

Novel Drugs of Abuse:

Updates to the current rave

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WHAT ARE "Novel" Drugs of Abuse?

- ▣ Drugs commonly known as "emerging drugs of abuse". They include but are not limited to :
- ▣ 3,4-Methylenedioxymethamphetamine(E)
- ▣ Gamma-hydroxybutyric Acid (GHB)
- ▣ Ketamine
- ▣ Flunitrazepam (Rohypnol,Roaches)
- ▣ Alkaloids

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What are Novel Drugs of Abuse (cont.)

- ▣ Methamphetamine - Speed
- ▣ LSD - lysergic acid diethylamide
- ▣ PCP - phencyclidine
- ▣ "Designer Drugs" aka "Emerging Drugs of Abuse" - 2CB, PMA, DOM,DMT
- ▣ Hallucinogenic mushrooms, toad toxin
- ▣ Fentanyl analogs
- ▣ Synthetic cannabinoids

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Short History of Novel Drugs of Abuse

- ▣ Began overseas in underground dance clubs (England and the Island of Ibiza)
- ▣ Usually involve "loud techno music", large crowds and last all night long.
- ▣ Highly stimulating events where synthetic drugs are abused to enhance the overall sensory experience.
- ▣ Psychedelic Music Festivals aka RAVE, circuit party and Trance

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Emerging Drugs of Abuse:

- ❑ Synthetic drug abusers have a distinct culture and attire. Loose fitting clothes and toys are common paraphernalia.
- ❑ Due to the side effects of XTC and prolonged dancing, overheating is a problem with most raves. Thus water and baggy clothes are a must.
- ❑ Pacifiers, lollipops and bead candy are also used to offset the effects of teeth grinding found with XTC use.

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Emerging Drugs of Abuse (cont.)

- % of RAVE attendees testing positive for drug use - "Admitted users" - n=75

Drug Category	Percentage Positive
SMA's	~90%
MDMA	~85%
PolyDrug (THC, BZ, LSD, OP)	~55%

Club drugs show regional variability. Interpret surveys with caution.

Source: JAT, Vol. 25, May/June 2001

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Emerging Drugs of Abuse (cont.)

- Not all music festival attendees abuse drugs, but drug use at music festivals is common
- XTC is not the only drug abused at music festivals.
- Avoid generalizations, but be informed about the dangers of drug abuse.
- Stay informed, there are always people investigating new ways of getting high.

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MDMA - 3,4Methylenedioxymethamphetamine

- MDMA is a sympathomimetic agent structurally similar to amphetamine and mescaline. It was first synthesized in 1912 and originally marketed as an appetite suppressant. Used in psychotherapy and recreationally. Placed on the DEA Schedule I category in 1985 once its neurotoxic side effects were discovered.
- AKA : Adam, Ecstasy, E, XTC, "the love drug", X, clarity and lover's speed

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MDMA - cont.

- ▣ Almost all XTC is produced in Europe at approximately 25 cents a pill, then sold for between \$25 to \$50 a pill.
- ▣ A typical dosage is 50-150 mg/pill. The actual amount/purity will vary due to its clandestine production.
- ▣ Effects of the drug are usually felt about 30 to 40 minutes after a dose. The high will usually last ~ 6 hrs.
- ▣ Logos are placed on a pill and useful to abusers, who will buy XTC according to logo.

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MDMA - cont.

- ▣ MDMA acts by binding serotonin transporters preventing serotonin reuptake, causing an accumulation of the neurotransmitter. The increased levels result in euphoria, an increase in alertness, endurance and sexual arousal. It will also cause a sense of well being and heightened sensory perception.
- ▣ All this stimulation comes at a cost to the neurons.

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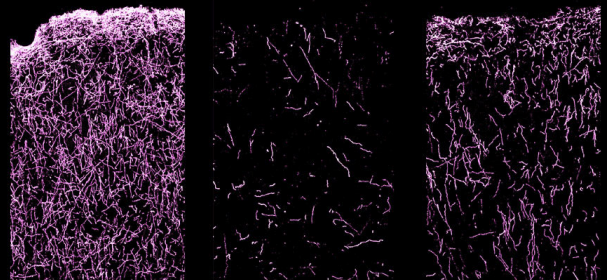
MDMA - cont.

- ▣ Neurologic and/or neurodegenerative side effects of XTC abuse include : impaired memory, hyperthermia, stroke and physical neuronal damage.
- ▣ Cardiotoxic complications, DIC and rhabdomyolysis are known OD complications.
- ▣ Recent Drug Abuse Awareness Network data for MDMA suggest that abuse is on the rise and the drug is generally viewed as being "safe", making this drug very dangerous.

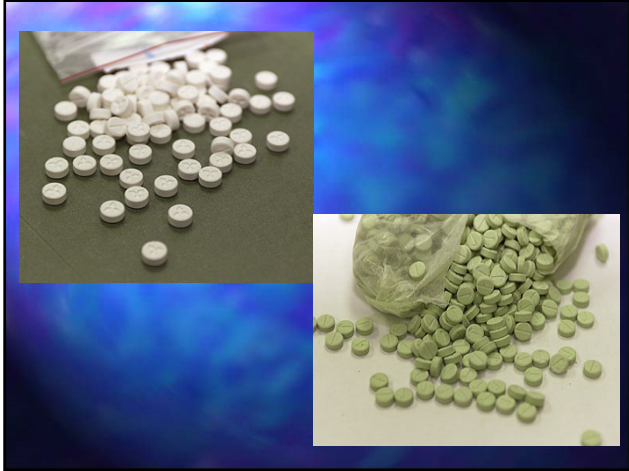
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Serotonin Present in Cerebral Cortex Neurons

Normal 2 weeks after Ecstasy 7 years after Ecstasy



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Ecstasy tablets imprinted with colorful designs.

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GHB - Gamma Hydroxybutyrate, and GBL, 1,4 - Butanediol (BDL)

- ▣ GHB is a naturally occurring inhibitory neurotransmitter similar to GABA.
- ▣ Has been used "legally" to treat alcohol withdrawal, narcolepsy and as an anesthetic hypnotic.
- ▣ Used "illegally" as a mood enhancer, club drug, aphrodisiac and as a "date rape drug". Also, thought to improve muscle mass by stimulating the production of growth hormone.

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GHB - cont.

- ▣ Can be purchased in liquid or power form.
- ▣ AKA : GHB, Grievous Bodily Harm, scoop, liquid X, growth hormone booster, easy lay, and Georgia Home Boy
- ▣ Precursors are used to skirt FDA/DEA regulatory issues, e.g., GBL(gamma butyrolactone) and BDL
- ▣ CNS depressant properties of GHB pose its biggest risk. Short term amnesia, hypotonia, drowsiness and sleep can occur at various levels of ingestion. In high concentrations can produce coma and respiratory depression requiring intubation.

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GHB cont.

- ❑ Sold by the capful for \$10.00 a "swig".
- ❑ Since it is clear and colorless, it can be placed into a drink, aiding sexual assaults.
- ❑ GBL and BDL are sold commercially as industrial solvents. The precursors are regulated chemicals since they can be easily converted to GHB.
- ❑ GHB can be mixed in water or alcohol and go undetected by most tests.

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Ketamine

- ❑ Ketamine is a piperidine derivative used in anesthetic practice. Can induce a catatonic state and dissociative episodes.
- ❑ Found in crystal and liquid forms
- ❑ Has legitimate medical usage with high potential for abuse.
- ❑ Dosages are either injected or snorted like cocaine.

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Ketamine - cont.

- ❑ Duration of effects are ~ 1 to 2 hours
- ❑ Dissociative effects are trance like, out of body experiences. In higher dosages can produce a "near death experience" with convulsions and death occurring in some cases.
- ❑ AKA : K, Vitamin K, Special K, K hole, Kat valium, Jet, Honey Oil, Gas

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Ketamine - cont.

- ▣ Dosages illegally purchased can range in price from \$20 - \$200.00
- ▣ Most Ketamine is stolen from pharmaceutical supplies intended for veterinarians.

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PCP- Phencyclidine

- ▣ PCP is another piperidine derivative used in anesthetic practice, especially in veterinarian practice.
- ▣ Similar to ketamine in its dissociative properties but much more potent.
- ▣ AKA : PCP, Angel Dust, Embalming Fluid, Horse Tranquilizer, Elephant Tranq, Shermans (when smoked with MJ)

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PCP - cont.

- ▣ Routes of administration include smoking, snorting and oral ingestion
- ▣ Effects last ~4 to 8 hours and can last as long as 24 - 48 hours
- ▣ Toxic levels of PCP can produce psychiatric symptoms with violent behavior

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Flunitrazepam - Rohypnol

- Flunitrazepam is a benzodiazepine with depressant properties.
- Legitimate uses include treatment of insomnia and preanesthetic regimens
- Along with its anxiolytic properties, it will produce anterograde amnesia. Those under its influence will not remember details of the events occurring during this time.

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Rohypnol - cont.

- When used in combination with alcohol, memory lapses may last as long as 8 - 24 hours. It is also easily dissolved in alcohol and is colorless. This property makes it a favorite drug to use for "date rapes". Currently the drug companies are making flunitrazepam with a color dye to make it more noticeable if placed in a drink.

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Rohypnol - cont.

- Can be purchased in Mexico and smuggled into the US. It is sold in the US for \$2.00 to \$30.00 a pill
- Its effects are similar to alcohol intoxication without the hangover
- Difficult to detect by most BZD assays, but can be detected up to 72 hours post ingestion if assaying for the parent drug and its metabolite (7-amino-flunitrazepam)
- AKA : Roofies, Roaches, Mexican Valium, Rocka, For-get-me Pill

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LSD - Lysergic Acid Diethylamide

- ❑ LSD is a synthetic derivative of ergot alkaloids from the rye fungus. First synthesized in 1938.
- ❑ Has no legitimate medical uses
- ❑ Very potent hallucinogenic drug with marked sensory perception changes. This drug can make you see sounds and hear colors.
- ❑ Usually sold in blotter paper form but can be found in liquid or pill form. Prices range from \$5.00 to \$12.00 a hit. It is one of the least expensive drugs found at RAVES.

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LSD - cont.

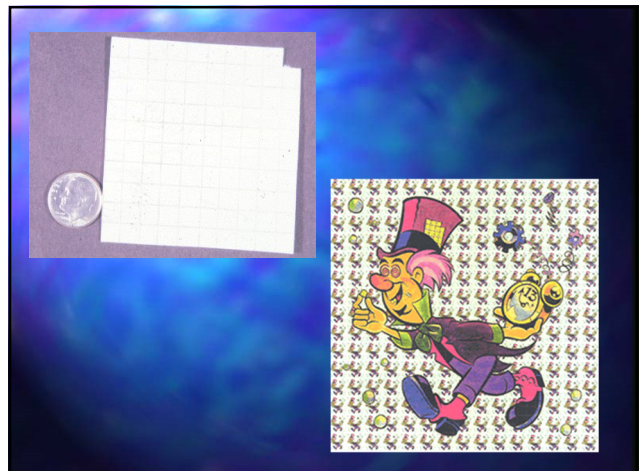
- ❑ Effects are felt beginning at ~ 45 minutes post ingestion and last 6 - 12 hours
- ❑ Physiological effects include extremely dilated eye pupils, increased body temperature, increased heart rate, muscle rigidity and dry mouth.
- ❑ Delusional and visual hallucinations also occur. Drug induced psychosis may occur with long term abuse (HPPD)

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LSD - cont.

- ❑ HPPD or hallucinogen persisting perception disorder is also referred to "flashbacks". Can be very vivid and frightening. HPPD will require psychiatric intervention.
- ❑ AKA : LSD, Acid, blotter, boomers and yellow sunshine

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Methamphetamine

- ▣ Potent sympathomimetic amine with stimulant properties.
- ▣ AKA : Crank, Speed, Crystal Meth, ICE, YABA
- ▣ Has gained popularity at RAVES due to its stimulant properties.
- ▣ Is produced in clandestine labs through out the Southwest. These "meth labs" can be hazardous waste nightmares and are usually "mom and pop shops". Meth is also produced in large quantities by Mexican narcotrafficking gangs

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Methamphetamine - cont.

- ▣ Can be injected, smoked, snorted or taken orally
- ▣ Effects are usually felt within 20 mins and can last several hours.
- ▣ YABA is a new form of methamphetamine coming from Southeast Asia. Its use is currently prevalent on the West Coast and is distributed in the form of small colorful tablets.
- ▣ Long term effects of MTAM consist of neurological damage and psychiatric episodes.

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Designer Drugs

- ▣ This class of drugs are making their presence known on the RAVE scene. These are usually drugs structurally related to indolylalkylamines or phenethylamines.
- ▣ The drugs are chemical modifications of known compounds.
- ▣ Indolylalkylamines include psilocybin, bufotenine and n,n-dimethyltryptamine(DMT)
- ▣ Phenethylamines include peyote/mescaline and MDMA

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Designer Drugs - cont.

- ▣ The drugs include but are not limited to : DMT, PMA (para-methoxyamphetamine), DOM, 2C-B, 4-MTA, BZP and 2C-T-7
- ▣ PMA is a very dangerous drug and often mistakenly taken as MDMA. Can result in accidental overdoses causing extreme hyperthermia with core body temperatures ranging from 39 to 46.1 degrees C. PMA is also known as "Death" or "Dr. Death"

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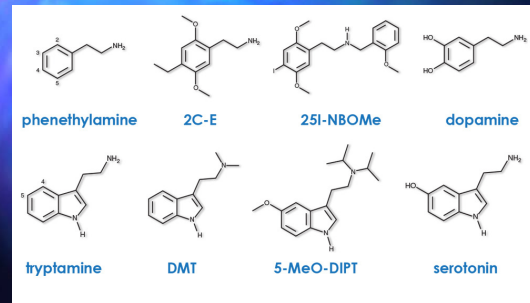
Designer Drugs - cont.

- 2C-B or 4-Bromo-2,5-dimethoxyphenethylamine is a synthetic hallucinogen. AKA Nexus or Bromo
- 4-MTA also known as "Flatliners" for its ability to possibly induce serotonin syndrome. A condition resulting in extreme body temps, seizures, coma and death.
- Most of this class of drugs are abused for their ability to induce empathogenic and entactogenic effects. All play on the drug's ability to affect the brain's neurotransmitters.

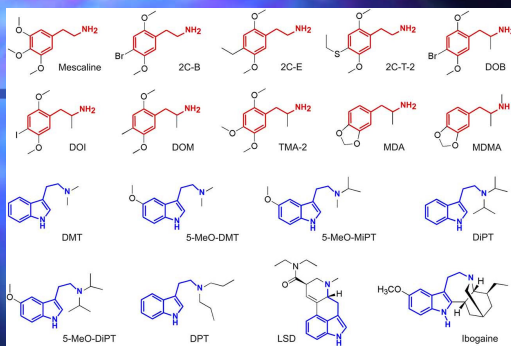
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Designer molecules and neurotransmitters:

<https://www.caymanchem.com/news/designer-drugs-and-recreational-drugs-of-abuse>



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Source: Ray, T. S. (2010). Psychedelics and the human receptorome. PLoS One 5:e9019. doi: 10.1371/journal.pone.0099019

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Others: Mushrooms and Nitrous Oxide

- Hallucinogenic mushrooms are also known as magic mushrooms. They have no legitimate medical use.
- Psilocybin is the active compound of magic mushrooms. It is an indolylalkylamine and will produce vivid hallucinations, sweating and paranoia. Effects are similar to LSD but with a shorter duration, usually a 3-5 hour trip.
- Price of "shrooms" varies but usually ~\$10.00.

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Others : cont.

- ▣ Nitrous oxide is an anesthetic gas used in medical/dental practice. Can be found in dental offices, whipping cream chargers, pro-racing shops and head shops.
- ▣ Sold by the balloon full for \$3.00 to \$5.00. Can also be found in medium sized gas tanks with gas masks attached for easy access to the abuser.
- ▣ AKA : N2O, laughing gas, whippets
- ▣ Similar to Ketamine and PCP in its dissociative properties.

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Others : cont.

- ▣ Nitrous oxide is fast acting and short acting.
- ▣ When used medically it is co-administered with oxygen to prevent oxygen displacement which is an obvious dangerous side effect.
- ▣ Abusers of nitrous oxide are known to pass out while getting high.

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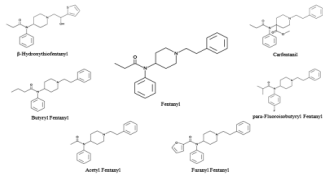
Fentanyl and fentanyl analogs:

- ▣ Fentanyl – most common in AZ
- ▣ Acetyl fentanyl – second most common in AZ
- ▣ 3-Methylfentanyl
- ▣ Butyryl fentanyl
- ▣ Butanoyl-4-fluorofentanyl
- ▣ Para-fluoroisobutyrylfentanyl
- ▣ Carfentanyl

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Fentanyl and fentanyl analogs:

Molecular structures of fentanyl and fentanyl analogs.



Journal of Analytical Toxicology, Volume 41, Issue 6, July-August 2017, Pages 488-492, <https://doi.org/10.1093/jat/kwx041>
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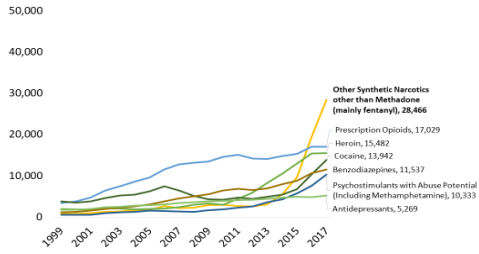
Fentanyl and fentanyl analogs:

- Fentanyl developed in the 1960's for pain management in cancer patients.
- Potency is 80 to 100 times that of morphine
- Dramatic rise in fentanyl deaths since 2011, up 1000%. Main sources of illicit fentanyl are Mexico and China.
- Fast acting and death by respiratory arrest.
- Sometimes found as an adulterant in heroin or cocaine.
- Difficult to detect using routine toxicology immunoassays. Requires LC-MS/MS

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Synthetic Narcotic other than Methadone Deaths

National Drug Overdose Deaths
Number Among All Ages, 1999-2017



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018

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Synthetic Cannabinoids

XLR11
AB-FUBINACA
AB-CHMINACA
AB-PINACA
PB-22
5F-PH-22
UR-144
5F-AMB
MAB-CHMINACA
NM-2201
AM-2201
5F-AKB48
5F-AB-PINACA
5F-ADB
FUB-PB-22
THJ-2201
ADB-FUBINACA
ADB-PINACA
JWH-018
FUB-AMB
AKB48 (APINACA)
MAM-2201
FUB-144
FUB-122
JWH-210

- Types of synthetic cannabinoids aka SPICE and K2. Emerged around 2008 as unregulated or legal alternatives to marijuana
- Most commonly encounter are XLR11, AB-FUBINACA, and AB-CHMINACA.
- Not detected in routine THC immunoassay screens.
- Can result in very dramatic psychosis, seizures, delirium and even death
- Synthetic cannabinoids are not structurally similar to "natural" cannabinoids.

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Take home points:

- ▣ Stay informed, someone is always looking for a better way to get high.
- ▣ All club drugs work on brain chemistry but differ in their site of action.
- ▣ All novel/emerging drugs are dangerous with potentially devastating side effects. There is no "safe use" of emerging drugs of abuse.
- ▣ The internet, you'll be surprised at what you'll find.
- ▣ Communicate, communicate, communicate

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Resources and References :

- ▣ www.clubdrugs.org - NIDA website, club drug info and neurobiology slides
- ▣ www.justice.gov/dea/ - DEA website, drug photos
- ▣ www.DAWNinfo.net - Drug Abuse Warning Network
- ▣ Literature references :
- ▣ Day N, Criss J, Griffiths B, et al. *Music festival attendees' illicit drug use, knowledge and practices regarding drug content and purity: a cross-sectional survey.* Harm Reduct J. 2018;15(1):1. Published 2018 Jan 5. doi:10.1186/s12954-017-0205-7
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- ▣ <https://psmag.com/social-justice/the-electric-forest-acid-and-bath-salt-testers>
- ▣ <https://bunkpolice.com/>

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