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MetaboNews is a monthly newsletter published in a partnership between The Metabolomics Innovation Centre (TMIC) and the Metabolomics Society.

Metabolomics Society News

Conference Corner



[Register today for Metabolomics 2022!](https://www.metabolomics2022.org/m22registration)

The Society's annual conference consistently features the latest and greatest advances in metabolomics science. We look forward to welcoming you in beautiful Valencia this summer. Poster abstracts are still accepted through May 16. Make sure to register now on our website:

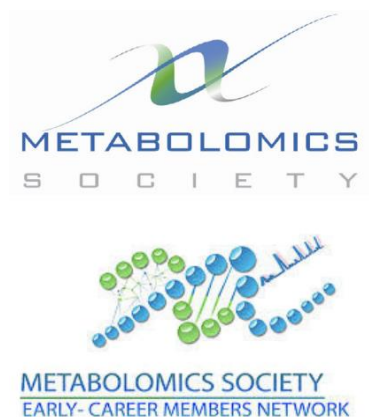
<https://www.metabolomics2022.org/m22registration>

Pre-conference Workshops

This year we will hold 13 workshops on a broad range of topics such as ion mobility, spatial metabolomics, metabolite identification, lipidomics, QA/QC, advanced statistical methods, analysis workflows, a career workshop and many more. Several of these workshops include hands-on activities. Registration for workshops will open very soon!

Career Night – Sunday, June 19

The Metabolomics Society is excited to announce our second Career Night at the 18th International Conference in Valencia. This dynamic event will feature representatives from all employment sectors who want to engage with job seekers.



The Metabolomics Society is an independent, non-profit organization dedicated to promoting the growth, use, and understanding of metabolomics in the life sciences.

General Enquiries

info@metabolomicssociety.org

Membership Enquiries

membership@metabolomicssociety.org

Career Night will include a job fair for participants to learn about available positions and interact in a relaxed setting with potential employers. Both **industry and academic employers** are encouraged to sign up for a table at Career Night. This networking event will allow you to meet with job candidates during the event. Additionally, meeting space will be available to have further discussion or one-on-one interviews with applicants during the conference week. Don't miss out on these qualified job candidates and [click here](#) to sign up for a table at Career Night. Tables are free of charge, but a limited number are available. Don't delay!

As some participants may not be currently seeking new employment, the job fair will also include an interactive roundtable event for participants to develop rapport and expand their networks to ready themselves for future employment. This roundtable event will feature discussions covering topics such as career transitions and strategies for obtaining a postdoctoral fellowship.

[Click here](#) for additional information on Career Night!

International Affiliates' Corner

Netherlands Metabolomics Centre (NMC)

The Netherlands Metabolomics Centre is excited to present a 2-day program for Benelux Metabolomics Days to take place on May 19 & 20, 2022. Visit www.metabolomicscentre.nl/ for details.

The program committee is convinced the overall program will give attendees an overview of metabolomics research in the Benelux. The event will feature excellent international speakers, opportunities to interact with colleagues in the field during breaks, poster sessions, and a conference dinner.

The conference is planned to be face-to-face and the program will focus on those attending in person. The possibility of attending remotely will be made possible by live streaming.

[Read more and register here.](#)

Benelux Metabolomics Days 2022

19-20 May 2022 - Villa Jongerius & Jaarbeurs, Utrecht, Netherlands

Dajana Vuckovic, PhD



Associate Professor in the Department of Chemistry and Biochemistry, Director of the Centre for Biological Applications of Mass Spectrometry, Concordia University

Biography

Dajana Vuckovic received her PhD in Chemistry from the University of Waterloo, and completed postdoctoral training in quantitative proteomics at the University of Toronto. Her group at Concordia University specializes in developing new analytical methods and devices to improve metabolite coverage and data quality in metabolomics, with the overarching goal of discovering and validating personalized biomarkers in cardiovascular health and nutrition. She is a leading researcher in sample preparation for metabolomics, and has introduced *in vivo* solid-phase microextraction sampling for metabolomics and lipidomics including *in vivo* sampling of oxylipins in the brain to study neuroinflammation. Her lab has also built highly sensitive assays for mycotoxin biomonitoring, including the largest in-house library of human mycotoxin metabolites that includes 100 metabolites characterized for the first time. Her research has been recognized by the bestowing of the 2019 Young Investigator Award of the Canadian Society for Mass Spectrometry and the 2020 Young Investigator Award of the Eastern Analytical Symposium. Dajana is an active member of the community-driven international consortium mQACC (metabolomics QA & QC Consortium). Recently she was elected to the Board of Directors of the Metabolomics Association of North America, where she serves as Secretary and mentor for the WomiX interest group as well as chairs the Membership Committee.

Interview Q&A

How did you get involved in metabolomics?

It happened almost by serendipity. I was pursuing an MSc at the University of Waterloo to develop the 96-well plate automation of solid-phase microextraction for high-throughput drug discovery and pharmaceutical applications. My supervisor, Prof. Janusz Pawliszyn, offered me an opportunity to fast-track to PhD, with the goal to show that *in vivo* solid-phase microextraction could be used for untargeted metabolite profiling of blood. At the time, this idea was deemed impossible – microextraction methods

were recognized for their selectivity, and the idea that microextraction could be used in this untargeted way and still achieve good coverage was paradigm-shifting. Embracing this challenge appealed to me, and my passion for metabolomics only grew further throughout this project.

What are some of the most exciting aspects of your work in metabolomics?

I am most excited by our efforts in sample-limited metabolomics to bring less invasive

sampling technologies to the field. This opens up numerous possibilities for more frequent longitudinal sampling, self-sampling, and for sample collection outside of the clinical lab. However, we still face many challenges to bring non-invasive sampling technologies (microextraction or alternate biospecimens such as saliva, tears, and sweat) to routine use. The second exciting aspect of our work is the ability to measure unstable metabolites that can be difficult or impossible to measure using standard metabolomics approaches. With our collaborators in immunology, neuroscience, and cardiovascular health, we are pushing the limits of measurements we can make in rare cell populations or *in vivo* directly in the brain in response to a given stimulus. This approach allows us to connect brain metabolic profile with behaviour and dig deeper into inter-individual variability.

What key metabolomics initiatives are you pursuing at your research centre or institute?

Together with our collaborators Dr. Andreas Bergdahl and Lillemand Health, we are currently working on a large study looking at the interaction of microbiome and diet, and how this may promote atherosclerosis in a mouse animal model. We are now completing the analysis of some of the early time points of this longitudinal study, and it is impressive how early we can detect lipid dysregulation and how sensitive it is to both diet and microbiome composition. I cannot wait for the rest of the results to come in so we can look at the full time-integrated picture and to further examine which tissue changes we can adequately measure in circulating blood profiles and at which timepoints. On the more fundamental side of things, we are currently studying the stability of many oxylipins on microextraction devices and examining how well this approach can stabilize analytes from oxidation and other degradation processes. As part of this long-term effort, we are also performing selected forced degradation studies within the oxylipin family and examining in detail how unstable metabolites can impact accuracy of the measurement of stable metabolites. Finally, we are also helping to co-lead a microsampling study with the EpiLipidNET consortium to evaluate several selected commercial microsampling devices across a wide range of metabolite and lipid classes in an inter-laboratory study that aims to compare not only the device performance but also establish consensus bridging data between plasma and these alternate biospecimens.

What is happening in your country in terms of metabolomics?

Canadian researchers are major contributors to the rapid development and growth of metabolite databases and data analysis packages, for example, the Human Metabolome Database (HMDB) and MetaboAnalyst. It is truly exciting to see how much these tools have advanced over the past decade and to see the leadership Canadian researchers have played in this. I would also like to single out impressive work to translate metabolomics technology for infectious disease diagnosis, pioneered by Dr. Ian Lewis at the University of Calgary, and ongoing, large-scale multi-ethnic birth cohort and maternal health studies by Dr. Philip Britz-McKibbin at McMaster University. Lastly, we are super excited to host the 2023 edition of Metabolomics Society Conference in Canada and look forward to great discussion and networking between Canadian and international metabolomics researchers. Although virtual events have their benefits, we cannot wait to meet everyone in person again!

How do you see your work in metabolomics being applied today or in the future?

I love the idea of performing a metabolomics measurement without having to take a defined biospecimen, so I hope that our work on *in vivo* microextraction will be expanded and adopted widely. Microextraction methods have required great ingenuity to boost the sensitivity of instrumental methods used for the analysis to be able to handle the small amounts extracted, and many of these lessons are applicable to any type of microsampling or sample-limited situations. I am also excited to see that many of our ideas regarding the need for better quality control and evaluation of sample preparation methods in untargeted metabolomics are starting to be implemented and are resonating with the community today.

As you see it, what are metabolomics' greatest strengths?

Metabolites act in unison in tightly-controlled networks, and metabolomics allows us to have unprecedented insight into these elegant networks. The capability to find new metabolite functions and to discover new metabolites are two additional greatest strengths of metabolomics.

What do you see as the greatest barriers for metabolomics?

I believe that we are only detecting a fraction of metabolites that are present in various biospecimens, and therefore we need more international co-operation to most effectively address this issue. In my opinion, the metabolomics field could benefit from a joint, large-scale initiative analogous to the Human Proteome Project to help us map the many metabolites present, along with the conditions and biospecimens in which they are expressed, as well as to prioritize frequently-observed unknowns for identification and synthesis in a well-coordinated, collective effort. I think we also have to push our metabolomics methods to increase data quality and quantitative capability and of course we need to be able to compare and harmonize our results across different laboratories. We also need to talk more about longitudinal study designs, and how to best incorporate and integrate metabolomics with other omics disciplines as this is still extremely challenging despite recent advances.

Replication and translation are key, and we need to work together to truly harness the power of metabolomics in large population-based studies.

What improvements, technological or otherwise, need to take place for metabolomics to really take off?

I think sample throughput definitely remains a challenge, so faster and more sensitive instrumentation is definitely on my wish list. This will ultimately decrease the cost of metabolomics analysis and allow us to access the data from increasingly larger cohorts. I see a growing role for chip microfluidics and wearables so I hope to see more advances in these technologies for metabolomics applications. As a microextraction researcher, of course I would love to see personalized collection devices to become more mainstream and really decouple that sample collection step from having to go to the laboratory. I believe we also need to start to pay more attention to metabolite chirality and incorporate this into our standard workflows and of course to spend more effort on metabolite quantitation. Better pathway and multi-omics tools, together with large cohorts and public datasets can really propel our field forward but require us to work together and harmonize and share our data efficiently. As far as we have come – and the progress has been truly

inspiring – we still have much more to do, which is one of the exciting and motivating things about metabolomics!

How does the future look in terms of funding for metabolomics?

The funding landscape for biomedical research in Canada continues to be challenging, and there is still some hesitancy to embrace metabolomics technologies. Thus, it can be very difficult to fund metabolomics programs especially for large-scale epidemiological studies. I hope this will improve in the future as I worry that Canada is falling behind what the US and EU are investing in metabolomics technology and studies.

What role can metabolomics standards play?

Metabolomics standards will play a critical role going forward and are essential for translation of metabolomics findings. In fact, I am surprised that the introduction of proper standards and analytical rigour has been so far delayed in our field, especially for untargeted analyses. This is why I have joined the metabolomics Quality Assurance and Quality Control Consortium (mQACC). This international consortium is tackling critical issues in untargeted metabolomics, including best practices, standard reference materials, and the critical aspects of metabolomics analyses that should be reported in publications. If you would like to hear more about the efforts of the Best Practices Working group of the mQACC over the past year, then come join us for a workshop (June 19) at the upcoming Metabolomics Society Conference in Valencia (<https://www.metabolomics2022.org/workshops>, to be updated). We will share a subset of our results to date and our plans for a living QC guidance document.

Do you have any other comments that you wish to share about metabolomics?

I would love to see more cross-fertilization of ideas between the omics communities: metabolomics, lipidomics, proteomics, transcriptomics, exposomics, and genomics. I hope we can see some upcoming events that bring researchers from these different communities together in an effective way to promote new ideas and multi-omics approaches.

Recent Publications

Recently published papers in metabolomics

- [A High-Throughput Platform for the Rapid Screening of Vitamin D Status by Direct Infusion-Tandem Mass Spectrometry](#)
- [Angiopoietin-like 4 governs diurnal lipoprotein lipase activity in brown adipose tissue.](#)
- [automRm: An R Package for Fully Automatic LC-QQQ-MS Data Preprocessing Powered by Machine Learning.](#)
- [Core Gut Microbiota of Shrimp Function as a Regulator to Maintain Immune Homeostasis in Response to WSSV Infection.](#)
- [Dynamics of the infant gut microbiota in the first 18 months of life: the impact of maternal HIV infection and breastfeeding.](#)
- [Effects of dietary supplementation of different levels of vitamin B₁₂ on the liver metabolism of laying hens.](#)
- [Global metabolome analysis of *Dunaliella tertiolecta*, *Phaeobacter italicus* R11 Co-cultures using thermal desorption - Comprehensive two-dimensional gas chromatography - Time-of-flight mass spectrometry \(TD-GC×GC-TOFMS\)](#)
- [Longitudinal associations of pre-pregnancy BMI and gestational weight gain with maternal urinary metabolites: an NYU CHES study.](#)
- [Metabolomic and Transcript Analysis Revealed a Sex-Specific Effect of Glyphosate in Zebrafish Liver](#)
- [Metabolomic profiling of adrenal function in asthma.](#)
- [Plasma Metabolomic Alterations Induced by COVID-19 Vaccination Reveal Putative Biomarkers Reflecting the Immune Response.](#)
- [Polyphenols and Their Metabolites in Renal Diseases: An Overview.](#)
- [Pyruvate kinase, a metabolic sensor powering glycolysis, drives the metabolic control of DNA replication.](#)
- [Triglyceride profiles are associated with subacute exposure to bisphenol A in healthy young adults](#)
- [Widely Targeted Metabolomics Analysis Reveals the Differences of Nonvolatile Compounds in Oolong Tea in Different Production Areas.](#)



Metabolomics Events

The Association of Biomolecular Resources Facilities (ABRF) Metabolomics Research Group invites individuals interested in “Compound Identification” to participate in the MRG 2022 study

[Learn More Here](#)

Overview

Consistent and accurate compound identification is a major challenge for LC-MS-based metabolomics. A combination of accurate mass MS1, MS2 fragmentation, and retention time (RT) of external standards is frequently used to provide a high-confidence, though unconfirmed, compound identification. However, given this information it is unclear how much compound identification success will vary from lab to lab. The aim of this study is to quantify inter-personal and inter-lab variability of compound identification. The target population of this study are PIs, trainees, and professional staff of metabolomics laboratories.

April 27, 2022

West Coast Metabolomics Centre: Online Guest Lecture Seminar

Venue: Online

[Learn More Here](#)

Overview

Frances Platt, PhD, will be presenting on “Understanding the complexity of metabolomics in the lysosomal disorders: insights from Niemann-Pick disease type C”.

[Register Here](#)

[WCMC YouTube Channel](#)

May 5, 2022

Bits & Bites #6: Introduction to Bayesian statistics in Metabolomics

Venue: Online

[Learn More Here](#)

Overview

This 10-part short course series will feature in-depth topics in untargeted metabolomics such as Bayesian statistics, a deeper look into MS-DIAL, fundamental courses in mass spectrometry, lipidomics, and so many others. Each short course can be taken individually or you can select multiple Bites. Participants will gain a deeper insight into current software, methods, and pitfalls. Each session starts promptly at 9 a.m. (Pacific Time) and will take approx. 4 hours. The courses will be conducted in a highly interactive manner, with the use of freely available software and databases. The tuition is \$150 USD per Bite.

The 6th course is “Introduction to Bayesian statistics in Metabolomics”, taught by Dr. Christopher Brydges. Bayesian statistics are a useful method for estimating effect sizes and testing the strength of evidence in favor of one hypothesis over another - things that p-values and traditional statistics can't do. This workshop will provide a brief refresher on traditional statistics, teach the basic principles behind Bayesian statistics, learn how to conduct basic Bayesian analyses in JASP (free, open-source software available from <https://jasp-stats.org/>) and learn how to report the results in the style of a journal article.

May 6, 2022

MANA Early-Career Members (ECM) Virtual Job Fair

Venue: Online

[Learn More Here](#)

Overview

Hiring new members? Looking for a new position? Gathering information for the next step in your career? Join the ECM Virtual Job Fair!

As an employer or recruiter, you'll get the opportunity to meet potential candidates. As someone who is in the market, this is a great opportunity for you to meet potential employers from different tracks (i.e., Academia, Industry, or Government/Nonprofit). We will help employers and potential candidates meet effortlessly in a virtual capacity via Zoom! Using Breakout Rooms, we'll set up and manage interviews and/or informal meetings.

After this, the next ECM Virtual Job Fair will be August 5, 2022.

May 13-16, 2022

2nd Metabolism in Health and Disease Conference

Venue: Cancun, Mexico

[Learn More Here](#)

Overview

Topics will span diverse areas such as cancer metabolism, organismal metabolism in disease, metabolic pathway engagement in cell function, metabolites as signaling molecules, mitochondrial biology, nutrient sensing, metabolism in tissue homeostasis and repair, neurometabolism, and metabolism in host-microbe interactions.

May 29-June 2, 2022

19th International GCxGC Symposium

Venue: Online

[Learn More Here](#)

Overview

While we had planned to host the meeting in beautiful Canmore, Alberta, Canada, we are now moving to a fully virtual event. The technical program includes the 2022 John B. Phillips and Scientific Achievement Award Lectures, 3.5 full days of live talks, posters and discussion sessions, and opportunities to contribute virtual talks and posters. Registration is open until May 20.

June 14, 2022

MANA SODAMeet

Venue: Online

[Learn More Here](#)

Overview

The goal of SODA is to provide a community-driven resource of actively-maintained software, test datasets used for software benchmarking, and results produced by software. SODAMeets is a platform where data generators and computational scientists can share their use of software/data.

During SODAMeets (every 2 months), we will have two speakers present on software or data they would like to share with the community, emphasizing how these software/data are used.

June 18-23, 2022

HPLC 2022

Venue: San Diego, California, USA

[Learn More Here](#)

Overview

HPLC 2022 will provide researchers with an extensive technical program where world-renowned experts will present recent developments, cutting-edge research, and new applications in all aspects of separations and analyses carried out in liquid phase. Early-bird registration deadline is April 20.

June 19-23, 2022

18th Annual Conference of the Metabolomics Society

Venue: Valencia, Spain

[Learn More Here](#)

Overview

The meeting will be co-organized with the Spanish Society for Metabolomics (SESMET) and the Spanish Network for Metabolomics. Building on the success of previous years, the conference will present the latest advances in the field covering the major scientific themes of technological advances, bioinformatics, metabolomics applications in health and disease, exposomics, and a focus on metabolomics in agriculture, plants, food and nutritional sciences. The scientific program will include plenary and keynote talks, parallel scientific sessions, poster sessions, sponsored luncheons, and other networking events.

July 3-9, 2022

14th Mass Spectrometry School in Biotechnology and Medicine

Venue: Dubrovnik, Croatia

[Learn More Here](#)

Overview

Whether you are a new researcher, just starting out, or an experienced scientist who needs to find out more about how mass spectrometry has advanced, this is the school for you. The MSBM program is taught through a combination of lectures, workshops, and tutorials. Deadline for registration is June 18. Vendor sponsorship opportunities available until July 3.

July 11-15, 2022

Hands-on Data Analysis for Metabolic Profiling

Venue: London, UK

[Learn More Here](#)

Overview

This 4 day course (held over 5 days) provides a comprehensive overview of data analysis for metabolic profiling studies focussing on data from NMR spectroscopy and Liquid Chromatography-Mass Spectrometry. It combines lectures and tutorial sessions using open source software to ensure a thorough understanding of the theory and practical applications.

August 7-12, 2022

Gordon Research Conference on Lipidomics

Venue: Newry, Maine, USA

[Learn More Here](#)

Overview

In this Gordon Conference series, we will highlight recent developments in standardization, omics integration, and state-of-the-art technologies and their impact on applications to study human health and disease. The time is critical to set the future cornerstones in how to powerfully, adequately, and transparently define the lipidomics rules of new and existing platforms in basic research, and most importantly, in a regulatory environment. Overall, the future of lipidomics in the clinical and biological realms will be discussed at this conference, aligning with other ongoing consortia, with an anticipated active involvement of researchers across all important arenas (academic, industry, government) and different stages of their career (established and young scientists).

Applications for this meeting must be submitted by **July 10, 2022**. Apply early to avoid disappointment! The conference chair is currently developing their detailed program, which will include the complete meeting schedule, as well as the titles of talks for all speakers.

August 22-September 2, 2022

International Summer Sessions in Metabolomics

Venue: Online or Davis, California (Hybrid)

[Learn More Here](#)

Overview

This course at UC Davis has been completely redesigned for a hybrid format and will also be recorded for the participants to view at a later time. All software training has transitioned to a virtual machine environment so training can be done from any location. Virtual machines are hosted by Amazon Web Services and can be accessed using either a PC or a Mac computer. Every unit is taught using interactive tools such as polling, using the annotation tool, utilizing non-verbal feedback, live questions, and group work.

September 9-10, 2022

2022 World Endocrine & Obesity Conference

Venue: Online or Bangkok, Thailand (Hybrid)

[Learn More Here](#)

Overview

The 2022 World Endocrine & Obesity Conference (2022WEOC) in collaboration with Thyroid Federation International is scheduled for September 9-10, 2022, in Bangkok, Thailand, and will run as a hybrid conference model allowing virtual/digital and physical platforms. Their focus is to bring together leading experts, researchers, and clinicians to exchange and share their experiences of various treatment procedures on endocrine care and obesity.

September 16-18, 2022

4th Annual MANA Conference

Venue: Edmonton, Alberta, Canada

[Learn More Here](#)

Overview

We are very excited to announce that the 4th Annual Conference of the Metabolomics Association of North America will take place September 16-18, 2022, on the campus of the University of Alberta in Edmonton, Alberta, Canada. The conference will be hosted by the University of Alberta and The Metabolomics Innovation Centre (TMIC), and the organizers have developed an engaging preliminary program. Stay tuned for more information and available travel and career development awards.

October 14, 2022

4th MANA Fall Symposium

Venue: Online

[Learn More Here](#)

Overview

We are what we eat – Metabolomics is leading the way for nutritional research.

October 25-27, 2022

2nd International Diabesity and Metabolic Surgery Summit

Venue: Tel Aviv, Israel

[Learn More Here](#)

Overview

The focus of IDMSS 2022 will be the relationship between obesity and type 2 diabetes and their associated complications and the beneficial results obtainable from metabolic/bariatric surgery. The Summit will bring together many of the world experts in the fields of metabolic surgery and medicine. The range and scope of the program are a must for all clinicians caring for patients suffering from metabolic diseases.

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Metabolomics Jobs

If you have a job to post, please email the MetaboNews team at metabolomics.innovation@gmail.com.


Jobs Offered

Job Title	Employer	Location	Posted	Closes	Source
Operations Manager (TMIC-The Metabolomics Innovation Centre)	University of Alberta	Edmonton, Alberta, Canada	14-April-2022	Until filled	University of Alberta
PhD in Nutritional Metabolomics Group	University College Dublin	Dublin, Ireland	12-April-2022	20-May-2022	MetaboNews Jobs
Research Technician (Mass Spectrometry)	University of Alberta	Edmonton, Alberta, Canada	5-April-2022	Until filled	University of Alberta
Experimental Officer in Metabolomics	University of Birmingham-School of Biosciences	Edgbaston, Birmingham, UK	4-April-2022	26-April-2022	University of Birmingham
Postdoc in Mass Spectrometry	University of Alberta	Edmonton, Alberta, Canada	1-Mar-2022	Until filled	University of Alberta
Bioinformatic Scientist, Omics (research programmer) (Contractor)	Denali Therapeutics	Remote / South San Francisco, California, USA		Until filled	Denali Therapeutics
Postdoc in Metabolomics/ Exposomics	University of Vienna	Vienna, Austria	4-Feb-2022	Until filled	University of Vienna
Postdoctoral Research Associate (Sumner Lab)	University of North Carolina at Chapel Hill	Kannapolis, North Carolina, USA	12-Jan-2022	Until filled	University of North Carolina Careers
Various Positions	Various	Various (within North America)	Various	Various	Metabolomics Association of North America

Jobs Wanted

This section is intended for very highly-qualified individuals (e.g., lab managers, professors, directors, executives with extensive experience) who are seeking employment in metabolomics.

We encourage these individuals to submit their position requests to the MetaboNews team at metabolomics.innovation@gmail.com. Upon review, a limited number of job submissions will be selected for publication in the Jobs Wanted section.



Dr. Liang Li's
TMIC Node
offers:


NO COST

NO OBLIGATION

PILOT PROJECT

FOR NEW CLIENTS


Global Metabolomics
with Chemical Isotope
Labeling (CIL) LC-MS




Global Metabolome Analysis

Our chemical isotope labeling (CIL) LC-MS based analysis provides **accurate relative quantification** of metabolites in comparative samples with very high coverage


2000-3000 metabolites (not features) per channel
up to 10,000 metabolites from 4-channels




- Total of 6 samples: two comparative groups (n=3 per group)
- This promotion only applies to human urine, human serum, human plasma; for other type of samples, please inquire
- Sample analysis using one-channel CIL LC-MS for profiling the amine/phenol submetabolome
- Analysis report and consultation on the results
- Consultation on the follow up project design



info@metabolomicscentre.ca



Turn-around time
one month after
receiving the samples



Sample type
Human urine, human
serum, human plasma

- Shipping fee is paid by the client
- Service provider reserves the right to modify, cancel and limit this promotional offer



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