Join Keystone Symposia for the 2015 conference on:

**The Arthropod Vector: The Controller of Transmission**

**May 12–17, 2015**

**Sagebrush Inn and Conference Center**

**Taos, New Mexico, USA**

Scientific Organizers: Serap Aksoy, Stephen K. Wikel and David S. Schneider

Organizing Committee: Adriana Costero-Saint Denis, Tonu M. Wali and Wolfgang Leitner

Vector innate immunity studies have been ongoing for about a decade, and the field has advanced understanding of the complex interactions between pathogens and vectors. Vector saliva contains powerful molecules with translational potential, and vectors also ingest various bioactive factors of human origin which affect the development and survival of pathogens within the vector. This meeting integrates the multiple levels of influence on disease transmission by the arthropod vector. Its goal is to translate immunological and microbiological insights into new approaches for combating vector-borne diseases, including manipulation of the microbiome and identification of novel, non-traditional vaccine targets, such as arthropod saliva proteins.

**Session Topics:**
- Innate Immunity: Models and Midguts
- Innate Immunity: From Cells to Host Factors
- Microbiota of Vectors: The New Frontier?
- Microbiome Impact on Innate Immunity
- The Use of Symbionts to Prevent Transmission
- Vector Spit: from Alchemy to Public Health Solutions
- Saliva Proteins to Prevent and Track Transmission
- Novel Approaches to Disease Control
TUESDAY, MAY 12
Arrival and Registration

WEDNESDAY, MAY 13
Welcome Remarks
*Serap Aksoy*, Yale University School of Public Health, USA
*Adriana Costero-Saint Denis*, NIAID, National Institutes of Health, USA

**Keynote Address**
Shirley Luckhart, University of California, Davis, USA
*Six Degrees of Separation: Shared Biology to Empower Novel Translational Approaches to Vector-Borne Disease Control*

**Innate Immunity: Models and Midguts**
*Kristin Michel*, Kansas State University, USA
*M. A. Riehle*, University of Arizona, USA
Bruno Lemaître, École Polytechnique Fédérale de Lausanne, Switzerland

*The Drosophila Antimicrobial Response at the Time of the Cas9/CRISPR Gene Targeting Revolution*
*Carolina V. Barillas-Mury*, NIAID, National Institutes of Health, USA
*Brian Hinnbusch*, NIAID, National Institutes of Health, USA
Short Talk: *Comparative Evaluation of Two Ways that Fleas Transmit Yersinia pestis*
*Rushika Perera*, Colorado State University, USA
Short Talk: *Metabolic Pathways that May Regulate Vector Competence in Aedes aegypti during Dengue Virus Infection*
*Daniel P. Dulebohn*, Rocky Mountain Laboratories, NIAID, National Institutes of Health, USA
Short Talk: *Analyzing the Role of Histidine Kinase-2 in Spirochete Transmission from Ticks*
*Berlin Londono-Renteria*, Kansas State University, USA
Short Talk: *Effect of Human Complement on Dengue Virus Infectivity in Aedes aegypti Midgut*
*Barbara S. Drolet*, USDA, Agricultural Research Service, USA
Short Talk: *Immunomodulatory Effects of Culicoides Blood Feeding: A Murine Model*

**Workshop 1**
*David S. Schneider*, Stanford University School of Medicine, USA
*Ulrike Munderloh*, University of Minnesota, USA
*Jacob I. Meyers*, Texas A&M University, USA
*Mosquitoicidal Properties and Antibody Passage of IgG Targeting the Glutamate-Gated Chloride Channel of Three Diverse Mosquito Disease Vectors*
*Dana K. Shaw*, University of Maryland, School of Medicine, USA
*Non-Canonical Activation of the Immune Deficiency Pathway in Ticks*
*Jose E. Pietri*, University of California, Davis, USA
*Two Insulin-Like Peptides Regulate Resistance to Plasmodium falciparum infection in Anopheles stephensi through Distinct Effects on Immunity, Metabolism and Midgut Homeostasis*

José Luis Ramírez, NIAID, National Institutes of Health, USA
*Molecular Mechanisms Mediating Innate Immune Priming in An. gambiae Mosquitoes*
Mathilde Gendrin, Imperial College, UK
*Antibiotics in Ingested Human Blood Affect the Mosquito Microbiota and Capacity to Transmit Malaria*
Gong Cheng, Tsinghua University, China
*A Transmission-Blocking Vaccine Strategy for Dengue Prevention*
Jiannong Xu, New Mexico State University, USA
*Identification of CRISPR/Cas Systems in the Mosquito Gut Microbiome: Implications for the Ecological Phage-CRISPR Interactions*
Karina Mondragon-Shem, Liverpool School of Tropical Medicine, UK
*Sweet Mysteries: Unraveling the Salivary Glycome of Sandflies*

**Innate Immunity: From Cells to Host Factors**
*Carolina V. Barillas-Mury*, NIAID, National Institutes of Health, USA
*Bruno Lemaître*, École Polytechnique Fédérale de Lausanne, Switzerland

*Vector-Microbiome Interactions: Impacts on Mosquito Immunity and Development*
*Kristin Michel*, Kansas State University, USA
*Michael A. Riehle*, University of Arizona, USA
*The Effects of Ingested Mammalian Blood Factors on Vector Arthropod Immunity and Physiology*
*Ondrej Hajdusek*, Institute of Parasitology, Czech Republic
*Short Talk: Tick Immune System and its Interaction with the Transmitting Pathogens*
*Veronika Urbanova*, Biology Centre ASCR, v.v.i., Czech Republic
*Short Talk: Complement System of the Ticks and its Role in the Immune Response to Borrelia*

**Poster Session 1**

**THURSDAY, MAY 14**

**Microbiota of Vectors: The New Frontier?**
*Elizabeth A. McGraw*, Monash University, Australia
*Jason L. Rasgon*, Pennsylvania State University, USA
*Angela E. Douglas*, Cornell University, USA
*How the Taxonomic and Functional Diversity of Gut Microbiota Shapes Insect Traits*
*Serap Aksoy*, Yale University School of Public Health, USA
*Insights into the Microbiome of a Vapivorous Dipteran*
*George Dimopoulos*, Johns Hopkins University, USA
*Exploring the Mosquito Microbiome for Disease Control*
*Sassan Asgari*, University of Queensland, Australia
*Role of MicroRNAs in Regulation of Symbiont-Pathogen Interactions in a Vector System*
*Kerri L. Coon*, University of Georgia, USA
*Short Talk: Specific Gut Bacteria Promote Autogeny in Mosquitoes*
Daniel LePage, Vanderbilt University, USA
Short Talk: Investigating the Genetic Basis of Wolbachia-Induced Cytoplasmic Incompatibility

Microbiome Impact on Innate Immunity
*Angela E. Douglas, Cornell University, USA
*Sassan Asgari, University of Queensland, Australia
Nicolette M. Gerardo, Emory University, USA
The Intersection of Symbionts, Pathogens and Immunity in Insect Systems
Zhiyong Xi, Michigan State University, USA
Interaction of Mosquito Immunity with Wolbachia and its Impact on Symbiosis Establishment and Vector Competence for Malaria and Dengue Virus
Rod Dillon, Lancaster University, UK
The Gut Microbiome of Lutzomyia Sand Flies
Zhee Sheen Wong, University of Pittsburgh, USA
Short Talk: Oxidative Stress Correlates with Wolbachia-Mediated Antiviral Protection in Naturally Infected Insects
Brian L. Weiss, Yale School of Public Health, USA
Short Talk: An Endosymbiont-Regulated Tsetse Odorant Binding Protein Mediates Host Immune System Maturation Processes

Posters Session 2

FRIDAY, MAY 15
The Use of Symbionts to Prevent Transmission
*Nicolette M. Gerardo, Emory University, USA
*Rod Dillon, Lancaster University, UK
Marcelo Jacobs-Lorena, Johns Hopkins Bloomberg School of Public Health, USA
Fighting Malaria with Engineered Symbiotic Bacteria from Vector Mosquitoes
Ulrike Munderloh, University of Minnesota, USA
Paratransgenic Approaches to Manipulate Tick Infectivity
Pamela Pennington, Universidad del Valle de Guatemala, Guatemala
Applying Paratransgenic Approaches to Control Disease
Jason L. Rasgon, Pennsylvania State University, USA
Microbiome as a Driving Mechanism for Gene Spread
Elizabeth A. McGraw, Monash University, Australia
Short Talk: Wolbachia Affects Dengue Virus Infection Dynamics in the Mosquito
Christine L. Sansone, University of Pennsylvania, USA
Short Talk: Microbiota-Dependent Activation of Antiviral Intestinal Immunity in Drosophila
Sarah M. Short, Johns Hopkins University, USA
Short Talk: Investigating Mosquito Molecular Factors that Control Gut Microbiota Variability in Aedes aegypti

Vector Spit: From Alchemy to Public Health Solutions
*Esther von Stebut-Borschitz, Johannes Gutenberg University, Germany
*Jan Van den Abbeele, Institute of Tropical Medicine Antwerp, Belgium

Stephen K. Wikel, Quinnipiac University, USA
Vector Saliva: A Powerful Immunomodulator
Jesus G. Valenzuela, NIAID, National Institutes of Health, USA
Basic and Translational Research on Sand Fly Saliva: From Pharmacology to Biomarkers and Vaccines
João Pedra, University of Maryland School of Medicine, USA
Mitigation of Nod-Like Receptor Sensing by a Tick Salivary Protein
Erol Fikrig, Yale University School of Medicine, USA
Keynote Address: The Translation of Saliva Proteins into Tools to Prevent Vector-Borne Disease Transmission

Posters Session 3
SATURDAY, MAY 16
Saliva Proteins to Prevent and Track Transmission
*Stephen K. Wikel, Quinnipiac University, USA
*João Pedra, University of Maryland School of Medicine, USA
Esther von Stebut-Borschitz, Johannes Gutenberg University, Germany
Immune Cells in the Human Skin: Modulatory Properties of Vector Saliva
Jan Van den Abbeele, Institute of Tropical Medicine Antwerp, Belgium
Using Tsetse Fly Saliva Proteins as Biomarkers of Vector Exposure
Franck Remoue, UMR 224 MIVEGEC, France
Epidemiological Applications of Assessing Mosquito Exposure in a Malaria-Endemic Area
Shaden Kamhawi, NIAID, National Institutes of Health, USA
Unique Features of Vector-Transmitted Leishmaniasis and their Relevance to Disease Progression and Control
Guy Caljon, University of Antwerp, Belgium
Short Talk: Early Immunological Responses upon Tsetse Fly Mediated Trypanosome Inoculation
Donald Champagne, University of Georgia, USA
Short Talk: Characterization of a Lymphocyte-Depleting Factor in Saliva of the Yellow Fever Mosquito, Aedes aegypti
Dennis A. Bente, University of Texas Medical Branch, USA

Panel
*Tonu Wali, NIAID, National Institutes of Health, USA
*Wolfgang W. Leitner, National Institute of Allergy and Infectious Diseases, NIH, DHHS, USA
Shaden Kamhawi, NIAID, National Institutes of Health, USA
Shirley Luckhart, University of California, Davis, USA
Michael R. Strand, University of Georgia, USA
Marcelo Jacobs-Lorena, Johns Hopkins Bloomberg School of Public Health, USA
João Pedra, University of Maryland School of Medicine, USA

* Session Chair † Invited but not yet accepted     Program current as of January 31, 2020. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit https://www.keystonesymposia.org.
Novel Approaches to Disease Control
*Serap Aksoy*, Yale University School of Public Health, USA
*George Dimopoulos*, Johns Hopkins University, USA
Matthew B. Thomas, Pennsylvania State University, USA
*Novel Strategies for Delivery of Bioactives Against Adult Malaria Mosquitoes in Field Settings*
Luciano A. Moreira, Instituto de Pesquisas René Rachou-Fiocruz, Brazil
*Using an Endosymbiont to Control Dengue*
David S. Schneider, Stanford University School of Medicine, USA
*Tracing the Path Hosts Travel through “Disease Space”*

Meeting Wrap-Up
Serap Aksoy, Yale University School of Public Health, USA
Adriana Costero-Saint Denis, NIAID, National Institutes of Health, USA

SUNDAY, MAY 17
Departure