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EXPERT REVIEWS

Proteomic landscape in Central and Eastern Europe: the 9th Central and Eastern European Proteomic Conference, Poznań, Poland

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Every year since 2007, the Central and Eastern European Proteomic Conference (CEEPC) has excelled in representing state-of-the-art proteomics in and around Central and Eastern Europe, and linking it to international institutions worldwide. Its mission remains to contribute to all approaches of proteomics including traditional and often-revisited methodologies as well as the latest technological achievements in clinical, quantitative and structural proteomics with a view to systems biology of a variety of processes. The 9th CEEPC was held from June 15th to 18th, 2015, at the Institute of Bioorganic Chemistry, Polish Academy of Sciences in Poznań, Poland. The scientific program stimulated exchange of proteomic knowledge whilst the spectacular venue of the conference allowed participants to enjoy the cobblestoned historical city of Poznań.

Keywords: Central and Eastern European Proteomic Conference (CEEPC) • proteomics • mass spectrometry imaging • bioinformatics • biomarkers • brain proteomics • diseases • system biology

The unique geopolitics of the Central and Eastern Europe highlighted the challenges for advancement of proteomics where years of isolating science from international society created an institutionalized environment under various totalitarian regime occupations. Military goals and economic hardship had limited the science, resulting in uneven development across the Bloc. Some countries such as former East Germany, Czechoslovakia and Hungary experienced relatively greater success due to connections with the Western world in the 90s of the previous millennium. Countries more successful today in proteomics are those that are able to utilize the national and international dynamics to their own advantages and this is where CEEPC has played a remarkable role in promoting proteomics in several of these countries.[1] Additionally, encouraging young researchers to present their findings orally or as posters and rotation of the meeting's venue each year to wonderful iconic locations of Europe, with diverse cultures, histories, fine cuisine, wines and music, adds to the intertwining of "cutting edge" research and cultural excitement. To this day, CEEPCs' outstanding success is due to the undiminished enthusiasm of its unique group of friends, their academic institutional researchers and participating scientists from all over the world, returning each year for this intoxicating mixture of proteomics and camaraderie.[2–6]

The 9th CEEPC was organized in Poznań, Poland, in June 2015, with resounding success.

The 9th Central and Eastern European Proteomic Conference (CEEPC), jointly with the 1st Polish Proteomics Society Meeting, June 15–18, 2015

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[7] Cutting-edge proteomics relevant to diverse diseases and with a strong focus on recent trends in mass spectrometry imaging was extensively discussed. The Organizing Committee, under the auspices of Maciej Stobiecki, Łukasz Marczak and Magdalena Łuczak, put together a fascinating scientific and cultural program for the participants.

The Conference commenced on the 15th of June with a plenary lecture from Andreas Römpp (Institute of Inorganic and Analytical Chemistry, Justus Liebig University, Giessen, Germany), who discussed the recent trends and developments in mass spectrometry imaging (MSI). The implementation of the methods and instrumentation relevant for multicentric studies were highlighted as the key aspect of MSI across laboratories. Joanna Polańska (Institute of Automatic Control, Silesian University of Technology, Gliwice, Poland) followed with a presentation on novel algorithm for Gaussian modeling of high-resolution mass spectra of different types based on automated partitioning of protein mass spectral signal into fragments. The final presentation was by Piotr Widlak (Maria Sklodowska–Curie Memorial Cancer Center and Institute of Oncology, Gliwice, Poland), who presented an interesting talk on serum proteome signature of response to radiotherapy, proposing a set of serum proteins specifically reflecting acute radiation toxicity.

Participants were pleasantly surprised by the appearance of a student choir from the Institute, which kicked off the welcome party by serenading the audience. This was followed by excellent Polish cuisine and warm hospitality for all to enjoy. Interestingly, Poznań is the home to the Poznańskie Słowiki (Poznań Nightingales)—a leading Polish choir founded in 1939—and hence the welcome reception would not have been complete without the appearance of a choir.

Conference resumed on day 2 with a plenary lecture from Corinna Henkel (Leibniz-Institut für Analytische Wissenschaften—ISAS—e.V., Dortmund, Germany) entitled "MALDI imaging in clinical research". Corinna presented different strategies for biomarker discovery as well as methods for data interpretation, including examples of clinical studies. She concluded that MSI could be used in clinical routine if method robustness and standard operation procedures were stringently defined. Michal Marczyk (Institute of Automatic Control, Silesian University of Technology, Gliwice, Poland) continued with exploring different approaches for detection and quantification of spectral peaks in MSI data. This topic was expanded by Grzegorz Drazek (Institute of Informatics, Silesian University of Technology, Gliwice, Poland) with application of Gaussian mixture modeling and permutation tests for biomarker discovery on patient's samples. Martha Gawin (Maria Sklodowska–Curie Memorial Cancer Center and Institute of Oncology, Gliwice, Poland) followed with an interesting talk on tissue-fixation strategy enabling MALDI imaging of peptides and small organic molecules.

Katarina Davalieva (Research Center for Genetic Engineering and Biotechnology "Georgi D. Efremov," Macedonian Academy of Sciences and Arts, Skopje, Republic of Macedonia) focused on the screening and diagnosis of prostate cancer using proteomics by showing results of the analyses of prostate tissue and urine. Candidate biomarkers highlighted by comparative proteomics studies were proposed for future clinical application and screening. Felicia Antohe (Institute of Cellular Biology and Pathology "Nicolae Simionescu," Bucharest, Romania), presented a fascinating talk on the "Proteomic profiling of thyroid differentiated carcinoma" using high-resolution mass spectrometry. This analysis revealed significant differences in protein expression in follicular adenoma versus papillary thyroid carcinoma that could help in early prognosis. The morning session was concluded by Anna Wojakowska (Maria Sklodowska–Curie Memorial Cancer Center and Institute of Oncology, Gliwice, Poland) with a presentation on the metabolome profiling of thyroid tissue, revealing molecular components that could be used for classification of different subtypes of thyroid lesions using GC/MS-based analysis of fixed thyroid tissue samples.

Afternoon session devoted to brain proteomics commenced with a plenary lecture by Maciej Lalowski (Institute of Biomedicine/Biochemistry and Developmental Biology, University of Helsinki, Helsinki, Finland) entitled, "Drafting the neuronal ceroid lipofuscinosis interactome in the brain". This presentation showed that protein network maps and systematic integration of experimental data and database information could allow reconstruction of disease-specific pathways in the brain. László Drahos (Research Center for Natural Sciences, Hungarian Academy of Sciences, Budapest, Hungary) followed by sharing results of the analysis of the altered synapse proteome including changes during β-amyloid accumulation typical for pathogenesis of Alzheimer's disease. Suresh Jivan Gadher (ThermoFisher Scientific—Life Science Solutions, Frederick, Maryland, USA) discussed "Cytokine measurements in cerebrospinal fluid and secretome of microglial cells of transgenic Minipig model of Huntington's disease using a multiplexing bead based assay". Central nervous and peripheral cytokine levels were investigated and among the most pronounced change was the decline of IFN-α in cerebrospinal fluid and secretome of microglial cells but not blood monocytes of transgenic animals. The lack of innate and adaptive immune responses distinguished central nervous system whilst inflammation was shown to be a common pathological event. The development of a prognostic or diagnostic assay involving biochemical marker(s) could be of immense importance in the evaluation of neurodegenerative disorders such as Huntington's disease. This was followed by an exciting presentation by Hana Kovarova (Institute of Animal Physiology and Genetics, Academy of Sciences of the Czech Republic, Laboratory of Applied Proteome Analyses, Liběchov, Czech Republic), depicting extensive study of surface N-glycoproteins during neuronal differentiation of neural stem cells. Several of the proteins including cell adhesion proteins were validated by selected reaction monitoring and they hold a key for development of safe strategies in cell-replacement therapies of neuronal disorders.

Martina Marchetti-Deschmann's (Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria) presentation on fungal proteome and surface changes during host–pathogen interaction and Jan Sadowski's (Department of Biotechnology, Institute of Molecular Biology and Biotechnology, Adam Mickiewicz University, Poznań, Poland) talk on functional proteomics-based studies on identifying and characterizing a yeast NuA4-like protein complex in plants brought the day 2 to a close.

Evening was specially choreographed in Polish style with a Conference dinner at the "Pod Pretekstem" restaurant offering local recipes and excellent wines—after all, this was a first-ever meeting of Polish Proteomic Society and jointly with the 9th CEEPC in Poland.

The third and final day commenced with a plenary lecture from Malcolm R. Clench (Biomedical Research Centre, Sheffield Hallam University, Sheffield, UK) on "Examination of toxico and pharmacodynamic responses in skin and tumor samples by MALDI-MS imaging". Günter Allmaier (Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna, Austria) followed with discussions on the advantages of nano-coated polypropylene targets for MALDI MS of proteins or tryptic digests for long-term archiving. An excellent presentation by Maksym Danchenko (Institute of Virology, Slovak Academy of Sciences, Bratislava, Slovakia) highlighted the use of immobilized polyclonal antibodies as an efficient tool for the reliable detection of immunoreactive proteins of *Coxiella burnetii*. An interesting presentation by Aleš Svatoš (Max Planck Institute for Chemical Ecology, Mass Spectrometry/Proteomics Research Group, Jena, Germany) discussed the "Proteome analysis of beewolf-associated symbiotic '*Streptomyces philanthi*'," which revealed bacterial factors essential for survival under *in vivo* stress conditions.

The afternoon session was a credit to the Polish Proteomic Society and numerous presentations on diverse topics highlighted the advancement of Polish Proteomics. One such example was the presentation by Katarzyna Rolle (Institute of Bioorganic Chemistry, Polish Academy of Sciences, Poznań, Poland), who described a fascinating novel strategy for human brain tumors therapy based on intervention with RNAi to inhibit tenascin-C synthesis. Katarzyna showed that such molecular intervention with direct injection into the tumor tissue resected area could be a promising therapy after surgery for glioblastoma multiforme patients.

The Conference concluded with closing remarks from both the CEEPC and the Polish Proteomic Society. The meeting was a great success for Polish Proteomics and an important milestone in the history of CEEPC continuity. The venue for the 10th CEEPC is Budapest, Hungary, in 2016 (October 11th –14th), where once again, all proteomes, proteomics and biological systems related topics will be debated.

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The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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