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:

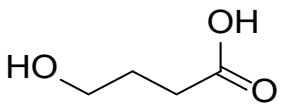
Gamma-hydroxybutyric acid (GHB) is a schedule I depressant. The GHB-containing pharmaceutical product, Xyrem®, is controlled as a schedule III drug. GHB abuse became popular among teens and young adults at dance clubs and "raves" in the 1990s. GHB gained notoriety as a date rape drug.

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, colorless, and slightly salty in taste. The chemical structure of GHB 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. GHB 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 2021 American Association of Poison Control Centers (AAPCC) report indicates that GHB (including analogues gamma-butyrolactone [GBL] and 1,4-butanediol [BD]) accounted for 637 case mentions, 392 single exposures, 132 moderate medical outcomes, 92 major medical outcomes, and 0 deaths. In 2022, AAPCC reported that GHB and its analogs and precursors accounted for 558 case mentions, 387 single exposures, 97 moderate medical outcomes, 117 major medical outcomes, and 0 deaths. 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 those from GHB.

User Population:

GHB is abused at all-night parties and "raves," as well as for enhanced sexual experiences. According to the 2020 National Survey on Drug Use and Health, the crude prevalence of GHB use among people aged 12 or older was 0.07% (190,058 people). Among those GHB users, 65% (123,145 people) were 35–49 years old, 18.5% (35,147 people) were 26–34 years old, 9.6% (18,187 people) were 18–25 years old, and 0.8% (1,533 people) were 12–17 years old. The 2022 Monitoring the Future Survey reported that since 2014, the annual prevalence of 12th grade students using GHB has hovered around 0.4%; in 2022, this prevalence was 0.5% (8,900 people).

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.

The Drug Enforcement Administration's National Forensic Laboratory Information System Drug database collects scientifically verified data on drug items and cases submitted to and analyzed by federal, state, and local forensic drug laboratories. NFLIS-Drug received 158 reports of GHB in 2020, 150 in 2021, 69 in 2022, and 62 in 2023.

Control Status:

GHB is controlled in schedule I of the Controlled Substances Act (CSA).

Although Xyrem is a schedule III controlled substance, trafficking of Xyrem is subject to schedule I penalties. In addition, GBL and BD are structurally similar to GHB. A large body of evidence confirms 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.