



FACULTY OF PHARMACY
IN HRADEC KRÁLOVÉ
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LABORATORY OF BIOANALYTICAL METHODS

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COOPERATING LABORATORY

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RESEARCH AREA & EXCELLENCE

Chromatography in bioanalysis

High Performance Liquid Chromatography (HPLC) and Ultra High Performance Liquid Chromatography (UHPLC) are modern separation techniques, which found their important role in bioanalysis. Studies in clinical research usually contain many samples and new fast LC techniques in combination with simple pre-analysis could be the solution.

Mission

To develop fast, sensitive and simple bioanalytical LC methods with the main emphasis on simple sample preparation procedure and all pre-analysis.

KNOW-HOW & TECHNOLOGIES

Main Capabilities

Clinical research, modern sample preparation techniques, sample storage, bioanalytical separation methods (HPLC, UHPLC, Ultracentrifugation), biological fluids as urine serum, plasma, erythrocytes, breast milk, wound exudates, lipoproteins etc., stability studies.

Fields of Research

- Development of modern bioanalytical methods made to order
- Determination of vitamins in various biological matrices
- Determination of pharmaceuticals in human fluids
- Determination of important biomarkers
- Handling and pretreatment of various biofluids as breast milk, erythrocytes, lipoproteins, serum, plasma, whole blood, wounds liquids, exudates, ascites, urine, amniotic fluid etc.
- Stability studies
- Method validation (FDA, ICH, PhEu, USP)
- Development of modern sample preparation techniques suitable for large sequences
- Sample storage

Fields of Education

- Summer practices for pre gradual students
- Diploma thesis, Bachelors thesis etc.
- Post gradual studies

EXPECTATIONS & OFFERS

We are opened to wide spectrum of collaboration with academic as well as public/private organization in the field of medicine, chemistry and bioanalysis.

EXPERTISE

Research team guarantees:

- 1) correct sampling,
- 2) perfect processing of biological materials and proper storage,
- 3) proper composition of validation protocol and implementation of new methods into the practice,
- 4) laboratory methods investigation,
- 5) the obtained results publishing at the local and international level.

KEY RESEARCH EQUIPMENT

- UFLC Nexera system equipped with the autosampler for microtitration plates and with UV-VIS detector, fluorescence detector and ultra-fast mass spectrometry LCMS 80-30 detector (Shimadzu, Japan)
- HPLC set Prominence LC20 with DAD and fluorescence detector (Shimadzu, Japan)
- Ultracentrifuge Optima Max-XP (Beckman Coulter, USA)
- Sample preparation equipment: manifolds for solid phase extraction (SPE) cartridges and SPE sets using microtitration plates, concentrators, hood, refrigerated centrifuges, two microcentrifuges, freezers at $-86\text{ }^{\circ}\text{C}$ (long-term sample storage)

PARTNERSHIPS & COLLABORATIONS

Main Projects

Analytes

- Vitamins (A, D, E, B) and its metabolites, neopterin, kynurenine, tryptophan, creatinine, 8hydroxy-2deoxy guanosine, 8hydroxy guanosine, arginine, ornithine, citruline, vancomycine

Matrices

- Serum, plasma, whole blood, erythrocytes, cell lines, lipoproteins, urine, breast milk, wounds liquids, exudates, pleural effusions, amniotic fluid

Patients

- Various types of cancer, surgery, gerontology patients, infants, patients with metabolic diseases etc.

International collaborations

- University of Coimbra – Portugal
- University of Porto – Portugal
- University of Tasmania – Australia
- University Las Palmas – Spain
- Cardiff University – Great Britain
- The University St. Andrews – Great Britain
- Stockholm University – Sweden

National collaborations

- Palacký University and University Hospital – Olomouc
- Inst Hematol & Blood Transfus – Prague
- Contipro group Ltd. – Dolní Dobrouč
- St. Ann Hospital – Brno

ACHIEVEMENTS

Publications

More than 200 publications in international journals with impact factors in the field of analytical chemistry and medicine.

