

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Innate Immune Memory: From Evolutionary Roots to Human Disease (X3)

Scientific Organizers: Mihai G. Netea, Shabaana A. Khader and Triantafyllos Chavakis

Sponsored by Astellas Pharma Inc., BioLegend, Inc. and Genentech, Inc.

## Myeloid Cells: From Birth to Immunity and Disease (X4)

Scientific Organizers: Venizelos Papayannopoulos, Claudia Jakubzick and Martin Guillems

March 6-9, 2022 • Fairmont Banff Springs • Banff, AB, Canada

Sponsored by AstraZeneca, Genmab A/S, Infinity Pharmaceuticals, Inc. and Takeda Pharmaceutical Company Limited

Scholarship Deadline: November 18, 2021 / Abstract Deadline: November 30, 2021 / Discounted Registration Deadline: February 2, 2022

### SUNDAY, MARCH 6

#### Arrival and Registration

### MONDAY, MARCH 7

#### Welcome and Keynote Address (X3)

\***Mihai G. Netea**, Radboud University, Netherlands

**Iliyan D. Iliev**, Weill-Cornell Medical College, USA

*Innate Immunity and Inflammation through the Prism of Gut Fungal Commensalism*

#### Welcome and Keynote Address (X4)

**Kathy D. McCoy**, University of Calgary, Canada

#### Innate Immune Memory: Evolutionary Aspects (X3)

\***Mihai G. Netea**, Radboud University, Netherlands

\***Uwe Conrath**, RWTH Aachen University, Germany

*Innate Immune Memory in Plants*

**Jorge Dominguez Andres**, Radboud University Nijmegen Medical Centre, Netherlands

*Transmission of Trained Immunity and Heterologous Resistance to Infections Across Generations*

**Michael Nash**, University of Colorado, Anschutz Medical Campus, USA

*Short Talk: Maternal Western Diet Programs Inflammatory Trained Immunity in Fetal and Juvenile Non-human Primates through Hematopoietic Stem Cells and Macrophages*

**Vinod Kumar Magadi Gopalaiiah**, Radboud UMC, Netherlands

*Short Talk: Genetic Modulators of Trained Immunity upon BCG Vaccination in Children from Guinea-Bissau*

#### Functional Specialization (X4)

**Martin Guillems**, Ghent University - VIB, Belgium

*Myeloid Specialization and Tissue Homeostasis*

**Carla V. Rothlin**, Yale University, USA

*TAMpering with Memories*

**Claudia Jakubzick**, Dartmouth College, USA

*Myeloid B Cell Cross-Talk*

**Erwan Pernet**, McGill University, Canada

*Short Talk: A New Player in Alveolar Macrophage Ontogeny: Neutrophils*

**Domien Vanneste**, Universite de Liege, Belgium

*Short Talk: Single Cell Analysis of Lung Interstitial Macrophage (IM) Niche Refilling Identifies Important Transcriptional Programs Driving IM Differentiation and Identity*

#### Workshop 1: Young Investigators Session (X3)

\***Lydia Kalafati**, TU Dresden, Germany

\***Eva Kaufmann**, Meakins-Christie Laboratories, Canada

**Kim A. Tran**, McGill University, Canada

*Cross-protection of BCG Vaccination in Influenza Infection: Training Adaptive Immunity?*

**Judith Austermann**, University of Muenster, Germany

*Chromatin Remodeling in Immune Tolerance of Monocytes*

**Siroon Bekkering**, Radboud University Medical Centre, Netherlands

*Trained Immunity, Inflammation and Subclinical Cardiovascular*

*Phenotypes in Children with Obesity*

**Hannah Theobald**, Life and Medical Sciences Institute, University of Bonn, Germany, Germany

*Environmentally Induced Lung-specific Innate Immune Training is Controlled by Apolipoprotein E and Dectin-1*

**Giulio Cavalli**, Vita-Salute San Raffaele University, Italy

*Maladaptive Activation of Trained Immunity in the Pathogenesis of Giant Cell Arteritis*

**Keke C. Fairfax**, University of Utah, USA

*Schistosome Induced Innate Metabolic Training: What's Sex Got to Do With It?*

**Anne E. Geller**, University of Louisville, USA

*The Induction of Trained Immunity in the Pancreas Incites Anti-tumor Activity to Control Pancreatic Cancer Progression*

#### Workshop: Young Investigators Session (X4)

**Carlos Hiroji Hiroki**, University of Calgary, Canada

*A Unique Subtype of Neutrophil Contributes to a Neuroimmune Crosstalk During Pulmonary Fibrosis*

**Pailin Chiaranunt**, University of Toronto, Canada

*Microbial Energy Metabolism Fuels an Intestinal Macrophage Niche*

**Sarah A. Dick**, University Health Network, Canada

*Cross-tissue Organization of Resident Macrophage Subsets*

**Jose M. Adrover**, Cold Spring Harbor Laboratory, USA

*A Vascular-restricted, Tumor-induced Neutrophil Population Drives Vascular Occlusion, Pleomorphic Necrosis, and Metastasis*

**Calum C. Bain**, University of Edinburgh, UK

*Defining the Molecular Control of Airway Macrophages in Health and Tissue Repair*

**Charlotte L. Scott**, University of Ghent & VIB, Belgium

*Defining Hepatic Macrophage Plasticity in Distinct Inflammatory Contexts*

**Shruti Sharma**, Tufts University School of Medicine, USA

*How Inflammation Tunes Tissue Resident Macrophage Vitality with Aging*

**Simon Yona**, Hebrew University, Israel

*The Kinetics and Lifespan of Human Dendritic Cell Subsets*

#### Trained Immunity in Vertebrates (X3)

\***Triantafyllos Chavakis**, Technische Universität Dresden, Germany

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Innate Immune Memory: From Evolutionary Roots to Human Disease (X3)

**Scientific Organizers:** Mihai G. Netea, Shabaana A. Khader and Triantafyllos Chavakis

*Sponsored by Astellas Pharma Inc., BioLegend, Inc. and Genentech, Inc.*

## Myeloid Cells: From Birth to Immunity and Disease (X4)

**Scientific Organizers:** Venizelos Papayannopoulos, Claudia Jakubzick and Martin Guillems

**March 6-9, 2022 • Fairmont Banff Springs • Banff, AB, Canada**

*Sponsored by AstraZeneca, Genmab A/S, Infinity Pharmaceuticals, Inc. and Takeda Pharmaceutical Company Limited*

*Scholarship Deadline: November 18, 2021 / Abstract Deadline: November 30, 2021 / Discounted Registration Deadline: February 2, 2022*

**Zhou Xing**, McMaster University, Canada

*Lung-resident Memory Macrophages and Host Defense*

**Mélanie Hamon**, Institut Pasteur, France

*Bacteria Mediated Histone Modifications and Lasting Impact*

**\*Elaine Fuchs**, Rockefeller University, USA

*Inflammatory Memory in Epithelial Stem Cells*

**Musa M. Mhlanga**, Radboud Institute for Molecular Life Sciences, Netherlands

*A Chromatin-regulated Biphasic Circuit Coordinates Inflammation and Trained Immunity*

**Bailee N. Kain**, Baylor College of Medicine, USA

*Short Talk: Central Trained Immunity is Heterogeneous and Cross-protective in a Mouse Model of M. avium Infection*

### Myeloid Cells in Cancer (X4)

**Maria Casanova-Acebes**, Spanish National Cancer Research Centre, Spain

*Tissue-Resident Macrophages Provide a Pro-Tumorigenic Niche to Early NSCLC*

**Lev Becker**, University of Chicago, USA

*Therapeutically Targeting Tumor-associated Macrophages*

**Catherine Hedrick**, La Jolla Institute for Immunology, USA

*Monocytes in Cancer*

**Matthew D. Park**, Icahn School of Medicine at Mount Sinai, USA

*Short Talk: Identification of SPP1+IL4I1+ Monocyte-derived Macrophages that Distinguish TMEs by Patient Age*

**Chen Varol**, Tel Aviv Sourasky Medical Center and Tel Aviv University, Israel

*Short Talk: COMMD10 Controls the Lifestyle and Life-span of Macrophages*

### Poster Session 1

#### TUESDAY, MARCH 8

#### Innate Immune Memory: Mechanistic Aspects (X3)

**\*Mélanie Hamon**, Institut Pasteur, France

**\*Katherine Y. King**, Baylor College of Medicine, USA

**Triantafyllos Chavakis**, Technische Universität Dresden, Germany

*Innate Immune Memory and Hematopoiesis*

**Menno P. J. de Winther**, Academic Medical Center, Netherlands

*Epigenetic Control of Macrophages*

**Maziar Divangahi**, McGill University, Canada

*TB and Bone Marrow Myelopoiesis*

**Christopher J. Cowley**, Rockefeller University, USA

*Short Talk: Establishment, Maintenance, and Recall of Inflammatory Memory*

**Samarth Hegde**, Icahn School of Medicine at Mount Sinai, USA

*Short Talk: How do Macrophages get Maladapted in Lung Cancers?*

**Anna Eleanor Ledwith**, Trinity Biomedical Sciences Institute, Ireland

*Short Talk: Reprogramming of Bone-marrow Myelopoiesis by  $\beta$ -glucan can Rescue the Immune-metabolic Impairments Induced by High-fat Diet*

### Regulation of Inflammation (X4)

**Yasmine Belkaid**, NIAID, National Institutes of Health, USA

*Immunity to the Microbiota Promotes Sensory Neuron Regeneration via IL-17A*

**Bart N. Lambrecht**, VIB, Ghent University, Belgium

*Myeloid Cells in Asthma*

**Steffen Jung**, Weizmann Institute of Science, Israel

*Probing Tissue Macrophage functions in Health and Disease*

**Marten A. Hoeksema**, Amsterdam UMC, Netherlands

*Short Talk: Mechanisms Underlying Divergent Responses of Genetically Distinct Macrophages to IL-4*

**Jessica Huang**, University of Washington, USA

*Short Talk: Dendritic Cell-mediated Regulation of Innate Cell Trafficking During Inflammation*

### Workshop 2: Young Investigators Session (X3)

**\*Cameron McAlpine**, Icahn School of Medicine at Mount Sinai, USA

**\*Shruti Naik**, New York University Langone Health, USA

**Elisa Jenthó**, Instituto Gulbenkian de Ciência, Portugal

*Heme Induced Trained Innate Immunity*

**Lydia Kalafati**, TU Dresden, Germany

*Innate Immune Training of Granulopoiesis: A Novel Tool in Cancer Immunotherapy*

**Eva Kaufmann**, Meakins-Christie Laboratories, Canada

*BCG Vaccination Provides Protection against IAV but not SARS-CoV-2*

**Allison M. Owen**, Vanderbilt University Medical Center, USA

*MYD88-Dependent Signaling Drives TLR-Mediated Trained Immunity and Infection Resistance Via Macrophage Reprogramming*

**Iñaki Robles-Vera**, CNIC, Spain

*Gut Microbiota Translocation Induces Trained Immunity in Bone Marrow Progenitors*

**Timo Rückert**, Deutsches Rheuma-Forschungszentrum, Germany

*Human Cytomegalovirus-Specific Adaptive NK Cells Are Maintained as Clonal Expansions with Divergent and Convergent Epigenetic Signatures*

**Alexandre Grant**, McGill University, Canada

*Trained Immunity Induction in Macrophages Requires the Reprogramming of Hematopoietic Stem Cells*

### Innate Immune Memory in Human Disease (X3)

**\*Musa M. Mhlanga**, Radboud Institute for Molecular Life Sciences, Netherlands

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Innate Immune Memory: From Evolutionary Roots to Human Disease (X3)

**Scientific Organizers:** Mihai G. Netea, Shabaana A. Khader and Triantafyllos Chavakis

*Sponsored by Astellas Pharma Inc., BioLegend, Inc. and Genentech, Inc.*

## Myeloid Cells: From Birth to Immunity and Disease (X4)

**Scientific Organizers:** Venizelos Papayannopoulos, Claudia Jakubzick and Martin Williams

**March 6-9, 2022 • Fairmont Banff Springs • Banff, AB, Canada**

*Sponsored by AstraZeneca, Genmab A/S, Infinity Pharmaceuticals, Inc. and Takeda Pharmaceutical Company Limited*

*Scholarship Deadline: November 18, 2021 / Abstract Deadline: November 30, 2021 / Discounted Registration Deadline: February 2, 2022*

\***Zhou Xing**, McMaster University, Canada

**Shruti Naik**, New York University Langone Health, USA  
*Trained Immunity and Cancer*

**Niels Peter Riksen**, Radboud University Medical Center, Netherlands  
*Trained Immunity and Atherosclerosis*

**Jordi C. Ochando**, Mount Sinai School of Medicine, USA  
*Trained Immunity and Transplantation*

**Katherine Y. King**, Baylor College of Medicine, USA  
*Interferon-Mediated Reprogramming of Hematopoietic Stem Cells*

**Claire D. Bourke**, Barts and the London School of Medicine and Dentistry, UK  
*Short Talk: Innate Immune Cell Function in Severe Acute Malnutrition*

### The Neuro-Immune Axis (X4)

**Benjamin Matthew Segal**, Ohio State University, USA  
*Immature Hematopoietic Myeloid Cells in Central Nervous System Repair*

**Jonathan Kipnis**, Washington University School of Medicine, USA  
*Brain Parenchymal Border Macrophages – Origin and Function*

**Claudia Han**, University of California, San Diego, USA  
*Short Talk: Gene Regulatory Networks Underlying Human Microglia Maturation*

**Maria Francesca Viola**, KU Leuven, Belgium  
*Short Talk: Neuro-immune Crosstalk in the Myenteric Plexus from Early Postnatal Development to Adulthood*

### Poster Session 2

### WEDNESDAY, MARCH 9

#### Trained Immunity in Vaccination (X3)

\***Maziar Divangahi**, McGill University, Canada

\***Menno P. J. de Winther**, Academic Medical Center, Netherlands

**Mihai G. Netea**, Radboud University, Netherlands  
*Trained Immunity Induced by Vaccines: Heterologous Protective Efforts*

**Shabaana A. Khader**, Washington University School of Medicine, USA  
*MMR Vaccination in COVID-19*

**Angela I. Bordin**, Texas A&M University, USA  
*Short Talk: Enteric Rhodococcus equi Protects against Pneumonia and Induces Expression of Trained Immunity-Related Genes in Neutrophils*

**Maria Lerm**, Linköping University, Sweden  
*Short Talk: DNA Methylation Profiling of Immune Cells from Tuberculosis-exposed Individuals Overlaps with BCG-induced Epigenetic Changes*

**Alisha Kang**, McMaster University, Canada

*Short Talk: Parenteral BCG Vaccination Induced Respiratory Mucosal-resident Memory Alveolar Macrophages Protect Against Bacterial Pneumonia via Regulating Innate Immune Responses*

**Stephanie Jost**, Duke University, USA  
*Short Talk: Human Natural Killer Cells Mediate Potent Influenza-specific Adaptive Responses Against Antigenically Distinct Influenza Strains that Rely in Part on the NKG2C/HLA-E Axis*

#### Myeloid Responses to Infection and Disease (X4)

**Paul Kubes**, University of Calgary, Canada  
*Spatiotemporal Control of Antimicrobial Responses*

**Andrés Hidalgo**, Fundación Centro Nacional de Investigaciones Cardiovasculares Carlos III, Spain  
*Neutrophils at the Borders*

**Venizelos Papayannopoulos**, Francis Crick Institute, UK  
*The Dark Side of Histones*

**David Sancho**, CNIC-Fundación Centro Nacional de Investigaciones Cardiovasculares, Spain  
*Mitochondrial Regulation of Macrophage Function*

**Philipp Henneke**, University-Medical Center Freiburg, Germany  
*Short Talk: Origin and Metabolic Rewiring of Dermal Macrophages Drive Immunity and Immune Memory in Bacterial Infection*

**Antonin Weckel**, University of California San Francisco, USA  
*Short Talk: Early Life Interactions Between Commensal Bacteria and Dermal CD301b+ cDC2s Facilitate Long-term Immune Tolerance to the Skin Microbiome*

#### Career Roundtable (Joint)

**Nandita Bose**, HiberCell, USA

**Andrés Hidalgo**, Fundación Centro Nacional de Investigaciones Cardiovasculares Carlos III, Spain

**Benjamin Matthew Segal**, Ohio State University, USA

**Keke C. Fairfax**, University of Utah, USA

**Niels Peter Riksen**, Radboud University Medical Center, Netherlands

#### Trained Immunity in Disease Treatment (X3)

\***Shabaana A. Khader**, Washington University School of Medicine, USA

\***Niels Peter Riksen**, Radboud University Medical Center, Netherlands

**Nandita Bose**, HiberCell, USA  
*Beta-Glucan in Cancer Treatment*

**Cameron McAlpine**, Icahn School of Medicine at Mount Sinai, USA  
*Sleep Exerts Lasting Effects on Hematopoietic Stem Cell Function and Diversity*

#### Sensing Self, Pathogens and Danger (X4)

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Innate Immune Memory: From Evolutionary Roots to Human Disease (X3)

Scientific Organizers: Mihai G. Netea, Shabaana A. Khader and Triantafyllos Chavakis

*Sponsored by Astellas Pharma Inc., BioLegend, Inc. and Genentech, Inc.*

## Myeloid Cells: From Birth to Immunity and Disease (X4)

Scientific Organizers: Venizelos Papayannopoulos, Claudia Jakubzick and Martin Guillems

March 6-9, 2022 • Fairmont Banff Springs • Banff, AB, Canada

*Sponsored by AstraZeneca, Genmab A/S, Infinity Pharmaceuticals, Inc. and Takeda Pharmaceutical Company Limited*

*Scholarship Deadline: November 18, 2021 / Abstract Deadline: November 30, 2021 / Discounted Registration Deadline: February 2, 2022*

**Sammy Bedoui**, University of Melbourne, Australia

*Integration of Innate Signals into T Cell Antiviral Immunity by DC*

**Petr Broz**, University of Lausanne, Switzerland

*Microbial Recognition and Cell Death*

**Tristan Kooistra**, Massachusetts General Hospital, USA

*Short Talk: Airway Epithelial Basal Stem Cells Establish a Niche for Intraepithelial Airway Myeloid Cells*

**Meihong Deng**, Ohio State University, USA

*Short Talk: TLR9 Signaling in Fibroblastic Reticular Cells Controls the Retention of Peritoneal Resident Macrophages*

### Closing Keynote Address (X3)

\***Shabaana A. Khader**, Washington University School of Medicine, USA

**Michael K. Skinner**, Washington State University, USA

*Environmental Induced Epigenetic Transgenerational Inheritance of Disease: Generational Immunology and Preventative Medicine*

### Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X3)

### Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X4)

## THURSDAY, MARCH 10

### Departure