HML1600 - High-throughput Targeted Metabolomics Panel

Service Description

We provide one of the most comprehensive panels for targeted metabolomics research. The HML1600 performs high throughput targeted metabolomics detection and analysis by liquid chromatography-tandem mass spectrometry (LC-MS/MS) quantitative analytical technique for more than 1,600 lipids of 12 subclasses by the method of combining standard curves with internal standard, covering all kinds of lipids with important biological functions. HML1600 is used for nervous system disease research, cardiovascular and cerebrovascular disease research, nutritional metabolism research, lipid metabolism research, and other fields.

Coverage of the Metabolites

Category	Main Class	Sub Class	Number of Metabolites	Representative Lipids
Glycerophos-pholipids (GP)	P-Choline	Phosphatidylcholine(PC)	~211	PC 16:0-16:0, PC 16:0-16:1, PC 16:0-18:0
		Lysophosphatidylcholine (LPC)	~24	LPC 14:0, LPC 15:0, LPC 16:0, LPC 16:1, LPC 17:0
	P-Glycerol	Phosphatidylglycerol (PG)	~211	PG 16:0-16:0, PG 16:0-16:1, PG 16:0-18:0
	P-Inositol	Phosphatidylinositol (PI)	~210	PI 16:0-16:0, PI 16:0-16:1, PI 16:0-18:0, PI 16:0-18:1
	P-Serine	Phosphatidylserine (PS)	~204	PS 16:0-16:0, PS 16:0-16:1, PS 16:0-18:3, PS 16:0-18:4
	P-Ethanol Amine	Phosphatidylethanolamine (PE)	~207	PE 16:0-16:0, PE 16:0-16:1, PE 16:0-18:0, PE 16:0-18:1
		Lysophosphatidylethanolamine (LPE)	~24	LPE 14:0, LPE 15:0, LPE 16:0, LPE 16:1, LPE 17:0
Glycerolipids (GL)	Diradylglycerols	Diacylglycerol (DAG)	~49	DAG 16:0-16:0, DAG 16:0-16:1, DAG 16:0-18:0
	Triacylglycerols	Triacylglycerol (TAG)	~464	TAG 42:0-FA12:0, TAG 42:0-FA14:0, TAG 42:0-FA16:0
Sterol Lipids (ST)	Sterols	Cholesterol Ester (CE)	~26	CE 12:0, CE 14:0, CE 14:1, CE 15:0, CE 16:0
Sphingolipids (SP)	Ceramides	Ceramides (CER)	~13	Cer d18:1/14:0, Cer d18:1/16:0, Cer d18:1/16:1
	Sphingolipids	Sphingomyelin (SM)	~57	SM 34:0, SM 35:0
Total			1600+	

Technology Platforms

Waters ACQUITY UPLC   SCIEX QTRAP 5500

Service Advantages

- High Throughput: Targeted detection of more than 1600 lipids of 12 subclasses.
- High Sensitivity: Effectively distinguish lipid isomerism and accurately identify different fatty acid chain types.
- Accurate Quantification: Metabolomics quantification by using standard curves and internal standards with excellent accuracy and precision.
- Rich Analysis: Integrates statistical analysis and functional analysis methods to assist in mining key metabolites and important metabolic pathways.
- High Reproducibility: The standardized workflow combines with MRM mode to meet the high reproducibility requirements in large sample testing.
- Multi-omics Association: Provide multi-omics association analysis services (metabolome + metagenome/16S/transcriptome/proteome, mGWAS).

Lipid Metabolism Pathway Coverage for Intensive Functional Studies of Lipid-related Diseases

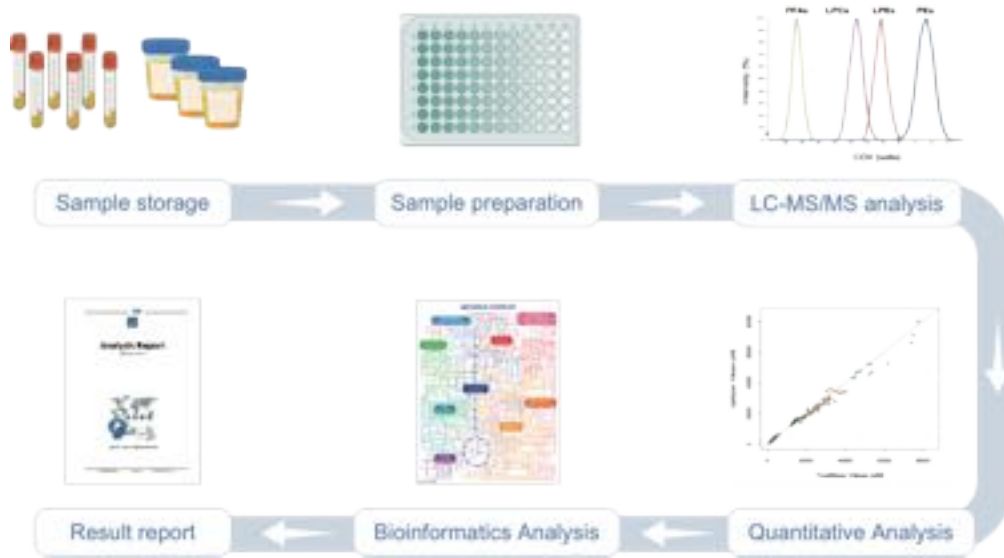| Category	Related Lipids	Biological Function
Ceramide	Cer d18:1/14:0, Cer d18:1/16:0, Cer d18:1/16:1	Ceramide participates in a variety of cellular signaling, including regulating differentiation, proliferation, and programmed cell death (PCD) of cells. It is associated with stroke, coronary artery disease, atherosclerosis, and so on.
Phosphatidylc-holine	PC 16:0-16:0, PC 16:0-16:1, PC 16:0-18:0	Phosphatidylcholine is a major constituent of the cell membrane and pulmonary surfactant. It is often used to prevent atherosclerosis, liver disease, hypertension, Alzheimer's disease, diabetes, and neurasthenia.
Glyceride	DAG 16:0-16:0, DAG 16:0-16:1, TAG 42:0-FA12:0, TAG 42:0-FA14:0	The primary function of glyceride is to serve as fat storage molecules. It is related to various diseases, such as hyperlipidemia, chronic heart disease, pancreatitis, and hypothyroidism.
Cholesterol ester	CE 12:0, CE 14:0, CE 14:1, CE 15:0	Cholesterol ester is found in human brains as lipid droplets which store and transport cholesterol. It has been linked to other neurological disorders like multiple sclerosis and Alzheimer's disease.

Category	Related Lipids	Biological Function
Phosphatidyle-thanolamine	PE 16:0-16:0, PE 16:0-16:1, PE 16:0-18:0	Phosphatidylethanolamine (cephalin) has a good regulatory effect on diseases such as liver cirrhosis and atherosclerosis.
Phosphatidylg-lycerol	PG 16:0-16:0, PG 16:0-16:1, PG 16:0-18:0	Phosphatidylglycerol is an important indicator of fetal lung maturity, which plays a role in stabilizing surfactant lipoprotein complex.
Phosphatidyl-serine	PS 16:0-16:0, PS 16:0-16:1, PS 16:0-18:3	Phosphatidylserine plays a key role in cell cycle signaling, specifically in relation to apoptosis. It helps with cognitive support and promotes other functions like stress response, positive mood, skin health & athletic endurance.
Phosphatidyli-nositol	PI 16:0-16:0, PI 16:0-16:1, PI 16:0-18:0	Phosphatidylinositol is an important lipid. In addition to their structural role in membranes, these lipids are intimately involved in innumerable aspects of membrane trafficking and signaling in eukaryotic cells, functions that are essential to cell growth and metabolism.

Research Applications
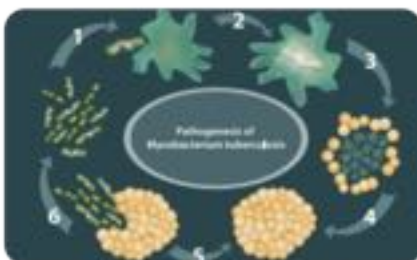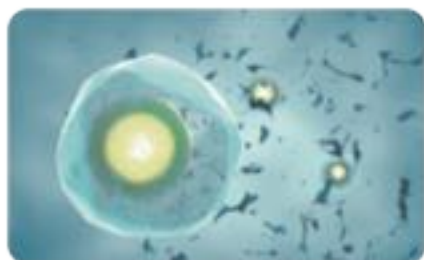
- Disease biomarkers research
- Pathogenesis and prognosis study on diseases
- Drug target research, toxicity assessment, drug efficacy evaluation, and target research
- Regulation mechanism of tissue development
- Microbial infection and its pathogenesis
- Animal particular behavior mechanism and food/medicinal value research
- Gut microbiota research

Analysis Workflow

Sample storage → Sample preparation → LC-MS/MS analysis

Result report ← Bioinformatics Analysis ← Quantitative Analysis

Bioinformatics Analysis

Standard:

1. Data processing and quality control

Peak extraction, peak alignment, and metabolite identification Missing value filling, normalization, and low-quality data filtering BPC, CV, and PCA analysis of QC samples

2.Quantitative Analysis

The standard curve is drawn to calculate the concentration of metabolites

3.Statistical Analysis and Function Analysis

Global metabolite analysis (Chromatogram, super Pathway statistics, PCA for all samples, etc.)
Differential metabolites screening (PCA, PLS-DA, OPLS-DA, etc.)
Analysis of differential metabolite in a single comparison group (Chain length analysis, Chain saturation analysis, Cluster heatmap, Z-score, etc.)
Differential metabolite analysis of all comparison groups (limited to two or more comparison groups).

Customized:

• Metabolome + 16S/Metagenome correlation analysis
• Metabolome + Transcriptome/Proteome correlation analysis
• Metabolome + Genome re-sequencing correlation analysis（mGWAS）
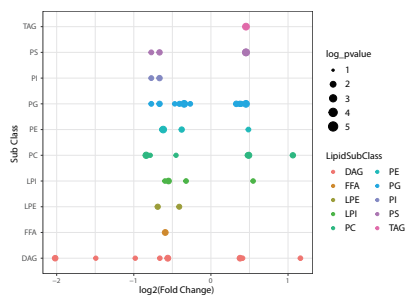
Examples of Bioinformatics Analysis
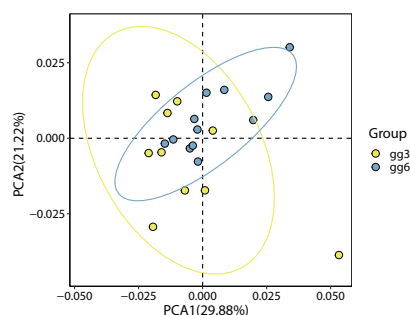
Score Graph of PCA
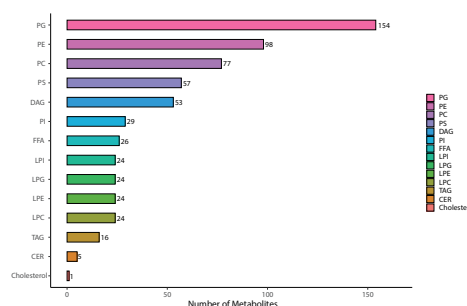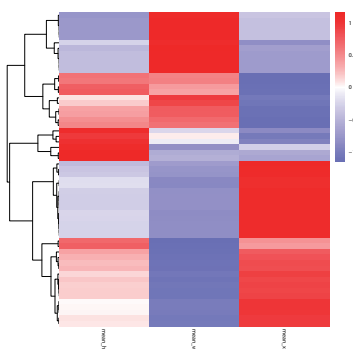
Metabolite Classification Bar Chart
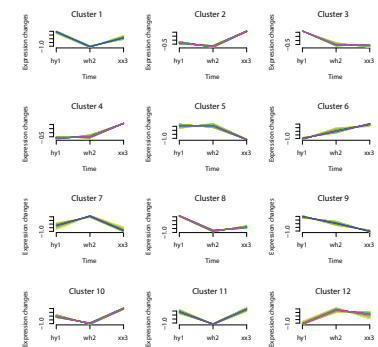
Trend Analysis

Bubble Diagram of Differential Lipids
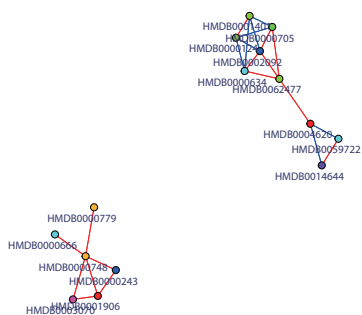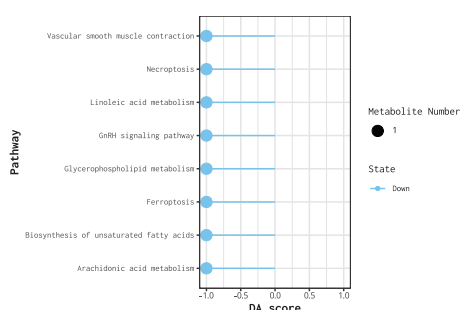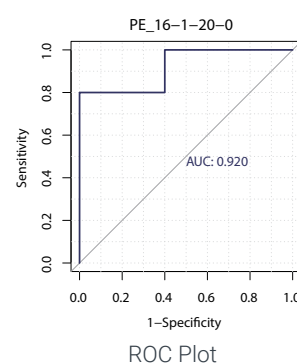

Clustering of Differential Lipids
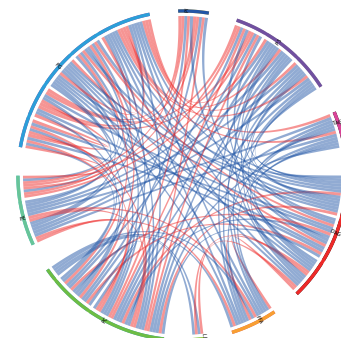
Correlation Chord Diagrams of Differential Lipids

Correlation Network Diagram of Differential Lipids

Metabolic Pathway Enrichment Analysis Abundance Score Plot

ROC Plot

General Sample Requirements

Sample Type	Recommended Sample Amount	Minimum Sample Amount
Serum, plasma, urine	≥ 100 µL	≥ 50 µL
Animal and clinical tissues, feces and intestinal contents, microorganism	≥ 50 mg	≥ 20 mg
Cell	$1×10^7$	$1×10^5$
Culture medium, fermentation medium	≥ 500 µL	≥ 100 µL

Biological Replicates Requirements

Sample Type	Recommended Biological Duplicates	Minimum Biological Duplicates
Cell and Microorganism	≥ 6	≥ 3
Animal	≥ 10	≥ 6
Human	≥ 30	≥ 10

Turn Around Time

Sample size: 1-50, 4-6 weeks

To learn more

If you have any questions or would like to discuss how our services can help you with your research, please don't hesitate to contact us at P_contact@innomics.com. We look forward to hearing from you!

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