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Advances in sample preparation and analytical techniques for lipidomics study of clinical samples

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HIGHLIGHTS

- Lipids are important biological molecules for the maintenance of a healthy body
- Clinical lipidomics helps to understand lipid-related human diseases
- Advances in sample preparation and mass spectrometry for clinical lipidomics
- Current key challenges and their potential solutions in clinical lipidomics

ABSTRACT

Lipids play multiple key roles in biological systems, including acting as secondary energy reserves, being components of cellular membranes and participating in cell-signaling pathways. As a result, lipid defects have been implicated in the development of diseases. Consequently, the detailed analysis of lipids found in clinical samples, known as clinical lipidomics, is crucial for improving our understanding of disease mechanisms and progression, and the development of potential treatment strategies. This review documents the lipidomics workflow, beginning with a description of approaches to preparation of samples of lipids. We also describe of progress in mass spectrometry technologies that led to the development of several widely-used techniques of lipid analysis. The review concludes with a discussion on the major challenges that exist in clinical lipidomics studies and looks at potential solutions that can address them.

Keywords:
Chromatography
Clinical lipidomics
Clinical sample analysis
Disease mechanism
Disease treatment
Lipid
Lipid extraction

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