Y15 Qualtrics Survey of Gamma-Hydroxybutyric Acid (GHB) Methodologies in Blood and Urine

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Learning Overview: After attending this presentation, attendees will have an increased understanding of the lack of general consensus that laboratories across the United States have regarding the analysis and cut-offs of GHB.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing survey data on toxicology laboratory analysis of GHB and its reported cut-offs.

GHB is an endogenous short-chain fatty acid that depresses the Central Nervous System (CNS) via GHB receptors in the brain. GHB also works via $GABA_B$ receptors. GHB's popularity increased due to bodybuilders who used it to improve athletic performance.[1] Due to its anesthetic property, it became suspected of use in Drug-Facilitated Crimes (DFC).[1-4] As such, in March 2000, GHB became a federally controlled Schedule I drug in the United States.[1] Exogenous GHB has a narrow detection window of 3–6 hours in blood and up to 12 hours in urine.[5] It is important that biological samples be collected very quickly to enable differentiation of exogenous from endogenous GHB levels.

This presentation illustrates the collation and comparison of methods used for the analysis of GHB in blood and urine, as well as the cut-offs used in laboratories across the United States. The scientific literature contains a wide range of methods and cut-offs, so the goal was to collect data obtained from a survey to determine the most commonly used methodologies for GHB analysis and the cut-offs for reporting in order to establish a best practice for GHB determinations.

The survey was sent to toxicology laboratory directors worldwide and was created using the web-based survey tool, Qualtrics, which allows users to collect, analyze, and present survey data.

The majority of respondents were from government laboratories (57%) within the United States with an even spilt of casework between Driving Under the Influence of Drugs (DUID), Postmortem (PM), and DFC. Approximately 60% of the responding laboratories performed testing for GHB. More than 90% of the laboratories testing for GHB (n=46) reported conducting analyses in-house, with the majority of the testing being performed for DFC cases. Only four laboratories (10%) hydrolyze their urine samples prior to analysis. The majority did not force a GHB: Gamma-Butyrolactone (GBL) equilibrium through pH manipulation during analysis. There was a 60:40 split of laboratories who derivatized GHB samples and about 60% of laboratories reported conducting analysis by Gas Chromatography/Mass Spectrometry (GC/MS) or Gas Chromatography/Flame Ionization Detector (GC/FID). None of the laboratories analyzed for GHB in its conjugated form. Cut-off levels ranged from 1mg/L–50mg/L in blood and urine with the majority of respondents using either 5mg/L or 10mg/L. Either aqueous- or matric-spiked standard were reported for calibration in both matrices.

Reference(s):

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GHB, Survey, Blood and Urine

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