

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

The Microbiome: From Mother to Child (EK11)

Scientific Organizers: Jacques Ravel, David M. Aronoff, Grace M. Aldrovandi and Maria Carmen Collado

Sponsored by Cell Research

Harnessing the Microbiome for Disease Prevention and Therapy (EK12)

Scientific Organizers: Eric G. Pamer, Laurie E. Comstock and Alan Walker

January 18-20, 2021 • Virtual at your computer

Sponsored by AstraZeneca, Cell Research, and Novo Nordisk A/S

MONDAY, JANUARY 18

Welcome and Keynote Address (Joint) (8am Denver/Mountain Time Start)

***Eric G. Pamer**, University of Chicago, USA
Session Chair

***Jacques Ravel**, University of Maryland School of Medicine, USA
Session Chair

Jeffrey I. Gordon, Washington University School of Medicine, USA
[NOT AVAILABLE ON DEMAND] *Developing Microbiota-Directed Complementary Foods for Treating Childhood Undernutrition*

Chemical Biology of the Microbiome (Joint) (8:40am Denver/Mountain Time Start)

***Emily P. Balskus**, Harvard University, USA
Dissecting and Manipulating Microbial Metabolism in the Vagina and the Gut Microbiota

Mohamed S. Donia, Princeton University, USA
Chemical Ecology of the Human Microbiome in Health and Disease

Michael A. Fischbach, Stanford University, USA
Small Molecules from the Human Microbiota

***Lora V. Hooper**, University of Texas Southwestern Medical Center, USA
Metabolism, the Microbiome, and the Circadian Clock

Amrisha Bhosle, Broad Institute of MIT and Harvard, USA
Short Talk: Prioritization and Annotation of Novel Bioactive Small Molecules from the Microbiome

Christine Isabella, Massachusetts Institute of Technology, USA
Short Talk: Lectin-Sequencing for Analysis of the Gut Microbiome

Poster Session 1 (Joint) (11am Denver/Mountain Time Start)

The Vaginal Microbiome in Health and Disease (2pm Denver/Mountain Time Start) (EK11)

***Jacques Ravel**, University of Maryland School of Medicine, USA
Functional Insight into the Vaginal Microbiome

***Tal Korem**, Columbia University, USA
The Vaginal Microbiome and Metabolome in Spontaneous Preterm Birth

Marguerite Indriati Hood-Pishchany, Boston Children's Hospital, USA
Ecological Commodities Driving Composition in the Vaginal Microbiome

Lauren Courtney Martin, Stellenbosch University, South Africa
Short Talk: The Maternal Vaginal Microbiome: An Investigation into Its Influence in the Development of Foetal Alcohol Spectrum Disorders (FASD)

Nkechi Martina Odogwu, Mayo Clinic, USA

Short Talk: Dynamics of the Vaginal Microbiome with Steroid Hormones: A Longitudinal Study from a Pregnant and Postnatal Nigerian Cohort

Matthew R. Hayward, Ragon Institute, USA

Short Talk: Construction of a Comprehensive Bacterial Genome Catalogue for the Female Genital Tract Identifies Hundreds of New Species

Seth M. Bloom, Massachusetts General Hospital, USA

Short Talk: Characterization of Unique Cysteine Metabolic Requirements in Lactobacillus iners Identifies a Target for Therapeutic Manipulation of the Cervicovaginal Microbiota

Interactions of Phage and Pathogens with the Microbiota (2pm Denver/Mountain Time Start) (EK12)

***Denise M. Monack**, Stanford University, USA
Cholesterol Metabolism by the Gut Microbiota Fuels Salmonella Super Spreaders

***Wendy S. Garrett**, Harvard School of Public Health, USA
[NOT AVAILABLE ON DEMAND] *Commensal Bacteria, Inflammation and Cancer*

Manuela Raffatellu, University of California, San Diego, USA
Mechanisms of Commensal-Mediated Inhibition of Pathogens

Kimberley Seed, University of California, Berkeley, USA
Phage Dynamics during Intestinal Infection with Vibrio cholerae

Brittany Miller, University of California, Davis, USA
Short Talk: Anaerobic Respiration of NOX1-Derived Hydrogen Peroxide Licenses Bacterial Growth at the Colonic Surface

Kali M. Pruss, Washington University in St. Louis, USA
Short Talk: Clostridium difficile Exploits a Host Metabolite Produced during Toxin-Mediated Infection

Mericien Venzon, NYU School of Medicine, USA
Short Talk: Harnessing Gut Bacteria to Disrupt Helminth Life Cycle Progression

Apollo Stacy, National Institutes of Health, USA
Short Talk: Infection Trains the Host for Microbiota-Enhanced Resistance to Pathogens

TUESDAY, JANUARY 19

The Microbiome and Pregnancy Outcomes (8am Denver/Mountain Time Start) (EK11)

***Michal A. Elovitz**, University of Pennsylvania School of Medicine, USA
Microbiota-Immune Interactions in the Cervicovaginal Space and Spontaneous Preterm Birth

David MacIntyre, Imperial College London, UK
Glycan Mediated Microbiota-Host Interactions in the Reproductive Tract and Pregnancy Outcomes

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

The Post-Partum Microbiome and Predisposition Towards Spontaneous Preterm Birth

Katharina Ribbeck, Massachusetts Institute of Technology, USA

Modulation of the Properties of Cervicovaginal Mucus by the Microbiota: A Role in Spontaneous Preterm Birth?

Heleen Schuster, Amsterdam University Medical Center, Netherlands

Short Talk: Vaginal Immunoglobulins and Inflammatory Markers in Preterm Birth; A Cohort and Nested Case-Control Study from the PROPELLOR Cohort

Julie Mirpuri, University of Texas Southwestern Medical Center, USA

Short Talk: Exposure to Maternal High Fat Diet Is Associated with Altered Prenatal Offspring Intestinal Innate Immunity that Is Dependent on the Maternal Microbiome

Laurence Daoust, Université Laval, Canada

Short Talk: Postnatal Environment Impacts the Development of Sex-Specific Metabolic Outcomes in Offspring when Targeting Dams' Gut Microbiota

Karen Lithgow, University of Calgary, Canada

Short Talk: Secreted Protease Activities of Vaginal Porphyromonas Species Associated with Preterm Birth

The Microbiome and Cancer (8am Denver/Mountain Time Start) (EK12)

***Cynthia L. Sears**, Johns Hopkins University School of Medicine, USA

Bacterial Biofilms Associated with Colon Cancer

Melody Smith, Stanford University, USA

Intestinal Microbiome Analyses Identify Biomarkers for Patient Response to CAR T Cell Therapy

***Laurence Zitvogel**, Institut Gustave Roussy, France

Metagenomic Hallmarks of Resistance to Immune Checkpoint Inhibitors in Advanced Lung Cancers

Bärbel Stecher, Ludwig-Maximilians-Universität München, Germany

[NOT AVAILABLE ON DEMAND] Probing Microbial Community Functions Using Synthetic Microbial Communities

Matthew E. Griffin, The Scripps Research, USA

Short Talk: Dissecting Chemical Factors from the Gut Microbiota to Improve Cancer Immunotherapy

Joon Seok Park, Harvard Medical School, USA

Short Talk: The Gut Microbiota Mediated T-Cell Co-Inhibitory Signaling Regulates Responses to anti-PD-1 Cancer Immunotherapy

Joanna Dreux, Second Genome, USA

Short Talk: Microbiome-Based Biomarker Predicts Response to Immune Checkpoint Inhibitor Therapy Independently of Clinical Features in a Melanoma Meta-Cohort

Abby E. Overacre, University of Pittsburgh, USA

Short Talk: Microbiome-Specific T Cells Drive Tertiary Lymphoid Structure Development and Anti-Tumor Immunity in Colorectal Cancer

Poster Session 2 (Joint) (11am Denver/Mountain Time Start)

Meet the Editors (Joint)

Andrew T. Gewirtz, Georgia State University / Frontiers, USA

Montserrat Cols-Vidal, Journal of Experimental Medicine, USA

Kristan van der Vos, Cell Press, Netherlands

Microbiome Transmission from Mother to Infants (2pm Denver/Mountain Time Start) (EK11)

***Moran Yassour**, Hebrew University of Jerusalem, Israel
Strain-Level Analysis of Mother-to-Child Bacterial Transmission during the First Few Months of Life

Anita L. Kozyrskyj, University of Alberta, Canada

Evidence for Causal Pathways of the Infant Gut Microbiome to Overweight and Atopic Disease

***Grace M. Aldrovandi**, University of California, Los Angeles, USA

When Mom is Sick: Maternal Health and the Infant Microbiome

Carole Brosseau, INRAE BIA, France

Short Talk: Probiotics Supplementation during Pregnancy Leads to the Transmission of Microbial and Immune Factors from Mother to Child, Preventing from Food Allergy

Carolyn Ann Thomson, University of Calgary, Canada

Short Talk: The Shape of Things to Come: How the Maternal Microbiota Shapes Susceptibility to Type 1 Diabetes in the Offspring

Mercedes Gomez de Agüero, University of Würzburg, Germany

Short Talk: Neonatal Skin Barrier Formation Occurs Embryonically and Is Driven by Maternal Microbiota

Sanzhima Garmeeva, University Medical Center Groningen, Netherlands

Short Talk: Early Development of the Gut Bacteriome and Virome and Their Interactions

Xin M. Luo, Virginia Tech, USA

Short Talk: Regulation of Neonatal IgA Production by the Maternal Microbiota

Genetics of Microbe-Microbe Interactions (2pm Denver/Mountain Time Start) (EK12)

Seth Rakoff-Nahoum, Boston Children's Hospital, USA

Metabolites as Mediators of Gut Microbial Ecology

Chun-Jun (CJ) Guo, Weill Cornell Medicine, USA

A Genetic Approach to Investigate Microbe-Host Interaction at the Molecular Level

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***Laurie E. Comstock**, University of Chicago, USA
Antibacterial Toxins of the Gut Bacteroidales and Their Therapeutic Potential

***Andrew L. Goodman**, Yale School of Medicine, USA
Survival Strategies in the Gut Microbiome

Lucas Osborn, Cleveland Clinic Foundation, USA
Short Talk: Colorful Foods and Fatty Liver Disease: A Gut Microbial Perspective

Eric A. Franzosa, Harvard T.H. Chan School of Public Health, USA
Short Talk: Integrating Taxonomic, Functional, and Strain Profiling of Microbial Communities with bioBakery 3

Jingyuan Fu, University Medical Center Groningen, Netherlands
Short Talk: The Long-Term Genetic Stability and Individual Specificity of the Human Gut Microbiome

Yancong Zhang, Broad Institute of MIT and Harvard, USA
Short Talk: Identifying Novel Bioactive Microbial Gene Products in Inflammatory Bowel Disease

WEDNESDAY, JANUARY 20

Development of the Infant Gut Microbiota (8am Denver/Mountain Time Start) (EK11)

***Christopher Stewart**, Newcastle University, UK
Temporal Development of the Gut Microbiome in Early Childhood

Marie-Claire Arrieta, University of Calgary, Canada
Bacterial and Fungal Microbiome Maturation in Premature and Term Infants

***Erika C. Claud**, University of Chicago, USA
NEC and the Preterm Infant Microbiome

Microbiome, Immunity, Phage and Inflammation (8am Denver/Mountain Time Start) (EK12)

Ivaylo I. Ivanov, Columbia University, USA
[NOT AVAILABLE ON DEMAND] Uptake and Presentation of Commensal Antigens

***Bana Jabri**, University of Chicago, USA
Microbiota, Bowel Inflammation and Celiac Disease

Ramnik Xavier, Massachusetts General Hospital, USA
[NOT AVAILABLE ON DEMAND] Microbiota Compositions and Inflammatory Bowel Disease

***Colin Hill**, University College Cork, Ireland
Shining Light on the Viral Dark Matter of the Human Gut Microbiome

Snehal N. Chaudhari, Harvard Medical School, USA
Short Talk: A Microbial Metabolite Remodels the Gut-Liver Axis Following Bariatric Surgery

Zachary C. Holmes, Duke University, USA
Short Talk: Individualized Microbiota Responses Are Conserved across Prebiotics and Associated with Diet History

Jianbo Zhang, Massachusetts Institute of Technology, USA
Short Talk: Harnessing Patient Derived Microphysiological System to Study Host-Microbe Interactions

Matthew Ostrowski, University of Michigan, USA
Short Talk: Xanthan Gum Digestion by Human Gut Microbiota

The Influence of Nutrition on Infants' Microbiota and Health (9:30am Denver/Mountain Time Start) (EK11)

Steven D. Townsend, Vanderbilt University, USA
Human Milk Oligosaccharides: Defense Against Pathogens

***David M. Aronoff**, Indiana University, USA
Group B Streptococcus: Transmission of a Pathogen from Mother to Infant

***Maria Carmen Collado**, Institute of Agrochemistry and Food Technology-Spanish National Research Council, Spain
Impact of Maternal Diet and Environment/Geographical Location on Maternal Breast Milk Neonatal Microbiota

Robert Y. Chen, Washington University School of Medicine, USA
Short Talk: Linking the Duodenal Microbiota of Undernourished Children to Enteropathy, Stunting, and Central Nervous System Dysfunction

Networking Lounge (11am Denver/Mountain Time Start) (EK11)

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Clinical Trials to Optimize Microbiome-Mediated Disease Resistance (12:15pm Denver/Mountain Time Start) (EK12)

***Eric G. Pamer**, University of Chicago, USA
Session Chair

***Matthew Henn**, Seres Therapeutics, USA
Microbiome Therapeutics to Treat Bacterial Infections and Inflammatory Disease

Bernat Olle, Vedanta Biosciences, USA
Medicines Based on Defined Bacterial Consortia

Johan van Hylckama Vlieg, Kaleido Biosciences, USA
Synthetic Glycans to Optimize Microbiome Composition and Function

Mark R. Charbonneau, Synlogic, USA
Short Talk: Development of a Synthetic Biotic for the Treatment of Enteric Hyperoxaluria

The Mother and Infant Microbiome and Neurodevelopment (2:00pm Denver/Mountain Time Start) (EK11)

***Tracy L. Bale**, University of Maryland School of Medicine, USA
The Transfer of Stress and Trauma via the Maternal Vaginal Microbiome

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***Elaine Y. Hsiao**, University of California, Los Angeles, USA
Microbiome Interactions with the Nervous System during Early Development

Geoffrey N. Pronovost, UCLA, USA
Short Talk: The Maternal Microbiome Regulates Placental and Fetal Development

Ai Ing Lim, NIAID, National Institutes of Health, USA
Short Talk: Maternal Infection Promotes Offspring Tissue-Specific Immune Fitness

Joan Miro-Blanch, CIBERDEM, Spain
Short Talk: Sex and Microbiota Shape Metabolism and Epigenetic Marks in the Host

Impact of Microbiota Composition, Metabolism and Phage on the Host (2pm Denver/Mountain Time Start) (EK12)

***Kiran Patil**, European Molecular Biology Laboratory, Germany
[NOT AVAILABLE ON DEMAND] Impact of Therapeutic Drugs on Microbiota Metabolism

***Alan Walker**, University of Aberdeen, UK
Implications of Gut Microbiota Variability for Dietary and Therapeutic Interventions

Paul L. Bollyky, Stanford University, USA
Pf Bacteriophages and the Pathogenesis of Pseudomonas Infections

Kenya Honda, Keio University School of Medicine, Japan
Mining the Microbiota and Identifying Effector Microbes that Causally Affect the Host Physiology

Sun-Ho Lee, Mount Sinai Hospital Toronto, Canada
Short Talk: The GEM PROJECT: Altered Host Sero-Reactivity to Microbial Antigens Is Associated with Future Onset of Crohn's Disease

Tyler Rice, Yale University, USA
Short Talk: Inter-species Gut Commensal Rivalry Dictates Mucosal and Systemic Immune Responses

Timur Tuganbaev, Keio University, Japan
Short Talk: Diet Diurnally Regulates Small Intestinal Microbiome-Epithelial-Immune Homeostasis and Enteritis

Mihnea Mangalea, CU Denver Anschutz Medical Campus, USA
Short Talk: Characterizing the Intestinal Viromes of Individuals at Risk for Developing Rheumatoid Arthritis

The Placental and Endometrial Microbiota - A Debate: Technical Artifact or Biological Reality? (3:45pm Denver/Mountain Time Start) (EK11)

***Jacques Ravel**, University of Maryland School of Medicine, USA
Session Chair

***Michal A. Elovitz**, University of Pennsylvania School of Medicine, USA
Session Chair

Indira U. Mysorekar, Washington University School of Medicine, USA
Moving from 'Microbiome' to Microbes in the Placenta and Uncovering Microbial-Immune Crosstalk

Frederic D. Bushman, University of Pennsylvania, USA
Establishment of the Microbiome and Virome in Newborn Human Infants

Closing Remarks (4:50pm Denver/Mountain Time Start) (EK11)

Closing Remarks (4:50pm Denver/Mountain Time Start) (EK12)