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The journey towards improved bioactive lipid analysis

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Profiling the oxylipin and endocannabinoid lipidome requires highly sensitive, precise and robust methods, which can be accommodated by the use of liquid chromatography (LC) combined with tandem mass spectrometry (MS/MS) methods. We have developed several LC-MS/MS protocols for these bioactive lipids from different fatty acid precursors, mainly arachidonic and linoleic acid, but also from eicosapentaenoic and docosahexaenoic acid, as well as from other fatty acids. Originally, we employed separate extraction protocols for each family of bioactive lipid (oxylipins and endocannabinoids, respectively), and also different LC-MS/MS equipments. But for application in clinical studies, it is more convenient to combine the analytical procedures for oxylipins and endocannabinoids in order to cover a larger portion of the lipidome in one single LC-MS/MS injection and preceding sample extraction. It would allow for smaller sample volumes and less labour intensive work procedures. However, combined analysis of oxylipins and endocannabinoids is a challenging task, partly due to the different modes used for optimal ionization, negative for oxylipins and positive for endocannabinoids. Furthermore, the extraction solvents, mobile phases etc are not identical, so modifications of the previous (separate) protocols were necessary. I will describe our work towards combined analysis of oxylipins and endocannabinoids, which we currently have in place at the Swedish Metabolomics Centre in Umeå. Crucial steps in the workflow will be highlighted and examples of successful applications will be given.

Biography

Malin L Nording has completed her PhD from Umeå University, Sweden, and Post-doctoral studies from University of California, Davis. She has almost a decade of experience in metabolomics studies, with particular emphasis on the bioactive lipidome, including oxylipins such as eicosanoids and other fatty acid metabolites. She has been awarded an International Career Grant for her work on bioactive lipids, in collaboration with the Swedish Metabolomics Centre and the NIH West Coast Metabolomics Center.

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