Improving detection of a 'date rape' drug

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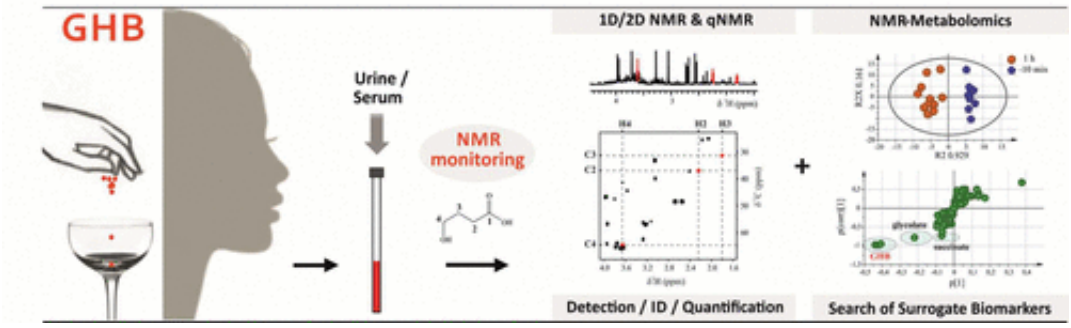

Credit: American Chemical Society

Because gamma hydroxybutyric acid (GHB), commonly known as a "date rape drug" is rapidly absorbed and metabolized by the body, it's difficult for law enforcement to tell if someone has been given GHB. Now, scientists report in ACS' journal *Analytical Chemistry* that they have identified a potential biomarker that might lead to tests to detect the compound that could be performed much later than current ones.

When ingested, GHB can make a person groggy or sleepy and can induce amnesia. As a prescription drug, it is used to treat narcolepsy, a sleep disorder, as well as relieve pain, fatigue and other symptoms of fibromyalgia. But it also has been used as a recreational club drug and has been linked to thousands of sexual assault cases. Current techniques can only detect GHB in the first few hours after ingestion. In addition they require considerable modifications to the samples that can skew the results or even destroy the evidence. To address these challenges,

Míriam Pérez-Trujillo and colleagues wanted to see if they could identify a biomarker of the drug that would stay in urine or blood a lot longer than GHB itself does. They also wanted to find a method that would not require extensive sample manipulation.

The researchers studied samples from a clinical trial in which volunteers received small doses of GHB. Blood and urine samples were taken from trial participants at regular intervals over 30 hours following ingestion. The scientists analyzed the samples using nuclear magnetic resonance spectroscopy and found that they could detect GHB in urine samples taken up to 2 hours after ingestion. They also could distinguish GHB from other similar drugs. Importantly, the researchers found that glycolate, a metabolite of GHB, might be a good biomarker for the drug. They could measure its levels in urine for up to 20 hours after the drug was taken. This finding could form the basis for tests that could be performed much later than current ones. And, because technique didn't damage or destroy the samples, further analyses with other methods are possible.

More information: Martina Palomino-Schätzlein et al. Direct Monitoring of Exogenous γ-Hydroxybutyric Acid in Body Fluids by NMR Spectroscopy, *Analytical Chemistry* (2017). DOI: 10.1021/acs.analchem.7b01567

Abstract

γ-Hydroxybutyric acid (GHB) is a popular drug increasingly associated with cases of drug-facilitated sexual assault (DFSA). Currently, expanding procedures of analysis and having forensic evidence of GHB intake in a long term are mandatory. Up to now, most studies have been performed using GC/MS and LC-MS as analytical platforms, which involve significant manipulation of the sample and, often, indirect measurements. In this work, procedures used in NMR-based metabolomics were applied to a GHB clinical trial on urine and serum.

Detection, identification, and quantification of the drug by NMR methods were surveyed, as well as the use of NMR-based metabolomics for the search of potential surrogate biomarkers of GHB consumption. Results demonstrated the suitability of NMR spectroscopy, as a robust nondestructive technique, to fast and directly monitor (detect, identify, and quantify) exogenous GHB in almost intact body fluids and its high potential in the search for metabolites associated with GHB intake.

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