

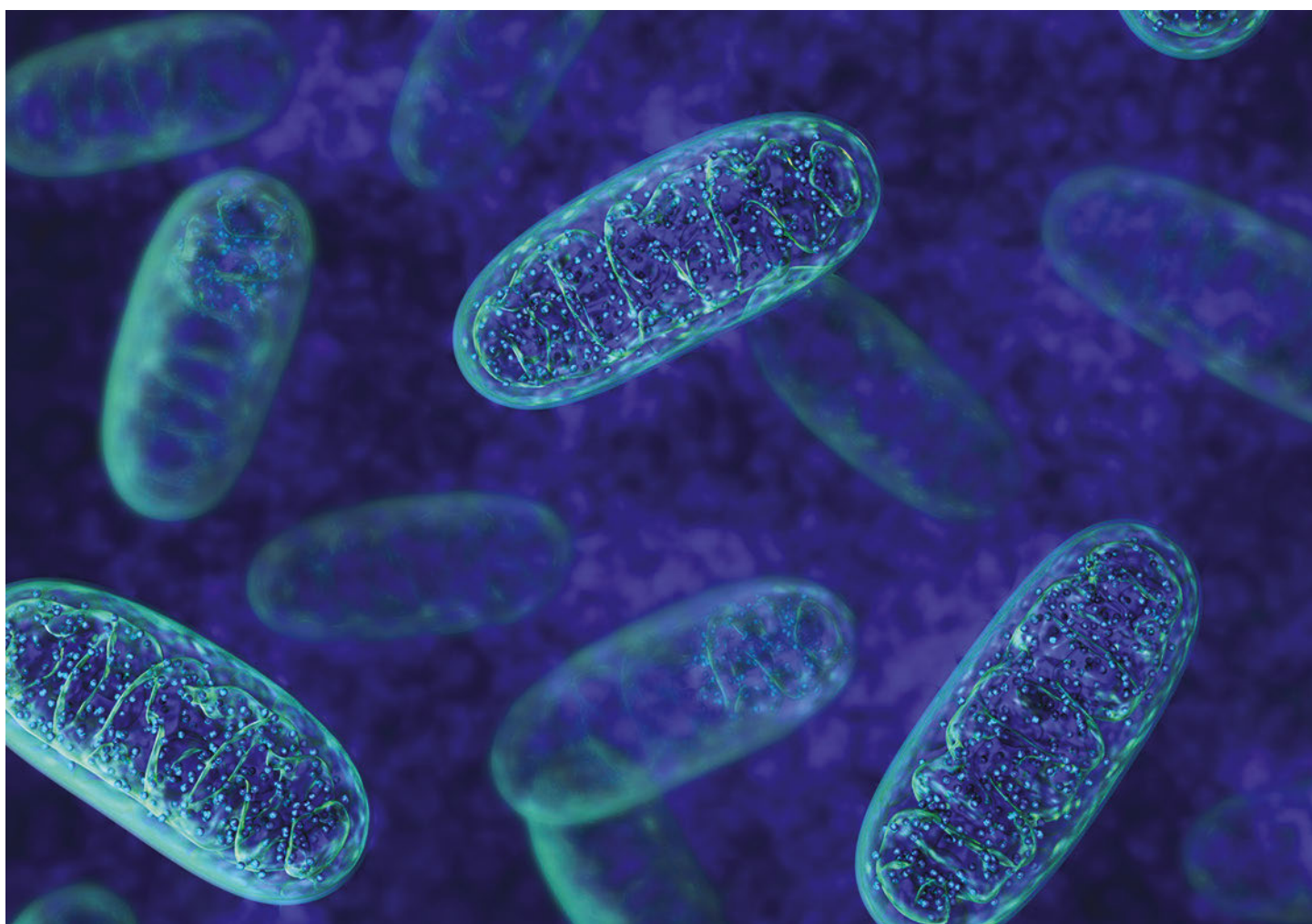


Cambridge Isotope Laboratories, Inc.  
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RESEARCH PRODUCTS

# Stable Isotope-Labeled Products

## For Metabolomics



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## Table of Contents

### Compounds

Amino Acids and Derivatives .....	2	Nucleotides, Nucleosides, and Nucleobases .....	13
Bile Acids .....	6	Organic Acids .....	15
Caffeine and Metabolites .....	6	Steroids and Hormones .....	16
Carbohydrates .....	7	Vitamins and Metabolites .....	18
Carnitines/Acylcarnitines .....	8	Other Compounds .....	20
Drugs and Metabolites .....	9		
Fatty Acids and Lipids .....	10	<b>Sets, Mixtures, and Kits</b>	
Flavonoids .....	12	Sets .....	21
MS/MS Standards .....	12	Mixtures .....	22
Neurotransmitters .....	12	Kits .....	23

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## Compounds

### Amino Acids and Derivatives

Catalog No.	Description
DLM-7476	ADMA-HCl·XH <sub>2</sub> O (asymmetric dimethylarginine) (2,3,3,4,4,5,5-D <sub>7</sub> , 98%) may be hydrate
CLM-1655	D-Alanine (1- <sup>13</sup> C, 99%)
CLM-2495	D-Alanine (3- <sup>13</sup> C, 99%)
DLM-7326	D-Alanine (D <sub>7</sub> , 98%) <5% L
NLM-6762	D-Alanine ( <sup>15</sup> N, 98%)
NLM-3289	D-Alanine, N-acetyl ( <sup>15</sup> N, 98%)
CLM-705	DL-Alanine (1- <sup>13</sup> C, 99%)
CLM-115	DL-Alanine (2- <sup>13</sup> C, 99%)
CLM-707	DL-Alanine (3- <sup>13</sup> C, 99%)
CLM-4514	DL-Alanine ( <sup>13</sup> C <sub>3</sub> , 98%)
DLM-2760	DL-Alanine (2-D, 98%)
DLM-176	DL-Alanine (3,3,3-D <sub>3</sub> , 98%)
DLM-1276	DL-Alanine (2,3,3,3-D <sub>4</sub> , 97-98%)
NLM-706	DL-Alanine ( <sup>15</sup> N, 98%)
CLM-116	L-Alanine (1- <sup>13</sup> C, 99%)
CLM-2016	L-Alanine (2- <sup>13</sup> C, 99%)
CLM-117	L-Alanine (3- <sup>13</sup> C, 99%)
CLM-2734	L-Alanine (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2184-H	L-Alanine ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-3101	L-Alanine (2-D, 96-98%)
DLM-248	L-Alanine (3,3,3-D <sub>3</sub> , 99%)
DLM-250	L-Alanine (2,3,3,3-D <sub>4</sub> , 98%)
DLM-251	L-Alanine (D <sub>7</sub> , 98%)
NLM-454	L-Alanine ( <sup>15</sup> N, 98%)
OLM-7460	L-Alanine ( <sup>18</sup> O <sub>2</sub> , 90%)
CDLM-8649	L-Alanine (3- <sup>13</sup> C, 99%; 2-D, 96%)
CDLM-3439	L-Alanine (3- <sup>13</sup> C, 99%; 3,3,3-D <sub>3</sub> , 98%)
CNLM-6993	L-Alanine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-3594	L-Alanine (2- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-534-H	L-Alanine ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 99%)

Catalog No.	Description
DNLM-7178	L-Alanine (2,3,3,3-D <sub>4</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6800	L-Alanine ( <sup>13</sup> C <sub>3</sub> , 97-99%; D <sub>4</sub> , 97-99%; <sup>15</sup> N, 97-99%)
DLM-9799	DL-2-Aminoadipic acid (2,5,5-D <sub>3</sub> , 98%)
CLM-535	5-Aminolevulinic acid·HCl (4- <sup>13</sup> C, 99%)
CLM-1371	5-Aminolevulinic acid·HCl (5- <sup>13</sup> C, 99%) CP 96%
CLM-1268	L-Arginine·HCl (1- <sup>13</sup> C, 99%)
CLM-2070	L-Arginine·HCl (guanido- <sup>13</sup> C, 99%)
CLM-2051	L-Arginine·HCl (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2265-H	L-Arginine·HCl ( <sup>13</sup> C <sub>6</sub> , 99%)
DLM-6038	L-Arginine·HCl (4,4,5,5-D <sub>4</sub> , 94%) <5% D
DLM-541	L-Arginine·HCl (D <sub>7</sub> , 98%)
NLM-1267	L-Arginine·HCl (α- <sup>15</sup> N, 98%)
NLM-395	L-Arginine·HCl (guanido- <sup>15</sup> N <sub>2</sub> , 98%)
NLM-396	L-Arginine·HCl ( <sup>15</sup> N <sub>4</sub> , 98%)
CNLM-7819	L-Arginine·HCl (1- <sup>13</sup> C, 99%; α- <sup>15</sup> N, 98%)
CNLM-539-H	L-Arginine·HCl ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>4</sub> , 99%)
DNLM-7543	L-Arginine·HCl (D <sub>7</sub> , 98%; <sup>15</sup> N <sub>4</sub> , 98%)
CDNLM-6801	L-Arginine·HCl ( <sup>13</sup> C <sub>6</sub> , 97-99%; D <sub>7</sub> , 97-99%; <sup>15</sup> N <sub>4</sub> , 97-99%)
ULM-8347	L-Arginine·HCl (unlabeled)
CNLM-9007-CA	L-Argininosuccinic acid, barium salt·2H <sub>2</sub> O (arginine- <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>4</sub> , 99%) CP 90%
ULM-9008-CA	L-Argininosuccinic acid, barium salt·3H <sub>2</sub> O (unlabeled) CP 90%
CLM-8699-H	L-Asparagine·H <sub>2</sub> O ( <sup>13</sup> C <sub>4</sub> , 99%)
DLM-6844	L-Asparagine·H <sub>2</sub> O (2,3,3-D <sub>3</sub> , 94%)
NLM-120	L-Asparagine·H <sub>2</sub> O (amide- <sup>15</sup> N, 98%)
NLM-3286	L-Asparagine·H <sub>2</sub> O ( <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-7818	L-Asparagine·H <sub>2</sub> O (1,4- <sup>13</sup> C <sub>2</sub> , 99%; α- <sup>15</sup> N, 98%)
CNLM-3819-H	L-Asparagine·H <sub>2</sub> O ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)
DNLM-6932	L-Asparagine·H <sub>2</sub> O (2,3,3-D <sub>3</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 98%)
CDNLM-6802	L-Asparagine·H <sub>2</sub> O ( <sup>13</sup> C <sub>4</sub> , 97-99%; D <sub>3</sub> , 97-99%; <sup>15</sup> N <sub>2</sub> , 97-99%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Amino Acids and Derivatives (continued)

Catalog No.	Description
CLM-865	DL-Aspartic acid (3- <sup>13</sup> C, 99%)
CLM-518	DL-Aspartic acid (4- <sup>13</sup> C, 99%)
DLM-832	DL-Aspartic acid (2,3,3-D <sub>3</sub> , 98%)
DLM-8599	DL-Aspartic acid, N-acetyl (aspartate-2,3,3-D <sub>3</sub> , 98%) CP 97%
CLM-3616	L-Aspartic acid (1- <sup>13</sup> C, 99%)
CLM-3617	L-Aspartic acid (2- <sup>13</sup> C, 99%)
CLM-627	L-Aspartic acid (3- <sup>13</sup> C, 98-99%)
CLM-519	L-Aspartic acid (4- <sup>13</sup> C, 99%) CP 96%
CLM-4455	L-Aspartic acid (1,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1801-H	L-Aspartic acid ( <sup>13</sup> C <sub>4</sub> , 99%)
DLM-546	L-Aspartic acid (2,3,3-D <sub>3</sub> , 98%)
NLM-718	L-Aspartic acid ( <sup>15</sup> N, 98%)
CNLM-7817	L-Aspartic acid (1,4- <sup>13</sup> C <sub>2</sub> , 99%; <sup>15</sup> N, 98%)
CNLM-544-H	L-Aspartic acid ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-6931	L-Aspartic acid (2,3,3-D <sub>3</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6803	L-Aspartic acid ( <sup>13</sup> C <sub>4</sub> , 97-99%; D <sub>3</sub> , 97-99%; <sup>15</sup> N, 97-99%)
ULM-8676	L-Aspartic acid (unlabeled)
CLM-4899	L-Citrulline (ureido- <sup>13</sup> C, 99%)
DLM-3860	L-Citrulline (5,5-D <sub>2</sub> , 98%)
DLM-6039	L-Citrulline (4,4,5,5-D <sub>4</sub> , 95%)
NLM-6850	L-Citrulline (ureido- <sup>15</sup> N, 98%)
CDLM-7879	L-Citrulline (ureido- <sup>13</sup> C, 99%; 5,5-D <sub>2</sub> , 98%)
CDLM-7139	L-Citrulline (5- <sup>13</sup> C, 99%; 4,4,5,5-D <sub>4</sub> , 95%)
CDLM-4211	Cycloleucine (carboxyl- <sup>13</sup> C, 99%; 2,2,5,5-D <sub>4</sub> , 96%)
DLM-6108	DL-Cystathionine (3,3,4,4-D <sub>4</sub> , 98%)
CLM-3790	DL-Cysteine (1- <sup>13</sup> C, 99%)
CLM-898	DL-Cysteine (3- <sup>13</sup> C, 99%)
DLM-899	DL-Cysteine (3,3-D <sub>2</sub> , 98%)
CLM-3852	L-Cysteine (1- <sup>13</sup> C, 99%)
CLM-1868	L-Cysteine (3- <sup>13</sup> C, 99%)
CLM-4320-H	L-Cysteine ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-769	L-Cysteine (3,3-D <sub>2</sub> , 98%)
DLM-6901	L-Cysteine (2,3,3-D <sub>3</sub> , 98%)
NLM-2295	L-Cysteine ( <sup>15</sup> N, 98%)
DLM-2942	L-Cysteine, S-methyl (S-methyl-D <sub>3</sub> , 98%)
CNLM-7815	L-Cysteine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-3871-H	L-Cysteine ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-6902	L-Cysteine (2,3,3-D <sub>3</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6809	L-Cysteine ( <sup>13</sup> C <sub>3</sub> , 97-99%; D <sub>3</sub> , 97-99%; <sup>15</sup> N, 97-99%)
DLM-8738	S-Sulfo-DL-cysteine (2,3,3-D <sub>3</sub> , 99%)
DLM-1000	DL-Cystine (3,3,3',3'-D <sub>4</sub> , 98%)
NLM-1668	DL-Cystine ( <sup>15</sup> N <sub>2</sub> , 95%)
CLM-520	L-Cystine (3,3'- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-9812	L-Cystine (3,3,3',3'-D <sub>4</sub> , 98%)
NLM-3818	L-Cystine ( <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-4244-H	L-Cystine ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)
CDNLM-8659	L-Cystine ( <sup>13</sup> C <sub>6</sub> , 98%; D <sub>6</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 98%) CP 95%
DLM-8516	N,N-Dimethylglycine-HCl (D <sub>6</sub> , 99%)
CLM-3632	DL-Glutamic acid (3- <sup>13</sup> C, 99%)
DLM-335	DL-Glutamic acid (2,4,4-D <sub>3</sub> , 98%)
DLM-357	DL-Glutamic acid (2,3,3,4,4-D <sub>5</sub> , 97%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Catalog No.	Description
CLM-674	L-Glutamic acid (1- <sup>13</sup> C, 99%)
CLM-2474	L-Glutamic acid (2- <sup>13</sup> C, 99%)
CLM-4742	L-Glutamic acid (3- <sup>13</sup> C, 99%)
CLM-2431	L-Glutamic acid (4- <sup>13</sup> C, 98-99%)
CLM-613	L-Glutamic acid (5- <sup>13</sup> C, 99%)
CLM-2024	L-Glutamic acid (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-3646	L-Glutamic acid (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1800-H	L-Glutamic acid ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-3725	L-Glutamic acid (2,4,4-D <sub>3</sub> , 97-98%)
DLM-556	L-Glutamic acid (2,3,3,4,4-D <sub>5</sub> , 97-98%)
NLM-135	L-Glutamic acid ( <sup>15</sup> N, 98%)
CNLM-7812	L-Glutamic acid (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-554-H	L-Glutamic acid ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-6996	L-Glutamic acid (2,3,3,4,4-D <sub>5</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6804	L-Glutamic acid ( <sup>13</sup> C <sub>5</sub> , 97-99%; D <sub>5</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CLM-3721	DL-Glutamic acid-H <sub>2</sub> O (1- <sup>13</sup> C, 99%)
OLM-8028	L-Glutamic acid-HCl ( <sup>17</sup> O <sub>4</sub> , ~30%)
CLM-3612	L-Glutamine (1- <sup>13</sup> C, 99%)
CLM-3613	L-Glutamine (2- <sup>13</sup> C, 99%)
CLM-770	L-Glutamine (4- <sup>13</sup> C, 99%)
CLM-1166	L-Glutamine (5- <sup>13</sup> C, 99%)
CLM-2001	L-Glutamine (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-3641	L-Glutamine (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1822-H	L-Glutamine ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-1826	L-Glutamine (2,3,3,4,4-D <sub>5</sub> , 97%)
NLM-1016	L-Glutamine (α- <sup>15</sup> N, 98%)
NLM-557	L-Glutamine (amide- <sup>15</sup> N, 98%)
NLM-1328	L-Glutamine ( <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-7813	L-Glutamine (1- <sup>13</sup> C, 99%; α- <sup>15</sup> N, 98%)
CNLM-1275-H	L-Glutamine ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)
DNLM-6997	L-Glutamine (2,3,3,4,4-D <sub>5</sub> , 97-98%; <sup>15</sup> N <sub>2</sub> , 97-98%)
CDNLM-6805	L-Glutamine ( <sup>13</sup> C <sub>5</sub> , 97-99%; D <sub>5</sub> , 97-99%; <sup>15</sup> N <sub>2</sub> , 97-99%)
CLM-422	Glycine (1- <sup>13</sup> C, 99%)
CLM-136	Glycine (2- <sup>13</sup> C, 99%)
CLM-1017	Glycine (1,2- <sup>13</sup> C <sub>2</sub> , 97-99%)
DLM-1674	Glycine (2,2-D <sub>2</sub> , 98%)
DLM-280	Glycine (D <sub>5</sub> , 98%)
NLM-202	Glycine ( <sup>15</sup> N, 98%)
CNLM-507	Glycine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-508	Glycine (2- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-1673-H	Glycine ( <sup>13</sup> C <sub>2</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-6862	Glycine (2,2-D <sub>2</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6799	Glycine ( <sup>13</sup> C <sub>2</sub> , 97-99%; 2,2-D <sub>2</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CNLM-7175	Glycine-HCl, ethyl ester ( <sup>13</sup> C <sub>2</sub> , 98%; <sup>15</sup> N, 98%)
CLM-2636	DL-Histidine (ring-2- <sup>13</sup> C, 99%)
NLM-138	DL-Histidine-2HCl (α- <sup>15</sup> N, 98%)
NLM-4649	L-Histidine (ring-ε- <sup>15</sup> N, 98%) (<5% D)
NLM-4457	L-Histidine (ring-π- <sup>15</sup> N, 98+%) (<5% D)
NLM-9585	L-Histidine (ring- <sup>15</sup> N <sub>2</sub> , 98%)
DLM-8691	π-Methyl-L-histidine (methyl-D <sub>3</sub> , 98%)
DLM-2949	τ-Methyl-L-histidine (methyl-D <sub>3</sub> , 98%)
CLM-1512	L-Histidine-HCl-H <sub>2</sub> O (ring-2- <sup>13</sup> C, 99%) <5% D
DLM-7855	L-Histidine-HCl-H <sub>2</sub> O (ring-2,4-D <sub>2</sub> ; α,β,β-D <sub>3</sub> , 98%)
NLM-2245	L-Histidine-HCl-H <sub>2</sub> O (α- <sup>15</sup> N, 98%)
NLM-846	L-Histidine-HCl-H <sub>2</sub> O (ring-π- <sup>15</sup> N, 98%) <5% D

Continued ►

## Amino Acids and Derivatives (continued)

Catalog No.	Description
DNLM-7366	L-Histidine·HCl·H <sub>2</sub> O (D <sub>5</sub> , 98%; <sup>15</sup> N <sub>3</sub> , 98%)
CDNLM-6806	L-Histidine·HCl·H <sub>2</sub> O ( <sup>13</sup> C <sub>6</sub> , 97-99%; D <sub>5</sub> , 97-99%; <sup>15</sup> N <sub>3</sub> , 97-99%) CP 95%
CNLM-4645	L-Homoarginine·HCl ( <sup>13</sup> C <sub>7</sub> , 98%; <sup>15</sup> N <sub>4</sub> , 98%)
DLM-8259	DL-Homocysteine (3,3,4,4-D <sub>4</sub> , 98%)
DLM-3619	DL-Homocystine (3,3,3',3',4,4,4',4'-D <sub>8</sub> , 98%)
NLM-2466	L-Homoserine ( <sup>15</sup> N, 95-99%) CP 97%
CLM-8742	L-Allo-isoleucine ( <sup>13</sup> C <sub>6</sub> , 97-99%)
DLM-1505	L-Allo-isoleucine (D <sub>10</sub> , 98%)
CNLM-8670	L-Allo-isoleucine ( <sup>13</sup> C <sub>6</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CLM-1026	L-Isoleucine (1- <sup>13</sup> C, 99%)
CLM-2248-H	L-Isoleucine ( <sup>13</sup> C <sub>6</sub> , 99%)
DLM-141	L-Isoleucine (D <sub>10</sub> , 98%)
NLM-292	L-Isoleucine ( <sup>15</sup> N, 98%)
CNLM-7810	L-Isoleucine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-561-H	L-Isoleucine ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-7325	L-Isoleucine (D <sub>10</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6807	L-Isoleucine ( <sup>13</sup> C <sub>6</sub> , 97-99%; D <sub>10</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CLM-204	DL-Leucine (1- <sup>13</sup> C, 99%)
CLM-207	DL-Leucine (2- <sup>13</sup> C, 99%)
DLM-9423	DL-Leucine (D <sub>10</sub> , 98%)
NLM-355	DL-Leucine ( <sup>15</sup> N, 98%)
CLM-468	L-Leucine (1- <sup>13</sup> C, 99%)
CLM-2014	L-Leucine (2- <sup>13</sup> C, 99%)
CLM-3524	L-Leucine (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2262-H	L-Leucine ( <sup>13</sup> C <sub>6</sub> , 99%)
DLM-1259	L-Leucine (5,5,5-D <sub>3</sub> , 99%)
DLM-4212	L-Leucine (isopropyl-D <sub>7</sub> , 98%)
DLM-567	L-Leucine (D <sub>10</sub> , 98%)
NLM-142	L-Leucine ( <sup>15</sup> N, 98%)
OLM-2041	L-Leucine ( <sup>18</sup> O <sub>2</sub> , 94%)
CNLM-615	L-Leucine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-3450	L-Leucine (2- <sup>13</sup> C, 99%; <sup>15</sup> N, 95-99%)
CNLM-281-H	L-Leucine ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-4642	L-Leucine (D <sub>10</sub> , 98%; <sup>15</sup> N, 97%)
CDNLM-6808	L-Leucine ( <sup>13</sup> C <sub>6</sub> , 97-99%; D <sub>10</sub> , 97-99%; <sup>15</sup> N, 97-99%)
ULM-8203	L-Leucine (unlabeled)
CLM-749	DL-Lysine·2HCl (1- <sup>13</sup> C, 99%)
DLM-8941	DL-Lysine·2HCl (4,4,5,5-D <sub>4</sub> , 96-98%)
NLM-1031	DL-Lysine·2HCl (ε- <sup>15</sup> N, 98%)
CNLM-3452	DL-Lysine·2HCl (1- <sup>13</sup> C, 99%; ε- <sup>15</sup> N, 99%)
CNLM-3453	DL-Lysine·2HCl (2- <sup>13</sup> C, 99%; ε- <sup>15</sup> N, 99%)
CLM-653	L-Lysine·2HCl (1- <sup>13</sup> C, 99%)
CLM-632	L-Lysine·2HCl (6- <sup>13</sup> C, 99%)
CLM-2247-H	L-Lysine·2HCl ( <sup>13</sup> C <sub>6</sub> , 99%)
DLM-2640	L-Lysine·2HCl (4,4,5,5-D <sub>4</sub> , 96-98%)
DLM-2641	L-Lysine·2HCl (3,3,4,4,5,5,6,6-D <sub>8</sub> , 98%)
DLM-570	L-Lysine·2HCl (D <sub>9</sub> , 98%)
NLM-143	L-Lysine·2HCl (α- <sup>15</sup> N, 95-99%)
NLM-1554	L-Lysine·2HCl ( <sup>15</sup> N <sub>2</sub> , 98%)
NLM-631	L-Lysine·2HCl (ε- <sup>15</sup> N, 98%)
CNLM-7821	L-Lysine·2HCl (1- <sup>13</sup> C, 99%; α- <sup>15</sup> N, 98%)
CNLM-3454	L-Lysine·2HCl (6- <sup>13</sup> C, 99%; ε- <sup>15</sup> N, 98%)

Catalog No.	Description
CNLM-291-H	L-Lysine·2HCl ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)
DNLM-7545	L-Lysine·2HCl (D <sub>9</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 98%)
CDNLM-6810	L-Lysine·2HCl ( <sup>13</sup> C <sub>6</sub> , 97-99%; D <sub>9</sub> , 97-99%; <sup>15</sup> N <sub>2</sub> , 97-99%)
ULM-8766	L-Lysine·2HCl (unlabeled)
CLM-7356	D-Methionine (1- <sup>13</sup> C, 99%) CP 96%
CLM-6191	DL-Methionine (1- <sup>13</sup> C, 99%)
DLM-2933	DL-Methionine (3,3,4,4-D <sub>4</sub> , 98%)
DLM-9019	DL-Methionine (3,3,4,4-D <sub>4</sub> ; methyl-D <sub>3</sub> , 98%)
CLM-3267	L-Methionine (1- <sup>13</sup> C, 99%)
CLM-206	L-Methionine (methyl- <sup>13</sup> C, 99%)
CLM-893-H	L-Methionine ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-431	L-Methionine (methyl-D <sub>3</sub> , 98%)
DLM-6797	L-Methionine (2,3,3,4,4-D <sub>5</sub> ; methyl-D <sub>3</sub> , 98%)
NLM-752	L-Methionine ( <sup>15</sup> N, 96-98%)
CDLM-760	L-Methionine (1- <sup>13</sup> C, 99%; methyl-D <sub>3</sub> , 98%)
CDLM-9289	L-Methionine (methyl- <sup>13</sup> C, 99%; methyl-D <sub>3</sub> , 98%)
CDLM-8885	L-Methionine (2,3,3,4,4-D <sub>5</sub> , 98%; methyl- <sup>13</sup> CH <sub>3</sub> , 99%)
CNLM-7807	L-Methionine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-9774	L-Methionine (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N, 98%)
CNLM-759-H	L-Methionine ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-7179	L-Methionine (D <sub>8</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6798	L-Methionine ( <sup>13</sup> C <sub>5</sub> , 97-99%; D <sub>8</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CLM-8002	L-Methionine sulfone (1- <sup>13</sup> C, 99%)
CNLM-10424	β-N-Methylamino-L-alanine ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 98%)
ULM-10493	β-N-Methylamino-L-alanine HCl (unlabeled) CP 97%
CLM-7104	3-Nitro-L-tyrosine (ring- <sup>13</sup> C <sub>6</sub> , 99%) CP 94%
CLM-1036	L-Ornithine·HCl (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-4724-H	L-Ornithine·HCl ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-4261	L-Ornithine·HCl (5,5-D <sub>2</sub> , 98%)
DLM-6046	L-Ornithine·HCl (4,4,5,5-D <sub>4</sub> , 95%)
DLM-2969	L-Ornithine·HCl (3,3,4,4,5,5-D <sub>6</sub> , 98%)
DLM-6669	L-Ornithine·HCl (D <sub>7</sub> , 98%)
NLM-2212	L-Ornithine·HCl (α- <sup>15</sup> N, 98%)
NLM-2174	L-Ornithine·HCl (5- <sup>15</sup> N, 98%)
NLM-3610	L-Ornithine·HCl ( <sup>15</sup> N <sub>2</sub> , 98%)
CDLM-3873	L-Ornithine·HCl (5- <sup>13</sup> C, 99%; 4,4,5,5-D <sub>4</sub> , 95%)
CNLM-7578-H	L-Ornithine·HCl ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)
DLM-4526	D-Phenylalanine (ring-D <sub>5</sub> , 97%)
CLM-761	DL-Phenylalanine (1- <sup>13</sup> C, 99%)
DLM-2983	DL-Phenylalanine (2-D, 98%)
DLM-2986	DL-Phenylalanine (ring-D <sub>5</sub> , 98%)
NLM-3434	DL-Phenylalanine ( <sup>15</sup> N, 98%)
CLM-762	L-Phenylalanine (1- <sup>13</sup> C, 99%)
CLM-1631	L-Phenylalanine (2- <sup>13</sup> C, 99%) CP 97%
CLM-1053	L-Phenylalanine (3- <sup>13</sup> C, 99%)
CLM-1055	L-Phenylalanine (ring- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-2250-H	L-Phenylalanine ( <sup>13</sup> C <sub>9</sub> , 99%)
DLM-2984	L-Phenylalanine (2-D, 95%)
DLM-2985	L-Phenylalanine (3,3-D <sub>2</sub> , 98%)
DLM-1258	L-Phenylalanine (ring-D <sub>5</sub> , 98%)
DLM-372	L-Phenylalanine (D <sub>8</sub> , 98%)
NLM-108	L-Phenylalanine ( <sup>15</sup> N, 98%)
CNLM-7611	L-Phenylalanine (2,3- <sup>13</sup> C <sub>2</sub> , 99%; <sup>15</sup> N, 98%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Amino Acids and Derivatives (continued)

Catalog No.	Description
CNLM-575-H	L-Phenylalanine ( <sup>13</sup> C <sub>9</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-7180	L-Phenylalanine (D <sub>8</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6811	L-Phenylalanine ( <sup>13</sup> C <sub>9</sub> , 97-99%; D <sub>8</sub> , 97-99%; <sup>15</sup> N, 97-99%)
ULM-8205	L-Phenylalanine (unlabeled)
CLM-2479	DL-Proline (1- <sup>13</sup> C, 99%)
DLM-2657	DL-Proline (2,3,3,4,4,5,5-D <sub>7</sub> , 97-98%)
CLM-510	L-Proline (1- <sup>13</sup> C, 99%)
CLM-2260-H	L-Proline ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-487	L-Proline (D <sub>7</sub> , 97-98%)
NLM-835	L-Proline ( <sup>15</sup> N, 98%)
CNLM-7822	L-Proline (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-436-H	L-Proline ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-7562	L-Proline (D <sub>7</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6812	L-Proline ( <sup>13</sup> C <sub>5</sub> , 97-99%; D <sub>7</sub> , 97-99%; <sup>15</sup> N, 97-99%)
ULM-8333	L-Proline (unlabeled)
DLM-6874	Sarcosine-HCl (N-methylglycine-HCl) (methyl-D <sub>3</sub> , 98%)
CNLM-9699	Sarcosine-HCl (N-methylglycine-HCl) ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 98%)
CLM-1075	DL-Serine (1- <sup>13</sup> C, 99%)
CLM-496	DL-Serine (2- <sup>13</sup> C, 99%)
CLM-497	DL-Serine (3- <sup>13</sup> C, 99%)
DLM-1073	DL-Serine (2,3,3-D <sub>3</sub> , 98%)
NLM-1531	DL-Serine ( <sup>15</sup> N, 98%)
CNLM-4207	DL-Serine ( <sup>13</sup> C <sub>3</sub> , 98%; <sup>15</sup> N, 98%)
CLM-1573	L-Serine (1- <sup>13</sup> C, 99%)
CLM-2013	L-Serine (2- <sup>13</sup> C, 99%)
CLM-1572	L-Serine (3- <sup>13</sup> C, 99%)
CLM-1574-H	L-Serine ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-161	L-Serine (3,3-D <sub>2</sub> , 98%)
DLM-582	L-Serine (2,3,3-D <sub>3</sub> , 98%)
NLM-2036	L-Serine ( <sup>15</sup> N, 98%)
OLM-9960	L-Serine (carboxyl- <sup>18</sup> O <sub>2</sub> , 95%)
CNLM-7814	L-Serine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-474-H	L-Serine ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-6863	L-Serine (2,3,3-D <sub>3</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6813	L-Serine ( <sup>13</sup> C <sub>3</sub> , 97-99%; D <sub>3</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CLM-3949	Sodium glutamate-XH <sub>2</sub> O ( <sup>13</sup> C <sub>5</sub> , 97-98%) may be hydrate
CLM-447	L-Threonine (1- <sup>13</sup> C, 99%)
CLM-2261	L-Threonine ( <sup>13</sup> C <sub>4</sub> , 97-99%)
DLM-1693	L-Threonine (D <sub>5</sub> , 98%)
NLM-742	L-Threonine ( <sup>15</sup> N, 98%)
CDLM-9307	L-Threonine (4- <sup>13</sup> C, 97%; 2,3-D <sub>2</sub> , 96-98%)
CNLM-587	L-Threonine ( <sup>13</sup> C <sub>4</sub> , 97-99%; <sup>15</sup> N, 97-99%)
DNLM-7367	L-Threonine (D <sub>5</sub> , 97%; <sup>15</sup> N, 98%)
CDNLM-6814	L-Threonine ( <sup>13</sup> C <sub>4</sub> , 97-99%; D <sub>5</sub> , 97-99%; <sup>15</sup> N, 97-99%)
ULM-8800	L-Threonine (unlabeled)
CLM-778	L-Tryptophan (1- <sup>13</sup> C, 99%)
CLM-1543	L-Tryptophan (indole-2- <sup>13</sup> C, 98%)
CLM-716	L-Tryptophan (indole-3- <sup>13</sup> C, 95-99%)
CLM-717	L-Tryptophan (indole-4- <sup>13</sup> C, 99%) CP 95%
CLM-4290-H	L-Tryptophan ( <sup>13</sup> C <sub>11</sub> , 99%)

Catalog No.	Description
DLM-1092	L-Tryptophan (indole-D <sub>5</sub> , 98%)
DLM-6903	L-Tryptophan (D <sub>8</sub> , 97-98%)
NLM-1208	L-Tryptophan (indole- <sup>15</sup> N, 98%)
NLM-1695	L-Tryptophan (α- <sup>15</sup> N, 95-99%)
NLM-800	L-Tryptophan ( <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-2475-H	L-Tryptophan ( <sup>13</sup> C <sub>11</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)
DNLM-6904	L-Tryptophan (D <sub>8</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 98%)
CDNLM-6816	L-Tryptophan ( <sup>13</sup> C <sub>11</sub> , 97-99%; D <sub>8</sub> , 97-99%; <sup>15</sup> N <sub>2</sub> , 97-99%)
CLM-7103	3-Chloro-L-tyrosine (ring- <sup>13</sup> C <sub>6</sub> , 99%) CP 95%
CLM-448	DL-Tyrosine (1- <sup>13</sup> C, 99%)
DLM-137	DL-Tyrosine (3,3-D <sub>2</sub> , 98%)
DLM-2914	DL-Tyrosine (ring-3,5-D <sub>2</sub> , 98%)
CLM-776	L-Tyrosine (1- <sup>13</sup> C, 99%)
CLM-437	L-Tyrosine (2- <sup>13</sup> C, 99%)
CLM-3378	L-Tyrosine (3- <sup>13</sup> C, 99%)
CLM-622	L-Tyrosine (phenol-4- <sup>13</sup> C, 95-99%)
CLM-623	L-Tyrosine (phenol-3,5- <sup>13</sup> C <sub>2</sub> , 95-99%)
CLM-1542	L-Tyrosine (ring- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-2263-H	L-Tyrosine ( <sup>13</sup> C <sub>9</sub> , 99%)
DLM-2317	L-Tyrosine (3,3-D <sub>2</sub> , 98%)
DLM-449	L-Tyrosine (ring-3,5-D <sub>2</sub> , 98%)
DLM-2917	L-Tyrosine (ring-2,6-D <sub>2</sub> , 2-D, 98%)
DLM-451	L-Tyrosine (ring-D <sub>4</sub> , 98%)
DLM-589	L-Tyrosine (D <sub>7</sub> , 98%)
NLM-590	L-Tyrosine ( <sup>15</sup> N, 98%)
OLM-621	L-Tyrosine (phenol- <sup>17</sup> O, 35-40%)
OLM-8696	L-Tyrosine (phenol- <sup>18</sup> O, 85-90%)
CDLM-2369	L-Tyrosine (ring- <sup>13</sup> C <sub>6</sub> , 99%; 3,3-D <sub>2</sub> , 30%)
CNLM-7809	L-Tyrosine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-7610	L-Tyrosine (2,3- <sup>13</sup> C <sub>2</sub> , 99%; <sup>15</sup> N, 98%)
CNLM-439-H	L-Tyrosine ( <sup>13</sup> C <sub>9</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-7373	L-Tyrosine (D <sub>7</sub> , 98%; <sup>15</sup> N, 98%)
CDNLM-6815	L-Tyrosine ( <sup>13</sup> C <sub>9</sub> , 97-99%; D <sub>7</sub> , 97-99%; <sup>15</sup> N, 97-99%)
CLM-166	DL-Valine (1- <sup>13</sup> C, 99%)
CLM-3277	DL-Valine (2- <sup>13</sup> C, 99%)
DLM-311	DL-Valine (D <sub>8</sub> , 98%)
NLM-236	DL-Valine ( <sup>15</sup> N, 98%)
CLM-470	L-Valine (1- <sup>13</sup> C, 99%)
CLM-3050	L-Valine (2- <sup>13</sup> C, 99%)
CLM-9217	L-Valine (dimethyl- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2249-H	L-Valine ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-7732	L-Valine (3-D, 98%)
DLM-4364	L-Valine (2,3-D <sub>2</sub> , 98%)
DLM-488	L-Valine (D <sub>8</sub> , 98%)
NLM-316	L-Valine ( <sup>15</sup> N, 98%)
CNLM-3466	L-Valine (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-8678	L-Valine (2- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
CNLM-442-H	L-Valine ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)
DNLM-4643	L-Valine (D <sub>8</sub> , 96%; <sup>15</sup> N, 96%)
CDNLM-4281	L-Valine ( <sup>13</sup> C <sub>5</sub> , 95-97%; 2,3-D <sub>2</sub> , 97%; <sup>15</sup> N, 96-99%)
CDNLM-6817	L-Valine ( <sup>13</sup> C <sub>5</sub> , 97-99%; D <sub>8</sub> , 97-99%; <sup>15</sup> N, 97-99%)

► See pages 21-27 for amino acid mixes.

## Bile Acids

Catalog No.	Description
CLM-2709	Chenodeoxycholic acid (24- <sup>13</sup> C, 99%)
DLM-6780*	Chenodeoxycholic acid (2,2,4,4-D <sub>4</sub> , 98%)
DLM-9327	Chenodeoxycholic acid (2,2,3,4,4-D <sub>5</sub> , 98%)
DLM-9541*	Chenodeoxycholic acid (2,2,3,4,4,6,6,7,8-D <sub>9</sub> , 98%)
ULM-9540	Chenodeoxycholic acid (unlabeled)
CLM-2710	Cholic acid (24- <sup>13</sup> C, 99%)
DLM-2611*	Cholic acid (2,2,4,4-D <sub>4</sub> , 98%)
DLM-9549	Cholic acid (2,2,3,4,4-D <sub>5</sub> , 98%)
ULM-9543	Cholic acid (unlabeled)
CLM-3364	Deoxycholic acid (24- <sup>13</sup> C, 99%) CP 97%
DLM-2824*	Deoxycholic acid (2,2,4,4-D <sub>4</sub> , 98%)
DLM-9546*	Deoxycholic acid (2,2,4,4,11,11-D <sub>6</sub> , 98%)
ULM-9545	Deoxycholic acid (unlabeled)
DLM-7804*	Glycochenodeoxycholic acid (2,2,4,4-D <sub>4</sub> , 98%) CP 97%
DLM-9550*	Glycochenodeoxycholic acid (2,2,3,4,4,6,6,7,8-D <sub>9</sub> , 98%) CP 97%
ULM-9942	Glycochenodeoxycholic acid, sodium salt (unlabeled)
CLM-191	Glycocholic acid (glycine-1- <sup>13</sup> C, 99%)
DLM-2742*	Glycocholic acid (2,2,4,4-D <sub>4</sub> , 98%) may contain ~4% H <sub>2</sub> O
ULM-9551	Glycocholic acid, hydrate (unlabeled)
DLM-9554*	Glycodeoxycholic acid (2,2,4,4-D <sub>4</sub> , 98%)
DLM-9553*	Glycodeoxycholic acid (2,2,4,4,11,11-D <sub>6</sub> , 98%)
ULM-9552	Glycodeoxycholic acid, sodium salt (unlabeled)

Catalog No.	Description
DLM-9556*	Glycolithocholic acid (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9555	Glycolithocholic acid (unlabeled)
DLM-9558*	Glycoursodeoxycholic acid (2,2,4,4-D <sub>4</sub> , 98%) CP 97%
ULM-9557	Glycoursodeoxycholic acid (unlabeled)
DLM-9560*	Lithocholic acid (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9559	Lithocholic acid (unlabeled)
DLM-9562*	Taurochenodeoxycholic acid, sodium salt (2,2,4,4-D <sub>4</sub> , 98%) CP 97%
DLM-9563*	Taurochenodeoxycholic acid, sodium salt (2,2,3,4,4,6,6,7,8-D <sub>9</sub> , 98%)
ULM-9561	Taurochenodeoxycholic acid, sodium salt (unlabeled)
DLM-9572*	Taurocholic acid, sodium salt (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9571	Taurocholic acid, sodium salt, hydrate (unlabeled) CP 97%
DLM-9568*	Taurodeoxycholic acid, sodium salt (2,2,4,4-D <sub>4</sub> , 98%)
DLM-9567*	Taurodeoxycholic acid, sodium salt (2,2,4,4,11,11-D <sub>6</sub> , 98%)
ULM-9943	Taurodeoxycholic acid, sodium salt, hydrate (unlabeled)
DLM-9570*	Taurolithocholic acid, sodium salt (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9569	Taurolithocholic acid, sodium salt (unlabeled)
DLM-9882*	Tauroursodeoxycholic acid, sodium salt (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9885	Tauroursodeoxycholic acid, dihydrate (unlabeled)
DLM-9574*	Ursodeoxycholic acid (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9573	Ursodeoxycholic acid (unlabeled)

## Caffeine and Metabolites

Catalog No.	Description
CNLM-9240	5-Acetylamino-6-amino-3-methyluracil (AAMU) (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3- <sup>15</sup> N <sub>2</sub> , 6-amino- <sup>15</sup> N, 98%) CP 97%
CLM-728	Caffeine (3-methyl- <sup>13</sup> C, 99%)
CLM-514	Caffeine (trimethyl- <sup>13</sup> C <sub>3</sub> , 99%)
NLM-332	Caffeine (1,3- <sup>15</sup> N <sub>2</sub> , 99%)
CNLM-333	Caffeine (2- <sup>13</sup> C, 99%; 1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-9241	1,3-Dimethyluric acid (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
CNLM-9242	1,7-Dimethyluric acid (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
DLM-9245	1,7-Dimethylxanthine (paraxanthine) (dimethyl-D <sub>6</sub> , 98%)
CNLM-9243	1,7-Dimethylxanthine (paraxanthine) (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
CLM-522	Ethyl acetoacetate (1,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-523	Ethyl acetoacetate (2,4- <sup>13</sup> C <sub>2</sub> , 99%)

Catalog No.	Description
CNLM-9246	1-Methyluric acid (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
CNLM-9248	7-Methyluric acid (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
CDLM-9249	1-Methylxanthine (1-methyl,6- <sup>13</sup> C <sub>2</sub> , 99%; 1-methyl-D <sub>3</sub> , 98%) CP 97%
CNLM-9252	1-Methylxanthine (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
CNLM-9250	3-Methylxanthine (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
CNLM-9251	7-Methylxanthine (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
DLM-10436	Theobromine (3,7-dimethylxanthine) (7-methyl-D <sub>3</sub> , 98%)
DLM-8565	Theobromine (3,7-dimethylxanthine) (dimethyl-D <sub>6</sub> , 98%)
CLM-6154	Theophylline (dimethyl- <sup>13</sup> C <sub>2</sub> , 99%)
CNLM-444	Theophylline (2- <sup>13</sup> C, 99%; 1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-9253	1,3,7-Trimethyluric acid (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)

\*Compounds available in dry and solution forms.

†Compounds available in solution only.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Carbohydrates

Catalog No.	Description	Catalog No.	Description
CLM-7642	D-Arabinitol (U- <sup>13</sup> C <sub>5</sub> , 98%)	CLM-4819	D-Glucose (U- <sup>12</sup> C <sub>6</sub> , 99.9%)
CLM-715	D-Arabinose (1- <sup>13</sup> C, 99%)	CLM-420	D-Glucose (1- <sup>13</sup> C, 98-99%)
CLM-1288	D-Arabinose (2- <sup>13</sup> C, 98%)	CLM-746	D-Glucose (2- <sup>13</sup> C, 99%)
CLM-8477	D-Arabinose (U- <sup>13</sup> C <sub>5</sub> , 99%)	CLM-1393	D-Glucose (3- <sup>13</sup> C, 99%)
DLM-1379	D-Arabinose (2-D, 97%)	CLM-1394	D-Glucose (4- <sup>13</sup> C, 99%)
CLM-1824	2-Deoxy-D-glucose (1- <sup>13</sup> C, 99%)	CLM-1395	D-Glucose (5- <sup>13</sup> C, 98%)
CLM-2122	2-Deoxy-D-glucose (6- <sup>13</sup> C, 99%)	CLM-481	D-Glucose (6- <sup>13</sup> C, 99%)
CLM-10466	2-Deoxy-D-glucose (U- <sup>13</sup> C <sub>6</sub> , 99%)	CLM-2717	D-Glucose (1- <sup>13</sup> C, 99%; 6- <sup>13</sup> C, 97%)
DLM-6732	2-Deoxy-D-glucose (1-D, 98%)	CLM-504	D-Glucose (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-6940	2-Deoxy-D-glucose (D <sub>8</sub> , 98%)	CLM-8942	D-Glucose (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9601	2-Deoxy-D-glucose-6-phosphate, disodium salt (6- <sup>13</sup> C, 99%)	CLM-6750	D-Glucose (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-7266	2-Deoxyribose (1- <sup>13</sup> C, 99%)	CLM-8787	D-Glucose (4,5- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1118	D-Erythrose (1- <sup>13</sup> C, 99%) 1.2% in H <sub>2</sub> O	CLM-4673	D-Glucose (1,2,3- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-1387	D-Erythrose (2- <sup>13</sup> C, 99%) 1.2% in H <sub>2</sub> O	CLM-8770	D-Glucose (4,5,6- <sup>13</sup> C <sub>3</sub> , 98%)
CLM-8944	D-Erythrose (4- <sup>13</sup> C, 99%) 1.2% in H <sub>2</sub> O	CLM-8946	D-Glucose (2,3,4,5,6- <sup>13</sup> C <sub>5</sub> , 99%)
CLM-7863	D-Erythrose (U- <sup>13</sup> C <sub>4</sub> , 98%) 1.2% in H <sub>2</sub> O	CLM-1396	D-Glucose (U- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-6678	D-Fructose-1,6-bisphosphate, sodium salt, hydrate (1- <sup>13</sup> C, 99%)	DLM-1150	D-Glucose (1-D, 98%)
CLM-8962	D-Fructose-1,6-bisphosphate, sodium salt, hydrate (U- <sup>13</sup> C <sub>6</sub> , 98%)	DLM-1271	D-Glucose (2-D, 98%)
CLM-8616	D-Fructose-6-phosphate·2Na <sup>+</sup> ·XH <sub>2</sub> O (U- <sup>13</sup> C <sub>6</sub> , 99%) may contain up to ~10% <sup>13</sup> C <sub>6</sub> glucose-6-phosphate	DLM-3557	D-Glucose (3-D, 97-98%)
CLM-1201	D-Fructose (1- <sup>13</sup> C, 99%)	DLM-9294	D-Glucose (4-D, 98%)
CLM-1527	D-Fructose (2- <sup>13</sup> C, 99%)	DLM-6754	D-Glucose (5-D, 98%)
CLM-7660	D-Fructose (3- <sup>13</sup> C, 99%)	DLM-349	D-Glucose (6,6-D <sub>2</sub> , 99%)
CLM-7661	D-Fructose (4- <sup>13</sup> C, 99%)	DLM-2062	D-Glucose (1,2,3,4,5,6,6-D <sub>7</sub> , 97-98%)
CLM-7662	D-Fructose (5- <sup>13</sup> C, 99%)	DLM-9047	D-Glucose (U-D <sub>12</sub> , 98%)
CLM-1388	D-Fructose (6- <sup>13</sup> C, 99%)	CDLM-6064	D-Glucose (1- <sup>13</sup> C, 99%; 1-D, 98%)
CLM-2462	D-Fructose (1- <sup>13</sup> C, 99%; 6- <sup>13</sup> C, 97%)	CDLM-999	D-Glucose (1- <sup>13</sup> C, 98%; 2-D, 98%)
CLM-528	D-Fructose (1,2- <sup>13</sup> C <sub>2</sub> , 99%)	CDLM-4895	D-Glucose (1- <sup>13</sup> C, 99%; 6- <sup>13</sup> C, 97%; 6,6-D <sub>2</sub> , 98%)
CLM-10546	D-Fructose (4,5- <sup>13</sup> C <sub>2</sub> , 99%)	CDLM-3813-50	D-Glucose (U- <sup>13</sup> C <sub>6</sub> , 98%; 1,2,3,4,5,6,6-D <sub>7</sub> , 50%)
CLM-8415	D-Fructose (1,2,3- <sup>13</sup> C <sub>3</sub> , 99%)	CDLM-3813	D-Glucose (U- <sup>13</sup> C <sub>6</sub> , 99%; 1,2,3,4,5,6,6-D <sub>7</sub> , 97-98%)
CLM-1553	D-Fructose (U- <sup>13</sup> C <sub>6</sub> , 99%)	CLM-1966	L-Glucose (1- <sup>13</sup> C, 99%)
DLM-6050	D-Fructose (1-D, 97%)	CLM-1399	L-Glucose (2- <sup>13</sup> C, 99%)
DLM-1389	D-Fructose (6,6-D <sub>2</sub> , 98%)	CLM-8813	D-Glucose-1-phosphate, dicyclohexylammonium salt, monohydrate (U- <sup>13</sup> C <sub>6</sub> , 99%) CP 95%
CLM-3705	L-Fucose (1- <sup>13</sup> C, 99%)	CLM-8367	D-Glucose-6-phosphate, disodium salt, hydrate (U- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-219	L-Fucose (6- <sup>13</sup> C, 99%)	DLM-7826	<i>myo</i> -Inositol (2-D, 91%)
CLM-9605	L-Fucose (U- <sup>13</sup> C <sub>6</sub> , 99%)	DLM-2725	<i>myo</i> -Inositol (1,2,3,4,5,6-D <sub>6</sub> , 98%)
CLM-8998	D-Galactose-1-phosphate, dipotassium salt (1- <sup>13</sup> C, 99%)	CLM-4518	Lactose ureide:2H <sub>2</sub> O (ureide- <sup>13</sup> C, 99%)
CLM-9873	D-Galactose-1-phosphate, dipotassium salt (1,2- <sup>13</sup> C <sub>2</sub> , 99%)	ULM-4519	Lactose ureide:2H <sub>2</sub> O (unlabeled)
CLM-9874	D-Galactose-1-phosphate, dipotassium salt (galactose- <sup>13</sup> C <sub>6</sub> , 99%)	CLM-4423	Lactose·H <sub>2</sub> O (glucose- <sup>13</sup> C <sub>6</sub> , 98%)
CLM-744	D-Galactose (1- <sup>13</sup> C, 99%)	CLM-1127	D-Lyxose (1- <sup>13</sup> C, 99%)
CLM-745	D-Galactose (2- <sup>13</sup> C, 99%)	CLM-1525	D-Lyxose (2- <sup>13</sup> C, 99%)
CLM-4217	D-Galactose (1,2- <sup>13</sup> C <sub>2</sub> , 99%)	CLM-1128	D-Lyxose (5- <sup>13</sup> C, 99%)
CLM-1570	D-Galactose (U- <sup>13</sup> C <sub>6</sub> , 99%)	DLM-1187	D-Lyxose (1-D, 98%)
DLM-1390	D-Galactose (1-D, 98%)	DLM-1188	D-Lyxose (2-D, 98%)
DLM-1391	D-Galactose (2-D, 98%)	CLM-2470	L-Lyxose (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9452	α-D-Glucopyranosyl-1-phosphate, dipotassium salt monohydrate ( <sup>13</sup> C <sub>6</sub> , 99%)	CLM-2642	D-Maltose·H <sub>2</sub> O (U- <sup>13</sup> C <sub>12</sub> , 99%)
CLM-9883	D-Glucosamine·HCl ( <sup>13</sup> C <sub>6</sub> , 99%)	CLM-1189	D-Mannitol (1- <sup>13</sup> C, 98%)
		CLM-4416	D-Mannitol (2- <sup>13</sup> C, 99%)
		CLM-6733	D-Mannitol (U- <sup>13</sup> C <sub>6</sub> , 99%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Continued ►

## Carbohydrates (continued)

Catalog No.	Description
CLM-358	D-Mannose (1- <sup>13</sup> C, 99%)
CLM-1523	D-Mannose (2- <sup>13</sup> C, 99%)
CLM-9064	D-Mannose (3- <sup>13</sup> C, 99%)
CLM-9394	D-Mannose (4- <sup>13</sup> C, 99%)
CLM-9063	D-Mannose (5- <sup>13</sup> C, 99%)
CLM-1192	D-Mannose (6- <sup>13</sup> C, 99%)
CLM-6567	D-Mannose (U- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-1193	D-Mannose (1-D, 98%)
DLM-1194	D-Mannose (2-D, 98%)
DLM-1195	D-Mannose (6,6-D <sub>2</sub> , 98%)
CLM-1218	L-Mannose (1- <sup>13</sup> C, 99%)
CLM-1196	D-Ribitol (1- <sup>13</sup> C, 99%)
CLM-768	D-Ribose (1- <sup>13</sup> C, 99%)
CLM-1069	D-Ribose (2- <sup>13</sup> C, 99%)
CLM-1066	D-Ribose (5- <sup>13</sup> C, 99%)
CLM-4602	D-Ribose (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-4830	D-Ribose (2,3,4,5- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-3652	D-Ribose (U- <sup>13</sup> C <sub>5</sub> , 98%)
DLM-1070	D-Ribose (1-D, 98%)
DLM-1197	D-Ribose (2-D, 98%)
DLM-6559	D-Ribose (3-D, 98%)
DLM-7778	D-Ribose (5,5-D <sub>2</sub> , 98%)
CLM-8780	Sodium D-gluconate (1- <sup>13</sup> C, 99%)
CLM-8781	Sodium D-gluconate (U- <sup>13</sup> C <sub>6</sub> , 99%)

Catalog No.	Description
CLM-1565	D-Sorbitol (1- <sup>13</sup> C, 99%)
CLM-8529	D-Sorbitol (U- <sup>13</sup> C <sub>6</sub> , 98%)
CLM-9811	D-Sucrose (fructose- <sup>13</sup> C <sub>6</sub> , 98%)
CLM-8091	D-Sucrose (glucose- <sup>13</sup> C <sub>6</sub> , 98%)
CLM-7757	D-Sucrose ( <sup>13</sup> C <sub>12</sub> , 98%)
CLM-1203	D-Talitol (1- <sup>13</sup> C, 99%)
CLM-1204	D-Talose (2- <sup>13</sup> C, 99%)
CLM-1139	D-Threose (1- <sup>13</sup> C, 99%) 1.8% in H <sub>2</sub> O
CLM-1207	D-Threose (2- <sup>13</sup> C, 99%) 1.8% in H <sub>2</sub> O
CLM-1295	D-Xylitol (1- <sup>13</sup> C, 99%)
CLM-1214	D-Xylitol (5- <sup>13</sup> C, 99%)
CLM-7608	D-Xylitol (U- <sup>13</sup> C <sub>5</sub> , 99%)
CLM-1140	D-Xylose (1- <sup>13</sup> C, 99%)
CLM-1524	D-Xylose (2- <sup>13</sup> C, 99%)
CLM-8593	D-Xylose (3- <sup>13</sup> C, 99%)
CLM-9083	D-Xylose (4- <sup>13</sup> C, 99%)
CLM-1219	D-Xylose (5- <sup>13</sup> C, 99%)
CLM-2456	D-Xylose (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-6140	D-Xylose (U- <sup>13</sup> C <sub>5</sub> , 99%)
DLM-1215	D-Xylose (1-D, 99%)
DLM-1216	D-Xylose (2-D, 98%)
DLM-7121	D-Xylose (D <sub>6</sub> , 98%)

## Carnitines/Acylcarnitines

Catalog No.	Description
DLM-3555	L-Carnitine (trimethyl-D <sub>9</sub> , 98%)
ULM-7801	L-Carnitine (unlabeled)
DLM-3820	L-Carnitine-HCl (dimethyl-D <sub>6</sub> , 98%)
DLM-1871	L-Carnitine-HCl (methyl-D <sub>3</sub> , 98%)
ULM-9173	L-Carnitine-HCl (unlabeled)
ULM-10431	DL-Carnitine-HCl, O-acetyl (unlabeled)
ULM-10433	DL-Carnitine-HCl, O-palmitoyl (unlabeled) CP 97%
ULM-10432	DL-Carnitine-HCl, O-octanoyl (unlabeled)
DLM-754	L-Carnitine-HCl, O-acetyl (N-methyl-D <sub>3</sub> , 98%)
DLM-3821	L-Carnitine-HCl, O-acetyl (N,N-dimethyl-D <sub>6</sub> , 98%) CP 97%
ULM-7802	L-Carnitine-HCl, O-acetyl (unlabeled)
DLM-3861	L-Carnitine-HCl, O-butryl (N-methyl-D <sub>3</sub> , 98%) CP 97%
ULM-7704	L-Carnitine-HCl, O-butryl (unlabeled)
DLM-9067	L-Carnitine-HCl, O-decanoyl (N-methyl-D <sub>3</sub> , 98%)
ULM-7195	L-Carnitine-HCl, O-decanoyl (unlabeled)
DLM-8162	L-Carnitine-HCl, O-dodecanoyl (N-methyl-D <sub>3</sub> , 98%)
DLM-8215	L-Carnitine-HCl, O-dodecanoyl (N,N,N-trimethyl-D <sub>9</sub> , 98%)
ULM-7199	L-Carnitine-HCl, O-dodecanoyl (unlabeled)
DLM-9276	L-Carnitine-HCl, O-hexanoyl (N-methyl-D <sub>3</sub> , 98%)
ULM-7198	L-Carnitine-HCl, O-hexanoyl (unlabeled)
DLM-6718	L-Carnitine-HCl, O-hexacosanoyl (N-methyl-D <sub>3</sub> , 98%) CP 95%
ULM-6719	L-Carnitine-HCl, O-hexacosanoyl (unlabeled) CP 95%
DLM-3974	L-Carnitine-HCl, O-isovaleryl (N,N,N-trimethyl-D <sub>9</sub> , 98%)
ULM-4697	L-Carnitine-HCl, O-isovaleryl (unlabeled)

Catalog No.	Description
DLM-4425	L-Carnitine-HCl, O-myristoyl (N,N,N-trimethyl-D <sub>9</sub> , 98%)
ULM-7737	L-Carnitine-HCl, O-myristoyl (unlabeled)
DLM-8271	L-Carnitine-HCl, O-octadecanoyl (N-methyl-D <sub>3</sub> , 98%)
ULM-7196	L-Carnitine-HCl, O-octadecanoyl (unlabeled) CP 97%
DLM-755	L-Carnitine-HCl, O-octanoyl (N-methyl-D <sub>3</sub> , 98%)
ULM-7770	L-Carnitine-HCl, O-octanoyl (unlabeled)
DLM-1263	L-Carnitine-HCl, O-palmitoyl (N-methyl-D <sub>3</sub> , 98%)
ULM-7738	L-Carnitine-HCl, O-palmitoyl (unlabeled)
DLM-3973	L-Carnitine-HCl, O-propionyl (N-methyl-D <sub>3</sub> , 98%)
ULM-7705	L-Carnitine-HCl, O-propionyl (unlabeled)
DLM-8746	L-Carnitine-HCl, O-dec-2-enoyl (95% E) (N,N,N-trimethyl-D <sub>9</sub> , 98%)
ULM-8744	L-Carnitine-HCl, O-tetradec-2-enoyl, 90% E (unlabeled)
ULM-8198	L-Carnitine-HCl, O-2-decenoyl (unlabeled)
ULM-8623	L-Carnitine (mono)-ClO <sub>4</sub> , benzyl ester (unlabeled)
DLM-3975	L-Carnitine (mono)-ClO <sub>4</sub> , O-glutaryl (N-methyl-D <sub>3</sub> , 98%) CP 97%
ULM-7594	L-Carnitine (mono)-ClO <sub>4</sub> , O-glutaryl (unlabeled)
ULM-8621	L-Carnitine (mono)-ClO <sub>4</sub> , O-3-DL-hydroxybutyryl (unlabeled)
DLM-9189	L-Carnitine (mono)-ClO <sub>4</sub> , O-3-DL-hydroxypalmitoyl (N-methyl-D <sub>3</sub> , 98%)
ULM-8620	L-Carnitine (mono)-ClO <sub>4</sub> , O-3-DL-hydroxypalmitoyl (unlabeled) CP 97%
DLM-8272	L-Carnitine-ClO <sub>4</sub> , 3-hydroxyisovaleryl (N-methyl-D <sub>3</sub> , 98%)
ULM-8237	L-Carnitine-ClO <sub>4</sub> , 3-hydroxyisovaleryl (unlabeled)
ULM-8743	L-Carnitine-ClO <sub>4</sub> , O-malonyl (unlabeled) CP 97%

\*Compounds available in their dry and solution forms.

† Compounds are in solution only.

➤ See page 21 for carnitine/acylcarnitine mixes.



## Drugs and Metabolites

Catalog No.	Description
CLM-2436	Acetaminophen (carbonyl- <sup>13</sup> C, 99%)
CLM-630	Aminopyrine ( <i>N,N</i> -dimethyl- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-2762	Amitriptyline-HCl ( <i>N</i> -methyl-D <sub>3</sub> , 98%)
CLM-6585	Aspirin (acetyl- <sup>13</sup> C, 99%)
CLM-3655	AZT (methyl- <sup>13</sup> C, 99%) CP 96%
DLM-1566	Benzotropine mesylate ( <i>N</i> -methyl-D <sub>3</sub> , 98%) CP 95%
DLM-2790	Buspirone-HCl (butyl-D <sub>8</sub> , 98%)
CLM-1608	Chloral hydrate (trichloromethyl- <sup>13</sup> C, 97%)
DLM-1287	Clonidine-HCl (4,4,5,5-imidazoline-D <sub>4</sub> , 98%) CP 95%
DLM-2816	Clozapine (4-methylpiperazinyl-D <sub>4</sub> , 97%)
DLM-1819	DL-Cotinine (methyl-D <sub>3</sub> , 98%)
DLM-3020	Desipramine-HCl (2,4,6,8-D <sub>4</sub> , 98%)
DLM-7504	Dexamethasone (4,6 $\alpha$ ,21,21-D <sub>4</sub> , 96%) may contain D at C-2
DLM-1886	Diazepam (phenyl-D <sub>5</sub> , 98%)
DLM-3025	5,5-Diphenylhydantoin (phenyl-D <sub>5</sub> , 98%)
DLM-324	5,5-Diphenylhydantoin (diphenyl-D <sub>10</sub> , 98%)
CNLM-411	5,5-Diphenylhydantoin (2- <sup>13</sup> C, 99%; 1,3- <sup>15</sup> N <sub>2</sub> , 98%)
DLM-2745	Enalapril maleate (phenyl-D <sub>5</sub> , 98%)
DLM-2744	Enalaprilat·H <sub>2</sub> O (phenyl-D <sub>5</sub> , 98%)
CLM-123	Erythromycin ( <i>N</i> -methyl- <sup>13</sup> C, 99%)
CLM-3672	Erythromycin ( <i>N,N</i> -dimethyl- <sup>13</sup> C <sub>2</sub> , ~90%) 90-95% Erythromycin A
CDLM-10030	Erythromycin ( <i>N</i> -methyl- <sup>13</sup> C, 99%; D <sub>3</sub> , 98%) CP 97%
CLM-165	Erythromycin, lactobionate salt ( <i>N</i> -methyl- <sup>13</sup> C, 99%)
CLM-3758	Erythromycin, lactobionate salt ( <i>N,N</i> -dimethyl- <sup>13</sup> C <sub>2</sub> , ~90%)
CLM-10404 <sup>†</sup>	Estradiol undecanoate (2,3,4- <sup>13</sup> C <sub>3</sub> , 98%) CP 95%
DLM-9855*	Everolimus (2-hydroxyethyl-D <sub>4</sub> , 98%)
ULM-9856*	Everolimus (unlabeled)
CLM-10405	Fenoprofen, sodium salt, hydrate (ring- <sup>13</sup> C <sub>6</sub> , 99%)

Catalog No.	Description
DLM-3996	Glybenclamide (cyclohexylamine-D <sub>11</sub> , 98%)
CLM-6943*	Ibuprofen (propionic- <sup>13</sup> C <sub>3</sub> , 99%)
ULM-7275*	Ibuprofen (unlabeled)
DLM-3035	Imipramine-HCl (2,4,6,8-D <sub>4</sub> , 98%) CP 97%
CLM-7118	Ketoconazole (carbonyl- <sup>13</sup> C, 99%)
CNLM-7633	Lamotrigine (5,6- <sup>13</sup> C <sub>2</sub> , 99%; 5-amino- <sup>15</sup> N, 98%)
DLM-7861	Metformin-HCl (dimethyl-D <sub>6</sub> , 99%)
CLM-1280	Methacetin (methoxy- <sup>13</sup> C, 99%)
DLM-10407	Moricizine hydrochloride (D <sub>8</sub> , 98%) CP 95%
CLM-7522	Naproxen, sodium salt ( <i>O</i> -methyl- <sup>13</sup> C, 98%)
CLM-3914*	DL-Nicotine (3',4',5'- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-1818	DL-Nicotine (methyl-D <sub>3</sub> , 98%)
DLM-1885	Nordiazepam (phenyl-D <sub>5</sub> , 98%)
DLM-9017	DL-Nornicotine (pyridine-D <sub>4</sub> , 98%)
DLM-3038	Nortriptyline-HCl (methyl-D <sub>3</sub> , 98%)
DLM-1888	Oxazepam (phenyl-D <sub>5</sub> , 98%)
DLM-9254	Paclitaxel (12-benzoyloxy-ring-D <sub>5</sub> , 98%) CP 97%
CLM-1296	Phenacetin (ethoxy- <sup>13</sup> C, 99%)
DLM-433	Phenobarbital (ethyl-D <sub>5</sub> , 98%)
CLM-10557	Probucol (propyl- <sup>13</sup> C <sub>3</sub> , 99%) CP 96%
DLM-9220	Rapamycin (D <sub>3</sub> , 98%)
DLM-2659	DL-Secobarbital (1-methyl-D <sub>3</sub> , butyl-2,2-D <sub>2</sub> , 98%)
ULM-10473 <sup>†</sup>	Stanozolol (unlabeled)
CLM-3045*	Sulfamethazine (phenyl- <sup>13</sup> C <sub>6</sub> , 99%)
ULM-7220*	Sulfamethazine (unlabeled)
CLM-7119	Temozolomide (methyl- <sup>13</sup> C, 99%)
CLM-7491	<i>cis</i> -(+/-)-Tramadol-HCl (methoxy- <sup>13</sup> C, 99%)
CLM-7988*	Trimethoprim (pyrimidine-4,5,6- <sup>13</sup> C <sub>3</sub> , 99%)
ULM-7989*	Trimethoprim (unlabeled)

► Please visit the “Drug Standards” section of [isotope.com/products](https://isotope.com/products) for complete product listings and additional information.

\*Compounds available in dry and solution forms.

<sup>†</sup>Compounds available in solution only.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Continued ►

## Fatty Acids and Lipids

Catalog No.	Description
DLM-1234	Arachidic acid (methyl-D <sub>3</sub> , 98%) CP 97%
DLM-1233	Arachidic acid (D <sub>39</sub> , 98%)
DLM-1661-N	Arachidonic acid (5,6,8,9,11,12,14,15-D <sub>8</sub> , 98%)
CLM-9666	Butyric acid (1- <sup>13</sup> C, 99%)
CLM-9768	Butyryl coenzyme A, lithium salt (butyryl- <sup>13</sup> C <sub>4</sub> , 99%) CP 95%
CLM-9950	Decanoic acid ( <sup>13</sup> C <sub>10</sub> , 98%)
DLM-2006	Decanoic acid (methyl-D <sub>3</sub> , 98%)
DLM-270	Decanoic acid (D <sub>19</sub> , 98%)
ULM-9721	<i>N</i> -Decanoyl-D-sphingosine (ceramide D18:1/10:0) (unlabeled) CP 97%
CLM-8388	Docosahexaenoic acid (U- <sup>13</sup> C <sub>22</sub> , 99%)
DLM-10012	Docosahexaenoic acid (21,21,22,22,22-D <sub>5</sub> , 98%)
ULM-10013	Docosahexaenoic acid (unlabeled)
DLM-10015	Docosahexaenoic acid, ethyl ester (21,21,22,22,22-D <sub>5</sub> , 98%) CP 95%
ULM-10016	Docosahexaenoic acid, ethyl ester (unlabeled) CP 95%
CLM-8398	Docosahexaenoic acid, methyl ester (docosahexaenoate-U- <sup>13</sup> C <sub>22</sub> , 99%)
DLM-10014	Docosahexaenoic acid, methyl ester (21,21,22,22,22-D <sub>5</sub> , 98%) CP 97%
CLM-9909	Docosanoic acid (1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%) CP 95%
DLM-9180	Docosanoic acid (22,22,22-D <sub>3</sub> , 98%)
DLM-9951	Docosanoic acid (3,3,5,5-D <sub>4</sub> , 98%) CP 95%
DLM-4703	Docosanoic acid (D <sub>43</sub> , 98%)
DLM-2274	Dodecylphosphocholine (D <sub>38</sub> , 98%)
DLM-9720	<i>cis</i> -5,8,11,14,17-Eicosapentaenoic acid (19,19,20,20,20-D <sub>5</sub> , 98%)
ULM-10024	<i>cis</i> -5,8,11,14,17-Eicosapentaenoic acid (unlabeled)
CLM-8389	Eicosapentaenoic acid (U- <sup>13</sup> C <sub>20</sub> , 98%)
CLM-8399	Eicosapentaenoic acid, methyl ester (eicosapentaenoate-U- <sup>13</sup> C <sub>20</sub> , 90%)
CLM-8274	Ethyl hexanoate (hexanoate- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-4338	DL-Glycerol (1- <sup>13</sup> C, 99%) aqueous solution
CLM-1397	Glycerol (2- <sup>13</sup> C, 99%)
CLM-1857	Glycerol (1,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1510	Glycerol ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-10430	Glycerol (2-D, 95-98%) aqueous solution
DLM-1229	Glycerol (1,1,2,3,3-D <sub>5</sub> , 99%)
DLM-558	Glycerol (D <sub>8</sub> , 99%)
DLM-1326	Glycerol [(OD) <sub>3</sub> , 98%]
CDLM-7745	Glycerol ( <sup>13</sup> C <sub>3</sub> , 99%; D <sub>8</sub> , 98%) CP 95%
DLM-1308	Heptadecanoic acid (methyl-D <sub>3</sub> , 98%)
DLM-6905	Heptadecanoic acid (D <sub>33</sub> , 98%)
DLM-1820	Heptanoic acid (2,2,3,3-D <sub>4</sub> , 98%)
DLM-2731	Heptanoic acid (D <sub>13</sub> , 98%)
CLM-9790	Hexacosanoic acid (1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-9953	Hexacosanoic acid (3,3,5,5-D <sub>4</sub> , 98%) CP 95%
DLM-8510	Hexacosanoic acid (12,12,13,13-D <sub>4</sub> , 98%)
DLM-2922	DL-3-Hydroxymyristic acid (2,2,3,4,4-D <sub>5</sub> , 96%)
CLM-2095	Isovaleric acid (1- <sup>13</sup> C, 99%)
DLM-2938	Isovaleric acid (D <sub>9</sub> , 98%)
CLM-1586	Lauric acid (1- <sup>13</sup> C, 99%)
DLM-3062	Lauric acid (methyl-D <sub>3</sub> , 99%)
DLM-563	Lauric acid (D <sub>23</sub> , 98%)

Catalog No.	Description
CLM-9688	Linoleic acid (18:2) (1- <sup>13</sup> C, 99%)
CLM-6855	Linoleic acid (18:2) (U- <sup>13</sup> C <sub>18</sub> , 98%) <10% <i>cis,trans</i> isomer CP 94%
CLM-2119	Linoleic acid (18:2), ethyl ester (1- <sup>13</sup> C, 99%)
CLM-3960	Linoleic acid (18:2), ethyl ester (linoleate-U- <sup>13</sup> C <sub>18</sub> , 98%) CP 95%
DLM-227	Linoleic acid (18:2), ethyl ester (17,17,18,18,18-D <sub>5</sub> , 98%)
DLM-766	Linoleic acid (18:2), ethyl ester (D <sub>31</sub> , 98%) CP 95%
CLM-8395	Linoleic acid (18:2), methyl ester (linoleate-U- <sup>13</sup> C <sub>18</sub> , 98%) CP 95%
DLM-9663	Linoleic acid (18:2), methyl ester (D <sub>31</sub> , 98%) CP 95%
CLM-6229	Linoleic acid (18:2), potassium salt (1- <sup>13</sup> C, 99%)
CLM-8835	Linoleic acid (18:2), potassium salt (U- <sup>13</sup> C <sub>18</sub> , 98%) (may have up to 5% isomers) CP 97%
CLM-8386	Linolenic acid (18:3) (U- <sup>13</sup> C <sub>18</sub> , 98%) CP 95%
DLM-9348	Linolenic acid (18:3) (17,17,18,18,18-D <sub>5</sub> , 98%) CP 90%
DLM-2351	Linolenic acid (18:3), ethyl ester (17,17,18,18,18-D <sub>5</sub> , 98%) CP 95%
CLM-8396	Linolenic acid (18:3), methyl ester (linolenate-U- <sup>13</sup> C <sub>18</sub> , 98%) CP 95%
CLM-9792	Lyso-PC 26:0 (hexacosanoyl-1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%)
ULM-9791	Lyso-PC 26:0 (unlabeled)
DLM-8375	Mixed triglycerides (U-D, 97%)
CLM-1844	Myristic acid (1- <sup>13</sup> C, 99%)
CLM-3665	Myristic acid (1,2,3- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-1039	Myristic acid (methyl-D <sub>3</sub> , 98%)
DLM-7487	Myristic acid (13,13,14,14,14-D <sub>5</sub> , 98%)
DLM-208	Myristic acid (D <sub>27</sub> , 98%)
CLM-6228	Myristic acid, potassium salt (1- <sup>13</sup> C, 99%)
CLM-8695	Myristic acid, sodium salt (1,2,3- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-8724	Nonanoic acid (U- <sup>13</sup> C <sub>9</sub> , 98%)
DLM-7490	Nonanoic acid (9,9,9-D <sub>3</sub> , 98%)
DLM-9501	Nonanoic acid (D <sub>17</sub> , 98%)
CLM-293	Octanoic acid (1- <sup>13</sup> C, 99%)
CLM-3827	Octanoic acid (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2721	Octanoic acid (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-3981	Octanoic acid ( <sup>13</sup> C <sub>8</sub> , 99%)
DLM-619	Octanoic acid-D <sub>15</sub> (D, 98%)
CLM-3707	2-Octanoyl-1,3-distearin (octanoic-1- <sup>13</sup> C, 99%)
CLM-4258	2-Octanoyl-1,3-distearin (octanoyl-1,2- <sup>13</sup> C <sub>2</sub> , 99%)
ULM-9722	<i>N</i> -Octanoyl-D-sphingosine (ceramide D18:1/8:0) (unlabeled)
DLM-6726	<i>N</i> -Octyl β-glucoside (D <sub>24</sub> , 98%)
CLM-2492	Oleic acid (methyl- <sup>13</sup> C, 99%)
CLM-149	Oleic acid (1- <sup>13</sup> C, 99%)
CLM-460	Oleic acid (U- <sup>13</sup> C <sub>18</sub> , 98%)
DLM-689	Oleic acid (9,10-D <sub>2</sub> , 97%)
DLM-1891	Oleic acid (D <sub>33</sub> , 98%)
DLM-8747	Oleic acid, ethyl ester (D <sub>33</sub> , 98%) CP 95%
CLM-4337	Oleic acid, methyl ester (oleate-U- <sup>13</sup> C <sub>18</sub> , 98%)
CLM-4477	Oleic acid, potassium salt (1- <sup>13</sup> C, 99%)
CLM-8856	Oleic acid, potassium salt (U- <sup>13</sup> C <sub>18</sub> , 98%) CP 95%
DLM-8837	Oleic acid, potassium salt (15,15,16,16,17,17,18,18,18-D <sub>9</sub> , 98%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Fatty Acids and Lipids (continued)

Catalog No.	Description
CLM-6230	Oleic acid, sodium salt (1- <sup>13</sup> C, 99%)
CLM-8763	Oleic acid, sodium salt (U- <sup>13</sup> C <sub>18</sub> , 98%)
CLM-9583	<i>N</i> -Oleoyl-D-sphingosine (ceramide d18:1/18:1 (9z)) (oleoyl-U- <sup>13</sup> C <sub>18</sub> , 99%) CP 95%
ULM-9581	<i>N</i> -Oleoyl-D-sphingosine (ceramide d18:1/18:1 (9z)) (unlabeled) CP 95%
CLM-150	Palmitic acid (1- <sup>13</sup> C, 99%)
CLM-2120	Palmitic acid (2- <sup>13</sup> C, 99%)
CLM-214	Palmitic acid (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-7896	Palmitic acid (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-409	Palmitic acid (U- <sup>13</sup> C <sub>16</sub> , 98%)
DLM-8673	Palmitic acid (12-D, 98%)
DLM-1153	Palmitic acid (2,2-D <sub>2</sub> , 98%)
DLM-2890	Palmitic acid (9,9-D <sub>2</sub> , 98%)
DLM-2891	Palmitic acid (13,13-D <sub>2</sub> , 98%)
DLM-611	Palmitic acid (methyl-D <sub>3</sub> , 98%)
DLM-2893	Palmitic acid (7,7,8,8-D <sub>4</sub> , 98%)
DLM-2894	Palmitic acid (11,11,12,12-D <sub>4</sub> , 98%)
DLM-9424	Palmitic acid (13,13,14,14,15,15,16,16,16-D <sub>9</sub> , 98%)
DLM-2895	Palmitic acid (9,9,...16,16,16-D <sub>17</sub> , 98%) CP 97%
DLM-215	Palmitic acid (D <sub>31</sub> , 98%)
CLM-3957	Palmitic acid, ethyl ester (palmitate-U- <sup>13</sup> C <sub>16</sub> , 98%) CP 95%
DLM-8793	Palmitic acid, ethyl ester (D <sub>31</sub> , 98%)
CLM-8390	Palmitic acid, methyl ester (palmitate-U- <sup>13</sup> C <sub>16</sub> , 98%)
CLM-2241	Palmitoleic acid (U- <sup>13</sup> C <sub>16</sub> , 98%) CP 97%
CLM-3958	Palmitoleic acid, ethyl ester (palmitoleate-U- <sup>13</sup> C <sub>16</sub> , 98%) CP 97%
CLM-8391	Palmitoleic acid, methyl ester (palmitoleate-U- <sup>13</sup> C <sub>16</sub> , 98%) CP 97%
CLM-9582	<i>N</i> -Palmitoyl-D-sphingosine (ceramide d18:1/16:0) (palmitoyl-U- <sup>13</sup> C <sub>16</sub> , 99%) CP 95%
ULM-9580	<i>N</i> -Palmitoyl-D-sphingosine (ceramide d18:1/16:0) (unlabeled) CP 95%
DLM-1307	Pentadecanoic acid (methyl-D <sub>3</sub> , 98%)
DLM-572	Pentanoic acid (D <sub>9</sub> , 98%)
DLM-4341	DL- $\alpha$ -Phosphatidylcholine, dihexanoyl (DHPC) (D <sub>40</sub> , 98%) CP 95%
DLM-605	L- $\alpha$ -Phosphatidylcholine, dimyristoyl (DMPC) (dimyristoyl-D <sub>54</sub> , 97%) CP 95%
CLM-9668	DL- $\alpha$ -Phosphatidylcholine, dipalmitoyl (DPPC) (U- <sup>13</sup> C <sub>40</sub> , 98%) CP 95%
DLM-8256	DL- $\alpha$ -Phosphatidylcholine, dipalmitoyl (DPPC) (D <sub>80</sub> , 98%) CP 95%
DLM-606	L- $\alpha$ -Phosphatidylcholine, dipalmitoyl (DPPC) (dipalmitoyl-D <sub>62</sub> , 98%) CP 95%
DLM-7557	L-Phosphatidylglycerol, dipalmitoyl (DPPG) (dipalmitoyl-D <sub>62</sub> , 98%)

Catalog No.	Description
DLM-6998	Phytanic acid (3-methyl-D <sub>3</sub> , 98%) CP 95%
CLM-1889	Potassium palmitate (1- <sup>13</sup> C, 99%)
CLM-6865	Potassium palmitate (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-3943	Potassium palmitate (U- <sup>13</sup> C <sub>16</sub> , 98%)
DLM-3773	Potassium palmitate (2,2-D <sub>2</sub> , 97%)
DLM-6199	Potassium palmitate (methyl-D <sub>3</sub> , 98%)
DLM-6033	Potassium palmitate (7,7,8,8-D <sub>4</sub> , 98%)
DLM-8302	Pristanic acid (2-methyl-D <sub>3</sub> , 98%) CP 95%
DLM-197	Sodium dodecyl sulfate (D <sub>25</sub> , 98%)
CLM-1948	Sodium octanoate (1- <sup>13</sup> C, 99%)
CLM-3876	Sodium octanoate (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-3980	Sodium octanoate (2,4,6,8- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-9617	Sodium octanoate ( <sup>13</sup> C <sub>8</sub> , 99%)
CLM-174	Sodium palmitate (1- <sup>13</sup> C, 99%)
CLM-6059	Sodium palmitate (U- <sup>13</sup> C <sub>16</sub> , 98%)
ULM-9579	Sphingosine (unlabeled) CP 95%
CLM-490	Stearic acid (methyl- <sup>13</sup> C, 99%)
CLM-676	Stearic acid (1- <sup>13</sup> C, 99%)
CLM-6990	Stearic acid (U- <sup>13</sup> C <sub>18</sub> , 98%) CP 97%
DLM-1154	Stearic acid (methyl-D <sub>3</sub> , 98%)
DLM-2712	Stearic acid (17,17,18,18,18-D <sub>5</sub> , 98%)
DLM-379	Stearic acid (D <sub>35</sub> , 98%)
CLM-8731	Stearic acid, ethyl ester (stearate-U- <sup>13</sup> C <sub>18</sub> , 98%)
CLM-8394	Stearic acid, methyl ester (stearate-U- <sup>13</sup> C <sub>18</sub> , 98%) CP 95%
CLM-6227	Stearic acid, potassium salt (1- <sup>13</sup> C, 99%)
CLM-10365	Stearic acid, sodium salt (U- <sup>13</sup> C <sub>18</sub> , 98%) CP 97%
CLM-9932	Tetracosanoic acid (1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%) CP 96%
DLM-9952	Tetracosanoic acid (3,3,5,5-D <sub>4</sub> , 98%) CP 95%
DLM-9179	Tetracosanoic acid (9,9,10,10-D <sub>4</sub> , 98%)
DLM-7302	Tetracosanoic acid (D <sub>47</sub> , 98%)
CNLM-8110	Tiglylglycine (glycine- <sup>13</sup> C <sub>2</sub> , 98%; <sup>15</sup> N, 98%)
DLM-1392	Tridecanoic acid (D <sub>25</sub> , 98%)
CLM-162	Trioctanoin (1,1,1- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-163	Triolein (1,1,1- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-164	Tripalmitin (1,1,1- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-350	Tripalmitin (2,2,2- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-8445	Tripalmitin (glyceryl- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-9468	Tripalmitin (1,1,1,2,2,2,3,3,3,4,4,4- <sup>13</sup> C <sub>12</sub> , 99%)
DLM-9986	Tripalmitin (glyceryl-D <sub>5</sub> , 98-99%)
DLM-9462	Tripalmitin (trispalmitoyl-D <sub>93</sub> , 98%)
DLM-9044	Tripalmitin (D <sub>98</sub> , 98%)
DLM-7875	Tristearin (tristearoyl-D <sub>105</sub> , 98%)

► See pages 21-27 for fatty acid mixes.

## Flavonoids

Catalog No.	Description
CLM-9256	(+/-)-Catechin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-10554	(+/-)-Catechin gallate (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
CLM-9257	(+/-)-Epicatechin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
ULM-10550	(+/-)-Epicatechin (unlabeled) CP 97%
CLM-10553	(+/-)-Epicatechin gallate (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
CLM-10555	(+/-)-Epigallocatechin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
CLM-10551	(+/-)-Epigallocatechin gallate (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
CLM-9756	Galangin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 95%
ULM-10281	Galangin (unlabeled)

Catalog No.	Description
CLM-10556	(+/-)-Galocatechin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
CLM-10552	(+/-)-Galocatechin gallate (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
CLM-9755	Kaempferol (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 95%
CLM-9754	Myricetin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 95%
CLM-9753	Quercetin (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 95%
CLM-9259	Resveratrol (4-hydroxyphenyl- <sup>13</sup> C <sub>6</sub> , 99%)

## MS/MS Standards

Catalog No.	Description
DLM-10520	LYSO-PC 20:0 (eicosanoyl-12,12,13,13-D <sub>4</sub> , 98%)
ULM-10521	LYSO-PC 20:0 (unlabeled)
CLM-10499	LYSO-PC 22:0 (docosanoyl-1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-10500	LYSO-PC 22:0 (docosanoyl-12,12,13,13-D <sub>4</sub> , 98%)
ULM-10498	LYSO-PC 22:0 (unlabeled)
CLM-10496	LYSO-PC 24:0 (tetracosanoyl-1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-10497	LYSO-PC 24:0 (tetracosanoyl-12,12,13,13-D <sub>4</sub> , 98%)
ULM-10495	LYSO-PC 24:0 (unlabeled)
CLM-9792	LYSO-PC 26:0 (hexacosanoyl-1,2,3,4,5,6- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-10501	LYSO-PC 26:0 (hexacosanoyl-12,12,13,13-D <sub>4</sub> , 98%)
ULM-9791	LYSO-PC 26:0 (unlabeled)
NSK-NI	Acid sphingomyelinase substrate and internal standard
NSK-KR	Galactocerebrosidase substrate and internal standard
NSK-FA	α-Galactosidase substrate and internal standard

Catalog No.	Description
NSK-GA	Glucocerebrosidase substrate and internal standard
NSK-MP	α-L-Iduronidase substrate and internal standard
NSK-PO	Lysosomal α-Glucosidase substrate and internal standard
CNLM-9007-CA	L-Argininosuccinic acid, barium salt·2H <sub>2</sub> O (arginine- <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>4</sub> , 99%) CP 90%
ULM-9008-CA	L-Argininosuccinic acid, barium salt·3H <sub>2</sub> O (unlabeled) CP 90%
DLM-3619	DL-Homocystine (3,3,3',3'4,4,4',4'-D <sub>8</sub> , 98%)
CLM-9426	Methylmalonic acid ( <sup>13</sup> C <sub>4</sub> , 99%)
DLM-387	Methylmalonic acid (methy-D <sub>3</sub> , 98%)
NLM-1048	Orotic acid·H <sub>2</sub> O (1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CLM-2260	L-Proline ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-487	L-Proline (D <sub>7</sub> , 97-98%)
ULM-8333	L-Proline (unlabeled)

## Neurotransmitters

Catalog No.	Description
CLM-8666	4-Aminobutyric acid ( <sup>13</sup> C <sub>4</sub> , 97-99%)
CLM-548	Choline chloride (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-549	Choline chloride (trimethyl-D <sub>9</sub> , 98%)
CLM-3368	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (1- <sup>13</sup> C, 99%)
CLM-3369	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (ring- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-2833	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (1,1-D <sub>2</sub> , 93%) CP 96-98%
DLM-2834	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (2,2-D <sub>2</sub> , 97-98%)
DLM-2181	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (ring-D <sub>3</sub> , 98%)

Catalog No.	Description
DLM-2498	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (1,1,2,2-D <sub>4</sub> , 97-98%)
DLM-2290	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (ring-D <sub>3</sub> , 95%; 2,2-D <sub>2</sub> , 95%)
CNLM-3445	Dopamine·HCl (2-(3,4-dihydroxyphenyl)- ethylamine·HCl) (1- <sup>13</sup> C, 99%; <sup>15</sup> N, 99%)
DLM-2911	Histamine·2HCl (α,β,β,β-D <sub>4</sub> , 98%)
DLM-3560	DL-Metanephrine·HCl (α,β,β-D <sub>3</sub> , 98%)
DLM-2950	N-τ-Methylhistamine·2HCl (N-methyl-D <sub>3</sub> , 98%)
DLM-8820	DL-Norepinephrine·HCl (ring-D <sub>3</sub> , 1,2,2-D <sub>3</sub> , 99%)
DLM-8609	DL-Normetanephrine·HCl (α,β,β-D <sub>3</sub> , 98%)
DLM-8075	Tyramine·HCl (1,1,2,2-D <sub>4</sub> , 98%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Nucleotides, Nucleosides, and Nucleobases

Catalog No.	Description
CLM-1654	Adenine (8- <sup>13</sup> C, 95%)
NLM-6924	Adenine·HCl ( <sup>15</sup> N <sub>5</sub> , 98%)
CLM-7674	Adenosine (3'- <sup>13</sup> C, 98%)
CLM-3698	Adenosine (ribose-2- <sup>13</sup> C, 99%)
CLM-3678	Adenosine (ribose- <sup>13</sup> C <sub>5</sub> , 98%) CP 97%
DLM-7676	Adenosine (ribose-1-D, 98%)
DLM-7677	Adenosine (ribose-2-D, 97%)
DLM-7678	Adenosine (ribose-5,5-D <sub>2</sub> , 98%)
CNLM-3806-CA	Adenosine ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 96-98%)
NLM-9750-SL	Adenosine (U- <sup>15</sup> N <sub>5</sub> , 96-98%)
CNLM-3802	Adenosine 5'-monophosphate ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 96-98%)
NLM-3792-SL	Adenosine 5'-monophosphate, lithium salt (U- <sup>15</sup> N <sub>5</sub> , 96-98%)
DLM-7514-CA <sup>†</sup>	Adenosine 5'-triphosphate (ATP), ammonium salt (D, 97%) CP >90%
DLM-8815-CA <sup>†</sup>	Adenosine 5'-triphosphate (ATP), ammonium salt (2-D, 97%) CP >90%
DLM-8922-CA <sup>†</sup>	Adenosine 5'-triphosphate (ATP), ammonium salt (ribose-3',4',5',5"-D <sub>4</sub> , 98%) CP >90%
NLM-3987-CA <sup>†</sup>	Adenosine 5'-triphosphate (ATP), ammonium salt ( <sup>15</sup> N <sub>5</sub> , 98-99%) CP >90%
CNLM-4265-CA <sup>†</sup>	Adenosine 5'-triphosphate (ATP), ammonium salt ( <sup>13</sup> C <sub>10</sub> , 98-99%; <sup>15</sup> N <sub>5</sub> , 98-99%) CP >90%
CLM-3605	Adenosine·H <sub>2</sub> O (ribose-1- <sup>13</sup> C, 99%) CP 95%
CLM-3611	Cytidine (ribose-1- <sup>13</sup> C, 99%)
CLM-3699	Cytidine (ribose-2- <sup>13</sup> C, 99%)
CLM-3679	Cytidine (ribose- <sup>13</sup> C <sub>5</sub> , 98%)
DLM-7681	Cytidine (ribose-5,5-D <sub>2</sub> , 98%)
NLM-3797	Cytidine ( <sup>15</sup> N <sub>3</sub> , 96-98%)
CNLM-3807	Cytidine ( <sup>13</sup> C <sub>9</sub> , 98%; <sup>15</sup> N <sub>3</sub> , 96-98%)
NLM-3793-SL	Cytidine 5'-monophosphate, lithium salt (U- <sup>15</sup> N <sub>3</sub> , 96-98%) CP >90%
CNLM-3803-SL <sup>†</sup>	Cytidine 5'-monophosphate, lithium salt (U- <sup>13</sup> C <sub>9</sub> , 98%; U- <sup>15</sup> N <sub>3</sub> , 96-98%) (in solution) CP >90%
DLM-8924-CA <sup>†</sup>	Cytidine 5'-triphosphate (CTP), ammonium salt (5-D, ribose-3',4',5',5"-D <sub>4</sub> , 97%) CP >90%
DLM-9267-CA <sup>†</sup>	Cytidine 5'-triphosphate (CTP), ammonium salt (5,6-D <sub>2</sub> , 97%) CP 90%
DLM-8594-CA <sup>†</sup>	Cytidine 5'-triphosphate (CTP), ammonium salt (cytosine-5-D, 6-H; ribose-1,2,3,4,5,5-D <sub>6</sub> , 96-97%)
DLM-7515-CA <sup>†</sup>	Cytidine 5'-triphosphate (CTP), ammonium salt (D <sub>8</sub> , 97%) CP >90%
NLM-4266-CA <sup>†</sup>	Cytidine 5'-triphosphate (CTP), ammonium salt ( <sup>15</sup> N <sub>3</sub> , >96%) CP >90%
CNLM-4267-CA <sup>†</sup>	Cytidine 5'-triphosphate (CTP), ammonium salt ( <sup>13</sup> C <sub>9</sub> , 99%; <sup>15</sup> N <sub>3</sub> , 96-98%) CP >90%
DLM-9101-CA	Cytidine·H <sub>2</sub> O (5,6-D <sub>2</sub> , 98%) CP 95%
CLM-1001	Cytosine (2- <sup>13</sup> C, 99%)
CNLM-4424	Cytosine (2- <sup>13</sup> C, 99%; 1,3- <sup>15</sup> N <sub>2</sub> , 98%)
DLM-4750	2-Deoxy-D-ribose (5,5-D <sub>2</sub> , 98%)
NLM-3919-SL	2'-Deoxyadenosine 5'-monophosphate (U- <sup>15</sup> N <sub>5</sub> , 98%)
CNLM-3918-SL	2'-Deoxyadenosine 5'-monophosphate, lithium salt (U- <sup>13</sup> C <sub>10</sub> , 98%; U- <sup>15</sup> N <sub>5</sub> , 98%)

Catalog No.	Description
CNLM-6219-CA <sup>†</sup>	2'-Deoxyadenosine 5'-triphosphate (dATP) ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 96-98%) CP >90%
DLM-7507-SL <sup>†</sup>	2-Deoxyadenosine 5'-triphosphate (dATP), lithium salt (U-D, 97%) CP >90%
NLM-6215-SL <sup>†</sup>	2'-Deoxyadenosine 5'-triphosphate (dATP), lithium salt (U- <sup>15</sup> N <sub>5</sub> , 98%) CP >90%
NLM-6829	2'-Deoxyadenosine phosphoramidite ( <sup>15</sup> N <sub>5</sub> , 98%) CP 95%
CNLM-6828	2'-Deoxyadenosine phosphoramidite ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 98%) CP 95%
CLM-3700	2'-Deoxyadenosine·H <sub>2</sub> O (deoxyribose-1- <sup>13</sup> C, 99%)
CLM-3701	2'-Deoxyadenosine·H <sub>2</sub> O (deoxyribose-2- <sup>13</sup> C, 99%)
CLM-7682	2'-Deoxyadenosine·H <sub>2</sub> O (ribose-5- <sup>13</sup> C, 98%)
CLM-4579	2'-Deoxyadenosine·H <sub>2</sub> O (ribose- <sup>13</sup> C <sub>5</sub> , 99%)
DLM-7683	2'-Deoxyadenosine·H <sub>2</sub> O (ribose-5,5-D <sub>2</sub> , 98%)
NLM-3895	2'-Deoxyadenosine·H <sub>2</sub> O ( <sup>15</sup> N <sub>5</sub> , 96-98%)
NLM-3897	2'-Deoxycytidine ( <sup>15</sup> N <sub>3</sub> , 96-98%)
NLM-3921	2'-Deoxycytidine 5'-monophosphate ( <sup>15</sup> N <sub>3</sub> , 96%)
DLM-7508-SL <sup>†</sup>	2-Deoxycytidine 5'-triphosphate, lithium salt (U-D, 97%) CP >90%
NLM-6216-SL <sup>†</sup>	2'-Deoxycytidine 5'-triphosphate, lithium salt (U- <sup>15</sup> N <sub>3</sub> , 98%) CP >90%
CNLM-6220-SL <sup>†</sup>	2'-Deoxycytidine 5'-triphosphate, lithium salt (U- <sup>13</sup> C <sub>9</sub> , 98%; U- <sup>15</sup> N <sub>3</sub> , 98%) CP >90%
NLM-6827	2'-Deoxycytidine phosphoramidite ( <sup>15</sup> N <sub>3</sub> , 98%) CP 95%
CNLM-6830	2'-Deoxycytidine phosphoramidite ( <sup>13</sup> C <sub>9</sub> , 98%; <sup>15</sup> N <sub>3</sub> , 98%) CP 95%
CLM-3702	2'-Deoxycytidine·H <sub>2</sub> O (deoxyribose-2- <sup>13</sup> C, 99%)
CLM-7684	2'-Deoxycytidine·H <sub>2</sub> O (ribose-1- <sup>13</sup> C, 98%)
DLM-7685	2'-Deoxycytidine·H <sub>2</sub> O (ribose-5,5-D <sub>2</sub> , 98%)
CNLM-3900-CA	2'-Deoxyguanosine ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 96-98%)
NLM-6835-SL <sup>†</sup>	2'-Deoxyguanosine 5'-monophosphate (U- <sup>15</sup> N <sub>5</sub> , 98%) CP >90%
CNLM-6836-SL	2'-Deoxyguanosine 5'-monophosphate (U- <sup>13</sup> C, 98%; U- <sup>15</sup> N, 98%)
NLM-6217-CA <sup>†</sup>	2'-Deoxyguanosine 5'-triphosphate (DTP), ammonium salt ( <sup>15</sup> N <sub>5</sub> , 98-99%) CP >90%
CNLM-6221-CA <sup>†</sup>	2'-Deoxyguanosine 5'-triphosphate (DTP), ammonium salt ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 96-98%) CP >90%
DLM-7509-SL <sup>†</sup>	2-Deoxyguanosine 5'-triphosphate (DTP), lithium salt (U-D, 97%) CP >90%
NLM-6217-SL <sup>†</sup>	2'-Deoxyguanosine 5'-triphosphate (DTP), lithium salt (U- <sup>15</sup> N <sub>5</sub> , 98%) CP >90%
NLM-6826	2'-Deoxyguanosine phosphoramidite ( <sup>15</sup> N <sub>5</sub> , 98%) CP 95%
CNLM-6825	2'-Deoxyguanosine phosphoramidite ( <sup>13</sup> C <sub>10</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 98%) CP 95%
CLM-7686	2'-Deoxyguanosine·H <sub>2</sub> O (ribose-1- <sup>13</sup> C, 98%)
DLM-7687	2'-Deoxyguanosine·H <sub>2</sub> O (ribose-5,5-D <sub>2</sub> , 98%)
NLM-3899-CA	2'-Deoxyguanosine·H <sub>2</sub> O ( <sup>15</sup> N <sub>5</sub> , 98%) CP 95%
CNLM-8771-CA <sup>†</sup>	2'-Deoxyuridine, ammonium salt ( <sup>13</sup> C <sub>9</sub> , 98-99%; <sup>15</sup> N <sub>2</sub> , 98-99%) CP 90%
DLM-4391	5,6-Dihydrothymine (5,6,6-D <sub>3</sub> , methyl-D <sub>3</sub> , 95%)
CNLM-4510	5,6-Dihydrouracil ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-3752	Fapyadenine (formyl- <sup>13</sup> C, 98%; diamino- <sup>15</sup> N <sub>2</sub> , 98%)
NLM-798	5-Fluorouracil (1,3- <sup>15</sup> N <sub>2</sub> , 99%)
CNLM-3916	5-Fluorouracil ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 98%)

\*Compounds available in dry and solution forms.

<sup>†</sup>Compounds available in solution only.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Continued ►

## Nucleotides, Nucleosides, and Nucleobases (continued)

Catalog No.	Description
DLM-1846	Guanidine·DCI (D <sub>6r</sub> , 98%)
CLM-1019	Guanine (8- <sup>13</sup> C, 98%)
NLM-6925	Guanine ( <sup>15</sup> N <sub>5</sub> , 98%)
CNLM-3990	Guanine (8- <sup>13</sup> C, 98%; 7,9- <sup>15</sup> N <sub>2</sub> , 98%)
NLM-3798	Guanosine ( <sup>15</sup> N <sub>5</sub> , 96-98%)
NLM-3794-SL	Guanosine 5'-monophosphate, lyophilized powder (U- <sup>15</sup> N <sub>5</sub> , 98%) CP >90%
CNLM-3804-SL*	Guanosine 5'-monophosphate, lithium salt (U- <sup>13</sup> C <sub>10r</sub> , 98%; U- <sup>15</sup> N <sub>5</sub> , 98%) CP >90%
DLM-7516-CA <sup>†</sup>	Guanosine 5'-triphosphate (GTP), ammonium salt (D, 97%) CP >90%
DLM-8923-CA <sup>†</sup>	Guanosine 5'-triphosphate (GTP), ammonium salt (ribose-3',4',5',5"-D <sub>4</sub> , 98%) CP >90%
NLM-4268-CA <sup>†</sup>	Guanosine 5'-triphosphate (GTP), ammonium salt ( <sup>15</sup> N <sub>5</sub> , 98-99%) (in solution) CP >90%
CNLM-4269-CA <sup>†</sup>	Guanosine 5'-triphosphate (GTP), ammonium salt ( <sup>13</sup> C <sub>10r</sub> , 99%; <sup>15</sup> N <sub>5</sub> , 98%) CP >90%
CLM-7688	Guanosine-H <sub>2</sub> O (ribose-1- <sup>13</sup> C, 98%)
DLM-7689	Guanosine-H <sub>2</sub> O (ribose-5,5-D <sub>2</sub> , 98%)
CNLM-3808-CA	Guanosine-H <sub>2</sub> O ( <sup>13</sup> C <sub>10r</sub> , 98%; <sup>15</sup> N <sub>5</sub> , 96-98%)
NLM-6715	8-Hydroxy-2'-deoxyguanosine ( <sup>15</sup> N <sub>5</sub> , 98%) CP 95%
CNLM-4392	5-Hydroxycytosine (2- <sup>13</sup> C, 99%; 1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CLM-8042	Hypoxanthine ( <sup>13</sup> C <sub>5</sub> , 99%)
DLM-8658	Hypoxanthine (2,8-D <sub>2</sub> , 98%)
DLM-2923	Hypoxanthine (2,8,9-D <sub>3r</sub> , OD, 98%)
NLM-8500	Hypoxanthine ( <sup>15</sup> N <sub>4</sub> , 98%)
CNLM-7894	Hypoxanthine ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N <sub>4</sub> , 98%)
NLM-4264	Inosine ( <sup>15</sup> N <sub>4</sub> , 95%)
NLM-8712-CA <sup>†</sup>	Inosine 5'-monophosphate, ammonium salt ( <sup>15</sup> N <sub>4</sub> , 98-99%) CP >90%
DLM-7471	3-Methyladenine (methyl-D <sub>3</sub> , 98%)
DLM-7473	6-O-Methylguanine (methyl-D <sub>3</sub> , 98%)
DLM-7472	7-Methylguanine (methyl-D <sub>3</sub> , 98%)
CLM-9427-CA	1-(5'-Phosphoribosyl)-5-amino-4-imidazole-carboxamide salt·2NH <sub>4</sub> <sup>+</sup> (ribose- <sup>13</sup> C <sub>5r</sub> , 99%) CP 90%
CLM-3629	Ribothymidine (ribose-1- <sup>13</sup> C, 99%)
NLM-7565-SL	RNA standard ( <sup>15</sup> N, 98%)
CLM-6622	Taurine (1,2- <sup>13</sup> C <sub>2</sub> , 98%)
DLM-8057	Taurine (D <sub>4</sub> , 98%) CP 95%
NLM-4472	Taurine ( <sup>15</sup> N, 98%)
CLM-4289	Thymidine (deoxyribose-1- <sup>13</sup> C, 99%)
CLM-3703	Thymidine (deoxyribose-2- <sup>13</sup> C, 99%)
CLM-7692	Thymidine (deoxyribose-3- <sup>13</sup> C, 99%)
CLM-3647	Thymidine (methyl- <sup>13</sup> C, 98%)
DLM-7691	Thymidine (ribose-5,5-D <sub>2</sub> , 98%)
DLM-3327	Thymidine (methyl-D <sub>3</sub> , ring-6-D, 97%) CP 95%
NLM-3901	Thymidine ( <sup>15</sup> N <sub>2</sub> , 96-98%) CP 97%
CNLM-3902	Thymidine ( <sup>13</sup> C <sub>10r</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 96-98%)

Catalog No.	Description
NLM-3925	Thymidine 5'-monophosphate ( <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-3924-SL	Thymidine 5'-monophosphate (U- <sup>13</sup> C <sub>10r</sub> , 98%; U- <sup>15</sup> N <sub>2</sub> , 98%)
DLM-7510-SL <sup>†</sup>	Thymidine 5'-triphosphate (TTP), lithium salt (U-D, 97%) CP >90%
NLM-6218-SL <sup>†</sup>	Thymidine 5'-triphosphate (TTP), lithium salt (U- <sup>15</sup> N <sub>2</sub> , 98%) CP >90%
CNLM-6222-SL <sup>†</sup>	Thymidine 5'-triphosphate (TTP), lithium salt (U- <sup>13</sup> C <sub>10r</sub> , 98%; U- <sup>15</sup> N <sub>2</sub> , 98%) CP >90%
NLM-6823	Thymidine phosphoramidite ( <sup>15</sup> N <sub>2</sub> , 96-98%) CP 95%
CNLM-6824	Thymidine phosphoramidite ( <sup>13</sup> C <sub>10r</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 98%) CP 95%
CLM-3764	Thymine (6- <sup>13</sup> C, 99%)
DLM-1089	Thymine (α,α,α,6-D <sub>4</sub> , 98%)
NLM-3995	Thymine (1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-6945	Thymine ( <sup>13</sup> C <sub>5r</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 98%)
CLM-3276	Uracil (2- <sup>13</sup> C, 99%)
CLM-692	Uracil (4,5- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-8633	Uracil (5-D, 98%)
DLM-8502	Uracil (5,6-D <sub>2</sub> , 98%)
NLM-637	Uracil (1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CNLM-3917	Uracil ( <sup>13</sup> C <sub>4r</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 98%)
NLM-1697	Uric acid (1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CLM-3630	Uridine (ribose-1- <sup>13</sup> C, 99%)
CNLM-3809	Uridine ( <sup>13</sup> C <sub>9</sub> , 98%; <sup>15</sup> N <sub>2</sub> , 96-98%)
DLM-7693	Uridine (ribose-5,5-D <sub>2</sub> , 98%)
NLM-812	Uridine ( <sup>15</sup> N <sub>2</sub> , 98%)
NLM-3795	Uridine 5'-monophosphate ( <sup>15</sup> N <sub>2</sub> , 96-98%)
CNLM-3805-SL <sup>†</sup>	Uridine 5'-monophosphate, lithium salt (U- <sup>13</sup> C <sub>9</sub> , 98%; U- <sup>15</sup> N <sub>2</sub> , 96-98%) (in solution) CP > 90%
DLM-8925-CA <sup>†</sup>	Uridine 5'-triphosphate (UTP), ammonium salt (5-D, ribose-3',4',5',5"-D <sub>4</sub> , 98%) (in solution) CP >90%
DLM-9100-CA <sup>†</sup>	Uridine 5'-triphosphate (UTP), ammonium salt (5,6-D <sub>2</sub> , 98%) CP >90%
DLM-8637-CA <sup>†</sup>	Uridine 5'-triphosphate (UTP), ammonium salt (uracil-5-D, 6-H; ribose-1,2,3,4,5,5-D <sub>6</sub> , 96-97%) CP >90%
DLM-7517-CA <sup>†</sup>	Uridine 5'-triphosphate (UTP), ammonium salt (D <sub>8</sub> , 97%) CP 90%
NLM-4270-CA	Uridine 5'-triphosphate (UTP), ammonium salt ( <sup>15</sup> N <sub>2</sub> , 98-99%) CP >90%
CNLM-4271-CA <sup>†</sup>	Uridine 5'-triphosphate (UTP), ammonium salt ( <sup>13</sup> C <sub>9</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 98%) CP >90%
NLM-1698	Xanthine (1,3- <sup>15</sup> N <sub>2</sub> , 98%) CP 90%
CLM-8700-CA <sup>†</sup>	Xanthosine-5'-monophosphate, ammonium salt ( <sup>13</sup> C <sub>10r</sub> , 98%) CP >90%

► See pages 21-27 for mixes.

\*Compounds available in dry and solution forms.

<sup>†</sup>Compounds available in solution only.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Organic Acids

Catalog No.	Description
CLM-317	Acetic acid (1- <sup>13</sup> C, 99%)
CLM-318	Acetic acid (2- <sup>13</sup> C, 99%)
CLM-113	Acetic acid (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9878	<i>trans</i> -Aconitic acid (2,4,4'- <sup>13</sup> C <sub>3</sub> , 99%) CP 95%
DLM-2115	Adipic acid (D <sub>10</sub> , 98%)
CLM-7337	Citric acid (1,5- <sup>13</sup> C <sub>2</sub> , 98%)
CLM-148	Citric acid (2,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9876	Citric acid (1,5,6-carboxyl- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-9021	Citric acid ( <sup>13</sup> C <sub>6</sub> , 99%) CP 97%
DLM-3487	Citric acid (2,2,4,4-D <sub>4</sub> , 98%)
CLM-7933	Creatine (guanidino- <sup>13</sup> C, 99%)
DLM-1302	Creatine (methyl-D <sub>3</sub> , 98%) CP 97%
DLM-3653	Creatinine (N-methyl-D <sub>3</sub> , 98%)
CLM-1529	Fumaric acid ( <sup>13</sup> C <sub>4</sub> , 99%)
DLM-1539	Fumaric acid (2,3-D <sub>2</sub> , 98%)
DLM-7654	Fumaric acid (D <sub>4</sub> , 98%)
CDLM-6062	Fumaric acid (1- <sup>13</sup> C, 99%; 2,3-D <sub>2</sub> , 98%)
CDLM-8473	Fumaric acid (1,4- <sup>13</sup> C <sub>2</sub> , 99%; 2,3-D <sub>2</sub> , 98%)
CLM-373	Homovanillic acid (1,2- <sup>13</sup> C <sub>2</sub> , 98-99%)
DLM-2738	Homovanillic acid (phenyl-D <sub>3</sub> , 2,2-D <sub>2</sub> , 96-98%)
COLM-376	Homovanillic acid (ring- <sup>13</sup> C <sub>6</sub> , 99%; 4-hydroxy- <sup>18</sup> O, 90-95%)
CLM-10351	DL-2-Hydroxyglutaric acid, disodium salt ( <sup>13</sup> C <sub>5</sub> , 99%)
ULM-10479	DL-2-Hydroxyglutaric acid, disodium salt (unlabeled)
DLM-9104	(RS)-2-Hydroxyglutaric acid, disodium salt (2,3,3-D <sub>3</sub> ; OD, 98%) CP 95%
CLM-6820	α-Ketobutyric acid, sodium salt (methyl- <sup>13</sup> C, 99%)
CLM-6164	α-Ketobutyric acid, sodium salt ( <sup>13</sup> C <sub>4</sub> , 98%)
CDLM-7318	α-Ketobutyric acid, sodium salt (methyl- <sup>13</sup> C, 99%; 3,3-D <sub>2</sub> , 98%)
CDLM-7353	α-Ketobutyric acid, sodium salt (4- <sup>13</sup> C, 99%; 3,3,4,4-D <sub>4</sub> , 98%)
CDLM-4611	α-Ketobutyric acid, sodium salt ( <sup>13</sup> C <sub>4</sub> , 98%; 3,3-D <sub>2</sub> , 98%)
CLM-2411	α-Ketoglutaric acid ( <sup>13</sup> C <sub>5</sub> , 99%) CP >90%
DLM-9476	α-Ketoglutaric acid (D <sub>6</sub> , 98%)
CLM-4442	α-Ketoglutaric acid, disodium salt (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%) CP 97%
CLM-2093	α-Ketoisocaproic acid, sodium salt (1- <sup>13</sup> C, 99%)
CLM-4826	α-Ketoisocaproic acid, sodium salt (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-1944	α-Ketoisocaproic acid, sodium salt (methyl-D <sub>3</sub> , 98%)
DLM-4214	α-Ketoisocaproic acid, sodium salt (isopropyl-D <sub>7</sub> , 98%)
CLM-6821	α-Ketoisovaleric acid, sodium salt (dimethyl- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-4418	α-Ketoisovaleric acid, sodium salt ( <sup>13</sup> C <sub>5</sub> , 98%)
DLM-4646	α-Ketoisovaleric acid, sodium salt (D <sub>7</sub> , 98%)
CDLM-7317	α-Ketoisovaleric acid, sodium salt (3-methyl- <sup>13</sup> C, 99%; 3,4,4,4-D <sub>4</sub> , 98%)
CDLM-8446	α-Ketoisovaleric acid, sodium salt (dimethyl- <sup>13</sup> C <sub>2</sub> , 98%; 3-methyl-D <sub>2</sub> , 4,4-D <sub>2</sub> , 98%)
CDLM-7354	α-Ketoisovaleric acid, sodium salt (3-methyl- <sup>13</sup> C, 99%; 3-methyl-D <sub>2</sub> , 3,4,4,4,4-D <sub>4</sub> , 98%)
CDLM-8100	α-Ketoisovaleric acid, sodium salt (1,2,3,4- <sup>13</sup> C <sub>4</sub> , 99%; 3,4',4',4'-D <sub>4</sub> , 97-98%)
CDLM-4418	α-Ketoisovaleric acid, sodium salt ( <sup>13</sup> C <sub>5</sub> , 98%; 3-D, 98%)
DLM-7374	Kynurenic acid (ring-D <sub>5</sub> , 98%)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Catalog No.	Description
DLM-1129	Maleic acid (2,3-D <sub>2</sub> , 98%)
CLM-310	Maleic anhydride (1,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-312	Maleic anhydride (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-6019	Maleic anhydride ( <sup>13</sup> C <sub>4</sub> , 99%)
DLM-1853	Maleic anhydride (D <sub>2</sub> , 98%)
DLM-9045	DL-Malic acid (2,3,3-D <sub>3</sub> , 98%)
CLM-8065	L-Malic acid ( <sup>13</sup> C <sub>4</sub> , 99%)
CLM-4285	3-Methylglutaconic acid (2,4- <sup>13</sup> C <sub>2</sub> , 3-methyl- <sup>13</sup> C, 99%)
DLM-387	Methylmalonic acid (methyl-D <sub>3</sub> , 98%)
CNLM-9247	3-Methyluric acid (2,4,5,6- <sup>13</sup> C <sub>4</sub> , 99%; 1,3,9- <sup>15</sup> N <sub>3</sub> , 98%)
NLM-1048	Orotic acid-H <sub>2</sub> O (1,3- <sup>15</sup> N <sub>2</sub> , 98%)
CLM-3551	Potassium phosphoenol pyruvate (2- <sup>13</sup> C, 99%)
CLM-2723	Potassium phosphoenol pyruvate (3- <sup>13</sup> C, 99%)
CLM-3398	Potassium phosphoenol pyruvate (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-646	Propionic acid (1- <sup>13</sup> C, 99%)
CLM-647	Propionic acid ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-2488	Propionic acid (2,2-D <sub>2</sub> , 98%)
DLM-1137	Propionic acid (methyl-D <sub>3</sub> , 98%)
DLM-1919	Propionic acid (D <sub>5</sub> , 98%)
DLM-599	Propionic acid (D <sub>6</sub> , 98%)
CLM-8077	Pyruvic acid (1- <sup>13</sup> C, 99%)
CLM-8849	Pyruvic acid (2- <sup>13</sup> C, 99%) CP 95%
CLM-9505	Pyruvic acid (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2471	Sodium acetate – <sup>13</sup> C depleted (1,2- <sup>12</sup> C <sub>2</sub> , 99.95%)
CLM-156	Sodium acetate (1- <sup>13</sup> C, 99%)
CLM-381	Sodium acetate (2- <sup>13</sup> C, 99%)
CLM-440	Sodium acetate (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-3126	Sodium acetate (D <sub>3</sub> , 99%)
OLM-1077	Sodium acetate ( <sup>18</sup> O <sub>2</sub> , 95%)
CDLM-611	Sodium acetate (1- <sup>13</sup> C, 99%; D <sub>3</sub> , 98%)
CDLM-1240	Sodium acetate (2- <sup>13</sup> C, 99%; D <sub>3</sub> , 98%)
CDLM-3457	Sodium acetate (1,2- <sup>13</sup> C <sub>2</sub> , 99%; D <sub>3</sub> , 98%)
CLM-1256	Sodium butyrate (1- <sup>13</sup> C, 99%)
CLM-4780	Sodium butyrate (2- <sup>13</sup> C, 99%)
DLM-641	Sodium butyrate (3,3,4,4,4-D <sub>5</sub> , 98%)
DLM-7616	Sodium butyrate (D <sub>7</sub> , 98%)
CLM-3706	Sodium D-3-hydroxybutyrate (2,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-3853	Sodium D-3-hydroxybutyrate ( <sup>13</sup> C <sub>4</sub> , 99%) CP 97%
DLM-10415 <sup>†</sup>	Sodium DL-3-hydroxybutyrate (D <sub>4</sub> , 98%) CP 95%
CLM-583	Sodium formate ( <sup>13</sup> C, 99%)
OLM-8123	Sodium formate ( <sup>18</sup> O <sub>2</sub> , 95%)
CLM-1577	Sodium L-lactate (1- <sup>13</sup> C, 99%) 20% w/w in H <sub>2</sub> O
CLM-1578	Sodium L-lactate (3- <sup>13</sup> C, 98%) 20% w/w in H <sub>2</sub> O
CLM-1579	Sodium L-lactate ( <sup>13</sup> C <sub>3</sub> , 98%) 20% w/w in H <sub>2</sub> O
DLM-9071	Sodium L-lactate (3,3,3-D <sub>3</sub> , 98%) 20% w/w in H <sub>2</sub> O
CLM-771	Sodium propionate (1- <sup>13</sup> C, 99%)
CLM-1506	Sodium propionate (2- <sup>13</sup> C, 99%)
CLM-4573	Sodium propionate (3- <sup>13</sup> C, 99%)
CLM-3042	Sodium propionate (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1865	Sodium propionate ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-1601	Sodium propionate (D <sub>5</sub> , 98%)

Continued ►

## Organic Acids (continued)

Catalog No.	Description
CLM-1082	Sodium pyruvate (1- <sup>13</sup> C, 99%)
CLM-1580	Sodium pyruvate (2- <sup>13</sup> C, 99%)
CLM-1575	Sodium pyruvate (3- <sup>13</sup> C, 99%)
CLM-3507	Sodium pyruvate (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-2440	Sodium pyruvate ( <sup>13</sup> C <sub>3</sub> , 99%)
DLM-6068	Sodium pyruvate (D <sub>3</sub> , 97-98%)
CLM-1084	Succinic acid (1,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-1199	Succinic acid (2,3- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-584	Succinic acid (D <sub>4</sub> , 98%)
DLM-831	Succinic acid (D <sub>6</sub> , 98%)

Catalog No.	Description
DLM-2307	Succinic acid, disodium salt (D <sub>4</sub> , 75%) CP 95%
CLM-3399	Valproic acid (1,2,3,3'- <sup>13</sup> C <sub>4</sub> , 99%)
DLM-4291	Valproic acid (4,4,4',4'-D <sub>4</sub> , 98%)
DLM-7876	Valproic acid (propyl-1,1-D <sub>2</sub> , pentanoic-3,3-D <sub>2</sub> , 98%)
DLM-8875	Valproic acid (D <sub>15</sub> , 98%)

## Steroids and Hormones

Catalog No.	Description
DLM-8438*	Aldosterone (2,2,4,6,6,17,21,21-D <sub>8</sub> )
ULM-9134 <sup>††</sup>	Aldosterone (unlabeled) CP 95%
CLM-10548	5 $\alpha$ -Androstan-3,17-dione (androstenedione) (2,3,4- <sup>13</sup> C <sub>3</sub> , 98%)
ULM-8794*	5 $\alpha$ -Androstan-3,17-dione (androstenedione) (unlabeled)
DLM-9769*	5 $\alpha$ -Androstan-3 $\alpha$ -ol-17 $\beta$ -diol (16,16,17-D <sub>3</sub> , 98%)
ULM-9752*	5 $\alpha$ -Androstan-3 $\alpha$ -ol-17 $\beta$ -diol (unlabeled)
DLM-10269	5 $\alpha$ -Androstan-3 $\beta$ -ol-17-one (epiandrosterone) (2,2,4,4-D <sub>4</sub> , 98%)
ULM-10270	5 $\alpha$ -Androstan-3 $\beta$ -ol-17-one (epiandrosterone) (unlabeled)
DLM-8750	5 $\beta$ -Androstan-3 $\alpha$ -ol-17-one (etiocholanolone) (16,16-D <sub>2</sub> , 98%)
DLM-10008*	5 $\beta$ -Androstan-3 $\alpha$ -ol-17-one (etiocholanolone) (2,2,3,4,4-D <sub>5</sub> , 98%)
ULM-10009*	5 $\beta$ -Androstan-3 $\alpha$ -ol-17-one (etiocholanolone) (unlabeled)
DLM-9787	Androstenediol glucuronide, sodium salt (16,16,17-D <sub>3</sub> , 98%) CP 97%
DLM-10397	4-Androsten-11 $\beta$ ,17 $\beta$ -diol-3-one (9,11,12,12-D <sub>4</sub> , 98%) CP 95%
DLM-10396	4-Androsten-11 $\beta$ -ol-3,17-dione (9,11,12,12-D <sub>4</sub> , 98%)
DLM-9697	4-Androsten-11 $\beta$ -ol-3,17-dione (2,2,4,6,6,16,16-D <sub>7</sub> , 98%)
DLM-10401	5-Androsten-3 $\beta$ ,17 $\beta$ -diol (16,16,17-D <sub>3</sub> , 98%) CP 95%
CLM-9135*	4-Androstene-3,17-dione (2,3,4- <sup>13</sup> C <sub>3</sub> , 98%)
DLM-8330	4-Androstene-3,17-dione (2,2,4,6,6-D <sub>5</sub> , 98%)
DLM-7976	4-Androstene-3,17-dione (2,2,4,6,6,16,16-D <sub>7</sub> , 97%)
ULM-8472*	4-Androstene-3,17-dione (unlabeled)
DLM-10420 <sup>††</sup>	4-Androstene-6 $\beta$ ,17 $\beta$ -diol-3-one (16,16,17-D <sub>3</sub> , 98%)
DLM-7937	Androsterone (5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one) (16,16-D <sub>2</sub> , 98%)
DLM-10402 <sup>††</sup>	Androsterone (5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one) (2,2,4,4-D <sub>4</sub> , 98%) CP 95%
ULM-10403*	Androsterone (5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one) (unlabeled)
DLM-9137	Androsterone glucuronide, sodium salt (2,2,4,4-D <sub>4</sub> , 98%)
ULM-9138	Androsterone glucuronide, sodium salt (unlabeled)
DLM-4700	Cholestane (3,3-D <sub>2</sub> , 98%)
DLM-8276	Cholestenone (2,2,4,6,6-D <sub>5</sub> , 98%)

Catalog No.	Description
CLM-804	Cholesterol (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9139*	Cholesterol (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-9587*	Cholesterol (23,24,25,26,27- <sup>13</sup> C <sub>5</sub> , 99%)
DLM-1831	Cholesterol (3-D, 97%)
DLM-7260	Cholesterol (25,26,26,26-D <sub>4</sub> , 98%)
DLM-2607 <sup>††</sup>	Cholesterol (2,2,3,4,4,6-D <sub>6</sub> , 97-98%)
DLM-3057	Cholesterol (25,26,26,26,27,27,27-D <sub>7</sub> , 98%)
OLM-7695	Cholesterol ( <sup>18</sup> O, 80%)
ULM-9140*	Cholesterol (unlabeled)
CLM-3361	Cholesterol-3-octanoate (octanoate-1- <sup>13</sup> C, 99%)
DLM-10416	Cholesterol-3-sulfate, sodium salt (25,26,26,26,27,27,27-D <sub>7</sub> , 98%)
DLM-7347	Corticosterone (2,2,4,6,6,17 $\alpha$ ,21,21-D <sub>8</sub> , 97-98%)
ULM-9988*	Corticosterone (unlabeled)
CLM-10371 <sup>†</sup>	Cortisol (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-2615	Cortisol (1,2-D <sub>2</sub> , 98%)
DLM-2057	Cortisol (9,12,12-D <sub>3</sub> , 98%)
DLM-2218	Cortisol (9,11,12,12-D <sub>4</sub> , 98%)
ULM-9141*	Cortisol (unlabeled)
CLM-10536 <sup>†</sup>	Cortisone (2,3,4- <sup>13</sup> C <sub>3</sub> , 98%) CP 97%
DLM-8863	Cortisone (1,2-D <sub>2</sub> , 98%) CP 95%
DLM-9142*	Cortisone (2,2,4,6,6,12,12-D <sub>7</sub> )
DLM-9976	Cortisone (2,2,4,6,6,9,12,12-D <sub>8</sub> , 98%)
ULM-9202*	Cortisone (unlabeled)
CLM-10537 <sup>†</sup>	Cortisone 21-sulfate, sodium salt (2,3,4- <sup>13</sup> C <sub>3</sub> , 98%) CP 95%
DLM-4216	7-Dehydrocholesterol (25,26,26,26,27,27,27-D <sub>7</sub> , 98%)
CLM-10549*	Dehydroepiandrosterone (DHEA) (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-7714	Dehydroepiandrosterone (DHEA) (16,16-D <sub>2</sub> , 97%)
DLM-8049 <sup>††</sup>	Dehydroepiandrosterone (DHEA) (2,2,3,4,4,6-D <sub>6</sub> , 97-99%) CP 97%
ULM-9143*	Dehydroepiandrosterone (DHEA) (unlabeled)
DLM-8701	Dehydroepiandrosterone sulfate, sodium salt (DHEAS) (16,16-D <sub>2</sub> , 97%)
DLM-8337*	Dehydroepiandrosterone sulfate, sodium salt (DHEAS) (2,2,3,4,4,6-D <sub>6</sub> , 95%)
ULM-9144*	Dehydroepiandrosterone sulfate, sodium salt (DHEAS) (unlabeled)

Chemical purity (CP) is 98% or greater, unless otherwise indicated.



## Steroids and Hormones (continued)

Catalog No.	Description
CLM-10384*	11-Deoxycortisol (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
DLM-7209	11-Deoxycortisol (21,21-D <sub>2</sub> , 96%)
DLM-8336*	11-Deoxycortisol (2,2,4,6,6-D <sub>5</sub> , 98%)
ULM-9145*	11-Deoxycortisol (unlabeled)
DLM-8305	21-Deoxycortisol (2,2,4,6,6,21,21,21-D <sub>8</sub> , 97%)
ULM-9987*	21-Deoxycortisol (unlabeled)
DLM-170*	Diethylstilbestrol ( <i>cis/trans</i> mix) (ring-3,3',5,5'-diethyl-1,1,1',1'-D <sub>8</sub> , 98%)
CLM-9146*	5 $\alpha$ -Dihydrotestosterone (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
DLM-9041	5 $\alpha$ -Dihydrotestosterone (2,2,4,4-D <sub>4</sub> , 98%) CP 95%
ULM-8364*	5 $\alpha$ -Dihydrotestosterone (unlabeled)
DLM-3023	Dihydrotestosterone (16,16,17-D <sub>3</sub> , 98%)
CLM-9222	L-3,3'-Diiodothyronine (T2) (phenoxy- <sup>13</sup> C <sub>6</sub> , 99%) CP 97%
ULM-9223	L-3,3'-Diiodothyronine (T2) (unlabeled)
CLM-7401	L-Dopa (1- <sup>13</sup> C, 99%)
CLM-1007	L-Dopa (ring- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-7824	L-Dopa (1- <sup>13</sup> C, ring- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-2084	L-Dopa (ring-D <sub>3</sub> , 98%)
COLM-2232	L-Dopa (2,3- <sup>13</sup> C <sub>2</sub> , 97%; 4-hydroxy- <sup>18</sup> O, 95%)
CLM-7768	Epicholesterol (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-9088	DL-Epinephrine (ring-D <sub>3</sub> , 1,2,2-D <sub>3</sub> , 98%)
CNLM-7889	DL-Epinephrine (1,2- <sup>13</sup> C <sub>2</sub> , 99%; <sup>15</sup> N, 98%)
CLM-803*	Estradiol (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-3694	Estradiol (16,16,17-D <sub>3</sub> , 98%) CP 95%
DLM-2487	Estradiol (2,4,16,16-D <sub>4</sub> , 95-97%)
ULM-7449*	Estradiol (unlabeled)
CLM-9147*	Estriol (16 $\alpha$ -hydroxyestradiol) (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
DLM-8586	Estriol (2,4,16-D <sub>3</sub> , 98%)
DLM-8343	Estriol (2,4,17-D <sub>3</sub> , 98%) CP 96%
CLM-673 <sup>††</sup>	Estrone (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9148*	Estrone (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-3976	Estrone (2,4,16,16-D <sub>4</sub> , 97%)
CLM-8033	DL-Estrone 3-methyl ether (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-4691	17 $\alpha$ -Ethinylestradiol (2,4,16,16-D <sub>4</sub> , 97-98%)
ULM-10267	7 $\alpha$ -Hydroxycholesterol (unlabeled)
DLM-8646	7 $\beta$ -Hydroxycholesterol (25,26,26,26,27,27-D <sub>7</sub> , 98%) CP 97%
ULM-10268	7 $\beta$ -Hydroxycholesterol (unlabeled)
DLM-9150 <sup>††</sup>	18-Hydroxycorticosterone (9,11,12,12-D <sub>4</sub> , 98%) CP 95%
ULM-9151*	18-Hydroxycorticosterone (unlabeled) CP 95%
DLM-9149	6 $\beta$ -Hydroxycortisol (9,11,12,12-D <sub>4</sub> ) CP 95%
CLM-8012	DL-2-Hydroxyestradiol (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-8016	DL-2-Hydroxyestrone-3-methyl ether (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-9153*	16 $\alpha$ -Hydroxyestrone (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
ULM-9152*	16 $\alpha$ -Hydroxyestrone (unlabeled)
CLM-8013	DL-4-Hydroxyestrone (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-7206	17 $\alpha$ -Hydroxypregnenolone (21,21,21-D <sub>3</sub> , 97%)
CDLM-9154*	17 $\alpha$ -Hydroxypregnenolone (20,21- <sup>13</sup> C <sub>2</sub> , 98%; 16,16-D <sub>2</sub> , 98%)
ULM-9155*	17 $\alpha$ -Hydroxypregnenolone (unlabeled)

Catalog No.	Description
CLM-9157*	17 $\alpha$ -Hydroxyprogesterone (2,3,4- <sup>13</sup> C <sub>3</sub> , 98%)
DLM-6598	17 $\alpha$ -Hydroxyprogesterone (2,2,4,6,6,21,21,21-D <sub>8</sub> , 98%)
ULM-9156*	17 $\alpha$ -Hydroxyprogesterone (unlabeled)
DLM-8647	7-Ketocholesterol (25,26,26,26,27,27-D <sub>7</sub> , 99%)
DLM-10395	11-Ketotestosterone (16,16,17-D <sub>3</sub> , 98%) CP 95%
DLM-7101	Melatonin (acetyl-D <sub>3</sub> , 98%)
CLM-8015	DL-2-Methoxyestradiol (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-8014	DL-2-Methoxyestrone (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
CLM-8017	DL-4-Methoxyestrone (13,14,15,16,17,18- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-2646	5-Methoxytryptamine-HCl ( $\alpha,\alpha,\beta,\beta$ -D <sub>4</sub> , 98%)
CLM-2468	Norethindrone (ethynyl- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-3979*	19-Nortestosterone (16,16,17-D <sub>3</sub> , 98%)
DLM-3754	5 $\alpha$ -Pregnan-3 $\alpha$ -ol-20-one (17,21,21,21-D <sub>4</sub> , 96-98%) CP 95%
DLM-7492	5 $\alpha$ -Pregnan-3 $\beta$ -ol-20-one (17 $\alpha$ ,21,21,21-D <sub>4</sub> , 97%) CP 96%
ULM-8242	5 $\alpha$ -Pregnan-3 $\beta$ -ol-20-one (unlabeled)
DLM-2294	5 $\beta$ -Pregnan-3 $\alpha$ -ol-20-one (17,21,21,21-D <sub>4</sub> , 96-98%)
DLM-8751	5 $\beta$ -Pregnan-3 $\alpha$ ,11 $\beta$ ,17 $\alpha$ ,21-tetrol-20-one (9,11 $\alpha$ ,12-D <sub>3</sub> , 95%)
DLM-8753	5 $\beta$ -Pregnan-3 $\alpha$ ,17 $\alpha$ ,20-triol (20,21,21,21-D <sub>4</sub> , 98%) mix of 20 $\alpha$ and 20 $\beta$
DLM-3910	5 $\alpha$ -Pregnane-3 $\alpha$ ,21-diol-20-one (17,21,21-D <sub>3</sub> , 95%)
DLM-3816	5 $\alpha$ -Pregnane-3,20-dione (1,2,4,5,6,7-D <sub>6</sub> , 95%)
ULM-10385	5 $\alpha$ -Pregnane-3 $\alpha$ ,21-diol-20-one (unlabeled)
DLM-9901	5 $\beta$ -Pregnane-3,20-dione (2,2,4,4,17 $\alpha$ ,21,21,21-D <sub>8</sub> , 98%) CP 97%
CLM-10411	5 $\beta$ -Pregnane-3 $\alpha$ ,20 $\alpha$ -diol (2,3,4,20,21- <sup>13</sup> C <sub>5</sub> , 99%) CP 95%
DLM-10413	5 $\beta$ -Pregnane-3 $\alpha$ ,20 $\alpha$ -diol (2,2,3,4,4-D <sub>5</sub> , 98%)
CLM-10412	5 $\beta$ -Pregnane-3 $\alpha$ ,20 $\alpha$ -diol glucuronide, sodium salt (2,3,4,20,21- <sup>13</sup> C <sub>5</sub> , 99%) CP 95%
CLM-10010*	4-Pregnen-21-ol-3,20-dione (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-7228	4-Pregnen-21-ol-3,20-dione (2,2,4,6,6,17,21,21-D <sub>8</sub> , 96%) CP 97%
ULM-10011*	4-Pregnen-21-ol-3,20-dione (unlabeled)
CDLM-9158*	Pregnenolone (20,21- <sup>13</sup> C <sub>2</sub> , 98%; 16,16-D <sub>2</sub> , 98%)
DLM-6896	Pregnenolone (17,21,21,21-D <sub>4</sub> , 98%)
ULM-9159*	Pregnenolone (unlabeled)
CDLM-9160	Pregnenolone sulfate, sodium salt (20,21- <sup>13</sup> C <sub>2</sub> , 99%; 16,16-D <sub>2</sub> , 98%)
ULM-9161	Pregnenolone sulfate, sodium salt (unlabeled)
CLM-457	Progesterone (3,4- <sup>13</sup> C <sub>2</sub> , 90%)
CLM-9162*	Progesterone (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
CLM-10414	Progesterone (2,3,4,20,21- <sup>13</sup> C <sub>5</sub> , 99%)
DLM-7953*	Progesterone (2,2,4,6,6,17 $\alpha$ ,21,21,21-D <sub>9</sub> , 98%)
DLM-3627 <sup>†</sup>	Prostaglandin A2 (3,3,4,4-D <sub>4</sub> , 98%)
DLM-3728 <sup>†</sup>	Prostaglandin E1 (3,3,4,4-D <sub>4</sub> , 98%)
DLM-3628 <sup>†</sup>	Prostaglandin E2 (3,3,4,4-D <sub>4</sub> , 98%)
DLM-3558 <sup>†</sup>	Prostaglandin-F2 $\alpha$ (3,3,4,4-D <sub>4</sub> , 98%)
DLM-4200 <sup>†</sup>	9 $\alpha$ ,11 $\alpha$ -Prostaglandin F2 (3,3',4,4'-D <sub>4</sub> , 98%)
DLM-7457	Sodium 17 $\beta$ -estradiol 3-sulfate (2,4,16,16-D <sub>4</sub> , 98%) stabilized with 50% w/w tris

\* Compounds available in dry and solution forms.

† Compounds available in solution only.

†† Compounds available in dry and solution forms; chemical purity varies 95-98%.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Continued ►

## Steroids and Hormones (continued)

Catalog No.	Description
DLM-9503	Stigmastanol (2,2,3,4,4-D <sub>5</sub> , 98%)
CLM-159	Testosterone (3,4- <sup>13</sup> C <sub>2</sub> , 99%)
CLM-9164*	Testosterone (2,3,4- <sup>13</sup> C <sub>3</sub> , 99%)
DLM-683	Testosterone (1,2-D <sub>2</sub> , 98%)
DLM-6224*	Testosterone (16,16,17-D <sub>3</sub> , 98%)
DLM-8085*	Testosterone (2,2,4,6,6-D <sub>5</sub> , 98%)
DLM-8265	Testosterone diacetate (testosterone-D <sub>4</sub> , acetate methyl-D <sub>6</sub> , 98%)

Catalog No.	Description
ULM-9163	3 $\alpha$ ,5 $\beta$ -Tetrahydroaldosterone (unlabeled)
CLM-6725	L-Thyroxine (tyrosine-ring- <sup>13</sup> C <sub>6</sub> , 99%) CP 90%
CLM-8931	L-Thyroxine (ring- <sup>13</sup> C <sub>12</sub> , 99%) CP 97%
ULM-8184	L-Thyroxine (unlabeled)
CLM-7185*	3,3',5-Triiodo-L-thyronine-HCl (ring- <sup>13</sup> C <sub>6</sub> , 99%) CP >95%
DLM-6989	Tryptamine-HCl ( $\alpha$ , $\alpha$ , $\beta$ , $\beta$ -D <sub>4</sub> , 97%)

## Vitamins and Metabolites

Catalog No.	Description
CLM-3085	L-Ascorbic acid (1- <sup>13</sup> C, 99%)
CLM-7283	L-Ascorbic acid (U- <sup>13</sup> C <sub>6</sub> , 98%)
CLM-6126	$\beta$ -Carotene (10,10',11,11'- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-9641	$\beta$ -Carotene (12,12',13,13',14,14',15,15',20,20'- <sup>13</sup> C <sub>10</sub> , 99%) CP >97%
DLM-3829	$\beta$ -Carotene (19,19,19,19',19',19'-D <sub>6</sub> , 98%)
DLM-2439	$\beta$ -Carotene (10,10',19,19,19,19',19',19'-D <sub>8</sub> , 97%)
ULM-9106*	1,25-Dihydroxyvitamin D <sub>2</sub> (unlabeled) CP 95%
ULM-9109*	24,25-Dihydroxyvitamin D <sub>2</sub> (unlabeled)
DLM-9107*	1,25-Dihydroxyvitamin D <sub>3</sub> (6,19,19-D <sub>3</sub> , 97%) CP 95%
ULM-9108*	1,25-Dihydroxyvitamin D <sub>3</sub> (unlabeled) CP 95%
DLM-9404	24R,25-Dihydroxyvitamin D <sub>3</sub> (26,26,26,27,27,27-D <sub>6</sub> , 98%) CP 97%
DLM-9114*	25-Hydroxyvitamin D <sub>2</sub> (6,19,19-D <sub>3</sub> , 97%)
ULM-9115*	25-Hydroxyvitamin D <sub>2</sub> (unlabeled)
DLM-9481	3- <i>epi</i> -25-Hydroxyvitamin D <sub>2</sub> (6,19,19-D <sub>3</sub> , 98%)
ULM-9110*	3- <i>epi</i> -25-Hydroxyvitamin D <sub>2</sub> (unlabeled)
CLM-10025*	25-Hydroxyvitamin D <sub>3</sub> (23,24,25,26,27- <sup>13</sup> C <sub>5</sub> , 99%) CP 95%
DLM-9116*	25-Hydroxyvitamin D <sub>3</sub> (6,19,19-D <sub>3</sub> , 97%)
ULM-9117*	25-Hydroxyvitamin D <sub>3</sub> (unlabeled)
CLM-10266	3- <i>epi</i> -25-Hydroxyvitamin D <sub>3</sub> (23,24,25,26,27- <sup>13</sup> C <sub>5</sub> , 99%)
DLM-9111*	3- <i>epi</i> -25-Hydroxyvitamin D <sub>3</sub> (6,19,19-D <sub>3</sub> , 98%)
ULM-9112*	3- <i>epi</i> -25-Hydroxyvitamin D <sub>3</sub> (unlabeled)
DLM-7708*	25-Hydroxyvitamin D <sub>3</sub> monohydrate (26,26,26,27,27,27-D <sub>6</sub> , 98%) CP 97%
CLM-9548	5-Methyltetrahydrofolic acid (glutamic acid- <sup>13</sup> C <sub>5</sub> , 99%) CP 95%
CLM-7321-N	5-Methyltetrahydrofolic acid, calcium salt (glutamic acid- <sup>13</sup> C <sub>5</sub> , 98%) CP 95%
CLM-7321	(6S)-5-Methyltetrahydrofolic acid, calcium salt (glutamic acid- <sup>13</sup> C <sub>5</sub> , 90%) contains ~10% H <sub>2</sub> O
CNLM-9757	Nicotinamide (2,6,carbonyl- <sup>13</sup> C <sub>3</sub> , 99%; ring-1- <sup>15</sup> N, 98%)
DLM-9793-N	Pyridoxal phosphate (mix of 5-,3-isomers) (methyl-D <sub>3</sub> , 97%)
CLM-7563	Pyridoxine-HCl (4,5-bis(hydroxymethyl)- <sup>13</sup> C <sub>4</sub> , 99%)
DLM-8754	Pyridoxine-HCl (5-hydroxymethyl-D <sub>2</sub> , 98%)

Catalog No.	Description
CLM-320	Retinal (10- <sup>13</sup> C, 99%)
CLM-325	Retinal (11- <sup>13</sup> C, 99%)
CLM-326	Retinal (14- <sup>13</sup> C, 99%)
CLM-327	Retinal (15- <sup>13</sup> C, 99%)
DLM-7719	Retinal (D <sub>6</sub> , 96%)
CLM-331	Retinoic acid (10- <sup>13</sup> C, 99%)
CLM-328	Retinoic acid (11- <sup>13</sup> C, 98%)
CLM-329	Retinoic acid (14- <sup>13</sup> C, 99%)
CLM-330	Retinoic acid (15- <sup>13</sup> C, 99%)
CLM-4343	Retinoic acid (10,11,14,15- <sup>13</sup> C <sub>4</sub> , 99%)
DLM-7720	Retinoic acid (D <sub>6</sub> , 96%)
DLM-9305	Retinol (10,19,19,19-D <sub>4</sub> , 96%)
DLM-8113	Retinol (19,19,19,20,20,20-D <sub>6</sub> , 96%)
DLM-9306	Retinol (10,14,19,19,19,20,20,20-D <sub>8</sub> , 90%) CP 96%
DLM-4902	Retinyl palmitate (10,19,19,19-D <sub>4</sub> , 96%) (50 ppm BHT) all <i>trans</i> , <4% <i>cis</i>
CLM-7613	<i>trans</i> -Lycopene (8,8',9,9',10,10',11,11',19,19'- <sup>13</sup> C <sub>10</sub> , 99%)
CLM-8870	Vitamin A acetate (12,13,14,20- <sup>13</sup> C <sub>4</sub> , 99%)
CLM-4831	Vitamin A acetate (8,9,10,12,13,14,19,20- <sup>13</sup> C <sub>8</sub> , 99%)
CLM-7277	Vitamin A acetate (8,9,10,11,12,13,14,15,19,20- <sup>13</sup> C <sub>10</sub> , 99%)
DLM-2244	Vitamin A acetate (10,19,19,19-D <sub>4</sub> , 96%) 3-4% <i>cis</i>
DLM-3828	Vitamin A acetate (19,19,19,20,20,20-D <sub>6</sub> , 96%) 3-4% <i>cis</i>
DLM-4203	Vitamin A acetate (10,14,19,19,19,20,20,20-D <sub>8</sub> , 90%) 3-4% <i>cis</i>
CLM-7667	Vitamin B <sub>1</sub> hydrochloride (thiamine hydrochloride) (4,5,4-methyl- <sup>13</sup> C <sub>3</sub> , 99%) CP 97%
ULM-10004	Vitamin B <sub>1</sub> hydrochloride (thiamine hydrochloride) (unlabeled)
DLM-8741	Vitamin B <sub>1</sub> pyrophosphate (thiamine pyrophosphate) (thiazole-methyl-D <sub>3</sub> , 95%)
CNLM-8851	Vitamin B <sub>2</sub> (riboflavin) ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 98%) CP >97%
ULM-9123	Vitamin B <sub>2</sub> (riboflavin) (unlabeled) CP 97%
CLM-9925	Vitamin B <sub>3</sub> (nicotinamide) ( <sup>13</sup> C <sub>6</sub> , 99%)
DLM-6883	Vitamin B <sub>3</sub> (nicotinamide) (D <sub>4</sub> , 98%)
CNLM-9512	Vitamin B <sub>3</sub> (nicotinic acid) (2,6,carboxyl- <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 98%) CP 97%

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Vitamins and Metabolites *(continued)*

Catalog No.	Description
CNLM-7694	Vitamin B <sub>5</sub> , calcium salt-H <sub>2</sub> O (calcium pantothenate-H <sub>2</sub> O) (β-alanyl- <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 98%)
ULM-10003	Vitamin B <sub>5</sub> , calcium salt-H <sub>2</sub> O (calcium pantothenate-H <sub>2</sub> O) (unlabeled)
DLM-9069	Vitamin B <sub>6</sub> (pyridoxal) (methyl-D <sub>3</sub> , 98%)
ULM-9118	Vitamin B <sub>6</sub> (pyridoxal-HCl) (unlabeled)
DLM-9119	Vitamin B <sub>6</sub> (pyridoxamine-2HCl) (methyl-D <sub>3</sub> , 98%)
ULM-9120	Vitamin B <sub>6</sub> (pyridoxamine-2HCl) (unlabeled)
DLM-9121	Vitamin B <sub>6</sub> (pyridoxine-HCl) (methyl-D <sub>3</sub> , 98%) CP 96%
ULM-9122	Vitamin B <sub>6</sub> (pyridoxine-HCl) (unlabeled) CP 96%
DLM-8806	Vitamin B <sub>7</sub> (biotin) (ring-6,6-D <sub>2</sub> , 98%) CP 97%
DLM-9751	Vitamin B <sub>7</sub> (biotin) (3',3',4',4'-D <sub>4</sub> , 98%) CP 95%
ULM-9129	Vitamin B <sub>7</sub> (biotin) (unlabeled)
CLM-7861	Vitamin B <sub>9</sub> (folic acid) (glutamic acid- <sup>13</sup> C <sub>5</sub> , 95%) contains ~10% H <sub>2</sub> O
CLM-7861-N	Vitamin B <sub>9</sub> (folic acid) (glutamic acid- <sup>13</sup> C <sub>5</sub> , 99%) CP 95%
CNLM-9564	Vitamin B <sub>9</sub> (folic acid) (glutamic acid- <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 98%) CP 95%
CLM-9770†	Vitamin B <sub>12</sub> (cyanocobalamin) ( <sup>13</sup> C <sub>7</sub> , 99%) CP 95%
ULM-10005†	Vitamin B <sub>12</sub> (cyanocobalamin) (unlabeled)
DLM-8985*	Vitamin D <sub>2</sub> (ergocalciferol) (6,19,19-D <sub>3</sub> , 97%)
ULM-9124*	Vitamin D <sub>2</sub> (ergocalciferol) (unlabeled)
DLM-10478†	Vitamin D <sub>2</sub> sulfate, sodium salt (6,19,19-D <sub>3</sub> , 98%) CP 97%
ULM-10477†	Vitamin D <sub>2</sub> sulfate, sodium salt (unlabeled) CP 97%

Catalog No.	Description
CLM-7850	Vitamin D <sub>3</sub> (cholecalciferol) (23,24- <sup>13</sup> C <sub>2</sub> , 99%) CP 90%
CLM-10470†	Vitamin D <sub>3</sub> (cholecalciferol) (23,24,25,26,26- <sup>13</sup> C <sub>5</sub> , 98%) CP 97%
DLM-8853†	Vitamin D <sub>3</sub> (cholecalciferol) (6,19,19-D <sub>3</sub> , 97%) CP 97%
ULM-9125*	Vitamin D <sub>3</sub> (cholecalciferol) (unlabeled)
DLM-10476†	Vitamin D <sub>3</sub> sulfate, sodium salt (26,26,26,27,27,27-D <sub>6</sub> , 98%) CP 97%
DLM-10475†	Vitamin D <sub>3</sub> sulfate, sodium salt (6,19,19-D <sub>3</sub> , 98%) CP 97%
ULM-10474†	Vitamin D <sub>3</sub> sulfate, sodium salt (unlabeled) CP 97%
CLM-10273	Vitamin E (α-tocopherol) ( <sup>13</sup> C <sub>3</sub> , 99%) CP 96%
CLM-10275	Vitamin E (α-tocopherol) ( <sup>13</sup> C <sub>6</sub> , 99%) CP 96%
CLM-10276	Vitamin E (α-tocopherol) ( <sup>13</sup> C <sub>9</sub> , 99%) CP 96%
CLM-10274	Vitamin E ((+/-)-α-tocopherol) (all rac) ( <sup>13</sup> C <sub>3</sub> , 99%) CP 96%
DLM-9126	Vitamin E (α-tocopherol) (5-methyl-D <sub>3</sub> , 7-methyl-D <sub>3</sub> , 98%)
ULM-9127	Vitamin E (α-tocopherol) (unlabeled) CP 96%
DLM-8847	Vitamin E acetate (tocopherol acetate) (acetyl-D <sub>3</sub> , 98%)
CLM-9566	Vitamin K <sub>1</sub> (phyloquinone) (4α,5,6,7,8,8α- <sup>13</sup> C <sub>6</sub> , 99%)
DLM-7702	Vitamin K <sub>1</sub> (phyloquinone) (ring-D <sub>4</sub> , 98%)
DLM-9130	Vitamin K <sub>1</sub> (phyloquinone) (D <sub>7</sub> , 99%) CP 97%
ULM-9131	Vitamin K <sub>1</sub> (phyloquinone) (unlabeled) CP 97%
DLM-9132	Vitamin K <sub>3</sub> (menadione) (D <sub>8</sub> , 98%) CP 97%
ULM-9133	Vitamin K <sub>3</sub> (menadione) (unlabeled) CP 97%

\* Compounds available in dry and solution forms.

† Compounds available in solution only.

†† Compounds available in dry and solution forms; chemical purity varies 95-98%.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

Continued ►

## Other Compounds

Catalog No.	Description
CLM-173	Acetaldehyde (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
DLM-112	Acetaldehyde (D <sub>4</sub> , 99%)
CLM-1220	<i>N</i> -Acetylglucosamine ( <i>N</i> -acetyl-1- <sup>13</sup> C, 99%)
CLM-1827	<i>N</i> -Acetylglucosamine ( <sup>13</sup> C <sub>6</sub> , 99%)
NLM-8810	<i>N</i> -Acetylglucosamine ( <sup>15</sup> N, 98%)
DLM-9262	<i>N,N'</i> -bis(3-Aminopropyl)-1,4-butanediamine-4HCl (1,1,2,2,3,3,4,4-D <sub>8</sub> , 97%) CP 95%
ULM-10265	<i>N,N'</i> -bis(3-Aminopropyl)-1,4-butanediamine-4HCl (unlabeled) CP 95%
CLM-9435	<i>N</i> -(3-Aminopropyl) butane-1,4-diamine-3HCl (spermidine-3HCl) ( <sup>13</sup> C <sub>4</sub> , 99%) CP 95%
DLM-9261	<i>N</i> -(3-Aminopropyl) butane-1,4-diamine-3HCl (1,1,2,2,3,3,4,4-D <sub>8</sub> , 98%) CP 95%
ULM-10264	<i>N</i> -(3-Aminopropyl) butane-1,4-diamine (unlabeled) CP 95%
NLM-467	Ammonium chloride ( <sup>15</sup> N, 99%)
NLM-390	Ammonium nitrate ( <sup>15</sup> N <sub>2</sub> , 98%)
NLM-390-10	Ammonium nitrate ( <sup>15</sup> N <sub>2</sub> , 10%)
NLM-390-5	Ammonium nitrate ( <sup>15</sup> N <sub>2</sub> , 5%)
NLM-711	Ammonium nitrate (ammonium- <sup>15</sup> N, 98%)
NLM-711-10	Ammonium nitrate (ammonium- <sup>15</sup> N, 10%)
NLM-712	Ammonium nitrate (nitrate- <sup>15</sup> N, 98%)
NLM-712-10	Ammonium nitrate (nitrate- <sup>15</sup> N, 10%)
DLM-1100	Ammonium sulfate (D <sub>8</sub> , 98%)
NLM-713	Ammonium sulfate ( <sup>15</sup> N <sub>2</sub> , 99%)
NLM-713-10	Ammonium sulfate ( <sup>15</sup> N <sub>2</sub> , 10%)
NLM-713-5	Ammonium sulfate ( <sup>15</sup> N <sub>2</sub> , 5%)
CLM-8141	Arsenobetaine bromide (carboxymethyl- <sup>13</sup> C <sub>2</sub> , 99%)
CNLM-9695	5-Azacytosine (4,6- <sup>13</sup> C <sub>2</sub> , 98%; <sup>15</sup> N <sub>4</sub> , 98%)
NLM-499	Calcium nitrate ( <sup>15</sup> N <sub>2</sub> , 98%)
NLM-499-10	Calcium nitrate ( <sup>15</sup> N <sub>2</sub> , 10%)
DLM-9786	<i>p</i> -Cresol sulfate, potassium salt (D <sub>7</sub> , 98%) CP 97%
DLM-4	Deuterium oxide (D, 99.9%)
DLM-4-99.8	Deuterium oxide (D, 99.8%)
DLM-4-99	Deuterium oxide (D, 99%)
CLM-9255	1,3-Diaminobenzene ( <sup>13</sup> C <sub>6</sub> , 99%) CP 95%
CLM-344	Ethanol (1- <sup>13</sup> C, 99%) <6% H <sub>2</sub> O
CLM-130	Ethanol (2- <sup>13</sup> C, 99%) <6% H <sub>2</sub> O
CLM-551	Ethanol (1,2- <sup>13</sup> C <sub>2</sub> , 99%) <6% H <sub>2</sub> O

Catalog No.	Description
CLM-2291	Ethanolamine ( <sup>13</sup> C <sub>2</sub> , 99%)
DLM-552	Ethanolamine (1,1,2,2-D <sub>4</sub> , 98%)
NLM-8722	Ethanolamine ( <sup>15</sup> N, 98%)
CLM-3911	Ethanolamine-HCl (1- <sup>13</sup> C, 99%)
CLM-274	Ethanolamine-HCl (1,2- <sup>13</sup> C <sub>2</sub> , 99%)
NLM-6723	Guanidine-HBr ( <sup>15</sup> N <sub>3</sub> , 98%)
CLM-9260	4-Hydroxy-3-methoxycinnamic acid (ferulic acid) (1',2',3'- <sup>13</sup> C <sub>3</sub> , 99%)
CNLM-10399	DL-3-Hydroxykynurenine (1,2,3- <sup>13</sup> C <sub>3</sub> , 98%; α-amino- <sup>15</sup> N, 98%) CP 95%
DLM-7842	L-Kynurenine sulfate (ring-D <sub>4</sub> , 3,3-D <sub>2</sub> , 97%) CP 95%
CLM-359	Methanol ( <sup>13</sup> C, 99%)
DLM-1211	Methanol (D, 98%)
DLM-1209	Methanol (D <sub>2</sub> , 98%)
CDLM-1035	Methanol ( <sup>13</sup> C, 99%; D <sub>3</sub> , 98%)
DLM-651	Methyl formate (formyl-D, 99%)
CLM-10410	Porphobilinogen (propanoic-1,2- <sup>13</sup> C <sub>2</sub> , 99%) CP 95%
NLM-765	Potassium nitrate ( <sup>15</sup> N, 99%)
NLM-765-10	Potassium nitrate ( <sup>15</sup> N, 10%)
CLM-222	Potassium thiocyanate ( <sup>13</sup> C, 95-99%) CP 95%
CNLM-3952	Potassium thiocyanate ( <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)
DLM-3579	Serotonin creatinine sulfate complex (α,α,β,β-D <sub>4</sub> , 98%)
CLM-441	Sodium bicarbonate ( <sup>13</sup> C, 99%)
CLM-9676	Sodium isopropyl carbonate (carbonyl- <sup>13</sup> C, 99%)
NLM-157	Sodium nitrate ( <sup>15</sup> N, 98%)
CLM-3780	Sodium dichloroacetate ( <sup>13</sup> C <sub>2</sub> , 99%)
CLM-10417	Toxoflavin (3,4α,5,8α- <sup>13</sup> C <sub>4</sub> , 98%) CP 95%
CNLM-9258	1,2,4-Triazole (3,5- <sup>13</sup> C <sub>2</sub> , 99%; 1,2,4- <sup>15</sup> N <sub>3</sub> , 98%)
DLM-4779	Trimethylamine <i>N</i> -oxide (D <sub>9</sub> , 98%)
CLM-311	Urea ( <sup>13</sup> C, 99%)
DLM-1269	Urea (D <sub>4</sub> , 98%)
NLM-233	Urea ( <sup>15</sup> N <sub>2</sub> , 98%)
NLM-233-10	Urea ( <sup>15</sup> N <sub>2</sub> , 10%)
NLM-233-5	Urea ( <sup>15</sup> N <sub>2</sub> , 5%)
OLM-655	Urea ( <sup>18</sup> O, 95%)
CNLM-234	Urea ( <sup>13</sup> C, 99%; <sup>15</sup> N <sub>2</sub> , 98%)
COLM-4861	Urea ( <sup>13</sup> C, 99%; <sup>18</sup> O, 98%)
CNOLM-8871	Urea ( <sup>13</sup> C, 99%; <sup>15</sup> N <sub>2</sub> , 99%; <sup>18</sup> O, 99%)

\* Compounds available in dry and solution forms.

† Compounds available in solution only.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

# Sets, Mixtures, and Kits

## Sets

**Table 1.** Standard products for MS/MS screening or tuning.

Catalog No.	Description
NSK-A	Labeled Amino Acid Standards Set A
NSK-A1	Labeled Amino Acid Standards Set A1
NSK-B	Labeled Carnitine Standards Set B
NSK-B-G1	Labeled Carnitine Standards Supplement to NSK-B
NSK-AB	Labeled Standards Sets A & B
NSK-A-TS	Labeled Amino Acid Tuning Standards Set A
NSK-B-TS	Labeled Carnitine Tuning Standards Set B
NSK-AB-TS	Labeled Tuning Standards Sets A & B
NSK-A-US	Unlabeled Amino Acid Standards Set A
NSK-B-US	Unlabeled Carnitine Standards Set B
NSK-B-G1-US	Unlabeled Carnitine Standards Supplement to NSK-B
NSK-S-CAH	Labeled Steroid CAH Set S
NSK-T	Labeled Succinylacetone Standard Set T
NSK-PO-1	Lysosomal $\alpha$ -Glucosidase Substrate and Internal Standard
NSK-FA-1	$\alpha$ -Galactosidase Substrate and Internal Standard
NSK-GA-1	Glucocerebrosidase Substrate and Internal Standard
NSK-KR-1	Galactocerebrosidase Substrate and Internal Standard
NSK-MP-1	$\alpha$ -L-Iduronidase Substrate and Internal Standard
NSK-NI-1	Acid Spingomyelinase Substrate and Internal Standard

**Table 2.** Composition details of NSK-A, -B and -B-G1. Please refer to isotope.com for additional information for other mixes.

NSK-A	
Components	Conc. (mM)
Glycine (2- <sup>13</sup> C, 99%; <sup>15</sup> N, 98%)	2500
L-Alanine (2,3,3,3-D <sub>4</sub> , 98%)	500
L-Valine (D <sub>8</sub> , 98%)	500
L-Leucine (5,5,5-D <sub>3</sub> , 99%)	500
L-Methionine (methyl-D <sub>3</sub> , 98%)	500
L-Phenylalanine (ring- <sup>13</sup> C <sub>6</sub> , 99%)	500
L-Tyrosine (ring- <sup>13</sup> C <sub>6</sub> , 99%)	500
L-Aspartic acid (2,3,3-D <sub>3</sub> , 98%)	500
DL-Glutamic acid (2,4,4-D <sub>3</sub> , 98%)	500
L-Ornithine-HCl (5,5-D <sub>2</sub> , 98%)	500
L-Citrulline (5,5-D <sub>2</sub> , 98%)	500
L-Arginine-HCl (5- <sup>13</sup> C, 99%; 4,4,5,5-D <sub>4</sub> , 95%)	500
NSK-B	
Components	Conc. (mM)
L-Carnitine (trimethyl-D <sub>3</sub> , 98%)	152
O-Acetyl-L-carnitine-HCl (N-methyl-D <sub>3</sub> , 98%)	38
O-Propionyl-L-carnitine-HCl (N-methyl-D <sub>3</sub> , 98%)	7.6
O-Butyryl-L-carnitine-HCl (N-methyl-D <sub>3</sub> , 98%) CP 97%	7.6
O-Isovaleryl-L-carnitine-HCl (N,N,N-trimethyl-D <sub>3</sub> , 98%)	7.6
O-Octanoyl-L-carnitine-HCl (N-methyl-D <sub>3</sub> , 98%)	7.6
O-Myristoyl-L-carnitine-HCl (N,N,N-trimethyl-D <sub>3</sub> , 98%)	7.6
O-Palmitoyl-L-carnitine-HCl (N-methyl-D <sub>3</sub> , 98%)	15.2

### NSK-B-G1

Components	Conc. (mM)
O-Glutaryl-L-carnitine-CLO <sub>4</sub> (N-methyl-D <sub>3</sub> , 98%) CP 97%	152
3-Hydroxyisovaleryl-L-carnitine-CLO <sub>4</sub> (N-methyl-D <sub>3</sub> , 98%)	7.6
O-Dodecanoyl-L-carnitine-HCl (N,N,N-Trimethyl-D <sub>3</sub> , 98%)	7.6
O-Octadecanoyl-L-carnitine-HCl (N-methyl-D <sub>3</sub> , 98%)	15.2
O-3-DL-Hydroxypalmitoyl-L-carnitine-CLO <sub>4</sub> (N-methyl-D <sub>3</sub> , 98%)	15.2

**Note:** The concentration tolerances are  $\pm 20\%$  (exception: O-Glutaryl-L-carnitine-CLO<sub>4</sub> at  $\pm 40\%$ ). Also, NSK-A1 is equivalent in composition to NSK-A, with the exception of the Orn labeling (i.e., 3,3,4,4,5,5,-D<sub>6</sub> in NSK-A1 vs. 5,5-D<sub>2</sub> in NSK-A).

► **Custom mixes can be formulated according to user specifications. Please inquire for details.**

### Example References

Rodriguez-Colman, M.J.; Schewe, M.; Meerlo, M.; et al. **2017**. Interplay between metabolic identities in the intestinal crypt supports stem cell function. *Nature*, 543(7645), 424-427.

Huang, T.; Cao, Y.; Zeng, J.; et al. **2016**. Tandem mass spectrometry-based newborn screening strategy could be used to facilitate rapid and sensitive lung cancer diagnosis. *Onco Targets Ther*, 9, 2479-2487.

Wang, Q.; Sun, T.; Cao, Y. **2016**. A dried blood spot mass spectrometry metabolomic approach for rapid breast cancer detection. *Onco Targets Ther*, 9, 1389-1398.

### CIL Application Note 41

NSK-A-TS and NSK-B-TS Instructions for Use

**Table 3.** Sets of uniformly labeled dNTPs and rNTPs.

Catalog No.	Description	Conc. (mM)
NLM-7512-SL	Set of 4 2'-deoxyribonucleoside 5'-triphosphates (U- <sup>15</sup> N, 98%) (Li salts/in soln) CP >90%	55 for dATP, dCTP, and TTP; 50 for dGTP
DLM-7511-SL	Set of 4 2'-deoxyribonucleoside 5'-triphosphates (U-D, 98%) (Li salts/in soln) CP >90%	50 for dATP, 60 for dCTP, 58 for dGTP, and 66 for TTP
CNLM-7513-SL	Set of 4 2'-deoxyribonucleoside 5'-triphosphates (U- <sup>13</sup> C, 98%; U- <sup>15</sup> N, 98%) (Li salts/in soln) CP >90%	100 for dATP, dCTP, dGTP, and TTP
NLM-7519-CA	Set of 4 2'-ribonucleoside 5'-triphosphates (U- <sup>15</sup> N; 98%) (NH <sub>4</sub> salts/in soln) CP >90%	100 for ATP, CTP, GTP, and UTP
CNLM-7503-CA	Set of 4 2'-ribonucleoside 5'-triphosphates (U- <sup>13</sup> C, U- <sup>15</sup> N; 98-99%) (NH <sub>4</sub> salts/in soln) CP >90%	100 for ATP, CTP, GTP, and UTP
DLM-7518-CA	Set of 4 ribonucleoside 5'-triphosphates (U-D, 98%) (NH <sub>4</sub> salts/in soln) CP >90%	100 for ATP, CTP, GTP, and UTP

### Example Reference

Song, Y.; Marmion, R.A.; Park, J.O.; et al. **2017**. Dynamic control of dNTP synthesis in early embryos. *Dev Cell*, 42(3), 301-308.

## Mixtures

**Table 4.** Algae-derived amino acid mixtures and whole cells.

Catalog No.	Description
CLM-1548	Algal amino acid mixture (U- <sup>13</sup> C, 97-99%)
NLM-2161	Algal amino acid mixture (U- <sup>15</sup> N, 98%)
DLM-2082	Algal amino acid mixture (U-D, 98%)
CNLM-452	Algal amino acid mixture (U- <sup>13</sup> C, 97-99%; U- <sup>15</sup> N, 97-99%)
DNLM-819	Algal amino acid mixture (U-D, 98%; U- <sup>15</sup> N, 98%)
CDNLM-2496	Algal amino acid mixture (U- <sup>13</sup> C, 97-99%; U-D, 97-99%; U- <sup>15</sup> N, 97-99%)
ULM-2314	Algal amino acid mixture (unlabeled)
CLM-2065	Algal lyophilized cells (U- <sup>13</sup> C, 98%)
NLM-2162	Algal lyophilized cells (U- <sup>15</sup> N, 96-99%)
DLM-2066	Algal lyophilized cells (U-D, 98%)
CNLM-455	Algal lyophilized cells (U- <sup>13</sup> C, 98%; U- <sup>15</sup> N, 96-99%)
CDLM-3441	Algal lyophilized cells (U- <sup>13</sup> C, 98%; U-D, 98%)
DNLM-839	Algal lyophilized cells (U-D, 98%; U- <sup>15</sup> N, 96-99%)
CDNLM-3677	Algal lyophilized cells (U- <sup>13</sup> C, 98%; U-D, 98%; U- <sup>15</sup> N, 96-99%)
ULM-2177	Algal lyophilized cells (unlabeled)

**Note:** The algal strain is *Agmenelum quadriplicatum*. Also, the pH of the mixture may require adjustment after dissolution before its intended research use.

### Example References

Wei, X.; Lorkiewicz, P.K.; Shi, B.; et al. **2017**. Analysis of stable isotope assisted metabolomics data acquired by high resolution mass spectrometry. *Anal Methods*, 9(15), 2275-2283.

Wei, X.; Shi, B.; Koo, I.; et al. **2017**. Analysis of stable isotope assisted metabolomics data acquired by GC-MS. *Anal Chim Acta*, 980, 25-32.

Millard, P.; Cahoreau, E.; Heuillet, M.; et al. **2017**. <sup>15</sup>N-NMR-based approach for amino acids-based <sup>13</sup>C-metabolic flux analysis of metabolism. *Anal Chem*, 89(3), 2101-2106.

**Table 5.** Uniform stable-isotope-labeled fatty acid mixtures.

Catalog No.	Description
CLM-8455	Mixed fatty acids (U- <sup>13</sup> C, 98%)
DLM-8572	Mixed fatty acids (U-D, 96-98%)
CDLM-8376	Mixed fatty acids (U- <sup>13</sup> C, 98%; U-D, 97%)
CLM-8381	Mixed fatty acid methyl esters (U- <sup>13</sup> C, 98%) (terminal ester unlabeled) CP 95%
DLM-2497	Mixed fatty acid methyl esters (U-D, 96-98%)

► Please inquire for composition of mixed fatty acids.

### Example References

Schoors, S.; Bruning, U.; Missiaen, R.; et al. **2015**. Fatty acid carbon is essential for dNTP synthesis in endothelial cells. *Nature*, 520(7546), 192-197.

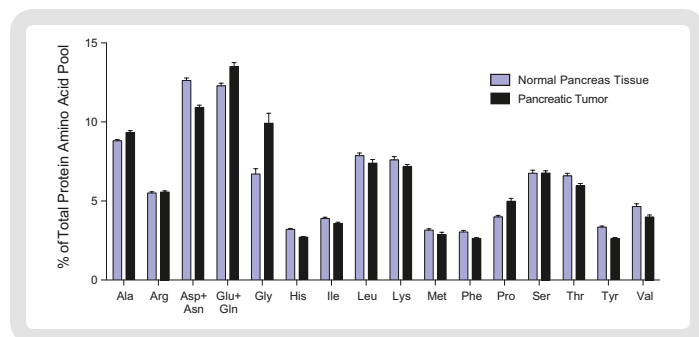
Sharma, S.C.; Klinman, J.P. **2015**. Kinetic detection of orthogonal protein and chemical coordinates in enzyme catalysis: double mutants of soybean lipoxygenase. *Biochem*, 54(35), 5447-5456.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

**Table 6.** Composition details of the metabolomics amino acid mix standard (MSK-A2-1.2).

Description	Conc. (mM)
L-Alanine ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Arginine-HCl ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>4</sub> , 99%)	2.5
L-Aspartic acid ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Cystine ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)	1.25
L-Glutamic acid ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)	2.5
Glycine ( <sup>13</sup> C <sub>2</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Histidine-HCl·H <sub>2</sub> O ( <sup>13</sup> C <sub>6</sub> , 97-99%; <sup>15</sup> N <sub>3</sub> , 97-99%)	2.5
L-Isoleucine ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Leucine ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Lysine-2HCl ( <sup>13</sup> C <sub>6</sub> , 99%; <sup>15</sup> N <sub>2</sub> , 99%)	2.5
L-Methionine ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Phenylalanine ( <sup>13</sup> C <sub>9</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Proline ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Serine ( <sup>13</sup> C <sub>3</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Threonine ( <sup>13</sup> C <sub>4</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Tyrosine ( <sup>13</sup> C <sub>9</sub> , 99%; <sup>15</sup> N, 99%)	2.5
L-Valine ( <sup>13</sup> C <sub>5</sub> , 99%; <sup>15</sup> N, 99%)	2.5

**Note:** The analogous unlabeled standard mix (MSK-A2-US-1.2) is also available. These 1.2 mL mixtures are prepared in 0.1 M HCl. The concentration tolerances are ±10%.



**Figure 1.** Amino acid composition of normal pancreas tissues compared to pancreatic tumors (details in Mayers JR et al. PMID: 27609895). Relative measurements were facilitated by MSK-A2-1.2 mix as internal standards during the LC-MS analysis. Data are presented as mean ± standard error of mean, with n = 7 controls and n = 5 tumors.

### Example References

Chen, W.W.; Freinkman, E.; Sabatini, D.M. **2017**. Rapid immunopurification of mitochondria for metabolite profiling and absolute quantification of matrix metabolites. *Nat Protoc*, 12(10), 2215-2231.

Havelund, J.F.; Andersen, A.D.; Binzer, M.; et al. **2017**. Changes in kynurenine pathway metabolism in Parkinson patients with L-DOPA-induced dyskinesia. *J Neurochem*, 142(5), 756-766.

Mayers, J.R.; Torrence, M.E.; Danai, L.V.; et al. **2016**. Tissue of origin dictates branched-chain amino acid metabolism in mutant Kras-driven cancers. *Science*, 353(6304), 1161-1165.

## Kits

The kits described below are all accompanied by user manuals that outline general procedures and processing examples for user reference. Additionally provided are troubleshooting notes and alternate method suggestions, as well as instructions and guides for data analysis.

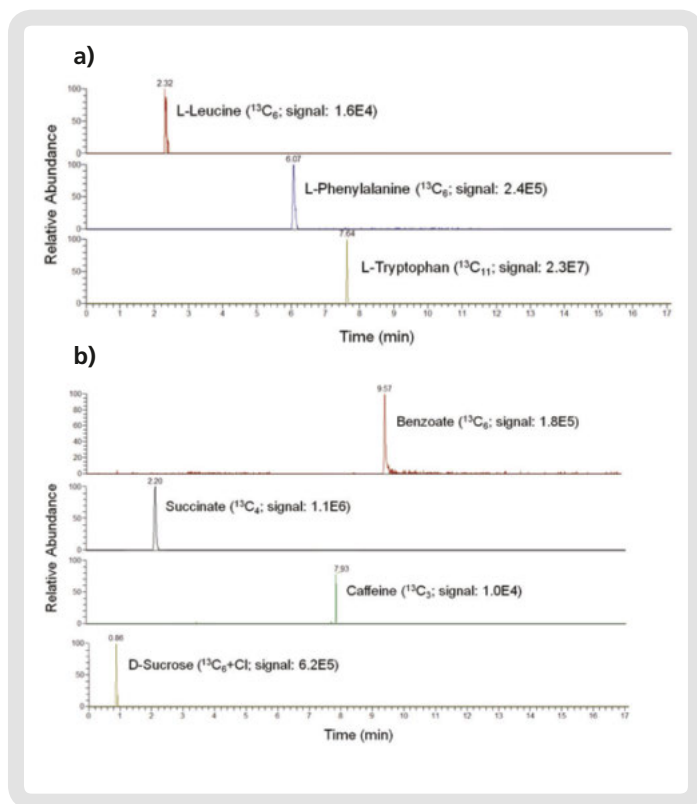
### Metabolomics QC Kit

Quality control (QC) of methods and processes is an essential factor toward the generation of reliable LC-MS data that can be reproduced by independent laboratories using untargeted or targeted MS technologies. Toward that, CIL offers a metabolomics QC kit (MSK-QC-KIT) for performance assessment of analytical workflows.

**Table 7.** Analyte composition of MSK-QC-KIT. Rehydrating each mix in 1 mL of solvent (e.g., 0.1% FA/5% ACN in water) yields the concentrations noted.

Components	Conc. (µg/mL)	Vial
L-Alanine ( $^{13}\text{C}_3$ , 99%)	4	1
L-Leucine ( $^{13}\text{C}_6$ , 99%)	4	1
L-Phenylalanine (ring- $^{13}\text{C}_6$ , 99%)	4	1
L-Tryptophan ( $^{13}\text{C}_{11}$ , 99%)	40	1
L-Tyrosine (ring- $^{13}\text{C}_6$ , 99%)	4	1
D-Glucose (U- $^{13}\text{C}_6$ , 99%)	4	2
D-Sucrose (glucose- $^{13}\text{C}_6$ , 98%)	4	2
Caffeine (trimethyl- $^{13}\text{C}_3$ , 99%)	4	2
Stearic acid, sodium salt (U- $^{13}\text{C}_{18}$ , 98%) CP 97%	0.4	2
Sodium octanoate ( $^{13}\text{C}_8$ , 99%)	4	2
Sodium propionate ( $^{13}\text{C}_3$ , 99%)	4	2
Sodium benzoate (ring- $^{13}\text{C}_6$ , 99%)	4	2
Sodium citrate (1,5,6-carboxy- $^{13}\text{C}_3$ , 99%)	4	2
Succinic acid, disodium salt ( $^{13}\text{C}_4$ , 99%)	4	2

► **Custom mixes can be formulated according to user specifications. Please inquire for details.**



**Figure 2.** Representative XICs of a subset of kit metabolites – vial 1 in a) and vial 2 in b) – measured in human plasma by RP-LC-MS (negative ESI, Q Exactive). Procedurally, aliquots of the reconstituted vials were mixed then prepared/processed according to the user manual. Note that all isotopically labeled metabolites in the mixes co-eluted with their endogenous analytes in the plasma analyses and their  $m/z$  were predominantly  $[M-H]^-$ .

## Kits (continued)

## Metabolite Yeast Extract

In partnership with ISOtopic Solutions, CIL is pleased to offer an unlabeled and <sup>13</sup>C-labeled metabolite yeast extract for use as an internal or external standard in LC-/GC-MS studies. The unlabeled extract is designed for QC assessment and the isotopically enriched extract for quantitation of 100s of metabolites in a variety of samples (e.g., plasma, cells).

Catalog No.	Description
ISO1	Metabolite Yeast Extract (U- <sup>13</sup> C, 98%)
ISO1-UNL	Metabolite Yeast Extract (unlabeled) <b>NEW!</b>

Dry extract of ~2 × 10<sup>9</sup> *Pichia pastoris* cells (~15 mg dry cell weight).



**Table 8.** Reproducibly measured metabolites in ISO1 and ISO1-UNL by HILIC-MS. Identifications were verified by comparison to authentic standards. **Note:** Other metabolites have been identified with alternate methods and analysis techniques.

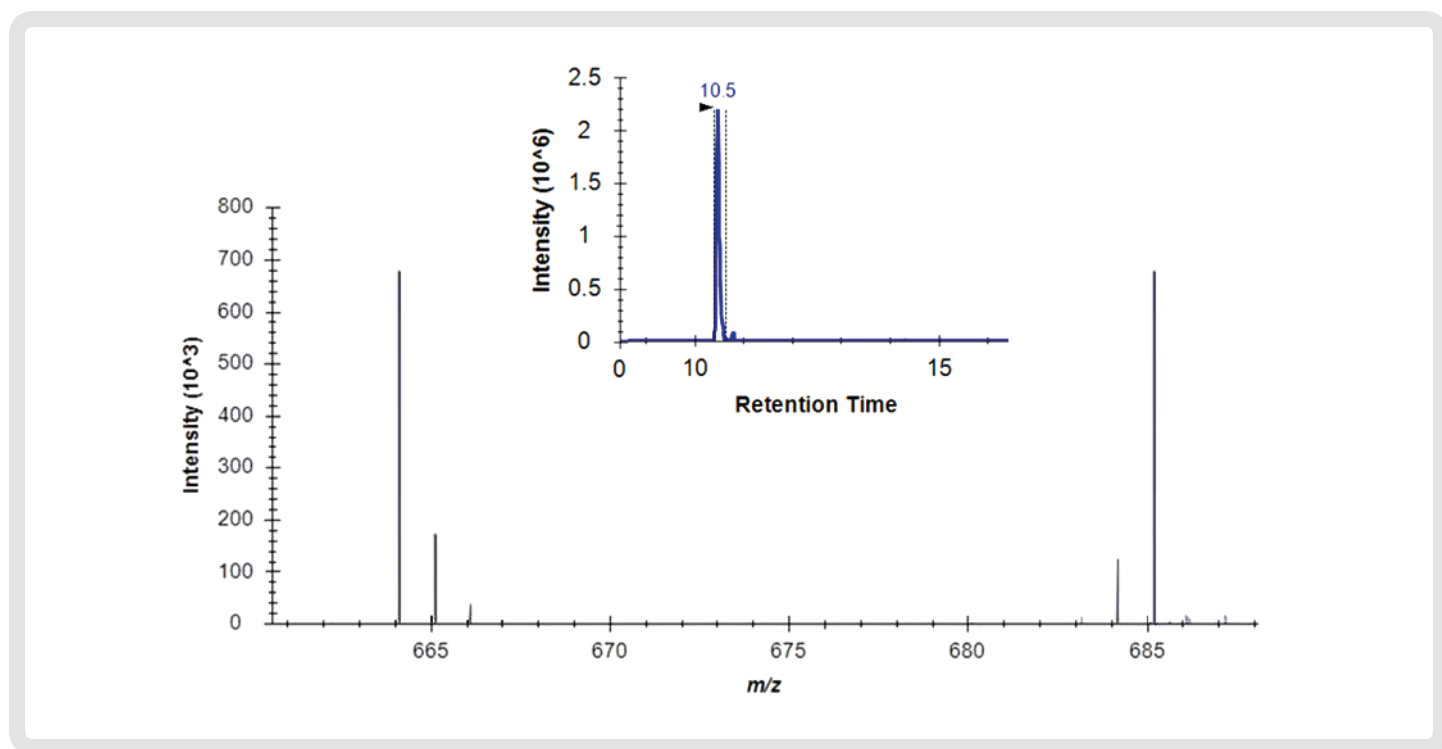
Amino Acids and Derivatives (L enantiomer where applicable)		
(+/-)-3-Methyl-2-oxovaleric acid	Glutamate	Phenylalanine
α-Aminoadipic acid	Glutamine	Proline
α-Ketoisovalerate	Glycine	S-Adenosyl-homocysteine
Alanine	Guanidineacetic acid	Sarcosine
Arginine	Histidine	Serine
Argininosuccinic acid	Homoserine	Threonine
Asparagine	Isoleucine	Tryptophan
Aspartate	Kynurenine	Tyrosine
Betaine	Leucine	Valine
Citrulline	Lysine	
Cystathionine	Methionine	
Dihydroxyisovalerate	Ornithine	
Organic Acids		
DL-2-Hydroxyglutarate	Fumerate	Malate
α-Ketoglutarate	Gluconate	Pyruvate
cis-Aconitate	Isocitrate	Succinate
Citrate	Lactate	
Nucleobases, Nucleosides, and Nucleotides		
5'-Deoxy-5'-methylthioadenosine	Cyclic guanosine monophosphate	Guanosine triphosphate
5-Methyluridine	Cytidine monophosphate	Inosine
Adenine	Cytidine triphosphate	Inosine monophosphate
Adenosine	Deoxyadenosine monophosphate	Pseudouridine
Adenosine diphosphate	Guanine	Uridine
Adenosine monophosphate	Guanosine	Uridine diphosphate
Adenosine triphosphate	Guanosine diphosphate	Uridine monophosphate
Cyclic adenosine monophosphate	Guanosine monophosphate	Uridine triphosphate
Sugar and Sugar Phosphates (D enantiomer where applicable)		
2-Phosphoglycerate	Fructose-6-phosphate	Mannose-6-phosphate
6-Phosphogluconate	Galactose	Ribose
Dihydroxyacetone phosphate	Glucose-6-phosphate	Ribose-5-phosphate
Erythritol	Mannitol	Sedoheptulose-7-phosphate
Fructose	Mannose	Trehalose
Fructose-1,6-bisphosphate		
Vitamins and Coenzymes		
Biotin*	Nicotinamide	Nicotinamide adenine dinucleotide, reduced
Choline	Nicotinamide adenine dinucleotide, oxidized	Nicotinamide adenine dinucleotide phosphate, oxidized
Other Small Molecules		
Glutathione, oxidized	Glutamylcysteine	Mevalonic acid
Glutathione, reduced		

\*Identified in ISO1-UNL only.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.



## Kits (continued)



**Figure 3.** Mixed extract of ISO1 and ISO1-UNL measured by LC-MS on a Q Exactive HF. Procedurally, both ISO1 and ISO1-UNL were reconstituted in 2 mL of water before aliquot addition (100  $\mu$ L each) to solvent (500  $\mu$ L ACN and 300  $\mu$ L water) and HILIC-MS measurement. Shown here is the MS1 spectrum of NAD<sup>+</sup> (C<sub>21</sub>H<sub>27</sub>N<sub>7</sub>O<sub>14</sub>P<sub>2</sub>;  $m/z$  664.1164 for unlabeled and 685.1869 for U-<sup>13</sup>C), with its matching chromatogram in inset.

## Example References

Hermann, G.; Schwaiger, M.; Volejnik, P.; et al. **2018**. <sup>13</sup>C-labelled yeast as internal standard for LC-MS/MS and LC high resolution MS based amino acid quantification in human plasma. *J Pharm Biomed Anal*, 155, 329-334.

Guijas, C.; Montenegro-Burke, J.R.; Domingo-Almenara, X.; et al. **2018**. METLIN: a technology platform for identifying knowns and unknowns. *Anal Chem*, 90(5), 3156-3164.

Si-Hung, L.; Causon, T.J.; Hann, S. **2017**. Comparison of fully wetttable RPLC stationary phases for LC-MS-based cellular metabolomics. *Electrophoresis*, 38(18), 2287-2295.

Schwaiger, M.; Rampler, E.; Hermann, G.; et al. **2017**. Anion-exchange chromatography coupled to high-resolution mass spectrometry: a powerful tool for merging targeted and non-targeted metabolomics. *Anal Chem*, 89(14), 7667-7674.

Ortmayr, K.; Hann, S.; Koellensperger, G. **2015**. Complementing reversed-phase selectivity with porous graphitized carbon to increase the metabolome coverage in an on-line two-dimensional LC-MS setup for metabolomics. *Analyst*, 140(10), 3465-3473.

Neubauer, S.; Chu, D.B.; Marx, H.; et al. **2015**. LC-MS/MS-based analysis of coenzyme A and short-chain acyl-coenzyme A thioesters. *Anal Bioanal Chem*, 407(22), 6681-6688.

## Kits (continued)

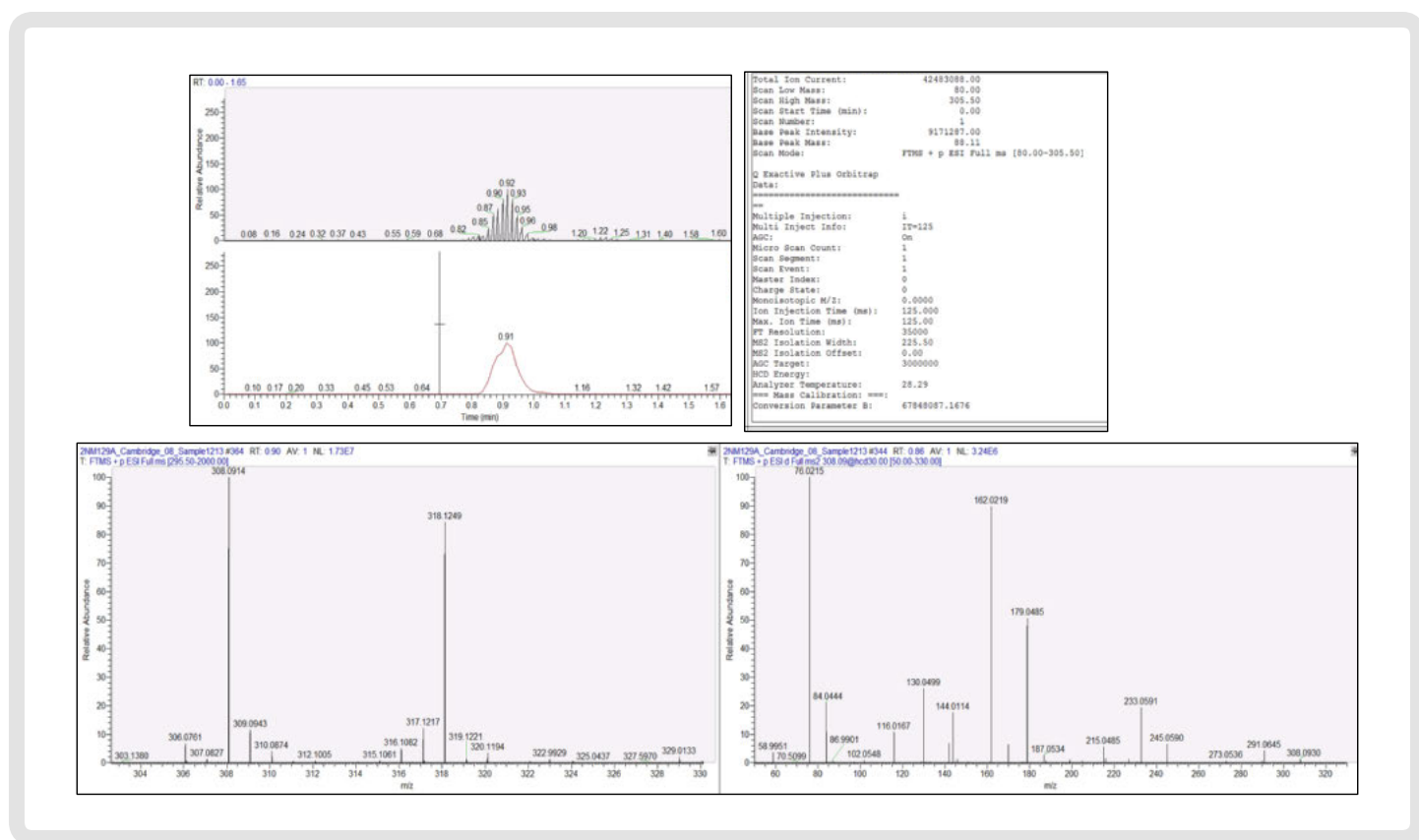
Credentialed *E. coli* Cell Extract Kits

An exceeding challenge in optimizing metabolomic methods toward improved metabolome coverage has been the difficulty in comparing the number of metabolites profiled in each. This evaluation is challenged by artifactual (i.e., noncredentialed) features arising from sample contamination during metabolite extraction, background noise, and/or misannotation of data during bioinformatic processing. To help streamline method optimization/evaluation in untargeted metabolomics, Dr. Gary Patti and colleagues developed a credentialed platform that utilizes a simple software algorithm for interrogating *E. coli* extracts (see references below). To aid broad utility, CL is proud to offer *E. coli* cell extract kits that can be applied for performance comparisons of 100s of

metabolites across different metabolomic workflows and instrument platforms. The figure below illustrates a credentialed metabolite measured in the *E. coli* extract.

Catalog No.	Description
MSK-CRED-KIT	Credentialed <i>E. coli</i> Cell Extract Kit (solution)
MSK-CRED-DD-KIT	Credentialed <i>E. coli</i> Cell Extract Kit (dried down)

**Note:** Each kit contains two vials of *E. coli* cell extracts (K12 strain MG1655), with one grown in  $^{13}\text{C}$  D-glucose ( $\text{U-}^{13}\text{C}_6$ , 99%) and the other in natural abundance D-glucose. Procedurally, these are to be mixed (at defined ratios) prior to LC-MS analysis and bioinformatic processing.



**Figure 4.** Credentialed extract measured by LC-MS on a Q Exactive Plus. Shown are the measured parameters and observed spectra for reduced glutathione ( $\text{C}_{10}\text{H}_{17}\text{N}_3\text{O}_6\text{S}$ ; unlabeled CAS 70-18-8). The M+0 in the MS survey scan is at  $m/z$  308.0914, while the M+U is at 318.1249.

## Example References

Wang, L.; Naser, F.J.; Patt, G.J. **2018.** A protocol to compare methods for untargeted metabolomics. *Methods Mol Biol.* In press.

Naser, F.J.; Mahieu, N.G.; Wang, L.; et al. **2018.** Two complementary reversed-phase separations for comprehensive coverage of the semipolar and nonpolar metabolome. *Anal Bioanal Chem*, 410(4), 1287-1297.

Mahieu, N.G.; Patti, G.J. **2017.** Systems-level annotation of a metabolomics data set reduces 25,000 features to fewer than 1000 unique metabolites. *Anal Chem*, 89(19), 10397-10406.

Benton, H.P.; Ivanisevic, J.; Mahieu, N.G.; et al. **2015.** Autonomous metabolomics for rapid metabolite identification in global profiling. *Anal Chem*, 87(2), 884-891.

Mahieu, N.G.; Huang, X.; Chen, Y.; et al. **2014.** Credentialed features: a platform to benchmark and optimize untargeted metabolomic methods. *Anal Chem*, 86(19), 9583-9589.

Chemical purity (CP) is 98% or greater, unless otherwise indicated.

## Kits (continued)

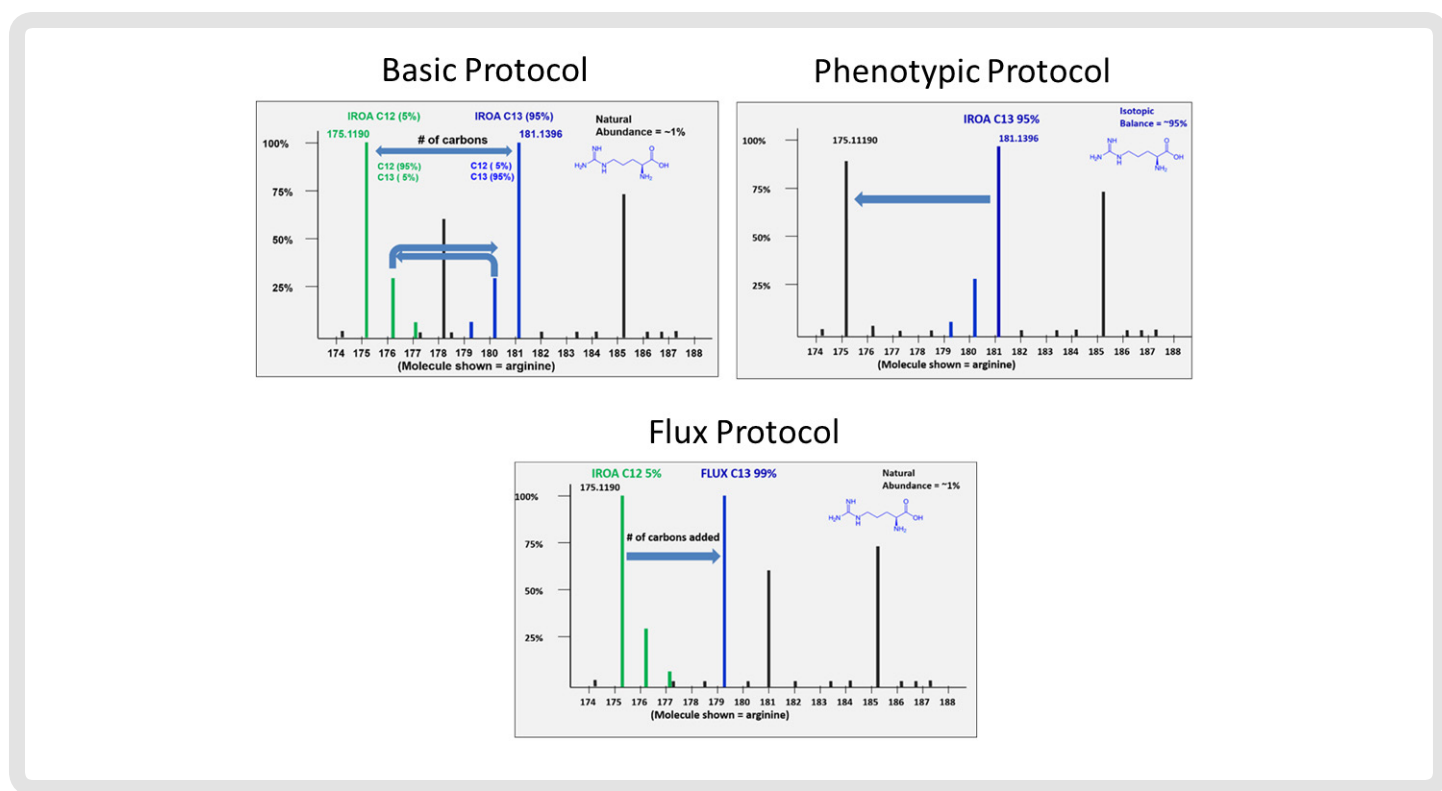
## IROA® Biochemical Quantitation Kits

By using specific isotopic balances (e.g., 95%  $^{13}\text{C}$  and 5%  $^{13}\text{C}$  D-glucose in the basic protocol for control and experimental groups), IROA's quantitative assay kits can be used to study biomarkers, systems biology, and flux in a wide variety of cell populations and biological samples (see references below for general background and application examples). The reduced enrichment enables isotopic distributions to be detected by MS in a predictable and distinguishable manner. These distributions can then be used to: (i) differentiate biological signals from artifacts, (ii) calculate accurate molecular formulae, and (iii) determine relative concentrations of the metabolites of biological origin.

IROA is a registered trademark of IROA Technologies.

Catalog No.	Description	Protocol
IROA-100	IROA 100 for Yeast/Fungi Metabolic Profiling	Basic
IROA-200	IROA 200 for Bacterial Metabolic Profiling	Basic
IROA-300	IROA 300 for Mammalian Metabolic Profiling	Basic
IROA-PHENO-95	IROA 300 for Phenotypic Metabolic Profiling	Phenotypic
IROA-FLUX-5	IROA 300 for Fluxomic Metabolic Profiling	Flux

**Note:** Unlabeled bacterial (IROA-200-UL) and mammalian (IROA-300-UL) media are also available for cell-growth testing and adaptation.

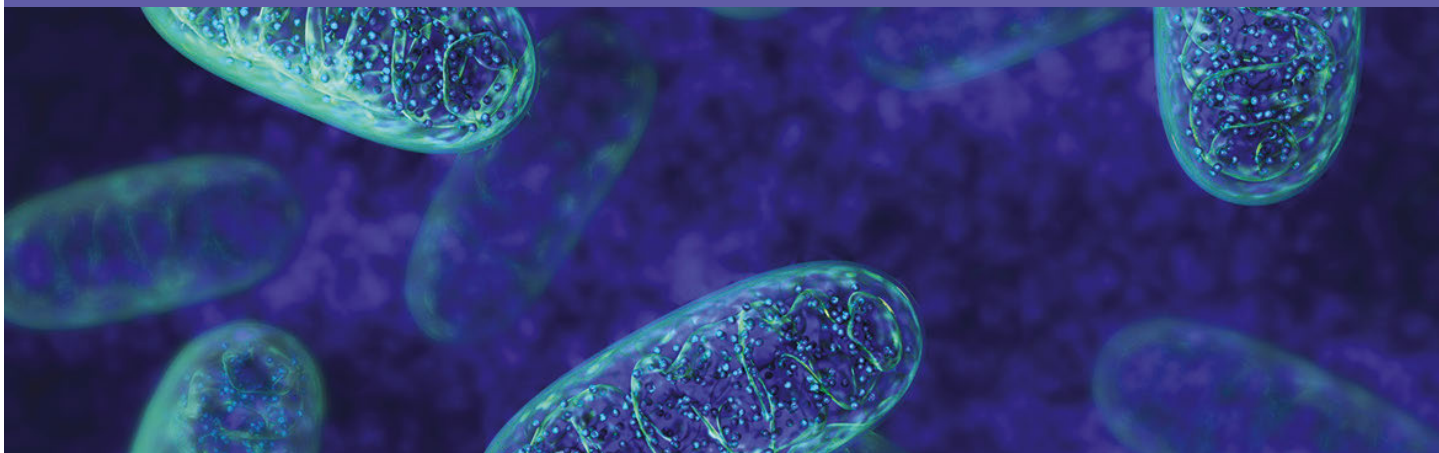


**Figure 5.** MS spectra for L-arginine ( $\text{C}_6\text{H}_{14}\text{N}_4\text{O}_2$ ) measured by LC-MS under three types of IROA protocols. Briefly, the cell populations are grown with isotopically labeled D-glucose for control and experimental samples in the basic protocol, control samples only in phenotypic, and experimental samples only in fluxomic (tracers added after harvest at 99%  $^{13}\text{C}$ ). **Note:** the control signals (at 5%  $^{13}\text{C}$ ) are illustrated in blue and the experimental (at 95%  $^{13}\text{C}$ ) in green. IROA's ClusterFinder software is used for data analysis and the Assay Portal for results interpretation.

## Example References

- Viant, M.R.; Kurland, I.J.; Jones, M.R.; et al. **2017**. How close are we to complete annotation of metabolomes? *Curr Opin Chem Biol*, *36*, 64-69.
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