ISMRM WORKSHOP ON
Frontiers in Metabolomics & Metabolomic Imaging in Medicine: Challenges & Opportunities

📅 16-18 October 2025

📍 Cultural Center Altinate San Gaetano
Padua, Italy

OVERVIEW

Disease and medical conditions can variably affect overall physiological and metabolic homeostasis. Metabolomics, which provides a wholistic and comprehensive quantification of metabolic alterations from tissues or biofluids, has the potential to revolutionize disease diagnosis, patient prognostication, and personalized/precision medicine. Currently, medical metabolomics are predominantly evaluated by NMR and mass spectrometry, and complemented by methodologies such as PET, hyperpolarized NMR, MRS, etc. This workshop is designed to bring together metabolomic researchers spanning academia, healthcare, and industry, each with unique methodological perspectives, to promote free discourse and exploration of metabolomics. Our aim is to establish a unifying platform on which medical metabolomics, through biospecimen evaluation and in vivo imaging, can be translated into clinical implementations, with a specific focus on cancer and Alzheimer's disease applications.

The workshop will cover the following topics:
1. The fundamentals of NMR- and MS-based metabolomics;
2. Additional imaging technologies that provide localized metabolomic measures;
3. Current challenges in cancer and Alzheimer's disease diagnosis and detection, and opportunities for medical metabolomics to advance these fields;
4. Big data approaches to metabolomics in the era of artificial intelligence and machine learning; and
5. Perspectives from funding agencies and research institutes on progressing medical metabolomics forward.

Invited speakers will include members from the ISMRM and non-member experts both within and outside the realm of MR technologies. By facilitating dialogue and collaboration, our goal is to establish a medical metabolomics network dedicated to achieving common goals.

TARGET AUDIENCE

This inaugural Metabolomics and Metabolomic Imaging (MMI) workshop is designed for scientists, clinicians, and trainees from academia, healthcare, and industry, who seek to learn and discuss the frontiers of metabolomics in medicine. The central foci of this workshop are medical metabolomics and metabolomic imaging, a burgeoning field with enormous potential for medical applications, particularly in the context of cancer and Alzheimer's disease. These malignant and neurodegenerative diseases present wholistic metabolic alterations that can only be collectively evaluated by metabolomics. At present, metabolomics studies are predominantly conducted by NMR and mass spectrometry, and complemented by methodologies such as PET, hyperpolarized NMR, MRS, and others. By uniting leaders from various methodological domains of metabolomics, along with pioneers in data science, artificial intelligence, and machine learning, we aim to create an environment conducive to open discussion and collaboration. Our goal is to propel the development of medical metabolomics and metabolomic imaging for clinical implementation, with a specific focus on cancer and Alzheimer's disease applications.

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants should be able to:
- Identify technologies used in metabolomics and metabolomic imaging;
- Recognize the challenges and potential of metabolomics and metabolomic imaging for malignant and neurodegenerative disease studies;
- Review advanced metabolomic data analyses using AI and machine learning; and
- Develop collaborative networks with metabolomic experts from multiple domains.

ORGANIZING COMMITTEE

Co-Chairs: Leo L. Cheng, Ph.D. & Candace C. Fleischer, Ph.D.
Organizing Committee: Kevin Chuen Wing Chan, Ph.D., Raffaele Lodi, M.D., Ph.D. & Tracey Schock, Ph.D.

Learn more & REGISTER!