

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

Tuberculosis: Immunity and Immune Evasion (A2)

January 16-20, 2020 • Eldorado Hotel & Spa • Santa Fe, NM, USA

Scientific Organizers: Joel Ernst, Jennifer Philips and Daniel L. Barber

Part of the Keystone Symposia Global Health Series, supported by the Bill & Melinda Gates Foundation

Global Health Travel Award Deadline: August 13, 2019 / Discounted Abstract & Scholarship Deadline: September 24, 2019 / Abstract Deadline: October 16, 2019 / Discounted Registration Deadline: November 19, 2019

THURSDAY, JANUARY 16

Arrival and Registration

FRIDAY, JANUARY 17

Welcome and Keynote Address

***Joel D. Ernst**, University of California, San Francisco, USA

Eric Goosby, University of California, San Francisco / United Nations, USA

Global Solutions to Elimination of Tuberculosis: The Roles of Immunology and Vaccines

TB Vaccines and Vaccine Immunology

***Joel D. Ernst**, University of California, San Francisco, USA

Patricia A. Darrach, NIAID, National Institutes of Health, USA
Evaluating Mechanisms of Protection after Intravenous BCG Immunization in Nonhuman Primates

Thomas J. Scriba, University of Cape Town, South Africa
Immune Responses to Diverse TB Vaccines in Humans

Ann M. Ginsberg, Bill & Melinda Gates Foundation, USA
TB Vaccine Human Efficacy Trials: What Have We Learned? Where Are We Headed?

Poster Session 1

Workshop 1: Moving Beyond Th1 Immunity in TB

***Andrew Olive**, Michigan State University, USA

Shi-Hsia Hwa, Africa Health Research Institute, South Africa
Human Serum and Monoclonal Antibodies Can Inhibit Intracellular Mycobacterium Tuberculosis Growth and Promote Phagocyte Survival

Hao Li, China Agricultural University, China
Isolation and Functional Characterization of Fully Human Protective Monoclonal Antibodies Directed against the Surface of Mycobacterium tuberculosis

Rachel L. Tanner, University of Oxford, UK
Characterising the BCG-Induced Humoral Immune Response to Inform the Design of Improved TB Vaccines

Paula Ruibal, Leiden University Medical Center, Netherlands
Identification of Novel HLA-E Binding Mtb-Derived Peptides as Potential Vaccine Candidates

Shunsuke Sakai, NIAID, National Institutes of Health, USA
Immunoregulatory and Host-Protective Functions of MAIT Cells during Mycobacterium tuberculosis Infection

David M. Lewinsohn, Oregon Health & Science University, USA
Presentation of Mtb-Derived Antigens to MR1T Cells: A Unique Role for Endosomal Trafficking, and an Inhibitory Role for the MR1B Splice Variant

Michael C. Kiritsy, University of Massachusetts Medical School, USA
Dissecting Host Innate Immunity to Tuberculosis Using Engineered and Natural Genetic Variation

Daniel F. Hoft, St. Louis University, USA
A Human BCG Challenge Model to Assess TB Vaccines and Identify Immune Biomarkers

Impact of Host and Pathogen Diversity

***Thuong T. T. Nguyen**, Oxford University Clinical Research Unit, Vietnam

Chetan Seshadri, University of Washington, USA
IFN- γ -Independent Immune Markers of Mycobacterium tuberculosis Exposure

Sara Suliman, Brigham and Women's Hospital, USA
Human Genetic and Transcriptional Correlates of TB Progression

Shabaana Khader, Washington University School of Medicine, USA
Role of Innate Lymphoid Cells in Tuberculosis

Sarah M. Fortune, Harvard TH Chan School of Public Health, USA
Single Cell RNAseq Reveals Novel Correlates of TB Granuloma Fate

SATURDAY, JANUARY 18

Mechanisms of T Cell Protection

***Cheryl L. Day**, Emory University, USA

Marc K. Jenkins, University of Minnesota Medical School, USA
CD4+ T Cell-Based Control of a Phagosomal Pathogen

Cecilia S. Lindestam Arlehamn, La Jolla Institute for Allergy and Immunology, USA
T Cell Transcriptomics Reveal Immune Signatures of Tuberculosis

Daniel L. Barber, NIAID, National Institutes of Health, USA
Protective CD4 T Cell Responses to M. tuberculosis Infection

Paul Ogongo, University of California, San Francisco, USA
Compartmentalization of M. tuberculosis-Specific Human T-Cells in the Lung

Munyaradzi Nyasha Musvosvi, University of Cape Town, South Africa

Short Talk: Mycobacteria-Specific T Cell Receptor Clonotypes Associated with Mycobacterium tuberculosis Infection Outcome

Christine Nelson, NIAID, National Institutes of Health, USA
Short Talk: CD226 and CD28 Have Opposing Roles in the Generation of Lung-Homing CD4 T Cells during M. tuberculosis Infection

Workshop 2: Impact of Coinfections and Comorbidities on TB Immunity

***Blanca I. Restrepo**, University of Texas HSC Houston, Brownsville Campus, USA

Taryn A. McLaughlin, Emory University, USA
CD4 T Cells in Mycobacterium tuberculosis and Schistosoma Mansoni Co-Infected Individuals Maintain Functional TH1 Responses

Deepak Tripathi, University of Texas Health Science Center at Tyler, USA

IL-22 Produced by Type 3 Innate Lymphoid Cells (ILC3s) Reduces the Mortality of Type 2 Diabetes Mellitus (T2DM) Mice Infected with Mycobacterium tuberculosis

Mohau Steven Makatsa, University of Cape Town, South Africa
Characterization of Mtb-Specific Th22 Cells in HIV and TB Co-Infection

Susana Benet, Irsicaixa, Spain
Impact of Siglec-1 Variant on Disseminated Tuberculosis during HIV-1 Co-Infection

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Charles A. Scanga, University of Pittsburgh School of Medicine, USA
Vaccination with Intravenous BCG Confers Remarkable Protection from Tuberculosis in SIV+ Macaques

Robert Blomgran, Linköping University, Sweden
Beneficial Effects of Helminth Antigen Exposure for the Control of Mycobacterium tuberculosis Infection in Monocytes and Macrophages, Contrasting the Effect of Chronic Helminth Infection

Immunometabolism and Host-Directed Therapies

***Tom H. M. Ottenhoff**, Leiden University Medical Center, Netherlands

Amit Singhal, Singapore Immunology Network, Singapore
Reprogramming Host Immunometabolic Circuits for Designing TB HDT

Sarah A. Stanley, University of California, Berkeley, USA
Metabolic Regulation of Macrophage Activation during Mtb Infection

Jennifer Philips, Washington University School of Medicine, USA
Targeting Host Metabolism to Treat TB

Jeffrey M. Collins, Emory University School of Medicine, USA
Short Talk: Tryptophan Catabolism Reflects Disease Activity and Treatment Response in Latent Infection and Active Disease Caused by Mycobacterium tuberculosis

Katharina Ronacher, University of Queensland, Australia
Short Talk: Identification of a Putative Target for Host-Directed Therapy: A Cholesterol Receptor Regulates Interferons and Bacterial Growth during M. tuberculosis Infection

Hua Yang, Shanghai Pulmonary Hospital, Tongji University School of Medicine, China
Short Talk: Interception of Host Fatty Acid Metabolism by Mycobacteria Under Hypoxia to Suppress Anti-TB Immunity

Poster Session 2

SUNDAY, JANUARY 19

Lessons from Beyond TB

***Sarah A. Stanley**, University of California, Berkeley, USA
Steven M. Holland, NIAID, National Institutes of Health, USA
Are Infections in the Lung and Outside it the Same? Host Factors in Mycobacterial Tissue Specificity

Nevil J. Singh, University of Maryland, USA
The Signaling Logic Regulating T Cell Responses to Persistent Antigens

David L. Sacks, NIAID, National Institutes of Health, USA
Dermis Resident Macrophages are Maintained as a Replicative Niche for Leishmania in a Th1 Immune Environment

Haina Shin, Washington University, USA
Distinct Host Restriction of HSV-1 and HSV-2 Genital Herpes

Lara Mittereder, Food and Drug Administration, USA
Short Talk: Primed Lymphocytes That Control Intramacrophage Bacterial Replication Shift Metabolism toward Glycolysis

Erika J. Hughes, Duke University, USA
Short Talk: Single-Cell RNA-Seq of Zebrafish Granulomas Reveals Altered Cell Composition and Inflammatory Expression Profiles Associated with Dysregulated Eicosanoid Signaling

Ya-Ting Wang, Washington University School of Medicine, USA
Short Talk: Redefining the Role of Autophagy in Infectious Disease

Mechanisms of T Cell Evasion

***Daniel L. Barber**, NIAID, National Institutes of Health, USA

Joel D. Ernst, University of California, San Francisco, USA
Partners of T Cells: Functional Diversity of Mononuclear Phagocytes in Chronic M. tuberculosis Infection

Samuel M. Behar, University of Massachusetts Medical School, USA
Differential Presentation of M. tuberculosis Antigens to T Cells During Priming and Chronic Infection

Kevin B. Urdahl, Seattle Children's Research Institute, USA
Barriers to Immunity in the TB Granuloma

Björn Corleis, Friedrich-Loeffler Institute, Germany
Short Talk: Tobacco Smoke Leads to Recruitment of Inflammatory Monocytes into the Alveolar Space and Accelerates Growth of Mycobacterium Tuberculosis

Ana Beatriz Enriquez, Emory University, USA
Short Talk: Mycobacterium tuberculosis Modulation of Notch Ligand Expression Impedes Dendritic Cell-T Cell Crosstalk and Limits Th17 Polarization

Poster Session 3

MONDAY, JANUARY 20

Pathogen Determinants of Immune Evasion

***Jennifer Philips**, Washington University School of Medicine, USA
Steven A. Porcelli, Albert Einstein College of Medicine, USA
Mycobacterial PE_PGRS Proteins in Evasion of Innate and Adaptive Immunity

Olivier Neyrolles, IPBS, CNRS-University of Toulouse, France
C-Type Lectin Receptors in Immunity to Tuberculosis

Maximiliano Gutierrez, Francis Crick Institute, UK
Mycobacterium tuberculosis Evasion of Xenophagy in the Cytosol of Host Cells

Oren S. Rosenberg, University of California, San Francisco, USA
TB from the Inside Out: Structural Biology of ESX Secretion

Volker Briken, University of Maryland, USA
Short Talk: A Molecular Mechanism of Mycobacterium tuberculosis Mediated Inflammasome Inhibition

Jeffrey Buter, University of Groningen, Netherlands
Short Talk: M. Tuberculosis Antacids Block Autophagy and Promote Lipid Accumulation in Foamy Macrophages

Workshop 3: New Technologies and Models in TB Immunity

***Oren S. Rosenberg**, University of California, San Francisco, USA
Amanda J. Martinot, Tufts Cummings School of Veterinary Medicine, USA
Cyclic Immunofluorescence: in situ Multiplex Immunophenotyping of Cells in TB Granulomas

Erin F. McCaffrey, Stanford University, USA
Characterization of the Composition and Structure of Human Tuberculosis Granulomas with Multiplexed Ion Beam Imaging

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Sherry L. Kurtz, Food & Drug Administration, USA

Genetically Diverse DO Mice Are a Novel Model for Studying Tuberculosis Vaccines and for Defining Genetic Traits Associated with Vaccine-Induced Protection

Mohamed Ahmed, Africa Health Research Institute, South Africa
Sensing of Interferon-gamma by Mycobacterium tuberculosis

Paulo Bettencourt, University of Oxford, UK
Immunopeptidomics-Based Identification of Antigens Presented by MHC-I and MHC-II for Vaccines against Tuberculosis

Mark Hatherill, University of Cape Town, South Africa
Biomarker-Targeted Tuberculosis Preventive Therapy: A Randomized, Partially-Blinded Clinical Trial

Trained Immunity and Control of TB

Mihai G. Netea, Radboud University, Netherlands
Trained Immunity: A Memory for Innate Host Defense

Maziar Divangahi, McGill University, Canada
M. tuberculosis Reprograms HSCs to Limit Myelopoiesis and Impair Trained Immunity

Simone A. Joosten, Leiden University Medical Center, Netherlands
Trained Immunity in TB Exposure

***Alissa C. Rothchild**, Seattle Children's Research Institute, USA
Short Talk: Alveolar Macrophages Up-Regulate a Non-Classical Innate Response to Mycobacterium tuberculosis Infection in vivo

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

TUESDAY, JANUARY 21

Departure