

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

Tumor Metabolism and the Microenvironment (EK14)

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

Sponsored by AstraZeneca, Cell Research and Gilead Sciences, Inc.

Integrating Metabolism and Immunity (EK16)

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

January 25-28, 2021 • Virtual at your computer

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

MONDAY, JANUARY 25

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

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

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

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

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

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

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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

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

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

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

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

Donita C. Brady, University of Pennsylvania, USA

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

Tom Thuren, Novartis Pharmaceuticals, USA

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

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

Tom Thuren, Novartis Pharmaceuticals, USA

WEDNESDAY, JANUARY 27

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

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

***Elise Dalmas**, INSERM, France

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

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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

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

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

Poster Session 2 (2pm Denver/Mountain Time Start)

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

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

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

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

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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

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)