CECE 2014

11th International Interdisciplinary Meeting on Bioanalysis

"... bringing people and ideas together ..."

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Find the meeting history and more at www.ce-ce.org

Foreword

Welcome to CECE 2014. With this 11th CECE in a row we are entering the second decade of the conference. As in the previous year we start with lectures by young scientists (CECE Junior), followed by two days of invited lectures and poster sessions. This book of proceedings includes the program of all three days. This year the meeting is free of charge for all perticipants thanks to the financial support by the European Social Fund and the state budget of the Czech Republic (CZ.1.07/2.3.00/20.0182). Of course our original goal of "bringing together scientists who may not meet at specialized meetings, promote informal communication of researchers from different disciplines and map the current status of the fields shaping the bioanalytical science" remains intact. The organizers want to thank the invited speakers and all the participants and hope that you will enjoy the scientific presentations as well as personal contacts and informal discussions.

Brno, October 18, 2014

The CECE 2014 conference is dedicated to Prof. Jaroslav Janák, the founder of the Institute of Analytical Chemistry, on the occasion of his 90th birthday

Jaroslav Janák was born in Užhorod on 27th May 1924. Already during his first class at secondary school at the age of eleven, he was fascinated by chemistry and organized a small laboratory equipped with various reagents of mystifying designations. His interest in chemistry continued at the Higher Industrial Chemical School and, after the Second World War, at the Technical University in Prague where he graduated in 1947. There he met a number of famous scientists, e.g., František Čůta, Oldřich Tomíček and Jaroslav Heyrovský, who influenced his future scientific direction. Another famous person who had a crucial impact on his career, was Professor Erica Cremer. Her first publications in the journal *Elektrochemie* on the separation of simple gases inspired him to look for a solution applicable in laboratory practice.

In 1954 he obtained the MS degree at the Technical University in Ostrava where his thesis was "Metamorphosis of deep water in sedimentary basins." In 1964 he defended the thesis "Chromatographic semimicroanalysis of gases" and was granted the title DS. He was promoted to Associate professor in analytical chemistry in 1965 at the Faculty of Natural Sciences of the University of J. E. Purkyně (as Masaryk University in Brno was known at that time). He titled his thesis "New methods for identification and determination of organic substances." He had been giving lectures on analytical separation methods there for more than two decades and in 1993 he was granted an external professorship in analytical chemistry.

Dr. Janák launched his professional career at the Chemical Works Litvínov near Most as an analytical chemist responsible for control and development of methods suitable for testing waste waters, production of phenols, synthetic methanol, formaldehyde and formic acid. He was well-versed in low pressure liquid and paper chromatography and ion exchange. It may be of interest that early in his career he reached a practical separation of hydrogen, nitrogen carbon monoxide and methane on a column filled by charcoal using carbon dioxide as a mobile phase. The newly established, geologically-oriented Institute for Petroleum Research in Brno offered Professor Janák a chance to build analytical laboratories for prospecting and evaluating sources of crude oil and natural gas shells and composition of deep ground water. It was here where he has developed the final design of the gas chromatograph and realized the analytical separation of hydrocarboneous and permanent gases. Jaroslav Janák's earliest scientific results were a breakthrough and the instrumental solution he designed led in 1952 to the first patent in the world devoted to a gas

chromatograph. He also studied geochemistry and applied ion exchange equilibria known as ion exchange chromatography to changes in the composition of deep ground waters migrating through sedimentary rocks.

Janak's gas chromatograph donated by the B.P. Research Centre, Sunbury-on-Thames, U.K. to Dr. J. Janak in 1983.

The second exemplar is in the Science Museum in London.

In 1956, the presidency of the Czechoslovak Academy of Sciences asked him to establish, chair and profile the Laboratory for Gas Analysis, later Institute of Instrumental Analytical Chemistry, now known as the Institute of Analytical Chemistry in Brno. Under his management and in the first twenty years of its existence the Institute became known world wide as the school of gas chromatography, and some of distinguished scientists are grateful to Professor Janák and the Institute for their early scientific development, e.g., M. Novotny (USA), F. I. Onuska and V. M. Bhatnagar (Canada), V. G. Berezkin (Russia), O. K. Guha, R. N. Nigan (India), J. Nuñez, L. F. Gonzáles (Cuba), N. Ruseva-Rakshieva, K. Lekova (Bulgaria), R. Staszewski (Poland).

In the first twenty years of the Institute's existence it has become well known beyond the then Czechoslovakia due to a number of world class scientific publications, patented research results and advanced instrumentation Jaroslav Janák's main scientific interests in chromatography were focused on the methodology and instrumentation of the separation of gases and trace analysis. Professor Janák with his co-workers achieved success in gas analysis, defined pyrolysis in GC conditions, multi-dimensional chromatography (GC-TLC), use of zeolits in GC, and elemental analysis. Many of his co-workers attained a high quality level of scientific excellence and opened their own projects (e.g., capillary HPLC, isotachophoresis, zone electrophoresis, supercritical fluid chromatography and extraction, etc.).

Professor Janák is author or co-author of more than 300 original papers and co-author of seven books. Analytical data per se did not interest him, but their understanding and interpretation attracted his attention. He attached importance to analytical data as a reflection of observed processes, and analytical chemistry as an

independent branch of natural science and analysis as one of the philosophical domains. During his carreer he was a visiting scientist at the Technical University in Gdańsk (Poland), New York Academy of Sciences (New York, USA), Academia Sinica in Dalian (China), Laboratorio di Cromatographia CNR, Rome (Italy) and the Technical University in Delft (The Netherlands).

Jaroslav Janák was deeply involved in establishing reputable international journals such as, *Journal of Chromatography* and *Journal of Gas Chromatography*, now *Journal of Chromatographic Science.* He had a considerable influence on the scientific profiling of the first one, and served as an editorial board member or editor of several special issues and bibliographic service for many decades. He was advisor and co-author of the compendium *Encyclopedia of Separation Science* (London 1996, UK).

Professor Janák´s contributions to the development of (analytical) chemistry, especially chromatography, have been recognized and honored with several awards and medals, namely, the M.S. Tswett Award for Distinguished Research in Chromatography (Munich, Germany 1975), the J. Heyrovsky Gold Medal (Prague, Czechoslovakia 1984), gold medal of University in Ferrara (Italy 1991), gold medal of Masaryk University in Brno (Czech Republic, 1991), medal of Faculty of Chemistry, Technical University in Brno (1992), gold medal, and "Leading Intellectual of the World" award of American Biographical Society (Raleigh, NC USA, 2004) and „De Scientia et Humanitate Optime Meritis" by the Academy of Sciences of the Czech Republic in 2005.

Since 1945, Professor Janák has been a member of the Czech Chemical Society and a long-term chairman of its office in Brno. He organized postgraduate and summer courses and due to his efforts the Chemical Faculty of Technical University in Brno was renewed. In recognition of his work he was awarded *doctor honoris causa*. This curriculum vitae would not be complete without mentioning Jaroslav's strong cultural background and his interests in everything taking place in the culture, politics, and society. For all his work and contributions to the city he was awarded the Prize of the City of Brno in 2009.

Program - CECE 2014

Monday, October 20

8:00 – 16:00 Registration

9:00 – 9:10 CECE Junior opening

9:10 – 9:25 **LA-ICP-MS AS A TOOL FOR ELEMENTAL MAPPING**

Tereza Warchilová[1,2], Tomáš Vaculovič[1,2], Zuzana Čadková[3], Vítězslav Otruba[1], Jiřina Száková[4], Viktor Kanický[1,2]

[1]Department of Analytical Chemistry, Masaryk University, Brno, Czech Republic; [2]Central European Institute of Technology, Masaryk University, Brno, Czech Republic; [3]Department of Zoology and Fisheries, Czech University of Life Sciences, Praha, Czech Republic; [4]Department of Agroenvironmental Chemistry and Plant Nutrition, Czech University of Life Sciences, Praha, Czech Republic

9:25 – 9:40 **THIOL-ENE-BASED MONOLITHIC MICROREACTORS**

Jakub Novotný[1,2], Josiane P. Lafleur[3], Jörg P. Kutter[3]

[1]Institute of Analytical Chemistry of the ASCR, v. v. i., Brno, Czech Republic; [2]Department of Biological and Biochemical Sciences, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czech Republic; [3]Department of Pharmacy, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark

9:40 – 9:55 **POLYELECTROLYTE MULTILAYER COATINGS FOR THE SEPARATION OF PROTEINS BY CAPILLARY ELECTROPHORESIS: INFLUENCE OF POLYELECTROLYTE NATURE**

Samya Bekri, Laurent Leclercq, Hervé Cottet

Institut des Biomolécules Max Mousseron (UMR CNRS 5247), Montpellier, France

9:55 – 10:10 ***IN VITRO* RNA RELEASE OF A HUMAN RHINOVIRUS FOLLOWED VIA A MOLECULAR BEACON AND CHIP ELECTROPHORESIS**

Victor U. Weiss[1], Dieter Blaas[2], Guenter Allmaier[1]

[1]Vienna University of Technology, Institute of Chemical Technologies and Analytics, Vienna, Austria; [2]Max F. Perutz Laboratories (MFPL), Vienna Medical University, Vienna, Austria

10:10 – 10:25 **DEVELOPMENT OF A NOVEL RP-HPLC METHOD FOR THE DETERMINATION OF AMINO SUGARS IN SAMPLES OF ENVIRONMENTAL ORIGIN**

Erik Beňo, Róbert Góra, Milan Hutta

Department of Analytical Chemistry, Faculty of Natural Sciences, Comenius University in Bratislava, Bratislava, Slovak Republic

10:25 – 10:40 **HPLC DETERMINATION OF METHIONINE, HOMOCYSTEINE AND CYSTEINE ENANTIOMERS IN SERUM OF PATIENTS AFTER STROKE**

Zuzana Deáková[1,2], Zdeňka Ďuračková[2], Ingrid Žitňanová[2], Jozef Lehotay[1]

[1]Institute of Analytical Chemistry, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovak Republic; [2]Institute of Medical Chemistry, Biochemistry and Clinical Biochemistry, Faculty of Medicine, Comenius University, Bratislava, Slovak Republic

10:40 – 11:00 Coffee break

11:00 – 11:15 **CAPILLARY ELECTROPHORETIC ANALYSIS OF SINGLE BREATH - POSSIBLE OR NOT?**

Michal Greguš[1,2], František Foret[1], Petr Kubáň[1,2]

[1]Bioanalytical Instrumentation, CEITEC MU, Brno, Czech Republic; [2]Department of Chemistry, Masaryk University, Brno, Czech Republic

11:15 – 11:30 **ANALYSIS AND CHARACTERIZATION OF ANTIMICROBIAL PEPTIDES BY CAPILLARY ELECTROPHORESIS**

Tereza Tůmová[1,2], Lenka Monincová[1], Václav Čeřovský[1], Václav Kašička[1]

[1]Institute of Organic Chemistry and Biochemistry AS CR, v.v.i., Prague, Czech Republic; [2]Institute of Chemical Technology, Prague, Czech Republic

11:30 – 11:45 **TAIL-LABELED OLIGONUCLEOTIDE PROBES FOR A DUAL ELECTROCHEMICAL MAGNETIC IMMUNOPRECIPITATION ASSAY OF DNA-PROTEIN BINDING**

Monika Hermanová, Jan Špaček, Petr Orság, Miroslav Fojta

Institute of Biophysics, v.v.i., Academy of Sciences of the Czech Republic, Brno, Czech Republic

11:45 – 12:00 **MAGNETIC BEAD-BASED IMMUNOCAPTURE OF CLINICAL BIOMARKERS IN MICROFLUIDIC DEVICES: FROM PEPTIDES TO WHOLE CELLS**

Zuzana Svobodova, Barbora Jankovičová, Jana Kučerová, Zuzana Bilkova

Department of Biological and Biochemical Sciences, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czech Republic

12:00 – 12:15 **DIODE LASER THERMAL VAPORIZATION – NOVEL SAMPLE INTRODUCTION TECHNIQUE FOR ICP MS**

Antonín Bednařík[1], Pavla Foltynová[1], Iva Tomalová[1], Viktor Kanický[1,2], Jan Preisler[1,2]

[1]Department of Chemistry, Faculty of Science, Masaryk University, Brno, Czech Republic; [2]Central European Institute of Technology (CEITEC), Masaryk University, Brno, Czech Republic

12:15 – 13:45 Lunch break - poster session

13:45 – 14:00 **A RAPID IDENTIFICATION OF TRIACYLGLICEROLS AND PHOSPHOLIPIDS USING MALDI-TOF MS**

Justyna Walczak, Bogusław Buszewski

Department of Environmental Chemistry and Bioanalysis, Faculty of Chemistry, Interdisciplinary Centre of Modern Technologies, Nicolaus Copernicus University, Torun, Poland

14:00 – 14:15 **COMPARISON OF CHIRAL STATIONARY PHASES BASED ON CYCLOFRUCTAN IN NORMAL PHASE LIQUID CHROMATOGRAPHY**

Marianna Moskaľová, Taťána Gondová

Department of Analytical Chemistry, Faculty of Science, P. J. Šafárik University, Košice, Slovak Republic

14:15 – 14:30 **SIMULATION OF MICROFLUIDIC SYSTEMS WITH COMSOL MULTIPHYSICS**

Andrea Nagy[1], Eszter Tóth[2], Kristóf Iván[2], Attila Gáspár[1]

[1]Department of Inorganic and Analytical Chemistry, University of Debrecen, Debrecen, Hungary; [2]Faculty of Information Technology and Bionics, Pázmány Péter Catholic University, Budapest, Hungary

14:30 – 14:45 **INFLUENCE OF MASS SPECTROMETRY RESOLUTION ON METABOLITE COVERAGE IN PLASMA**

Lukas Najdekr[1,2], David Friedecky[1], Ralf Tautenhahn[3], Junhua Wang[3], Tomas Pluskal[4], Yingying Huang[3], Tomas Adam[1,2]

[1]Laboratory of Metabolomics, Institute of Molecular and Translational Medicine, University Hospital and Palacky University in Olomouc, Olomouc, Czech Republic; [2]Department of Clinical Biochemistry, University Hospital in Olomouc, Olomouc, Czech Republic; [3]Thermo Fisher Scientific, San Jose, CA, USA; [4]Okinawa Institute of Science and Technology, Okinawa, Japan

14:45 – 15:00 **STUDY ON SILVER IMMOBILIZATION TO LACTOFERRIN**

Paweł Pomastowski, Bogusław Buszewski

Department of Environmental Chemistry and Bioanalytics, Faculty of Chemistry, Interdisciplinary Centre for Modern Technologies, Nicolaus Copernicus University, Toruń, Poland

15:00 – 15:20 Coffee break

15:20 – 15:35 **DEVELOPMENT AND APPLICATIONS OF IONIZATION TECHNIQUES IN AMBIENT MASS SPECTROMETRY**

Jan Rejšek[1,2], Vladimír Vrkoslav[1], Josef Cvačka[1]

[1]Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, v.v.i., Prague, Czech Republic; [2]Department of Analytical Chemistry, Faculty of Science, Charles University in Prague, Prague, Czech Republic

15:35 – 15:50 **COMPARISON OF ANTIOXIDANT PROPERTIES OF DIFFERENT MENTHA PIPERITA SPECIES AND COMMERCIAL TEAS BY CAPILLARY ZONE ELECTROPHORESIS AND SPECTROSCOPY**

Vendula Roblová[1], Miroslava Bittová[1], Petr Kubáň[1,3], Vlastimil Kubáň[1,2]

[1]Department of Chemistry, Faculty of Science, Masaryk University, Brno, Czech Republic; [2]Department of Food Technology, Faculty of Technology, Tomas Bata University, Zlín, Czech Republic; [3]Bioanalytical Instrumentation, CEITEC MU, Brno, Czech Republic

15:50 – 16:05 **TOWARDS CYTOCHROME P450 IMER FOR KINETICS AND INHIBITION STUDIES USING CAPILLARY ELECTROPHORESIS IN ONLINE CONFIGURATION**

Jan Schejbal, Roman Řemínek, Zdeněk Glatz

Department of Biochemistry, Faculty of Science and CEITEC, Masaryk University, Brno, Czech Republic

16:05 – 16:20 **WATER UPTAKE ON SILICA-BASED STATIONARY PHASES IN HYDROPHILIC INTERACTION CHROMATOGRAPHY**

Jan Soukup, Pavel Jandera

Department of Analytical Chemistry, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czech Republic

16:20 – 16:35 **GRAPE POMACE APPLICATION IN ENVIRONMENTAL STUDIES: FROM WASTE TO NATURAL FOOD PRESERVATIVE AND SOURCE OF BIOFUEL**

Zorana Andonovic[1], Violeta Ivanova Petropulos[2]

[1]Secondary School Yahya Kemal College, Skopje, Republic of Macedonia; [2]Faculty of Agriculture, University "Goce Delčev", Štip, Republic of Macedonia

16:35 – 17:05 **MULTILEVEL CHARACTERIZATION OF ANTIBODY THERAPEUTICS BY CESI-MS**

András Guttman

University of Pannonia, Veszprem, Hungary; University of Debrecen, Hungary; Sciex Separations, Brea, CA, USA

17:05 – 09:00 Poster session

Tuesday, October 21

8:00 – 15:00 Registration

9:00 – 9:15 CECE 2014 - Opening remarks

9:15 – 9:45 **NEXT-GENERATION PROFILING OF HUMAN IMMUNE REPERTOIRES**
Jan Berka
Roche Molecular Systems, Pleasanton, USA

9:45 - 10:15 **THE EVOLUTION OF FORM AND FUNCTION SANS GENES**
Keith Baverstock
Department of Environmental Science, University of Eastern Finland, Kuopio, Finland

10:15 – 10:45 Coffee break

10:45 – 11:15 **ANALYSIS OF BIONANOPARTICLES BY MEANS OF NANO ES/CHARGE REDUCTION COUPLED TO DIFFERENTIAL MOBILITY ANALYZER**
Guenter Allmaier[1], Victor Weiss[1], Marlene Havlik[1], Martina Marchetti-Deschmann[1], Peter Kallinger[2], Wladyslaw Szymanski[2]
[1]Institute of Chemical Technologies and Analytics, Vienna University of Technology (TU Wien), Vienna, Austria; [2]Faculty of Physics, University of Vienna, Vienna, Austria

11:15 - 11:45 **THE STUDY OF ULTRASMALL SAMPLES BY FAST CAPILLARY ELECTROPHORESIS - MASS SPECTROMETRY**
Frank-Michael Matysik, Jonas Mark, Marco Grundmann, Sven Kochmann, Andrea Beutner
University of Regensburg, Institute for Analytical Chemistry, Chemo- and Biosensors, Regensburg, Germany

11:45 - 12:15 **TIME-RESOLVED CRYO-ELECTRON MICROSCOPY OF MACROMOLECULES**
Tanvir Shaikh
CEITEC, Brno, Czech Republic

12:15 – 14:15 Lunch break – poster session

14:15 – 14:45 **IMPROVING ENANTIOSELECTIVITY AND RESOLUTION IN CEC AND NANO-LC: RECENT RESULTS**

Salvatore Fanali

Institute of Chemical Methodologies, Italian National Research Council (C.N.R.), Monterotondo, Italy

14:45 – 15:15 **THE VALUE OF BIOBANK PATIENT SAMPLES IN PROTEIN EXPRESSION STUDIES**

György Marko-Varga

[1]Clinical Protein Science & Imaging Group, BioMedical Center, University of Lund, Lund, Sweden; [2]Dept. of Surgery, Tokyo Medical University, Tokyo, Japan

15:15 – 15:45 **SEX DURING COMMUNISM. INTIMATE LIFE AND THE POWER OF EXPERTISE**

Kateřina Lišková

Masaryk University, Brno, Czech Republic

16:10 City walk with invited speakers

19:00 Conference dinner with the traditional Moravian music

Wednesday, October 22

9:15 – 10:00 **THE MONKEY KING AND PIGSY FERRYING THE PROTEOMIC SUTRAS INTO THE THIRD MILLENNIUM**
Pier Giorgio Righetti
Department of Chemistry, Materials and Chemical Engineering "Giulio Natta", Politecnico di Milano, Milano, Italy

10:00 – 10:30 **HYDROPHILIC INTERACTION CHROMATOGRAPHY- THE STATE OF THE ART**
David McCalley
Faculty of Health and Life Sciences, University of the West of England, Bristol, UK

10:30 – 11:00 Coffee break

11:00 – 11:30 **MICROFLUIDICS COUPLED WITH MASS SPECTROMETRY FOR ONLINE MONITORING OF DYNAMIC BIOLOGICAL PROCESSES**
Ryan T. Kelly
Pacific Northwest National Laboratory, Richland, USA

11:30 - 12:00 **HARSH ENVIRONMENT CAPILLARY ELECTROPHORESIS**
Mihkel Kaljurand
Tallin University of Technology, Tallinn, Estonia

12:00 – 14:00 Lunch break – poster session

14:00 – 14:30 **EVOLUTION OF A MICROFLUIDIC LC/MS SYSTEM - FUNDAMENTAL TECHNOLOGY TO A COMPLETED SYSTEM**
Geoff Gerhardt
Waters Corporation, Milford, MA, USA

14:30 – 15:00 **A LIGHT AT THE END OF THE TUNNEL FOR THE COMPREHENSIVE COMPOUND IDENTIFICATION IN UNTARGETED METABOLOMICS**
Robert Mistrik
HighChem Ltd., Bratislava, Slovak Republic

15:00 – 15:30 **cHiPLC: MICROFLUIDIC COMPONENTS FOR HPLC**
Don W. Arnold
Eksigent, Redwood City, CA, USA

15:30 - 16:00 **SUB-2 µM SILICA PARTICLES WITH INTERNAL MACROPORES: DO WE NEED ANOTHER PARTICLE TYPE IN CAPILLARY SEPARATIONS?**
Milos V. Novotny[1], Sara E. Skrabalak[1], James P. Grinias[2], Justin M. Godinho[2], James W. Jorgenson[2]
[1]Department of Chemistry, Indiana University, Bloomington, USA; [2]Department of Chemistry, Kenan Laboratory, University of North Carolina, Chapel Hill, USA

16:00 Closing remarks

List of poster presentations

P1 ANALYSIS OF SEQUENCE SPECIFIC INTERACTIONS BETWEEN DNA AND P53 FAMILY PROTEINS BY ELISA, SLOT-BLOT AND EMSA
Matej Adámik, Lucie Holaňová, Lucie Navrátilová, Jana Nygrínová, Jana Pokorová, Marek Petr, Vlastimil Tichý, Marie Brázdová

P2 SAMPLE PREPARATION FOR SINGLE CELL ANALYSIS
Eva Adamová, Evgenia Yu. Basova, Anna Potáčová, František Foret, Eva Matalová, Karel Klepárník

P3 LAYER-BY-LAYER CAPILLARY COATING FOR MODIFICATION OF ELECTROOSMOTIC FLOW IN CAPILLARY ELECTROPHORESIS
Daniel Baron, Jana Horská, Jan Petr

P4 CITP ANION ANALYSIS OF BEVERAGES
Bartošková M., Pelikánová B., Lubal P., Farková M.

P5 THE DETERGENT EFFECT DURING N-GLYCAN RELEASE FROM STANDARD GLYCOPROTEINS
Judit Bodnar, Andras Guttman

P6 SIMULTANEOUS ANALYSIS OF DEXRAZOXANE AND ITS PUTATIVE ACTIVE METABOLITE USING HPLC-MS/MS
Jan Bures, Vit Sestak, Hana Jansova, Marek Kratochvil, Jaroslav Roh, Jiri Klimes, Petra Kovarikova

P7 SPECTROPHOTOMETRIC DETERMINATION OF METALLO-THIONEINS IN FISH
Bušová M., Havlíková G., Opatřilová R.

P8 MONITORING OF SELECTED PARAMETERS IN AMELANCHIER ALNIFOLIA EXTRACTS BY UV-VIS-NIR AND EPR SPECTROSCOPY
Butorová Lenka, Polovka Martin Vítová Eva

P9 EFFECT OF SLEEVE GASTRECTOMY ON PARAMETERS OF BONE METABOLISM AFTER RADICAL WEIGHT LOSS
Bužga Marek, Švagera Zdeněk

P10 BEAD-BASED IMMUNOSENSOR FOR EARLY STAGE DIAGNOSIS OF OVARIAN CANCER
Michaela Čadková, Veronika Dvořáková, Radovan Metelka, Zuzana Bílková, Lucie Korecká

P11 USE OF PCR-DGGE FOR CONTROL OF BACTERIA IN CHEESES AND THEIR PICKLES
Čakajdová Martina, Trachtová Štěpánka, Mohelský Tomáš, Němečková Irena, Španová Alena, Rittich Bohuslav

P12 PHOTO-INDUCED FLOW-INJECTION DETERMINATION OF NITRATE IN WATER
Pavel Mikuška, Lukáš Čapka, Zbyněk Večeřa, Ivan Kalinichenko, Josef Kellner

P13 OPTIMIZATION OF AMINO ACID DERIVATIZATION PROCEDURE USING NAPHTHALENE-2,3-DICARBOXALDEHYDE FOR CAPILLARY ELECTROPHORESIS WITH FLUORESCENCE DETECTION
Andrea Cela, Tereza Dedova, Ales Madr, Zdenek Glatz

P14 MODELLING OF MICROFLUIDIC FLOW-GATING INTERFACE FOR TWO-DIMENSIONAL LIQUID CHROMATOGRAPHY-CAPILLARY ELECTROPHORESIS
Petr Česla, Jana Křenková, Tomáš Václavek, Jana Váňová, Nikola Vaňková, Jan Fischer

P15 INFLUENCE OF PEG 6000 CONCENTRATION ON DNA VISCOSITY AND ADSORPTION CAPACITY ON MAGNETIC MICROSPHERES
Maria Chroboková, Judit Tóth, Alena Španová, Bohuslav Rittich

P16 MONOSACCHARIDE ANHYDRIDES IN ATMOSPHERIC AEROSOLS – OPTIMIZATION OF SEPARATION AND DETECTION BY MEANS OF LC-MS TECHNIQUE
Richard Čmelík, Pavel Coufalík, Pavel Mikuška

P17 EXTRACTION OF BIOAVAILABLE PROPORTION OF METALS IN DIESEL EMISSIONS AND ATMOSPHERIC AEROSOLS USING ARTIFICIAL LUNG FLUIDS
Pavel Coufalík, Pavel Mikuška, Kamil Křůmal, Zbyněk Večeřa, Michal Vojtíšek, Tomáš Matoušek

P18 TOWARDS THE PRODUCTION OF HIGHLY EFFICIENT POLYMERIC MONOLITHIC COLUMNS FOR HILIC SEPARATIONS OF SMALL MOLECULES
Sinéad Currivan, Pavel Jandera

P19 TESTING DIFFERENT TYPES LYSIS METHOD FOR THE PREPARATION OF THE BACTERIAL CELL LYSATES WITH SUBSEQUENT ISOLATION AND AMPLIFICATION OF DNA
Robert Čuta, Michaela Fričová, Bohuslav Rittich, Alena Španová

P20 QUANTUM DOT-BASED FÖRSTER RESONACE ENERGY TRANSFER BIOANALYSIS
Vladimíra Datinská, Karel Klepárník, Barbora Belšánová, Marek Minárik, František Foret

P21 MAGNETIC BEAD MEDIATED COMBINATORIAL CARBOHYDRATE SYNTHESIS
Boglárka Döncző, László Kalmár, András Guttman

P22 IDENTIFICATION OF HUMAN MICROBIOME IN HARD-TO-HEAL WOUNDS BY MALDI-TOF MS AND SEQUENCING
Dagmar Chudobova, Kristyna Cihalova, Roman Guran, Simona Dostalova, Kristyna Smerkova, Radek Vesely, Jaromir Gumulec, Zbynek Heger, Michal Masarik, Vojtech Adam, Rene Kizek

P23 NON-INVASIVE SAMPLING AND SUBSEQUENT CAPILLARY

ELECTROPHORETIC ANALYSIS OF SWEAT AND SALIVA IN CLINICAL DIAGNOSIS OF CYSTIC FIBROSIS
P. Ďurč, M. Greguš, J. Hodáková, E. Pokojová, J. Skřičková, F. Foret, P. Kubáň

P24 QUANTUM DOT-BASED LABELING PROCEDURES FOR PREPARATION OF SPECIFIC ANTIBODY CONJUGATES
Veronika Dvorakova, Michaela Cadkova, Barbora Jankovicova, Zuzana Bilkova, Lucie Korecka

P25 ANALYSIS OF SACCHARIDES IN GRAPES AND WINE USING HPLC WITH VARIOUS STATIONARY PHASES
Dana Flodrová, Richard Čmelík, Jiří Šalplachta, Janette Bobáľová

P26 THE STUDY OF INFLAMMATORY MARKERS OF ONCOLOGICAL PATIENTS BY MULTIVARIATE DATA ANALYSIS
Ľuboš Fraňo, Pavel Májek

P27 EFFECT OF DIFFERENT SEPARATION MATRIX COMPOSITION ON SMALL NUCLEIC ACIDS SEPARATION BY COMBINATION OF CAPILLARY IZOTACHOPHORESIS AND CAPILLARY ZONE ELECTROPHORESIS
Milan Fraňo, Michaela Gallee, Pavol Koiš

P28 THE USE OF IONT POTENCIAL AT THE BACTERIAL DNA SEPARATION BY AMINO FUNCIONALISED MAGNETIC NANOPARTICLES
Michaela Fričová, Bohuslav Rittich, Alena Španová

P29 DETERMINATION OF TOTAL APIGENIN IN EXTRACTS OF PETROSELINUM CRISPUM
Paulina Furmaniak, Paweł Kubalczyk, Rafał Głowacki

P30 THE POSSIBILITIES OF FLUORESCENCE ANALYSIS OF SHORT NUCLEIC ACID BY ARTIFICIAL CHEMOSENSOR
Michaela Gallee, Milan Fraňo, Pavol Koiš

P31 THEORETICAL PRINCIPLES OF CAPILLARY ISOTACHOPHORESIS IN MOVING-BOUNDARY SYSTEMS
Petr Gebauer, Zdena Malá, Petr Boček

P32 DETERMINATION OF DIAGNOSTICALLY IMPORTANT AMINO ACIDS IN SAMPLES OF BIOLOGICAL ORIGIN BY RP-HPLC USING A PRE-COLUMN DERIVATIZATION
Natália Bielčíková, Róbert Góra, Milan Hutta, Erik Beňo

P33 TREATMENT AND FUNCTIONALIZATION STUDY OF PDMS MICROFLUIDIC DEVICES DESIGNED FOR RARE CELL CAPTURE
Laszlo Hajba, Marton Szigeti, David F. Sranko, Andras Guttman

P34 SEPARATION OF NONPOLAR LIPIDS FROM VERNIX CASEOSA
Eva Háková, Radka Míková, Vladimír Vrkoslav, Antonín Doležal, Richard Plavka, Josef Cvačka

P35 PREPARATION OF LOW-COST MICROFLUIDIC DEVICES BASED

ON FILTER AND BAKERY PAPERS BY USING AN OFFICE LAMINATOR
Lenka Hárendarčíková, Jan Petr

P36 VOLTAMETRIC DETECTION OF DNA DELETION ON PENCIL ELECTRODE
Lucia Hároníková, Jan Špaček, Miroslav Fojta

P37 ENOLISATION-SILYLATION REACTION STUDY OF SELECTED STEROIDS
Anna Hehenberger, Petr Kotas, Jan Tříska

P38 PROTEIN EXTRACTION OF POPPY (PAPAVER SOMNIFERUM) FOR PROTEOMIC 2 – DE ANALYSIS
Tímea Kuťka Hlozáková, Edita Gregová, Svetlana Šliková, Zdenka Gálová

P39 SENSITIVE DETERMINATION OF GLUTATHIONE IN VARIOUS BIOLOGICAL SAMPLES BY CAPILLARY ELECTROPHORESIS WITH GREEN LASER INDUCED FLUORESCENCE DETECTION
J. Hodáková, J. Preisler, F. Foret, P. Kubáň

P40 SUBCRITICAL EXTRACTION AS SAMPLE TREATMENT METHOD FOR ANTIOXIDANT SCREENING OF VARIOUS PLANT EXTRACTS
Barbora Hohnová, Lenka Šťavíková, Pavel Karásek, Michal Roth

P41 THE SELENIUM DETERMINATION IN LLAMA HAIR BY HYDRIDE GENERATION AAS
Milada Holasová, Věra Vyskočilová, Alena Pechová

P42 A PILOT STUDY ON DETERMINATION OF CITRATE AS THE STABILIZATION AGENT OF NANOPARTICLES USING CAPILLARY ZONE ELECTROPHORESIS WITH INDIRECT UV DETECTION
Jana Horská, Juraj Ševčík, Jan Petr

P43 IN-SYRINGE ANALYSIS / LAB-IN-A-SYRINGE: A NOVEL FLOW TECHNIQUE FOR LARGE VOLUME SAMPLE PRETREATMENT
Burkhard Horstkotte, Ivana Šrámková, Hana Sklenářová, Petr Solich

P44 POTENTIAL OF CONNECTING ION MOBILITY SPECTROMETRY TO LIQUID SEPARATION TECHNIQUES
Jasna Hradski, Martin Sabo, Štefan Matejčík, Marián Masár

P45 USE HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY FOR DETERMINATION OF SACCHARIDES AFTER THE ENZYMATIC HYDROLYSIS OF WASTE BREAD
Helena Hudečková, Petra Šupinová, Libor Babák

P46 INFLUENCE OF CHROMATOGRAPHIC PARAMETERS ON HYDROPHILIC INTERACTION CHROMATOGRAPHY SEPARATION OF ALIPHATIC ACIDS ON ZWITTERIONIC STATIONARY PHASE
Iveta Hukelová, Pavel Jandera, Radoslav Halko

P47 HILIC-RP DUAL RETENTION MECHANISM ON DIOL BASED STATIONARY PHASES
Petr Janás, Pavel Jandera, Tomáš Hájek

P48 OPTIMIZATION OF ANALYTICAL METHODS FOR THE DETERMINATION OF RESIDUES OF SELECTED PHARMACEUTICALS IN THE AQUATIC ENVIRONMENT
Kateřina Járová, Milada Vávrová, Jana Oborná

P49 COMPUTER ASSISTED DEVELOPMENT OF A PNEUMATIC ELECTROSPRAY NEBULIZER
Gabor Jarvas, Marton Szigeti, Jakub Grym, Frantisek Foret, Andras Guttman

P50 DETERMINATION OF TESTOSTERONE AND ITS 5 METABOLITES IN THE INCUBATION MEDIA AS A MEASURE OF CYTOCHROME P450 METABOLIC ACTIVITY
Miroslav Turjap, Gabriela Dovrtělová, Kristýna Nosková, Ondřej Zendulka, Jan Juřica

P51 METABOLITE PROFILING OF SERUM FROM HORSES WITH ATYPICAL MYOPATHY
Radana Karlíková, Jitka Široká, Františka Hrdinová, David Friedecký, Barbora Hnízdová, Edita Čedroňová, Hana Janečková, Petr Jahn, Tomáš Adam

P52 N-GLYCAN GLUCOSE UNIT (GU) DATABASE FOR CAPILLARY GEL ELECTROPHORESIS
Márta Kerékgyártó, András Guttman

P53 SYNTHESIS, ANALYSIS AND BIOLOGICAL EVALUATION OF SOME GLYCOCONJUGATES
Tomáš Klunda, Monika Poláková, Andrea Bilková, Slavomír Bystrický, Eva Machová

P54 HPLC SEPARATION OF HUMAN HEMOGLOBINS IN BLOOD SAMPLES OF PATIENTS WITH THALASSEMIA
Veronika Komorowska, Milan Hutta, Viera Fábryová, Peter Božek

P55 AFFINITY CAPILLARY ELECTROPHORESIS APPLIED FOR STUDY OF SOLVENT EFFECT ON STABILITY CONSTANT OF DIBENZO-18-CROWN-6 COMPLEX WITH POTASSIUM ION
Renáta Konášová, Jana Jaklová Dytrtová, Václav Kašička

P56 ELECTROPHORETIC ANALYSIS OF SERUM PARAPROTEIN GLYCOSYATION IN MULTIPLE MYELOMA
Zsuzsanna Kovács, Boglárka Döncző, András Guttman

P57 OPTIMISATION OF SAMPLE PREPARATION FOR THE DETERMINATION OF LIPOIC ACID IN VEGETABLES BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY
Krawczyk M.J., Głowacki R., Chwatko G.

P58 ANALYSIS OF POLYPHENOLS IN SELECTED BLACK AND GREEN TEAS BY HPLC-MS TECHNIQUES
Katarína Krčová, Andrea Vojs Staňová, Jozef Marák

P59 MICROBICIDAL PROPERTIES AND CHEMICAL COMPOSITION OF

ESSENTIAL OILS
Kamil Křůmal, Zbyněk Večeřa

P60 IDENTIFICATION OF NOSOCOMIAL INFECTION BY ELECTROPHORETIC TECHNIQUES
Anna Kubesová, Dana Moravcová, Marie Tesařová, Marie Horká

P61 DIAGNOSTIC ACCURACY OF CYSTATIN C AND CREATININE BASED ESTIMATION OF GLOMERULAR FILTRATION USING VARIOUS EQUATIONS IN PEDIATRICS
Pavlína Kušnierová, Radka Šigutová, František Všianský, Věra Ploticová, Zdeněk Švagera

P62 STUDY OF PROTEIN AND DRUG INTERACTIONS BY CAPILLARY ELETROFORESIS – MASS SPECTROMETRY
Monika Langmajerová, Lenka Michalcová, Zdeněk Glatz

P63 KINETIC INVESTIGATION OF HUMAN SALIVARY AMYLASE USING MICROCALORIMETRY
Gábor Lehoczki, Gyöngyi Gyémánt

P64 THE BIOANALYTICAL METHODS TO CHARACTERIZE ANTIFUNGAL AGENTS PRODUCED BY LACTIC ACID BACTERIA
Lidia Lipińska, Elżbieta Klewicka

P65 CITP ANALYSIS OF AMINOPOLYCARBOXYLIC ACIDS
Březina J., Miliónová R., Lubal P., Šimbera J.

P66 CAPILLARY ELECTROPHORESIS WITH CONTACTLESS CONDUCTIVITY DETECTION FOR AMINO ACID PROFILING OF HUMAN PLASMA SAMPLES
Aleš Mádr, Andrea Celá, Josef Tomandl, Zdeněk Glatz

P67 ASSESSMENT OF AROMA COMPOUNDS IN APPLES USING SPME-GC-FID METHOD
Martina Mahdalova, Eva Vitova

P68 DETERMINATION OF BINDING CONSTANT OF 1ST GENERATION ANTIDIABETIC DRUG WITH HUMAN SERUM ALBUMIN
Lenka Michalcová, Zdeněk Glatz

P69 DETAILED STUDY OF IMATINIB METABOLISM USING HIGH-RESOLUTION MASS SPECTROMETER ORBITRAP ELITE
Kateřina Mičová, David Friedecký, Edgar Faber, Marcela Hrdá, Tomáš Adam

P70 LIQUID CHROMATOGRAPHIC MASS SPECTROMETRIC DETECTION OF METABOLITES OF MINOR BENZO[C]PHENANTHRIDINE ALKALOIDS
Adam Midlik, Roman Sándor, Kristýna Nosková, Gabriela Dovrtělová, Jan Juřica, Eva Táborská, Ondřej Peš

P71 OPTIMIZATION OF SARCOSINE OXIDASE BIOSENSOR FOR DETERMINATION CARBOXYLIC ACIDS IN REAL SAMPLES OF FRUIT WINE

Miodrag Milovanovic, Jiri Zeravik, Petr Skladal

P72 DETERMINATION OF ALIPHATIC CARBOXYLIC ACIDS IN PARTIALLY FERMENTED GRAPE MUST
Andrea Nagyová, Radoslav Halko

P73 STUDY OF COMPETITIVE BINDING BETWEEN DICLOFENAC AND TRYPTOPHAN ON HUMAN SERUM ALBUMIN USING CAPILLARY ELECTROPHORESIS
Hana Nevídalová, Lenka Michalcová, Zdeněk Glatz

P74 PERSPECTIVE SWEETENER TAGATOSE AND PH STABILITY
Zuzana Olšovcová, Milena Vespalcová

P75 DIRECT COUPLING OF SUPPORTED LIQUID MEMBRANE EXTRACTIONS TO CAPILLARY ELECTROPHORESIS. SENSITIVITY ENHANCEMENT IN ANALYSES OF UNTREATED COMPLEX SAMPLES
Pantůčková Pavla, Kubáň Pavel, Boček Petr

P76 DNA POLYMERASE STOP ASSAY FOR DETECTION OF G-QUADRUPLEXES
Marek Petr, Pavla Bažantová, Matej Adámik, Iva Kejnovská, Zuzana Dvořáková, Michaela Vorlíčková, Petr Pečinka, Marie Brázdová

P77 GENETIC DIVERSITY OF CZECHOSLOVAK ORIGIN RYE CULTIVARS DETECTED BY RAPD MARKERS
Lenka Petrovičová, Zdenka Gálová, Želmíra Balážová, Martin Vivodík, Magdalena Wójcik-Jagła, Marcin Rapacz

P78 THE WAYS OF ACTIVATING TP53
Polášková A., Helma R., Adámik M., Hronešová L., Holacká K., Ballová Ľ., Brázdová M.

P79 PLASMA FREE METANEPHRINES IN DIAGNOSTICS
Portychová Lenka, Nývltová Zora, Brabcová Vránková Alice, Bartoš Michal, Vermousek Ivan, Horna Aleš

P80 ZIC®-HYDROPHILIC INTERACTION CHROMATOGRAPHY SEPARATION OF PURINE AND PURINE BASES
Silvia Carballo Marrero, Simona Procházková, Ľudovít Schreiber, Radoslav Halko

P81 IN VIVO ANALYSIS OF DICLOFENAC AND ITS HYDROXY-METABOLITES BY HPLC-MS
Monika Radičová, Andrea Vojs Staňová, Jozef Marák

P82 CAPILLARY ELECTROPHORESIS WITH NATIVE FLUORESCENCENCE DETECTION IN THE WIDE BORE CAPILLARY
Zdenka Radičová, Róbert Bodor, Milan Hutta, Marián Masár

P83 KINETIC STUDY OF KETAMIE N-DEMETHYLATION MEDIATED BY ON-LINE ENANTIOSELECTIVE CAPILLARY ELECTROPHORETIC METHOD
Roman Řemínek, Zdeněk Glatz, Wolfgang Thormann

P84 USE OF ARTIFICIAL NEURAL NETWORKS FOR OPTIMIZATION OF BIOGENIC AMINES DERIVATIZATION
Tomáš Rozman, Zdeněk Farka, Jan Havliš, Přemysl Lubal, Marta Farková

P85 DETERMINATION OF 3-NITROTYROSINE IN URINE BY MICROCHIP ELECTROPHORESIS
Marína Rudašová, Róbert Bodor, Marián Masár

P86 ZIC-HILIC MONOLITHIC CAPILLARY COLUMN COUPLED WITH MALDI-MS: A TOOL FOR GLYCAN ANALYSIS
Jozef Šesták, Jana Křenková, Dana Moravcová, Josef Planeta, Vladislav Kahle

P87 FIRST INSIGHT INTO PHARMACOKINETICS OF DPC - A NOVEL IRON CHELATING ANTI CANCER THIOSEMICARBAZONE
Vit Sestak, Jan Stariat, Eliska Potuckova, Stanislav Micuda, Vlasta Suprunova, Jan Bures, Petr Prusa, Jaroslav Roh, Tomas Simunek, Jiri Klimes, Des R. Richardson, Petra Kovarikova

P88 SURFACE PLASMON RESONANCE IMAGING - FIRST EXPERIENCE
Radka Šigutová, Michal Lesňák, Pavlína Kušnierová, František Všianský, Věra Ploticová, Zdeněk Švagera, Kristian Šafarčík

P89 ELECTROLYSIS IN ELECTROMEMBRANE EXTRACTIONS. EFFECTS ON EXTRACTION PERFORMANCE FOR SUBSTITUTED PHENOLS
Šlampová Andrea, Kubáň Pavel, Boček Petr

P90 MICRO RNA-124 DETERMINATION EMPLOYING MAGNETIC PARTICLES AND QUANTUM DOTS
Kristyna Smerkova, Maja Stanisavljevic, Iva Blazkova, Marketa Vaculovicova, Vojtech Adam, Rene Kizek

P91 ZWITTERIONIC MONILITHIC CAPILLARY COLUMNS FOR HYDROPHILIC INTERACTION CHROMATOGRAPHY
Magda Staňková, Pavel Jandera

P92 THE INFLUENCE OF STORAGE ON THE SENSORY QUALITY OF PROCESSED CHEESE ANALOGUES
Sukalova Katerina, Vitova Eva, Bunka Frantisek

P93 STABILITY OF PARATHYROID HORMONE IN HUMAN WHOLE BLOOD
Zdeněk Švagera, Jana Chlopčíková, Marek Bužga, Ivo Valkovský

P94 PREANALYTIC PHASE OPTIMIZATION OF ETHYL FERULATE ANALYSIS AFTER PENETRATION EXPERIMENTS INTO THE SKIN WITHIN VARIOUS DELIVERY SYSTEMS
M. Svoboda, E. Salvetova, D. Smejkalova, T. Muthny

P95 RARE CELL CAPTURE DEVICE OPERATING WITH CD44 ANTIBODY FUNCTIONALIZED MAGNETIC BEADS
Marton Szigeti, Laszlo Hajba, Gabor Jarvas, Andras Guttman

P96 ANALYSIS OF PHARMACEUTICAL ADDITIVES BY MICROCHIP

ELECTROPHORESIS – SURFACE ENHANCED RAMAN SPECTROSCOPY
Peter Troška, Marián Masár, Róbert Bodor

P97 RAPID DETERMINATION OF METFORMIN, PHENFORMIN AND PROPYL TRIPHENYLPHOSPHONIUM BROMIDE IN MITOCHONDRIA MATRIX BY CAPILLARY ELECTROPHORESIS
Petr Tůma

P98 SEPARATION OF TRYPTIC DIGEST OF CYTOCHROME C WITHIN A LONG NANOELECTROSPRAY TIP
Anna Týčová, František Foret

P99 SEPARATION OF ASPARTIC A GLUTAMIC ACIDS ENANTIOMERS BY MICROCHIP AND CAPILLARY ELECTROPHORESIS
Katarína Uhlárová, RóbertBodor, Martin Schmid, MariánMasár

P100 ANALYSIS OF INDIVIDUAL ORGANELLES
Tomas Vaclavek, Deirdre Manion-Fisher, Katie Muratore, Thane Taylor, Jana Krenkova, Frantisek Foret, Edgar A. Arriaga

P101 COMPARISON OF DIAGNOSTIC PERFORMACE OF HIGH RESOLUTIN MASS SPECTROMETRY AND TANDEM MASS SPECTROMETRY – A CASE OF PURINE AND PYRIMIDNE METABOLICK DISORDERS
Václavík Jan, Friedecký David, Adam Tomáš

P102 THE IMPACT OF FARMING PRODUCTION SYSTEM ON LACTIC ACID BACTERIA AND THE AMOUNT OF ORGANIC ACIDS IN GRAPE MUST DURING FERMENTATION
Markéta Valicová, Jiřina Omelková

P103 NOVEL UHPLC/MS/MS METHOD FOR THE SAFETY CONTROL OF THE LUPIN SEEDS
Vaněrková D., Marková L., Němcová L., Voborníková Š., Hornová M., Horna A.

P104 RETENTION CHARACTERISTICS OF LABELLED OLIGOSACCHARIDES IN HYDROPHILIC INTERACTION LIQUID CHROMATOGRAPHY
Nikola Vaňková, Petr Česla, Jan Fischer

P105 CAPILLARY ELECTROPHORETIC SEPARATION OF FLUORESCENTY LABELLED OLIGOSACCHARIDES
Jana Váňová, Petr Česla, Kateřina Hlavová, Jan Fischer

P106 METABOLOMIC APPROACH TO THE STUDY OF NANOPARTICLES IMPACT TO BARLEY PLANTS
Zbyněk Večeřa, Kristýna Večeřová, Michal Oravec, Michaela Kozáčiková, Otmar Urban, Jan Tříska

P107 IDENTIFICATION AND QUANTIFICATION OF AROMA COMPOUNDS OF SEA BUCKTHORN BERRIES
Eva Vitova, Kateřina Sůkalova, Martina Mahdalova, Lenka Butorova

P108 THE STUDY OF POLYMORPHISM OF CASTOR (RICINUS COMMUNIS L.) USING RAPD TECHNIQUE
Martin Vivodík, Želmíra Balážová, Zdenka Gálová, Lenka Petrovičová

P109 ANALYTICAL POTENTIAL OF SEPARATION TECHNIQUES AND MASS SPECTROMETRY IN THE STUDY OF BIOLOGICALLY ACTIVE SUBSTANCES
Andrea Vojs Staňová, Monika Radičová, Jozef Marák, Petra Kmeťová, Miroslava Šupolíková, František Golais, Pavol Koiš

P110 ANALYSIS OF AQUEOUS SOIL EXTRACTS BY THIN LAYER CHORMATOHRAPHY
Veronika Vojtková, Milan Hutta

P111 ULTRA-FAST ONLINE SPE-MS/MS METHOD FOR QUANTIFICATION OF FOUR TYROSINE KINASE INHIBITORS IN HUMAN PLASMA
Ivo Vrobel, Kateřina Míčová, David Friedecký, Edgar Faber, Tomáš Adam

P112 ISOTACHOPHORETIC DETERMINATION OF KETONE BODIES AND LACTATE IN CATTLE SERUM
Věra Vyskočilová, Alena Pechová, Pavla Pantůčková

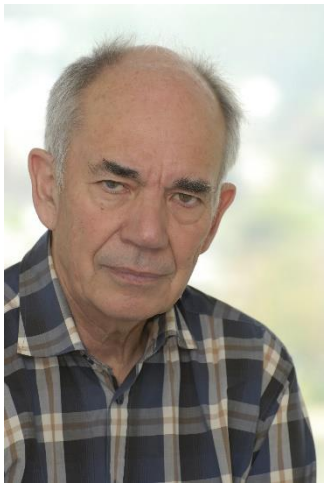
P113 CELLULASE IMMOBILIZATION ON CARRIER FROM WASTE POLYETHYLENE TEREPHTHALATE BOTTLES
Miroslava Zichová, Jiřina Omelková, Eva Stratilová

About the invited speakers

András Guttman, Professor of Translational Glycomics (Horváth Laboratory of Bioseparation Sciences, University of Pannonia and Debrecen, Hungary) also leads the application efforts at Sciex Separations (Brea, CA). His work is focusing on capillary electrophoresis and CE-MS based proteomics and glycomics analysis of biopharmaceutical and biomedical interests. Dr Guttman previously held academic appointments at Northeastern University (Boston, MA) and University of Innsbruck (Austria) as well as industrial positions at Novartis (La Jolla, CA), Genetic BioSystems (San Diego, CA), and Beckman Coulter (Fullerton, CA), developing high resolution capillary electrophoresis and microfluidics based separation methods. Professor Guttman has more than 240 scientific publications, wrote 32 book chapters, edited several textbooks and holds 19 patents. He is a CASSS board member, president of the Hungarian Chapter of the American Chemical Society, and on the editorial boards of numerous international scientific journals. Dr. Guttman graduated from University of Veszprem, Hungary in chemical engineering, where he also received his doctoral degree. He was recognized by the Analytical Chemistry Award of the Hungarian Chemical Society in 2000, elected as a member of the Hungarian Academy of Sciences in 2004, named as Fulbright Scholar in 2012, received the CASSS CE Pharm Award in 2013, the Arany Janos medal of the Hungarian Academy of Sciences in 2014 and the Pro Scientia award of the University of Pannonia just recently.

Jan Berka is a Director of Research, Sequencing Unit, Roche Molecular Systems in Pleasanton, CA, since April 1, 2014. Jan was born in the Czech Republic where he graduated from Masaryk University with a Doctor of Natural Sciences degree (RNDr.) in molecular biology and genetics. After four years of post-graduate studies, Jan received a post-doctoral fellowship at the Barnett Institute, Northeastern University in Boston, MA, where he worked on developing multi-capillary DNA sequencers, a project funded by the DOE under the Human Genome program. Jan continued to develop DNA analysis methods at CuraGen and in April 2000 became a team member at 454 Life Sciences, a CuraGen spin-off. At 454 life Sciences, he was a co-inventor of several key components of the Roche-454 DNA sequencing system, including emulsion PCR. In 2006, Jan switched focus to applying next-generation 454 sequencing to the discovery of rare genetic variants associated with human disease traits, first at Perlegen Sciences with David

Cox, and later at Pfizer Rinat Laboratories in South San Francisco. At Rinat, Jan's team was among the first groups to apply NGS to profiling of the human immune system. Jan continued to explore innovative immunosequencing approaches at Adaptive Biotechnologies in Seattle, where he developed a novel method for pairing sequences of immune receptor chains, until recently.



Keith Baverstock graduated in chemistry from London University. His Ph D, also from London University, was in chemical kinetics. He was an NRC of Canada postdoctoral fellow at Atomic Energy of Canada in Pinawa, Manitoba, for 2 years, returning to the UK and Nottingham University for further postdoctoral work. In 1971 he joined the UK Medical Research Council's Radiobiology Unit with the dual remit of research and advising on public health aspects of radiation exposure. In 1991 he joined the World Health Organisation and was instrumental in uncovering the "epidemic" of childhood thyroid cancer resulting from the Chernobyl accident. On retirement from the WHO in 2003 he continued his research at the University of Kuopio, now the University of Eastern Finland. He has taken a keen interest in the public health consequences of nuclear accidents and his WHO programme was instrumental in uncovering the childhood thyroid cancer outbreak after the Chernobyl accident. Currently he collaborates with a Citizen Scientist organisation in Japan in connection with the Fukushima accident. Earlier he worked extensively on public health issues in the Marshall Islands. His recent research has concentrated on uncovering the processes that underlie the phenomenon of genomic instability and how biology has to change in order to accommodate the phenomenon. He believes the Modern Synthesis that dominates genetics is not just flawed but fundamentally wrong and needs to be replaced by a "theory of life" based on thermodynamic considerations.

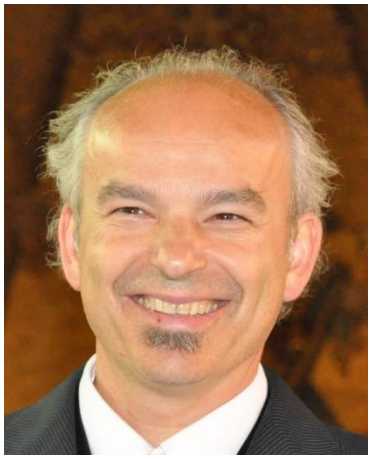
Guenter Allmaier was born and raised in Vienna (Austria), got a M. Sc. degree in Pharmaceutical Chemistry and Pharmacology from the University of Vienna and 1983 his Ph.D. degree in Analytical Chemistry from the same institution. From 1985 to 1986 he worked as post-doctoral associate in the Department of Chemistry (with Prof. K. Biemann) at MIT (Cambridge, MA, USA). Afterwards he joined the Institute of Analytical Chemistry (University of Vienna) as assistant professor. He worked several periods as visiting scientist in the Department of Molecular Biology (with Prof. P. Roepstorff) at University of Southern Denmark (Odense, Denmark) as well as visiting professor in the Centro de Biologia Molecular Severo Ochoa, C.S.I.C., Universidad de Autonoma de Madrid (Madrid Spain). 1995 he was appointed to the rank of associate professor. 2003 he moved as

full professor of analytical chemistry to the Institute of Chemical Technologies and Analytics at the Vienna University of Technology (TU Wien) and is directing the institute as managing director since 2011. He has written or co-authored more than 250 publications in peer-reviewed international journals and books as well as has been granted two patents. He has participated in the organization of several international conferences (e.g. 20th IMSC, Geneva, Switzerland; International Symposium of Glycoconjugates XXI, Vienna, Austria; 27th IMMS (Informal Meeting on Mass Spectrometry) Retz, Austria). Furthermore he was founder of the Austrian Proteomics Association (AuPA) and its annual meeting as well as the Central and Eastern European Proteomics Symposium (CEEPS) series. He acts at the moment as elected vice president of the Austrian Society of Analytical Chemistry (ASAC). He obtained several prizes as the John Beynon RCM Award and Dr. Wolfgang Houska Prize. His interests are covering mass spectrometry and separation sciences in terms of instrumentation with a broad array of application fields from nanoparticles to lipidomics and proteomics as well as tribology and biopharmaceuticals.

Frank-Michael Matysik is Professor of Analytical Chemistry at the University of Regensburg (Bavaria, Germany). He studied chemistry at the University of Leipzig and received his Ph.D. (1994) and "Habilitation" (2001) degrees from the University of Leipzig. From 2001 to 2008 he was "Privatdozent" for Analytical Chemistry at the same university. In May 2008 he accepted the position of a professor of chemistry at the University of Regensburg where he is representing the field of instrumental analytical methods. Research interests: Instrumental analytical developments, Hyphenated analytical systems, Miniaturized sample preparation techniques, Electroanalysis, Bioelectroanalysis, Electromigrative separation systems (capillary and chip format), Chromatographic separation techniques, Mass spectrometry.

Tanvir (Tapu) Shaikh is a junior group leader at the Central European Institute of Technology (CEITEC). Tapu received his Ph.D. in the laboratory of David DeRosier, and spent his postdoctoral years at the Wadsworth Center in Albany, working under Joachim Frank, Rajendra Agrawal, Terry Wagenknecht, and ArDean Leith. Tapu's research interests are two-fold: development of methodologies for time-resolved electron microscopy (EM) and development of the SPIDER image-processing suite. The time-resolved methodologies have included flash photolysis and, mostly recently, development of microfluidic devices which quickly mix two solutions and spray microdroplets onto an EM grid. The SPIDER software suite came into existence in 1978 and is used.

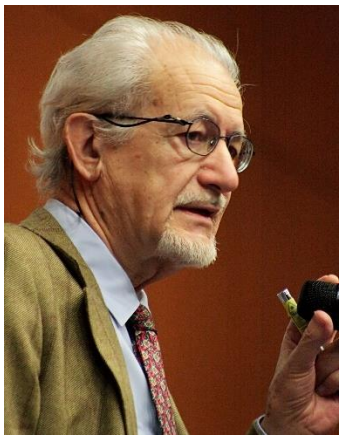
Salvatore Fanali is a Senior Researcher "Direttore di Ricerca" at the Italian National Research Council (C.N.R.), Institute of Chemical Methodologies in Monterotondo (Rome) Italy and head of "Capillary Electromigration and Chromatographic Methods" Unit. In 1974 he received the degree of Dr. in Chemistry at Rome University "La Sapienza" and later on the PhD in Analytical Chemistry at Comenius University – Bratislava, Slovakia. His research is focused on development of miniaturized techniques, e.g., nano-liquid chromatography/nano-LC, capillary zone electrophoresis/CZE, capillary electrochromatography /CEC. They were coupled with mass spectrometry. Studies on enantiomers separations, new stationary phases are carried out. Methods are applied to pharmaceutical, agrochemical, food, environmental, forensic analysis. He is author or co-author of about 300 publications in Journal (SCI) of international interest, chapters in books, two booklets. He received awards, e.g., Bratislava University, University of Verona, "Liberti" Medal in Analytical Chemistry (Italian Chemical Society), "Nota" Medal (ISCC-2014) Capillary Chromatography, University of Olomouc. He is Editor of Journal of Chromatography A (Elsevier), honorary Editor in Journal of Separation Science where he served as Editor-in-chief and member of the advisory editorial board of 6 International Journals.



Gyorgy Marko-Varga (GMV) is Professor at the Tokyo Medical University, Japan, and is the head of the div. Clinical Protein Science and Imaging. GMV has been working within senior Drug-, Discovery/Development positions and responsibilities within Astra, and AstraZeneca for a period of more than 20 years. He started as a Lead Scientist in collaboration with the Nobel Prize winner Bengt Samuelsson, Karolinska Institute, on inflammation studies in 1992. GMV has been in leadership positions in AstraZeneca; as global proteomics head, Clinical Biomarker Platforms used in clinical studies phase I and II, moving into phase III, and Biological Mass Spectrometry. In 2006 GMV was one of the initiators of "Nietorp AB", a MicroTechnology company within AstraZeneca. In addition Marko-Varga has been a founder of additionally two start-up companies, ISET AB (2006) and OKRAM Technology (2009). He was responsible for IRESSA Protein Biomarker Discovery studies in Japan (2005-2009) with 52 Lung Cancer Clinical Centres throughout Japan, the biggest Biomarker study activities in the industry with 4.000 patients. Today GMV is Responsible for Biobank and Biomarker developments within the "Big 3" study: Lung Cancer-Cardiovascular diseases-, and COPD with 100,000 patients processing 5 Million samples (2012-2015) in Southern Sweden. He became the

leading PI of a 5-year project in the Malignant Melanoma, sponsored by the Kamprad Foundation (2012-2017), of a 5-year grant on Protein Biomarker Discovery and Drug Imaging for Cancer Research. Marko-Varga has since then been the PI or Co-PI of several national and international grants, including one funded from the Swedish Strategic Foundation funded in 2011 on Cardiac Infarct. Additional Biobanking studies within Lung Cancer and COPD runs under the leadership of Marko-Varga. Marko-Varga has published more than 270 scientific publications since 1984 in reviewed international scientific journals, 21 Book Chapters and Edited 2 Books, His H index for the global career amounts to more than 7000 citations and H-index of 42 (2014-02-01). As part of his career, he is the founder and President of the Swedish Proteomics Society, General Council member (Swedish representative). I became the President of the European Proteomics Association (EuPA) 2011-2015. Marko-Varga is also the European Editor of Journal of Proteome Research, an American Chemical Society journal. In addition Editorial board member of additionally 9 international journals. As a longstanding member (20 years) of the Swedish Academy of Pharmaceutical Sciences (Drug Analysis Section), organised and lead more than 25 national and international congresses, as well as coerces and workshops. He had 14 PhD students, 6 Licenciate students, more than 25 diploma students, 8 post docs, throughout a 19 year period. He has filed 20 patent applications in Europe as well as worldwide, and is the owner of 10 approved patents. The extensive educational role through supervision of students of GMV has been complemented by teaching coerces, and developing new pedagogic lecturing, that is combined with experimental sections. Students are experimentally introduced to cutting edge research technologies in an environment of front line science at the new medical mass spectrometry laboratories at the Biomedical Center in Lund.

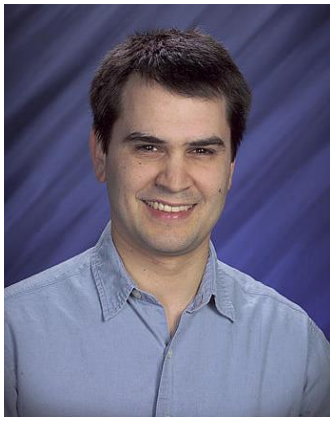
Kateřina Lišková, PhD is Assistant Professor in gender studies and sociology at Masaryk University. In the 2012/13 academic year, she was a Visiting Scholar at Columbia University where she conducted her research on sexology and sexuality in communist Czechoslovakia, supported by the Marie Curie International Outgoing Fellowship - European Commission Seventh Framework Programme. Her research is focused on gender, sexuality, and the social organization of intimacy, particularly in Central and Eastern Europe. In the past, she was affiliated with the New School for Social Research as a Fulbright Scholar and as a Visiting Scholar with New York University. She has lectured at various U.S. universities and her papers have appeared in several monographs published by Routledge, SAGE, Blackwell and Palgrave. In the Czech Republic, her book Good Girls Look the Other Way, Feminism and Pornography was published by Sociological Publishing House (2009).



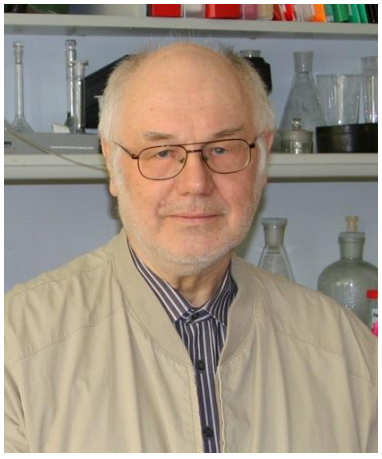
Pier-Giorgio Righetti earned his Ph. D. in Organic Chemistry from the University of Pavia in 1965. He then spent 3 years as a Post. Doc. at MIT and 1 year at Harvard (Cambridge, Mass, USA). He is full professor of Proteomics at the Milan's Polytechnic. He is in the Editorial Board of Electrophoresis, J. Proteomics, BioTechniques, Proteomics, Proteomics Clinical Applications. He has co-authored the book Boschetti, E. Righetti, P.G. *Low-Abundance Proteome Discovery; State of the Art and Protocols*, Elsevier, Amsterdam, 2013, pp. 1-341. He has developed isoelectric focusing in immobilized pH gradients, multicompartment electrolyzers with isoelectric membranes, membrane-trapped enzyme reactors, temperature-programmed capillary electrophoresis and combinatorial peptide ligand libraries for detection of the low-abundance proteome. On 560 articles reviewed by the ISI Web of Knowledge (Thomson Reuters), Righetti scores 19.500 citations, with an average of 33 citations/article and with a H-index of 61. Only in the last nine years (2005-2013) he has received citations ranging from 1000 to 1200 per year. He has won the CaSSS (California Separation Science Society) award (October 2006), at that time in its 12th edition, and the Csaba Horvath Medal award, presented on April 15, 2008 by the Connecticut Separation Science Council (Yale University). In 2011, he has been nominated honorary member of the Spanish proteomics society and in 2012 he has won the prestigious Beckman award and medal granted in February at the Geneva MSB meeting. In October 2014, in Madrid, he will be awarded the much coveted HUPO Distinguished Achievement in Proteomic Sciences and in November 2014, in Atlanta, the Prize of the American Electrophoresis Society.

David McCalley is Professor of Bioanalytical Science at the University of the West of England, Bristol U.K. In 2013, he was named as one of the world's 100 most influential analytical scientists by 'Analytical Science' magazine after a poll of its 60,000+ readers, and the input of an expert jury. He was awarded the Silver Jubilee medal of the Chromatographic Society in 2008. He serves on the Editorial Board of the Journal of Chromatography A and the magazine LC.GC, and has been a member of the Scientific Committee of a number of conferences including the HPLC 2013 symposium held in Amsterdam. In the past two years, he has given invited lectures in New Orleans, Stockholm, Utrecht, Balaton, Amsterdam, Umea, Paris, Tarragona and Anaheim. Professor McCalley's research is directed towards the understanding of the fundamental mechanisms of separation that occur in liquid and gas chromatography. These studies in LC have included the effects of pressure on the separation, superficially porous packings, overloading effects, and hydrophilic interaction chromatography. His work has also been directed towards

application of these techniques, for example in the development of robust methods for the analysis of strongly basic pharmaceuticals using LC, and the determination of sterols that are indicative of environmental pollution by GC. His work has been funded by the U.K. Engineering and Physical Science Research Council, by instrument manufacturers through donation of sophisticated analytical equipment and by the pharmaceutical industry.



Ryan T. Kelly is a Senior Research Scientist and leads the Instrument Development and Microfabrication laboratories at the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL), a national scientific user facility at Pacific Northwest National Laboratory in Richland, Washington, USA. He has a broad background in the design and fabrication of microfluidic devices and other microsystems for a diverse array of applications. His graduate research at Brigham Young University (Ph.D. 2005) focused on the development of novel electrically driven separation and analysis methods for proteins and peptides within microfluidic devices. While at PNNL, he developed approaches for increasing the sensitivity of electrospray ionization mass spectrometry using both capillary-based and microfabricated systems as well as improved ion optics. His process for chemically etching electrospray emitters for dramatically improved performance in the nanoflow regime has recently been commercialized and the multi-nanoelectrospray sources that he developed were a key component of the R&D 100 award-winning, "Ultrasensitive electrospray ionization source and interface". His current research interests involve coupling microfluidic systems with mass spectrometry for sample-limited bioanalyses and to provide solution based, label-free determination of kinetic parameters for biomedical and bioenergy research. Kelly has authored or co-authored more than 50 scientific publications and is an inventor on eight issued and three pending patents.



Mihkel Kaljurand is professor and director of the Institute of Chemistry which is based in the Tallinn University of Technology, Tallinn, Estonia. Prior to joining to Tallinn University of Technology, Prof. Kaljurand served as the senior researcher at Estonian Academy of Sciences, where he also received his candidate of chemistry degree in 1979 (Leningrad University) and doctor of sciences degree (Moscow Institute of Physical Chemistry) in 1991. He has worked with a number of public organizations in his research endeavors, including NASA and Southern Illinois University (Carbondale IL, USA). Mihkel Kaljurand has been awarded Estonian Science Prize (twice) and he has been awarded fellowships by the Fulbright Visiting Scholar Program (y. 2002) and the National Research Council Research

Associateship Program (y. 1995-1996). His teaching interests and experience are in the areas of analytical chemistry. He has written extensively on chemometrics, instrumental analysis and separation science. Dr. Kaljurand's current research focuses on automatization and miniaturization of capillary electrophoresis and on green analytical chemistry.

Geoff Gerhardt got his start in analytical chemistry as Chief Bottle Washer at a water analysis lab. While cleaning sample collection bottles was his primary responsibility there, it was his understanding and maintenance of a rather antiquated LIMS that turned that summer internship into a full-time position. When a position came up at the Canadian Food Inspection Agency (CFIA) where more sophisticated instrumentation like LC, GC and MS were used, Geoff leapt at it. Geoff was a chemist at CFIA, developing methods for the detection of drug residues in animal tissue. While at CFIA, he completed his Ph.D. at the University of Saskatchewan with a focus on electrochemical detection for capillary electrophoresis. In the process of this research he developed a compact, automated CE-ECD system that caught the eye of the folks at J&W Scientific who were looking to develop a CE system. Geoff joined J&W Scientific in 1999 to further develop this CE system, but they were acquired by Agilent in 2000. Agilent was primarily interested in J&W's GC consumables business and had their own CE system, so Geoff moved on to Waters. Geoff has been doing instrument development at Waters for 14 years and now leads the Core Research Group which has a charter to identify, develop and prototype next-generation analytical solutions. With expertise in the three major areas of Waters' technology: Separations science, mass spectrometry and informatics, Core Research looks for innovative technologies that provide integration opportunities.

Robert Mistrik received a master degree from the Slovak Technical University, Bratislava, Slovakia in 1991 and Ph.D. from the University of Vienna, Austria in 1994. Between 1995 - 1997 he held a postdoctoral position at National Institute of Standards and Technology, Gaithersburg, MD, USA working in Mass spectrometry data centre. Back in Slovakia in 1998, he founded HighChem, Ltd., a privately owned scientific software company, and since then he is holding the position of CEO. In 2009 he has been awarded the Head of the Year price, a national award for exceptional achievements in science and technology. Dr. Mistrik was a member of scientific steering committee in METAcancer consortium aiming to identify small molecule biomarkers in breast

cancer tissue. In 20012 he has been elected into Board of Directors of the Metabolomics Society.

Don W. Arnold

Milos V. Novotny has been a faculty member at Indiana University (Bloomington, Indiana, USA) for 43 years. He holds there the titles of Distinguished Professor and the Lilly Chemistry Alumni Chair. He is also an Adjunct Professor of Medicine and the Director of Institute for Pheromone Research. A native of Brno, Czech Republic, he received his undergraduate education and a doctoral degree in biochemistry at the University of Brno (now Masaryk University). Subsequently, Dr. Novotny held research appointments at the Czechoslovak Academy of Sciences in Brno (now the Institute of Analytical Chemistry of the Academy of Sciences) and the Royal Karolinska Institute (Sweden). He was a Robert A. Welch Postdoctoral Fellow at the University of Houston (under the direction of Albert Zlatkis) for two years. Milos V. Novotny has been best known for his major role in developing modern chromatographic and electrophoretic methods of analysis. However, his general research interests are wide-ranging, including separation science and structural analysis of biological molecules, proteomics and glycoscience, and chemical communication in mammals. Dr. Novotny and his associates are known for structural identification of the first definitive mammalian pheromones. As a member of the Viking 1975 Science Team, Novotny designed the miniaturized GC column to search for organic molecules on the surface of Mars. He was a pioneer in the preparation of glass capillary columns for GC and coupling of capillary GC-MS during the late 1960s. A decade later, Novotny was responsible for the onset of the field of capillary LC, coming up with novel types of microcolumns, miniaturized detectors, and instrumentation. Capillary LC is now being routinely used under the names of "microflow LC" and "nanoflow LC" as an integral part of proteomics, lipidomics, glycomics, and metabolomics analytical platforms. Together with his former student, Milton Lee, Novotny was responsible for the renaissance of supercritical fluid chromatography during the 1980s. Milos Novotny made also major contributions to the development of capillary electrophoresis and capillary electrochromatography in the areas of protein, peptide and carbohydrate separations, including the design of unique fluorescent tags to assist these separations. More recently, his group has been known for identification of disease biomarkers through glycomics and glycoproteomics. During his 43 years on the Indiana University faculty, Dr. Novotny has trained numerous students and visiting scientists who have become scientific leaders in separation science and bioanalytical chemistry, in both industry and

academia. Milos Novotny has authored over 500 journal articles, reviews, books and patents. He has received around 40 awards, medals and distinctions, including three honorary doctorates from European universities. His many awards include the American Chemical Society (ACS) Award in Chromatography (1986); the ACS Chemical Instrumentation Award (1988); the ACS Separation Science and Technology Award (1992); Eastern Analytical Symposium Awards in Separation Science (1988) and Outstanding Achievements in the Field of Analytical Chemistry (2001), the Anachem Award (1992), the Dal Nogare Award (2004), the ACS Award in Analytical Chemistry (2005), and the Ralph N. Adams Award in Bioanalytical Chemistry (2008). Internationally, Dr. Novotny received the M. J. E. Golay Medal and was recognized by the Czech Academy (J. E. Purkynje Medal), the Russian Academy (M. S. Tswett Memorial Medal), the Royal Society of Chemistry of Great Britain (Theophilus Redwood Lectureship and the A. J. P. Martin Gold Medal) and Congreso Latinoamericano de Cromatografia Merit Medal (Argentina), and Giorgio Nota Award in Capillary Liquid Chromatography (2012) in Italy. He is a foreign member of two academies: The Royal Society for Sciences (Sweden) and the Learned Society of Czech Republic.

Abstracts of oral presentations – Invited speakers

MULTILEVEL CHARACTERIZATION OF ANTIBODY THERAPEUTICS BY CESI-MS

András Guttman[1,2,3]

[1]*MTA-PE Translational Glycomics Group, University of Pannonia, Veszprem, Hungary*
[2]*Horváth Laboratory of Bioseparation Sciences, University of Debrecen, Hungary*
[3]*Sciex Separations, Brea, CA, USA*

Summary
The increase of the number of approved therapeutic proteins in the market triggered rapid development of comprehensive and reproducible multilevel characterization methods for the biopharmaceutical industry and regulatory agencies. One of the largest groups of biotherapeutics is monoclonal antibodies (mABs), possessing various post-translational modifications (PTMs) and potential degradation hotspots, which should be analyzed during clone selection, manufacturing and lot release as potentially affecting efficacy and immunogenicity. The exceptional separation power of capillary electrophoresis (CE) in conjunction with high resolution mass spectrometry fulfills the multilevel characterization requirements of: Level-1) determination of accurate molecular mass and some degree of heterogeneity at the intact protein level; Level-2) measurement of exact molecular mass of the heavy and light chains as well as the degree of heterogeneity after reduction of the disulfide bonds with or without alkylation; Level 3) characterization of degradative hotspots such as aspargine-deamidation, methionine-oxidation, glutamic-acid-cyclization, C-terminal lysine heterogeneity and other posttranslational modifications at the peptide/glycopeptide level after proteolytic digestion of the reduced and alkylated antibody; Level 4) glycosylation characterization. In this presentation a comprehensive multilevel characterization example will be given for a representative monoclonal antibody illustrating the benefits of the integration of capillary electrophoresis (CE) and electrospray ionization (ESI) in a unified bioanalytical process (CESI) coupled with high resolution mass spectrometry. The low flow rate of the system (>20 nL/min) ensured maximized ionization efficiency and dramatically reduced ion suppression.

NEXT-GENERATION PROFILING OF HUMAN IMMUNE REPERTOIRES

Jan Berka

Roche Molecular Systems, Pleasanton, USA

Summary

Advances in high-throughput DNA sequencing have enabled the development of a powerful new technology for probing the adaptive immune system. Due to the vast diversity of immunoglobulin and T-cell receptor genes, deep sequencing of these loci pose a genome-size sequencing challenge. Millions of B or T cell receptor sequences can be read in parallel from a single sample, but the true size of the human immunome has not yet been experimentally determined. However, the dynamics of an adaptive immune response, which is based on clonal expansion and contraction, can be monitored in real time at high sensitivity and resolution. A number of clinical applications for this technology are presently under study. We will present examples of immune repertoire sequencing applications in therapeutic monoclonal antibody development, in autoimmune disease and hematological malignancies. Latest developments in methods for high-throughput sequencing cognate T-cell receptor chains from tens of thousands of cells will be reported.

THE EVOLUTION OF FORM AND FUNCTION SANS GENES

Keith Baverstock

Department of Environmental Science, University of Eastern Finland, Kuopio, Finland

Summary

The Modern Synthesis or Neo-Darwinism sees the development of form and function in organisms as being due to small modifications (mutations) to the genomic DNA sequence, creating genetic variation upon which natural selection acts. It was worrying to Darwin that in fact the evidence, both extant and extinct in the fossil record, does not support this gradual process in so far as there seems to be no clear case of a completely smooth transition between related species. This hypothesis underpinning genetics has up to 2001, with the completion of the sequencing of the human genome, not been directly testable. The thirteen years post the genomic sequence have not relieved Darwin's anxiety in so far as attempts to relate phenotypic traits to genomic variation have failed for common diseases and mental conditions such as schizophrenia. It is now necessary to question the role genes in biology and consequently the integrity of genetics.

Based on a reappraisal of the foundations of biology [1] it has been proposed that natural selection acts upon the efficiency with which organisms can extract energy (nutrient) from their ecosystems and that the life process is governed by the 2nd law of thermodynamics and the principle of least action proposed by Maupertuis 100 years prior to the publication of the "*The Origin*". Following the logic of a metabolism-first origin of life, preceded by proto-life based on proteins and subsequent regulation of the cell by information bearing proteins contributing to a quasi-stable attractor state representing phenotype, it can be concluded that for multi-celled organisms form arises from a cellular attractor state based on information contained in the cellular phenotype and function from the deployment of specialised cells, for example, to photosensitive cells. Genes figure only as a data base for peptide sequences which are manipulated through downward causation by the phenotype.

Reference

[1] Annila, A. and K. Baverstock, (2014) Genes without prominence: a reappraisal of the foundations of biology. J R Soc Interface. 11:20131017.

ANALYSIS OF BIONANOPARTICLES BY MEANS OF NANO ES/CHARGE REDUCTION COUPLED TO DIFFERENTIAL MOBILITY ANALYZER

Guenter Allmaier[1], Victor Weiss[1], Marlene Havlik[1], Martina Marchetti-Deschmann[1], Peter Kallinger[2], Wladyslaw Szymanski[2]

[1]Institute of Chemical Technologies and Analytics, Vienna University of Technology (TU Wien), Vienna, Austria
[2]Faculty of Physics, University of Vienna, Vienna, Austria
guenter.allmaier@tuwien.ac.at

Summary

Nano ES with charge reduction (by Po-210, corona discharge or soft X-ray irradiation) is used to form single-charge bionanoparticles (intact virus, vaccine particles, polysaccharides, liposomes or VLP-antibody complexes), followed by size separation with a differential mobility analyzer (from 2.5 up to 800 nm depending on the device) and chemical nature-independent detection as well as sample collection of size-selected bionanoparticles for further investigations. A correlation between the measured electric mobility diameter and molecular mass could be obtained finally.

1 Introduction

For the physico-chemical characterization of bionanoparticles as virus-like particles (VLPs), VLP-antibodies complex, vaccines, polysaccharides, liposomes and recombinant antibodies, besides functional parameters usually methods as the imaging techniques SEM or AFM in different modes as well as far it is feasible ESI MS and as

the separation techniques SEC, analytical ultracentrifugation, AF4 as well as MALS or DLS are applied showing pros and cons. Here, we want to present a technique, based on nano electrospray ionization (nano ES) with charge reduction to singly charged species combined with an analyzer (separation device) operated at atmospheric pressure, which is mainly targeted to analyzed bionanoparticles or –nano-objects with molecular masses beyond 100 kDa or sizes above 5 nm.

2 Experimental

The nano ES unit is integrated with a charge reduction chamber (incorporating an α-radiation source, a corona charger or a soft X-ray tube generating a bi/monopolar atmosphere) and coupled to a differential mobility analyzer (DMA; an ion mobility-based separation device) connected to condensation particle counter (CPC; allowing detection on the single particle level without any bias towards the chemical nature of the particle) or Faraday cup detector or an electrostatic nanoparticle sampler for subsequent investigations (AFM, EM, DotBlot etc.). This instrument is called macroIMS (ion mobility spectrometry), a.k.a. gas-phase electrophoretic mobility macromolecular analyzer (GEMMA) or scanning mobility particle sizer (SMPS). The second device is a custom-built device with an additional nDMA run in parallel (PDMA, parallel DMA) allowing the simultaneous size monitoring in an analytical DMA and after size-separation in a "so-called" preparative DMA the parallel collection of size-selected bionanoparticle fractions.

3 Results and Discussion

The characterization of viruses as human rhino virus, selected VLPs, vaccine particles, liposomes, polysaccharides, and VLP-antibody fragment complexes by means of nES connected to a DMA and a CPC will be demonstrated. Based on the determined sizes of the spherical bionanoparticles the molecular mass will be calculated via a compound-class-dependent correlation plot and evaluated. Furthermore the *off-line* combination of SEC will be demonstrated for vaccines. Size-separated bionanoparticles were collected on different surfaces (e.g. mica, copper grid or nitrocellulose) for subsequent analysis. This will be also shown with PDMA approach. Finally, first results on a radically new hyphenation technique, namely CE-naonES-DMA-CPC will be given.

4 Conclusions

The presented approach and data will demonstrate the closing of the gap between ESI QRTOF mass spectrometry and aerosol micrometer particle physics as well as a new hyphenation technique – electrophoresis in the liquid and gas phase.

Acknowledgements

This work was supported by Austrian Science Foundation (TRP29 and P25749-B20).

References

[1] Bacher, G., et al., *J. Mass Spectrom.* 2001, *6*, 1038-1052.

[2] Havlik, M., et al., *Analyst* 2014, *139*, 1412-1419.
[3] Weiss V., et al., *Anal. Chim. Acta* 2014, *841*, 91-98.

THE STUDY OF ULTRASMALL SAMPLES BY FAST CAPILLARY ELECTROPHORESIS-MASS SPECTROMETRY

Frank-Michael Matysik, Jonas Mark, Marco Grundmann, Sven Kochmann, Andrea Beutner

University of Regensburg, Institute for Analytical Chemistry, Chemo- and Biosensors, Regensburg, Germany
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Summary
The hyphenation of capillary electrophoresis (CE) with mass spectrometry (MS) is an attractive tool of instrumental analysis. However, the combination of conventional CE systems with MS using sheath-liquid ESI sprayers is usually associated with the implementation of rather long capillaries (longer than or equal to 60 cm). Consequently, the window of migration times is typically in the range of 5-10 min or even longer. In order to speed up CE-MS separations much shorter capillaries and rather high separation voltages should be applied.

We present a novel instrumental approach for fast CE-MS measurements in the time scale of seconds; in addition ultrasmall samples in the nanolitre range can be studied. Samples are handled by means of a microprocessor controlled injection system with an integrated capillary. The injection capillary is moved out of the injection cell for sample take-up from a microenvironment, and after repositioning it is facing the fixed inlet of a short separation capillary (15 cm in length), then a small sample plug is injected onto the inlet of the separation capillary. In this way separations of catecholamines could be carried out in less than 12 s.

The capability of handling samples in the nanolitre range allows for a rapid pre-concentration protocol based on the simple volume reduction by evaporation from µL to nL sample volumes. The efficient usage of available sample is of key importance in many bioanalytical questions for which CE-MS is an attractive method. The main advantage of separations in short capillaries is the dramatical decrease in migration times which is an important requirement for high-throughput analysis in the life sciences.

A very recent development from our laboratory is the concept of two-dimensional separations of ionic species by combining ion chromatography – fast capillary electrophoresis – mass spectrometry. This novel approach of ion analysis will also briefly be discussed.

TIME-RESOLVED CRYO-ELECTRON MICROSCOPY OF MACROMOLECULES

Tanvir Shaikh

CEITEC, Brno, Czech Republic

Summary

The goal of structural biology is to understand the function of macromolecules from their three-dimensional organization. Using cryo-electron microscopy (cryoEM), one pursues this goal by imaging hundreds or thousands up to a few million macromolecules, determining their relative orientations, and computing a three-dimensional reconstruction. Typically, static structures are studied, or perhaps an ensemble of structures populated under steady-state conditions. One area that has so far been explored little using cryoEM has been the dynamics of macromolecules. Since individual molecules can be imaged, cryoEM is well-suited to this task, although a particular state must be present in thousands of copies in order to obtain a 3D reconstruction. With the goal of implementing time-resolved cryoEM, we have developed a microfluidic device which mixes two components, sprays the mixture onto an EM grid, and then plunges the grid into cryogen. Here I describe results of such experiments mixing ribosomal subunits. I will also contrast different time-resolved methods in EM, and describe future development.

IMPROVING ENANTIOSELECTIVITY AND RESOLUTION IN CEC AND NANO-LC: RECENT RESULTS

Salvatore Fanali

Institute of Chemical Methodologies, Italian National Research Council (C.N.R.), Monterotondo, Italy

Summary

The separation of chiral compounds has been demonstrated a long time ago with the interesting work by Pasteur related to the separation of tartrate isomers. Since that time efforts have been devoted by a large number of researchers to develop theory, new methodologies, new chiral stationary phases, new instrumentation etc.

The analysis of enantiomers is an important topic in different areas including agrochemical, environment, biochemistry, pharmaceutical where new methodology offering high enantioresolution and selectivity is often required.

Chiral separation has been obtained utilizing several techniques such as gas chromatography (GC), High-performance Liquid Chromatography (HPLC), electrophoresis etc. All of them were also successfully investigated in the

miniaturized format. These analytical techniques offer several advantages over the conventional ones, e.g., reduced consumption of both sample, mobile and stationary phase, reduced waste and costs. In addition they also offer high resolution and high efficiency allowing for fast separations.

Aim of this communication is to briefly illustrate the state of the art of chiral separation achieved by using CEC and nano-LC as well as the features of these two techniques. Examples of new chiral stationary phases (CSPs) applied in both techniques, packing procedure used, selection of optimal experimental conditions, coupling with mass spectrometry (MS) will also be illustrated.

THE VALUE OF BIOBANK PATIENT SAMPLES IN PROTEIN EXPRESSION STUDIES

György Marko-Varga[1,2]

[1]*Clinical Protein Science & Imaging Group, BioMedical Center, University of Lund, Lund, Sweden*

[2]*Dept. of Surgery, Tokyo Medical University, Tokyo, Japan*

Summary

Many of the modern approaches for studying disease compare steady state functions, such as repair, growth, and regulated gene expression within the various biological compartments organised by specialized function, be it mitochondria or blood vessels. The assignment of protein identities, which are linked to key biological mechanisms, which are associated with disease processes and disease progressions are an important area of this work. Today, the technology available for studying proteome expression and resolving exact protein and peptide identities in complex mixtures of biological samples allows global protein expression within cells, fluids, and tissue to be approached with confidence. This confidence is due in part to reproducible repetitive sampling and analysis technologies including robotics data acquisition and high level mass spectrometry including both laser-desorbtion and electrospray ionisation. The precision in defining differences between normal and diseased steady states is aided by the creation of compiled reference and master data sets and by new methods for multiplexing the analysis of samples in groups. The establishment of key representative reference proteome systems representing the dynamic changes in protein expression during disease will be vital to the interpretation of changes observed in specific samplings of disease states and specific cells obtained from these samples. The creation of reference databases of proteins linked to disease pathways will play an important role in furthering our understanding of the "proteome of disease". Examples will be given where protein expression patterns have been generated from compartments within tissue sections as well as clincal studies directed to drug action and Biomarker developments.

SEX DURING COMMUNISM. INTIMATE LIFE AND THE POWER OF EXPERTISE

Kateřina Lišková

Masaryk University, Brno, Czech Republic

Summary

Sexuality seems to be something innate and biological, as if it were around in the same form since the dawn of time. Research in the social sciences, however, has shown persuasively that what people perceive as sex, the ways in which they understand themselves as sexual beings and even sexual practices change across time and place. Moreover, sexuality might be perceived as the innermost part of ourselves but its forms and expressions are strongly culturally mediated. Sex is formed by society and, conversely, we can make sense of the broader social arrangements if we study sexuality.

What did, then, sex during communism look like? What was seen as normal and deviant? How did these perceptions change over time? On the case of Czechoslovakia between the years 1948 and 1989, I will show the ways in which sex changed in connection to the shifts in the regime and its priorities.

THE MONKEY KING AND PIGSY FERRYING THE PROTEOMIC SUTRAS INTO THE THIRD MILLENNIUM

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Summary

About fifty years of progress in "proteome" analysis, starting from primitive two-dimensional (2D) maps attempts in the early sixties of last century, will be here covered. The polar star in 2D mapping arose in 1975 with the classical paper by O'Farrell in J Biol. Chem. It became the compass for all proteome navigators. Perfection only came, though, with the introduction of immobilized pH gradients, which fixed the polypeptides spots in the 2D plane. Great impulse in proteome analysis came by introducing informatics tools and creating databases, among which Swiss Prot remains the site of excellence. Towards the end of the nineties, 2D chromatography, as epitomized by coupling strong cation exchangers with C_{18} resins, began to be a serious challenge to electrophoretic 2D mapping, although up to the present both techniques are still much in vogue and appear to give complementary results. Yet the migration of "proteomics" into the third millennium was only made possible by mass spectrometry (MS, the Monkey King!), which today represents the standard analytical tool in any lab dealing with proteomic analysis. Another major improvement has been the

introduction of combinatorial peptide ligand libraries (CPLL, Pigsy!), which, when properly used, enhance the visibility of low-abundance species by 3 to 4 orders of magnitude. Coupling the Monkey King with Pigsy permits to explore at least 8 orders of magnitude in dynamic range on any proteome.

HYDROPHILIC INTERACTION CHROMATOGRAPHY-THE STATE OF THE ART

David McCalley

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Summary

Hydrophilic interaction chromatography (HILIC) is a technique that has attracted increasing interest over the last decade, with over 350 primary publications last year, compared with only a handful ten years ago. The method is very useful for the separation of polar and ionisable compounds which tend to have poor retention in reversed-phase (RP) separations. Alpert coined the name HILIC in 1990, but the technique was in existence for many years previously, and may even originate in the early work of Martin and James in the 1940s. HILIC uses stationary phases similar to those in normal phase (NP) but with eluents comparable to those used in RP separations. Acetonitrile (>60%,v/v) together with aqueous buffer (>2.5%, v/v) is a typical eluent. HILIC is distinct from NP-LC where strenuous attempts are made to exclude water from the mobile phase. Partition of the solute between a layer of water held on the surface of the polar stationary phase and the bulk mobile phase appears to be a major mechanism. Evidence for the water layer exists from both experimental studies and computer simulations. The solute distribute coefficient D between octanol and water thus serves as a guide to the suitability of a particular solute for analysis using HILIC. However, selectivity differences which exist between different stationary phases, show that the column cannot function merely as an inert support for the water involved in a partitioning process. Adsorption onto polar column groups, ionic retention and even RP retention can also contribute. This lecture will discuss evidence for these various interactions.

Despite the complex separation mechanism, HILIC is rather easy to implement in practice. The selection of stationary and mobile phases will be considered, along with the best strategies that should be employed in order to manipulate the selectivity of a separation. The kinetics of HILIC separations will also be discussed and how its behaviour differs somewhat from expectations. Examples of different HILIC analyses will be given and the advantages and limitations of HILIC will be emphasised.

MICROFLUIDICS COUPLED WITH MASS SPECTROMETRY FOR ONLINE MONITORING OF DYNAMIC BIOLOGICAL PROCESSES

Ryan T. Kelly

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Summary

Active microfluidic devices with integrated pneumatic microvalves enable automated, multistep biochemical analyses to be performed using subnanoliter volumes of sample and reagents. The control provided by the microvalves makes it possible to combine and mix reagents with high temporal resolution and incubate those reagents for variable durations to follow reactions over time, with timeframes ranging from seconds to hours. Importantly, the devices can incorporate integrated electrospray sources to enable sensitive, label-free and information-rich monitoring of reactions by mass spectrometry (MS). We will present the use of these integrated microfluidic devices to perform on-chip proteolytic digestion with MS detection as well as determining enzyme kinetics and protein-ligand interactions in both droplet-based and droplet-free platforms. Approaches to separate the reaction products by microchip electrophoresis prior to MS introduction will also be described.

HARSH ENVIRONMENT CAPILLARY ELECTROPHORESIS

Mihkel Kaljurand

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Summary

Deploying capillary electropherographs outside of the typical laboratory setting means placing complex equipment in diverse environments. These range from volcanoes, battlefields, hazardous urban sites, and ocean depths, to outer space and other rugged locales. Building capillary electrophoresis instrumentation to withstand the rigors of such harsh and remote environments poses unique technological challenges to engineering design and science objective planning. Stringent operational requirements for power, size and durability must all be met while achieving the goals of the scientific mission.

This talk will focus on recent developments in portable capillary electrophoresis instrument design. By applying sound engineering principles, many research groups have reported design innovations in systems that can be successfully deployed to the remote hazardous waste sites and even the planet Mars.

EVOLUTION OF A MICROFLUIDIC LC/MS SYSTEM - FUNDAMENTAL TECHNOLOGY TO A COMPLETED SYSTEM

Geoff Gerhardt

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Summary

Microscale LC offers significant advantages, particularly when coupled to a MS. Significant sensitivity gains can be realized when using microscale LC/MS (i.e. column i.d. <300um) versus analytical scale LC/MS (i.e. column i.d. >1mm). Unfortunately, microscale LC/MS systems lack the robustness and ease-of-use of analytical-scale systems. Typically plumbed with fragile fused-silica tubing using fine-tipped, narrow-bore glass electrospray needles, assembling and maintaining microscale LC/MS systems can be a tedious process. This presentation will describe a multi-year project to create a robust and easy-to-use microscale LC/MS system. Development of an integrated microscale LC consumable device consisting of a high-pressure ceramic microfluidic system, an integrated robust ESI emitter, temperature control and EEPROM for storing usage data. Also, a simple cartridge interface will be described that creates all the fluidic, gas and electronic connections to the device with a very simple user interface. In addition to describing the basic elements of this novel system, data will be showing illustrating the chromatographic and MS performance compared to more traditional analytical-scale LC/MS systems.

A LIGHT AT THE END OF THE TUNNEL FOR THE COMPREHENSIVE COMPOUND IDENTIFICATION IN UNTARGETED METABOLOMICS

Robert Mistrik

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Summary

Despite the increasing availability of modern high resolution mass spectrometers, untargeted metabolomics is hindered by an inability to identify thousands of observed components effectively. We will present an advanced computational and database framework leading to the much anticipated increase in mass spectral coverage of the metabolome, taking into account all the important experimental and calculated information necessary for efficient and reliable identifications. The resulting spectral space serves as a unique resource for the identification of unknowns even if reference spectra are not available, providing a major benefit for the metabolomics' community.

cHiPLC: MICROFLUIDIC COMPONENTS FOR HPLC

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Summary

In this presentation, we will describe a series of nanoLC-MS and microLC-MS proteomics results enabled by new microfluidic technologies, protocols and methods developed in our labs. We will discuss high-pressure microfluidic tools, zero-dead volume connectors, state-of-the-art nanoscale and microscale fluid delivery systems, new microfluidic workflows, integrated microfluidic sample preparation tools. The discussion will briefly describe the technologies and continue onto discuss a series of nanoLC-MS and microLC-MS results discussion that illustrate how they enable full workflow solutions that deliver sample-to-answer with the precision required to carry out the next generation of proteomics experiments.

SUB-2 µM SILICA PARTICLES WITH INTERNAL MACROPORES: DO WE NEED ANOTHER PARTICLE TYPE IN CAPILLARY SEPARATIONS?

Milos V. Novotny[1], Sara E. Skrabalak[1], James P. Grinias[2], Justin M. Godinho[2], James W. Jorgenson[2]

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Summary

A new type of chromatographic particle has recently been synthesized at Indiana University (USA): its size is consistent with the use in UHPLC; the material has high porosity (~200 m^2/g) and features 100-nm interconnected macropores throughout its volume; and its surface can be functionalized to fit different modes of chromatography, including bioaffinity separations. After a brief physical characterization of these novel materials, they were derivatized with several types of lectins and evaluated as preconcentration materials for oncologically interesting glycoproteins isolated from human blood serum. The precolumn fabricated for immobilized lectins featured binding capacities of more than 10-fold greater than the conventional silica-based materials. More recently, we have evaluated performance of longer capillaries filled with these small particles for low-MW solutes using high pressures and low-dead-volume electrochemical detector (work done at the University of North Carolina). Very high column efficiencies have been obtained, corresponding to reduced plate-height values as low as 1.5. The column materials alternative to silica

are also being explored, while preparative hydrodynamic chromatography has been utilized to obtain particle fractions with a narrow particle size distribution.