



Anti-doping

Upholding the integrity of sport

With advanced chromatography and mass spectrometry solutions from the leader in anti-doping technologies



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The modern anti-doping landscape

A long-standing commitment to analytical integrity in sport

The integrity of sport depends on analytical excellence. As doping strategies grow increasingly sophisticated, anti-doping laboratories must deploy technologies that not only meet today's regulatory requirements but anticipate tomorrow's challenges. Innovation in chromatography, high-resolution mass spectrometry, and isotope ratio analysis has become central to protecting clean competition.

For more than 25 years, Thermo Fisher Scientific has partnered with World Anti-Doping Agency (WADA)-accredited laboratories worldwide to advance the analytical science that underpins modern anti-doping programs—supporting high-resolution screening, ultra-sensitive quantitation, isotope differentiation, longitudinal biomarker monitoring, and Olympic-scale operational readiness.



“This partnership with Thermo Fisher will be decisive in ensuring the exemplarity of the Olympic and Paralympic Games Paris 2024 and guaranteeing the absolute safety and integrity of athletes and competitions.”¹

— Tony Estanguet
President of the Paris 2024
Organizing Committee for the Olympic and Paralympic Games

25 years of advancing analytical excellence— Championing integrity in sport on the world stage

On July 17, 2023, Thermo Fisher Scientific announced that the company had joined the Paris 2024 Olympic and Paralympic Games as an Official Supporter.¹ As part of its role, Thermo Fisher provided the necessary laboratory equipment for doping control and sample storage, as well as advanced instrumentation to analyze samples, enabling WADA to deliver reliable, accurate, and fast scientific results at the Paris 2024 Olympic Games. A range of chromatography and mass spectrometry instruments allowed the accredited French laboratory to accurately detect the presence of prohibited substances and their metabolites in samples taken at the Olympic and Paralympic Games. “We depend on accurate analyses—without exception—as the results of our sports doping control tests can mean the difference between an athlete being allowed to compete or being banned from competition,” said Tony Estanguet, President of Paris 2024. “We have found a partner we trust in Thermo Fisher Scientific to provide chromatography and mass spectrometry-based solutions to ensure clean and fair sport at the Games.”

Providing analytical solutions to WADA labs

Thermo Fisher Scientific has delivered leading technologies for the analysis of performance-enhancing drugs and other prohibited substances for more than a quarter century. In line

with its commitment to advance the field, the technologies the company offers bolster the analytical arsenal of doping control laboratories, enabling them to provide multiple perspectives to enhance the reliability of results. The company’s special commitment to the field began as it built cross-functional project teams to demonstrate the performance of its technologies and workflows to WADA lab directors and their scientific teams and provided support from its application and service specialists around the clock during the Olympic Games. This resulted in a continuous cycle of support backed by a partnership with the CEO and the most senior levels of the organization, all the way through to the R&D, product management, marketing, applications, and field support engineering teams.

Thermo Fisher Scientific is dedicated to its Mission to enable our customers to make the world healthier, cleaner and safer. And while the Olympics garners a special level of company-wide support, the community of testing personnel can rest assured that they have year-round assistance of a focused team of clinical research and toxicology experts from Thermo Fisher to support all their anti-doping testing regimens and analytical success in the quest to preserve clean and fair competitions worldwide.



“Based on the remarkable sensitivity of the equipment and economic requirements of this project, Thermo Fisher Scientific became a primary provider of laboratory technology for the Olympic Games in Rio. As a strategic decision, Thermo Scientific™ Orbitrap™ technology was used to monitor prohibited substances.”

— Prof. Dr. Henrique Marcelo Gualberto Pereira
Director, Brazilian Doping Control Laboratory
LB CD - LADETEC / IQ – UFRJ

New substances, new strategies: The need for constant innovation

The World Anti-Doping Agency publishes an annually updated Prohibited List that serves as the global regulatory framework for testing programs. However, this list is explicitly non-exhaustive, requiring laboratories to detect structurally related analogues and substances with similar biological activity.²

As a result, anti-doping laboratories must maintain broad-spectrum detection strategies capable of monitoring hundreds of compounds across multiple chemical classes while preserving defensible confirmation pathways.

Technologies for today's threats and tomorrow's risks

Innovation in analytical technologies can enable anti-doping authorities and testing laboratories to stay ahead of evolving doping techniques and illicit substances to ensure a fair and clean sporting environment. Continued enhancement of such technologies, including heightened sensitivity and accelerated processing speeds, plays a pivotal role in shaping the trajectory of future anti-doping endeavors.

Embracing cutting-edge analytical tools not only empowers anti-doping laboratories to stay ahead of emerging prohibited substances but also fosters a culture of integrity and trust within the sporting community.



Anti-doping efforts are the cornerstone of upholding the integrity and fairness of sports. Doping scandals have a profound and detrimental impact on the credibility of sporting events, tarnishing the reputation of athletes, teams, and the entire sports industry. The erosion of trust resulting from these scandals not only undermines the competitive spirit but also jeopardizes the core values that sports represent—honesty, equality, and true skill. Thus, robust anti-doping measures are essential to protect the essence of sports and to sustain the belief that victory is earned through hard work, talent, and dedication, rather than unethical shortcuts.



“As a WADA-accredited and Olympic testing laboratory, LADF relies on advanced mass spectrometry workflows to deliver defensible results. The integration of Thermo Scientific™ TSQ™ and Vanquish™ systems has enhanced efficiency and turnaround while supporting more than 40,000 sample analyses since 2023. This unified platform strengthens our ability to provide accurate, high-quality anti-doping testing.”

— Magnus Ericsson

Director, Laboratoire Antidopage Français (LADF)

Advanced analytical technologies can detect today's threats and anticipate tomorrow's challenges

In this comprehensive eBook, we provide information and solutions to ensure you are up to date with the latest advancements in anti-doping technologies. The aim of this guide is to provide you with the cutting-edge tools and methodologies that stand at the forefront of the fight against doping, ensuring a fair and integrity-driven landscape in the world of sports.

Beyond the Prohibited List

The misguided creativity of the athletes that choose to dope and/or their respective staff and coaching counterparts requires doping control labs to implement multiple analytical procedures to accurately monitor performance enhancement targets in real time while incorporating longitudinal studies to monitor emerging trends. WADA publishes its annual list of prohibited substances and methods of doping, which is used as the guideline for compliance in and out of competition. However, this list is not considered exhaustive, as many substances exhibit similar biological activity to those that are prohibited. This results in an abundance of compounds (over >500 molecules) that anti-doping laboratories must be able to routinely monitor during any given event (in and out of competition). There is no denying that doping scandals negatively impact the credibility of athletes and the sporting industry. To avoid tarnishing the reputation of athletes and the ethos of sports, implementation of robust anti-doping measures is imperative. Fortunately, the past few decades have seen substantial advancements by analytical instrument vendors towards the qualitative (“what is it”) and quantitative (“how much of it”) measurements of many banned substances. Utilizing highly sensitive and high-resolution analytical technologies is paramount in the fight against doping in sports. These advanced analytical tools enable the detection of even minuscule traces of prohibited substances, leaving no room for undetected doping. By leveraging such precise technologies, anti-doping authorities can ensure a level playing field for all athletes.

The evolution of anti-doping science

For more than a quarter century, Thermo Fisher Scientific has contributed to this evolution through sustained collaboration with WADA-accredited laboratories and continued innovation in analytical instrumentation.

Anti-doping measures have advanced significantly from their early beginnings to the highly sophisticated analytical technologies of today. Initially, when the International Amateur Athletics Federation (IAAF), now the International Association of Athletics Federations, banned the use of stimulants in 1928, doping detection relied on basic tests and observations. As awareness grew of the dangers of doping after the deaths of several cyclists in the 1960s, more systematic approaches emerged, including standardized testing procedures and banned substance lists.²

The advent of gas chromatography (GC), liquid chromatography (LC), and mass spectrometry (MS) in anti-doping efforts in the early 1970s marked a major leap forward, allowing for more accurate and sensitive testing.³ Over the years, advancements in analytical chemistry, biomarker detection, and molecular biology have revolutionized anti-doping efforts. The contemporary era of sports drug testing is based on methodology-driven strategies, required by growing demands in routine sports drug testing related to analytical sensitivity, comprehensiveness, and faster turnaround times. Except for a few target analytes, most test methods for doping are covered by modern GC-MS/MS, LC-MS/MS, isotope ratio-MS (IR-MS), and high-resolution accurate mass techniques. These modern analytical instruments offer unparalleled precision in identifying prohibited substances both in competition as well as retrospectively, as in re-testing programs.⁴



“Close collaboration in research and development with industry partners such as Thermo Fisher Scientific has proven invaluable in achieving the goals of sports drug testing programs.”

— Mario Thevis
Director, Center for Preventative Doping Research
German Sport University Cologne

As of January 2026, WADA's Monitoring Program includes markers of semaglutide and tirzepatide, reflecting interest in the potential misuse of GLP-1 drugs in elite sport, though they are not currently prohibited. For anti-doping labs, this creates an emerging LC-MS opportunity for sensitive detection of peptide-based GLP-1 agents and related markers in biological matrices. LC-HRAM/MS is especially relevant because it supports targeted monitoring now and retrospective analysis as the science and regulations evolve.⁵

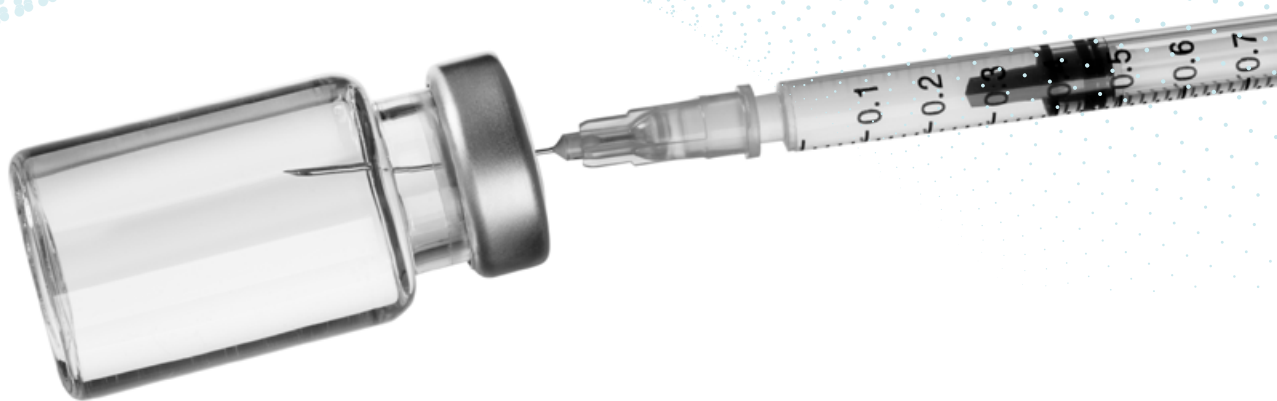
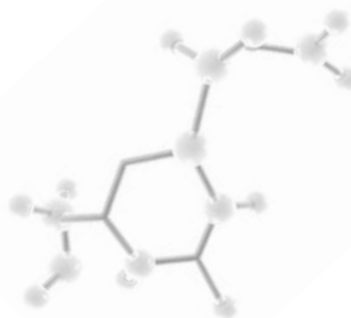
The availability of precise, accurate mass analyzers has enabled consideration of alternative matrices to be implemented for routine doping control. In particular, dried blood spots (DBS) have shown substantial potential in routine sports drug testing programs, offering a minimally invasive and athlete-friendly alternative to traditional venipuncture.

Originally introduced for newborn screening and metabolic disorder monitoring, DBS has gained traction in anti-doping programs.⁶ DBS testing can offer several advantages compared to the conventional venipuncture method, which is more invasive and requires skilled personnel. This innovative approach involves collecting capillary blood from the skin, reducing discomfort and allowing for at-home sampling. DBS testing has gained WADA approval, providing a complementary method to urine testing.⁷

Notably, the DBS technique allows for easier transport, longer sample storage, mitigated risk of exposure to blood-borne pathogens, and the potential for remote sample collections.⁸ The future of the technology includes improvements in blood draw capacity, expanded substance detection, and a shift towards

virtual blood collections, ultimately enhancing athlete experience and anti-doping efforts. Ongoing research explores the application of DBS in doping detection, showcasing its potential to revolutionize result management processes in routine sports drug testing.⁸

The use of high-resolution mass spectrometry instruments, such as time-of-flight (TOF) and Thermo Scientific™ Orbitrap™ Ion Trap Mass Analyzer Technology, has become prevalent for precise mass measurements and the ability to detect new markers.⁹ GC-triple quadrupole (QQQ) MS offers high sensitivity, allowing for the identification and quantification of doped substances. Additionally, GC coupled with isotope ratio mass spectrometry (GC/C/IRMS) enhances sensitivity, distinguishing natural and synthetic steroids.¹⁰ The integration of different techniques like GC-MS/MS, GC/C/IRMS, LC MS/MS, and others, along with statistical tools, have proven effective in detecting trace quantities of prohibited substances in biological samples.¹⁰



Core analytical architectures in modern doping control laboratories

Thermo Scientific™ Transcend™ Multichannel LC Systems increase LC-MS throughput by running multiple LC channels in parallel into a single mass spectrometer. This helps anti-doping labs improve instrument utilization, accelerate turnaround, and support high-volume analysis of complex biological samples.

Doping control labs use a variety of sophisticated analytical techniques including gas chromatography (GC), single- and multi-channel liquid chromatography (LC) systems coupled to mass spectrometry (MS), and isotope ratio mass spectrometry (IRMS). These powerful tools enable the detection and quantitation of trace amounts of banned substances and low-level metabolites (breakdown products) of banned substances in complex biological samples. In the simplest terms, chromatography is a technique that separates substances in the biological sample (e.g., urine or blood). Some compounds will respond better to gaseous phase separation and others to liquid phase separation.

Once separated, the mass spectrometer can analyze (identify and quantify) the substances based on their mass-to-charge ratio. A chemical “fingerprint” is generated, which helps the analyst identify the structure of any given molecule.

Prohibited substance screening

Initial testing procedures (ITPs) efficiently screen urinary or blood samples for numerous prohibited substances, at times requiring high-resolution mass spectrometry with resolution over 60,000 FWHM and mass errors under 2 ppm. These assays for direct urine analysis target substances such as steroids, stimulants, corticoids, metabolic modulators, diuretics, narcotics, cannabinoids, and low molecular mass peptides.

The table below provides a general overview of doping control analysis including the classes of prohibited compounds and the mainly applied methodology.

Overview of analytical techniques for prohibited substance detection

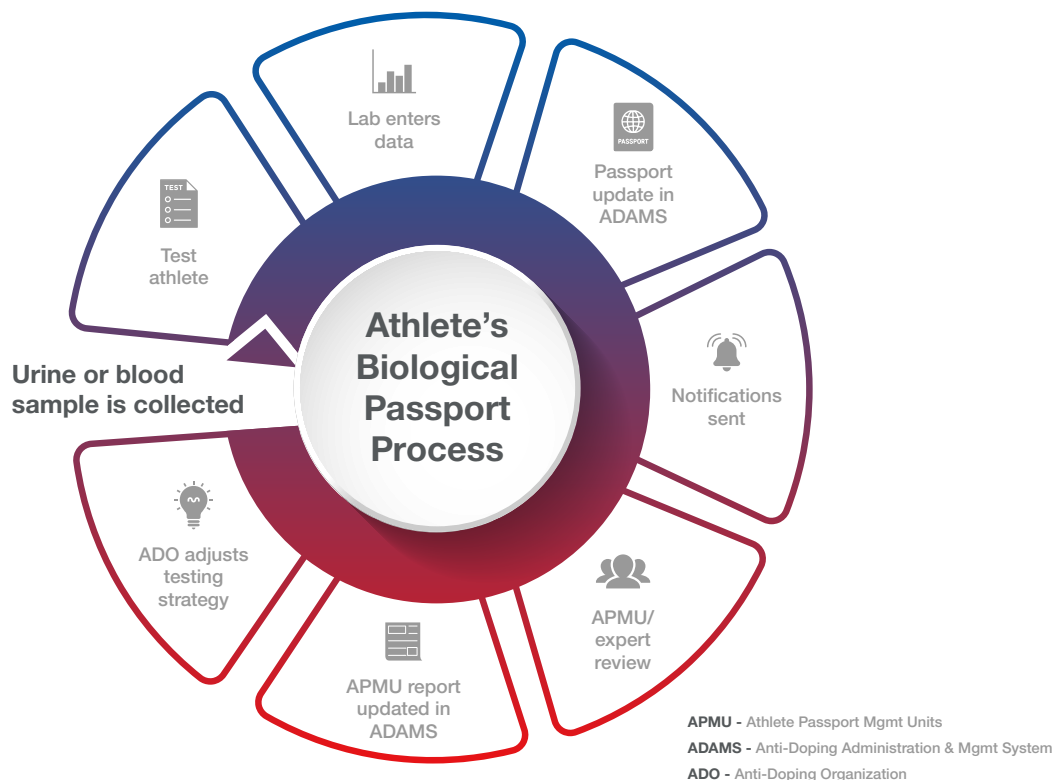
LC-MS, LC-MS/MS, LC-HRAM MS	GC-MS or GC-MS/MS	Alternative analysis
Glucocorticoids	Exogenous steroids	Erythropoiesis stimulating agents
Stimulants	Endogenous steroids	Growth hormone (GH)
Anabolic agents	Stimulants	Chorionic gonadotrophin (CG) and luteinizing hormone (LH)
β_2 -agonists	Narcotics	Hematological parameters
β -blocker	β_2 -agonists	Blood transfusion
Narcotics	Cannabinoids	Gene doping
Metabolic modulators	Anabolic agents	
Diuretics	Xenon	
Peptides (small and large)		
Proteases		
siRNA		
Initial testing procedures (ITP)	Initial testing procedures (ITP)	Initial testing procedures (ITP)
Confirmation procedures (CP)	Confirmation procedures (CP)	Confirmation procedures (CP)

*Abbreviations: GC-MS: gas chromatography-mass spectrometry; LC-MS: liquid chromatography-mass spectrometry; HRMS: high-resolution mass spectrometry; IRMS: isotope-ratio mass spectrometry; C: combustion; EI: electron ionization; ESI: electrospray ionization; APCI: atmospheric pressure chemical ionization; SDS-PAGE: sodium dodecyl sulfate-polyacrylamide gel electrophoresis; ECLIA: electrochemiluminescence immunoassay; IEF: isoelectric focusing; SAR: sarcosyl; ILMA: immunoluminometric assay; PCR: polymerase chain reaction

The Athlete Biological Passport (ABP)

Anti-doping laboratories use two main strategies. The first involves analyzing a single sample, typically at competitive events, to detect prohibited substances. The second is longitudinal testing, where results are part of a broader performance profiling framework. This approach forms the basis

of the Athlete Biological Passport (ABP), which monitors the effects of doping on the body over time and allows anti-doping organizations to establish individual baseline profiles for each athlete. By tracking fluctuations outside an athlete's normal range, the ABP helps identify potential doping practices, including steroid abuse.



A comprehensive Thermo Scientific portfolio engineered for the evolving demands of anti-doping science

LC-MS

Enabling accurate quantitation and retrospective reanalysis through integrated LC-MS workflows

Another advancement in the field of doping control is the use of liquid chromatography (LC) combined with high-resolution accurate mass (HRAM) mass spectrometry (MS), which has become the technology of choice for precise mass measurements and the ability to detect new doping markers. Thermo Fisher Scientific leads the industry with its proprietary Thermo Scientific™ Orbitrap™ technology (such as the Thermo Scientific™ Orbitrap Exploris™ 120 Mass Spectrometer), which has become synonymous with unparalleled performance that can even resolve compounds with very small differences in mass from one another, delivering the ultimate in precision and mass accuracy—down to sub parts per million (ppm) error (a measurement from the observed monoisotopic mass to theoretical). This can be reliably done over thousands of sample injections for the comprehensive screening of both known and unknown performance-enhancing substances.

The major benefit of high-resolution Orbitrap MS is that it allows testing organizations to perform retrospective analyses by reprocessing previously collected samples to confirm newly identified illicit substances. The International Testing Agency stores athlete samples for 10 years, which acts as a powerful means of deterrence, discouraging the misuse of performance enhancing substances, whether currently on the banned list or not. This, combined with the use of retrospective analysis on high-resolution mass spectrometers, enables detection of new metabolites, extends detection windows, and is crucial in the monitoring of an athlete's ABP, which determines select biological parameters (not necessarily drug compounds) over time, allowing agencies to generate longitudinal profiles for athletes.

Following screening results, the LC triple quadrupole technology (Thermo Scientific™ TSQ Certis™ Mass Spectrometer, Thermo Scientific™ TSQ Altis™ Plus Mass Spectrometer) can be used for the ongoing confirmation of prohibited substances at a low level of detection.



“Using the Thermo Scientific™ Q Exactive™ Orbitrap™ Mass Spectrometer in positive, negative, and all ion fragmentation modes in 1.3 seconds for non-targeted data capture met our aim and was certainly a first at any Olympics meeting.”

— David Cowan
Former Director of the London Drug Control Centre
Department of Analytical, Environmental & Forensic Sciences
King's College London



“Leveraging its outstanding sensitivity, the equipment effectively facilitated excellent doping-control operations throughout the Olympic period.”

— Junghyun (John) Son, Ph.D.
Director at Doping Control Center
Associate Professor at UST

Korea Institute of Science and Technology

Next-generation steroid ester detection

The Thermo Scientific™ Stellar™ MS enables direct detection of exogenous steroid esters in DBS, eliminating the ambiguity of traditional urinary profiling while maintaining sensitivity at trace levels. Simplified workflows—no derivatization, reduced sample prep, and unified multi-analyte methods—improve efficiency across diverse DBS platforms. Leveraging MS³, the Stellar MS delivers enhanced specificity and sensitivity through cleaner backgrounds, reduced noise, and highly reproducible, diagnostic transitions critical for confident confirmatory screening.

One notable system is the Thermo Scientific™ Tox Explorer™ Collection, a comprehensive LC-MS toxicology workflow solution tailored to tackle intricate analytical challenges that is optimized for quick start-up and ease of use. In addition,

Thermo Fisher Scientific offers a diverse range of both triple quadrupole TSQ and HRAM Orbitrap LC-MS systems, catering to a wide spectrum of analytical requirements, including the ability to identify unknowns.

Thermo Scientific™ FAIMS Pro Duo Technology provides an additional dimension of separation to enhance LC-MS analysis. This results in improved signal-to-noise ratios and LOQ when dealing with complex matrices, such as human serum.

For enhanced efficiency, the multichannel LC Thermo Scientific™ Vanquish™ Duo UHPLC Systems and Thermo Scientific™ Transcend™ TLX-4 System stand out, facilitating substantial throughput and enabling online solid phase extraction (SPE). With the ability to run two to four independent LC channels simultaneously, these systems contribute to streamlined processes.

LC-MS featured products



[Learn more about the Orbitrap Exploris 120 hybrid HRMS](#)

View brochure



[Learn more about the Stellar hybrid nominal mass quadrupole linear ion trap MS](#)

View brochure



[Learn more about the TSQ Certis Triple Quadrupole MS](#)

View brochure





[Learn more about the TSQ Altis Plus Triple Quadrupole MS](#)

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[Learn more about the Tox Explorer Collection](#)

View brochure 



[Learn more about the Vanquish Duo UHPLC](#)

View brochure 



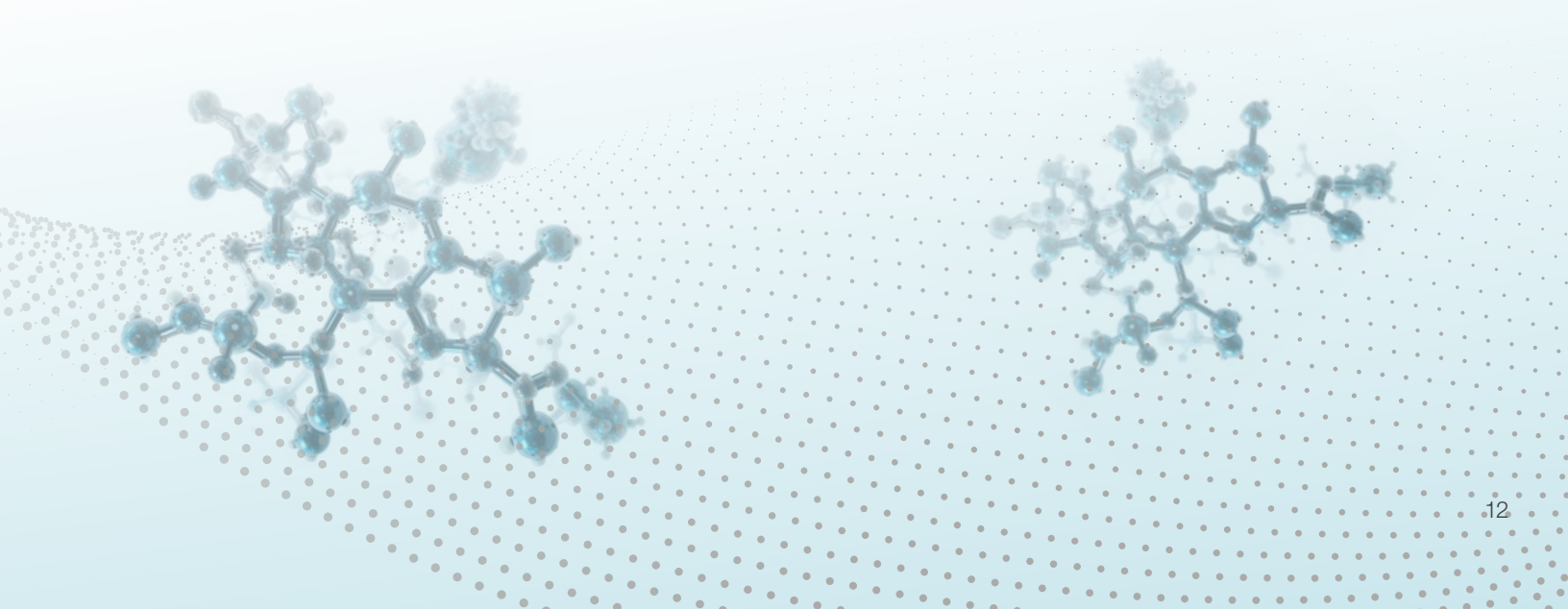
[Learn more about the Transcend TLX-4 Systems](#)

View brochure 



[Learn more about the FAIMS Pro Duo Interface](#)

View brochure 



GC-MS/MS

Ideal for robust steroid and volatile compound confirmation

Another advancement in the field of doping control is the use of gas chromatography (GC) triple quadrupole mass spectrometry (MS) for the screening of prohibited molecules and for confirmation. The achievable detection limit allows the WADA lab to be compliant with current detection limit guidelines on a routine basis. GC triple quadrupole (QQQ) MS offers high sensitivity and allows for the identification and quantification of doped substances. Additionally, GC coupled with isotope ratio mass spectrometry (GC/C/IRMS) enhances sensitivity, distinguishing natural and synthetic steroids. GC coupled with high-resolution accurate mass (HRAM) mass spectrometry (MS) could also be used for confirmation.

The user-centric Thermo Scientific™ TSQ™ 9610 Triple Quadrupole GC-MS is designed to minimize downtime and maximize sample throughput. Thermo Fisher Scientific provides a variety of solutions to meet diverse analytical needs, leveraging the precision of LC-MS and the efficiency of complementary systems to address complex challenges in substance detection and analysis.



[Learn more about the TSQ 9610 GC-MS](#)

[View product specifications](#)

[View brochure](#)

PS-MS

Simplifying anti-doping workflows by eliminating chromatography

In addition to LC-MS and GC-MS, Thermo Fisher Scientific excels in delivering unique front-end solutions, amplifying the efficiency and effectiveness of the analytical process. The Thermo Scientific™ VeriSpray™ PaperSpray Ion Source for MS (PS-MS) is a valuable alternative to LC analysis, eliminating chromatography separation and thus simplifying mass spectrometry analyses for any user.



[Learn more about the VeriSpray PaperSpray Ion Source for MS](#)

[View product specifications](#)

[View brochure](#)

Software

Unifying data processing and regulatory reporting infrastructure

In addition, Thermo Fisher Scientific provides state-of-the-art software solutions, such as Thermo Scientific™ TraceFinder™ Software, that complement its hardware, allowing for seamless data analysis, interpretation, and reporting. The integration of advanced software greatly enhances the speed and accuracy of identifying potential doping violations.



[Learn more about TraceFinder Software](#)

[View product specifications](#)

[Download free trial](#)

IRMS

For definitive endogenous versus exogenous differentiation

In some instances where there appears to be a suspicious profile upon screening, isotope ratio mass spectrometry (IRMS) can be employed. This technique gives the ability to look at the isotope ratio of the elements inside a target compound, which is particularly useful when determining the presence of endogenous (naturally produced) or exogenous (external) compounds, such as steroids. A classic example is that of testosterone, which is both an endogenous compound in the body and an exogenous anabolic steroid, administered to enhance sporting ability. In this case, an anti-doping rule violation cannot be based solely on the steroid presence. Instead, the analytical measurement of the $^{13}\text{C}/^{12}\text{C}$

ratio can distinguish between the endogenous steroid production (natural and legal) versus synthetic administration of the steroid (banned and illegal). As concomitant data are critical to qualify the identity of a compound in doping investigations, the routinely used GC-IRMS system can be coupled to an organic MS system for ultimate sample characterization. From a single injection, isotope ratio data, structural information, and identification of individual GC compounds can be obtained. Recent technological advancements in liquid chromatography coupling to IRMS are opening new analytical approaches to using isotope fingerprints in doping control, allowing for simpler sample preparation and higher confidence in data accuracy. Modern analytical instrumentation can deliver unparalleled precision in identifying prohibited substances both in and out of competition.



[Learn more about Gas Isotope Ratio Mass Spectrometry \(IRMS\)](#)

View product specifications 

View brochure 



Additional anti-doping resources

Videos

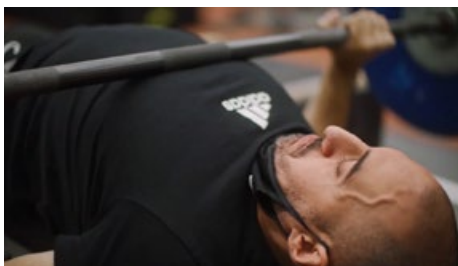


View video



Inside Laboratoire Anti-Dopage Français (LADF): An interview with Director Dr. Magnus Ericsson (Triple Quadrupole LC-MS)

Explore how Dr. Magnus Ericsson, Director of LADF and a leading expert in analytical chemistry, detects banned substances, manages high-throughput workflows, and leverages advanced Thermo Fisher Scientific technologies to stay ahead of constantly evolving challenges in anti-doping science.



View video



How mass spectrometry is changing the game in sports anti-doping testing (HRAM-LC-MS)

Learn how mass spectrometry overcomes the challenges and ever-evolving testing requirements of sports anti-doping testing laboratories. Also, Ali Jawad, paralympic powerlifter, describes the impact of doping on athletes.



View video



LCH Ludovic Bailly-Chouriberry testimonial video for TSQ Altis Plus MS (Triple Quadrupole LC-MS)

Gain insight as to how TSQ Triple Quadrupole Mass Spectrometers, combined with Vanquish UHPLC Systems and 96-well plate workflows, enable the lab to maintain analytical sensitivity while processing approximately 200 samples per day.



View video



Tox Explorer Collection: Simplifying targeted screening with Orbitrap technology

Screening, identification, confirmation, and quantitation can all be performed in a complete mass spectrometry workflow solution using the Tox Explorer Collection. One of the key benefits of using high-resolution accurate mass (HRAM) mass detection is to identify unknowns and the ability to use retrospective data to help with the identification of novel drugs.



Mass spectrometry enables top WADA lab to beat the cheats

(HRAM LC-MS)

Professor Francisco Radler, Head of the Brazilian Doping Control Lab - LADETEC – UFRJ, discusses using state-of-the-art mass spectrometry in the fight against doping.

View video



Doping control with the Isotope Hunter

(GC-IRMS)

With isotope fingerprints and IRMS, you will discern the true identities, quantities, origins, and, most importantly, legality of substances under World Anti-Doping Agency regulations.

View video



Step inside the World Cup anti-doping lab with Dr. Martial Saugy, Director, LAD

(HRAM LC-MS)

Take a tour of the Laboratoire Suisse d'Analyse du Dopage (LAD) and learn how the team tested anti-doping specimens from the 2014 FIFA World Cup.

View video



Analyzing footballers with mass spec: Exclusive WADA anti-doping interview

(HRAM LC-MS)

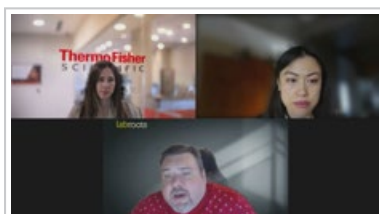
Watch behind the scenes at the WADA-accredited Laboratoire Suisse d'Analyse du Dopage (LAD) to learn how state-of-the-art mass spectrometry is being used to detect low levels of forbidden substances in biological samples.

View video



Additional antidoping resources

Webinars



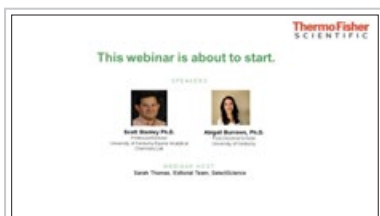
View webinar



Next generation workflows for small molecule quantitation including steroids and drugs of abuse using the Thermo Scientific™ Stellar™ Mass Spectrometer

(Nominal Mass LC-MS)

In this webinar, learn how to leverage higher energy dissociation (HCD) and resonant collisional dissociation (CID) using tMS2 and tMS3 acquisition to improve quantitative selectivity, sensitivity, and specificity in complex biological matrices.



View webinar



Analytical workflows for anti-doping using LC-MS tools

(HRAM-LC-MS)

This webinar discusses the most current methods widely used in equine anti-doping analysis. Learn about the utility and importance of the liquid chromatograph in an LC-MS analysis. Adapt LC-MS methods to improve analysis of proteins with high matrix interference.



View webinar



Prohibited substances detected in urine by UHPLC-Orbitrap for doping control

(HRAM-LC-MS, GC-IRMS)

In this webinar Dr. Alessandro Casilli, Brazilian Laboratory for Doping Control, discusses the use of Orbitrap HRAM-MS in the fight against sports doping.



View webinar



Isotope fingerprints against sports doping with Julian Renpenning

(GC-IRMS)

Isotope Hunter Julian Renpenning explains how analyzing isotopes provides a solution to differentiate characteristic isotope fingerprints of urinary steroids.



View webinar



Metabolite ID: Detecting drug metabolism *in vitro* and *in vivo* (HRAM LC-MS)

Learn how Thermo Scientific™ Tribrid™ Mass Spectrometry is being used to identify ciclesonide metabolites in equine anti-doping.



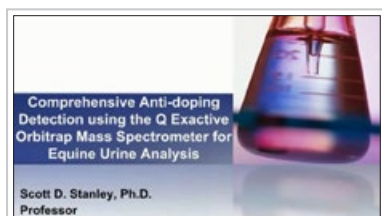
View webinar



Advancing analytical workflows for prohibited substance detection in equine athletes using software tools

(HRAM LC-MS, Triple Quadrupole LC-MS)

In this webinar, we discuss the development of a >440 compound screen, with a custom-built mass spectral library and compound database.



View webinar



Comprehensive anti-doping detection using the Q Exactive Orbitrap Mass Spectrometer for equine urine analysis

(HRAM LC-MS)

Scott Stanley, Ph.D., Professor of the School of Veterinary Medicine at UC Davis, describes how his team is using Orbitrap mass spectrometry to detect doping compounds in equine urine.



Additional anti-doping resources

Technical literature



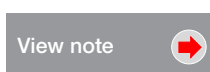
A decade of DBS steroid innovation in the German Sports University Cologne

Case study | 004613



Selective and sensitive measurement of 17 steroids in human serum using a Stellar Mass Spectrometer

Technical note | 003984



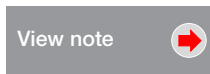
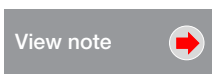
A ready-to-run workflow for quantitating 80 drugs of abuse in whole blood with the TSQ Certis Triple Quadrupole MS

Technical note | 004362



Analysis of testosterone from human serum using FAIMS technology

Technical note | 000304



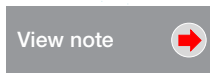
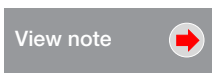
Quantitation of an oral fluid drug panel including THC using the new Stellar Mass Spectrometer

Technical note | 003851



Quantitative analysis of cannabinoids in urine and oral fluid using reactive paper spray tandem mass spectrometry for clinical research and forensic toxicology

Technical note | 000553





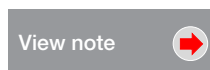
Screening and semi-quantitation of 212 fentanyl analog compounds by the Orbitrap Exploris 120 Mass Spectrometer

Technical note | 66050



Method development considerations for paper spray mass spectrometry - Direct ionization technique for physiological fluid analysis

Poster note | 64926



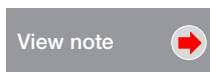
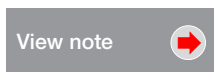
Quantitation of 22 fentanyl analog compounds on an Orbitrap Exploris 120 Mass Spectrometer

Technical note | 73957



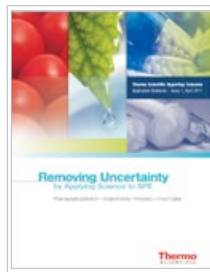
Detection of stanozolol glucuronides in human sports drug testing by means of high-resolution, accurate-mass mass spectrometry

Application note | 613



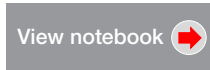
Staying ahead of regulations for the analysis of steroids in urine with GC-MS/MS

Technical note | 001896



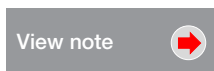
Sample preparation for doping applications: SPE notebook

Application notebook | BRCCSSPEAPBOOK



Detection of controlled substances in blood samples using the VeriSpray Ion Source with TSQ Altis MS for clinical research and forensic toxicology

Technical note | 65420





Advancing anti-obesity drug development with robust quantitation of GLP-1 analogs using human plasma

Application note | 004408

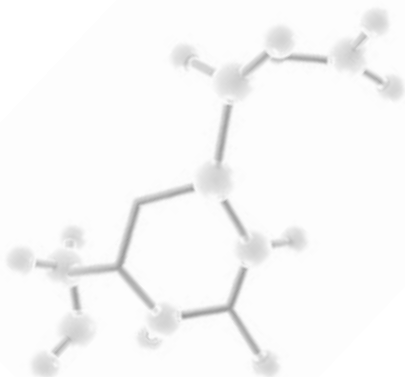
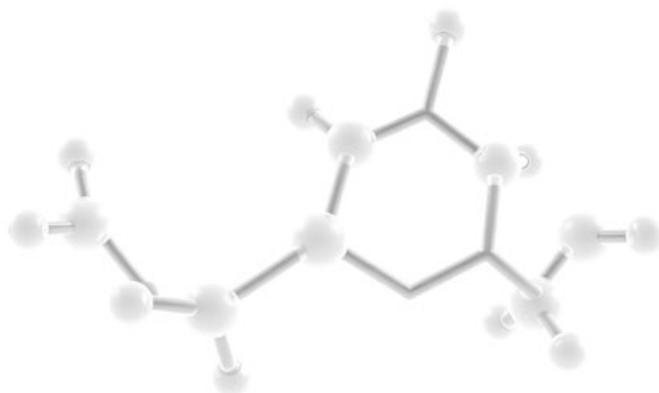
View note



A rugged LC-MS method for reliable bioanalysis of GLP-1 peptides

Application note | 004407

View note



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