

Liquid ecstasy: a new kid on the dance floor

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The use of recreational drugs in the UK is on the increase, as is the range of available substances. One relative newcomer to the drugs of misuse that is achieving popularity in the UK among 'ravers' and bodybuilders is gamma-hydroxybutyrate (GHB), also known as 'liquid ecstasy'.

WHAT IS GHB?

Gamma-hydroxybutyrate is an endogenous fatty acid found in every cell in the human body. In the brain it is widely distributed, reaching highest concentrations in the hypothalamus and basal ganglia (Gallimberti *et al*, 1989). It is available as a liquid or in powdered form and when taken by mouth it readily enters the brain and produces behavioural consequences that include anxiolytic, sedative and euphoric effects. It appears to have complex effects on both GABA_A and GABA_B receptors and has some actions similar to benzodiazepines, baclofen and alcohol (Barbaccia *et al*, 2002). The effects may result from potentiation of cerebral dopaminergic systems and there is evidence that the serotonin system also may be involved via stimulation of tissue serotonin turnover due to an increase in tryptophan transport (Gobaille *et al*, 2002). Gamma-hydroxybutyrate has been utilised in medical settings for a number of years to induce anaesthesia (Laborit, 1964), to aid with alcohol dependence and opioid withdrawal (Kam & Yoong, 1998; Tarricone, 2000; Nicholson & Balster, 2001) and as a treatment for sleep disorders (Mamelak, 1989; Chin *et al*, 1992).

LEGAL STATUS

During the 1980s GHB was popular in the USA as an over-the-counter food supplement. It enjoyed popularity among bodybuilders because it was believed to aid in fat reduction and muscle building

(Miotto *et al*, 2001). Gamma-hydroxybutyrate stimulates growth hormone release and activates the 'pentose pathway', which plays an important role in the synthesis of protein within the body. It also results in a protein-sparing effect, which reduces the rate at which the body breaks down its own proteins and it is these properties that are believed to underlie its ability to aid in bodybuilding and fat loss (Miotto *et al*, 2001). In 1990 the Food and Drug Administration banned over-the-counter sales because of the growing body of evidence of the potential for misuse. This was followed in March 2000 by the placing of the substance in Schedule 1, making it illegal to possess or sell GHB without a licence in the USA. At the moment in the UK possession of GHB is not illegal, but manufacture and supply is illegal because the drug is a controlled substance under the Medicines Act 1968. Gamma-hydroxybutyrate became scheduled under the Misuse of Drugs Act in June 2003.

ON THE DANCE FLOOR

Reports from the USA, Australia and Europe indicate that GHB now is being consumed increasingly as a recreational drug (Colfax *et al*, 2001; Karch *et al*, 2001; Mattison *et al*, 2001; Miotto *et al*, 2001; Nicholson & Balster, 2001; Whitten, 2001; Deveaux *et al*, 2002; Gross *et al*, 2002; Degenhardt *et al*, 2003). Degenhardt *et al* (2003), in a study of 76 Australian users, report that reasons for using the drug recreationally include the resultant feelings of euphoria, relaxation, increased sociability and loss of inhibition, as well as heightened sexual interest. There has been very little UK-based research into the use of GHB. One survey (Winstock *et al*, 2001) reports that 13% of a sample of 1151 respondents recruited via a dance-culture magazine (mean age of 23.9 years) reported using the drug. The mean age of first use of

GHB in this sample was 22.4 years. The effects of GHB were reported as including feelings of relaxation, a sense of well-being and very restful sleep, and its use is frequently associated with 'rave' or 'dance-party' settings, where it is used to aid 'comedown' following the use of stimulants. Consequently it is often taken along with or following the use of a range of other substances, including, most frequently, methylenedioxymethamphetamine (MDMA, Ecstasy), cocaine, lysergic acid diethylamide (LSD), cannabis and alcohol (Teter & Guthrie, 2001; Degenhardt *et al*, 2002; Tong & Boyer, 2002). Although interactions with other drugs of misuse are as yet unclear, research indicates that the concomitant use of alcohol interferes with GHB metabolism, preventing breakdown, raising blood concentrations and making respiratory arrest more likely (Karch *et al*, 2001). In the USA, GHB is popular among gay and bisexual men where it has been associated with increased sexual risk (Colfax *et al*, 2001; Mattison *et al*, 2001). A major concern is that the use of recreational drugs such as GHB could interact with agents commonly prescribed for patients with HIV. Antoniou & Tseng (2002) report evidence of relative overdoses secondary to an interaction between GHB and MDMA and protease inhibitors, especially ritonavir.

ACUTE SIDE-EFFECTS

The increasing popularity of GHB is indicated by a sharp rise in the number of accident and emergency cases associated with it across Europe and in the USA (Espinosa *et al*, 2001; Marinetti *et al*, 2001; Whitten, 2001; Deveaux *et al*, 2002; Iten & Oestreich, 2002; Miro *et al*, 2002). Adverse acute effects are wide ranging and include dizziness, blurred vision, hot/cold flushes, excess sweating, confusion, vomiting, loss of consciousness, tremors, blackouts and memory lapses, agitation and death (Galloway *et al*, 1997; Nicholson & Balster, 2001; Degenhardt *et al*, 2002). In addition, evidence from both clinical and recreational settings indicates that GHB may induce seizures/fits (Dyer, 1991; Degenhardt *et al*, 2002) and coma (Espinosa *et al*, 2001). Adverse reactions have been reported at a wide variety of doses (between 2 and 30g; Chin *et al*, 1992), indicating variable individual responses to the drug. In addition the