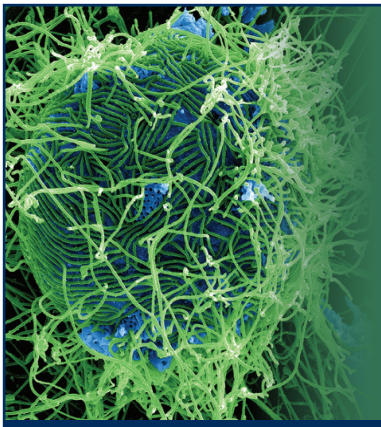

Modeling Viral Infections and Immunity

May 1–4, 2017 | Stanley Hotel | Estes Park, Colorado | USA

Scientific Organizers:

Alan S. Perelson, Los Alamos National Laboratory, USA
Rob J. De Boer, University of Utrecht, Netherlands
Phillip D. Hodgkin, Walter and Eliza Hall Institute of Medical Research, Australia

Viral infection modeling has provided insights into the pathogenesis and treatment of HIV, HCV, HSV-2, CMV and other viruses. It has had impact in revealing the lifespan of infected cells, how rapidly virus is produced and cleared from the circulation, and the means for evaluating the effectiveness of antiviral treatments. HIV remains a global health threat and there is great interest in revealing features of the main HIV reservoir, latently infected cells and mechanisms of reducing the size of this reservoir by pharmacological means. Other important gaps in knowledge revolve around the cell-mediated and humoral immune responses to HIV, important for generating vaccines and broadly neutralizing antibodies as therapeutics, topics that will be discussed. Further, viral infections generally occur in tissues and thus the meeting will discuss imaging techniques and methods of modeling and analyzing spatial infection data, the role of tissue-resident memory cells, and important features of immune regulation, such as immune exhaustion, cytokine signaling between cells, and viral subversion of innate responses and escape from adaptive responses. The meeting will highlight what we believe are significant hurdles to curing viral infections and will bring together experimental virologists, physician scientists and modelers of various types and experience, groups that do not normally meet. It should foster new collaborations between experimentalists and theoreticians, and between theoreticians working on different viral infections or different aspects of viral infections, as well as help young scientists formulate new research directions and make connections with established senior scientists.

Session Topics:

- HIV - Barriers to a Cure
- Modeling Cellular Immune Responses
- Spatial Aspects of Infection
- Modeling Viral Infection
- Using Big Data to Understand Viral Infection
- Modeling Immune Regulation

Scholarship Application & Discounted Abstract Deadline: January 10, 2017
Abstract Deadline: February 1, 2017
Discounted Registration Deadline: March 1, 2017

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted.

Upper image courtesy of: National Institute of Allergy and Infectious Diseases, National Institutes of Health

Meeting Hashtag: #KSinfection
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KEYSTONE SYMPOSIA
on Molecular and Cellular Biology

Modeling Viral Infections and Immunity (E1)

May 1-4, 2017 • Stanley Hotel • Estes Park, Colorado, USA

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Sponsored by Merck & Co., Inc.

Abstract & Scholarship Deadline: January 10, 2017 / Abstract Deadline: February 1, 2017 / Discounted Registration Deadline: March 1, 2017

MONDAY, MAY 1

Arrival and Registration

TUESDAY, MAY 2

Welcome and Keynote Address

*__Alan S. Perelson__, Los Alamos National Laboratory, USA

Robert F. Siliciano, Johns Hopkins University School of Medicine, USA
Modeling HIV Infection: Insights into Treatment and the Possibility of Cure

HIV - Barriers to a Cure

*__Alan S. Perelson__, Los Alamos National Laboratory, USA

Sharon R. Lewin, University of Melbourne, Australia
Optimizing Latency Reversal to Eliminate HIV Persistence on Antiretroviral Therapy

Alison L. Hill, Harvard University, USA
Modeling the Dynamics of HIV Latency, Rebound, and Control

Miles P. Davenport, University of New South Wales, Australia
The Dynamics of HIV / SIV Latency

John Michael Murray, University of New South Wales, Australia
Short Talk: Perturbations of the Latent Reservoir to Achieve a Functional Cure

Audrey Fahrny, University Hospital Zurich, Switzerland
Short Talk: A HIV-1 Persistence Humanized Mouse Model for the Characterization of HIV-1 Reservoir Cells

Workshop 1: Modeling HIV Infection

*__Roland R. Regoes__, Integrative Biology, ETH Zurich, Switzerland

Catherine A.A. Beauchemin, Ryerson University, Canada
Duration of SHIV Production by Infected Cells Is Not Exponentially Distributed: Implications for Estimates of Infection Parameters and Antiviral Efficacy

Erwing F. Cardozo-Ojeda, Los Alamos National Laboratory, USA
Dynamics of HIV-1 in Chronically Infected Individuals during Therapy with Raltegravir

Stanca M. Ciupe, Virginia Tech, USA
The Role of Antibody during SIV Infections in Rhesus Macaques

Jason M. Hataye, National Institutes of Health, USA
Rebound Establishment of HIV Dependent on Burst Size Breakthrough of a Growth Threshold

Vincent Madelain, INSERM, France
Modeling Viral Kinetics Predicts a Rapid Establishment of the Cytotoxic Immune Response Targeting Distinct Infected Cell Compartments in SIV Controller Macaques

Angie Raad, York University, Canada
A Mathematical Model Predicting Restored T Cell Homeostasis as a Major Contributor to the Decay in HIV Persistence

Daniel Reeves, Fred Hutchinson Cancer Research Center, USA
Long-Term Antiretroviral Therapy Shifts the Mechanism of HIV Persistence toward Proliferating Latently Infected Cells

Robin N. Thompson, University of Oxford, UK
Accounting for Donor Viral Diversity Gives High Estimates of the Number of HIV Founder Virions among Recipients

Modeling Cellular Immune Responses

*__Phillip D. Hodgkin__, Walter and Eliza Hall Institute of Medical Research, Australia

Andrew J. McMichael, Oxford University, UK
Cell-Mediated Immune Responses to HIV

Rob J. De Boer, Utrecht University, Netherlands
Broad CD8 Immune Responses to HIV

Becca Asquith, Imperial College London, UK
KIRs, CD8+ T Cell Dynamics and Control of Chronic Viral Infection

Lydie Trautmann, US Military HIV Research Program, USA
Short Talk: Immune Cell Dynamics in Lymph Node and Blood during Acute HIV Infection

Poster Session 1

WEDNESDAY, MAY 3

Spatial Aspects of Infection

*__Rob J. De Boer__, Utrecht University, Netherlands

Scott N. Mueller, University of Melbourne, Australia
Dissecting the Dynamics of Antiviral Immunity and the Lymphoid Tissue Microenvironment

Joshua T. Schiffer, Fred Hutchinson Cancer Research Center, USA
Thresholds of Protection for Tissue-Resident T-Cells

Ruy M. Ribeiro, University of Lisbon, Portugal
Spatial Aspects of Hepatitis C Virus Infection

Jean-Pierre Levraud, Institut Pasteur, France
Short Talk: From Whole-Body Imaging to Whole-Body Modeling of Viral Infection in Zebrafish

Richard Beck, Leiden Academic Centre for Drug Research, Netherlands
Short Talk: Direct T Cell-Mediated Killing of Solid Tumours Is Insufficient to Explain Tumor Regression

Modeling Viral Infection

*__Jane Heffernan__, York University, Canada

Thomas Hofer, Deutsches Krebsforschungszentrum, Germany
Dengue Virus Spread and Innate Immune Response at the Single-Cell Level

Narendra M. Dixit, Indian Institute of Science, India
Viral Infection and Subversion of the Interferon Response

Amber M. Smith, St. Jude Children's Research Hospital, USA
Modeling the Lethal Synergism of Influenza A Virus and Pneumococcal Coinfection

Frederik Graw, Heidelberg University, Germany
Short Talk: Towards Understanding Malaria Pathogenesis and Efficient Experimental Vaccination

Poster Session 2

THURSDAY, MAY 4

Using Big Data to Understand Viral Infection

*__Lars Kaderali__, University Medicine Greifswald, Germany

Thierry Mora, École Normale Supérieure, France
Analyzing High-Throughput Sequence Data to Understand Immune Repertoire Diversity and Affinity

Steven H. Kleinstein, Yale University School of Medicine, USA
Systems Immunology of Influenza Infection and Vaccination

Katia Koelle, Duke University, USA
Capturing the Roles of Cellular Coinfection and Viral Complementation in the Within-Host Dynamics of Influenza

Thomas B. Kepler, Boston University, USA
Affinity Maturation in Humans: Immunization, Analysis and Modeling

Florian Rubelt, Stanford University, USA
Short Talk: Distinctive Differences in T Cell Receptor Repertoire and Cell Frequencies Are Evident in Individual Immune Responses

Workshop 2: Modeling Other Virus Infectious and Immune Responses

*__Vitaly V. Ganusov__, University of Tennessee, USA

Ruian Ke, North Carolina State University, USA
Modeling the Mechanistic Action and Predicting the Impact of an Immunotherapeutic DART® Molecule in HIV 'Shock and Kill' Strategies

Wen-Han Yu, Massachusetts Institute of Technology, USA
Multivariate Modeling of Immunological Profilings from HIV Vaccine Trials Cross-Predicts Vaccine Protection and Infers the Underlying Mechanisms

Nathanael Hoze, ETH Zurich, Switzerland
Quantitative Delineation of Antibody Composition from Polyclonal Plasmas

Shingo Iwami, Kyushu University, Japan
Optimizing Drug Combinations against Hepatitis C Virus Infection in Pre-Clinical Setting

Christopher Dächert, German Cancer Research Center - DKFZ, Germany
Understanding the Fight by Looking at the Soldiers - A Quantitative Systems Biology Approach to Analyze the Dynamic Host-Virus-Interactions by the Example of Hepatitis C Virus

Laura Liao, Ryerson University, Canada
Counting Defective Interfering Particles: Easy as 1, 2, 3 ...?

Katharine Best, Los Alamos National Laboratory, USA
Modeling Zika Plasma Viral Dynamics in Non-Human Primates: Insights into Viral Pathogenesis and Antiviral Strategies

Sanket Rane, University of Glasgow, UK
Age Is Not Just A Number – Time Since Thymic Export Influences Homeostatic Fitness and Drives the Accumulation of Veteran Naïve T Cells in Mice

Modeling Immune Regulation

*__Sebastian L. Bonhoeffer__, ETH-Zentrum, Switzerland

Phillip D. Hodgkin, Walter and Eliza Hall Institute of Medical Research, Australia
Formation of Effector and Memory Cells

Rustom Antia, Emory University, USA
How Does Prior Immunity Affect the Dynamics of Immune Responses to New Strains of Influenza?

Alan S. Perelson, Los Alamos National Laboratory, USA
Modeling Antibodies and HIV Cure

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

FRIDAY, MAY 5

Departure