

Mass spectrometry is a highly sensitive approach for the identification, characterization and quantification of biomolecules which include proteins, lipids and other small molecule metabolites with functions in biological systems. In order to facilitate such analyses, BLiSc has set up a mass spectrometry facility in the areas of proteomics, metabolomics and lipidomics. We present the capabilities of these facilities as well as the applications of these in science performed at BLiSc.

Training Program for internal users: MS Facility conducts user ship training program for BLiSc students/ Post Docs on Quarterly.

Proteomics

The proteomics unit at mass spectrometry facility provides scientific and technical support to various academic and non-academic institutions across the country. Currently, the facility comprises of Thermo Scientific Orbitrap Fusion Tribrid mass spectrometer coupled with Thermo Easy nLC 1200 at NCBS and Sciex Zeno TOF 7600 coupled with Acuity UPLC at InStem.

Technology



Orbitrap Fusion

AP/MALDI (ng) UHR Ion Source



Zeno TOF 7600

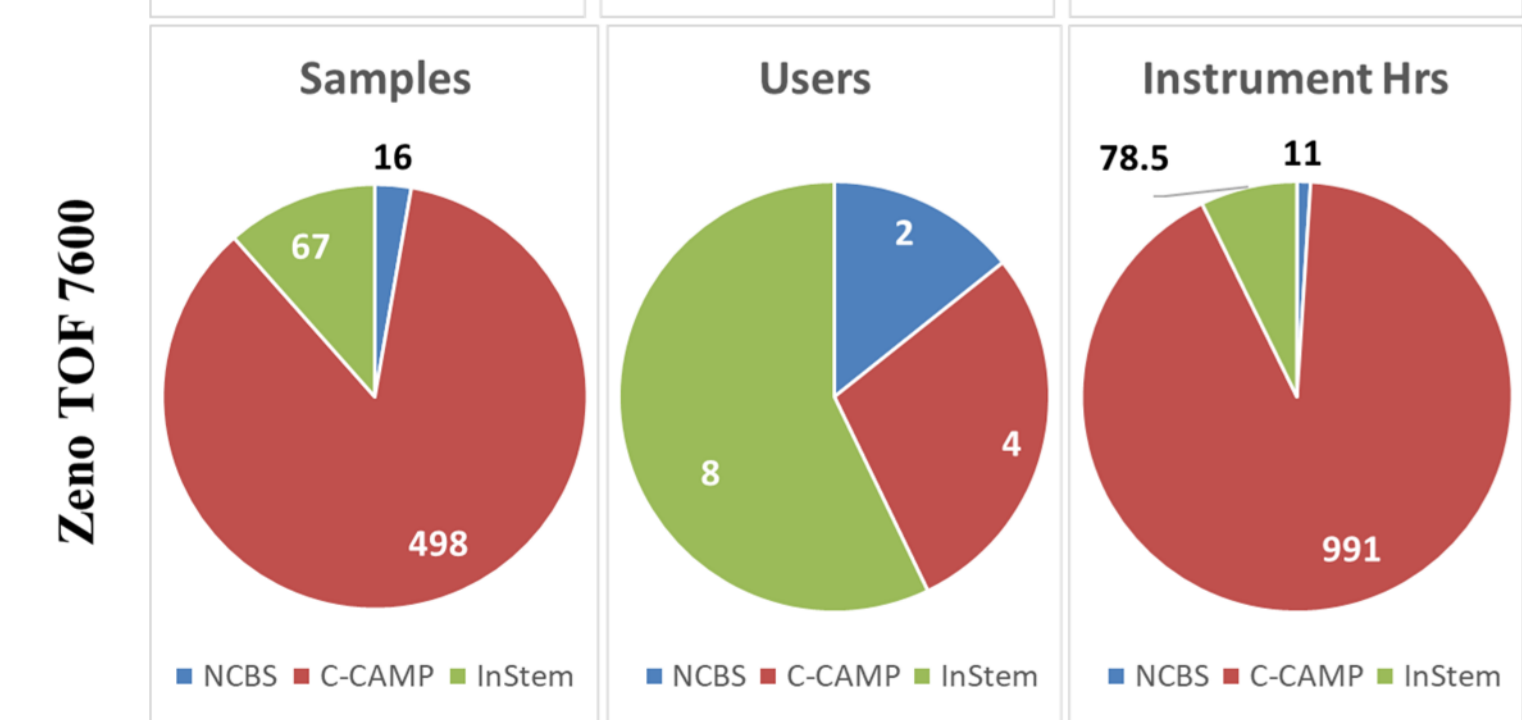
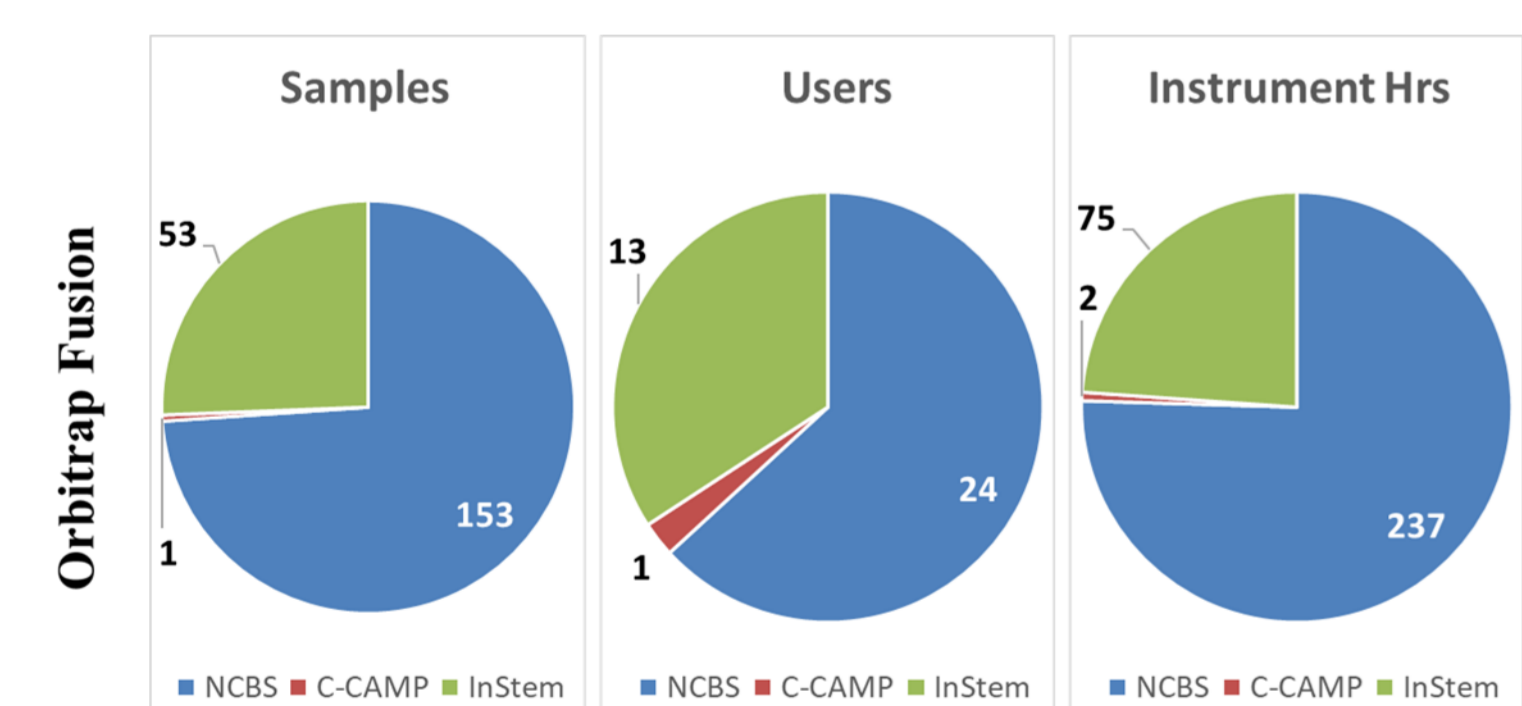
TripleTOF 5600



6545XT AdvanceBio Q-TOF

Orbitrap- XL

Facility Usage Statistics



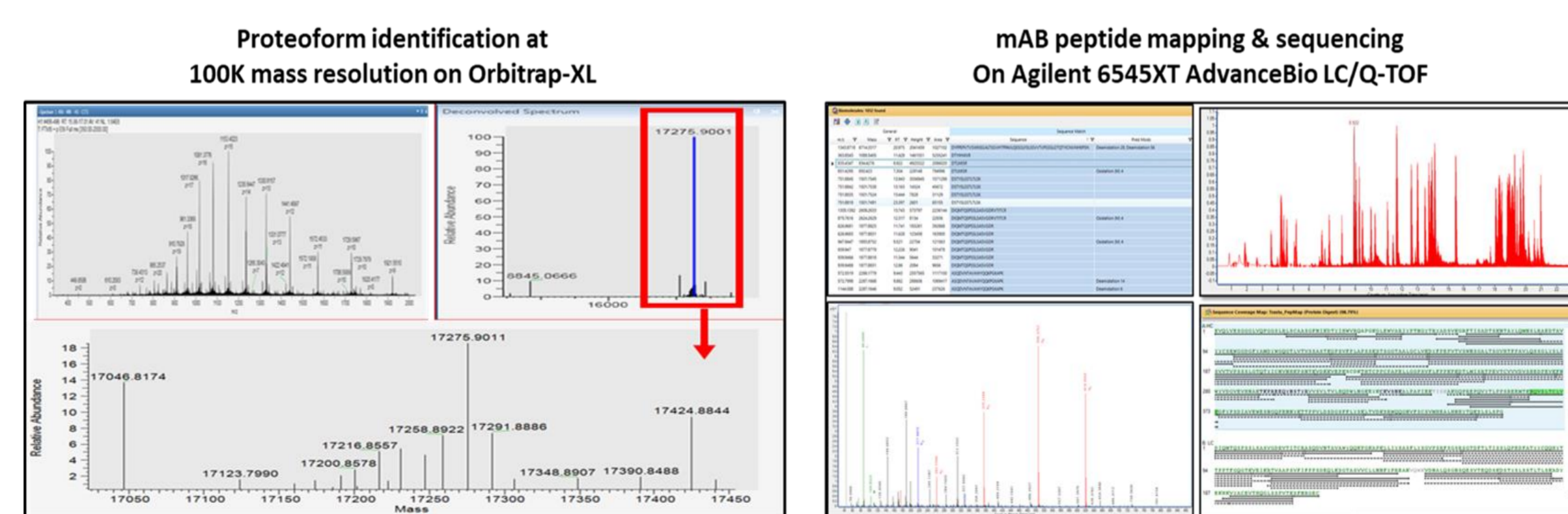
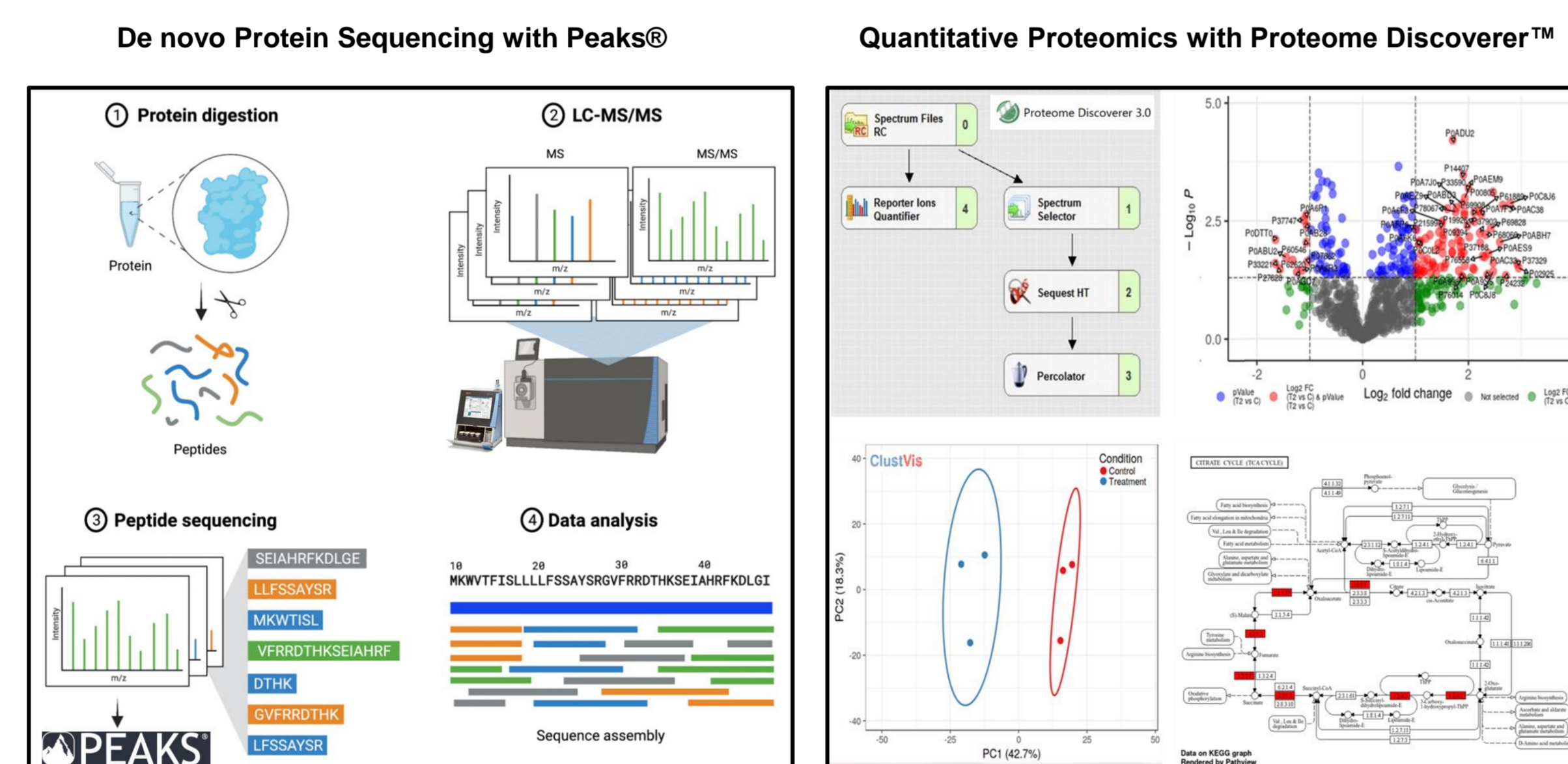
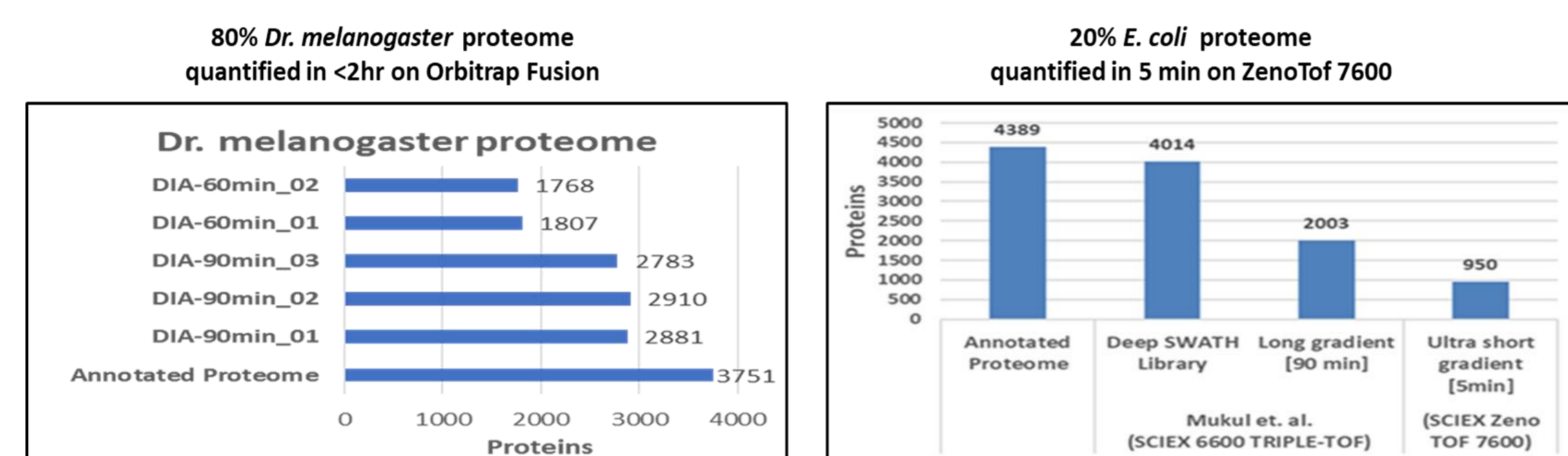
Recent publications [DOIs]

- 10.1016/j.fbio.2023.102882
- 10.1016/j.heliyon.2023.e19478
- 10.1016/j.jep.2023.106357
- 10.3390/biom13040669

Services offered

- SWATH/DIA and reporter ion-based workflow for proteome quantitation
- Identification and site-localization of selected post-translational modifications
- Global quantification of (sub) proteomes using DDA
- co-IP analysis using label-free or stable isotope labelling approaches
- Identification of gel-separated and Coomassie-stained proteins
- Determination of molecular mass of intact proteins
- Fast-track validation of antibodies for Co-IP experiments
- Data analysis for all the services listed above
- Capacity building through training and workshops

Facility Capabilities & Workflows



Future plans

- Development of HR-MALDI imaging facility for spatial multi-omics
- The facility will develop analytical protocols to measure low-level protein concentrations and will continue its analytical efforts to use targeted proteomics for biomarker analysis.

Lipidomics & Metabolomics

Targeted (Absolute Quantification) and Untargeted (Relative Quantification) metabolomics are the commonly employed strategies for study of metabolites in the biological systems.

Available technologies



Qtrap 6500

Qtrap 5500



6495C - QQQ

TSQ Vantage



LCQ Ion trap Fleet

Q Exactive



GC-MS 7000C Triple Quad

GC-MS 7890B Single Quad

Services offered & Facility Capabilities

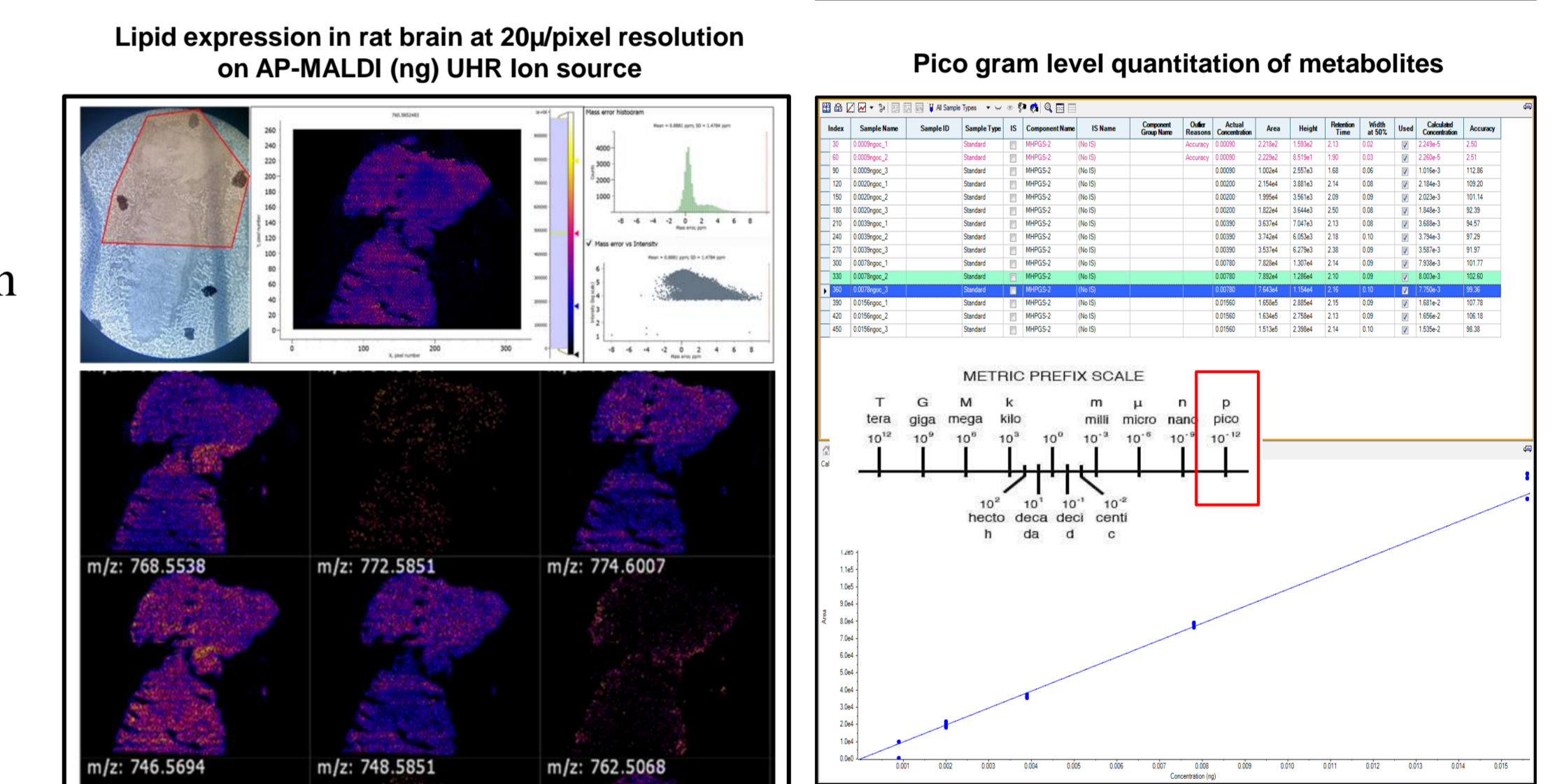
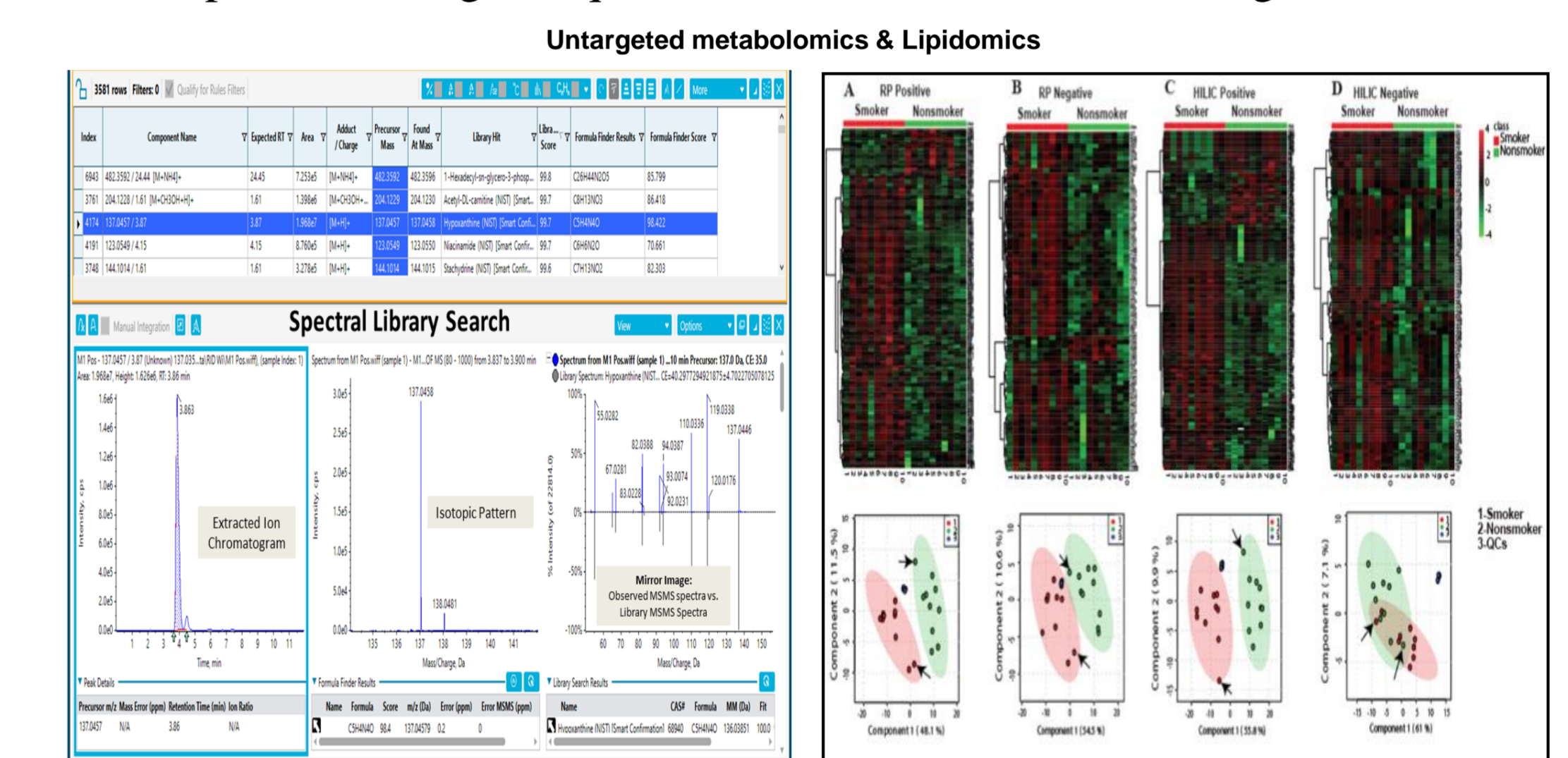
- Capacity building through training and workshops.
- Development of new method and workflow for targeted quantitation of peptides, proteins and small molecules.
- Global non targeted Lipidomics analysis using HRMS
- Pharmacokinetic study and method development for targeted quantitation of small molecule/drugs

1. Bio-molecules

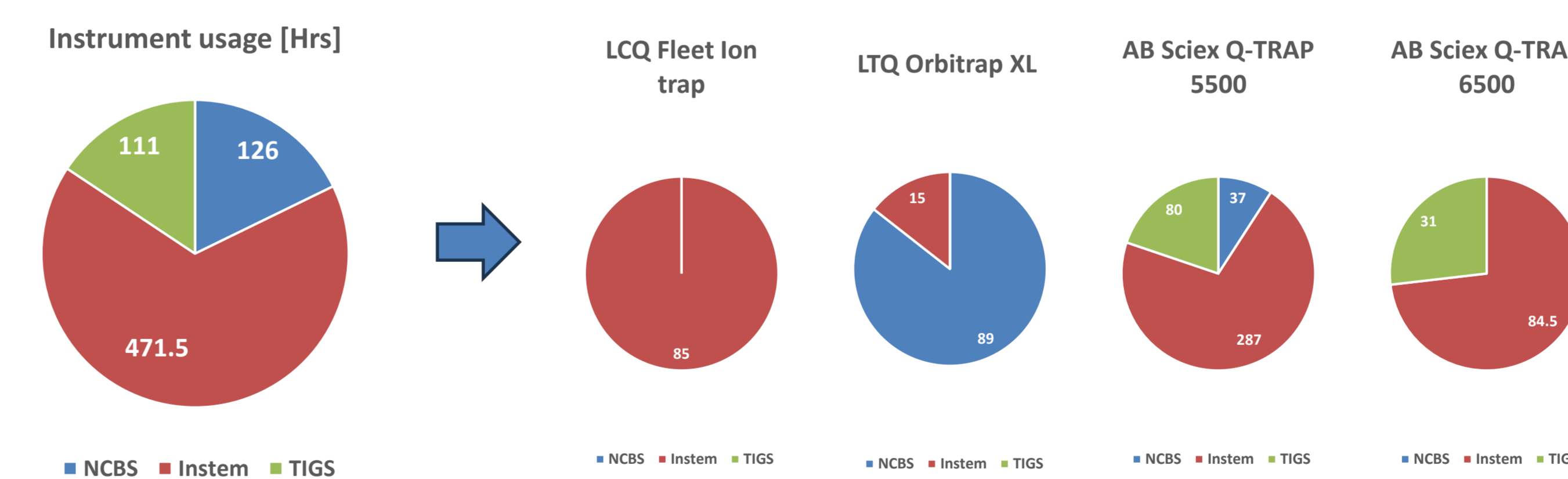
- Neurotransmitters
- Nucleotides
- Cholic acids
- Amino acids
- Plant secondary metabolites
- Plant growth hormones
- Peptides
- Custom

2. Analysis Type

- Targeted (Quantitative) by MS, PDA, FLD
- Analytical Method Validation (on request)
- Untargeted (Metabolite Profiling)
- Semi-preparative RP-HPLC
- MW Identification of Fractions



Facility Usage Statistics



Facility now has training module for UPLC-MS and Multiquant™ for targeted quantitation and provide in-house training with this module only.

Recent publications : [DOIs]

- 10.1128/spectrum.04943-22
- 10.1038/s41467-023-39670-4
- 10.26508/lsa.202301920

Training and Workshops

Regular training and workshops for both NCBS students and external students are conducted on a regular basis for capacity building

Internal students trained in different techniques

Proteomics	Metabolomics	Intact-Mass	Small Molecule-HRMS
10	12	3	5

Workshop	No. of participants
Hands-On training course on MS Data Analysis	18
6 th Hands On workshop on Integrated Omics	25
Hands-On workshop on Proteomics	10
Hands-On training course on Metabolomics-II	30
Hands-On training course on Metabolomics-I	20