National Cancer Institute

15th Annual Innovative Molecular Analysis Technologies (IMAT) Principal Investigators' (PI) Meeting

November 12-13, 2014

Porter Neuroscience Conference Center
NIH Campus
Bethesda, Maryland

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

Program Overview

Welcome to the 15th Annual Principal Investigators' (PI) Meeting for the NCI Innovative Molecular Analysis Technologies (IMAT) program. As many of you already know, this annual meeting is organized to address two important aims of the IMAT program: (1) to provide NCI program staff a chance to interact directly with PIs and receive an update on progress to date with supported research and (2) to provide an opportunity for interactions and exchange of ideas among meeting participants. The latter aim serves as a critical opportunity to spark new project collaborations for either further improvement of supported technology platforms or to launch the development of entirely new technologies. The interactions are also an important opportunity for receiving critical feedback and guidance from a broad community, as well as for fostering dissemination of the exciting technologies emerging from IMAT-supported researchers.

An important issue in general from the perspective of any investor is the need to *engage end-users early and often*, and so the meeting includes various mechanisms for facilitating that communication. Researchers from NCI's intramural laboratories of the Center for Cancer Research will be in attendance and likely asking questions throughout the meeting, including the poster sessions. You are very much encouraged to engage them to understand their interests and needs. Also note there are collaborative funding opportunities for projects involving intramural researchers. Many of the IMAT-supported technologies are multidisciplinary endeavors, and as such your fellow supported investigators also represent important end-user perspectives that might be explored. The relatively long breaks between sessions are meant to allow for such interaction and dialog. Finally, discussion groups are being organized to encourage exploration of emerging areas for which new technology development should be focused. Beyond the several topics introduced by NCI program scientists for discussion, participants are very much encouraged to form additional discussion groups and consider inviting other meeting participants to join.

There are more exciting active research projects in the IMAT portfolio than we could possibly allow sufficient speaking time for, so we will continue our practice of having short "Poster Highlight" talks for those investigators presenting particularly interesting posters relevant to each session. As these presentations are short, each of you are encouraged to seek additional details from the poster during one of the two poster sessions. In addition to the agenda and presentation abstracts, a list of resources and funding opportunities we thought might be of interest to participants are included toward the back of this program book.

On behalf of the NCI program staff and everyone involved in the planning for this meeting, I thank you for your participation, your interest, and the important work you all do to assist in our collective mission against cancer. I look forward to an exciting and productive meeting.

Sincerely,

Tony Dickherber, Ph.D.
Program Director
Center for Strategic Scientific Initiatives
Office of the Director
National Cancer Institute

Agenda

Wednesday, November 12, 2014

8:25 a.m. - 8:40 a.m. **Welcome and Overview**
Tony Dickherber, Ph.D.
National Cancer Institute, NIH

Session 1: Cancer Modeling

Moderator: J. Randy Knowlton, Ph.D.
National Cancer Institute, NIH

8:40 a.m. - 9:00 a.m. **Microfluidic 3D Assays for Metastatic Cancer**
Roger Kamm, Ph.D.
Massachusetts Institute of Technology

9:00 a.m. - 9:20 a.m. **A Cancer Rainbow Mouse for the Simultaneous Assessment of Multiple Oncogenes**
Joshua Snyder, Ph.D.
Duke University Medical Center

9:20 a.m. - 9:50 a.m. **Poster Highlights**

Development of 3D Organ-Specific Models of Colorectal Cancer Metastasis
Andrew Zhuang Wang, M.D.
The University of North Carolina at Chapel Hill

Microfluidic Approach for the Development of a Three-Dimensional Bone Marrow Microenvironment Model to Test Personalized Multiple Myeloma Treatments
Jenny Zilberberg, Ph.D.
Hackensack University Medical Center

Next-Generation Mouse Gene-Targeting Technology to Model Tumorigenesis
Ronald Conlon, Ph.D.
Case Western Reserve University

9:50 a.m. - 10:00 a.m. **Session Discussion**

10:00 a.m. - 10:20 a.m. **BREAK**

Session 2: Sample Prep Technologies

Moderator: Stephen Hewitt, M.D., Ph.D.
National Cancer Institute, NIH

10:30 a.m. - 10:50 a.m. **Validation of Nanotrap Nanotechnology for One Step Capture and Preservation of Labile Low Abundance Body Fluid Biomarkers**
Lance Liotta, M.D., Ph.D.
George Mason University

10:50 a.m. - 11:10 a.m. **Integrated Microscale Transcriptional Profiling of Cell Communication Networks**
Scott Berry, Ph.D.
University of Wisconsin-Madison

11:10 a.m. - 11:40 a.m. **Poster Highlights**

Enhancement of DNA Fragmentation for Biospecimen Processing
Samantha Pattenden, Ph.D.
The University of North Carolina at Chapel Hill

Validation of a Novel One Step Tissue Fixation Chemistry That Preserves Phosphoproteins and Histomorphology
Virginia Espina, Ph.D.
George Mason University

Advanced Development of Immuno-MRM Technology to Analyze Archived Cancer Tissues
Jacob Kennedy, M.Sc.
Fred Hutchinson Cancer Research Center

11:40 a.m. - 11:50 a.m. **Session Discussion**

11:50 a.m. - 1:20 p.m. **Lunch and Discussion Groups**

Session 3: High Throughput Screening Technologies

Moderator: Lynn Sorbara, Ph.D.
National Cancer Institute, NIH

1:30 p.m. - 1:50 p.m. **PCR-Free Multiplexed Detection of Circulating miRNA in Blood**
Stephen Meltzer, M.D.
Johns Hopkins University

1:50 p.m. - 2:10 p.m. **Improving PRISM-SRM MS Work Flow for High Sensitivity and High Throughput Biomarker Verification**
Keqi Tang, Ph.D.
Pacific Northwest National Laboratory

2:10 p.m. - 2:30 p.m. **Oligonucleotide Selective Sequencing: A Platform Sequencing Technology for Delineating Clinically Relevant Genetic Aberrations from Cancer Driver Targets**
Hanlee Ji, M.D.
Stanford University

2:30 p.m. - 2:50 p.m. **Poster Highlights**

SNP-SNAP Binding Arrays Reveal SNPs That Modulate Transcription Factor Interactions in Prostate Cancer
Mary Szatkowski Ozers, Ph.D.
Proteovista LLC

New Reagents for Tracking Protein Oxidation in Cells by MS and Imaging Methods
Cristina Furdui, Ph.D.
Wake Forest University

2:50 p.m. - 3:00 p.m. **Session Discussion**

3:00 p.m. - 4:30 p.m. **Poster Session I**

Session 4: Clinical Technologies

Moderator: Tawnya McKee, Ph.D.
National Cancer Institute, NIH

4:40 p.m. - 5:00 p.m. ***In Vivo* Metal-Free Cycloaddition Chemistry Driven Pretargeted Cancer Radiotherapy**
Thomas Quinn, Ph.D.
University of Missouri

5:00 p.m. - 5:20 p.m. **One Drop and One Step Assay (ODOSA) for Circulating Tumor Cell Detection in Whole Blood**
Youli Zu, M.D.
The Methodist Hospital Research Institute

5:20 p.m. - 5:40 p.m. **Color Doppler Ultrasound, Single Dose Acute Toxicity and Biodistribution of Perfluoropentane Loaded Iron Doped Silica Nanoshells**
Sarah Blair, M.D.
University of California, San Diego

5:40 p.m. - 6:10 p.m. **Poster Highlights**

Microfluidic System for AML Minimum Residual Disease Diagnostics
Steven Soper, Ph.D.
The University of North Carolina at Chapel Hill

A Novel Theranostic Platform for Targeted Cancer Therapy and Treatment Monitoring
Mingfeng Bai, Ph.D.
University of Pittsburgh

Implantable Device for High-Throughput In Vivo Drug Sensitivity Testing
Michael Cima, Ph.D.
Massachusetts Institute of Technology

6:10 p.m. - 6:20 p.m. **Session Discussion**

6:20 p.m. **Close of Day 1**

Session 5: Imaging Tools

Moderator: Miguel Ossandon
National Cancer Institute, NIH

8:50 a.m. - 9:10 a.m. **Direct Visualization of De Novo Lipogenesis in Single Living Cancer Cells**
Ji-Xin Cheng, Ph.D.
Purdue University

9:10 a.m. - 9:30 a.m. **Microsystems for Targeting Lévy Walks in Metastatic Cancer Cells**
Bartosz Grzybowski, Ph.D.
Northwestern University

9:30 a.m. - 10:00 a.m. **Poster Highlights**

Optimization of Multivalent Ligands by Super-Resolution Microscopy to Treat Cancer
John C. Williams, Ph.D.
City of Hope

Tijana Talisman, Ph.D.
City of Hope

Characterizing Gene Regulation With Single Molecule Sensitive Probes
Philip Santangelo, Ph.D.
Georgia Institute of Technology

Exosomal Recombinase as a Tool to Dissect Metastasis and the Cancer Microenvironment
Richard Steinman, M.D., Ph.D.
University of Pittsburgh

10:00 a.m. - 10:10 a.m. **Session Discussion**

10:10 a.m. - 10:30 a.m. **BREAK**

Session 6: Novel Biosensors

Moderator: Rao Divi, Ph.D.
National Cancer Institute, NIH

10:40 a.m. - 11:00 a.m. **Biosensor Technology to Monitor Leukemia-Related Kinase Activity in Patient Cells**
Laurie Parker, Ph.D.
University of Minnesota

11:00 a.m. - 11:20 a.m. **Charge Sensitive Optical Detection for High Throughput Study of Small Molecules**
Nongjian Tao, Ph.D.
Arizona State University

11:20 a.m. - 11:50 a.m. **Poster Highlights**

Photoreactive Histone Deacetylase Probes for Chromatin Immunoprecipitation in Cancer
Pavel Petukhov, Ph.D.
University of Illinois at Chicago

Meso-Plex miRNA and Protein Profiling for Cancer Diagnostics Using Chip-Integrated Silicon Photonics
Ryan Bailey, Ph.D.
University of Illinois at Urbana-Champaign

Sensor-seq: A Genome-Wide Biological Measure of microRNA Activity
Brian David Brown Ph.D.
Icahn School of Medicine at Mount Sinai

11:50 a.m. - 12 noon **Session Discussion**

12 noon - 1:10 p.m. **Lunch and Poster Session II**

Session 7: Drug Screening Tools

Moderator: Tony Dickherber, Ph.D.
National Cancer Institute, NIH

1:20 p.m. - 1:40 p.m. **Discovery of Peptidomimetic Death Ligands Against Ovarian Cancer Through OB2C Combinatorial Library Approach**
Kit Lam, M.D., Ph.D.
University of California, Davis, School of Medicine

1:40 p.m. - 2:00 p.m. **Digital One-Disc-One-Compound Array for High-Throughput Discovery of Cancer Targeting Agents**
Tingrui Pan, Ph.D.
University of California, Davis

2:00 p.m. - 2:20 p.m. **A Novel High Throughput Tumor Spheroid Microtechnology**
Hossein Tavana, Ph.D.
The University of Akron

2:20 p.m. - 2:30 p.m. **Session Discussion**

2:30 p.m. - 2:35 p.m. **Thanks and Meeting Close**
Tony Dickherber, Ph.D.
National Cancer Institute, NIH

2:35 p.m. **Adjournment**

Speaker Abstracts

Poster Abstracts

**denotes poster highlighted during meeting session*

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