K27 Comprehensive Drugs of Abuse Screening of Overdose Cases By Accurate Mass Liquid Chromatography/ Time-of-Flight Mass Spectrometry

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After attending this presentation, attendees will understand a new analytical technology for identifying drugs of abuse in overdose cases.

This presentation will impact the forensic community and/or humanity by exposing the attendees to a new approach to identification and quantification of drugs of abuse that can be applied to poisons and other toxicological investigations.

Comprehensive drug screening of overdose patients is presently performed by GC/MS. The methodology includes extraction and analysis of both acidic and basic drugs. Over 70 drugs of abuse are included in the standard screen. The methodology is both laborious and time consuming and includes derivatization steps for many of the targeted compounds. In addition, there are cases where the screen does not produce results indicative of the overdose. The speed of analysis can be a critical issue where the patient/victim is unconscious and proper medical attention may depend on identification of the unknown toxin. Even in these cases where toxicological signs indicate a drug overdose, the analytical methodology may be slow.

This work will show the comparison of present analytical methods using GC/MS with Liquid Chromatography/Time-of-Flight Mass Spectrometry (LC/TOF MS). Acid and base extraction of blood serum and their analysis using an Agilent LC/MSD TOF with reversed-phase chromatography is used for fast drug screens of overdose patients. This instrumentation has been shown to provide routine mass accuracy measurements better than 3 ppm for compounds with mass above 200 amu. This technology combined with the ability to perform fast reversed-phase chromatography is used to develop a drug screen without the need for derivatization. The screen will examine the more than 70 compounds targeted by GC/MS and include designer drugs and other drugs of abuse not presently sought. The results will be evaluated for quantitative accuracy and precision, qualitative confidence, and overall speed of the analysis. In addition, the ability to use the accurate mass measurement capability of the technology to propose an identification for peaks found in the screen that are not among the comprehensive list of target compounds will be determined and presented. The results will be summarized so that feasibility of this new technology can be assessed.

Time-of-Flight, Mass Spectrometry, Drugs of Abuse

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