



Delta 8 THC and Counterfeit Drugs

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Learning Objectives

Participants will:

Comprehend the neurobiology of Delta 8 THC and its derivatives

Formulate the legal status of Delta 8 THC

Review the major adverse drug effects (ADE) of Delta 8 THC

Discuss a case study of a Delta 8 THC toxicity overdose

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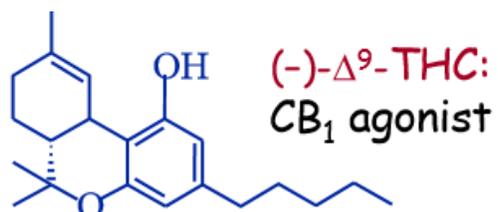


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The Neurobiology of Delta 8 THC

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THC - Structure



- **Converted from THCa by drying, heating.**

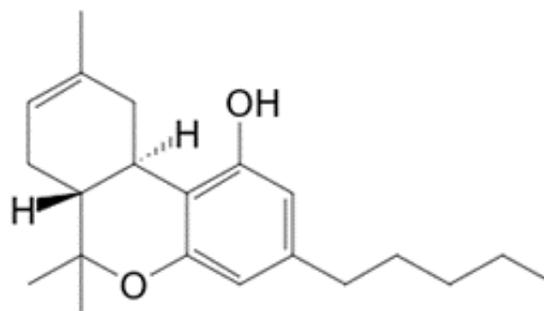
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Delta 8 THC

Delta 8 Cannabinoids



Dr. Martin Kerwin Pharm.D., D.Phil., FRCAC

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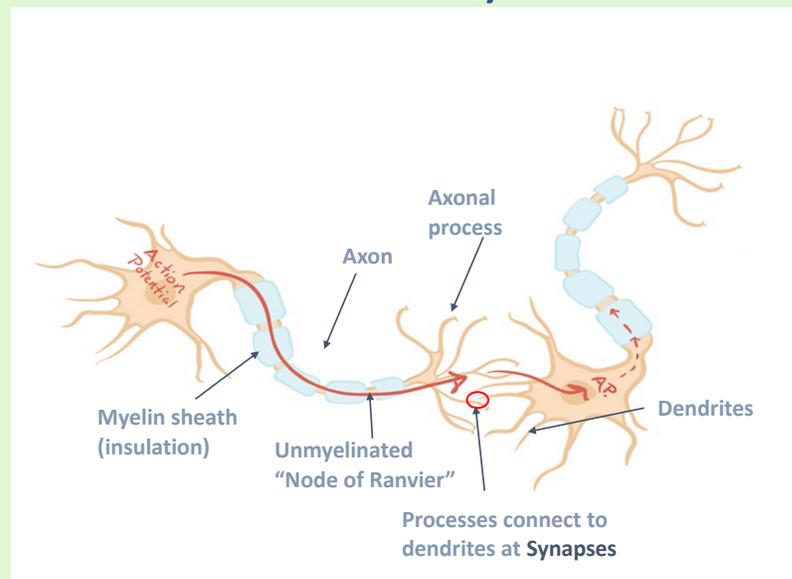
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Marijuana Pharmacology

- Marijuana consists of more than 421 components and 60 pharmacologically active cannabinoids.
- The two best-described cannabinoids are THC and cannabidiol (CBD).
- Most of the other compounds are not yet understood and their mental and physical effects are unknown.

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Neuronal Anatomy

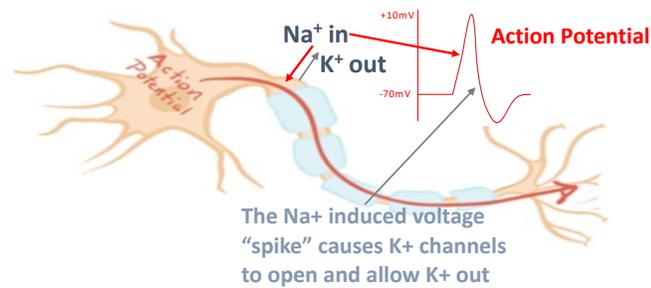


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How Nerves Fire

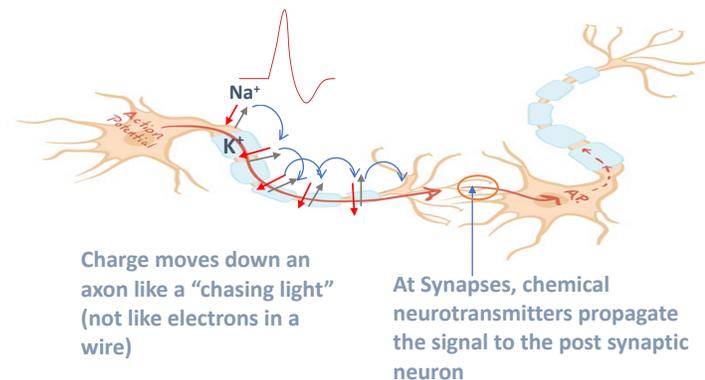
At rest, pumps keep the sodium ion (Na^+) concentration inside neurons low, and the potassium (K^+) ion concentration higher than outside

- When stimulated, Na^+ channels in the node open followed by K^+ channels, causing a “pulse” of charge to enter then exit the neuron.
- This pulse of charge is called an “Action Potential” (AP)



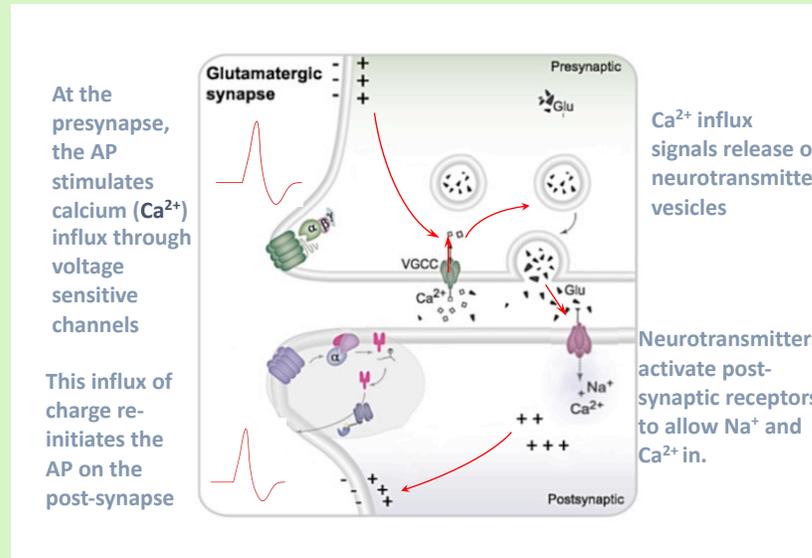
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Signal Transmission



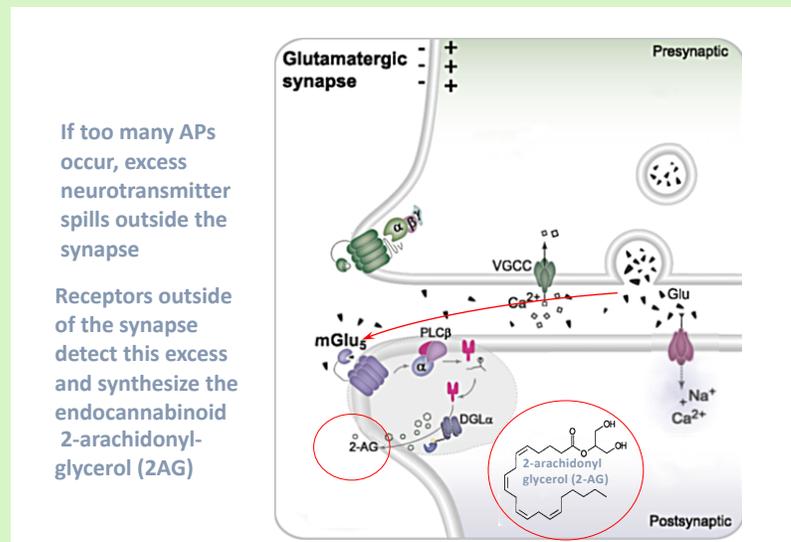
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Neurotransmission at Synapses



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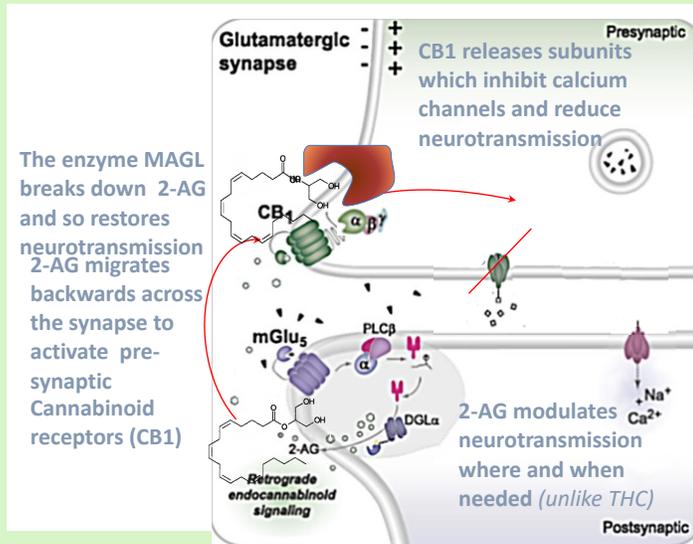
Endocannabinoids



Volkow, N.D., Hampson, A.J., and Baler, R.D. (2017). Don't Worry, Be Happy: Endocannabinoids and Cannabis at the Intersection of Stress and Reward. Annual review of pharmacology and toxicology 57, 285-308

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Endocannabinoids regulate Neurotransmission

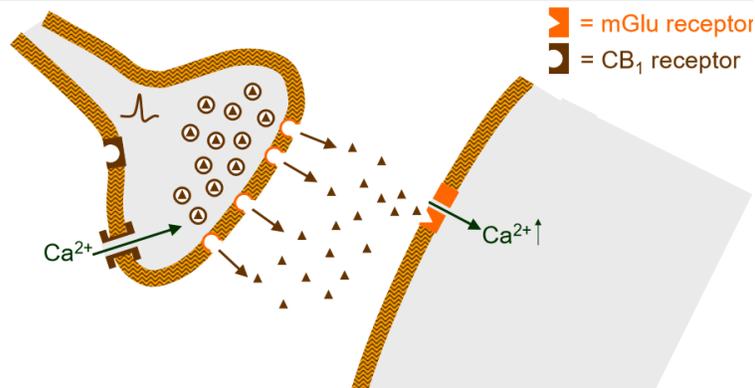


Volkow, N.D., Hampson, A.J., and Baler, R.D. (2017). Don't Worry, Be Happy: Endocannabinoids and Cannabis at the Intersection of Stress and Reward. Annual review of pharmacology and toxicology 57: 285-308

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Endocannabinoid System

Endocannabinoid (EC) retrograde signalling between e.g. cerebellar Purkinje cells and presynaptic glutamatergic granule cells (DSE)

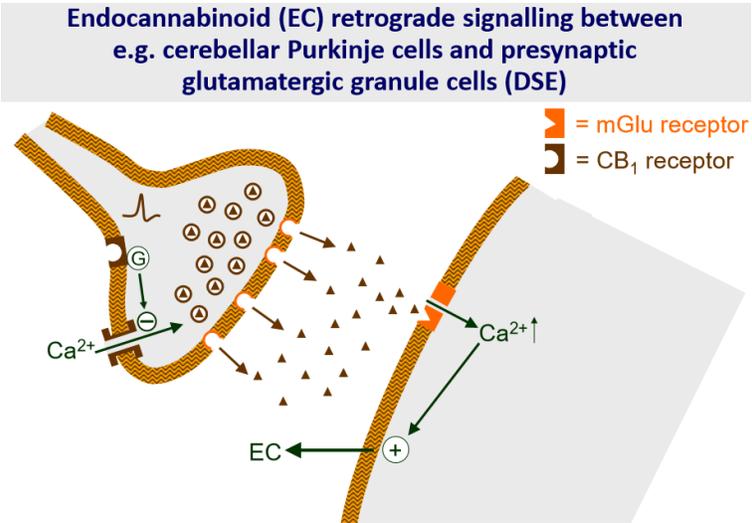


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Endocannabinoid System

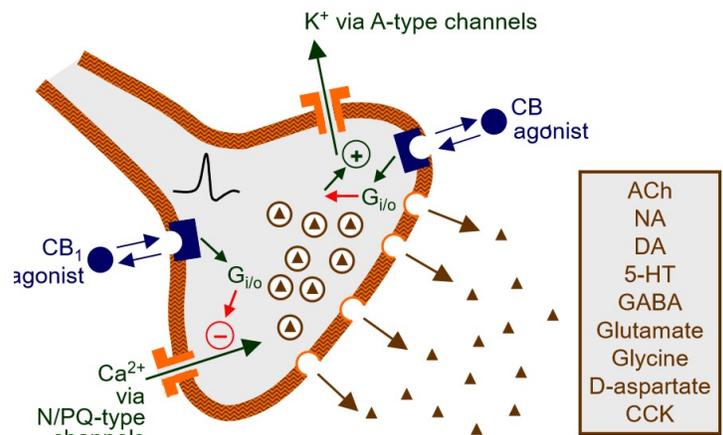


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Actions at the Nerve Terminal



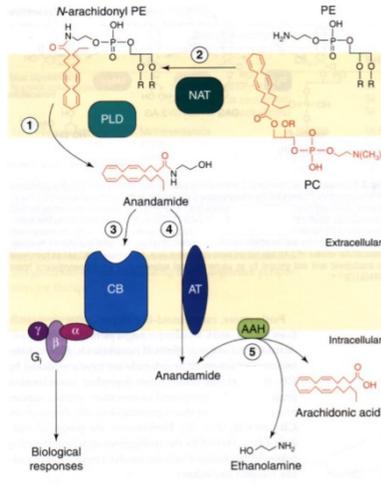
Howlett (2002); Pertwee (2005a)

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Anandamide Synthesis and Degradation



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Endocannabinoid Synthesis

- **2 AG** (2 arachidonoylglycerol)
- **Synthesis** (one pathway)(calcium dependent)
 - Phospholipids > diacylglycerol > 2 AG
 - Enzyme: (first step) PLC; (last step) DAG lipase
- **Degradation** (levels not kept low)
 - 2 AG > arachidonic acid and glycerol

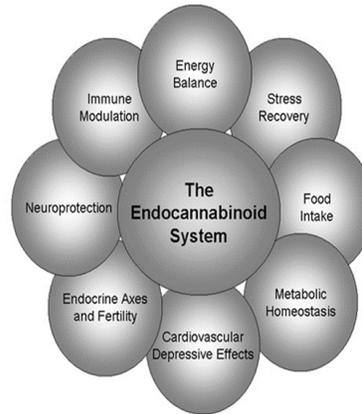
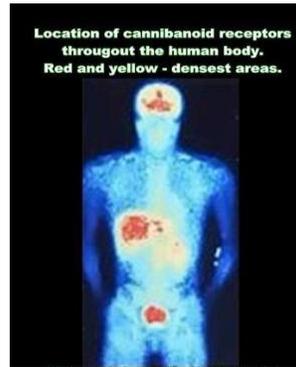
Enzymes: MAGL (monoacylglycerol lipase), FAAH (fatty acid amide hydrolase) and others

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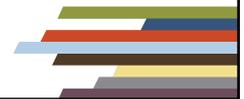
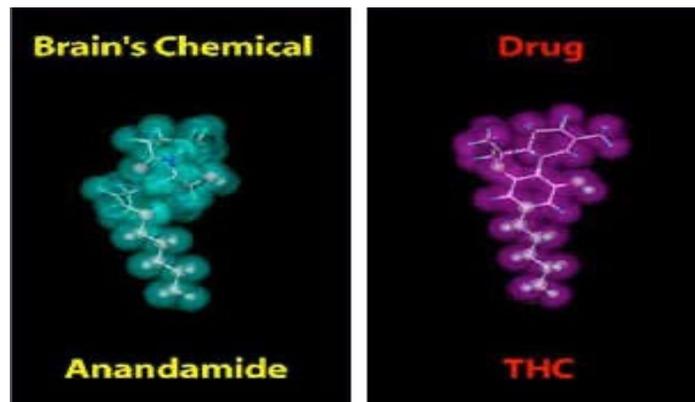
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Made in the Brain: Endogenous Endocannabinoids



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Endocannabinoids and THC



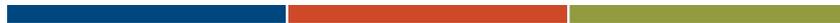
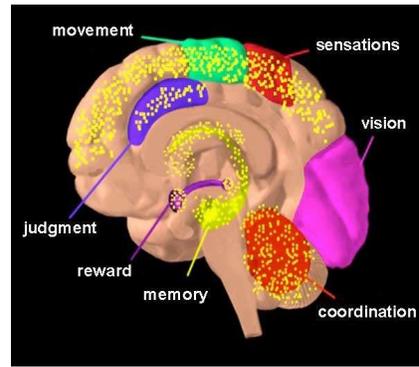
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Brain Cannabinoid Receptor Sites

- Nucleus Accumbens
- Hippocampus
- Amygdala
- Hypothalamus
- Medulla
- Cerebellum

(Zhang, H., et al., 2014; Ait-Daoud Tiouririne, N. (n.d.).

[Click here to watch the NIDA video:](#)
The Reward Circuit: How the Brain Responds to Marijuana

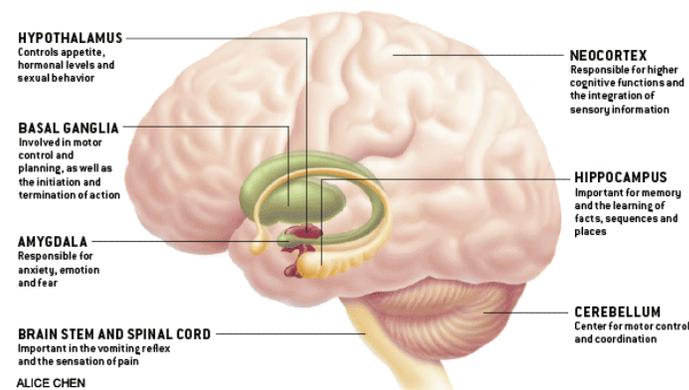


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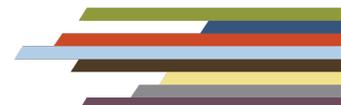
WHERE MARIJUANA ACTS

The drug *Cannabis sativa* binds to the brain's own cannabinoid receptors in many different areas, including those highlighted below. This widespread influence accounts for the diverse effects

the drug—and its relatives made by the brain—can have and offers exciting opportunities for devising medications that can specifically target certain sites to control, say, appetite or pain.



ALICE CHEN



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5 Things to Know about Delta-8 THC FDA Concerns

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1. Delta-8 THC products have not been evaluated or approved by the FDA for safe use and may be marketed in ways that put the public health at risk.

- The FDA is aware of the growing concerns surrounding delta-8 THC products currently being sold online and in stores.
- These products have not been evaluated or approved by the FDA for safe use in any context.
- Some concerns include variability in product formulations and product labeling, other cannabinoid and terpene content, and variable delta-8 THC concentrations.
- Additionally, some of these products may be labeled simply as “hemp products,” which may mislead consumers who associate “hemp” with “non-psychoactive.”
- Furthermore, the FDA is concerned by the proliferation of products that contain delta-8 THC and are marketed for therapeutic or medical uses, although they have not been approved by the FDA.

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5 Things to Know about Delta-8 Tetrahydrocannabinol – Delta-8 THC

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2. The FDA has received adverse event reports involving delta-8 THC-containing products.

- From December 2020 through July 2021, the FDA received adverse event reports from both consumers and law enforcement describing 22 patients who consumed delta-8 THC products; of these, 14 presented to a hospital or emergency room for treatment following the ingestion.
- Of the 22 patients, 19 experienced adverse events after ingesting delta-8 THC-containing food products (e.g., brownies, gummies). Adverse events included vomiting, hallucinations, trouble standing, and loss of consciousness.
- National poison control centers received 661 exposure cases of delta-8 THC products between January 2018 and July 31, 2021, 660 of which occurred between January 1, 2021, and July 31, 2021.

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5 Things to Know about Delta-8 THC

- Of the 661 exposure cases:
- 41% involved unintentional exposure to delta-8 THC and 77% of these unintentional exposures affected pediatric patients less than 18 years of age.
- 39% involved pediatric patients less than 18 years of age
- 18% required hospitalizations, including children who required intensive care unit (ICU) admission following exposure to these products.

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5 Things to Know about Delta-8 THC

3. Delta-8 THC has psychoactive and intoxicating effects.

- Delta-8 THC has psychoactive and intoxicating effects, similar to delta-9 THC (i.e., the component responsible for the “high” people may experience from using cannabis).
- The FDA is aware of media reports of delta-8 THC products getting consumers “high.”
- The FDA is also concerned that delta-8 THC products likely expose consumers to much higher levels of the substance than are naturally occurring in hemp cannabis raw extracts.
- Thus, historical use of cannabis cannot be relied upon in establishing a level of safety for these products in humans.

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5 Things to Know about Delta-8 Tetrahydrocannabinol – Delta-8 THC

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4. Delta-8 THC products often involve use of potentially harmful chemicals to create the concentrations of delta-8 THC claimed in the marketplace.

- The natural amount of delta-8 THC in hemp is very low, and additional chemicals are needed to convert other cannabinoids in hemp, like CBD, into delta-8 THC (i.e., synthetic conversion). Concerns with this process include:
- Some manufacturers may use potentially unsafe household chemicals to make delta-8 THC through this chemical synthesis process. Additional chemicals may be used to change the color of the final product.
- The final delta-8 THC product may have potentially harmful by-products (contaminants) due to the chemicals used in the process, and there is uncertainty with respect to other potential contaminants that may be present or produced depending on the composition of the starting raw material.
- If consumed or inhaled, these chemicals, including some used to make (synthesize) delta-8 THC and the by-products created during synthesis, can be harmful.

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5 Things to Know about Delta-8 Tetrahydrocannabinol – Delta-8 THC

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5. Delta-8 THC products should be kept out of the reach of children and pets.

- Manufacturers are packaging and labeling these products in ways that may appeal to children (gummies, chocolates, cookies, candies, etc.).
- These products may be purchased online, as well as at a variety of retailers, including convenience stores and gas stations, where there may not be age limits on who can purchase these products.
- As discussed above, there have been numerous poison control center alerts involving pediatric patients who were exposed to delta-8 THC-containing products.
- Additionally, animal poison control centers have indicated a sharp overall increase in accidental exposure of pets to these products. Keep these products out of reach of children and pets.

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The Unregulated Distribution And Sale Of Consumer Products Marketed As Delta-8 THC

- There is a rapidly expanding crisis in the United States involving a psychoactive form of THC which is derived from unregulated industrial hemp, referred to as Delta-8 tetrahydrocannabinol or Delta-8 THC.
- Delta-8 THC is an “isomer” (chemical analog) of Delta-9 THC, the molecule better known as the source of marijuana’s high, which reportedly has 75% of potency of Delta-9 THC.
- Over the past year or so, sales of this drug have spread across the country through such outlets as tobacco stores, newsstands, and local pharmacies, as well as internet sales.
- While efforts to legalize and to regulate the sale of cannabis and cannabinoids derived from cannabis should encompass Delta-8 THC, the fact that it is being sold outside of the regulated marketplace with no oversight or testing and is readily available to children is alarming, and it presents a public health risk of potentially wider impact than the vape crisis.

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The Unregulated Distribution And Sale Of Consumer Products Marketed As Delta-8 THC

- This Delta-8 THC crisis has been spawned by a supposed loophole in the federal 2018 Farm Act, which legalized the cultivation and sale of “industrial hemp,” a form of cannabis that contains negligible quantities of psychoactive chemicals, as well as products naturally derived from industrial hemp.
- Despite such arguments by supporters of unregulated Delta-8 THC distribution, there is no such “loophole:” the 2018 Farm Act does not legalize the production of psychoactive drugs simply because the base material has been extracted from industrial hemp, and the DEA’s current rulemaking clearly confirms this position.
- Moreover, Delta-8 THC is being marketed and sold in violation of consumer protections provided by the Food and Drug Act and FDA rules, as well as in violation of state laws—and a growing list of states have acted to specifically address the Delta-8 THC issue.

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The Unregulated Distribution And Sale Of Consumer Products Marketed As Delta-8 THC

- To highlight the dangers of the unregulated sale of Delta-8 THC and similar products, the USCC has commissioned testing of Delta-8 THC products procured from various states and as well as examination of the labelling and marketing of these products.
- These tests reveal that not only do Delta-8 THC products commonly have vastly varying amounts of Delta-8 THC, they but they also can contain amounts of Delta-9 THC in clearly illegal quantities, as well as pesticides and heavy metals.
- The packaging of such products is often misleading or outright false as to the ingredients of the product and its legal status, and often includes unsubstantiated claims about medical or other benefits.

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The Unregulated Distribution And Sale Of Consumer Products Marketed As Delta-8 THC

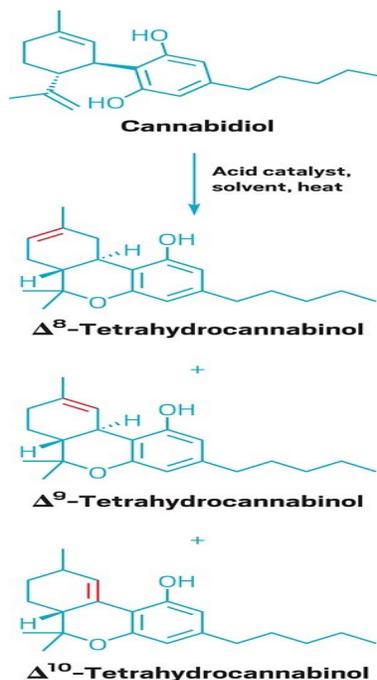
- Delta-8 differs in structure from Delta-9 THC in the placement of a double bond between carbon atoms 8 and 9 rather than carbon atoms 9 and 10.
- Due to its altered structure, Delta-8 THC has a lower affinity for the CB1 receptor, and therefore has a lower psychotropic potency than Delta-9 THC.
- Relative to the psychotropic potency of Delta-9 THC, Delta-8 THC has been estimated to be about 75% or perhaps two-thirds as potent.
- Delta-8 THC has been described as “marijuana light” or “pain relief with less psychoactivity.”
- Although Delta-8 THC does exist naturally in the cannabis plant, it is only present at very low levels.
- The cost effective manufacturing process of Delta-8 THC involves the isomerization of CBD via exposure to an acidic environment. Delta-8 THC can also be manufactured from Delta-9 THC.

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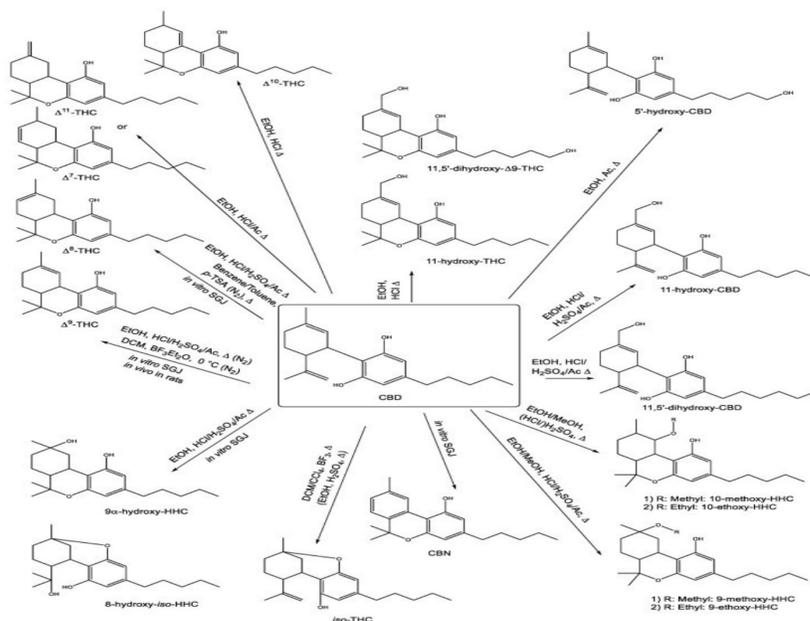
The Different Delta CBD and THC



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Overview of various chemical conversions of cannabidiol (CBD) to different conversion products and the respective conditions, which are reported in the literature.



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Best Delta 8 Carts

- Best Delta 8 carts – Exhale
- Highly potent Delta 8 carts – Delta Effex
- Fast shipping – BudPop
- Most popular Delta 8 varieties – Diamond CBD
- The biggest variety of blends – 3Chi
- Best cartridge bundles – CBD Vape Juice
- Most affordable deals – Blue Moon Hemp
- Purest CBD cartridges – ATRX
- Best refund policy – MoonWlkr
- Best flavors – Boston Hempire
- Premium Delta 8 blends – Secret Nature CBD

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What Is Delta 8 THC?

Unlike CBD, delta-8-THC produces euphoric effects that are similar to but milder than those of delta-9-THC, the well-known psychoactive compound in cannabis.

Delta-8-THC is an isomer of delta-9-THC. The only difference between the two molecules is the location of a double bond between two carbons.

The delta-8-THC craze began when an oversupply of CBD extracted from US-grown hemp caused the price of CBD to plummet.

Producers began looking for ways to turn the glut of CBD into something profitable. Using simple chemistry reported in the 1960s, the industry got creative and started experimenting with ways to convert CBD into delta-8-THC.

The resulting products target consumers who are looking to relieve stress and anxiety, especially those who don't want to use traditional cannabis products or those who live in places where cannabis products are not legally available.

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What Is Delta 8 THC?

But with no regulatory oversight and limited laboratory testing, most products sold as delta-8-THC are not actually pure delta-8-THC.

Such products typically contain a high percentage of delta-8-THC and small amounts of other cannabinoids, including delta-9-THC, and reaction by-products.

Some of the cannabinoids are not naturally found in cannabis. In most cases, nothing is known about the health effects of these impurities.

Several states are starting to crack down on sales of delta-8-THC products.

But as long as they are derived from hemp and contain no more than 0.3% of delta-9-THC on a dry-weight basis—the limit under federal law—many lawyers and hemp industry officials consider them legal.

Regardless of whether delta-8-THC is legal, chemists are sounding the alarm after finding several unidentified compounds in products labeled as delta-8-THC.

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Safety Concerns

- Using chromatographic methods with ultraviolet or mass spectrometry detection, scientists at ProVerde have tested thousands of products labeled delta-8-THC.
- “So far, I have not seen one that I would consider a legitimate delta-8-THC product,” Hudalla says.
- “There’s some delta-8 in there, but there’s very frequently up to 30 [chromatographic] peaks that I can’t identify.”
- There are often also peaks that correlate with delta-9-THC as well as another isomer, delta-10-THC, he notes.
- Little is known about the effects of delta-10-THC, but users have anecdotally reported feeling euphoric and more focused after consuming it.

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pH Safety Concerns

- The conversion of CBD to delta-8-THC involves refluxing CBD in an organic solvent, such as toluene or heptane, with *p*-toluene sulfonic acid or another acid that serves as a catalyst.
- The reaction is typically run for 60–90 min. “You basically close the ring on the CBD molecule,” Coffin says.
- “These are pretty aggressive synthetic conditions that use strong acids,” Hudalla says.
- “They might be using strong bases to neutralize. They can use metal catalysts.
- I hear different people doing it different ways.” In a pharmaceutical environment, PhD chemists ensure that products don’t include harmful unconsumed reactants, he says.
- But nobody is measuring the pH of delta-8 products or testing for strong acids and residual metals that are left behind, he says.

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Olivetol Protection ????

- One by-product commonly found in delta-8-THC products is olivetol, a precursor of THC, Boyar says.
- “There’s a patent for olivetol oral compositions” that inhibit cannabis intoxication from delta-9-THC, he says.
- If olivetol also inhibits intoxication from delta-8, it may contribute to the perceived milder effects of that isomer.
- The patent applies to an oral dose of olivetol.
- “I don’t think anybody really knows the safe inhalation dose of olivetol,” he adds.

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Users’ Concerns

- Very experienced cannabis users and naive cannabis users who thought delta-8 wouldn’t make them anxious.
- But it did when they took too much, he says.
- “The beauty of cannabis is you don’t get fatal overdoses, but it can make you feel absolutely horrible.”
- Some of the solvents people are using.
- One popular method uses dichloromethane, also known as methylene chloride.
- Dichloromethane should not be used “without appropriate ventilation and controls because it’s a silent killer,”

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So What's the Problem With Delta 8 THC?

- Regulators aren't ready for it either.
- Many states are scrambling to control sales of delta-8-THC, which is now the fastest-growing product in the hemp industry.
- More than a dozen states have banned delta-8-THC, and others are developing rules.
- The problem is the manufacturing of Delta 8 THC-one cannabis manufacturer states that the limited availability of high-purity delta-8-THC is due to uncontrolled processing steps.
- But existing independent analytical labs can't handle the burden of exhaustive testing on all delta-8-THC products.

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So What's the Problem With Delta 8 THC?

- Regulators should require manufacturers to reveal what chemicals they use to make delta-8-THC and what compounds are in their final products.
- Cannabis plants typically contain 0.1% delta-8-THC or less.
- So synthetic products delta 8 THC will dominate for a while.
- If regulators simply ban delta-8-THC as they did with delta-9-THC, "folks will make delta-10-THC or other types of ring isomers or alkyl chain analogs"
- Some of these analogs could be toxic or "wildly psychoactive".

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So What's the Problem With Delta 8 THC?

- Another cannabinoid called THC-O-acetate, the acetate ester of THC, which he's seeing popping up in gummies and vapes.
- It is basically acetylated THC, which does not occur naturally in cannabis plants.
- Heroin was created by acetylating morphine over 100 years ago, resulting in a drug that is much more potent than morphine.
- Many participants in the hemp industry see delta-8-THC as the salvation, providing a financial bridge until the [US Food and Drug Administration] approves CBD as a dietary ingredient.”
- “But I do not believe that it should be at the expense of unsuspecting consumers, who are being misled about what products they are being sold, to bail out the producers and investors who gambled on the CBD market.”
- *Christopher Hudalla, president and chief scientific officer, ProVerde Laboratories*

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Delta 8 THC Clinical Effects

- Cases of delta-8-THC ingestions reported to poison control centers have been associated with a variety of clinical symptoms, including euphoria, relaxation, drowsiness, bradycardia, and hypotension sometimes requiring vasopressors.
- Other patients report feeling confused and anxious, with tachycardia and generalized numbness.
- The variation in clinical effects from delta-8-THC use is not unexpected, as people respond to other cannabinoids, i.e. delta-9-THC, in a variety of ways.

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Drug Testing for Delta 8 THC

- Urine drug screens may be helpful as delta-8-THC may be detected on screening tests for THC metabolites.
- However, these commercial urine drug screens do not differentiate among the cannabinoids.
- Studies demonstrating detection of delta-8-THC and its cross-reactivity with various urine drug screens have not been conducted.

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Products Available

- Products have started appearing on the market, including
- vape cartridges,
- tinctures,
- joints,
- blunts,
- gummies,
- syrups,
- other edibles and beverages.

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Summary

- Delta-8 has similar clinical effects to delta-9 including euphoria, confusion, tachycardia, relaxation, tranquility, and mild hallucinogenic effects.
- One study from 1973 compared the effects of 20 mg delta-8, 40 mg delta-8, and 20 mg delta-9 and found that delta-8 is about 2/3 as potent as delta-9 (*Clin Pharmacol Ther*; 1973:14(3):353-357).
- Besides this study and some animal data, comparative data in humans are lacking and anecdotal reports are clearly inadequate to describe the differences between the two compounds.
- Anecdotal reports often describe delta-8 as “weed light” and state that it produces more of a body high with less hallucinogenic effects than delta-9 ([https:// weedmaps.com/learn/dictionary/delta-8-tetrahydrocannabinol](https://weedmaps.com/learn/dictionary/delta-8-tetrahydrocannabinol)).

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Summary

- Delta-8 is available in many forms including edibles (gummies, baked goods), vapes, dabs, and infused plant material.
- In a study commissioned by the US Cannabis Council, 16 samples purported to be delta-8 were sourced in April of 2021 from various states.
- The samples were analyzed by ProVerde Laboratories. All but one of the samples contained delta-9-THC at concentrations above the legal limit of 0.3%.
- Some samples contained lead and other metals (US Cannabis Council from <https://irp.cdn-website.com/6531d7ca/files/uploaded/USCC%20Delta-8%20Kit.pdf>).

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Summary

- The largest concern with delta-8 is the lack of oversight with manufacturing and application of current laws.
- It is available in convenience stores and online in formulations that may be enticing to children.
- Management of a patient after ingesting or inhaling delta-8 is supportive care (e.g., benzodiazepines for agitation and observation with attention to airway for sedation).
- Testing via urine drug screen may identify “cannabinoids” either because of lack of specificity in the test or because of contamination with delta-9-THC. The American Association of Poison Control Centers is actively monitoring for cases of delta-8 - THC. Call your local poison center to report any cases at 800-222-1222.

Dr. Merrill Norton Pharm.D.,D.Ph.,CMAC

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How to report complaints and cases of accidental exposure or adverse events:

- If you think you are having a serious side effect that is an immediate danger to your health, call 9-1-1 or go to your local emergency room. Health care professionals and patients are encouraged to report complaints and cases of accidental exposure and adverse events to the FDA’s MedWatch Safety Information and Adverse Event Reporting Program:
- Call an FDA Consumer Complaint Coordinator if you wish to speak directly to a person about your problem.
- Complete an electronic Voluntary MedWatch form online or call 1-800-332-1088 to request a reporting form, then complete and return to the address on the form, or submit by fax to 1-800-FDA-0178.
- Complete a paper Voluntary MedWatch form and mail it to the FDA.
- To report adverse events in animals to the FDA’s Center for Veterinary Medicine, please download and submit Form FDA 1932a found at: www.fda.gov/ReportAnimalAE.

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References

For further reading:

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- <https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq>
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DOI: 10.1177/191602011500659069 journals.sagepub.com/home/hic

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Dr. Merrill Norton Pharm.D., D.Ph., CMAAC

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- Thapa, D., Cairns, E.A., Szczesniak, A.-M., et al. The cannabinoids D8THC, CBD, and HU-308 act via distinct receptors to reduce corneal pain and inflammation. *Cannabis and Cannabinoid Res.* 3.1, (2018).

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Counterfeit medicine

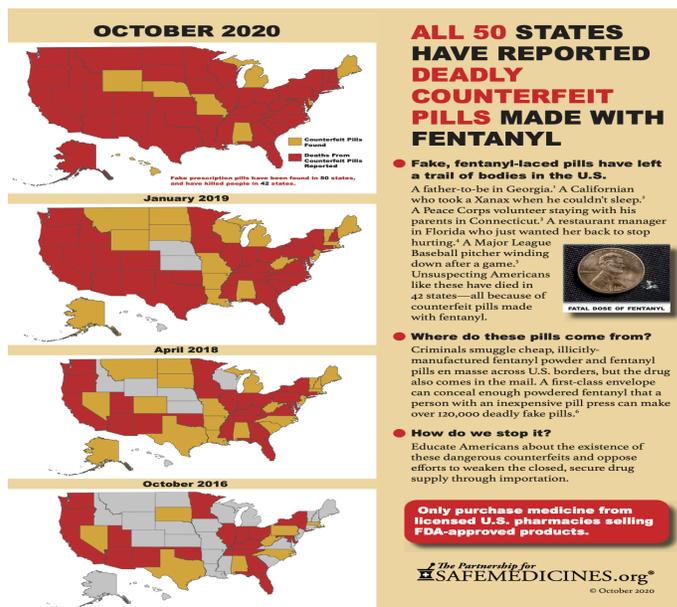
Counterfeit medicine is fake medicine and may be harmful to your health.

However, incidence of counterfeit drugs in the U.S. is rare relative to the large number of prescription drugs used. FDA remains vigilant to protect the U.S. drug supply from counterfeits and other substandard drugs that often originate from outside our borders.

Since many counterfeits are made abroad and can arrive in the U.S. through the mail or are smuggled in, FDA works with U.S. Customs and Border Protection, and using a risk-based approach focuses on areas that present the most threat to our drug supply.

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Fentanyl in counterfeit pills in all 50 states



61

Counterfeit Medicine

Health care providers and consumers need to be aware of how they could be exposed to counterfeit medicines. Watch out for possible signs of a counterfeit drug:

Does the drug or packaging look different than what you normally receive?

Has the consumer experienced a new or unusual side effect after using the drug?

Did the consumer buy the drug from an internet seller?

See BeSafeRx for more information about the potential dangers of buying medicine from online pharmacies.

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Counterfeit Medicine

- **As counterfeit pills containing various fentanyl analogues are killing people all over the United States, the DEA takes a measure of this deadly and growing counterfeit drug epidemic.**
- The report, titled Counterfeiting Prescription Pills Containing Fentanyls: A Global Threat describes how “hundreds of thousands of counterfeit prescription pills, some containing deadly amounts of fentanyls have been introduced into U.S. drug markets.”
- Following the DEA’s report, The American College of Emergency Physicians’ Annals of Emergency Medicine published “Fentanyl and a Novel Synthetic Opioid U-47700 Masquerading as Street ‘Norco’ in Central California: A Case Report,” by Patil Armenian, MD, a research physician at the University of California San Francisco on July 26, 2016

63

Counterfeit medicine

In March 2019, The Partnership for Safe Medicines, the National Association of Boards of Pharmacy, and National Association of Drug Diversion Investigators released a report, Pill Presses: An Overlooked Threat to American Patients

In it, we identified pill presses and counterfeit pill molds, which are widely available online, as a flexible counterfeit production base that would pose a growing threat to U.S. patients.

Since then, fentanyl pills that used to be sold almost exclusively in the form of counterfeit anti-anxiety and opioids have been found mimicking metformin, a prescription drug used by diabetics, as well as aspirin and Aleve.

Several large counterfeiting operations have outfitted their pill presses to produce hundreds of thousands of fake Adderall pills made with methamphetamine, and a smaller ring was found making dibutylone pills.

64

Counterfeit Opioid Medications

DEA is alerting all citizens to an increase in drug overdose deaths tied to counterfeit pills containing the powerful synthetic opioid fentanyl.

Manufactured by Mexican drug trafficking (DTOs), and marketed as a medication such as oxycodone on the illicit drug market, these pills can be deadly.

One pill can be enough to kill someone.

Fentanyl is a synthetic opioid that is 100 times stronger than morphine.

DEA lab analysis has identified pills ranging from .02 milligrams to 5.1 milligrams of fentanyl per tablet, with 26% of the counterfeit pills tested containing a lethal dose of fentanyl.

A deadly dose of fentanyl can be as little as 2 milligrams.

65

Counterfeit Opioid Medications

Counterfeit pills are nearly identical to actual prescription medications.

The majority of counterfeit pills resemble oxycodone 30mg pills (M30s), but can also mimic hydrocodone, alprazolam (Xanax), Adderall, and other medications.

There are indications that drug trafficking organizations are specifically targeting kids and teens by creating counterfeit pills in a variety of shapes and bright colors to appeal to that age group. Counterfeit M30 pills can vary in color from white to blue.

The best way to avoid counterfeit medication is to take only medications prescribed by a licensed medical professional and dispensed by a registered pharmacist.

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Counterfeit Opioid Medications

- *Left: Authentic oxycodone M30 tablets (bottom) vs. counterfeit oxycodone M30 tablets containing fentanyl (top)*



67

Counterfeit Opioid Medications

- *Authentic Adderall tablets (top) vs. counterfeit Adderall tablets containing methamphetamine (bottom).*



68

Counterfeit Opioid Medications

- *Authentic Xanax tablets (white) vs. counterfeit Xanax tablets containing fentanyl (yellow).*



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Counterfeit Opioid Medications

- *A lethal dose of fentanyl.*



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Counterfeit Opioid Medications IN Georgia

On June 5, 2017, a Georgia North-Central Health District emergency department (ED) notified the Georgia Poison Center of six opioid overdoses and one death during the previous day.

All patients had severe respiratory depression, loss of consciousness, or both, and some required high naloxone doses and mechanical ventilation.

Two patients reported taking one or two pills that they believed to be Percocet, purchased without a prescription, on the street.

Among the 37 possible cases reported initially (including five deaths), 27 cases (including one death) that occurred during June 4–13 met the counterfeit Percocet cluster case definition.

71

Counterfeit Opioid Medications IN Georgia

- Georgia's Department of Public Health has issued a warning about a cluster of overdoses from counterfeit pills that contain fentanyl, a potent opioid drug.



72

Counterfeit Opioid Medications

Opioid overdose deaths increased 58.3 percent,” said Cheryl Kolb, a public health educator in Georgia. “Fentanyl overdose deaths increased by 160.9%.

After most cases initially were found around Augusta, officials say they are finding overdose clusters around Savannah and Columbus.

From Jan. 1 to April 19 2021 in Chatham County, there were 336 suspected overdoses.

That compares to 368 in all of last year. Officials say counterfeit pills also are being found in Chattahoochee, Dooly, Harris, Muscogee, Schley and Taylor counties.

73

Counterfeit Opioid Medications

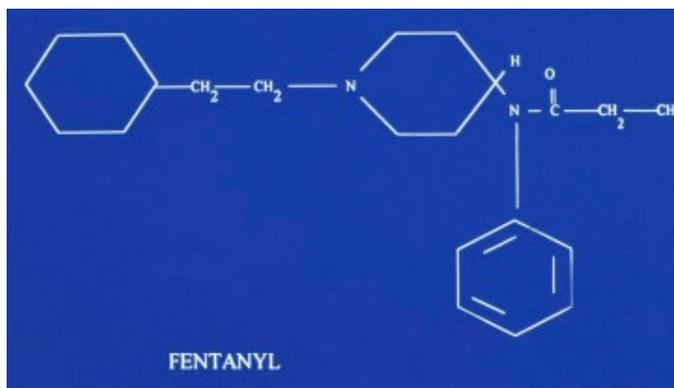
- If a counterfeit pill is found:
- Wear adequate PPE when handling the substance.
- Specific recommendations from the GBI include double gloving, gown, n95 mask and goggles (please see the attached guidance for more specific details). • Double bag the substance with a bio-hazard label on the outside and handle per agency protocol. **Whenever possible, Naloxone should be carried when working in an environment where an overdose incident may occur.**
- **Georgia has a Standing Order for Prescription of Naloxone for Overdose Prevention, which makes naloxone available at any pharmacy without a prescription.**
- When administering naloxone, please note that multiple doses may be necessary. To report suspected cases or for any additional questions, please call the Georgia Poison Center at 1-800-222-1222 or contact the Drug Surveillance Unit at ga.opioidprogram@dph.ga.gov.

74

What Started the opioid epidemic:

The Fentanyl Story

- **Fentanyl, a potent synthetic μ receptor-stimulating opioid, was first synthesized by Dr. Paul Janssen and the Janssen Company of Beerse, Belgium, in December 1960.**



77

Lethal Doses of Heroin, Fentanyl & Carfentanil



78

STORY OF FENTANYL: Rapid Onset Opioids (ROOs)

Formulation	FENTANYL CITRATE Compressed Powder	FENTANYL CITRATE Compressed Powder	FENTANYL CITRATE Compressed Powder	FENTANYL CITRATE Compressed Powder	FENTANYL CITRATE Nasal Solution	FREE FENTANYL Oral Solution
Route of Administration	 Buccal Lozenge	 Buccal Tablet	 Buccal Film	 Sublingual Tablet	 Intranasal Spray	 Sublingual Spray
Administration Time Requirements	Consumed over 15 min	Disintegration takes 14–25 min	Dissolves within 15–30 min	1–5 min	Seconds	Seconds
Bioavailability	50%	65%	71%	54%	Est 60%	76%
Onset of Action (mins)	10-15	15 minutes	15 minutes	10 minutes	10 minutes	5 minutes
Dosage Strengths (mcgs)	6 strengths	5 strengths	5 strengths	6 strengths	4 strengths	7 strengths



[Terms and Conditions](#)

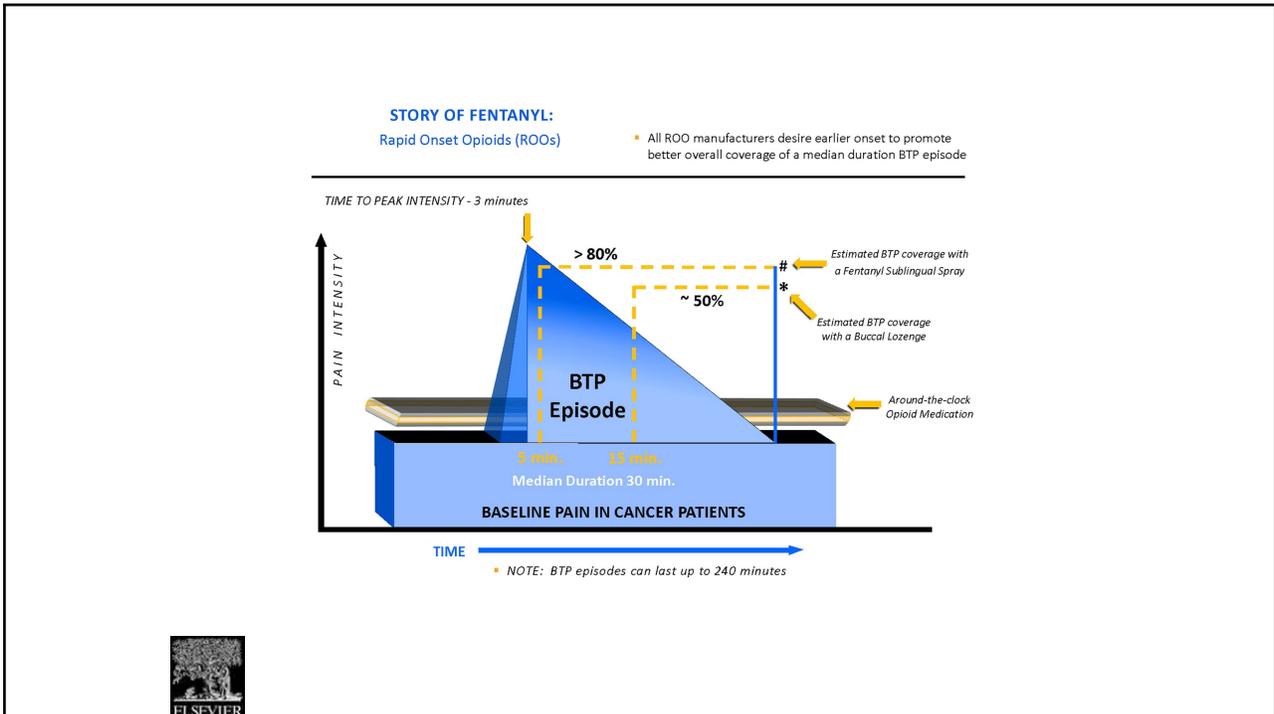
79



80



81



82

Fentanyl Related Substances

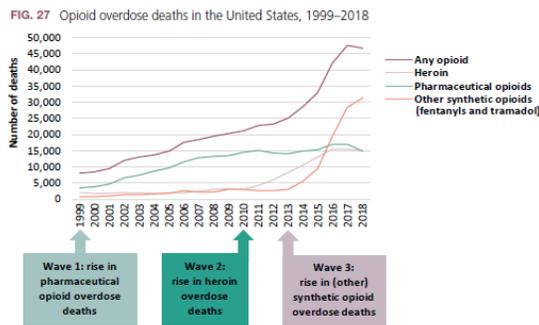
- 3-methylfentanyl
- 3-methylthiofentanyl
- 4-methoxy-butryl fentanyl
- Acetyl norfentanyl
- Acetyl-alpha-methylfentanyl
- Acetylfentanyl
- Acryl-alpha-methylfentanyl
- Acrylfentanyl
- Alfentanil
- Alpha-methylfentanyl
- Alpha-methylthiofentanyl
- Benzodioxole fentanyl
- Benzoylbenzyl fentanyl
- Benzylfentanyl
- Beta-hydroxy-3-methylfentanyl
- Beta-hydroxyfentanyl
- Beta-hydroxythiofentanyl
- Butanoyl 4-fluoro fentanyl
- Butyryl fentanyl
- Carfentanil
- Crotonyl fentanyl
- Cyclopentyl fentanyl
- Cyclopropyl fentanyl
- Fluorobutyryl fentanyl
- Fluorofentanyl
- Fluoroisobutyryl fentanyl
- Furanyl fentanyl
- Isobutyryl fentanyl
- Lofentanil
- Methoxyacetyl fentanyl
- N-isobutanoyl 4-fluoro fentanyl
- Ortho-fluorofentanyl
- P-fluorobutyryl fentanyl
- P-fluorofentanyl
- P-fluoroisobutyryl fentanyl
- Phenyl fentanyl
- Remifentanil
- Sufentanil
- Tetrahydrofuran fentanyl
- Thenylfentanyl
- Thiofentanyl
- Thiofuranyl fentanyl

UNCLASSIFIED

83

Developments in the United States: overdose deaths

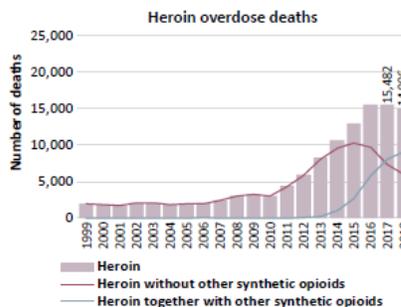
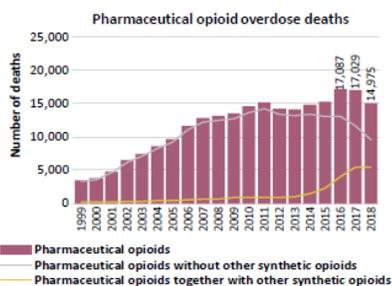
Gains in the reduction of overdose deaths attributed to pharmaceutical opioids partly offset by the continuing increase in deaths attributed to synthetic opioids



Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999–2018".

84

United States: reduction in overdose deaths attributed to pharmaceutical opioids and heroin (1998-2018) offset by increase in deaths involving fentanyl



Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999-2018".

85

United States: Regional variations in synthetic opioid overdose deaths



Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999-2018".
 Note: Alaska and Hawaii are not shown because valid estimates do not exist for these two States.
 The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

86

Uneven spread of fentanyl in the United States is also visible in supply indicators

FIG. 30 Fentanyl samples submitted to and analysed by forensic laboratories, by region, United States, 2014–2018

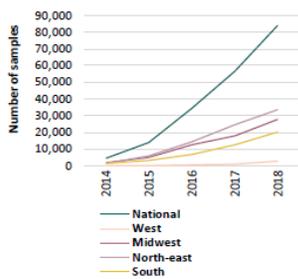
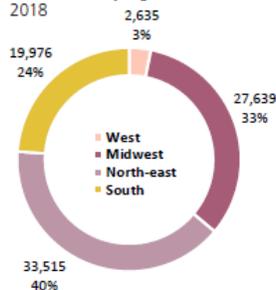


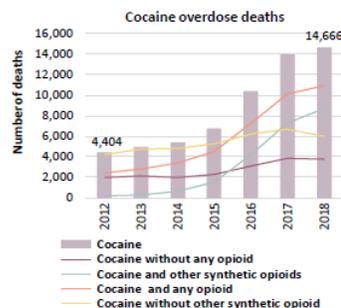
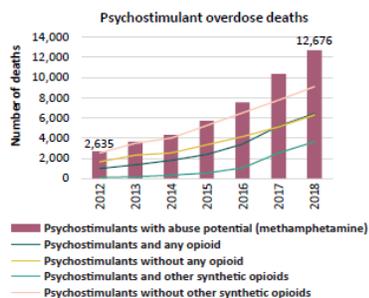
FIG. 31 Number and percentage of fentanyl submitted to and analysed by forensic laboratories, by region, United States, 2018



Source: United States, Department of Justice, DEA, Diversion Control Division, National Forensic Laboratory Information System, reports for different years.

87

United States: fentanyls also contribute to increase in overdose deaths involving stimulants



Source: United States, Centers for Disease Control and Prevention, Wide-ranging Online Data for Epidemiologic Research, "Multiple cause of death (Detailed mortality), 1999–2018".

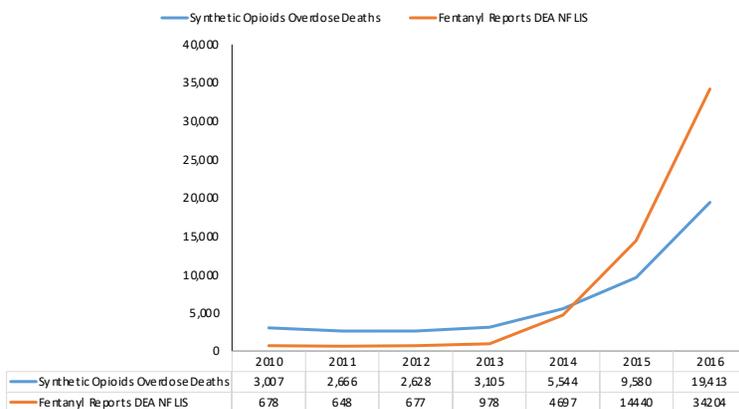
88

What has driven the fentanyl crisis In US that began in 2013?

- Diffusion of simpler, more effective methods of manufacture of synthetic opioids and their analogues
- Availability on the Internet of instructions for their manufacture
- Shift from preparation by a limited number of skilled chemists to preparation by basic “cooks”
- Discovery of ever more fentanyl analogues
- Lack of effective control of precursors and oversight of the industry expanding
- Distribution networks that reduced the risk of detection through the use of postal services and Internet
- Increased licit trade including e-commerce

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Synthetic Opioid Deaths Closely Linked to Illicit Fentanyl Supply



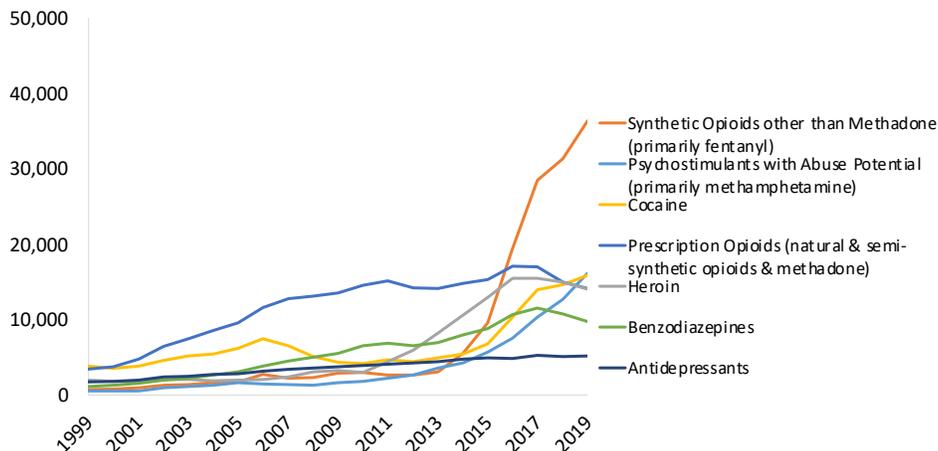
Known or suspected exposure to fentanyl in past year (n = 121)

	APR	95% CI	p
Regular heroin use	4.07	1.24–13.3	0.020

Source: Carroll et al, Int. J. Drug Policy, 2017 and CDC Epi-Aid 2015-2016

90

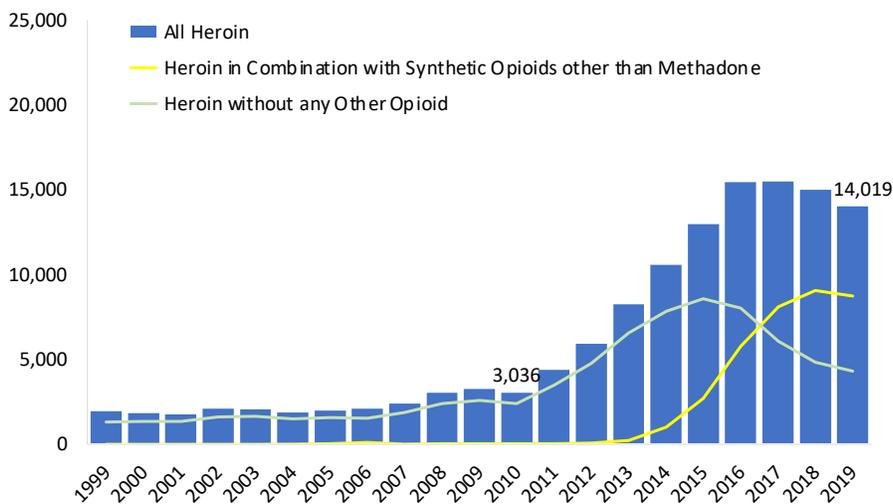
Figure 2. National Drug-Involved Overdose Deaths*, Number Among All Ages, 1999-2019



*Includes deaths with underlying causes of unintentional drug poisoning (X40–X44), suicide drug poisoning (X60–X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10–Y14), as coded in the International Classification of Diseases, 10th Revision.
 Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

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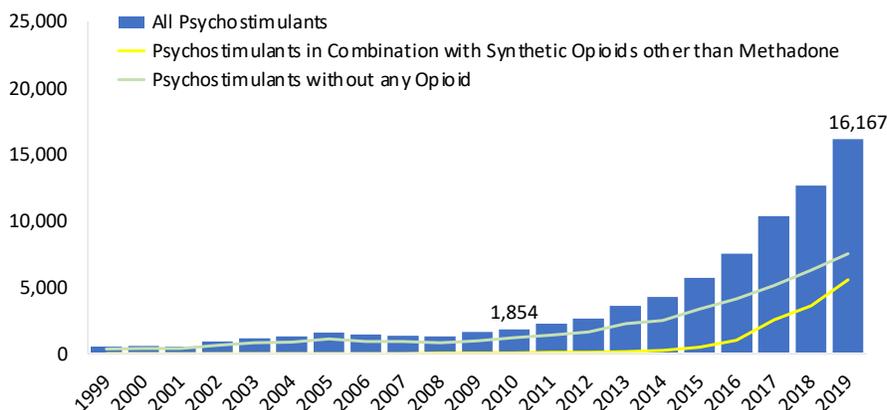
Figure 5. National Overdose Deaths Involving Heroin*, by other Opioid Involvement, Number Among All Ages, 1999-2019



*Among deaths with drug overdose as the underlying cause, the heroin category was determined by the T40.1 ICD-10 multiple cause-of-death code. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

92

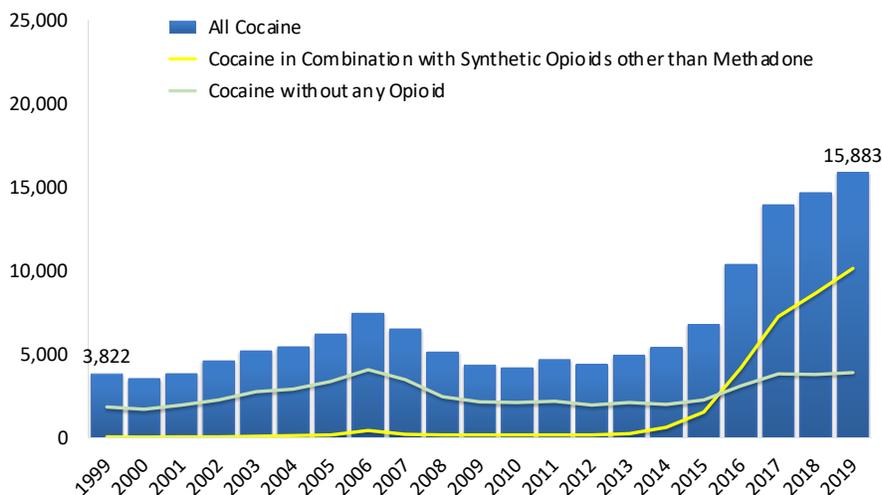
Figure 6. National Overdose Deaths Involving Psychostimulants with Abuse Potential (Primarily Methamphetamine)*, by Opioid Involvement, Number Among All Ages, 1999-2019



*Among deaths with drug overdose as the underlying cause, the psychostimulants with abuse potential (primarily methamphetamine) category was determined by the T43.6 ICD-10 multiple cause-of-death code. Abbreviated to *psychostimulants* in the bar chart above. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

93

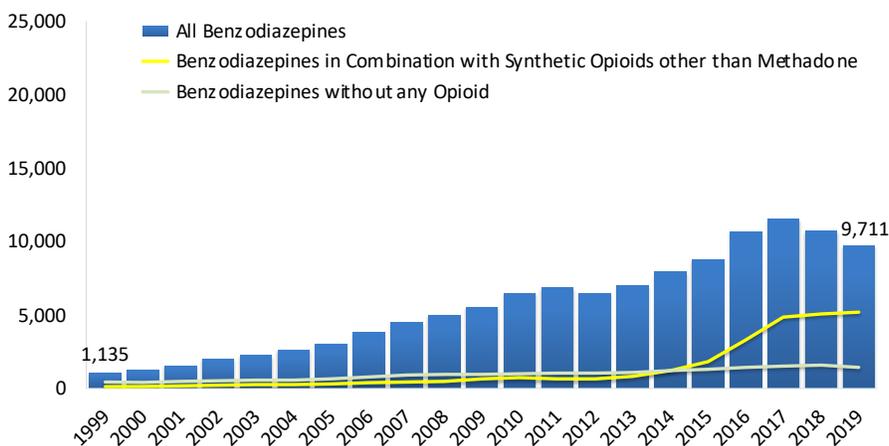
Figure 7. National Drug Overdose Deaths Involving Cocaine*, by Opioid Involvement, Number Among All Ages, 1999-2019



*Among deaths with drug overdose as the underlying cause, the cocaine category was determined by the T40.5 ICD-10 multiple cause-of-death code. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

94

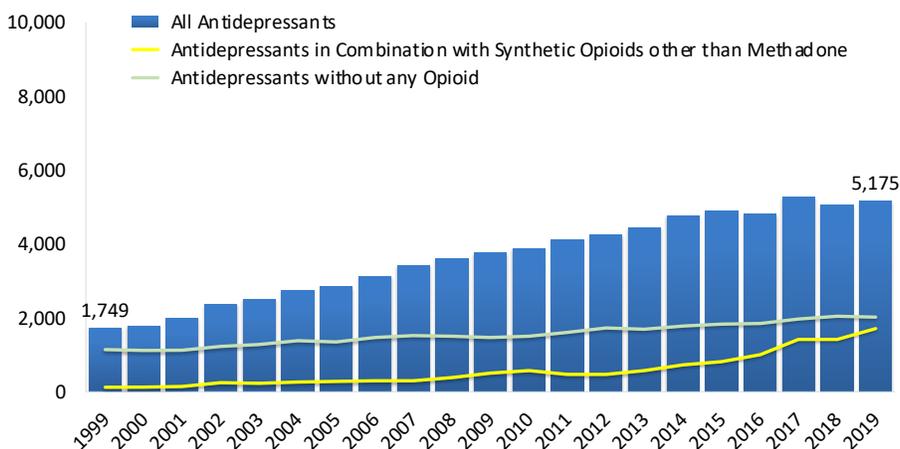
Figure 8. National Drug Overdose Deaths Involving Benzodiazepines*, by Opioid Involvement, Number Among All Ages, 1999-2019



*Among deaths with drug overdose as the underlying cause, the benzodiazepine category was determined by the T402.2 ICD-10 multiple cause-of-death code. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

95

Figure 9. National Drug Overdose Deaths Involving Antidepressants, by Opioid Involvement, Number Among All Ages, 1999-2019



*Among deaths with drug overdose as the underlying cause, the antidepressant subcategory was determined by the following ICD-10 multiple cause-of-death codes: Tricyclic and tetracyclic antidepressants (T43.0), monoamine-oxidase-inhibitor antidepressants (T43.1), and other unspecified antidepressants (T43.2). Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

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Heroin 101



Heroin Stamp Bag Weighs Approximately .01 to .03 gms

Heroin Stamp Bags Cost \$5 to \$15

Heroin "BUNDLE" Consists of 10 Individual Stamp Bags

Heroin "BUNDLE" Costs \$50 to \$80

Heroin "BRICK" Consists of 50 Individual Stamp Bags

Heroin "BRICKS" Cost \$150 to \$400

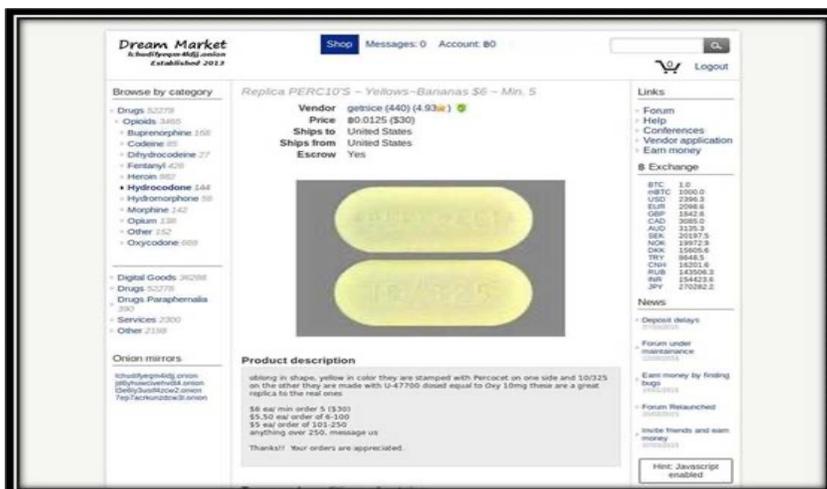
One (1) Gram of Heroin Sells for \$150

One (1) Ounce of Heroin Sells for \$2,000 to \$3,000

One (1) Kilogram of Heroin Sells for \$50,000 to \$80,000

97

Availability of Fentanyl Products Via the Internet



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Acetyl Fentanyl Internet Sales

Acetyl Fentanyl Powder

[Send SMS](#)
[Send Inquiry](#)



Description/ Specification of Acetyl Fentanyl Powder

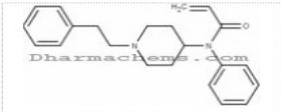
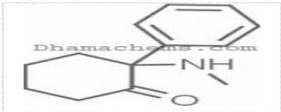
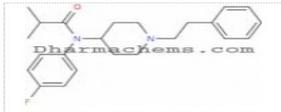
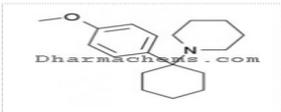
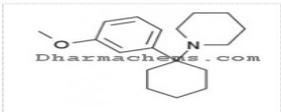
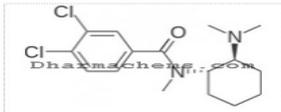
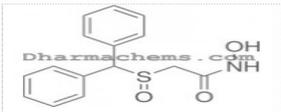
We are famously involved in trading and exporting of high quality Acetyl Fentanyl Powder in Delhi, Delhi, India. Our offered Acetyl Fentanyl Powder is widely appreciated by our clients which are situated all round the nation. We offer Acetyl Fentanyl Powder at most affordable prices.

Supplier Product Code : XXL024

99

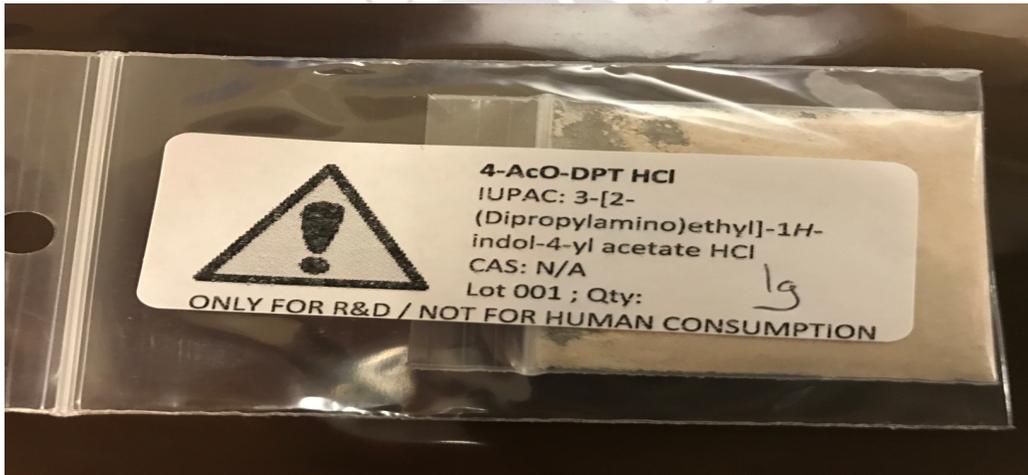
Acetyl Fentanyl Internet Sales

OTHER MEDICAL DRUGS

 <p>Acrylfentanyl View Details</p>	 <p>Deschloroketamine (DXE) View Details</p>	 <p>4-Fluoroisobutyrfentanyl View Details</p>
 <p>4-MEO-PCP View Details</p>	 <p>3-MEO-PCP View Details</p>	 <p>U-47700 View Details</p>
 <p>Adrafinil View Details</p>		

100

Availability of Fentanyl Products Via the Internet



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Drug Testing for Fentanyl

- Fentanyl (Duragesic) is not easily detected in either urine or serum
- Fentanyl, in particular, shows essentially no reactivity to standard opioid immunoassays, such as the SAMHSA five-drug panel test, and it requires a separate drug test generally on an “extended panel.”
- The ability to create new fentanyl compounds by making small changes in chemical structure poses a growing challenge to fentanyl drug testing.
- According to the *United Nations Office on Drugs and Crime (UNODC) Early Warning Advisory*, 17 fentanyl analogues originated in countries in East Asia, Europe, and North America between 2012 and 2016.
- Acetyl fentanyl analogues have increased to 35 or more.

103

Fentanyl Overdose



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How can a fentanyl overdose be treated?

- Naloxone is a medicine that can treat a fentanyl overdose when given right away. It works by rapidly binding to opioid receptors and blocking the effects of opioid drugs. But fentanyl is stronger than other opioid drugs like morphine and might require multiple doses of naloxone.
- Because of this, if you suspect someone has overdosed, the most important step to take is to call 911 so they can receive immediate medical attention. Once medical personnel arrive, they will administer naloxone if they suspect an opioid drug is involved.
- Naloxone is available as an injectable (needle) solution and nasal sprays (NARCAN® and KLOXXADO®).
- People who are given naloxone should be monitored for another two hours after the last dose of naloxone is given to make sure breathing does not slow or stop.

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	Injectable (and Nasal) Generic	Intranasal Branded	Injectable Generic	Auto-injector Branded
				
FDA approval	X (for IV, IM, SC)	X	X	X
Layperson experience	X		X	X
Fragile; requires assembly	X		X	
Can titrate dose	X		X	
Strength	1 mg/mL	4 mg/0.1 mL	0.4 mg/mL or 4 mg/10 mL	0.4 mg/0.4 mL
Cost per kit	\$\$	\$\$	\$	\$\$\$
Rx and quantity	#2, 2 mL Luer-Jet Luer-Lock needleless syringe plus #2 mucosal atomizer devices (MAD-300)	#1 two-pack of two 4-mg/0.1 mL intranasal devices	#2 single-use 1-mL vials or #1 10-mL multidose flip-top vial PLUS #2 3 mL syringe with 23 to 25 gauge 1-1.5 inch IM needles	#1 two-pack of two 0.4 mg/0.4 mL prefilled auto-injector devices
Sig. (for suspected opioid overdose)	Spray 1 mL (1/2 of syringe) into each nostril. Repeat after 2 to 3 minutes if no or minimal response	Spray 0.1 mL into one nostril. Repeat with second device into other nostril after 2 to 3 minutes if no or minimal response	Inject 1 mL in shoulder or thigh. Repeat after 2 to 3 minutes if no or minimal response	Inject into outer thigh as directed by English voice-prompt system. Place black side firmly on outer thigh and depress and hold for 5 seconds. Repeat with second device in 2 to 3 minutes if no or minimal response

Some portions developed with funding from NIDA R01 DA034634.

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NALOXONE

Opioid antagonist that works predominantly at mu-opioid receptors

Rapid acting with a short half-life

- Half-life: 30-60 min
- Action: 2-5 min

Has no effect on alcohol, benzodiazepines, or other CNS depressants

There is minimal risk in giving naloxone if patient is not having an overdose

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SO, WHAT DO YOU DO?

Call 911

Assess the signs and symptoms

Check the mouth and body of patient

Administer Naloxone

Wait and monitor

Administer Naloxone 2 minutes later if needed

If certified and if needed, administer CPR

Stay with patient until first responders arrive

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Things to Consider

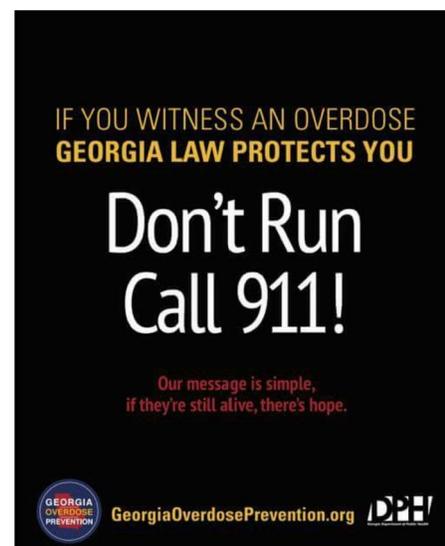
- Just like other drugs, it has an expiration date
 - If the drug is expired, the efficacy may be slightly decreased but most of the time it is better to give if someone is overdosing.
- When naloxone is administered, all effects of the opioid will be gone.
 - Rapid withdrawal

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Georgia 9-1-1 Medical Amnesty Law

- HB 965 was approved in the House and Senate in 2014
- The law cover individuals who seek medical help in an overdose emergency and who possess or use naloxone in good faith.
- There is a substance limit on the law
 - This is so we protect individuals transporting or making large amount of substances.
- Senator from Athens extended the law to alcohol



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HBO Special: The Crime of the Century

Alex Gibney's new documentary on HBO is called **The Crime of the Century**. It details the role of the medical system in creating the opioid crisis. ... It's not just a crisis destroying communities and plunging countless people into addiction, but is also a crime, says documentary filmmaker Alex Gibney.

Other HBO documentaries include: **Warning: This Drug May Kill You**

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Thank You For Your Time

Any Questions?



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