

# Drugs in Today's World

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# What do people need to know about prescription and illicit drugs?

- Addiction potential?
- Tolerance?
- Withdrawal symptoms?
- Physical toxicity/bodily damage?
- Psychological dangers?
- **Misrepresentation**

# OPIOIDS



# Opioids

- Opium
- Morphine
- Heroin
- Hydrocodone (Vicodin)
- Oxycodone (OxyContin/Percodan)
- Fentanyl

# Opioid effects

- Sedation (“nodding”)
- Euphoria
- Pain relief
- Respiratory depression (slowed breathing)
- Constipation
- Constricted pupils

# Opioids: Basics

- Addiction potential high
- Tolerance develops
- Physical dependence withdrawal symptoms moderate to serious/not life-threatening
- Immediate physical toxicity potential (overdose) moderate to high
- Long-term physical toxicity potential low
- Acute and chronic psychiatric impairment potential low



# Opiate Withdrawal

- Signs of w/d:
  - Drug hunger (craving)
  - Dilated pupils
  - Yawning
  - Lacrimation (eyes tear)
  - Rhinitis (runny nose)
  - Fever
  - Restlessness
  - Stomach, leg and back cramps

# Opiate Withdrawal

- Signs of w/d:
  - Insomnia
  - Nausea
  - Diarrhea
  - Vomiting
  - Chills/cold flashes with goose bumps ("cold turkey")
  - Sweating
  - Leg spasms ("kicking the habit")



# Opiate Withdrawal

- Signs of w/d:
  - Rapid pulse
  - Increased blood pressure
  - Anxiety
  - Depression
  - Muscle and bone pain

# Opioids: Basics

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**BEWARE OF DRUG MISINFORMATION**



# “Krokodil”:

## A Media Rumor Runs Wild

A lesson in how to divert attention from real problems



Krokodil patient in Russia





# Krokodil is a myth. So what?

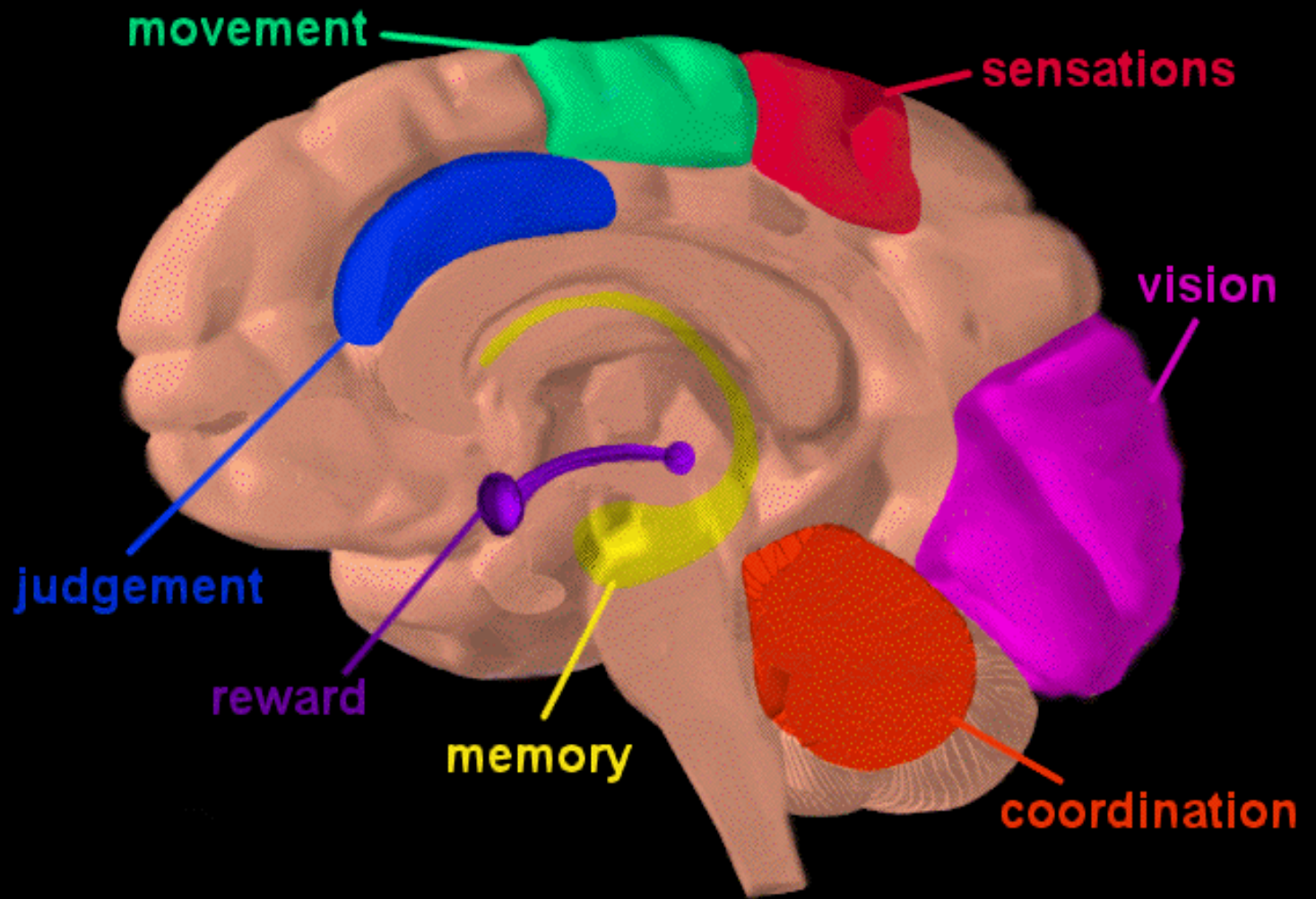
- “Krokodil” symptoms probably caused by bacterial infection
  - Transmitted by dirty hypodermic needles
  - Drug users could have been told free sterile syringes available legally at needle exchanges
- Waste of time and resources
- Loss of credibility
- What is something real shows up?

# Drug information tips

- Always ask:
  - How do you know that?
  - Could I see the evidence?
- Good sources:
  - Journals
  - Science magazines
  - Reputable websites
  - Colleges and universities
- One source or many?

# Neuroscience

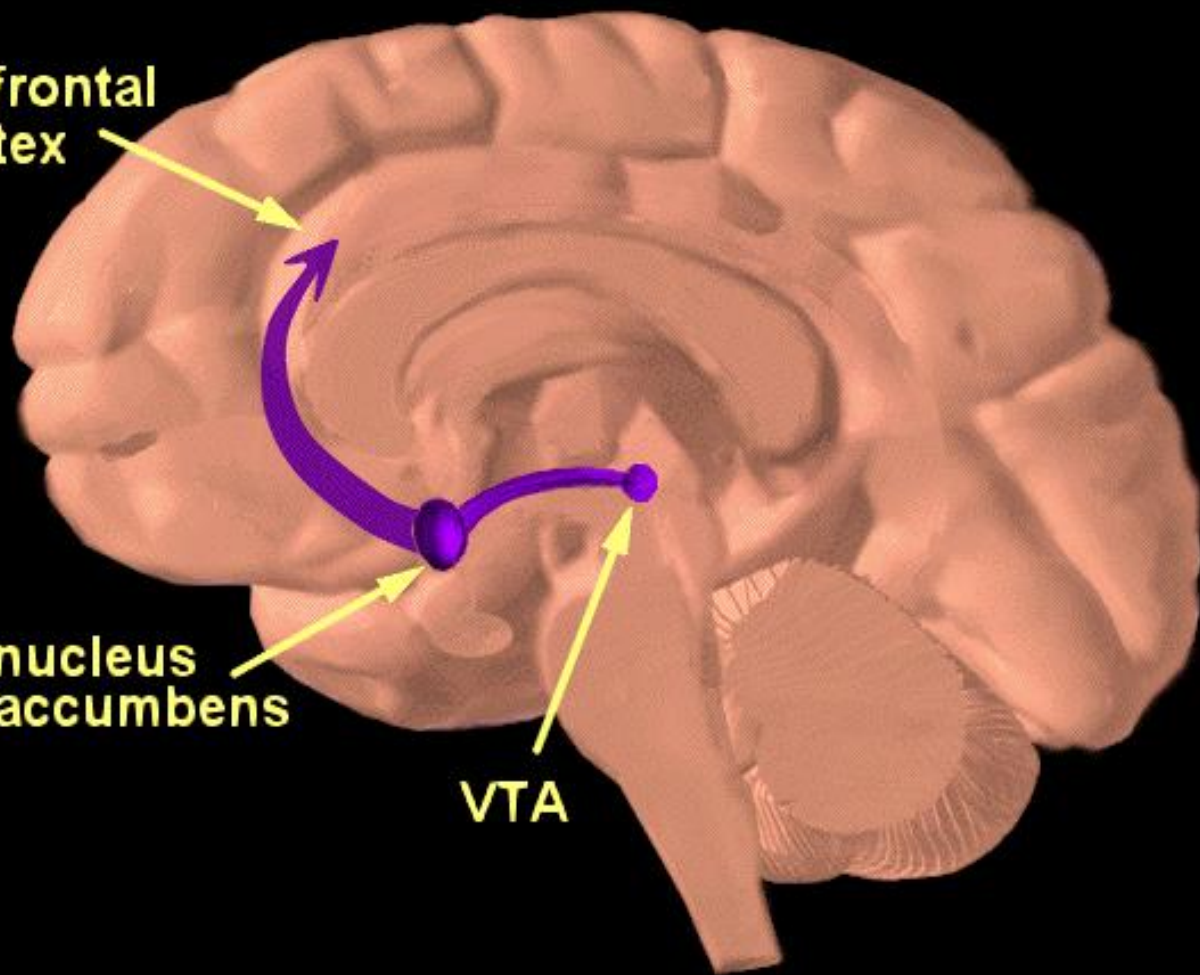




**prefrontal  
cortex**

**nucleus  
accumbens**

**VTA**



# Executive Functioning: Frontal lobes are “boss”

- Planning and organizing
- Decision-making
- Appraisal of risk
- Self-restraint and self-control (inhibition of impulses)



# NEUROTRANSMITTERS

- Naturally-occurring brain chemicals
- Many psychoactive drugs resemble neurotransmitters:

# Neurotransmitters

- Serotonin (5-HT)
- Norepinephrine (NE)
- Dopamine (DA)
- Acetylcholine (Ach)
- Glutamate (GLU)
- Gamma amino butyric acid (GABA)
- N-methyl-D-aspartate (NMDA)

# NEUROTRANSMITTERS

- Naturally-occurring brain chemicals
- Many psychoactive drugs resemble neurotransmitters:



# NEUROTRANSMITTERS

## DRUG

## NEUROTRANSMITTER

LSD

Serotonin

Methamphetamine

Norepinephrine

heroin

Endorphins

# NEUROTRANSMITTERS

DRUG

NEUROTRANSMITTER

THC

Anandamide

PCP

Receptor site identified but not associated  
neurotransmitter

CANNABIS



# Cannabis: Basics

- Addiction potential low to moderate
- Tolerance develops to some symptoms of intoxication
- Physical dependence withdrawal symptoms mild
- Immediate and long-term physical toxicity potential appears moderate to low
- Immediate psychiatric impairment potential low to moderate/chronic psychiatric impairment may be moderate for adolescents

# Cannabis

- Endocannabinoids
  - $CB_1$   $CB_2$
- Marijuana
  - THC
  - CBD
  - Other cannabinoids
- Hashish
- Concentrates
  - Hash oil
  - Shatter
  - Wax

# Hashish (Up to 65% THC)





# Hash oil/BHO (Up to 90% THC)



# Shatter (Up to 90% THC)



# Wax (Up to 90% THC)





# Cannabis

- Effects:
  - Euphoria
  - Dreaminess
  - Introspective mood
  - Hilarity
  - Heightened perception

# Cannabis

- Effects (side):
  - Bloodshot eyes
  - Forgetfulness
  - Increased pulse
  - Dry mouth

# Cannabis

- Effects (undesired):
  - Confusion
  - Paranoia
  - Derealization
  - Depersonalization
  - Panic
  - Anxiety
  - Psychosis (rare)





Breaking  
News!!

December 5, 2017



**Smokers are 7 times more likely to use  
marijuana daily, study says**

# CANNABIS RESEARCH: Receptor Sites/Endogenous Cannabinoids

- **CB<sub>1</sub> & CB<sub>2</sub>**
- **Specific for endogenous cannabinoids**
  - **Anandamide**
  - **Arachnidonyl Glycerol**
- **Δ-9 THC also fits these receptors**
- **Other cannabinoids (e.g., cannabidiol) use CB<sub>2</sub> receptor**

# CANNABIS RESEARCH:

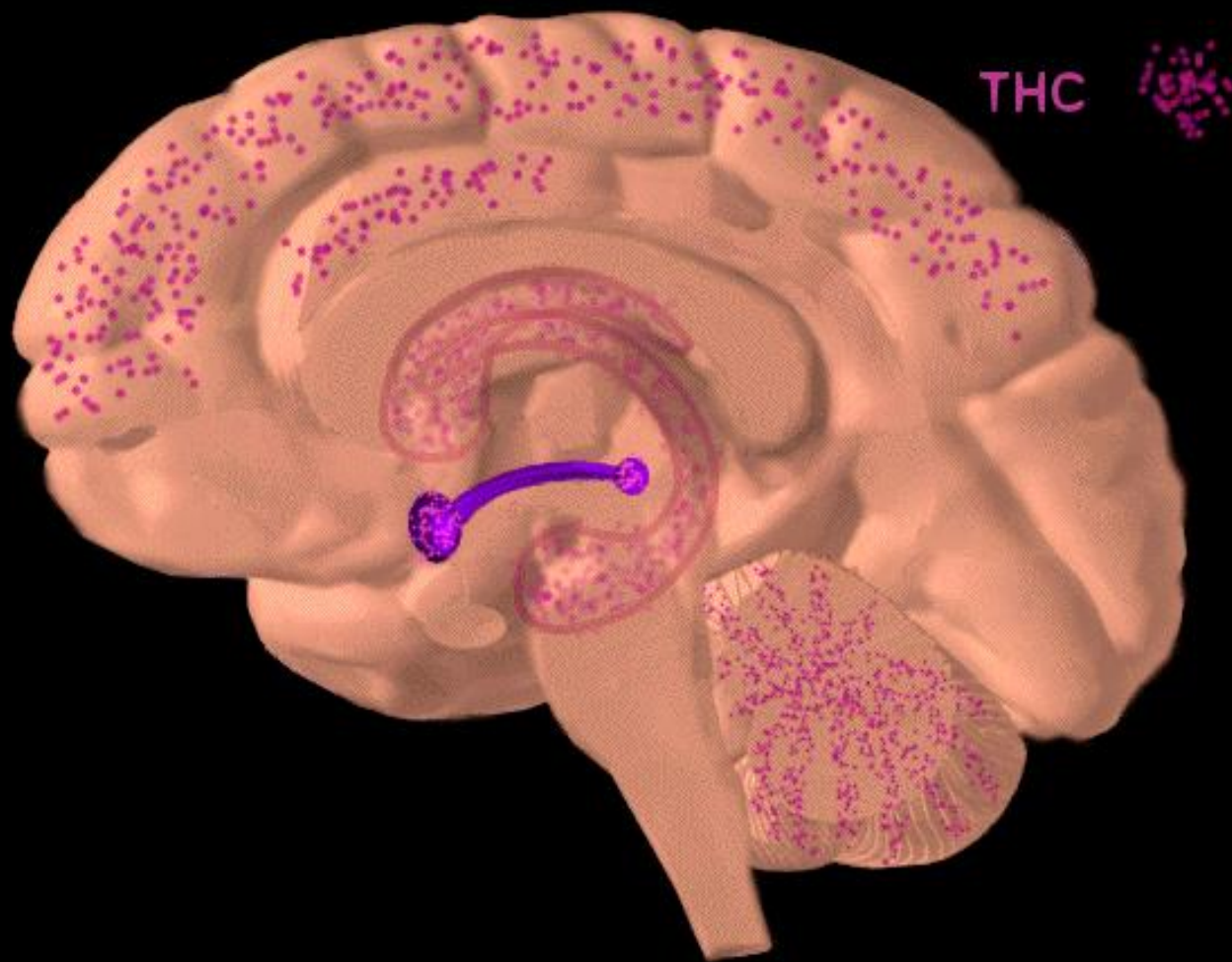
## Withdrawal

- Cannabis dependence can include withdrawal signs
- Severity: Mild to Moderate
- May be more severe in smokers with a long history of cannabis use
- Can last from 3-28 days



# Withdrawal

- Drug use discontinuation (mild to moderate)
- Initiated by antagonist (moderate to severe)
- Symptoms (drug d/c)
  - Craving
  - Anxiety
  - Loss of appetite
  - Physical tension
  - Irritability/ Anger
  - Restlessness
  - Difficulty concentrating



prefrontal  
cortex

nucleus  
accumbens

VTA



# Cannabis and Health

Report from the National Academies of  
Engineering, Science and Medicine (2017)

# Therapeutic Effects (Medical marijuana)

- In adults with chemotherapy-induced nausea and vomiting, *oral cannabinoids are effective antiemetics.*
- In adults with *chronic pain*, patients who were treated with cannabis or cannabinoids are more likely to experience a *clinically significant reduction in pain symptoms.*
- In adults with *multiple sclerosis* (MS)-related spasticity, *short-term use of oral cannabinoids improves patient reported spasticity symptoms.*

# Therapeutic Effects (Medical marijuana)

- For these conditions, the effects of cannabinoids are modest; for all other conditions evaluated, there is inadequate information to assess their effects.



# Cannabis & Cancer

- The evidence suggests that smoking cannabis *does not increase the risk for certain cancers (i.e., lung, head, and neck) in adults.*
- There is *modest evidence* that cannabis use is associated with *one subtype of testicular cancer.*

# Cannabis and Respiratory System

- *Smoking cannabis on a regular basis is associated with **chronic cough and phlegm production**.*
- *Quitting cannabis smoking is likely to reduce **chronic cough and phlegm production**.*
- *It is **unclear** whether cannabis use is associated with COPD, asthma, or worsened lung function.*

# Cannabis and the Immune System

- There exists *a paucity of data on the effects of cannabis or cannabinoid-based therapeutics on the human immune system.*
- There is *insufficient data* to draw overarching conclusions concerning the *effects of cannabis smoke or cannabinoids on immune competence.*
- There is *limited evidence* to suggest that regular exposure to cannabis smoke may have *anti-inflammatory* activity.



# Cannabis and Pregnancy

- *Smoking cannabis during pregnancy is linked to lower birth weight in the offspring.*
- *The relationship between smoking cannabis during pregnancy and other pregnancy and childhood outcomes is **unclear**.*

# Cannabis and Addiction

- *Greater frequency of cannabis use increases the likelihood of developing problem cannabis use.*
- *Initiating cannabis use at a younger age increases the likelihood of developing problem cannabis use.*

# Cannabis and Injury

- *Cannabis use prior to driving increases the risk of being involved in a motor vehicle accident.*
- *In states where cannabis use is legal, there is increased risk of unintentional cannabis overdose injuries among children.*
- *It is unclear whether and how cannabis use is associated with occupational injury.*



# Cannabis and Psychosocial Issues

- *Recent cannabis use impairs the performance in cognitive domains of learning, memory, and attention (Recent use may be defined as cannabis use within 24 hours of evaluation).*
- *A limited number of studies suggest that there are impairments in cognitive domains of learning, memory, and attention in individuals who have stopped smoking cannabis.*

# Cannabis and Mental Health

- *Cannabis use is likely to increase the risk of developing schizophrenia and other psychoses; the higher the use the greater the risk.*
- *Cannabis use does not appear to increase the likelihood of developing depression, anxiety, and posttraumatic stress disorder.*
- *For individuals diagnosed with bipolar disorders, near daily cannabis use may be linked to greater symptoms of bipolar disorder than non-users.*

# Cannabis and Mental Health

- *Heavy cannabis users are more likely to report thoughts of suicide than non-users.*
- *Regular cannabis use is likely to increase the risk for developing social anxiety disorder.*



# Cannabis Hyperemesis Syndrome

- Nausea
- Vomiting
- Stomach pain
- Relieved by hot showers
- Disappears when cannabis use stopped

# Synthetic Cannabinoids

“K2”, “Spice”, “herbal incense”, “synthetic marijuana”

# **Synthetic pot warning issued as number of users experiencing severe bleeding jumps to 32**

**March 30, 2018**

State and local health officials have issued a warning about a synthetic pot in Illinois that has caused users to experience severe bleeding.



# First Generation Herbal Incense: Typical Effects

- Cannabis-like intoxication
- Dreaminess
- Euphoria
- Introspective mood
- Hilarity
- Forgetfulness
- Heightened sensory perception

**THESE ARE THE EFFECTS MOST COMMONLY  
REPORTED BY USERS**

# First Generation Herbal Incense: Other Effects

- Severe anxiety (may persist after herbal incense use is discontinued)
- Panic attacks
- Dissociation (e.g., derealization)
- Racing thoughts
- Hallucinations
- Rapid pulse (tachycardia)
- Seizures (*Journal of Addiction Medicine*, Sept 2012)

# Calls to Poison Control Centers

- Data from the American Association of Poison Control Centers' "National Poison Data Center"
- 2010: 2,874 calls
- 2017 (January-July): 1,952
- 2018 (Jan-March): 462





Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives. Protecting People.™

## **Morbidity and Mortality Weekly Report (MMWR)**

**February 15, 2013**

**Acute Kidney Injury Associated with Synthetic Cannabinoid Use — Multiple States, 2012**

# New Synthetic Cannabinoids

## ● UR-144

- Placed in Schedule I by DEA May 2013
- Users' experience:
  - Very mellow and enjoyable
  - A blissful glow...intellectually and artistically stimulating (then with more) Catapulted into another dimension where the stakes are high. On trial in front of God.
  - The familiar becomes strange and different, an alternate reality
  - The woods.....large and deep....the weeds actively malevolent, almost alive
  - I had no idea these chemicals could do something that intense. Thought the entire world was ending and I losing my mind.
  - Extreme addiction & depression after only half a week of use. Also major anxiety lasting for 2 days

# Additional Synthetic Cannabinoids

- THJ-2201
- 5F-PB-22
- AB-CHMINACA
- AB-PINACA
- MAB-CHMINACA



# SC: Overview

- Many times, the effects mimic those of cannabis
- Also:
  - Severe and persistent anxiety
  - Psychotic episodes
  - Seizures
  - Overly rapid heart beat
  - Kidney problems
  - Life-threatening bleeding
- Some deaths have been reported, but since SCs are often used with other drugs, difficult to establish SCs as cause
- SCs are now available as powders to be snorted or injected, or as liquids to be vaporized

# STIMULANTS

# Stimulants

## (cocaine, amphetamines, methylphenidate)

- High addiction potential\*
- Tolerance develops
- Moderate to high potential for physical toxicity
- Moderate to high potential for psychiatric impairment

\* Method of administration affects nature of the high



# Adderall

- Dextroamphetamine
- ADHD
- “Study drug”
- Increase in ER visits
- Increase in students seeking help for addiction

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**February 15, 2018**

Abusing Adderall is a serious problem for adults  
between the ages of 18-25

# Amphetamine Addicts







# CNS depressants

- Addiction potential moderate to high
- Tolerance develops
- Physical dependence withdrawal symptoms moderate to severe/life-threatening
- Physical toxicity (overdose) potential high/other immediate & long-term physical toxicity low
- Low potential for psychiatric impairment

# CNS depressants: Withdrawal symptoms

- Tremor
- Agitation
- Insomnia
- Sweating
- Elevated pulse and blood pressure
- Sensory hypersensitivity
- (Stomach cramps)
- (Nausea/vomiting)
- Seizures



# CNS depressants

- Addiction potential moderate to high
- Tolerance develops
- Physical dependence withdrawal symptoms moderate to severe/life-threatening
- Physical toxicity (overdose) potential high/other immediate & long-term physical toxicity low
- Low potential for psychiatric impairment