An Introduction To Lipidomic Workflows

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Course Outline

- Introductory Level

- Goal is to provide information and resources on current 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.

- Basic knowledge of analytical chemistry and mass spectrometry is required
Overview and Sample Prep

History of Lipidomics

Technological advancements

Applications

Internal Standard Addition

Lipid Extraction

Derivatization

Stability

Mix sample with chloroform/methanol 1:2 (v/v).

Resulting proportions: chloroform/methanol/water 1:2:0.8 (v/v/v).

Addition of 1 volume of chloroform and 1 volume of water, mixing and filtering.

Resulting proportions chloroform/methanol/water 2:2:1.8 (v/v/v).

Upper phase:
- polar molecules (metabolites)
- salts, amino acids, etc.

Interphase (non-extractable residues):

Lower phase:
- lipids

Biological sample containing 80% of water:
- e.g. blood, tissue (homogenate), microorganisms, cell pellet.
LC Drift Time Ion Mobility MS*

Imaging and datamatrix composition

*doi: 10.1021/acs.analchem.8b01527
MS Workflow

Targeted Lipidomics (NL, MRM...)

Untargeted Lipidomics (DDA, DIA)

Structural Identification (HRMS, MSn)

Isomer Differentiation (ozID, Paterno-Buchi)

*doi:10.1073/pnas.94.6.2339; doi:10.1039/C6AN00015K
Data Handling

Quantitation

Reporting and Annotation

Software Resources

Integration of Omics data

Statistics

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