Testing issues related to the drug gamma hydroxy-butyrate (GHB) are complex and a frequent source of questions. GHB has been a perplexing drug to detect in biological samples due to rapid dissipation from blood (four hours) and urine (12 hours). Thus any delay in reporting is an initial factor in the inability to identify GHB.

Instrumentation testing for GHB in urine and blood has existed for some time but requires specific equipment, testing protocols, and significant expense. GHB baffled researchers trying to develop on-site screening tests for years, but now a rapid, inexpensive dip test is available for urine samples.

Express Diagnostics, www.drugcheck.com, recently announced a partnership with Project GHB, to promote awareness of the effects and dangers of GHB and to promote the availability of this important on-site test. The GHB test strip is a recent addition to Express Diagnostics on-site urine and saliva screening devices (see full press release).

The new DrugCheck GHB Single Test, the only onsite test for GHB, provides semi-quantitative results in five minutes. The simple procedure involves dipping the test strip into the urine specimen for five seconds and then comparing color changes in the reactive pad to a color chart provided on the product pouch. The GHB test has a minimum detection cutoff of 10 µg/mL (micrograms per milliliter). A box of 10 single tests is $45 ($4.50 per test). To purchase kits, submit this order form to Express Diagnostics via fax or email.

In the emergency room, GHB is often "identified" by the exhibited symptoms and by ruling out other drugs through standard hospital screening tests. And, perhaps just as often, GHB may go unidentified due to a lack of experience with this unique drug and the testing limitations, especially in hospital laboratories with typically high detection limits. This challenge is particularly critical in drug facilitated sexual assault cases involving GHB and the many other drugs commonly used to facilitate sexual assault because of the common delays in reporting by victims of these crimes.

To assist law enforcement with identifying laboratories capable of testing for these drugs, the Society of Forensic Toxicologists (SOF) Drug-Facilitated Sexual Assault (DFSA) Committee created a document with the recommended maximum detection limits for common DFSA drugs and metabolites in urine samples. Representative labs with comprehensive testing panels for DFSA drugs include Medtox and National Medical Services Labs.

Delays in obtaining samples during this time will further limit the opportunity to detect GHB. Urine is the better sample, and collection of the first void as quickly as possible is crucial. However, the Society of Forensic Toxicologists recommends collecting urine up to 120 hours after the suspected ingestion. This is one of the primary reasons we believe it is critical to collect toxicology samples in all sexual assaults. As with other evidence obtained by law enforcement, collection does not mean that all evidence will be tested. Requests for
toxicology testing by law enforcement should be based on the history and a thorough investigation. Most often, first responders, including law enforcement and forensic examiners, will not immediately know they are working a suspected drug facilitated sexual assault until it is too late to collect the samples.

It is also important to remember that testing at hospitals is for medical diagnosis and treatment. Hospital laboratories do not routinely maintain a chain of custody and any results will generally be inadmissible as evidence in court. The best case scenario is to split any early toxicological samples taken by medical examiners with law enforcement. Investigators will then submit their sample to the appropriate laboratory for testing. Law enforcement should never direct forensic examiners to test toxicological samples as part of their investigation. However, they should be informed if toxicological tests were performed for medical purposes. It is equally important to understand that a negative toxicology for GHB (as well as many other drugs) does not necessarily mean the drug was not involved. It may simply indicate that the samples were not obtained during the brief window of opportunity or that the laboratory detection limits are too high for detection, potentially resulting in a false negative test.

More than 50 drugs have been identified in DFSA cases. The overall goal of the perpetrator is amnesia and/or incapacitation or impairment that will prevent victims from being able to protect themselves, recall the assault and to identify the assailant. But, it is important to remember that each drug has its own variation of symptoms and time that the drug remains in the body. Some specific drugs may be identifiable in urine up to 5-7 days after ingestion. GHB just happens to be very short-lived.

Victims of DFSA or drugging for robbery, credit card fraud or sometimes even "just for laughs" often report difficulty in getting testing done for GHB in the emergency room. This is especially true if not actually alleging DFSA or another crime. Individuals arrested for driving under the influence who believe they may have been drugged, even if the allegation is made in a timely manner, also report difficulty in getting tests done for drugs like GHB. The availability of an inexpensive field test can alter the landscape of response to drugging allegations dramatically.

**GHB Instrumentation Testing**

As with all drugs, screening tests are not the final word. Screening tests are important indicators of drugs being present. This is followed up with instrumentation tests to establish drug identity definitively and to identify the level of the drug(s) present. Even a negative screening result may justify further testing, for example, if the symptoms strongly support something more than alcohol. For example, if no alcohol, or a low amount of alcohol is present to explain the victim's behavior and symptomology. If the police crime lab, or lab normally used by the agency, is unable to do confirmation testing for GHB or other complex drugs in blood or urine, it is important for the agency to have a contract in place with a lab that can test at the maximum detection levels needed.
GHB Testing in Products, Drink Glasses and Vomit

In terms of testing in products or drink glasses or bottles that are believed to have contained GHB or its analogs, field test strips are available for GHB and GBL and finally BD. As with all field test kits, they are merely indicators and would be followed up with definitive instrumentation testing in the lab. MMC International is the primary source of these field test kits, sold through sites such as www.mmc-america.com and www.criminalisticsInc.com.

Vomit is also a potentially valuable source of drug evidence in sexual assault as well as death cases. Consult your designated lab as to how they want this type of sample handled.

GHB Analogs

GHB is easily made from just two basic ingredients. Gamma butyrolactone (GBL) is converted to GHB most commonly by using sodium hydroxide (yes, drain cleaner). But GBL, a degreasing solvent or paint stripper, can be ingested directly and the human body rapidly converts the GBL to GHB. Thus GBL is considered an "analog" of GHB, a chemical cousin with the same effects. The second most common GHB analog is 1,4 butanediol (BD or BDO). While not easily converted to GHB "on the stove," BD can also be ingested directly and the human body will convert it to GHB. Since both GBL & BD convert to GHB in vitro, testing in biological samples is usually only done for GHB.

Generally speaking, only in a death case would testing for the two analogs in various biological samples be significant, such as stomach contents where unconverted analogs might be found and could help identify the initial source. There are other analogs of GHB that will not be picked up easily as they do not convert to GHB in the body but have similar, though in some cases weaker or less desirable, properties. Fortunately they have not become commonly utilized but probably would be missed in testing. In death cases, because of complexities involving testing in blood for GHB after death, it is ideal to also test in urine and/or vitreous samples to compare to the level found in blood.

About Project GHB

In addition to researching and cataloging the latest GHB information, the nonprofit Project GHB provides referrals, basic counseling, and intervention through a helpline hosted on their website (projectghb.org). The Project GHB helpline has assisted more than 3,500 addicts and their families throughout the U.S. and more than 20 countries. The mission of Project GHB is to educate the public about the dangers of GHB and to provide a forum for those who have been sexually assaulted after being given the drug or have lost a loved one to GHB, and to assist those who are addicted to the drug. Learn more at www.projectghb.org.