



### **K16 Issues Pertaining to the Analysis of Buprenorphine and its Metabolites by GC-MS**

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After attending this presentation, attendees will better understand the low-cost and widely available GC-MS technology can be effectively applied to the analysis of buprenorphine (B) and its metabolites in urine specimens.

This presentation will impact the forensic community by reporting the following issues pertaining to the analysis of B and its metabolites by GC-MS: (a) selection of extraction methods for the determination of free and total B and norbuprenorphine (NB); (b) effectiveness of hydrolysis, derivatization, and internal standard; and (c) deriving the contents of the glucuronides based on the free and total concentrations of B and NB observed from a two-step analytical protocol.

“Substitution therapy” and the use of B as an agent for treating heroin addiction continue to gain acceptance and have recently been implemented in Taiwan. Mature and widely utilized GC-MS technology can complement the low-cost and highly sensitive immunoassay (IA) approach to facilitate the implementation of analytical tasks supporting compliance monitoring and pharmacokinetic/pharmacodynamic studies. Issues critical to GC-MS analysis of B and NB (free and as glucuronides), including extraction, hydrolysis, derivatization, and internal standard, are studied, followed by comparing the resulting data against those derived from IA and liquid chromatography-tandem mass spectrometry methods. Commercial solid-phase extraction devices, highly effective for recovering all metabolites, may not be suitable for the analysis of free B and NB; acetyl-derivatization products exhibit the most favorable chromatographic, ion intensity, and cross-contribution characteristics for GC-MS analysis; B-d<sub>4</sub> can effectively serve as the single internal standard for the quantitations of both B and NB. The 2- aliquot GC-MS protocol hereby developed is proven effective for the analysis of free B and NB and their glucuronides.

#### **Buprenorphine, Glucuronide, GC-MS**