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

Discounted Abstract/Scholarship Deadline: Jan 13, 2015
Abstract Deadline: Feb 11, 2015
Discounted Registration Deadline: March 11, 2015

To see the full program and for additional details, visit www.keystonesymposia.org/15E2.
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
*Michael 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
Anopheles/Plasmodium Interactions: The Tale of the Invisible Parasite!

Jose Luis Ramirez, 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

Keynote Address
B. Joseph Hinnebusch, 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
Mosquitoes 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

Jose Luis Ramirez, 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 Lemaitre, École Polytechnique Fédérale de Lausanne, Switzerland
Michael R. Strand, University of Georgia, USA
Vector-Microbiome Interactions: Impacts on Mosquito Immunity and Development

Kristin Michel, Kansas State University, USA
Immunomodulation Therapy to Control Mosquito Vectors

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 Viviparous Dipteran

George Dimopoulos, Johns Hopkins University, USA
Exploring the Mosquito Microbiome for Disease Control

Sasan 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
**Microbiome Impact on Innate Immunity**

*Angela E. Douglas*, Cornell University, USA  
*Sasan Assgari*, 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

**Daniel LePage**, Vanderbilt University, USA  
Short Talk: Investigating the Genetic Basis of Wolbachia-Induced Cytoplasmic Incompatibility

**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

**Poster 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  

**Shaden Kamhawi**, NIAID, National Institutes of Health, USA  
Unique Features of Vector-Transmitted Leishmaniasis and their Relevance to Disease Progression and Control

**Guy Caljon**, Institute of Tropical Medicine, Belgium  
Short Talk: Early Immunological Responses upon Tsetse Fly Mediated Trypanosome Inoculation

**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

**Point**

*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

**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

**Abstract & Scholarship Deadline:** January 13, 2015 / **Abstract Deadline:** February 11, 2015 / **Discounted Registration Deadline:** March 11, 2015
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