LSD sends "speed up" messages

The drug LSD fits into the same receptor site as the neurotransmitter SEROTONIN

LSD affects:
perception
attention
brain stem
touch and movement
vision

LSD is also called "acid".

LSD users may say that they can "see" sound waves or "smell" colors. This is because LSD sends a lot of "speed up" messages to the small part of the limbic system where messages for all the senses pass through together on their way to the cerebrum.

The drug LSD can have different effects on different people. There is no way to know ahead of time how one particular person will react to it.

A person who has taken LSD usually can't tell the difference between themselves and the world around them. They can't tell how big something really is, or how long time is really taking.

People who are on LSD may panic and jump to their deaths. They may also suffer mental breakdowns that do not end even after the drug has worn off.

LSD, which is short for "lysergic acid diethylamide", comes from an extract of the ergot fungus. This fungus was used as a poison in the Middle Ages.

A person who takes LSD usually has dilated (bigger) pupils, feels cold, feels dizzy, feels tingling in their hands and feet, and feels sick to their stomach.

People who have used LSD may have "flashbacks", which means that at any time they may start to act and feel like they are on LSD, even without taking more.

Scientists have found that LSD probably causes damage to chromosomes, the part of the cell that has all the information about how the cell works.
This may cause birth defects in the children of people who have used LSD.

MDMA, or "Ecstasy", acts like LSD. Scientists have found that longterm use of Ecstasy causes neurons in the brain to die or become damaged.

Hallucinogens (http://teens.drugabuse.gov/mom/tg_hal1.asp)

Hallucinogens are drugs which cause altered states of perception and feeling and which can produce flashbacks. They include natural substances, such as mescaline and psilocybin that come from plants (cactus and mushrooms), and chemically manufactured ones, such as LSD and MDMA (ecstasy). LSD is manufactured from lysergic acid, which is found in ergot, a fungus that grows on rye and other grains. MDMA is a synthetic mind-altering drug with both stimulant and hallucinogenic properties. Although not a true hallucinogen in the pharmacological sense, PCP causes many of the same effects as hallucinogens and so is often included with this group of drugs. Hallucinogens have powerful mind-altering effects. They can change how the brain perceives time, everyday reality, and the surrounding environment. They affect regions and structures in the brain that are responsible for coordination, thought processes, hearing, and sight. They can cause people who use them to hear voices, see images, and feel sensations that do not exist. Researchers are not certain that brain chemistry permanently changes from hallucinogen use, but some people who use them appear to develop chronic mental disorders. PCP and MDMA can be addictive; whereas LSD, psilocybin, and mescaline are not.

Research has provided many clues about how hallucinogens act in the brain to cause their powerful effects. However, because there are different types of hallucinogens and their effects are so widespread, there is still much that is unknown. The following paragraphs describe some of what is known about this diverse group of drugs.

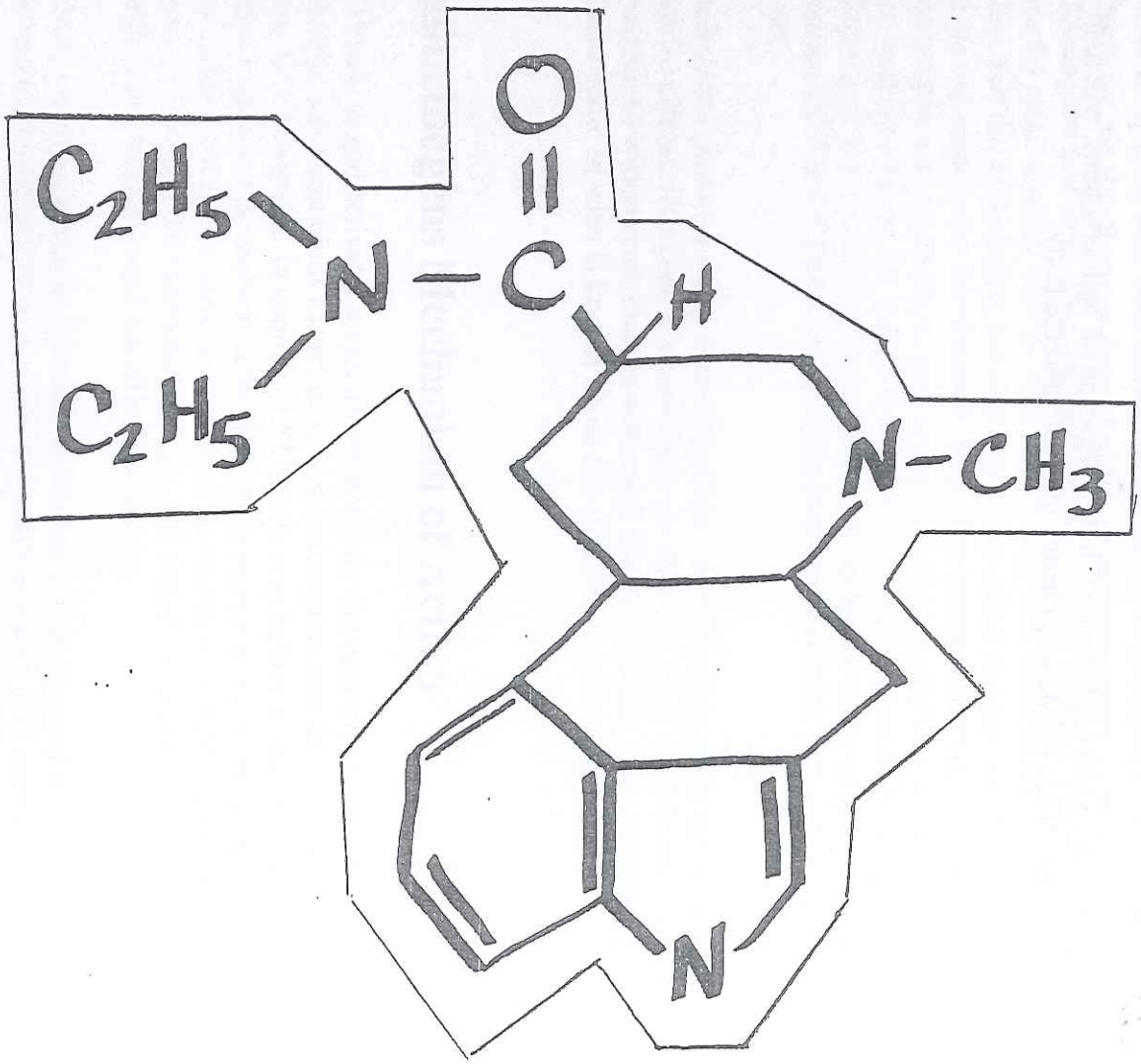
Hallucinogens Mechanism of Action

LSD binds to and activates a specific receptor for the neurotransmitter serotonin. Normally, serotonin binds to and activates its receptors and then is taken back up into the neuron that released it. In contrast, LSD binds very tightly to the serotonin receptor, causing a greater than normal activation of the receptor. Because serotonin has a role in many of the brain's functions, activation of its receptors by LSD produces widespread effects, including rapid emotional swings, and altered perceptions, and if taken in a large enough dose, delusions and visual hallucinations.

MDMA, which is similar in structure to Methamphetamine and mescaline, causes serotonin to be released from neurons in greater amounts than normal. Once released, this serotonin can excessively activate serotonin receptors. Scientists have also shown that MDMA causes excess dopamine to be released from dopamine-containing neurons. Particularly alarming is research in animals that has demonstrated that MDMA can damage serotonin-containing neurons. MDMA can cause confusion, depression, sleep problems, drug craving, and severe anxiety.

PCP, which is not a true hallucinogen, can affect many neurotransmitter systems. It interferes with the functioning of the neurotransmitter glutamate, which is found in neurons throughout the brain. Like many other drugs, it also causes dopamine to be released from neurons into the synapse. At low to moderate doses, PCP causes altered perception of body image, but rarely produces visual hallucinations. PCP can also cause effects that mimic the primary symptoms of schizophrenia, such as delusions and mental turmoil. People who use PCP for long periods of time have memory loss and speech difficulties.

The following activities, when used along with the magazine on hallucinogens, will help explain to students how these substances change the brain and the body.



Drug:

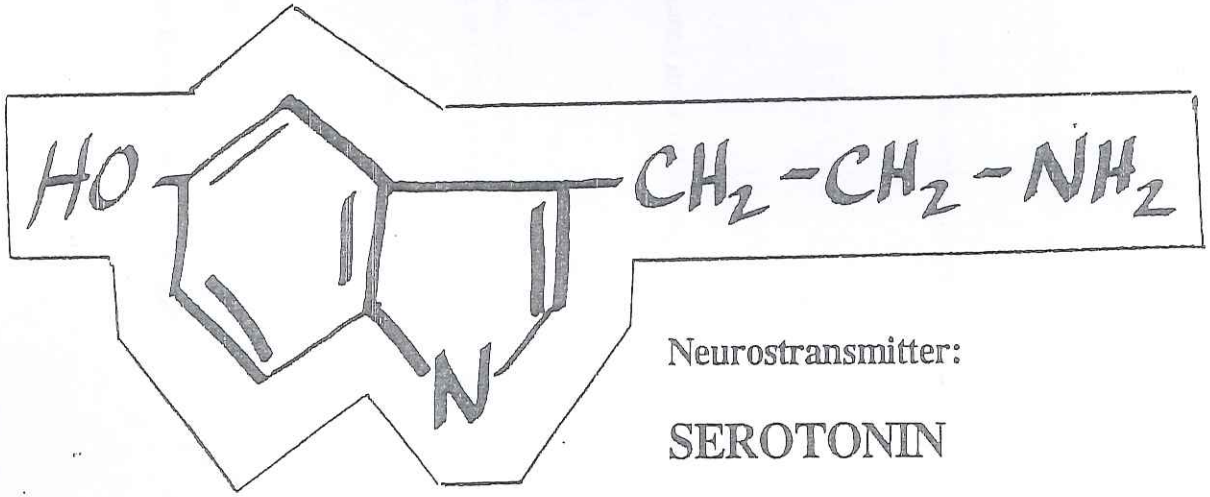
LSD

Receptor for the neurotransmitter, SEROTONIN

Serotonin sends "speed up" messages

Serotonin affects:
- perception
- attention
- brain stem
- touch and movement
- vision

Serotonin pathways are associated with sleep and arousal, and with mood changes.

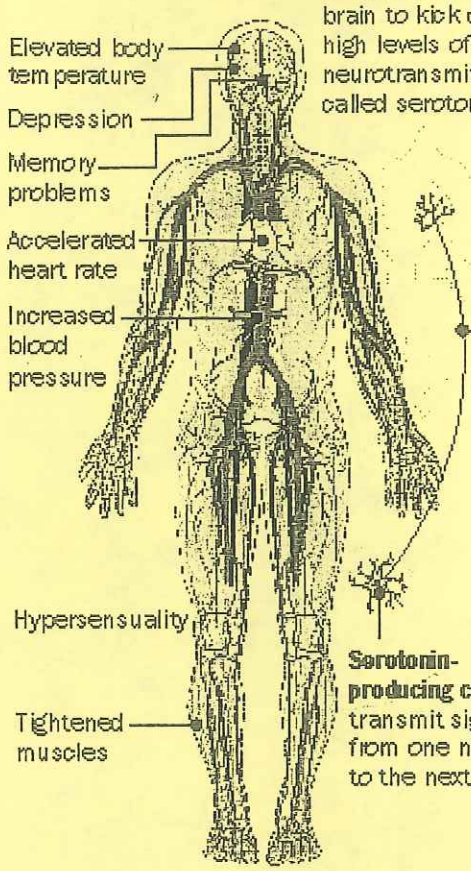


Neurostransmitter:

SEROTONIN

How Ecstasy affects the body

The symptoms



The brain

Ecstasy forces the brain to kick out high levels of a neurotransmitter called serotonin.

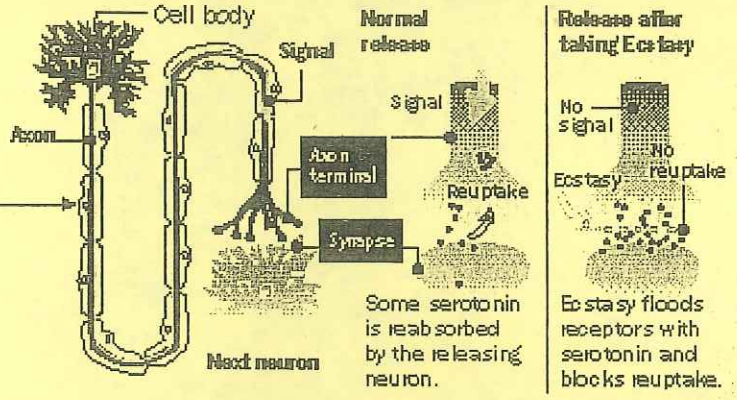
Serotonin-producing cells transmit signal from one nerve to the next.

THE SIGNAL

Releases serotonin stored in the axon terminals to the next neuron.

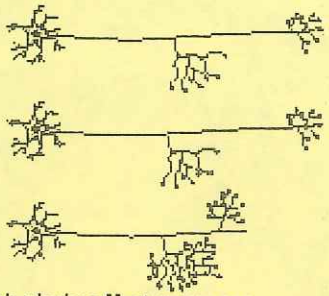
THE RELEASE

Ecstasy releases serotonin without a signal and keeps it from being reabsorbed, causing heavy concentration in the synapse.



THE DAMAGE

Blood circulation is reduced and temperature may be elevated, damaging brain tissue.



Normal nerve — Axon can stretch to reach distant areas.

Damaged nerve — It is believed that axon ends die after the rush of serotonin.

Nerve recovery — Studies indicate nerves may grow back but they may no longer reach distant areas. This may particularly affect memory, as well as control over the emotions.

Source: National Institute of Drug Abuse; Time Magazine; Advertiser staff research

MARTHA HERNANDEZ • The Honolulu Advertiser

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June 6, 2001

Health Report: The Dangers of Ecstasy

with Saint Vincent Emergency Medicine Specialist Ron Strony, M.D.

Ecstasy and the Rave Culture

The rave culture came from Europe to American during the early 1990's. In the early days, all-night dance parties were held in clandestine locations with small numbers (usually less than 100) of attendees. Today's raves are often held in concert halls and warehouses and can attract thousands of people, mostly 15 to 25-year-olds. The parties have their own unique kind of "techno" music, which produces loud, repetitive, pulsating sounds.

Because of the young age group at most raves, alcohol is generally forbidden. However, many (but not all) of the attendees use illicit drugs. One of the most popular rave drugs is Ecstasy (methylenedioxymethamphetamine, also called MDMA, XTC, X, Adam, Essence, and Clarity). Ecstasy stimulates release of serotonin (a brain chemical). People who take it report enhanced feelings of peace, closeness and empathy with others. Depending upon the dose and purity of the drug, the "high" can last from several minutes to an hour or more.

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The Dangers of Ecstasy

According to a recent survey by the National Institute on Drug Abuse, high schoolers' use of some illicit drugs, such as cocaine and methamphetamine, is finally decreasing. But use of Ecstasy is up, and that increase has some health officials worried.

Although many people think Ecstasy is a "safe" drug, it can have some risky side effects. Users can experience confusion, depression, sleep problems, anxiety, and paranoia for weeks after taking Ecstasy. It increases heart rate and blood pressure, which can have dangerous consequences for people with cardiovascular disease. Hot, crowded dancing areas and limited access to drinking water increase the risk of dehydration, hyperthermia (abnormally high body temperature), and heart or kidney failure. Users are also at risk of taking a dangerous drug which has been passed off as Ecstasy.

A more serious danger for Ecstasy users is the drug's effects on the brain and memory. Using advanced imaging techniques, researchers compared brain scans of Ecstasy users with non-users who were matched for age and educational background. Those who used Ecstasy had a significant loss in the number of serotonin transporters, the sites in the brain which regulate memory and other functions. Doctors say similar brain scans are seen in 60–year-old stroke patients. But the Ecstasy users are young, and doctors are worried the brain damage will be permanent. Although

there's no proof that use of Ecstasy just once or twice can cause any lasting effects, a recent study found continued regular use of the drug can also cause memory impairment.

stimulant

BBC NEWS

Ecstasy can kill

A 19-year-old student has died after taking what has been described as "exceptionally potent" ecstasy pills. BBC News Online examines a drug whose use has become widespread among clubbers in recent years.

The case of Lorna Spinks, a sociology undergraduate at Anglia Polytechnic University, who collapsed and died after taking ecstasy pills graphically illustrates the dangers of taking the drug.

It is clear that the drug has the potential to kill.

Most deaths have been caused by dehydration. Ecstasy affects body temperature, and when combined with dancing for long periods in a hot place there is a risk of dangerous over-heating.

However, the medical profession is still unclear as to the exact danger that the drug poses to health.

Part of the problem is that many tablets sold as ecstasy are not what purchasers think they are.

The amount of ecstasy in a tablet can vary greatly.

Tablets have been analysed and some contained no ecstasy but other drugs such as amphetamine or ketamine.

Others have been found to contain some ecstasy but mixed with other drugs or a range of adulterants. Some tablets have even been found to be fish tank cleaners or dog worming tablets.

Stimulant

Ecstasy is a stimulant and increases brain activity.

It is often taken by clubbers, who say that it induces a sense of euphoria, followed by a feeling of calm.

They claim it makes them feel more sociable and increases their awareness of their surroundings.

However, large doses of the drug can cause anxiety, panic and confusion.

Evidence is also mounting that regular use of the drug may cause long-term brain changes which may be linked to an increased risk of mental health problems, including chronic depression.

Studies have already suggested that the drug is toxic to the neurones in the brain, and that it may kill cells which produce a vital mood chemical called seratonin.

An autopsy of a 26-year-old long-term heavy user of Ecstasy revealed that he had up to 80% less serotonin in his brain than normal.

Research from University College London has also shown that that former ecstasy users may suffer memory impairment - even a year or more after giving up the drug.

Serotonin carries messages between nerves and is thought to play a role in regulating sleep patterns in humans as well as their mood, memory, perception of pain, appetite and libido.

Liver damage

Research on long-time users suggests it may cause liver and kidney problems in later life.

People with problems such as epilepsy, high blood pressure and depression are thought to be more likely to suffer side effects from ecstasy use.