## LSD

#### **Profile**

LSD (D-lysergic acid diethylamde) is a highly potent synthetic hallucinogen. It is manufactured from a lysergic acid compound found in ergot, a fungus that grows on grains. Because of its high potential for abuse, LSD is a Schedule I drug under the Controlled Substances Act of 1970. Currently, there is no accepted medical use in the United States.<sup>2</sup>

## History

Swiss chemist Albert Hofmann first synthesized LSD in 1938 as an employee of the Sandoz Laboratories. Hofmann was conducting research on the therapeutic value of the lysergic acid compounds as a circulatory and respiratory stimulant, though no great effects were discovered and his research was discontinued. Hofmann discovered the hallucinogenic effects of LSD in 1943 when he accidentally ingested some of the drug. This discovery renewed interest in the drug as a possible treatment for schizophrenia and as a research tool in studying mental illness.<sup>3</sup> In 1947, Sandoz marketed LSD under the trade name "Delysid" as a psychiatric panacea, curing everything from schizophrenia and criminal behavior to sexual perversions and alcoholism; they introduced it to the United States prescription drug market a year later.<sup>4</sup>

From the 1940's to the mid 1970's, LSD was extensively researched in the psychiatric community. Psychiatric students were encouraged to use LSD as a teaching tool to help understand schizophrenia. Soon, LSD emerged as a drug of abuse by some in the psychiatric and medical community who shared it with friends. By the 1960's, casual use of LSD evolved into a subculture that celebrated mysticism and psychedelia and embraced media personalities such as Harvard University instructor Dr. Timothy Leary.<sup>5</sup>

Though casual LSD use spread through the early 1970's, publicity about the negative effects of LSD, such as "flashbacks" and "bad trips," as well as prohibitive legislation and the efforts of law enforcement agencies led to a decreased popularity by the midseventies. By the early 1980s, the value of LSD use in psychotherapy was discredited, and scientific study of the drug ended.<sup>6</sup>

Today's recreational users of LSD often include people in their late teens and early twenties who are involved in the psychedelic music scene. In the 1990's, LSD was among the ranks of "club drugs" that, along with MDMA and ketamine, were found at dance clubs and large underground parties known as raves. A recent national study suggests LSD use among high school students is declining, and may be at its lowest level in many years.

### Method of Use

In its original form, LSD is a white or clear, odorless, water-soluble crystal that can be crushed into a powder and dissolved. The most common form of LSD is "blotter acid" – sheets of paper that have been laced with LSD. Tablets known as "microdots" are also very common. LSD is also found as a powder or crystal, dried on gelatin sheets or on sugar cubes, or in capsule or liquid form. The potency of each LSD blotter tab or pill is between 20 and 80 micrograms, and users usually chew or swallow them, allowing the drug to be absorbed through the gastrointestinal tract. It also is inhaled or injected.

### LSD's Effects on Brain

Users feel the effects of LSD within 30 to 90 minutes after ingestion, and these effects may last as long as 12 hours. LSD causes hallucinogenic effects by disrupting the interaction of the neurotransmitter serotonin and nerve cells. Serotonin is involved in the control of behavioral, perceptual, and regulatory systems, such as mood, hunger, body temperature, sexual behavior, and muscle control. LSD's impact on serotonin also affects an area of the brain that detects external stimuli from all over the body, making it more responsive to input from the environment.

### **Addiction and Tolerance**

Though tolerance to LSD develops rapidly, it does not produce compulsive drug-seeking behavior that is typical of addictive drugs, such as crack and heroin. The Drug Enforcement Administration cites four reasons for this. First, the long duration of the drug's effects means the user will not have to purchase the drug on a rapidly recurring basis. Second, tolerance develops so quickly that repeated ingestion is useless. Third, the inconsistent effects and potential adverse reactions lead to erratic use of LSD. Finally, the powerful hallucinations produced by LSD will often prompt users to abstain from use in order to recover and reorient.<sup>16</sup>

## **Short Term Effects**

- Physical effects<sup>17</sup>
  - Dilated pupils
  - o Raised body temperature
  - o Rapid heartbeat and elevated blood pressure
  - o Increased blood sugar
  - Salivation
  - o Dry mouth
  - o Tingling fingers and toes
  - Weakness
  - o Tremors
  - o Palpitations
  - o Facial flushing
  - o Chills and gooseflesh
  - o Sweating
  - o Nausea

- Loss of appetite
- o Dizziness
- Blurred vision
- o Sleeplessness

# • Psychedelic effects

- O Visual hallucinations, ranging from intensified color or flashes of light to geometric designs to distortions of reality or completely new images seen with the eyes open or closed<sup>18</sup>
- o Intensification of smells, sounds, and other sensations<sup>19</sup>
- Sense of heightened understanding<sup>20</sup>
- o Distorted sense of time<sup>21</sup>
- Distorted perception of body and a sense of "depersonalization" in which the one feels one's mind has left one's body<sup>22</sup>
- Synethesia- a blending of sensory perception (i.e. "hear" colors or "see" sounds)<sup>23</sup>
- The sense that one is undergoing a profound mystical or religious experience<sup>24</sup>
- Adverse reaction: Bad Trips
  - o Intense anxiety
  - o Panic
  - o Delusions
  - o The sense that one is losing his/her identity
  - o The fear one is disintegrating into nothingness and reality does not exist<sup>25</sup>
  - o Paranoia
  - o Rapid mood swings<sup>26</sup>
  - Violent or hazardous behavior leading to accidental fatalities, homicides, self-mutilation, or suicide
  - Some users may experience seizures<sup>27</sup>

# **Long Term Effects**

• Drug-induced Psychosis:

For some people, even those with no history or symptoms of psychological disorders, a distorted ability to recognize reality, think rationally, or communicate with others caused by LSD may last years after taking the drug.<sup>28</sup>

• Hallucinogen Persisting Perception Disorder (HPPD):

Known familiarly to LSD users as "flashbacks," HPPD episodes are "spontaneous, repeated recurrences of some of the sensory distortions originally produced by LSD." The flashback experience may include visual disturbances such as halos or trails attached to moving objects or seeing false motions in the peripheral vision. 30

# **Terminology**<sup>31</sup>

- Slang terms for LSD
  - Acid, boomers, doses, Yellow Sunshines, battery acid, blotter, microdots, dots, electric Kool-Aid, window pane, purple haze, sugar cubes, cubes, Elvis, tabs, hits, blue cheer
- Slang terms for LSD combined with other substances
  - o Candy-flipping, troll (the use of LSD and MDMA)
  - o Frisco special, Frisco speedball (LSD, cocaine, and heroin)
  - o Outer limits, sheet rocking (crack and LSD)
  - o Black Acid (LSD and PCP)
  - o Banana split (combination of 2C-B [Nexus] and LSD or other drugs)
- Slang terms for LSD dosage units
  - o Hits, tabs, trips (usually paper squares)
- Slang terms for LSD users
  - o Acid freak, acid head, explorers club (group of LSD users)
- Other slang
  - o Trip (to take LSD)
  - o Come home (end a trip from LSD)
  - o Yen sleep (restless, drowsy state after LSD use)

## Links

• NIDA InfoFacts: LSD

• DEA: LSD in the United States

<sup>&</sup>lt;sup>1</sup> National Institute on Drug Abuse. (2001). Research Report Series: Hallucinogens and Dissociative Drugs (NIH Publication number 01-4209). Washington, DC: US

<sup>&</sup>lt;sup>2</sup> Street Drugs. LSD. Retrieved October 25, 2006, from http://www.streetdrugs.org/lsd.htm.

<sup>&</sup>lt;sup>3</sup> National Institute on Drug Abuse . (2001).

<sup>&</sup>lt;sup>4</sup> US Department of Justice, Drug Enforcement Administration. LSD in the United States. Retrieved October 25, 2006, from http://www.fas.org/irp/agency/doj/dea/product/lsd/toc.htm.

<sup>&</sup>lt;sup>5</sup> Drug Enforcement Administration.

<sup>&</sup>lt;sup>6</sup> Drug Enforcement Administration.

<sup>&</sup>lt;sup>7</sup> Drug Enforcement Administration.

<sup>&</sup>lt;sup>8</sup> National Drug Intelligence Center. (April 2001). Information Bulletin: Raves (Product no. 2001-L0424-004). Washington, DC:US

<sup>&</sup>lt;sup>9</sup> National Institute on Drug Abuse. (12/16/02). 2002 Monitoring the Future Survey: Decreasing in Use of Marijuana, Club Drugs, and Tobacco. Retrieved October 25, 2006, from <a href="http://www.nida.nih.gov/Newsroom/02/NR12-16.html">http://www.nida.nih.gov/Newsroom/02/NR12-16.html</a>

<sup>&</sup>lt;sup>10</sup> National Institute on Drug Abuse. (2001).

<sup>&</sup>lt;sup>11</sup> Drug Enforcement Administration

<sup>&</sup>lt;sup>12</sup> Drug Enforcement Administration; Street Drugs: LSD.

<sup>&</sup>lt;sup>13</sup> Brands, B., Sproule, B., Marshman, J. (1998). Drugs & Drug Abuse (3<sup>rd</sup> edition). Addiction Research Foundation: Toronto, Ontario: Canada.

<sup>&</sup>lt;sup>14</sup> National Institute on Drug Abuse. (2001).

<sup>&</sup>lt;sup>15</sup> Carson-Dewitt, R., MD (editor). (2001). Encyclopedia of Drugs, Alcohol, & Addictive Behavior, 2<sup>nd</sup> edition (vol. 2). Macmillan Reference USA. New York, NY: US

<sup>16</sup> Drug Enforcement Administration.

http://www.nida.nih.gov/ResearchReports/Hallucinogens/halluc3.html.
21 Drug Enforcement Administration.

<sup>&</sup>lt;sup>17</sup> Drug Enforcement Administration.

<sup>&</sup>lt;sup>18</sup> Drug Enforcement Administration.

<sup>&</sup>lt;sup>19</sup> National Institute on Drug Abuse. (2001).

National Institute on Drug Abuse. (2005). Research Report Series: Hallucinogens and Dissociative Drugs. Retrieved October 25, 2006, from

<sup>&</sup>lt;sup>22</sup> Brands, B., Sproule, B., Marshman, J. (1998).

<sup>&</sup>lt;sup>23</sup> National Institute on Drug Abuse. (2001).

<sup>&</sup>lt;sup>24</sup> Brands, B., Sproule, B., Marshman, J. (1998).

<sup>&</sup>lt;sup>25</sup> Centre for Addiction and Mental Health. Do You Know... LSD. Retrieved October 25, 2006, from http://www.camh.net/About\_Addiction\_Mental\_Health/Drug\_and\_Addiction\_Information/lsd\_dyk.html.

26 Drug Enforcement Administration.

<sup>&</sup>lt;sup>27</sup> eMedicine. (2006, May 11). Incapacitating Agents, LSD. Retrieved October 25, 2006, from http://www.emedicine.com/EMERG/topic911.htm.

<sup>&</sup>lt;sup>28</sup> National Institute on Drug Abuse. (2001). <sup>29</sup> National Institute on Drug Abuse. (2005).

<sup>&</sup>lt;sup>30</sup> National Institute on Drug Abuse. (2005).

<sup>&</sup>lt;sup>31</sup> Office of National Drug Control Policy (ONDCP). Slang Terms: Drugs and the Drug Trade. Retrieved October 25, 2006, from http://www.whitehousedrugpolicy.gov/streetterms/ByType.asp?intTypeID=6