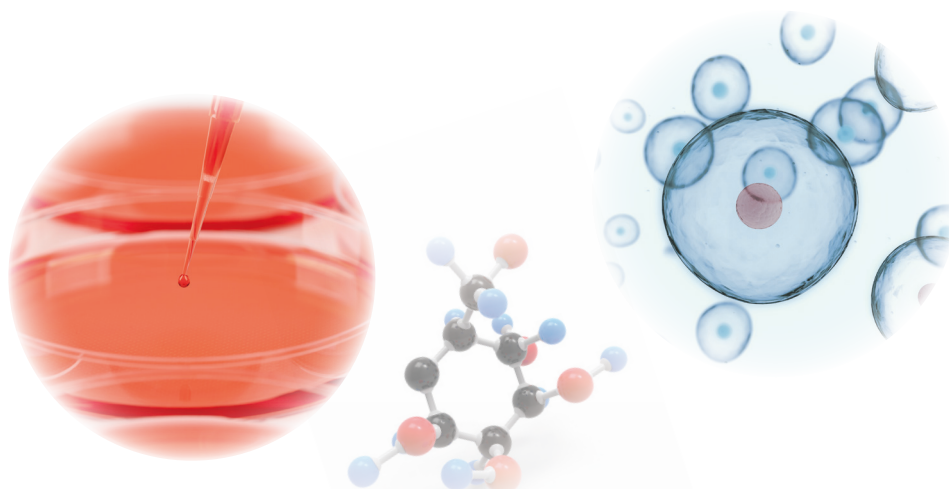


LC/MS/MS Method Package for Cell Culture Profiling

LC/MS/MS Method Package for Cell Culture Profiling Ver. 3 for LabSolutions LCMS



Capable of Simultaneous Analysis of 144 Compounds in Less than 20 Minutes

Version 3 of this method package adds metabolites characteristic of CHO cells, which are frequently used in the manufacture of monoclonal antibodies. Together with existing analytes, including amino acids, vitamins, basal medium compounds, and other metabolites, this method package enables simultaneous analysis of 144 compounds in less than 20 minutes without complex method development.

List of Registered Compounds

Amino acids and their metabolites	Group
5-Oxoproline	Ala, Asp and Glu MT
Alanine	Ala, Asp and Glu MT
Asparagine	Ala, Asp and Glu MT
Aspartic acid	Ala, Asp and Glu MT
Glutamic acid	Ala, Asp and Glu MT
Glutamine	Ala, Asp and Glu MT
N-Acetylaspartic acid	Ala, Asp and Glu MT
4-Aminobutyric acid	Arg and Pro MT
4-Hydroxyproline	Arg and Pro MT
Arginine	Arg and Pro MT
Argininosuccinic acid	Arg and Pro MT
Citrulline	Arg and Pro MT
Creatine	Arg and Pro MT
Ornithine	Arg and Pro MT
Proline	Arg and Pro MT
Putrescine	Arg and Pro MT
2-Aminobutyric acid	Cys and Met MT
5-Glutamylcysteine [®]	Cys and Met MT
5'-Methylthioadenosine	Cys and Met MT
Cystathionine	Cys and Met MT
Cysteine	Cys and Met MT
Cystine	Cys and Met MT
Glutathione	Cys and Met MT
Homocysteine	Cys and Met MT
Homocystine	Cys and Met MT
Methionine	Cys and Met MT
Methionine sulfoxide	Cys and Met MT
N-Acetylcysteine	Cys and Met MT
Ophthalmic acid	Cys and Met MT
Oxidized glutathione	Cys and Met MT
5-Adenosylhomocysteine	Cys and Met MT
2-Aminoethanol	Gly and Ser MT
Glycine	Gly and Ser MT
O-Phosphoethanolamine	Gly and Ser MT
Serine	Gly and Ser MT
Threonine	Gly and Ser MT
2-Aminoadipic acid	Lys MT
Acetylcarnitine	Lys MT
Carnitine	Lys MT
Hydroxylysine	Lys MT
Lysine	Lys MT
Pipecolic acid	Lys MT
Saccharopine	Lys MT
3-Hydroxyanthranilic acid	Trp MT
5-Hydroxytryptophan	Trp MT
Anthranilic acid	Trp MT
Formylkynurenine	Trp MT
Hydroxykynurenine	Trp MT
Indole-3-acetic acid	Trp MT
Kynurenic acid	Trp MT
Kynurenine	Trp MT
Serotonin	Trp MT
Tryptophan	Trp MT

Amino acids and their metabolites	Group
1-Methylhistidine	His MT
3-Methylhistidine	His MT
Histidine	His MT
Urocanic acid	His MT
4-Hydroxyphenyllactic acid	Tyr and Phe MT
Dopa	Tyr and Phe MT
Norepinephrine	Tyr and Phe MT
Phenylalanine	Tyr and Phe MT
Phenyllactic acid	Tyr and Phe MT
Tyrosine	Tyr and Phe MT
3-Hydroxyisobutyric acid	Val MT
3-Methyl-2-oxovaleric acid	Val MT
Isoleucine	Val MT
Leucine	Val MT
Valine	Val MT
Alanyl-glutamine	Others
Asymmetric dimethylarginine	Others
Glycyl-glutamine	Others
Symmetric dimethylarginine	Others

Nucleic acids and their metabolites	Group
Adenine	Purine MT
Adenosine	Purine MT
Adenosine monophosphate	Purine MT
Deoxyadenosine	Purine MT
Deoxyguanosine	Purine MT
Deoxyguanosine monophosphate	Purine MT
Guanine	Purine MT
Guanosine	Purine MT
Guanosine 3',5'-cyclic monophosphate	Purine MT
Guanosine monophosphate	Purine MT
Hypoxanthine	Purine MT
Inosine	Purine MT
Inosine monophosphate	Purine MT
Uric acid	Purine MT
Xanthine	Purine MT
Xanthosine	Purine MT
Xanthosine monophosphate	Purine MT
3-Aminoisobutyric acid	Pyrimidine MT
3-Aminopropanoic acid	Pyrimidine MT
Cytidine	Pyrimidine MT
Cytidine 3',5'-cyclic monophosphate	Pyrimidine MT
Cytidine monophosphate	Pyrimidine MT
Cytosine	Pyrimidine MT
Deoxycytidine	Pyrimidine MT
Deoxycytidine monophosphate	Pyrimidine MT
Orotic acid	Pyrimidine MT
Thymidine	Pyrimidine MT
Thymidine monophosphate	Pyrimidine MT
Thymine	Pyrimidine MT
Uracil	Pyrimidine MT
Uridine	Pyrimidine MT
Uridine monophosphate	Pyrimidine MT

Sugars	Group
Gluconic acid	—
Hexose (Glucose)	—
Sucrose	—
Threonic acid	—

Vitamins	Group
Riboflavin	B2
Pantothenic acid	B5
4-Pyridoxic acid	B6
Pyridoxal	B6
Pyridoxalphosphate	B6
Pyridoxine	B6
Biotin	B7
4-Aminobenzoic acid	B9
Folic acid	B9
Cyanocobalamin	B12
Ascorbic acid	C
Acetylcholine	Others
Choline	Others
Citicoline	Others
NAD	Others
Niacinamide	Others
Nicotinic acid	Others
Lipoic acid	Others

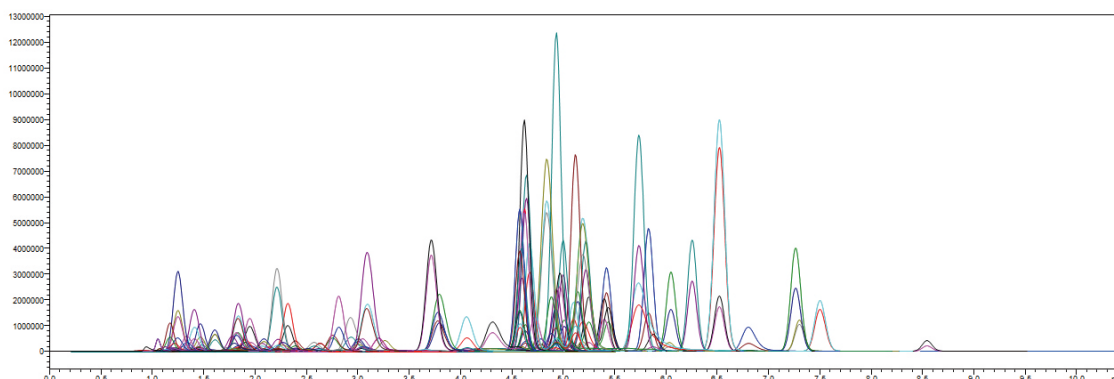
Others	Group
2-ketoglutaric acid	TCA Cycle
Acotinic acid	TCA Cycle
Citric acid	TCA Cycle
Fumaric acid	TCA Cycle
Isocitric acid	TCA Cycle
Lactic acid	TCA Cycle
Malic acid	TCA Cycle
Pyruvic acid	TCA Cycle
Succinic acid	TCA Cycle
Glyceric acid	Others
Glycolic acid	Others
Glyoxylic acid	Others
Mevalonic acid	Others
MVA-P	Others
Penicillin G	Others
Resveratrol	Others
Shikimic acid 3-phosphate	Others
Taurine	Others

Internal Standard	Group
2-Isopropylmalic acid	—
10-Camphorsulfonic acid	—

*MT: metabolism

※This compound may be deleted from the list depending on the analytical column selected.

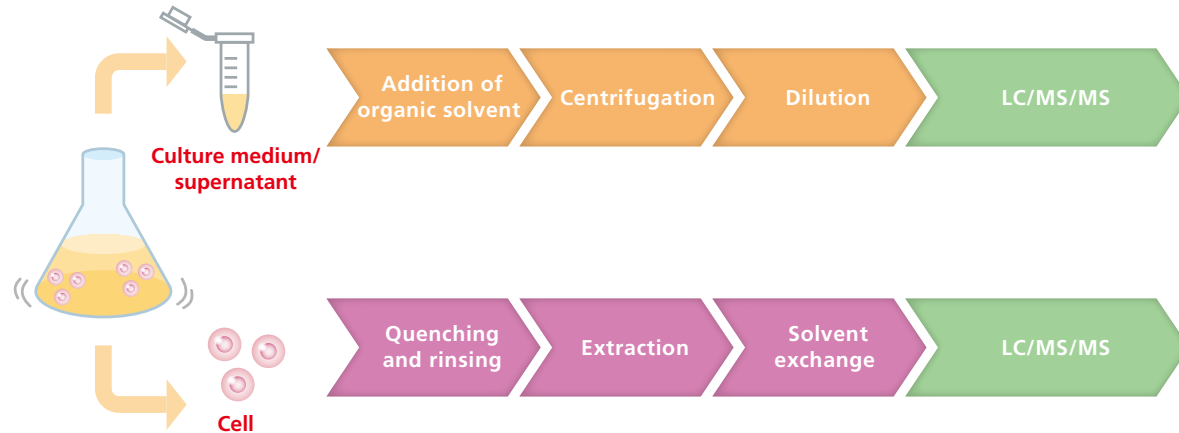
Chromatogram



Analysis of Intracellular and Extracellular Metabolites in One Method

Metabolites present in both the cell medium supernatant and within cells can be analyzed using the same optimized chromatography and mass spectrometry conditions.

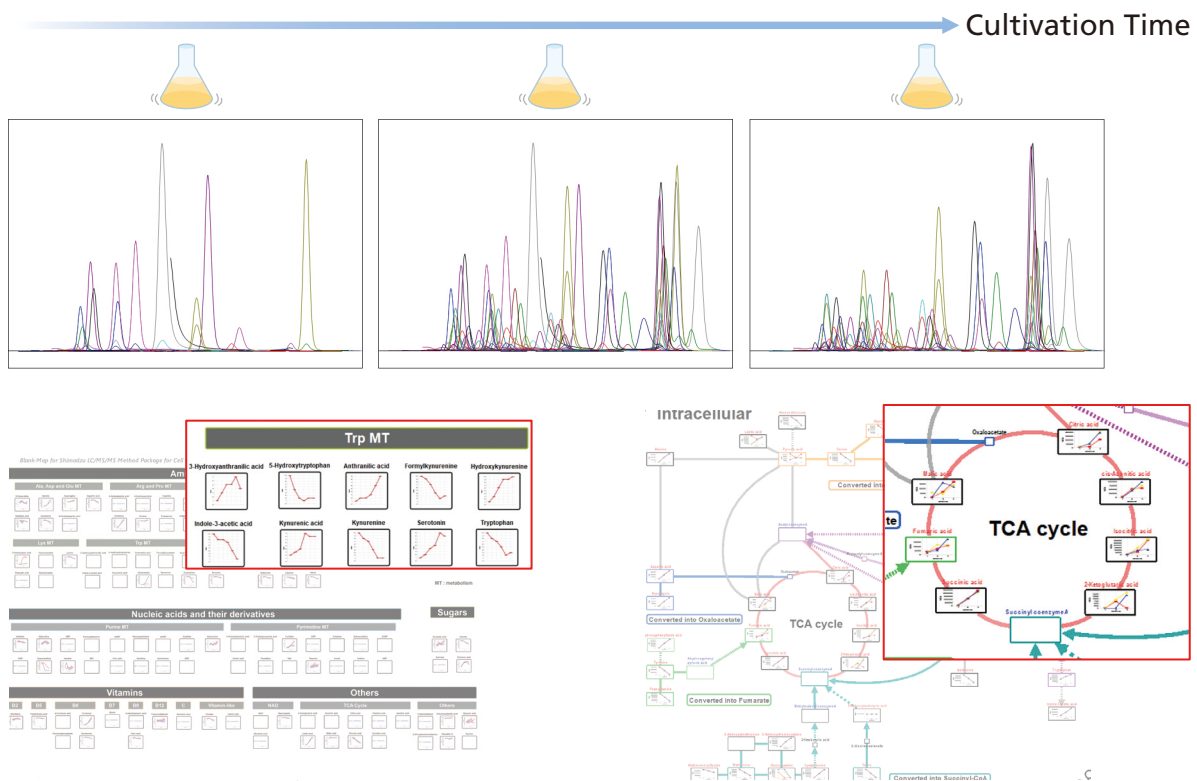
Sequence of Analysis



Example sample extraction protocols for both culture supernatant and cultured cells are provided. LC and MS parameters have been optimized to allow for the analysis of metabolites from both sources.

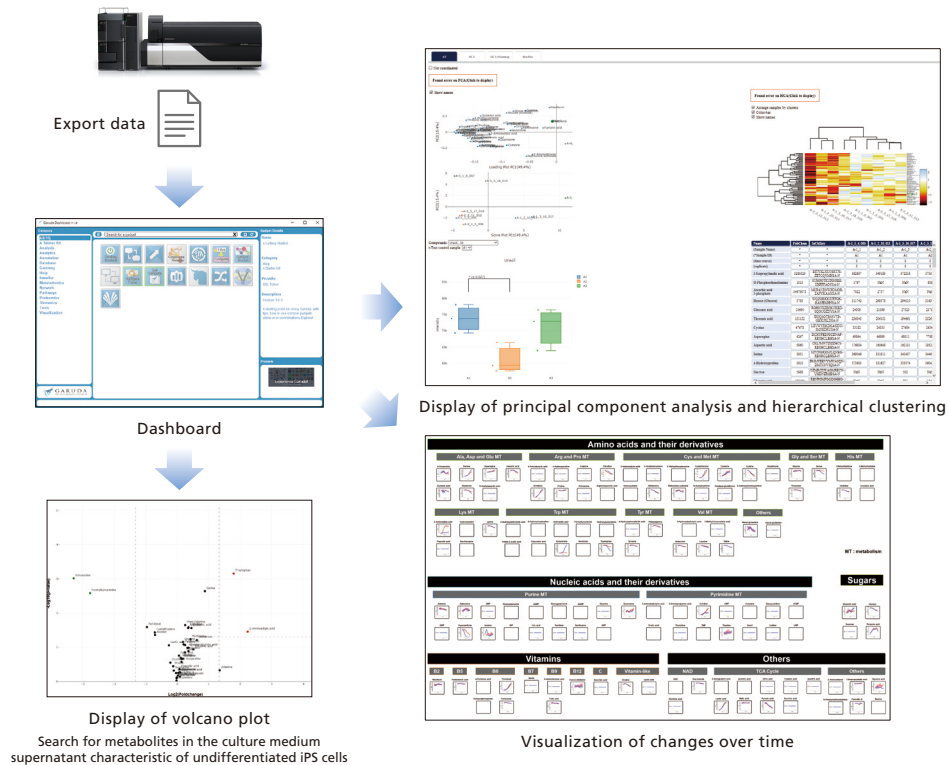
Visualization of Changes in Cultivation over Time

This product makes it easy to visualize the time-course changes of up to 144 compounds from culture supernatant and cellular extracts collected at intervals.



Multi-omics Analysis Package Supports Data Analysis

Volcano plots, principal component analysis, hierarchical clustering, and other analyses can easily be performed using the included Multi-omics Analysis Package. In addition, changes in the amount of compound over time can be visualized with a few simple operations, so the process from measurement to data analysis can be implemented seamlessly.



The data for the volcano plots and visualization of changes over time is from samples provided by the Research & Development Center for Cell Therapy at the Foundation for Biomedical Research and Innovation at Kobe. For details, refer to Application News C209 "Evaluation of Undifferentiated State of Human iPS Cells Using C2MAP™ Cell Culture Media Analysis Platform."

Use this QR code to access the latest information on the Multi-omics Analysis Package.
<https://www.an.shimadzu.co.jp/lcms/tq-option/multiomics.htm>



Use this QR code to access a video introduction and operational overview of the Multi-omics Analysis Package.
<https://www.shimadzu.co.jp/labcamp/multiomics5.html>



Precautions

1. LabSolutions™ LCMS Ver. 5.113 or later is required, and LabSolutions Insight™ Ver. 3.8 SP3 or later is required.
2. This method package is intended for research use. It may not be used for clinical diagnostic applications.



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