitamin D through sunlight, UVB exposure. Dr. Shippen concluded that research is needed to determine the beneficial effects of higher dose vitamin D in the treatment of patients with
chronic infections, like Lyme disease.

**Dr. Brian Fallon** of Columbia University provided an update on the Lyme and Tick Borne Diseases Research Center – biomarker studies, the establishment of a specimen bank, and most recently, the completion of a large community study in Lyme endemic areas to compare established and novel diagnostic assays. The focus of this talk was on two studies of diagnostic tests. One study examined whether three well-known Lyme specialty labs had greater sensitivity or specificity than one well-known national commercial laboratory in the correct detection of patients vs. healthy controls. The second study reported on a community-based study of 450 patients from Lyme endemic areas in the Northeast to determine whether two new diagnostic approaches imported from Europe and adapted for the U.S., resulted in greater sensitivity or specificity than currently available tests.

The second day of this conference featured presentations from experienced clinicians. Highlights from selected presentations are offered below.

**Dr. Dirk Elston**, Director of Department of Dermatology at Geisinger Medical Center in Pennsylvania, presented a visually powerful and humor-filled but serious talk. Tick-borne illnesses remain a significant risk to public health. Cutaneous signs of illness can be helpful in establishing an early diagnosis. These include erythema migrans, acral petechiae, and retiform purpura. In areas endemic for Rocky Mountain spotted fever, tetracycline should be started in patients presenting with fever and headache. Therapy should not be delayed because of absence of rash.

**Dr. Darrin Wiggins**, Chairman of the Department of Emergency Medicine at Southampton Hospital on Long Island spoke about the recognition and diagnosis of acute tick-borne diseases in the emergency room, placing special emphasis on MD-examination of peripheral blood smears.

**Dr. David Hardesty**, movement disorder neurologist from Columbia University, presented an overview of movement disorders phenomenology with videos of tics, generalized dystonia, focal dystonias, and Parkinson’s disease. He mentioned drug-induced movement disorders, and the role of diagnostic testing to determine the etiology of myoclonus. The role of the basal ganglia in psychiatric illness and movement disorders was reviewed. A video of ‘amphetamine-like high’ caused by deep brain stimulation of the sub thalamic nucleus at settings that improved motor control in PD was presented.
**Dr. Ernest Visconti**, pediatrician and infectious disease specialist from Lutheran Medical Center in Brooklyn, NY presented a talk on differential diagnosis of patients with chronic symptoms, highlighting the importance of careful and thorough examination of patients for missed diagnoses. Of particular concern were those patients who presented with previously undetected Mannose Binding Protein deficiency – a deficiency that would impair clearance of infections.

**Dr. Sam T. Donta**, infectious disease specialist, consultant at Falmouth Hospital on Cape Cod, and retired Professor of Medicine from Boston University, reviewed strategies and considerations in making antibiotic decisions in Lyme disease. He reported very favorable open label clinical experience for the treatment of patients with biaxin and plaquinyl as well as with tetracycline.

**Dr. Cheryl Ortel**, OB-GYN in private practice, spoke about Women’s Health and Lyme Disease. Dr. Ortel reviewed the frequency of tick-borne disease in private practice and the particular concerns for women during pregnancy.

**Dr. James Dillard**, MD, DC, Lac in clinical practice in Manhattan and East Hampton, gave a sweeping review of acupuncture, herbs, nutrition & other integrative medicine approaches to managing chronic pain among patients with chronic Lyme symptoms.

**Dr. Amiram Katz**, neurologist and Assistant Professor of Neurology at Yale University, discussed his finding that autonomic neuropathy is not uncommon in the context of the late manifestations of Lyme disease. It usually accompanies ganglionic and small fiber neuropathy. To date, autonomic malfunction could be demonstrated only by tedious, expensive, and not always reproducible battery of autonomic testing. He and his colleagues have recently been able to diagnose autonomic neuropathy and quantify its degree, by counting sweat gland nerve fiber density. In a preliminary analysis with this technique, he has shown that IVIG treatment repairs autonomic neuropathy, and this repair might sometimes antedate recovery of small fiber neuropathy.