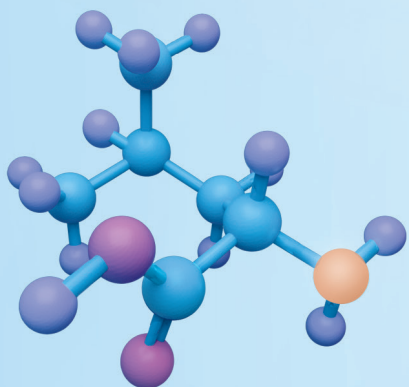


Isotope-Labeled Compounds

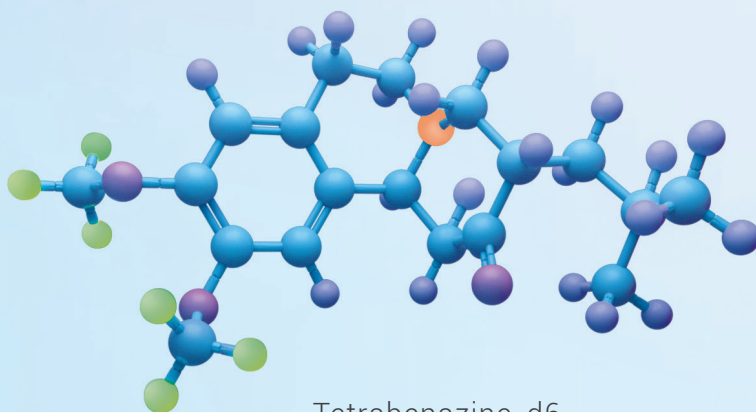
A Tool for
Quantitative Analysis

To Explore
Metabolic Pathways

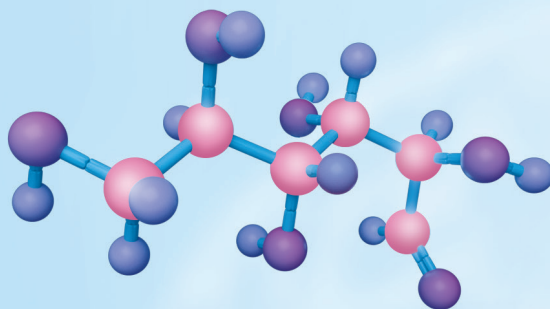
To Improve
Drug Pharmacokinetics



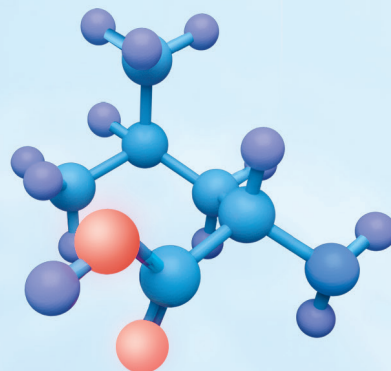
L-Leucine-15N



Tetrabenazine-d6



D-Glucose-13C6



L-Leucine-18O2

Isotopes

Isotopes are atoms of an element that have the same number of protons but different numbers of neutrons, giving them slightly different weights. For example, hydrogen has three isotopes: hydrogen (^1H), deuterium (^2H), tritium (^3H), all of which contains 1 proton, but each contains 0, 1, and 2 neutrons and its atomic mass is 1, 2, 3 respectively. Deuterium (^2H) is a stable isotope atom of hydrogen (^1H) whereas tritium (^3H) is a radioactive isotope. While mass of individual isotopes is different, their physical and chemical properties remain mostly unchanged.

Stable Isotope-Labeled Compounds are mainly a series of labeled compounds which contains deuterium (^2H , D), carbon-13 (^{13}C), nitrogen-15 (^{15}N), oxygen-18 (^{18}O), etc. These compounds are excellent tools for identifying and understanding tracers, biological and chemical processes.

Advantages of Stable Isotope-Labeled Compounds: 1) No radiation, no pollution. 2) Can be used in different research fields, such as life sciences, food and drug safety, environment & ecology, and precision medicine, etc.

Stable Isotope-Labeled Compounds have a wide range of applications in Life Science areas, such as Metabolomics, Proteomics, Clinical Studies, and Deuterium Drugs, etc^{[1][2][3]}.

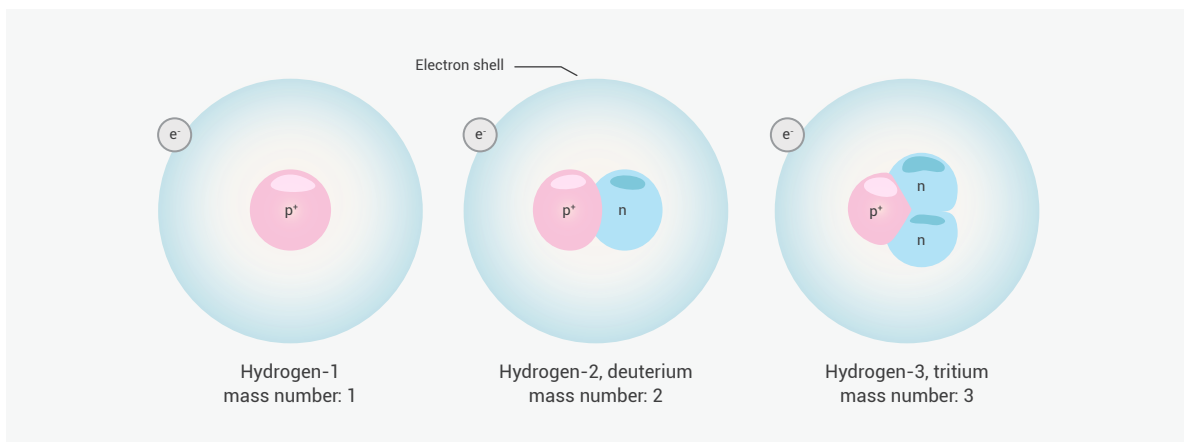


Figure 1. Isotope of hydrogen

CONTENTS

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Stable Isotope-Labeled Compounds Studies in Metabolomics	10
Custom Synthesis and Testing Services of Stable Isotope-Labeled Compounds	12

Applications of Stable Isotope-Labeled Compounds

Pharmaceutical Research

In theory, incorporating 'heavy hydrogen' into small molecules improves half-life of a drug and its toxicity profile. For example, Deutetrabenazine (Austedo®) is the world's first approved deuterated drug, for the treatment of Huntington's-disease-related movement disorders. Compared to tetrabenazine, Deutetrabenazine has a unique pharmacokinetic profile with more consistent systemic exposure, less frequent dosing, and a potentially more favorable safety/tolerability profile^[3].

Application of Stable Isotope-Labeled Compounds in medicinal chemistry: 1) Optimization of the pharmacokinetic properties. 2) Reduction of toxicity. 3) Increase in bioactivity. 4) Reduction of epimerization. 5) Mechanism of action. 6) PET tracers^[4].

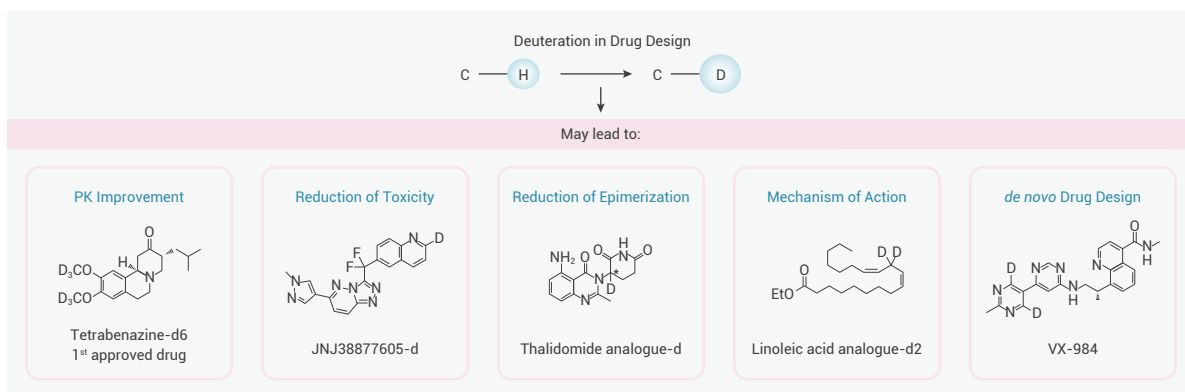


Figure 2. Deuteration in drug design^[4].

Metabolic Research

Stable isotope labeling is an effective method for identifying drug metabolites because it can retain the physical and chemical properties and are easily detected by mass spectrometry. Jixia Yang *et al.* used ¹³C and ¹⁵N isotope labeled indolinone derivatives which successfully detected seven metabolites by UPLC/Q TOF MS in metabolic studies performed in hepatocytes, providing the important information to develop α -synuclein aggregate inhibitors^[5].

Proteomics

Mass spectrometry (MS)-based quantitative proteomic methods employ stable isotope-labeling to introduce signature mass tags to proteins that can be used by a mass spectrometer to quantify each analyte.

Glycomics

Using Tetraplex Stable-Isotope Coded Tags in mass spectrometric glycomics, and differentiating glycan structural isomers based on the tandem mass spectra of each composition using nanospray ionization, Michael J. Bowman *et al.* demonstrated the value of the tetraplex stable isotope tagging approach for producing high-quality glycomics, compositional profiling and fine structural analysis^[6].

Standards for Environmental Analysis

PCBs and PBDEs are well-known man-made organohalogen compounds as environmental pollutants. Chenchen Huang *et al.* developed a compound-specific (Cl/Br-CSIA) using the GC-qMS method for the detection of PCBs and PBDEs, which are toxic to human health and are frequently detected in various abiotic and biotic media. It is also a promising tool for assessing the sources and transformation processes of PCBs and PDBEs in the environment^[7].

Clinical Research

Advances in mass spectrometry (MS)-based disease biomarker discoveries are continuously expanding the clinical diagnostics landscape. An important advantage of using stable isotopes is that these tracers are not radioactivity (such as the ¹³C urea breath test).

Biomolecular NMR

The advent of multidimensional (2D-4D) NMR, together with the widespread use of uniform isotopic labeling of proteins and RNA with the NMR-active isotopes, ¹⁵N and ¹³C, opened the door to detailed analysis of macromolecular structure, dynamics, and interactions of smaller macromolecules (<~25 kDa).

Trace Element Analysis

Linards Klavins *et al.* studied the trace element concentration and stable isotope ratio analysis in blueberries and bilberries across the world; the results demonstrated the detectable differences between macro- and microelement values in bilberries. This method could be utilized as an authenticity testing tool for berry origins^[8].

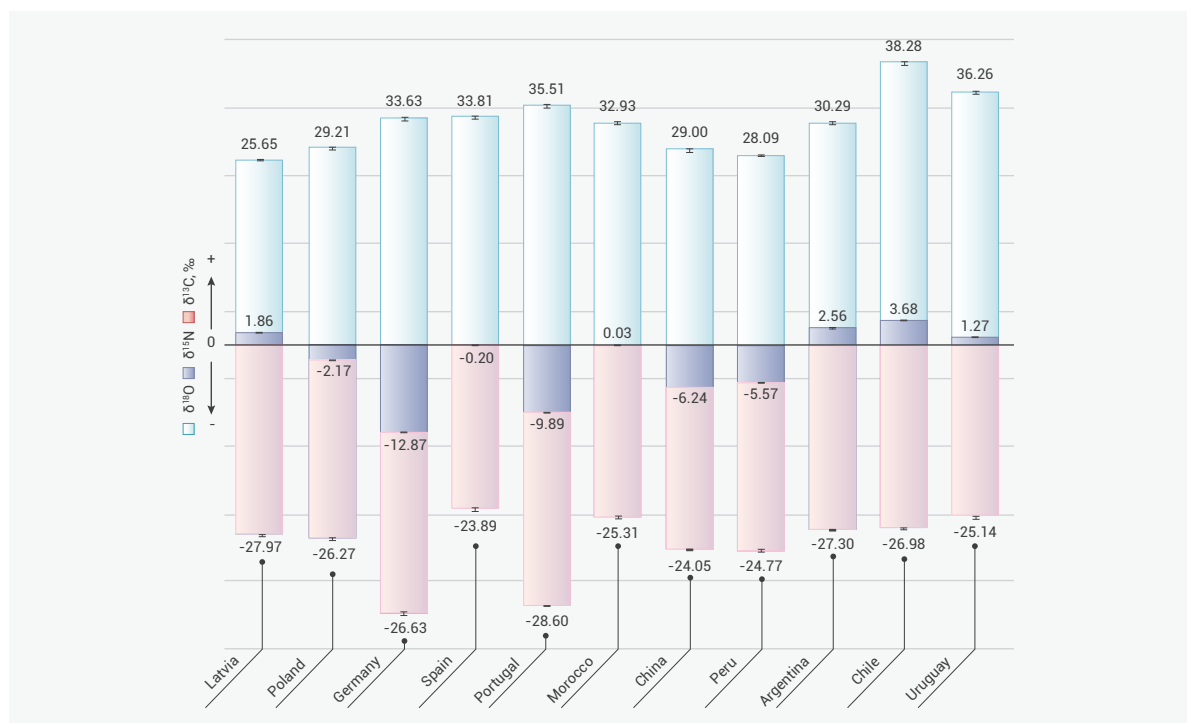
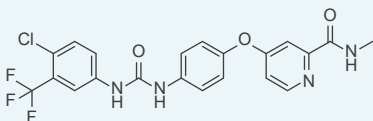


Figure 3. Light stable element isotope ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{18}\text{O}$) ratio values in blueberries from different countries^[8]

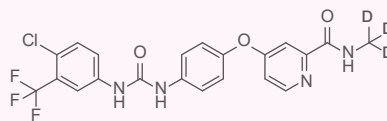
Stable Isotope-Labeled Compounds

The chemical behavior of a compound labeled with stable isotopes is usually indistinguishable from that of the parent. For example, in **Donafenib (Sorafenib-d3)**, the three hydrogens on the methyl group were replaced by deuterium, and clinical trials indicated that Donafenib (Sorafenib-d3) has a favorable safety profile and notable anticancer efficacy for treating advanced hepatocellular carcinoma than Sorafenib^[9].

Chemical structure of Sorafenib



Chemical structure of Donafenib (Sorafenib-d3)



MedChemExpress (MCE) offers thousands of unique Stable Isotope-Labeled Compounds with the following competitive advantages: 1) Different Kinds of Isotope Atoms: ²H (D), ¹³C, ¹⁵N, ¹⁸O, etc. 2) High Isotopic Enrichment: ≥98%. 3) High Purity: ≥98%. 4) Novel Isotope Labeled Compounds. 5) Customization.

Typical Stable Isotope-Labeled Compounds from MedChemExpress (MCE)

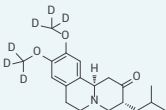
Deuterium (²H, D) Labeled Compounds:

Deuterium (²H, or D) is one of the stable isotope atoms of hydrogen, it contains one proton and one neutron, also known as heavy hydrogen. The following compounds contain one or more stable isotope atoms of deuterium (²H, D).

HY-B0590S

Tetrabenazine-d6

≥98 atom% D

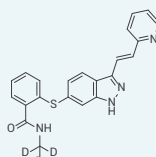


CAS No. : 1392826-25-3

HY-10065S1

Axitinib-d3

≥98 atom% D

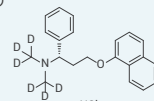


CAS No. : 1126623-89-9

HY-B0304AS1

Dapoxetine-d6 hydrochloride

≥98 atom% D

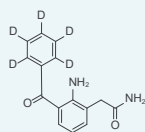


CAS No. : 1246814-76-5

HY-17357S

Nepafenac-d5

≥98 atom% D

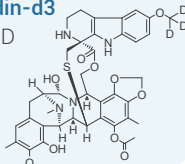


CAS No. : 1246814-53-8

HY-16293S

Lurbinectedin-d3

≥98 atom% D

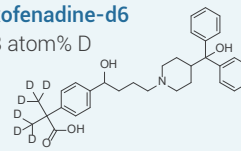


CAS No. : N/A

HY-B0801S

Fexofenadine-d6

≥98 atom% D



CAS No. : 548783-71-7

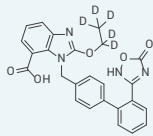
MCE

Master of Bioactive Molecules

HY-14914S

Azilsartan-d5

≥98 atom% D

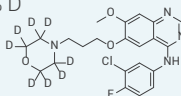


CAS No. : 1346599-45-8

HY-50895S

Gefitinib-d8

≥98 atom% D

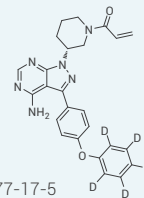


CAS No. : 857091-32-8

HY-10997S

Ibrutinib-d5

≥98 atom% D

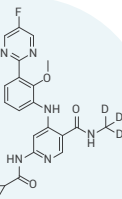


CAS No. : 1553977-17-5

HY-131968

BMS-986202

≥98 atom% D

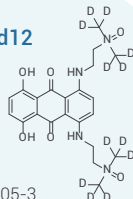


CAS No. : 1771691-34-9

HY-13562S

Banaxtrone-d12

≥98 atom% D

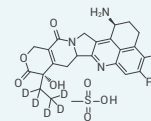


CAS No. : 1562067-05-3

HY-13631AS

Exatecan-d5 mesylate

≥98 atom% D

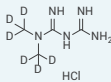


CAS No. : N/A

HY-110228

Metformin-d6 hydrochloride

≥98 atom% D

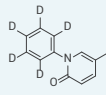


CAS No. : 1185166-01-1

HY-B0673S

Pirfenidone-d5

≥98 atom% D

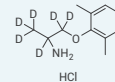


CAS No. : 1020719-62-3

HY-A0093S

Mexiteline-d6 hydrochloride

≥98 atom% D

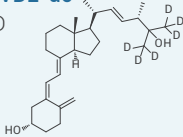


CAS No. : 1329835-60-0

HY-15328

25-Hydroxy VD2-d6

≥98 atom% D

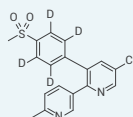


CAS No. : 1262843-46-8

HY-15321S

Etoricoxib-d4

≥98 atom% D

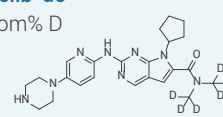


CAS No. : 1131345-14-6

HY-15777S

Ribociclib-d6

≥98 atom% D

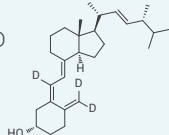


CAS No. : 1328934-40-2

HY-15330

VD2-d3

≥98 atom% D

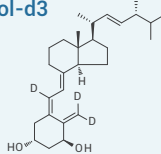


CAS No. : 11217448-46-8

HY-15285

Doxercalciferol-d3

≥98 atom% D

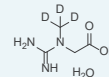


CAS No. : N/A

HY-W010388AS

Creatine-d3 hydrate

≥98 atom% D

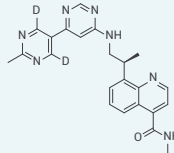


CAS No. : 284664-86-4

HY-19939S

VX-984

≥98 atom% D

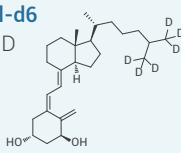


CAS No. : 1476074-39-1

HY-15332

Alfacalcidol-d6

≥98 atom% D

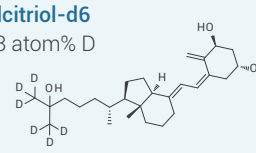


CAS No. : 1641940-94-4

HY-76814

Calcitriol-d6

≥98 atom% D

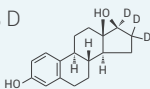


CAS No. : 78782-99-7

HY-B0141S

Estradiol-d3

≥98 atom% D

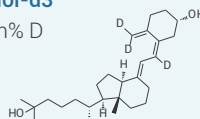


CAS No. : 79037-37-9

HY-32351S

Calcifediol-d3

≥97 atom% D

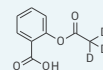


CAS No. : 140710-94-7

HY-14654S

Aspirin-d3

≥98 atom% D

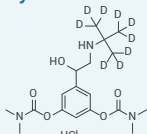


CAS No. : 921943-73-9

HY-17501S

Bambuterol-d9 hydrochloride

≥98 atom% D

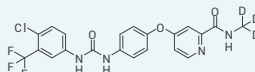


CAS No. : 1794810-59-5

HY-10201S

Sorafenib-d3

≥98 atom% D

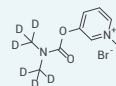


CAS No. : 1130115-44-4

HY-B0207AS

Pyridostigmine-d6 bromide

≥98 atom% D

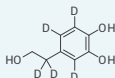


CAS No. : 2375858-08-3

HY-N0570S1

Hydroxytyrosol-d5

≥98 atom% D



CAS No. : N/A

HY-101392S

Harmaline-d1

≥98 atom% D

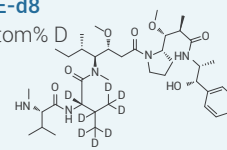


CAS No. : N/A

HY-15162A

MMAE-d8

≥98 atom% D

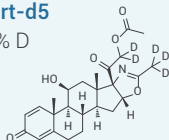


CAS No. : 2070009-72-0

HY-13609S

Deflazacort-d5

≥98 atom% D

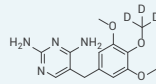


CAS No. : N/A

HY-B0510S2

Trimethoprim-d3

≥98 atom% D

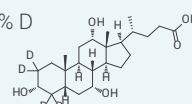


CAS No. : 1189923-38-3

HY-N0324S

Cholic acid-d4

≥98 atom% D

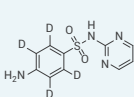


CAS No. : 116380-66-6

HY-B0273S

Sulfadiazine-d4

≥98 atom% D

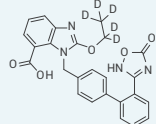


CAS No. : 1020719-78-1

HY-14914S

Azilsartan-d5

≥98 atom% D

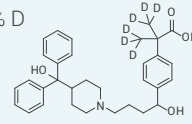


CAS No. : 1346599-45-8

HY-B0801S

Fexofenadine-d6

≥98 atom% D

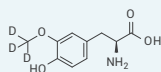


CAS No. : 548783-71-7

HY-113468AS

3-O-Methyl dopa-d3

≥98 atom% D

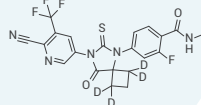


CAS No. : 586954-09-8

HY-16060S

Apalutamide-d4

≥98 atom% D

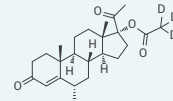


CAS No. : 1638885-65-0

HY-B0469S

Medroxyprogesterone-acetate-d3

≥98 atom% D



CAS No. : N/A

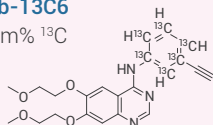
Carbon-13 (¹³C) Labeled Compounds:

Carbon-13 (¹³C) is one of stable isotope atoms of carbon-12 (¹²C), it contains six protons and seven neutrons, and its atomic mass is 13. The following compounds contain one or more stable isotope atoms of carbon-13 (¹³C).

HY-50896S1

Erlotinib-13C6

≥98 atom% ¹³C

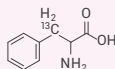


CAS No. : 1211107-68-4

HY-B1732S1

DL-3-Phenylalanine-13C

≥98 atom% ¹³C

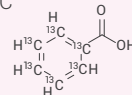


CAS No. : 286425-42-1

HY-N0216S1

Benzoic acid-13C6

≥98 atom% ¹³C

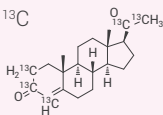


CAS No. : 125945-98-4

HY-N0437S1

Progesterone-13C5

≥98 atom% ¹³C

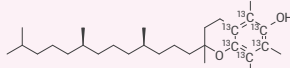


CAS No. : 2687960-32-1

HY-N0683S

α-Vitamin E-13C6

≥98 atom% ¹³C

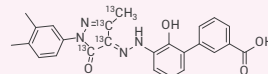


CAS No. : 2140857-08-3

HY-15306S

(E/Z)-Eltrombopag-13C4

≥98 atom% ¹³C

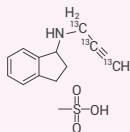


CAS No. : 1217230-31-3

HY-14605BS

Rasagiline-13C3 mesylate racemic

≥98 atom% ¹³C

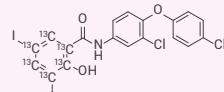


CAS No. : 1216757-55-9

HY-17598S

Rafoxanide-13C6

≥98 atom% ¹³C

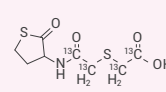


CAS No. : 1353867-98-7

HY-B0289S

Erdosteine-13C4

≥98 atom% ¹³C

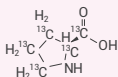


CAS No. : N/A

HY-Y0252S

L-Proline-13C5

≥98 atom% ¹³C



CAS No. : 201740-83-2

HY-W010407S

Cyanuric acid-13C3

≥98 atom% ¹³C

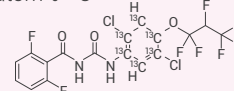


CAS No. : 201996-37-4

HY-115584S

Lufenuron-13C6

≥98 atom% ¹³C



CAS No. : N/A

HY-Y0479S3

L-Lactic acid-2-13C1

≥98 atom% ¹³C

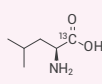


CAS No. : 740788-63-0

HY-N0486S1

L-Leucine-13C

≥98 atom% ¹³C

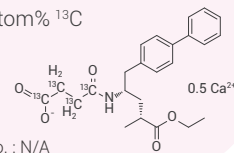


CAS No. : 74292-94-7

HY-15407AS

Sacubitril-13C4 hemicalcium salt

≥98 atom% ¹³C



CAS No. : N/A

Nitrogen-15 (¹⁵N) Labeled Compounds:

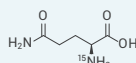
Nitrogen-15 (¹⁵N) is a stable isotope atom of nitrogen-14 (¹⁴N), it contains seven protons and eight neutrons, and its atomic mass is 15. The following compounds contain one or more stable isotope atoms of nitrogen-15 (¹⁵N).

HY-41877S

Succinimide-15N≥98 atom% ¹⁵N

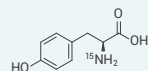
CAS No. : 32807-36-6

HY-N0390S

L-Glutamine-15N≥98 atom% ¹⁵N

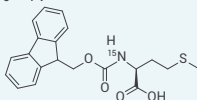
CAS No. : 80143-57-3

HY-N0473S1

L-Tyrosine-15N≥98 atom% ¹⁵N

CAS No. : 35424-81-8

HY-W008371S

Fmoc-Met-OH-15N≥98 atom% ¹⁵N

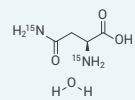
CAS No. : 934183-50-3

HY-Z0283S

Benzamide-15N≥98 atom% ¹⁵N

CAS No. : 31656-62-9

HY-N0667S2

L-Asparagine-15N2 monohydrate≥98 atom% ¹⁵N

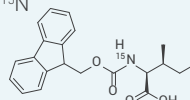
CAS No. : 287484-32-6

HY-Y0271S

Urea-15N2≥98 atom% ¹⁵N

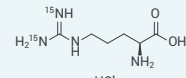
CAS No. : 2067-80-3

HY-19821S

Fmoc-Ile-OH-15N≥98 atom% ¹⁵N

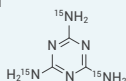
CAS No. : 204633-89-6

HY-N0455AS

L-Arginine-15N2 hydrochloride≥98 atom% ¹⁵N

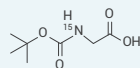
CAS No. : 204633-92-1

HY-Y1117S

Melamine-15N3≥98 atom% ¹⁵N

CAS No. : 287476-11-3

HY-Y0978S

Boc-Glycine-15N≥98 atom% ¹⁵N

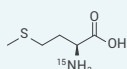
CAS No. : 106665-75-2

HY-101037S

Sarcosine-15N≥98 atom% ¹⁵N

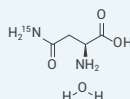
CAS No. : N/A

HY-N0326S

L-Methionine-15N1≥98 atom% ¹⁵N

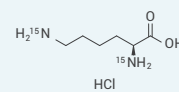
CAS No. : 82572-25-6

HY-W017443S1

L-Asparagine-amide-15N≥98 atom% ¹⁵N

CAS No. : 204451-47-8

HY-N0470S

L-Lysine-15N2 hydrochloride≥98 atom% ¹⁵N

CAS No. : 1217460-44-0

Two or more Stable Isotope Atoms Labeled Compounds :

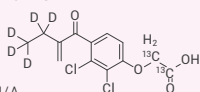
The following compounds contain two or more stable isotope atoms of ^2H , ^{13}C & ^{15}N .

HY-B1640S

Ethacrynic acid- $^{13}\text{C}2$, d5

≥ 98 atom% D

≥ 98 atom% ^{13}C



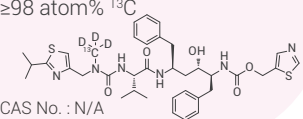
CAS No. : N/A

HY-90001S1

Ritonavir- ^{13}C , d3

≥ 98 atom% D

≥ 98 atom% ^{13}C



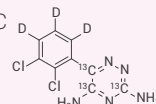
CAS No. : N/A

HY-B0495S

Lamotrigine- $^{13}\text{C}3$, d3

≥ 98 atom% D

≥ 98 atom% ^{13}C



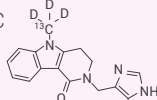
CAS No. : 1246815-13-3

HY-70050AS1

Alosetron- ^{13}C , d3

≥ 98 atom% D

≥ 98 atom% ^{13}C



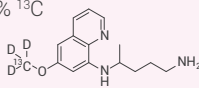
CAS No. : N/A

HY-12651AS

Primaquine- ^{13}C , d3

≥ 98 atom% D

≥ 98 atom% ^{13}C



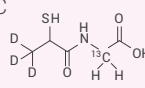
CAS No. : N/A

HY-B0373S

Tiopronin- ^{13}C , d3

≥ 98 atom% D

≥ 98 atom% ^{13}C



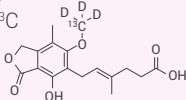
CAS No. : 1189695-13-3

HY-B0421S1

Mycophenolic acid- ^{13}C , d3

≥ 98 atom% D

≥ 98 atom% ^{13}C



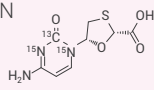
CAS No. : 2455553-76-9

HY-135330

Lamivudine- ^{13}C , $^{15}\text{N}2$

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N



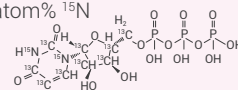
CAS No. : 1391052-30-4

HY-107372S

Uridine triphosphate- $^{13}\text{C}9$, $^{15}\text{N}2$

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N



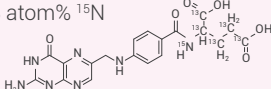
CAS No. : 285978-18-9

HY-16637S2

Folic acid- $^{13}\text{C}5$, $^{15}\text{N}1$

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N



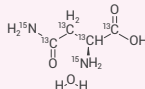
CAS No. : N/A

HY-W017443S

L-Asparagine- $^{13}\text{C}4$, $^{15}\text{N}2$

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N



CAS No. : 202406-87-9

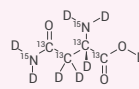
HY-N0667S

L-Asparagine- $^{13}\text{C}4$, $^{15}\text{N}2$, d8

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N

≥ 98 atom% D



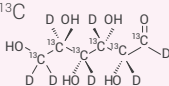
CAS No. : 1217464-18-0

HY-B0389S

D-Glucose- $^{13}\text{C}6$, d7

≥ 98 atom% D

≥ 98 atom% ^{13}C



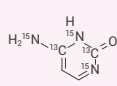
CAS No. : 201417-01-8

HY-10626S

Cytosine- $^{13}\text{C}2$, $^{15}\text{N}2$

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N



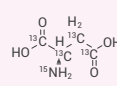
CAS No. : 285978-06-5

HY-N0666S1

L-Aspartic acid- $^{13}\text{C}4$, ^{15}N

≥ 98 atom% ^{13}C

≥ 98 atom% ^{15}N



CAS No. : 202468-27-7

Stable Isotope-Labeled Compounds Studies in Metabolomics

A metabolic network is the complete set of metabolic and physical processes that determine the physiological and biochemical properties of a cell. It is complex and dynamic. Metabolic flux analysis (MFA) using stable isotope-labeled substrates allows tracing of carbon, nitrogen, and hydrogen atoms through metabolic pathways and is a powerful tool for investigating dynamic metabolic changes occurring in health and disease.

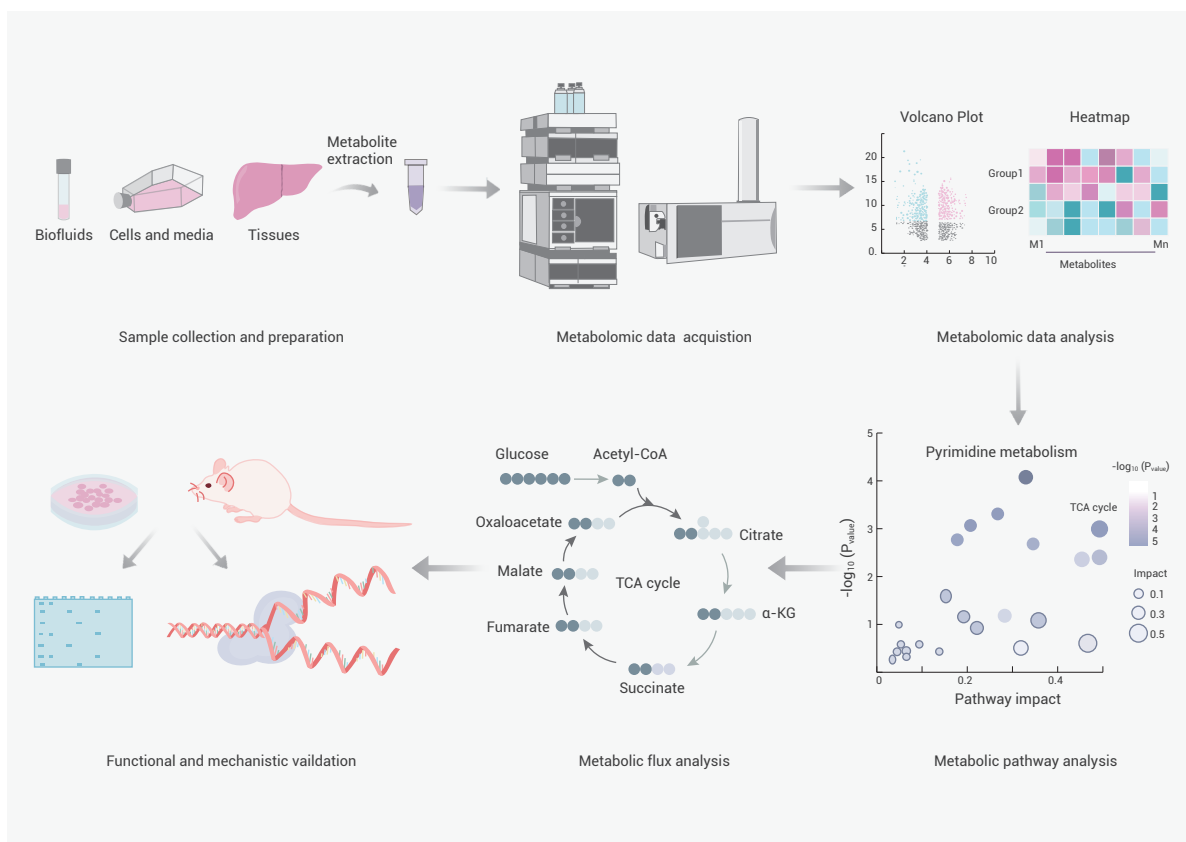


Figure 4. Workflow of LC-MS based metabolomics^[10]

Case

Stable isotope tracing allows a metabolic substrate to be followed through downstream biochemical reactions, thereby providing unparalleled insights, and it is also a powerful tool to understand the impact of genetic alterations and defined perturbations in metabolism.

The carbon transition and label incorporation in the pathway intermediates were interpreted from the mass isotopomers of histidine derived from cells fed in parallel with $[1-^{13}\text{C}]$ glucose and $[1, 2-^{13}\text{C}]$ glucose. The mass isotopomer distribution in histidine m/z 440 (C-1 to C-6) showed that non-OxPPP was the predominant route, $[1-^{13}\text{C}]$ glucose oxidation via OxPPP would result in unlabeled histidine, whereas non-OxPPP would result in one carbon-labeled ($m+1$) histidine. To further confirm that ^{13}C labeled histidine was from the non-OxPPP, bacterial cells were also fed with $[1, 2-^{13}\text{C}]$ glucose. It was observed that the mass isotopomer abundances in histidine ($m+2$) and relative proportions of mass representing ribose ($m+2$) were higher than ($m+1$)^{[11][12]}.

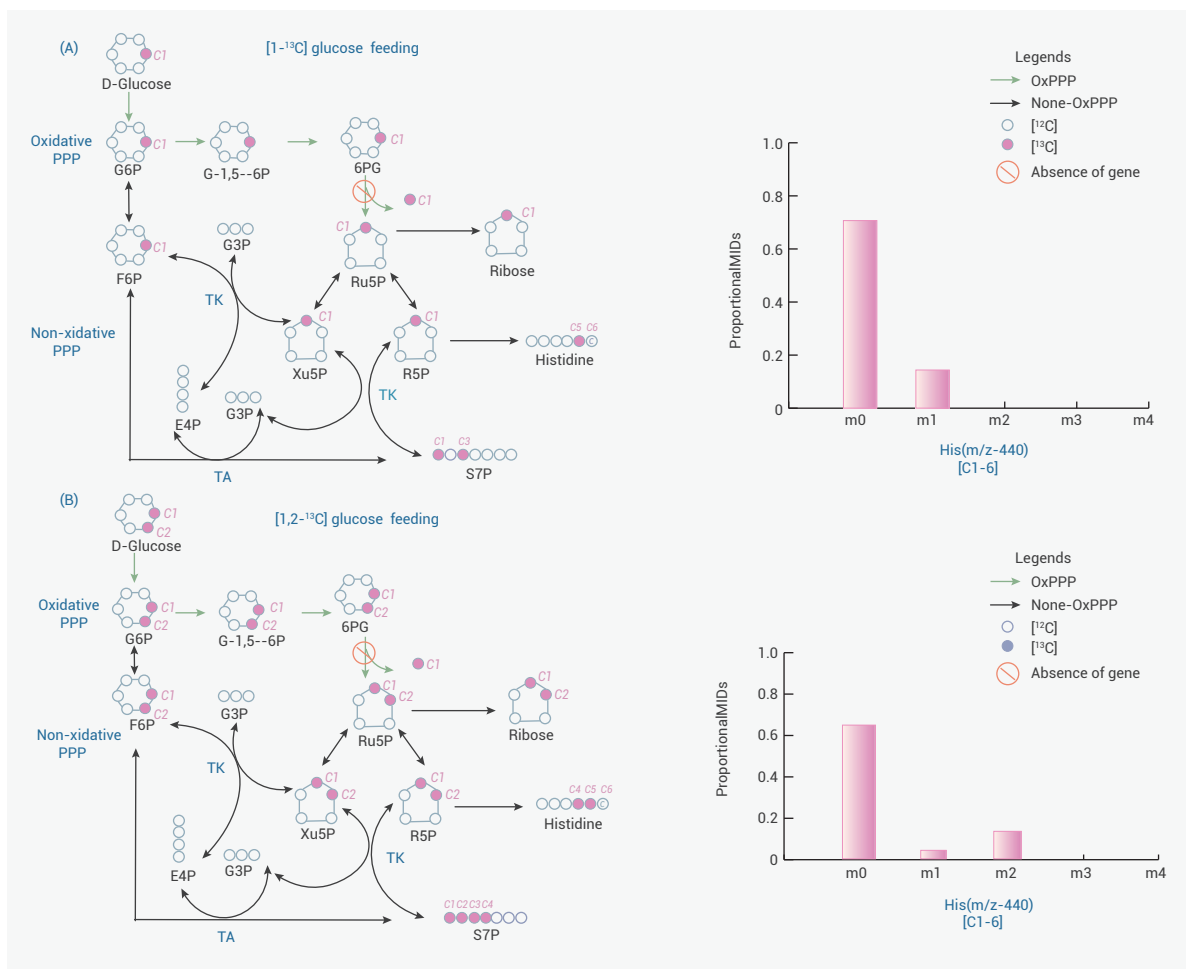


Figure 5. Movement of ^{13}C label through OxPPP and non-OxPPP in *R. solanacearum* F1C1^[11].

Custom Synthesis & Testing Services

MedChemExpress (MCE) offers custom synthesis of Stable Isotope-Labeled Compounds with different stable isotope atoms, such as Deuterium (^2H , D), Carbon-13 (^{13}C), Nitrogen-15 (^{15}N) and so on. MedChemExpress owns a professional technical team and state-of-the-art facilities for the research and development of new Stable Isotope-Labeled Compounds.

MedChemExpress (MCE) provides stable isotopes (such as ^2H , ^{13}C , ^{15}N , etc.) analysis and determination services for various research fields. Our laboratory is equipped with advanced equipment to analyze isotope labeled samples, such as isotope tracer, isotopic enrichment, isotope element content, etc.

MCE Stable Isotope Testing Services

	Detection Categories	Detection Targets
Content Detection & Determination of Isotopic Enrichment for ^2H , ^{13}C , ^{15}N & ^{18}O (Typically metabolic flux analysis uses ^{13}C -labeled substrates)	Amino Acid (AA) Metabolism / Urea Cycle	20 different kinds of amino acids, like Aspartic acid , L-Asparagine, Glutamine, Glutamic acid, Ornithine, etc.
	Tricarboxylic Acid (TCA) Cycle	Citric Acid, α -Ketoglutaric acid, Succinic acid, Fumaric acid, Oxaloacetic acid, Malic acid.
	Glycolytic Pathway (or EMP)	Glucose, Glucose-6-phosphate, Pyruvic acid, Lactic acid, Phosphoenolpyruvate, etc
	Phytochromes	Chlorophyll A, Chlorophyll B, β -Carotene, Lutein.
	Fatty Acid Metabolism	37 Kinds of fatty acids: Short-chain fatty acids (SCFA) (C2~C6) Medium-chain fatty acids (MCFA)(C7~C12) Long-chain fatty acids (LCFA) (>C14)
	Hormones	1) Testosterone, 2) Hydrocortisone, progesterone, etc, 3) Steroidhormone
	Vitamins	VA, VB, VC, VD, VE and their palmitate.
	Polycyclic Aromatic Hydrocarbons	16 targets: Naphthalene, Acenaphthylene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Chrysene, etc.
	Phospholipid Fatty Acids (PLFAs) in soil	Long-chain Fatty Acids in soil (C16~C19)
Others	Melatonin, Betacyanin, Astaxanthin, etc.	

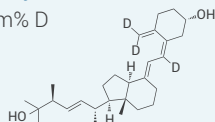
The applications of stable isotopes combined with metabolomic and proteomic analytical strategies will undoubtedly be a growing area in the future, and this challenge will provide great growth opportunities for isotope-labeled compounds. MedChemExpress (MCE) offers a broad range of Stable Isotope-Labeled Compounds for your research.

Stable Isotope-Labeled Vitamins

HY-32349S

25-hydroxy Vitamin D2-d3

≥98 atom% D

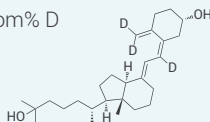


CAS No. : 1217467-39-4

HY-32351S

Calcifediol-d3

≥98 atom% D

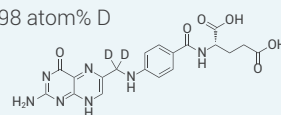


CAS No. : 140710-94-7

HY-16637S

Folic Acid-d2

≥98 atom% D



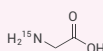
CAS No. : 69022-87-3

Stable Isotope-Labeled Amino Acids

HY-Y0966S

Glycine-15N

≥98 atom% ¹⁵N

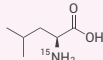


CAS No. : 7299-33-4

HY-N0486S3

L-Leucine-15N

≥98 atom% ¹⁵N



CAS No. : 59935-31-8

HY-Y0252S2

L-Proline-15N

≥98 atom% ¹⁵N



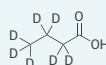
CAS No. : 59681-31-1

Stable Isotope-Labeled Fatty Acids

HY-B0350S

Butyric acid-d7

≥98 atom% D

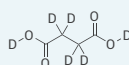


CAS No. : 73607-83-7

HY-N0420S

Succinic acid-d6

≥98 atom% D



CAS No. : 21668-90-6

HY-N0830S2

Palmitic acid-d31

≥98 atom% D



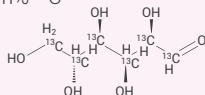
CAS No. : 39756-30-4

Stable Isotope-Labeled Saccharides

HY-B0389A

D-Glucose-13C6

≥98 atom% ¹³C

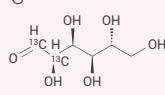


CAS No. : 110187-42-3

HY-B0389S15

D-Glucose-13C2-4

≥98 atom% ¹³C

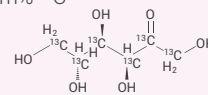


CAS No. : 138079-87-5

HY-N7092S

D-Fructose-13C6

≥98 atom% ¹³C



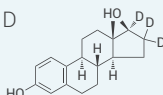
CAS No. : 201595-65-5

Stable Isotope-Labeled Hormones

HY-B0141S

Estradiol-d3

≥98 atom% D

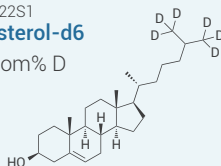


CAS No. : 79037-37-9

HY-N0322S1

Cholesterol-d6

≥98 atom% D

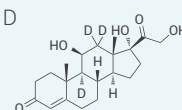


CAS No. : 60816-17-3

HY-N0583S3

Hydrocortisone-d3

≥98 atom% D



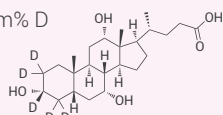
CAS No. : 115699-92-8

Stable Isotope-Labeled Bile Acids

HY-N0324S1

Cholic acid-d5

≥98 atom% D

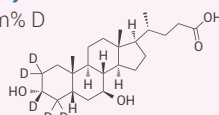


CAS No. : 53007-09-3

HY-13771S

Ursodeoxycholic acid-d5

≥98 atom% D

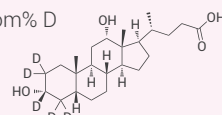


CAS No. : 93701-18-9

HY-N0593S1

Deoxycholic acid-d5

≥98 atom% D



CAS No. : 52840-14-9

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References:

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