

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

Microbiome: Therapeutic Implications (T1)

October 6-10, 2019 • INEC Killarney Convention Centre • Killarney, Co. Kerry, Ireland

Scientific Organizers: Justin L. Sonnenburg, Fergus Shanahan and Suzanne Devkota

Supported by the Directors' Fund

Discounted Abstract & Scholarship Deadline: June 6, 2019 / Abstract Deadline: July 9, 2019 / Discounted Registration Deadline: August 7, 2019

SUNDAY, OCTOBER 6

Arrival and Registration

MONDAY, OCTOBER 7

Welcome and Keynote Address

***Fergus Shanahan**, National University of Ireland, Ireland

David A. Relman, Stanford University, USA

Humans, History and the Study of Microbiomes: Where Have We Been, Where do We Need to Go?

Live Microbial Therapeutics

***Elena F. Verdu**, McMaster University, Canada

Bernat Olle, Vedanta Biosciences, USA

Medicines Based on Defined Bacterial Consortia

Ian A. Myles, NIAID, National Institutes of Health, USA

Short Talk: First-in-Human Topical Microbiome Transplantation with Roseomonas Mucosa for Atopic Dermatitis: Clinical Outcomes and Mechanistic Insights

Alice Cheng, Stanford University, USA

Short Talk: Design and Therapeutic Application of a Highly Complex Synthetic Microbial Community

Jessica Ravikoff Allegretti, Brigham and Women's Hospital, USA

FMT for C. difficile and Beyond

Paul E. Carlson, US Food and Drug Administration, USA

Regulatory Considerations for Microbiome Related Products

Workshop 1: Microbiome Science: Human-Centered Studies

***Tzu-Wen L. Cross**, Purdue University, USA

Michael Woodworth, Emory University School of Medicine, USA

Clearance of Antibiotic-Resistant Enterobacteriaceae after Stool Enema Shown by Genome Sequencing of Stool-Derived and Clinical Isolates

Jessica McCann, Duke University, USA

Deciphering the Contribution of the Microbiome to Branched Chain Amino Acid (BCAA) Metabolism and Obesity in Adolescents and Mice

Anubhav Das, 4D Pharma Cork Ltd, Ireland

Impact of a Live Biotherapeutic on the Structure of the Gut Microbiota – Results from the Blautix Phase I Study in Irritable Bowel Syndrome

Julia Copeland, University of Toronto, Canada

The Impact of Immigration on the Gut Metagenome of South Asian Canadians

Carles Lerin, Hospital Sant Joan de Deu, Spain

Effects of Bifidobacterium animalis subsp. lactis BPL1 (CECT 8145) on Children with Prader-Willi Syndrome: A Randomized Crossover Trial

Philippa Margaret Wells, King's College London, UK

Genetic Risk of Rheumatoid Arthritis is Associated with the Oral and Gut Microbiota

Madelief Wijdeveld, Amsterdam University Medical Center, Netherlands

Relation Between Intestinal Acetate Production and Plasma Glucose Levels in Healthy Subjects

Christopher B. Ford, Seres Therapeutics, USA

Engraftment of Investigational Microbiome Drug, SER-262, in Subjects Receiving Vancomycin is Associated with Reduced Rates of Recurrence after Primary Clostridium difficile Infection (CDI)

Using the Microbiome to Alter Immune Status: Beyond Colonic Bacteria

***Justin L. Sonnenburg**, Stanford University, USA

David M. Underhill, Cedars-Sinai Medical Center, USA

A Role for the Fungal Microbiota in Crohn's Disease?

Susan V. Lynch, University of California, San Francisco, USA

Infant Probiotics to Combat Allergies and Asthma

Elena F. Verdu, McMaster University, Canada

Small Intestinal Microbiome and Gluten Metabolism: A Missing Ingredient in Celiac Disease?

David Chaim Jacob Zilber, Noma Restaurant, Denmark

Democratizing Deliciousness

Poster Session 1

TUESDAY, OCTOBER 8

Diet as a Lever for Altering the Microbiome

***Suzanne Devkota**, Cedars-Sinai Medical Center, USA

Christopher J. Damman, Bill & Melinda Gates Foundation, USA

Food, Microbes, and the Gut for Good Growth in Global Health

Arjun Raman, Washington University in St. Louis, USA

Short Talk: A Sparse Co-Varying Unit that Describes Healthy and Impaired Community Development

Paul W. O'Toole, University College Cork, Ireland

The Impact of Diet on Microbiome in Aging

Brianna Petrone, Duke University, USA

Short Talk: DNA Metabarcoding, a Molecular Diet Survey for Studies of Human Gut Microbiota

Liping Zhao, Shanghai Jiao Tong University, China and Rutgers University, USA

Diets, Microbes and Diabetes

Wenjie Ma, Massachusetts General Hospital, USA

Short Talk: Dietary Fiber Intake, the Gut Microbiome, and Chronic Systemic Inflammation

Ivan Vujkovic-Cvijin, NIAID, National Institutes of Health, USA

Short Talk: Mining Immune Memory to Identify Pro-Inflammatory Gut Microbiota Members in Mice and Humans

Mark Sampson, Azitra Inc., USA

Short Talk: Engineering the Skin Microbiome to Treat Skin Disease: A Phase I First-in-Human Safety Study with Topical Application of Engineered S. Epidermidis

Controlling Microbial Metabolism

***David A. Relman**, Stanford University, USA

Eric C. Martens, University of Michigan Medical School, USA

Diet-Induced, Microbial Mucus Erosion as a Catalyst for Intestinal Diseases

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Patricia Wolf, University of Illinois at Urbana-Champaign, USA
Short Talk: Network Modeling of Bile Acid Metabolomics and Cecal Bacterial Metatranscriptomic Responses to Berberine in a Gnotobiotic Mouse Model Constituted with the B4PC2 Human Microbial Consortium

Weston Whitaker, Novome Biotechnologies, USA
Synthetic Biology for Engineering Gut Microbes

Gary D. Wu, University of Pennsylvania, USA
Engineering the Environment of the Gut to Modify the Gut Microbiota and its Metabolome

Will Van Treuren, Stanford University, USA
Short Talk: Strain-Resolved Metabolomics of >150 Human Gut-Resident Bacterial Species Reveals Large-Scale Ecological Patterns, Novel Metabolic Strategies, and Widespread Production of Physiologically Relevant Molecules

Poster Session 2

WEDNESDAY, OCTOBER 9

Looking to the Past, Predicting the Future

***Kelly Swanson**, University of Illinois at Urbana-Champaign, USA

Justin L. Sonnenburg, Stanford University, USA
Ancestral Microbes and Precision Human Interventions

Marsha C. Wibowo, Harvard Medical School, USA
Short Talk: Reconstruction of Ancient Microbial Genomes from the Human Gut

Nicolai Karcher, University of Trento, Italy
Short Talk: Analysis of 1,321 Eubacterium Rectale Genomes from Metagenomes Unravels Complex Phylogeographic Population Structure and Subspecies Functional Adaptations

Susan Bullman, Fred Hutchinson Cancer Research Center, USA
The Tumor Microbiota: A Role in Cancer Progression and Treatment

David Zeevi, Rockefeller University, USA
Structural Variation in the Gut Microbiome Associates with Host Health

Matthew R. Olm, University of California, Berkeley, USA
Short Talk: Metagenomic Identification of Fecal Microbial Signatures Preceding Acute Intestinal Inflammation in Premature Infants

Fergus Shanahan, National University of Ireland, Ireland
Translating Microbiome Science – Lessons from the Past and Future Directions

Poster Session 3

Workshop 2: Considerations for Conducting Human Trials and Testing Investigational New Drugs

***Suzanne Devkota**, Cedars-Sinai Medical Center, USA

Paul E. Carlson, US Food and Drug Administration, USA

Susan V. Lynch, University of California, San Francisco, USA

Bernat Olle, Vedanta Biosciences, USA

Jessica Ravikoff Allegretti, Brigham and Women's Hospital, USA

Purna C. Kashyap, Mayo Clinic, USA

Therapeutics - A Whole Body Approach

***Premysl Bercik**, McMaster University, Canada

Purna C. Kashyap, Mayo Clinic, USA
An Integrated Top Down and Bottom Up Strategy for Delineating the Role of Gut Microbiome in Functional Bowel Disorders

Hagit Shapiro, Weizmann Institute of Science, Israel
Short Talk: Potential Roles of the Gut Microbiome in Modulation of Murine ALS

John Cryan, University College Cork, Ireland
Microbes and the Mind: Moving Toward Mechanisms

Hannah Yan, Baylor College of Medicine, USA
Short Talk: The Bacterial Microbiome Regulates Steady-State Hematopoiesis via Immune Signaling Pathways

Eileen Murphy, Alimentary Health, Ireland
The Pipeline from Concept to Market - Harnessing the Microbiome for Health

THURSDAY, OCTOBER 10

Antibiotic Resistance, Microbe Killing, and Survival

***Robert A. Britton**, Baylor College of Medicine, USA

Kevin Foster, University of Oxford, UK
Cooperation and Competition in Bacteria: From Model Systems to the Microbiome

Daniel C. Propheter, University of Texas Southwestern Medical Center, USA
Short Talk: Adiponectin is a Novel Intestinal Antibacterial Defense Protein

Suzanne Devkota, Cedars-Sinai Medical Center, USA
Creeping Fat: Microbial Translocation Drives Cellular Restructuring of Adipose Tissue in Humans

Eric G. Pamer, University of Chicago, USA
Exploiting the Microbiota to Reduce Antibiotic-Resistant Infections

Sujatha Srinivasan, Fred Hutchinson Cancer Research Center, USA
Short Talk: Periodic Presumptive Treatment (PPT) with Metronidazole Reduces Abundance of Vaginal Bacteria Associated with HIV Risk

Ami S. Bhatt, Stanford University, USA
Mechanisms of Microbial Diversification and Resistance

Takuji Yamada, Tokyo Institute of Technology, Japan
Short Talk: Metagenomic and Metabolomic Analyses Reveal Distinct Stage-Specific Phenotypes of the Gut Microbiota in Colorectal Cancer

Next-Gen Therapeutics and New Frontiers

***Ami S. Bhatt**, Stanford University, USA

Jeff F. Miller, University of California, Los Angeles, USA
Diversity-Generating Retroelements in Phage, Microbes, and Microbiomes

Ines Thiele, National University of Ireland, Galway, Ireland
Modeling Gut Microbiome Metabolism

Ravi U. Sheth, Columbia University, USA
Short Talk: Spatial Metagenomic Characterization of Microbial Biogeography in the Gut

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Trevor Lawley, Wellcome Sanger Institute, UK
*Integrating Mass Culturing and Metagenomic Analysis for Human
Microbiome Translational Science*

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

FRIDAY, OCTOBER 11

Departure