

# 2<sup>nd</sup> NCI/NIH Microbiome-Targeted Intervention Clinical Research Workshop

March 5-6, 2024  
Virtual

## Agenda

### **Event website and registration:**

[2nd NCI/NIH-Microbiome Intervention Clinical Research Workshop \(Overview\)](#) | [Events Registration \(cancer.gov\)](#)

### **Purpose:**

To accelerate translational and clinical research for developing precision microbiome-targeted interventions for cancer and other diseases.

### **Objectives:**

- 1) Evaluate the science and best research approaches of microbiome-targeted interventions in mechanistic and translational clinical research.
- 2) Discuss research needs and opportunities for harmonization, standardization, and collaboration to enhance the rigor and reproducibility of research on the safety and effectiveness of microbiome-targeted interventions.

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*\*Presentations are 15 min each, keynote lecture 30 min.*

### **Day 1: March 05, 2024**

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|-------------------|---|
| 9:00 AM - 9:05 AM | <b>Welcome and Overview of the Workshop</b><br>Dan Xi, NCI, Event Chair                           |
| 9:05 AM - 9:15 AM | <b>Opening Remarks</b><br>Kimryn Rathmell, NCI Director   |
| 9:15 AM - 9:45 AM | <b>Keynote</b><br><b>Microbiome Optimization: Beyond FMT</b><br>Eric Pamer, University of Chicago |
| 9:45 AM - 9:50 AM | <b>Break (5 min)</b>  |

- 9:50 AM - 11:30 AM**    **Session 1**  
**Microbiome Measurements, Bioinformatics and Computation Analysis**  
(Aim: discuss current state, challenges and limitations, and innovation needs in rigor on methodology through harmonization, standardization, and collaboration)  
  
(Session Moderators/Chairs: Dan Xi, NCI and Ryan Ranallo, NIAID)
- 9:50 AM - 10:05 AM    **Understanding and Manipulating Immune Modulation by a Prominent Skin Commensal**  
Michael Fischbach, Stanford University
- 10:05 AM - 10:20 AM    **Methodological Considerations for the Study of the Fecal and Oral Microbiome**  
Emily Vogtmann, NCI
- 10:20 AM - 10:35 AM    **Intratumoral Microbes: Their Impact on Cancer Heterogeneity and the Predominance of a Genetically Distinct *Fusobacterium Nucleatum* Clade in Colorectal Tumors**  
Christopher Johnston, Fred Hutchinson Cancer Center
- 10:35 AM - 10:50 AM    **Major Data Analysis Errors Invalidate Cancer Microbiome Findings**  
Steven Salzberg, Johns Hopkins University
- 10:50 AM - 11:05 AM    **Multi-omics for Microbiome Target Discovery**  
Curtis Huttenhower, Harvard University
- 11:05 AM - 11:30 AM    **Discussion**
- 11:30 AM-12:00 PM**    **Lunch Break (30 min)**
- 12:00 PM - 1:35 PM**    **Session 2**  
**Preclinical Research and Models**  
(Aim: discuss current state, challenges and limitations, and innovation needs to improve rigor on human relevant preclinical mechanistic research)  
  
(Session Moderator/Chair: Phil Daschner, NCI)
- 12:00 PM - 12:15 PM    **Dietary Enhancement of Microbial Tryptophan Catabolism Improves Cancer Immunotherapy Efficacy**  
Marlies Meisel, University of Pittsburg
- 12:15 PM - 12:30 PM    **Microbiota-Modified Bile Acids in Cancer: The Dichotomous Roles of 7-oxo-Deoxycholic Acid and Iso-Deoxycholic Acid in Tumorigenesis**  
Ting Fu, University of Wisconsin
- 12:30 PM - 12:45 PM    **Biofilms, Microbes & Mechanisms**  
Cynthia Sears, Johns Hopkins University

- 12:45 PM - 1:00 PM **Engineered Bacteria for Cancer therapy**  
Tal Danino, Columbia University
- 1:00 PM - 1:15 PM **Using Pre-clinical Models to Complement Human Translational Studies of the Gut Microbiome in Cancer Immunotherapy**  
Jenifer Wargo, MD Anderson Cancer Center
- 1:15 PM - 1:35 PM **Discussion**
- 1:35 PM - 1:45 PM Break (10 min)**
- 1:45 PM - 5:00 PM Session 3**  
**Translational and Clinical Research**  
(Aim: discuss current state, challenges and limitations, and innovation needs in rigor on translational and clinical research approach for developing intervention to improve therapeutic effectiveness and toxicity for current standard care through harmonization, standardization, and collaboration)
- 1:45 PM - 3:35 PM *Sub-Session 1:***  
**IBD, C. diff and Neurodegeneration**  
(Session Moderators/Chairs: R. Dwayne Lunsford, NIDDK and Ryan Ranallo, NIAID)
- 1:45 PM - 2:00 PM **Precision Microbiome Therapy for IBD**  
Randy Longman, Cornell University
- 2:00 PM - 2:15 PM **FMT-Derived Defined Live Biotherapeutic Products for Recurrent C. Difficile Infection**  
Jeremiah Faith, Icahn School of Medicine at Mount Sinai
- 2:15 PM - 2:30 PM **Development of a Defined Bacterial Consortium, for Prevention of Recurrent Clostridioides difficile Infection**  
Bernat Olle, Vedanta Biosciences, Inc
- 2:30 PM - 2:45 PM **Development of VOWST for the Prevention of Recurrent of Clostridioides difficile Infection**  
Chris Ford, Seres Therapeutics
- 2:45 PM - 3:00 PM **Effect of Intermittent Fasting on the Gut Microbiome and Metabolites in the MS Model and Patients**  
Yanjiao Zhou, University of Connecticut Health
- 3:00 PM - 3:15 PM **The Gut Microbiome Impacts Neuroinflammation in a Mouse Model of Parkinson's Disease**  
Sarkis Mazmanian, California Institute of Technology (Pre-recording)
- 3:15 PM - 3:35 PM **Discussion**

**3:35 PM - 3:45 PM**      **Break (10 min)**

**3:45 PM - 5:00 PM**      **Sub-session 2:**  
**Microbiome in Cancer (Part 1)**  
(Session Moderators/Chairs: Dan Xi, NCI and Nina Lukinova, NCI)

3:45 PM - 4:00 PM      **Harnessing the Power of the Oral Microbiome and Probiotic Molecules to Address Oral Cancer**  
Yvonne Kapila, University of California, Los Angeles, Los Angeles

4:00 PM - 4:15 PM      **The Impact of Periodontitis on Cancer Outcomes in the Era of Immunotherapy**  
Sara Pai, Yale University

4:15 PM - 4:30 PM      **Modulating the Microbiome Using Live Bacterial Products in Renal Cell Carcinoma**  
Sumanta Pal, City of Hope

4:30 PM - 4:45 PM      **Fungi in GI**  
Iliyan D Iliev, Cornell University

4:45 PM - 5:00 PM      **Discussion**

**5:00pm**                      **Day 1 Adjourn**

## Day 2: March 06, 2024

**9:00 AM - 12:00 PM**      **Session 3 (continued)**  
**Translational and Clinical Research**

**9:00 AM - 10:25 AM**      **Microbiome in Cancer (Part 2)**  
(Session Moderators/Chairs: Dan Xi, NCI and Marco Cardone, NCI)

9:00 AM - 9:15 AM      **Targeting the PD-L2/RGMB Pathway to Overcome Microbiome-Dependent Resistance to PD-1 Checkpoint Blockade**  
Arlene Sharpe, Harvard University

9:15 AM - 9:30 AM      **Facts and Hope for FMT in Cancer Immunotherapy**  
Hassane Zarour and Diwakar Davar, University of Pittsburg

9:30 AM - 9:45 AM      **Mechanisms and Microbiome Therapeutics**  
Giorgio Trinchieri, NCI

- 9:45 AM - 10:00 AM **Immune Checkpoint Inhibitor Related GI Toxicity**  
Yinghong Wang, MD Anderson Cancer Center
- 10:00 AM - 10:15 AM **Toposcore to Quantify Gut Dysbiosis for Immunotherapy of Cancer**  
Laurence Zitvogel, University Paris Saclay, Villejuif-Grand-Paris, France
- 10:15 AM - 10:40 AM **Discussion**
- 10:40 AM - 10:50 AM Break (10 min)**
- 10:50 AM - 12:00 PM Microbiome in Cancer (Part 3)**  
(Session Moderator/Chair: Marco Cardone, NCI and Dan Xi, NCI)
- 10:50 AM - 11:05 AM **FMT as Prophylaxis After Hematopoietic Cell Transplantation**  
Armin Rashidi, Fred Hutchinson Cancer Center
- 11:05 AM - 11:20 AM **Microbial Gut-Tumors Axis in Pancreatic Cancer: from Mice to Human**  
Florencia McAllister, MD Anderson Cancer Center
- 11:20 AM - 11:35 AM **Healthy Donor FMT for the Treatment of Solid Tumors**  
Saman Maleki Vareki, Western University, London, Ontario, Canada
- 11:35 AM - 12:00 PM **Discussion**
- 12:00 PM - 1:00 PM Lunch Break (60 min)**
- 1:00 PM - 2:00 PM **Microbiome in Cancer (Part 4)**  
(Session Moderator/Chair: Nina Lukinova, NCI and Dan Xi, NCI)
- 1:00 PM - 1:15 PM **Microbiome as Potentially Targetable Biomarker for Anti-CD19 CAR T Cell Response**  
Robert R Jenq, MD Anderson Cancer Center
- 1:15 PM - 1:30 PM **Microbiome Disruption and FMT in ICI Colitis**  
Jonathan U. Peled, Memorial Sloan Kettering Cancer Center
- 1:30 PM - 1:45 PM **The Role of the Gut Bacteriome and Inflammation in Cancer Treatment-Induced Behavioral Side Effects**  
Leah Pyter, The Ohio State University
- 1:00 PM - 2:00 PM **Discussion**
- 2:00pm-2:10 pm Break (10 min)**
- 2:10 PM – 3:10 PM Session 4**  
**FDA Clinical Trial Design and Clinical Regulatory Policy/IND: FMT and LBP for Cancer and Other Diseases**

(Session Moderator/Chair: Dan Xi, NCI and Ryan Ranallo, NIAID)

**Clinical Regulatory Considerations for Microbiota-based Cancer Therapy**

Peter Bross, FDA

**Regulatory Considerations for Microbiome Based Therapeutics**

Paul Carlson, FDA

**Discussion**

**3:10 PM – 3:20 PM**      **Break (10 min)**

**3:20 PM – 4:00 PM**      **Session 5**

**Final Panel Discussion and Summary**

(Aim: Summarize the challenges and provide actionable recommendations for developing a strategic framework for the next 5 and 10 years: how to overcome pitfalls and effectively advance the rigor and reproducibility of preclinical and clinical research in developing precision microbiome-targeted interventions for cancer and other diseases through harmonization, standardization, and collaboration in the era of precision medicine and AI.)

(Session Moderators/Chairs: Dan Xi, NCI and R. Dwayne Lunsford, NIDDK)

All Speakers

**4:00 PM - 4:25 PM**      **NCI and NIH funding information and resources**

NIH Program Officers

- NCI DCTD BBRB Biobanking Resources (Ping Guan, NCI)
- NCI Microbiome targeted intervention cancer network initiative concept (<https://deainfo.nci.nih.gov/advisory/joint/1123/index.htm> ) (Dan Xi, NCI)
- NCI DCTD PAR-24-085 “National Cancer Institute's Investigator-Initiated Early Phase Clinical Trials for Cancer Treatment and Diagnosis (R01 Clinical Trial Required)” <https://grants.nih.gov/grants/guide/pa-files/PAR-24-085.html>
- Others

**4:25 PM**                      **Day 2 Adjourn**

**Workshop Planning Committee:**

**NCI:**

DCTD: Dan Xi (Chair), Nina Lukinova, Marco Cardone, Mehdi Mesri

DCB: Phil Daschner

### Other ICs:

NIAID/NIH: Ryan Ranallo

NIDDK/NIH: R. Dwayne Lunsford

### FDA:

Peter Bross

- **Workshop Contacts:**

Dan Xi, PhD, NCI; Workshop Planning Chair at [xida@mail.nih.gov](mailto:xida@mail.nih.gov)

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### Sessions Key Suggested Discussions:

#### Session 1: Microbiome Measurements, Bioinformatics and Computation Analysis

1. What are the best practices, approaches, tools, and methodologies to enhance research rigor and reproducibility in microbiome measurement and computational analysis for cancer and other diseases?
2. What are the challenges for the next steps in developing SOPs? How to overcome?

#### Session 2: Preclinical Research and Models

1. How do we go beyond correlative studies of microbiome and cancer?
2. How to take advantage of preclinical models to better understand specific mechanisms of how specific bacteria or bacteria consortia that impact cancer etiopathogenesis and cancer therapies?

#### Session 3: Translational and Clinical Research

1. What is the best approach to developing therapeutic microbiome-targeted interventions for clinical trials for cancer and other diseases? What is the need of public-private collaboration?
2. What is the current best evidence supporting the most promising interventions advancing to clinical trials, e.g. FMT or defined microbial product? What are the challenges?
3. What are the best practices in clinical trial study design, specimen collection, biological measurement and assay, eligibility criteria, inclusion of diverse racial and ethnic populations, determination of primary and secondary endpoints, statistical power calculation, and selection of biomarkers for patient selection?
4. What are the best approaches to data collection for variables and confounding factors, and how can AI be developed for microbiome-targeted intervention development, mechanistic research, and clinical trials?

#### Session 4: FDA Clinical Trial Design and Clinical Regulatory Policy/IND: FMT and LBP for Cancer and Other Diseases

## Session 5: Final Panel Discussion and Summary

1. Summarize the challenges and provide actionable recommendations for developing a strategic framework for the next 5 and 10 years: how to overcome pitfalls and effectively advance the rigor and reproducibility of preclinical and clinical research in developing precision microbiome-targeted interventions for cancer and other diseases through harmonization, standardization, and collaboration in the era of precision medicine and AI.
2. What are the best practices, approaches, tools, and methodologies to enhance research rigor and reproducibility for microbiome measurement and computational analysis from population studies, preclinical mechanistic and translational research to clinical trials in cancer and other diseases?
3. What are the best practices and approaches to enhance research rigor and reproducibility for preclinical and clinical research to inform the best clinical trial design?
4. What are the best practices and approaches in conducting clinical trials to enhance success and improve healthcare disparity for microbiome targeted intervention?
5. What is the current best evidence for the most promising products of each type of intervention moving forward to phase 1/2, randomized phase 2, or 3 in cancer and other diseases?
6. What is the best evidence of the currently most promising interventions to develop potential cancer standard care for improving overall survivor and quality of life?
7. What are the best approaches in developing a framework for multi-dimensional data collection of biomarkers, variables, and confounding factors, and for infrastructure of bioinformatic and computational analysis for human research and clinical trials?
8. What is the best practice and approach in applying data science and AI to advance microbiome-targeted intervention development and clinical trials?
9. What is the need of public-private collaboration?

**Agenda Last Update: March 4, 2024.**