

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

Neurodegenerative Diseases: Genes, Mechanisms and Therapeutics (EK48)

Scientific Organizers: Eric J. Huang, Alison Goate and Richard M. Ransohoff

Sponsored by BlueRock Therapeutics, Cell Research, Genentech, Ionis Pharmaceuticals, Inc. and Ultragenyx Pharmaceutical Inc.

NeuroImmune Interactions in Health and Disease (EK49)

Scientific Organizers: Beth Stevens, Jonathan Kipnis and Kate Monroe

June 7-9, 2021 • Virtual at your computer

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MONDAY, JUNE 7

Welcoming Remarks and Keynote Session (Joint) (7am Denver/Mountain Time Start)

***Eric J. Huang**, University of California, San Francisco, USA

***Beth Stevens**, Boston Children's Hospital, Harvard Medical School, USA

Akiko Iwasaki, Yale University School of Medicine, USA
Manipulating Immune Trafficking In and Out of the CNS

Christopher K. Glass, University of California, San Diego, USA
Exploiting Dynamic Enhancer Landscapes to Infer Pathogenic Mechanisms in Neurodegenerative Diseases

Disease Mechanisms and Therapeutic Targets (Joint) (8:10am Denver/Mountain Time Start)

Holly Kordasiewicz, Ionis Pharmaceuticals, USA
Antisense Oligonucleotides for the Treatment of Neurological Diseases

***Joseph W. Lewcock**, Denali Therapeutics, USA
Therapeutic Strategies for the Treatment of Neurodegenerative Disease Based on Human Genetics

***Kate Monroe**, Denali Therapeutics, USA
Enhancing Microglia Function with ATV:TREM2

Johan Luthman, Lundbeck, Denmark
Neuroimmunological Target Considerations - To Be or Not To Be in the Brain

Raz Dvir Szternfeld, Weizmann Institute of Science, Israel
Short Talk: TREM2-Independent Neuroprotection Mediated by Monocyte-Derived Macrophages in a Mouse Model of Alzheimer's Disease

Christiane D. Wrann, Massachusetts General Hospital, USA
Short Talk: Myokine Irisin Is a Critical Regulator of Cognitive Function

Elise Marsan, University of California, San Francisco, USA
Short Talk: Highly Conserved Glial Pathology and Human-Specific Neuronal Pathology Promote Neurodegeneration in FTL-GRN

Mapping Immune Cell States in Health and Disease (11am Denver/Mountain Time Start) (EK49)

***Francisco J. Quintana**, Harvard Medical School and the Broad Institute of MIT and Harvard, USA

***Beth Stevens**, Boston Children's Hospital, Harvard Medical School, USA
Mapping Microglia State to Function in Health and Disease

Burkhard Becher, University of Zürich, Switzerland
The T Cell-Myeloid Axis in Neuroinflammation

Shane Antony Liddelow, New York University Langone Medical Center, USA
Redefining Astrocytes States in Health and Disease

Kevin Guttenplan, Oregon Health & Science University, USA
Short Talk: Identification of a Novel Astrocyte Toxic Factor

Frederick Bennett, University of Pennsylvania, USA
Short Talk: Brain Macrophage Transplantation for Research and Therapy Development

From Therapeutic Targets to Clinic (11am Denver/Mountain Time Start) (EK48)

***Joseph W. Lewcock**, Denali Therapeutics, USA

***Charlotte J. Sumner**, Johns Hopkins School of Medicine, USA
The Evolving Challenges of Gene Targeted Therapeutics for SMA

Lorenz Studer, Memorial Sloan Kettering Cancer Center, USA
iPSC-Derived Dopaminergic Neurons and Parkinson's Disease Therapy

Priyanka Narayan, National Institute of Health, USA
Short Talk: Discovering and Reversing the Metabolic Consequences of APOE4 in iPSC-Derived Glia

Poster Session 1 (Joint) (1pm Denver/Mountain Time Start)

TUESDAY, JUNE 8

Genetic Contributions to Neurodegeneration (7am Denver/Mountain Time Start) (EK48)

***Valina L. Dawson**, Johns Hopkins University School of Medicine, USA

***Alison Goate**, Icahn School of Medicine at Mount Sinai, USA
Human Genetics Implicates Microglial Function in Alzheimer's Disease Risk

Jennifer Yokoyama, University of California, San Francisco, USA
Immune Contributions to Early-Onset Neurodegenerative Disease

Martine Therrien, Broad Institute, USA
Short Talk: Modeling the Impact of AD Genetic Risk on Microglia States and Function

Andy P. Tsai, Indiana University School of Medicine, USA
Short Talk: Impact of PLAG2 Alzheimer's Disease Risk Variants on Microglia Biology and Disease Pathogenesis

Neuroimmune Regulation of Sleep and Brain States (7am Denver/Mountain Time Start) (EK49)

***Jonathan Kipnis**, Washington University School of Medicine, USA

***Maria Lehtinen**, Harvard Medical School, USA

Maiken Nedergaard, University of Rochester, USA
Sleep Regulation and Disease Roles of the Glymphatic System

David M. Holtzman, Washington University, USA
APOE, Innate Immunity, and Neurodegeneration

Marco Colonna, Washington University School of Medicine, USA
ILCs and Sleep

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Constanze Martha Depp, Max Planck Institute for Experimental Medicine, Germany

[NOT AVAILABLE ON DEMAND] Short Talk: Aging-Associated Myelin Dysfunction Drives Amyloid Deposition in Alzheimer's Disease

Cellular Pathways Targeted by Neurodegeneration (8:20am Denver/Mountain Time Start) (EK48)

***Alison Goate**, Icahn School of Medicine at Mount Sinai, USA

***Valina L. Dawson**, Johns Hopkins University School of Medicine, USA

Mechanism of A-Synuclein-Mediated Neurodegeneration

Christian Hoffmann, German Center for Neurodegenerative Diseases - DZNE, Germany

Short Talk: Synapsin and Synaptic Vesicle Condensates Recruit alpha-Synuclein

Kathryn M. Hixson, UNC Chapel Hill, USA

Short Talk: Cerebellar Degeneration in ARSACS Disease Linked to Tau Hyperphosphorylation and Membrane-Protein Disruption

Noah Johnson, University of Colorado Anschutz Medical Campus, USA

Short Talk: Identification of Small Molecule Drugs that Target Apolipoprotein E4-Catalyzed Amyloid- β Fibrillization: A New Therapeutic Approach to Alzheimer's Disease

NeuroImmune Crosstalk at Brain Borders (8:30am Denver/Mountain Time Start) (EK49)

***Jonathan Kipnis**, Washington University School of Medicine, USA
Lymphatic System Function and Dysfunction

Michal Schwartz, Weizmann Institute of Science, Israel
Boosting Immunity to Combat Alzheimer's Disease

***Maria Lehtinen**, Harvard Medical School, USA
Imaging and Probing Choroid Plexus Influence on Brain Development and Function

Richard Daneman, University of California, San Diego, USA
Control of Blood Brain Barrier Development, Function and Dysfunction

Alec Walker, Boston Children's Hospital, USA
Short Talk: The Meninges Function as a Niche for B Lymphopoiesis in Early Life

Justin Rustenhoven, Washington University in St Louis, USA
Short Talk: Skull and Vertebral Bone Marrow Are Myeloid Cell Reservoirs for the Meninges and CNS Parenchyma

Glial Contributions to Neurodegeneration (10:05am Denver/Mountain Time Start) (EK48)

***Mathew M. Blurton-Jones**, University of California, Irvine, USA

Marco Prinz, University of Freiburg, Germany
Novel Genetic Tools for Studying Myeloid Cells in the CNS

Ádám Dénes, Hungarian Academy of Sciences, Hungary
Microglia Shape Neuronal and Vascular Responses via Compartment-Specific Purinergic Mechanisms

Anne Schaefer, Icahn School of Medicine at Mount Sinai, USA
Control of Neuron Activity by Microglia

***Michael T. Heneka**, German Center for Neurodegenerative Diseases, Germany
Inflammasome Activation in Alzheimer's Disease

Swati Mishra, University of Washington, USA
Short Talk: Depletion of AD Risk Gene Sortilin-Related Receptor (SORL1) Causes Cell-Type Specific Dysfunction of the Endo-Lysosomal Pathway in Human Neurons and Microglia – Implications in Alzheimer's Disease (AD)

Patrick W. Sheehan, Washington University in St. Louis, USA
Short Talk: Astrocytic BMAL1 Regulates Protein Aggregation in Mouse Models of Alpha-Synuclein and Tau Pathology

Sabina Tahirovic, Deutsches Zentrum für Neurodegenerative Erkrankungen e. V. - DZNE, Germany

Short Talk: Loss of NPC1 Enhances Phagocytic Uptake and Impairs Lipid Trafficking in Microglia

Immune Mechanisms of Synapse Function and Dysfunction (11:10am Denver/Mountain Time Start) (EK49)

***Beth Stevens**, Boston Children's Hospital, Harvard Medical School, USA

***Jonathan Kipnis**, Washington University School of Medicine, USA
Dorothy Schafer, University of Massachusetts Chan Medical School, USA

Neural-Immune Crosstalk at the Synapse

Betty Diamond, Feinstein Institute for Medical Research, USA
Autoimmune Mechanisms of Cognitive Dysfunction

Borislav Dejanovic, Broad Institute, USA
Short Talk: Synaptic Proteomics in an AD Mouse Model Reveals Complement-Dependent Synapse Elimination by Astrocytes

Susanna Rosi, University of California, San Francisco, USA
Short Talk: Novel Microglia-Mediated Mechanisms Underlying Synaptic Loss and Cognitive Impairment after Traumatic Brain Injury

Meet the Editors (Joint) (1:30pm Denver/Mountain Time Start)

Swapnika Ramu, Cell Press, USA

Gabriel A. Gasque, PLOS Biology, USA

Sophie Morgan, Nature Communications, UK

Tim Spencer, Journal of Cell Biology, USA

Networking Lounge (Joint) (2:30pm Denver/Mountain Time Start)

WEDNESDAY, JUNE 9

Phase Separation, Protein Aggregation and Transmission (7am Denver/Mountain Time Start) (EK48)

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*Eric J. Huang, University of California, San Francisco, USA

J. Paul Taylor, St. Jude Children's Research Hospital, USA
Phase Separation of RNA Binding Proteins in Neurodegeneration

Sjors Scheres, MRC Laboratory of Molecular Biology, UK
Cryo-EM Structures of Amyloid Filaments from Human Brain

*Virginia M. Y. Lee, University of Pennsylvania School of Medicine, USA

Tau and A-Synuclein Aggregation and Spreading

Alyssa Coyne, Johns Hopkins University School of Medicine, USA
Short Talk: Nuclear Accumulation of CHMP7 Initiates Nuclear Pore Complex Injury and Subsequent TDP-43 Dysfunction in Sporadic and Familial ALS

Roberta Romano, University of Salento, Italy
Short Talk: Role of RAB7A Mutations in Charcot-Marie-Tooth Type 2B Disease

Epigenetics and Transcriptomics of the Aging Brain (8:45am Denver/Mountain Time Start) (EK48)

*Richard M. Ransohoff, Third Rock Ventures, USA

*Li-Huei Tsai, Massachusetts Institute of Technology, USA
Transcriptomic Dissection of Alzheimer's Disease at the Single Cell Resolution

Philip L. De Jager, Columbia University Medical Center, USA
Epigenetics and Systems Biology of Alzheimer's Disease

Anne Brunet, Stanford University, USA
Neuro-Immune Interactions in the Aging Neurogenic Niche

Carlos Cruchaga, Washington University School of Medicine, USA
Short Talk: Multi-Tissue High-Throughput Proteomics Profiling for Neurodegenerative Disease

Hyo Won Ahn, National Institute of Child Health and Human Development, USA
Short Talk: Transposable Element Insertions Associated with Risk of Neurologic and Psychiatric Diseases

Immune Regulation of Brain Development and Behavior (7am Denver/Mountain Time Start) (EK49)

*Dorothy Schafer, University of Massachusetts Chan Medical School, USA

*Burkhard Becher, University of Zürich, Switzerland

Jonathan P. Godbout, Ohio State University, USA
The Impact of Social Stress on Immune Cell Trafficking and Neurobehavior

Sonia Garel, INSERM, France
Microglia and the Crossroads of Cortical Wiring and Environmental Signals

Gloria Choi, Massachusetts Institute of Technology, USA
Neuroimmune Interactions Shaping Social Behavior

Jeffrey Stogsdill, Harvard University, USA

Short Talk: Pyramidal Neuron Subtype Diversity Governs Microglia States in the Neocortex

Jiawei Chen, University of California, San Francisco, USA
Short Talk: Role of Microglia-Vasculature Interaction in Angiogenesis and Germinal Matrix hemorrhage in the Prenatal Brain

Jason Shepherd, University of Utah, USA
Short Talk: The Role of Virus-Like Intercellular Communication in Neuroinflammation

Modeling Neuro-Immune Interactions in Neurodegeneration (11am Denver/Mountain Time Start) (EK48)

*Li-Huei Tsai, Massachusetts Institute of Technology, USA

Fred H. Gage, The Salk Institute for Biological Studies, USA
Cerebral Organoids and Neurodegeneration

Hui-Hsin Tsai, Biogen, USA
Multiple Sclerosis Neurorepair – A Drug Discovery Perspective

*Mathew M. Blurton-Jones, University of California, Irvine, USA
Neuro-Immune Interactions in AD Models

Emmy Li, University of California, San Francisco, USA
Short Talk: CRISPRi-based Genetic Screens in iPSC-Derived 3D Neuron-Astrocyte-Microglia iAssembloids

T Cell Brain Communication (9:20am Denver/Mountain Time Start) (EK49)

*Dorothy Schafer, University of Massachusetts Chan Medical School, USA

*Burkhard Becher, University of Zürich, Switzerland

Anthony J. Filiano, Duke University, USA
T Cell-Neural Interactions in Health and Disease

Frauke Zipp, Johannes-Gutenberg-Universität Mainz, Germany
Immune Regulatory Processes within the Central Nervous System

Celia E. Shiao, University of North Carolina at Chapel Hill, USA
Short Talk: Neutrophil Trafficking to Brain Driven by Peripheral Inflammatory Macrophages Modulates CNS Control of Behavior

Stefan Bittner, University Medical Center Mainz, Germany, Germany
Short Talk: Direct Modulation of Neuronal Firing Patterns and Local Networks by Invading Lymphocytes

Ethan G. Hughes, University of Colorado Anschutz Medical Campus, USA

Short Talk: Microglia Engulf Myelin during Immune-Mediated Cortical Demyelination

Impact of Peripheral Signals and the Gut Brain Axis (10:55am Denver/Mountain Time Start) (EK49)

*Burkhard Becher, University of Zürich, Switzerland

Daniel Mucida, Rockefeller University, USA
Neuronal Regulation of Innate Immune Cells

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***Elaine Y. Hsiao**, University of California, Los Angeles, USA
The Microbiome as a Modifier of Environmental Risk for Cognitive Impairment

Henrique Veiga-Fernandes, Champalimad Research, Portugal
Neuronal Regulation of Innate Lymphoid Cells

Brian Kim, Washington University School of Medicine, USA
Neuroimmune Regulation of Itch

Francisco J. Quintana, Harvard Medical School and the Broad Institute of MIT and Harvard, USA
Microbial Regulation of Astrocyte Responses

Charlotte R. Wayne, Columbia University Irving Medical Center, USA
Short Talk: Mechanisms of Th17 Cell-Mediated Microglial Activation and BBB Dysfunction in Post-Infectious Basal Ganglia Encephalitis

Malu G. Tansey, University of Florida, USA
Short Talk: Colitis Disrupts Inflammatory Gene Networks and Nigrostriatal Integrity in the Brain and LRRK2 G2019S Mutant Mice Display Enhanced Vulnerability

Poster Session 2 (Joint) (1:30pm Denver/Mountain Time Start)

Career Roundtable (Joint) (2:30pm Denver/Mountain Time Start)

Holly Kordasiewicz, Ionis Pharmaceuticals, USA

Philip L. De Jager, Columbia University Medical Center, USA

Lorenz Studer, Memorial Sloan Kettering Cancer Center, USA