Thug Drugs

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Faculty

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- WV PDMP Advisory Panel Member
- CDC Grant Reviewer

Disclosures

- Consultant/Independent Contractor: Daiichi Sankyo, Clinical Pharmacists Advisory Panel, Member

This presentation was not a part of the presenter’s official duties at the WVU and does not represent the opinion of WVU.
Learning Objectives

- Recognize commonly abused substances across the globe.
- Classify commonly abused substances based on each substance’s mechanism(s) of action.
- Explain how to provide guidance to the lay public on the anticipated effects of commonly abused substances.

What are *illicit* substances?

1. Schedule I Controlled Substances
   - Illegal to make, sell, or use
   - No accepted medical use, dangerous, & potential severe dependence

2. Any Schedule Controlled Substance utilized for unintended people/uses

Laws are not uniform among states/countries

- Heroin is LEGAL in the UK, Portugal, Canada, etc.
- Marijuana is "LEGAL" in certain US states, yet illegal on the Federal level
Illicit Substances Overview

<table>
<thead>
<tr>
<th>Hallucinogens</th>
<th>Stimulants</th>
<th>Opioid-Related Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NBOME</td>
<td>• Cocaine</td>
<td>• Heroin</td>
</tr>
<tr>
<td>• LSD</td>
<td>• Methylamphetamine</td>
<td>• Laced Heroin</td>
</tr>
<tr>
<td>• Ketamine</td>
<td>• KhAT</td>
<td>• Krokodil</td>
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<tr>
<td>• MXE</td>
<td>• Bath Salts &amp; Gravel</td>
<td>• Kratom</td>
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<tr>
<td>• PCP</td>
<td></td>
<td>• Salvia</td>
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<tr>
<td>• Psychedelic Mushrooms</td>
<td>• Cannabis Products</td>
<td>• Dextromethorphan</td>
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<tr>
<td>• Peyote Cacti</td>
<td>• Marijuana Plant</td>
<td>• Looperamide</td>
</tr>
<tr>
<td>• Ecstasy</td>
<td>• Synthetic Marijuana</td>
<td></td>
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<tr>
<td></td>
<td>• Marijuana Extracts</td>
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</tbody>
</table>

Increased Neurotransmitter Effects

<table>
<thead>
<tr>
<th>Serotonin (5HT)</th>
<th>Dopamine (DA)</th>
<th>Norepinephrine (NE)</th>
<th>Opioid</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;High or Happy&quot;</td>
<td>&quot;Euphoria&quot;</td>
<td>&quot;Fight or Flight&quot;</td>
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<tr>
<td>Stimulants</td>
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</table>

Structures

9/20/18
Hallucinogens

- NBOMe: 5-HT-2A Receptor Agonist
- LSD: Affects D/5HT/NE Receptor
- Ketamine: NMDA Antagonist, D/mu/K Agonist, S/N/D -RI, Na/Ca Channel Blockers, NO Synthase Inhibitor
- MXE: NMDA Antagonist & SSRI (5HT)

Hallucinogens

- PCP: NMDA Antagonist, Anti-Cholinergic, & Dopamine
- Psychedelic Mushrooms: 5-HT-1A and 5-HT-2A and 5-HT-7A Agonist
- Peyote Cacti: 5HT-2A Receptors & Dopamine
- Ecstasy (MDMA): 5HT/2A/NE
Cocaine

**Nicknames**
- Coke, Speed, Snow, Blow, or Cocoa Puffs

**Mechanism**
- 5HT/NE/D & Na-Channel Blocker

**Market**
- Snorted Powder
  - "Lines" include: "Bumps" (35mg) or "Rails" (100mg)
  - Cocaine HCL + Baking Soda
  - Crack Dime Bags: $10 for 1/10th Gram (Smoked)

Stimulants

**Mechanism**
- NE & Dopamine

**Khat**
- NE & Dopamine

**Bath Salts & Gravel**
- Synthetic Cathinones
  - NE & Dopamine
Cannabinoids
Adverse Effects & Interactions

<table>
<thead>
<tr>
<th>Adverse Effect</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disorientation</td>
<td>5</td>
</tr>
<tr>
<td>Dizziness</td>
<td>5</td>
</tr>
<tr>
<td>Dry Mouth</td>
<td>4</td>
</tr>
<tr>
<td>Euphoria</td>
<td>4</td>
</tr>
<tr>
<td>Depression</td>
<td>4</td>
</tr>
<tr>
<td>Confusion</td>
<td>4</td>
</tr>
<tr>
<td>Balance issues</td>
<td>3</td>
</tr>
<tr>
<td>Hallucinations, Nausea, Vomiting, Diarrhea, Fatigue</td>
<td>2</td>
</tr>
</tbody>
</table>

Cannabinoid | CYP-2C8 | CYP-2C19 | CYP-3A4
---|---|---|---
Δ9-THC | X | X |
Δ8-THC | X | X |
CBD | X | X |
CBN | X | X |

“Medical” Marijuana States Timeline

<table>
<thead>
<tr>
<th>State</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>1996</td>
</tr>
<tr>
<td>Alaska</td>
<td>1998</td>
</tr>
<tr>
<td>Oregon</td>
<td>1998</td>
</tr>
<tr>
<td>Washington</td>
<td>1998</td>
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<tr>
<td>Maine</td>
<td>1999</td>
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<tr>
<td>Colorado</td>
<td>2000</td>
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<tr>
<td>Hawaii</td>
<td>2000</td>
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<tr>
<td>Nevada</td>
<td>2000</td>
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<td>Montana</td>
<td>2004</td>
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<td>Vermont</td>
<td>2004</td>
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<td>Rhode Island</td>
<td>2006</td>
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<td>New Mexico</td>
<td>2007</td>
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<td>Michigan</td>
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<td>Arizona</td>
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<td>North Dakota</td>
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<tr>
<td>Ohio</td>
<td>2016</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2016</td>
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<tr>
<td>West Virginia</td>
<td>2017</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>2018</td>
</tr>
</tbody>
</table>

Opiates/Opioids
Opioid Abuse Transition

75% of Heroin Users Started with Legal Prescription Opioids

Hydrocodone Combo Tablets $5-10/Tab

Codeine Combo IR Products $10-15/Tab

Dependent Sole ER Products $15/Tab

Heroin ($100/Bag)

Heroin Production

1. Purification of raw opium
2. Extraction of morphine from opium
3. Morphine to Diacetylmorphine Base
4. Diacetylmorphine Base to Diacetylmorphine HCl Tar

Heroin

Nicknames
Dope, H, Brown Sugar, Black Tar, Snack, & Dragon

Mechanism
Mu Opioid Receptors

Chemical
Di-acetyl-morphine


Heroin ($10/Bag)
Laced Heroin

<table>
<thead>
<tr>
<th>Heroin</th>
<th>Fentanyl</th>
<th>Carfentanil</th>
</tr>
</thead>
<tbody>
<tr>
<td>• MME: 3</td>
<td>• MME: 100</td>
<td>• MME: 10,000</td>
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</tbody>
</table>

Heroin

Fentanyl

Carfentanil

Krokodil

Nicknames

Russian Magic or Poor Man's Heroin

Mechanism

Mu Opioid Receptors

MME Factor

Ten (10)

Chemical

Desomorphine (6-Hydroxy-derivative of morphine) patented in 1934 as Permonid in Switzerland

Kratom

Nicknames

Thang, Thom, & Seim

Mechanism

Kappa & D-2 Opioid 00 Anti-Inflammatory

Drug Interactions

CYP450 3A4, 206, & 1A2 Inhibitor

Chemical

Mitragyna Speciosa Tropical plant in coffee family Native to Southeast Asia
Salvia

**Nicknames**
Salvia Divinorum, La Maria, Magic Mint, or Diviner's Sage

**Mechanism**
- Potent K-Opioid D2 Agonist
- Endocannabinoid Modulator

**Drug Interactions**
CYP450 1A2, 2C19, 2D6, & 2E1

**Chemical**
- Sage plant (Mint Family)
- Native to Mexico

Dextromethorphan (DXM)

**Nicknames**
- Sizzurp, Purple Drank, Purple Tonic
- Robitussin DM à Roboshake
- Delsym à Agent Orange
- Coricidin HBP à Skittles

**Mechanism**
- Non-Selective Serotonin Reuptake Inhibitor
- NMDA Antagonist
- Opioid Sigma Agonist
- Anesthetic

**Chemical**
- D-enantiomer of levomethorphan (methyl-levorphanol)

Chirality

Samuel L. Jackson  Samuel D. Jackson
Opioid “Cousins”

Dextromethorphan

\( (\text{DXM}) \)

\( \rightarrow \)

Dextrophan (DXO)

“D(+) enantiomer” of racemorphan

Levorphanol

“L(-) enantiomer” of racemorphan

Iloperamide

Nicknames

Poor Man’s Methadone & Imodium®

Mechanism

Peripheral Mu-Opioid Agonist

Info

1988 Moved from C-V to OTC

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Hallucinogens
- NB001E
- LSD
- Ketamine
- MXE
- PCP
- Psychedelic Mushrooms
- Peyote Cacti
- Ecstasy

Stimulants
- Cocaine
- Meth(amphetamine)
- Khat
- Bath Salts & Gravel

Cannabis Products
- Marijuana Plant
- Synthetic Marijuana
- Marijuana Extracts

Opioid-Related Products
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<td>Peyote Cacti</td>
<td>Excitatory</td>
<td>Excitatory</td>
<td>Jitteriness</td>
<td>Confusion</td>
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<tr>
<td>Ecstasy</td>
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<tr>
<td>Mushrooms</td>
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<tr>
<td>LSD</td>
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<td>Ecstasy</td>
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<td>Ketamine</td>
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<td>MXE</td>
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<td>NBOMe</td>
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<tr>
<td>PMA</td>
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<td>Drugs of Abuse Resource Guide</td>
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Pharming & Punchbowl Parties

Resources Concentrating on Illicit Substances

- BLUENIGHT
- Drugs Forum
- Drugs Abuse
- European Narcotics Centre
- Drug-Free World
Support Groups

Alcoholics Anonymous (AA)
www.aa.org
212-870-3400

Narcotics Anonymous (NA)
www.na.org
1-818-773-9999

Nar Anon (Family & Friends)
www.nar-anon.org
1-800-477-6291

Audience Question #1
Which of the following illicit substances is a hallucinogen?

a) Bath Salts
b) Khat
c) Ketamine
d) Carfentanyl

Audience Question #1 (ANSWER)
Which of the following illicit substances is a hallucinogen?

a) Bath Salts
b) Khat
c) KETAMINE
d) Carfentanyl
Audience Question #2

While stopped at a cross-walk on Las Vegas Boulevard (i.e. "The Strip") at 2am, you notice a college student next to you leaning against a stop light post, shaking, with a red-toned skin color, grinding her teeth, and profusely sweating. If she was to have ingested an illicit substance, which of the following would be the most likely of the listed substances.

a) Kratom  
b) Scooby Snax  
c) Heroin  
d) Ecstasy

Audience Question #2 (ANSWER)

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Audience Question #3

Which of the following are effects of various doses of dextromethorphan (i.e. DXM)?

a) Cough Suppression  
b) Pain Suppression  
c) Hallucinations  
d) Euphoria  
e) All of the Above
Audience Question #3 (ANSWER)

Which of the following are effects of various doses of dextromethorphan (i.e. DXM)?

a) Cough Suppression
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e) ALL OF THE ABOVE