The Microbiome and Cancer

SEPTEMBER 17-18
Welcome to the first Biennial Symposium of the Fred Hutch Microbiome Research Initiative. This inaugural symposium focuses on the microbiome and cancer, with sessions on HCT outcomes, nutrition and metabolites, carcinogenesis, and immune therapy. We are thrilled to have attendees from across Seattle’s research community including Fred Hutch, the University of Washington, the Seattle Children’s Research Institute, the Center for Infectious Disease Research, the Institute for Systems Biology, and the Benaroya Research Institute.

PARKING
A public pay parking lot is available on Aloha Street. Limited street parking is also available. Parking in campus visitor lots is limited to 2-hours or less. All visitors must sign in and record their vehicle information at the Thomas building reception desk, the Yale building Security and Transportation desk or the Arnold building front desk.

CHECK-IN / NAME BADGE
Please check-in at the entrance of the Arnold building and pick-up your symposium name badge. Please wear your badge during the symposium, as well as during meals and the evening reception. Please return your badge at the end of the symposium in the boxes provided so we may reuse the materials at future events.

MEALS
Breakfast and lunch will be provided to symposium attendees, and will be located in the Arnold Building Atrium (lower level). To access meals, please present your symposium badge.

WI-FI AVAILABLE
Connection: Fred Hutch Guest

RECEPTION AND POSTER SESSION
Following Monday’s presentations, please join us for a reception and poster session including beer, wine, light bites and conversation: Monday, September 17, 5 pm, Arnold building atrium. A list of poster presentations can be found at the end of this program.

SIMULCAST
Symposium lectures will also be simulcast live to the following locations:
MONDAY SEPTEMBER 17
Weintraub Building, Pelton Auditorium
TUESDAY SEPTEMBER 18
1100 Eastlake Building, Room E4-200

TWITTER
@HutchMRI #MRIsymposium

QUESTIONS OR COMMENTS?
Please contact Sue Bartlett
206-667-3731
sbartlet@fredhutch.org
EVENT SCHEDULE

Monday, September 17, 2018
Arnold Building, Behnke Suite

7:00-8:00 A.M. BREAKFAST
Arnold Building Atrium

8:00-8:05 A.M. INTRODUCTION
David Fredricks, MD, Fred Hutchinson Cancer Research Center;
University of Washington

8:05-8:15 A.M. GREETING
Geoffrey R. Hill, MD, Member and José Carreras/E. Donnall
Thomas Endowed Chair for Cancer Research, Clinical Research
Division, Fred Hutchinson Cancer Research Center

THERAPEUTICS
Moderator: Mac Cheever, MD, Fred Hutchinson Cancer Research Center;
University of Washington

8:15-9:15 A.M. Commensal Microbiota and Anti-Tumor Immunity
Thomas F. Gajewski, MD, PhD, University of Chicago

9:15-10:15 A.M. Development of Microbiome Drugs for Immune Related Disorders
David Cook, PhD, Seres Therapeutics

10:15-10:30 A.M. BREAK

DIET
Moderator: William R. DePaolo, PhD, University of Washington

10:30-11:30 A.M. Diet, the Microbiome, and Colon Cancer Risk
Stephen J.D. O’Keefe, MBBS, MSc, MD, FRCP [England]
University of Pittsburgh; University of Stellenbosch, South Africa

11:30 A.M.—NOON Gut Microbial Metabolism of Dietary Phytochemicals and
Impact on Cancer Risk
Johanna Lampe, PhD, RD
Fred Hutchinson Cancer Research Center;
University of Washington

NOON-12:30 P.M. Microbiome-Encoded Targets for the Prevention of
Colorectal Cancer
Neelendu Dey, MD
Fred Hutchinson Cancer Research Center;
University of Washington

12:30-1:30 P.M. LUNCH
Arnold Building Atrium

HEMATOPOIETIC CELL TRANSPLANT
Moderator: Steven Pergam, MD, MPH, Fred Hutchinson Cancer Research Center;
University of Washington

1:30-2:30 P.M. Microbiome Modulation of Intestinal Barrier Function
Robert Jenq, MD
University of Texas MD Anderson Cancer Center

2:30-3:00 P.M. Dynamics of the Gut Microbiota after Hematopoietic
Cell Transplantation
David Fredricks, MD
Fred Hutchinson Cancer Research Center;
University of Washington

3:00-3:30 P.M. MAIT Cell Reconstitution after Allogeneic Hematopoietic
Stem Cell Transplantation
Cameron Turtle, MBBS, PhD, FRACP, FRCPA
Fred Hutchinson Cancer Research Center;
University of Washington

3:30-3:45 P.M. BREAK

PANEL DISCUSSION: THE NEXT GENERATION OF RESEARCH
Moderator: David Fredricks, MD, Fred Hutchinson Cancer Research Center

3:45-4:45 P.M. David Cook, Neelendu Dey, Robert Jenq, Johanna Lampe,
Stephen O’Keefe

POSTER SESSION AND RECEPTION
5:00-6:00 P.M. Arnold Building Atrium
EVENT SCHEDULE

Tuesday, September 18, 2018
Arnold Building, Behnke Suite

7:00-8:00 A.M. BREAKFAST
Arnold Building Atrium

8:00-8:15 A.M. INTRODUCTION
Sujatha Srinivasan, PhD
Fred Hutchinson Cancer Research Center

KEYNOTE ADDRESS
Moderator: Sujatha Srinivasan, PhD, Fred Hutchinson Cancer Research Center
8:15-9:15 A.M. Control of Tissue Immunity and Repair by the Microbiota
Yasmine Belkaid, PhD, National Institutes of Health

9:15-9:45 A.M. BREAK

BASIC SCIENCES
Moderator: Nina Salama, PhD, Fred Hutchinson Cancer Research Center
9:45-10:00 A.M. Acquired Interbacterial Defense (AID) Systems Encoded by Members of the Highly-Abundant Order Bacteroidales
Benjamin Ross, PhD, University of Washington

10:00-10:30 A.M. Maternal Antibodies Regulate Neonatal Intestinal Homeostasis
Meghan Koch, PhD, Fred Hutchinson Cancer Research Center

10:30-11:15 A.M. Tumor Microbiota in the Progression and Treatment of Colorectal Cancer
Susan Bullman, PhD, Broad Institute of Harvard and MIT

TOOLS & TECHNOLOGIES
Moderator: Neelendu Dey, MD, Fred Hutchinson Cancer Research Center
11:15-11:45 A.M. Minimizing Variability and Enhancing Accuracy in Microbiome Studies
Sujatha Srinivasan, PhD, Fred Hutchinson Cancer Research Center

11:45 A.M.-12:15 P.M. Discovering Ultrasmall Bacteria and Homeostatic Mechanisms Through Cultivation of a High Diversity Oral Community in Vitro
Jeffrey Scott McLean, PhD, University of Washington

12:15-1:15 P.M. LUNCH
Arnold Building Atrium

ANALYTICS
Moderator: Sujatha Srinivasan, PhD, Fred Hutchinson Cancer Research Center
1:15-1:30 P.M. A Compositional Transform Reveals HIV Exposure Induced Shifts in the Fecal Microbiota and Vaccine Responsiveness of Nigerian Infants
Bryan Brown, PhD, Seattle Children’s Research Institute

1:30-2:00 P.M. Bacterial Genome Islands in the Gut Microbiome are Reproducibly Associated with Human Health and Disease
Sam Minot, PhD, Fred Hutchinson Cancer Research Center

2:00-3:00 P.M. Modeling and Testing the Human Microbiome in Longitudinal Perturbation Experiments
Susan Holmes, PhD, Stanford University

3:00-3:15 P.M. BREAK

3:15-4:15 P.M. Microbiomes in the Context of Personal, Dense, Dynamic Data Clouds for Human Health
Nathan Price, PhD, Institute for Systems Biology; University of Washington; Arivale

4:15-4:45 P.M. Joint Analysis of Microbiome and Other Omic Data Types
Michael Wu, PhD, Fred Hutchinson Cancer Research Center; University of Washington
Yasmine Belkaid, PhD  
Director, NIAID Microbiome program; Co-Director, NIH Center for Human Immunology; Chief, Metaorganism Immunology Section, Laboratory of Immune System Biology, National Institutes of Health  
RESEARCH INTERESTS: Factors controlling host-microbe interactions in tissues and the consequences of host-microbe relationships for health and diseases.

Bryan Brown, PhD  
Research Fellow, Center for Global Infectious Disease Research, Seattle Children’s Research Institute  
RESEARCH INTERESTS: Using molecular and computational approaches to study bacterial-viral interactions in human enteric communities; building statistical tools to integrate and analyze multi-omic datasets.

Susan Bullman, PhD  
Instructor in Medicine, Meyerson Lab; Medical Oncology, Dana-Farber Cancer Institute; Broad Institute of Harvard and MIT  
RESEARCH INTERESTS: How the tumor microbiota may impact initiation, progression and treatment of human cancers.

David Cook, PhD  
Executive Vice President of R&D, Chief Scientific Officer, Seres Therapeutics  
RESEARCH INTERESTS: Microbial vaccine platforms to induce cellular immune responses.

Neelendu De, MD  
Assistant Member, Clinical Research Division, Fred Hutchinson Cancer Research Center; Assistant Professor, Division of Gastroenterology, Department of Medicine, University of Washington  
RESEARCH INTERESTS: Elucidating interactions between gut bacterial metabolism, the enteric nervous system, gut motility, and colorectal cancer using gnotobiotic models.
**SPEAKERS**

**Meghan Koch, PhD**  
Assistant Member, Basic Sciences Division, Fred Hutchinson Cancer Research Center  
RESEARCH INTERESTS: maternal–offspring interactions with a focus on immunity, metabolism and the microbiota.

**Johanna Lampe, PhD, RD**  
Member, Public Health Sciences Division, Fred Hutchinson Cancer Research Center; Research Professor, Epidemiology, School of Public Health, University of Washington  
RESEARCH INTERESTS: Diet and mechanisms of cancer prevention, studied using controlled feeding studies and dietary interventions in humans; effects of host and gut microbial genetic variation on biologic response to diet and biomarkers of dietary exposure.

**Jeffrey Scott McLean, PhD**  
Associate Professor, School of Dentistry and Adjunct Associate Professor, Department of Microbiology, University of Washington  
RESEARCH INTERESTS: Characterizing novel microbes and understanding the microbial processes that lead to oral-related diseases as well as maintaining health in the human oral microbiome, employing cultivation with multi-omic approaches.

**Sam Minot, PhD**  
Staff Scientist, Microbiome Research Initiative, Vaccine and Infectious Disease Division, Fred Hutchinson Cancer Research Center  
RESEARCH INTERESTS: Bioinformatic challenges and opportunities of using metagenomic whole-genome shotgun sequencing to characterize the human microbiome; working to identify the biological mechanisms by which the gut microbiome influences human health and disease.

**Sujatha Srinivasan, PhD**  
Senior Staff Scientist, Fredricks Lab, Vaccine and Infectious Disease Division, Fred Hutchinson Cancer Research Center  
RESEARCH INTERESTS: Developing and applying molecular, omics, and cultivation approaches to study the human microbiome, Understanding how bacterial interactions in human microbial communities impact human health and disease with a goal towards improving diagnostic tools and therapeutic interventions.

**Stephen J.D. O’Keefe, MBBS, MSc, MD, FRCP (England)**  
Professor of Medicine, Division of Gastroenterology, University of Pittsburgh; Director, African Microbiome Institute, University of Stellenbosch, South Africa  
RESEARCH INTERESTS: The influence of diet on colon cancer; the role of the microbiota in maintaining mucosal health and preventing disease; pancreatic physiology and the nutritional management of acute pancreatitis.

**Nathan Price, PhD**  
Professor & Associate Director of the Institute for Systems Biology; Affiliate Professor, Departments of Bioengineering, Computer Science & Engineering, and Molecular & Cellular Biology, University of Washington; Co-Founder/Board Member, Arivale  
RESEARCH INTERESTS: Systems biology of the human microbiome; translational medicine; scientific wellness; P4 medicine; biological networks; genome-scale models.

**Benjamin Ross, PhD**  
Senior Fellow, Mougous Lab, Department of Microbiology, University of Washington School of Medicine  
RESEARCH INTERESTS: Ecology of the human gut microbiome, interbacterial interactions, bacterial evolution, type VI secretion system, metagenomics.

**Johanna Lampe, PhD, RD**  
Member, Public Health Sciences Division, Fred Hutchinson Cancer Research Center; Research Professor, Epidemiology, School of Public Health, University of Washington  
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SPEAKERS

Cameron Turtle, MBBS, PhD, FRACP, FRCPA
Associate Member, Clinical Research Division, Fred Hutchinson Cancer Research Center; Associate Professor, Division of Medical Oncology, Department of Medicine, University of Washington
RESEARCH INTERESTS: Understanding the characteristics of distinct subsets of human T cells, their potential utility for tumor immunotherapy, and their role in immune reconstitution after HCT.

Michael Wu, PhD
Associate Member, Public Health Sciences Division, Fred Hutchinson Cancer Research Center; Affiliate Associate Professor, Department of Biostatistics, School of Public Health, University of Washington
RESEARCH INTERESTS: Developing statistical and computational tools for understanding host–microbiome relationships.

POSTER SESSION

1. The Gut Microbiome Gradually Mirrors the Development of Type 2 Diabetes in a Treatment Naive Mexican Population.
Christian Diener, PhD, Research Fellow, Gibbons Lab, Institute for Systems Biology

2. Vaginal Microbiota and HIV Acquisition Risk Among African Women
Tina Fiedler, BS, Research Technician, Fredricks Lab, Fred Hutchinson Cancer Research Center

3. Gut Bacterial Bile Acid Metabolism Modulates Homeostatic Enteric Nervous System Signaling
Sean Koester, Undergraduate Student, Summer Research Program, Dey Lab, Fred Hutchinson Cancer Research Center

4. Human Gut Microbiota are Associated with HIV- Reactive Immunoglobulin at Baseline and Following HIV Vaccination
James Kublin, MD MPH, Principal Staff Scientist, Vaccine and Infectious Disease Division and Executive Director, Human Vaccine Trials Network, Fred Hutchinson Cancer Research Center; Clinical Associate Professor, Department of Global Health, University of Washington

5. Identifying Regulators of Microbiome-Encoded Bile Acid Metabolism
Dan Lachance, PhD Student, Molecular Engineering, Dey Lab, Fred Hutchinson Cancer Research Center

6. Accuracy and Reproducibility of 16S rRNA Gene Profiling of Bacterial Communities: A Laboratory Investigation
Congzhou Liu, MS, Research Technician, Fredricks Lab, Fred Hutchinson Cancer Research Center

7. The Male Urethral Microbiota and Non-gonococcal Urethritis
Matt Munch, BS, Research Technician, Fredricks Lab, Fred Hutchinson Cancer Research Center

8. Higher Exposure to Enterolactone is Associated with Differences in Plasma Bile Acid Profiles in Healthy Adults on Controlled Diets
Sandi Navarro, PhD, Staff Scientist, Public Health Sciences, Fred Hutchinson Cancer Research Center

9. Functional Analysis of a Bacterial Cytoskeletal Element in Patterning the Helical Cell Shape of Helicobacter pylori
Sophie Sichel, M3D Graduate Student, Salama Lab, Fred Hutchinson Cancer Research Center

10. Characterization of Novel Megasphaera Species from the Female Reproductive Tract
Susan Strenk, BS, Research Technician, Fredricks Lab, Fred Hutchinson Cancer Research Center

11. Bacterial Communities in Women with Idiopathic Vaginitis
DJ Valint, MS, Research Technician, Fredricks Lab, Fred Hutchinson Cancer Research Center

12. Accuracy and Reproducibility of 16S rRNA Gene Profiling of Bacterial Communities: A Laboratory Investigation
Congzhou Liu, MS, Research Technician, Fredricks Lab, Fred Hutchinson Cancer Research Center
Microbiome science is an exciting and cross-cutting area of research that is critical for understanding human health and susceptibility to disease, including cancer. In addition, the microbiome is linked to the success of cancer therapies and to infectious complications that may ensue. Human associated microbial communities have a major impact on normal human physiology and health, with emerging evidence that these communities may contribute to disease through multiple mechanisms. For example, the gut microbiota has a role in changing host metabolism that can impact carcinogenesis, and it also plays a role in changing host immunity that impacts response to cancer therapy. Individual gut microbes and microbial communities can contribute to the development of cancer directly, such as colon cancer, or indirectly via production of metabolites that are absorbed or via changes in immune function that operate at sites distant from the gut. Indeed, understanding the human organism is incomplete without an understanding of the human microbiome within.

The Microbiome Research (MRI) Initiative serves as an incubator at Fred Hutch, linking investigators at the Center who share a common interest in microbiome research, capitalizing on recent advances in the field, and catalyzing nascent research that impacts cancer and infectious diseases. The MRI includes investigators with expertise in study design, laboratory methods, microbial ecology, animal models, human intervention studies, data analysis, biostatistics, and data visualization. Together we strive to predict health outcomes, understand the pathogenesis of disease, and manipulate the microbiota to promote health.