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Development of a method for quantitative profiling of the carnitine family by LC-HRMS

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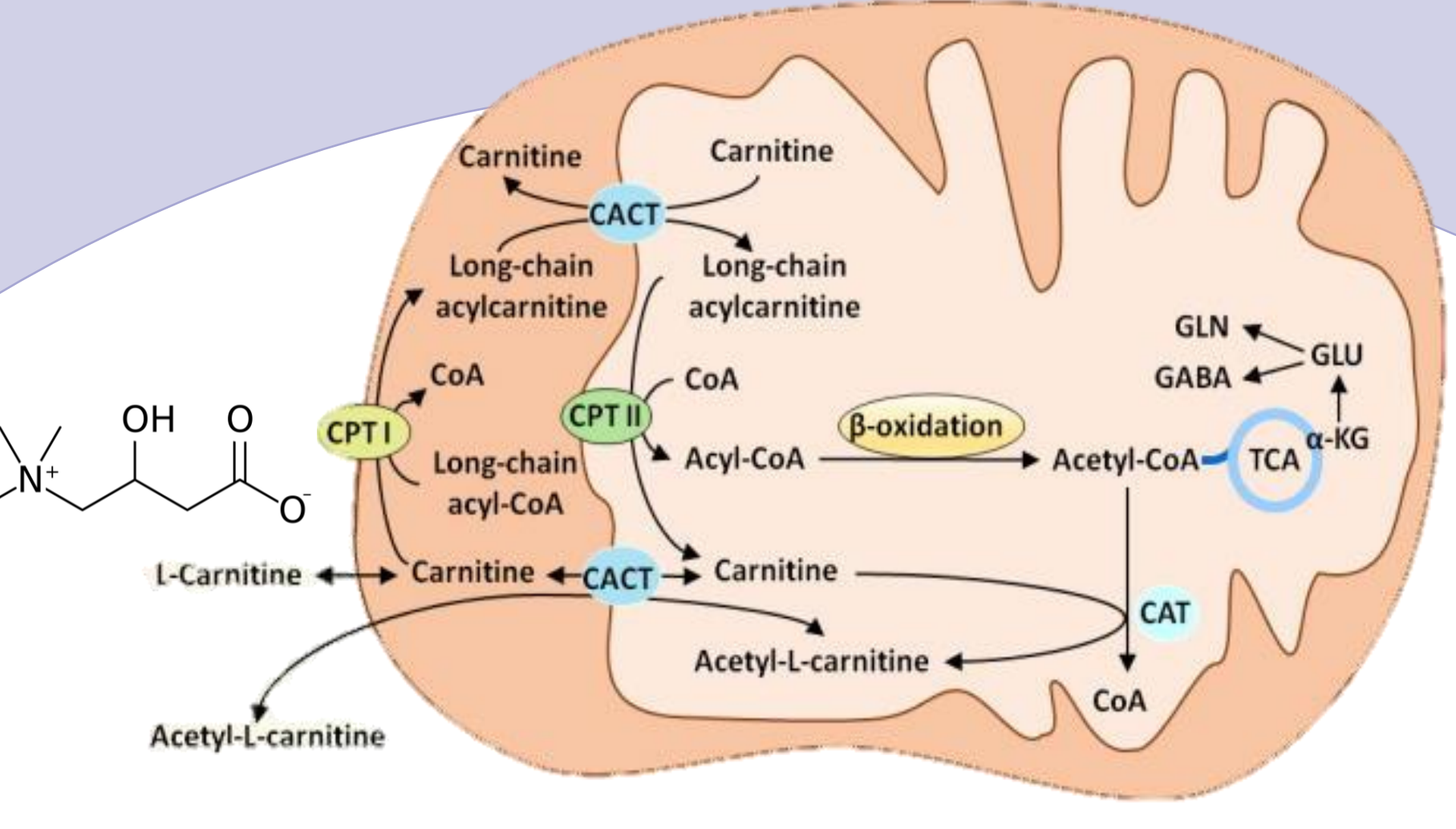
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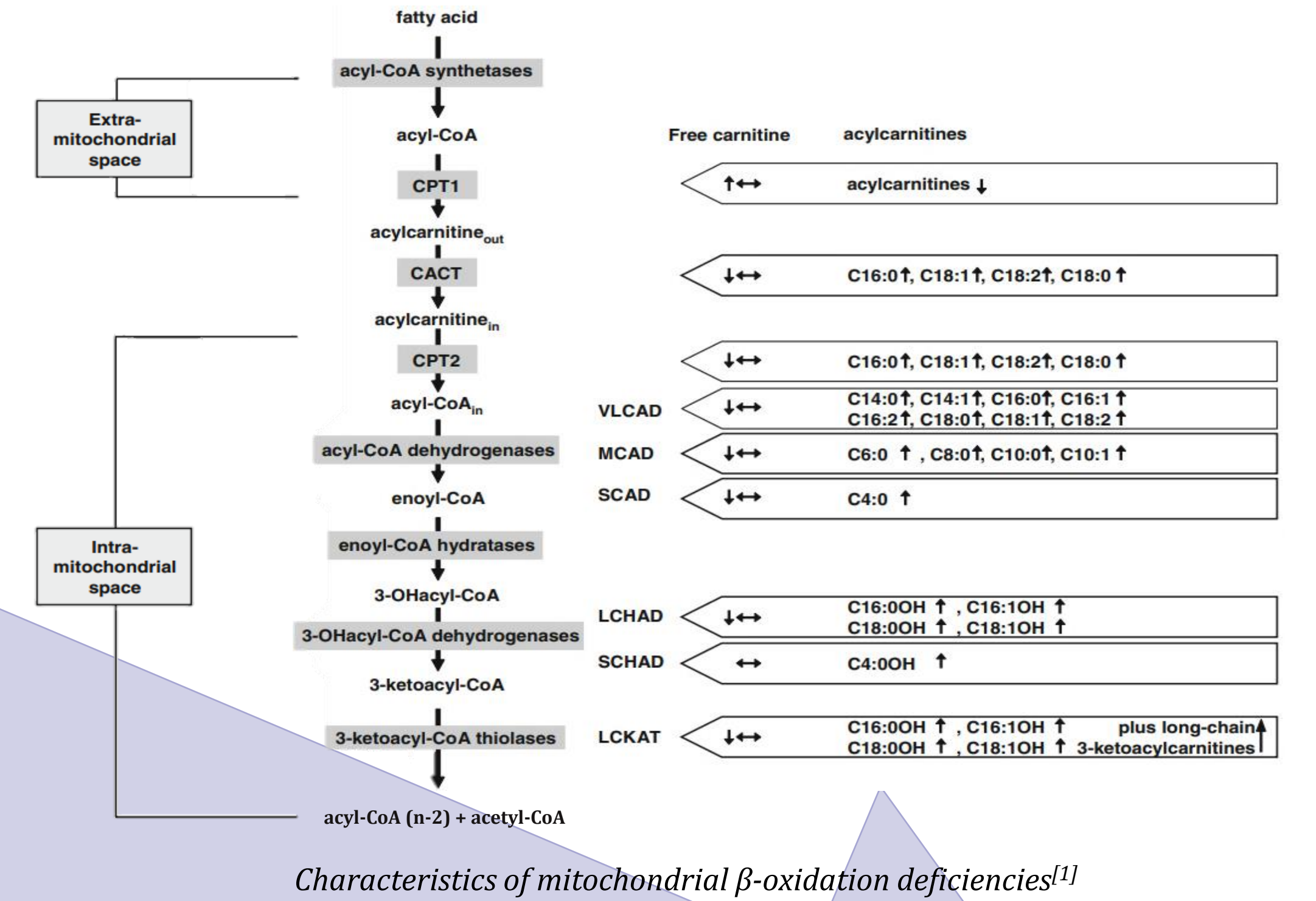
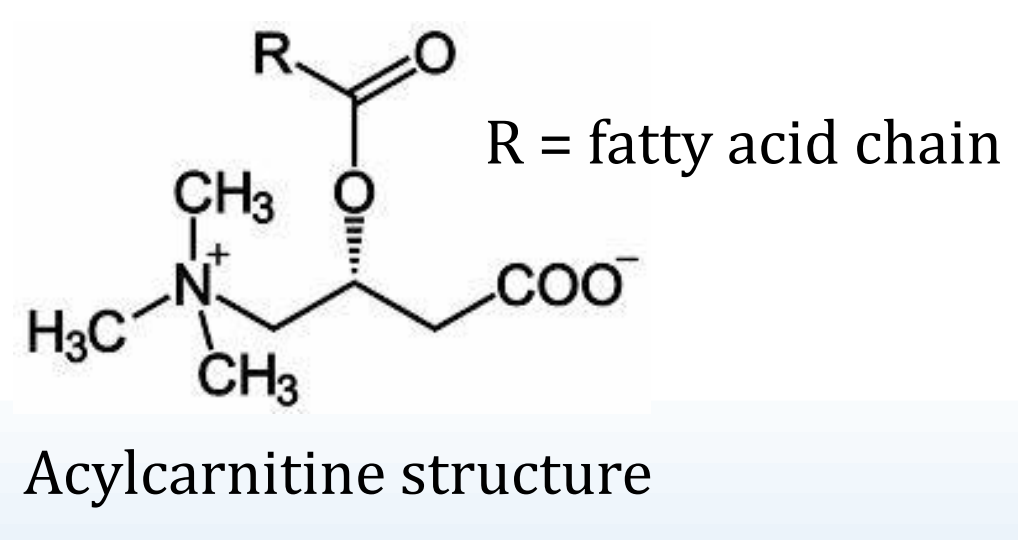
β-oxidation cycle



Pathologies

Carnitine and its derivatives are key partners in physiology. Deregulations can generate pathologies.

- Free L-carnitine deficiency
- Mitochondrial β-oxidation anomalies
 - Carnitine cycle anomaly
 - β-oxidation cycle anomaly

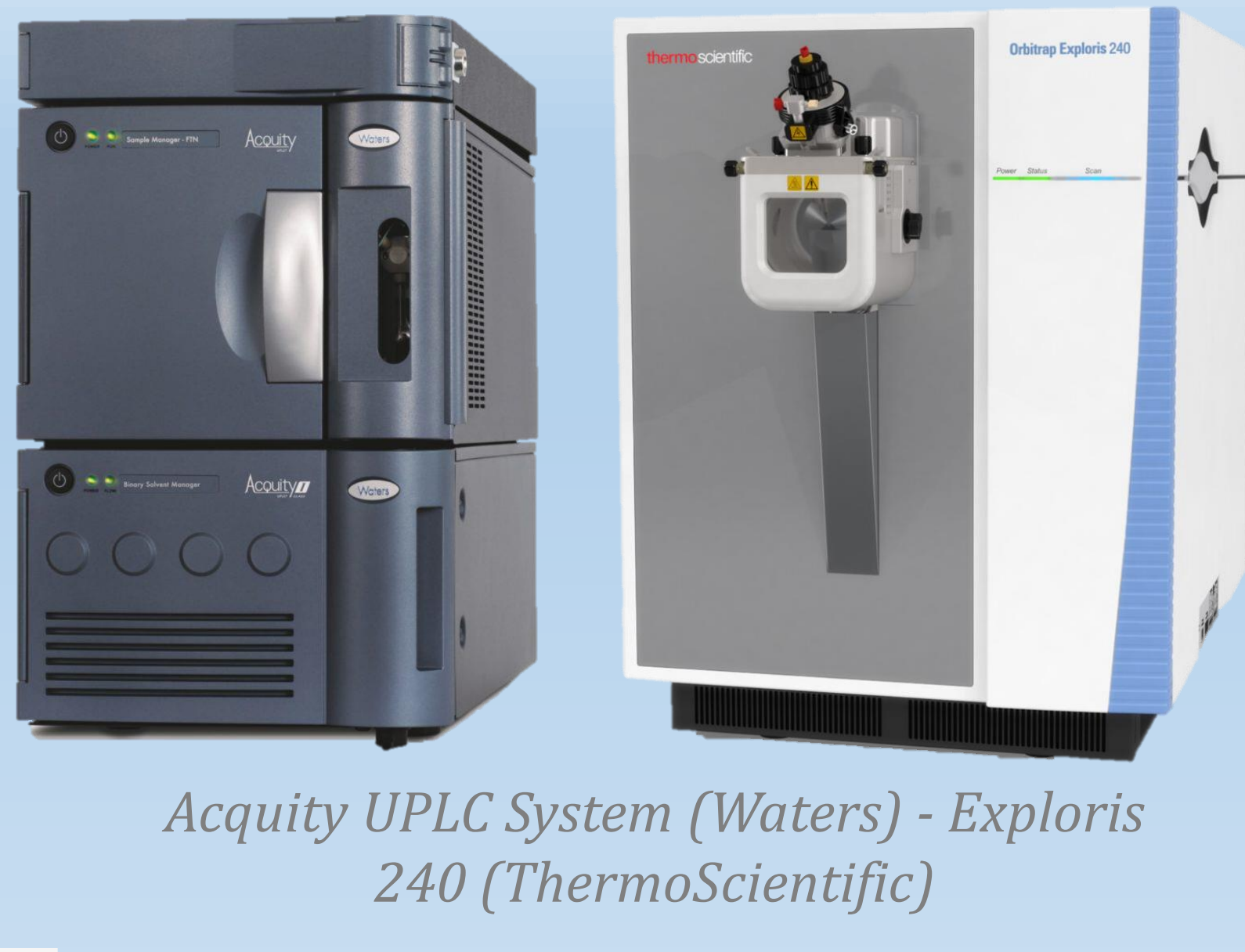
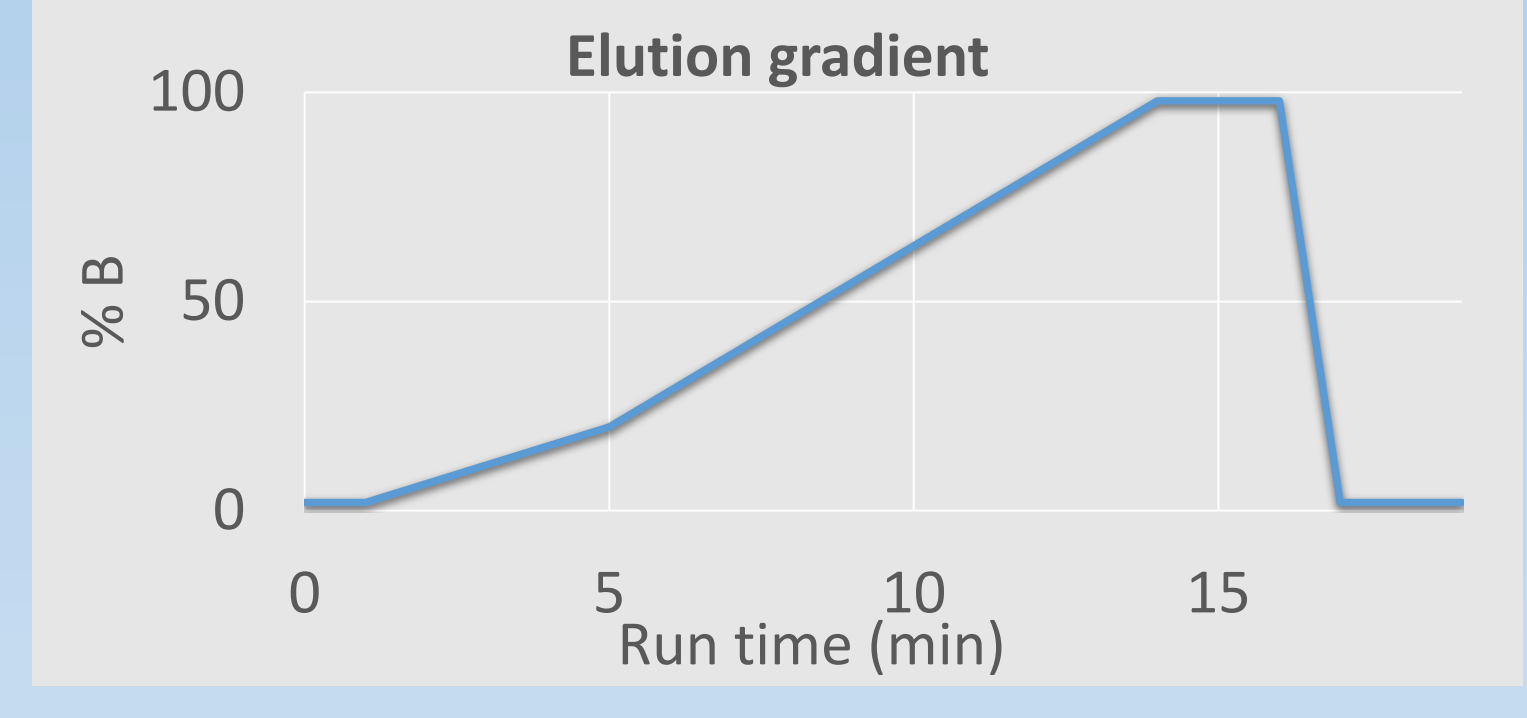


Why study acylcarnitines profile ?

Acylcarnitines have an important role in metabolism and are markers of several deficiencies : profiles are different depending on the anomaly. Measuring them in blood or plasma is essential to understand metabolism and could be a powerful diagnostic tool.

Development of the analytical method^[2]

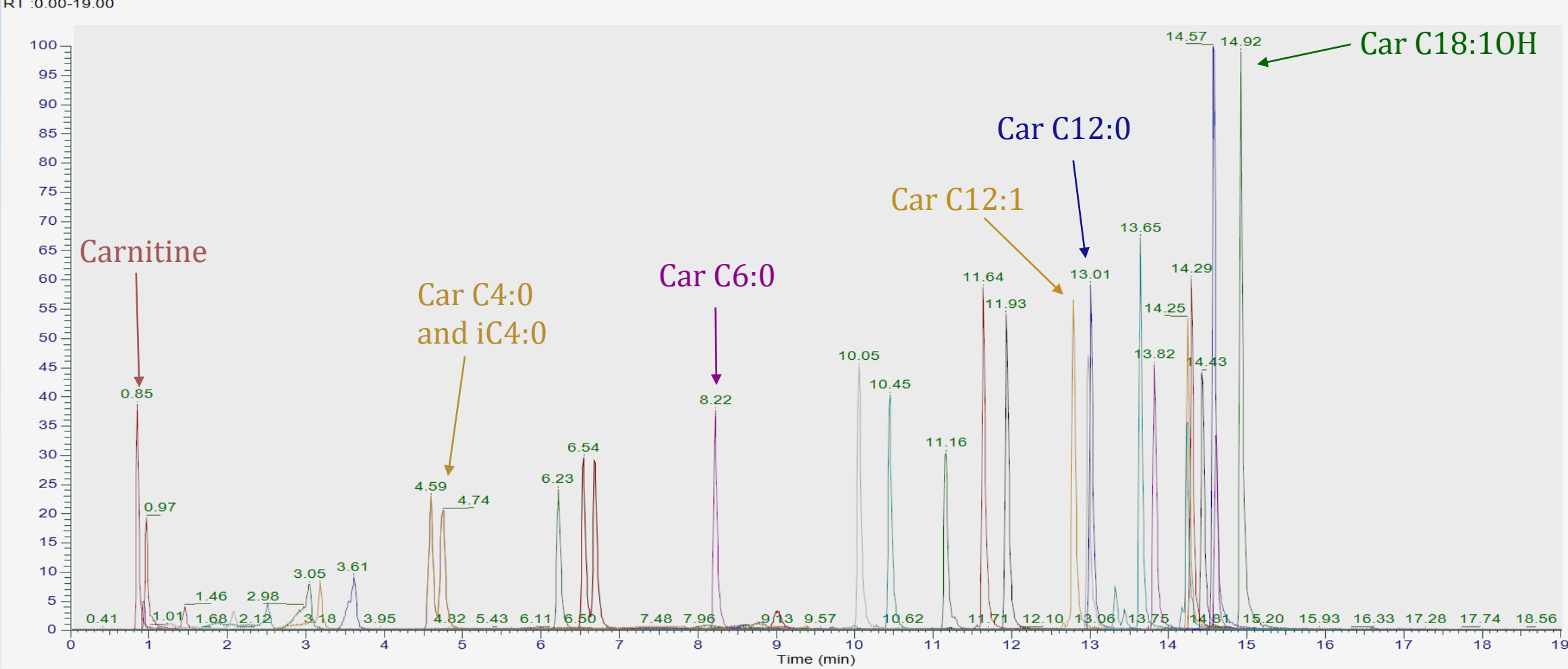
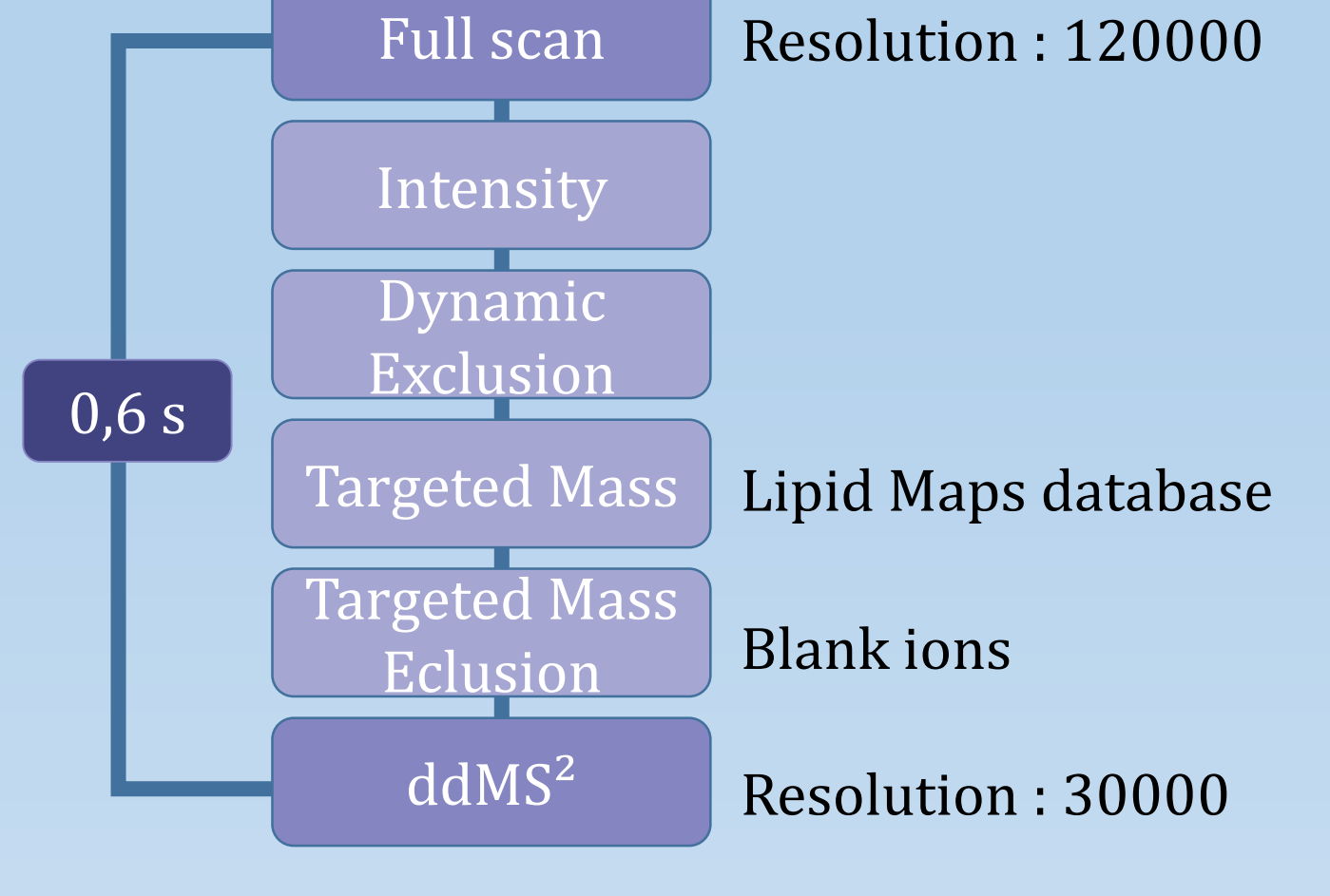
Column : Acquity Premier HSS T3 1,8 μm 2,1*100 mm
 A : H₂O, 5 mM Ammonium acetate, 0,1% formic acid
 B : MeOH, 5 mM Ammonium acetate, 0,1% formic acid
 Flow rate : 0.3 mL/min
 T_{oven} : 40°C



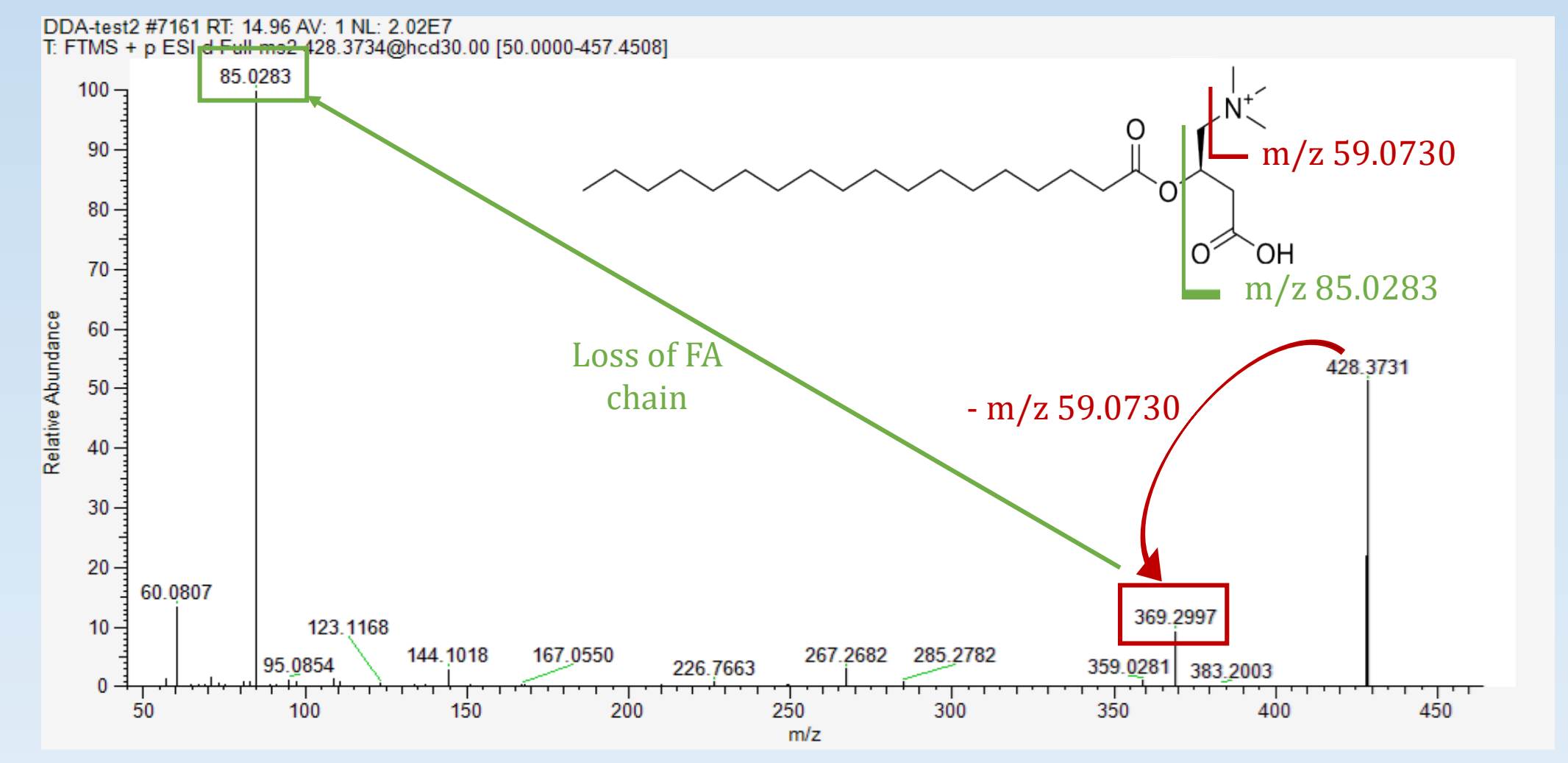
Source parameters

Positive ion = 3500 V
 Sheath gas = 50
 Auxiliary gas = 10
 Sweep gas = 1
 T_{ion transfer tube} = 325°C
 T_{vaporizer} = 350°C

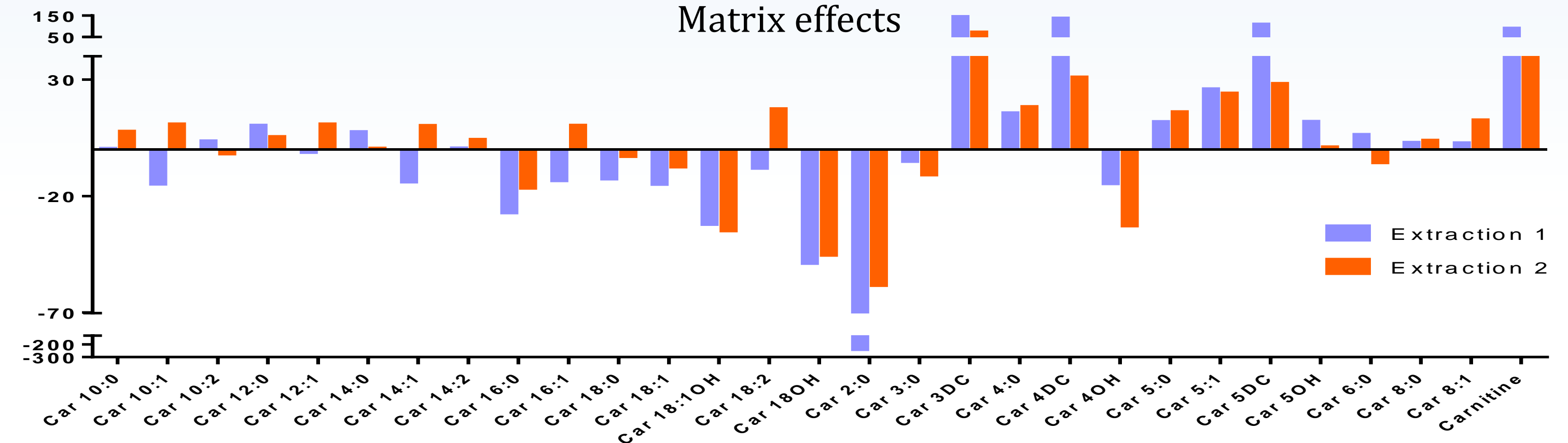
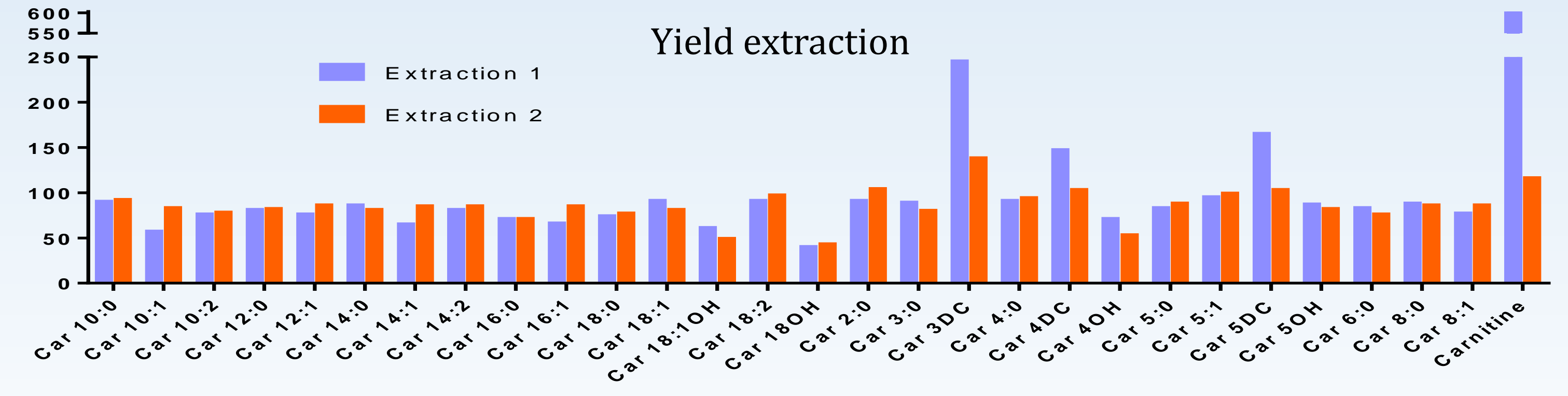
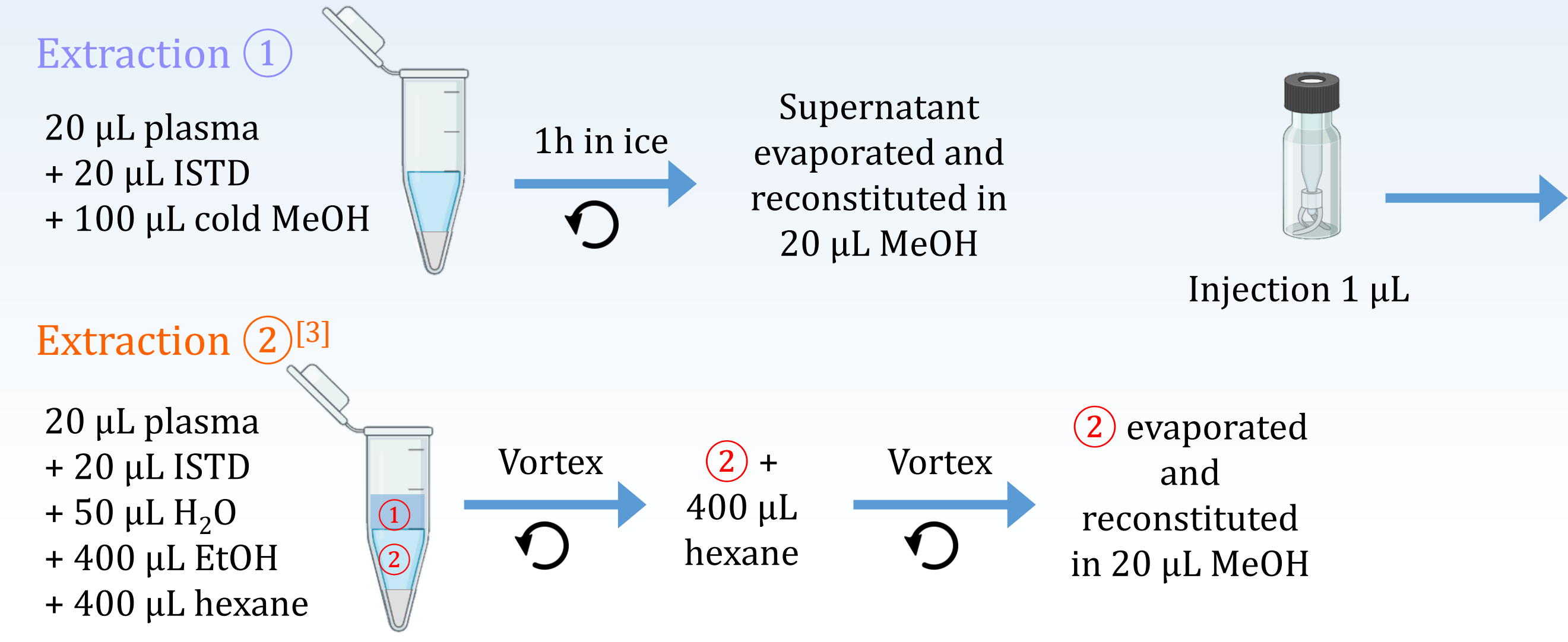
Scan parameters : DDA acquisition



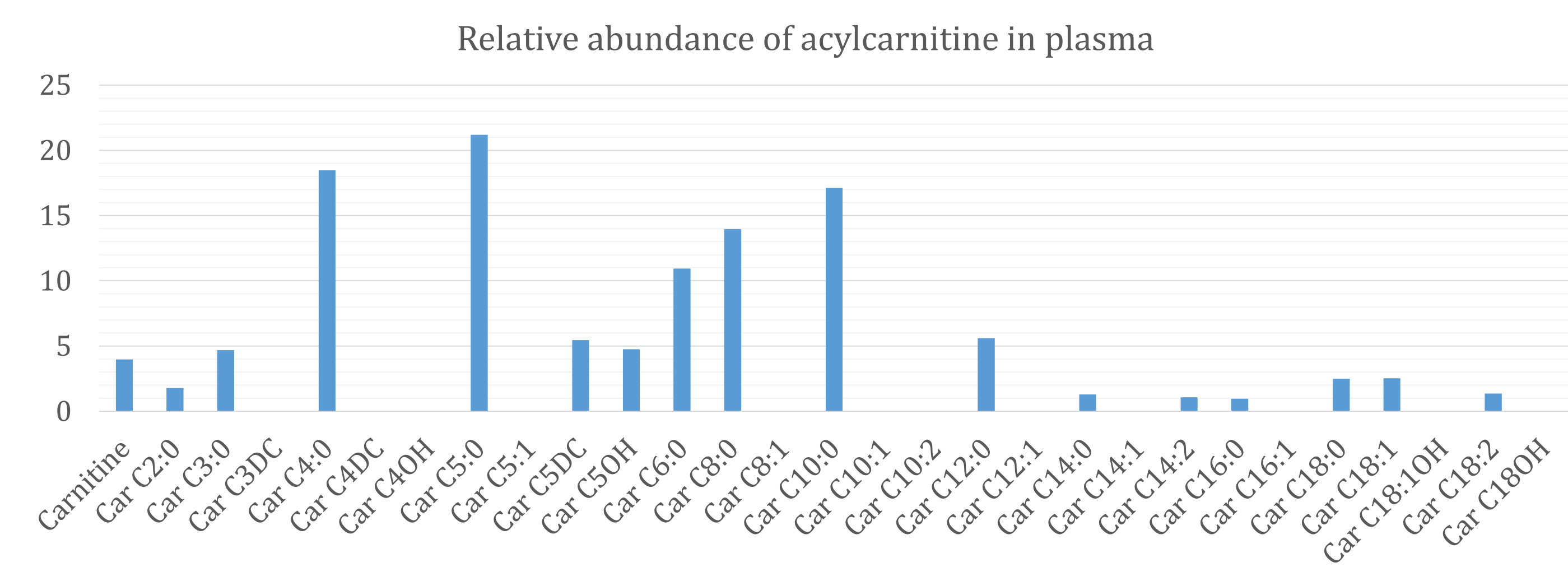
→ Carnitine and 30 acylcarnitines separated in 19 min
 → Analyse of short and long acylcarnitines: from 2C to 18C, saturated, unsaturated, hydroxylated and dicarboxylated
 → 3 internal standards : Carnitine-d9, car C2:0-d3, car C18:1-d3



Samples preparation



→ Plasmatic composition : relative abundance = $\frac{\text{Compound area}}{\text{ISTD area}}$



Conclusion and perspectives

- The method developed allows a **good separation of the acylcarnitine family**.
 → LOD, LOQ, linearity still need to be determined to validate the method.
 - **Extraction 2** seems to offer better results than extraction 1.
 → Extraction steps could be simplified to reduce time extraction.
- This new profiling will be offered as a service on MetaToul. It will also be use to follow the **13C-labelled acylcarnitines in the context of fluxomic experiments**. It will be an important complement to the profile of labelled fatty acids already proposed.

References

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