Miniaturizatin of lipidomic profiling by UHPLC/SFC-MS/MS

Lipids are essential cellular constituents that have many critical roles in cellular functions. They are involved in energy storage, cell signaling as second messengers, and are major constituents of cell plasma membranes including lipid rafts (Simons and Toomre 2000). Their crucial role is highlighted by their involvement in a large number of heterogeneous diseases such as cancer, diabetes, neurological disorders and inherited metabolic diseases (Wenk 2005; Lamari et al. 2013). Abnormal concentrations of lipids are especially observed in various neurological disorders, including neurodegenerative conditions such as Alzheimer's or Parkinson's diseases and neurometabolic disorders (Han et al. 2002; Adibhatla et al. 2006; Colsch et al. 2008; Ariga et al. 2008; Haughey et al. 2010).
Due to the high structural diversity of lipid species arising from various combinations of fatty acyls and functional headgroups, the presence of isomeric and isobaric (i.e., species having the same nominal mass but distinct exact masses) lipid species and their occurrence at a large concentration scale, a complete lipidomic profiling of biological matrices remains a challenge.

In this context, the objective of this work will be to improve lipidomic profiling for low quantity of material. During the intership the sample preparation should be improved, and the analytical method using SFC-QTOF (Waters) and LC-MS/MS QqQ (Shimdazu) should be optimized.

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