



Carnitine/Acylcarnitine Standards and Mixtures

For Identification and Quantification



Carnitines and acylcarnitines play an essential role in fatty acid metabolism. Metabolic disorders of fatty acid oxidation and various organic acidurias arising from carnitine/acylcarnitine accumulation impose major clinical manifestations (e.g., hypoketotic hypoglycemia, skeletal myopathy, liver disease). These are largely attributed to enzymatic deficiencies and can be monitored through carnitine/acylcarnitine measurement.

To aid MS/MS screening developments and applications, Cambridge Isotope Laboratories, Inc. (CIL) is pleased to offer a variety of well characterized, stable isotope-labeled (and unlabeled) carnitine/acylcarnitine standards and mixes. These are available in different labeling patterns in their neat form. For a complete listing, visit isotope.com.

Individual Standards

Catalog No.	Description	Abbreviation
DLM-1871	L-Carnitine-HCl (methyl-D ₃ , 98%)	C0
DLM-3820	L-Carnitine-HCl (dimethyl-D ₆ , 98%)	C0
DLM-10962	L-Carnitine-HCl (trimethyl-D ₉ , 98%)	C0
DLM-3555	L-Carnitine (trimethyl-D ₉ , 98%)	C0
DLM-754	L-Carnitine-HCl, O-acetyl (N-methyl-D ₃ , 98%)	C2
DLM-3821	L-Carnitine-HCl, O-acetyl (N,N-dimethyl-D ₆ , 98%) CP 97%	C2
DLM-3973	L-Carnitine-HCl, O-propionyl (N-methyl-D ₃ , 98%)	C3
DLM-11049	L-Carnitine-CIO ₄ , O-malonyl (N-methyl-D ₃ , 98%)	C3-DC
DLM-3861	L-Carnitine-HCl, O-butyryl (N-methyl-D ₃ , 98%)	C4
DLM-11713	L-Carnitine, O-3-hydroxybutyryl (N-methyl-D ₃ , 98%) CP 95%	C4-OH
DLM-3974	L-Carnitine-HCl, O-isovaleryl (N,N,N-trimethyl-D ₉ , 98%)	C5
DLM-12325	L-Carnitine-CIO ₄ , tiglyl (N,N,N-trimethyl-D ₉ , 98%) CP 90%	C5:1
DLM-3975	L-Carnitine (mono-CIO ₄), O-glutaryl (N-methyl-D ₃ , 98%) CP 97%	C5-DC
DLM-8272	L-Carnitine-CIO ₄ , 3-hydroxyisovaleryl (N-methyl-D ₃ , 98%)	C5-OH
DLM-9276	L-Carnitine-HCl, O-hexanoyl (N-methyl-D ₃ , 98%)	C6
DLM-755	L-Carnitine-HCl, O-octanoyl (N-methyl-D ₃ , 98%)	C8
DLM-9067	L-Carnitine-HCl, O-decanoyl (N-methyl-D ₃ , 98%)	C10
NEW! CNLM-11665	L-Carnitine-HCl, O-decanoyl (trimethyl- ¹³ C ₃ , 98%; ¹⁵ N, 98%) CP 95%	C10
DLM-8746	L-Carnitine-HCl, O-dec-2-enoyl (N,N,N-trimethyl-D ₉ , 98%) 95% E	C10:1
DLM-8162	L-Carnitine-HCl, O-dodecanoyl (N-methyl-D ₃ , 98%)	C12
DLM-8215	L-Carnitine-HCl, O-dodecanoyl (N,N,N-trimethyl-D ₉ , 98%)	C12
DLM-4425	L-Carnitine-HCl, O-myristoyl (N,N,N-trimethyl-D ₉ , 98%)	C14
DLM-12326	L-Carnitine-CIO ₄ , tetradec-5-cis-enoyl (N,N,N-trimethyl-D ₉ , 98%) CP 90%	C14:1
DLM-1263	L-Carnitine-HCl, O-palmitoyl (N-methyl-D ₃ , 98%)	C16
DLM-9189	L-Carnitine (mono-CIO ₄), O-3-DL-hydroxypalmitoyl (N-methyl-D ₃ , 98%)	C16-OH
DLM-8271	L-Carnitine-HCl, O-octadecanoyl (N-methyl-D ₃ , 98%)	C18
NEW! CNLM-11666	L-Carnitine-HCl, O-octadecanoyl (trimethyl- ¹³ C ₃ , 98%; ¹⁵ N, 98%) CP 95%	C18
NEW! DLM-11594	L-Carnitine, O-hexacosanoyl (N-methyl-D ₃ , 98%) CP 95%	C26
NEW! DLM-11741	L-Carnitine-CIO ₄ , O-hexacosanoyl (N-methyl-D ₃ , 98%) CP 95%	C26
DLM-11174	L-Carnitine-HCl, O-hexacosanoyl (N,N,N-trimethyl-D ₉ , 98%) CP 95%	C26

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Mixtures

Catalog No.	Description	No. of Metabolites	Unit Size
NSK-B	Carnitine/Acylcarnitine Standards Mix Set B	8	1 vial, 10 vials

Standard	Abbreviation	Conc. (µM)
L-Carnitine (trimethyl-D ₃ , 98%)	C0	152
O-Acetyl-L-carnitine·HCl (N-methyl-D ₃ , 98%)	C2	38
O-Propionyl-L-carnitine·HCl (N-methyl-D ₃ , 98%)	C3	7.6
O-Butyryl-L-carnitine·HCl (N-methyl-D ₃ , 98%)	C4	7.6
O-Isovaleryl-L-carnitine·HCl (N,N,N-trimethyl-D ₃ , 98%)	C5	7.6
O-Octanoyl-L-carnitine·HCl (N-methyl-D ₃ , 98%)	C8	7.6
O-Myristoyl-L-carnitine·HCl (N,N,N-trimethyl-D ₃ , 98%)	C14	7.6
O-Palmitoyl-L-carnitine·HCl (N-methyl-D ₃ , 98%)	C16	15.2

NSK-B-G1	Carnitine/Acylcarnitine Standards Mix Supplement to NSK-B	5	1 vial, 10 vials
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Standard	Abbreviation	Conc. (µM)
O-Glutaryl-L-carnitine·ClO ₄ (N-methyl-D ₃ , 98%) CP 97%	C5-DC	15.2
3-Hydroxyisovaleryl-L-carnitine·ClO ₄ (N-methyl-D ₃ , 98%)	C5-OH	7.6
O-Dodecanoyl-L-carnitine·HCl (N,N,N-trimethyl-D ₃ , 98%)	C12	7.6
O-3-DL-Hydroxypalmitoyl-L-carnitine·ClO ₄ (N-methyl-D ₃ , 98%)	C16-OH	15.2
O-Octadecanoyl-L-carnitine·HCl (N-methyl-D ₃ , 98%)	C18	15.2

Note: Companion unlabeled mixes and sets are also available; please inquire.

Individual Standards

Example References

He, W.; Berthiaume, J.M.; Previs, S.; et al. **2023**. Ischemia promotes acyl-CoAs dephosphorylation and propionyl-CoA accumulation. *Metabolomics*, 19(2), 12-26.

Mak, J.; Peng, G.; Le, A.; et al. **2023**. Validation of a targeted metabolomics panel for improved second-tier newborn screening. *J Inherit Metab Dis*, 46(2), 194-205.

Al-Riyami, S.; Al-Manei, M.; Al-Fahdi, A.; et al. **2022**. Establishment and validation of reference values for amino acids and acylcarnitines in dried blood spots for Omani newborns using tandem mass spectrometry. *Oman Med J*, 37(5), e426-e432.

Wang, W.Y.; Liu, X.; Gao, X-Q.; et al. **2022**. Relationship between acylcarnitine and the risk of retinopathy in type 2 diabetes mellitus. *Front Endocrinol*, 13, 834205-834213.

Mixtures

Example References

Tan, H.C.; Hsu, J.W.; Tai, E.S.; et al. **2024**. The impact of obesity-associated glycine deficiency on the elimination of endogenous and exogenous metabolites via the glycine conjugation pathway. *Front Endocrinol*, 15, 1343738-1343749.

Zong, G.-W.; Wang, W.-Y.; Zheng, J.; et al. **2023**. A metabolism-based interpretable machine learning prediction model for diabetic retinopathy risk: a cross-sectional study in Chinese patients with type 2 diabetes. *J Diabetes Res*, 2023, 3990035-3990046.

Pruss, K.M.; Chen, H.; Liu, Y.; et al. **2023**. Host-microbe co-metabolism via MCAD generates circulating metabolites including hippuric acid. *Nat Commun*, 14(1), 512-523.

Mak, J.; Peng, G.; Le, A.; et al. **2023**. Validation of a targeted metabolomics panel for improved second-tier newborn screening. *J Inherit Metab Dis*, 46(2), 194-205.

Huguenard, C.J.C.; Cseresznye, A.; Darcey, T.; et al. **2023**. Age and APOE affect L-carnitine system metabolites in the brain in the APOE-TR model. *Front Aging Neurosci*, 14, 1059017-1059035.

Technical Note

Xie, X.; Kozak, M. **2020**. Simultaneous analysis of amino acids, acylcarnitines, and succinylacetone in dried blood spots for research using nonderivatized and derivatized methods. (Thermo Scientific technical note #73398).

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

For research use only. Not for use in diagnostic procedures.



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MSMS_CARNITINE_ACYLCARNITINE (10/22/24)
Supersedes all previously published literature