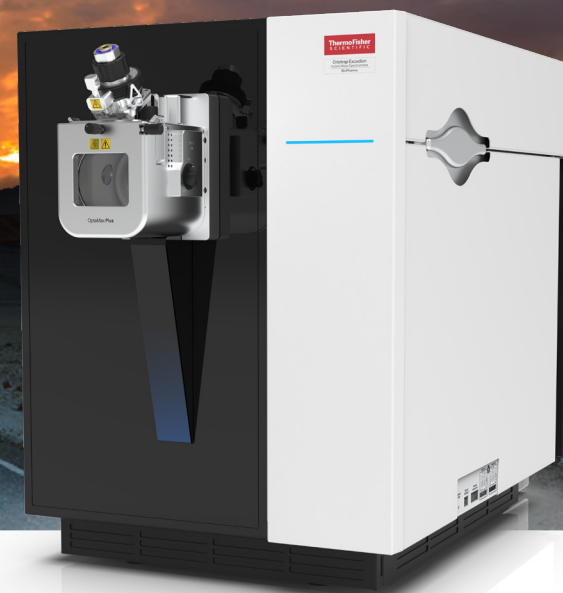


Mass spectrometry



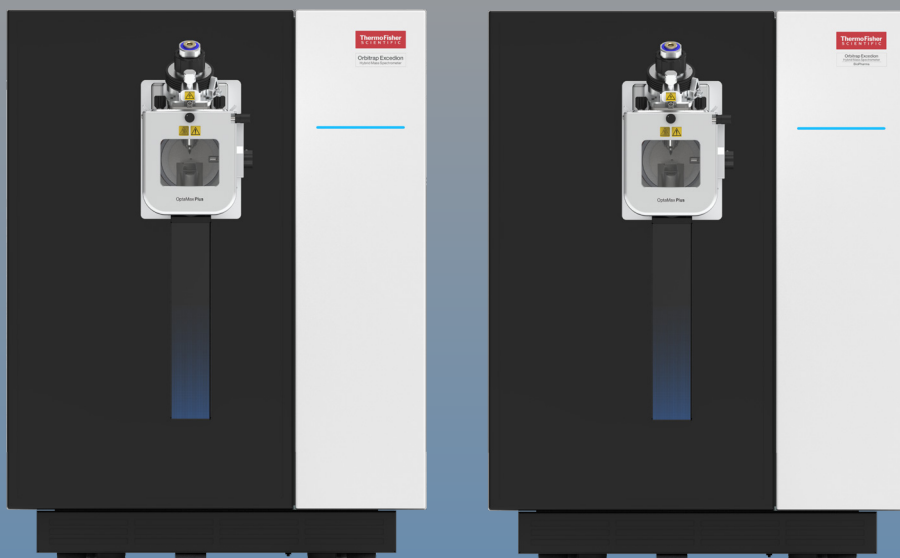
Expand your analytical horizons

Purpose-built for the journey ahead

thermoscientific

Move beyond incremental gains to transformative analytical capabilities

The Thermo Scientific™ Orbitrap™ Excedion™ Hybrid Mass Spectrometer represents a decisive evolution in high-resolution, accurate-mass (HRAM) performance—bringing the latest Orbitrap Excedion MS platform architecture to laboratories that require immediate analytical impact in increased sensitivity, dynamic range, and a clear path to expanded analytical capabilities.



Orbitrap Excedion Hybrid MS

Orbitrap Excedion BioPharma Hybrid MS

- **Higher sensitivity — *Reveal more low-level analytes***
Accelerate discovery across metabolomics, lipidomics, DMPK, environmental analysis, food safety, and oligonucleotide workflows by detecting trace-level compounds, low-abundance metabolites, therapeutics, and contaminants with greater confidence.
- **Increased dynamic range — *Capture more signal in every scan***
Get a more complete view of complex samples across metabolomics, lipidomics, exposomics, environmental analysis, food safety, and small-molecule research by measuring high- and low-abundance species together with greater confidence.
- **In-lab upgrade to Orbitrap Excedion Pro MS — *Expand capabilities when your science demands it***
Future-proof your laboratory for evolving research and analytical demands in proteomics, biopharma, structural biology, advanced omics, and complex characterization workflows through an in-lab upgrade path that expands instrument performance and capabilities without requiring system replacement.

From sample to insight: An integrated ecosystem that delivers confident answers

The Orbitrap Excedion mass spectrometer is part of an integrated ecosystem supporting the full workflow—from sample introduction to confident data interpretation.

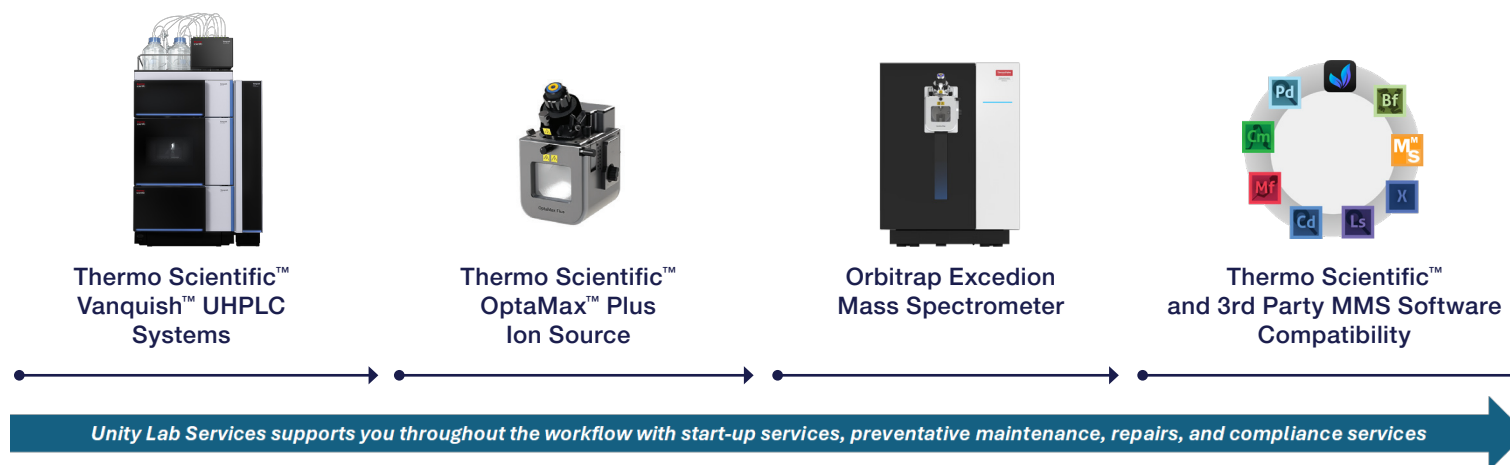
The Thermo Scientific™ Vanquish™ UHPLC portfolio combined with a comprehensive column portfolio enable flexible separation across nano-, capillary-, micro-, and analytical-flow regimes.

Application-specific software—including Thermo Scientific™ Compound Discoverer™, TraceFinder™, BioPharma Finder™, and Proteome Discoverer™ Software—combined with Thermo Scientific™ mzCloud™ and Thermo Scientific™

AcquireX™ Workflows, delivers confident identifications and meaningful insights from complex data. For enterprise-scale, compliance-critical workflows, Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) Software provides a secure, CFR 21-compliant, validated environment that safeguards data integrity and delivers audit-ready results with built-in support for electronic records and electronic signatures.

Thermo Scientific™ Unity™ Lab Services provides installation, maintenance, training, and compliance support to ensure uptime, reproducibility, and long-term performance.

Figure 1. Integrated LC-MS workflow combining a Thermo Scientific™ Vanquish™ UHPLC system, Orbitrap Excedion mass spectrometer, application-specific software, and Unity Lab Services support—enabling seamless progression from sample to confident insight.



When you invest in Thermo Scientific™ instrumentation, you not only benefit from top-quality product performance, you can also enjoy world-class service solutions from Unity™ Lab Services. Our comprehensive service portfolio was designed to meet the needs of your lab. Keep focused on what matters. We've got your back.

unity
lab services

Engineered for analytical depth, sensitivity, and reproducibility

At the core of the Orbitrap Excedion mass spectrometer is an advanced ion transmission system engineered to deliver more ions to the analyzer while preserving molecular integrity. The electrodynamic ion funnel improves transfer efficiency and reduces unintended fragmentation compared to previous-generation ion funnel designs, resulting in cleaner spectra, increased sensitivity, and linear dynamic range of quantification.

Full Scan enhanced Dynamic Range (eDR) MS expands the Full Scan MS¹ intra-scan dynamic range and improves signal-to-noise, enabling detection of both trace-level and high-abundance species in a single experiment.

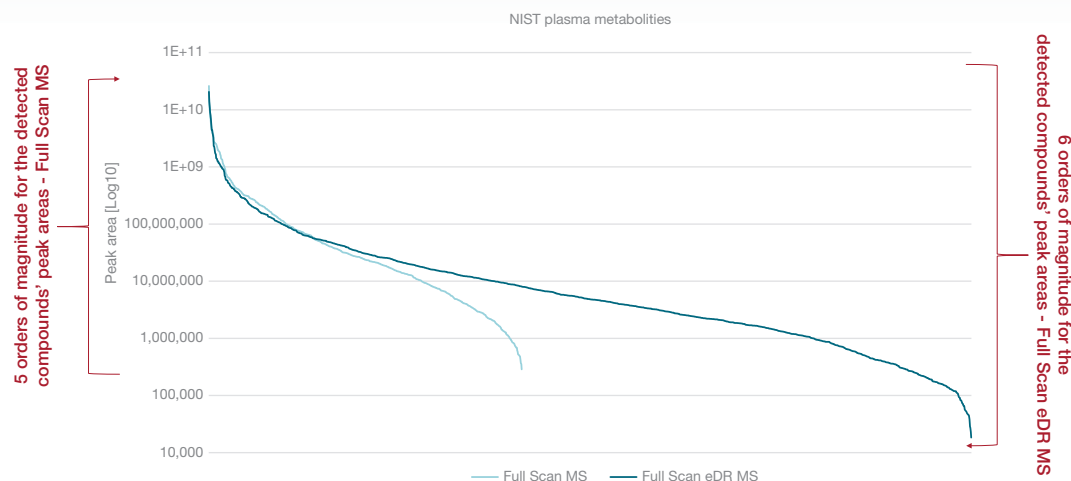


Figure 2. Full Scan eDR MS expands the detectable peak-area range in NIST plasma metabolite analysis from five to six orders of magnitude. This broader intra-scan dynamic range helps capture low-abundance compounds alongside high-intensity species, supporting deeper coverage of complex biological samples.

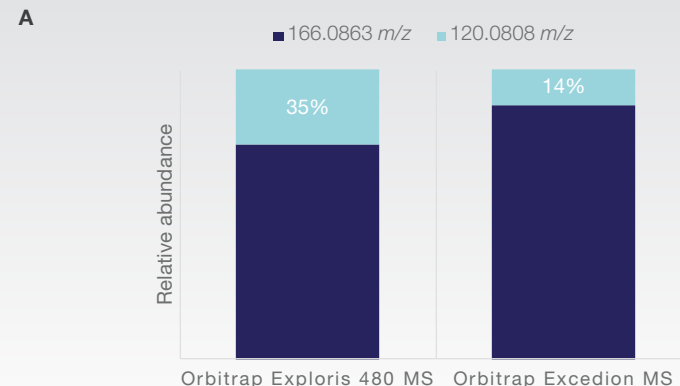


Figure 3A. Reduced unintentional source fragmentation versus Orbitrap Exploris 480 MS.

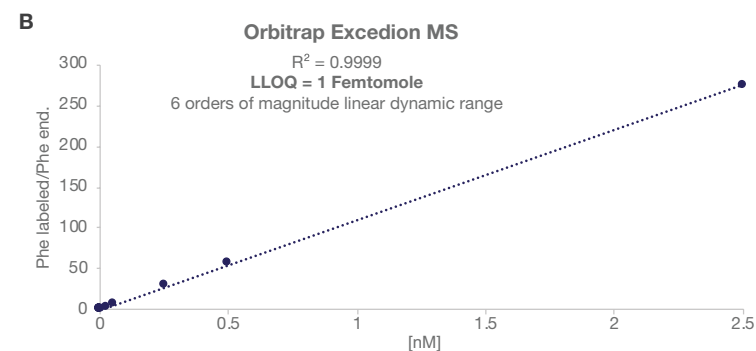


Figure 3B. Up to 6 orders of linear dynamic range and 10x higher sensitivity versus Orbitrap Exploris 240 MS. Sample is spiked in labeled phenylalanine in NIST SRM 1950 plasma (Full Scan MS). m/z 166.0863 is phenylalanine and m/z 120.0808 is a known fragment of phenylalanine.

Reveal biological complexity with confidence and clarity

Gain deeper, more reliable insight into complex biological systems with the Orbitrap Excedion MS. High-resolution accurate-mass performance and extended dynamic range reduce ambiguity, improve reproducibility, and support confident metabolite and lipid identification and quantitation.

Advance your metabolomics analyses with the Orbitrap Excedion mass spectrometer

Detect up to 3× more compounds at the MS¹ level, with each defined as a unique *m/z*–retention time feature after background subtraction and isotope and adduct consolidation, in Compound Discoverer 3.5 software.

AcquireX software uses intelligent iterative data-dependent MS² injections to increase MS² coverage from MS¹ data. Compared with traditional Full Scan AcquireX analysis, eDR delivers up to 70% more high-confidence mzCloud database annotations, increasing identification confidence and biological insights.

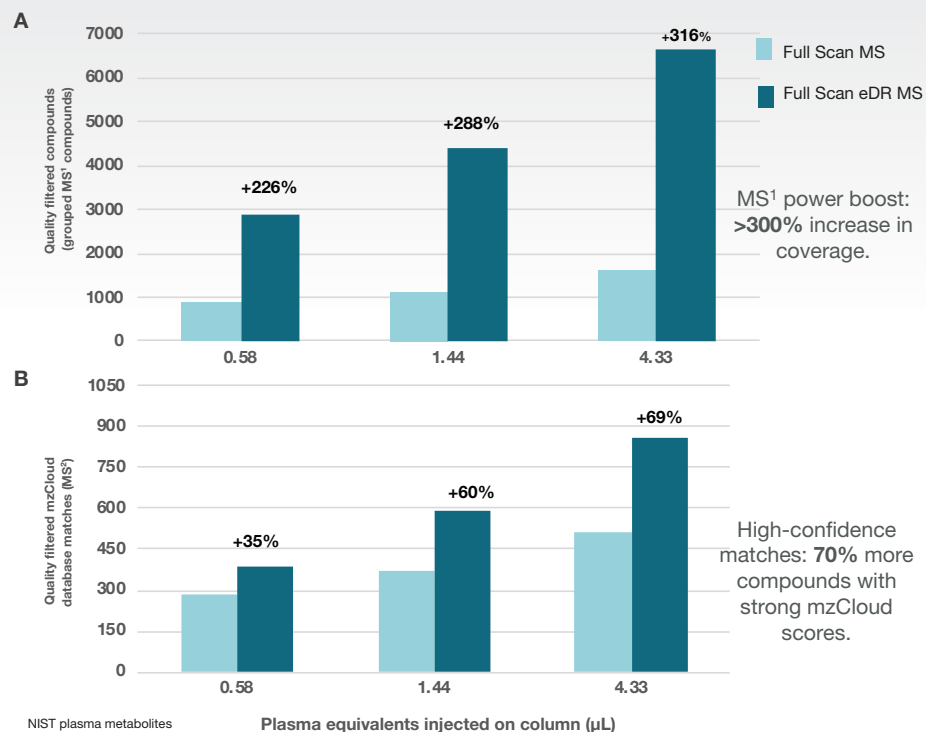
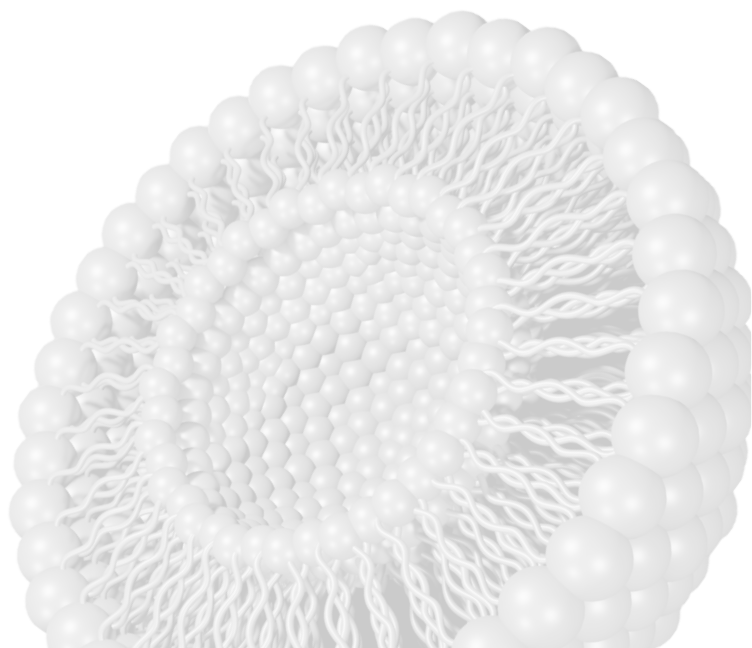


Figure 4. eDR increases plasma coverage across representative plasma-equivalent loads. SRM 1950 plasma extracts were analyzed employing an AcquireX deep scan workflow at 0.58, 1.44, and 4.33 μL plasma equivalent loaded on column using matched eDR and conventional full-scan acquisition. (A) Quality-filtered MS¹ compound entities with filters: CV <20%, formula assignment, and peak rating >6 in all three MS¹ reference replicates. (B) Strict mzCloud MS² matches with filters: CV <20%, non-blank formula assignment, peak rating ≥6 in 3/3 MS¹ reference replicates, best mzCloud match score ≥60, and MS² purity >60.



Expand detectable features with Full Scan eDR MS, reducing high abundant compound saturation and capturing more low-abundance compounds to improve metabolome coverage and biomarker discovery.

This increase drives more confident identifications, with greater library hits and spectral matches for richer insights.

The Orbitrap Excedion MS outperforms previous-generation hybrid Orbitrap instruments in detecting and annotating compounds, demonstrating greater speed and sensitivity.

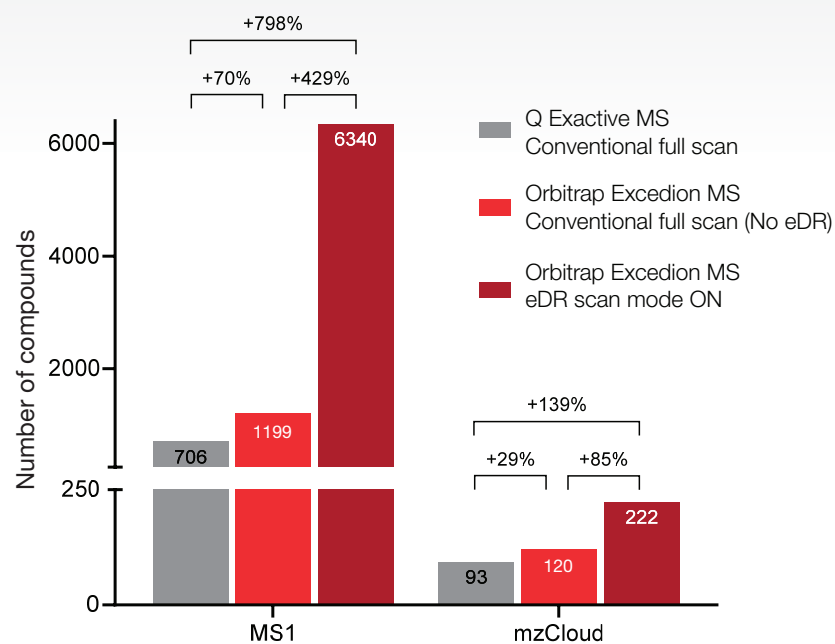


Figure 5. Number of detected compounds (grouped compounds) and annotated species (mzCloud database annotation) in dried blood spot samples (n = 5) acquired in positive ionization mode. Demonstrating a step-change in both compound identification and annotation power, with Full Scan eDR MS enabled, the total number of detected compounds increased by 798%, alongside a 139% rise in high-confidence mzCloud database annotations compared to the Thermo Scientific™ Q Exactive™ Hybrid Quadrupole-Orbitrap™ Mass Spectrometer

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In a clinical research setting, having reliable and robust workhorse instruments is crucial. Additionally, increasing the number of identified metabolites is essential to understand the full biochemical picture of diseases and pathological states.

”



Katja Benedikte Prestø Elgstøen, Ph.D.

Head of Core Facility for Global Metabolomics and Lipidomics
University of Oslo, Norway
Head of Section for Metabolomics and Lipidomics
Oslo University Hospital, Norway

Benefits of eDR in clinical research

Full Scan eDR MS reduces high-abundance interferents like EDTA, mitigating ion suppression and improving signal-to-noise for co-eluting analytes.

In K_2EDTA plasma, EDTA can saturate the detector and suppress low-abundance co-eluting compounds. With eDR scan mode, saturation is reduced, increasing dynamic range and sensitivity.

This enables more consistent detection of biomarkers such as leucine/isoleucine, acetylcarnitine, and Thr-Asp, supporting more reliable metabolomics insights.

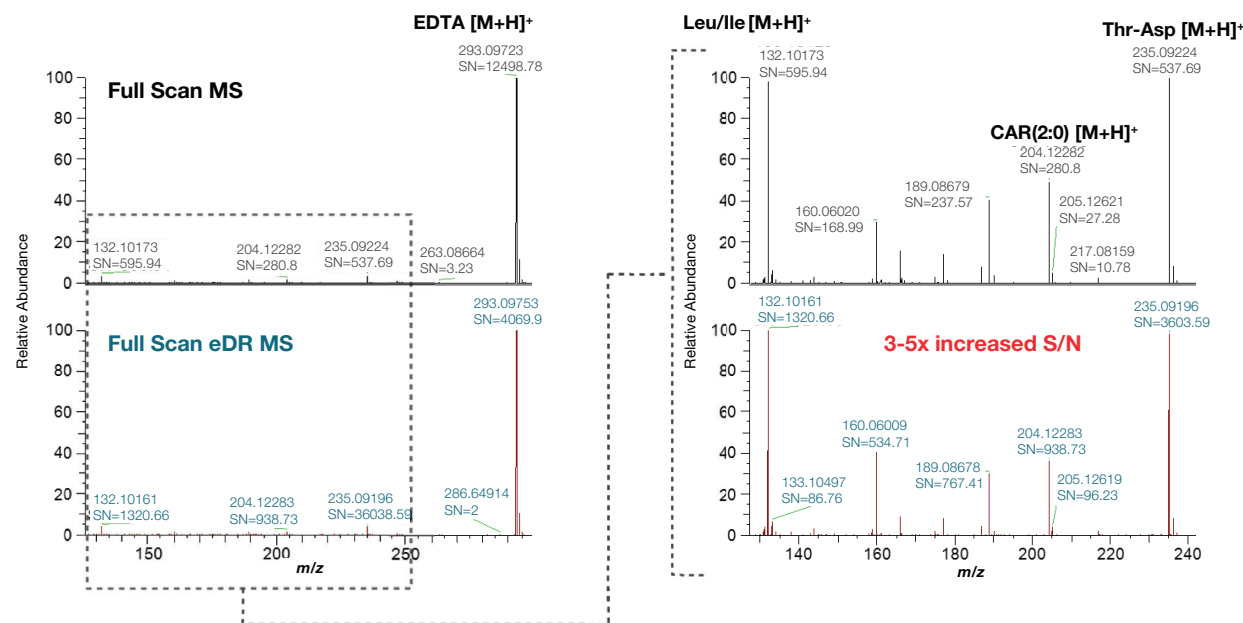


Figure 6. Comparing conventional Orbitrap full-scan acquisition (Full Scan MS) with enhanced dynamic range acquisition (Full Scan eDR MS) demonstrates that eDR markedly improves signal-to-noise for compounds that co-elute with EDTA, including Leu/Ile [M+H]⁺, CAR(2:0) [M+H]⁺, and Thr-Asp [M+H]⁺. At the same time, eDR effectively suppresses the dominant EDTA signal, reducing saturation effects and restoring detection sensitivity for co-eluting analytes.

Unlock deeper lipid coverage from minimal sample input

Single-cell and low-input lipidomics require a balance of sensitivity, scan speed, and structural insight in a single injection. While nanoflow LC increases overall sensitivity, the Orbitrap Excedion MS enables polarity switching to acquire positive and negative ion data in one experiment—without compromising data quality.

Combining complementary information from both ionization modes expands lipid coverage while maintaining the scan density needed for robust quantitation. Even at extremely low input levels, sufficient sampling across chromatographic peaks is maintained to support reliable MS¹-based analysis.

Polarity switching also improves annotation confidence: positive ion mode confirms lipid class, while negative ion mode provides fatty acid side chain information. Together, these capabilities deliver deeper lipid insight, greater analytical confidence, and more meaningful biological interpretation from limited samples.

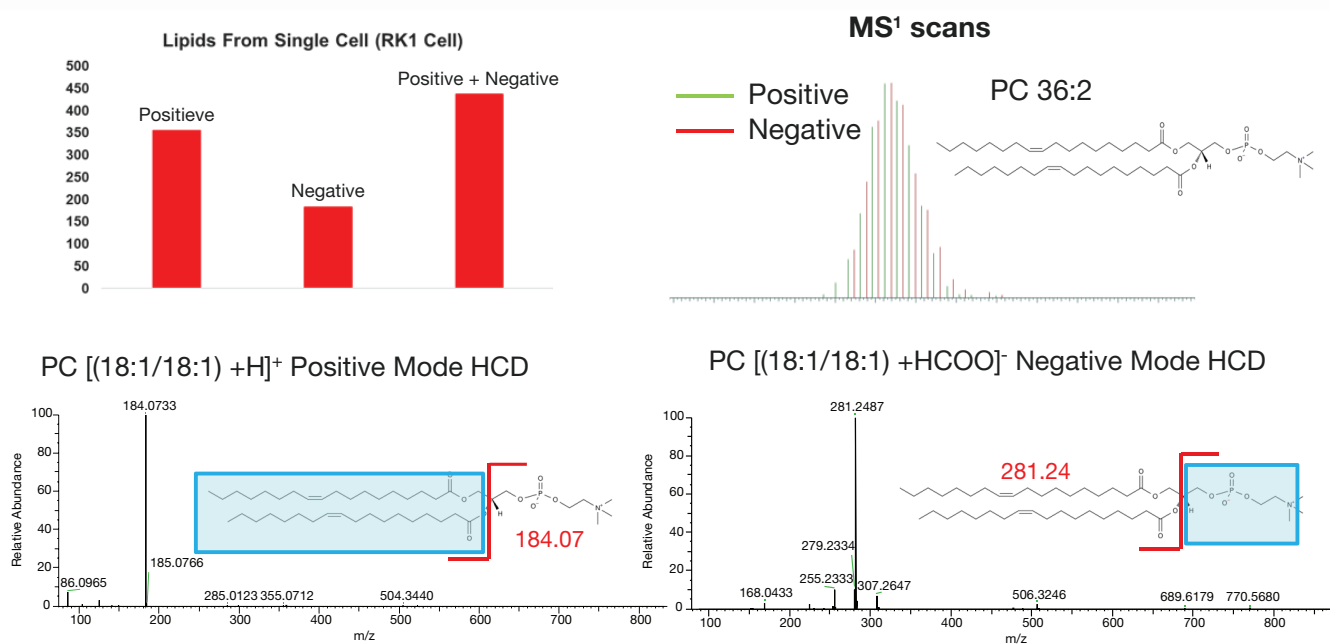


Figure 7. Single-cell lipidomics analysis of RK1 cells using nanoflow LC-MS with polarity switching acquisition.

Combining positive and negative ion modes in one injection, the total lipid identifications increased by approximately 33% (~350 positive, ~150 negative, ~450 combined).

“

The combination of high-resolution atmospheric-pressure MALDI imaging with the Orbitrap Excedion mass spectrometer allows us to visualize, for example, lipid distributions in brain tissue with remarkable spatial precision and mass accuracy.

The ability to clearly resolve even the Purkinje cell layer demonstrates how high resolving power and stable performance translate directly into biologically meaningful insights.

”



Bernhard Spengler, Ph.D.

Professor of Analytical Chemistry
Justus Liebig University Giessen, Germany
and Director of the Center for Mass
Spectrometric Developments
TransMIT GmbH
Giessen, Germany



High-resolution lipid mapping using AP-SMALDI⁵ AF ion source coupled to the Orbitrap Excedion MS

Molecular distributions align with H&E histology, reinforcing confidence in spatial accuracy. The result: confident MS¹ data in mass and space, strong sensitivity for both abundant and low-level species, combinable with (user's choice) additional MS² data for confirmation or structural information in the same raw data file—lead to answers in biological differentiation—without compromise.

The AP-SMALDI⁵ AF ion source provides the required high spatial resolution: the system achieves 5 μm image resolution without oversampling, aligning molecular distributions with histology for precise, biologically meaningful insights.

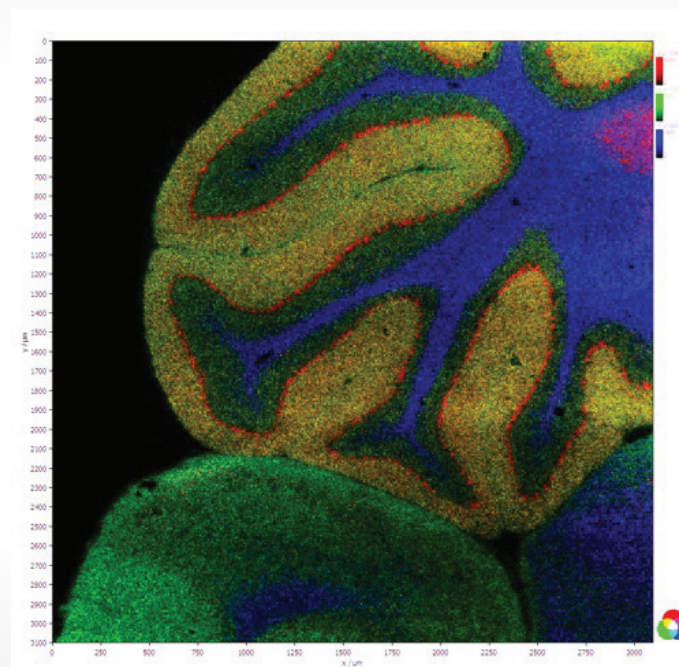


Figure 8. An MS¹ image acquired in positive-ion mode at 5 μm pixel size reveals distinct lipid distributions of three selected m/z channels across the cerebellum of healthy mouse brain tissue; results are displayed in a RGB overlay image.

While m/z 772.5264, green, and m/z 848.6386, blue, are indicative of spatially differentiated lipids across the cerebellum, the lipid with m/z 872.5575, red, allows a clear visualization of the Purkinje cell layer in the cerebellum - known to be represented by equally thin dimensions in mouse brain tissue.

Deliver confident, regulation-ready results across complex matrices

Environmental and food safety labs require high sensitivity, reliability, and robustness across complex matrices.

The Orbitrap Excedion MS enables confident detection and quantitation of contaminants, with Full Scan eDR MS preserving low-abundance signals in complex matrices and supporting QqQ-comparable low $\mu\text{g/kg}$ performance without increasing injection volume.

High resolving power and mass accuracy below 2 ppm support confident multiresidue pesticide analysis in food matrices, enabling targeted quantification, suspect and non-targeted screening, and retrospective data analysis within a single HRMS workflow at low $\mu\text{g/kg}$ levels.

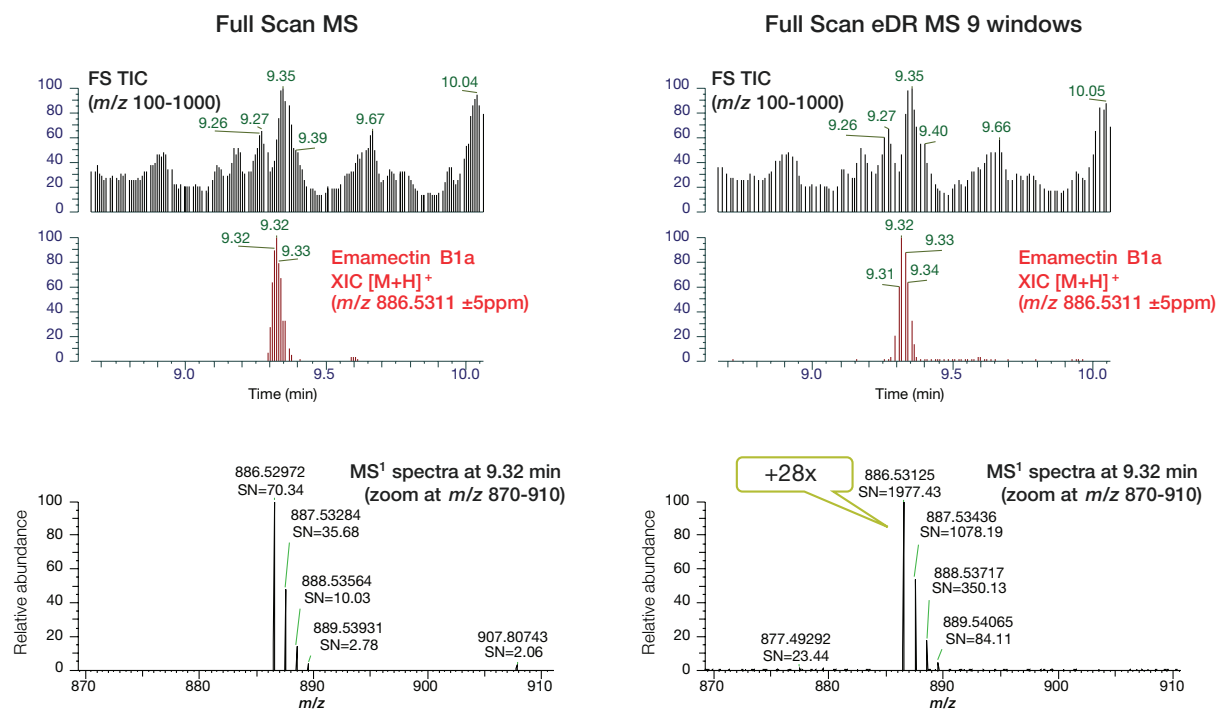


Figure 9. Detection of emamectin B1a at 10 ppb demonstrates improved sensitivity using eDR.

“

With the Orbitrap Excedion MS, we can finally bring high-resolution mass spectrometry into our pesticide lab and rely on it day in and day out, gaining the confidence, selectivity, and consistency we need for accurate results.

”



Amadeo R. Fernandez-Alba Ph.D.
Professor of Analytical Chemistry and Head,
European Reference Laboratory for Pesticide
Residues in Fruits and Vegetables
Department of Chemistry and Physics
University of Almería, Spain



“

eDR is a game-changer, delivering far more detected compounds and much higher sensitivity—enabling sub-ppt PFAS quantitation alongside comprehensive non-targeted analysis in highly complex samples on a single, versatile platform.

”



P. Lee Ferguson, Ph.D.
Professor of Civil and Environmental Engineering
Department of Civil and Environmental Engineering
Pratt School of Engineering
Duke University, USA

Expand detection. Accelerate identification.

Full scan eDR MS unlocks a broader, more complete view of complex samples, expanding both detection and insight in non-targeted workflows. In PFAS analysis, enabling eDR increased compound detection nearly fivefold, revealing 8,741 compounds compared to 1,824 without eDR.

This expanded visibility goes beyond compound count. By capturing low-abundance ions alongside dominant species within the same scan, eDR enhances MS² coverage and improves annotation success—enabling more confident identification of trace-level compounds in highly complex matrices such as AFFF.

Paired with intelligent acquisition strategies like the AcquireX workflow and Compound Discoverer software for compound annotation, eDR drives deeper, more efficient sample interrogation—helping ensure that meaningful chemical information is not missed. The result is greater confidence in discovery workflows and a clearer path from detection to identification.

Reveal more of what's in your sample

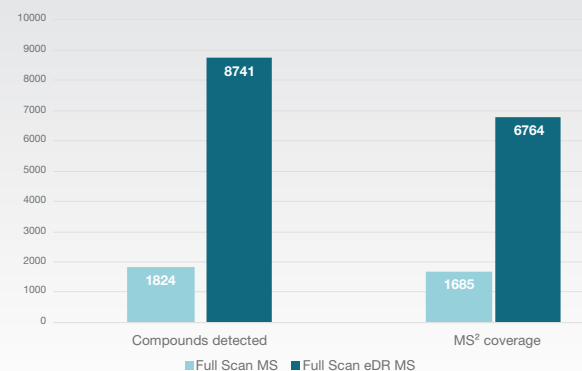


Figure 10. eDR expands compound detection nearly fivefold—revealing 8,741 compounds versus 1,824 without eDR in complex AFFF samples and enabling the acquisition of MS² data for 6,764 compounds.

Turn detection into confident identification

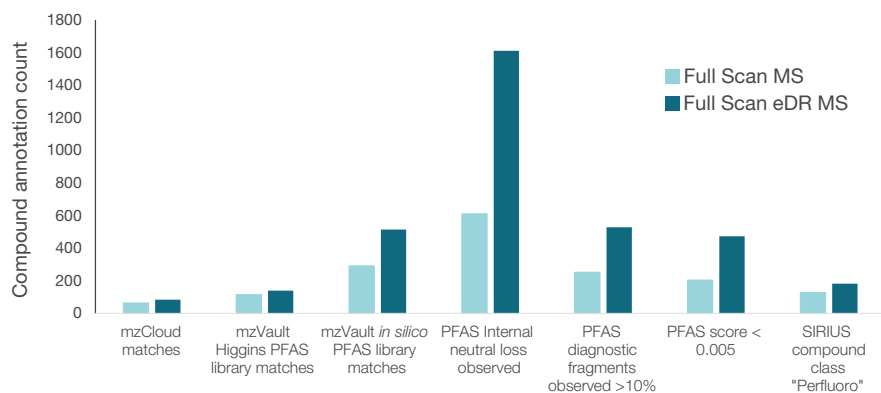


Figure 11. Increased compound detection with eDR drives higher annotation success, improving PFAS identification through enhanced MS² coverage and isotope-based scoring.

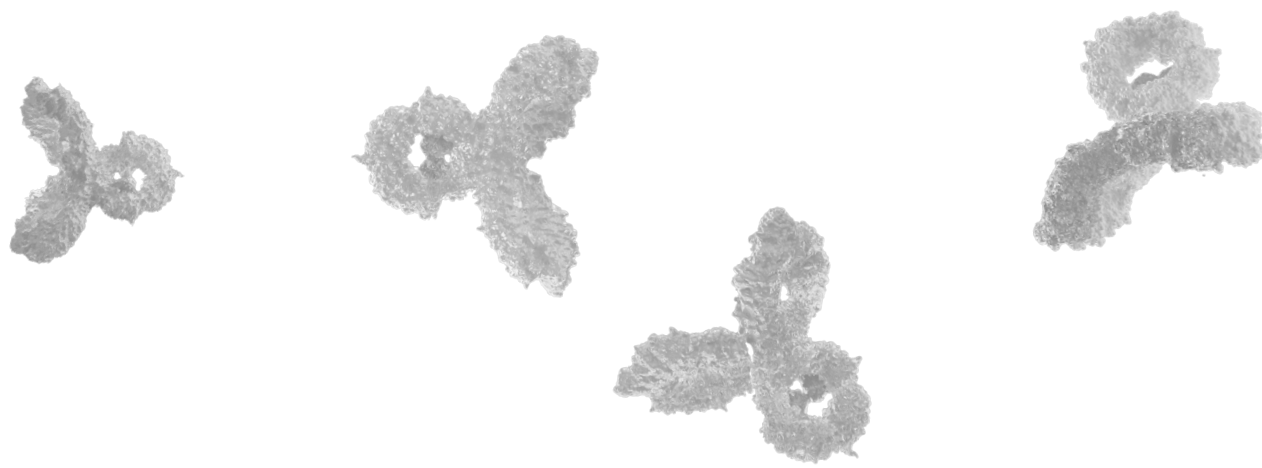
Confidently detect and quantify drug metabolites in complex biological systems

Detect, identify, and quantify emerging modality drugs and their metabolites with sensitivity and confidence across complex biological matrices

Drug metabolism and pharmacokinetic workflows require sensitive, reliable analysis. The Orbitrap Excedion MS enables confident detection, identification, and quantitation of metabolites in complex matrices. Full Scan eDR MS improves detection and identification of low-abundance species.

Full Scan eDR MS unlocks confident detection of low-abundance semaglutide metabolites in micropig plasma

With eDR enabled, the Orbitrap Excedion MS clearly resolves low level semaglutide metabolite from complex plasma, delivering improved signal-to-noise and clean isotopic patterns for confident detection and identification. Without eDR, spectral clarity is reduced by matrix interference. By extending intra-scan dynamic range, eDR minimizes background suppression of low-intensity species, enabling confident detection and quantitation of trace-level metabolites *in vivo*.



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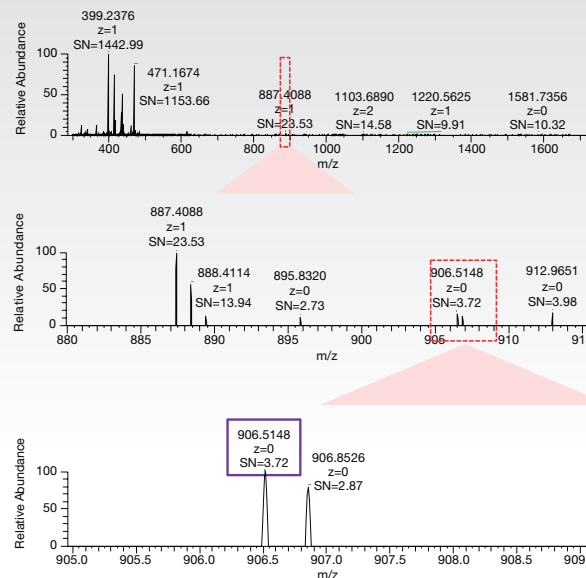
The Orbitrap Excedion Hybrid MS provides high-resolution, accurate mass with sensitivity comparable to a triple quadrupole, enabling highly sensitive peptide drug metabolite detection and identification via eDR, while supporting concurrent qualitative and quantitative analysis in a single LC-MS experiment ”



Aaron Lopes

Core Director - Bioanalysis
Massachusetts Institute of
Technology (MIT), USA
Broad Institute of MIT, USA

Full Scan MS



Full Scan eDR MS

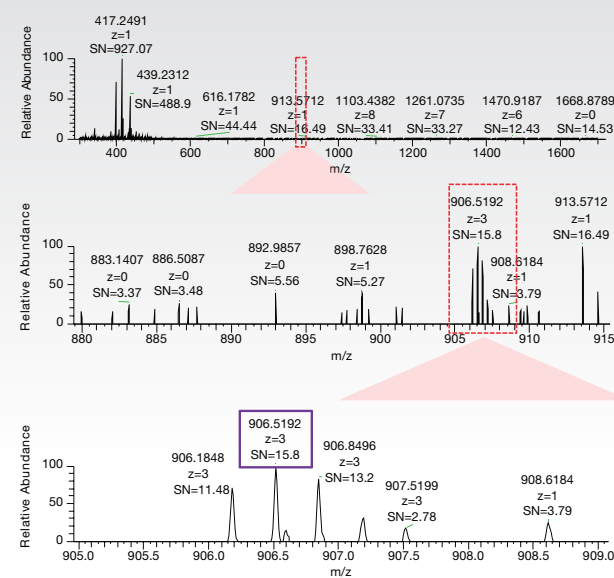


Figure 12. High-sensitivity, high-isotope fidelity detection of trace-level semaglutide metabolite *in vivo* using Full Scan eDR MS. Semaglutide was administered subcutaneously to micropigs, and plasma samples were collected at different time points post-administration followed by protein precipitation and solid phase extraction for sample cleanup. Confident detection of low-abundance semaglutide metabolite in extracted plasma samples was achieved as early as 60 minutes post injection. Full Scan eDR MS on the Orbitrap Excedion mass spectrometer enabled high isotope fidelity, improved signal-to-noise ratio, and clear discrimination from plasma background. Compared with standard acquisition (Full Scan MS), eDR provides full isotopic profiles and accurate charge state assignment of a Semaglutide metabolite at m/z 906.5192 with increased S/N, supporting reliable detection and identification of trace-level analytes.

High-sensitivity, selective quantification of ASOs in plasma

High-sensitivity and selective quantitation of antisense oligonucleotides (ASOs) in plasma is often challenged by complex biological matrices and limited assay selectivity. Acquisition of HRAM tMS2 data on the Orbitrap Excedion Hybrid MS enables post-acquisition selection of fragment ions with sub-ppm mass accuracy and high resolving power, helping resolve matrix interferences and improve quantitative selectivity. By summing the peak areas of multiple fragment ions to enhance sensitivity, the method achieves an LLOQ of 100 pg/mL for ASOs while maintaining excellent accuracy and precision across a broad linear dynamic range.

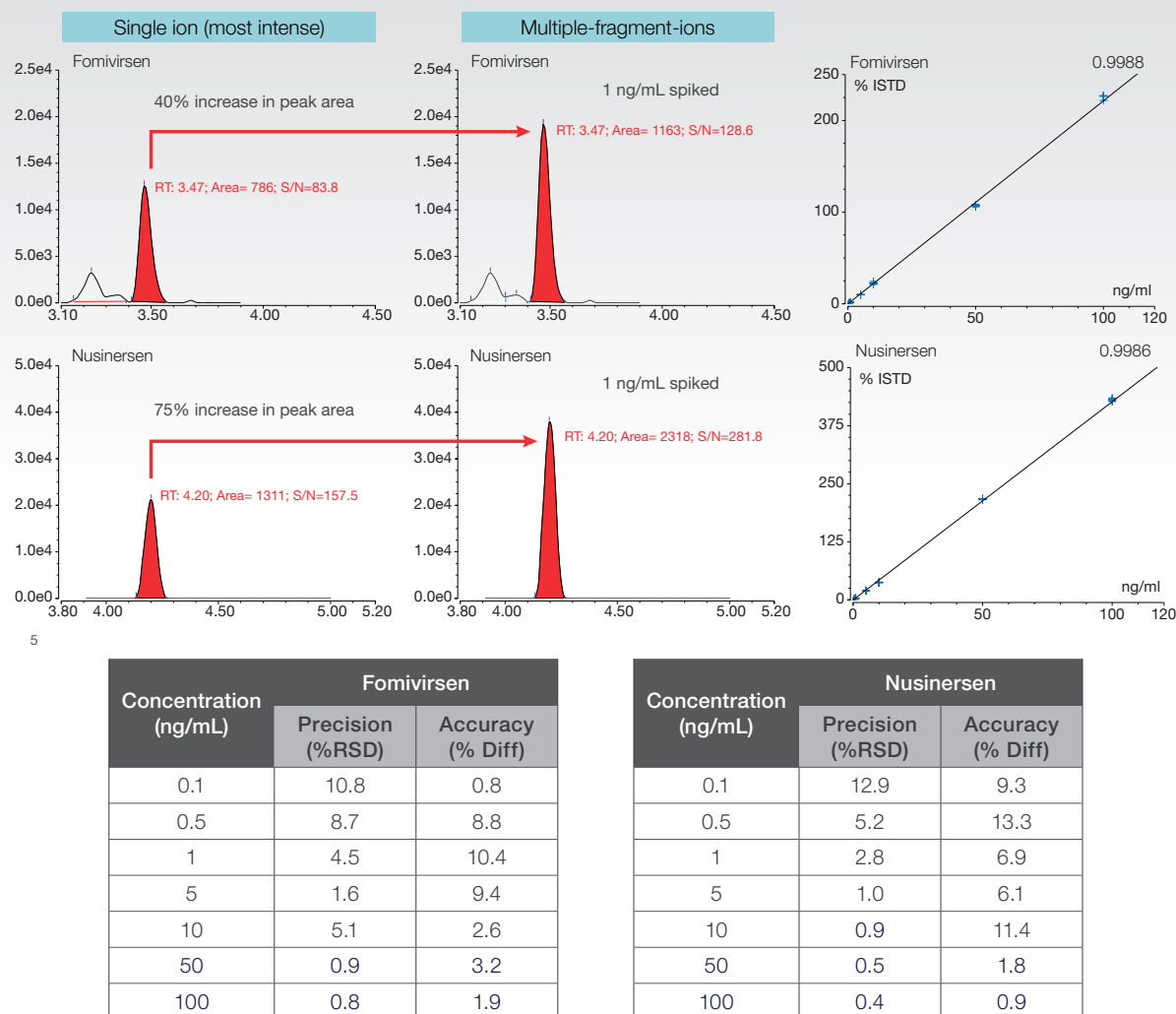


Figure 13. High-sensitivity and selective HRAM tMS2 quantitation of ASOs in plasma using multiple fragment ions. Representative extracted ion chromatograms for fomivirsen and nusinersen show that summing multiple fragment ions increases peak area relative to the single most intense fragment ion, improving sensitivity by approximately 40% for fomivirsen and 75% for nusinersen at 1 ng/mL spiked concentration. Calibration curves generated from summed fragment-ion responses demonstrate excellent linearity across the evaluated concentration range from 0.1 to 100 ng/mL, supporting an LLOQ of 0.1 ng/mL with acceptable accuracy and precision in plasma.

Achieve deep proteome coverage without compromise

Proteomics workflows often force tradeoffs between depth, speed, and confidence. The Orbitrap Excedion MS eliminates these tradeoffs, enabling reliable protein and peptide identification with high resolution and extended dynamic range. It delivers the sensitivity and selectivity needed for complex samples without sacrificing throughput, supporting deep coverage and reproducible quantitation. In DIA (data independent acquisition) mode, it maintains strong identification performance across mixed-species samples, demonstrating consistent depth in complex workflows.

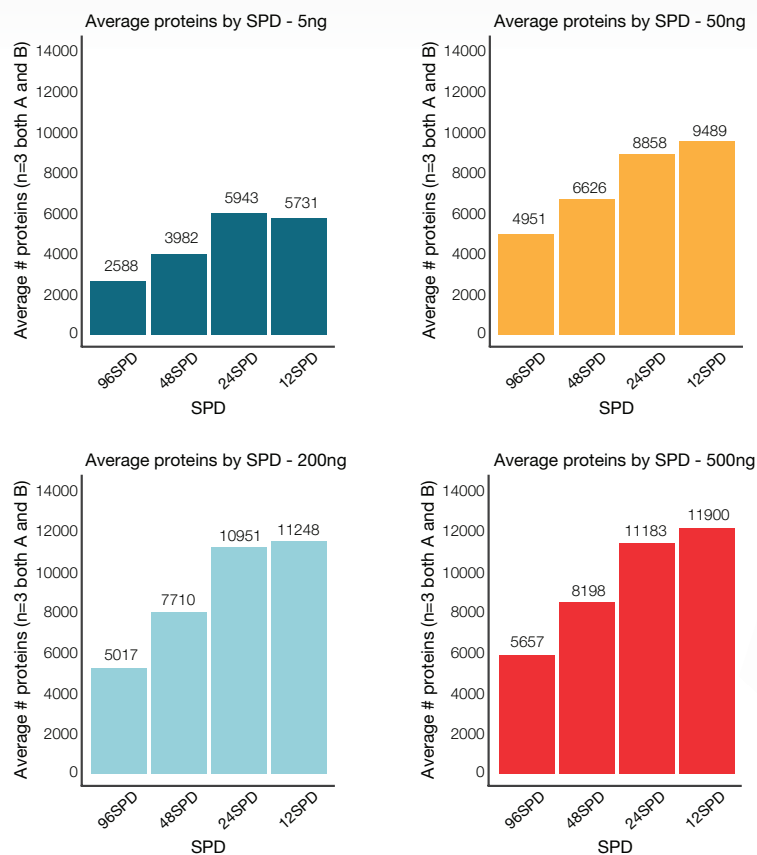


Figure 14. DIA performance, average protein by samples per day (SPD) using a three proteome mix and a sample load from 5 ng to 500 ng of proteome digest.

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In the current environment, finding the cash for a new instrument is extremely difficult. The ability to upgrade instrumentation, at a fraction of the cost, is a game changer. It will allow many more labs to stay at the forefront of technology.”

”



Danielle L. Swaney, Ph.D.
Associate Professor, Bioengineering
and Therapeutic Sciences
University of California,
San Francisco, USA

Select throughput settings based on study needs without losing confidence in quantitation

The Orbitrap Excedion MS delivers high-accuracy quantitation across a wide range of SPDs, identifying over 5.5K proteins at 96 SPD and more than 11.8K at 12 SPD—maintaining both depth and throughput.

Across yeast, human, and *E. coli* proteomes, median protein $\log_2$ ratio deviations ≤ 0.10 , and median protein CVs ranging from 3% to 6% demonstrate consistent, reliable quantitation for comparative studies.

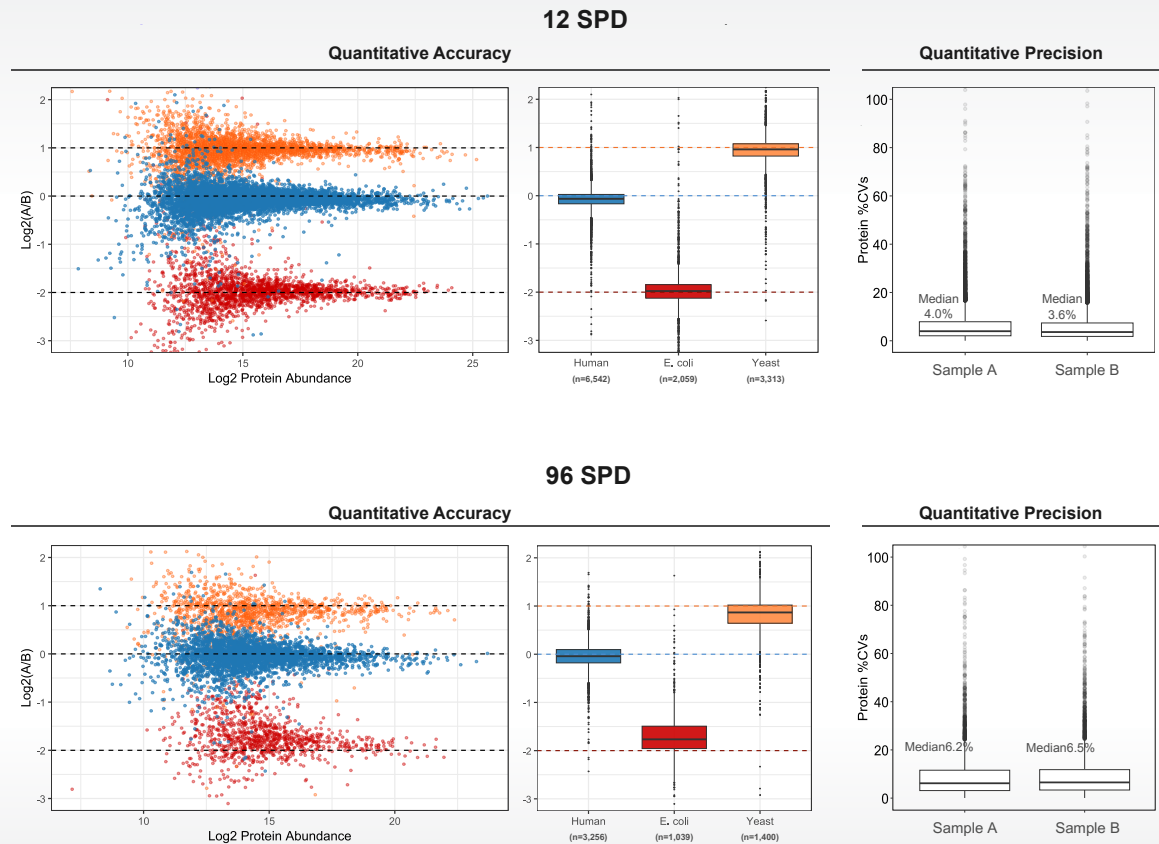


Figure 15. Median protein $\log_2$ ratio deviations ≤ 0.10 and median protein CVs ranging from 3 to 6% across yeast, human, and *E. coli* proteomes.

A platform built for long-term scientific success

Orbitrap Excedion MS is designed for adaptability, scalability, and sustained performance, enabling laboratories to confidently meet evolving analytical demands over time.

By combining next-generation Orbitrap performance with a practical upgrade path, the platform supports a more sustainable approach to instrument adoption—one that aligns immediate analytical needs with long-term scientific ambition.

Start with Orbitrap Excedion MS and expand to Orbitrap Excedion Pro MS when your science demands more.

Both deliver equal performance in:

- Sensitivity
- Mass accuracy
- Linear dynamic range
- Full Scan eDR MS
- m/z 40–6,000 mass range



Upgrade to Orbitrap Excedion Pro MS to add:

	Orbitrap Excedion MS	Orbitrap Excedion Pro MS
Scan speed:	Up to 40 Hz	Up to 70 Hz
Max resolution:	240k	480k
Multiplexing:	TMTpro 18-plex	TMTpro 35-plex
Ion management:	X	Bent trap pre-accumulation
Hybrid-DIA acquisition:	X	Hybrid-DIA with adaptive RT routine
Advanced electron-transfer fragmentation:	X	Fast and sensitive EASY-ETD (option)
Expanded structural characterization:	X	ETHcD analysis (option)
	Orbitrap Excedion BioPharma Edition MS	Orbitrap Excedion Pro BioPharma Edition MS
Mass range	Up to m/z 8,000	Up to m/z 12,000



Experience the advantages of Thermo Fisher Scientific Service

Choosing the Orbitrap Excedion mass spectrometer platform means more than just acquiring advanced technology; it means partnering with Thermo Fisher Scientific, a leader in scientific innovation and support. **Our Unity™ Lab Services** delivers world-class service solutions to support your instruments. Our comprehensive service portfolio includes instrument service plans, on-demand services (compliance services, maintenance, and installation), and education support.

Services Central allows you to easily request, manage and view services via a centralized online platform. You can also check service plan or warranty coverage, access manuals, and more.

For more information or to schedule a demonstration, contact us today.
Discover what Orbitrap Excedion mass spectrometers can do for you!

 Learn more at thermofisher.com/orbitrapexcedion

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