University Hospital Centre Zagreb
Department of Laboratory Diagnostics
Kišpatićeva 12
Zagreb 10 000, Croatia

Training report

I would like to express my sincere gratitude to ERNDIM and Professor Jim Bonham, the Director of Division of Pharmacy, Diagnostics and Genetics in Sheffield Children's Hospital, UK, for great opportunity to gain knowledge of acyl-carnitine plasma profile. The training took place from 29 February till 11 March 2016. The main reason for my visit to Sheffield Children's Hospital in the United Kingdom was to understand how to analyse and interpret acyl-carnitine profile in plasma for patients suspected to have an underlying fatty-acid β-oxidation (FAO) disorders. Acyl-carnitines are fatty acyl ester of L-carnitine and an important analyte for many tissues like skeletal or cardiac muscle. The most commonly tested specimen is plasma. In FAO, defects in acyl-carnitine species are accumulated and with the technology of tandem mass spectrometry it is possible to screen for many metabolic disorders.

During the training in Inherited Metabolic Disease Laboratory, the staff were very helpful and friendly. Olivia demonstrated sample processing and data analysis on UPLC-MS/MS and Joanne Croft spent time with me discussing some of the interpretative aspects of acyl-carnitine profile in plasma. Disorders expected to be analyzed by tandem mass spectrometry are short-chain acyl-CoA dehydrogenase deficiency, medium chain acyl-CoA dehydrogenase deficiency, multiple acyl CoA dehydrogenase deficiency, very long-chain acyl-CoA dehydrogenase and other diseases. Clinical status for each patient should be carefully considered when interpreting metabolite profiles. But if clinical suspicion is high, confirmatory testing may be required by molecular genetic analysis or enzyme assay in fibroblasts. I learned from Dr Simon Olpin about skin biopsy for enzyme diagnosis, about considerations for parental/ethical consent, what the best use is of quality control for contamination of cell with mycoplasma, what the benefit of our tests is for other infants/children and for how long we should store fibroblasts from patients. Additionally there was a possibility to learn from Claire Hart about organic acid assay by GC-MS, calibration, method validation and interpretation of chromatogram, and Jenny Watkinson offered useful information about analysis of aminoacids. During the training I visited the Newborn Screening Laboratory where I learned from Joyce Baston. Much of the specific information provided was useful for me and my laboratory in Croatia, like the fact that blood spots should be allowed to dry, placed in the transparent paper (Glassine) envelope provided (not plastic as this may cause the specimen to "sweat") and then dispatched. Also, I learned what kind of internal control should be used, what type of calibrators, CV%, how often to repeat analysis of samples and many other valuable information. This training in the Sheffield Children Hospital laboratory with international reputation provided a great deal of knowledge, experience, and understanding of organisation of the Clinical Chemistry with Metabolic, Tissue Culture and the Newborn Screening Section. Organisational matters and quality control methods were covered by Mr Philip Craddock.

I would like to thank ERNDIM for financial support and for organizing various activities and events that helped me to get important knowledge and experience in a number of laboratory techniques and interpretation of results of rare diseases, and bring them to use in the metabolic laboratory in Croatia.

Sincerely,

Zekušić

Marija Zekušić, PhD
Department of Laboratory Diagnostics
University Hospital Centre Zagreb
Kišpatićeva12, Zagreb, Croatia
Phone: +385 1 236 72 44
E-mail: zekusicm@yahoo.com