



# Drugs of Abuse

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# Objectives

- Discuss common classes of drugs of abuse, their clinical effects, and management.
- Recognize over-the-counter (OTC) medications commonly abused and their clinical effects in the setting of overdose.
- Discuss contaminants and adulterants, such as xylazine, identified in drugs of abuse.
- Evaluate the utility of various drug screens in testing for commonly abused substances including synthetics.

# Opioids

- Include both prescription and illicit formulations
  - Multiple routes of exposure including ingestion, inhalation, parenteral
- Classic triad of symptoms includes CNS depression, respiratory depression, and pinpoint pupils
  - Other common effects include hypotension and bradycardia
  - These symptoms can also occur with clonidine, tizanidine, and imidazoline decongestants



**Papaver somniferum**



**Morphine and codeine are naturally occurring alkaloids from the opium poppy seed**



- $T_{1/2}$  varies widely – from relatively short (morphine) to long (methadone)
- Antidote is naloxone
- Start low, particularly in patients who are habituated, and be ready to titrate upwards quickly
- Duration of naloxone is 30-90 minutes
- If patient experiences recurrent symptoms, consider continuous infusion
- Synthetic opioids may require higher dosing

## Common Opioids

Drug	Type of Activity	Usual Adult Dose <sup>a</sup> (mg)	Elimination Half-Life (h)	Duration of Analgesia (h)
butorphanol (Stadol®)	Mixed	2	5-6	3-4
codeine	Agonist	60	2-4	4-6
fentanyl (Duragesic®, Sublimaze®)	Agonist	0.2	1-5	0.5-2
heroin	Agonist	4	(b)	3-4
hydrocodone (Lortab®, Vicodin®)	Agonist	5	3-4	4-8
hydromorphone (Dilaudid®)	Agonist	1.5	1-4	4-5
meperidine (Demerol®)	Agonist	100	2-5	2-4
methadone (Dolophine®, Methadose®)	Agonist	10	20-30	4-8 <sup>d</sup>
morphine	Agonist	10	2-4	3-6
nalbuphine (Nubain®)	Mixed	10	5	3-6
oxycodone (Percocet®, OxyContin®)	Agonist	4.5	2-5	4-6
pentazocine (Talwin®)	Mixed	50	2-3	2-3
propoxyphene (Darvon®, Darvocet®)	Agonist	100	6-12	4-6
tramadol (Ultram®)	Agonist <sup>c</sup>	50-100	6-7.5	4-6

<sup>a</sup> Usual dose: Dose equivalent to 10 mg of morphine

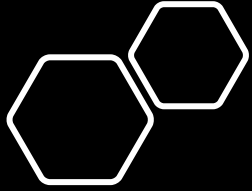
<sup>b</sup> Rapidly hydrolyzed to morphine

<sup>c</sup> Also inhibits serotonin reuptake

<sup>d</sup> Sedation and coma may last 2-3 days

TABLE 4. Classification of Opioids

Derivation	Opioid
From opium	Opium, morphine, codeine, thebaine
Semisynthetic	Heroin, hydrocodone, hydromorphone, oxycodone
Synthetic	Methadone, propoxyphene, meperidine, fentanyl



- We all know about the opioid epidemic...
- What happens with increased demand for prescription opioids and decreased supply?

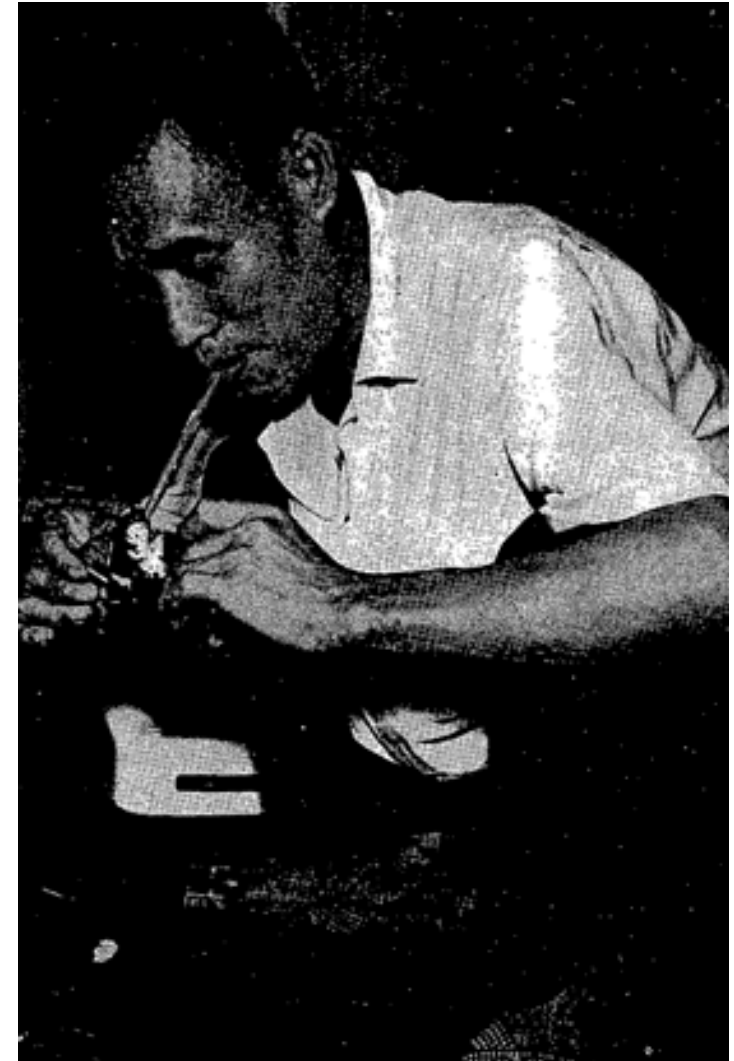
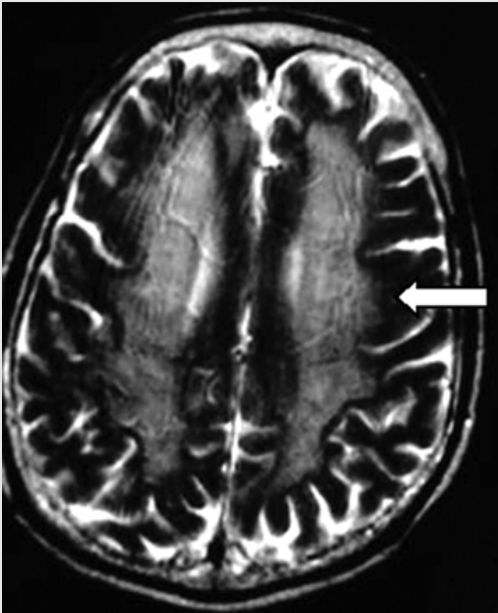


Heroin use rises dramatically



# “Chasing the Dragon”

- Users inhale the white pyrolysate [vapor] that is generated by heating heroin on aluminum foil
- Pharmacokinetics similar to IV heroin
- Spongioform leukoencephalopathy



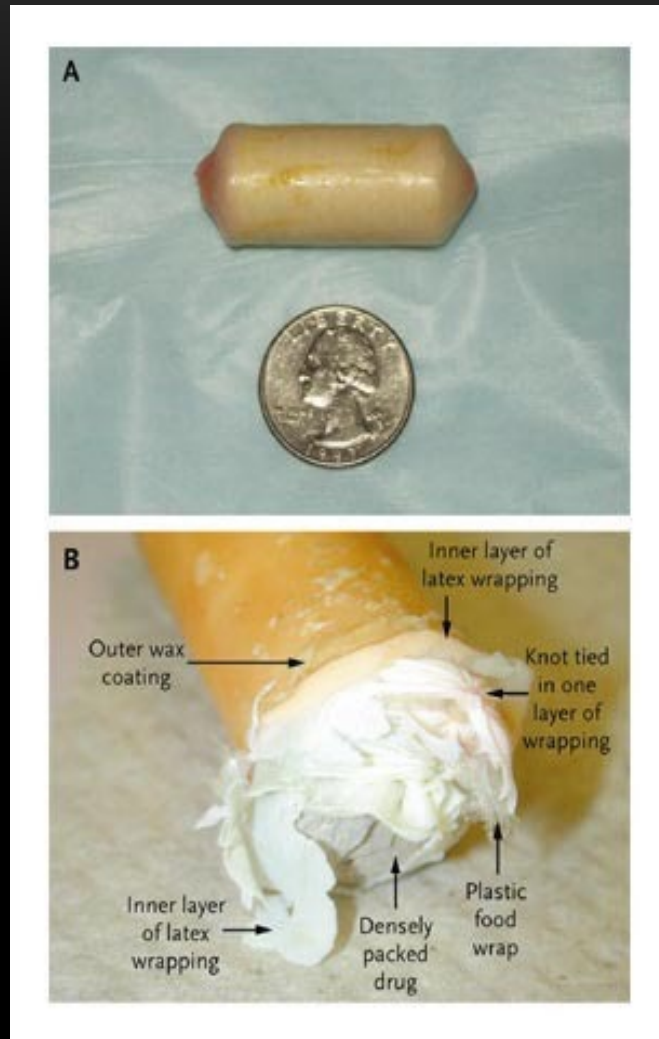
# Special considerations

**Body stuffer** – an individual who hastily ingests illegal drug packets to evade law enforcement officials

- Ingestion often involves more than one type/class of drugs. Leakage from these poorly wrapped packets can produce mild to severe toxicity
- Body stuffers usually deny the ingestion, and are often not discovered until symptoms develop



# Special considerations



**Body packer** –individual who ingests or inserts into body orifices, then transports wrapped packages of an illegal substance in an attempt to evade detection by law enforcement. Also known as a “mule.” Usually seen in those transporting cocaine or heroin.

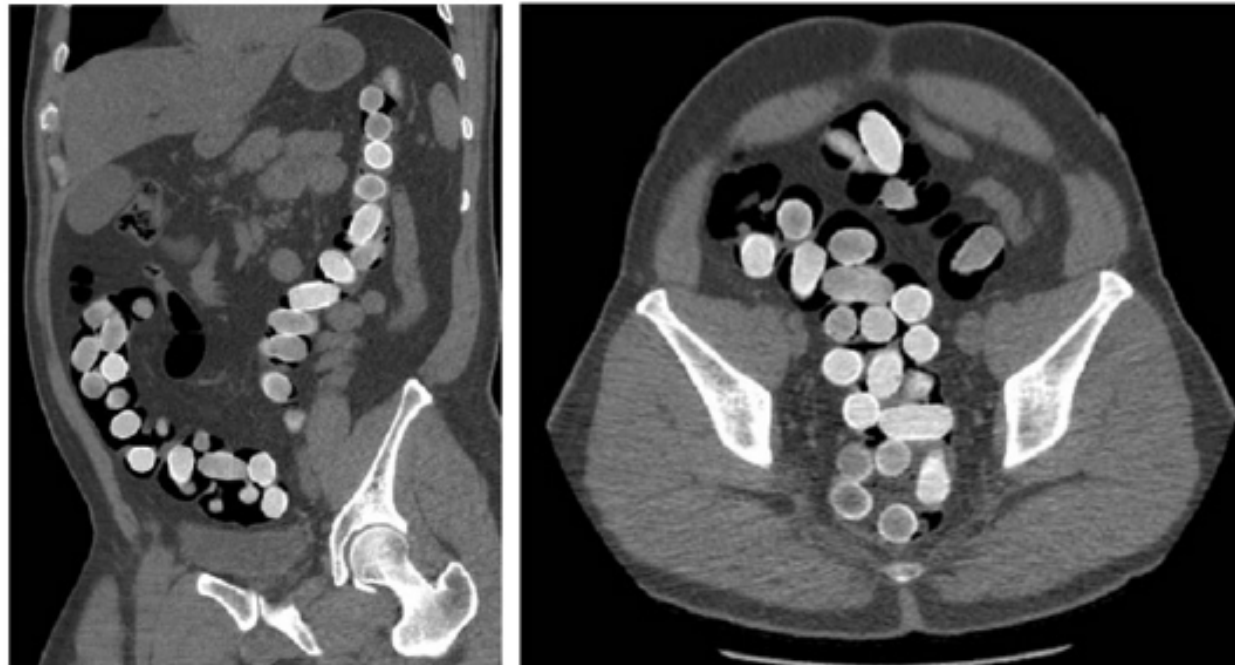
- Generally asymptomatic; however, severe acute drug toxicity can develop rapidly from leakage of contents or rupture of the drug packets
- Bowel obstruction is another potential complication, especially in opioid body packers







Multiple drug-filled packets distributed through colon.



CT showing multiple packets in the colon again, with difference in density suggesting difference in purity of content. Note lack of oral or intravenous contrast.



# Decontamination

- Body packers and stuffers – whole bowel irrigation (WBI)
- PEG solution (Golytely®) - continue until rectal effluent is clear and no packets are detected on a contrast study of the bowel
- Enemas or endoscopy should generally be avoided due to the risk of package rupture

# Antidote

- naloxone (Narcan<sup>®</sup>)
- naltrexone (Naltrex<sup>®</sup>, Vivitrol<sup>®</sup>) – an opioid antagonist used for the treatment of opioid dependence. NOT for use in the overdose setting

## Naloxone

- Initial dose is 0.4 – 2 mg IV push, may be repeated in 2 mg increments
- Large (>10 mg) doses may be required for treatment of buprenorphine or fentanyl (or fentanyl derivative) overdose
- In the habituated patient, smaller doses (0.1 or 0.2 mg increments) may be used intravenously and titrated to desired effect to minimize the precipitation of a withdrawal syndrome

# Naloxone (Narcan®)



- IV route is preferable, but may also be administered by endotracheal route, intramuscular, intralingual, intraosseous, or subcutaneous injection
- If a reversal response occurs, patients should be observed for 4 hours after the final dose for any recurrent sedation/respiratory depression
  - Recommend 8-hour observation time in the setting of long-acting opioids such as fentanyl, methadone and buprenorphine
  - Naloxone may not completely reverse the respiratory depression seen with buprenorphine





Intranasal naloxone has seen a tremendous increase in use in emergency situations. Easy for minimally-trained personnel to administer.

# Continuous-infusion (CI) naloxone

- May be used in patients with persistent or recurrent effects
- An initial dose of IV naloxone is given to achieve reversal of opioid effects, then a continuous infusion is administered to maintain this state of antagonism
- DOSE - Use  $\frac{2}{3}$  of the initial effective naloxone bolus on an hourly basis



- Add ten times this dose to each liter of D5W and infuse at a rate of 100 mL/hour
- Titrate dose to response
- Mixtures should be used within 24 hours
- Observe for recurrence of toxic symptoms for at least 2 hours after infusion is discontinued

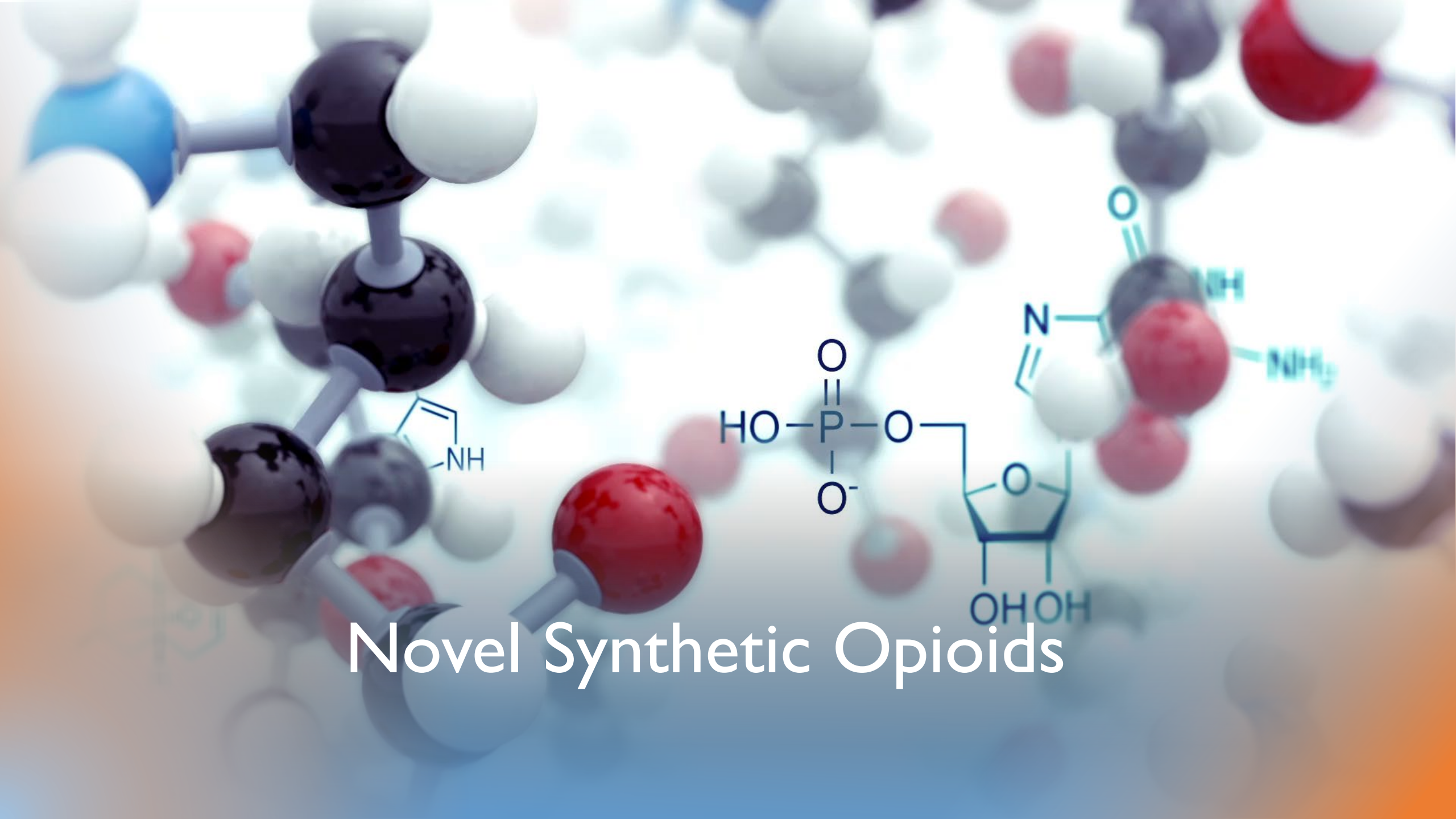
Continuous-infusion (CI) naloxone

# Example

- 1.5 mg of naloxone required to achieve satisfactory response
- Starting dose for CI naloxone will be 1 mg ( $\frac{2}{3}$  of 1.5 mg) per hour
- Mix 10 mg of naloxone in 1000 mL of D5W
- Infuse at 100 mL/hr; titrate to response

# Adverse Effects of Naloxone

- Adverse effects reported with naloxone include hypertension, laryngospasm, and pulmonary edema
- Precipitation of withdrawal may occur in the habituated patient
  - Although the symptoms are subjectively severe (e.g., n/v, diarrhea, diaphoresis, agitation), they are generally not life-threatening



# Novel Synthetic Opioids

# Classes of Novel Synthetic Opioids (NSOs)

- Fentanyl and its derivatives
  - Ones you may have heard of “historically”:
    - $\alpha$ -methylfentanyl/3-methylfentanyl (China white)
    - Acetylfentanyl
    - Carfentanil (Wildnil)
    - Fluorofentanils (i.e. para-fluorofentanyl) (briefly in 1980s then again in 2016)
      - Still seeing many cases of this (330 cases in Q1 of 2024)
  - New analogues:
    - Ortho-methylfentanyl (first detected in Dec 2023)
- Other non-fentanyl synthetic opioids
  - Ones you may have heard of “historically”:
    - AH-7921 (Doxylam) (a benzoamide)
    - U-47700 (closely related to AH-7921)
    - MT-45 (a piperazine)
  - Nitazene analogues
    - N-pyrrolidino etonitazene (first detected in May 2021)
    - Protonitazene (first detected in May 2021)
    - Metonitazene (first detected in July 2020)

# Classes of Novel Synthetic Opioids (NSOs)

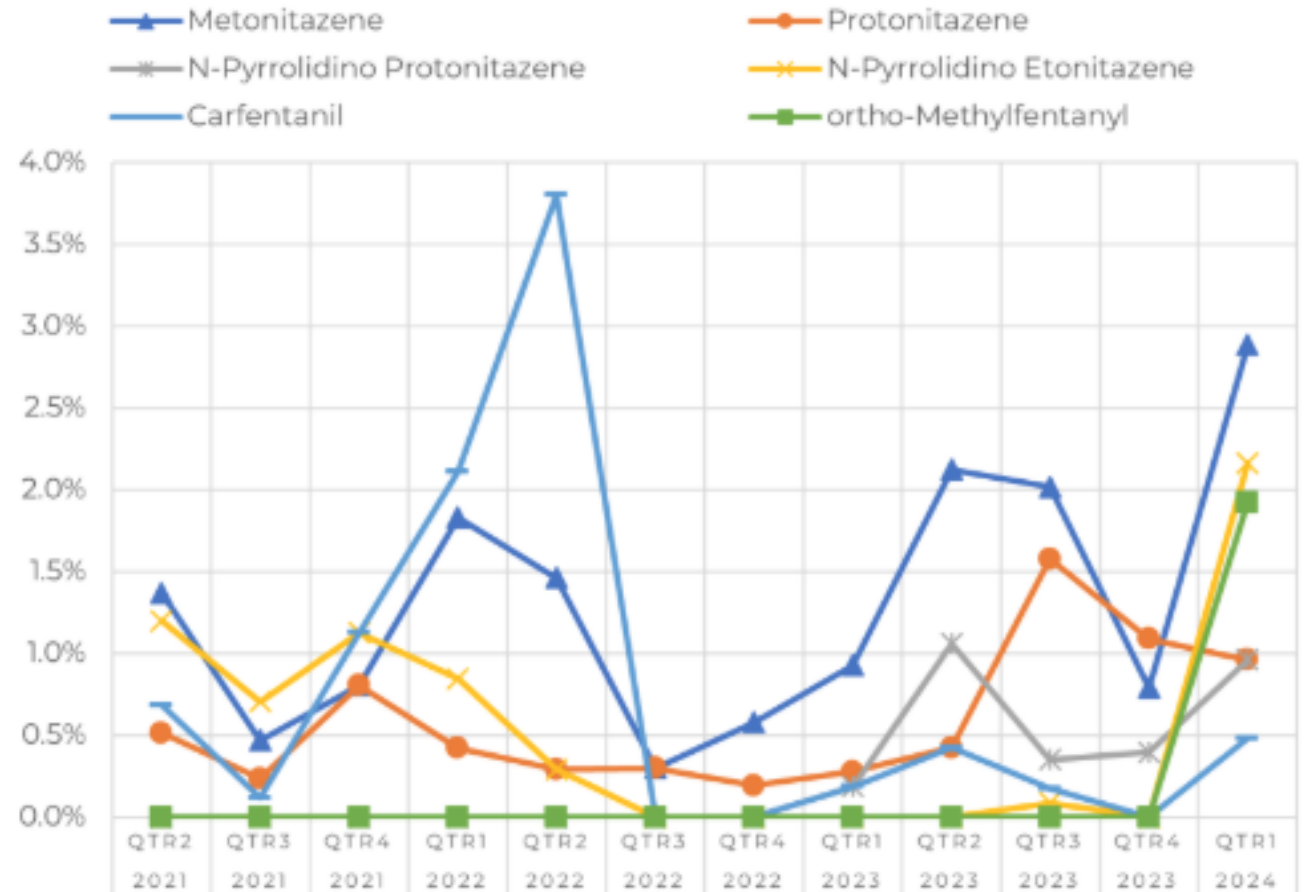
## **Current 5 Most Commonly Detected NSOs:**

(according to April 2024 Quarterly Report from The Center for Forensic Science Research and Education (CFSRE)):

1. Ortho-methylfentanyl
2. N-pyrrolidino etonitazene
3. Metonitazene
4. Protonitazene
5. Carfentanil

## **SELECT POSITIVITY: Q2 2021 TO Q1 2024**

*Positivity plots are derived from a select toxicology data source that has been consistently monitored since 2018.*

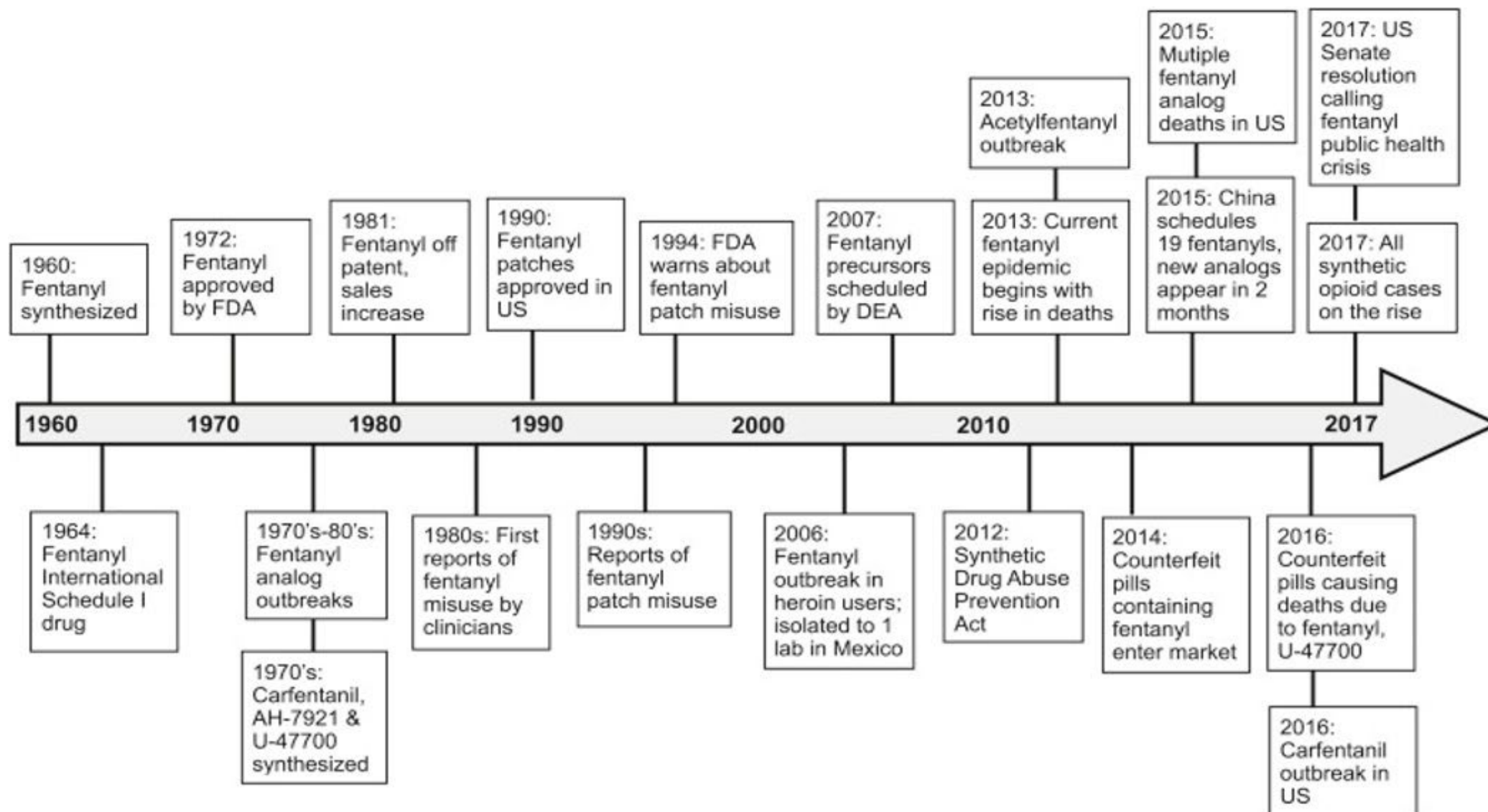


# Where do NSOs Come From?

- Online (including the dark web) – labs in China and overseas
  - Shipped to US
  - For example – fluorofentanyl being manufactured in Mexico by cartels as a result of the scheduling of Fentanyl precursors
- Head shops
- Drug dealers
- Often sold as heroin or mixed with other drug supplies to unsuspecting users
- May be ingested, insufflated, smoked, or injected



# Timeline of Synthetic Opioid Events



# Demographics

- The most US deaths from NSOs have occurred in the Northeast and South
- Primarily affects the same demographic group that uses heroin: non-Hispanic white males aged 25-44 years, lower SES
- Other potential risks: chronic pain, obesity, uneducated, mental health issues

# What About First Responders?

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- Risk of exposure to first responders is very low
- For routine handling of drug, nitrile gloves provide sufficient dermal protection
- In rare cases where there are aerosols, an N95 respirator provides sufficient protection
- No persistent effects from NSO exposure are expected in the absence of prolonged hypoxia



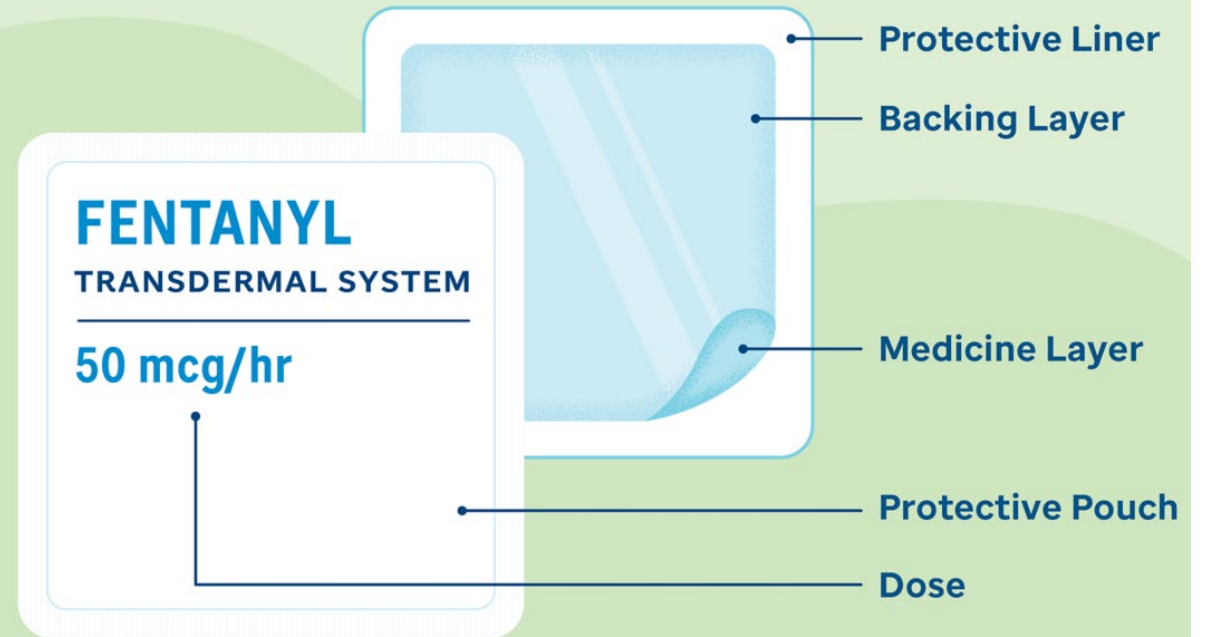
# Fentanyl

- Available in many formulations
  - Sublingual Spray (Subsys) – 100 mcg, 200mcg, 400 mcg, 600 mcg, 800 mcg, 1200 mcg, 1600 mcg/spray
  - Patches (Duragesic) - 12.5 mcg/hr, 25 mcg/hr, 37.5 mcg/hr, 50 mcg/hr, 62.5 mcg/hr, 75 mcg/hr, 87.5 mcg/hr, 100 mcg/hr,
  - Lozenge on a Handle (Actiq) - 200 mcg, 400 mcg, 600 mcg, 800 mcg, 1200 mcg, 1600 mcg
  - Buccal Tablets (Fentora, Abstral) - 100 mcg, 200 mcg, 400 mcg, 600 mcg, 800 mcg
- Highly lipid soluble and quickly crosses BBB
- Short duration of action

# Abuse of Fentanyl Patches

- Inhalation:
  - Place patch in a glass container, heat, and smoke
  - Scratch and smoke the patches
- Ingestion
  - Remove gel contents and ingest
  - Cut frozen patches into pieces and chew or suck on them (“Chiclets”)
- Injection:
  - Remove gel contents and inject
  - Simmer patches in water and inject the liquid extract IV

## Fentanyl Patch

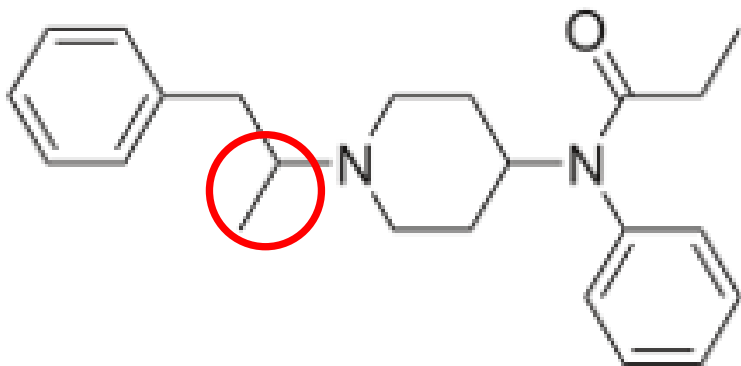


# Residual Amount of Fentanyl in Patch

Patch Strength	Dose in Patch (mg)	Dose in Patch (mcg)	mcg used in 72 hours	Residual amount of drug in patch (mcg)
25 mcg/hour	2.75	2750	1800	950
50 mcg/hour	5.5	5500	3600	1900
75 mcg/hour	8.25	8250	5400	2850
100 mcg/hour	11	11000	7200	3800

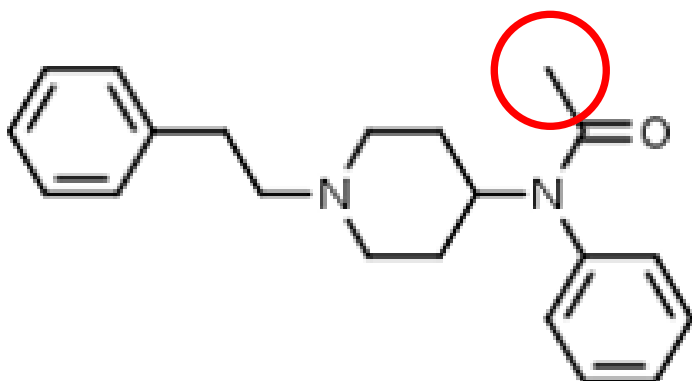
# $\alpha$ -Methylfentanyl (China White)

- First designer fentanyl (California, 1970s)
- Used as a heroin substitute or laced in heroin



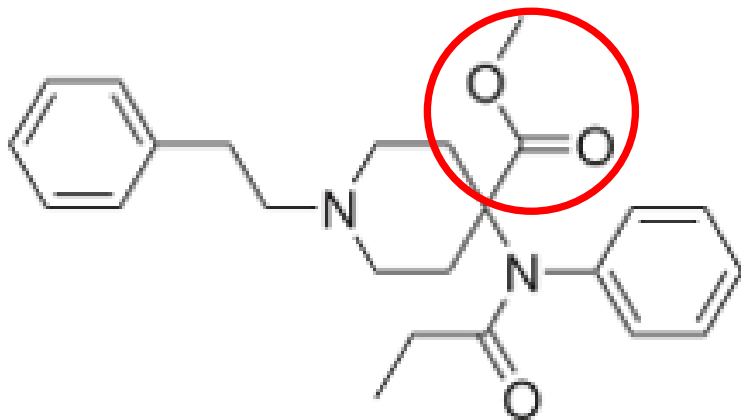


# Acetylfentanyl



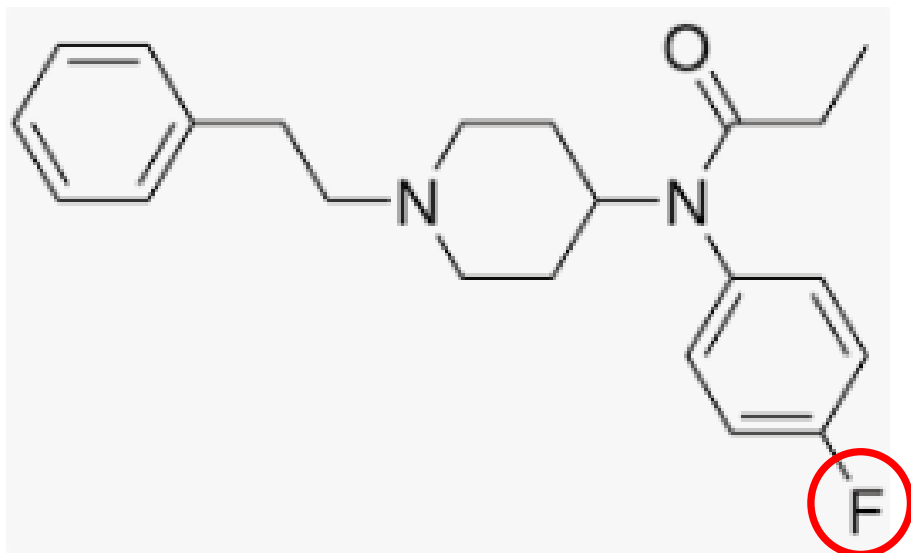
- Created by removing one methyl group from fentanyl to form desmethylfentanyl
- Somewhat weaker than fentanyl
- Public health alert first issued in early 2013

# Carfentanil (Wildnil®)



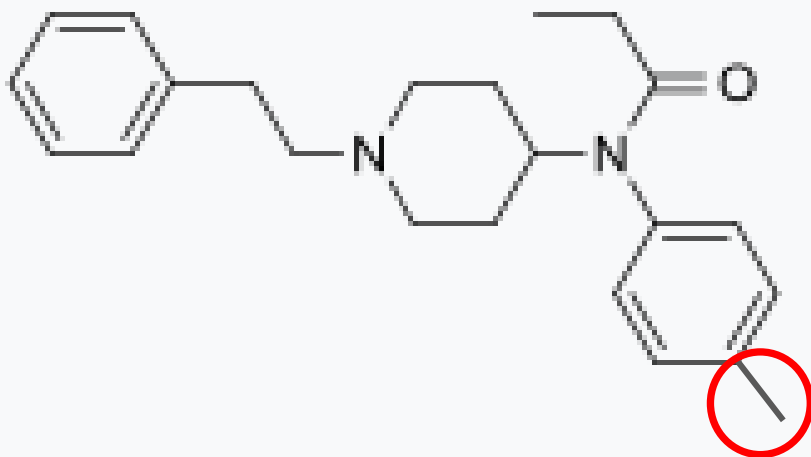
- Most potent commercially used opioid
- Marketed as a large animal sedative (elephants and rhinos) – not for human use!
  - First introduced as vet medicine in 1986
- May appear in heroin
- Dramatic increase in shipments from Chinese chemical companies into the US in 2016
- Current “outbreak” is different from historical outbreaks where found drug material that was solely carfentanil and multiple deaths in a centralized area
  - Now seeing it across the country and almost always mixed with fentanyl (not high purity)

# Para-fluorofentanyl



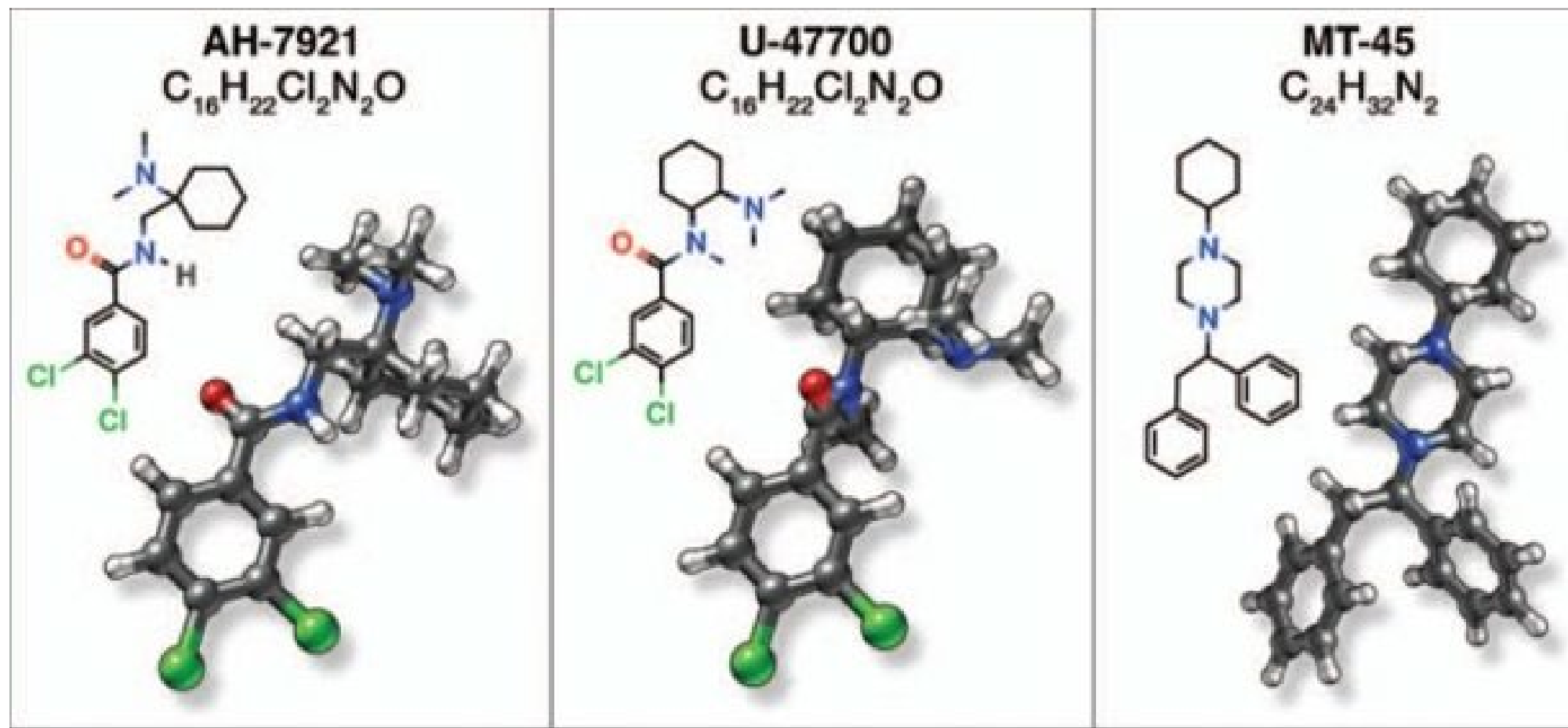
- Three times less potent than fentanyl
  - However, concentrations found in drug deaths suggest that deaths can occur with concentrations similar to those involving fentanyl
- Almost always found together with fentanyl (93% of the time)
- 1980s → 2016 → dropped off in 2018 after core-structure scheduling → re-emerged in Q4 of 2020 (per CFSRE)

# Ortho-methylfentanyl



- Relatively new – found in four blood toxicology specimens in British Columbia, Canada
- Not yet identified in any drug materials (as of Dec 2023)

# Other Novel Synthetic Opioids



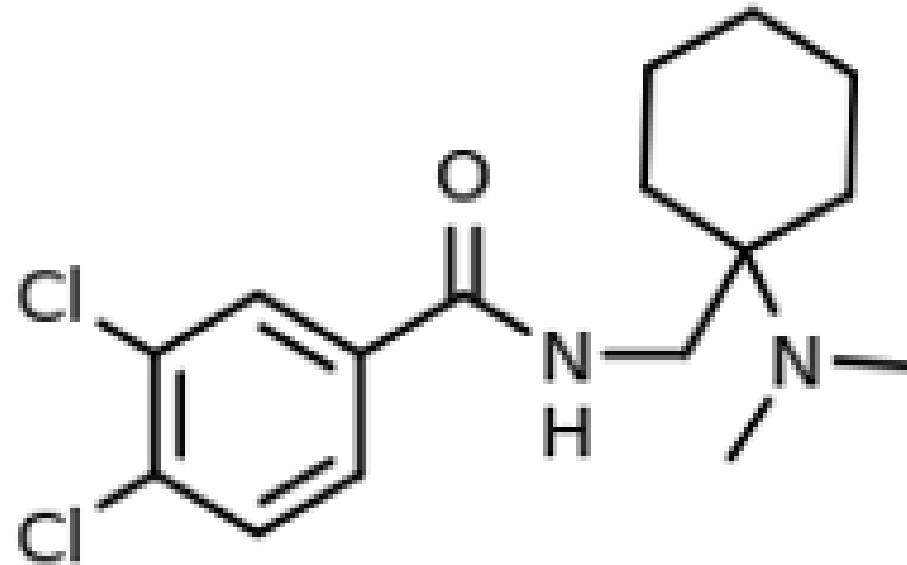
Note: none are approved for human use!

# AH-7921 (Doxylam)



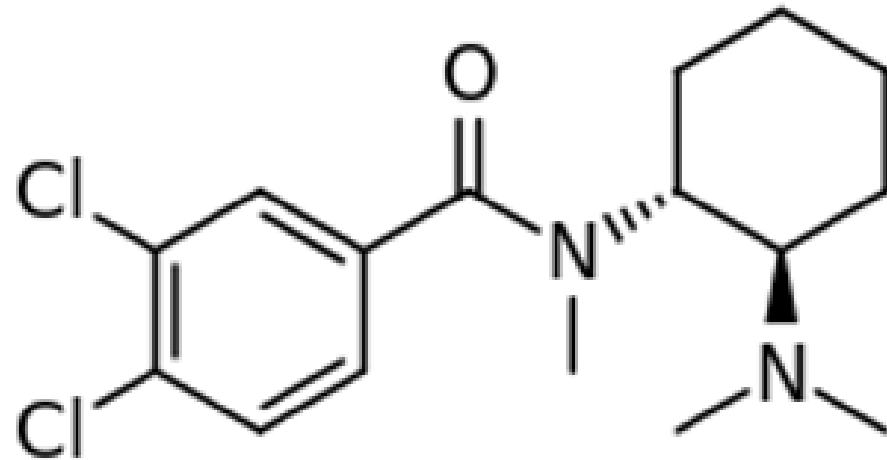
Two horses that raced at Belmont Park have tested positive for the synthetic opioid known as AH-7921

- Unique effects in overdose: tachycardia, HTN, seizures
- Not the same as doxylamine!
- Scheduled by the US in 2016
- Less commonly seen



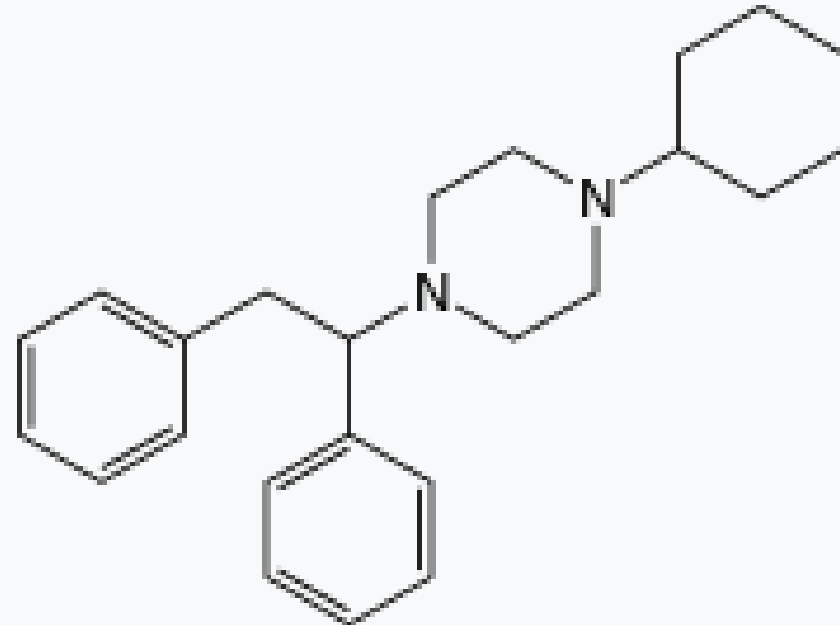
# U-47700 (U4 or pink heroin or pinky)

- Structural isomer of AH-7921
- According to user reports, has a longer-lasting effect than AH-7921
- Induces significant euphoria which is short-lived and causes an urge to keep redosing



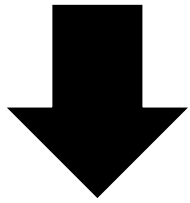
# MT-45 (IC-6)

- Unusual side effects: hearing loss, hair depigmentation, alopecia, cataracts, Mees lines on nails
- About 80% of potency of morphine





# Core Structure Scheduling – Fentanyl analogues

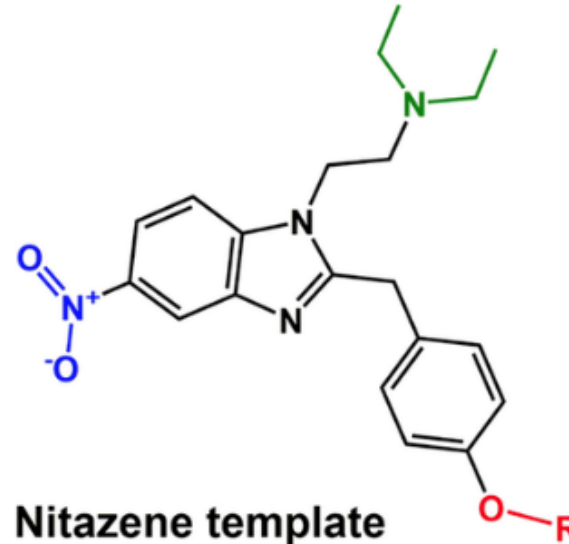


## The Scheduling Cycle – Nitazene analogues

- DEA moved to control fentanyl analogues (core structure scheduling) in spring of 2018
  - Had dramatic effect in eradicating fentanyl analogues in the supply in the United States
    - Exceptions: carfentanil and now ortho-methylfentanyl
  - As a result – opened the door to the proliferation of nitazene analogues
    - Starting with etonitazene
    - Early on – would see a nitazene analogue emerge – DEA would schedule it – would see that nitazene analogue go away
    - More recently – seeing some scheduled nitazene analogues persisting and proliferating in supply
      - Metonitazene – cyclical patterns of increase/decrease in the supply (not clear why)

# Nitazene Analogues

- First developed in the 1950s-1960s as opioid analgesics but never approved to market
  - Largely investigational/chemistry research
- Structurally unrelated to fentanyl
- Hundreds-thousands fold more potent than morphine and 10-40x more potent than fentanyl
  - Different from fentanyl analogues of which majority are less potent than fentanyl
- Often mixed with fentanyl or other agents

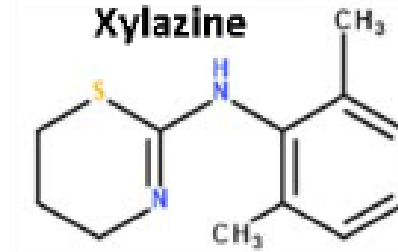


R = methyl, metonitazene  
R = ethyl, etonitazene  
R = isopropyl, isotonitazene  
R = propyl, protonitazene  
R = butyl, butonitazene

# Table of Comparative Opioid Potencies

Opioid	Potency Compared to Morphine	Potency Compared to Heroin
Morphine	1	~1/3
Heroin	2-5x	1
AH-7921	1.7x	
MT-45	3.5 x	
Butyrylfentanyl	7x	
U-47700	7.5x	
Acetylfentanyl	16-80x	5-15x
Fentanyl	50-100x	
3-methylfentanyl	1,000-7,000x	
Carfentanil	10,000x	4,000x

# Xylazine (“Tranq”)



- Commonly mixed with fentanyl
  - Fentanyl results in more euphoria but is shorter-acting than heroin
- Powerful sedative FDA approved for veterinary use
- Alpha-2 agonist (like clonidine and guanfacine)
- DEA has seized xylazine/fentanyl mixtures in 48/50 states
- Since 2021: >90% of “dope” samples tested from Philadelphia have contained xylazine and fentanyl with xylazine purity ranging from 5% to > 70%
- New Jersey: about 60% of samples contained xylazine
- In 2022, approximately 23% of fentanyl powder and 7% of fentanyl pills seized by the DEA contained xylazine.
- From June 2022 to June 2023, the Oklahoma ME office saw 9 cases of fentanyl and xylazine.
- Xylazine powder can be purchased online from Chinese suppliers.

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USA Market, 99% Purity White Crystal **Xylazine**/Xylazina/Xylazin/Zylazine/Zyla: HCl Powder Em Po Polvo Security Customs 23076-35-9/7361-61-7

**US\$ 490-690** / kg (FOB Price)

1 kg (MOQ)

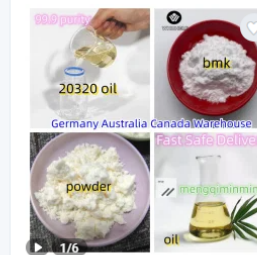
Customs Issues : No Customs Issues for Us, Plea... Purity : 99% Purity  
Export Market : Global (Safe Clearance) Express : Safe Customs Clearance, We I-

Guangzhou Teng yue Chemical Co., Ltd. >

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**US\$ 58-78** / Piece (FOB Price)

1 Piece (MOQ)

CAS No. : 718-08-1 Type : Pharmaceutical Intermediates  
Appearance : Powder Quality : Industrial

Henan Weixi New Materials Co., Ltd. >

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28578-16-7 L-Carnitine/103-63-9/541-15-1/52190-28-0 **Xylazine** /7361-61-7 23 Iodine Ball BMK Powder Mt2

**US\$ 60-80** / kg (FOB Price)

1 kg (MOQ)

**Trigger Warning:**  
**Graphic image of necrotic wound on next slide**

# Xylazine (“Tranq”)

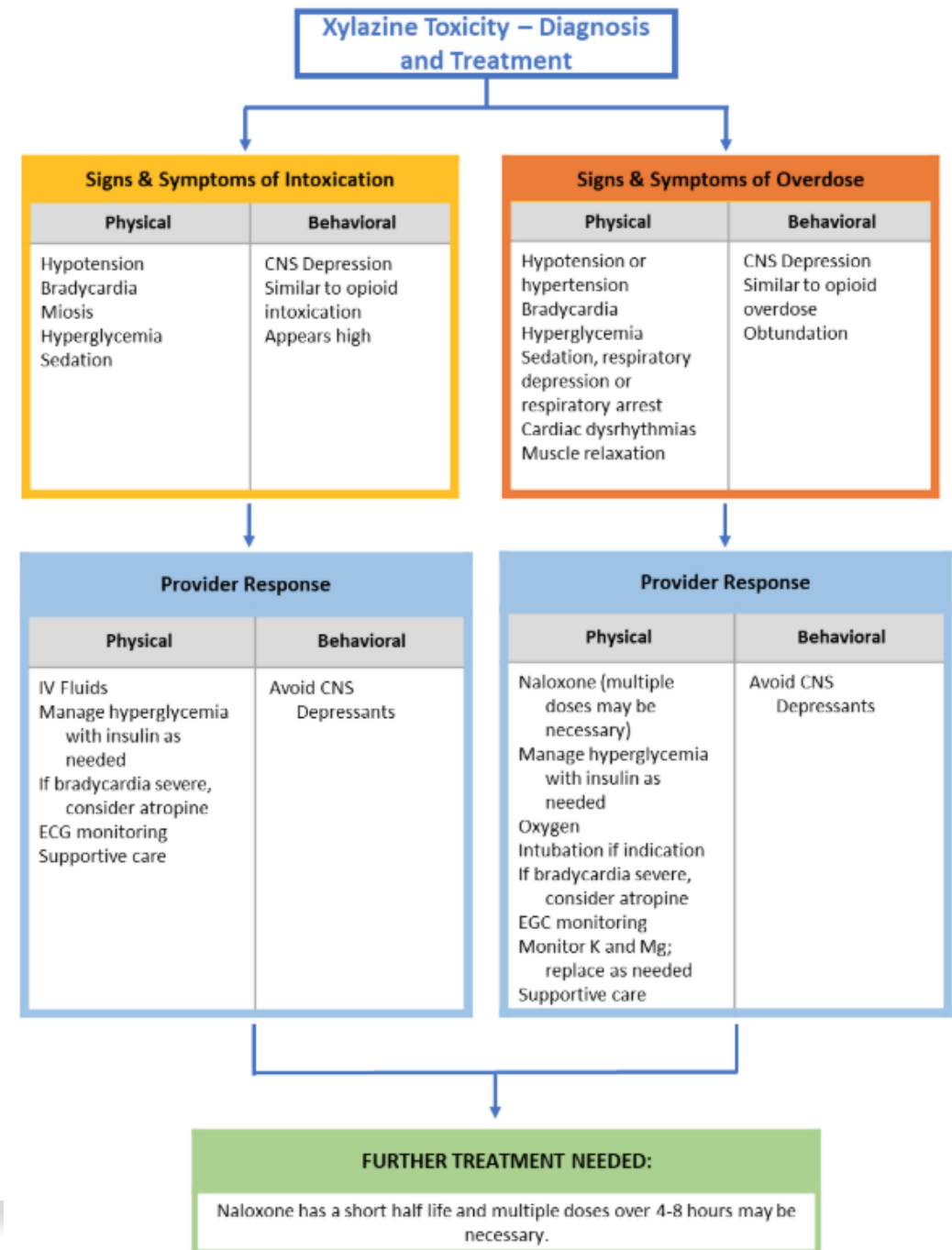
- Also, can develop severe wounds, including necrosis that may lead to amputation (seeing it even in some patients who deny injecting – rather use via insufflation)
- Potential pathophysiology of xylazine-associated soft tissue infections is possibly multifactorial:
  - Prolongs effects of fentanyl = patients have longer downtime = possible pressure necrosis
  - Peripheral vasoconstrictor = poorer blood flow resulting in an ischemic-like necrosis
  - Possible association with skin-picking behavior which can initiate wounds
  - May be compounded by poor nutritional status in users during chaotic use
  - Some animal evidence that xylazine is directly cytotoxic
  - Repeated trauma due to injection at site where developing wound (some patients state easier to inject directly into a vessel)





# Xylazine (“Tranq”)

- Mixed reports about whether or not xylazine responds to naloxone
- Potential for physiologic dependence and withdrawal with chronic use/cessation of use has been reported
  - Patients have reported anecdotally that xylazine withdrawal feels different from opioid withdrawal
    - Manifested by significant anxiety



## Narcotic (Opioid) Toxidrome

Mnemonic: "CPR-3H"

- C** : Coma
- P** : Pinpoint pupils
- R** : Respiratory depression
- H** : Hypotension
- H** : Hypothermia
- H** : Hyporeflexia



NOTE: Meperidine (*Demerol*) will not cause miosis

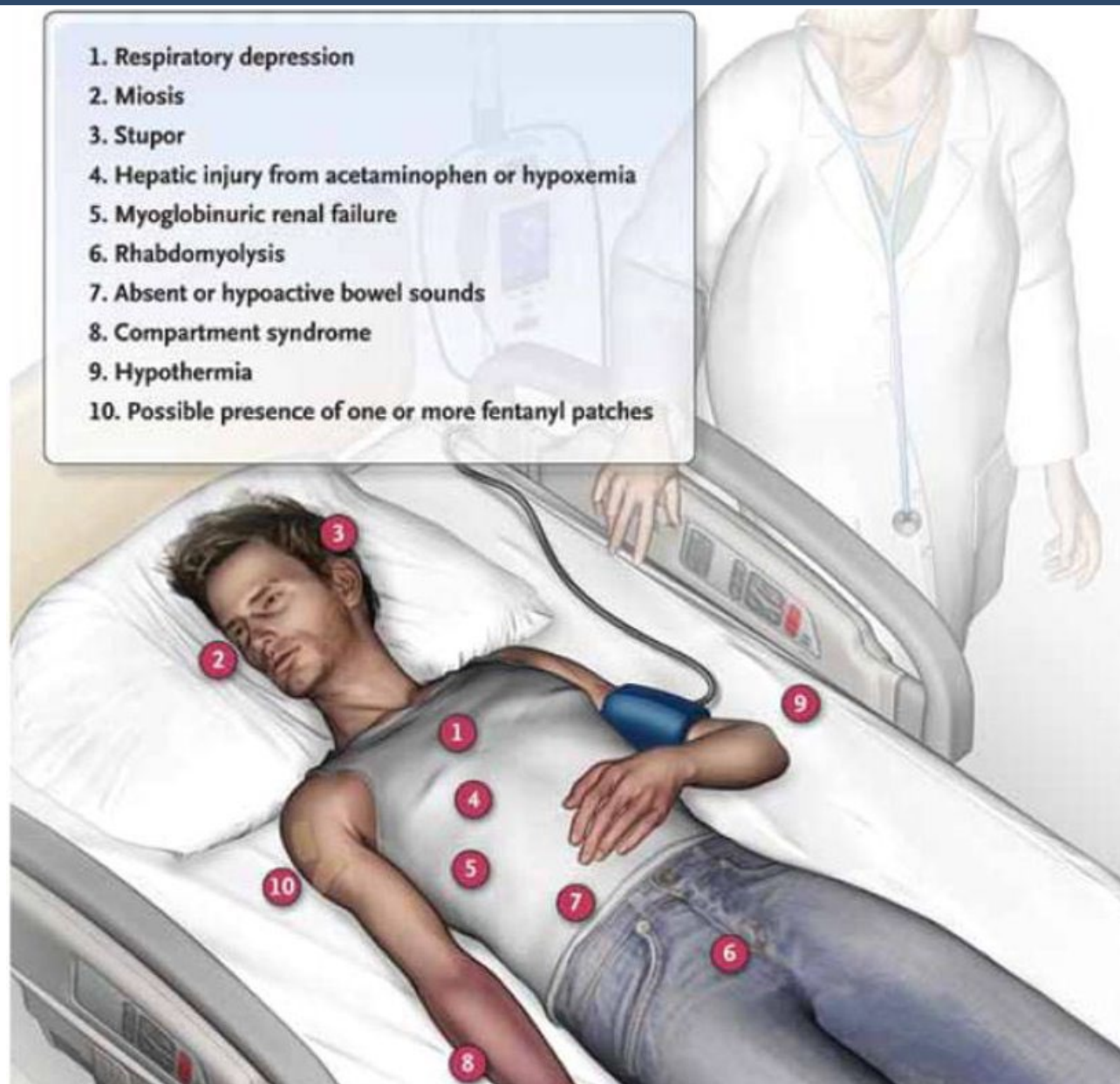
### Antidote: Naloxone

Start with **0.04 mg** and titrate up q 2-3 min as need for ventilation to 0.5 mg, 2 mg, 5 mg, up to max 10-15 mg

@jackcfchong

Review:  
Opioid  
Toxidrome

1. Respiratory depression
2. Miosis
3. Stupor
4. Hepatic injury from acetaminophen or hypoxemia
5. Myoglobinuric renal failure
6. Rhabdomyolysis
7. Absent or hypoactive bowel sounds
8. Compartment syndrome
9. Hypothermia
10. Possible presence of one or more fentanyl patches



# Workup

- UDS generally NOT helpful
- Immunoassay that tests for opiates (morphine, heroin, and codeine)
- Semisynthetic opioids like hydrocodone may show up when taken in high doses
- Synthetic opioids, including fentanyl and other NSOs, will NEVER show up
- Must use GC/MS or LC/MS to detect NSOs

# Stimulants

- Cocaine/methamphetamine
- Exposure by many routes – swallowed, snorted, smoked, injected
- Primary effect is sympathetic stimulation
- Risks include tachydysrhythmias, seizures, rhabdomyolysis

# Stimulants

- Duration of action of cocaine significantly less than for meth
- Treatment primarily sedation, possible cooling methods
- Cocaine combined with ethanol results in the formation of cocaethylene, which has a significantly longer half-life
- Cocaine only detectable for < 1 day in standard UDS --- benzoylecgonine metabolite generally detectable for 3-5 days





# Hallucinogens

- Includes LSD, MDMA (Ecstasy), ayahuasca, psilocybin, etc.
  - Most frequent routes of exposure are ingestion, buccal absorption
- Patients experience sensations/images that are perceived as real
- Synesthesia may occur
- Dissociative effects occur with PCP









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## Psilocybe cubensis Spore Syringes

Psilocybe genera spores, provided hydrated in aqueous solution. **Spores are supplied in 10cc B-D syringes with removable sterile tip cap attached and a sterility packaged 1.5 inch 16 gauge needle.** Each Microscopy Kit will include one glass microscope slide, cover slip, cardboard protective case, and instructions on how to properly view your spores under a microscope. Every request containing spores for microscopy will receive one microscopy slide kit per order. Quantity and wholesale discounts available, click on each item for more information and detailed pricing.

**California, Idaho, and Georgia residents:** Orders requesting Psilocybe Genera Spores shipped to California, Idaho, and Georgia will be refused, voided, or refunded. Possession of these mushroom spores may be illegal in CA, ID, and GA without the proper permissions.

### Products

Sort by: [Product](#) [Price](#) [Default](#)

Result pages: 1 2 [>](#)

#### [Psilocybe cubensis : 4 Pack Customer's Choice Grab Bag Special](#)



Our price: **\$55.55**

#### [Psilocybe cubensis : Albino A+ Spore Syringe Microscopy Kit](#)



Our price: **\$18.50**

Quantity

### CATEGORIES

[Spores for Microscopy](#)  
[Microscopy Supplies](#)  
[Specialty Mushroom Cultures](#)  
[Sales and Specials](#)

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# polkadotofficialstore.com

Infuse hallucinogenic mushrooms into:

- Gummies,
- Chocolate bars,
- Potions/shots



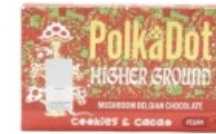
Polkadot Classic Belgian  
Milk Chocolate Bar  
**\$25.00**

ADD TO CART



Polkadot Cookie Crisp  
Chocolate  
**\$30.00**

ADD TO CART



Polkadot Cookies &  
Cacao Chocolate  
~~\$30.00~~ **\$25.00**

ADD TO CART



Polkadot Cookies and  
Cream Chocolate  
**\$25.00**

ADD TO CART



Polkadot Dark Chocolate  
Bar  
**\$25.00**

ADD TO CART



Polkadot Dark Matcha  
Chocolate  
**\$30.00**

ADD TO CART



Polkadot Ferrero Rocher  
Chocolate Bar  
**\$25.00**

ADD TO CART



Polkadot Frosted Flakes  
Chocolate Bar  
**\$25.00**

ADD TO CART



# OkMushFest

2<sup>nd</sup> annual  
festival will be in  
October 2024

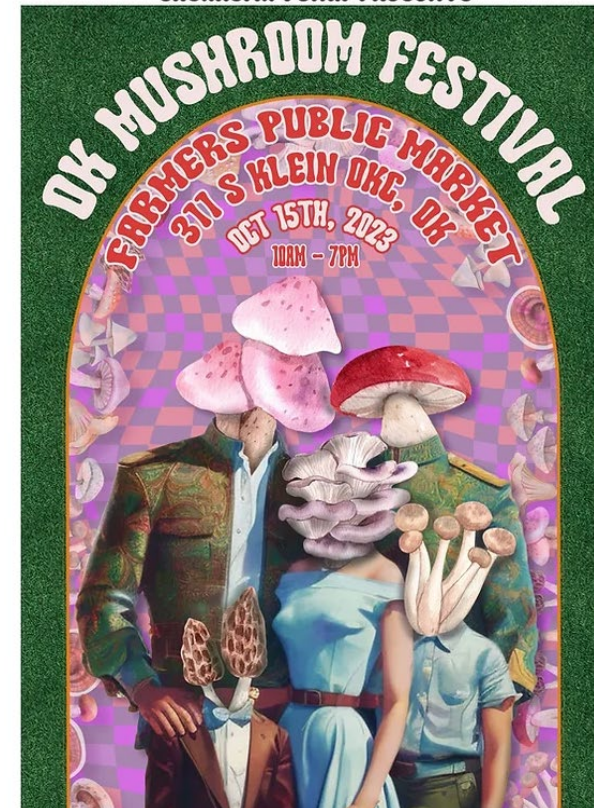
**OK MUSHROOM FESTIVAL**  
**FARMERS PUBLIC MARKET**  
**371 S KLEIN OKE, OK**  
**OCT 15TH, 2023**  
**10AM - 7PM**

**EDUCATION CLASSES:**

- 10:30-11:30AM MUSHROOM FORAGING 101**  
BY JACOB DEVECCIO FROM OKLAHOMA FUNGI
- 11:30-12:30PM WHY OKLAHOMA NEEDS MORE MYCOLOGISTS** BY DR. RACHEL JONES FROM USDA
- 12:30-1:30PM OKLAHOMA'S NATIVE MOREL MUSHROOMS** BY PROF. STEVE MAREK FROM OSU
- 1:30-2:30PM OKLAHOMA'S POISONOUS MUSHROOMS**  
BY DR. CLARK OUREBO FROM UCO
- 2:30-3:30PM MEDICINAL MUSHROOMS FOR VETERANS**  
BY JAMES FROM @MYCTYSONMUSHROOMS
- 3:30-4:30PM INTEGRATIVE THERAPY AND HARM REDUCTION** BY ASHLEY HURLEY M.S., LPC
- 4:30-5:30PM THE IMPORTANCE OF MUSHROOM TESTING** BY CHRIS PAULI FROM TRYPTOMICS
- 5:30-6:30PM HB2107 - OKLAHOMA'S PSILOCYBIN RESEARCH PROGRAM** BY BENJAMIN J. BARENBERG MD, MS, FPMRS FROM INTEGRIS AND CHRIS MOE FROM OCLA



OKLAHOMA FUNGI PRESENTS





# Stimulants & Hallucinogens

## Current 5 Most Commonly Detected Novel Stimulants and Hallucinogens:

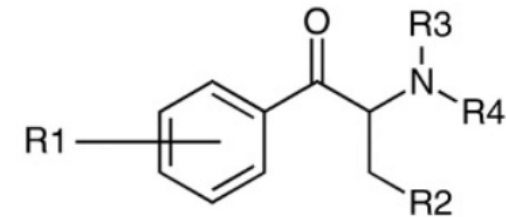
(according to April 2024 Quarterly Report from The Center for Forensic Science Research and Education (CFSRE)):

1. N,N-dimethylpentylone
2. Pentylone
3. 2F-2oxo-PCE
4. Methylnmethcathinone
5. Chloromethcathinone

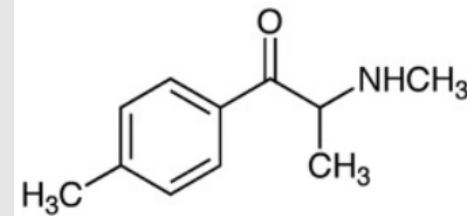
# Synthetic Cathinones

- Methylone (2009)
- Butylone (2013)
- n-ethylpentylone (2014)
- Eutylone (2014, surge in 2017-2021)
- N,N-dimethylpentylone (late 2021, surge in 2022)
  - WHO put on the list for international scheduling in March 2024
- All -ylone's (cross hybrid of MDMA) -- different from hexedrones (-drone's) which don't have the methylenedioxy group

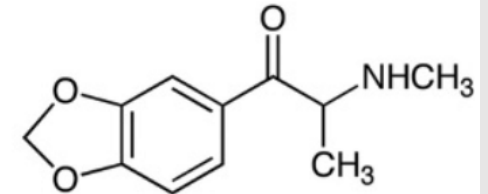
Cathinone



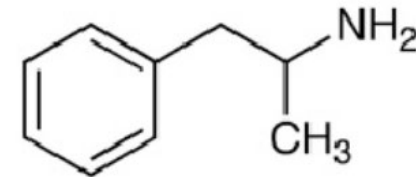
Mephedrone



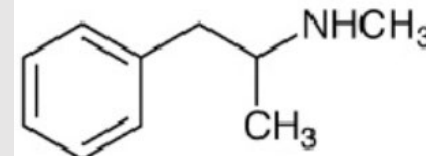
Methylone



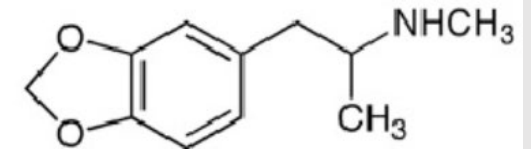
Amphetamine



Methamphetamine



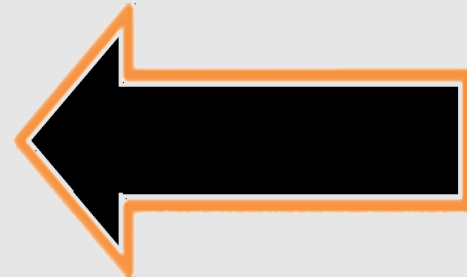
MDMA



# Synthetic Cathinones

AKA "Bath Salts"

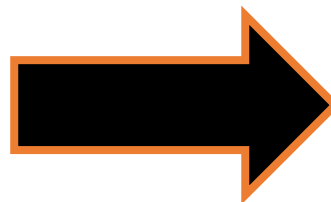
- Drugs designed for a specific pharmacologic effect similar to meth or MDMA.
  - The predominant effects seen to date have been severe agitation, paranoia, hallucinations, and violent behavior.



**Not these  
Bath Salts**

- Also see:
  - Elevated temperature/fever
  - Rapid heart rate,
  - High blood pressure
  - Seizures
  - Possible muscle breakdown leading to kidney failure
- Extraordinary compulsion to repeat use of the drug

## These Bath Salts



### Dangerous Bath Salts Drugs Linked To Nearly 23,000 Hospital ER Visits In 2011

Posted: 09/19/2013 12:03 pm EDT



**FOLLOW:** Bath Salts Emergency Department, Bath Salts Hospital, Bath Salts Hospital Er, Bath Salts Hospital Er Visits, Healthy Living News

Dangerous "bath salts" drugs were linked to tens of thousands of visits to hospital emergency departments in 2011, according to a new government report.

### Brandon DeLeon, High On Cloud 9 Bath Salts And Four Loko, Tries To Bite Police: Report (VIDEO)

The Huffington Post · By Andrew McCompton ·  
First Published: 11:30 am

#### Police: Home intruders were bath salts hallucination

By Jeff Bode

Published February 27th, 2013 8:44 pm

CHURCH HILL — Police said a Hawkins County man who called 911 Friday morning complaining of intruders in his home committing thefts was actually alone and hallucinating on bath salts.

About 9 a.m. Friday, Hawkins County Sheriff's Office Deputy Josh Byrd responded to the home of Ronald Wayne Sellers, 37, 300 Tipton Road near Church Hill after Sellers called 911 and stated someone had been inside his residence removing items.

After Byrd and other deputies arrived at the residence, they were told by Sellers that the intruders were in the woods behind his house.

Byrd added, "I asked Mr. Sellers if the subjects were still standing in the location, and he stated, 'They are still standing there. Don't you see them?' Officers could not see the subjects."



Ronald Wayne Sellers



#### Cross-Dressing Man High on Bath Salts Kills Neighbor's Goat

**By Brian Moylan** — Police in Charleston, West Virginia, found Mark Thompson wandering around the woods in a bra and panties and covered in the blood of his neighbor's pygmy goat, which he had killed in his bedroom. He had been high on "bath salts" for three days.

- As with the synthetic cannabinoids, these products are represented to be a legal product.
- Most common is “bath salts,” though more recently they’ve been marketed as insect repellents, plant food, toilet bowl deodorizer, and iPhone scratch remover.

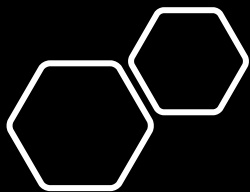




# Treatment



- For the patient experiencing hallucinations, minimize external stimuli (e.g. place in darkened room, no loud noises).
- Liberal use of benzos are the mainstay of therapy
- Be aware that effects of some of these compounds have been reported to last up to 48 hours



# Synthetic Cannabinoids

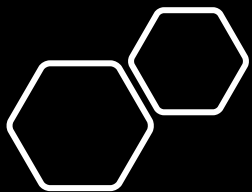
Emerged on the recreational market in 2010



Brand names were big – remember, the people selling these products are in it to make money

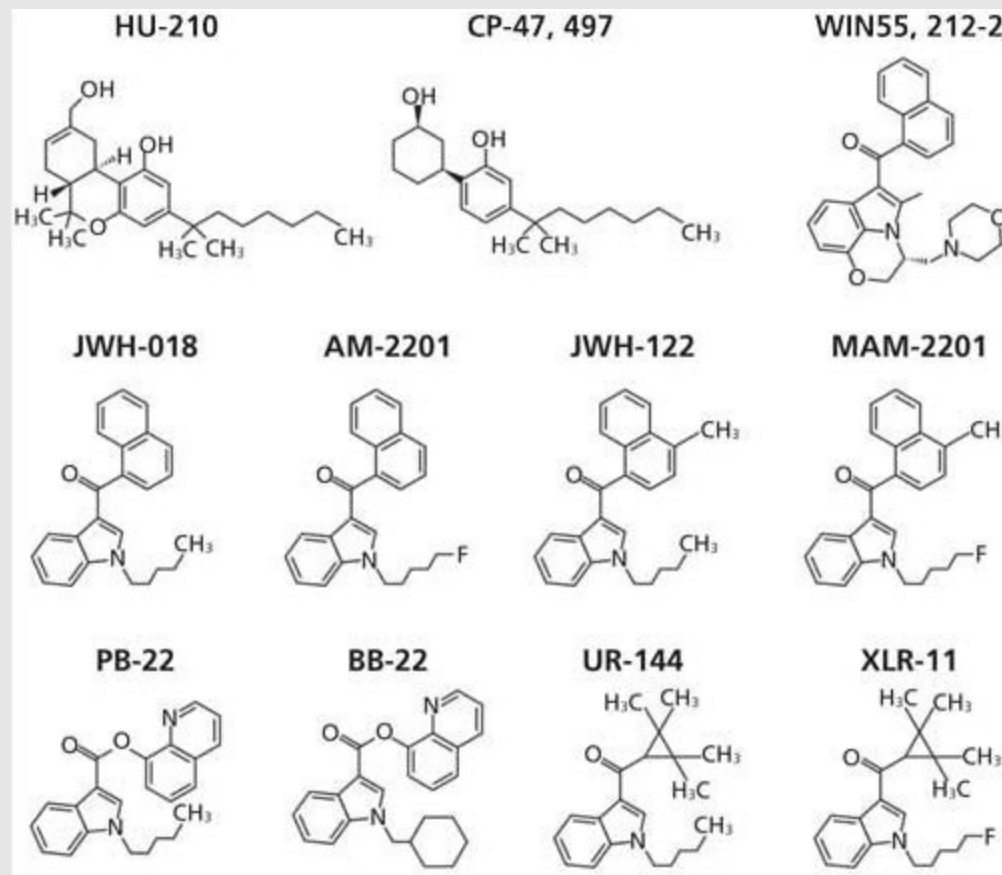


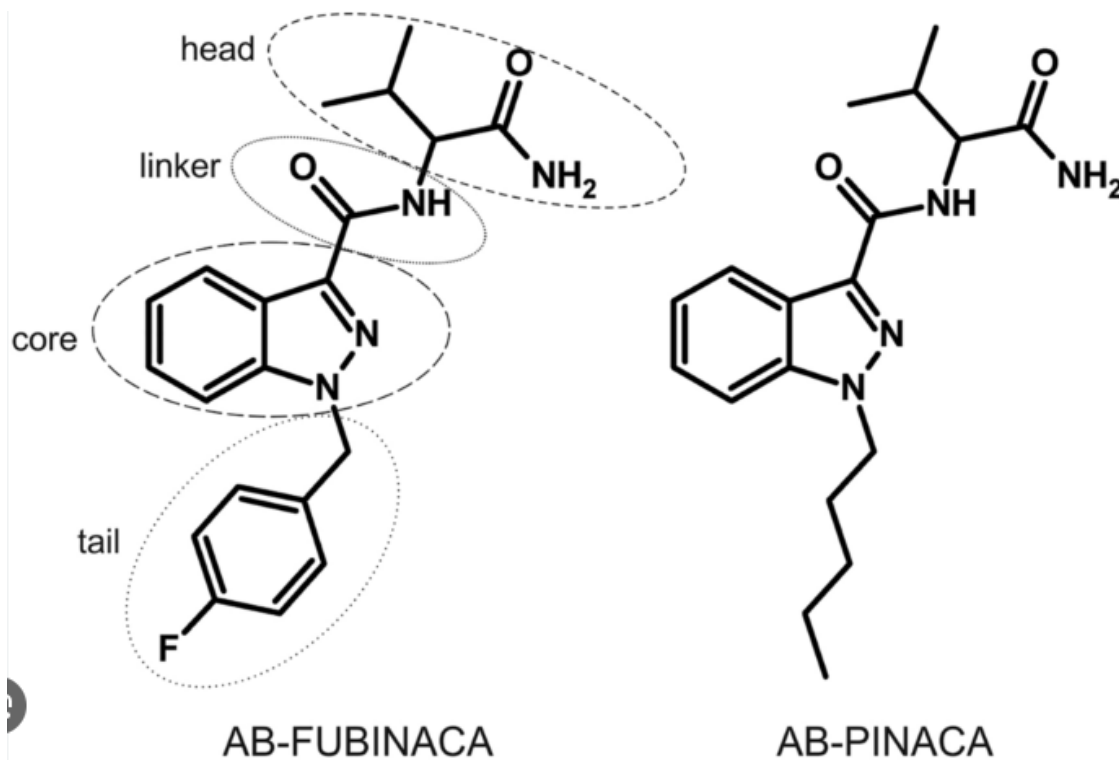




# Synthetic Cannabinoids: Challenging to Study

- From chemistry perspective
  - Unlike benzos, opioids, stimulants, and hallucinogens, they are difficult to detect in labs when mixed with other drugs
  - Need own detection methods
- Many labs unwilling to study because of difficulty





## Synthetic Cannabinoids Making a Resurgence

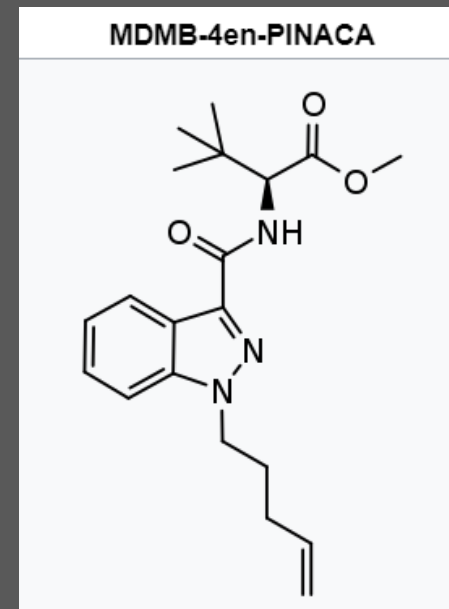
- July 2021- China announced plan to ban synthetic cannabinoids based on structural class
  - Similar to what US did with fentanyl analogues
  - Labs in China ceased in production of synthetic cannabinoids
- 2022 - into 2023: emergence of inactive drugs & unusual structures – with weird names
- End of 2023 – into 2024: market responded to ban – China ban did not include the precursor to synthetic cannabinoids so labs producing precursors (synthetic cannabinoids without the tail) then ship them somewhere + add on the tail

# Synthetic Cannabinoids

## Current 5 Most Commonly Detected Novel Synthetic Cannabinoids:

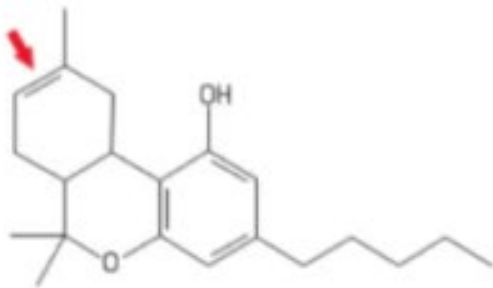
(according to April 2024 Quarterly Report from The Center for Forensic Science Research and Education (CFSRE)):

1. MDMB-4en-PINACA
2. 5F-MDMB-PINACA (5F-ADB)
3. MDMB-INACA
4. ADB-4en-PINACA
5. 4CN-CUMYL BINACA

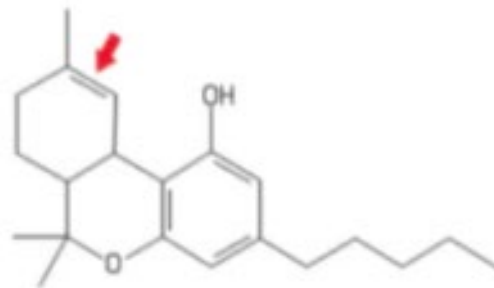




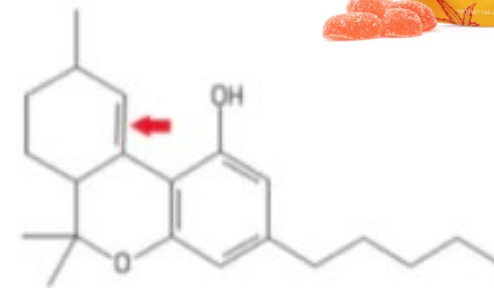
Head shops still exist but now selling semi-synthetic cannabinoids (derived from CBD):  
delta-8, delta-10, HHC, THC-P



delta-8-THC



delta-9-THC



delta-10-THC



# Galaxytreats.com

Home / Cosmic Krispies / Cosmic Krispies (100MG Delta 8 THC)



## COSMIC KRISPIES (100MG DELTA 8 THC)

**\$11.99** – OR SUBSCRIBE AND SAVE 15%

★★★★★ (87 customer reviews)

Get ready to launch with our 100mg Delta 8 THC Fruit Cereal Cosmic Krispies. Give it a try and explore the galaxy of uplifting and motivating feeling that Delta 8 THC has to offer!

Purchase one time or **subscribe & save 15% off**

- ☒ Purchase one time  
☐ Subscribe and save 15%

-

1

+

ADD TO CART



★★★★★

**BERRY MELON  
LIFTER 2500MG  
D8 D9 THCP  
GUMMIES (20-CT)**

**\$34.99**

SHOP NOW



★★★★★

**BLUE PUNCH  
2500MG D8 D9  
THCP GUMMIES  
(20-CT)**

**\$34.99**

SHOP NOW



★★★★★

**TROPICAL KUSH  
2500MG D8 D9  
THCP GUMMIES  
(20-CT)**

**\$34.99**

SHOP NOW



★★★★★

**STARBERRY  
2500MG D8  
GUMMIES (20-CT)**

**\$24.99**

SHOP NOW

## DELTA 8

SHOP NOW

## DELTA 9

SHOP NOW

## AMANITA GUMMIES

SHOP NOW



Vape  
Cartridge

HYPER  
DELTA 10

900MG DELTA-10  
DELTA-8  
BLEND  
APPROX. PER CARTRIDGE

SATIVA  
EFFECT

BLUE  
DREAM

1 ML

UP TO  
0.3%  
THC

INGREDIENTS:  
HEMP EXTRACT  
AND NATURAL TERPENES.

HERBAL

PINE

# Utility of UDS



- Though these drugs act on the cannabinoid receptors they are not structurally similar to THC.
- Therefore, they do not show up on a typical urine drug screen.
- In order to be detected, more specific (and expensive) tests such as GC-MS LC-MS/MS must be employed.



# Effects & Treatment

- Mild to moderate toxicity: similar to THC
  - Alterations in mood/perception, red eyes, increase in heart rate
  - Potential for hyperemesis with excessive use
  - Other effects: increased blood pressure, agitation, tremors, paranoia, and hallucinations
- Severe toxicity:
  - Severe agitation, hyperthermia, recurrent seizures, psychosis
  - Possible muscle breakdown
- Treatment:
  - Symptomatic and supportive
  - Most do not require specific treatment but some have been intubated for days

# Contaminants?

Chicago Tribune

APRIL 6, 2018, 4:05 PM

Rat poison likely to blame for deadly side effects of synthetic pot in Illinois



Photo Illustration of K2.  
(Christopher Smith / Chicago Tribune)

# Contaminants?

## Tainted synthetic marijuana linked to severe bleeding cases in Florida

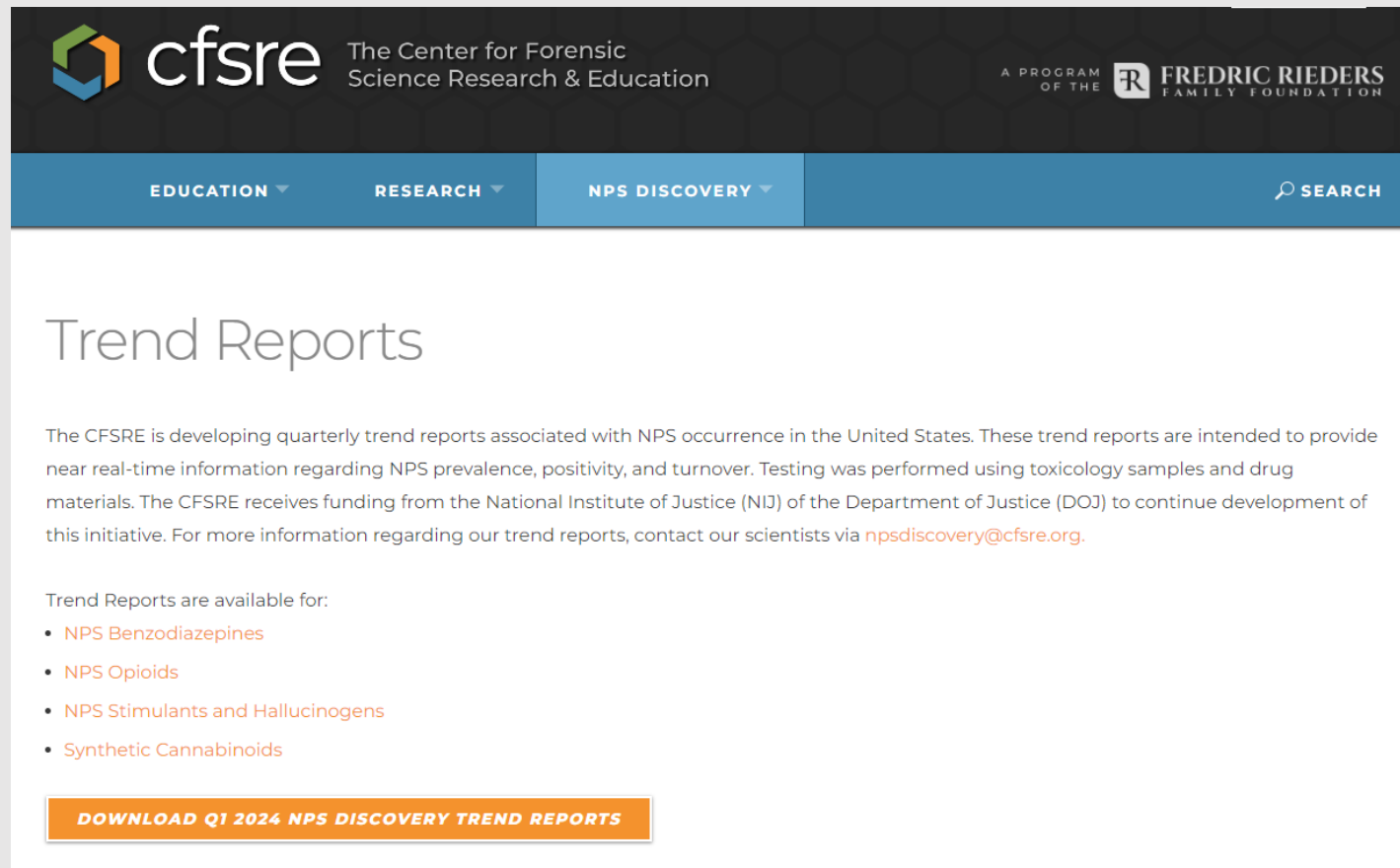
By Nicoletta Lanese published 2 days ago

Florida's Poison Control Centers urge people to go to the emergency room if they experience bleeding after using synthetic marijuana, or "spice."



# The Center for Forensic Science Research & Education

- <https://www.cfsre.org/nps-discovery/trend-reports>



The screenshot shows the website for The Center for Forensic Science Research & Education (CFSRE). The header includes the CFSRE logo and name, and identifies it as a program of the Fredric Rieders Family Foundation. A navigation bar contains links for Education, Research, and NPS Discovery, along with a search function. The main content area is titled 'Trend Reports' and provides information about quarterly trend reports on NPS occurrence in the United States. It lists the substances covered: NPS Benzodiazepines, NPS Opioids, NPS Stimulants and Hallucinogens, and Synthetic Cannabinoids. A prominent orange button at the bottom encourages downloading the Q1 2024 NPS Discovery Trend Reports.

**cfsre** The Center for Forensic Science Research & Education

A PROGRAM OF THE **FREDRIC RIEDERS** FAMILY FOUNDATION

EDUCATION ▼ RESEARCH ▼ **NPS DISCOVERY ▼** 🔍 SEARCH

## Trend Reports

The CFSRE is developing quarterly trend reports associated with NPS occurrence in the United States. These trend reports are intended to provide near real-time information regarding NPS prevalence, positivity, and turnover. Testing was performed using toxicology samples and drug materials. The CFSRE receives funding from the National Institute of Justice (NIJ) of the Department of Justice (DOJ) to continue development of this initiative. For more information regarding our trend reports, contact our scientists via [npsdiscovery@cfsre.org](mailto:npsdiscovery@cfsre.org).

Trend Reports are available for:

- NPS Benzodiazepines
- NPS Opioids
- NPS Stimulants and Hallucinogens
- Synthetic Cannabinoids

**DOWNLOAD Q1 2024 NPS DISCOVERY TREND REPORTS**

# Kratom

- Derived from the plant *Mitragyna speciosa*, which is native to southeast Asia
- Typically, the leaves of the plant are ingested (often in capsule form), but leaves can also be chewed; occasionally smoked
- Unregulated at the federal or state (Oklahoma) level
- In low doses, has stimulant and antidepressant effects
- In higher doses, opioid effects begin to be observed
- Frequently sold in "smoke shops" and convenience stores



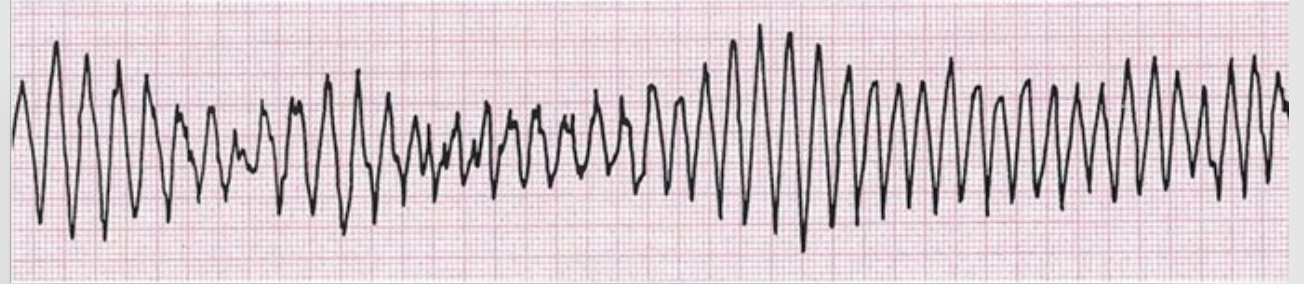


# Tianeptine (“Gas Station Heroin”)

- Not approved for use in the US but is marketed in Europe, Asia, and Latin America as a prescription antidepressant
  - Structurally similar to TCAs and at higher doses – reported to be a mu-receptor opioid agonist
- Relatively easy to obtain at convenience stores, gas stations, and on the internet
- Potential for physical dependence and withdrawal with chronic use/cessation of use

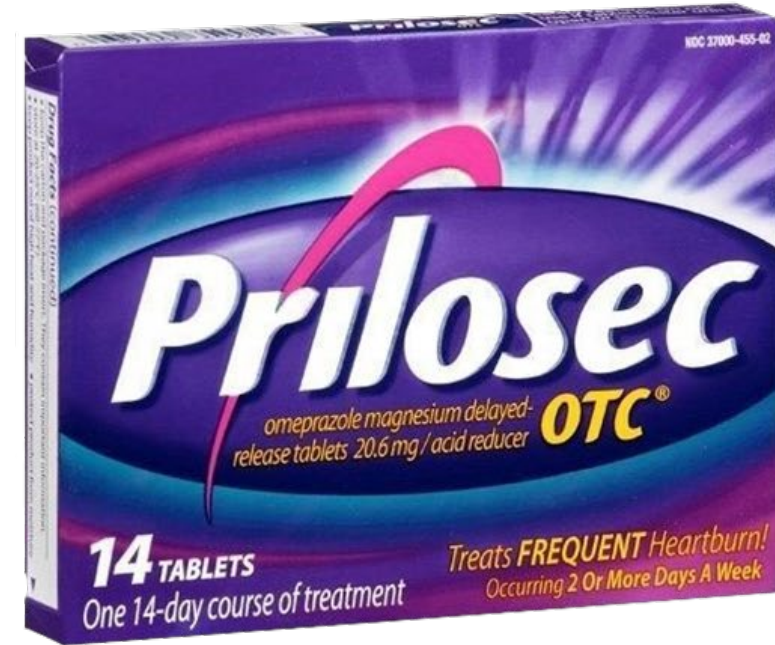






# Loperamide

- Sold OTC for treatment of diarrhea
- In addition to opioid effects, can cause cardiac conduction disturbances (QRS/QTc widening), torsades de pointes



Often taken with a p-glycoprotein inhibitor (omeprazole, lansoprazole) to increase CNS penetration



Shop by category ▾

loperamide

Digestion & Nau... ▾

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### Category

All

< Health & Beauty

< Health Care

< Over-the-Counter Medications & Treatments

Digestion & Nausea

Other OTC Meds & Treatments

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### Brand

- ☐ CVS (1)
- ☐ EQUATE (10)
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### Country/Region of Manufacture

- ☐ France (5)
- ☐ Italy (1)
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175 results for **loperamide** [Save this search](#)

Shipping to: 73162 ▾

### Price

Under \$16.00

\$16.00 to \$20.00

Over \$20.00



Loperamide Anti-Diarrheal 2mg HCL 240 Caplets by WELL & WORTH Made In USA  
Brand New

**\$20.49**

Buy It Now

Free 4 day shipping

Sponsored



200 Anti-Diarrheal pills, Loperamid 2MG each, NO BLISTER PACKS 200/96 CAPLETS  
Brand New

★★★★★ 725 product ratings

**\$14.99 to \$23.99**

Buy It Now

Free shipping

Free returns

90+ sold

Sponsored



Loperamide Anti-Diarrheal 2mg HCL 240 Caplets by WELL & WORTH Made In USA  
Brand New

**\$20.49**

Buy It Now

Free 4 day shipping

1.9% APR  
Financing\*



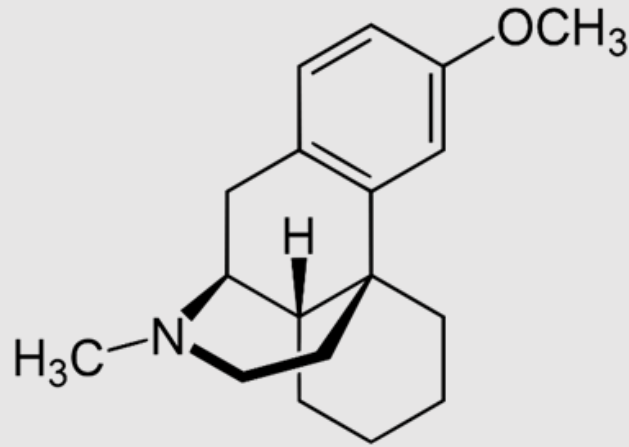
The 2022 Subaru Ascent.™

[Find a Retailer ▶](#)

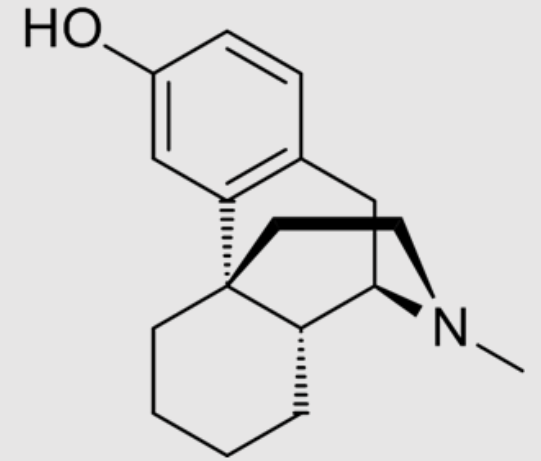
Disclaimer



# Dextromethorphan



dextromethorphan



levorphanol

- A dextrorotary analog of levorphanol, a powerful narcotic
- Causes dissociative effects, opioid-like effects at high doses



# Delsym

# COUGH

**12  
HOUR  
COUGH RELIEF**

89 mL (3 fl oz)

Day or Night  
Alcohol-free



*\*Compare to the active ingredient in Robitussin® CoughGels®*

### Non-Drowsy Formula

# ROBAFEN® COUGH LIQUIDGELS

**Dextromethorphan HBr, USP 15 mg**  
*Cough Suppressant*

## 8-Hour Cough Relief



**Easy-to-Swallow  
Liquid-Filled  
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**20**  
**Liquidgels**  
(Liquid-Filled  
Capsules)

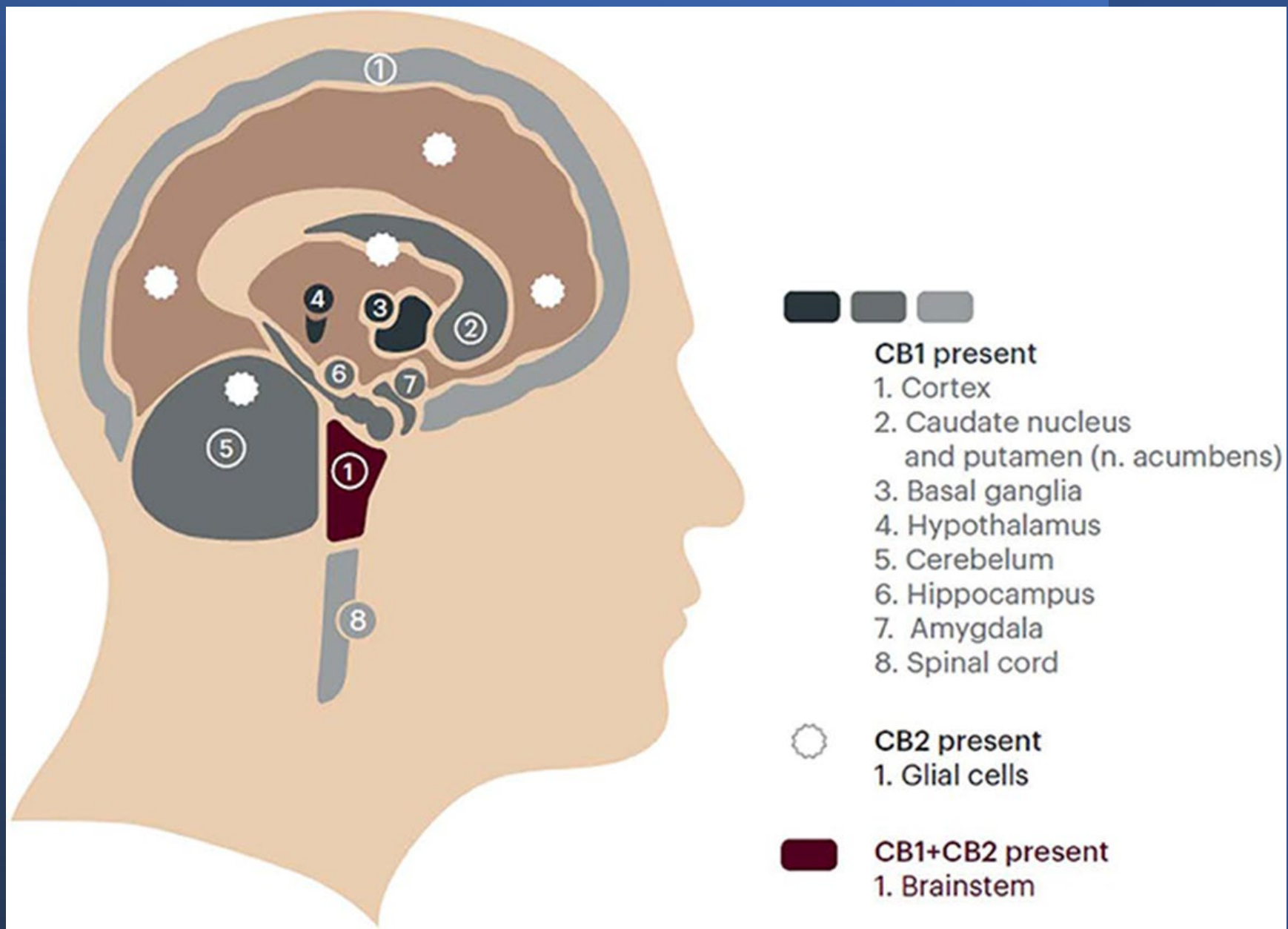
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www.rugbylaboratories.com  
P-17  
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Re-Order No. 3204nj



# Marijuana



- The human body produces *endocannabinoids*, i.e., endogenous compounds (anandamide, 2-arachidonoylglycerol) that act at CB1 and CB2 receptors
- Cannabinoids derived from plants are called *phytocannabinoids*: THC, cannabidiol, and cannabinol



### ***Brain***

- Learning, memory, cognition
- Motor control
- Anxiety and depression
- Appetite and food intake
- Reward and addiction
- Neuroprotection
- Neural development
- Sleep

### ***Liver***

- Ascites formation
- Lipogenesis
- Fibrosis
- Insulin resistance

### ***Reproductive system***

- Fertility regulation
- Embryo implantation
- Embryonic development

### ***Cardiovascular system***

- Negative inotropy
- Vasodilation
- Cardiac function

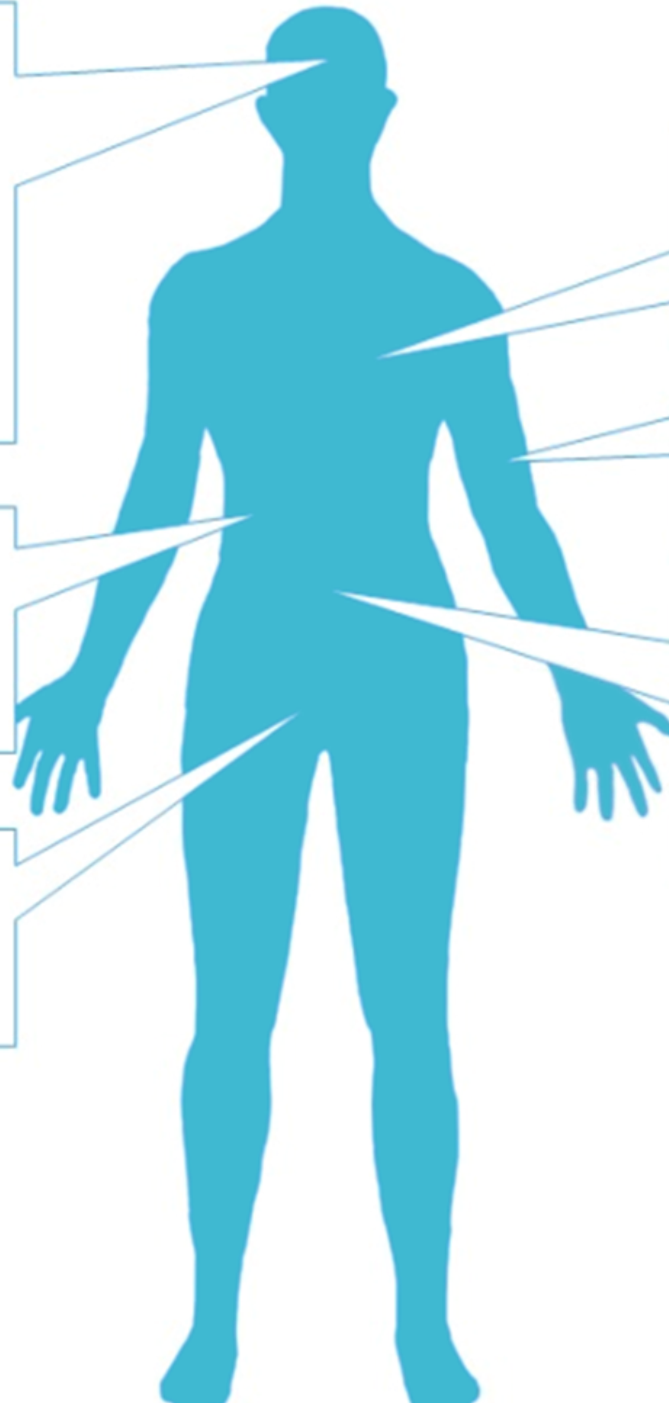
### ***Skeletal muscles***

- Energy metabolism
- Muscle fiber formation

### ***GI tract***

- GI motility
- Enteroendocrine function
- Intestinal barrier function
- Energy balance

- Nociception
- Immune modulation
- Nausea and emesis
- Intraocular pressure
- Bone remodeling
- Bronchodilation
- Cancer
- ...



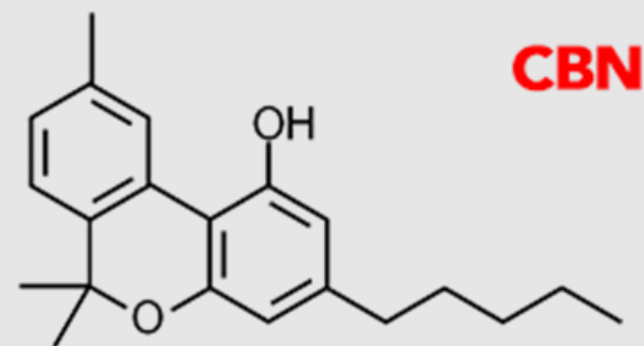
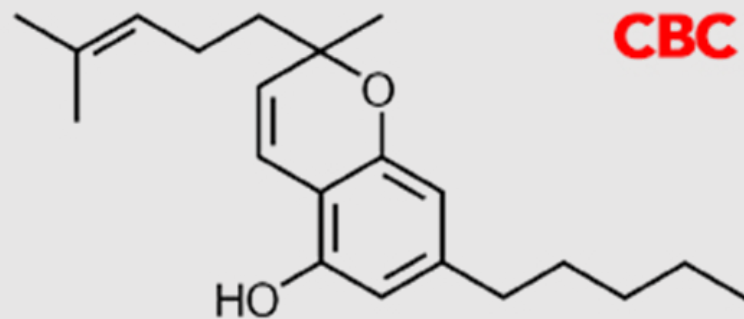
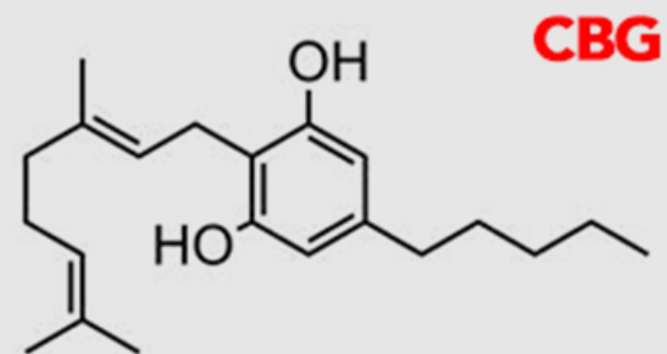
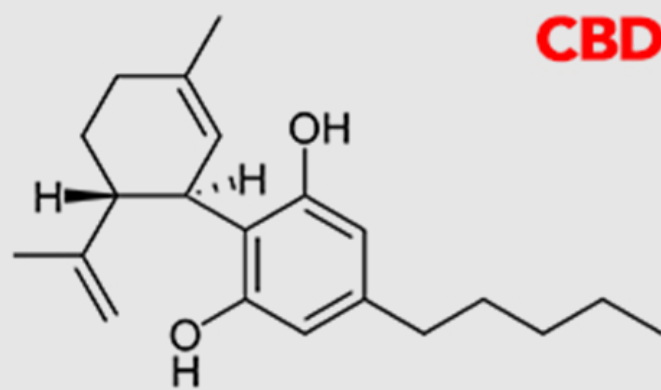
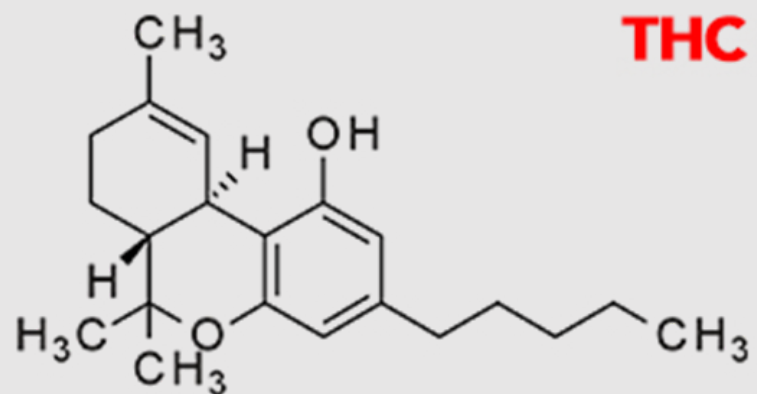


Effects vary by species / strain

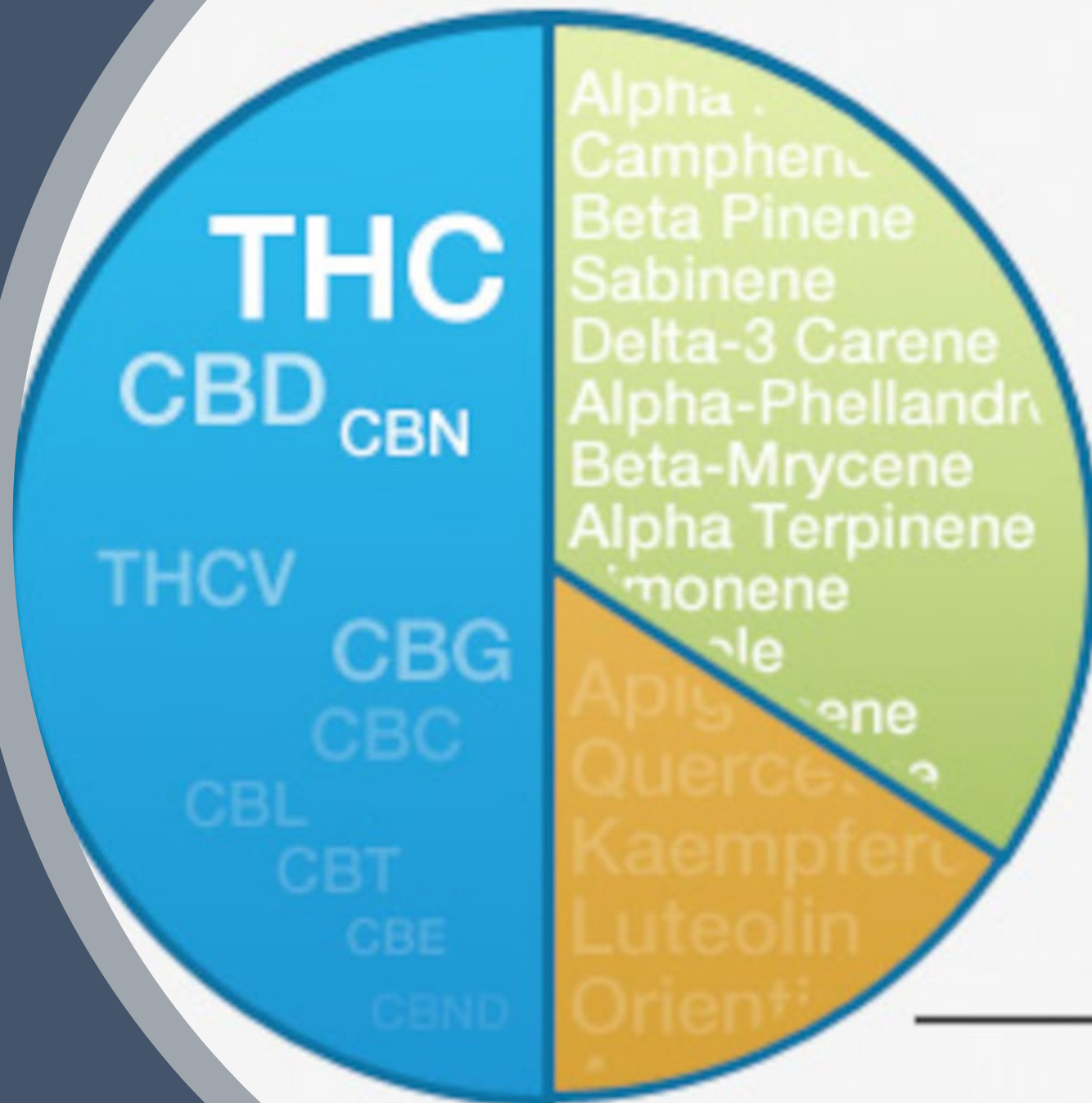
*Sativa*: More euphoria, stress relief

*Indica*: Relaxation, physical  
(especially pain) relief

*Sativa* and *Indica* are often combined







CANNABINOIDS

TERPENOIDS

FLAVANOIDS



**Genesis Testing Labs**  
 1620 South Main St, Unit A  
 Grove, OK 74344  
 (918)791-3460  
 OMMA # LAAA-EKZ6-UNEB

## Certificate of Analysis

<b>Client Name</b>	Full Tilt Cannabis	<b>License Number</b>	PAAA-CLAZ-QRID
<b>Address</b>	4017 27th Ave. NE Miami, OK 74354	<b>Phone</b>	253-331-0941
<b>Sample ID</b>	SA-071521-10329	<b>Sample Type</b>	Concentrate
<b>Strain</b>	Platinum OG 3141	<b>Sample Batch #</b>	POG-062421
		<b>Date Received</b>	07/15/2021

Summary of Results			
Potency Profile		Terpene Profile	
Cannabinoid	Result mg/g	Terpene	Result %
CBDV	-	Camphene	0.0137931
CBD	-	Myrcene	0.136398
CBDA	1.91571	β-pinene	0.0477011
CBN	-	3-Carene	-
CBD	-	Δ <sup>9</sup> -limonene	-
CRGA	6.22605	Cymene	-
CBG	0.91954	β-Ocimene	-
THCV	-	Eucalyptol	-
Δ <sup>9</sup> -THC	34.8276	γ-Terpinene	-
Δ <sup>8</sup> -THC	-	α-Terpinene	-
THCA	996.964	Terpinolene	0.0145594
CBC	1.9636	Linalool	0.0559387
<b>Total THC %</b>	90.9165%	Isopulegol	0.0810345
<b>Total THC mg/g</b>	909.165	Geraniol	-
<b>Microbiological Profile</b>		β-Caryophyllene	1.14215
<b>All Results</b>	Pass	Humulene	0.356897
<b>Mycotoxin Screening</b>		Nerolidol	-
<b>All Results</b>	Pass	Guaiol	-
<b>Residual Solvents</b>		Caryophyllene oxide	-
<b>All Results</b>	Pass	α-Bisabolol	0.0204981
<b>Heavy Metals Screening</b>		<b>Total Terpene %</b>	1.86897
<b>All Results</b>	Pass		
<b>Pesticide Screening</b>			
<b>All Results</b>	Pass		
<b>Water Activity</b>			
<b>All Results</b>	NT		



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### OMMA Patient Advisory:

Our QA lab has confirmed the presence of THC-O-acetate (a manufactured THC compound) in a concentrate by the name of Platinum OG (BA#-POG-062421). This manufactured THC compound has been shown to be harmful when added to other THC-containing products.



#### PATIENT ADVISORY

Our QA lab, Metis, has confirmed the presence of THC-O-acetate in a concentrate by the name of Platinum OG (BA#-POG-062421).

THC-O-acetate is NOT a medical marijuana product and has been shown to be very harmful when added to other THC-containing products, causing side effects such as seizures, difficulty speaking, and vomiting.

If you've had negative health outcomes after using a medical marijuana product purchased from a licensed dispensary, please immediately contact a medical provider or the Oklahoma Center for Poison and Drug Control (800-222-1222).

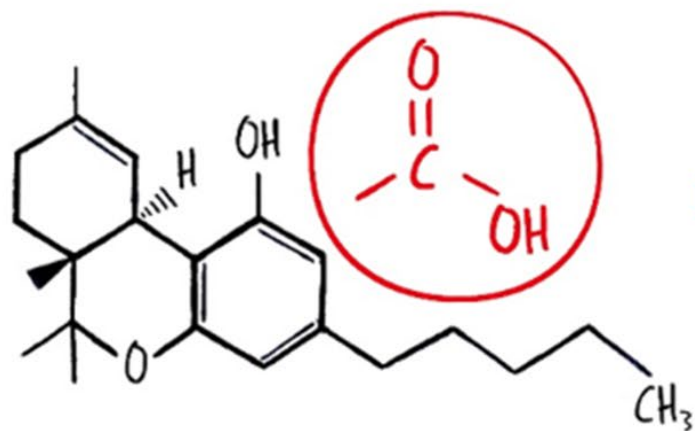


OKLAHOMA  
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Oct. 15, 2021

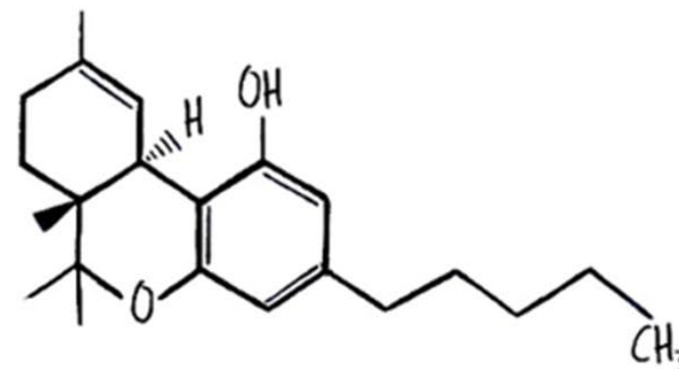
# THCA

Can't bind to CB receptors



# THC

Bioavailable and ready to bind with CB receptors









# Other Resources

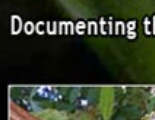
- [erowid.org](http://erowid.org)
  - A rich source of information, including “trip reports,” pharmacology information, legal status, etc.
  - Information is usually reliable
- [bluelight.ru](http://bluelight.ru)
- [drugs-forum.com](http://drugs-forum.com)
- [tripsit.me](http://tripsit.me)



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**CENTER**  
**1-800-222-1222**

## Drugs of Abuse

Eszter Moore, Pharm.D., CSPI

Oklahoma Poison Center