KEYSTONE SYMPOSIA
on Molecular and Cellular Biology

Aging, Inflammation and Immunity (X2)

Scientific Organizers: Bonnie B. Blomberg and Graham Pawelec

This activity was supported by an educational grant from Celgene Corporation

Immunological Memory: Innate, Adaptive and Beyond (X1)

Scientific Organizers: Rafi Ahmed, Susan M. Kaech and Joseph C. Sun

February 25-March 1, 2018 • Hyatt Regency Austin • Austin, Texas, USA

Sponsored by AbbVie Inc. and EMD Serono Research and Development Institute, Inc.

Abstract & Scholarship Deadline: October 26, 2017 / Abstract Deadline: November 29, 2017 / Discounted Registration Deadline: December 21, 2017

SUNDAY, FEBRUARY 25

Arrival and Registration

MONDAY, FEBRUARY 26

Welcome and Keynote Session (Joint)

*__Rafi Ahmed__, Emory University School of Medicine, USA

*__Bonnie B. Blomberg__, University of Miami School of Medicine, USA

__Rino Rappuoli__, GlaxoSmithKline Vaccines, Italy
Vaccines 2018

__Vishwa Deep Dixit__, Yale University, USA
Immunometabolic Regulation of Healthspan

Lifestyle, Epigenetics, Interventions (X2)

*__Vishwa Deep Dixit__, Yale University, USA

__Nir Barzilai__, Albert Einstein College of Medicine, USA
Moving to Translational Geroscience

__Manel Esteller__, Belvitge Biomedical Research Institute (IDIBELL), Spain
Cancer Epigenetics: From Knowledge to Applications

__Valter D. Longo__, University of Southern California, USA
Dietary Interventions

__Duygu Ucar__, The Jackson Laboratory, USA
Short Talk: The Chromatin Accessibility Signature of Human Immune Aging Stems from CD8+ T Cells

__Leena Bharath__, Boston University, USA
Short Talk: Effects of Metformin on Aging-Related Immune Cell Dysfunction

Initial Reactions: Forming Innate Memory (X1)

*__Steven L. Reiner__, Columbia University, USA

__Lewis L. Lanier__, University of California, San Francisco, USA
NK Cells Remember

__Joseph C. Sun__, Memorial Sloan Kettering Cancer Center, USA
Immunological Memory in Innate Lymphocytes

__Yasmine Belkaid__, NIAID, National Institutes of Health, USA
Homeostatic Immunity to the Microbiota

__Fadi G. Lakkis__, University of Pittsburgh, USA
Short Talk: Specific Monocyte Memory to Allogeneic MHC Mediated by Paired Immunoglobulin Receptors (PIR)

__Samantha B. Larsen__, Rockefeller University, USA
Short Talk: Inflammatory Memory Sensitizes Skin Epithelial Stem Cells to Tissue Damage

Longitudinal Studies on Aging and Immunity (X2)

*__Daniela Frasca__, University of Miami, USA

__Graham Pawelec__, University of Tübingen, Germany
Immune Parameters Associated with Mortality in the Elderly Are Context-Dependent: Lessons from Sweden, Holland and Belgium

__Luigi Ferrucci__, NIA, National Institutes of Health, USA
Blood Inflammatory Mediators and Aging: Causes and Consequences

__Allison E. Aiello__, University of North Carolina at Chapel Hill, USA
Stress, Immunity, Infection and Cellular Aging in Population-Based Studies

__Rebecca G. Reed__, University of Kentucky, USA
Short Talk: Stress, Cytomegalovirus, and Immunosenescence: A Longitudinal Study of Older Adults

CD8 T Cell Memory (X1)

*__Rafi Ahmed__, Emory University School of Medicine, USA

__Ananda W. Goldrath__, University of California, San Diego, USA
Identification of Molecules Essential for CD8+ T Cell Residency in Non-Lymphoid Tissues and Tumors

__Dirk Hans Busch__, Technical University Munich, Germany
Lineage Tracing of Memory CD8 T Cell Development

__Steven L. Reiner__, Columbia University, USA
Metabolic Ambivalence and the Logic of Immunologic Memory

__Scott N. Mueller__, University of Melbourne, Australia
Short Talk: Lymphoid Stromal Cells Support CD8 T Cell Priming and Memory

__Henrique Borges da Silva__, University of Minnesota, USA
Short Talk: The Extracellular ATP Receptor P2RX7 Controls Metabolic Fitness of Long-Lived Memory CD8+ T Cells

Poster Session 1

TUESDAY, FEBRUARY 27

Mechanisms of Inflammaging (X2)

*__Janet M. Lord__, University of Birmingham, UK

__Judith Campisi__, Buck Institute for Research on Aging, USA
Cellular Senescence and Inflammaging

__Margaret M. Harnett__, University of Glasgow, UK
Short Talk: Can the Parasitic Worm Product ES-62 Protect against Diet-Associated Pathologies in Aging Male and Female Mice?

__Debbie Van Baarle__, National Institute of Public Health and Environment, Netherlands
Short Talk: Proinflammatory Microbial Profiles Associate with Respiratory Infections in Older Adults

__Daniela Frasca__, University of Miami, USA
Adipose Tissue, Inflammation and Aging

__Michael P. Cancro__, University of Pennsylvania, USA
Mechanisms that Regulate Age-Associated B Cell Formation and Survival

__Elizabeth A. Leadbetter__, University of Texas Health Science Center, USA
Short Talk: iNKT Cells Support Tbet+ B Cells in Adipose Tissue and Are Required to Limit Symptoms of Metabolic Disease

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CD4 T Cell Memory (X1)

*__Marion Pepper__, University of Washington, USA

__Shane Crotty__, La Jolla Institute for Allergy and Immunology, USA
T Follicular Helper (Tfh) CD4 T Cells, Germinal Centers and the Generation of Memory

__Marc K. Jenkins__, University of Minnesota Medical School, USA
Differentiation of CD4+ T Effector and Memory Cells during Bacterial Infection

__Mark R. Boothby__, Vanderbilt University Medical Center, USA
Hypoxia-Inducible Factors Regulate Metabolism and Function of B Cells and their Helpers in Antibody Responses

__Amy Weinmann__, University of Alabama at Birmingham, USA
Role for Metabolites in T Cell Differentiation Programs

__Lillian B. Cohn__, Chan Zuckerberg Biohub, USA
Short Talk: Clonally Expanded CD4+ T Cells Contribute to the HIV-1 Latent Reservoir and Display a Distinct Gene Signature upon Reactivation

__Raquel Furtado__, Albert Einstein College of Medicine, USA
Short Talk: Expansion of Circulating CXCR3loPD-1+CXCR5+ Memory CD4+ T Helper Cells Correlates with Clinical Protection against Human Malaria

Workshop 1 (X2)

*__Bonnie B. Blomberg__, University of Miami School of Medicine, USA

__Petra Burilova__, St. Anne´s University Hospital, Czech Republic
Accelerated Aging of Monocytes in Childhood and Adolescent Cancer Survivors

__Mati Mann__, California Institute of Technology, USA
Heterogeneous Responses of Hematopoietic Stem Cells to Inflammatory Stimuli Are Altered with Age

__Nick P. Goplen__, Mayo Clinic, USA
Non-Resolving Influenza Response in Geriatric Lungs

__Kylie Quinn__, Monash University, Australia
Survival of Naïve CD8 T Cells During Aging Is Controlled by Homeostatic Signaling and Metabolic Remodeling

__Michelle Ratliff__, University of Okalhoma Health Sciences Center, USA
Expression of the DNA-Binding Protein ARID3a, a Mediator of Human Hematopoiesis, Is Reduced in Hematopoietic Progenitors from Aged Individuals

__YanChun Peng__, University of Oxford, UK
Identifying Age-Associated Immune Signatures on Influenza-Specific Human Memory T Cells using Single-Cell RNASeq

__Bo Ruem Yoon__, Seoul National University College of Medicine, South Korea
SLC7A5-Mediated Leucine Influx Controls IL-1β Production via Glycolytic Reprogramming in Human Monocytes/Macrophages

__Juan I. Moliva__, Texas Biomedical Research Institute, USA
Natural Aging Is Associated with Decreases in Lung Fluid Innate Immune Protein Function Driving Susceptibility to Mycobacterium Tuberculosis Infection

Workshop 1: Memory I (X1)

*__Joseph C. Sun__, Memorial Sloan Kettering Cancer Center, USA

__Brian J. Laidlaw__, University of California, San Francisco, USA
The Eph-Related Tyrosine Kinase Ligand Ephrin-B1 Marks Germinal Center and Memory Precursor B Cells

__Anoma Nellore__, University of Alabama at Birmingham, USA
T-bet Expression by Influenza-Specific Human Memory B Cells Is Differentially Regulated by Vaccine Platform and Prior Host Immunity and Correlates with Long-Lived Antibody Responses

__Aakanksha Jain__, UT Southwestern Medical Center, USA
T Cell Intrinsic IL-1R Signaling Licenses Effector Cytokine Production by Memory CD4 T Cells

__Robin Stephens__, University of Texas Medical Branch, USA
Mechanisms of Maintenance of Protection from Persistent Malaria Infection by CD4 Effector Memory T Cells

__Thomas Ciucci__, NCI, National Institutes of Health, USA
The Development of Memory CD4 T Cells Relies on a Thpok-Dependent Circuitry-Antagonizing Exhaustion Program

__Ning Jenny Jiang__, University of Texas at Austin, USA
High-Throughput Single-Cell Linking of Antigen Specificities with T Cell Receptor Sequences using de novo Generated DNA-Linked MHC Tetramers

New Ways to Generate B Cell Memory (X1)

*__Shane Crotty__, La Jolla Institute for Allergy and Immunology, USA

__Mark J. Shlomchik__, University of Pittsburgh School of Medicine, USA
Heterogeneity of Memory B Cell Compartments

__David M. Tarlinton__, Monash University, Australia
Molecular Regulation of Germinal Center Responses and B Cell Memory

__Scott D. Boyd__, Stanford University, USA
B Cell Memory Repertoires in Vaccination and Infection

__Mary F. Fontana__, University of Washington, USA
Short Talk: Expansion of an FCRL5+ B Cell Subset Resembling Atypical Memory B Cells in an Animal Model of Malaria

__Ali H. Ellebedy__, Washington University School of Medicine, USA
Short Talk: Biphasic B Cell Responses to Adjuvanted H5N1 Influenza Virus Vaccination in Humans

Frailty, Morbidity, Mortality/Survival (X2)

*__Nir Barzilai__, Albert Einstein College of Medicine, USA

Janet M. Lord, University of Birmingham, UK
Exercise, Frailty, Inflammation and Aging

Janet E. McElhaney, Health Sciences North Research Institute, Canada
Frailty, Inflammation and Immunosenescence

Daniel Belsky, Duke University, USA
Quantification of Biological Aging: Implications for Clinical Trials and Extension of Healthspan

Leonard Daniël Samson, National Institute for Public Health and the Environment/ RIVM, Netherlands
Short Talk: The Relationship between Frailty, Disease and the Development of Immunosenescence over a Time Span of More than 20 Years

Poster Session 2

WEDNESDAY, FEBRUARY 28

Immunosenescence and Diseases (X2)

*__Judith Campisi__, Buck Institute for Research on Aging, USA

*__Michael P. Cancro__, University of Pennsylvania, USA

Jorg J. Goronzy, Stanford University School of Medicine, USA
MicroRNA Regulation of T Cell Aging

Janko Nikolich-Zugich, University of Arizona College of Medicine, USA
T Cell Rejuvenation Requires Multiple Steps to Restore Immune Function with Aging

Laura Haynes, UConn Health, USA
The Impact of Aging on Response to Influenza Infection

Russell C. Ault, Texas Biomedical Research Institute, USA
Short Talk: Age-Related Differences in Peripheral Immunity at Tuberculosis Diagnosis in Humans

Patricia J. Gearhart, NIA, National Institutes of Health, USA
Short Talk: Role of B Cells in Atherosclerosis

Immunoregulation (X1)

*__Ananda W. Goldrath__, University of California, San Diego, USA

Erika L. Pearce, Max Planck Institute of Immunobiology and Epigenetics, Germany
Mitochondrial Priming By CD28

Ronald N. Germain, NIAID, National Institutes of Health, USA
Using Multiplex Histocytometry to Relate Tissue Microanatomy to Immune Activation and Regulation

Ellen A. Robey, University of California, Berkeley, USA
What Makes a Protective Anti-Toxoplasma T Cell Response?

Susan M. Kaech, The Salk Institute, USA
Metabolic Control of Memory T Cell Lifespan

John R. Teijaro, The Scripps Research Institute, USA
Short Talk: Cytokine-Mediated Expansion of Follicular Cytotoxic T Cells

Kimberly S. Schluns, University of Texas MD Anderson Cancer Center, USA
Short Talk: Upregulating IL-15 in the Tumor Microenvironment Promotes Anti-Tumor Responses

Inflammation, Biomarkers of the Aging Immune System and Possible Treatments (X2)

*__Arne N. Akbar__, University College London, UK

Bonnie B. Blomberg, University of Miami School of Medicine, USA
B Cells, Inflammation and Aging in Vaccine Response

Susan L. Swain, University of Massachusetts Medical School, USA
Optimum Ag Presentation Can Counteract Age-Related Defects in CD4 T Cell Immunity and Lead to Better CD4 T and B Cell Effector and Memory Responses

Luca Pangrazzi, University of Innsbruck, Austria
Adaptive Immunity in the Bone Marrow in Old Age

Joan Mannick, resTORbio, USA
TORC1 Inhibition as a Potential Immunotherapy to Decrease Infections in the Elderly

Suresh Pallikkuth, University of Miami, USA
Short Talk: Frequency and Function of Antigen-Specific Peripheral T Follicular Helper Cells Are Impaired by Basal Immune Activation and Impact Flu Vaccine Response in Biologic Aging with and without HIV Infection

Imprinting Memory in Tissues (X1)

*__Linda S. Cauley__, University of Connecticut Health Center, USA

David B. Masopust, University of Minnesota, USA
Functions of Trm Cells

Donna L. Farber, Columbia University Medical Center, USA
Tissue Specialization and Maintenance of Human Memory T Cells

Marion Pepper, University of Washington, USA
Pathological Lung Resident Memory Th2 Cells

Laura K. Mackay, University of Melbourne, Australia
Short Talk: Local Maintenance of a Proliferating Tissue-Resident Memory T Cell Pool following Antiviral Recall Responses

Angela Pizzolla, Peter Doherty Institute for Infection and Immunity, University of Melbourne, Australia
Short Talk: Nasal Tissue-Resident Memory CD8+ T Cells Prevent Pulmonary Influenza A Virus Infection

Poster Session 3

THURSDAY, MARCH 1

Therapeutic Approaches to Vaccines and Aging (Joint)

*__Donna L. Farber__, Columbia University Medical Center, USA

Antonio Lanzavecchia, Institute for Research in Biomedicine, Switzerland
Lessons from the Analysis of the Immune Response to P. falciparum

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Bali Pulendran, Stanford University School of Medicine, USA
Lessons from Successful Human Vaccines

Tyler J. Curiel, University of Texas Health, USA
Challenges in Successful Immunotherapy of Cancer in Aged Individuals

Arne N. Akbar, University College London, UK
Targeting MAP Kinase Signaling to Enhance Immunity during Aging

Katherine Kedzierska, University of Melbourne, Australia
Short Talk: Dynamics of CD8+ T Cell Memory Repertoires across Human Life-Span and Tissue Compartments

Sara Van Den Berg, National Institute of Public Health and Environment, Netherlands
Short Talk: T Cell Responses to Influenza Infection in Elderly Are Impaired by Latent Cytomegalovirus (CMV) Infection

Workshop 2 (X2)

*__Graham Pawelec__, University of Tübingen, Germany

Christina Camell, Yale University, USA
NLRP3 Inflammasome Controls Adipose Tissue B Cell Accumulation during Aging

Claire Gustafson, Stanford University, USA
Differentiation- and Age-Related MicroRNA Profiling Reveals Two Dimensions of CD8 T Cell Aging

Abhijit Kale, Buck Institute for Research on Aging, USA
Elimination of Senescent Cells by Innate Immune System

Mladen Jergovic, University of Arizona, USA
Expression of Ly6C Defines a Subpopulation of Naïve CD8 T Cells with a Rapid Effector Function which Is Expanded Under "non-SPF" Conditions

Susan Baldwin, Infectious Disease Research Institute, USA
Adjuvanted H1N1 Vaccines Improve Immune Responses in Young and Aged Mice

Andy Schile, The Jackson Laboratory, USA
Lessons Learned From Managing Aged Colonies of C57BL/6J Mice

Workshop 2: Memory II (X1)

*__Susan M. Kaech__, The Salk Institute, USA

Allan J. Zajac, University of Alabama, Birmingham, USA
The Production of IL-2 by CD8 T Cells Shapes Their Fate Decisions and Protective Efficacy

Enrico Lugli, Humanitas Clinical and Research Center, Italy
High-Dimensional Single Cell Analysis of the Tumor CD8+ T Cell Infiltrate Identifies Long-Lived Memory CD8+ T Cells with Enhanced Stemness

Philip Ansumana Hull, Bristol-Myers Squibb, USA
Metabolic Reprogramming of Human CD8+ Memory T Cells through Loss of SIRT1

Vandana Kalia, University of Washington, USA
Anatomic and Cellular Regulators of Metabolic Remodeling during Effector CTL to Memory Conversion

Dietmar Herndler-Brandstetter, Medical University of Vienna, Austria
Developmental Plasticity of KLRG1+ Effector CD8+ T Cells Promotes Protective Immunity

Paul Richard Dunbar, Emory University, USA
Pulmonary Monocytes Promote the Establishment of Lung Tissue-Resident CD8 T Cell Memory following Influenza Infection

Linda S. Cauley, University of Connecticut Health Center, USA
Innate Cytokine Stimulation Plays a Decisive Role in Late Differentiation of Activated CTLs

Peter Cockerill, University of Birmingham, UK
Immunological Memory in T Cells is Established via T Cell Receptor Signaling which Creates Stably Maintained Active Chromatin Domains at Immune Response Genes

Genetic, Epigenetic, Transcriptomic Regulation of Aging and Age-Related Diseases (X2)

*__Bonnie B. Blomberg__, University of Miami School of Medicine, USA

*__Graham Pawelec__, University of Tübingen, Germany

Albert C. Shaw, Yale School of Medicine, USA
Consequences of Aging on Signatures of Influenza Vaccine Response

Ruth R. Montgomery, Yale University School of Medicine, USA
Short Talk: Expression and Signaling of TAM Receptor Inflammatory Regulators in Aging

The Wear and Tear on T Cells in Chronic Infection and Tumors (X1)

*__Susan M. Kaech__, The Salk Institute, USA

E. John Wherry, University of Pennsylvania, USA
T Cell Exhaustion

Rafi Ahmed, Emory University School of Medicine, USA
Human CD8 T Cell Memory

Closing Keynote Address (X2)

*__Bonnie B. Blomberg__, University of Miami School of Medicine, USA

*__Graham Pawelec__, University of Tübingen, Germany

Claudio Franceschi, University of Bologna, Italy
Aging, Inflammation and Immunity

*__Bonnie B. Blomberg__, University of Miami School of Medicine, USA

*__Graham Pawelec__, University of Tübingen, Germany

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X1)

FRIDAY, MARCH 2

Departure

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Closing Keynote Address (X1)

*__Susan M. Kaech__, The Salk Institute, USA

__Federica Sallusto__, Università della Svizzera Italiana & ETH Zurich, Switzerland
Human Memory T Cell Subsets: from Phenotype to Function

Discussion of Meeting, Summary, Conclusion and Mouse-Human Connections (X2)