



K17 Observations of Endogenous Levels of GHB in Urine Over Time

Negin Aghdaie, MS, LAPD - SID, 555 Ramirez Street, Space 270,
Los Angeles, CA 90012*

The goal of this presentation is to provide the forensic toxicology community with information about the fluctuation of endogenous GHB levels in urine over time among different individuals.

This presentation will impact the forensic community and/or humanity by aiding forensic toxicologists with interpretation of urine GHB concentrations obtained in forensic casework. It will be made apparent that comparison of a background urine sample from an individual, with the forensic urine sample obtained from the same individual at the time of assault does not provide valuable information.

This poster will display the results obtained from the thesis research project completed as part of the Criminalistics MS program at California State University, Los Angeles. The focus of the project was to study the fluctuation of endogenous GHB concentration in human urine over time.

Gamma-hydroxy butyric acid (GHB) is a central nervous system depressant with hallucinogenic and euphoric effects. In a criminal context, it can be used along with alcohol for its incapacitating effects in drug facilitated sexual assaults. Forensic toxicologists commonly receive requests to analyze urine for the presence of GHB in sexual assault cases. The interpretation of the quantitative results in these cases can be ambiguous. This is due to the fact that GHB is an endogenous compound in human urine. It has also been demonstrated that the concentration of endogenous GHB varies between subjects. Therefore, it is essential to verify the amount of GHB found in urine as endogenous or exogenous in origin. To date, there is no widely accepted concentration threshold that distinguishes endogenous levels from ingested levels of GHB in urine.

Interand intra-individual variations of endogenous urine GHB levels were evaluated. The first goal of the study was to compare urine GHB concentrations between subjects. The second goal was to determine if an individual's endogenous GHB concentration is consistent over time. The establishment of a fixed endogenous GHB concentration level per individual would be valuable for forensic casework. The ability to compare the GHB concentration of a background sample obtained from a victim with the forensic sample, obtained from the same victim at the time of assault, would simplify the interpretation of the results.

In order to achieve its goals the study was divided into two parts. One hundred forty-seven urine samples from five individuals (non GHB users) were collected over a 30-day period and subsequently analyzed. During the first 48 hours of the study, an aliquot of every urine void from each subject was collected and analyzed. The second part of the study involved analysis of samples collected from the remaining 28 days, at which time only an aliquot of the daily morning first void from each individual was collected and analyzed. Fluctuations of endogenous urine GHB concentrations in both the two-day study as well as the month long period appear random in all participating individuals. No clear concentration pattern was observed. This implies that it is not feasible to try to establish a fixed background endogenous GHB level for any one individual.

The average GHB concentration among all individuals in the study was 3.2lg/mL. The highest concentration found among all samples was 9.8lg/mL. Several specimens in this study approached 10lg/mL, which some analysts consider a threshold level indicative of GHB ingestion. Findings of endogenous urine GHB concentration at such levels suggest necessary reassessment of 10lg/mL as the threshold level of endogenous urine GHB.

Toxicology, GHB, Endogenous