



CORE FACILITY

# Mass Spectrometry



HEAD OF CORE FACILITY



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**EDUCATION**

- ▲ 2008: Ph.D. in Environmental Chemistry, Brno University of Technology, Brno, Czech Republic
- ▲ 2001: Ing./MSc. in Chemistry and Technology of Environmental Protection, Brno University of Technology, Brno, Czech Republic

**TRAINING**

- ▲ 2017: EMBO Lab Management Course- Research Leadership for Group Leaders, The European Molecular Biology Organization, Germany

**KEY INTERESTS**

- Mass Spectrometry Based Proteomics
- Bottom-up Proteomics
- Top-down Proteomics
- Discovery Proteomics
- Protein Biomarkers
- MALDI Imaging

**RESEARCH FOCUS**

The main goal of the Mass Spectrometry core facility (MS) is to support biomedical or life science community in their own research by providing complete proteomics services. The facility is accessible for both, local users (FNUSA ICRC) and external academic partners, even to a commercial sector.

The MS uses nano-LC separation coupled to high-resolution MS for protein and peptide analysis in different body liquids, cell lines or tissue samples, among others. As an alternative and/or complementary approach, a MALDI TOF/TOF MS for intact mass measurements or MS profiling can be employed.

**Specific focus:** development of MALDI imaging MS protocols in order to provide 2D spatial distribution of target molecules within intact cell or tissue structures.

**RESEARCH OBJECTIVES**

- ▲ To provide full MS-based services such as consulting, protein analysis and method development.
- ▲ To achieve effective utilization of the mass spec instrumentation.
- ▲ To offer state-of-the-art technologies and competitive services.

CREATING THE FUTURE  
OF MEDICINE



CLINICAL RESEARCH



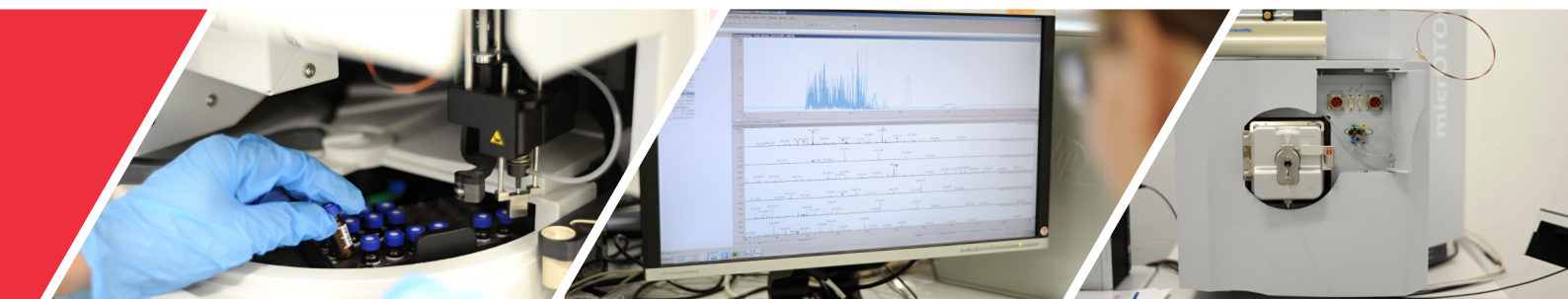
TRANSLATIONAL  
RESEARCH



BASIC RESEARCH



CORE FACILITIES



## TOP PUBLICATIONS

- ▲ RAINHA, N.; KOCI, K.; COELHO, A.V.; LIMA, E.; BAPTISTA, J.; FERNANDES-FERREIRA, J.M., HPLC-UV-ESI-MS analysis of phenolic compounds and antioxidant properties of *Hypericum undulatum* shoot cultures and wild-growing plants. *Phytochemistry*. 2013, 86, 83-91.
- ▲ FRANCO, C.; SOARES, R.; PIRES, E.; KOCI, K.; MARTINHO DE ALMEIDA, A.; SANTOS, R., COELHO, A.V., Understanding regeneration through proteomics. *Proteomics*. 2013, 13, (3-4), 686-709.
- ▲ SOARES, R.; FRANCO, C.; PIRES, E.; VENTOSA, M.; PALHINHAS, R.; KOCI, K.; MARTINHO DE ALMEIDA, A., COELHO, A.V., Mass Spectrometry and Animal Science: Protein identification strategies and particularities of farm animal species. *Journal of Proteomics*. 2012, 75, 4190-4206.
- ▲ ROSADO, T.; BERNARDO, P.; KOCI, K.; COELHO, A.V.; ROBALO, M.P. AND MARTINS, L., Methyl syringate: an Efficient Phenolic Mediator for Bacterial and Fungal Laccases. *Bioresource Technology*. 2012, 124, 371-378.
- ▲ KOCI, K.; PETROVSKA, H.; SIMEK, Z.; OSTRAVARADOVA, E.; SYSLOVA, A., Extraction of polycyclic aromatic nitrogen heterocycles from spiked soil samples. *International Journal of Environmental Analytical Chemistry*. 2007, 87 (2), 111-123.

## TECHNOLOGICAL EQUIPMENT

The MS is currently equipped with two different mass spectrometers and other instrumentation for sample preparation and fractionation.

- ▲ **MicrOTOF-Q IITM (Bruker Daltonics)**: a hybrid Q ToF mass spectrometer for analysis of complex mixtures and digests, PTMs mapping and protein quantitation studies.
- ▲ **MALDI-7090TM (Shimadzu Corporation)**: a MALDI TOF/TOF mass spectrometer for intact mass measurements, sample typing/classification and MALDI imaging.
- ▲ **Dionex UltiMateTM 3000 RSLCnano System (Thermo Scientific)**: a nano flow HPLC system coupled to the micrOTOF-Q II mass spec via CaptiveSprayTM interface.
- ▲ **7100 CE (Agilent Technologies)**: a capillary electrophoresis system, currently in stand-alone setup, but can be used as a separation component of a CE-MS system as well.

## OFFERED SERVICES AND EXPERTISE

### Provided services:

- ▲ Protein identification in complex mixtures
- ▲ Relative quantification in protein mixtures
- ▲ MALDI-TOF sample typing and classification
- ▲ Pathway analysis, Gene set enrichment analysis, Visualizations, etc.

### Main expertise:

- ▲ Discovery Proteomics

## MAIN PARTNERS AND COLLABORATING INSTITUTIONS

- ▲ **Shimadzu Corporation**, Analytical and Measuring Instruments Division, Kyoto, Japan
- ▲ **Translational Genomics Research Institute (TGen)**, Collaborative Center for Translational Mass Spectrometry, Phoenix, AZ
- ▲ **Proteomic Facility at Institute of Molecular and Translational Medicine**, Palacký University Olomouc, Olomouc, Czech Republic