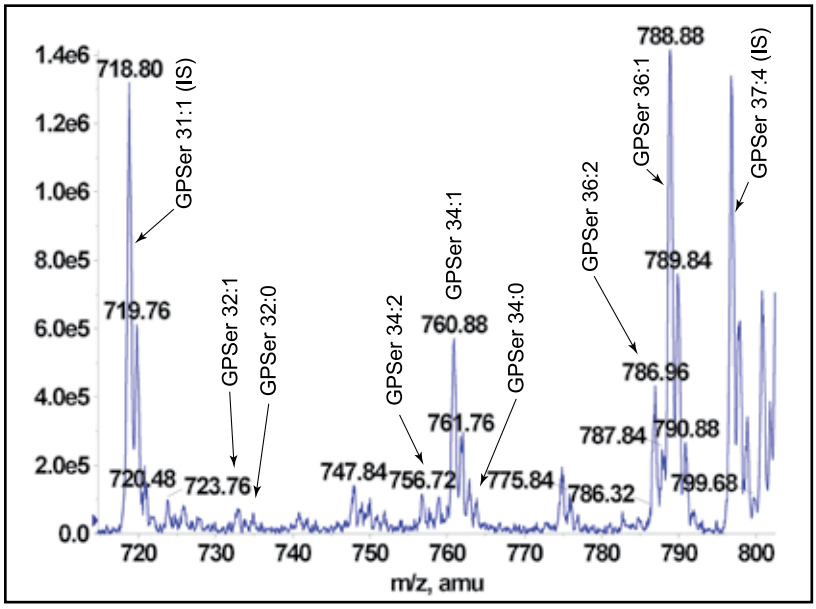
LIPID MAPS Mass Spectrometry Internal Standards for Glycerophospholipids

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.

Name	Number	Name	Number	Name	Number
12:0-13:0 PC	LM-1000	21:0-22:6 PG	LM-1203	17:0-20:4 PI	LM-1502
17:0-14:1 PC	LM-1004	12:0-13:0 PS	LM-1300	21:0-22:6 PI	LM-1503
17:0-20:4 PC	LM-1002	17:0-14:1 PS	LM-1304	13:0 LPC	LM-1600
21:0-22:6 PC	LM-1003	17:0-20:4 PS	LM-1302	17:1 LPC	LM-1601
12:0-13:0 PE	LM-1100	21:0-22:6 PS	LM-1303	13:0 LPA	LM-1700
17:0-14:1 PE	LM-1104	12:0-13:0 PA	LM-1400	17:1 LPA	LM-1701
17:0-20:4 PE	LM-1102	17:0-14:1 PA	LM-1404	14:1(3)-15:1 CA	LM-1802
21:0-22:6 PE	LM-1103	17:0-20:4 PA	LM-1402	15:0(3)-16:1 CA	LM-1803
12:0-13:0 PG	LM-1200	21:0-22:6 PA	LM-1403	22:1(3)-14:1 CA	LM-1804
17:0-14:1 PG	LM-1204	12:0-13:0 PI	LM-1500	24:1(3)-14:1 CA	LM-1801
17:0-20:4 PG	LM-1202	17:0-14:1 PI	LM-1504	Cardiolipin Mix I	LM-6003

Twenty four novel odd-carbon glycerophospholipid species have been formulated in conjunction with the LIPID MAPS Project for use as LC/MS internal standards. To bracket the entire range of biologically relevant phospholipids, four lipids per diradyl class (ranging from small saturated to large polyunsaturated species) were prepared. Odd-carbon standards were chosen for this project due to the fact that they do not occur naturally in most mammalian systems. Due to varying ionization efficiencies across a lipid class, multiple standards within a class with varying degrees of unsaturation and carbon chain length are required for the production of standard curves for all possible biologically relevant species.



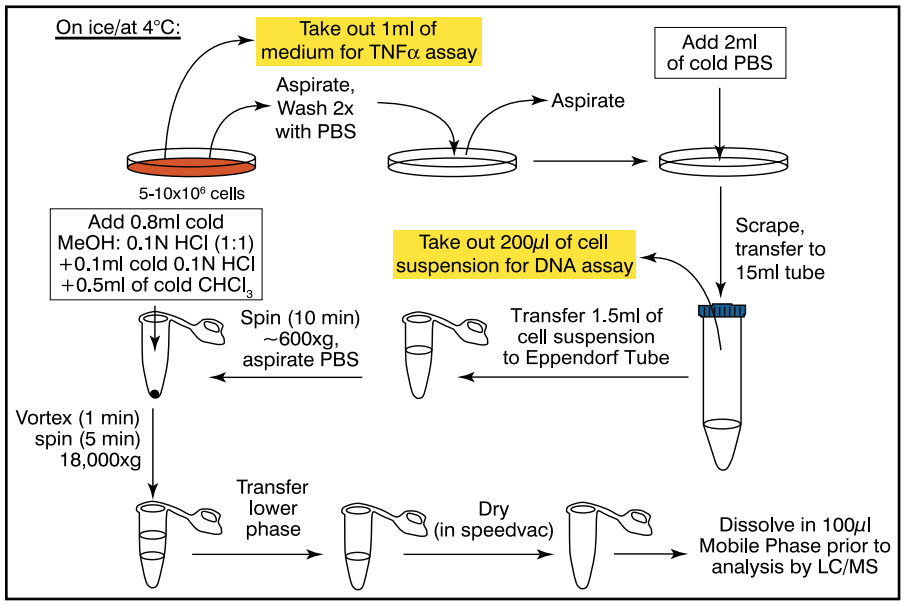
Highlights of the 32, 34, and 36 series GPSer lipids and two internal standards

Standards from six diradyl and two lyso lipid classes have been incorporated into LIPID MAPS LC/MS protocols for normalization and quantitation of data.

As an aid to the lipid community, fully annotated MS/MS fragmentation data for all of the standards is now available on the LIPID MAPS public website.

continued overleaf

LIPID MAPS MS Internal Standards



Glycerophospholipid Extraction Protocol

Glycerophospholipid standards
A total of 24 phospholipid standards have been formulated in methanol.
Single use, 1 mL ampoules are sufficient for over 50 samples (based on cell extracts from 10 million cells).

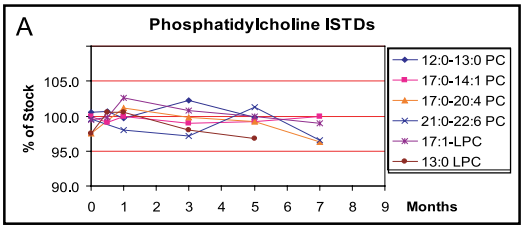
Cardiolipin Standards also available.

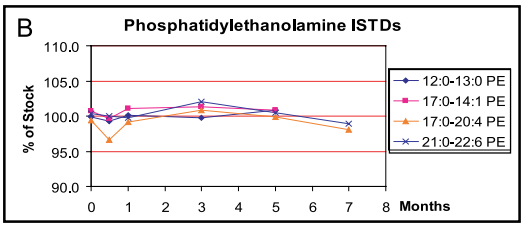
Only at Avanti

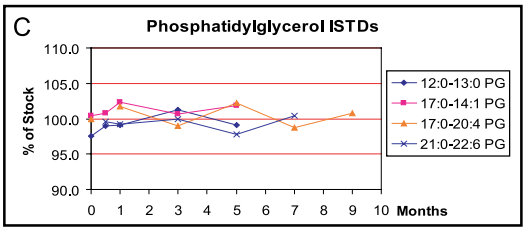
Recognition of the importance of lipid signaling in cellular function has led to rapid progress in the technology of lipid analysis. Measurements of lipid species changes are central to defining the networks of cell signaling (e.g., receptor activation by hormones or drugs) and lipids are involved in many biochemical and pathological processes. During the last several years our laboratory has focused on developing efficient methods for extraction of glycerophospholipids from biological systems and their detection and identification by mass spectrometry. We analyze phospholipid changes in mammalian cells as a result of a defined ligand stimulation strategy that supports the research questions of the consortium. The improvement of mass spectrometry techniques for phospholipid analysis combined with sophisticated computational methods developed in our group has facilitated simultaneous analysis of hundreds of phospholipid species in mammalian cells. This information is presented as Lipid Arrays (or more precisely as virtual arrays) and allows identification of temporal changes in membrane phospholipid species between two contrasting biological conditions (e.g., unstimulated basal vs. stimulated or as a contrast between normal and disease stages). Using the lipidomics approach, we are able to identify approximately 450 phospholipid species from total membrane extracts and qualitatively measure pattern response changes initiated by cell surface receptors. As such, this approach facilitates the elucidation of the metabolic changes induced by a perturbation in the cell and recognition of patterns of signaling.

Milne, S., P. Ivanova, J. Forrester, and H. Alex Brown. (2006). Lipidomics: an analysis of cellular lipids by ESI-MS. *Methods* 39:92-103.

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







Phospholipid stability graphs for GPCho (A), GPEtn (B), and GPGro (C) odd-carbon standards stored at -20°.
Ampoules are monitored bi-monthly by LC/MS/MS analysis

LIPID MAPS™
www.lipidmaps.org

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

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