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Metabolomics in precision diagnostics - asphyxia as an example

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Metabolomics data are very important for the elucidation of pathobiochemical mechanisms and an integral part of disease-related omics analyses. They further offer opportunities for diagnosis, prognosis and therapy control in numerous neurodegenerative diseases. This paper provides an overview on recent developments in metabolomics across diseases including Alzheimer's disease, multiple sclerosis (MS) and asphyxia of neonates. Recent publications report a good match of a brain metabolite signature with plasma data in Alzheimer's patients and indicate a disturbed glucose as well as glutamate-glutamine metabolism in MS patients. In cerebrospinal fluid (CSF) samples of MS patient's metabolic changes were found to be disease stage dependent. Our focus is on asphyxia diagnostics applying metabolic classifier. In asphyctic neonates, asphyxia was found to be reflected by characteristic plasma metabolite signatures involving e.g. Krebs-cycle metabolites. We have identified metabolites indicating early asphyxia and demonstrate that metabolite quantification offers an ideal tool for characterizing and prognosing neurodegenerative diseases and diagnosing oxygen deprivation.

Biography

Hans-Peter Deigner completed his PhD in Pharmaceutical Chemistry from Heidelberg University; Post-doctoral research at Harvard Medical School, Boston and then became Senior Lecturer at Heidelberg University. He has extensive experience in Biotechnology and Molecular Diagnostics including positions as Sr. Director Biomarker Research/CSO and share-holder of several biotech companies across Europe. From 2004-2006, he took up a chair in Biomedical Chemistry, School of Chemical Sciences and Pharmacy (CAP), University of East Anglia, Norwich, UK. Currently, he is Professor in the Faculty of Medical and Life Sciences (MLS), Furtwangen University and Co-director of Institute of Precision Medicine. He also holds an appointment as Visiting Scientist at Fraunhofer Institute IZI, Leipzig, Germany. He is author of more than 90 peer reviewed articles, 40 patents and patent applications. His research interests include "Precision diagnostics, biomarker and quantitative assay development, metabolomics and nanopore-sequencing".

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