

ADDICTED

THE SCIENCE OF ADDICTION & THE EROSION OF TEEN MENTAL HEALTH

Timothy Jeider, MD

Board Certified Child & Adolescent Psychiatrist

Board Certified General Psychiatrist

DISCLOSURES

- None

TODAY'S TOPICS

- Diagnosis of Addiction
- Dopamine Reward System
- Lethality of Fentanyl
- Treatment
- Teens

DIAGNOSIS OF ADDICTION

OPIOID USE DISORDER

OPIOID INTOXICATION

OPIOID WITHDRAWAL

DIAGNOSIS OF ADDICTION

OPIOID USE DISORDER

1. Larger amounts over longer periods of time.
2. Persistent desire to use, unable to cut down, unable to control use.
3. Increase time spent obtaining, using or recovering.
4. Failure to maintain obligations of work, school or home.
5. Important activities given up/reduced.
6. Use in physically hazardous situations.
7. Cravings
8. Recurrent use despite social/interpersonal problems.
9. Recurrent use despite physical/psychological problems.
10. Tolerance
11. Withdrawal

SEVERITY

- Mild 2-3 Symptoms
- Moderate 4-5 Symptoms
- Severe 6 or more Symptoms

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OPIOID INTOXICATION

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- B. Problematic behavioral/psychological changes.
 - Euphoria, apathy, dysphoria, agitation, psychomotor retardation (slowing), impaired judgment.
- C. Pupillary Constriction* plus one of:
 - Drowsiness/Coma
 - Slurred Speech
 - Impaired attention or memory

*Pupillary dilation if anoxic (not getting enough oxygen).

OPIOID OVERDOSE

- *Small, constricted “pinpoint pupils”
- Falling asleep or losing consciousness
- Slow, weak, or no breathing
- Choking or gurgling sounds
- Limp body
- Cold and/or clammy skin
- Discolored skin (especially in lips and nails)

DIAGNOSIS OF ADDICTION

OPIOID WITHDRAWAL

- A. Stopped Using or Opioid Antagonist (ie. Naloxone) given.
- B. Three or more of:
 - 1. Dysphoric Mood
 - 2. Nausea or Vomiting
 - 3. Muscle Aches
 - 4. Teary Eyes or Runny Nose
 - 5. Pupil Dilation, Piloerection (goose bumps) or Sweating
 - 6. Diarrhea
 - 7. Yawning
 - 8. Fever
 - 9. Insomnia
- C. Items from B cause significant distress or impairment.

TODAY'S TOPICS

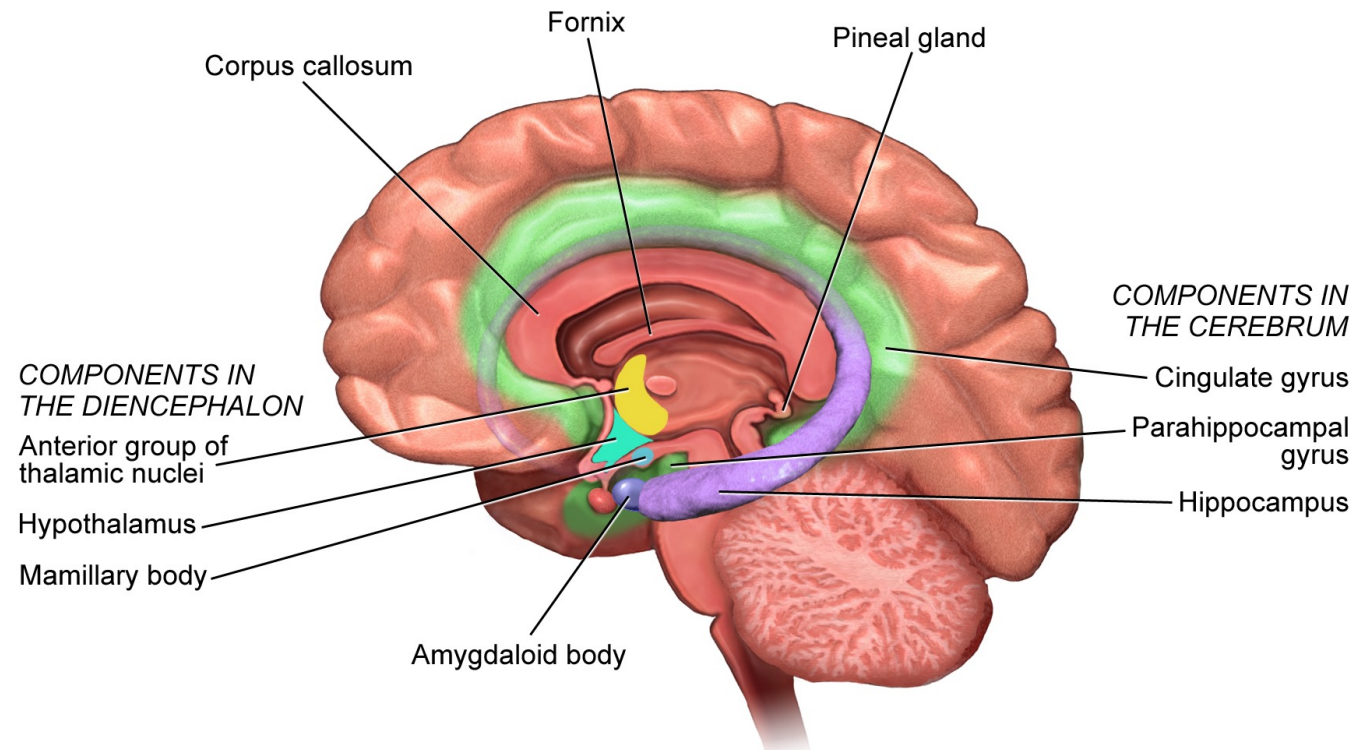
- Diagnosis of Addiction

TODAY'S TOPICS

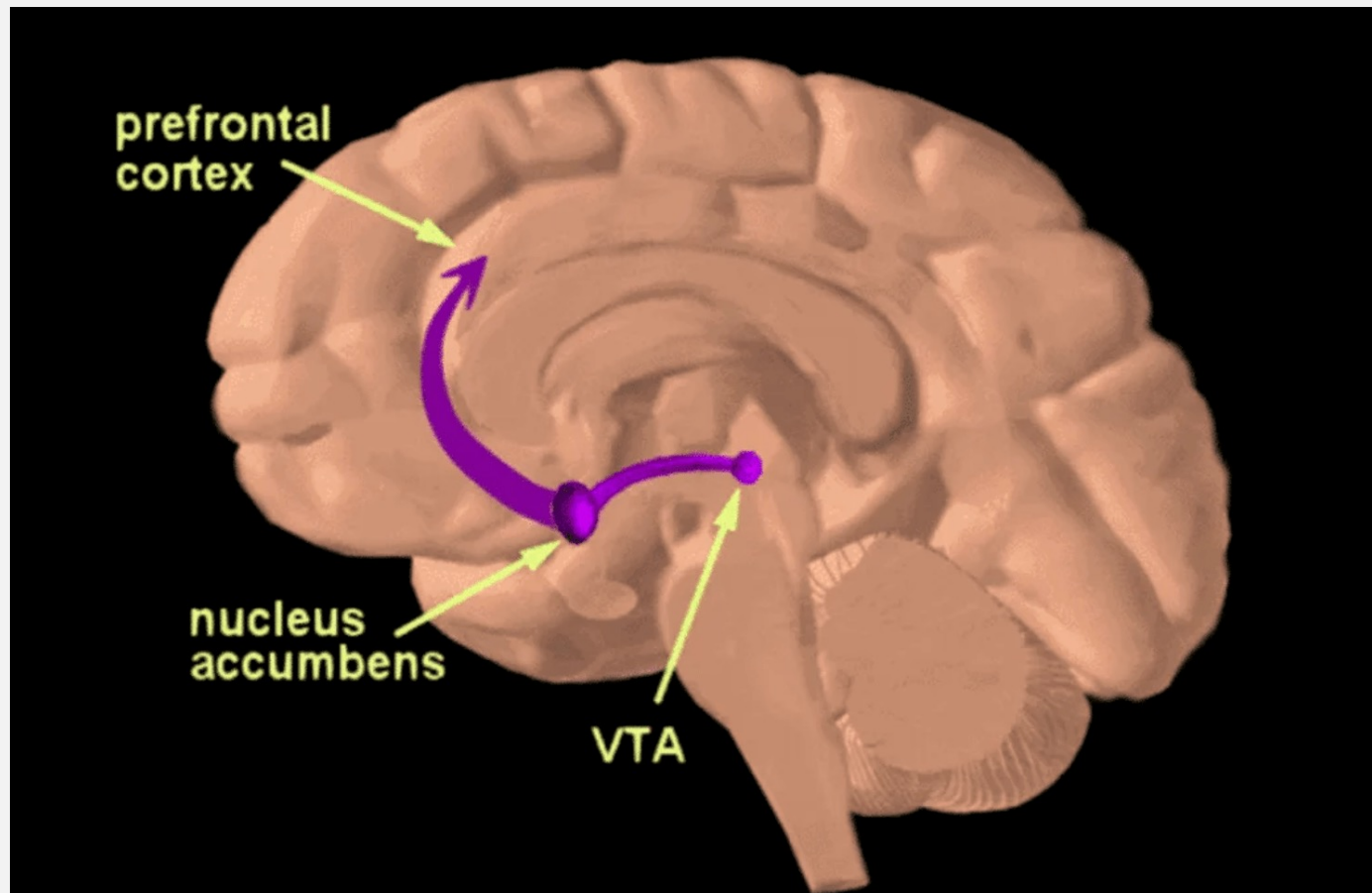
- Diagnosis of Addiction
- Dopamine Reward System

DOPAMINE REWARD SYSTEM

The Limbic System



DOPAMINE REWARD SYSTEM



DOPAMINE REWARD SYSTEM

The brain remembers that doing a thing resulted in feeling good.

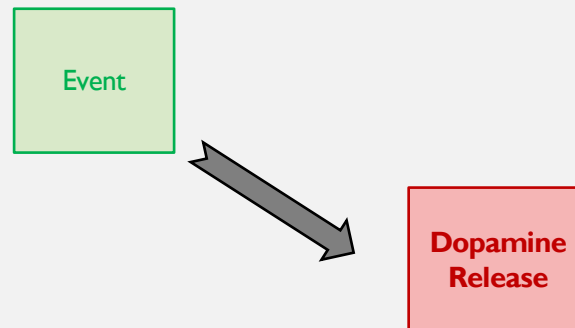
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Event

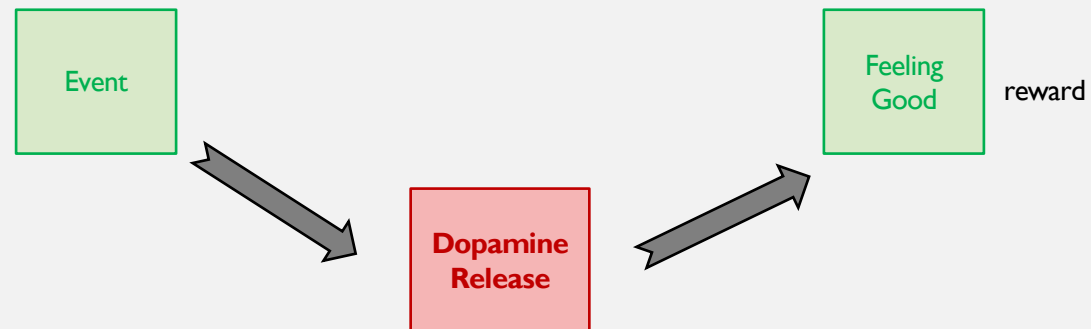
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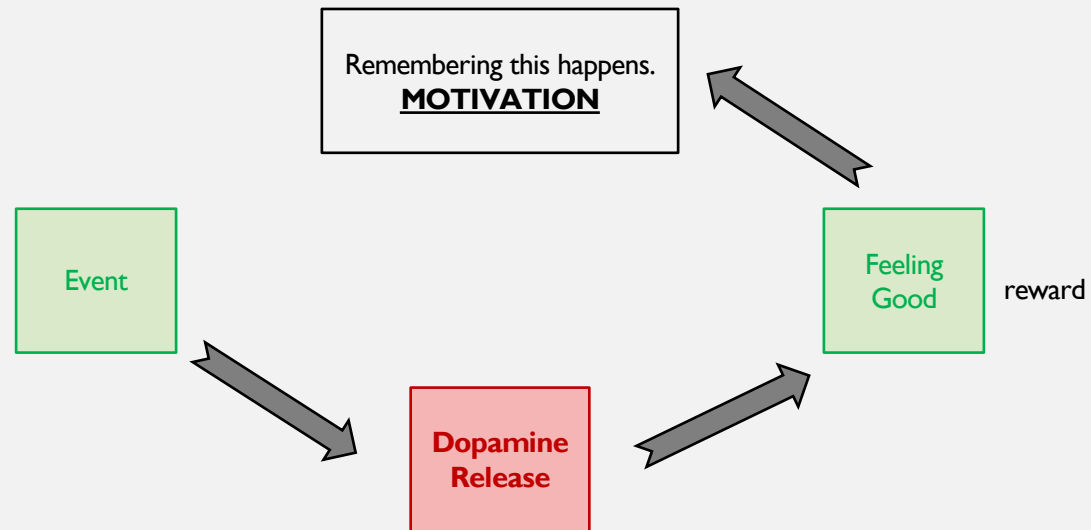
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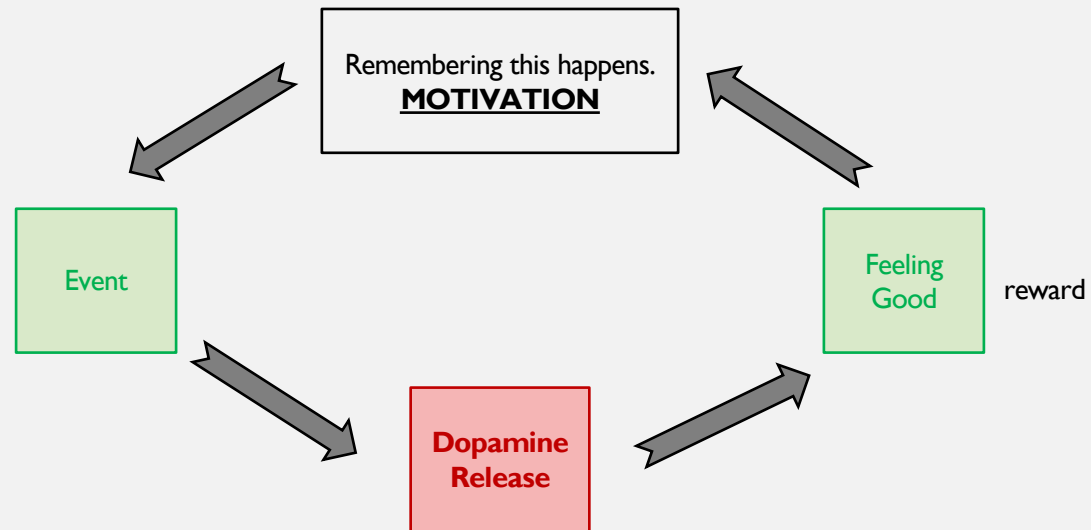
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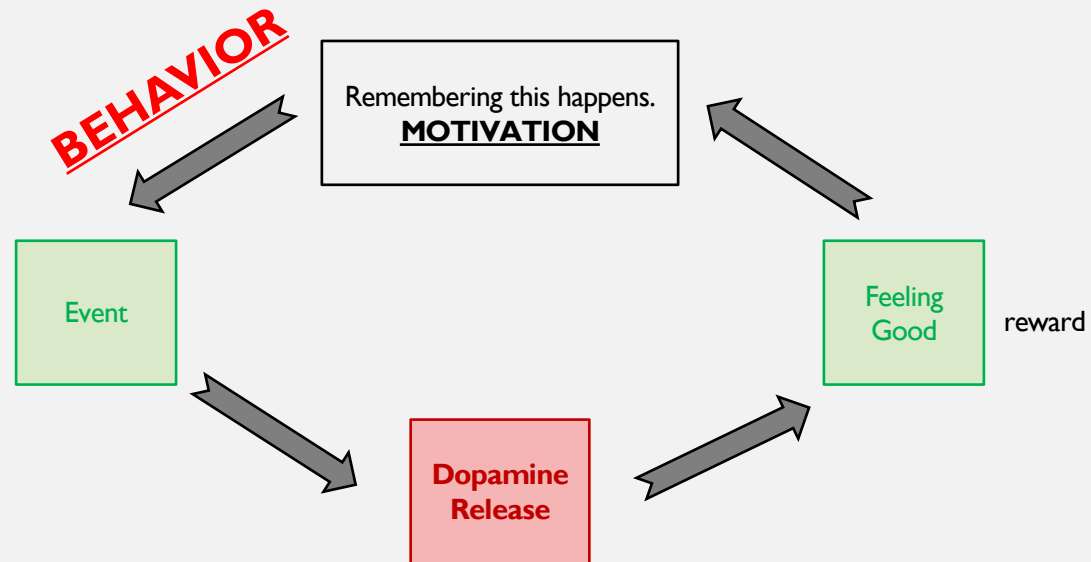
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Behaviors

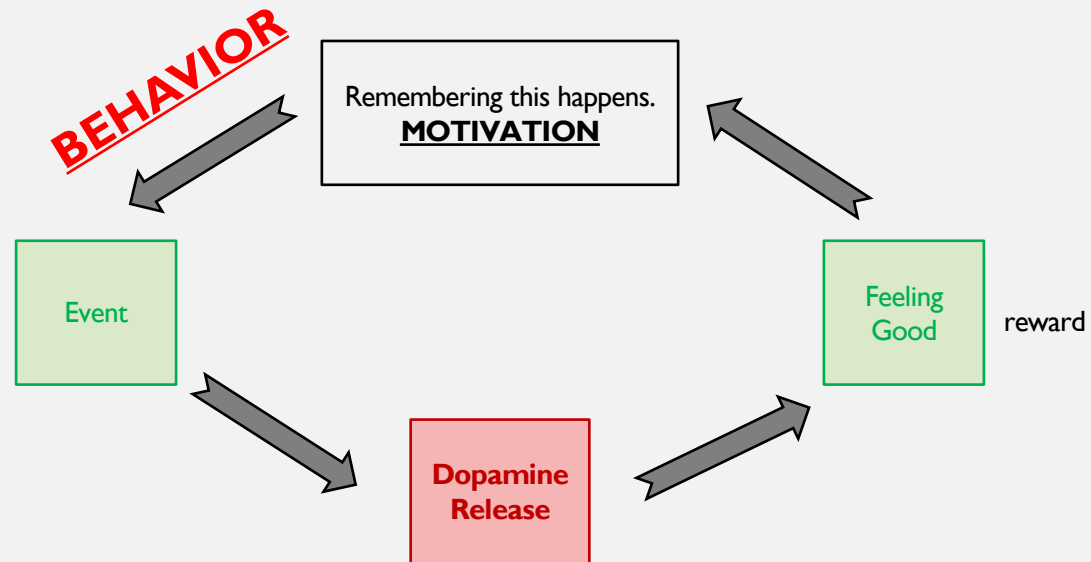
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DOPAMINE = BEHAVIOR

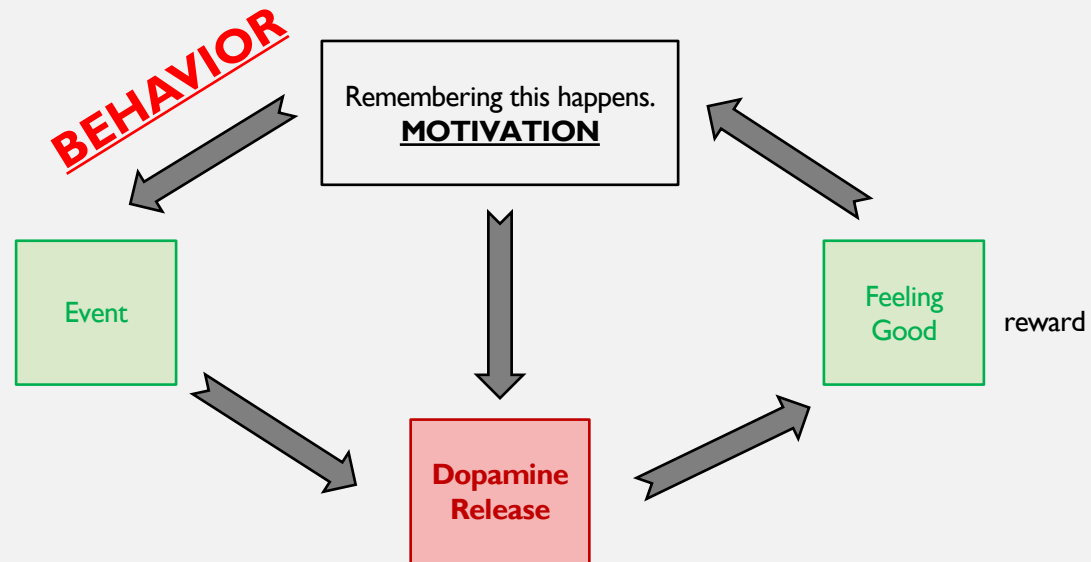
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DOPAMINE REWARD SYSTEM

Dopamine
Level



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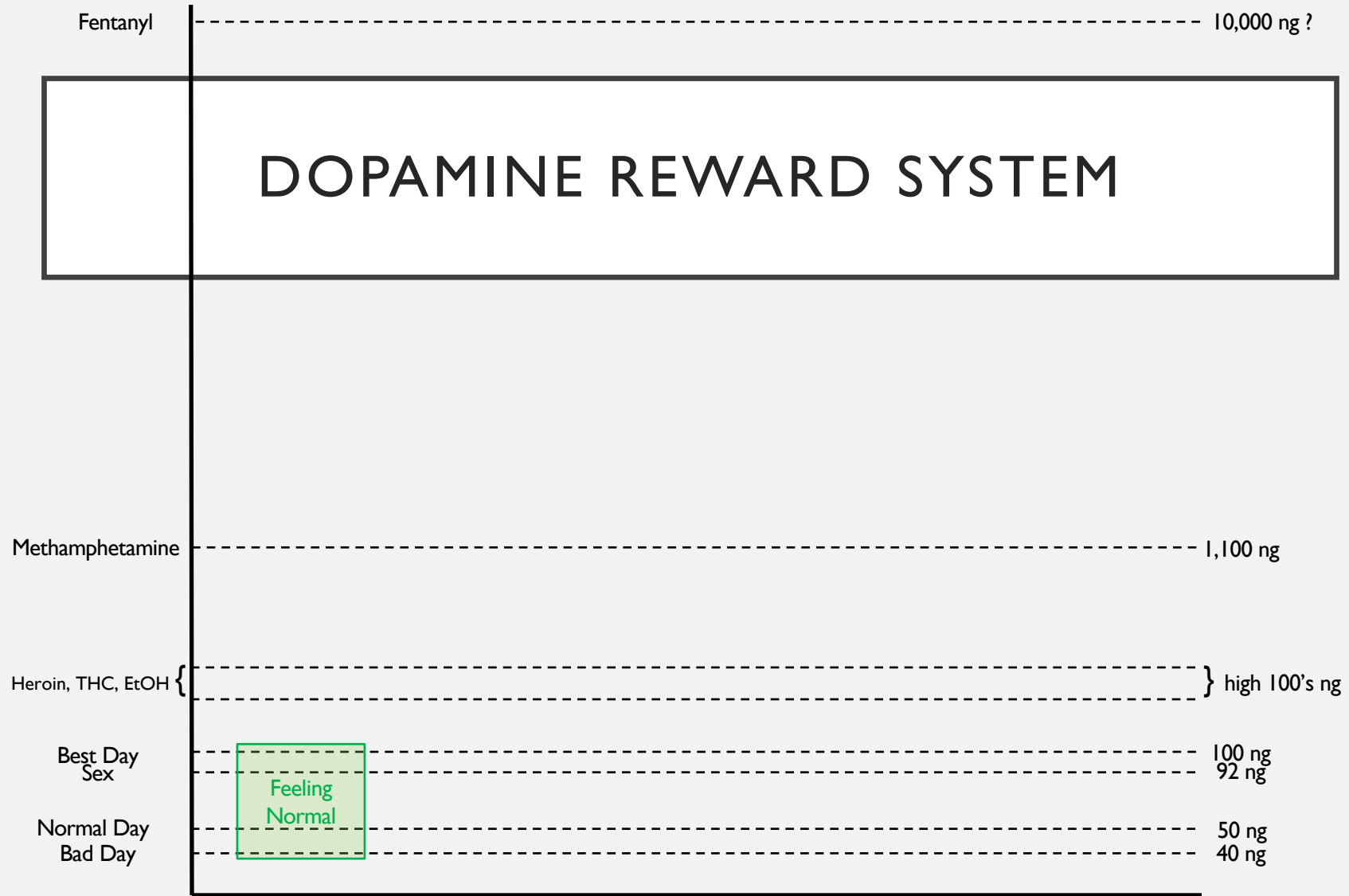


DOPAMINE REWARD SYSTEM

Dopamine Level



Dopamine
Level



DOPAMINE REWARD SYSEM

TOLERANCE

THE MORE YOU DO SOMETHING THE LESS EFFECT IT HAS

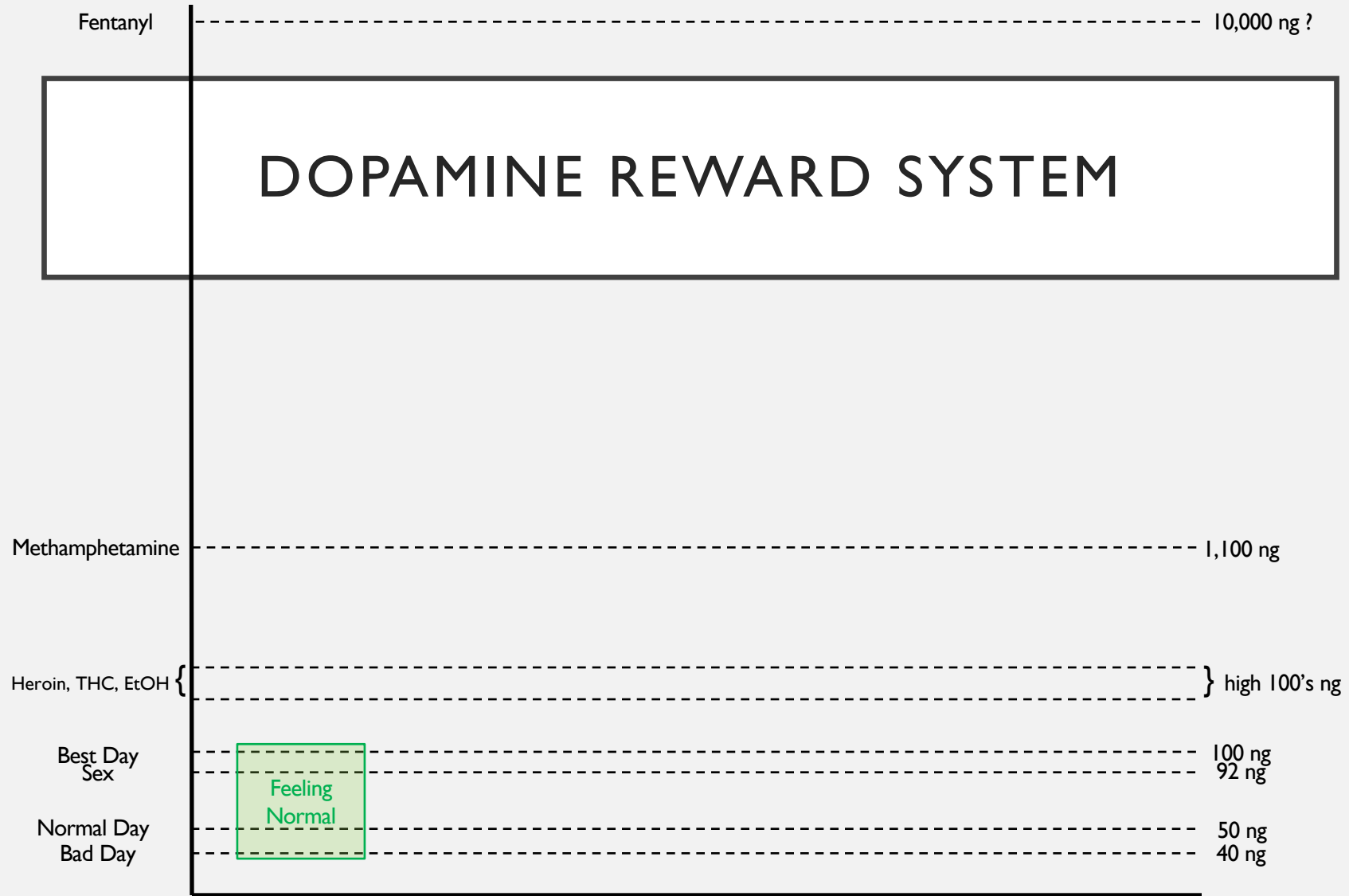
Never Drink

Always Drink

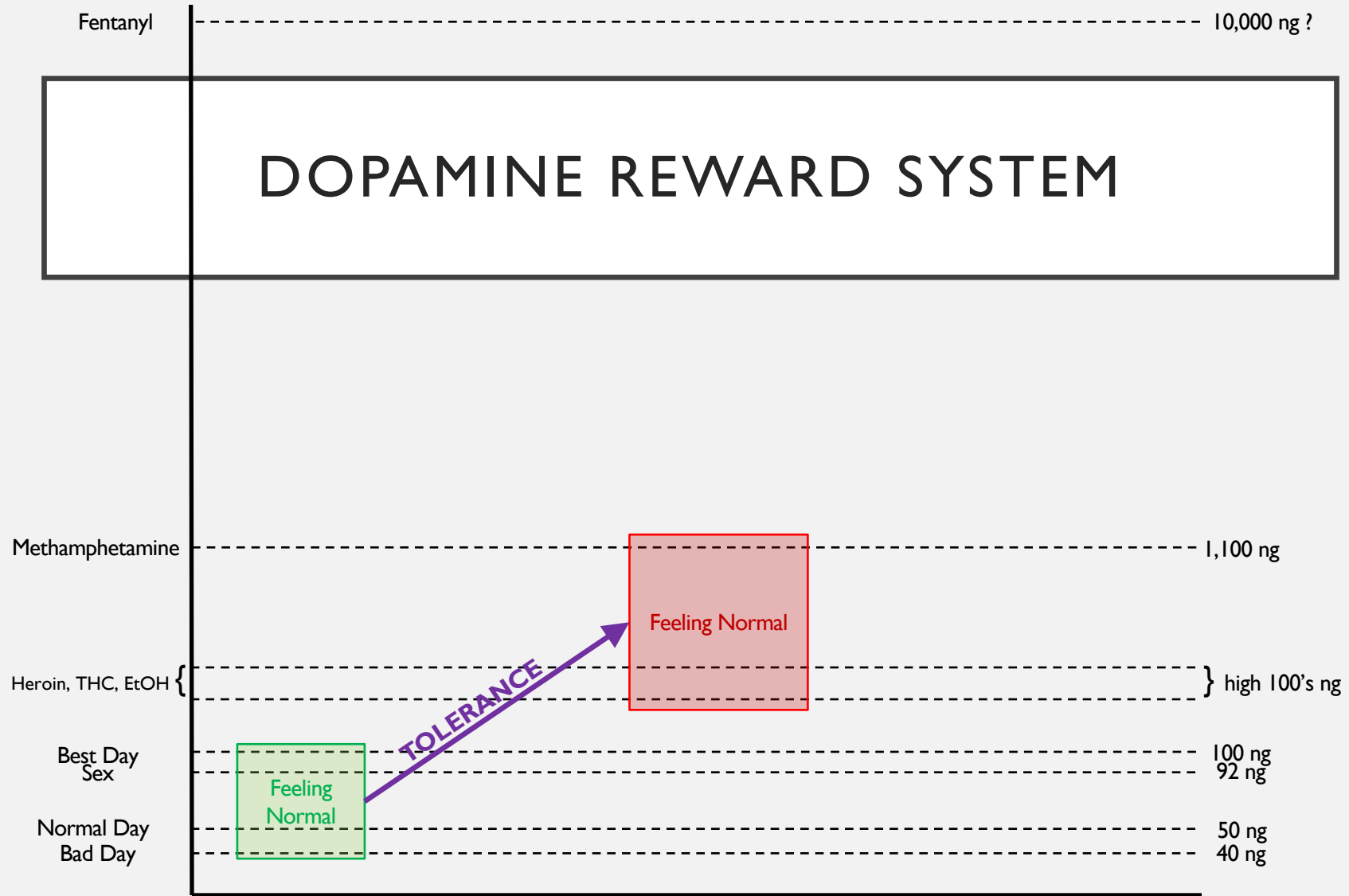
Drunk on fewer drinks.

More drinks needed to get drunk.

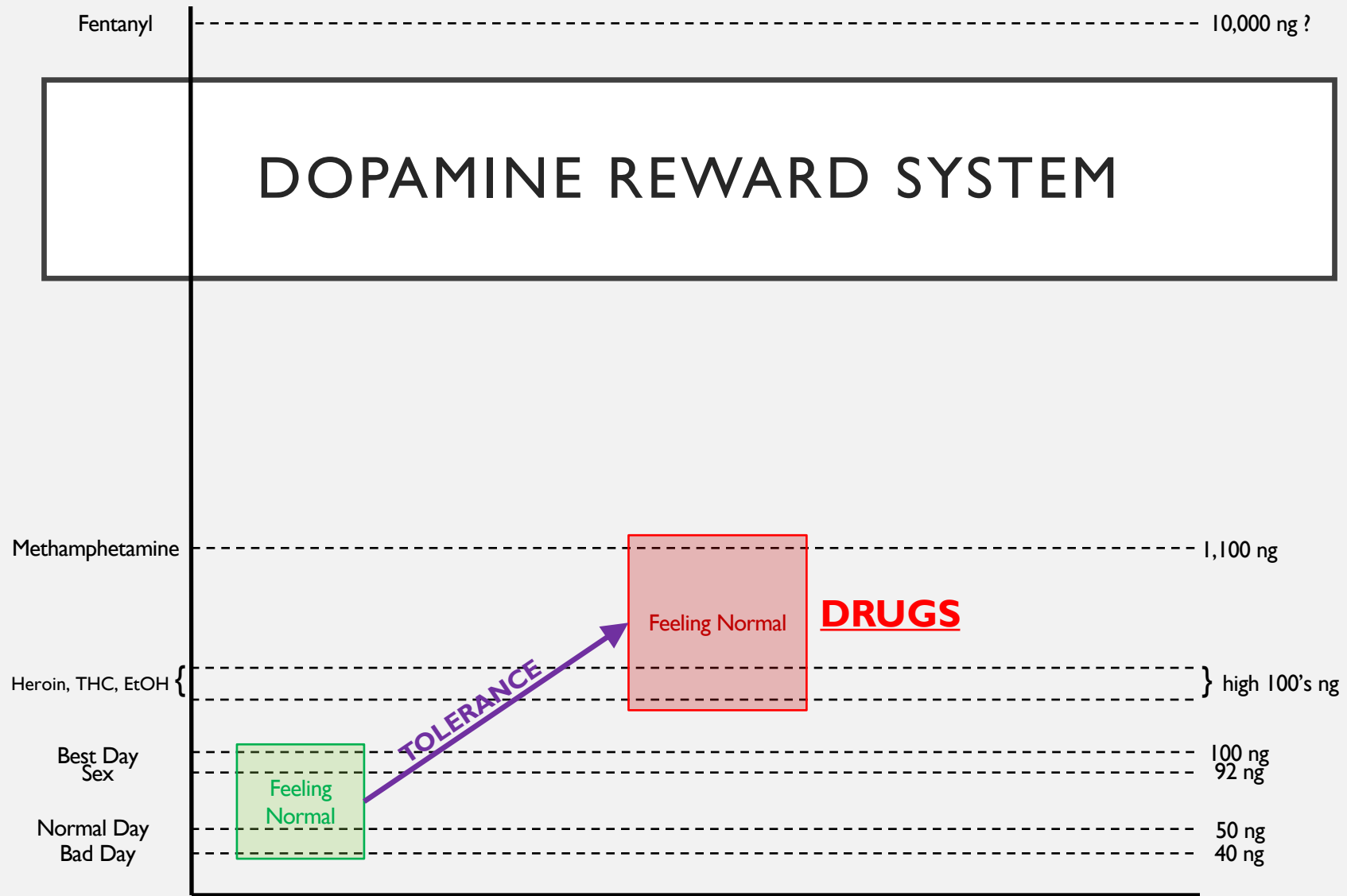
Dopamine
Level



Dopamine Level



Dopamine Level



TOLERANCE = **MORE** BEHAVIOR

DOPAMINE REWARD SYSTEM

IS EVERYONE SUSCEPTIBLE TO ADDICTION?

DOPAMINE REWARD SYSTEM

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No.

DOPAMINE REWARD SYSTEM

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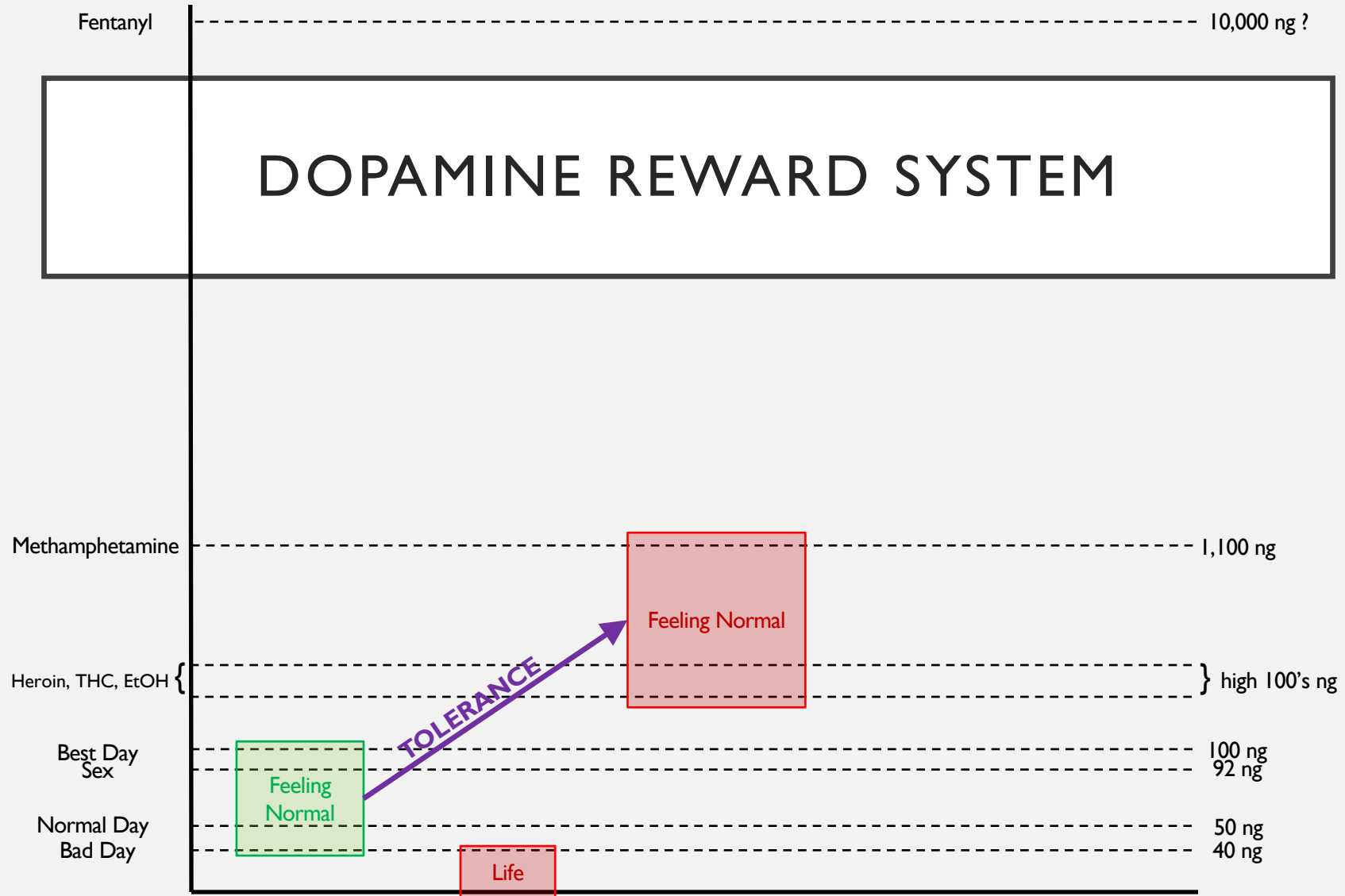
No.

We don't really know why or who is susceptible.

Inherent Dopamine System Deficits.

Life Circumstance ("Rat Park")

Dopamine Level



TODAY'S TOPICS

- Diagnosis of Addiction
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LETHALITY OF FENTANYL

PHYSIOLOGY OF FENTANYL

- Metabolized by the LIVER
- Excreted by the KIDNEYS
- Binds to Plasma Proteins
- Binding Affinity
 - Fentanyl – 1.2-1.4 nM
 - Naloxone – 11.3-18.7nM

LETHALITY OF FENTANYL

FENTANYL

- Equivalent Dose
 - 0.1mg

MORPHINE

- Equivalent Dose
 - 10mg

LETHALITY OF FENTANYL



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LETHALITY OF FENTANYL

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LETHALITY OF FENTANYL

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- Max Effect 10-15min
- Lasts 30min
- FASTER ONSET
- SHORTER DURATION

MORPHINE

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Hallmarks of an Addictive Substance

LETHALITY OF FENTANYL

- Effective Dose 50 (ED50)
 - The amount a single dose is expected to be effective in humans
 - Fentanyl - 0.0061 mg/kg
 - Morphine - 0.33 mg/kg

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- Effective Dose 50 (ED50)
 - The amount a single dose is expected to be effective in humans
 - Fentanyl - 0.0061 mg/kg
 - Morphine - 0.33 mg/kg
- Lethal Dose 50 (LD50)
 - The amount a single dose is expected to kill 50% of test animals
 - Monkeys 0.03mg/kg

LETHALITY OF FENTANYL

SEMI-SYNTHETIC OPIOIDS

- Heroin
- Hydrocodone
- Oxycodone
- Buprenorphine

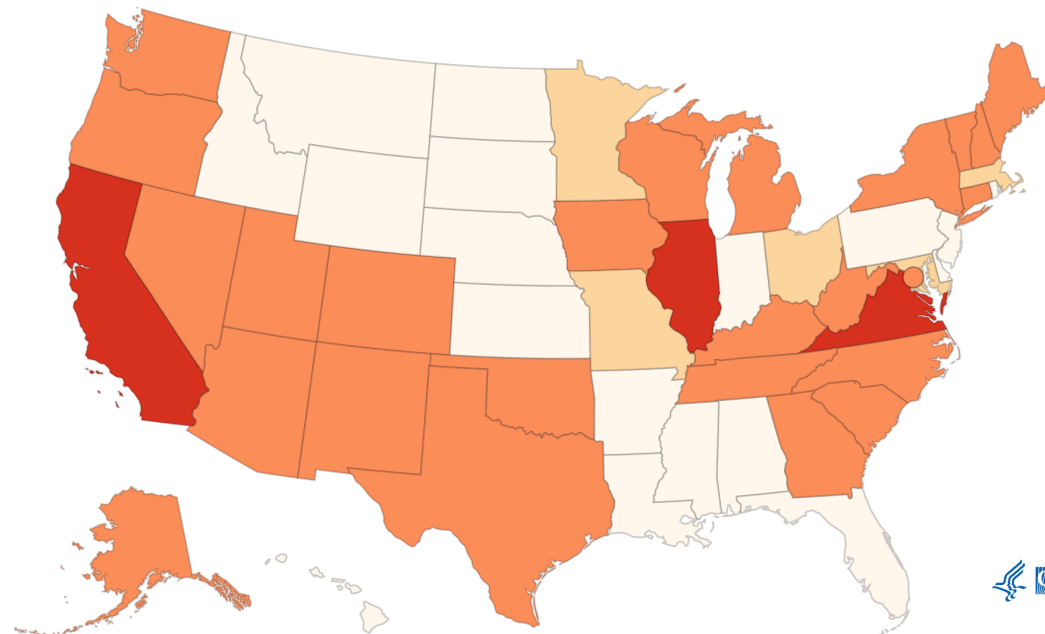
SYNTHETIC OPIOIDS

- Fentanyl Analogs
 - Carfentanil
 - Acryl fentanyl
 - Sufentanil
- Methadone
- Meperidine
- Tramadol

LETHALITY OF FENTANYL

2016-2017

Changes in drug overdose death rates involving synthetic opioids by select states, United States, 2016 to 2017



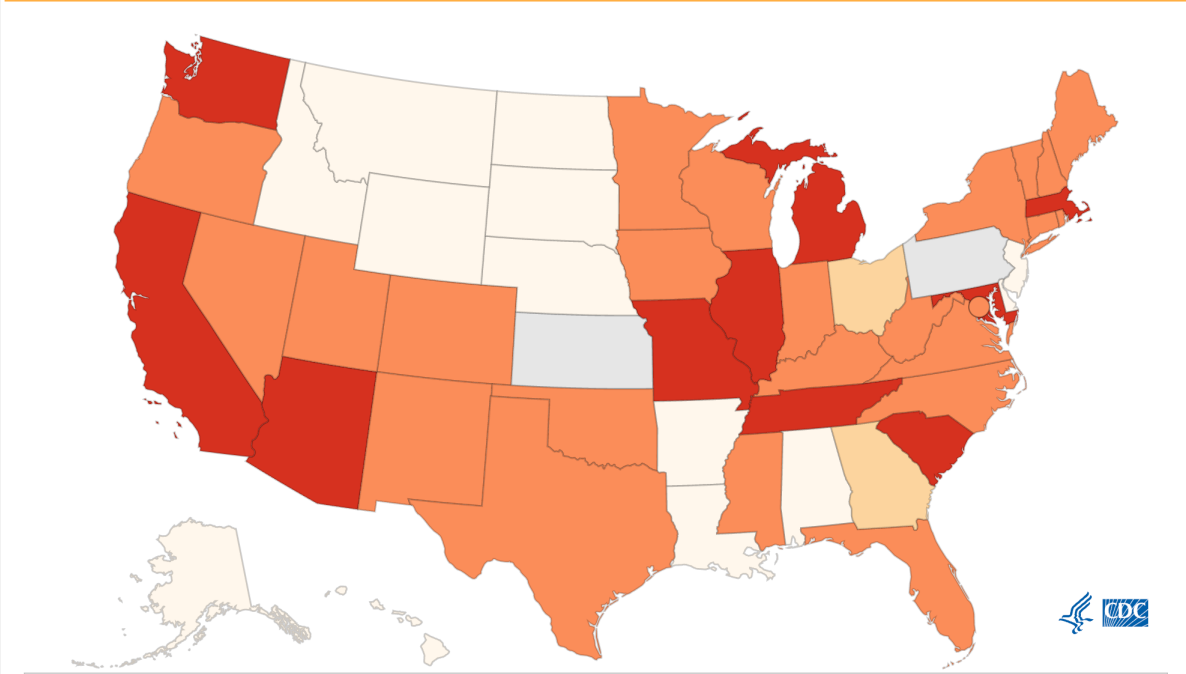
Legend

- Did not meet inclusion criteria
- Decrease
- Stable - not significant
- Increase

LETHALITY OF FENTANYL

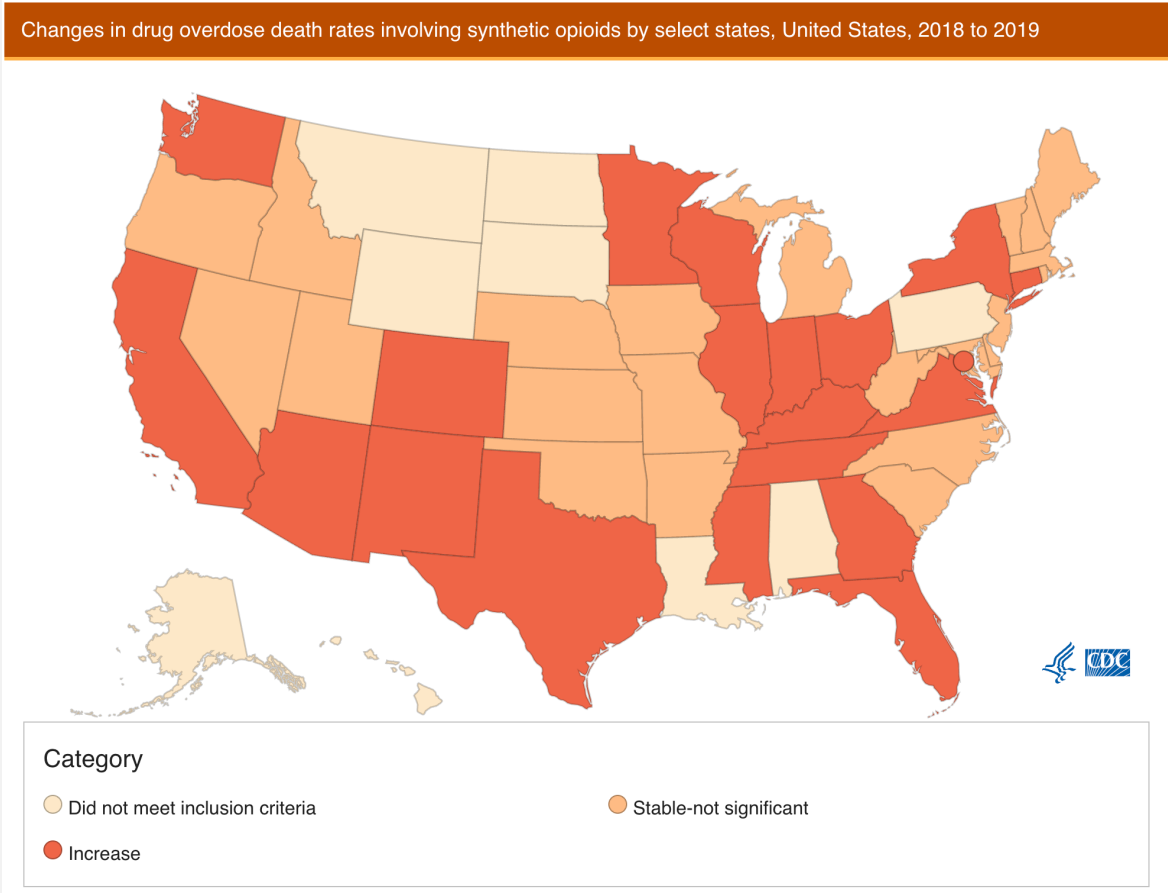
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Changes in drug overdose death rates involving synthetic opioids by select states, United States, 2017 to 2018



LETHALITY OF FENTANYL

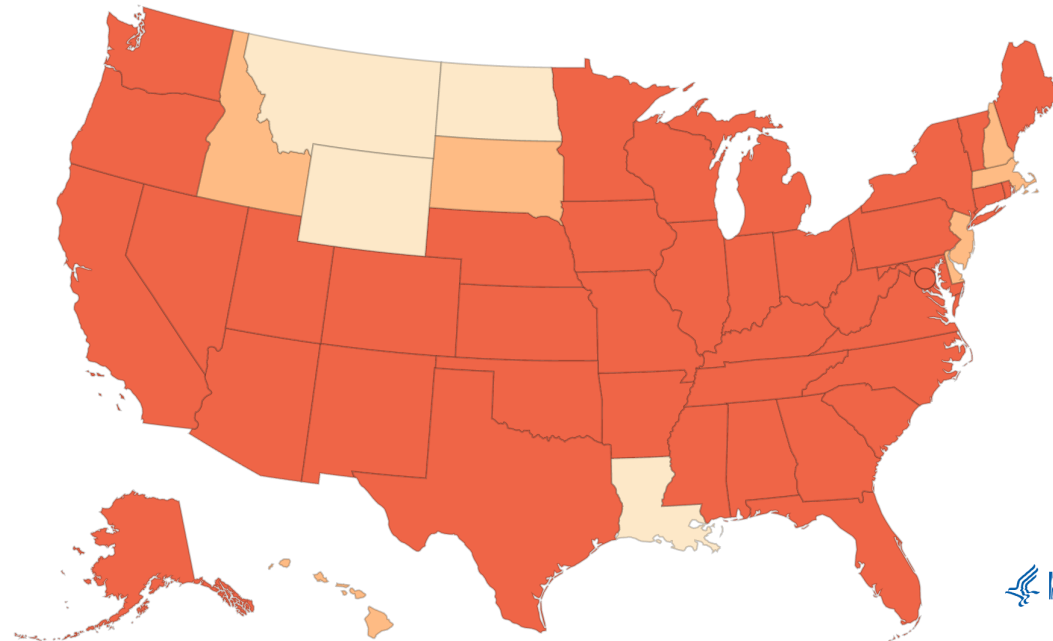
2018-2019



LETHALITY OF FENTANYL

2019-2020

Changes in drug overdose death rates involving synthetic opioids by select states, United States, 2019 to 2020



Category

○ Did not meet inclusion criteria

○ Stable

● Increase

LETHALITY OF FENTANYL

WHY IS FENTANYL SO DANGEROUS?

LETHALITY OF FENTANYL

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LETHALITY OF FENTANYL

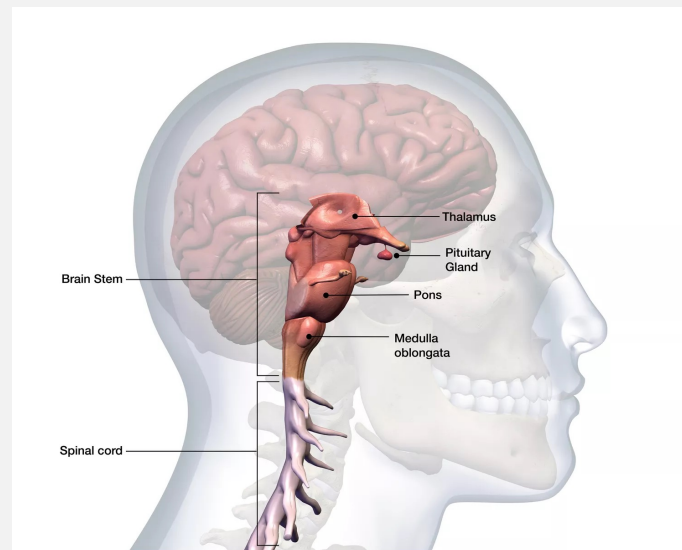
WHY IS FENTANYL SO DANGEROUS?

- 2021 – 4 out 10 counterfeit pills contained a lethal dose. **40% were Lethal Doses**
- 2022 – 6 out 10 counterfeit pills contained a lethal dose. **60% are Lethal Doses**

HOW DOES FENTANYL KILL?

LETHALITY OF FENTANYL

RESPIRATORY CENTER



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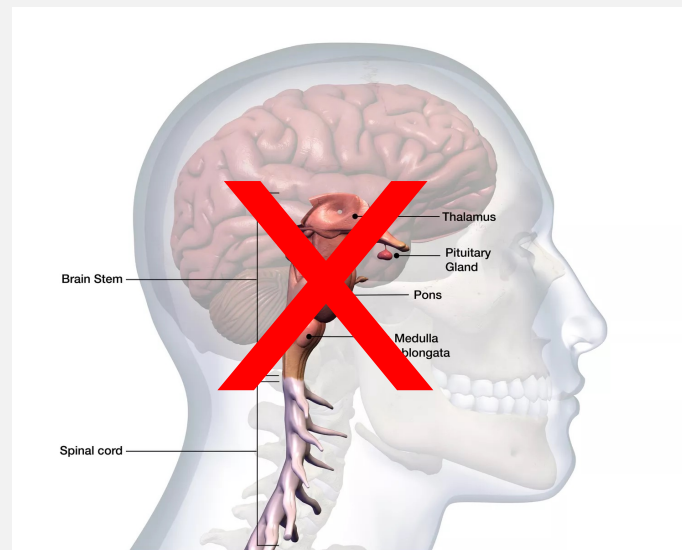
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- Treatment

TREATMENT

ACUTE TREATMENT: OPIOID ANTAGONISTS

TREATMENT

NALTREXONE

- Oral or Intramuscular
- Onset 1 hr (O) – 2 hr (IM)
- Duration
 - 24-72 hr (O) – 4 wks (IM)

NALOXONE

- Intranasal , Intramuscular, Intravenous, Subcutaneous
- Onset 2 mint (IV) – 5 min (IN, IM, SC)
- Duration
 - 60min (IN) – 30-90min (IV) – 4hrs (IM)

TREATMENT

NALOXONE



TREATMENT

NALOXONE



TREATMENT

ONGOING TREATMENT

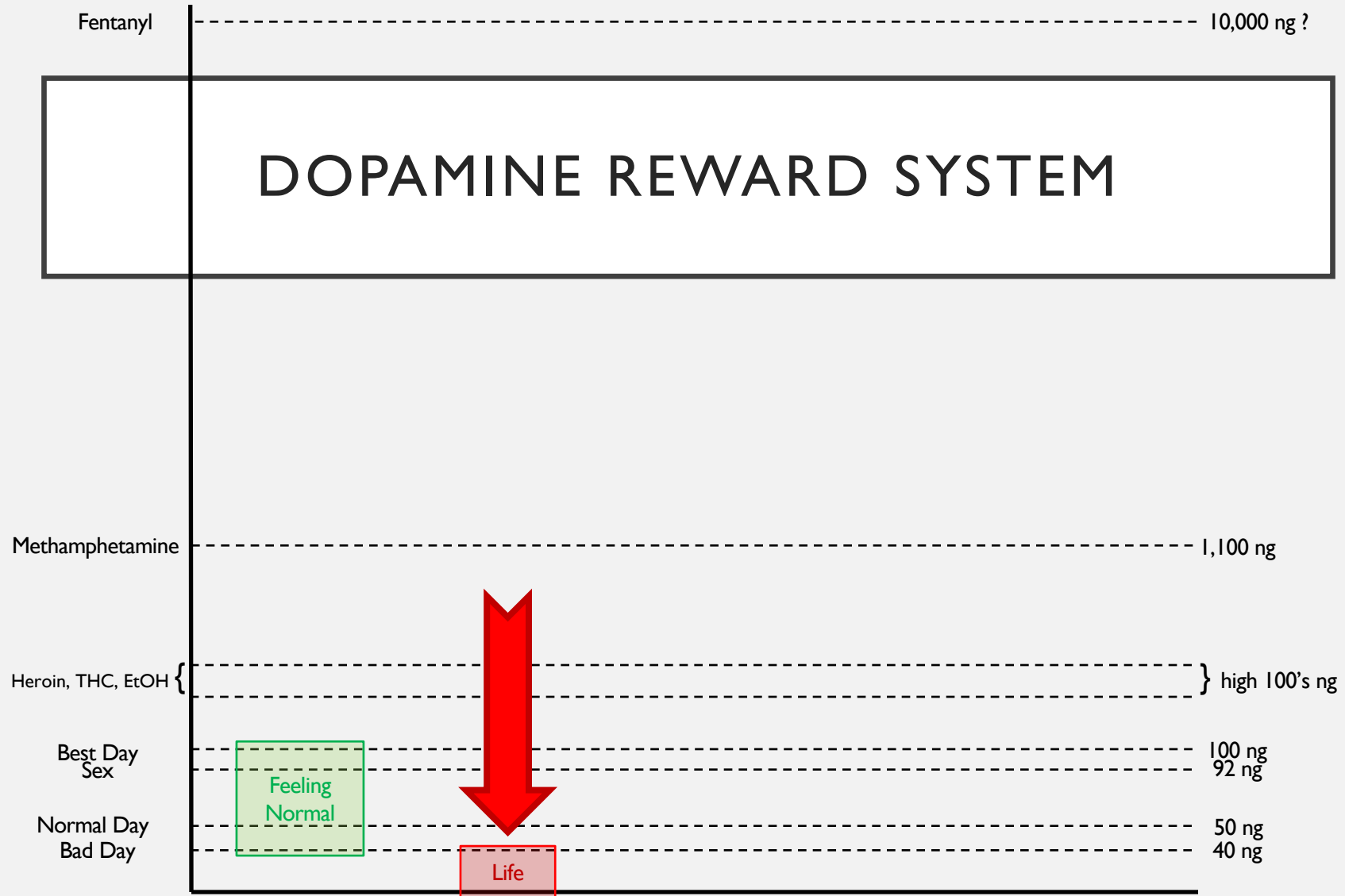
- MAT – Medication Assisted Treatment
 - Methadone - 75% effective
 - Buprenorphine (Subutex v. Suboxone [with Naloxone]) - 65% effective
 - Naltrexone – 25-60% effective
- Therapy
 - Moral Reconciliation Therapy (MRT)

TREATMENT

MORAL RECONATION THERAPY (MRT)

- Building of higher pinnacles of moral reasoning
- Lowering self-destructive tendencies and building your frustration tolerance
- Building a healthy concept of self
- Constructing a positive identity
- Reinforcing healthy habits and behaviors
- Assessing your current relationships
- Coming face-to-face with your current behaviors, attitudes, and beliefs

Dopamine
Level



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TEENS

STATISTICS FROM THE CDC

- Ages 10 – 19 from July–December 2019 to July–December 2021
 - Overdose Deaths increased **109%**
 - **90%** of deaths involved opioids and **84%** involved illicitly manufactured fentanyls (IMFs).
 - IMFs deaths increased **182%**.

TEENS

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- Counterfeit pills were present in nearly **25%** of deaths.

TEENS



TEENS



AUTHENTIC
oxycodone
M30 tablets



***FAKE**
oxycodone M30 tablets
containing fentanyl



***FAKE**
rainbow oxycodone M30 tablets containing fentanyl

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NALOXONE



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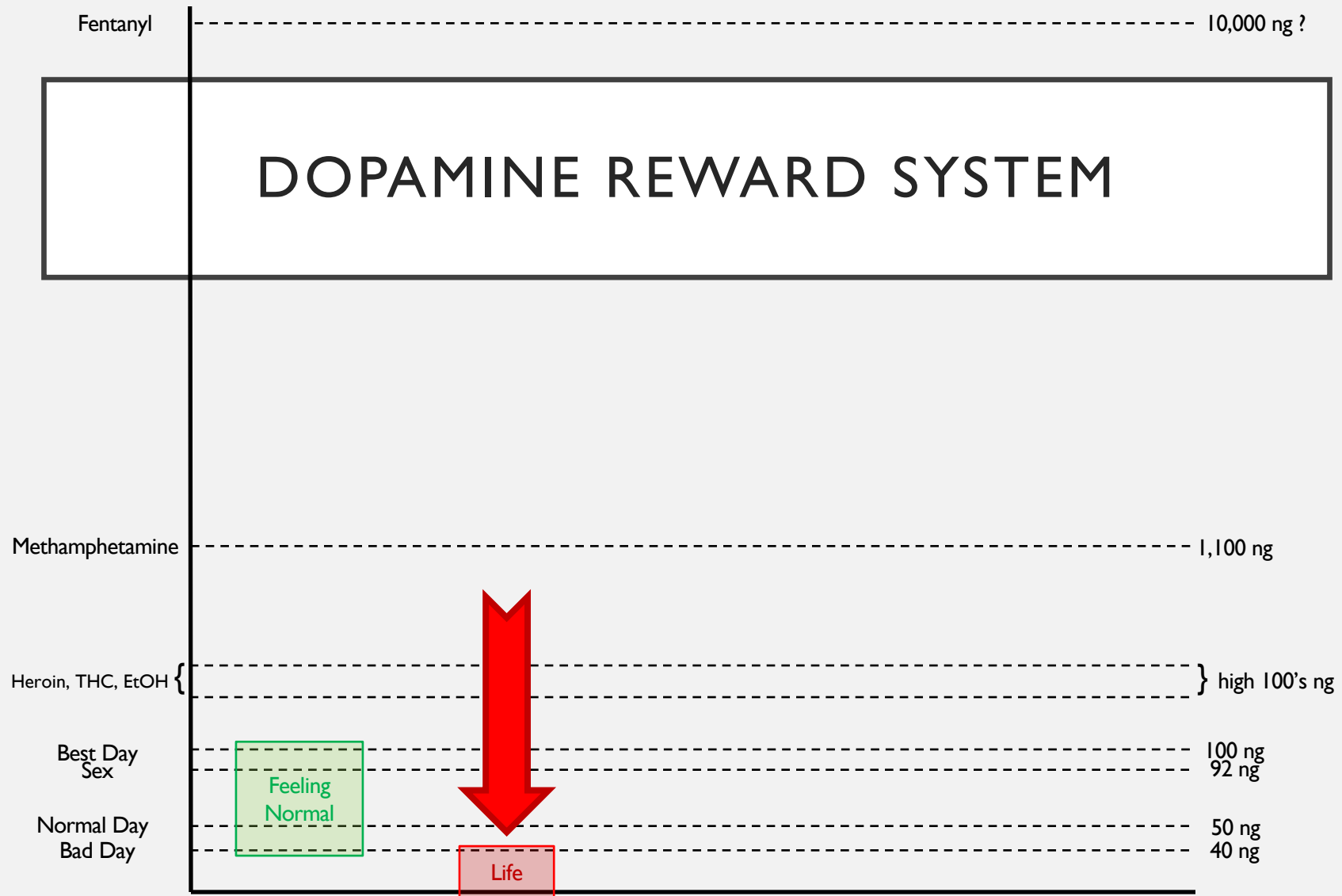
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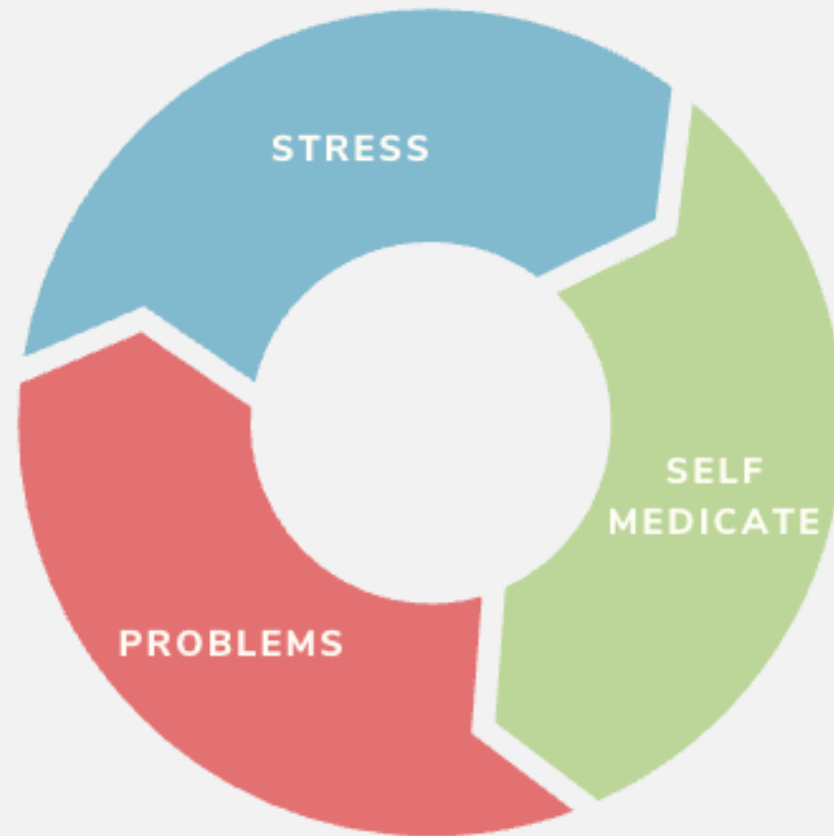
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- **41%** of dead teens had evidence of mental health conditions or treatment.

Dopamine
Level



TEENS



TEENS

- Talk to them!
 - Directly and honestly about Fentanyl
 - Discuss the Science
 - Lethality
 - Contamination
 - No pill is safe unless prescribed to you by a medical professional
- PLAN AHEAD

TEENS

PLAN AHEAD

- What to do in a bad situation.
 - How to say NO.
- What to do in an overdose.
 - Discuss signs of an overdose.
- Be there to NON-JUDGEMENTALY talk.

TAKE AWAY

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- Teens

TAKE AWAY

- Diagnosis of Addiction **BEHAVIORS**
- Dopamine Reward System
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TAKE AWAY

- Diagnosis of Addiction **BEHAVIORS**
- Dopamine Reward System **Dopamine = Behavior**
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TAKE AWAY

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- BEHAVIORS**
- Dopamine = Behavior**
- 50–100x stronger than morphine**

TAKE AWAY

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QUESTIONS

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REFERENCES

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