

METABOLOMICS

LINKING VIENNESE CUISINE WITH ANALYTICAL CHEMISTRY

Vienna is the city of music and the legacy of so many heroes of classical music is still vibrating in the city center. In addition, there is a strong legacy of medical research since the 19th century with proponents including Billroth, Semmelweis, Landsteiner and Freud. The research legacy co-exists with a more profane aspect of the city's culture, its cuisine. However, irrespective of the food quality, our bodies absorb the various nutrients to keep our biochemical machinery running.

While the beauty of this machinery compares to imperial Vienna's architecture, the Viennese fascination with the morbid is satisfied by the lethal connection between overindulgence and cancer or heart disease. Much remains to be discovered about the connection between various diseases and an aberrant metabolism, and Vienna could indeed be one of the best places to explore these connections not only for historic reasons.

The VBCF Metabolomics facility supports researchers at the VBC campus and beyond by quantifying metabolites and other small molecules. Some of the questions directly address the human metabolism and how it is affected by food, i.e., by asking how a high-fat diet can influence the lipid composition in the blood. Other questions are related to basic aspects of metabolism such as the impact of genetic perturbations on the production of the building blocks of DNA and RNA.

Our expert metabolomics team develops individual experimental approaches depending on the research question, as some may be best addressed by a hypothesis-free analysis of samples, while others require a targeted analysis, eventually assisted by isotopically labeled metabolites.

The facility is equipped with four state-of-the-art mass spectrometers, each coupled with a liquid chromatography system, and established methods for the analysis of more than 1,000 small molecules. These include molecules as diverse as lipids, carboxylic acids, sugar phosphates, nucleosides, amino acids, vitamins, plant hormones, neurotransmitters and bile acids. In parallel, the team is working towards delivering a comprehensive, dynamic, and quantitative picture of the metabolome by establishing a non-targeted LC-MS/MS platform.

The state-of-the-art equipment combined with the experience and expertise of the VBCF Metabolomics team forms the basis of systematic development of the service portfolio meeting customer needs. Thus, the VBCF metabolomics facility will continue to contribute significantly to exciting biological and biomedical discoveries at Vienna BioCenter and beyond.

VBCF METABOLOMICS TEAM

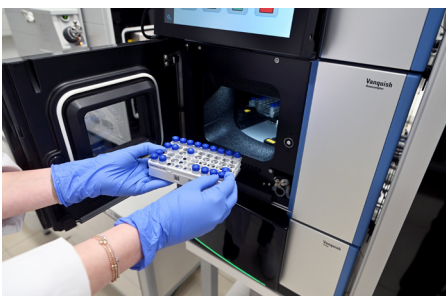


SERVICES AND METHODOLOGIES

- **Targeted liquid chromatography-tandem mass spectrometry (LC-MS/MS)**
 - Method portfolio for > 1000 small molecules
 - Analysis of metabolite panels for biochemical pathways (also tailor-made)
 - Method development for small molecules and more sophisticated assays
 - Relative and absolute quantification of compounds
- **Non-targeted LC-MS/MS or metabolite profiling**
 - Global metabolite profiling with maximum metabolome coverage
 - Separation using hydrophilic interaction liquid chromatography (HILIC) and reversed phase chromatography
 - Identification using steadily growing in-house compound library and public databases

EQUIPMENT

- **Q Exactive** (quadrupole orbitrap MS coupled to an Ultimate 3000 HPLC)
- **TSQ Quantiva** (triple quadrupole MS coupled to an Ultimate 3000 HPLC)
- **TSQ Altis** (triple quadrupole MS coupled to Vanquish HPLC via electrospray ionization)



Sample loading



Compound identification



TSQ Altis mass spectrometer

CONTACT

Metabolomics

Vienna BioCenter Core Facilities [VBCF]

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