WS10: Recent advances in MS-based forensic toxicology: achieving efficiency, selectivity, and sensitivity

Date: Tuesday, October 28

Time: 8:00 AM – 12:00 PM

Audience Knowledge: Intermediate - Involves more advanced concepts requiring some technical working knowledge or prior exposure to the subject matter

Rates:

Membership	Early Bird (June 25 - Sep 10)	Late (Begins Sept 11)	Onsite (Begins Oct 9)
Member	$150	$175	$200
Student	$150	$175	$200
Non-Member	$200	$225	$250

Workshop Chairs:

Tim Fassette
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Field Application Scientist, GC/GCMS

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Abstract

In forensic science, the accuracy and reliability of analytical techniques are paramount to solving complex cases, from drug-facilitated crimes (DFC) to driving under the influence (DUI) incidents. Liquid chromatography-mass spectrometry (LC-MS) and gas chromatography-mass spectrometry (GC-MS) play crucial roles in the analysis of evidence from crime scenes, including trace levels of drugs, toxins, and blood alcohol content. With recent technological advances, quantifying or screening many of the analytes of interests has become ever faster, easier, and higher efficiency.

The workshop will cover a wide range of contemporary LC-MS and GC-MS workflows and applications for forensic toxicology, with a focus on high-resolution accurate mass Orbitrap technology, hardware and software intelligent features that enable comprehensive and efficient LC-MS and GC-MS workflows in urine and whole blood for targeted screening, confirmation, and retrospective analysis. The workshop will then demonstrate method details for the use of the Orbitrap MS in an untargeted screen with an initial processing method for a panel of 94 therapeutic and illicit drugs in post-mortem blood samples with case studies from a medical examiner's office, followed by the fast quantification of 31 drugs and metabolites in Quantisal™-collected oral fluids using a hybrid quadrupole-linear ion trap MS, Thermo Scientific Stellar™ MS. We will also highlight automated sample preparation using the Hamilton Microlab® STAR liquid handler and the Dispersive Pipette XTRaction™ (XTR) SCX/WAX mixed mode INTip™ solid phase extraction (SPE) tips. Lastly, we will showcase the development of a dual-purpose

GC-MS method that allows for the analysis of both blood alcohol headspace samples and solvent extracted whole blood drug samples on a single instrument.

This session is designed for professionals who are seeking to enhance their understanding of advanced LC-MS and GC-MS analytical techniques and solutions for accurate and reliable toxicological analysis. By the end of the workshop, participants will be equipped with the knowledge and skills necessary to effectively apply the highlighted LC-MS and GC-MS workflows in their forensic work, ensuring high precision and reliability in their analyses.

Learning Objectives

1. Understand Orbitrap technology and its usage in the targeted quantification, targeted screening, and retrospective analysis of drugs and metabolites detection in complexed matrices
2. Learn the advantages of the hybrid quadruple-linear ion trap MS and its applications in forensic toxicology
3. Understand the utilization of a versatile GC autosampler and single column split into an FID detector and MS detector for accurate quantitation and identification of volatile components in whole blood.

Speakers

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Workshop Agenda

Time	Topic	Speaker
8:00 to 8:15 AM	Introductions	Tim Fassette
8:15 to 9:00 AM	Utilizing HRAM Orbitrap MS for Targeted Screening and Retrospective Analysis of Drugs and Metabolites	Courtney Patterson
9:15 to 10:00 AM	Orbitrap MS applications in NC OCME	OCME
10:00 to 10:30 AM	Break	
10:30 to 11:00 AM	Revolutionizing Targeted Small Molecule Quantitation using a Hybrid Quadrupole – Linear Ion Trap Mass Spectrometer	Courtney Patterson
11:10 AM to 12:00 PM	Old vs. New: A Novel Approach to Blood Alcohol Analysis in the Modern-Day Forensic Laboratory	Tim Fassette