SEPARATION SCIENCES + METABOLOMICS

Clinical Metabolomics

4 - 5 September 2017

***Advanced Mass Spectrometry Facility*, Murdoch University, South Street**

What is Metabolomics and why should you be interested?

Metabolomics provides a top-down systems level fingerprint or profile of the metabolic state of an organism/human and is the product of its genetic and environmental contributions. Through metabolomics, researchers are able to examine the dynamic interactions between genes, microbiomes, diets, lifestyles and the environment, and their impact on diseases.

Metabolomics allows clinicians and researchers to advance precision medicine and diagnostics by better understanding the pathology of diseases to improve clinical outcomes, as well as enable better stratification of diseases. The Murdoch University Separation Science and Metabolomics Laboratory, in collaboration with the ECU Centre for Integrative Metabolomics and Computational Biology, has designed a 2-day Short Course in Clinical Metabolomics for researchers to maximize the potential of metabolomics in clinical settings.

This course covers the application and optimization of metabolomics instruments such as nuclear magnetic resonance spectroscopy (NMR) and mass spectrometry and will be discussed in terms of sample preparation, method development, data analysis and interpretation for clinical samples (urine, plasma, serum and tissue samples). Particular emphasis will be placed on the importance of experimental design, analytical techniques and data processing. All instrumental platforms and software used in this course are provided onsite.

All course presenters are researchers skilled in metabolomics and mass spectrometry technologies and routinely provides research and analytical services for academia and industry.

Please email us - Metabolomics@murdoch.edu.au for more information on our courses.

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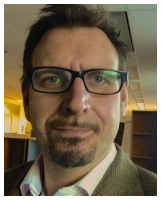
COURSE PRESENTERS

A. Prof Robert Trengove
Rob is the Director for the Murdoch Separation Science Laboratory and the research leader for the WA Node of Metabolomics Australia. He is also the Director for the newly established Australian National Phenome Centre.



Prof David Broadhurst
David is the Director for the Centre for Integrative Metabolomics and Computational Biology at Edith Cowan University. David specialises in multi-system/multi-omic data integration and data visualisation.

Dr Joel Gummer
Joel is a Research Fellow with the Metabolomics Australia WA node and an Affiliate of the Nanyang Technological University of Singapore, who specialises in mass spectrometry and metabolomics applications.

Dr Stacey Reinke
Stacey is a Postdoctoral Research Fellow at Murdoch University who specializes in metabolic profiling in biomedicine. She is experienced in NMR Spectroscopy, experimental design and data analysis.

Hayley Abbiss
Hayley is currently completing her PhD thesis while working as a Research Associate for the Separation Science and Metabolomics Laboratory. Hayley specialises in GCMS-based metabolomics.

COURSE OUTLINE

Day 1

- Welcome and housekeeping, laboratory tour and instrumentation introduction,
- Introduction to metabolomics and workflow,
- Metabolomics experimental design and workflow – sample size, study design, sources of bias and variance,
- Overview of sample collection, storage and preparation methods, with focus on urine, plasma/serum and tissue sample types,
- Outlining the analytical approaches – targeted analyses versus untargeted analyses,
- Platforms for metabolomics:
  - A) LCMS
    - Common metabolites,
    - LC separation – Column differentiations (C18/Reverse phase for lipids, HILIC for polar compounds),
    - Mass Spectra – mass to charge (m/z), identification of adducts.
  - B) GCMS
    - Common metabolites,
    - Derivitisation methods,
  - C) Nuclear Magnetic Resonance Spectroscopy (NMR),
    - Common metabolites.

Day 2

- Quality Assurance and Quality Control:
  - QA/QC procedures,
  - pooled QA/QC protocols,
  - how to prepare QC samples,
  - QC correction,
  - Data cleaning.
- Data Processing/ Deconvolution:
  - Full untargeted; Progenesis, AnalyzerPro,
  - Semi Targeted; Mass spectral libraries, sample data analysis for GCMS and LCMS,
  - Full Targeted.
- Overview of the Statistical analysis:
  - Univariate and Multivariate analysis (PCA and Discriminant analysis),
  - Pathway Analysis.

Cost for 2 days $300 (excluding GST). Please note that this course is supported through the Telethon-Perth Children's Hospital Research Fund and places are strictly limited. Light refreshments are provided.
Please **RSVP** by **Monday August 21st**, to metabolomics@murdoch.edu.au.

Murdoch UNIVERSITY
SEPARATION SCIENCES METABOLOMICS
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CIMCB The Centre for Integrative Metabolomics and Computational Biology
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