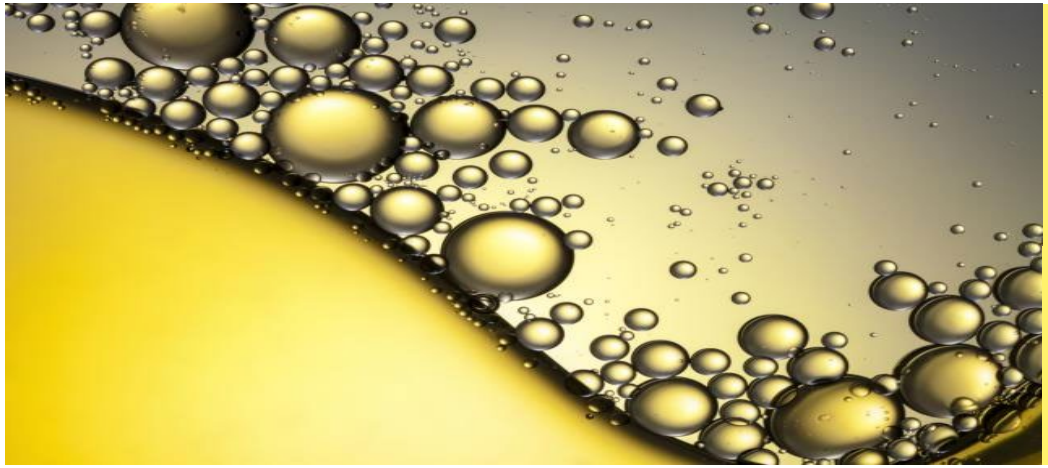
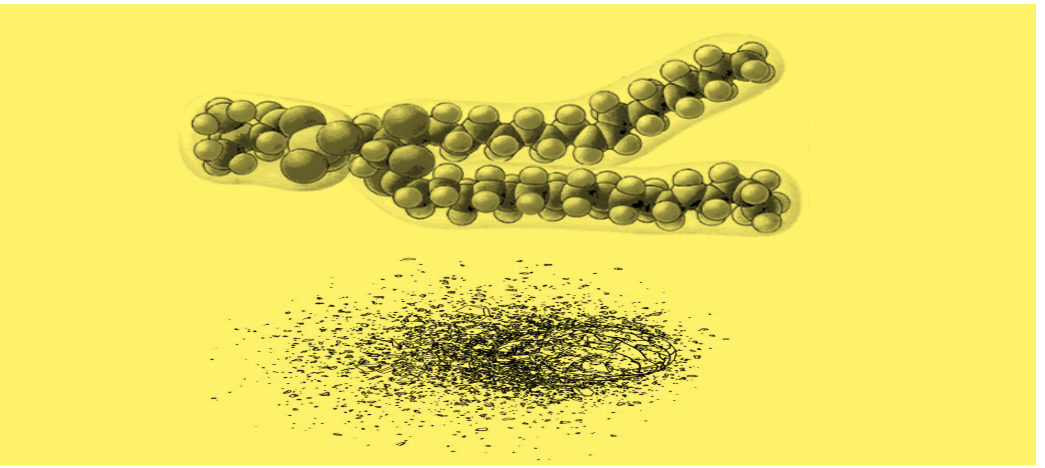




An Introduction To Lipidomic Workflows

John Bowden (University of Florida)
Jeremy P. Koelmel (Yale University)
Juan Aristizabal-Henao (BERG Health)

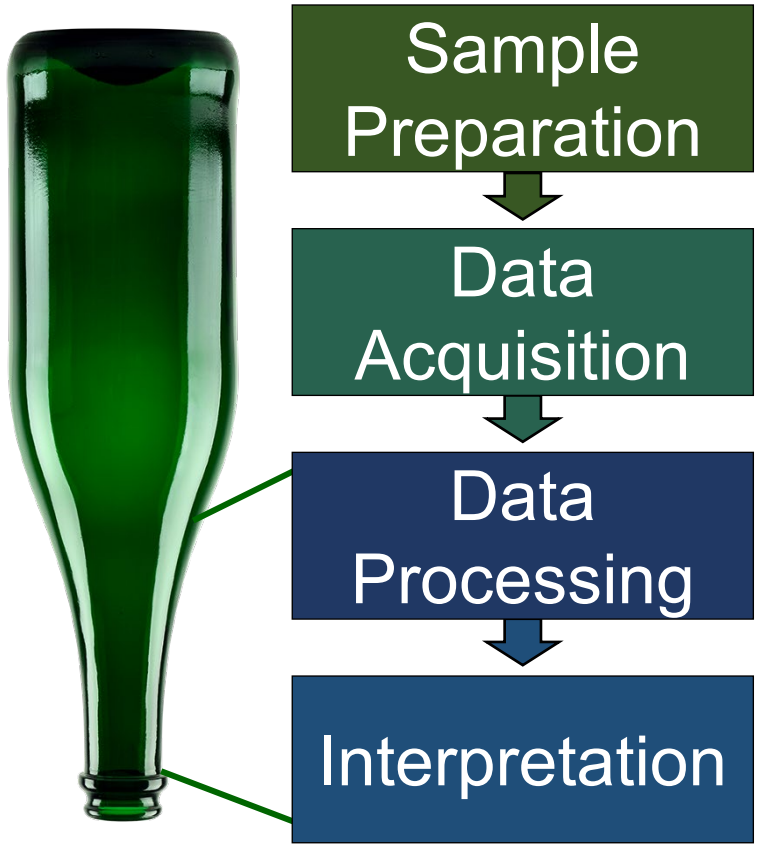
Course Outline

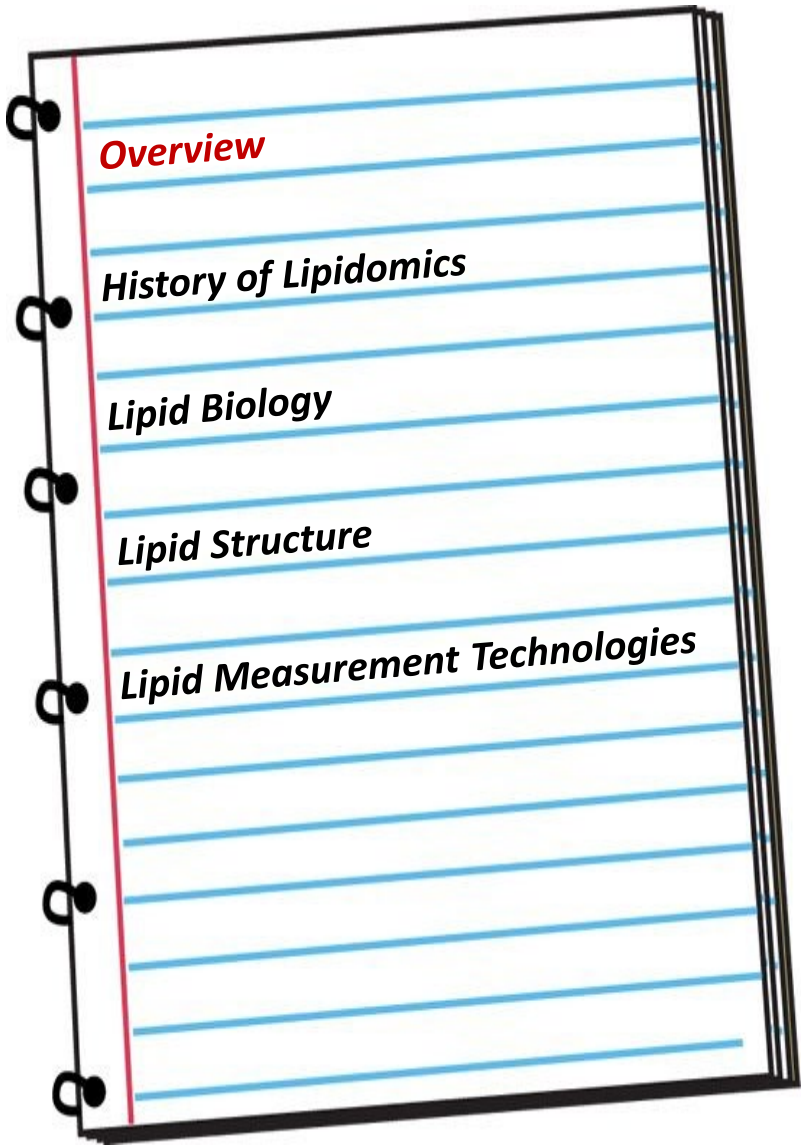
- Introductory Level

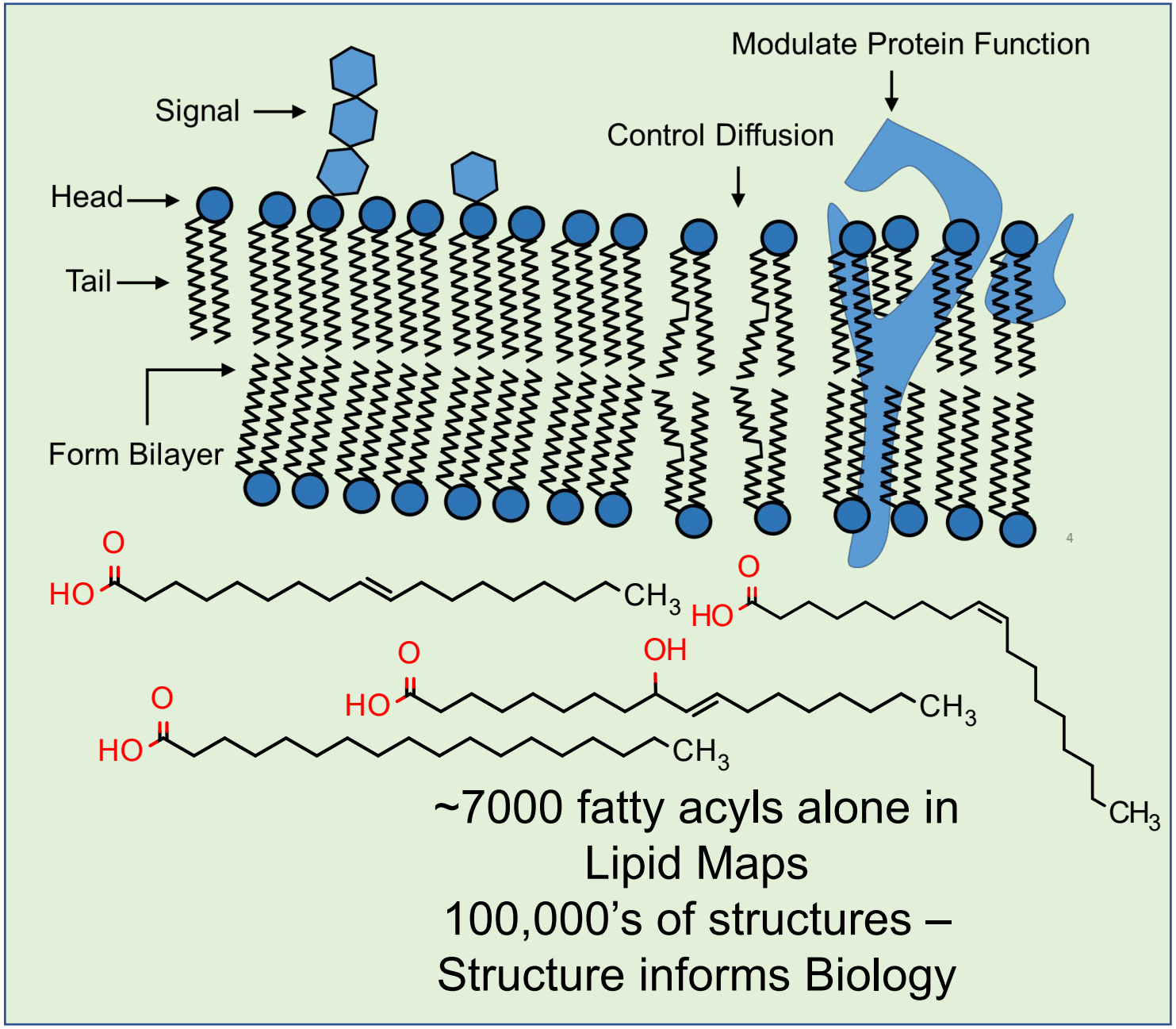
- Goal is to provide information and resources on current lipidomic workflows, from the experimental design stage to data dissemination, so that attendees can learn how to adequately design, perform, and analyze data from lipidomics experiments.

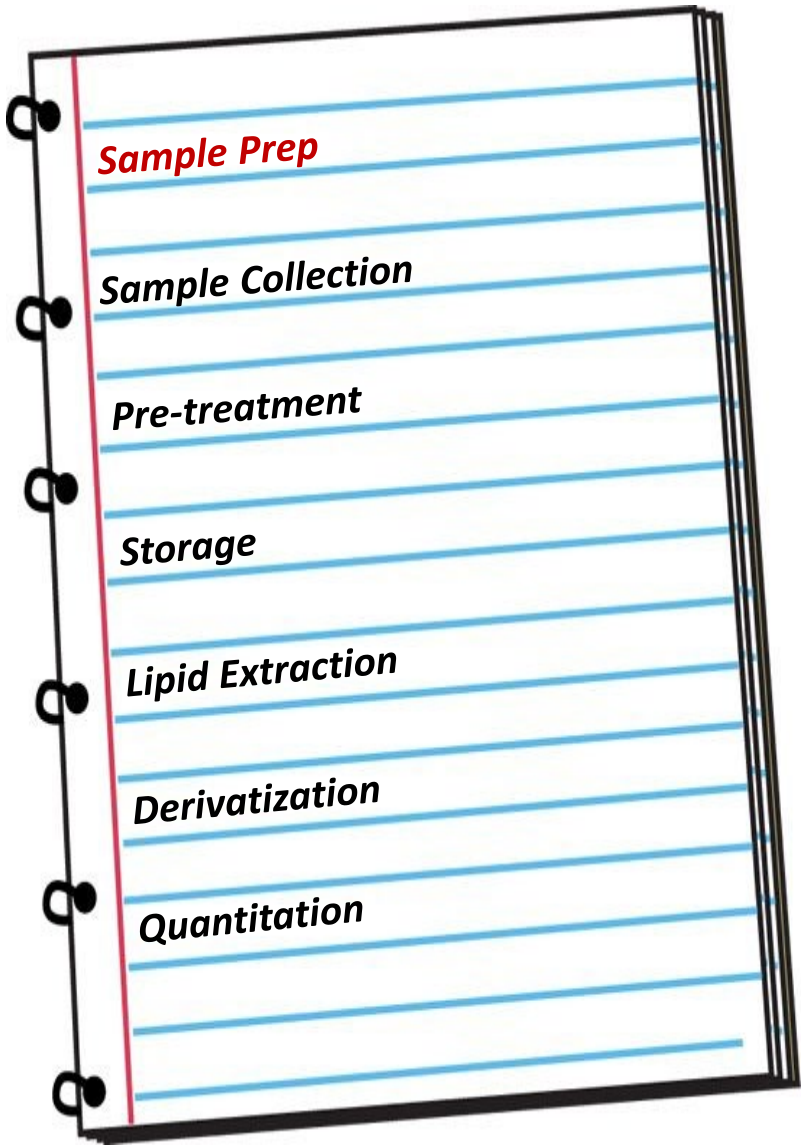
- Course taught with up-to-date guidelines regarding proper lipid measurement and dissemination, as defined by LIPID MAPS and the more recent Lipidomics Standards Initiative

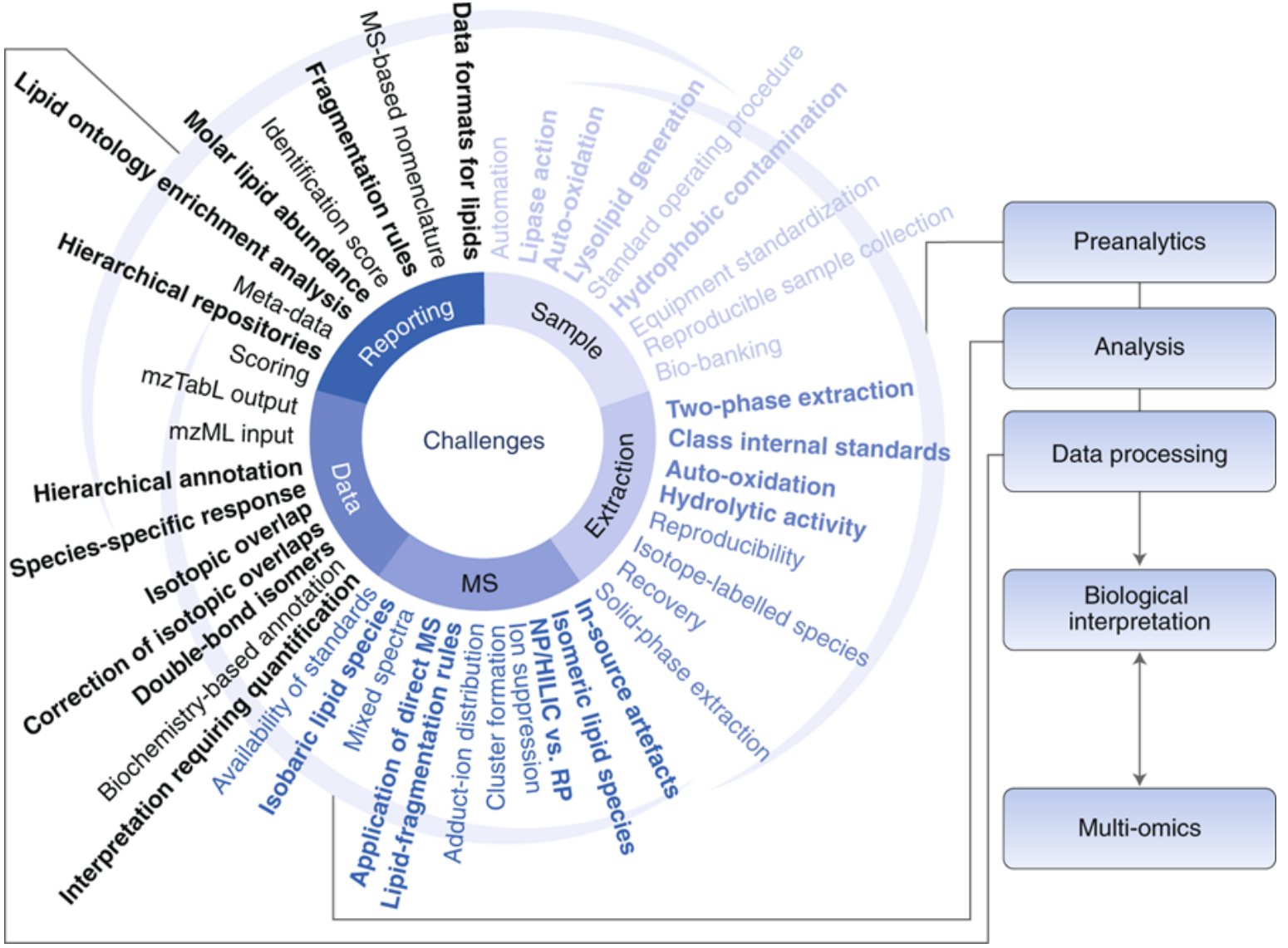
- Basic knowledge of analytical chemistry and mass spectrometry is required



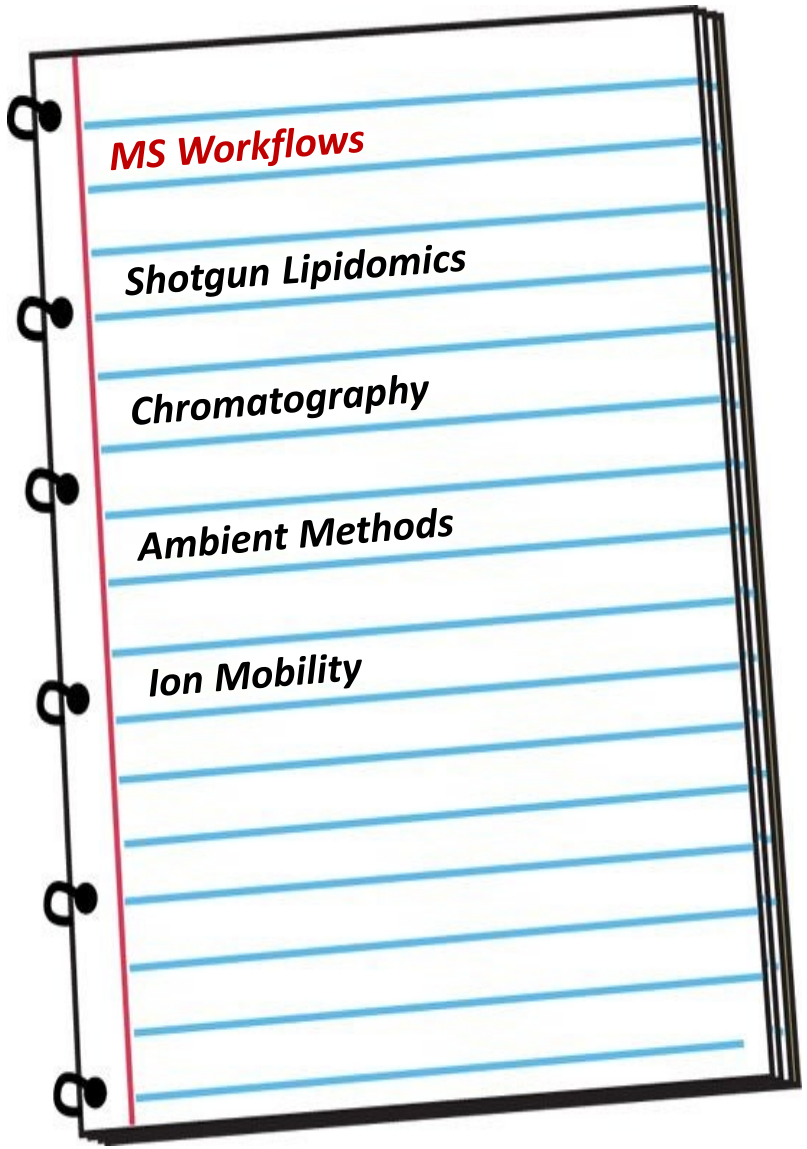

Overview
History of Lipidomics
Lipid Biology
Lipid Structure
Lipid Measurement Technologies

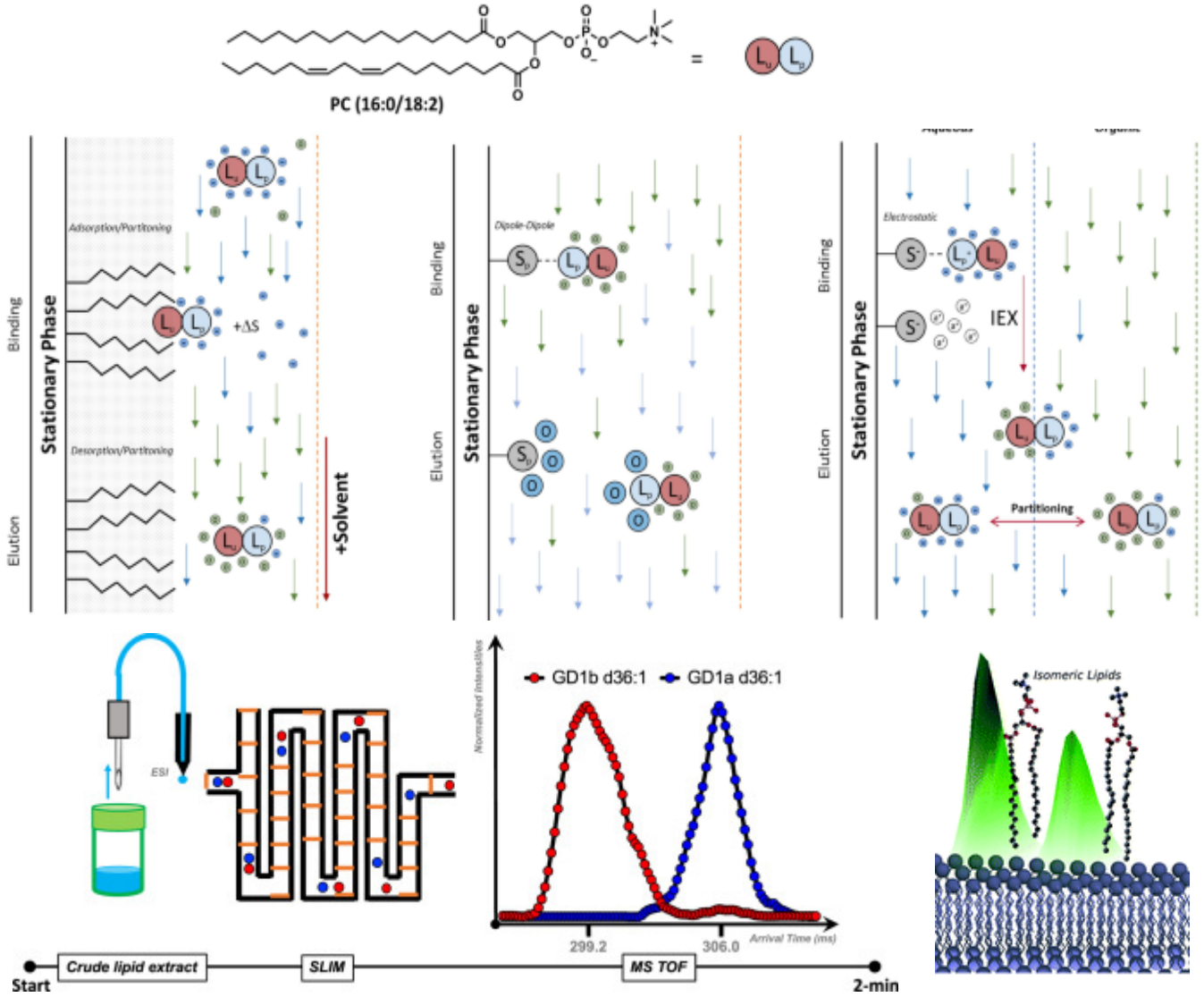

Modulate Protein Function
Signal
Control Diffusion
Head
Tail
Form Bilayer
4
~7000 fatty acyls alone in
Lipid Maps
100,000's of structures –
Structure informs Biology



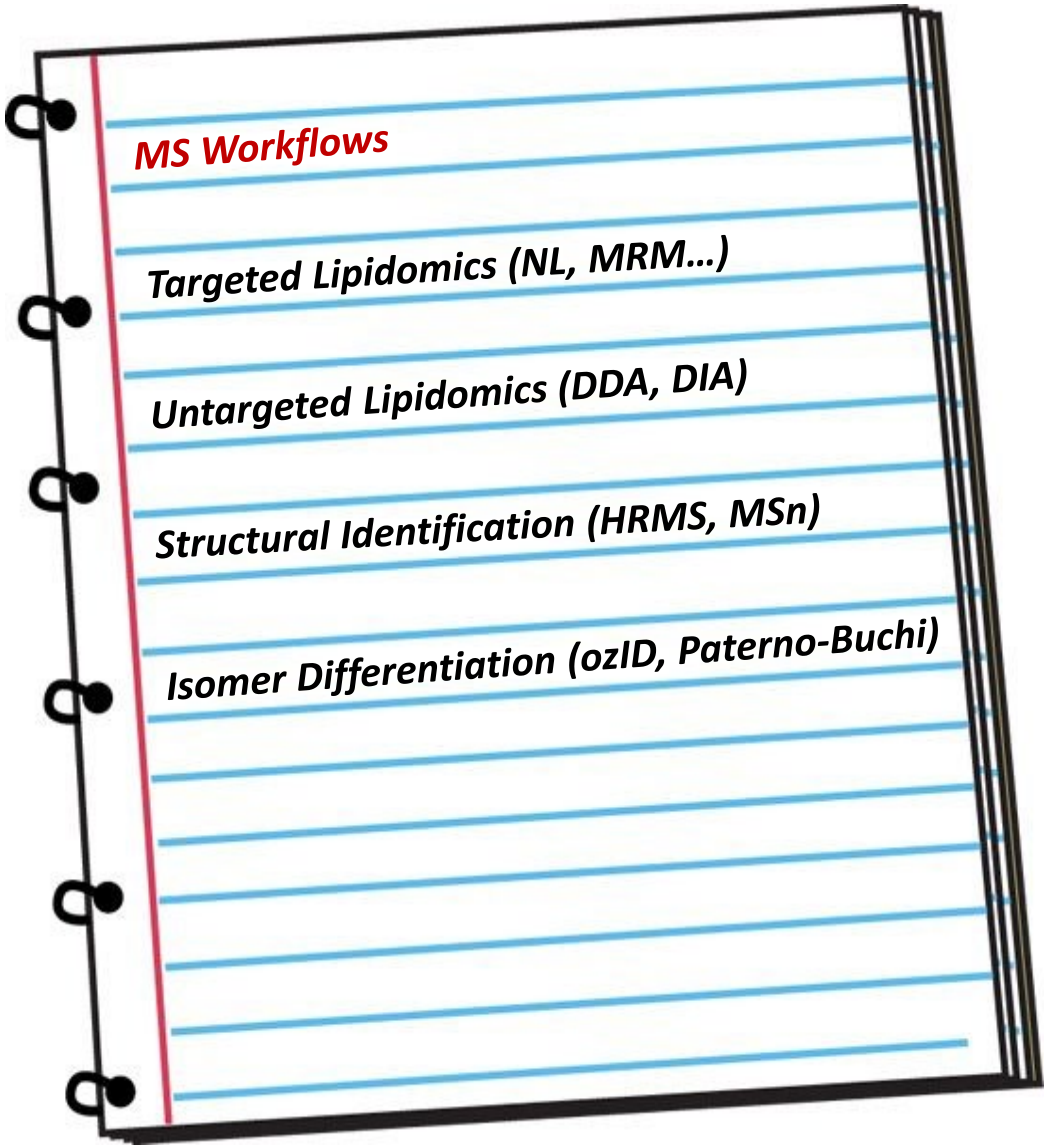


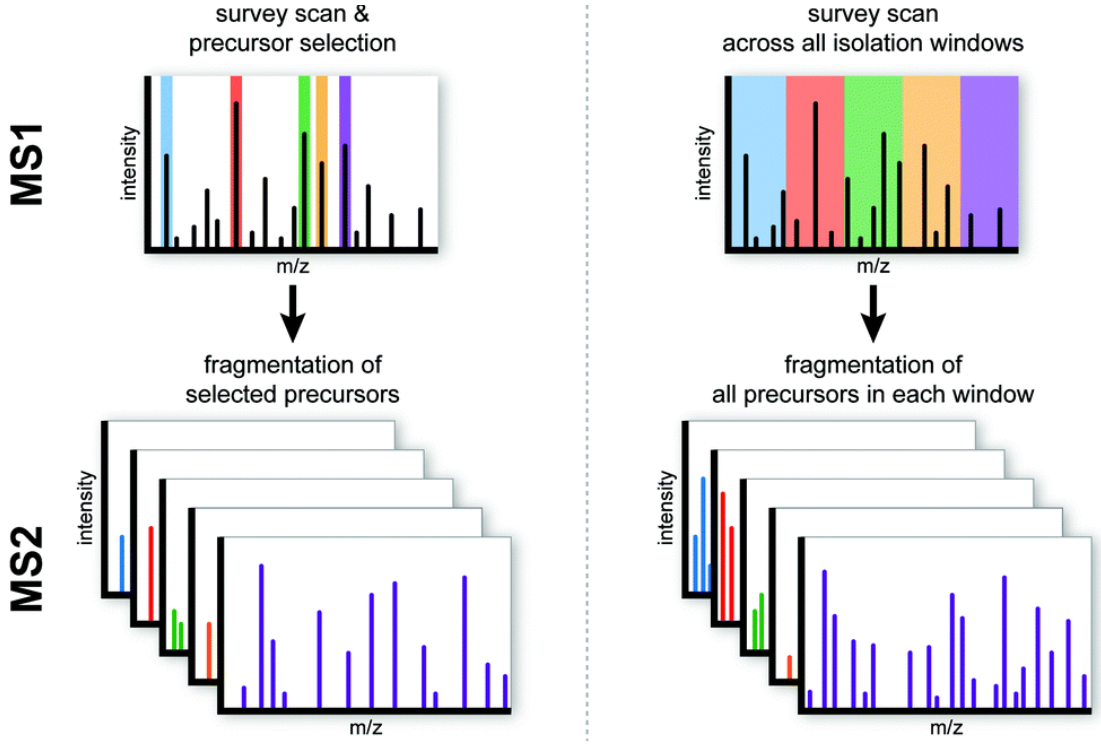
https://www.nature.com/articles/s42255-019-0094-z

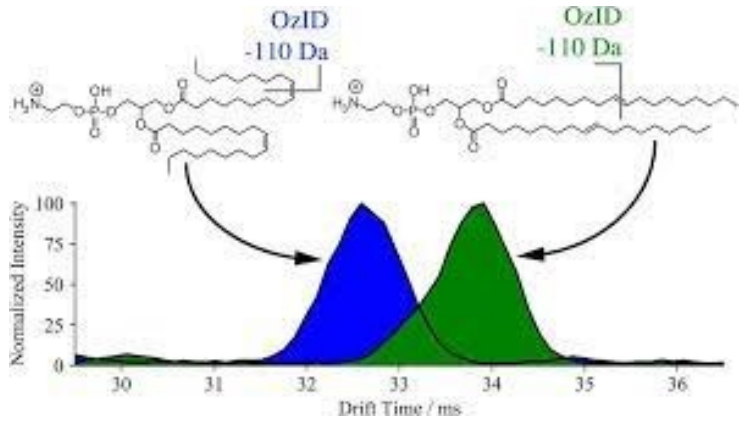




https://pubs.rsc.org/nl-be/content/articlelanding/2015/an/c5an00838g
https://link.springer.com/article/10.1007/s10337-018-3656-4
https://www.sciencedirect.com/science/article/abs/pii/S0003267020312150

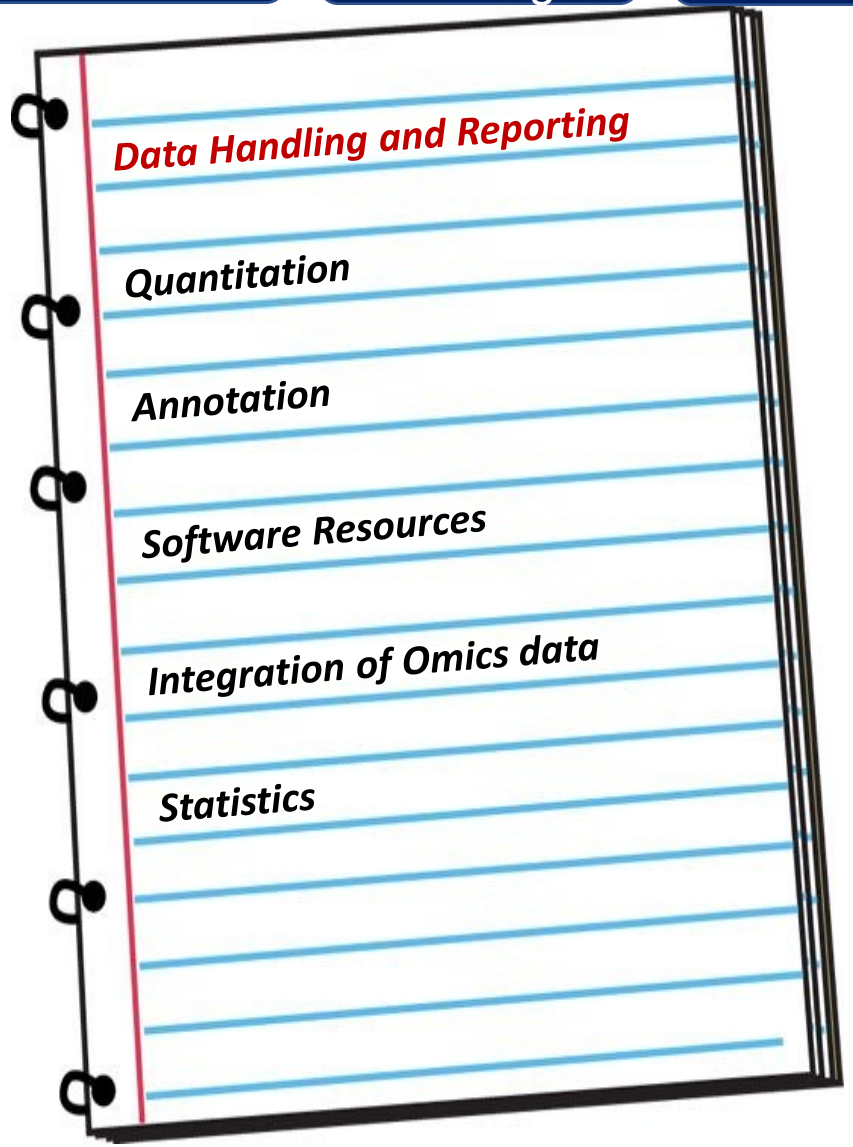






https://www.agilent.com/cs/library/slidepresentation/public/lipidomics-ozone-based-floridatech-asms-vip2019.pdf
https://pubs.rsc.org/en/content/articlehtml/2021/mo/d0mo00072h

File Conversion → Peak Picking → Blank Filtration → Identification → Combine Polarities → Normalize to IS → Statistics

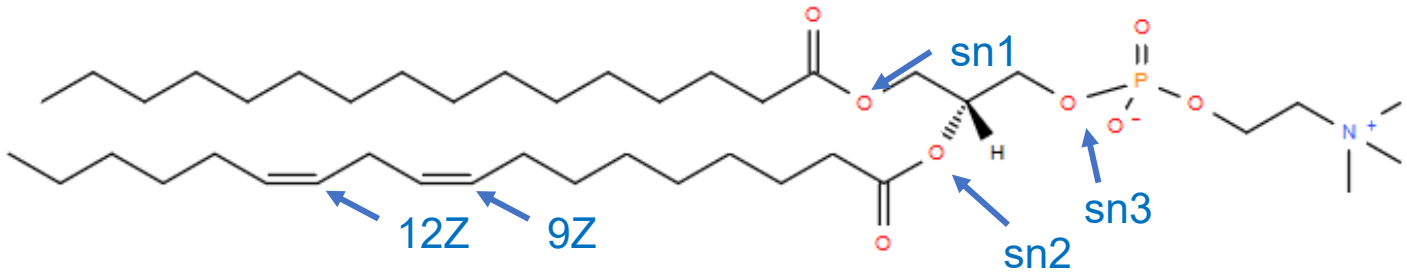


MS-DIAL

LipidMatch flow

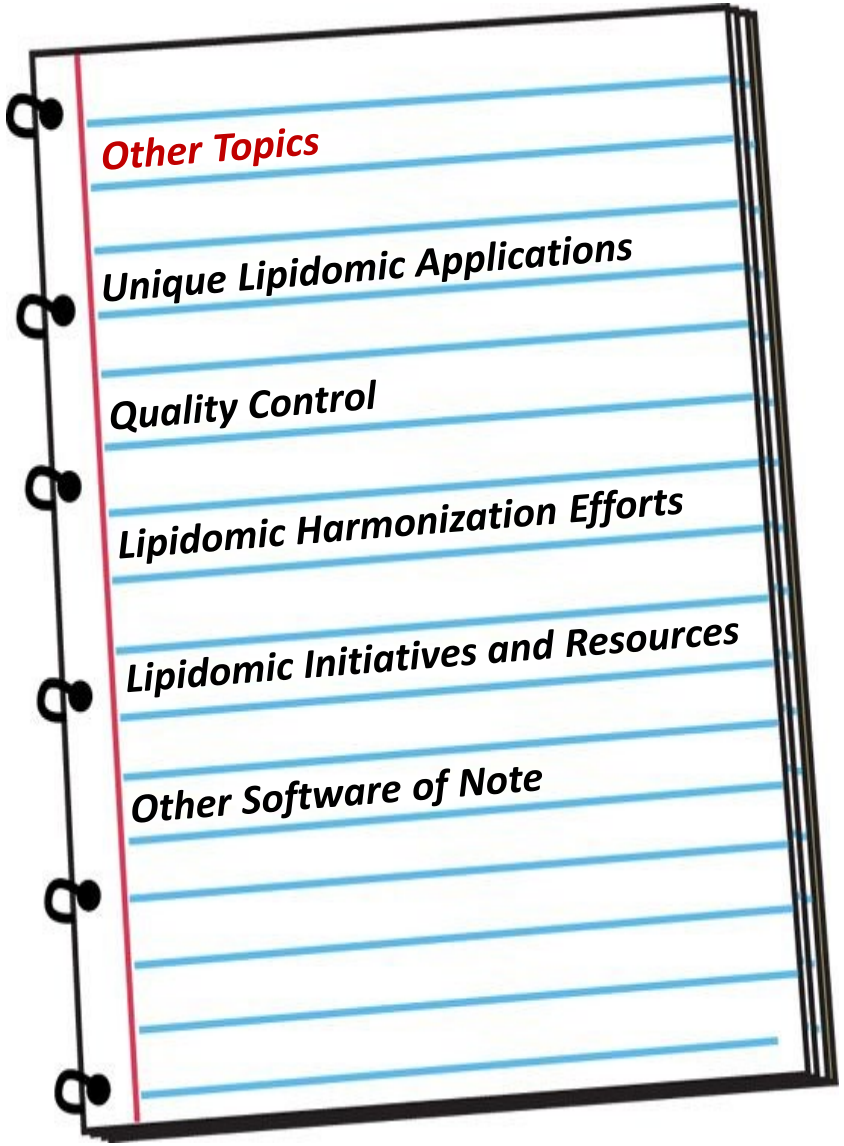
Xcms Online

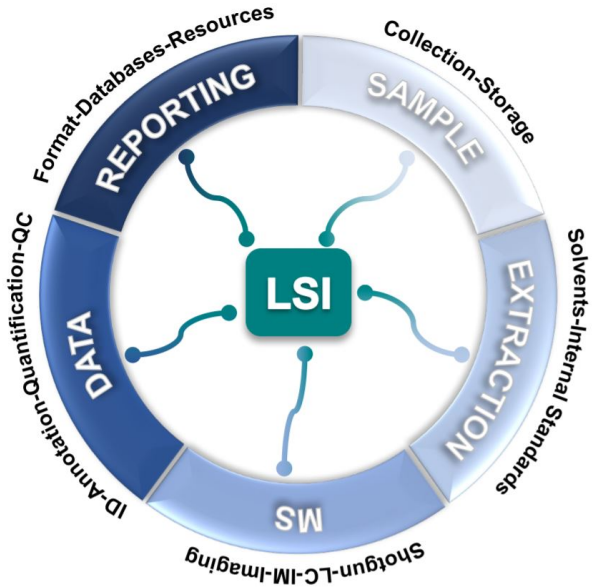
MZmine 2

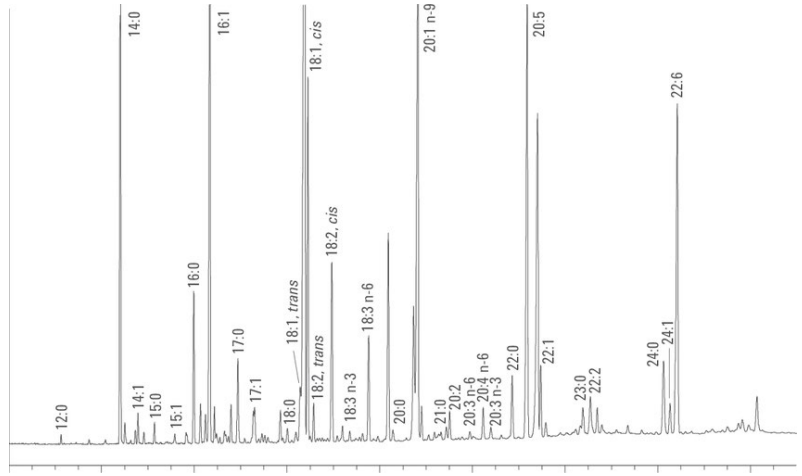


Structural Resolution	Example
Carbons and Double Bonds	PC(34:2)
Fatty Acid Constituents	PC(16:0_18:2)
Positional Isomers	PC(16:0/18:2)
Double Bond Position	PC(16:0/18:2(9,12))
Double Bond Cis vs Trans	PC(16:0/18:2(9Z, 12Z))

https://www.thermofisher.com/order/catalog/product/OPTON-30880
https://www.researchgate.net/publication/262180811_LipidBlast-handbook-v5
http://secim.ufl.edu/secim-tools/







INTERNATIONAL LIPIDOMICS SOCIETY

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https://www.researchgate.net/publication/267374168_Improving_the_Analysis_of_Fatty_Acid_Methyl_Esters_Using_Retention_Time_Locked_Methods_and_Retention_Time_Databases