METWARE BIO

Innovative Metabolomics Insights for Better Health

About Us

Metware Biotechnology Co., Ltd (“Metware”) is a professional metabolomics research and technology company focusing on developing and applying innovative metabolome technologies to life science and health. With over 40 mass spectrometers, over 20,000+ sq ft. of lab space, and 450 passionate staff and scientists, Metware is committed to provide effective and timely metbolomics services in basic and clinical research world-wide.

Since its establishment in 2015, Metware has constructed an ever-increasing curated database of metabolites and a proprietary detection methodology. The database now houses 280,000 metaboloites to date. Together with a proprietary ultra-sensitivity high-throughput widely-targeted metabolomics technology and metabolite marker machine learning algorithms, Metware’s technical achievements has been presented and published in over 700 publications, including Cell, Nature Genetics, PNAS, Nature Communications, National Science Review, and many other international peer-reviewed journals.

Systems

Low Resolution Mass Spectrometer

QTRAP® 6500 + system (20 sets)

Resolution Ratio	⩾9000
Mass Sweep Range	5-2000m/z
Scanning Speed	20000Da/s
Quality Accuracy	<0.01% (Total mass number range)
Sensitivity	ESI Positive ions：1pg Reserpine was injected, S/N⩾160000:1 ESI Negative ions：1pg Estradiol injection, S/N⩾500:1
Dynamic Range	$>10^6$

QTRAP® 4500 system (5- sets)

Resolution Ratio	Unit resolution
Mass Sweep Range	5-2000m/z
Scanning Speed	12000Da/s
Quality Accuracy	<0.1 Da over 24 hours
Sensitivity	1 pg reserpine, S/N⩾200,000:1
Dynamic Range	$>10^5$

Systems

High Resolution Mass Spectrometers

TripleTOF 6600+ system (5 sets)

resolution ratio	In the 956 m/z≥35,000 (FWHM)
Mass sweep range	5-40,000m/z
Scanning speed	25Hz (TOF MS), 100Hz (TOF MS/MS)
Quality accuracy	< 1ppm
sensitivity	200 fg reserpine, S/N > 60:1
Dynamic range	$>10^5$

Agilent 6545 Q-TOF LC-MS (1 sets)

resolution ratio	45000 (FWHM) at m/z 2,722
Mass sweep range	100–10,000 m/z
Scanning speed	50 spectra/second
Quality accuracy	interior label：<0.08ppm
sensitivity	ESI Positive ions：1pgReserpine was injected, S/N≥500:1
Dynamic range	$>10^5$

Systems

High Resolution Mass Spectrometer

Bruker TimsTof Pro (3 sets)

Resolution Ratio	At high acquisition speed (⩾40 Hz), resolution ⩾50,000(@M/Z 1222,FWHM)
Mass Sweep Range	20-40,000 m/z
Scanning Speed	MS⩾40 Hz, MS/MS acquisition speed⩾ 100 Hz
Quality Accuracy	interior label <0.8ppm RMS, External standard<2ppm RMS
Sensitivity	Mobility mode: MS: 1pg/uL reserpine, S/N> 100:1; MS/MS: 2.5Fmol glu-fibrinopeptide B, the strongest peak signal in y ion of divalent ion fragments was greater than 800, S/N>100:1

Q ExactiveHF-X

Resolution Ratio	240000@m/z 200
Mass Sweep Range	50-6000m/z
Scanning Speed	Up to 40Hz
Quality Accuracy	interior label <1ppm RMS, External standard<3ppm RMS
sensitivity	Full scanning MS: the S/N of reserpine on 100FG upper column was 150:1 SIM: 50FG S/N of reserpine on the upper column was 150:1
Dynamic Range	>5000:1

Widely Targeted Metabolome Technolog

Widely-targeted metabolomics is an innovative metabolomics method that combines the benefits of non-targeted metabolomics and targeted metabolomics to achieve high-throughput identification and quantification of wide variety of metabolites. This methodology is especially useful in plant metabolism research where the number of metabolites far exceeds those in animals. At Metware, our widely-targeted metabolomics approach stands out from many others with features such as:

(1) Using high-resolution mass spectrometers to allow unbiased collection of MS/MS spectrum data;
(2) Highly curated in-house metabolomics database (MWDB) that provides accurate identification of over 10000 metabolites;
(3) Using MRM analysis from QQQ to accurately quantify metabolites in each sample.

Our curated in-house database contains over 30,000 metabolites, which includes over 1800 primary metabolites and over 28,000 secondary metabolites. Primary metabolites include sugars, amino acids, lipids, nuclear acids. Secondary metabolites include flavonoids, polyphenol, cardiac glycosides, steroidal saponins, anthraquinone, naphthoquinone, indole alkaloids, isoquinoline alkaloids, triterpenoid saponin, tetraterpene, coumarin, lignan.

Number Of Metabolites In Different Classes			
Flavonoids	3700+	Coumarins	800+
Phenolic acids	2100+	Organic acids	270+
Alkaloids	7000+	Vitamins	50+
Terpenoids	8000+	Amino acids and derivatives	540+
Quinones	700+	Nucleotides and derivatives	120+
Steroid	1300+	Saccharides and Alcohols	340+
Tannins	240+	Lipids	500+
Ligans	1000+	Others	3200+
Glucosinolates	150+	Sum up	30000+

Featured Carbohydrates			
Fructose	Turanose	fucose	D-Mannitol
Glucarate O-Phosphoric acid	D-(+)-TrehaloseAnhydrous	D-(+)-Sucrose	D-Glucose 6-phosphate
Xylitol	1,1-kestotetraose	D(+)-Glucose	D-Glucose monohydrate
Gluconic acid	D-(-)-arabinose	DL-Arabinose	D-Sorbitol
Lactose			

Featured Organic Acids			
1,3,7-Trimethyluric acid	Citric Acid	L-(+)-Tartaric acid	Shikimic acid
Adipic Acid	Creatine	Malic acid	SubericAcid
Caproic Acid（C6:0）	Fumaric acid	Oxalic acid	Succinic acid
Caprylic Acid/Octanoic Acid(C8:0)	Kinic acid	Oxaloacetic acid	trans-Citridic acid
Citraconic acid	Kynurenic acid	Phosphoenolpyruvate	γ-aminobutyric acid
Citramalate	L(-)-Malic acid	Sebacate	

Featured Flavonoids			
3-Hydroxyflavone	Daidzin	Isorhamnetin	Phloretin
6-Hydroxydaidzein	Demethyltexasin	Isoschaftoside	phloretin 2'-O-glucoside
Acacetin	Dihydromyricetin	Isotrifoliin	protocatechuic acid
Afzelechin	Diosmetin	Isovitexin	Prunetin
Andrographidine A	Eriodictyol	Kaempferol	Puararin
Apigenin	Farrerol	Kaempferol 7-O-glucosdie	Quercetin
Apigenin 4-O-rhamnoside	Formononetin	Kaempferol 7-O-rhamnoside	Quercitrin
Apigenin 5-O-glucoside	Gallic acid	Kumatakenin	Robinin
Apigenin 7-O-glucoside	Genistein-7-Glucoside	L-Epicatechin	Rutin
Baicalein	Glycitein	Liquiritigenin	Sinensetin
Baicalin	Glycitin	Luteolin	Swertisin
Biochanin A	Gossypitrin	Luteolin 7-O-glucoside	Tamarixetin
Biorobin	Herbacetin	Luteolin-7-O-rutin	Tangeretin
Butin	Hesperetin	Myricetin	Taxifolin
Calycosin	Hesperidin	Naringenin	Tricetin
Calycosin-7-glucoside	Homoeriodictyol	Naringin	Tricin 4'-O-syringic acid
Casticin	HoMoorientin	Narirutin	Tricin 4'-O-syringyl alcohol
Catechin	Hyperin	Neohesperidin	Tricin 5-O-hexoside
Chalcone	Icariin	Nicotiflorin	Tricin 5-O-rutinoside
Chrysin	Isoliquiritigenin	Ononin	Tricin 7-O-hexoside
Chrysoeriol 7-O-rutinoside	Isoquercitrin	Orientin	Vitexin
Daidzein			

Featured Lignans			
Eleutheroside E	Gomisin G	Phillygenin	Schisandrol A
Syringaresinol	Gomisin J	Phillyroside	Schisandrol B
Arctiin	Gomisin N	Pinoresinol	Schisanhenol
Asarone	laricіresinol	Pinoresinol O-glucoside	Schisantherin B
Deoxyschisandrin	Matairesinol	Podophyllotoxin	Schisantherin D
Eucommin A	Matairesinoside	Pregomisin	SchisantherinA
Fargesin	Mesolipin diglucoside	Schisandrin A	Schizandrin B
Glucyrin	Olive resin	Schisandrin C	Sesamol
Gomisin F	Olivin Diglucoside		

Featured Alkaloids			
Arecoline	Evodiamine	Nuciferine	Solanine
Asimilobine	Gelsemine	Phellodendrine	Sophoranol
Berberine	Hordenine	Piperine	Stemonine
Betaine	Kukoamine A	Pseudoephedrine	Stenine
Caffeine	L-Dencichin	Raubasine	Tetrahydroberberine
Capsaicin	L-Hyoscyamine	Rhynchophylline	Theophylline
Dendrobine	Lycorine	Sinapine	Trigonelline
Ephedrine	Matrine		

Featured Amino Acid And Its Derivatives			
alpha-Aminocaproic acid	L-(-)-Tyrosine	L-Homocitrulline	L-Phenylalanine
D-(-)-Valine	L-(+)-Arginine	L-Homocystine	L-Proline
D-(+)-Phenylalanine	L-(+)-Lysine	L-Isoleucine	L-Theanine
D-Serine	L-Asparagine Anhydrous	L-KynurenineHydrate	L-Tryptophan
Glutamic acid	L-AsparticAcid	L-Leucine	L-Valine
Homoserine	L-Glutamic acid	L-Methionine	Oxidized Glutathione
L-(-)-Threonine	L-Histidine		

Featured Steroid			
Anemarrhena saponin H1	Ecdysterone	Ruscogenin	TiMosaponin A III
Anemarrhenasaponin F	Inokosterone	Sarsasapogenin	TiMosaponin B III
Anemarrhenasaponin III	Markogenin	Sisal saponin	TiMosaponin D
Dioscin	Protodioscin	TiMosaponin AI	β-Sitosterol

Featured Coumarins			
3,4-Dihydrocoumarin	Anomalin	Imperatorin	Oxypeucedanin
4-Hydroxycoumarin	Bergapten	Isofraxidin	Praeruptorin A
4-Methylumbelliferone	Coumarin	Isoglycyrol	Psoralen
5,7-Dimethoxycoumarin	Coumestrol	Isoimperatorin	Scoparone
6-MethylCoumarin	Daphnetin	Isooxyprohurin	Scopoletin
7-Methoxycoumarin	Esculetin	Licorice coumarin	Scopolin
8-Methoxypsoralen	Esculin	Notopterol	Skimmin
Angelicin	Esculin Hydrate	O-Feruloyl coumarin	Xanthotoxol
Angeloylgomisin Q	Fraxetin	Osthole	

Featured Nucleotide And Its Derivates			
1-Methyladenosine	Adenosine	Guanine	Thymidine
2'-Deoxyadenosine-5'-monophosphate	Adenosine 5'-monophosphate	Guanosine	Thymine
3'-Aenylic acid	Cytidine	Guanosine 3',5'-cyclic monophosphate	UDP-α-D-glucose
5-Methylcytosine	Cytidine 5'-monophosphate	Guanosine 5'-monophosphate	Uracil
5-Methyluridine	Cytosine	Guanosine monophosphate	Xanthine
7-methylguanine	Deoxyadenosine	Hypoxanthine	β-Pseudouridine
Adenine	Deoxycytidine	Inosine	

Featured Triterpenoids			
Andrographiside	Cucurbitacin E	Kaikasaponin I	Saikosaponin C
Andrographolide	Dehydroandrographolide	Kaikasaponin II	Saikosaponin E
Asiatic acid	Gardenoside	Lactucopicrin	Soyasapogenol B
Astragaloside I	Gardoside	Logamic acid	Sweroside
Astragaloside II	Geniposide	Loganetin	Toosendanin
Azadirachtin A	Ginsenoside Re	Loganin	Triptolide
Bisandrographolide A	Ginsenosides Rc	Maslinic acid	Uncargenin A
Cucurbitacin A	Isotoosendanin	Methyl Shanzhiside	Ursolic acid
Cucurbitacin B	Jujuboside B	Oleanolic acid	Zizyphus saponin I
Cucurbitacin C	JujubosideA	Paeoniflorin	

Featured Lipid			
1,18-Octadecanediol	5(S)-HETE	Elaidic Acid	Palmitic acid
12(S)-HETE	5(S),6(R)-Lipoxin a4	Hendecanoic Acid	Palmitoleic Acid
12-OxoETE	Arachidonic Acid	Linoleic acid	Pentadecanoic Acid
15-OxoETE	Choline alfoscerate	LysoPE 18:1	Stearic Acid
16-hydroxy hexadecanoic acid	cis-10-Heptadecenoic Acid	Margaric Acid	Tridecanoic Acid
1-Oleoyl-sn-glycero-3-phosphocholine	Docosapentaenoic acid	Myristic Acid	α-Linolenic Acid
1-Stearoyl-sn-glycero-3-phosphocholine	Docosatetraenoic acid	Oleic Acid	γ-Linolenic Acid

Featured Anthocyanins			
Anthocyanin 3-O-beta-D-glucoside	Cyanin chloride	Malvidin 3-O-galactoside	Pelargonidin 3-O-beta-D-glucoside
Centaureidin	Delphin chloride	Malvidin 3-O-glucoside	Pelargonin chloride
Cyanidin 3-O-glucoside	Delphinidin 3-O-glucoside	Oenin chloride	Peonidin
Cyanidin 3–rutinoside	Delphinidin chloride	Pelargonidin	Petunidin 3-O-glucoside chloride
Cyanidin chloride	Malvidin 3,5-diglucoside		

Featured Phenolamine			
Agmatine	N-cis-Feruloyltyramine	N-Feruloyltyramine	N-Sinapoyl putrescine
Agmatine Sulfate	N-Feruloyl agmatine	N-p-Coumaroyl agmatine	N-trans-Feruloyltyramine
Feruloylhistamine	N'-Feruloyl putrescine	N-p-Coumaroyl putrescine	Spermidine
Kukoamine A	N-Feruloyl serotonin	N-p-Coumaroyl spermidine	Spermine
N-Cinnamoyl serotonin	N-Feruloyl tryptamine	N-Sinapoyl agmatine	

Featured Polyphenol			
(-)-Epiafzelechin	Curcumin	Epigallocatechin	Protocatechuic acid
(+)-Gallocatechin	Demethoxycurcumin	Gallocatechin gallate	Protocatechuic acid O-glucoside
4-Methylcatechol	Ellagic acid	Gallocatechin-catechin	Protocatechuic aldehyde
6-Gingerol	Epicatechin gallate	Gallocatechin-gallocatechin	Theaflavin
Catechin	Epicatechin-epiafzelechin	Gossypol	Theaflavin-3
Catechin gallate	Epigallate catechin gallate	L-Epicatechin	Theaflavin-3-gallate
Catechin-catechin-catechin			

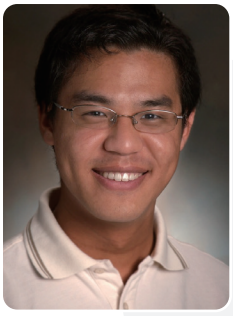
Experts Introduction

Prof. Jie Luo | Institute of Tropical Agriculture and Forestry, Hainan University

Expert introduction: Professor in Tropical Agricultre and Forestry College, Hainan University. Reciepient of National Science Fund for Distinguished Yong Scholars. Dr. Luo integrates metabolomics and other omics technologies to elucidate the metabolic pathways and its regulatory network affecting crop nutrient, quality, and adaptation to adverse environment. His research pioneers new ideas and directions on applying metabolomics and functional genomics to crop research. Dr. Luo' s work has been published in Cell, Nature Genetics, PNAS, Plant Cell, Nature Biotechnology, Nature Communications and other peer-reviewed journals.

Prof. Zheng-Jiang Zhu | Chinese Academy of Sciences

Expert introduction: Professor in Shanghai Institute of Organic Chemistry, and Interdisciplinary Research Center on Biology and Chemistry (IRCBC), Chinese Academy of Sciences (CAS). His current research interest mainly focuses on the development of mass spectrometry based metabolomics technology, and its applications in health and disease related research. Prof. Zhu has published >50 peer-reviewed papers in prestigious journals including Nature Chemistry, Nature Biotechnology, Nature Communications, JACS, eLife, Analytical Chemistry and Bioinformatics with >3000 times in citation.



Jeffrey Chu Ph.D. | Account Manager,North America

Dr. Chu has more than 10 years of experience in the biotechnology industry and has worked on many multi-omics and bioinformatics projects. His work focuses on using multi-omics and bioinformatics techniques to address questions in human dieases and economical crops. He is a reciepient of the 8th 3551 Optics Valley Talent Program. Dr. Chu has published over 25 peer-reviewed journals in Nature Communications, Genome Research, Genome Biology, and others.

Publications

YEAR	JOURNAL	SPECIES	TITLE
2021	Mol Plant	XXX	Development of a widely-targeted volatilomics method for profiling the volatilomes in plants
2021	Sci. Bull.	Rice	An Oryza-Specific Hydroxycinnamoyl Tyramine Gene Cluster Contributes to Enhanced Disease Resistance
2021	Sci. Bull.	Rice	A monocot-specific hydroxycinnamoylputrescine gene cluster contributes to immunity and cell death in rice
2021	Trends Plant Sci.	XXX	Domestication of Crop Metabolomes: Desired and Unintended Consequences
2021	Sci. Bull.	Tobacco	Rational design of geranylgeranyl diphosphate synthase enhances carotenoid production and improves photosynthetic efficiency in Nicotiana tabacum
2021	Nat Commun	Rice	A molecular switch in sulfur metabolism to reduce arsenic and enrich selenium in rice grain
2020	Sci China Life Sci	Rice	A UV-B-responsive glycosyltransferase, OsUGT706C2, modulates flavonoid metabolism in rice
2020	New Phytol	Rice	Natural variation in the OsbZIP18 promoter contributes to branched-chain amino acid levels in rice
2020	Nat Commun	Maize	Carotenoids modulate kernel texture in maize by influencing amyloplast envelope integrity
2020	Nat Plant	Rice	Selection of a subspecies-specific diterpene gene cluster implicated in rice disease resistance
2019	Mol Plant	Barley	Genome-wide dissection of co-selected UV-B responsive pathways in the UV-B adaptation of qingke
2019	Mol Plant	Rice	The structure and Function of major plant metaboliter modifications
2019	Plant J	Rice	Comparative analysis of metabolome of rice seeds at three developmental stages using a recombinant in bred line population
2019	Trends Plant Sci	Rice	Exploring thediversity of plant metabolism
2019	Plant J	Rice	Metabolic GWAS-based dissection of genetic bases underlying the diversity of plant metabolism
2019	Plant Cell Environ	Rice	OSTSD2-mediated cell wall modification affects ion homeostasis and salt tolerance
2018	Plant Physiol	Rice	Metabolome analysis of multi-connected biparental chromosome segment substitution line population
2018	Cell	Tomato	Rewiring of the fruit metabolome in tomato breeding
2017	Nat Commun	Rice	Differentially evolved glucosyltransferases determine natural variation of rice flavone accumulation and UV-tolerance
2016	Nat Commun	Rice	Comparative and parallel genome-wide association studies for metabolic and agronomic traits in cereals
2016	Plant Cell	Rice	Evolutionarily distinct BAHDN-acyltransferases are responsible for natural variation of aromatic amine conjugates in rice
2016	Mol Plant	Rice	Control of leaf senescence by a MeOH-jasmonates cascade that is epigenetically regulated by OsSRT1 in rice
2016	J EXP BOT	Rice	Rice putative methyltransferase gene OsTSD2 is required for root development involving pectin modification
2015	Curr Opin Plant Biol	Rice	Metabolite-based genome-wide association studies in plants
2015	Mol Plant	Rice	Spatio-temporal distribution of phenolamides and the genetics of natural variation of hydroxycinnamoyl spermidine in rice
2015	J EXP BOT	Rice	Interaction between carbon metabolism and phosphate accumulation is revealed by a mutation of a cellulose synthase-like protein, CSLF6
2014	Nat Genet	Rice	Genome-wide association analyses provide genetic and biochemical insights into natural variation in rice metabolism
2014	Nat Commun	Maize	Metabolome-based genome-wide association study of maize kernel leads to novel biochemical insights
2013	PNAS	Rice	Genetic analysis of the metabolome exemplified using a rice population
2013	Mol Plant	Rice	A novel integrated method for large-scale detection, identification, and quantification of widely targeted metabolites: application in the study of rice metabolomics

METWARE BIO

Innovative Metabolomics Insights for Better Health

International Offices
8A Henshaw St., Woburn, MA, USA +1（781）975-1541

www.metwarebio.com

support-global@metwarebio.com