SCIEX

Answers for Science.
Knowledge for Life.™

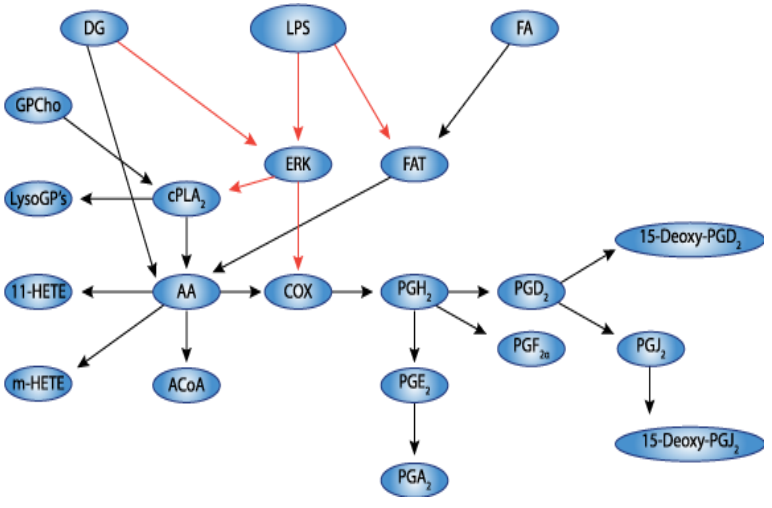
New Solutions for Next-Gen Lipidomics

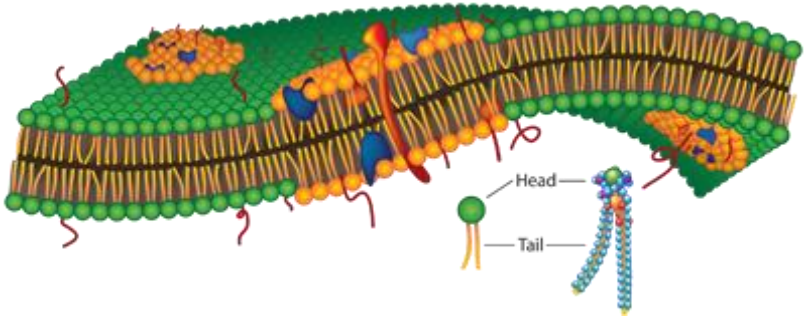
NAME
TITLE, LOCATION, DATE

Lipidomics

A Subset of the Metabolome

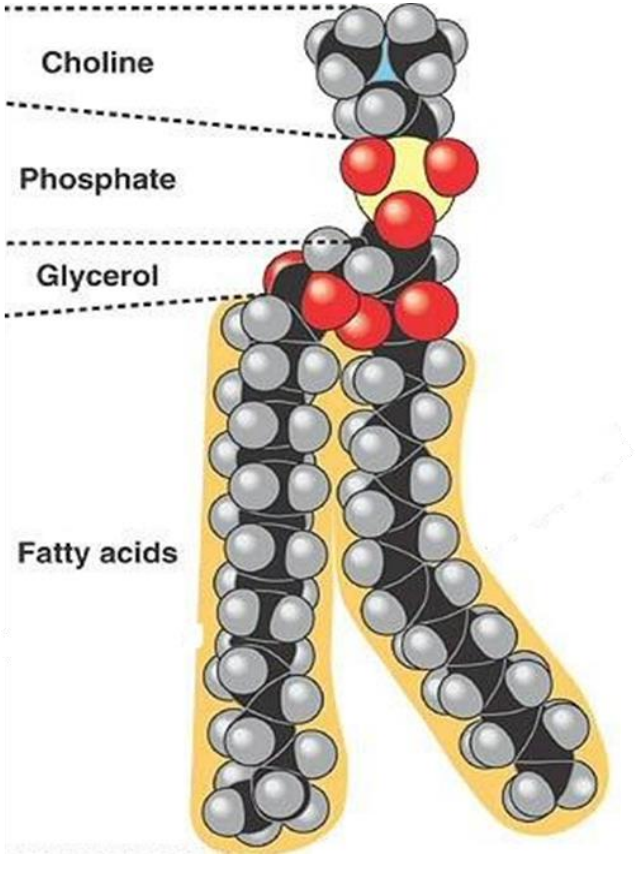
- The study of pathways and networks of cellular lipids in biological systems.
- The ‘lipidome’ describes the complete lipid profile within a cell, tissue or organism and is a subset of the ‘metabolome’
- The metabolome is the total number of metabolites present within an organism, cell, or tissue





The Challenge in Lipidomics Research

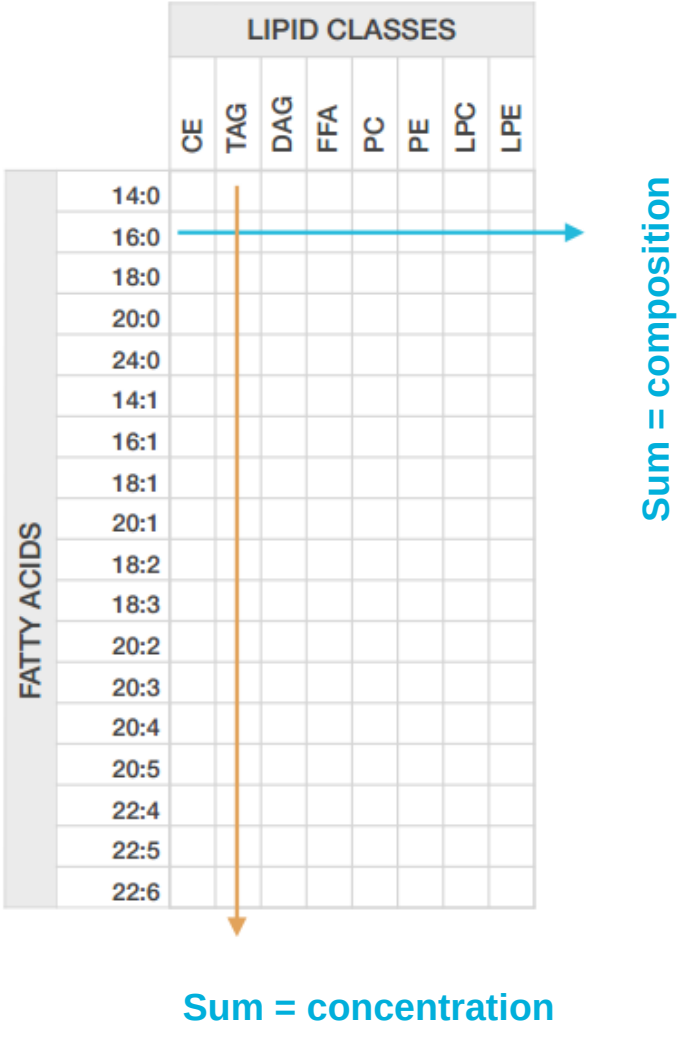
- Lipids are polymeric structures and their individual elements have their own pathways
- Breakdown into intermediary metabolites (FAs)
- Mapping lipids requires mapping to the right level



Intermediary	Complex	Aggregates
FAs →	TAGs →	VLDL
Fatty acid metabolism	Acyltransferase metabolism	Lipid class metabolism

Complex Lipids are like a Matrix

- Lipid are present in classes that have concentrations and compositions (important for level of metabolism)
  - Concentration = sum of the FAs for any given class (column)
  - Composition = relative abundances of each FA (or species) across many classes (rows)



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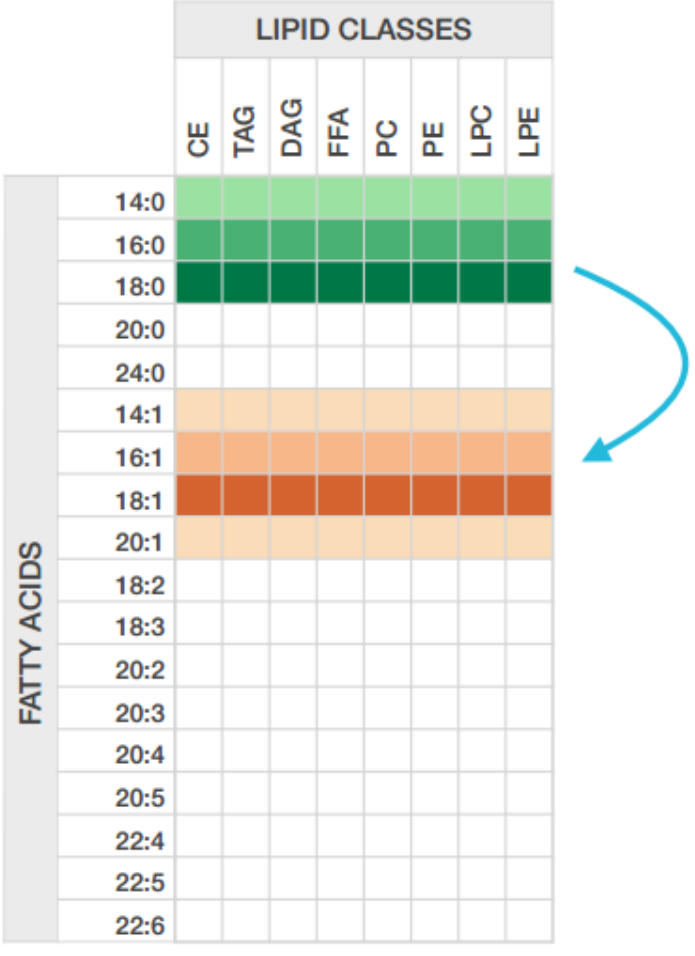

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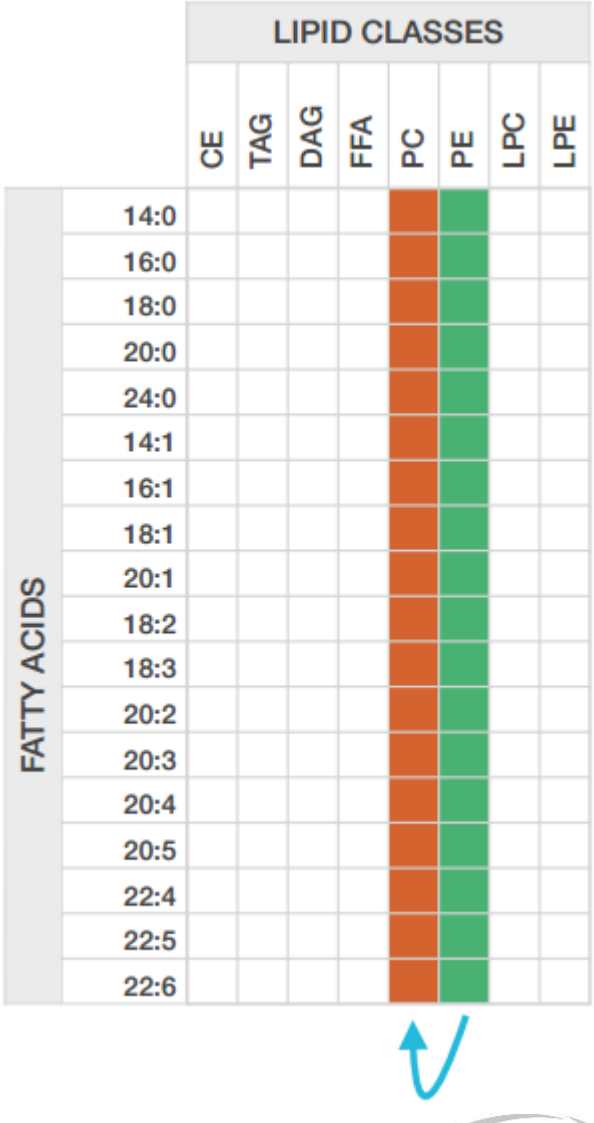
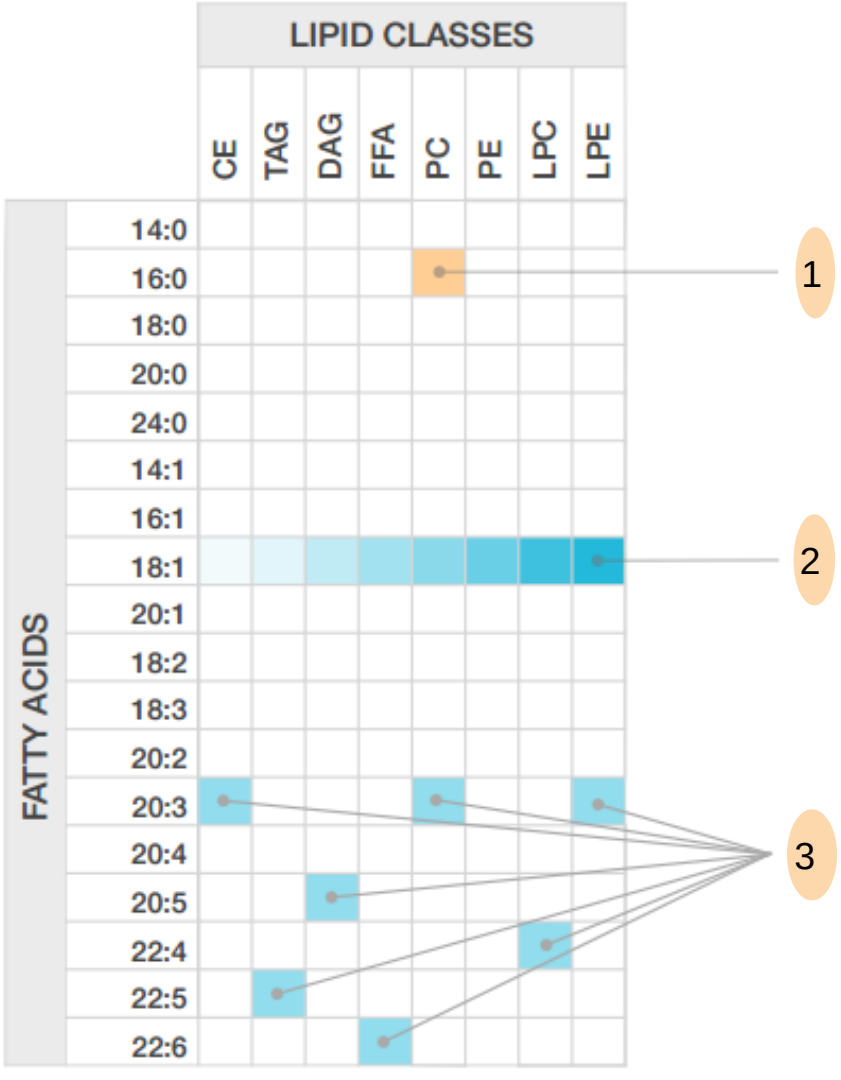
- When lipid class metabolism is altered there is the ability to change all members of the class



What is needed from a Lipid Platform



1) Specificity

- A non-specific method (e.g. PC 36:2) does not allow mapping to the elements of the matrix

2) Quantitation

- A non-quantitative approach does not allow accurate summing of the rows and columns

3) Comprehensive Coverage

- A partially complete matrix is difficult to interpret

Metabolon®

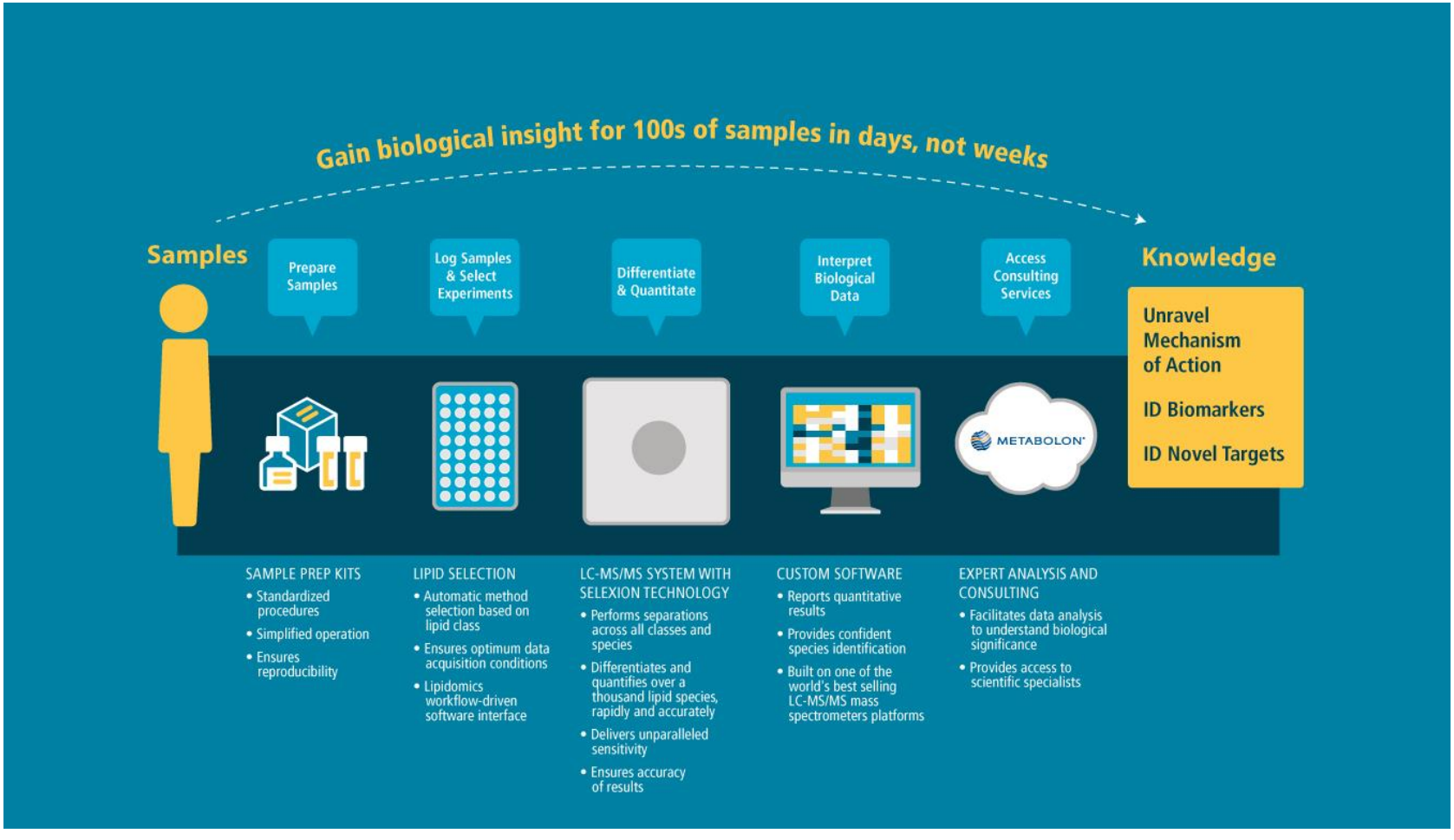
Global Leader in Metabolomics Applications

- Over 10 years of continuous leadership in metabolomics technology development
- Core business is metabolomics services and diagnostic development
- 500 publications, many in top tier journals (Nature, Science, Cell)
- Over 4000 projects conducted with hundreds of clients
- Acquired Lipomics in 2012, a lipidomics company founded in 2000

Partnered with SCIEX to build Next-Gen Lipidomic capabilities

Simplifying the Complexity

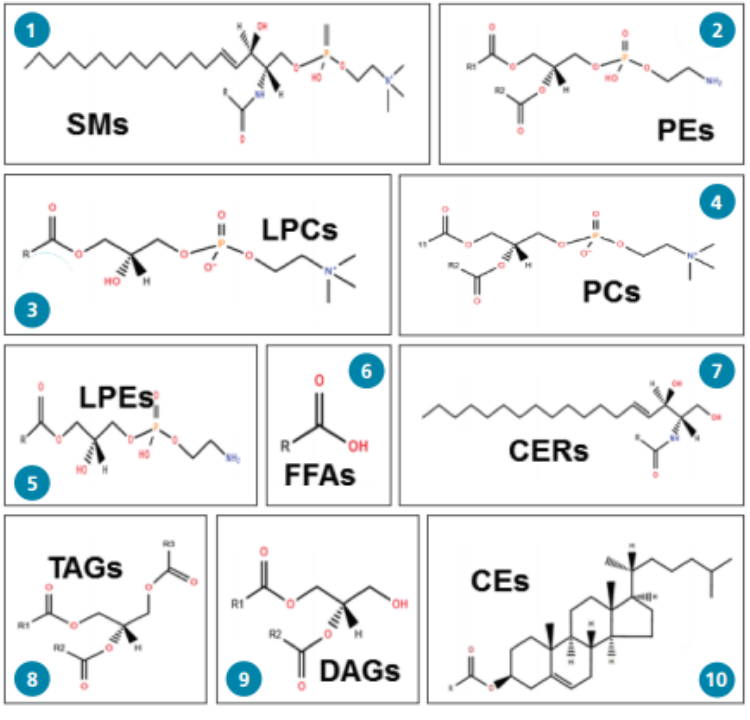
Powered by METABOLON®



Why the Lipidyzer™ Platform?

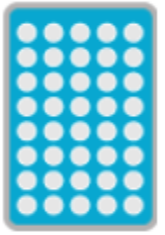
Standardization of Sample Preparation

- Novel internal standard kits and methods designed exclusively for the Lipidizer™.
- Built on Metabolon's "know-how" of commercial lipid analysis platforms and standard procedures
- Provides user with confident, reproducible quantitation
- **Over 50 internal standards across ten lipid classes – a complete unique strategy!**

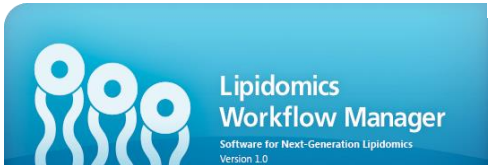


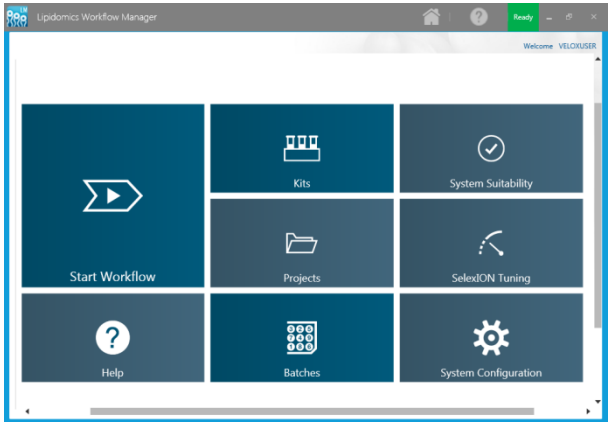
Why the Lipidyzer™ Platform?

Lipidomics Workflow Manager



- Sample login and metadata entry
- Selection of lipid class-specific methods
- Fully automated experimental design
  - Internal standard assembler allows automated calculation of volumes to add for your analysis
  - Automated templates of samples batches to ensure statistical distribution
  - Automated SelexION™ tuning and system suitability tests.
- **Controls your entire workflow**

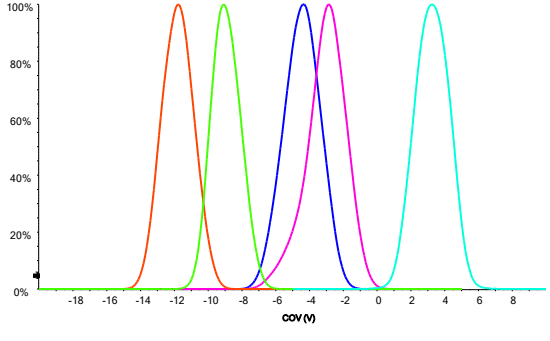




Why the Lipidyzer™ Platform?

QTRAP® 5500 & SelexION™ Technology

- A complete package for lipidomics analysis
- Robust and trusted quantitative mass spectrometry platform the 5500 QTRAP®
- Ensure the highest level of data reproducibility using the Shimadzu LC System.
- Perform most confident separation of isobaric lipid species using **SelexION™ Differential Mobility Separation Technology**



Why the Lipidyzer™ Platform?

Automated Output of Results

- Data Visualization including heat maps, QC charts and quantitative data tables
- Figure resolution allows direct use for publication
- Easy publishing to the cloud portal for expert data interpretation
- **True biological insights**

CLASS	SUB_CLASS	CHEMICAL_NAME	HMDB	KEGG	LIPID_MAPS	HIGH_CE_NORMAL(FOLD)	HIGH_TAG_NORMAL(FOLD)	HIGH_CE_HIGH_TAG(FOLD)
CE	-	CE(12:0)	HMDB02262		LMST01020001	-0.0469	0.6043	-0.0776
		CE(14:0)	HMDB06725		LMST01020004	1.4199	1.1559	1.2284
		CE(14:1)	HMDB10367		LMST01020021	-3.0216	-0.7978	3.7875
		CE(15:0)	HMDB60057		LMST01020027	1.3759	1.0632	1.2941
		CE(16:0)	HMDB00885	C11251	LMST01020005	1.1187	1.0354	1.0804
		CE(16:1)	HMDB00658		LMST01020006	1.3107	1.1377	1.1521
		CE(17:0)	HMDB60059		LMST01020026	1.3552	1.1253	1.2043
		CE(18:0)	HMDB10368		LMST01020007	1.1659	1.0583	1.1017
		CE(18:1)	HMDB00918		LMST01020003	1.1004	1.0398	1.0582
		CE(18:2)	HMDB00610	C15441	LMST01020008	1.0705	1.0119	1.0579
		CE(18:3)	HMDB10370		LMST01020009	1.3182	1.1823	1.1149
		CE(18:4)	-			-0.8704	-0.3228	2.6962
		CE(20:0)	HMDB06740		LMST01020010	-1.1611	-0.7863	-0.9130
		CE(20:1)	HMDB05193		LMST01020011	0.1312	0.9479	0.1384
		CE(20:2)	-		LMST01020012	3.1452	1.6873	1.8641
		CE(20:3)	HMDB06736		LMST01020013	1.2679	1.1191	1.1329
		CE(20:4)	HMDB06726		LMST01020014	1.1049	1.0261	1.0768
		CE(20:5)	HMDB06731		LMST01020015	1.4038	1.2857	1.0918
	-	CE(22:0)	HMDB06727		LMST01020016	0.5452	0.6966	0.7827
		CE(22:1)	HMDB10372		LMST01020025	0.6241	0.7762	0.8041
		CE(22:2)	HMDB06737		LMST01020017	0.6587	-0.9859	0.6494
		CE(22:4)	HMDB06729		LMST01020018	0.3507	0.8583	0.4086
	-	CE(22:5)	HMDB10375		LMST01020031	1.9222	1.3620	1.4113
		CE(22:6)	HMDB06733		LMST01020019	1.2405	1.0706	1.1587
		CE(24:0)	HMDB10376			0.7038		

Why the Lipidyzer™ Platform?

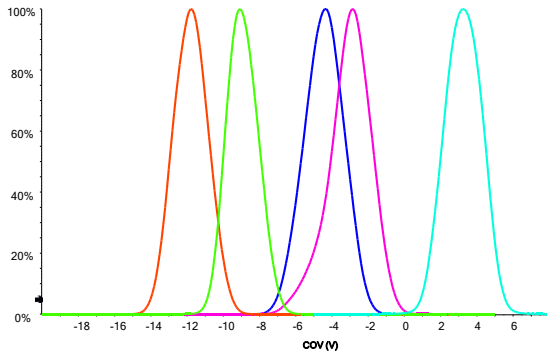
Access to Metabolon's Consulting Services

- Cloud enabled data processing including pathway mapping and deeper statistical tool also allowing sharing
- Consulting services and study design for in-depth biological data interpretation and disease relevance.
- Expert advice on alternative matrices and sample preparation
- **Expertise at your fingertips**

Benefits of the Lipidyzer™ Platform

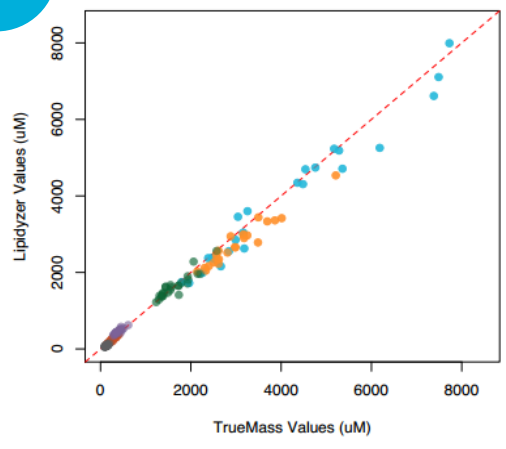
Powered by METABOLON®

1



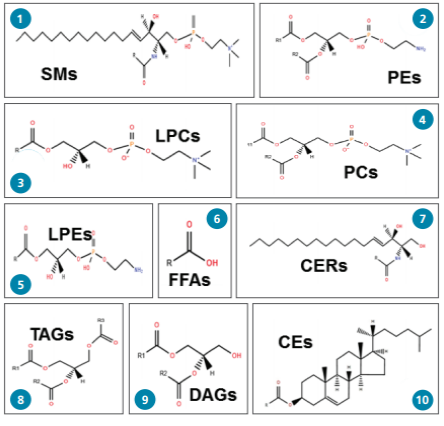
Specificity

2



Quantitation

3



Coverage

Acknowledgements

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- Corey DeHaven

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- Lisa Connell

Appendix

SCIEX Lipidomics Portfolio

Discovery | **Quantitative Targeted Profiling** | **Clinical Utilization**

TripleTOF® Platforms

AL LV MV

Global Discovery (MS/MS^{ALL})

The Lipidyzer™ Platform

QTRAP® Platforms

AL LV MV

Global Discovery (MPIS)

Validated Assays

CL

SCIEX Triple Quad™ 4500 MD*

* Selected Regions Only

SCIEX