Plant Metabolomics
Service Overview

Service Description

There are more than 300,000 known plant species and the number of metabolites they produce is estimated to be as many as 200,000 to 1 million. These include primary metabolites necessary for plant life activities, growth and development and secondary metabolites closely related to plant disease resistance.

Plant metabolomics is an important branch of metabolomics. Metabolites from different plant species, different gene types or different ecological types can be studied at different growth periods or before and after certain stimulation. Qualitative and quantitative analysis can then be performed to find the relative relationship between metabolites and physiological and pathological changes.

BGI has extensive experience in the field of plant metabolomics and offers services including:

- Untargeted Metabolomics (water/lipid-soluble metabolites)
- Lipidomics
- Targeted Metabolomics
- Muti-Omics Integrative Analysis

Research Applications

- Plant growth and development research
- Crop quality trait analysis and breeding improvement
- Plant biotic and abiotic stresses interaction research
- Nutrition research and color metabolism of fruits, vegetables and flowers
- Research into the function and active components of medicinal plants
- Gene function analysis and metabolic pathway analysis

Technology Platforms

Thermo Q Exactive

- Untargeted Metabolomics
- Lipidomics

SCIEX QTRAP 6500+

- Targeted Metabolomics

Service Advantages

Proprietary Comprehensive Databases: self-built database "BGI HRAM-PMDB" (High Resolution Accurate Mass Plant Metabolome Database 2500+ compounds), online HR database mzCloud (18000+ compounds) and LipidSearch software (1.7 million+ compounds) enable accurate identification.

State-of-the-art LC-MS/MS Systems: QE series of high-resolution mass spectrometers, such as Thermo Scientific Q Exactive and Q Exactive HF.

Multiple Strict Quality Controls: double quality control of isotopic internal standards and QC samples, and strict protocols governing the whole workflow.

Untargeted Metabolomics

BGI untargeted metabolomics services are designed to obtain a metabolite profile and screen for differentially-expressed metabolites in the sample. Metabolites are identified using BGI HRPMD (high resolution plant metabolome database) and mzCloud standard database. MzCloud is an online standard database of over 18,000 compounds containing both MS1 and MS2 spectra information.

BGI HRPMD is an in-house standards database in the field of plant metabolomics research, and comprehensively covers more than 2500 plant metabolite standards information, including relatively fixed retention time (RT), high resolution MS1 and MS2 spectra information.

CLASS	AMOUNT	REPRESENTATIVE COMPOUNDS
Amino acids	100+	Threonine, serine, tyrosine, valine, glutamine, cysteine, etc
Vitamins	30+	Vitamin A, vitamin B12, vitamin C, vitamin D2, vitamin K1, etc
Organic acids	200+	Fumaric acid, malic acid, shikimic acid, ferulic acid citric acid, tartaric acid, etc
Carbohydrates	50+	Lactose, galactose, sorbitol, xylitol, mannitol, arabinose, etc
Lipids	100+	Linoleic acid, palmitic acid, linolenic acid, myristic acid, arachidonic acid, etc
Nucleotides	100+	1-methyladenosine, 5-methylcytosine, adenine, cytosine, guanine, etc
Phenols	80+	Emodin, rhizoin, paeonol, curcumin, salidroside, etc
Phenolic acids	60+	Caffeic acid, catechin gallate ester, benzoyl paeoniflorin, salvianolic acid A, etc
Flavonoids	450+	Baicalin, soy flavin, myricetin, sarcophenol, proanthocyanidin B1, etc
Alkaloids	370+	Berberine, galantamine, reserpine, betaine, ricinine, cromarin, etc
Terpenoids	350+	Astragaloside III, ginsenoside, betulinol, carvone, tripterine, etc
Quinones	30+	Dihydrotanshinone I, hesperidin, emodin, Tanshinone IIA, hypericin, etc
Steroidals	60+	Lycopene, Ophiopogon japonicus saponin D, digitalis saponin, ritarine, etc
Phenylpropanes	150+	Glycosin, scopolamine, chlorogenic acid, 1-caffeyl quininic acid, etc
Others	400+	Mycotoxin A, aristolochic acid B, xanthodoxine B, acetylbenzene, etc
Total	2500+	

Technical Advantages

High Quality Standards Database

- 100% standard database
- 100% MS2 spectra
- 100% retention time

High-Precision Identification Results

- Corrected retention time with 60 standards
- 100% identification is achieved through the standards
- Identification credibility rating

Lipidomics

BGI lipidomics services are designed to obtain a lipid profile and screen for deferentially-expressed lipids in the sample. Combined with LipidSearch software and advanced algorithm analysis, BGI's lipidomics service enables confirmation of lipid structure characteristics such as lipid molecule head structure, fatty acid branch chain length and unsaturated double bond number by comparing the characteristic signals of precursor ions, MS2 fragments and neutral loss. LipidSearch is equipped with the largest lipids database, covering 8 categories of lipids, 300 lipid subclasses, and containing more than 1.7 million lipid ions and their predictive fragment ions information.

CATEGORY	SUB CLASS
Fatty Acyls	FA、OAHFA
Glycerolipids	MG、DG、TG
Glycerophospholipids	LPC、PC、LPE、PE、LPI、PI、LPG、PG、LPS、PS、LPA、PA、CL, etc
Sphingolipids	SM 、Cer、GM1、 GM2、 GM3, etc
Sterol Lipids	ChE、ZyE、StE、SiE
Prenol Lipids	Coenzyme (Co)
Saccharolipids	MGMG、MGDG、DGMG、DGDG、SQMG、SQDG、 SoG1、CerG1, etc

Technical Advantages

Professional Analysis Tools

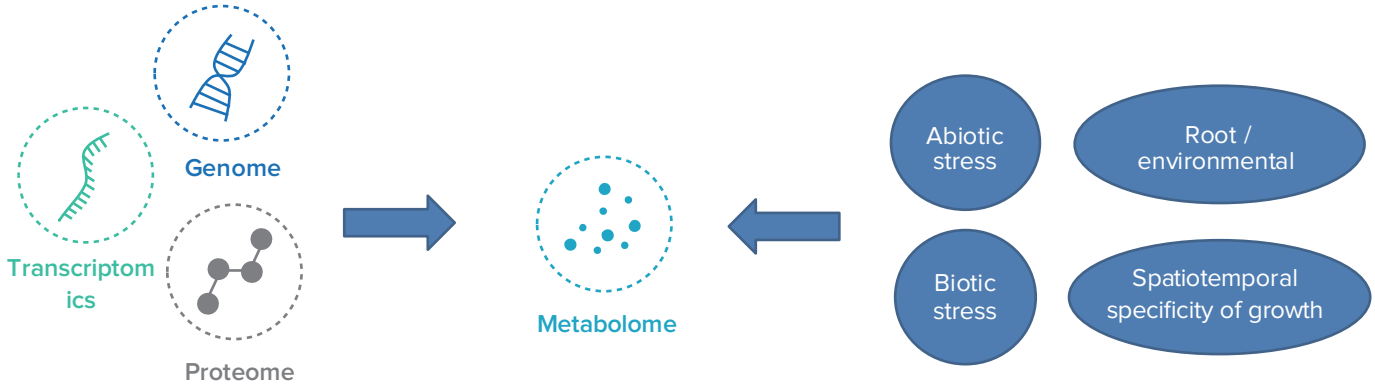
- LipidSearch:lipomics analysis software
- metaX: self developed metabolomics statistical analysis software

Comprehansive Lipids Database

- 8 categories of lipids
- 300 lipid subclasses
- 1.7 million lipid ions

Muti-Omics Integrative Analysis

BGI'S Metabolomics Analysis services enable researchers to more directly and accurately analyse the pathophysiological state of organisms. Effective small changes in genome and proteome can be amplified on metabolites. Information about stress disturbance, pathophysiological status or changes after drug treatment can be obtained by the integrative analysis between metabolomics data with other omics data, reflecting the function and metabolic state of the tissues and organs, so as to make a comprehensive interpretation of the biological system.



Gene and protein information can reveal or give insight into key biological mechanisms.

Metabolomics directly reflects the interaction between plant and environment, and provides a 'bridge' between phenotype and gene.

The change of external environment can affect the normal growth and development of plants and nutritional quality.

Service Options

- 16S + metabolome/lipidome correlation analysis
- Metagenome + metabolome/lipidome correlation analysis
- Transcriptome + metabolome/lipidome correlation analysis (personalized analysis)
- Proteome + metabolome/lipidome correlation analysis (personalized analysis)

To Learn More

To learn how your research can benefit from BGI's extensive experience in Plant Metabolomics approaches, visit www.bgi.com, write to us via info@bgi.com or contact your local BGI office.

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