

SYMPOSIA

All symposia will be held in the Walter E. Washington Convention Center.

THEME A: DEVELOPMENT

Developmental Origins of Neuronal Diversity in the Cerebral Cortex CME

Chair: Oscar Marin, PhD

Sunday, Nov. 12, 8:30–11 a.m.

Room: Ballroom B

The function of the cerebral cortex relies on a large variety of cell types, yet the developmental origins of this diversity are largely unknown. The symposium will discuss the role of developmental mechanisms in the generation of cellular diversity in the cortex of mice and humans. The session will focus on current efforts to reveal the diversity of progenitor cells and the identity of neuron-specific transcriptional programs as they dynamically unfold during development.

Impact of Zika Virus Infection in the Nervous System and Its Underlying Mechanisms CME

Chair: Guo-li Ming, MD, PhD

Co-Chair: Nenad Sestan, MD, PhD

Monday, Nov. 13, 8:30–11 a.m.

Room: Ballroom A

The World Health Organization declared a public health emergency of international concern on Feb. 1, 2016, due to a potential link between Zika virus and microcephaly and/or other neurological diseases. This symposium will discuss recent advances in our understanding of how Zika virus affects nervous system development and the underlying mechanisms that have been revealed using different model systems, including human fetal tissue, human pluripotent stem cell-derived organoids and neurospheres, and animal models.

Social Origins of Developmental Risk for Mental and Physical Illnesses CME

Chair: Judy L. Cameron, PhD

Co-Chair: Pat Levitt, PhD

Tuesday, Nov. 14, 1:30–4 p.m.

Room: Ballroom A

Young children experiencing intense adversity show profound changes in neural systems that regulate behavior and cardiovascular, metabolic, and immune function. This symposium will show the importance of timing of stress exposure, critical periods of intervention, and sex on various brain systems in young children, monkeys, and mice. The session will also focus on how changes in parental interaction with children can modify the long-term consequences of early-life stress exposure across species.

THEME B: NEURAL EXCITABILITY, SYNAPSES, AND GLIA

Assembly and Maintenance of the Peripheral Nerve Node of Ranvier in Development, Health, and Disease CME

Chair: Hugh J. Willison, PhD

Co-Chair: Peter J. Brophy, PhD

Monday, Nov. 13, 8:30–11 a.m.

Room: 146A

Nodes of Ranvier are the sites of saltatory conduction, a fundamental adaptation of myelinated axons. Our understanding of the molecular organization of the nodal region has rapidly advanced. Many components have been identified, as have the interactions among the axonal and glial molecules, accounting for the specialized features of nodal, paranodal, and juxtaparanodal domains. Human autoimmune neuropathies are diseases that target glial and axonal nodal proteins and glycolipids, leading to nodal disruption and conduction block. The symposium will comprise a broad overview of this area, including descriptions of the latest research findings from presenters' laboratories.

Unconventional NMDA Receptor Signalling CME

Chair: Per Jesper Sjöström, PhD

Co-Chair: Karen Zito, PhD

Tuesday, Nov. 14, 1:30–4 p.m.

Room: Ballroom C

In the classical view, postsynaptic NMDA receptors (NMDARs) act via calcium to signal coincidence detection in Hebbian learning. However, growing evidence shows that NMDARs can signal metabotropically, without the need for calcium influx. Moreover, NMDARs have been found presynaptically, where they do not act as Hebbian coincidence detectors. This symposium will highlight novel findings indicating how the NMDAR field needs to be expanded to include unconventional modes of NMDAR action.

THEME C: NEURODEGENERATIVE DISORDERS AND INJURY

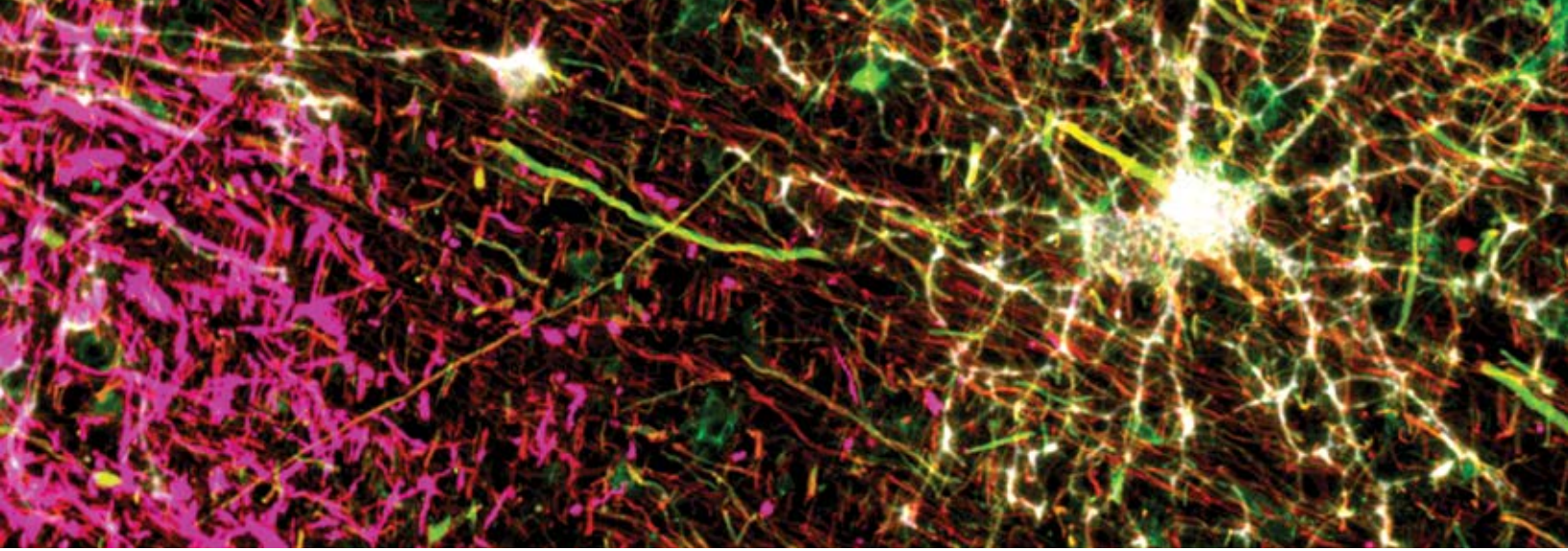
The Role of RNA Biology in Neurological Disease CME

Chair: Wenzhen Duan, MD, PhD

Sunday, Nov. 12, 8:30–11 a.m.

Room: Ballroom A

It has been increasingly recognized that RNA plays a pivotal role in the regulation of gene expression and neuronal function. This symposium will highlight advances in RNA biology and discuss the roles of RNA in neurological diseases, including repeat associated non-ATG translation, RNA metabolism, non-coding regulatory RNAs, and splicing factors. The symposium will provide new perspectives on how RNA biology guides strategies for therapeutic development in neurological diseases.



Neuroimmune Interactions:

A Status Change CME

Chair: Jorge Ivan Alvarez, PhD
Co-Chair: Jonathan Kipnis, PhD
Sunday, Nov. 12, 1:30–4 p.m.
Room: Ballroom A

Identifying the mechanisms regulating the influence of the immune system on the nervous system is critical to understanding brain health, behavior, cognition, and disease processes. In this symposium, a panel of expert scientists will describe how peripheral immune elements activate unique signaling pathways regulating neuronal function and how unique neurointrinsic signals shape the activity of leukocytes entering the central and peripheral nervous systems during homeostasis and disease.

Tau Homeostasis and Toxicity in Neurodegeneration CME

Chair: Li Gan, PhD
Co-Chair: Karen Ashe, MD, PhD
Tuesday, Nov. 14, 8:30–11 a.m.
Room: Ballroom A

Microtubule-binding protein tau has emerged as a central player in neurodegenerative diseases. Imbalanced tau proteostasis, characterized with accumulation and spread, is linked with neuronal and synaptic toxicity. The aim of the symposium is to discuss how tau proteostasis becomes dysregulated and how tau becomes toxic. The symposium will focus on the post-translational mechanisms as well as cell autonomous and non-cell

autonomous forms of regulation in both animal models and human stem cells.

Experimental Models Versus Reality of Neurological Disease CME

Chair: Werner Paulus, MD
Wednesday, Nov. 15, 8:30–11 a.m.
Room: Ballroom A

Experimental models of neurological disease are essential to better understanding disease pathomechanisms and to finding more effective treatments. Since models cannot reflect all aspects of human disease, they must be carefully selected, and results must be validated with human tissues. This symposium will outline the most recent neuropathological developments; discuss new models for Alzheimer's disease, ALS/FTLD, prion disease, and stroke; and compare experimental models with real (human) disease.

Illuminating Neural Circuits: From Molecules to MRI CME

Chair: Jin Hyung Lee, PhD
Co-Chair: Anatol C. Kreitzer, PhD
Wednesday, Nov. 15, 1:30–4 p.m.
Room: Ballroom A

The symposium will introduce cutting-edge experimental approaches for visualizing and manipulating neural circuits, novel circuit mechanisms, the role of circuit defects in neurological disease, and therapeutic approaches aimed at manipulating circuit mechanisms. The goal is to better understand the role of neural circuits in normal brain function

and how their impairment underlies neurological disease as well as to discuss our emerging ability to use this knowledge to develop therapeutics.

THEME D: SENSORY SYSTEMS

Cortical Plasticity Following Sensory Loss and Restoration CME

Chair: Stephen G. Lomber, PhD
Co-Chair: Amir Amedi, PhD
Sunday, Nov. 12, 1:30–4 p.m.
Room: Ballroom B

Studies of sensory loss and restoration are changing traditional views of cortical organization. Integrating animal and human models in addition to insight from the study of blindness and deafness, this symposium will discuss mechanisms of crossmodal plasticity in visual and auditory cortices throughout the lifespan, the role of critical periods, impact on perception and cognition, and how these changes influence the outcomes of sensory prosthetics.

THEME E: MOTOR SYSTEMS

Neural Mechanisms of Voluntary Action Control: From Habits to Intentionality in Animals and Humans CME

Chair: Itzhak Fried, MD, PhD
Monday, Nov. 13, 1:30–4 p.m.
Room: Ballroom A

This symposium will address the neural mechanisms underlying the capacity for internally-generated, voluntary action, that characterizes the motor systems of humans and some animals. Recent experimental

SYMPOSIA (CONT.)

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and modeling advances have rekindled neuroscientific interest in this classic topic. The symposium will cover animal models that have identified mechanisms for habitual and intentional action, as well as human studies that have both recorded and manipulated frontal processes underlying conscious volition. These advances are enabling the first computational models of volition.

THEME F: INTEGRATIVE PHYSIOLOGY AND BEHAVIOR

Central Network Dynamics Regulating Visceral and Humoral Functions CME

Chair: Rita J. Valentino, PhD

Co-Chair: Patrice G. Guyenet, PhD

Saturday, Nov. 11, 1:30–4 p.m.

Room: Ballroom B

The brain regulates visceral and immune functions to maintain internal homeostasis, optimally respond to a dynamic external environment, and integrate these functions with ongoing behavior. Using urological, gastrointestinal, and immune systems as examples, this symposium will show how advances in circuit dissection and manipulation and neural recordings across networks linking viscera to cortical regions are revealing how the brain performs this complex integration.

The Role of Extra-Suprachiasmatic Nucleus Brain Clocks in Circadian Regulation of Brain Function:

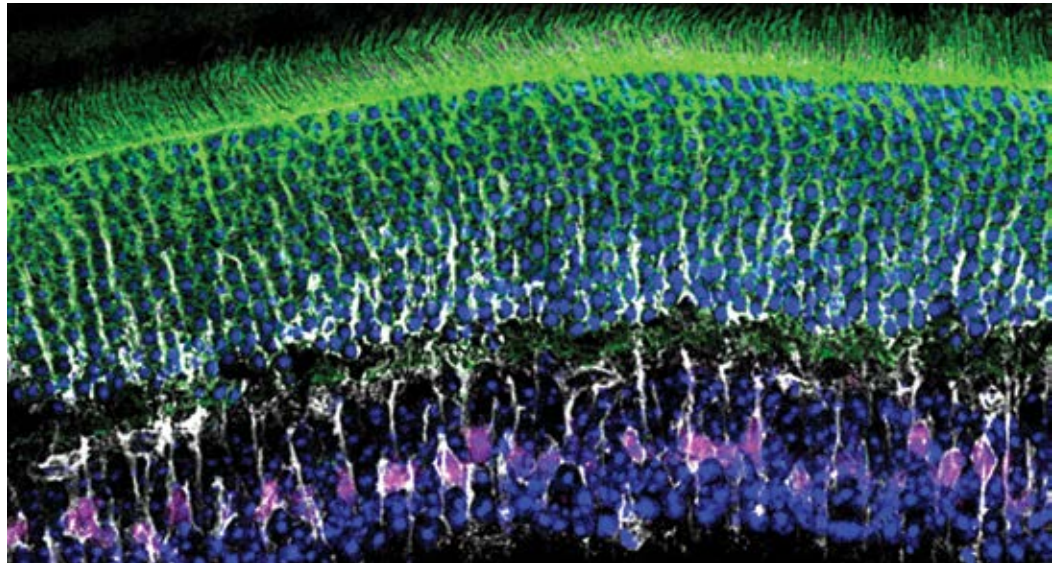
Time Matters! CME

Chair: Robert L. Spencer, PhD

Wednesday, Nov. 15, 8:30–11 a.m.

Room: Ballroom B

Although much has been learned about the operation of the “master clock” within the hypothalamic suprachiasmatic nucleus (SCN), only recently has there been significant progress in understanding how the SCN orchestrates circadian regulation of various brain processes. This symposium will present recent advances concerning the presence of operational molecular clocks throughout the



brain, mechanisms by which they are aligned with the SCN, and their functional relevance for learning, memory, and affective behavior.

THEME G: MOTIVATION AND EMOTION

From Salient Experience to Learning and Memory: Instructive Signals for Aversion and Reward CME

Chair: Joshua P. Johansen, PhD

Monday, Nov. 13, 1:30–4 p.m.

Room: Ballroom B

Aversive and rewarding experiences are translated by the nervous system into instructive signals that alter brain connectivity, producing learning and changes in behavior. Using modern circuit mapping, manipulation, and recording approaches, great progress has been made in understanding the neural mechanisms of instructive signaling. This symposium will provide an updated and interactive view on how aversive and rewarding instructive signals are constructed, coded, and transmitted.

Circuit and Synaptic Plasticity Mechanisms of Drug Relapse CME

Chair: Yavin Shaham, PhD

Tuesday, Nov. 14, 1:30–4 p.m.

Room: Ballroom B

Relapse is a core feature of drug addiction and a subject of intense basic research

investigation. The symposium will highlight new developments in our understanding of circuits and synaptic plasticity mechanisms of drug relapse from studies combining established and novel animal models with state-of-the-art cellular, electrophysiological, anatomical, chemogenetic, and optogenetic methods. The speakers will also discuss the translational implications of these new developments.

THEME H: COGNITION

Neuronal Adaptation and Behavioral Performance in Perceptual and Economic Decisions CME

Chair: Camillo Padoa-Schioppa, PhD

Saturday, Nov. 11, 1:30–4 p.m.

Room: Ballroom A

The implications of neuronal adaptation are more complex than classically recognized. In sensory systems, ambiguous firing rates may result in a “coding catastrophe”. In the representation of subjective values, uncorrected adaptation would induce arbitrary choice biases. These observations raise the question of whether adaptation is beneficial to the organism. The symposium will present recent work on perceptual and economic decisions showing that neuronal adaptation ensures optimal coding and thus increases behavioral performance.

BASIC-TRANSLATIONAL-CLINICAL ROUNDTABLES

Neural Correlates of Consciousness: Progress and Problems CME

Chair: Johan Storm, PhD

Co-Chair: Melanie Boly, MD, PhD

Wednesday, Nov. 15, 1:30–4 p.m.

Room: Ballroom B

Consciousness research is developing rapidly. Using evidence from brain injury in patients and physiological and behavioral studies in humans and related animals (single neuron, fMRI, EEG, TMS, intracranial recordings), the symposium will highlight how different conscious states and contents arise in the brain. Speakers will discuss different experimental approaches and theoretical frameworks as well as the medical and ethical relevance of this area.

THEME I: TECHNIQUES

Exciting New Tools and Technologies Emerging From the BRAIN Initiative CME

Chair: Joshua A. Gordon, MD, PhD

Tuesday, Nov. 14, 8:30–11 a.m.

Room: Ballroom C

The BRAIN Initiative seeks to reveal how brain cells and circuits dynamically interact in time and space to shape our perceptions and behavior. BRAIN investigators are accelerating the development and application of new tools and neurotechnologies to tackle these challenges. This symposium highlights advances that will enable exploration of how the brain records, stores, and processes vast amounts of information, shedding light on the complex links between brain function and behavior.

Hearing Loss, Brain Function, and Healthy Aging CME

Organizer: Frank R. Lin, MD, PhD

Monday, Nov. 13, 8:30–11 a.m.

Walter E. Washington Convention Center

Room: 206

Strategies to optimize healthy aging are imperative. From 2000 to 2050, the proportion of the world's population over age 60 will double from 11 percent to 22 percent. For the first time in history, the older adult population will be larger than the population of children under 14 years old. This session will discuss what constitutes healthy aging, explore hearing loss as an exemplar of a potential intervention target for optimizing healthy aging, and discuss the current and future role of neuroprostheses for hearing.

Advances and Challenges in Deep Brain Stimulation CME

Organizer: Andres M. Lozano, MD, PhD

Tuesday, Nov. 14, 8:30–11 a.m.

Walter E. Washington Convention Center

Room: 206

More than 160,000 patients have received deep brain stimulation (DBS), mostly for Parkinson's disease. This session will provide an overview of new DBS applications and discuss some of the emerging mechanisms of action and biological effects being discovered. The overall aim is to identify areas that require further exploration to optimize the DBS therapy and to develop novel indications for this technology.

Emerging Neuroimaging Biomarkers for Schizophrenia CME

Organizer: John Krystal, MD

Wednesday, Nov. 15, 8:30–11 a.m.

Walter E. Washington Convention Center

Room: 206

This session will introduce the development of neuroimaging biomarkers for schizophrenia. It will cover diagnostic and subtyping biomarkers, biomarkers of genetic risk for schizophrenia, neurochemical and molecular markers of pathophysiology, and pathophysiological biomarkers related to illness progression and treatment.

