

EGMIC MONTHLY NEWSLETTER



Agilent 6560 Ion Mobility Quadrupole Time-of-Flight (IM-QTOF) LC/MS System

TECHNOLOGY HIGHLIGHT

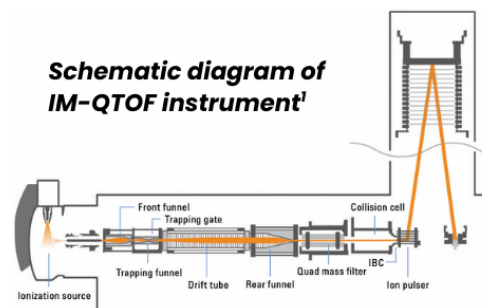
EGMIC Core houses a state-of-the-art prototype Agilent 6560 Ion Mobility Q-TOF mass spectrometer, retrofitted with Agilent's latest electron-based dissociation (ExD) cell and collision-induced unfolding (CIU) source. This instrument is supported through a collaboration with Agilent Technologies, Inc.

The IM 6560 enables comprehensive characterization of bioanalytes, especially peptides and proteins. Capabilities include deep sequencing, confident identification and localization of post-translational modifications (PTMs), and structural analysis of biomolecules in their native-like states.

Ion mobility-mass spectrometry (IM-MS) separates ions based on their size, shape, and charge, providing a third dimension of separation in addition to mass-to-charge ratio and retention time. IM-MS can resolve conformational isomers, distinguish structural variants of proteins or complexes, and yield collision cross section (CCS) values that reflect the gas-phase "shape" of the analyte. This makes IM-MS a powerful tool for probing protein folding, conformational heterogeneity, and interactions. If you are having difficulty differentiating isomeric species, then IM-MS may be the answer to your problem.



**Schematic diagram of
IM-QTOF instrument¹**



Reference: 1. <https://www.agilent.com/cs/library/technicaloverviews/public/5991-3244EN.pdf>

HOW TO START?

If your research involves separating isomeric species or requires detailed structural and sequence-level characterization of peptides, proteins, or complexes, the 6560 platform offers an ideal and versatile solution. To start a consultation on your project, please contact us (egmic@emory.edu) or contact our scientific director, Dr Blaine Roberts (blaine.roberts@emory.edu).

ELECTRON CAPTURE DISSOCIATION (ECD)

The ExD cell provides electron capture dissociation (ECD), a fragmentation technique that cleaves the peptide backbone while preserving labile PTMs such as phosphorylation, glycosylation, or metal coordination using low energy electron. ECD enables high sequence coverage and is particularly useful for mapping PTMs and dissecting the architecture of intact proteins and complexes.

COLLISION-INDUCED UNFOLDING (CIU)

Collision-induced unfolding (CIU) introduces increasing amounts of energy to protein or protein complex ions in the gas phase, promoting stepwise unfolding. By monitoring the resulting conformational transitions via IM-MS, CIU offers a way to assess protein stability, detect folding intermediates, and differentiate closely related proteoforms or complexes based on their unfolding fingerprints. It is a great approach to study protein stability, drug binding and ligands, characterize different glycoforms of antibodies and other glyco proteins.

NANOSPRAY EMITTER ASSEMBLY

This instrument is also equipped with a prototype static nanospray emitter assembly, allowing for native-like sample introduction. As a result, the 6560 is well-suited for the analysis of intact proteins, protein complexes, and other large biomolecules such as oligonucleotides due to the instrument's extended high-mass detection capabilities. For workflows requiring liquid chromatography, the instrument can be coupled with an Agilent 1290 HPLC system, enabling automated sample introduction and chromatographic separation and prior to mass spectrometry analysis.