



innovations from nature



# acib Service Offer

## Metabolomics Service

*We offer a comprehensive metabolomics service covering cell cultivation, sample preparation, analysis of intracellular metabolites and data analysis.*

## Background

Intracellular metabolite analysis has become an **essential tool** increasingly used in **human- and bio-sciences** for **phenotyping** as well as to identify health-associated **biomarkers** and process-limiting metabolic **bottlenecks**, respectively. Hundreds of intracellular metabolites can be addressed today by state-of-the-art mass spectrometry-based analytics in one sample run. However, preparation of phenotype-representative metabolite extract samples is still a **critical issue**. Dictated by the diversity of cellular systems a one hit sample preparation procedure does not exist. Moreover selection of inadequate sampling affects the metabolic state of the cells. Metabolite-specific degradation during the sample preparation process heavily distorts the metabolite composition and ion suppression a result of the sample matrix falsifies mass-spec signals of metabolites. Hence both sample preparation and data acquisition are extremely **error-prone** and necessitate sophisticated and typically complex working routines. The development of suitable protocols is a **demanding** and very **time-consuming** process and therefore out of question for many companies and research institutes.

## acib-Technology

acib and TU Graz have comprehensive expertise in metabolomics of different cell systems. The service covers all steps from **cultivation design** over cell **sampling** and metabolite extract **preparation** to **mass spectrometry**-based compound and **MS data analysis** and is outlined in the following in more detail. Standard routines permit **qualitative (n >100)** and **quantitative (n ≤50)** analysis of water-soluble intracellular metabolite pools (Trausinger et al. 2015, Biotechnol. Biofuels, 8:157). A distinctive feature of our service is the analysis of **time-resolved metabolite dynamics** induced by exogenous stimuli. All works are carried out in conformity with the respective quality standards (Goodacre, et al. 2007, Metabolomics, 3:231).

## acib-Offer

- Cultivation
  - ✓ Scale: Shake flask, stirred bioreactor (< 2L), filter, adherent systems
  - ✓ Aeration: Aerobic, anaerobic
  - ✓ Substrate: Unlabeled substrates, isotopically labeled substrates
  - ✓ Monitoring
- Sampling and metabolite extraction
  - ✓ Single time point
  - ✓ Multiple time points to study metabolite dynamics
  - ✓ Metabolite extraction: Quenching/extraction, metabolite-specific internal standardization

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## acib-Offer *continued*

- Mass spectrometry
  - ✓ LC-MS (Exactive Orbitrap, Thermo Fisher Scientific, USA)
- Data analysis
  - ✓ Compound identification, signal integration, calculation of  $^{12}\text{C}/^{13}\text{C}$  compound ratios for qualitative analysis
  - ✓ External standardization for absolute quantitative analysis
  - ✓ Isotopologue-specific analysis

### **Extras**

- We are highly interested in **expanding** our repertoire of addressable **cell systems** and **intracellular compounds**. We therefore offer support in the development of (i) sample preparation routines of cell types currently not accessible by our protocols and (ii) analytical tools to address special compounds or other compound classes.

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