

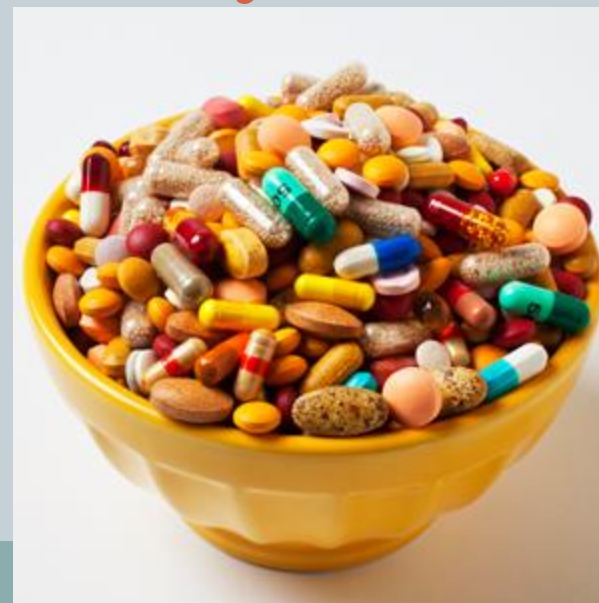


# Current Trends in Toxicology: Your kids know more than you!

WILLIAM RUSHTON, MD

OFFICE OF MEDICAL TOXICOLOGY  
DEPARTMENT OF EMERGENCY MEDICINE

UAB, BIRMINGHAM, AL





# Disclosure

I have *NO* relevant financial relationships to disclose

# Overview



- History
- Rx Drug Abuse
- Synthetic Cannabinoids
- Bath Salts
- Other agents
- Drug Screens

# History



- On 26 May 1981
  - EA-6B Prowler crashed on the flight deck of the U.S.S. Nimitz
  - killing 14 crewmen and injuring 45 others.



# History



- On 26 May 1981
  - EA-6B Prowler crashed on the flight deck of the U.S.S. Nimitz
  - killing 14 crewmen and injuring 45 others.
- Forensic testing conducted found that several members of the deceased flight deck crew tested positive for marijuana.



# The Investigation & Results



- The results revealed a large illicit substance-using cohort within the ranks of enlisted persons and officers.
- From these actions was derived the concept of a "drug-free workplace".
- In consultation with his drug-czar, Dr. Carlton Turner, President Ronald Reagan issued...



# Legislation



- Executive Order 12564 (1986)
  - Established requirement for drug testing for all Federal employees

The screenshot displays the Federal Register website. At the top, the title "Federal Register" is in a gold banner, with a breadcrumb trail: "Home > Federal Register > Codification > Executive Orders". Below this, a left sidebar contains links for "Codification", "About the Codification", "Alphabetical Index", "Chapter Index", "Numeric Index", and a "Search the Codification" button with a binoculars icon. The main content area is titled "Executive Order 12564--Drug-free Federal workplace". It begins with a "Source" note: "The provisions of Executive Order 12564 of Sept. 15, 1986, appear at 51 FR 32889, 3 CFR, 1986 Comp., p. 224, unless otherwise noted." This is followed by the text: "I, RONALD REAGAN, President of the United States of America, find that: Drug use is having serious adverse effects upon a significant proportion of the national work force and results in billions of dollars of lost productivity each year; The Federal government, as an employer, is concerned with the well-being of its employees, the successful accomplishment of agency missions, and the need to maintain employee productivity; The Federal government, as the largest employer in the Nation, can and should show the way towards achieving drug-free workplaces through a program designed to offer drug users a helping hand and, at the same time, demonstrating to drug users and potential drug users that drugs will not be tolerated in the Federal workplace; The profits from illegal drugs provide the single greatest source of income for organized crime, fuel violent street crime, and otherwise contribute to the breakdown of our society; The use of illegal drugs, on or off duty, by Federal employees is inconsistent not only with the law-abiding behavior expected of all citizens, but also with the special trust placed in such employees as servants of the public; Federal employees who use illegal drugs, on or off duty, tend to be less productive, less reliable, and prone to greater absenteeism than their fellow employees who do not use illegal drugs; The use of illegal drugs, on or off duty, by Federal employees impairs the efficiency of Federal departments and agencies, undermines public confidence in them, and makes it more difficult for other employees who do not use illegal drugs to perform their jobs effectively. The use of illegal drugs, on or off

# What “drugs”?



- Drug testing guidelines and processes are established and regulated by the Substance Abuse and Mental Health Services Administration (SAMHSA), formerly under the direction of the National Institute on Drug Abuse (NIDA).
- Urinalysis tests used to detect (*NIDA 5*):



# What “drugs”?



- Urinalysis tests used to detect (*NIDA 5*):
  - Marijuana metabolites
  - Cocaine metabolites
  - Amphetamines
  - Opiate metabolites
  - Phencyclidine (PCP)

# Fast Forward



**WHAT HAPPENS NEXT?**

# Navy to Kick Out 64 Sailors for Drug Use From Fleet That Buried Bin Laden

Published October 20, 2011 | Associated Press

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March 15, 2005: The nuclear powered aircraft carrier USS Carl Vinson (CVN 70) plows through the Indian Ocean as aircraft on its flight deck are prepared for flight operations.

SAN DIEGO – Sixty-four sailors from the San Diego-based U.S. Third Fleet will be kicked out of the Navy for drug use, mostly involving a synthetic drug that mimics marijuana, military officials said Thursday.

Capt. Greg Hicks of the Third Fleet said the sailors worked aboard the USS San Francisco, the floating dry dock Arco, and the USS Carl Vinson, the aircraft carrier that buried Usama bin Laden at sea. He said the Navy is still investigating and does not know if the accused members of the Vinson crew were aboard or using drugs when it was

on its mission in the Middle East at the time.

Hicks said all 64 will be separated from the Navy but he did not know when that would happen.

Most of the sailors were caught using the designer drug known as Spice, and 49 were found to be selling it, the Navy said. Six sailors admitted to also using cocaine and one was found to be using methamphetamines, the Navy said.

# Rx Drug Abuse

- Stimulants
- Narcotics
- Sedatives
- Antipsychotics



# Stimulants/Sympathomimetics



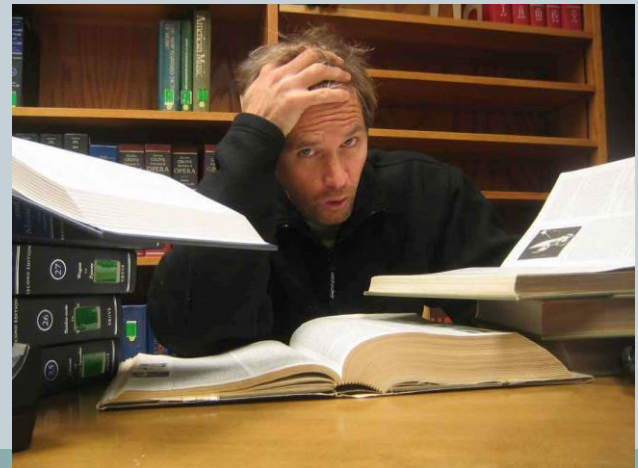
- Ritalin / Concerta / Daytrana
  - Methylphenidate
- Focalin
  - Dexamethylphenidate
- Adderall
  - Dextroamphetamine / amphetamine
- Vyvanse
  - Lisdexamfetamine
- All similar to amphetamines



# Desired Effects



- Euphoria, sense of invulnerability
- Arousal/wakefulness/hyperactivity
- Sharpened/narrowed focus/attention
- Stimulation of “pleasure centers” in brain
- Decreased appetite





# Modes of Abuse



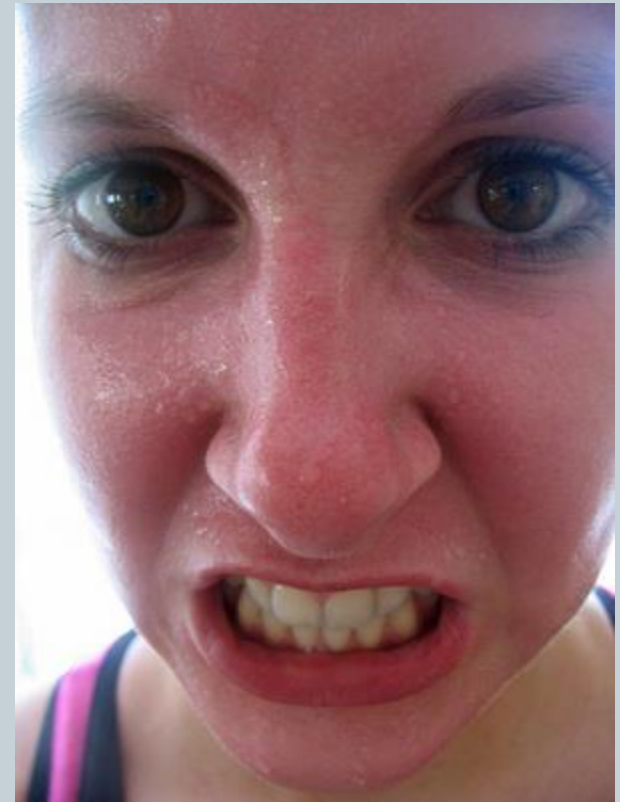
- Oral
- Snorted
- Injection – rare
- Illicit amphetamines smoked
- Increases “Adrenaline”



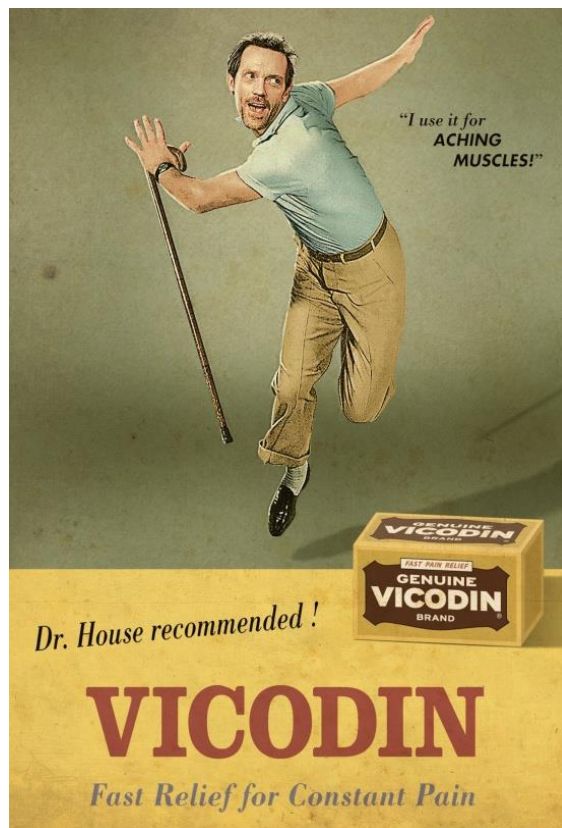
# Intoxication



- Fast speech
- Large pupils
- Elevated heart rate
- High blood pressure
- Sweating
- Agitation









# Narcotics



- Percocet / Tylox / oxycodone / oxycontin
  - Vicodin / Lortab / hydrocodone
  - Codeine
    - Tylenol with Codeine, Tylenol #3
  - Methadone
  - Heroin
- 
- A leading cause of death in adolescents
  - All similar to heroin



# Ways to use



# Intoxication

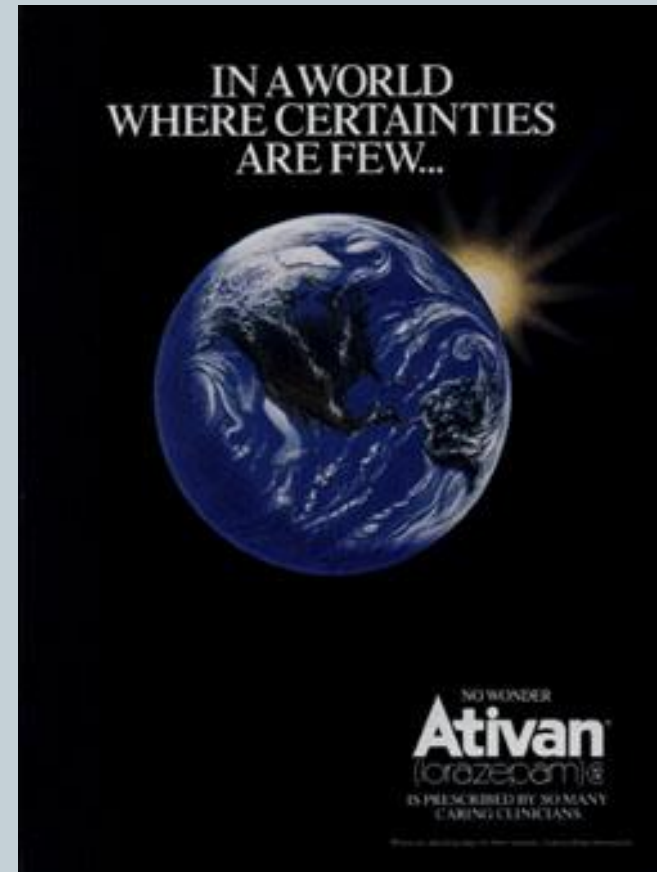


- Sedation
- Suppression of breathing
- Coma
- Commonly cause small pupils
- Can cause fluid in lungs
- Death typically caused by lack of oxygen





# Sedative Hypnotics



# Synthetic Cannabinoids

CP-47,497  
CP-55,040  
HU-210  
JWH-017  
JWH-018  
JWH-019  
JWH-073  
JWH-081  
JWH-200  
JWH-250  
WIN-55,212-2  
CB-25  
CB-52



# How is it used?



## ■ Smoked

- Rolled in papers
- Packed into cigars
- Hookah pipes
- Bong
- Inhaled as incense



# Effects



- *Not a Marijuana-like high*
- Tachycardia
- Hypertension
- Nausea
- Anxiety
- Headache
- Numbness
- **Seizures**





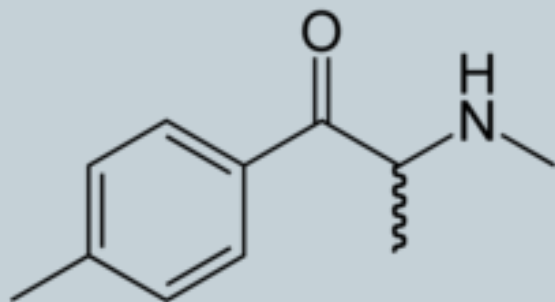
# Bath Salts



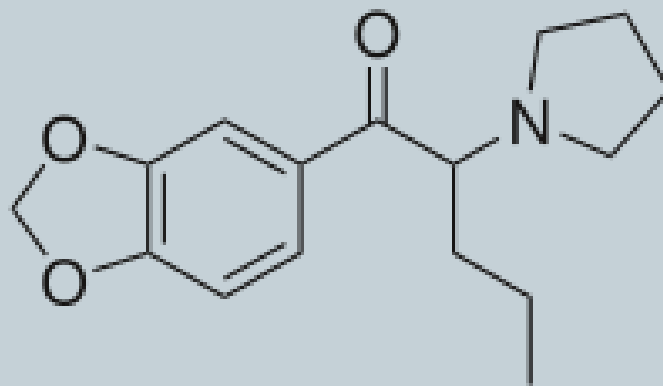
# Bath Salts



- May contain mephedrone or 3,4-methylenedioxypyrovalerone (MDPV)



Mephedrone



MDPV

# Signs & Symptoms



- Agitation
- Tachycardia
- Delusions/Hallucinations
- Seizures/tremor
- Hypertension
- Paranoia
- Mydriasis
- Intracranial hemorrhage



# What do these three things have in common?





# What do these three things have in common?



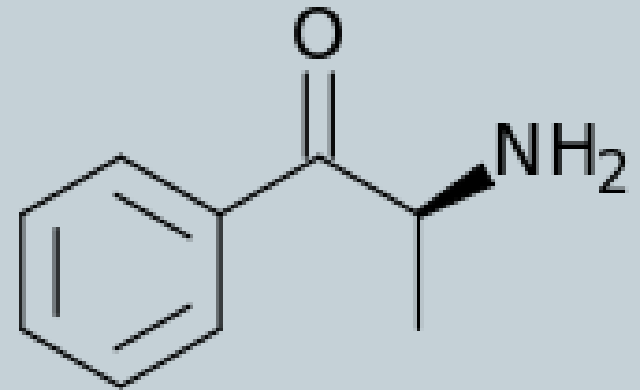
## KHAT



# Active ingredients

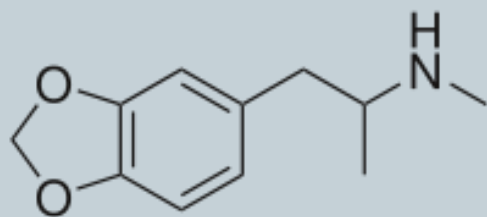
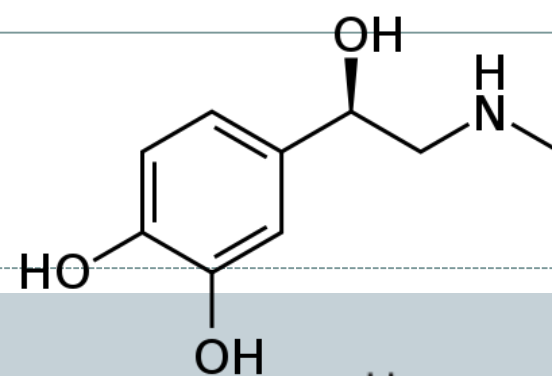


- Cathinone
- Cathine
- Norephedrine
- Norpseudophedrine

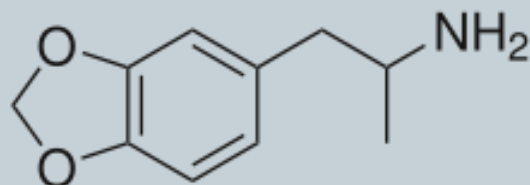


Cathinone

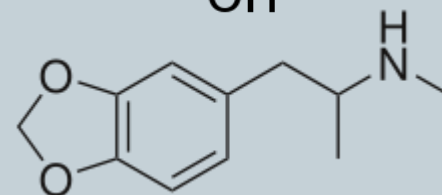
# Structures



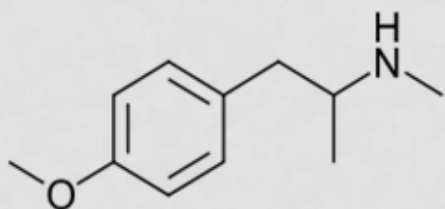
MDMA



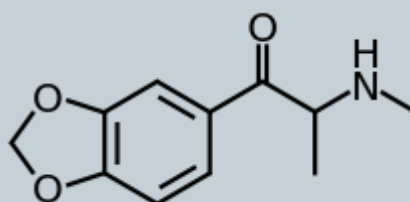
MDA



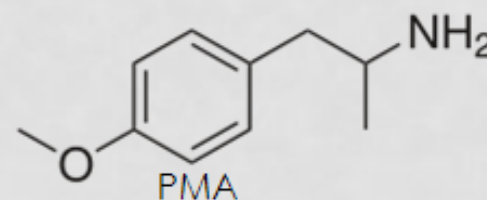
MDEA



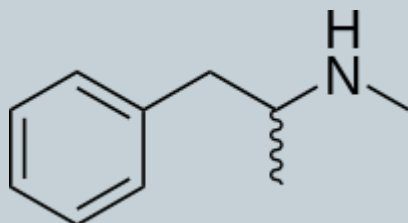
PMMA



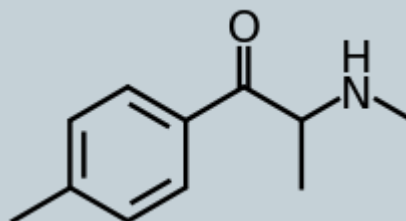
Methylone



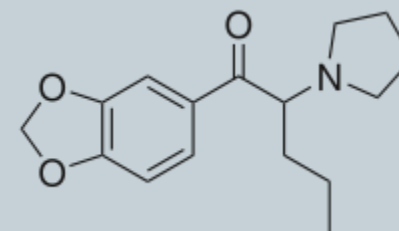
PMA



Methamphetamine



Mephedrone

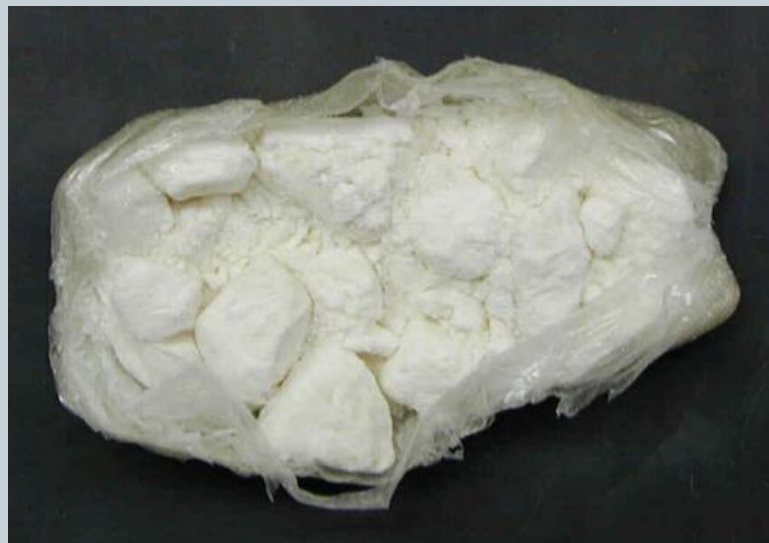
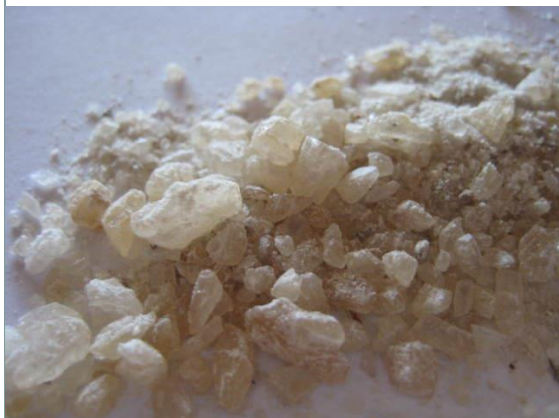


Methylenedioxypropylvalerone  
MDPV





# MDMA





# DanceSafe

Promoting health and safety within the rave and nightclub community



Got PLURRF?

Peace. Love. Unity.  
Respect. Responsibility...  
[Facebook.](#)

## Drug Information

### ▼ Stimulants

#### ▼ Ecstasy

- Ecstasy & Depression
- DanceSafe You Tube Channel
- Ecstasy Data
- Ecstasy and Neurotoxicity
- MDMA Contraindications
- Submit Your Testing Kit Results!
- Testing Kit Video
- Your Brain on Ecstasy Slideshow
- Cocaine
- MDPV

[Home](#) → [Drug Information](#) → [Stimulants](#) → [Ecstasy](#)

## Ecstasy

### WHAT IS ECSTASY?

- Ecstasy is **MDMA**, or 3,4-Methylenedioxymethamphetamine. It belongs to a family of drugs called "**entactogens**," which literally means "touching within." Other drugs in this category include MDA, MDE and MBDB.
- Before it was made illegal in 1985, MDMA was used by psychiatrists as a therapeutic tool. Studies are currently underway in several countries including the United States and Israel to assess MDMA's effectiveness in the treatment of Post Traumatic Stress Disorder (PTSD).

### WHAT ARE THE EFFECTS?

- MDMA is a "mood elevator" that produces a relaxed, euphoric state. It does not produce hallucinations.
- MDMA takes effect 20 to 40 minutes after taking a tablet, with little rushes of exhilaration which can be accompanied by nausea. 60 to 90 minutes after taking the drug, the user feels the peak effects.
- Sensations are enhanced and the user experiences heightened feelings of empathy, emotional warmth, and self-acceptance.
- The effects of 'real' ecstasy subside after about 3-5 hours.
- Users report that the experience is very pleasant and highly controllable. Even at the peak of the effect, people can usually deal with important matters.
- The effect that makes MDMA different from other drugs is that it increases a sense of empathy, or the sensation of understanding and accepting others.

#### ECSTASY



Embiggen

#### PRIMARY DRUG CATEGORY

- Stimulants

#### ADDITIONAL CATEGORIES

- Stimulants
- Club Drugs


#### KEYWORDS

## Random FAQs

- My testing kit is showing conflicting results, now what can I do?
- Do you ship to Canada? How can Canadians buy testing kits?
- What are the legal consequences for doing mushrooms?
- Do the Testing Kits expire?
- What are magic mushrooms?
- All FAQs

# Ecstasy Data.Org



SEARCH LAB RESULTS BY <a href="#">Advanced Search</a>								
Sample Photo	Tablet Name	Active Contents		Date Published	Date Tested	Location	Tablet Size	Data Source
		Substance	Ratio / Amounts					
	<a href="#">Green Powder</a> Girl 53840	Methamphetamine	1	Jan 22, 2014	Jan 22, 2014	San Gabriel, CA	348 mg, 21.3 x 7.4	<a href="#">EcstasyData.org</a>
	<a href="#">Manci Powder</a>	MDMA	1	Jan 22, 2014	Jan 22, 2014	Manchester, United Kingdom	300 mg, - x -	<a href="#">EcstasyData.org</a>
	<a href="#">Capsule</a> 08298	None Detected		Jan 22, 2014	Jan 22, 2014	Chicago, IL	400 mg, - x -	<a href="#">EcstasyData.org</a>
	<a href="#">Green PGP</a> BCJ22	TFMPP Diphenhydramine BZP Methadone	10 2 1 1	Jan 22, 2014	Jan 22, 2014	New York, NY	241 mg, 8.1 x 3.9	<a href="#">EcstasyData.org</a>
	<a href="#">White Powder</a> ND040 (Not Sold As Ecstasy)	4-Acetoxy-DMT	1	Jan 22, 2014	Jan 22, 2014	Chandler, AZ	400 mg, - x -	<a href="#">EcstasyData.org</a>
	<a href="#">Pink Man</a> 66998	MBZP TFMPP	1 1	Jan 22, 2014	Jan 22, 2014	San Francisco, CA	411 mg, 8.1 x 6.6	<a href="#">EcstasyData.org</a>
	<a href="#">Honda</a> 98832	TFMPP Lidocaine Dibenzylpiperazine Methamphetamine	4 2 1 1	Jan 22, 2014	Jan 22, 2014	San Francisco, CA	391 mg, 9.1 x 4.9	<a href="#">EcstasyData.org</a>
	<a href="#">Monopoly Guy</a> 32183 Rich Uncle Pennybags	TFMPP Lidocaine Dibenzylpiperazine	4 2 1	Jan 22, 2014	Jan 22, 2014	San Francisco, CA	389 mg, 8.1 x 5.8	<a href="#">EcstasyData.org</a>

ecstasy

Providing access to lab test

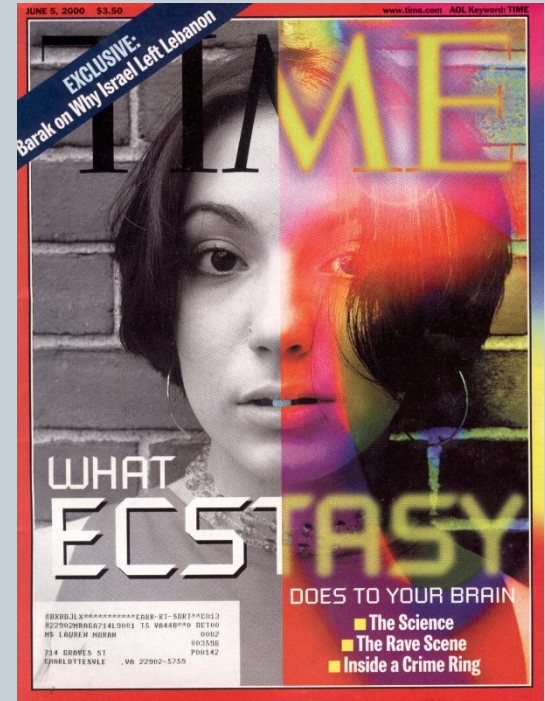
Test Results Test Results



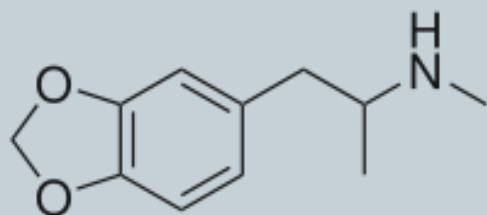
# Ecstasy



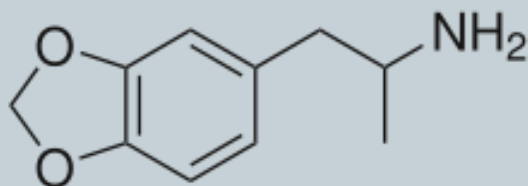
- **MDMA** (3,4-methylenedioxymethamphetamine)
  - Neurotransmitter release:
    - ✦ 5-HT, NE, Dopamine
  - Reuptake Inhibition:
    - ✦ Mainly 5-HT
- Usually tablet form
  - capsule and powder
- Taken orally, rarely snorted
  - Hallucinogen
  - Stimulant
- Unreliable in content
  - caffeine, ephedrine, dxm, other amphetamines



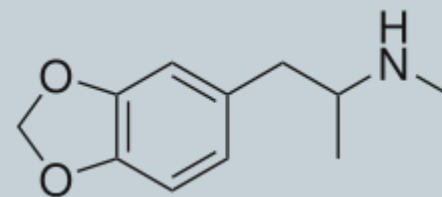
# Structures



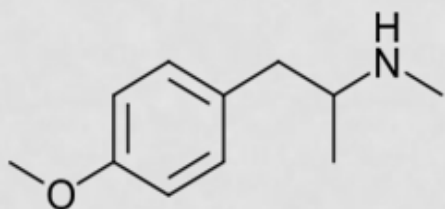
MDMA



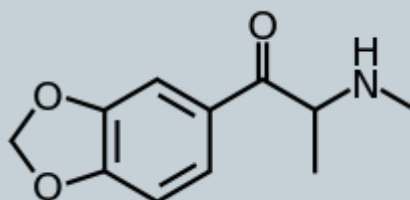
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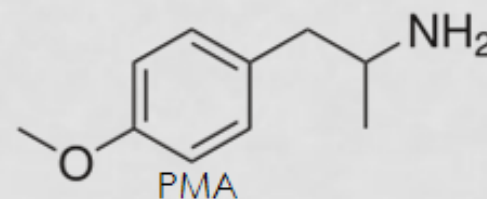
MDEA



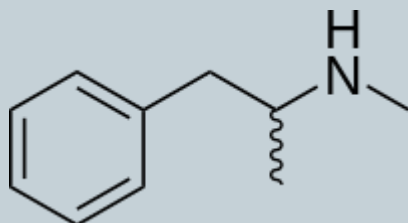
PMMA



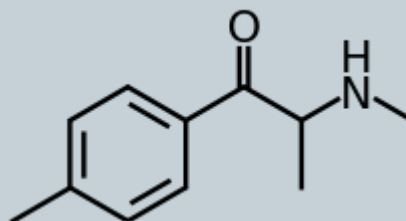
Methylone



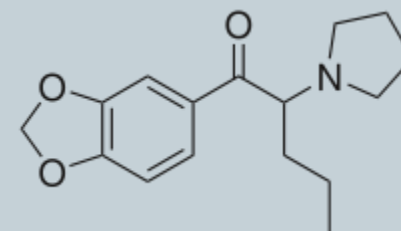
PMA



Methamphetamine



Mephedrone



Methylenedioxypropylvalerone  
MDPV



# Intoxication



- Elevated heart rate
- High blood pressure
- Large pupils
- Dry mouth
- Jaw clenching
- Bruxism
- Hallucinations



# Adverse Effects



- Trauma, poor decision-making, etc.
- Fever
- Muscle break down
- Hyponatremia
- Brain swelling
- Death





# Dextromethorphan



- Clinical effects
  - Euphoria, “giddiness,” vomiting, fast heart beat, respiratory difficulty, coma
- Commonly co-formulated with:
  - Antihistamines
  - Decongestant agents
  - Acetaminophen

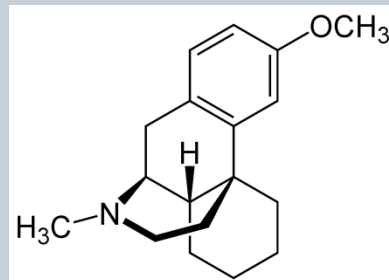


# Dextromethorphan

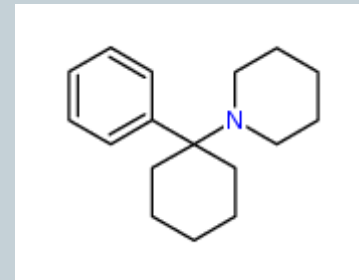


- Increases serotonin levels
- Also binds the PCP receptor site
  - Leads to “out-of-body” experience

DXM



PCP





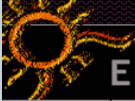
# Ethanol

- Inexpensive
- No age limit to buy
- Easy to extract



# EROWID.COM





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## Psychoactive Plants and Drugs

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<a href="#">DMT</a>	<a href="#">DXM</a>	<a href="#">GHB</a>	<a href="#">HEROIN</a>	<a href="#">KETAMINE</a>	<a href="#">LSD</a>
<a href="#">MDMA (ECSTASY)</a>	<a href="#">MDPV</a>	<a href="#">METH</a>	<a href="#">MUSHROOMS</a>	<a href="#">NITROUS</a>	<a href="#">OXYCODONE</a>
<a href="#">PEYOTE</a>	<a href="#">SALVIA</a>	<a href="#">TOBACCO</a>	<a href="#">ZOLPIDEM</a>	<a href="#">25I-NBOMe</a>	<a href="#">MORE ...</a>

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Thanks for supporting reliable harm-reduction information about psychoactive drugs!

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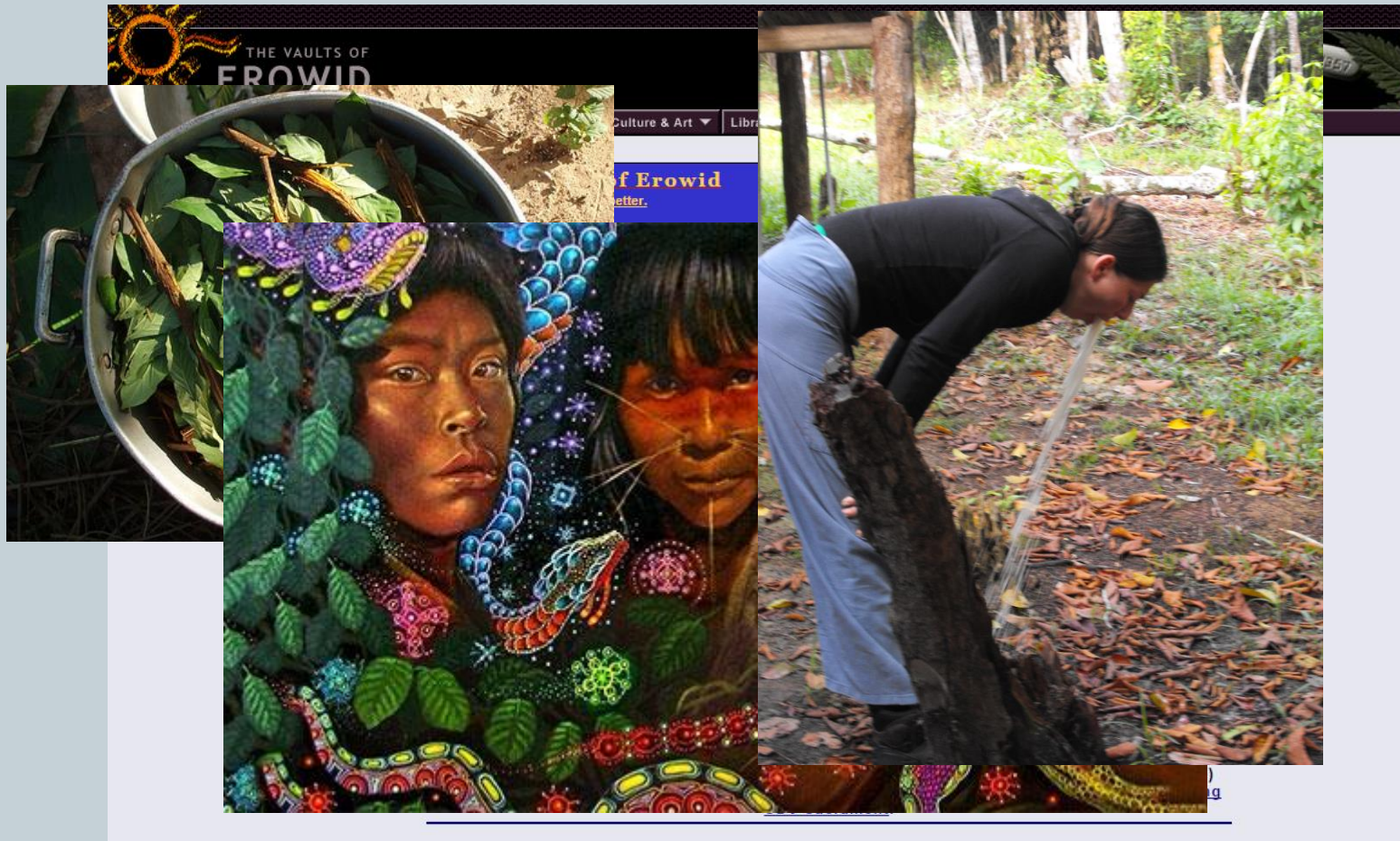
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# EROWID





# EROWID.COM



Path : [plants](#) > mushrooms

Fundamental #13: Note changes in health over time that may be related to psychoactive drug use.

## Psilocybin Mushrooms

### BOTANICAL CLASSIFICATION

Family :  
Strophariaceae  
Genus :  
Psilocybe  
Species :  
cubensis; cyanescens; semilanceata; ...  
Genus :  
Panaeolus  
Species :  
campanulatus; subbalteatus; ...

### COMMON NAMES

Shrooms; Magic Mushrooms; Sacred Mushrooms;  
teonanácatl

### EFFECTS CLASSIFICATION

Psychedelic

### DESCRIPTION

There are more than 180 species of mushrooms which contain psilocybin or psilocin. They have a long history of use in Mexico and are considered commonly available natural psychedelics.



BASICS



EFFECTS



IMAGES

Photo © Erowid.org



# Afrin



- Not the Wedding Crasher Effect
- Can cause severe sedation when ingested
  - Can also drop blood pressure and dramatically slow heart rate
- One bottle placed in a drink will cause severe sedation and will most likely not be detected
- Unless specifically looking for this substance, will not show up on expanded drug screens





# Urine Drug Screen

DRUG SCREENING	
Amphetamine Scr...	<i>NEGATIVE</i>
Barbiturate Scr...	<i>NEGATIVE</i>
Benzodiazepine ...	<i>NEGATIVE</i>
Cannabinoid Scr...	<i>NEGATIVE</i>
Cocaine, Urine	<i>NEGATIVE</i>
Ethanol, Ur	<i>NEGATIVE</i>
Opiate Scrn, Ur	<i>NEGATIVE</i>
PCP Quant, Ur	<i>NEGATIVE</i>
Oxycodone Scree...	<i>NEGATIVE</i>
Propoxyphene, S...	<i>NEGATIVE</i>
Methadone	<i>NEGATIVE</i>
Methadone Metab...	<i>NEGATIVE</i>
pH	<i>5.7 *</i>
Specific Gravit...	<i>1.020</i>

# Regional Poison Control Center

- 24/7/365
- Free Resource
- WRUSHTON@uabmc.edu



# Questions?

