Drug Enforcement Administration
Diversion Control Division
Drug & Chemical Evaluation Section

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Gamma Hydroxybutyric Acid
(Street Names: GHB, G, Gina, Liquid Ecstasy, Liquid X, Liquid G, Goop, Georgia Home Boy, Grievous Bodily Harm, Easy Lay)

Introduction:

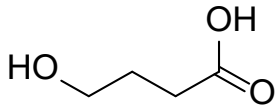
Gamma-hydroxybutyric acid (GHB) is a Schedule I depressant. The GHB-containing pharmaceutical product, Xyrem®, is controlled as a Schedule III drug. GHB abuse became popular among teens and young adults at dance clubs and "raves" in the 1990s, and gained notoriety as a date rape drug.

Licit Uses:

In 2002, the Food and Drug Administration approved Xyrem® (sodium oxybate) with Orphan Drug Status and limited distribution through a central pharmacy. Xyrem® is approved as a treatment to reduce the incidence of cataplexy and to improve daytime sleepiness in patients with narcolepsy.

Chemistry:

GHB has the molecular formula $C_4H_8O_3$ and the molecular weight 104.10 g/mol. It is a powdered substance and is generally dissolved in a liquid. In liquid form, GHB is clear and colorless, and slightly salty in taste. The structure is shown below.



Pharmacology:

GHB is present in the central nervous system in very small concentrations; it is a metabolite of the neurotransmitter gamma-aminobutyric acid (GABA). Scientific data suggest that GHB can function as a neurotransmitter or neuromodulator in the brain. It produces dose-dependent depressant effects similar to those of the barbiturates and methaqualone. Low doses of GHB produce drowsiness, nausea, and visual distortion. At high doses, GHB overdose can result in unconsciousness, seizures, slowed heart rate, severe respiratory depression, decreased body temperature, vomiting, nausea, coma, or death. Sustained use of GHB can lead to addiction. Chronic abuse of GHB produces a withdrawal syndrome characterized by insomnia, anxiety, tremors, marked autonomic activation (i.e., increased heart rate and blood pressure) and occasional psychotic thoughts. Currently, there is no antidote available for GHB overdose.

Illicit Uses:

GHB is abused for its euphoric and sedative effects. GHB is mainly self-ingested orally in a liquid mixture. It is sometimes mixed with alcohol to intensify its effects resulting in respiratory depression and coma. The average oral dose ranges from 1 to 5 grams (depending on the purity of the compound this can be 1-2 teaspoons mixed in a beverage). The concentration of GHB in these "home-brews" is variable, and the user is not usually aware of the actual dose they are drinking. The onset of action after oral ingestion is 15 to 30 minutes and the effects last 3 to 6 hours.

The 2018 American Association of Poison Control Centers (AAPCC) report indicates that GHB (including analogues gamma-butyrolactone (GBL) and 1,4-butanediol (BD)) accounted for 617 case mentions, 392 single exposures, 147 moderate medical outcomes and 85 major medical outcomes. In 2020, AAPC reported GHB and its analogs and precursors accounted for 766 case mentions, 528 single exposures, 148 moderate medical outcomes, 156 major medical outcomes, and one death. GHB analogues GBL and BD are often abused in place of GHB. Upon ingestion these analogues metabolize to GHB and thus produce physiological effects similar to GHB.

User Population:

GHB is abused by teens and young adults at all-night parties and "raves" and for enhanced sexual experiences. In the 2017 National Survey on Drug Use and Health (NSDUH), it was reported the lifetime use of GHB, among persons aged 12 and older, was 1,401 in 2016 and 1,512 in 2017.

Illicit Distribution:

GHB is produced illegally in both domestic and foreign clandestine laboratories. The major source of GHB is through clandestine synthesis by local operators. GHB is sold usually as a white powder or as a clear liquid. GHB is packaged in vials or small bottles. At bars or "rave" parties, GHB is sold in liquid form by the capful or "swig" for $5 to $25 per cap.

DEA's National Forensic Laboratory Information System (NFLIS) database indicates that there were 251 annual reports of GHB by federal, state and local forensic laboratories in 2017 and 224 in 2018; that have remained fairly stable over the years. Annual reports of GHB to NFLIS-Drug were 192, 156, and 148 in 2019, 2020, and 2021, respectively.

Control Status:

GHB is controlled in Schedule I of the Controlled Substances Act.

Though Xyrem® is a Schedule III controlled substance, trafficking of Xyrem® is subject to Schedule I penalties.

Gamma-Butyrolactone or GBL and 1,4-butanediol or BD are structurally similar to GHB and there is a large body of evidence to confirm that GBL and BD are converted to GHB after oral administration. GBL and BD have been sold and substituted for GHB in an effort to circumvent state and federal laws. If intended for human consumption, both GBL and BD may be treated as a "controlled substance analogue" under the CSA pursuant to 21 U.S.C §§802(32) (A) and 813.

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section; Fax 571-362-4250, Telephone 571-362-3249, or Email DPE@dea.gov