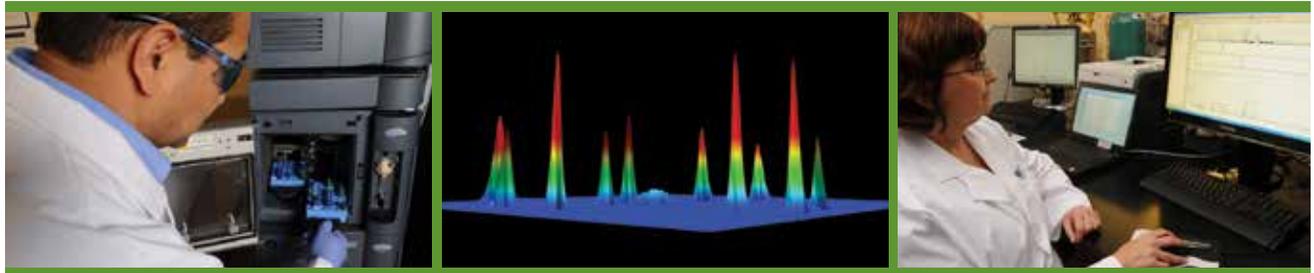


# NIH Eastern Regional Comprehensive Metabolomics Resource Core



RTI International serves as the NIH Eastern Regional Comprehensive Metabolomics Resource Core (RTI RCMRC), which is funded by the NIH Common Fund. The RTI RCMRC is one of six RCMRCs in the United States working in a consortium to establish national standards for metabolomics. They seek to increase national capacity to provide metabolomics profiling and data analysis services to basic, translational, and clinical investigators. Their goal is to foster collaborative efforts that will advance translational research using metabolomics approaches and facilitate institutional development of pioneering research, metabolomics training, and outreach.

## Overview

Metabolomics involves the analysis of the low molecular weight complement of cells, tissues, or biological fluids. Metabolomics makes it feasible to uniquely profile, or metabotype, the biochemistry of an individual or system apart from or in addition to the genome. The metabolomics profile includes signals for endogenous compounds and signals of exogenously derived components (e.g., metals, chemicals, and drugs). It can also include study designs to examine metabolic flux. Metabolomics is used to determine the pattern of changes and related metabolites arising from disease, dysfunction, disorder, or from the therapeutic or adverse effects of xenobiotics.

## Capabilities

We have experience in the analysis of exogenous and endogenous compounds in cells, tissues, and biological fluids collected from animal models or human subjects.

The RTI RCMRC uses the following analytical methods for the broad-spectrum analysis of metabolites, and targeted methods to detect and quantitate specific analytes:

- Nuclear magnetic resonance (NMR) spectroscopy
- Liquid chromatography-mass spectrometry (LC-MS/MS(n), UPLC-Q-TOF-MS, ion mobility).
- Gas chromatography-mass spectrometry (GC-MS, 2D-GCTOFMS)
- Inductively coupled plasma mass spectrometry, Orbitrap, and MALDI imaging

## Data Analysis

Following signal detection, RTI scientists apply statistical and mathematical tools (e.g., Umetrics, Spotfire, SAS) and use their expertise to identify data trends that show the correlation of specific signals with the phenotypic response under investigation. Identified signals are mapped to biochemical pathways through the use of specialized software, such as GeneGo, and expert biochemist interpretation to derive biomarkers and mechanistic insights.

## RTI Metabolite Synthesis Capabilities

RTI also serves as a Metabolomics Standards Synthesis Core (RTI MSSC) for the NIH Common Fund. The RTI MSSC synthesizes metabolite standards and isotopically labeled analogues for use by metabolomics researchers. A key challenge in metabolomics investigations includes the need for authentic standards to improve our ability to identify all of the metabolites that comprise the metabolome, to validate putative biomarkers, and to utilize in studies of metabolic flux.

To nominate compounds for synthesis by the RTI MSSC, go to [www.metabolomicsworkbench.org](http://www.metabolomicsworkbench.org).

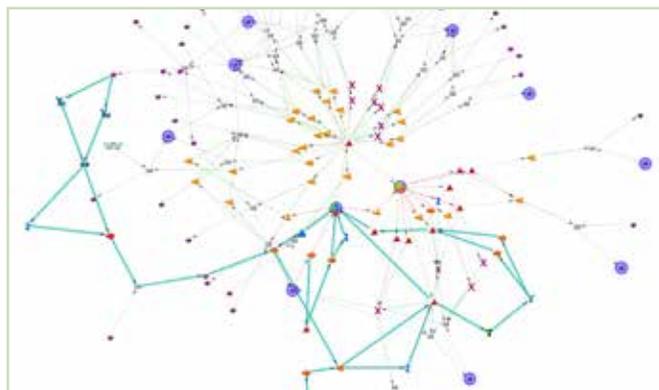
## Pilot and Feasibility Studies

The goal of the Pilot and Feasibility Studies Program is to enhance metabolomics research crucial to translational projects by providing support for investigators new to the metabolomics field, the development of new teams and partnerships, and high-risk/high-impact research. Pilot and feasibility funds will cover all costs of the metabolomics analysis conducted by RTI RCMRC investigators, including time for our staff to participate in data summary for use in manuscript and proposal development.

## Training Program

The RTI RCMRC offers a training program to undergraduate and graduate students and postdoctoral fellows. This training aims to develop a pipeline of future metabolomics investigators. Interns will gain experience using state-of-the-art metabolomics technologies (e.g., chromatography-mass spectrometry, NMR spectroscopy) for measuring endogenous metabolites in cells, tissues, and biological fluids. Interns will also gain experience with software and statistical methods for identification of metabolites and pathway mapping.

To apply for the Training Program or the Pilot and Feasibility Study Program, go to [www.rti.org/rcmrc](http://www.rti.org/rcmrc).



## Additional Resources

To learn more, visit the other NIH Common Fund RCMRCs:

- Michigan Regional Comprehensive Metabolomics Resource Core (MRC2) (<http://mrc2.umich.edu/index.php>)
- NIH West Coast Metabolomics Center at UC Davis (<http://metabolomics.ucdavis.edu/>)
- Southeast Center for Integrated Metabolomics (SECIM) (<http://secim.ufl.edu/>)
- Metabolomics Core at Mayo Clinic (<http://www.mayo.edu/ctsa/resources/laboratories/metabolomics-core>)
- Research Center for Stable Isotope Resolved Metabolomics (RC-SIRM) (<http://rcsirm.cesb.uky.edu>)

For more information about the NIH Common Fund Metabolomics Data Repository and Coordinating Center, visit <http://www.metabolomicsworkbench.org>.

## More Information

Susan Sumner, PhD  
Director, Systems and Translational Sciences  
Director, NIH Eastern Regional Comprehensive Metabolomics Resource Core  
919.541.7479  
[ssumner@rti.org](mailto:ssumner@rti.org)  
[www.rti.org/rcmrc](http://www.rti.org/rcmrc)  
RTI International  
3040 E. Cornwallis Road, PO Box 12194  
Research Triangle Park, NC 27709-2194 USA

RTI 8213 R1 0214