



## **Translational Metabolomics Shared Resource Mass Spectrometry Instrumentation and Services**

The Translational Metabolomics Shared Resource (TraMSR) Mass Spectrometry unit offers advanced multi-omics services for the identification and quantification of biomolecules, including proteins, lipids, metabolites, small molecules, and complex carbohydrates. Utilizing cutting-edge instrumentation such as Liquid Chromatography-Mass Spectrometry (LC-MS/MS) and Imaging Mass Spectrometry (IMS), the TraMSR provides comprehensive analytical capabilities to support a wide range of research needs, including the following areas: proteomics, lipidomics, metabolomics/small molecule analysis, and glycomics.

### **Thermo Fusion Lumos (Proteomics)**

The Fusion Lumos is a high-resolution Orbitrap mass spectrometer (up to 500,000 FWHM) designed for advanced multidimensional proteomics research. The instrumentation offers superior sensitivity, resolution, and MS<sup>n</sup> capabilities to enable deep proteome coverage and precise protein characterization. It is equipped with both HCD (Higher-energy C-trap Dissociation) and ETD (Electron Transfer Dissociation) applications, which enhance the fragmentation options for comprehensive protein and post-translational modification analysis.





### **Thermo Exploris 240 (Lipidomics, Metabolomics and Small Molecule analysis)**

The Exploris 240 is a powerful Orbitrap mass spectrometer (up to 240,000 FWHM) optimized for lipidomics, metabolomics, and small molecule analysis. It provides high-resolution, accurate-mass detection with fast scanning speeds for comprehensive molecular profiling.



### **Thermo Orbitrap Velos (Glycomics)**

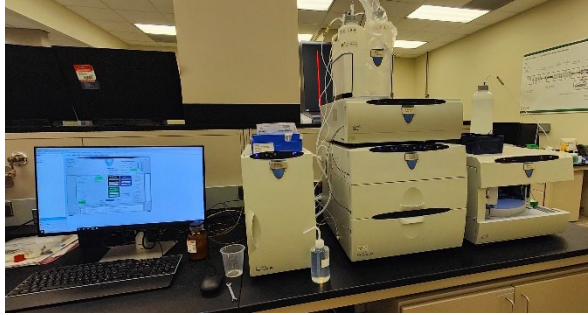
The Orbitrap Velos high-performance mass spectrometer (up to 60,000 FWHM) is tailored for glycomics research. Combining Orbitrap and dual linear ion trap technologies, the instrumentation enables detailed structural analysis of glycans with high sensitivity and resolution.

### **Bruker timsTOF fleX MALDI-2 (Imaging MS)**

This state-of-the-art imaging mass spectrometer (up to 60,000 FWHM) is equipped with MALDI-2 technology, enhancing ionization efficiency for lipids and other biomolecules. With the microGRID feature, the instrument achieves a minimum spatial resolution of 5  $\mu\text{m}$  per pixel for ion imaging, enabling high-definition tissue analysis.

By applying multiplex imaging, proteins and other biomolecules within tissue samples can be imaged on the same spatial dimension, providing comprehensive and simultaneous molecular mapping. This capability is essential for studying the intricate distribution and interaction of multiple biomolecules in tissues.





## DIONEX ICS-6000 Ion Chromatography system

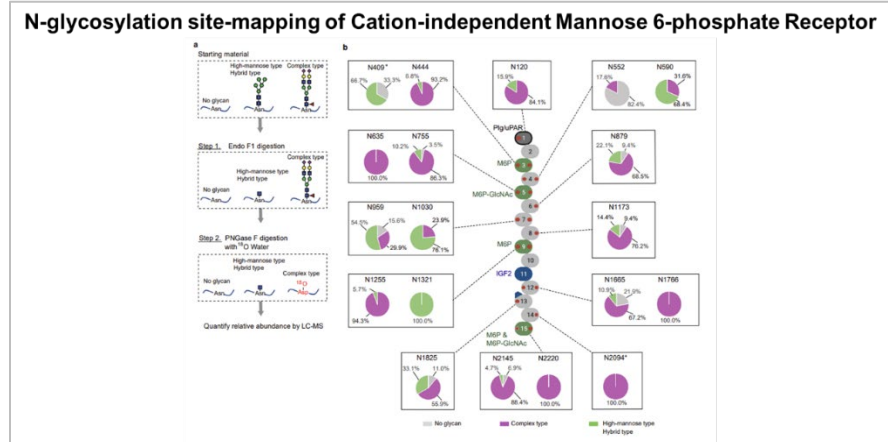
The DIONEX ICS-6000 is a high-performance ion chromatography system for quantitative analysis of anions, cations, and polar analytes, equipped with high-performance electrochemical detection using pulsed amperometry (HPAE-PAD).

## Examples

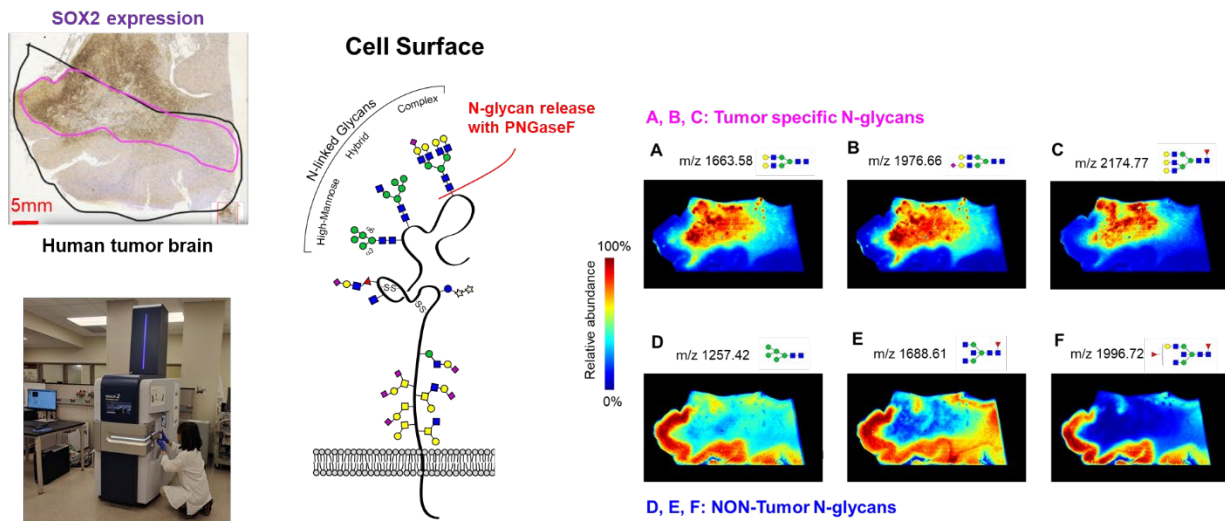
### LC-MS/MS: N-glycosylation site-mapping (Glycoproteomics)

Bohnsack RN, Misra SK, Liu J, Ishihara-Aoki M, Pereckas M, Aoki K, Ren G, Sharp JS, Dahms NM. Lysosomal enzyme binding to the cation-independent mannose 6-phosphate receptor is regulated allosterically by insulin-like growth factor 2.

*Sci Rep.* 2024 Nov 6;14(1):26875. DOI: 10.1038/s41598-024-75300-9. PMID: 39505925; PMCID: PMC11541866.



## Imaging MS: N-glycan



## Imaging MS: Small Molecule and Lipids

Overlaid MALDI-MS images of pCF<sup>3</sup>-mito-met10 and a few selected lipids

