



THIRD FACULTY
OF MEDICINE
Charles University

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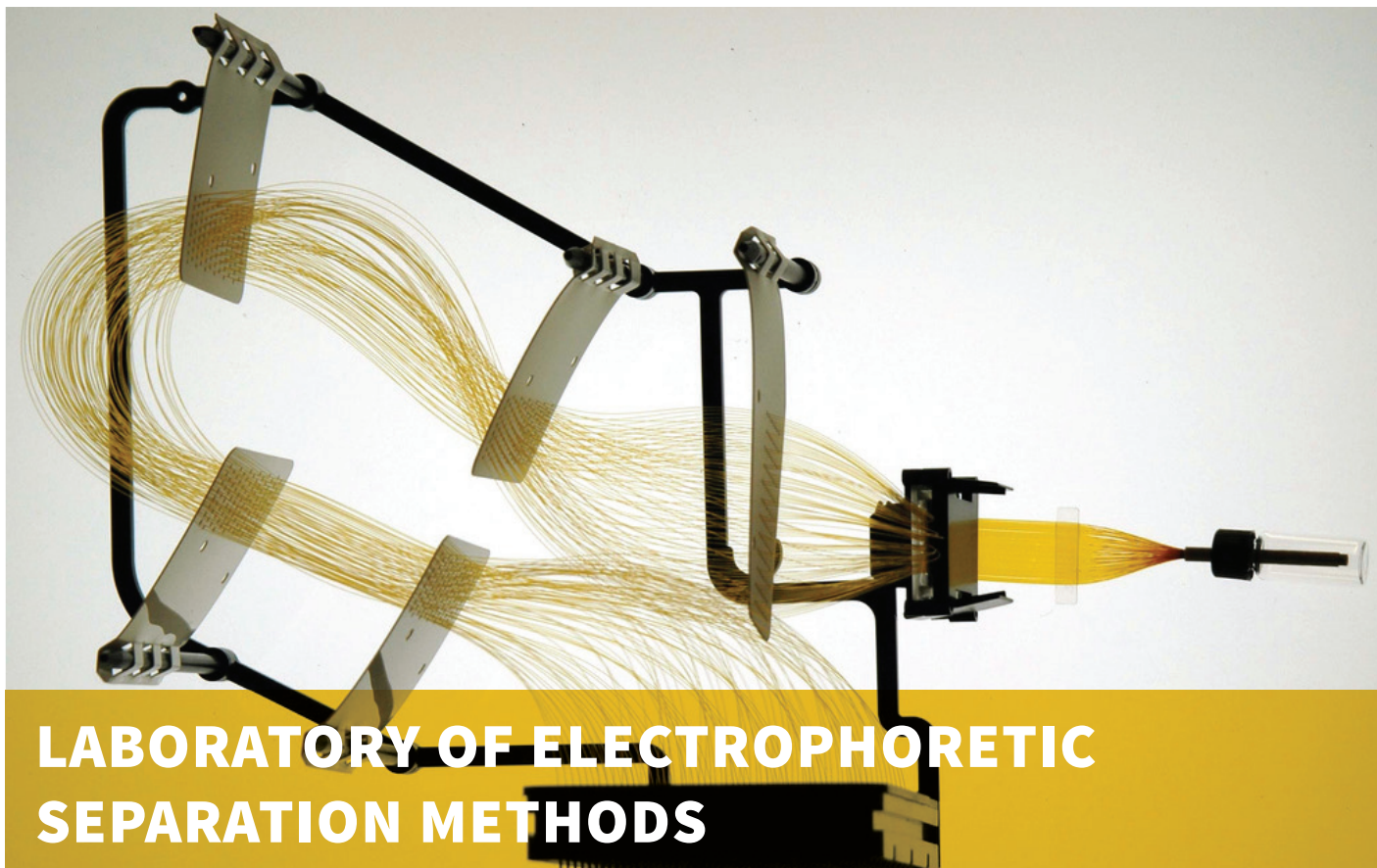
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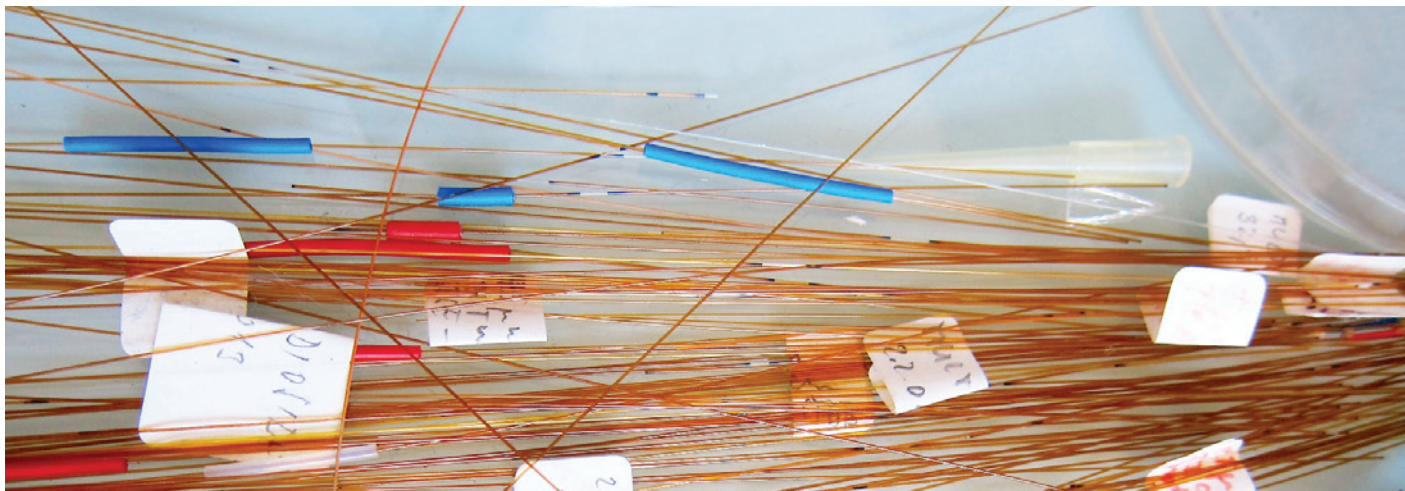
LABORATORY OF ELECTROPHORETIC SEPARATION METHODS

OFFER

- Development and testing of new methods and instrumentation for microscale separation.
- Expertise in the area of microscale separation techniques.
- Cooperation with partners on development and construction of electrochemical detectors for microscale separation techniques.
- Cooperation on development of electrophoretic strategies for rapid determination of various organic molecules in clinical samples (usable in various pharmacological and physiological studies).
- Cooperation with technological companies and research groups in this field.

KNOW-HOW & TECHNOLOGIES

- New methodologies based on electromigration for determination of analytes in clinical and other environmental matrices.
- Very short analysis time, very little sample volume is required.
- Development of instrumentation for electrochemical detection and sample introduction in microscale separation techniques.



RESEARCH AREA & EXCELENCE

- Development of new electrophoretic strategies for rapid determination of amino acids, saccharides and other metabolites in various clinical samples that represents background for solution of different pharmacological and physiological studies.
- Construction and optimization of electrochemical detectors for microscale separation techniques.
- Development of new preconcentration techniques of biological samples that are based on electrophoretic principle.

KEY RESEARCH EQUIPMENT

Agilent 7100 Capillary Electrophoresis System and HP3D Capillary Electrophoresis System (Agilent Technologies) equipped with diode-array detector, contactless conductivity detector, fluorescence detector ARGOS 250B (Flux Instruments) and mass spectrometry detector CE/MS Single Quad ES Superior Line Bundle (Agilent Technologies). Microchip electrophoresis with a lab-built contactless detector. Fully equipped biochemical laboratory for preparation and processing of the samples.

ACHIEVEMENTS

Technique of sampling low volume analytes (as low as 1 μ l) is currently in the process of intellectual property protection.

PARTNERSHIPS & COLLABORATIONS

Department of Analytical Chemistry, Faculty of Science, Charles University in Prague | J. Heyrovský Institute of Physical Chemistry | Institute of Physics | Department of Sport Medicine, Third Faculty of Medicine, Charles University in Prague | 2nd Internal Department of Third Faculty of Medicine and Faculty Hospital Královské Vinohrady | Centre for Research on Diabetes, Metabolism and Nutrition, Charles University in Prague | Department of Pharmacology, Third Faculty of Medicine, Charles University

IMPORTANT PUBLICATIONS

- Tůma P., Opekar F., Jelínek I.: A Contactless Conductometric Detector with Easily Exchangeable Capillary for Capillary Electrophoresis, *Electroanalysis* 2001, 13, 989–992. [http://dx.doi.org/10.1002/1521-4109\(200108\)13:12<989::AID-ELAN989>3.0.CO;2-C](http://dx.doi.org/10.1002/1521-4109(200108)13:12<989::AID-ELAN989>3.0.CO;2-C), IF2001 1,702, 59 times cited.
- Tůma P., Opekar F., Štulík K.: Contactless conductivity detector for capillary zone electrophoresis - effect of the detection cell geometry on the detector performance, *Electrophoresis* 2002, 23, 3718–3724. [http://dx.doi.org/10.1002/1522-2683\(200211\)23:21<3718::AID-ELPS3718>3.0.CO;2-U](http://dx.doi.org/10.1002/1522-2683(200211)23:21<3718::AID-ELPS3718>3.0.CO;2-U), IF2002 4,325, 52 times cited.
- Tůma P., Samcová E., Andělová K.: Determination of free amino acids and related compounds in amniotic fluid by capillary electrophoresis with contactless conductivity detection, *J. Chromatogr. B* 2006, 839, 12–18. <http://dx.doi.org/10.1016/j.jchromb.2005.12.020>, IF2006 2,647, 52 times cited.
- Tůma P., Samcová E., Opekar F., Jurka V. and Štulík K.: Determination of 1-methylhistidine and 3-methylhistidine by capillary and chip electrophoresis with contactless conductivity detection, *Electrophoresis* 2007, 28, 2174–2180. <http://dx.doi.org/10.1002/elps.200600697>, IF2007 3,609, 23 times cited.
- Tůma P., Samcová E., Duška F.: Determination of Ammonia, Creatinine and Inorganic Cations in Urine using CE with Contactless Conductivity Detection, *J. Sep. Sci.* 2008, 31, 2260–2264. <http://dx.doi.org/10.1002/jssc.200700655>, IF2008 2,746, 25 times cited.
- Tůma P., Málková K., Samcová E., Štulík K.: Rapid Monitoring of Arrays of Amino Acids in Clinical Samples Using Capillary Electrophoresis with Contactless Conductivity Detection, *J. Sep. Sci.* 2010, 33, 2394–2401. <http://dx.doi.org/10.1002/jssc.201000137>, IF2010 2,631, 31 times cited.

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