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A VERSATILE MULTI-ANALYTICAL PLATFORM FOR SERUM METABOLOMICS AND LIPIDOMICS PROFILING

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RÉSEAU FRANÇAIS DE MÉTABOLOMIQUE ET FLUXOMIQUE



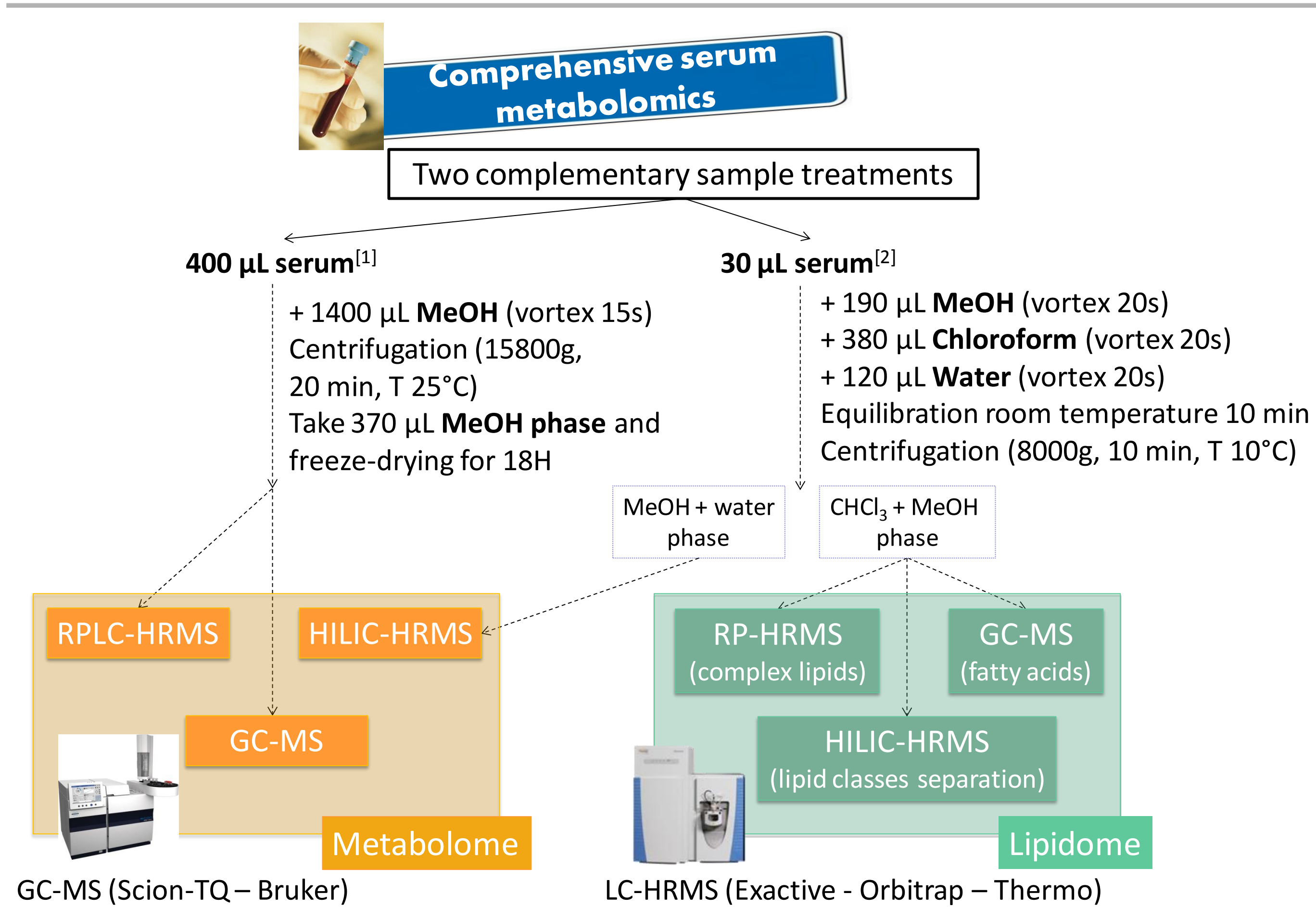
École Nationale Vétérinaire, Agroalimentaire et de l'Alimentation
 Nantes Atlantique

Introduction

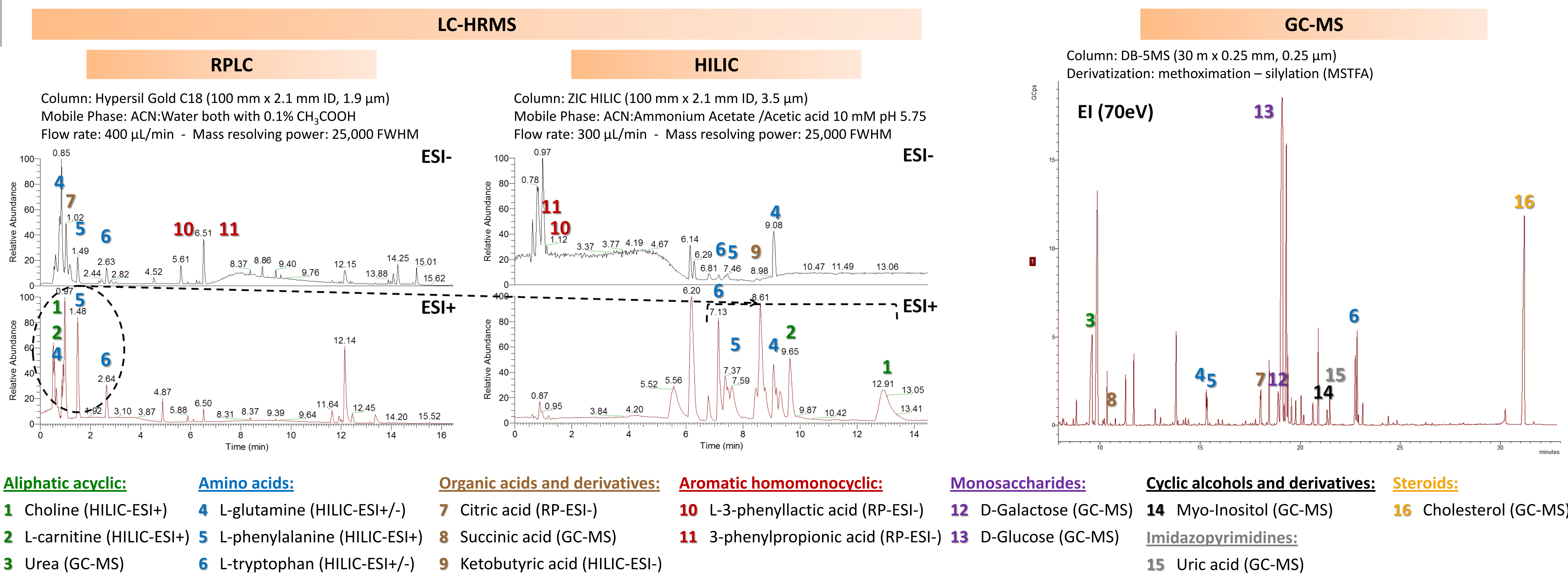
Metabolomic analysis of serum has been successfully applied for the discovery of biomarkers notably in a wide variety of areas such as physiology, toxicology, or nutrition. Serum contains hundreds even thousands of metabolites, thus allowing giving an appropriate overview of the metabolism. Due to these varieties in the metabolome, no single analytical technique can cover the entire metabolites analysis.

In this work, a multi-analytical platform based on LC-HRMS and GC-MS has been developed for a comprehensive characterization of both metabolic and lipidic content of serum samples. The analyses of metabolites with different polarities have been carried out by two complementary LC-HRMS methods (reversed phase and HILIC) and GC-MS. On the other hand, a sensitive and selective GC-MS method has been developed for the analysis of fatty acids, while the analysis of complex lipids such as glycerolipids and glycerophospholipids was performed by LC-HRMS using a reversed phase chromatographic separation for lipid speciation and HILIC for lipid classes separation.

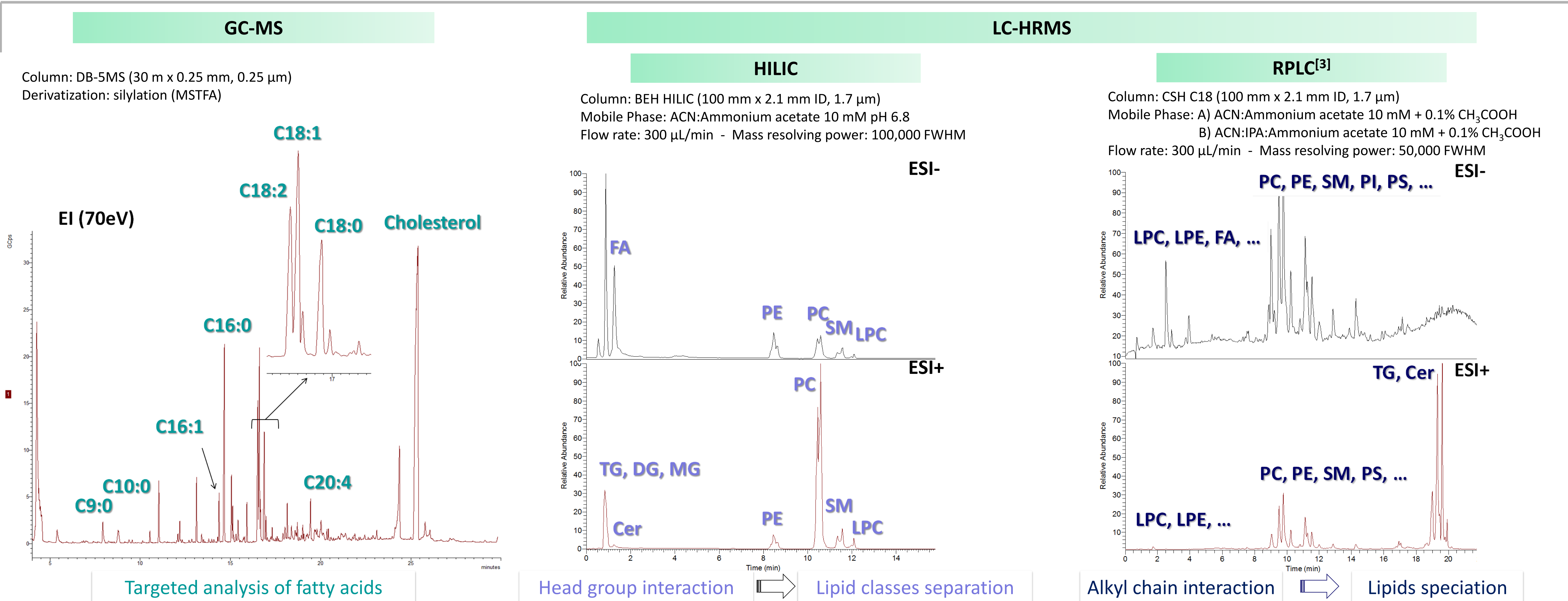
Workflow



Metabolome



Lipidome



Conclusion

- The use of RP and HILIC chromatography allowed to obtain a complementary chromatographic separations for metabolomics approaches and analysis of complex lipids.
- GC-MS makes enable the detection of specific metabolites generally not detected by LC-MS simultaneously with other polar metabolites. Moreover, good chromatographic resolution and selectivity have been achieved for the analysis of fatty acids.
- This versatile multi-analytical platform can be applied to look for biomarkers of exposure and/or effect related to chemical food safety.

References:

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 [3] Gallart-Ayala, H., et al, Analytica Chimica Acta, 2013, 75-83.