LIPID MAPS Mass Spectrometry Internal Standards for

Ceramides, Sphingoid bases (& 1-phosphates) and simple Phospho- & Glyco-sphingolipids

MS Internal Standards were formulated using unique molecules designed by Avanti Polar Lipids and the LIPID MAPS Consortium. Avanti is proud to supply these Quantitative MS Internal Standards to LIPID MAPS, and they are now available to the research community.

*Ceramide/Sphingoid Internal Standard Mixture I contains 25 μM of 10 of these compounds in ethanol . Single use, 1 ml ampules are sufficient for at least 50 samples.

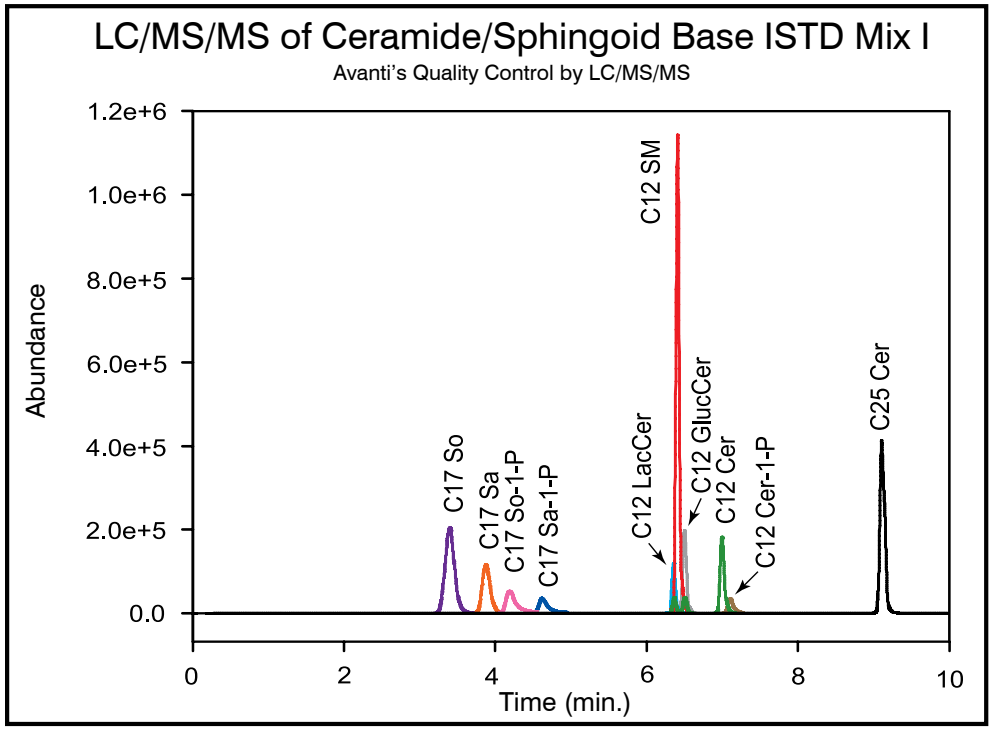
Also, all these compounds now available as individual Standards.

Warning

Using the method of Sullards, *et al*, Methods in Enzymology 432: 83-115, a discrepancy has been noted by the Merrill lab in the amounts of C24:1-Cer (d18:1/C24:1) using the ABI 3000 triple quadrupole versus the ABI 4000 quadrupole linear ion trap (QTrap) and this was found to be due to in-source dehydration of C25-Cer in the ABI 3000. This was surprising because the precursor-product pair of the in-source dehydration product of C25-Cer (m/z 646.9/264.4) does not correspond to the MRM pair for C24:1-Cer, however, the M+2 ^{13}C isotopologue of C25-Cer (m/z 648.9/264.4) provides this match. This interference can be minimized by careful selection of the ionization and fragmentation parameters for the instrument when using Sphingolipid Mix I.

†As an alternative, Avanti now offers Sphingolipid Mix II which does not contain C25-Cer.

Standard	Avanti Number
Sphingolipid Mix I*	LM-6002
Sphingolipid Mix II†	LM-6005
Sphingosine (C17 base)	LM-2000
Sphinganine (C17 base)	LM-2001
Sphingosine-1-P (C17 base)	LM-2144
Sphinganine-1-P (C17 base)	LM-2145
Lactosyl(ß) C12 Ceramide	LM-2512
12:0 Sphingomyelin	LM-2312
Glucosyl(ß) C12 Ceramide	LM-2511
12:0 Ceramide	LM-2212
12:0 Ceramide-1-P	LM-2251
25:0 Ceramide	LM-2225

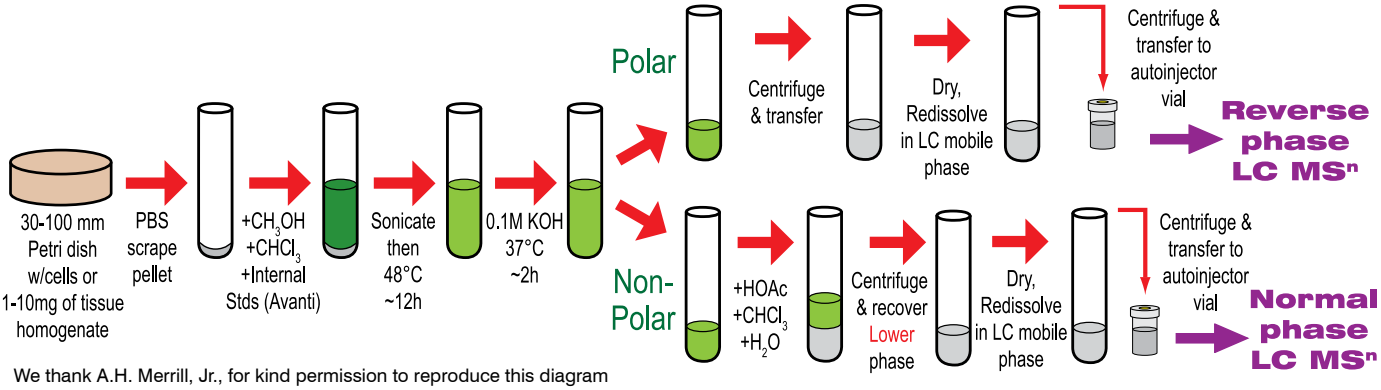


A total of 10 sphingolipids were formulated together in ethanol to deliver 50 nmoles of each in 20 μl added to cell extraction samples as in Merrill *et al.* (2005). Under the appropriate extraction and mass spectrometry conditions, the uncommon chain lengths of these internal standards allow them to be used for quantitative analysis of sphingolipids in diverse biological materials.

continued overleaf

LIPID MAPS MS Internal Standards

Where it all begins: Cell extraction for sphingolipids

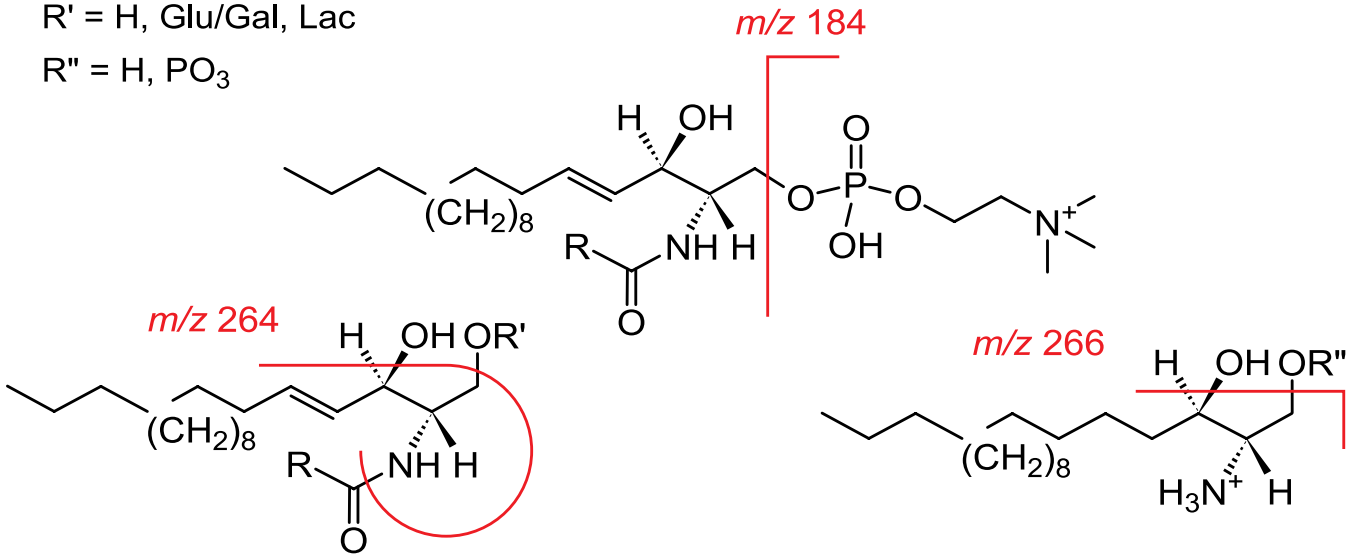


We thank A.H. Merrill, Jr., for kind permission to reproduce this diagram

R = n-alkyl chain

R' = H, Glu/Gal, Lac

R" = H, PO_3



Fragmentation of sphingolipids observed in the positive mode.

Fragmentation of long-chain bases, long-chain base phosphates, ceramides, and monohexosylceramides involves dehydration at the 3-position, dehydration at the 1-position, or cleavage of the 1-position moiety with charge retention on the sphingoid base. Sphingomyelin similarly cleaves at the 1-position; however, the charge is retained on the phosphoryl choline headgroup yielding the *m/z* 184 ion.

For information about procedures and guidance in the application of these Lipid Standards visit: www.lipidmaps.org/downloads/2007_methods_chapters.pdf

LIPID MAPS™

www.lipidmaps.org

Qualitative Standards also available for all of the above.
Visit avantilipids.com for more details and ordering information.

Avanti® Polar Lipids, Inc.