



Join Keystone Symposia  
for the 2016 conference on:

# Microglia in the Brain

June 12–16, 2016

Keystone Resort | Keystone, Colorado | USA

Scientific Organizers:

Beth Stevens and Richard M. Ransohoff

*Joint with the conference on **Common Mechanisms of Neurodegeneration***

*In the past five years, understanding of the origins and functions of microglia, the unique myeloid cells of the central nervous system (CNS) parenchyma, has proceeded at such a remarkable pace that it's as if an entirely new CNS cell type had been discovered. Since their discovery 100 years ago, it has been suspected that microglia are implicated in virtually all disorders of the nervous system. Associations of polymorphic variants of microglial genes have now proven this hypothesis. It is therefore rather urgent to engage investigators in developing a coherent account of the present status of microglial origins, physiological functions and aberrant properties in the diseased CNS. This meeting will further the objective of translating new information into research and treatment strategies. In many ways, the salient barriers in the field can be addressed by sharing fundamental understanding of complex organ systems among investigators. Microglial research is now conducted in parallel among three disciplines: leukocyte biology, neuroscience and immunology.*

*Session Topics:*

- Genetics to Pathogenesis
- Microglia Surveillance in Real Time: Lessons from *in vivo* Imaging
- Synaptic Pruning and Plasticity
- Role in Neurodevelopmental and Neuropsychiatric Disorders
- Microglia in Aging and Neurodegenerative Disease
- Profiling Resident Microglia in Health and Disease
- Microglial Regulation of Pain
- Special Lectures



Submitting an abstract is a great way of participating in the conference through poster presentation and possible selection for a short talk.

*Scholarship & Discounted Abstract Deadline: Feb 11, 2016*

*Abstract Deadline: Mar 10, 2016*

*Discounted Registration Deadline: Apr 12, 2016*

For additional details, visit [www.keystonesymposia.org/16Z4](http://www.keystonesymposia.org/16Z4).

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## Microglia in the Brain (Z4)

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## Common Mechanisms of Neurodegeneration (Z3)

Scientific Organizers: Bradley T. Hyman, Adriano M. Aguzzi and Ricardo E. Dolmetsch

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### SUNDAY, JUNE 12

#### Arrival and Registration

### MONDAY, JUNE 13

#### Welcome and Keynote Address (Z4)

\***Beth Stevens**, Children's Hospital Boston, USA

**Christopher K. Glass**, University of California, San Diego, USA  
*The Nature and Nurture of Macrophage Identity and Function*

#### Welcome and Keynote Address (Z3)

\***Bradley T. Hyman**, Massachusetts General Hospital, USA

**Laura Ranum**, University of Florida, USA  
*Repeat Associated Non-ATG (RAN) Translation: New Starts and Directions in Neurologic Disease*

#### Genetics to Pathogenesis (Z4)

\***Richard M. Ransohoff**, Third Rock Ventures, USA

**Zbigniew K. Wszolek**, Mayo Clinic College of Medicine, USA  
*Adult-Onset Leukoencephalopathy with Axonal Spheroids and Pigmented Glia due to CSF1R gene Mutations: Clinical, Radiological, Pathological and Genetic Correlations*

**Steven G. Younkin**, Mayo Clinic Jacksonville, USA  
*Association of Variants in Microglial Genes with Neurodegenerative Disease*

**Karel Otero Gutierrez**, Biogen, USA  
*Investigating the Functions of TREM2 in Neurodegeneration*

**Michael W. Salter**, Hospital for Sick Children and University of Toronto, Canada  
*Sexual Dimorphism in Microglia-Neuron Signaling in Pain Neuroplasticity*

#### Prions and "Prionoid" Molecules (Z3)

**Beat H. Meier**, ETH Zürich, Switzerland  
*Atomic-Resolution Structures of Amyloids: HET-s and Different Polymorphs of Amyloid Beta: What Can We Learn?*

\***Adriano M. Aguzzi**, University Hospital of Zürich, Switzerland  
*Prion Toxicity*

**Tuomas Knowles**, University of Cambridge, UK  
*Kinetics of Protein Aggregation*

**Kristen Anne Davenport**, Colorado State University, USA  
*Short Talk: Dissecting the Role of the PrP Amino Terminus in Species Barriers*

#### Microglia Surveillance in Real Time: Lessons from in vivo Imaging (Z4)

\***Marie-Ève Tremblay**, Laval University, Canada

**David Attwell**, University College London, UK

*An Ion Channel Regulating Microglial Surveillance of the Brain Parenchyma*

**Dimitrios Davalos**, Lerner Research Institute, Cleveland Clinic, USA  
*Microglial Responses to Blood Brain Barrier Breakdown*

**Francesca Peri**, European Molecular Biology Laboratory, Germany  
*Microglia Go Live: The Role Neuronal-Microglial Interactions in the Development and Repair of the CNS*

**Courtney N. Easley-Neal**, Eisai, USA  
*Short Talk: Cerebral Cortex Targeted Depletion of Microglia, via CSF1R Ligand Inhibition, as a Potential Approach to Mitigate Neurodegeneration in Alzheimer's Disease*

**Deborah Kurrasch**, University of Calgary, Canada  
*Short Talk: Microglia Influence Embryonic Development of Hypothalamic Energy Balance Centers*

#### Protein Templating and Spread of Neuropathology (Z3)

**Mathias Jucker**, Hertie-Institute for Clinical Brain Research and DZNE, Germany  
*Proteopathic Seeds in Neurodegenerative Diseases*

\***Bradley T. Hyman**, Massachusetts General Hospital, USA  
*Neuroanatomy and Consequences of Pathological Propagation in Neurodegeneration*

**Virginia M. Y. Lee**, University of Pennsylvania School of Medicine, USA  
*New Tauopathy Mouse Models for Alzheimer's Disease*

#### Poster Session 1

### TUESDAY, JUNE 14

#### Synaptic Pruning and Plasticity (Z4)

\***Staci Bilbo**, Harvard Medical School/MGH, USA

**Dorothy Schafer**, University of Massachusetts Medical School, USA  
*Microglia: Dynamic Sensors of Neural Activity and Regulators of Brain Plasticity*

**Rosa C. Paolicelli**, University of Lausanne, Switzerland  
*TDP-43 Loss in Microglia Promotes Phagocytosis and affects Synaptic Pruning and Motor Behavior in Adult Mice*

**Brian MacVicar**, University of British Columbia, Canada  
*Synaptic Sensing and Modulation by Microglia*

**Ryuta Koyama**, University of Tokyo, Japan  
*Short Talk: Fever Activates Microglia to Engulf Inhibitory Synapses in Epilepsy*

**Ukpong B. Eyo**, Mayo Clinic, USA  
*Short Talk: Bi-Directional Microglial-Neuronal Interactions During Glutamate-Induced Hyperactivity*

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### New Treatment Modalities (Z3)

**Christer Nordstedt**, Eli Lilly and Company, USA

*Future Alzheimer's Therapeutics*

\***Nathalie Isabelle Cartier-Lacave**, CEA MIRCen, France

*Gene Therapy Strategy for Alzheimer's Disease: The Cholesterol Connection*

**Douglas Golenbock**, University of Massachusetts Medical School, USA

*The Inflammasome Product IL18 Prevents Amyloid-Induced Fatal Seizures*

**Fyodor D. Urnov**, University of California, Berkeley, USA

*Targeted Genome Regulation for Neurodegenerative Disease Therapy*

**Claire E. Le Pichon**, NICHD, National Institutes of Health, USA

*Short Talk: Loss of Dual Leucine Zipper Kinase Signaling is Protective in the SOD1 Mouse Model of ALS*

**William J. Meilandt**, Genentech, inc., USA

*Short Talk: Loss of Dual Leucine Zipper Kinase Signaling is Protective in the PS2APP Mouse Model of Alzheimer's Disease*

### Poster Session 2

#### Workshop 1: Ontogeny and Development (Z4)

\***Florent Ginhoux**, Singapore Immunology Network, Singapore  
*Modeling Microglial Differentiation and Function in vitro using Induced Pluripotent Stem Cells*

**Morgane S. Thion**, INSERM U1024, France

*In utero Development of Microglia: Intrinsic Programs and Impact of Microbiota*

**Xianhua Piao**, Children's Hospital Boston, USA

*Microglial Transglutaminase-2 (TG2) Regulates Oligodendrocyte Development and CNS Myelination through GPR56 Signaling*

**Huixin Xu**, Harvard Medical School and Brigham and Women's Hospital, USA

*Environmental Enrichment Potently Prevents Microglia-Mediated Neuroinflammation by Human Amyloid Beta-Protein Oligomers*

#### Workshop 2: Models and Techniques I (Z4)

\***Dimitrios Davalos**, Lerner Research Institute, Cleveland Clinic, USA

**Steven Marinero**, Duke University, USA

*3D Brain Tissue-Based Model for Probing Contributions of Microglia and Peripheral Macrophages in Driving Neurodegenerative Disease Mechanisms*

**Susanna Rosi**, University of California, San Francisco, USA

*In vivo Metabolic Imaging of Neuroinflammation after TBI*

**Santiago Sole Domenech**, Weill Cornell Medicine, USA

*Intravital Imaging of Acidic Compartments in Mouse Brain Microglia*

### Role in Neurodevelopmental and Neuropsychiatric Disorders (Z4)

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

**Staci Bilbo**, Harvard Medical School/MGH, USA

*Modulation of Microglia by Maternal Immune Activation: Relevance for Autism*

**Mario R. Capecchi**, University of Utah, USA

*A Causal Role for Defective Microglia in the OCD-Spectrum Disorder, Trichotillomania*

**Beth Stevens**, Children's Hospital Boston, USA

*Microglia Function and Dysfunction During Brain Wiring*

### Role of Glia (Z3)

\***Don W. Cleveland**, University of California, San Diego, USA

*Mechanism and Therapy in ALS and Beyond*

**Shane Antony Liddelow**, New York University Langone Medical Center, USA

*What Do Reactive Astrocytes Do?*

**Serge Przedborski**, Columbia University, USA

*Molecular Mechanism of Motor Neuron Degeneration in Amyotrophic Lateral Sclerosis*

**Brian V. Lananna**, University of Washington in St. Louis, USA

*Short Talk: The Astrocyte Circadian Clock Regulates Astroglial and Neuronal Injury*

### WEDNESDAY, JUNE 15

#### Special Lecture (Z4)

**Marco Prinz**, University of Freiburg, Germany

*Origin and Function of CNS Macrophages*

### Microglia in Aging and Neurodegenerative Disease (Z4)

\***Thomas Möller**, Foundational Neuroscience Center, USA

**Marie-Ève Tremblay**, Laval University, Canada

*Dark Microglia: A New Phenotype Predominantly Associated with Pathological States*

**Gary E. Landreth**, Case Western Reserve University, USA

*Nuclear Receptors License the Phagocytic Clearance of Amyloid by Plaque-Associated Macrophages from the AD Brain*

**Daniel Wilton**, Boston Children's Hospital, Harvard Medical School, USA

*Short Talk: Microglia Mediate Early Loss of Specific Synaptic Connections in Huntington's Disease*

**Michelle K. Cahill**, University of California, San Francisco, USA

*Short Talk: Progranulin Deficiency Promotes Circuit-Specific Synaptic Pruning by Microglia via Complement Activation*



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### RNA and New Mechanisms of Toxicity (Z3)

**J. Paul Taylor**, St. Jude Children's Research Hospital, USA  
*Disturbed Phase Transitions Underlie Most Forms of ALS and FTD*

**Eva-Maria Hock**, University of Zürich, Switzerland  
*Short Talk: Understanding the Involvement of Cellular Stress in the Initiation of TDP-43 and FUS Pathology in Slice Culture Models*

**Maurice S. Swanson**, University of Florida, USA  
*Dynamic Mutations and RNA-Mediated Disease Mechanisms*

\***Magdalini Polymenidou**, University of Zürich, Switzerland  
*The Intertwined Roles of RNA Misregulation and Protein Aggregation in ALS and FTD*

**Josh T. Dubnau**, Stony Brook University, USA  
*Short Talk: The Retrotransposon Storm: Retrotransposon Activation Causes Neurodegeneration in a Drosophila TDP-43 Model of Amyotrophic Lateral Sclerosis*

### Panel: Career Development in Biotech and Pharma (Z4)

**Adam W. Bero**, Biogen, USA

**Irena Kadiu**, UCB BioPharma SPRL, Belgium

**Morag Stewart**, Intellia Therapeutics, USA

**Sean P. Cook**, Teva Pharmaceuticals, USA

**Peter S. DiStefano**, Zebra Biologics, Inc, USA

**Matthew Kennedy**, Merck Research Labs, USA

### Profiling Resident Microglia in Health and Disease (Z4)

\***Marco Prinz**, University of Freiburg, Germany

**Shane Antony Liddelow**, New York University Langone Medical Center, USA  
*Identification of Novel Microglia-Specific Markers in Healthy Mouse Brain*

**Joseph El Khoury**, Massachusetts General Hospital, USA  
*Deep Sequencing Brain Microglia Reveals Unique Molecular Fingerprints*

**Erik H.W.G.M. Boddeke**, University of Groningen, Netherlands  
*Human and Mouse Microglia Transcriptomes Related to Neurodegeneration and Aging*

**Brad A. Friedman**, Genentech, Inc., USA  
*Short Talk: The Transcriptional Landscape of Brain Myeloid Cells Reveals Gene Expression Responses Associated with Proliferation, Interferon Signaling and Neurodegeneration*

### Inflammatory Mechanisms (Z3)

**Gabor Veres**, Bluebird Bio, USA

*Clinical Study Update on the Efficacy and Safety of Ex Vivo Gene Therapy with Lenti-D Lentiviral Vector for the Treatment of Cerebral Adrenoleukodystrophy*

**Richard M. Ransohoff**, Third Rock Ventures, USA  
*(Re)Introducing Microglia*

**Jennifer Lee**, Johns Hopkins University, USA  
*Hypothermia and Rewarming Activate a White Matter Macrogial Unfolded Protein Response Independent of Hypoxia-Ischemia in a Piglet Model*

### Poster Session 3

#### THURSDAY, JUNE 16

### Microglia Regulation of Pain and Neuronal-Glia Interactions (Z4)

\***Francesca Peri**, European Molecular Biology Laboratory, Germany

**Richard M. Ransohoff**, Third Rock Ventures, USA  
*The Fractalkine Story: An Update*

**Sonia Garel**, INSERM, France

*Microglia and Prenatal Inflammation in the Development of Cortical Inhibitory Circuits*

**Amanda Sierra**, Achucarro Basque Center for Neuroscience, Spain  
*Short Talk: Of Ghost Cells and Ravenous Microglia: Coupling between Apoptosis and Microglial Phagocytosis in Health and Disease*

**Makoto Tsuda**, Kyushu University, Japan  
*Spinal Microglia Activated by Purinergic Signaling and Neuropathic Pain*

**Marzia Malcangio**, King's College London, UK  
*Neural-immune Interactions in Chronic Pain Mechanisms*

**Tuan Trang**, University of Calgary, Canada  
*Short Talk: Pain, Poppies, and Pannexin-1 Channels on Microglia*

### Unfolded Proteins (Z3)

\***Richard I. Morimoto**, Northwestern University, USA  
*Proteostasis Disruptions in Aging and Neurodegenerative Disease*

**David Eisenberg**, University of California, Los Angeles, USA  
*Structural Studies of Toxic and Non-Toxic Amyloid Proteins*

**Gordon P. Mearns**, West Virginia University, USA  
*Short Talk: Targeting PERK for Selective Immunomodulation in the CNS*

**Christoph Gericke**, University of Zurich, Switzerland  
*Short Talk: The Influence of Alzheimer's Disease-Like Cerebral Amyloidosis on Brain Immune Surveillance*

**David Christopher Wirthensohn**, University of Cambridge, UK  
*Short Talk: Detecting and Characterizing Individual Aggregates in Human CSF*

### Workshop 3: Models and Techniques II (Z4)

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\***Beth Stevens**, Children's Hospital Boston, USA

**Julien A. Muffat**, Whitehead Institute for Biomedical Research, USA  
*Modeling Neuro-Immune Interactions in CNS Disorders using Patient iPS-Derived Microglia-Like Cells*

**Ana Badimon**, Mount Sinai School of Medicine, USA  
*Brain Region Specific Microglia Specification*

**Edsel M. Abud**, University of California, Irvine, USA  
*Generating Microglia from Human iPSCs to Study Alzheimer's Disease*

**Petr Tvrdik**, University of Virginia, USA  
*Imaging and Analysis of Intracellular Calcium Dynamics in Cortical Microglia Responding to Injury*

### Brainstorming and Open Discussion (Z4)

\***Beth Stevens**, Children's Hospital Boston, USA

### Special Lectures (Z4)

\***Richard M. Ransohoff**, Third Rock Ventures, USA

**Adriano M. Aguzzi**, University Hospital of Zürich, Switzerland  
*Immunological Aspects of Prion Diseases*

**Thomas Möller**, Foundational Neuroscience Center, USA  
*Translating Microglial Biology: Promise and Problems*

### Synaptic Dysfunction in AD, Neurodegenerative Disease, and Developmental Disorders (Z3)

**Tara L. Spire-Jones**, University of Edinburgh, UK  
*Dynamic Synaptic Alterations Due to Amyloid Beta and Tau*

\***Ricardo E. Dolmetsch**, Novartis Institutes for BioMedical Research, USA  
*Synaptic Alterations as a Drug Target*

### Closing Keynote Address (Z3)

**Beth Stevens**, Children's Hospital Boston, USA  
*How Microglia Prune Specific Synapses in Health & Disease*

### Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Z4)

### Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Z3)

## FRIDAY, JUNE 17

### Departure