Agilent 6490 Triple Quadrupole LC/MS System

# REACH ULTIMATE SENSITIVITY WITH BREAKTHROUGH IFUNNEL TECHNOLOGY

The Measure of Confidence

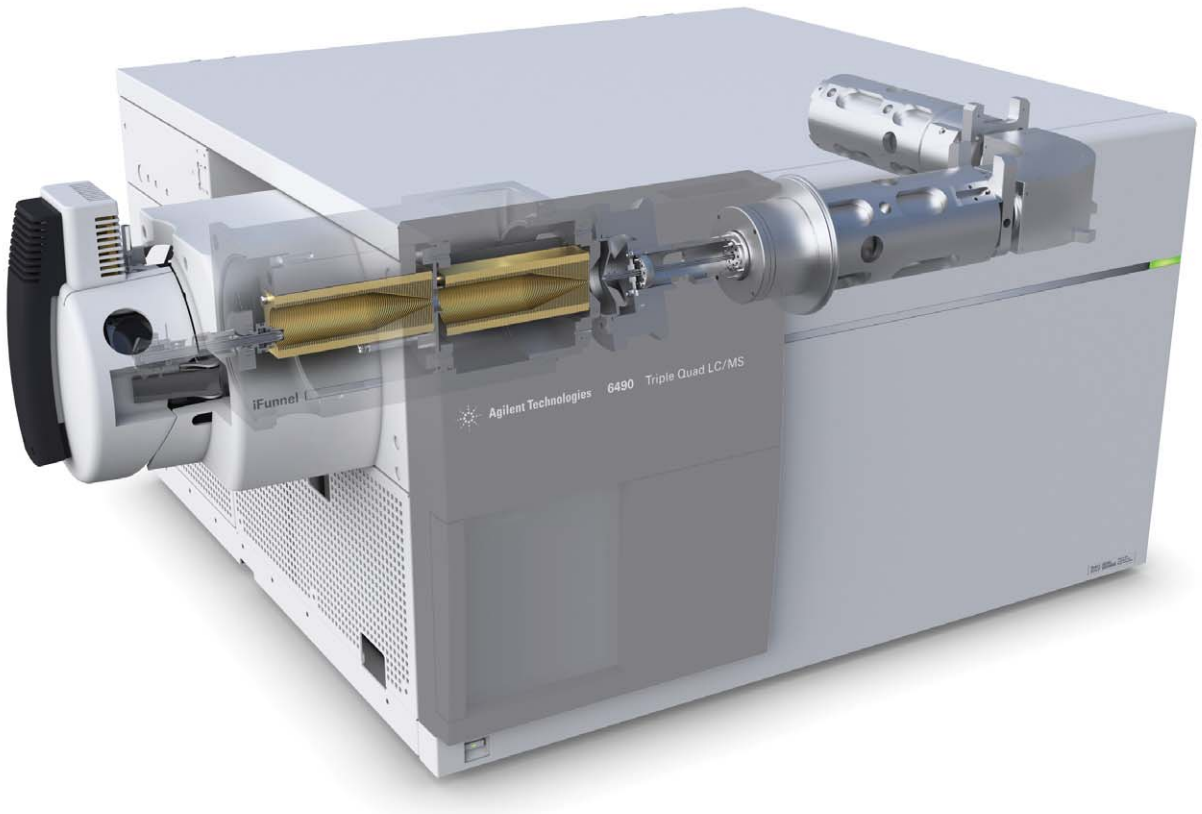

Agilent Technologies

# CLEARLY BETTER SENSITIVITY FOR YOUR MOST CHALLENGING QUANTITATIVE ANALYSES

Incorporating breakthrough iFunnel technology, the Agilent 6490 Triple Quadrupole LC/MS takes detection limits lower than ever. For the first time ever, you can achieve zeptomole level sensitivity at conventional flow rates—making the 6490 the ideal choice for critical pharmaceutical, life science, clinical, food safety, forensics/toxicology, and environmental applications.

A compact design utilizing a curved collision cell has resulted in a small benchtop footprint. New high frequency quadrupole electronics enable faster scan rates that are fully compatible with the ultra fast separations of Agilent's 1200 Infinity Series LC systems.

The Agilent 6490 Triple Quadrupole LC/MS delivers the lowest limits of detection over the widest linear dynamic range—in an extremely compact benchtop system.



*"By using this new Agilent Ion Funnel technology, a much more sensitive mass spectrometer, we can decrease the analysis time, increase the sensitivity and make it possible to analyze a large number of samples."*

**DR. CHRISTOPH BORCHERS,** UNIVERSITY OF VICTORIA-GENOME, BC PROTEOMICS CENTRE

## The Lowest Limits of Detection and Quantitation

Optimized ion generation and transmission across a broad mass range ensure the lowest limits of detection and quantitation for a wide range of sample types. Attogram (zeptomole) sensitivity allows more confident detection and quantitation of trace-level target compounds in complex matrices.

## Highest Day-to-Day Productivity

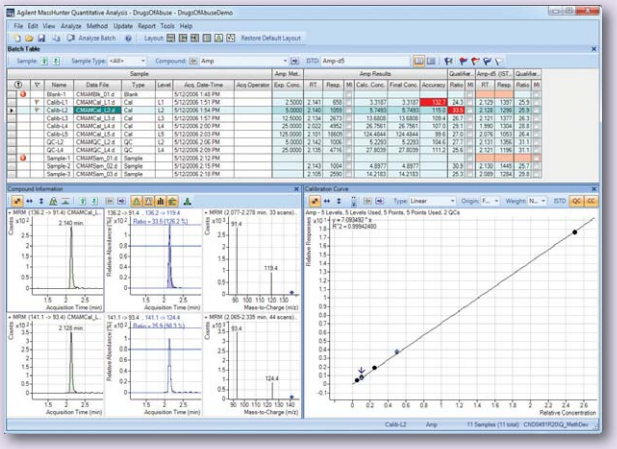
Automated multi-analyte tuning gives you more information from every experiment. High throughput automation capabilities let you analyze samples in 96 well plates in less than ten minutes—so you can keep up with the new 36-plate 1290 Infinity Injector HTC/HTS autosampler. The 6490 system's increased sensitivity and expanded dynamic range also boost productivity by making sample prep as easy as "dilute and shoot" for many applications.

## Agilent Reliability, of course

Agilent's commitment to innovation and performance improvement continues to produce new instruments with industry-leading speed, sensitivity, and performance. But one thing always remains constant: robust, Agilent-reliable performance and ease-of-use.

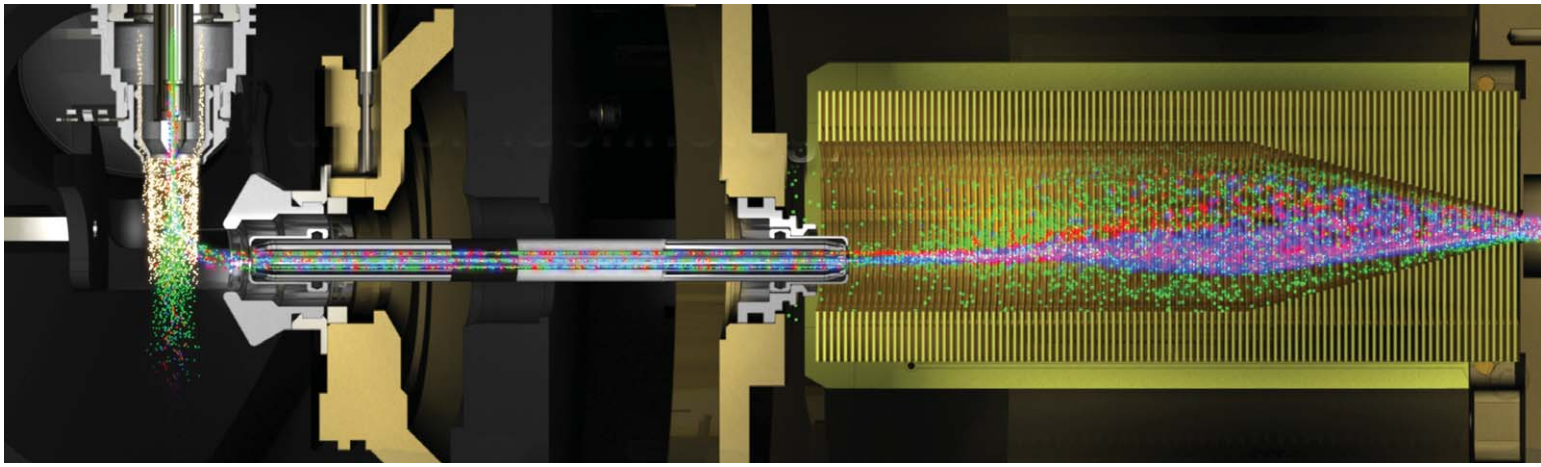
# MassHunter Software Simplifies and Automates Quantitative Analysis

Agilent MassHunter Workstation software simplifies sample management, MS method optimization, data processing, and reporting for quantitative analyses. An impressive suite of tools facilitates the major workflows, particularly for pharmaceutical and regulated laboratory environments. These include Study Manager for automated bioanalysis with LIMS connectivity and high-throughput *in vitro* screening in drug discovery applications. Optimizer software allows automated determination of compound MRM parameters, and triggered MRM (tMRM) data-dependent acquisition enables fast, sensitive compound quantitation and confirmation.



# IFUNNEL TECHNOLOGY: A LOT MORE SIGNAL, A LOT LESS NOISE

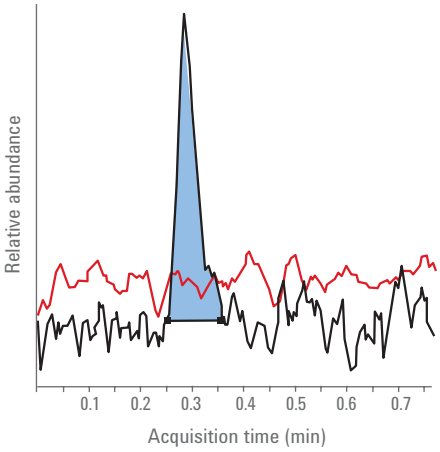
Agilent's proprietary iFunnel Technology combines the high-efficiency ESI ion generation and focusing of Agilent Jet Stream sample introduction with a hexabore capillary and a unique dual-stage ion funnel assembly. This innovative technology demonstrates double-digit increases in sensitivity compared to older instruments.



Three technology innovations work together to reduce contamination and neutrals and dramatically improve overall signal within the system:

- **Agilent Jet Stream thermal gradient focusing**—A precisely micro-machined sprayer surrounds ESI droplets with a sheath of superheated gas to desolvate and concentrate ions near the MS inlet for more effective sampling.
- **Hexabore sampling capillary**—Six independent, parallel bores enable a much larger fraction of the ions formed in the ESI spray plume to enter the mass spectrometer.
- **Dual-stage ion funnel**—Novel design allows increased ion transfer to Q1 while evacuating the higher gas load.

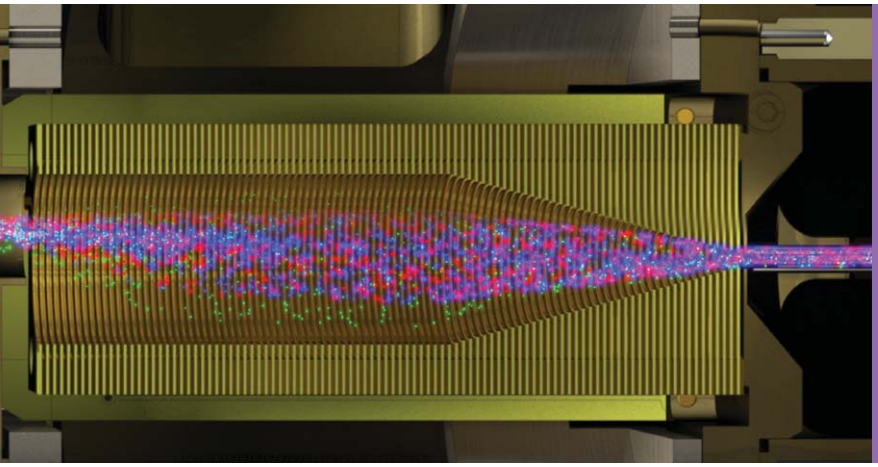
### Zeptomole sensitivity




The SRM ion chromatogram of verapamil (MRM transition 455.3⟶164.9) for 100 attograms (200 zeptomoles) injected on-column (blue). The red trace shows a blank injection.

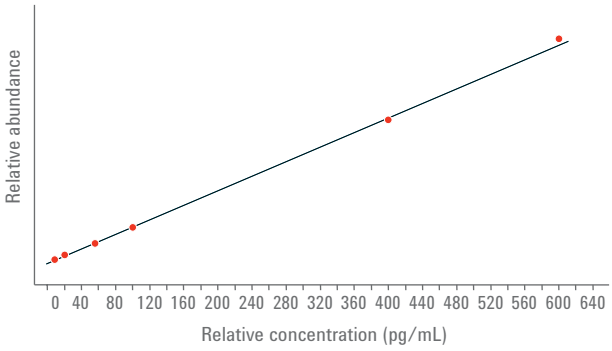
*"Ion Funnel technology could possibly be the most significant MS development since the introduction of the API. It delivers a fundamental sensitivity and detection limit breakthrough—resulting in performance far exceeding the capabilities of conventional mass spectrometers."*

**DR. RICHARD SMITH,** INVENTOR OF THE ION FUNNEL, BATTELLE FELLOW AND CHIEF SCIENTIST, PNNL



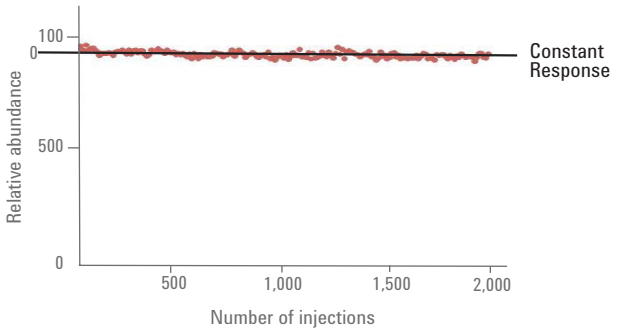
# iFUNNEL TECHNOLOGY REVOLUTIONIZES ATMOSPHERIC SAMPLING

### The first triple quadrupole LC/MS system to deliver six orders of linear dynamic range




Linear response of verapamil from 100 attograms to 100 picograms injected on-column. The $R^2$ value (0.997)underscores the wide range of linear response.

### Exceptional assay robustness for samples in complex matrices

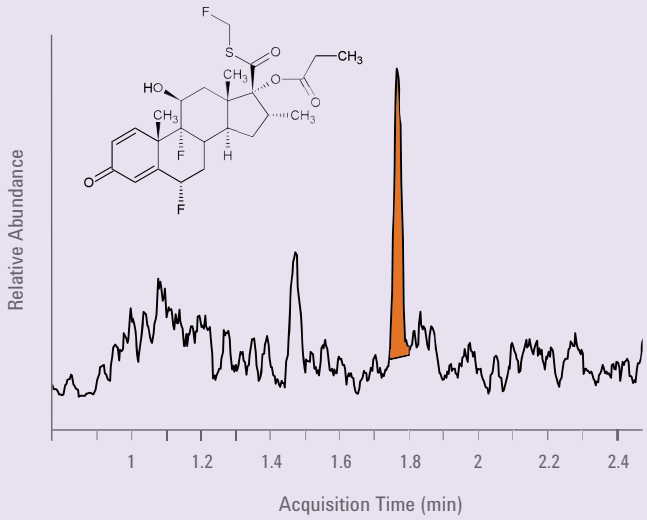



Data shows consistent peak response for 2,000 consecutive injections of verapamil in plasma (20 femtograms injected on-column)—more than four days of continuous operation. RSD for the peak area is <6%. Normally, peak-area stability in plasma is shown for picogram quantities injected on-column; levels in this example are more than one hundred times lower.

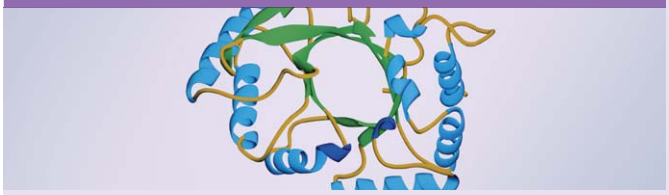
# ULTRA SENSITIVE PERFORMANCE IN THE MOST CRITICAL QUANTITATIVE APPLICATIONS

## Low-Level Drugs in Plasma Using "Dilute And Shoot" Method

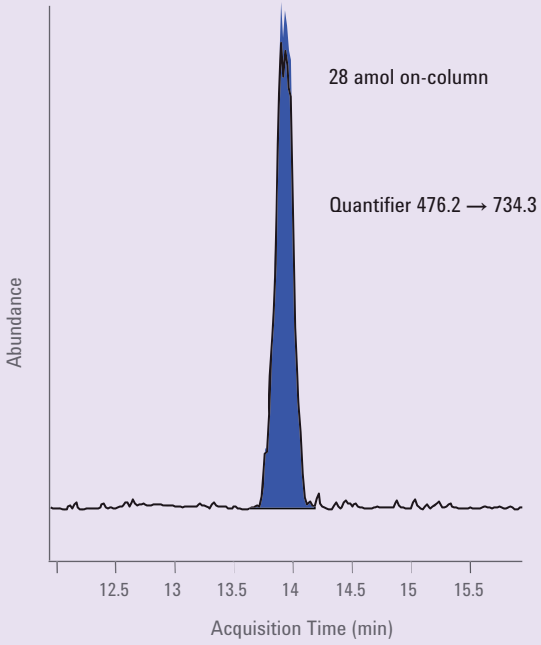
Fluticasone proprionate ion chromatogram (MRM transition 501.2 → 293.1) for 2.5 femtograms injected on-column. Due to its low systemic levels, a very high-sensitivity LC/MS assay is required to determine fluticasone concentrations. The extreme sensitivity of the 6490 eliminates the need for SPE and LLE and instead allows direct analysis of crashed plasma after a four-fold dilution with water.




## Attomole-Level Peptide Quantitation

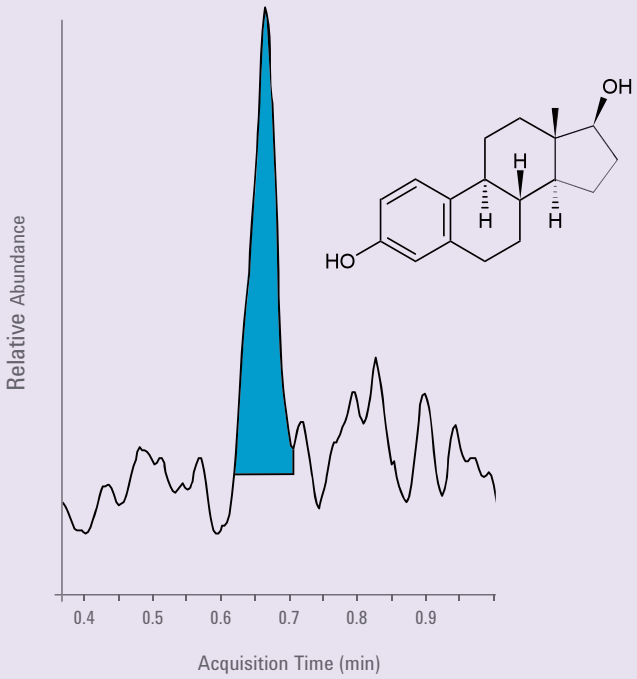


Extracted ion chromatogram of a peptide (IEDIVTSEK), using the transition from 476.2 to 734.3 m/z for 28 attomoles of peptide injected on-column with a conventional LC/MS system at 400 µL/min. The strong signal intensity and low noise of the 6490 system demonstrate a remarkable detection limit of approximately 1 attomole on a standard 2-mm column.



## Direct Determination of Estradiol in Human Plasma

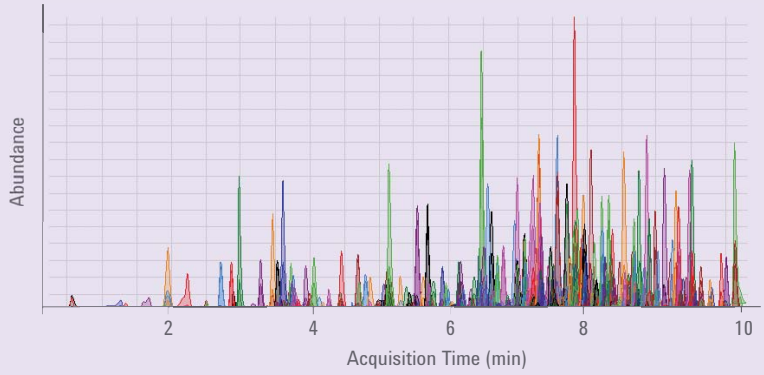
The 6490 system's extreme sensitivity enables quantifiable detection of estradiol in plasma down to a concentration of 10 pg/mL with just a 10-µL injection. The significant improvement in assay performance is a direct benefit of iFunnel technology, which provides a ten-fold lower limit of quantitation compared to other triple quadrupole instruments.




## Complex Pesticide Screening at High Sensitivity

**tMRM enables users to confidently quantitate and confirm target analytes in a single experiment.**

300 pesticides spiked into black tea at the 2.5 µg/kg level. The level of spiked pesticides represents only 0.25% of the Maximum Residue Limit (MRL); some pesticides could be readily detected at 0.05% of the MRL. Individual compounds could be diluted as much as 50-fold and were still detected below the MRL.



## Experience Clearly Better Sensitivity and Boost Your Lab's Productivity, Too

If you need to analyze trace organic compounds or peptides in complex matrices—quantitating drugs or metabolites, measuring pesticide levels in foods, or monitoring contaminant levels in ground water—take advantage of the unsurpassed sensitivity and robust performance of Agilent's 6490 Triple Quadrupole LC/MS.

## Software and Services that Support the Regulated Lab


MassHunter software provides comprehensive tools to help you address all the requirements of GLP/GMP and 21 CFR Part 11 compliance. With built-in audit trails, multi-user login security, user permissions, and electronic signatures, the software makes it easier for your laboratory to operate in a regulated environment. Agilent also offers a complete suite of Installation and Operation Qualification services to shorten the time between installation and running critical samples.

## The Agilent Value Promise: 10 Years of Guaranteed Performance


In addition to our continually evolving products, Agilent offers the industry's only 10-year value guarantee. Agilent guarantees you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of that system toward an upgraded model. It's our way of assuring you of a safe purchase now and protecting your investment.

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