

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Integrating Metabolism and Immunity (EK16)

Scientific Organizers: Marc Y. Donath, Tom Thuren, Bruce M. Spiegelman and Diane Mathis

Sponsored by AbbVie Inc., Astellas Pharma Inc., Cell Research, Merck & Co., Inc. and Novo Nordisk A/S

## Tumor Metabolism and the Microenvironment (EK14)

Scientific Organizers: Erik A. Sahai, Alec Kimmelman and Johanna A. Joyce

January 25-28, 2021 • Virtual at your computer

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### MONDAY, JANUARY 25

#### Welcoming Remarks and Keynote Address (8am Denver/Mountain Time Start) (EK16)

\***Diane Mathis**, Harvard Medical School, USA

\***Marc Y. Donath**, University Hospital Basel, Switzerland

**Bruce M. Spiegelman**, Harvard Medical School, USA

*Adipose Inflammation: Many Players and Many Regulatory Functions*

#### Welcoming Remarks and Keynote Address (8am Denver/Mountain Time Start) (EK14)

\***Erik A. Sahai**, Francis Crick Institute, UK

\***Alec Kimmelman**, New York University Langone Medical Center, USA

\***Johanna A. Joyce**, University of Lausanne, Switzerland

**Matthew G. Vander Heiden**, Massachusetts Institute of Technology, USA

*Impact of Nutrient Availability on Cancer Metabolic Dependencies*

#### Immunometabolism: The Metabolic View (8:40am Denver/Mountain Time Start) (EK16)

\***Janelle S. Ayres**, The Salk Institute for Biological Studies, USA

\***Diane Mathis**, Harvard Medical School, USA

*Control of Metabolism by Immune Cells*

**Vishwa Deep Dixit**, Yale University, USA

*Immunometabolic Regulation of Aging*

**Ana Domingos**, University of Oxford, UK

*Neuroimmunometabolism*

**Emily Vohralik**, UNSW Sydney, Australia

*Short Talk: Regulation of Adipose Tissue Beiging by Krüppel-Like Factor 3 (KLF3) and Eosinophils*

#### Metabolic Effects on the Immune System (8:40am Denver/Mountain Time Start) (EK14)

\***Erik A. Sahai**, Francis Crick Institute, UK

\***M. Celeste Simon**, University of Pennsylvania, USA

*Metabolic Symbioses in Stressful Tumor Microenvironments*

**Costas A. Lyssiotis**, University of Michigan, USA

*Metabolic Networks in the Tumor Microenvironment*

**Siva Karthik Varanasi**, The Salk Institute for Biological Studies, USA

*Short Talk: Tumor Metabolism Shapes Antigen Presentation and Adaptive Immune Responses*

**Hilary A. Collier**, University of California, Los Angeles, USA

*Short Talk: Cancer-Associated Stroma Requires Autophagy to Promote Tumor Growth by Maintaining Melanoma-Associated Fibroblasts and Suppressing Th1-Type Immune Responses*

**Eline C. Brombacher**, LUMC, Netherlands

*Short Talk: Activation of Nutrient-Sensor AMPK in Tumor-Associated Dendritic Cells Promotes Tolerogenic Responses and Compromises the Anti-Tumor Immunity*

#### The CNS Microenvironment (10:45am Denver/Mountain Time Start) (EK14)

\***Alec Kimmelman**, New York University Langone Medical Center, USA

**Frank Winkler**, University Hospital Heidelberg, Germany

*Brain Tumor Cells Interconnect to a Functional and Resistant Network*

**Johanna A. Joyce**, University of Lausanne, Switzerland

*Charting the Immune Landscape across Diverse Brain Cancers*

\***Michael E. Pacold**, New York University Medical Center, USA

*Brain Metastasis Adaptation to the Metabolic Niche of the Central Nervous System*

**Gino Ferraro**, Harvard Medical School, Massachusetts General Hospital, USA

*Short Talk: Fatty Acid Synthesis is Required for Breast Cancer Brain Metastasis*

#### Immunometabolism: The Immunologist View (10:20am Denver/Mountain Time Start) (EK16)

\***Vishwa Deep Dixit**, Yale University, USA

**Christoph Hess**, University Hospital Basel/University of Cambridge, Switzerland

*From Patient to Molecular Understanding of Immunometabolism*

**Luke A. J. O'Neill**, Trinity Biomedical Sciences Institute, Ireland

*Krebs Cycle Repurposed for Cytokines*

**Janelle S. Ayres**, The Salk Institute for Biological Studies, USA

*Metabolic Adaptations in Host-Microbe Interactions*

\***Ruth A. Franklin**, Harvard University, USA

*Stress Responses and Disease Tolerance*

**Katrin Andreasson**, Stanford University, USA

*Short Talk: Metabolic Reprogramming of Myeloid Cells Reverses Cognitive Decline in Aging*

#### Meet the Editors (Joint) (2pm Denver/Mountain Time Start)

**Ubaldo E. Martinez Outschoorn**, Thomas Jefferson University/Frontiers, USA

**Stephanie Ailsa Houston**, Journal of Experimental Medicine, USA

**Lise Roth**, European Molecular Biology Organization, Germany

**Catarina Sacristán**, Cell Press, USA

### TUESDAY, JANUARY 26

#### Clinical Translation: Unmet Needs (8am Denver/Mountain Time Start) (EK16)

\***Luke A. J. O'Neill**, Trinity Biomedical Sciences Institute, Ireland

\***Morris J. Birnbaum**, Pfizer Inc., USA

**Marina Mesquida**, F. Hoffmann-La Roche Ltd, Switzerland

*Anti-Inflammatory Treatment of Diabetic Eye Complications*

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**Marc Y. Donath**, University Hospital Basel, Switzerland  
*IL-1beta in Physiology and Treatment of Metabolic Diseases*

**Tom Thuren**, Novartis Pharmaceuticals, USA  
*Requirement to Implement Anti-Inflammatory Treatment of Cardiometabolic Diseases*

**Elena Carcarino**, INSERM, France  
*Short Talk: Epigenomic Regulation of IL-1B Enhancers in Type 2 Diabetes*

### Metastatic Colonisation (8am Denver/Mountain Time Start) (EK14)

\* **Johanna A. Joyce**, University of Lausanne, Switzerland

\* **Ruth Scherz-Shouval**, Weizmann Institute of Science, Israel

**Sarah-Maria Fendt**, VIB-KU Leuven, Belgium  
*Metabolic Rewiring Boosting Metastasis Formation*

**Mikala Egeblad**, Cold Spring Harbor Laboratory, USA  
*Activating a Collaborative Innate-Adaptive Immune Response to Restrain Metastasis*

**Matthew F. Krummel**, University of California, San Francisco, USA  
*Imaging the Tumor Microenvironment in Five Dimensions*

**Heather Christofk**, University of California, Los Angeles, USA  
*Targeting Cancer Asparagine Dependence*

**Kevin B. Walsh**, Genentech, USA  
*Short Talk: VEGF Blockade Augments CD8+ T Cell Activity by Amplifying Tumor Hypoxia*

### The Pancreatic Tumor Microenvironment (10:25am Denver/Mountain Time Start) (EK14)

\* **Johanna A. Joyce**, University of Lausanne, Switzerland

**Lewis C. Cantley**, Weill Cornell Medicine, USA  
*Insulin and Cancer*

\* **Mara H. Sherman**, Oregon Health & Science University, USA  
*Mechanisms and Consequences of Pancreatic Cancer Stromal Evolution*

**Andrea M. Amitrano**, University of Rochester School of Medicine & Dentistry, USA  
*Short Talk: Regulation of CD8+ T Cell Metabolism and Migration with Optogenetics*

**Patricia Altea Manzano**, VIB-KU Leuven Center for Cancer Biology, Belgium  
*[NOT AVAILABLE ON DEMAND] Short Talk: Environmental Fatty Acids Support Changes in Histone Acetylation that Promote Breast Cancer Metastasis*

**Felix Hartmann**, Stanford University, USA  
*Short Talk: Single-Cell Metabolic Regulome Profiling of Human Immune Cells in the Tumor Microenvironment*

**Tanya Schild**, Weill Cornell Medicine, USA  
*Short Talk: NADK Regulation by Oncogenic KRAS Signaling is Essential for PDAC*

### Insulin Production and Action (10:00am Denver/Mountain Time Start) (EK16)

\* **Marc Y. Donath**, University Hospital Basel, Switzerland

**Alan R. Saltiel**, University of California, San Diego, USA  
*Inflammatory Links Between Obesity and Energy Metabolism*

**Bruce Verchere**, University of British Columbia, Canada  
*Islet Amyloid Polypeptide and Islet Inflammation*

\* **Elise Dalmas**, INSERM, France  
*Innate Immunity in the Pancreatic Islet Niche*

**Feyza Engin**, University of Wisconsin-Madison, USA  
*Short Talk: Targeting Beta Cell Unfolded Protein Response in Type 1 Diabetes*

**Katia Monsorno**, University of Lausanne, Switzerland  
*Short Talk: Lactate Metabolism in the Control of Microglial Function*

### Poster Session 1 (12pm Denver/Mountain Time Start)

#### Career Roundtable (Joint) (1pm Denver/Mountain Time Start) (EK16)

**Donita C. Brady**, University of Pennsylvania, USA

**Matthew G. Vander Heiden**, Massachusetts Institute of Technology, USA

**Tom Thuren**, Novartis Pharmaceuticals, USA

### WEDNESDAY, JANUARY 27

#### Adipose Tissues (8am Denver/Mountain Time Start) (EK16)

\* **Elise Dalmas**, INSERM, France

\* **Bruce M. Spiegelman**, Harvard Medical School, USA

**Rinke Stienstra**, Wageningen University and RadboudUMC, Netherlands  
*Obesity and Diabetes: An Immunometabolic Perspective*

**Paul Cohen**, Rockefeller University, USA  
*The Adipose Tissue Microenvironment in Health and Disease*

**Jun Wu**, University of Michigan, USA  
*[NOT AVAILABLE ON DEMAND] Immune-Beige Adipocyte Communication*

**Inbar Shteinberg**, Tel Aviv University, Israel  
*Short Talk: Distinctive Effects of Alarmins S100A8 and S100A9 on Adaptive Thermogenesis*

**Katelyn D. Miller**, Wistar Institute, USA  
*Short Talk: Inhibition of Acetate Metabolism Enhances Host Anti-Tumor Immunity*

**Pegah Poursharifi**, University of Montreal-CRCHUM, Canada  
*Short Talk: Suppression of ABHD6 Promotes Healthy Expansion of Adipose Tissue in Obesity*

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### Identifying the Metabolic Dependencies of Cancer Cells (8am Denver/Mountain Time Start) (EK14)

\***Erik A. Sahai**, Francis Crick Institute, UK

**Karen H. Vousden**, Francis Crick Institute, UK  
[NOT AVAILABLE ON DEMAND] *Metabolic Control of Invasion and Metastasis*

**Eileen P. White**, Rutgers Cancer Institute of New Jersey, USA  
*Autophagy and Systemic Metabolism*

**Navdeep S. Chandel**, Northwestern University, USA  
*Mitochondrial Regulation of Cancer*

\***Donita C. Brady**, University of Pennsylvania, USA  
*New Sides for an Old Coin: Copper as an Intracellular Mediator of Autophagy via ULK1/2 Kinase Signaling*

### Therapeutic Targeting of Metabolism and the TME (10:10am Denver/Mountain Time Start) (EK14)

\***Erik A. Sahai**, Francis Crick Institute, UK

**Shannon J. Turley**, Genentech, Inc., USA  
*Evolving Stromal-Immune Axis in Cancer Immunology and Immunotherapy*

\***Marcia C. Haigis**, Harvard Medical School, USA  
*Dissecting the Tumor-Immune Metabolic Crosstalk in the Tumor Microenvironment*

**Valerie M. Weaver**, University of California, San Francisco, USA  
*Interplay between Tissue Fibrosis, Metabolic Reprogramming and Inflammation in Tumor Evolution*

**Natalya N. Pavlova**, Memorial Sloan Kettering Cancer Center, USA  
*Short Talk: Translation in Amino Acid-Poor Environments is Limited by tRNAGln Charging*

**Thomas Hanigan**, The Scripps Research Institute, USA  
*Short Talk: Small Molecule Inhibition of OXA1L Selectively Kills ZFH3 Mutant NSCLC from Imbalanced Cytidine Pool Expansion*

**Arin Aurora**, University of Texas Southwestern Medical Center, USA  
*Short Talk: Metastasizing Melanoma Cells Exhibit Increased Dependence on the Pentose Phosphate Pathway to Manage Oxidative Stress*

### Liver (10:10am Denver/Mountain Time Start) (EK16)

\***Gwendalyn J. Randolph**, Washington University, USA

\***Alan R. Saltiel**, University of California, San Diego, USA

**Michael Karin**, University of California, San Diego, USA  
*Mitochondrial DNA Metabolism and IL-1 Mediated Inflammation*

**Evanna Mills**, Dana-Farber Cancer Institute, USA  
*Thermogenic Fat as a Modifier of the Immune Response*

**Morris J. Birnbaum**, Pfizer Inc., USA  
*Therapeutic Approaches for the Treatment of Non-Alcoholic Fatty Liver Disease*

**Han Wang**, Ohio State University, Comprehensive Cancer Center, USA

*Short Talk: Neutrophil Extracellular Traps Promote the Differentiation of Tregs through Metabolic Reprogramming to Impair Cancer Immunosurveillance in NASH Liver*

**Sabine Daemen**, Washington University in St. Louis, USA  
*Short Talk: Recruited Monocyte-Derived Macrophages Regulate Hepatic Crown-Like Structure Formation and Liver Fibrosis in NASH*

**Jin Young Huh**, Seoul National University, South Korea  
*Short Talk: Tank-Binding Kinase 1 Regulates the Localization of acyl-CoA synthetase ACSL1 to Control Hepatic Fatty Acid Oxidation*

### THURSDAY, JANUARY 28

### Muscle/Cardiovascular (8am Denver/Mountain Time Start) (EK16)

\***Ana Domingos**, University of Oxford, UK

**Helga Ellingsgaard**, Centre for Physical Activity Research, Copenhagen, Denmark  
*IL-6, a Physiological Regulator of Adipose Tissue Mass in Humans*

\***Mark A. Febbraio**, Monash Institute of Pharmaceutical Sciences, Australia  
*Treatment of Type 2 Diabetes and Age-Related Sarcopenia with the Designer Cytokine IC7Fc*

**Amy J. Wagers**, Harvard University, USA  
*Stem Cell Metabolism and Muscle Regeneration*

**Shuang Zhang**, Harvard Medical School/Massachusetts General Hospital, USA

*Short Talk: Bone Marrow Adipocytes Fuel Fatty Acid Metabolism Directed Myelopoiesis after Myocardial Infarction*

**Dina Chokr**, INSERM, Centre de Recherche des Cordeliers, France  
*Short Talk: Impact of Histone Lysine Demethylase 6B on Adipose Tissue Macrophage Plasticity*

### Intercellular Signaling Networks in the TME (8am Denver/Mountain Time Start) (EK14)

\***Karin E. de Visser**, Netherlands Cancer Institute, Netherlands  
*How the Genetic Makeup of Breast Cancer Shapes the Immune Landscape*

\***Erik A. Sahai**, Francis Crick Institute, UK  
*Towards a Holistic Understanding of Tumor Architecture*

**Ruth Scherz-Shouval**, Weizmann Institute of Science, Israel  
*Transcriptional Heterogeneity of Cancer-Associated Fibroblasts in the Tumor Microenvironment*

**Hannah Bell**, University of Michigan, USA  
*Short Talk: Microbiota Metabolic Exchange Is Critical for Colorectal Cancer Redox Homeostasis and Growth*

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**Christina Schmidt**, University of Cambridge, UK

*Short Talk: TRACER, a 3D-Model to Study the Influence of the Microenvironment on the Metabolic Profile of Fumarate Hydratase-Deficient Cells*

### Metabolic Compartmentalisation (10:15am Denver/Mountain Time Start) (EK14)

\***Ralph J. DeBerardinis**, University of Texas Southwestern Medical Center, USA

*Compartmentalized Metabolism in Physiological States of Growth*

**Erika L. Pearce**, Johns Hopkins University, USA

*Metabolic Regulation of the Immune Metabolism*

\***Alec Kimmelman**, New York University Langone Medical Center, USA

*Metabolic Crosstalk in PDAC*

**Fabricio Loayza-Puch**, German Cancer Research Center, Germany

*Short Talk: Dual Ribosome Profiling Uncovers Metabolic Limitations in Distinct Cellular Populations of the Tumor Microenvironment*

**Marina Fukano**, Rosalind & Morris Goodman Cancer Research Centre, McGill University, Canada

*[NOT AVAILABLE ON DEMAND] Short Talk: Investigating Intra-Tumour Metabolic Heterogeneity in Triple-Negative Breast Cancer*

### Closing Remarks (12pm Denver/Mountain Time Start) (EK14)

### Networking Lounge (12:10pm Denver/Mountain Time Start) (EK14)

### Cardiovascular (10:05am Denver/Mountain Time Start) (EK16)

\***Paul Cohen**, Rockefeller University, USA

\***Michael Karin**, University of California, San Diego, USA

**Eicke Latz**, University of Bonn, Germany

*Pharmacological Modulation of Cellular Metabolism Controls Macrophage Metabolism*

**Gwendalyn J. Randolph**, Washington University, USA

*Immunity and Lipoprotein Trafficking*

**Matthias Nahrendorf**, Massachusetts General Hospital, USA

*Post-MI Emergency Hematopoiesis and Metabolism*

**Jan Van den Bossche**, Amsterdam UMC VUmc, Netherlands

*Short Talk: Macrophage ATP Citrate Lyase Deficiency Stabilizes Atherosclerotic Plaques*

**Enyuan Cao**, Monash University, Australia

*Short Talk: Mesenteric Lymphatic Dysfunction Promotes Insulin Resistance and Represents a Potential Novel Treatment Target in Obesity*

### Closing Remarks (11:50am Denver/Mountain Time Start) (EK16)

### Networking Lounge (12pm Denver/Mountain Time Start) (EK16)