

INFLAMMATORY BRAIN DISORDERS CONFERENCE 2023

Hosted by Neuroimmune Foundation and accredited
in collaboration with The Wisconsin Medical Society

MAY 18–19, 2023

A live event via webinar

Last updated May 10, 2023



NEUROIMMUNE
FOUNDATION



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The **Inflammatory Brain Disorders Conference** features nationally and internationally renowned experts skilled in diagnostic and therapeutic approaches who will present a diverse range of emerging clinical and research challenges, insights, and advances in the field of inflammatory brain disorders.

The intended audience is pediatric and adult physicians. Both generalists as well as specialists will find the conference valuable to their practices. The conference is designed for pediatricians, family physicians, psychiatrists, rheumatologists, immunologists, neurologists, and infectious disease physicians. Though the conference is designed for physicians, physician assistants and nurse practitioners will find the series valuable to their practices as well.

Though all content is geared towards providers, patients and families are welcome to participate. Additional follow up support will be provided through monthly case consultations led by our multidisciplinary panel of experts in neuroimmunology. No refunds will be granted.

Neuroimmune Foundation subscribes to the articles of Title III of the Americans with Disabilities Act of 1990. Should you or anyone accompanying you require special assistance, please notify us by contacting conference@neuroimmune.org or 608-381-0367. Requests should be made as early as possible to allow time to arrange the accommodation.

Neuroimmune Foundation

Advocating on Behalf of Individuals with Neuroimmune Conditions

neuroimmune.org

Thursday, May 18, 2023 Agenda

(Times all listed in central time zone)

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MAY 18, 2023 AGENDA

(Times all listed in U.S. central time zone)

9:00 – 9:45am CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

The Antibody-Mediated Encephalitis from Discovery to New Clinical Insights and Mechanisms



Josep Dalmau, MD, PhD, FAAN

Research Professor ICREA-IDIBAPS, Service of Neurology, Hospital Clínic, University of Barcelona; Adjunct Professor Neurology, University of Pennsylvania

Presentation Synopsis

Dr. Dalmau will be discussing the clinical and immunological observations that led to the discovery of autoimmune encephalitis, and how this group of diseases has changed the landscape of neurology and psychiatry. He will use anti-NMDA receptor encephalitis to illustrate the wide spectrum of neurologic and psychiatric symptoms, the potential triggers of these autoimmune disorders, and the underlying antibody-mediated mechanisms affecting synaptic function. Finally, Dr. Dalmau will show recent findings on the long-term effects of anti-NMDA receptor encephalitis comparing patients with animal models, and how these models may provide treatment strategies beyond immunotherapy.

Speaker Biography

Dr. Josep Dalmau received his MD and PhD from the Autònoma University of Barcelona, and trained in Neuro-oncology at Memorial Sloan-Kettering Cancer Center, New York, after which he joined the faculty. In 2002 he moved to the University of Pennsylvania (UPenn) where he was Professor of Neurology. He is currently Professor at the Catalan Institute for Research and Advanced Studies (ICREA)-IDIBAPS, University of Barcelona, and Adjunct Professor of Neurology at UPenn. Dr. Dalmau's research is focused on a new category of immune-mediated diseases against synaptic receptors that cause prominent neurologic and psychiatric syndromes. Dr. Dalmau is the recipient of numerous awards; he is a member of the National Academy of Medicine and many other scientific societies and serves as Editor-in-Chief of *Neurology: Neuroimmunology and Neuroinflammation*.

Dr. Dalmau receives research funding from Sage Therapeutics and has a research contract and receives royalties from Euroimmun, Inc. All of the relevant financial relationships for this individual have been mitigated.

9:45 – 10:30am CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Pathophysiology of Neuropsychiatric Syndromes Post-COVID



Avindra Nath, MD

Chief of Section of Infections of the Nervous System, Clinical Director, NINDS, NIH*

* Dr. Nath is presenting in his personal capacity. The views expressed are his own and do not necessarily represent the views of the National Institutes of Health or the United States Government.

Presentation Synopsis

Patients may develop a wide variety of cognitive, sleep, or mood disorders sometimes accompanied by intractable fatigue, dysautonomia, or neuropathies. Proposed pathophysiological mechanisms include persistent viral infection, innate or adaptive immune dysregulation resulting in microvascular injury and neuroinflammation. Evidence for these mechanisms and long-term consequences will be discussed.

Speaker Biography

Dr. Avindra Nath is a physician–scientist who specializes in neuro-immunology and neurovirology. His research is focused on the clinical manifestations, pathophysiology and treatment of emerging neurological infections with a focus on HIV infection. In recent years, he has studied the neurological complications of endogenous retroviruses, Ebola, Zika and SARS-CoV-2 and conducts research on patients with undiagnosed neuroinflammatory disorders. He has served on advisory committees to the NIH, CDC, FDA and WHO. The International Society of NeuroVirology gave him the Pioneer in NeuroVirology Award for his contributions to HIV neuropathogenesis and elected him as the President of the Society. He received the Wybran award from the Society of Neuroimmune Pharmacology for contributions to neurovirology. He also received the NIH Director’s award for his work on SARS-CoV-2 and the HHS Secretary’s award for his work on Ebola infection.

Dr. Nath is the Clinical Director of the National Institute of Neurological Disorders and Stroke (NINDS) at NIH, where he is also Chief of the Section of Infections of the Nervous System, Director of the Translational Center for Neurological Sciences.

Dr. Nath received his medical degree from Christian Medical College in Ludhiana, India, and completed a residency in neurology from the University of Texas Health Science Center in Houston, followed by a fellowship in multiple sclerosis and neurovirology at the same institution. He then completed a fellowship in neuro-AIDS at NINDS. Having held faculty positions at the University of Manitoba and the University of Kentucky, he joined Johns Hopkins University in 2002 as Professor of Neurology and Director of the Division of Neuroimmunology and Neurological Infections. He joined NIH in 2011.

Dr. Nath has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Break | 10:30 – 11:00 am CT

11:00 – 11:45 am CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Evidence for PANS as an Inflammatory Disorder: Stanford 2023 Research Update



Jennifer Frankovich, MD, MS

Clinical Professor, Pediatrics – Allergy, Immunology, Rheumatology; Co-Director, Stanford Children’s Immune Behavioral Health Clinic; Director, Stanford Immune Behavioral Health Research Program, Stanford University School of Medicine



Elizabeth Mellins, MD

Professor of Pediatrics, Pediatric Rheumatologist and Molecular Immunologist, Stanford University School of Medicine

Presentation Synopsis

Dr. Jennifer Frankovich and Dr. Betsy Mellins will present new PANS research findings from Stanford.

Speaker Biographies

Dr. Jennifer Frankovich’s primary research and clinical interest is in the intersection between mental health and systemic inflammation. She co-founded the Stanford PANS multidisciplinary clinic and research program. Alongside other collaborators, she is building a large biorepository of patient blood samples and clinical data to share with basic scientists around the world. She collaborates with 10 basic science labs at Stanford to characterize the immunophenotypes of active PANS compared to remission samples and age matched controls. Her ultimate goal is to understand the immunological factors contributing to mental health disturbances and to innovate effective multidisciplinary treatment regimens.

Speaker Biographies (cont.)

Dr. Elizabeth Mellins is a Pediatric Rheumatologist and a Molecular Immunologist at Stanford University School of Medicine. She has focused her career on laboratory-based research on normal and disease-causing immune responses, including those in PANS. She received her MD degree at Harvard Medical School and completed a pediatric residency at the University of Colorado and the University of Washington. She did a fellowship in pediatric Rheumatology followed by a research fellowship in Immunology, both at the University of Washington. She holds board certifications in General Pediatrics and Pediatric Rheumatology. After being an Assistant Professor at the University of Pennsylvania, she moved to Stanford, where she is now a full Professor. She has served on the NIH Cellular and Molecular Immunology Study Section and has received research funding from the NIH, the Arthritis Foundation and other foundations, and several pharmaceutical companies. She has authored over 175 peer-reviewed publications and is an editor of the premier textbook in Pediatric Rheumatology. She was the founder and first Chairperson of the Childhood Arthritis and Rheumatology Research Alliance, an organization that now includes almost all Pediatric Rheumatology Divisions in the US and Canada. She is a Distinguished Fellow of the American Association of Immunologists. Dr. Mellins is committed to training young investigators and has received several mentoring awards.

Dr. Frankovich has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Dr. Mellins provides research support for GlaxoSmithKline, Codexis, Inc. and Genentech. All of the relevant financial relationships for this individual have been mitigated.

11:45 am – 12:30 pm CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Long-Lasting Behavioral and Anatomic Consequences of Exposure to Pathogenic NMDAR Antibodies in a Mouse Model



Samuel Pleasure, MD, PhD

Glenn W. Johnson, Jr. Memorial Endowed Chair, Professor, Department of Neurology, UCSF; Director Neuroscience Graduate Program, UCSF; Co-Director, Center for Encephalitis and Meningitis, UCSF

Presentation Synopsis

Autoimmune encephalitis associated with autoantibodies to NMDA receptors (NMDAR) is associated with psychosis, seizures, and memory disturbances in adults. In children with this syndrome, there are also prominent sensory and motor functional deficits that can last long after treatment. We established a mouse model of exposure to pathogenic, patient-derived antibodies to NMDAR that are associated with early anatomic circuit disruption and find that even a brief exposure to these antibodies in the first two postnatal weeks in mice leads to anatomic abnormalities and behavioral deficits that persist into adulthood. This model sheds important light on the pathophysiology of pediatric NMDAR autoimmune encephalitis and also suggests the mechanisms leading to persistent deficits.

Speaker Biography

Dr. Samuel Pleasure is the Glenn W. Johnson, Jr. Memorial Endowed Chair in Neurology at UCSF. Dr. Pleasure is a neurologist who specializes in caring for patients with multiple sclerosis. He also has expertise in caring for patients with epilepsy as well as years of experience in managing a variety of neurological conditions in both clinic and hospital settings. Dr. Pleasure has two main areas of inquiry for his research. He studies processes that regulate early brain development in both normal and diseased situations. He also studies autoimmune forms of meningoencephalitis, where inflammation in specific brain areas causes severe neurologic dysfunction. Dr. Pleasure received his medical degree and a doctorate in neuroscience from the University of Pennsylvania. He was chief resident during his neurology residency at UCSF, where he then completed a research fellowship in neuroscience. He is a fellow of the American Neurological Association and a member of the American

Academy of Neurology, American Epilepsy Society, Society for Neuroscience, Society for Developmental Biology, and Cajal Club. He has won numerous awards for his research and received research funding from a wide variety of private, state, and federal sources. He has served in leadership roles in national organizations and in the UCSF Department of Neurology

Dr. Pleasure has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Lunch break | 12:30 – 1:30 pm CT

1:30 – 2:15 pm CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Untangling the Mystery of Nervous System Sequelae of COVID-19: What We Know and What We Need to Learn



Serena S. Spudich, MD

Gilbert H. Glaser Professor of Neurology; Chief, Neurological Infections and Global Neurology, Department of Neurology, Yale University School of Medicine; Co-director, Center for Brain & Mind Health

Presentation Synopsis

This talk will summarize the nascent understanding of the etiological underpinnings of nervous system post-acute sequelae of COVID-19. Lessons from clinical observations as well as knowledge gained from human clinical and translational investigation will be described. Limitations of existing studies and gaps in understanding will be highlighted. The talk will conclude with identification of key areas for future investigation and potential therapeutic interventions for these conditions.

Speaker Biography

Dr. Serena Spudich is the Gilbert H. Glaser Professor of Neurology and Chief, Division of Neurological Infections and Global Neurology at Yale University. Her clinical and translational research explores effects of HIV and other viral infections in the nervous system, focusing on effects of acute infection, antiviral and immune treatments, and cure strategies on viral pathogenesis and persistence in the central nervous system. She collaborates with colleagues of multiple disciplines in studies in the United States and in international settings, exploring questions of inflammation, injury, and viral reservoirs within the central nervous system. She has been active in the NIH-funded International AIDS Clinical Trials Group, co-leads the International NeuroHIV Cure Consortium, serves on the US DHHS Antiretroviral Treatment Guidelines Committee, CROI Program Committee, and currently serves as the Steering Committee Co-Chair for the NIH RECOVER study on long COVID. She also is a neurology physician who cares for patients with viral infections and neurological disorders in clinics at Yale.

Dr. Spudich has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.



Regulating the Brain from Its Borders

Anthony Filiano, PhD

Assistant Professor, Departments of Neurosurgery, Immunology, and Pathology, Marcus Center for Cellular Cures, Duke University; Scientific Director, Robertson Research Lab

Presentation Synopsis

The central nervous system (CNS) is an immune-privileged tissue that manages immunosurveillance at the meninges. In this presentation, Dr. Filiano will discuss how cell-to-cell communication in the meninges regulates CNS-directed immune cell trafficking.

Speaker Biography

The Filiano lab is investigating how cell interactions at the borders of the CNS regulate immune surveillance. In recent years, our appreciation of the meninges as a hub for neuroimmune communication has greatly increased and we now know that many classical immune processes take place in the meninges just outside the CNS. The meninges house a full complement of immune cells and lymphatic vessels that drain CNS-generated antigens and antigen presentation cells to lymph nodes. Work from the Filiano lab is uncovering novel pathways that regulate immune cell trafficking to the meninges and how immune signaling pathways, such as the IFN/STAT1 pathway, play important roles in maintaining brain homeostasis. Additionally, the lab is investigating how overactivation of these pathways contribute to CNS autoimmune diseases, like multiple sclerosis, and aim to develop novel cell-based therapeutics to limit CNS inflammation and promote remyelination.

Dr. Filiano is an inventor on intellectual property licensed to CryoCell. All of the relevant financial relationships for this individual have been mitigated.

Break | 3:00 – 3:15pm CT



Translingual Neural Stimulation in Patients with Multiple Sclerosis

Vivek Prabhakaran, MD, PhD

Professor (Tenured) of Radiology/Neuroradiology, Director of Functional Neuroimaging, Program Leader of Neuroimaging Research, Department of Radiology, University of Wisconsin School of Medicine and Public Health

Presentation Synopsis

This talk will focus on the effects of translingual neural stimulation in various patients with balance and gait deficits. We will look at the behavioral efficacy of translingual neural stimulation in Multiple Sclerosis, Traumatic Brain injury and other patients with balance and gait deficits. We will further examine neuroimaging evidence in terms of structural and functional data characterize the brain changes behind the effects of translingual neural stimulation.

Speaker Biography

Dr. Vivek Prabhakaran received his combined medical and doctoral degrees from Stanford Medical School with his doctoral work in cognitive neuroscience and functional neuroimaging. He went on to complete a combined residency-fellowship program in Neurology, Radiology, and Neuroradiology at Johns Hopkins Hospital with board certifications in both Radiology and Neurology. He joined the

faculty of University of Wisconsin–Madison in July 2008 as a professor in Neuroradiology and has affiliate appointments in Psychiatry, Neurology, and the Neuroscience Training Program. Dr. Prabhakaran's research laboratory focuses on developing fMRI and other multimodal neuroimaging methods and tools for neurotranslational research involving characterization and treatment of different brain lesions such as vascular lesions-stroke, tumors, and seizure pathology. His research accomplishments include multiple peer-reviewed journal publications including high profile seminal papers in *Nature*, *Nature Neuroscience*, *Journal of Neuroscience*, and *Journal of Neurophysiology*, and numerous presentations/symposiums at various regional, national, and international meetings which have made both an impact in the scientific as well as the public arena including coverage in NPR, BBC, CBS News, Scientific American, and other media.

Dr. Prabhakaran has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

4:00 – 4:45 pm CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Immunotherapy in Autoimmune Encephalitis



Sudarshini Ramanathan, BSc (Med), MBBS (Hons), FRACP, PhD

Neurology Staff Specialist, Concord Hospital, Sydney; Head, Translational Neuroimmunology Group, NHMRC Emerging Leadership Fellow (EL2), Associate Professor, Sydney Medical School; Faculty of Medicine and Health, University of Sydney

Presentation Synopsis

Dr. Ramanathan will review the existing evidence and approaches for the management of autoimmune encephalitis and highlight how understanding underlying disease immunobiology enables targeted treatment and a precision medicine approach.

Speaker Biography

Dr. Sudarshini Ramanathan is a neurologist and clinician-scientist, with subspecialty expertise in neuroimmunology. Dr. Ramanathan is a staff specialist neurologist at Concord Hospital in Sydney, and heads the Translational Neuroimmunology Group at the University of Sydney. She leads a translational fundamental science and clinical research program. She completed her PhD in neuroimmunology at the University of Sydney, and a post-doctoral fellowship at the University of Oxford working with the Oxford Autoimmune Neurology Group. Dr. Ramanathan has received 14 continuous years of NHMRC fellowship funding, and is currently an NHMRC Investigator Fellow. In 2013, Dr. Ramanathan established and has since been the lead investigator of the Australian and New Zealand MOGAD Study Group, which encompasses over 150 clinicians from 45 centers in Australasia, and she leads evaluation of a cohort of over 700 patients with myelin oligodendrocyte glycoprotein antibody-associated disease. In 2018 she initiated and, in collaboration with Professor Sarosh Irani, is co-lead investigator of an international LGI1 Antibody Encephalitis Study Group. She works with thirty experts from twenty international centers to record data on over 200 patients in order to develop therapeutic guidelines for this condition. Dr. Ramanathan leads a research program focused on understanding disease pathogenesis and improving the diagnosis and treatment of autoimmune neurological disorders including antibody-associated demyelination and autoimmune encephalitis.

Dr. Ramanathan is an advisor for UCB, received honorarium from Limbic Neurology, and was awarded National Health and Medical Research Council Australia Investigator Grant Fellowship for research. All of the relevant financial relationships for this individual have been mitigated.

MAY 19, 2023 AGENDA

(Times all listed in U.S. central time zone)

9:00 – 9:45am CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Immunopsychiatry – Evidence from Large-Scale Studies to Detailed Clinical CSF Studies



Michael Eriksen Benros, MD, PhD

Professor, Immuno-Psychiatry, Department of Immunology & Microbiology, Health and Medical Sciences, University of Copenhagen; Head of Research, Biological and Precision Psychiatry, Copenhagen Research Centre for Mental Health, Mental Health Centre Copenhagen, Copenhagen University Hospital

Presentation Synopsis

Utilizing Danish nationwide registers, we have consistently displayed that infections and autoimmune diseases increase the risk of developing severe mental disorders in a dose-response relationship, where the risk of severe mental disorders particularly increases with the number of infections exposed to and in a temporal manner. Utilizing large national biobank data, we have shown a small immunogenetic contribution with moderate correlation between the genetic susceptibility for infections and mental disorders. Moreover, at diagnosis there are elevated levels of inflammatory markers in the blood, and studies on the cerebrospinal fluid surrounding the brain have shown some evidence for elevated immune markers in the CSF and signs of disrupted blood-brain barrier in some of the patients. Interestingly, our meta-analyses of randomized clinical trials have shown that anti-inflammatory treatment seems to be effective for depression and depressive symptoms and to some extent also for psychotic disorders. However, studies identifying subgroups that would be most likely to respond to immune modulating add-on treatment are still warranted to pave the field forward.

Speaker Biography

Professor Michael E. Benros is chief physician and head of research on Biological and Precision Psychiatry at the Mental Health Centre Copenhagen, Copenhagen University Hospital and at the University of Copenhagen. He is recognized internationally for being at the forefront of the emerging field of ImmunoPsychiatry aiming to disentangle the role of the immune system in the development of severe mental disorders, combining immune exposures from the nationwide Danish registers, with immunogenetic investigations, and novel research on cerebrospinal fluid and blood obtained from biobank and clinical studies of patients with psychotic and affective disorders.

Dr. Benros has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

9:45 – 10:30am CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Autoimmunity in Postural Orthostatic Tachycardia Syndrome (POTS)



Taylor Doherty, MD, FAAAAI

Professor of Medicine, Interim Co-Chief, Division of Rheumatology, Allergy and Immunology, Department of Medicine, University of California, San Diego; Staff Physician, Allergy and Immunology, VA San Diego Health System

Presentation Synopsis

Dr. Doherty will discuss the role of autoimmunity in postural orthostatic tachycardia syndrome (POTS), a common form of dysautonomia, that is also commonly found in long-COVID-19 syndrome. Studies finding functional antibodies to muscarinic and adrenergic receptors will be presented along with the future of immunotherapy in POTS.

Speaker Biography

Dr. Doherty is a Professor of Medicine at UC San Diego and section chief of Allergy and Immunology. He cares for patients with asthma and allergies at UCSD and the Veterans Affairs Health System in San Diego. His laboratory investigates novel innate immune mechanisms of allergic inflammation in airway diseases. Funding of his studies is largely from NIH/NIAID and Veterans Affairs. He also has research funding from Dysautonomia International to study mitochondrial and immune dysfunction in postural orthostatic tachycardia syndrome. He developed a very personal interest in dysautonomia/POTS after being stricken over the last decade leading to multiple hospitalizations and having been severely disabled. After the discovery of an autoimmune component of his syndrome, he was successfully managed with immunotherapy, among other treatments.

Dr. Doherty has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Break | 10:30 – 11:00 am CT

11:00 – 11:45 am CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Autoimmune Psychosis: Towards Improved Diagnosis and Treatment



Thomas Pollak, PhD, MRCPsych

Clinical Lecturer, Section of Neuropsychiatry, Department of Psychosis Studies, Institute of Psychiatry, Psychology and Neuroscience, King's College London; Honorary Consultant Psychiatrist, South London and Maudsley NHS Foundation Trust

Presentation Synopsis

Dr. Pollak will discuss the evidence for autoimmunity playing an etiological role in psychotic disorders. He will describe the development of autoimmune psychosis as a diagnostic entity, and criteria that have been developed to diagnose this disorder in psychiatric settings. Finally, Dr. Pollak will explore how diagnosis of autoimmune psychosis might be improved, from attempts to identify a distinctive psychiatric phenotype to the discovery of new potential antibody targets and development of blood-based biomarkers.

Speaker Biography

Dr. Thomas Pollak is a Clinical Lecturer at the Institute of Psychiatry, Psychology and Neuroscience at King's College London and an honorary consultant neuropsychiatrist at South London and Maudsley NHS Foundation Trust.

He has set up and co-ran a joint multidisciplinary clinic dedicated to the assessment and management of patients with confirmed or suspected autoimmune encephalitis and other central nervous system autoimmune disorders at King's College Hospital, London. In Dr. Pollak's current work, he is attempting to improve the early detection of autoimmune psychosis as well as elucidating the brain mechanisms by which a self-reactive immune response might give rise to neuropsychiatric symptoms across a range of health and disease states. His other research interests include the role of infections in psychiatry, mechanisms of post-acute COVID syndrome (long covid), glutamatergic abnormalities in psychosis, and organic presentations in clinical neuropsychiatry.

Dr. Pollak has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

The Emerging Role of the Gut Microbiome in the Gut-Brain Axis and Neuroinflammation in PANS/PANDAS



Juliette C. Madan, MD, MS

Associate Professor, Pediatrics, Psychiatry, Epidemiology & Quantitative Biomedical Data Sciences, Department of Psychiatry, Division of Child and Adolescent Psychiatry, Dartmouth Hitchcock Medical Center, Geisel School of Medicine at Dartmouth



Pawel R. Kiela, DVM, PhD

Professor of Pediatrics and Immunobiology, PANDA Endowed Professor in Autoimmune Disease Research, Associate Director for Basic Science Research, Steele Children's Research Center, University of Arizona

Presentation Synopsis

The developing microbiome in early life plays a seminal role in shaping the immune system and balancing inflammation. As the immune system develops, the brain develops in parallel. The role of the intestinal microbiome in neurodevelopment and shaping brain and behavior provides an important window into an alterable aspect of neurodevelopment. Understanding the role of infection, post infectious shifts in the microbiome, and the relationship with inflammatory mediated neuropsychiatric illness is critical as we identify novel biomarkers for diagnostics, mechanisms behind disease, and opportunities for intervention.

Speaker Biographies

Dr. Madan is a physician scientist trained in pediatrics and psychiatry and is the Director of Research in the Division of Child Psychiatry at the Children's Hospital at Dartmouth. She is the Clinical Director of the Dartmouth Children's Environmental Health and Disease Prevention Research Center, and the focus of her research is on the developing microbiome in infants and children and the relationship to immune training and health outcomes that are alterable. She is a graduate of Brown University School of Medicine and trained in pediatrics followed by fellowship in neonatal-perinatal medicine at Tufts University, where she also completed a master's degree in clinical and translational research. She completed psychiatry training at Dartmouth to align her practice with her research focus on neurodevelopmental and neuroinflammatory conditions in childhood. Dr. Madan is an expert in the developing microbiome in large infant cohorts examining the relationship between exposures, the microbiome, and health outcomes (infectious disease risk, respiratory outcomes, and neurodevelopment). She is the founding co-director of the Psychiatry Immunology and Neurology Group at Dartmouth, which aims to provide clinical care and translational research initiatives in infection and inflammation mediated neuropsychiatric illnesses in children and young adults. Dr. Madan's lab is focused on the relationship between the gut microbiome and neurodevelopmental and neuropsychiatric outcomes and interventions such as nutritional, probiotic regimens and fecal transplant.

Dr. Pawel Kiela received his DVM degree from the Warsaw University of Life Science in Poland, followed by a PhD at the same university and the Lund University in Sweden in the developmental physiology of the gastrointestinal tract. He completed his postdoctoral training in the laboratory of Fayez K. Ghishan, MD at the University of Arizona, where he currently holds the rank of Professor of Pediatrics and Immunobiology, and PANDA Endowed Chair in Autoimmune Disease Research. His main research interest is autoimmune and autoinflammatory diseases, with particular focus on Crohn's disease and ulcerative colitis, gut microbiota, mucosal immunology, and extraintestinal manifestations of intestinal inflammation, including bone metabolism and gut-brain axis.

Dr. Madan has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Dr. Kiela has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Lunch break | 12:30 – 1:30 pm CT

Neuropsychiatric Lyme Disease: Symptoms, the Immune Response, and the Vagus Nerve



Brian A. Fallon, MD, MPH

Director of the Center for Neuroinflammatory and Somatic Disorders, Director of the Lyme and Tick-Borne Diseases Research Center, Columbia University

Presentation Synopsis

Dr. Fallon will describe the neuropsychiatric profile of Lyme disease, neuroimmune and neuroimaging findings, results from a nationwide epidemiologic study in Denmark assessing mental disorders and suicide after Lyme disease, and new directions in treatment, focusing on vagus nerve stimulation. Emerging neuropsychiatric findings in a related vector infection, Bartonella, will also be described.

Speaker Biography

Dr. Brian Fallon, Professor of Clinical Psychiatry, directs the Lyme and Tick-borne Diseases Research Center and the Clinical Trials Network for Tick-borne Diseases at Columbia University Irving Medical Center and directs the Center for Neuroinflammatory and Somatic Disorders at the New York State Psychiatric Institute. Dr. Fallon's work started with a focus on obsessive compulsive disorder and hypochondriasis and evolved into a focus on persistently symptomatic Lyme disease – a disorder which overlaps medicine, neurology, and psychiatry. Dr. Fallon has served on HHS, NIH and CDC review committees and given presentations to Congress and the Institute of Medicine. Dr. Fallon currently serves on the NIH RECOVER steering committee for clinical trials on Post-acute Sequelae of SARS CoV-2 Infection. Dr. Fallon has received numerous NIH, foundation, and industry grants to conduct studies of Lyme disease and other disorders. Dr. Fallon was principal investigator on the NINDS-funded study of post-treatment Lyme Encephalopathy which included neuroimaging (PET and MRI), neurocognitive testing, spinal fluid and blood studies, and antibiotic retreatment. The biorepository of samples at the Lyme Research Center has led to an array of diagnostic and biomarker investigations in collaboration with researchers around the country. Dr. Fallon's book entitled *Conquering Lyme Disease: Science Bridges the Great Divide* (Columbia Univ Press, 2018) summarizes the clinical challenges and latest scientific advances. Dr. Fallon, with his colleague Dr. Mara Kuveldina, is currently conducting a safety and feasibility study of transauricular vagus nerve stimulation for post-treatment Lyme Disease Syndrome.

Dr. Fallon has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Movement Disorders in Pediatric Inflammatory Brain Disease



Terence Sanger, MD, PhD

Vice President, Chief Scientific Officer, CHOC Children's Hospital; Professor of Electrical Engineering and Computer Science, UCI Samueli School of Engineering; Vice Chair for Research, Department of Pediatrics, UCI School of Medicine; Child Neurology and Movement Disorders, CHOC Children's Hospital, University of California, Irvine

Presentation Synopsis

Movement disorders including myoclonus, dystonia, chorea, ataxia, and eye movement abnormalities are frequently the presenting or defining symptoms of inflammatory brain disease in children. Importantly, inflammatory brain disease is one of the very few treatable causes of many of these movement disorders. Therefore, a close understanding of the clinical and physiological relationship

between these symptoms and underlying neuroinflammation is essential for appropriate diagnosis and clinical care. Dr. Sanger will review video cases, discuss the diagnostic workup, and offer some preliminary conjectures as to the mechanisms linking neuroinflammation and disorders of movement in children.

Speaker Biography

Dr. Terence Sanger holds an SM in Applied Mathematics (Harvard), PhD in Electrical Engineering and Computer Science (MIT), and MD (Harvard), with medical specialization in Child Neurology and Movement Disorders. He is currently Professor of Electrical Engineering at the University of California Irvine (UCI), Vice Chair of Research, Pediatrics, (UCI) Director of the Pediatric Movement Disorders Clinic and Deep Brain Stimulation Program at Children's Hospital of Orange County (CHOC), and the Vice President, Chief Scientific Officer at CHOC. Dr. Sanger is a member of CHOC's medical staff and is tenured faculty in the department of pediatrics at UC Irvine.

Prior to CHOC, Dr. Sanger served as Provost Professor in the biomedical engineering, neurology and biokinesiology departments at the University of Southern California. He was an attending neurologist at Children's Hospital Los Angeles, where he served as Director of the Pediatric Movement Disorders Program, the David Lee and Simon Ramo Chair in Health Sciences and Technology, and the Founding Director of the Health, Technology and Engineering Program at The University of Southern California. Previously, he was a tenured Professor of Child Neurology at Stanford University and on medical staff at Lucille Packard Children's Hospital.

Dr. Sanger's research focuses on understanding the origins of pediatric movement disorders from both a biological and a computational perspective. The primary goal of his research is to discover new methods for treating children with disorders of developmental motor control, including dystonia, chorea, ataxia, spasticity, and dyspraxia. His research includes computational neuroscience and large-scale neural circuit modeling of basal ganglia and cerebellum, nonlinear signal processing, machine learning, and control theory applied to robot models of motor disorders, and processing of electrophysiological data from children with implanted electrodes. Ongoing research also includes the development of electromyography-controlled soft exoskeleton orthotics for assistance with upper limb movement in children with cerebral palsy.

Dr. Sanger is on the Scientific Advisory Board for Cala Health. All of the relevant financial relationships for this individual have been mitigated.

Break | 3:00 – 3:15pm CT

3:15 – 4:00 pm CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Changing Landscape of Autoimmune Seizures and Epilepsy

Divyanshu Dubey, MD

Associate Professor of Neurology, and Laboratory Medicine and Pathology, Consultant, Department of Neurology, and Laboratory Medicine and Pathology, Mayo Clinic, Rochester



Presentation Synopsis

Immunotherapy remains the cornerstone of the treatment of autoimmune seizures/epilepsy. However, diagnosis and management of autoimmune seizures/epilepsy has evolved substantially in the last decade due to discovery of multiple autoimmune biomarkers. These biomarkers include neural specific autoantibodies, cytokine/chemokine profiles, and characteristic radiological and electroencephalographic features. Recognition of clinical and paraclinical characteristics associated with these autoantibody biomarkers is becoming critical in inpatient and outpatient neurology practices. Understanding the diagnostic potential and limitations of these autoantibody detection assays may aid managing clinicians in optimal utilization of available resources and timely immunotherapy initiation.

Speaker Biography

Dr. Divyanshu Dubey is an Associate Professor of Neurology and Laboratory Medicine & Pathology at Mayo Clinic, Rochester, MN. His research focus is central and peripheral autoimmune neurological conditions. This includes search for novel biomarkers and analysis of clinical and radiological features of autoimmune neurological disorders. He has played a crucial role in the discovery of multiple neural specific antibody biomarkers of autoimmune neurological disorders including KLHL11 IgG, LUZP4 IgG and Cavin-4 IgG. He has authored more than 120 peer reviewed articles in various high impact factor journals such as *NEJM*, *JAMA Neurology*, *Brain*, *Annals of Neurology*, and *Neurology*. He has been an invited speaker at multiple national and international conferences.

Dr. Dubey has consulted for UCB, Argenx, and Arialys. All of the relevant financial relationships for this individual have been mitigated.

4:00 – 4:45pm CT

Maximum of 0.75 AMA PRA Category 1 Credit(s)[™]

Microglia Specific Neural Circuit Defects in Repetitive Behaviors and Neuropsychiatric Conditions



Naveen Nagarajan, PhD

Postdoctoral Associate, Dr. Mario Capecchi Lab, Eccles Institute of Human Genetics, University of Utah

Presentation Synopsis

Dr. Nagarajan will discuss the corticostriatal circuit and its role in controlling repetitive behavior in a Hoxb8 mouse model of OCD-type repetitive grooming behavior. The Hoxb8 gene is expressed in 30% of the total microglia in the brain. Using optogenetic technology, Dr. Nagarajan will demonstrate that Hoxb8 microglia are optogenetically active and generate site specific behavior. Further, he will present findings that revealed that Hoxb8 microglia utilizes calcium signaling as a mechanistic way to communicate with neurons within the corticostriatal circuit. The studies provide insights into how proper function of microglia is essential for maintaining a healthy neural circuit required for optimal behavioral function and how genetic defects in microglia could alter neural circuit function and the behavioral output.

Speaker Biography

Dr. Naveen Nagarajan is a Postdoctoral Associate in the laboratory of Dr. Mario Capecchi at the Department of Human Genetics, University of Utah. His work is focused on investigating the microglia-neuronal interaction mechanisms and the neural circuit basis of repetitive behaviors in pre-clinical mouse models using multidisciplinary neuroscience areas that include genetics, behavioral, optogenetics, miniature fluorescence endoscopy, electrophysiological, and computational approaches.

Dr. Nagarajan received his PhD in chemistry, with specialization in biophysics and neuroscience from the Department of Membrane Biophysics, Max Planck Institute for Biophysical Chemistry in Goettingen, Germany, under the able guidance of Dr. Christian Rosenmund and Dr. Erwin Neher. He completed postdoctoral fellowships in cellular neuroscience in Mark Bear's lab at the Picower Institute for Learning and Memory at MIT and systems neuroscience at the Keck Center for Integrative Neuroscience at the University of California, San Francisco with Dr. Michael Merzenich. He joined Dr. Mario Capecchi's laboratory as a Postdoctoral Fellow in 2009 to investigate the role of Hoxb8 gene function in repetitive, anxiety, and social behavioral functions.

Dr. Nagarajan has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

4:45 CT

Closing

Hosts/Moderators



Anna Conkey

Executive Director and Founder, Neuroimmune Foundation

Ms. Conkey has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.



Lawrence Steinman, MD

Professor of Neurology and Pediatrics, Stanford University School of Medicine

Dr. Lawrence Steinman is Professor of Neurology, Neurological Sciences and Pediatrics at Stanford University. He was Chair of the Stanford Program in Immunology from 2001 to 2011. His research focuses on what provokes relapses and remissions in multiple sclerosis (MS), and on the quest for antigen specific therapy in autoimmune disease. Dr. Steinman was senior author on the 1992 *Nature* article that led to the drug Tysabri, approved for MS and Crohn's disease. He is currently applying insights from Tysabri to develop new therapies for neurodegenerative diseases, aimed at blocking macrophages and microglia from eating neurons and axons "in danger." Dr. Steinman graduated from Dartmouth College, Magna Cum Laude in Physics. His MD is from Harvard Medical School. He was a post-doctoral fellow in chemical immunology at the Weizmann Institute of Science. After neurology residency, he remained on the faculty in 1980. He has received numerous honors, including the John M. Dystel Prize in 2004, the Javits Neuroscience Investigator Award from the NINDS twice, the Charcot Prize in MS research, and the Cerami Prize in Translational Medicine. Dr. Steinman is a member of the National Academy of Sciences, and the National Academy of Medicine. Dr. Steinman cofounded several biotech companies, including Neurocrine, Atreca, 180 Life Sciences, 5 Integrin LLC, and Pasithea. He was a Director of Centocor from 1988 until its sale to Johnson and Johnson. He is a Director of BioAtla, an immune-oncology company, co-Executive Chair of 180 Life Sciences, and Executive Chair of Pasithea.

Dr. Steinman is a consultant for BristolMeyersSquibb, Atreca, Roche and Novartis. He also serves as a board member for Pasithea Therapeutics, 180 Life Sciences and Bio Alta. All of the relevant financial relationships for this individual have been mitigated.



Sam Pleasure, MD, PhD

Glenn W. Johnson, Jr. Memorial Endowed Chair Professor, Department of Neurology, University of California, San Francisco (UCSF) Director Neuroscience Graduate Program, UCSF; Co-Director, Center for Encephalitis and Meningitis, UCSF

Dr. Sam Pleasure is the Glenn W. Johnson, Jr. Memorial Endowed Chair in Neurology at UCSF. Dr. Pleasure is a neurologist who specializes in caring for patients with multiple sclerosis. He also has expertise in caring for patients with epilepsy as well as years of experience in managing a variety of neurological conditions in both clinic and hospital settings. Dr. Pleasure has two main areas of inquiry for his research. He studies processes that regulate early brain development in both normal and diseased situations. He also studies autoimmune forms of meningoencephalitis, where inflammation in specific brain areas causes severe neurologic dysfunction. Pleasure received his medical degree and a doctorate in neuroscience from the University of Pennsylvania. He was chief resident during his neurology residency at UCSF, where he then completed a research fellowship in neuroscience Pleasure is a fellow of the American Neurological Association and a member of the American Academy of Neurology, American Epilepsy Society, Society for Neuroscience, Society for Developmental Biology and Cajal Club. He has won numerous awards for his research and has received research funding from a wide variety of private, state and federal sources. He has served in leadership roles in national organizations and in the UCSF Department of Neurology.

Dr. Pleasure has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.



Eyal Muscal, MD

Section Chief, Pediatric Rheumatology, Baylor College of Medicine

Dr. Muscal is a pediatric rheumatologist with an MS Degree in Clinical Research whose activities include patient care, fellowship education, quality improvement, and clinical research. His research, quality improvement, and clinical interests include neurologic manifestations of systemic autoimmune disorders (primarily autoimmune encephalitis, NPSLE, APS, and CNS vasculitis), systemic vasculitides,

and patient-powered research in rare diseases. He is the Childhood Arthritis and Rheumatology Research Alliance (CARRA) registry PI and is the co-director of the CARRA autoimmune encephalitis work group. An increased portion of Dr. Muscal's clinical effort is spent on standardizing and enhancing the care of children with inflammatory brain disorders. As part of this effort, he has obtained additional training in advanced QI. During the COVID-19 pandemic he was one of his section's champions on the pathophysiology and treatment of MIS-C. This included providing educational sessions at his institution and to international audiences. Dr. Muscal has coordinated evidence-based guidelines for MIS-C at his institution and has insured timely, rational, and multi-disciplinary MIS-C care in both general floor and critical care areas. He is also the rheumatology lead for a joint cardiology-rheumatology clinic that follows MIS-C patients after hospital discharge. He is well suited to support institutional efforts regarding COVID-19 and MIS-C care and specifically the Artificial Intelligence COVID-19 Risk Assessment for Kids (AICORE-kids) program.

Dr. Muscal has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

ACTIVITY DIRECTOR

Anna Conkey

Executive Director and Founder, Neuroimmune Foundation

Ms. Conkey has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

PLANNING COMMITTEE MEMBER

Amy Malik, MD

Assistant Clinical Professor, Pulmonary and Critical Care Medicine, University of Wisconsin

Dr. Malik has no relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

LEARNING AND OUTCOME OBJECTIVES

- Report the cognitive and psychiatric effects that can occur post-infection.
- Learn how to accurately diagnose inflammatory brain conditions.
- Learn how to effectively treat inflammatory brain conditions.
- Recognize that neuropsychiatric sequelae can result from infections, autoimmune, and inflammatory conditions.
- Report the cognitive and psychiatric effects that can occur post-infection.
- Describe various inflammatory brain conditions.
- Describe appropriate treatments for patients with inflammatory brain conditions.
- List the various immune and inflammatory markers that can present in patients with inflammatory brain conditions.

ACCREDITATION / CREDIT DESIGNATION STATEMENT

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Wisconsin Medical Society and Neuroimmune Foundation. The Wisconsin Medical Society is accredited by the ACCME to provide continuing medical education for physicians.

The Wisconsin Medical Society designates this live activity for a maximum of 12 *AMA PRA Category 1 Credit(s)*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

SPONSORS

We are very grateful to the sponsors of this event who provided generous educational support, including the University of Wisconsin Hospital.



This conference is being hosted in memory of Bill Balsi Jr. who had a history of encephalitis and died following a COVID-19 infection in 2022.

In his memory, his family created the Bill Balsi, Jr. Scholarship fund which allows Nevada physicians to attend this conference free of charge.



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Neuroimmune Foundation is a 501(c)(3) non-profit organization dedicated to dramatically accelerating physician education of PANS, PANDAS, and encephalitis; significantly improving outcomes for individuals impacted by these disorders; providing meaningful support to families during their darkest days; and catalyzing research at an unprecedented pace.