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Total lipid extraction for lipidomics made easy - The BUME method

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An important part of the workflow of lipid analysis is the extraction procedure. While there has been an impressive development of automated and high-throughput oriented, analytical methods, the extraction procedure is still often performed manually with traditional chloroform-based methods since more than 50 years. Now is the time for a change. To overcome the drawbacks of time-consuming, manual, and chloroform-based methods we have developed an automated chloroform-free method for total lipid extraction of biofluids and tissue. The method for biofluids is 100% automated, performed using a standard pipetting 96-well pipetting robot. It is based on an initial one-phase extraction using butanol and methanol (BUME). After addition of heptane/ethyl acetate/1% acetic acid a two phase system is formed without the need for centrifugation, with the organic lipid-containing upper phase easily recovered. To validate the methods, extraction recoveries for hundreds of lipid species from 10 lipid classes were tested and compared to the Folch method. The results showed similar or better extraction yields for all investigated lipids using the BUME method. For biofluids, the method was shown to be compatible with volumes ranging from 10-100 µl. For tissue, the method was validated for 15-150mg tissue. In conclusion, we believe that the development of these two methods is a major breakthrough moving lipid extraction into the high-throughput workflows of a modern lipid laboratory.

Biography

Lars Löfgren completed his PhD in 1993 from Chalmers University of Technology, where he developed sampling devices for - and characterized human exposure to - volatile hydrocarbons in urban air. He has continued his scientific work, published in peer-reviewed journals, in the field of sample preparations for lipids and rapidly metabolized biomarkers in biological samples in his current position as an Associate Principal Scientist in Translational Science, AstraZeneca.

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