KEYSTONE SYMPOSIA
on Molecular and Cellular Biology
Cancer Neoantigens, Vaccines and Viruses - RESCHEDULED (RT3)
Scientific Organizers: Catherine J. Wu, Robert D. Schreiber and Cornelis J.M. Melief
Supported by the Directors' Fund

Advances in Checkpoints Immunology from Autoimmunity to Oncology to Infectious Diseases - RESCHEDULED (RB1)
Scientific Organizers: David M. Lee, Arlene H. Sharpe and William H. Robinson
June 8-12, 2022 • Fairmont Chateau Whistler • Whistler, BC, Canada

Scholarship Deadline: October 21, 2021 / Abstract Deadline: April 20, 2022 / Discounted Registration Deadline: April 7, 2022

WEDNESDAY, JUNE 8
Arrival and Registration

THURSDAY, JUNE 9
Welcome and Keynote Address (8:00 am Start) (RT3)
*Catherine J. Wu, Dana-Farber Cancer Institute, USA
Session Chair
Rafi Ahmed, Emory University School of Medicine, USA
T Cell Functional State, from Viruses to Cancer

Welcome and Keynote Address (8:00 am Start) (RB1)
*William H. Robinson, Stanford University School of Medicine, USA
Session Chair
Ira Mellman, Genentech, Inc., USA
Mechanistic Basis of Cancer Immunotherapy

Antigen Targets (9:00 am Start) (RT3)
*Catherine J. Wu, Dana-Farber Cancer Institute, USA
Session Chair
Benoit J. Van den Eynde, University of Louvain, Belgium
The Processing of Tumor Antigens for MHC Class I Presentation to CD8 T Cells
Michal Bassani-Sternberg, University Hospital of Lausanne, Ludwig Institute for Cancer Research, Switzerland
Mass Spectrometry and Proteogenomics Based Approaches for Antigen Detection

Sjoerd H. van der Burg, Leiden University Medical Center, Netherlands
Shared Neoantigens as T-Cell Targets for TAP-Impaired Tumors
Vinod Balachandran, Memorial Sloan Kettering Cancer Center, USA
Short Talk: High Quality Neoantigens are Immunoedited in Long-Term Pancreatic Cancer Survivors
Matthew H. Bakalar, Broad Institute, USA
Short Talk: Novel Programmable Production of pMHC Libraries with Analysis by Mass Spectrometry Enables Targeted Profiling of Peptide-MHC Binding and Stability

Advances in Checkpoint Biology I: Lymphocytes (9:00 am Start) (RB1)
*Arlene H. Sharpe, Harvard Medical School, USA
Session Chair
Chen Dong, Tsinghua University, China
Remote Presentation: Factors that Regulate CD8+ T Cell Fates in Cancer
Dietmar Zehn, Technical University of Munich, Germany
Molecular Recognition of T-Cell Exhaustion
David Bending, University of Birmingham, UK
Short Talk: Antigen and Checkpoint Receptor Engagement Recalibrates T Cell Receptor Signal Strength

Joseph Jae-Suk Kim, NYU School of Medicine, USA
Short Talk: The Role of TCR Affinity in Response to Immune Checkpoint Blockade

Paolo D A Vignali, University of Pittsburgh School of Medicine, USA
Short Talk: Tumor Hypoxia Drives Suppressor Function in Exhausted T Cells Limiting Antitumor Immunity

Career Roundtable (Joint) (2:30 pm Start)
Ira Mellman, Genentech, Inc., USA
Gulbul Uzel, National Institutes of Health, USA
Alice O. Kamphorst, Icahn School of Medicine at Mount Sinai, USA
Michal Bassani-Sternberg, University Hospital of Lausanne, Ludwig Institute for Cancer Research, Switzerland
Mishtu Dey, Cell Press, USA

Cellular Interactions Critical to Effective Tumor Immunity (5:00 pm Start) (RT3)
*Mishu Bassani-Sternberg, University Hospital of Lausanne, Ludwig Institute for Cancer Research, Switzerland
Session Chair
Robert David Schreiber, Washington University, USA
Remote Presentation: Spatial Proteome Analysis (CODEX) of Effective Cancer Immunotherapy

Jannie Borst, Leiden University, Netherlands
How CD4+ T Cell Help Optimizes Cytotoxic T Cell Responses in Cancer

Nir Hacohen, Broad Institute, Massachusetts General Hospital, Harvard Medical School, USA
Spatially Organized Hubs of Immune Cells in Tumors

Giacomo Oliveira, Dana-Farber Cancer Institute, USA
Short Talk: The Landscape of Helper and Regulatory antitumor CD4+ T cells in Human Melanoma

Emerging Clinical Insights into Checkpoint Contributions to Autoimmunity (5:00 pm Start) (RB1)
*William H. Robinson, Stanford University School of Medicine, USA
Checkpoints in B Cells
*Kevan C. Herold, Yale University, USA
Tissue/Immune Cell Interactions Leading to Autoimmunity (Diabetes) with Checkpoint Inhibitors

Alexandra-Chloé Villani, Broad Institute of MIT and Harvard, USA
New Views on ‘Traditional’ Autoimmune Disease Informed by Checkpoint Antagonist Therapy

Ellen D. Kaan, UMC Utrecht, Netherlands
Short Talk: Identification of Potential Immune Inhibitory Receptors in Interferon Associated Systemic Autoimmune Disease
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**Poster Session 1**

**FRIDAY, JUNE 10**

**Reprogramming the Microenvironment (8:00 am Start) (RT3)**

* Kellie N. Smith, Johns Hopkins University School of Medicine, USA  
  Session Chair

* Valerie Chew, SingHealth, Singapore  
  The microenvironments of Hepatitis B virus(HBV)-related Hepatocellular carcinoma

* Matthew H. Spitzer, University of California, San Francisco, USA  
  Talk Title to be Announced

* Stefani Spranger, Massachusetts Institute of Technology, USA  
  Not All T Cell Responses are Generated Equal: The Role of Dendritic Cells in Anti-Tumor Immunity

* Abhijeet Pataskar, Netherlands Cancer Institute, Netherlands  
  Short Talk: Exploring IFN-mediated Tryptophan Depletion for the Identification of Inducible Cancer Neo-antigens

* Aude-Helene Capietto, Genentech, Inc., USA  
  Short Talk: Neoantigen Targeted Therapy Promotes Expansion of T Follicular Helper CD4 T Cells and Induces Rejection of Established E0771 Breast Tumors in Mice

* Nicolas Cuburu, National Cancer Institute, NIH, USA  
  Short Talk: Harnessing Anti-Cytomegalovirus Immunity for Local Immunotherapy against Solid Tumors

* Anna-Sophia Wiekmeijer, ISA Therapeutics BV, Netherlands  
  Short Talk: T Cell Inducing SLP Vaccine against SARS-CoV-2 for Protection of Patients with Spontaneous or Therapy-Induced B Cell Deficiencies

**Checkpoints in Autoimmunity: Genetic Insights and Innate Immunity Lineages(8:00 am Start) (RB1)**

* Ferenc A. Scheeren, Leiden University Medical Center, Netherlands  
  The Role of Glutaminyl Cyclase in Innate Immunity from Oncology to Infectious Disease

* Gubu Uzel, National Institutes of Health, USA  
  Genetics 2—Insights from Human Checkpoint Mutations (both Autoimmunity and Immunodeficiency)

* Ben A. Youngblood, St. Jude Children's Research Hospital, USA  
  Epigenetic Programs Regulating CD8 T Cell Responses during Immune Checkpoint Blockade

* Sarah Weiss, Harvard University, USA  
  Short Talk: Deletion of an Exhaustion-associated PD-1 Enhancer Augments CD8+ T cell Function in Chronic Viral Infection and Improves Tumor Control

* Zoltan Malaria, Harvard Medical School, USA  
  Short Talk: Molecular Characterization of Skin Toxicities from Immune Checkpoint Inhibitors

**Workshop (2:30 pm Start) (RT3)**

* David A. Braun, Dana-Farber Cancer Institute, USA  
  Session Chair

* Giacomo Oliveira, Dana-Farber Cancer Institute, USA  
  Session Chair

* Rosaria Chila, IFOM, The FIRC Institute of Molecular Oncology, Italy  
  Non-Canonical Neoantigens are the Largest Fraction of MHC I Peptides in Mismatch Repair Deficient Murine Colorectal Cancer

* Zachary C. Hartman, Duke University, USA  
  Vaccination Targeting Mutant ESR1 Resistance Driver Neoepitopes to Immunologically Prevent and Suppress the Emergence of ER+ Endocrine Therapy-Resistant Breast Cancer

* Alex M. Jaeger, Moffitt Cancer Center, USA  
  Deciphering the Immunopeptidome in vivo Reveals Novel Tumor Antigens

* Allison M. Kirk, St. Jude Children’s Research Hospital, USA  
  Developing T Cell Immunotherapies Targeting Conserved Fusion Neoantigens in Fibrolamellar Carcinoma

* Ana Marcu, Genentech Inc., USA  
  The HLA Ligand Atlas: Defining Actionable Targets for T-Cell-Based Immunotherapy

* Mark J. McCarron, Genentech, Inc., USA  
  The Phenotype of the T Cell Response against Weak Antigens is Altered by the Presence of Strong T Cell Responses against Immunodominant Antigens

* Christian Seca, University of Liege, Belgium  
  Wobble tRNA Modification Regulates Melanoma Immune Response

* Sri Krishna, National Cancer Institute, USA  
  Impact of Neoantigen-Specific T Cell Phenotypes on Cellular Immunotherapies Targeting Metastatic Solid Tumors

**Workshop 1: Emerging Checkpoints Insights: Basic and Animal Model Studies (2:30 pm Start) (RB1)**

* Roarke A. Kamber, Stanford University, USA  
  Systematic Discovery of Mechanisms that Impede Macrophage Phagocytosis of Cancer Cells Using Inter-cellular CRISPR Screens

* Hrishi Venkatesh, University of Minnesota, USA  
  Targeted Therapy and Anti-PDL1 Checkpoint Blockade Elicit a CD4 T Cell Response that Eliminates B Cell Leukemia and Prevents Relapse

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* Session Chair † Invited but not yet accepted  
Program current as of **December 14, 2022**  
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**Immune Targeting against Viral Antigens (5:00 pm Start) (RT3)**

*Susan E. Klaeger, Broad Institute, USA  
**Session Chair**

Helen Heslop, Baylor College of Medicine, Houston Methodist Hospital and Texas Children's, USA  
Adoptive Transfer of Virus Specific T Cells

Cornelis J. M. Melief, Leiden University Medical Center & ISA Pharmaceuticals BV, Netherlands  
Vaccines Targeting HPV Antigens

Kellie N. Smith, Johns Hopkins University School of Medicine, USA  
Discovery and Characterization of Tumor- Reactive TIL

Derin Benerci Keskin, Dana Farber Cancer Institute, USA  
Short Talk: Reversal of Viral and Epigenetic HLA Class I Repression in Merkel Cell Carcinoma

Michael C. Brown, Duke University, USA  
Short Talk: Intratumor Childhood Vaccine-specific CD4+ T Cell Recall Coordinates Antitumor Type I and II Immunity

Esmé van der Gracht, ISA Therapeutics, Netherlands  
Remote Presentation: Short Talk: A Third Vaccination with a Single T Cell Epitope Protects against Lethal SARS-CoV-2 Infection

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**Advances in Checkpoint Biology II: Immune Exhaustion and Immunometabolism (5pm Start) (RB1)**

*Rafi Ahmed, Emory University School of Medicine, USA  
TGF-beta Regulates the Quiescence and Differentiation of PD-1+ TCF-1+ Stem-like CD8 T Cells during Chronic Infection

*Weiping Zou, University of Michigan, USA  
Metabolic Impact on Cancer Immunity and Immunotherapy

Christopher E. Rudd, University of Montreal, Canada  
Short Talk: Glycogen Synthase Kinase (GSK-3) Inhibition Generates CD8 Super-armed Killers in its Synergy with PD-1/PDL1 Blockade in Tumor Immunity

Sabelo M. Lukhele, University Health Network, Canada  
Short Talk: IRF2-mediated Inhibition of Interferon Signaling Drives CD8 T Cell Exhaustion to Prevent Long-term Cancer Control

Andrew Frisch, University of Pittsburgh, USA  
Short Talk: Redirecting Glucose Flux During In Vitro Expansion Improves the In Vivo Performance of Adoptive T Cell Therapies for Cancer

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**Panel Discussion:** New Directions in Checkpoint Biology: Major Gaps and Emerging Insights (6:45 pm Start) (RB1)

*Arlene H. Sharpe, Harvard Medical School, USA  
**Session Chair**

Weiping Zou, University of Michigan, USA  
Jennifer Guerriero, Brigham and Women's Hospital, USA  
David A. Hafler, Yale University School of Medicine, USA  
Bali Pulendran, Stanford University School of Medicine, USA  
Ira Mellman, Genentech, Inc., USA

**Poster Session 2**

**SATURDAY, JUNE 11**

**Immunoregulation and Immunosuppression (Joint) (8:00 am Start)**

*Thomas Gajewski, University of Chicago, USA  
The Tumor Microenvironment and Immunotherapy Efficacy

Hussein Sultan, Washington University School of Medicine, USA  
Unexpected Complexity of Neoantigen Specific Synthetic Long Peptide Cancer Vaccines: Potential for Induction of Tumor Specific Immunosuppressive CD4+ T cells

Jennifer Guerriero, Brigham and Women's Hospital, USA  
Elucidating Macrophage Diversity to Uncover Novel Anti-cancer Therapeutic Strategies

David A. Hafler, Yale University School of Medicine, USA  
Transcriptional Mechanism of FoxP3+ Treg Dysfunction in Human Autoimmune Disease

Jessica Stark, Stanford University, USA  
Short Talk: Antibody-lectin Bispecifics for Glyco-immune Checkpoint Blockade

Andreas Wieland, Ohio State University, USA  
Short Talk: Defining HPV-Specific B Cell Responses in Patients with Head and Neck Cancer
Workshop 2: Emerging Checkpoints Insights: Translational and Clinic Studies (3:00 pm Start) (RB1)

*Kate Carbone, Genentech, Inc., USA
Surveillance of in situ Tumor Arrays Reveals Early Environmental Control of Cancer Immunity

*Zhi Liang Chu, Crosssional Therapeutics, Inc., USA
TMER1: A Treg Cell Expressed, Hippo-YAP Regulating GPCR as a Novel Target for Cancer Immunotherapy Drug Development

Jenna Lynn Collier, Harvard University, USA
PD-1 Blockade Drives T Cell Transcriptional States in NOD Mice that are Comparable to T Cells in NOD Mice with Spontaneous Autoimmune Diabetes

David R. Glass, Fred Hutchinson Cancer Center, USA
Multi-omic Analysis of Cutaneous T Cell Lymphomas Reveals Broad Changes in Cellular Immunity Induced by Mono- and Combination Anti-PD-1 Immunotherapy

Akashdip Singh, UMC Utrecht, Netherlands
Cancer Immunotherapy by NC410, a LAIR-2 Fc Protein Blocking Human LAIR-collagen Interaction

Checkpoints in Autoimmunity: Function and Dysfunction in Disease (5:00 pm Start) (RB1)

*Bali Pulendran, Stanford University School of Medicine, USA
Systems Biological Analysis of Immunity to COVID-19 Infection and Vaccination

*Eoin McKinney, Cambridge University, UK
Lymphocyte Exhaustion State in Autoimmune Disease X: Integrating Functional Status across Active Checkpoints

David M. Lee, Janssen Pharmaceutical Companies of Johnson & Johnson, USA
Co-inhibitory Modulators In Autoimmunity: The Complex Path From Concept to Therapeutic Candidates

Chris Paluch, MiroBio Ltd, UK
Short Talk: A BTLA Agonist Antibody for the Treatment of Autoimmune Disease

Yang Zhao, Janssen Immunology Discovery, USA
Short Talk: VISTA is a Checkpoint Receptor Target for Autoimmune Diseases

Combination Therapy with Oncolytic Virus and Viral Delivery Systems (5:00 pm Start) (RT3)

*Jennifer Guerriero, Brigham and Women's Hospital, USA
Session Chair

Matthias Gromeier, Duke University School of Medicine, USA
Cancer Immunotherapy through Endogenous Type-I IFN Dominant Signaling in Dendritic Cells

Klaus Früh, Oregon Health & Science University, USA
Harnessing the Unique Immune Biology of Cytomegalovirus for Cancer Immunotherapy

E. Antonio Chiocca, Brigham and Women's Hospital, USA
Clinical Trials of Oncolytic Virus- and Gene-based Immunotherapy: Human Evidence of Changes in the Tumor Immune Microenvironment

Kristin DePeaux, University of Pittsburgh, USA
Short Talk: Overcoming Microenvironmental Resistance to Oncolytic Virus Immunotherapy with Virus-encoded Delivery of a Potent TGFß Inhibitor

Emma Wagner, University of Cambridge, UK
Short Talk: Role of Innate Immune DNA Sensing in Response to Oncolytic Virus Therapy

Poster Session 3

SUNDAY, JUNE 12

Vaccines in Cancer and Other Non Infectious Syndromes (8:00 am Start) (RT3)

*Cornelis J. M. Melief, Leiden University Medical Center & ISA Pharmaceuticals BV, Netherlands
Session Chair

Gerald P. Linette, University of Pennsylvania, USA
Dendritic-Based Targeting of Tumor Neoantigens

Jan David Beck, BioNTech SE, Germany
Combining RNA-encoded Interleukin-2 with Antibodies Overcomes Resistance in MHC Class I-deficient Cancer

Catherine J. Wu, Dana-Farber Cancer Institute, USA
SLPs for Personal Neoantigen-Targeting Vaccines

Megan L. Burger, Massachusetts Institute of Technology, USA
Short Talk: Antigen Dominance Hierarchies Shape Anti-tumor T Cell Phenotypes and Immunotherapy Response

Ann-Jay Tong, Genentech, Inc., USA
Short Talk: Molecular Determinants of Effective Neoantigen-specific T Cell Responses Following Vaccination

Anna Morena D'Alise, Nouscom Srl, Italy
Short Talk: Viral Vectored Vaccines Targeting Tumor Neoantigens Elicit Potent and Effective Anti-tumor Immune Response

Najia Arshad, Yale University, USA
Short Talk: Discovery of Immunogenic, Tumor-Associated Peptides Presented by Major Histocompatibility Complex Class I in a Myeloproliferative Neoplasm Cell Line

David A. Braun, Dana-Farber Cancer Institute, USA
Short Talk: A Personalized Neoantigen Vaccination Incorporating Locally Delivered Ipilimumab Induces Tumor-specific Immunity in Renal Cell Carcinoma

Checkpoints in Oncology—Treatment Effectiveness, Include CART, States of Immune Exhaustion in IO, and Combo Approaches (8:00 am Start) (RB1)

* Session Chair † Invited but not yet accepted  Program current as of December 14, 2022 Meal formats are based on meeting venue.
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**Remote Presentation: Immune-related Adverse Events with Checkpoint Inhibitors**
*Charles G. Drake*, Janssen, USA

**Talk Title to be Announced**
*Arlene H. Sharpe*, Harvard Medical School, USA

**Defining Regulators of Immunity to Infections and Tumors using in vivo CRISPR Screens**
*Alex C. McPherson*, University of Pittsburgh, USA

**Short Talk: Exploring the Mechanisms of how Commensal Bacteria Colonize Gut-distal Melanoma Tumors and Impact Immune Checkpoint Inhibitor Efficacy**
*Chun Wai Wong*, University of Manchester, UK

**Short Talk: Inhibition of PARP14 Restores Response to Anti-PD1 Immune Checkpoint Inhibition**
*Gerald P. Linette*, University of Pennsylvania, USA

**Session Chair**
*David E. Avigan*, Beth Israel Deaconess Medical Center, USA

**Integrating a Personalized Cancer Vaccine with Cellular Immunotherapy**
*Ravi Uppaluri*, BWH, USA

**Neoadjuvant PD1 Therapy**
*Brooke Huisman*, MIT, USA

**Short Talk: Characterizing the Peptide Repertoire of HLA-E and Natural Killer Cell Receptors via Yeast Display**
*Marcus Bosenberg*, Yale University, USA

**Epigenetic Regulation of Endogenous Retroelement Expression Modulates Anti-cancer Immune Responses**
*Christianne Groeneveldt*, Leiden University Medical Center, Netherlands

**Repurposing Reovirus-specific T Cells as Antitumor Effector Cells**
*David M. Lee*, Janssen Pharmaceutical Companies of Johnson & Johnson, USA

**Session Chair**
*Alexandra-Chloé Villani*, Broad Institute of MIT and Harvard, USA

**Strength of CD28 Costimulation Directs Self-Renewal and Differentiation of TCF-1⁺ PD-1⁺ CD8 T Cells**
*Georg Lauer*, Massachusetts General Hospital, USA

**Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (6:45 pm Start) (RT3)**
**Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (7:00 pm Start) (RB1)**

**MONDAY, JUNE 13**
Departure