

# Frontiers in Metabolomics for Cancer Research

October 24 – 25, 2005

## Draft Agenda

**Monday, October 24, 2005**

7:30 a.m. - 8:00 a.m.      **Registration**

### **Session I: Opening Remarks and Welcome**

8:00 a.m. - 8:15 a.m.      **Welcoming Remarks**

Peter Greenwald, Director  
Division of Cancer Prevention  
National Cancer Institute

Sudhir Srivastava, Chief  
Cancer Biomarkers Research Group

John Milner, Chief  
Nutritional Sciences Research  
Group

8:15 a.m. - 8:20 a.m.      **Setting the Stage**

Padma Maruvada and Young Kim  
Division of Cancer Prevention  
National Cancer Institute

### **Session II: Overview of Metabolomics**

#### *Objective:*

This session will compare and contrast the evolution of metabolomics, including its definitions, from its predecessors or counterparts and discuss convergences and divergences.

8:20 a.m. - 8:50 a.m.      **What Is Metabolomics/  
Metabonomics?**

Julian Griffin

## **Session II: Methodological and Technological Issues and Concerns (Moderator: Sharon Ross)**

### *Objective:*

This session will describe prevailing technologies, including those with dual purposes, reagents, and instrumentations, required infrastructures, etc.

8:50 a.m. - 9:20 a.m.	<b>State-of-the Art Technologies on Metabolomics</b>	Stephen Brown
9:20 a.m. - 9:30 a.m.	<b>Discussion</b>	
9:30 a.m. - 10:00 a.m.	<b>Pathway Discovery Through the Association of Metabolomics and Mass Isotopomer Analysis</b>	Henri Brunengraber
10:00 a.m. - 10:10 a.m.	<b>Discussion</b>	
10:10 a.m. - 10:25 a.m.	<b>Morning Break</b>	
10:25 a.m. - 10:55 a.m.	<b>Evolutionary Optimization in Metabolomics</b>	Douglas Kell
10:55 a.m. - 11:05 a.m.	<b>Discussion</b>	
11:05 a.m. - 11:35 a.m.	<b>Group Discussion</b>	Douglas Burrin, Moderator

## **Session III: Use of Metabolomics for Cancer Research (Moderator: Paul Wagner)**

### *Objective:*

To identify issues on the application of metabolomics in cancer research.

11:35 a.m. - 12:05 p.m.	<b>A Crossroad to Tumor Metabolome: Tumor M2 Pyruvate Kinase</b>	Sybille Mazurek
12:05 p.m. - 12:15 p.m.	<b>Discussion</b>	
12:15 p.m. - 1:15 p.m.	<b>Lunch (on your own)</b>	
1:15 p.m. - 1:45 p.m.	<b>Metabolomics by Magnetic Resonance: From Molecules to Man</b>	John Griffiths
1:45 p.m. - 1:55 p.m.	<b>Discussion</b>	
1:55 p.m. - 2:25 p.m.	<b>Metabolomic Profiling of Human Cancer With <i>Ex Vivo</i> Tissue</b>	Leo Cheng

2:25 p.m. - 2:35 p.m.	<b>MR Spectroscopy Discussion</b>	
2:35 p.m. - 3:05 p.m.	<b>Group Discussion</b>	Sudhir Srivastava, Moderator
3:05 p.m. - 3:20 p.m.	<b>Afternoon Break</b>	

**Session IV: Impact of Cancer Modifiers on Metabolic Profiling (Moderator: Elizabeth Yetley)**

*Objective:*

To discuss metabolomic arrays, spectroscopic profiles, and other metabolites-based phenotyping in relation to its application for patients, stratification for responders and non-responders to dietary components, drugs, and toxic agents.

3:20 p.m. - 3:50 p.m.	<b>Dynamics of Glucose Metabolism and Cancer</b>	Paul Lee
3:50 p.m. - 4:00 p.m.	<b>Discussion</b>	
4:00 p.m. - 4:30 p.m.	<b>Lipidomic Profiling Eicosanoid Changes in Carcinogenesis</b>	Edward Dennis
4:30 p.m. - 4:40 p.m.	<b>Discussion</b>	
4:40 p.m. - 5:10 p.m.	<b>Metabolic Profiling in Drug Discovery and Development</b>	Christopher Newgard
5:10 p.m. - 5:20 p.m.	<b>Discussion</b>	
5:20 p.m. - 5:50 p.m.	<b>Group Discussion</b>	John Milner, Moderator
5:50 p.m.	<b>Adjourn</b>	

**Tuesday, October 25, 2005**

**Session V: Models for Studying Metabolomic Approaches (Moderator: David Goldstein)**

*Objective:*

To identify challenges in application of metabolomics in cancer research.

8:30 a.m. - 9:00 a.m.	<b>Analysis of Metabolic Phenotype Changes in Response to Therapy</b>	Risto Kauppinen
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### **in Cancer Animal Models**

9:00 a.m. - 9:10 a.m.	<b>Discussion</b>	
9:10 a.m. - 9:40 a.m.	<b>Other Models To Understand the Cancer Cell Metabolic Flux</b>	Zoltan Oltvai
9:40 a.m. - 9:50 a.m.	<b>Discussion</b>	
9:50 a.m. - 10:20 a.m.	<b>Metabolomics in the Study of CNS Disorders</b>	Rima Kaddurah-Daouk
10:20 a.m. - 10:30 a.m.	<b>Discussion</b>	
10:30 a.m. - 11:00 a.m.	<b>Group Discussion</b>	Bruce Kristal, Moderator

### **Session VI: Integration of Metabolomics Into Systems Biology (Moderator: Lee Moore)**

#### *Objective:*

To discuss a systems biology approach to mapping small molecules in metabolic pathways and biochemical networks in relation to phenotypic changes.

11:00 a.m. - 11:30 a.m.	<b>Integration of all “Omics”</b>	Pedro Mendes
11:30 a.m. - 11:40 a.m.	<b>Discussion</b>	
11:40 a.m. - 12:10 p.m.	<b>Systems Approach to Cancer</b>	Michael Liebman
12:10 p.m. - 12:20 p.m.	<b>Discussion</b>	
12:20 p.m. - 12:50 p.m.	<b>Group Discussion</b>	Jennifer Couch, Moderator
12:50 p.m. - 1:50 p.m.	<b>Lunch (on your own)</b>	

### **Session VII: Breakouts**

1:50 p.m. - 3:10 p.m.	<b>Breakouts I, II, and III</b>	
	<b>Breakout I: Metabolomics vs. Other Omics</b>	Chair: Lance Liotta Co-Chair: Samir Hanash

- What information can metabolomics provide that genomics and/or proteomics may not be able to address?

- Can metabolic profiling identify individuals who will and who will not get the benefit from treatments with either drugs or dietary components?
- Can a metabolomics approach serve as a functional annotation that links to the systems biology?

**Breakout II:  
Application of Metabolomics  
in Understanding Tumor Cell Behavior**

Chair: Bruce Kristal  
Co-Chair: Gil Omenn

- What are the key metabolites relevant to tumor cell behavior that should be measured quantitatively in cancer research?
- Which fluids, cells and/or tissues should be sampled for the examination?
- Can metabolomic approaches be used to discover and further develop metabolic biomarkers that are distinct in tumor cell environment or in pre-cancerous tissues?

**Breakout III:  
Evaluation of Technologies**

Chair: Henri Brunengraber  
Co-Chair: Alan Kleinfeld

- What are the strengths and weaknesses of the most commonly used metabolomics technologies?
- Which bioinformatics tools can be used for the metabolomics data analysis?
- How can imaging be used to detect metabolites in cells or organs?

**Session VIII: Reports on Breakouts**

3:10 p.m. - 3:20 p.m.	<b>Breakout I</b>	Lance Liotta
3:20 p.m. - 3:30 p.m.	<b>Breakout II</b>	Bruce Kristal
3:30 p.m. - 3:40 p.m.	<b>Breakout III</b>	Henri Brunengraber
3:40 p.m. - 3:50 p.m.	<b>Future Directions</b>	Young Kim and Padma Maruvada
3:50 p.m.	<b>Adjourn</b>	