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Evaluation of solid-phase extraction approaches for LC-MS metabolomics

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Abstract

Current global LC-MS metabolomics methods for human plasma commonly rely on solvent protein precipitation using methanol or acetonitrile. Such rapid and unselective approaches are most suitable for the detection of medium to high abundance metabolites, whereas the coverage of low abundance metabolome remains poor. In this work, we explore the use of solid-phase extraction (carbon-based, pentafluorophenyl, core-shell nanoparticle and polystyrene-divinylbenzene) for the extraction and enrichment of low abundance metabolites in human plasma on global scale. We compare the optimized protocols in terms of metabolite coverage, precision and recovery of selected metabolites after LC-MS analysis of the extracts using both reversed-phase and HILIC chromatography coupled to high-resolution Orbitrap mass spectrometer. Our results clearly demonstrate the advantages and potential of sequential solid-phase extraction in global LC-MS metabolomics approaches.

Biography

Dajana Vuckovic obtained her Ph.D. under supervision of Prof. Janusz Pawliszyn at the University of Waterloo where she developed an innovative in vivo solid-phase micro extraction method for LC-MS metabolomics. She then completed postdoctoral studies in chemical proteomics at the University of Toronto. She is currently an Assistant Professor in Bioanalytical Chemistry at Concordia University, Montreal, Canada, where her research group focuses on developing new strategies in analytical and clinical metabolomics. To date, she has co-authored 30 articles, and serves as an Editorial Board member of Bioanalysis and the Editor of Sample Preparation.