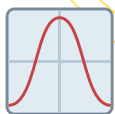


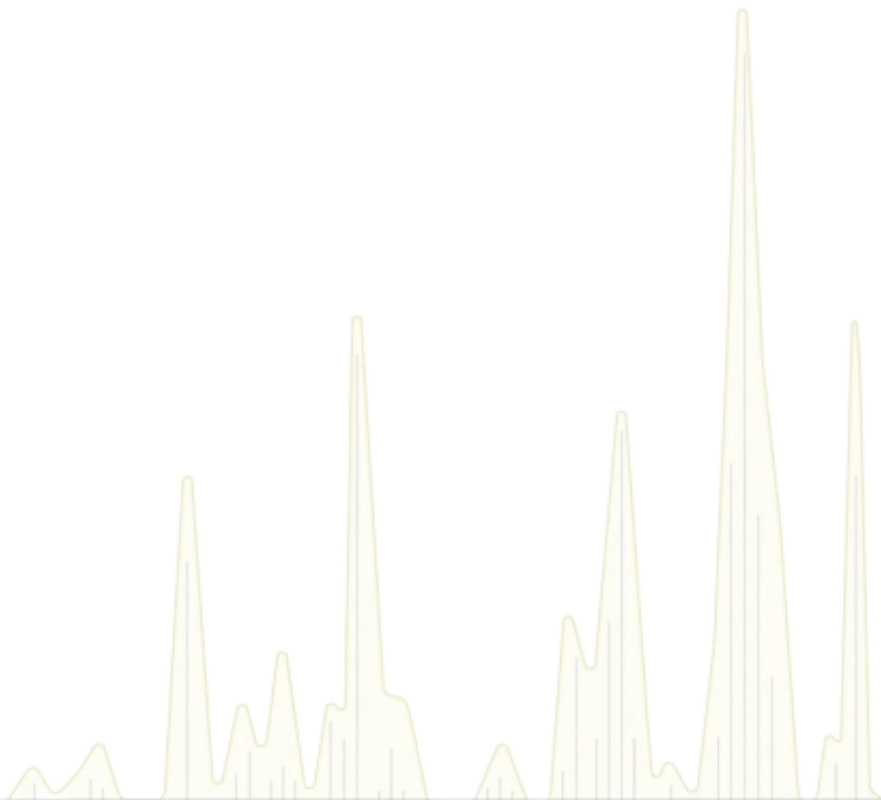


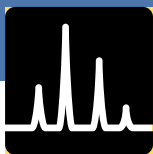
**HKU  
Med**

LKS Faculty of Medicine  
Centre for PanorOmic Sciences  
香港大學泛組學科研中心



# Proteomics and Metabolomics Core





## Proteomics & Metabolomics - PM Core

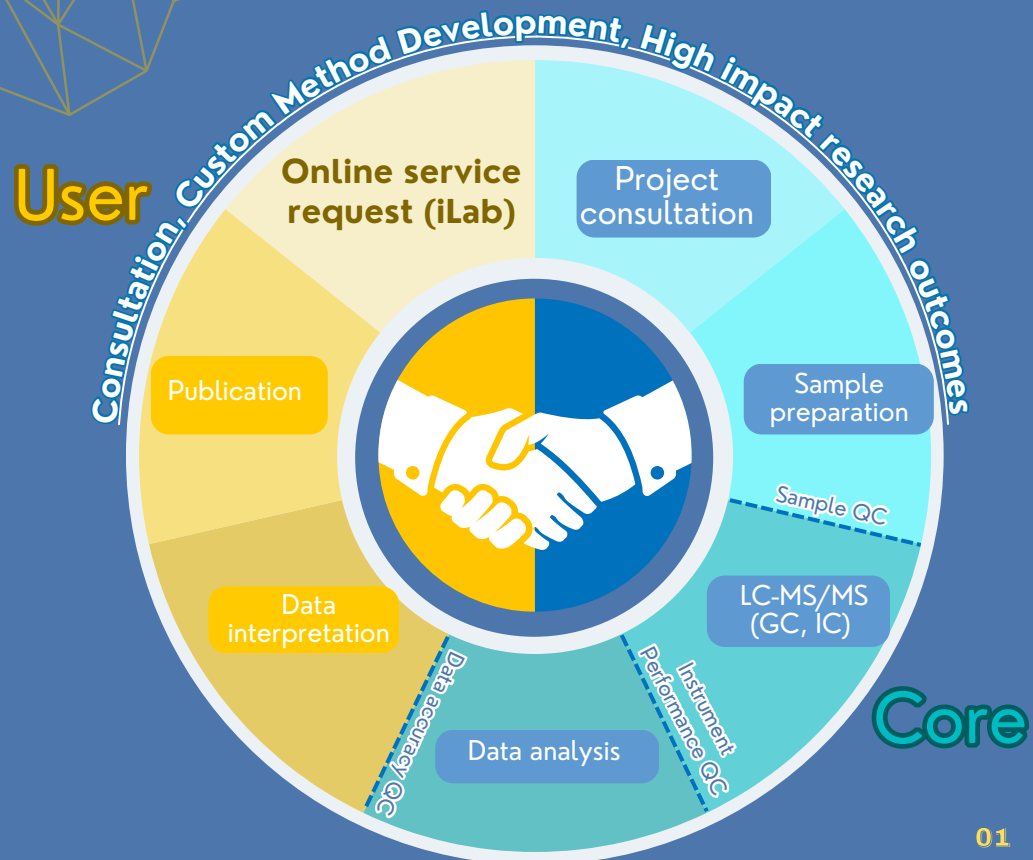
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# About Us

The Proteomics and Metabolomics Core (PM Core) is a MS facility that was established in 2016 under the Li Ka Shing Faculty of Medicine. Our core specializes in providing advanced analytical services for proteomics and metabolomics research, utilizing state-of-the-art mass spectrometry-based techniques.

## Precision Matters - PM Core



# About Us

## Precision Matters - PM Core

Centralized state-of-the-art **Mass Spectrometer instruments**



LC / IC -Thermo  
Orbitrap Exploris  
120



Sciex QTRAP  
6500+ with  
Shimadzu UPLC



nLC-Thermo  
Orbitrap Fusion  
LUMOS



Agilent 7010 GC-  
MS/MS (Triple  
quadrupole)



nLC-Bruker  
timsTOF Pro



Expert team with over 10 years of experience



Project  
consultations

Support faculty  
researchers



High impact publications

Collaboration



Knowledge enrichment  
training & workshops

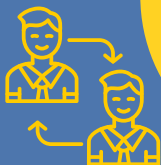
Grant application  
support



**Unlock Discoveries: Proteomics & Metabolomics Simplified!**

# Project Consultation

"Partnering for Progress,  
Maximizing Research Potential!"



Our project consultation service offers comprehensive support to researchers, aiding them in experiment design, data interpretation, and post-experiment follow-up. Our goal is to provide researchers with the necessary resources for conducting effective experiments. Our experienced Scientists/consultants collaborate closely with researchers to understand their objectives and offer guidance across all project aspects. This service establishes a robust support system, empowering researchers to successfully accomplish their research goals

# Sample requirements for PM Core services



Cell lines



Frozen tissue



FFPE tissue



Omnigene/ Stool



Body fluids  
(Serum, plasma, urine, CSF...)

Service Type	TAT		Sample requirement
Full service in Protein identification (ID)	2-3 weeks	<b>Proteomics</b>	Cell lysate, Tissue < 1 million cells or 5-20 µg protein
Full service in Label Free Protein Quan (LFQ)	4-6 weeks		Tissue, FFPE 2mg (w/w), 5µm, 10mm <sup>2</sup>
Full service in Label Based Protein Quan (LBQ)	6-8 weeks		Serum/plasma 0.1 ml
Full service in Phosphorylation site ID & Quan	6-8 weeks		Cell lysate, Tissue Phospho site ID: 5µg purified protein Phosphoproteomics: 1mg – 2mg protein per condition
Targeted Metabolomics of Polar compounds		<b>Metabolomics</b>	Cell lysate ~ 5 million cells
Targeted Metabolomics of Short Chain Fatty Acids (SCFA)			
Targeted Metabolomics of Medium & Long Chain Fatty Acids (FAME)			
Targeted Metabolomics of Bile acids	4-6 weeks		Frozen tissues 50mg
Targeted Profiling using AbsoluteIDQ p180 (Full Kit - 78 samples)			
Targeted Profiling using MXP 500 (Full Kit - 78 samples)			Serum/plasma 50-100µL
Untargeted Lipidomics Profiling		Stool 50mg (dried)/omnigene	



Please directly consult us for customized project and details.



# Proteomics Services



- We provide a diverse range of services for various biological samples, encompassing cells, tissues, FFPE tissues and body fluids.
- Our services include protein identification, quantification (Label-Based/Label-Free), post-translational modification and interaction analysis.
- We offer customized sample preparation and method development services, specifically tailored to meet your project needs. Our aim is to deliver research results of the utmost quality..

We excel in providing customized analysis tailored to researchers' innovative projects.

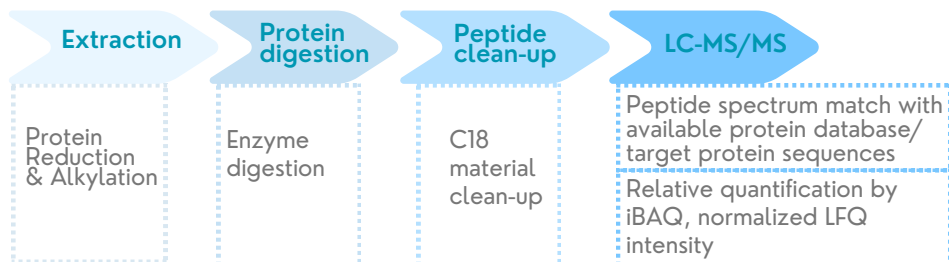
With our expertise and dedication, we deliver accurate and insightful solutions that empower meaningful discoveries.

We provide personalized service support you need to achieve your research goals.

# Protein Identification / PTM analysis



## Workflow >>>



## Applications

### Protein identification

Identification of protein mixes from gels or in-solution

### Protein isoform characterization

Detect intact protein isoforms and variants via the top-down & bottom-up proteomics approaches

### De novo peptide sequencing

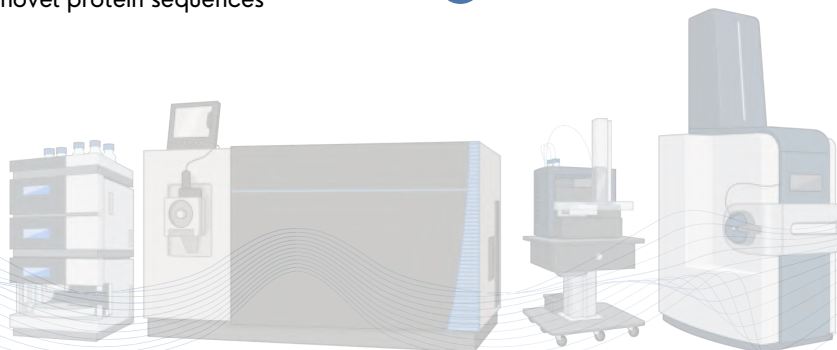
Database-free approach to analyze novel protein sequences

### PTM site identification

Identification & profiling of Post-translational modification(s) (PTM) sites from isolated protein(s) e.g. Phosphorylation, ubiquitination, glycosylation

Suitable for e.g. in vitro kinase assays, site-directed mutagenesis

Also applies to custom chemical modifications (drug or probe)



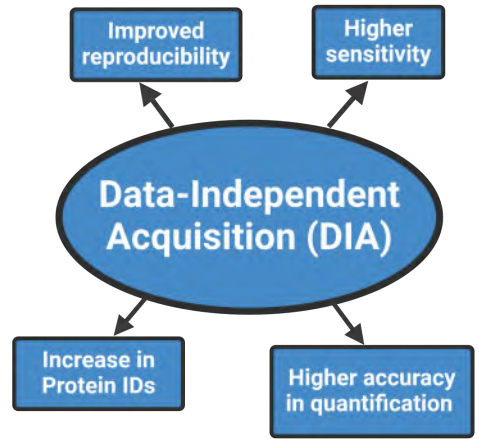
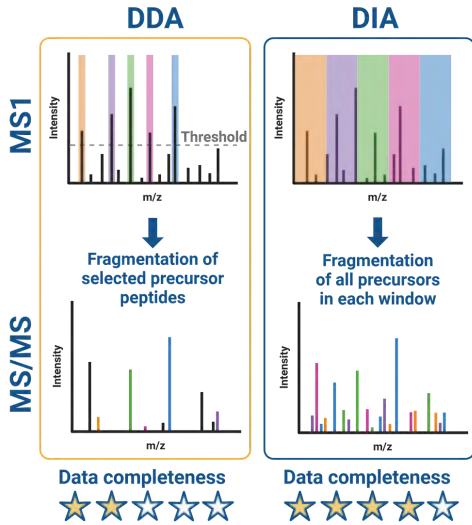
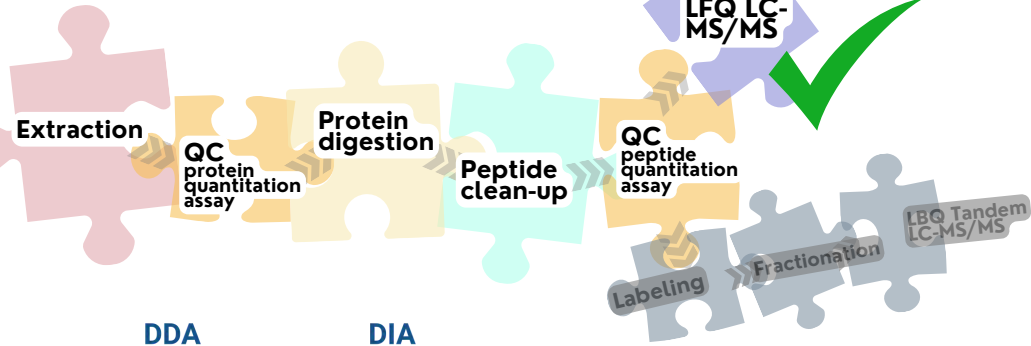


# Quantitative Proteomics (LFQ)

## Label-Free Quantitation (DDA/DIA)



### Workflow



### Applications

- MHC-peptides enrichment
- Neoantigen discovery

#### Immunopeptidome

- Profiling of protein interactors
- Proximity-based BiOLD
- Co-immunoprecipitation

#### Interactome

- Data Dependent Acquisition (DDA): single shot
- Data Independent Acquisition (DIA): large cohort

#### Label-free quantitation

- Modification site ID / annotation in purified proteins
- De novo peptide sequencing

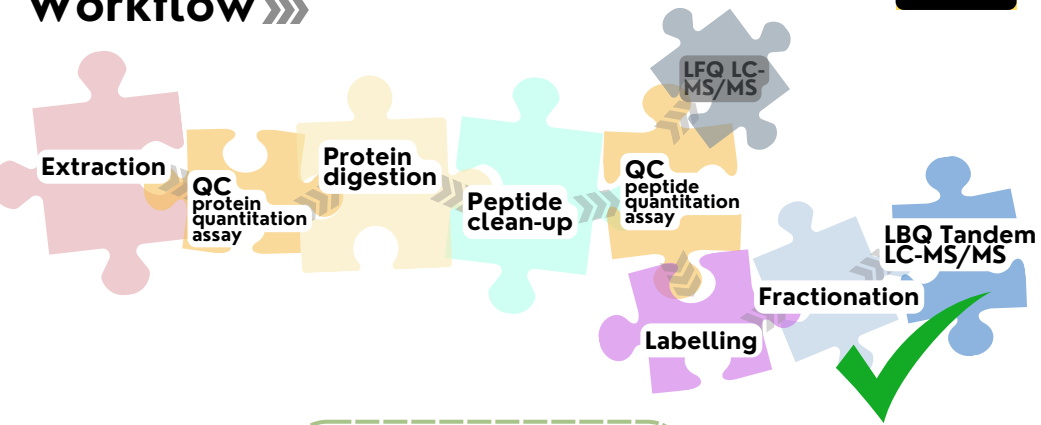
#### Targeted PTM profiling

# Quantitative Proteomics (LBQ)

## Label-Based Quantitation (TMT)



### Workflow >>>



- Advanced Proteomics workflow - DIA and Tandem Mass Tags (TMT)
- Deep-scale discovery of diagnostic markers (low-abundance proteins)

**Blood protein biomarker discovery**

- Deep-scale quantification of the total proteome & phosphorylation sites
- Kinase & cellular signaling events

**Deep-scale, multiplex TMT**

- Novel protein coding regions and isoforms
- Proteomic integration with genomic drivers

**Proteogenomics**



**Thermal protein profiling**



- Differential temperatures ( $T_m$ ) to explore drug-bound protein targets

## Bioinformatics Analysis

**PTMs**

**PCA**

**Network**

**Heatmap**

**Volcano plot**

**Integrative 'omics'**

**Enrichment**

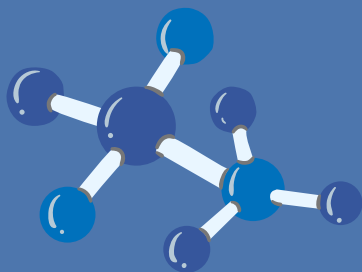
- Mitochondria respiration
- DNA checkpoint
- Apoptotic processes
- Ribosome biogenesis
- Innate immune response
- Translation



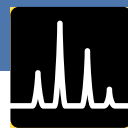
# Metabolomics Services



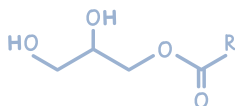
- **The Metabolomics services at CPOS, offer cutting-edge technologies and expertise for analyzing metabolites in biological samples. We provide both targeted and untargeted metabolomics methodologies, empowering researchers to explore disease-associated metabolic alterations and uncover potential biomarkers.**
- **Metabolomics services provide extensive support for data analysis and interpretation. Researchers can leverage statistical analysis, multivariate analysis, and pathway analysis techniques to extract valuable insights from their metabolomics data, facilitating a comprehensive understanding of metabolic processes.**



# Targeted Metabolomics



## Workflow



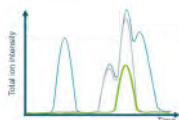
Extraction

Purification

Derivatization

GC or LC-MS/MS (MRM)

Align retention time & compare characteristic transition ion ratio of analyte & internal standard



## Applications



### Fatty Acid Methyl Esters (FAME)

- Energy metabolism
- Cancer Research
- DNA repair & Aging studies



### Central Carbon Metabolites

- Oxidative stress
- Inflammatory
- Cancer research
- Drug discovery



### Short-Chain Fatty Acids (SCFA)

- Liver metabolism
- Gut microbiota
- Gut - brain axis

## Kit-Based

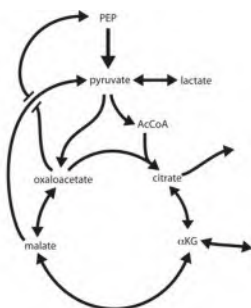


180+ or 630+ Targeted metabolites profiling

## Bile acids



- Neuroscience research
- Gut microbiome health

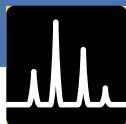


Metabolic pathway analysis

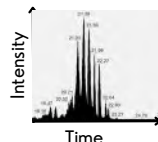
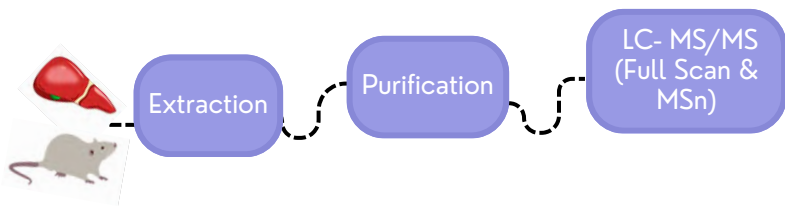


Heatmap for individual metabolite

# Untargeted Lipidomics



## Workflow >>>



Overlayered  
Extracted Ion  
Chromatograms

## Applications

**Relative Quantitation:**

- abundance
- peak area

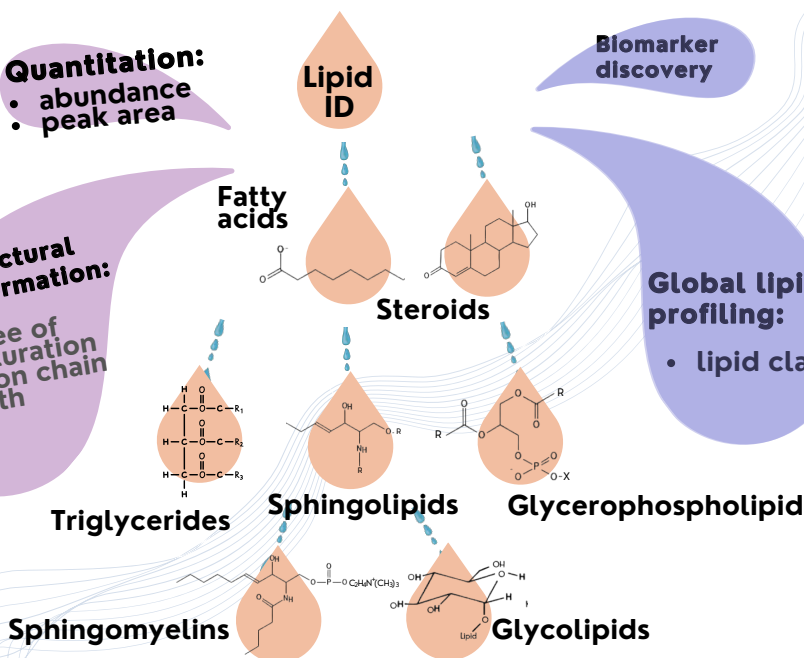
**Biomarker discovery**

**Global lipid profiling:**

- lipid class

**Structural Information:**

- degree of unsaturation
- carbon chain length



FA AcCa MG DG TG

LPE PS LPS PG LPG PA

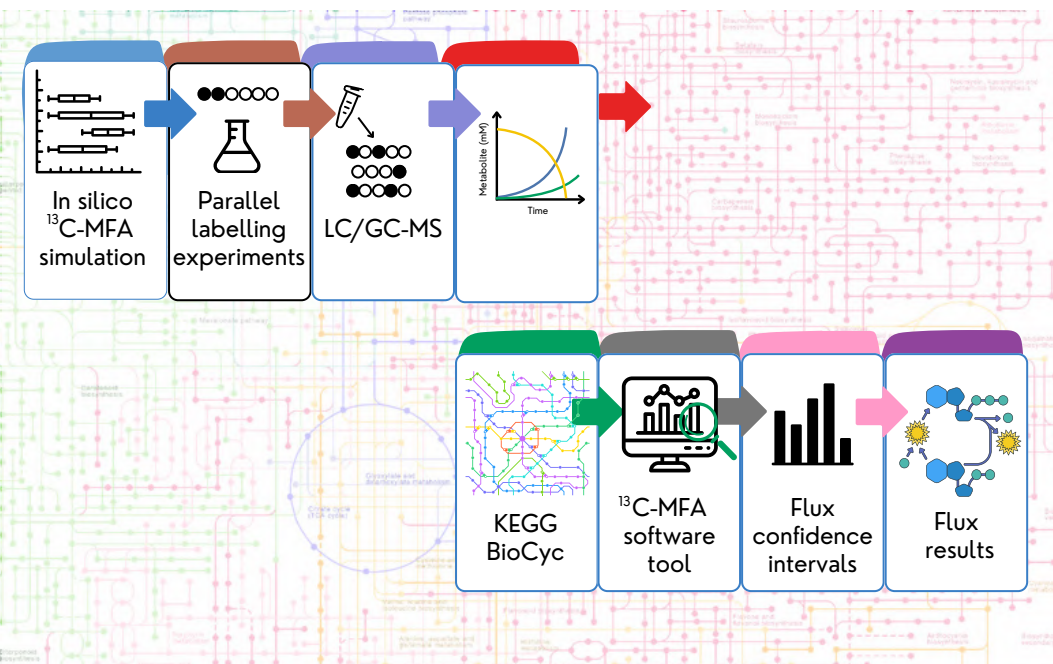
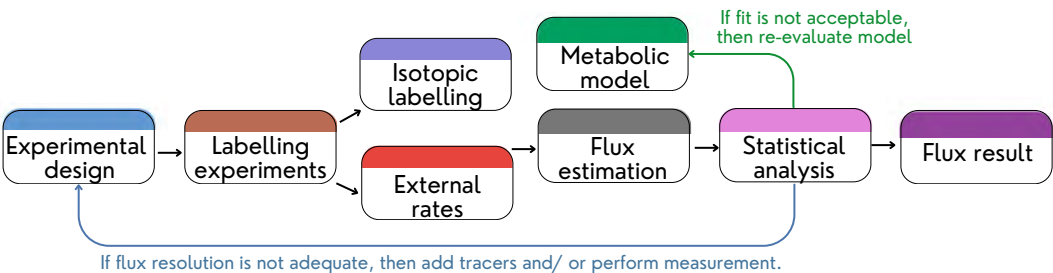
Cer SM SPH PC LPC PE

LPA PI LPI CL Co ChE

# Metabolic Flux Analysis



## Workflow >>>



## Applications

Isotopologue studies

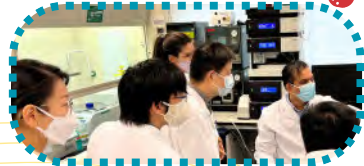
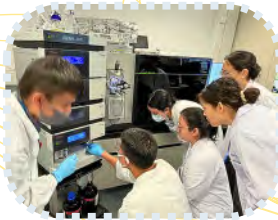
Pathway analysis

Kinetic studies

# Education

Our workshops, seminars, and lab tours are specifically designed to enrich researchers' understanding and proficiency in sample preparation, data analysis, and instrument operation.

## Workshop/ Training



Lab tour: Introductory to mass spectrometry 



Proteomics Label-based hands-on workshops



Protein interactome data analysis workshop 

## Seminar



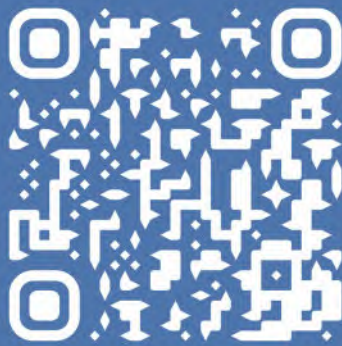
Metabolomics flux - Introductory Seminar



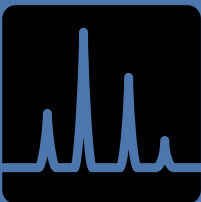
Biomarker discovery  
Proteomics - Seminar



Metabolomics lipidomics  
Introductory Seminar 



Contact us



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