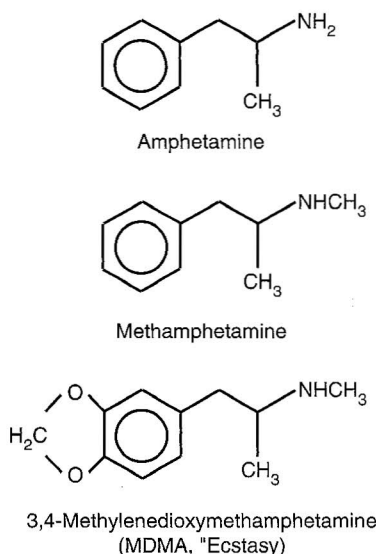




Structural formulas of amphetamine, methamphetamine, and MDMA ("Ecstasy").

when one looks at clinical experience. Some experts have argued that there is no clinical evidence that people who use MDMA develop such typical symptoms of serotonin depletion as disorders of sleep, mood, and sexual function (*Arch Gen Psychiatry*. 1990;47:288-289).

Lewis Seiden, PhD, professor of pharmacology at the University of Chicago, Ill, conducted extensive research on the neurotoxicity of MDMA in the mid-1980s. When he heard of the recent reports of fatalities associated with the use of the drug in English nightclubs, he was reminded, he says, of a well-established phenomenon in amphetamine research called "aggregation toxicology": One solitary rat or mouse given an injection of amphetamine will survive. But several animals, confined in a small cage and given the identical dose of amphetamine, will die.

Over the years, one of several proposed explanations for this phenomenon has been amphetamine-induced hyperthermia, Seiden says.

On the other hand, one "can't make the assumption the MDMA is just a fancy form of amphetamine," points out Steven Karch, MD, research director of the Trauma Center at the University Medical Center of Southern Nevada, Las Vegas. "The molecules are very close structurally [figure]. But then again, all stimulants look roughly the same."

Seiden also speculates that because MDMA is such a potent serotonin-releasing agent in the brain, it might also effect serotonin-releasing cells elsewhere in the body. Ninety percent of the serotonin in the body is located outside the brain, much of it in the gut and mast cells, he says.

The Long Road to Rave

MDMA has a long, controversial history that spans nearly a century, says Karch, who is also editor of the *Forensic Drug Abuse Advisor*.

The patent for MDMA was initially granted in 1914 to E. Merck in Darmstadt, Germany, as an appetite suppressant. The compound's toxicology wasn't systematically studied until the early 1950s, under a US Army contract with a group at the University of Michigan, Ann Arbor. The results of these studies were eventually declassified and published in 1973, when it was revealed that MDMA is somewhat less toxic than MDA (another amphetamine derivative), but more toxic than the hallucinogen mescaline (*Toxicol Appl Pharmacol*. 1973;25:299-309).

No pharmaceutical company has ever made MDMA, nor has the Food and Drug Administration approved it. A small number of psychiatrists have advocated its use in therapy, based on the belief that it lowers patients' defenses and promotes trust and confidence.

In 1985, after several studies showed neurotoxicity in animals, the Drug Enforcement Agency classified MDMA as a Schedule I compound. Schedule I compounds, such as heroin and LSD, are believed by the agency to have a high potential for abuse and no currently accepted medical use.—by Teri Randall

'Rave' Scene, Ecstasy Use, Leap Atlantic

THE BRITISH rave counterculture, and its liberal use of ecstasy (MDMA), has become a hot export to the United States, wrapped in a high-tech music and video package and supported by low-tech laboratories that illicitly produce the drug stateside.

An August 19, 1992, article by United Press International says that a clamp-down on rave parties by British authorities has inspired several English rave promoters to move their business to the United States. Staged in empty warehouses or open fields outside San Francisco or Los Angeles, their parties are drawing thousands of young Californians on designated weekend nights.

Partygoers—attired in *Cat in the Hat* hats and psychedelic jumpsuits—pay \$20 at the door to dance all night to heavily mixed, electronically generated sound, surrounded by computer-generated video and laser light shows. They pay another \$3 to \$5 for "smart drinks"—amino acid-laced beverages that reputedly enhance energy and alertness. And for another \$20, those so inclined can

purchase an ecstasy tablet (see accompanying article).

Many observers can't help but draw comparisons to the LSD-laced "human be-ins" of a quarter-century ago. The scene has come full circle, they add, noting that several Los Angeles raves have been hosted by Timothy Leary's son. The elder Leary, a former Harvard professor who advocated the use of LSD (lysergic acid diethylamide) three decades ago, has made several appearances at his son's raves, calling them "high-tech Acid Tests."

Large raves also have been staged in New York, NY, and other urban centers in the United States. Their popularity is increasing in parts of India, Indonesia, Belgium, and New Zealand, and a promoter is working to popularize the scene in Sweden, United Press International reports.

So far, there appear to be no published reports of death or severe toxicity caused by MDMA use.

Most of the MDMA available in England is supplied by clandestine labora-

tories in the Netherlands. In the United States, the drug is made predominantly on the West Coast by small-scale operators, says Joseph Bono, supervisory chemist, special testing, Drug Enforcement Agency.

The synthesis of MDMA requires minimal knowledge of chemistry. Illicit laboratories are often set up in kitchens, mobile trailers, or garages with little concern for cleanliness. Reactions may be set up in cookie jars. Solid products may be removed with coffee filters; and the coffee filter may be thrown back into the reaction vessel for a second synthesis step (*J Forensic Sci*. 1988;33:576-587). Bono detects a lot of contaminants and by-products in the samples that reach his laboratory for analysis.

"We're not dealing with Smith, Kline, and French here. We're dealing with people who are just interested in turning out a product," Bono says. "If it assays at 50% as opposed to 100% or 95%, they don't really care. And what is that other 50%? Who knows?"

—by Teri Randall