

# IMPLICATIONS OF RESEARCH FOR TREATMENT: *GHB*

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*Gamma hydroxybutyrate (sodium hydroxybutyrate, sodium oxybutyrate, GHB) a naturally occurring fatty acid found in mammals, is a CNS depressant which has intoxicating effects and, at sufficiently high doses, anesthetic properties [1]. One of its precursors, gamma butyrolactone (GBL), is converted to GHB when swallowed. Another precursor is 1,4-butanediol (1,4-BD), which is a Class I health hazard and is an industrial solvent sold to misusers under names such as (Revital)ize Plus, Serenity, Enliven, GHRE, SomatoPro, NRG3, Weight Belt Cleaner, Thunder Nectar, Pine Needle Extract, and Pine Needle Oil. When swallowed, it is metabolized in the body to GBL, which is then metabolized to GHB [2]. It possesses a higher potency than GHB [3].*

## LATEST RESEARCH FINDINGS

### Adverse Effects

Illicit use of GHB is characterized by little consistency and precision in the doses consumed. An oral dose of 10 mg/kg has been reported to cause euphoria, amnesia, and hypotonia; doses of 20-30 mg/kg have resulted in somnolence within 15 minutes. Doses greater than 50 mg/kg result in unconsciousness and coma [4, 5].

GHB and alcohol together have been reported to have a synergistic [6] or additive effect. The steep dose-response curves of both ethanol and GHB for many of their behavioral effects may account for the serious effects seen clinically when seemingly “moderate” doses of the two drugs are combined, rather than any synergistic actions of the drug combination [7].

In Australia, a study of 76 GHB users found they were stable, well-functioning, and highly educated. Some 29% typically drank more than five alcoholic drinks when using GHB and they had extensive experience with a range of other drugs which they used with GHB. But even though these users did not have a long or

extensive experience with GHB, 99% reported at least one negative side effect. Of those who had used GHB more than 15 times, 75% had overdosed at least once and a third had overdosed more than three times; 52% reported becoming unconscious. The high rate of problems reported by a group with limited use of this drug suggests that in a context of polydrug use, GHB is associated with significant risks to users [8, 9]. Likewise, use of GHB and a depressant drug can result in greater CNS depressant effects than seen with either drug alone [1].

The most serious effects of a GHB overdose are sudden onset of coma and respiratory depression. Withdrawal from GHB can be complicated, especially if other drugs or alcohol are involved. The one distinguishing feature of GHB toxicity is the sudden awakening of the patient from a comatose state to a normal or hyperactivated state of arousal. Severe withdrawal reactions have been reported, with some dependent persons escalating their use to every two to four hours in a pattern of

around-the-clock dosing [4, 10, 11, 12, 13]. For a detoxification protocol, see [http://www.tcada.state.tx.us/research/populations/GHB\\_Withdrawal.pdf](http://www.tcada.state.tx.us/research/populations/GHB_Withdrawal.pdf) or McDonough et al. [14].

## TREATMENT IMPLICATIONS

While detoxification case studies show the abuse potential, there is little information on chemical dependency treatment [15]. For some who use GHB or its precursors regularly, tolerance and dependence seem to build rapidly. Intervention and treatment efforts for GHB users are often delayed due to the fact many providers lack knowledge of symptoms of GHB intoxication and dependence. Information about GHB on the Internet and other lay sources may be misleading and may imply that GHB is non-addictive and has health benefits [10].

Clients admitted to programs funded by the Texas Commission on Alcohol and Drug Abuse with a primary, secondary, or tertiary problem with GHB between 1988 and 2003 presented a mixed picture of severe problems and good response to treatment [16]. In comparison to those admitted for problems with ecstasy, hallucinogens, methamphetamine, PCP, or Rohypnol, these clients were older, were self-referred, had more emergency room and hospital visits in the year prior to admission, were placed on medications at admission, had a DSM diagnosis of major depressive disorder, and had lower drug usage at follow-up. They used GHB in combination with methamphetamine or crack cocaine, and they used GHB on more days in the month prior to

admission than other clients used other club drugs. They were most likely to have been treated in residential settings. Yet even with their problems, GHB clients were likely to complete treatment. They had high rates of attendance at 12-step meetings and they were likely to be abstinent in their last month of treatment. The fact that only 4% of these clients were married may be a reflection of use by gay and bisexual men, a trend noted elsewhere [17], and clinicians should be prepared to deal with high-risk sexual behaviors as well as to alert any HIV-seropositive patients of the potential problems of using GHB while on antiretroviral therapy [18].

## TOXICOLOGY

Knowledge about the extent of abuse of GHB and its precursors has also been hampered because they are not detected by routine urine screens, and other immunoassays for GHB and GBL are not available [19]. They are reliably detected by specific requests for GC-MS, but timing is important, as GHB is rapidly excreted as carbon dioxide through exhalation [4]. GHB has a half-life of 27 minutes [13] and it is virtually undetected in the urine 12 hours after ingestion [2]. In cases of chemical submission, both urine and blood should be analyzed, since GHB is present longer in urine than in blood, and a detailed case history should be obtained. It is the policy of the U.S. Federal Bureau of Investigation (FBI) laboratory to report only “positive” GHB results when substantial amounts of GHB are found in both urine and blood [20].

## GLOSSARY

antiretrovirals—substances used to kill or inhibit the multiplication of retroviruses such as HIV; antiretroviral drugs attack HIV, which is a retrovirus.

dependence—a pattern of substance misuse characterized by a combination of factors, such as withdrawal, tolerance, cravings, out-of-control use, and use despite negative effects.

DSM-IV—Diagnostic and Statistical Manual, 4<sup>th</sup> edition, which is the diagnostic criteria of psychiatric disorders published by the American Psychiatric Association.

half-life—the time required for half the amount of a substance (such as a drug or radioactive tracer) in a living system or ecosystem to be eliminated or disintegrated by natural processes.

hypotonia—decreased skeletal muscle tone resulting a state of “floppiness.”

somnolence—drowsiness.

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