

Addiction and the Brain

Understanding Drug Addiction as a Disease

Peter Ninemire, LSCSW

The Caring Center of Wichita

October 31, 2019

Teen Summit Wichita, Kansas





**Families
Against
Mandatory
Minimums**

FAMMM





WICHITA STATE
UNIVERSITY

SPEED
LIMIT
20



THE CARING CENTER
Home & Community Services, LLC
118 - THE AVENUE

Defining the disease

Drugs change your brain chemistry *and* your behavior

National Institute of Drug Abuse

Drug addiction erodes a person's self-control and ability to make sound decisions, while sending intense impulses to take drugs.

Understanding the disease

Drugs change your brain chemistry *and* your behavior

Science of substance dependence

1. All addictive drugs produce a reward system in our brains.
2. Using addictive drugs gives us a feeling of well-being and alleviates bad feelings.
3. Our bodies develop a tolerance to limit the toxic effects of addictive drugs which requires us to take more, more often.

Science of substance dependence

1. All addictive drugs produce a reward system in our brains.
2. Using addictive drugs gives us a feeling of well-being and alleviates bad feelings.
3. Our bodies develop a tolerance to limit the toxic effects of addictive drugs which requires us to take more, more often.

Science of substance dependence

1. All addictive drugs produce a reward system in our brains.
2. Using addictive drugs gives us a feeling of well-being and alleviates bad feelings.
3. Our bodies develop a tolerance to limit the toxic effects of addictive drugs which requires us to take more, more often or suffer the consequences of withdrawal.

Drug Addiction

-

Substance Dependence

-

Substance Use Disorder

- Drugs change the brain until the brain adapts to it as its new normal
- Users experience withdrawal symptoms when the drug is no longer present

Science of substance dependence

Using

too much

too often

too soon

develops dependence

NEXT

Getting that *next* feel-good "high."



Courtesy of Quora

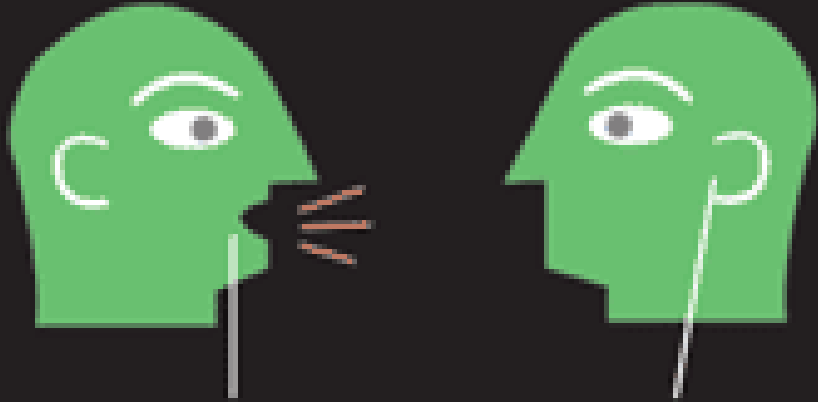
Your brain on drugs

Drugs change your brain chemistry *and* your behavior

Your brain on drugs...



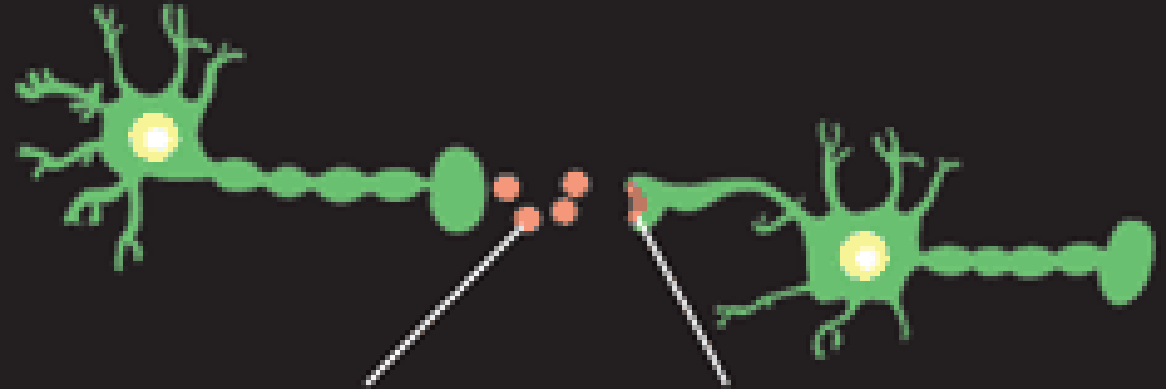
Here's how people communicate.



Transmitter

Receptor

Here's how brain cells communicate.



Neurotransmitter

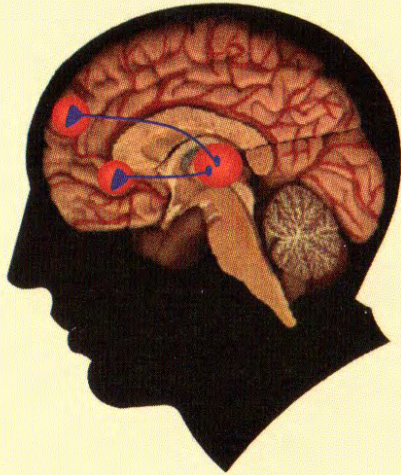
Receptor

Concept courtesy: B.K. Madras

Drugs of abuse target the brain's reward system by flooding the circuit with dopamine.

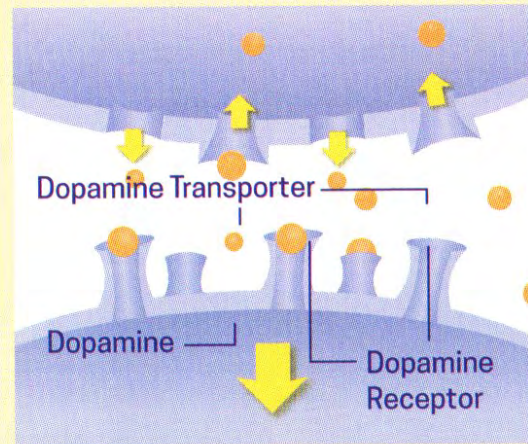
Some drugs target the brain's pleasure center

Brain reward (dopamine pathways)



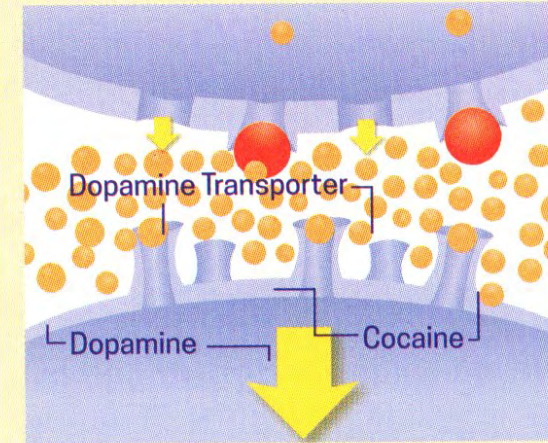
These brain circuits are important for natural rewards such as food, music, and sex.

How drugs can increase dopamine



While eating food

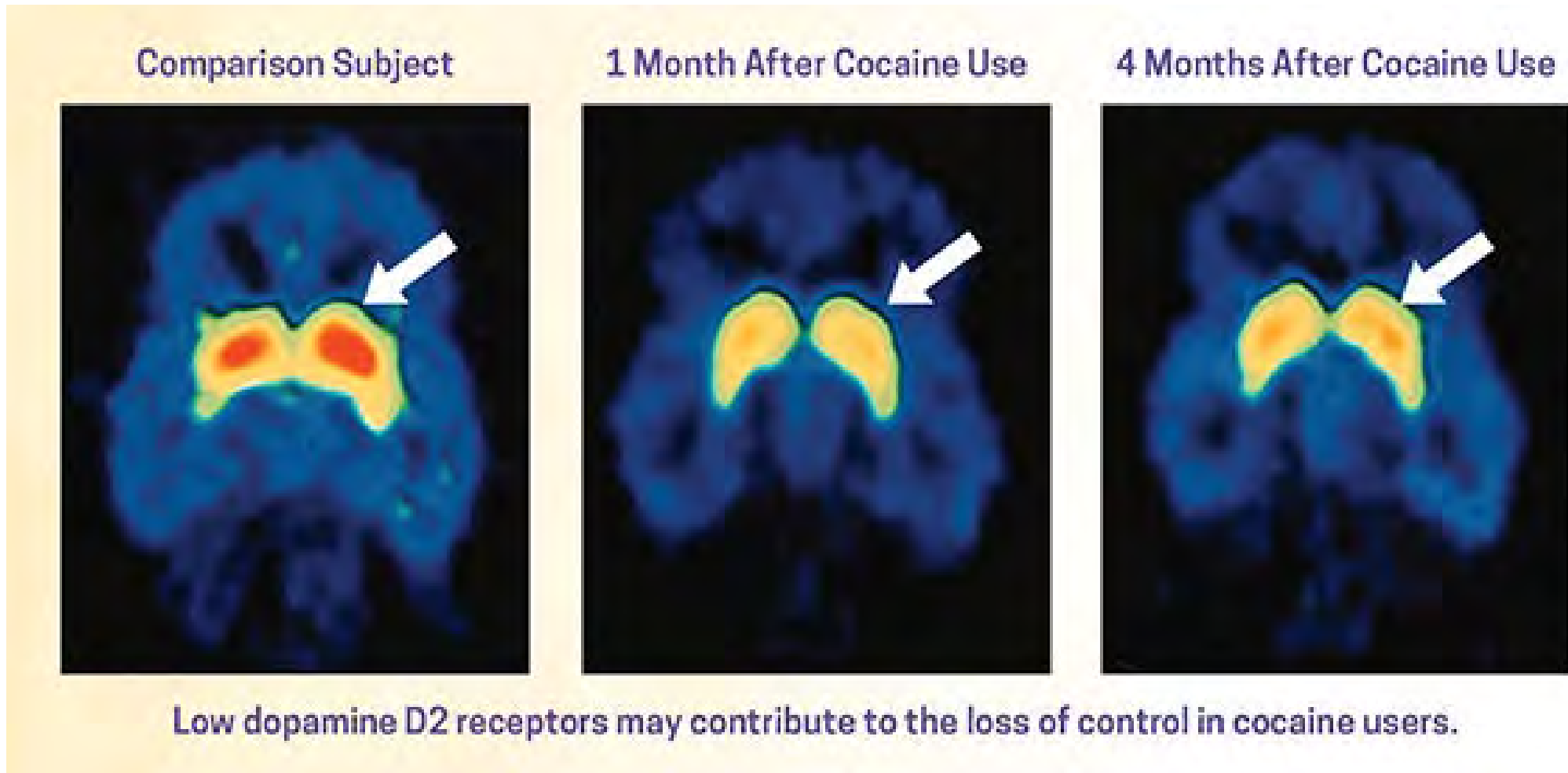
Typically, dopamine increases in response to natural rewards such as food. When cocaine is taken, dopamine increases are exaggerated, and communication is denied.



While using cocaine

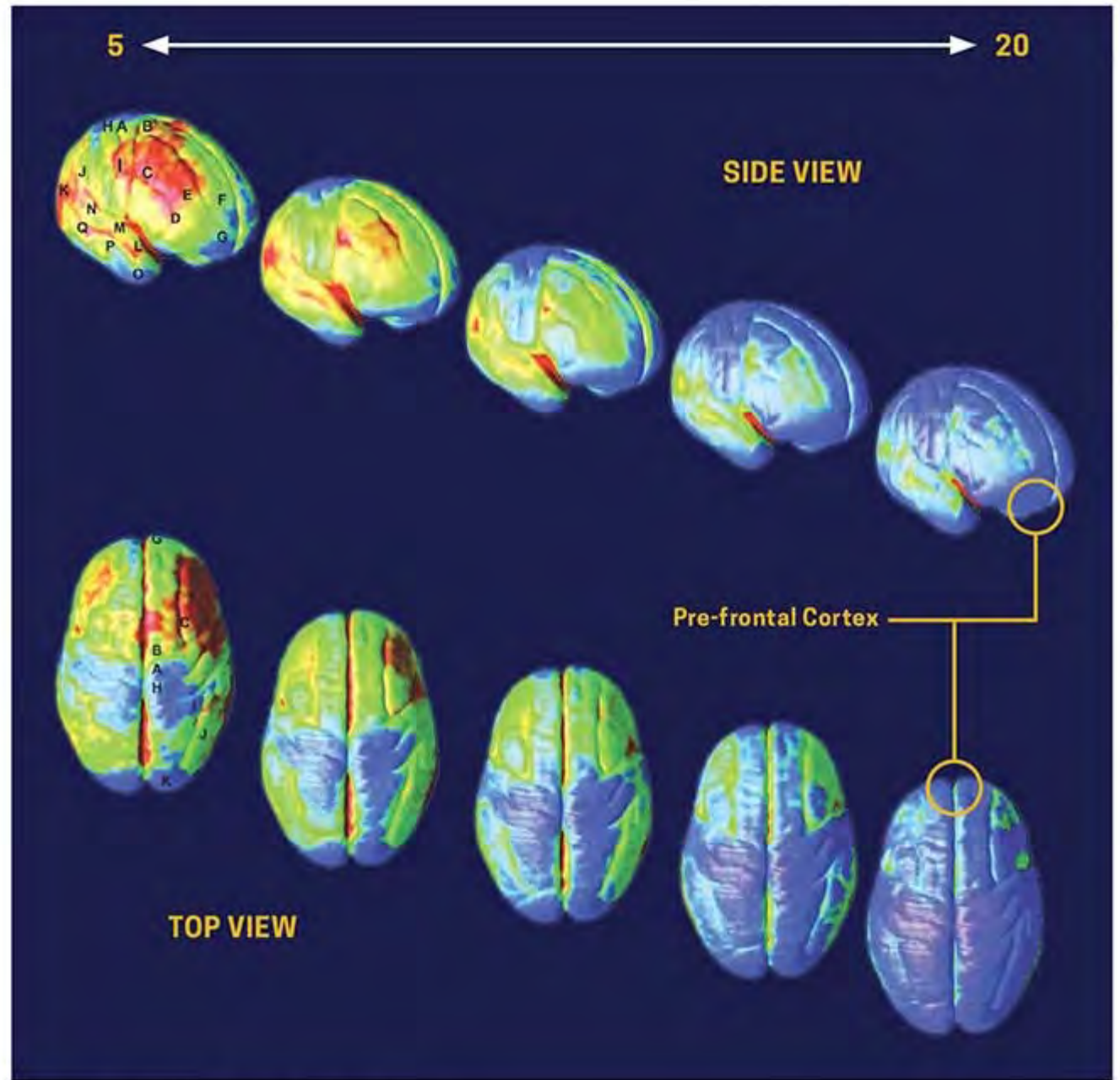
Some drugs of abuse release 2 to 10 times the amount of dopamine than natural rewards

A Brain on Drugs



Your Brain changes dramatically in your teens.

Images of Brain Development in healthy Children and Teens
(Ages 5-20)



Your Brain is still developing into your 20s.

(Simpkin, 2006)

“The combination of heightened responsiveness to rewards and immaturity in behavior control areas may bias adolescents to seek immediate rather than long-term gains.”

**WHEN YOU DIDN'T
STUDY FOR A TEST**



**AND ACT LIKE YOU
KNOW WHAT YOUR DOING**

imgflip.com

**Growing up is a
long and painful
process.**

Stress is everywhere

Adolescence appears to be a time of increased sensitivity to stress, which worsens each time substances are used to relieve stress.

(Simpkin)

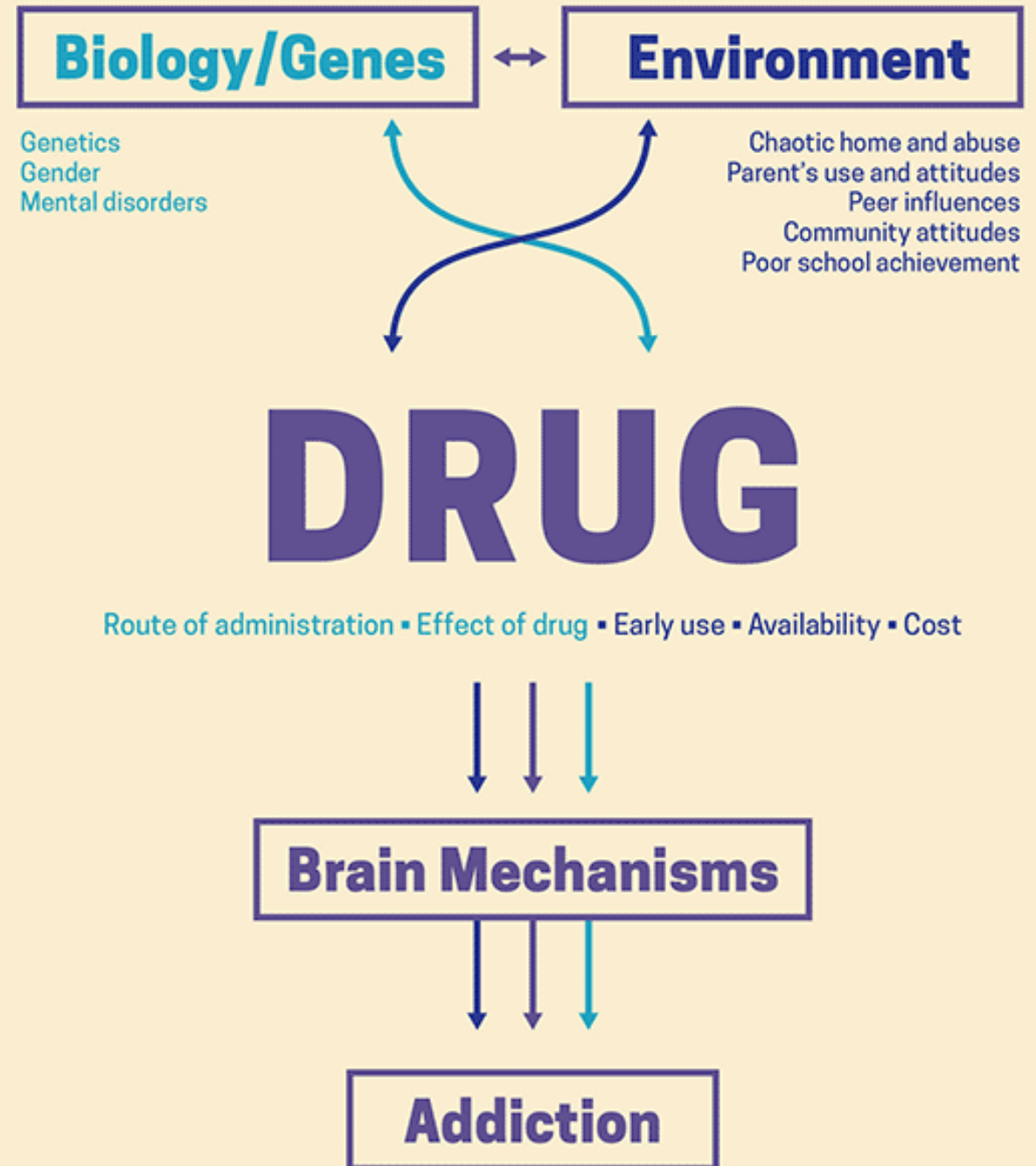
Your risk factors

Drugs change your brain chemistry *and* your behavior

No single factor determines if you will become addicted to drugs.

Early use is a factor

Courtesy National Institute of Drug Addiction, National Institute of Health



Adolescent Risk and Protective Factors

Risk Factors	Domain	Protective Factors
Poor Social Skills	Individual	Positive Relationships
Substance Abuse	Peer	Academic Competence
Drug Availability	School	Anti-Drug Use Policies

A predictor of progression to alcohol-related harm is age at first use.

Age of First Drink			Probability of Abuse and Dependence	
Age of First Drink	Abuse	Dependence		
11 – 12	=	15.9%		
13 – 14	=	9.0%		
19 – 20	=	1%		

Early use is a factor

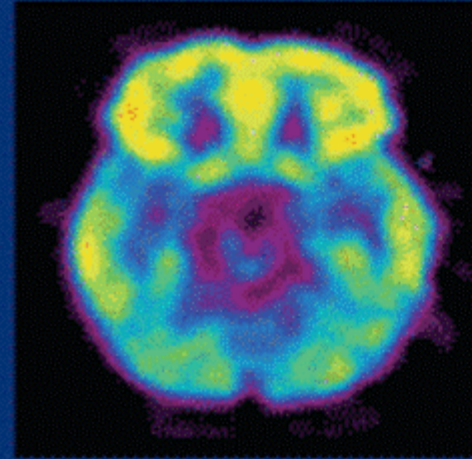
Drug addiction as a Disease

Drugs change your brain chemistry *and* your behavior

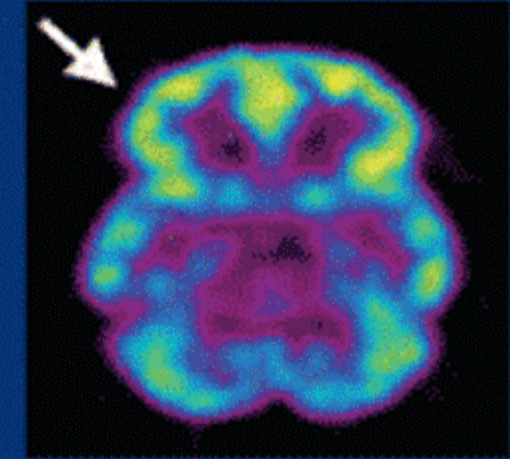
**Drug Addiction
is a disease like
heart disease.**

Courtesy of National Institute of Drug Abuse

DECREASED BRAIN METABOLISM IN *DRUG ABUSER*

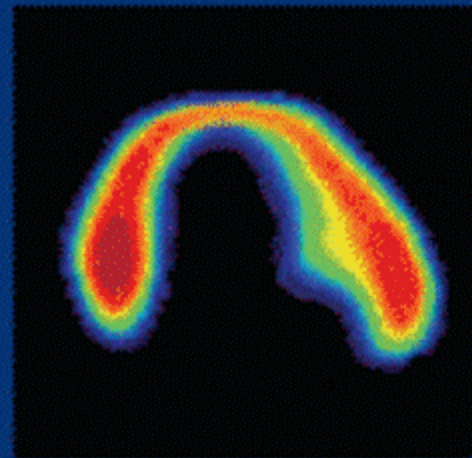


Healthy Brain

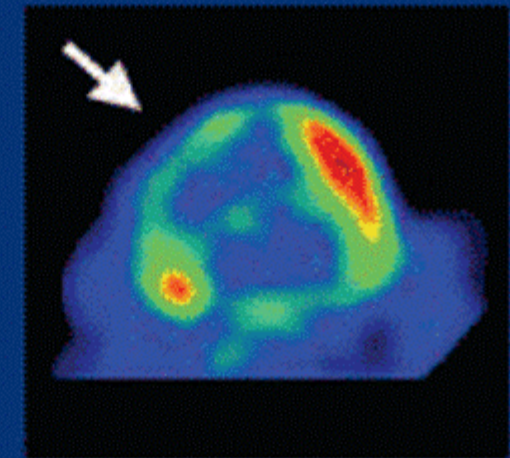


Diseased Brain/Cocaine Abuser

**DECREASED HEART METABOLISM IN
*HEART DISEASE PATIENT***



Healthy Heart



Diseased Heart



Drug Addiction recovery is long-term

Symptoms of Diabetes

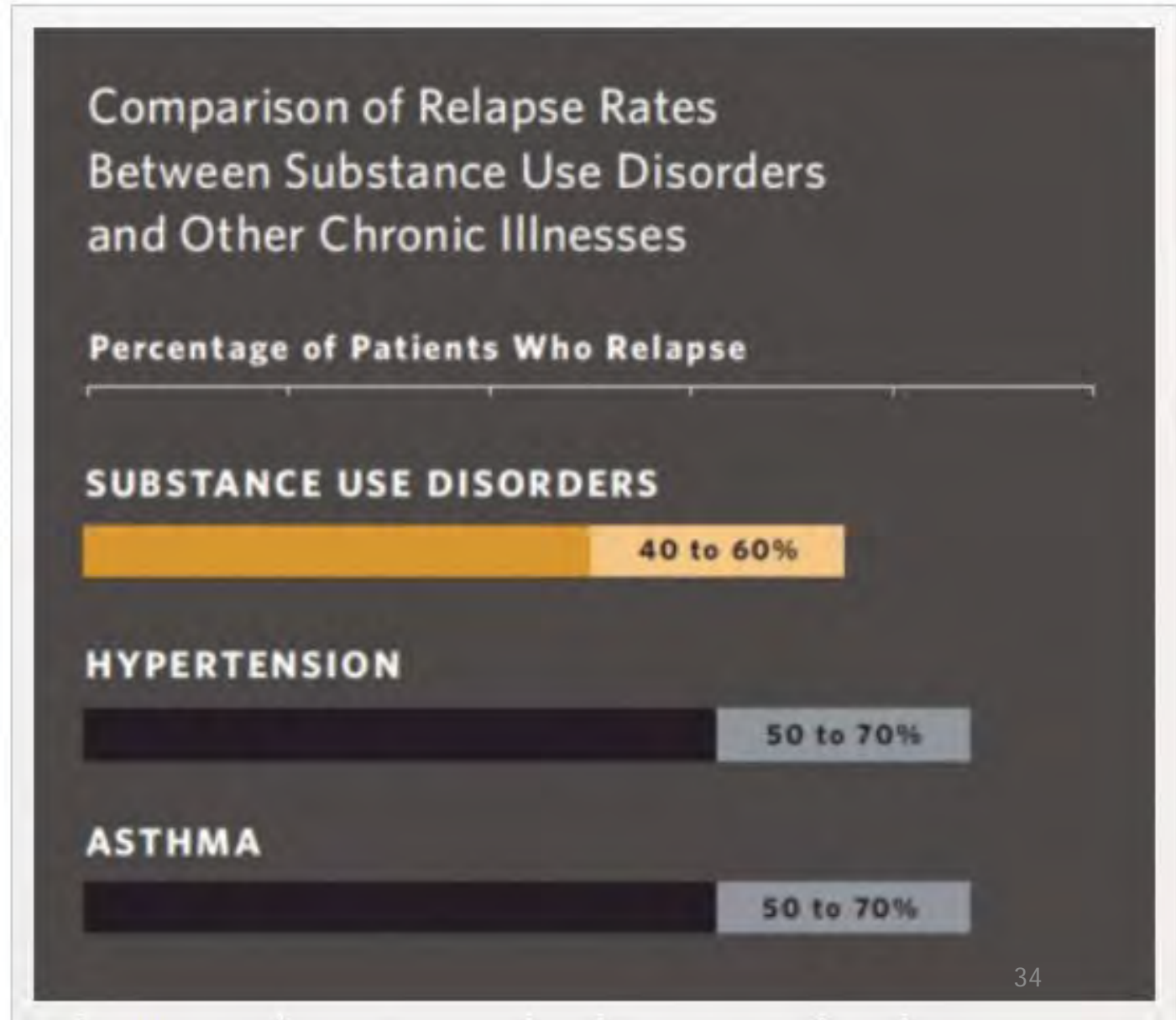
- Tiredness
 - Poor Circulation
 - High Blood Sugar
-
- Use despite harmful consequences
 - Genetic predisposition
 - The point of entry equals onset of the disease
 - *You don't un-get it*

Symptoms of Addiction

- Inability to control intake
 - Susceptible to triggers
 - High tolerance/deep withdrawals
-
- Use despite harmful consequences
 - Genetic predisposition
 - The point of entry equals onset of the disease
 - *You don't un-get it*

Patients who have a Chronic Illness; often relapse.

Courtesy National Institute of Drug Addiction, National Institute of Health



Your brain on marijuana

Drugs change your brain chemistry *and* your behavior

Marijuana Myths

- Not harmful
- Not addictive
- No withdrawal

Marijuana's Effects on the Brain

HYPOTHALAMUS
Controls appetite,
hormonal levels and
sexual behavior

BASAL GANGLIA
Involved in motor
control and
planning, as well as
the initiation and
termination of action

VENTRAL STRIATUM
Involved in the prediction
and feeling of reward

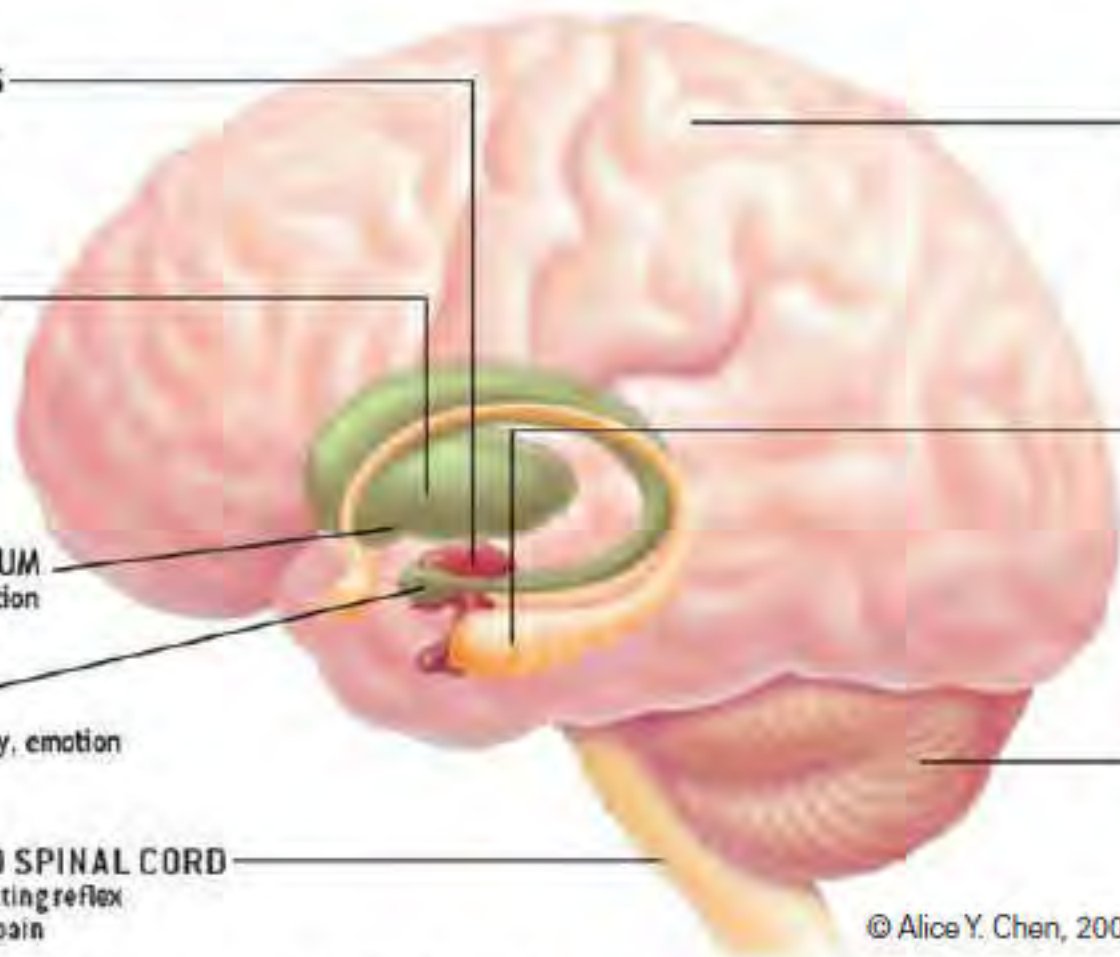
AMYGDALA
Responsible for anxiety, emotion
and fear

BRAIN STEM AND SPINAL CORD
Important in the vomiting reflex
and the sensation of pain

NEOCORTEX
Responsible for higher
cognitive functions and
the integration of
sensory information

HIPPOCAMPUS
Important for memory
and the learning of
facts, sequences and
places

CEREBELLUM
Center for motor control
and coordination

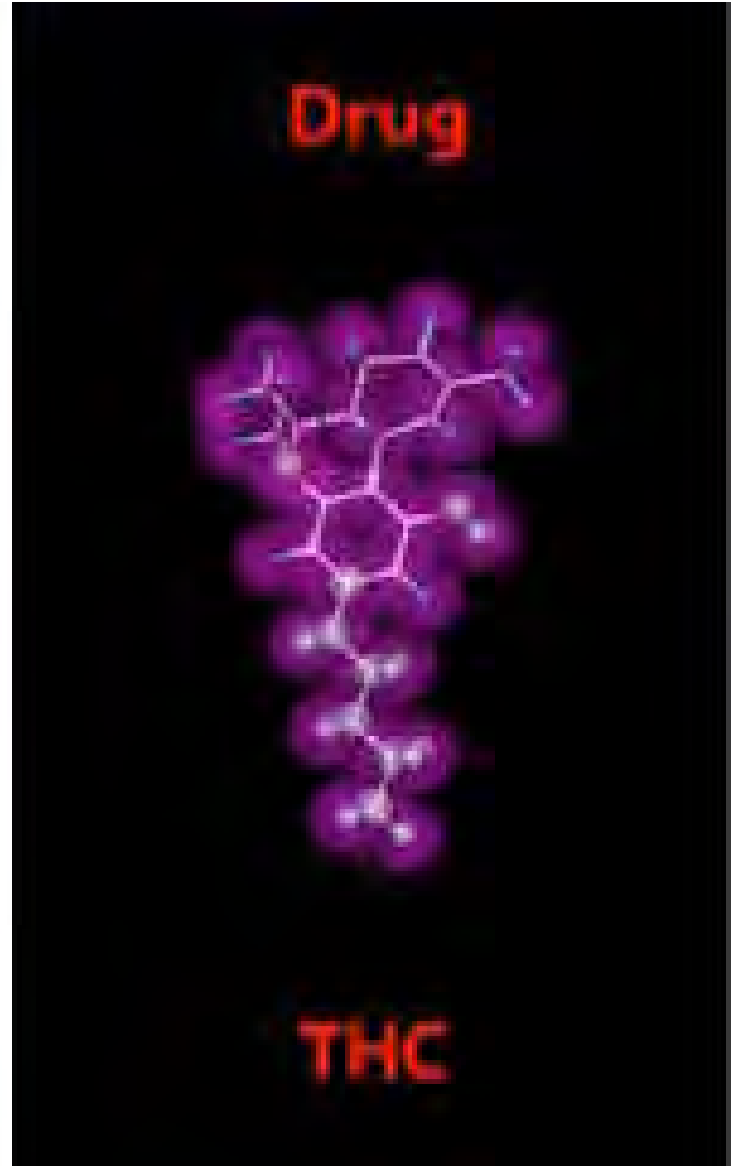
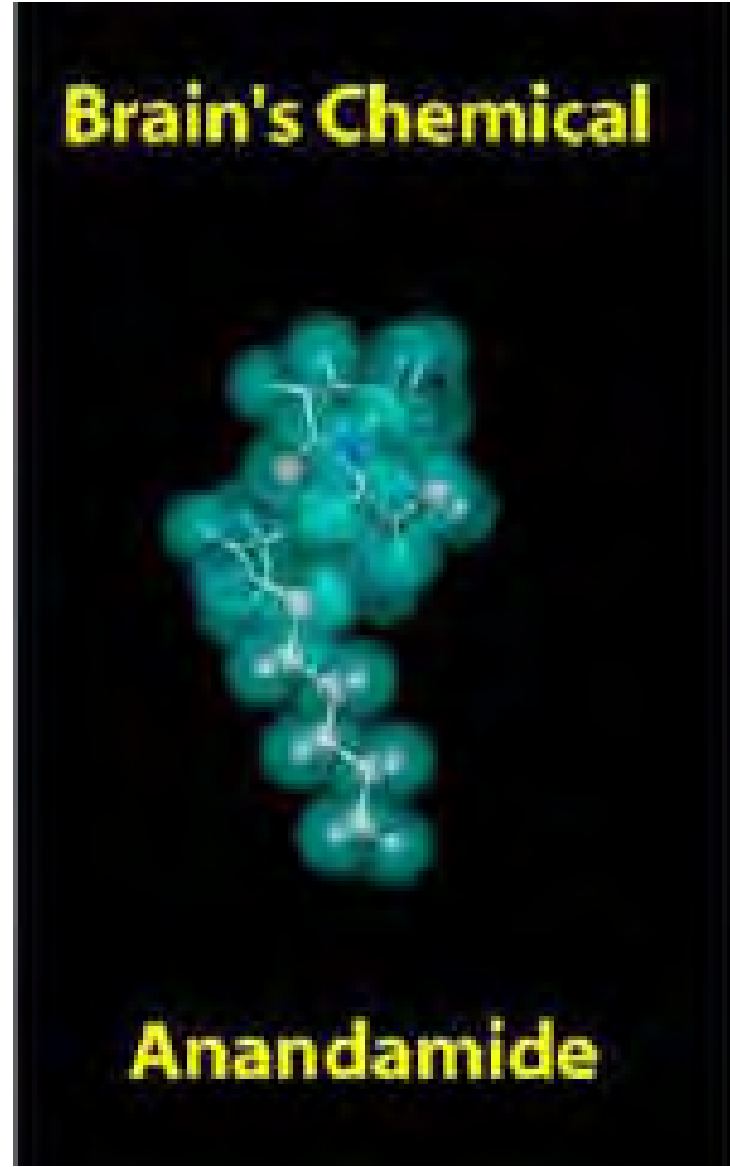


© Alice Y. Chen, 2004. Adapted from *Scientific American*.

When marijuana is smoked, its active ingredient, THC, travels throughout the body, including the brain, to produce its many effects. THC attaches to sites called cannabinoid receptors on nerve cells in the brain, affecting the way those cells work. Cannabinoid receptors are abundant in parts of the brain that regulate movement, coordination, learning and memory, higher cognitive functions such as judgment, and pleasure.

**THC hijacks
normal brain
communication
by mimicking
anandamide, a
neurotransmitter**

Courtesy of National Institute of Drug Abuse



Marijuana impairs higher brain function

Reduces

- Learning
- Memory
- Concentration
- Problem solving
- Decision making

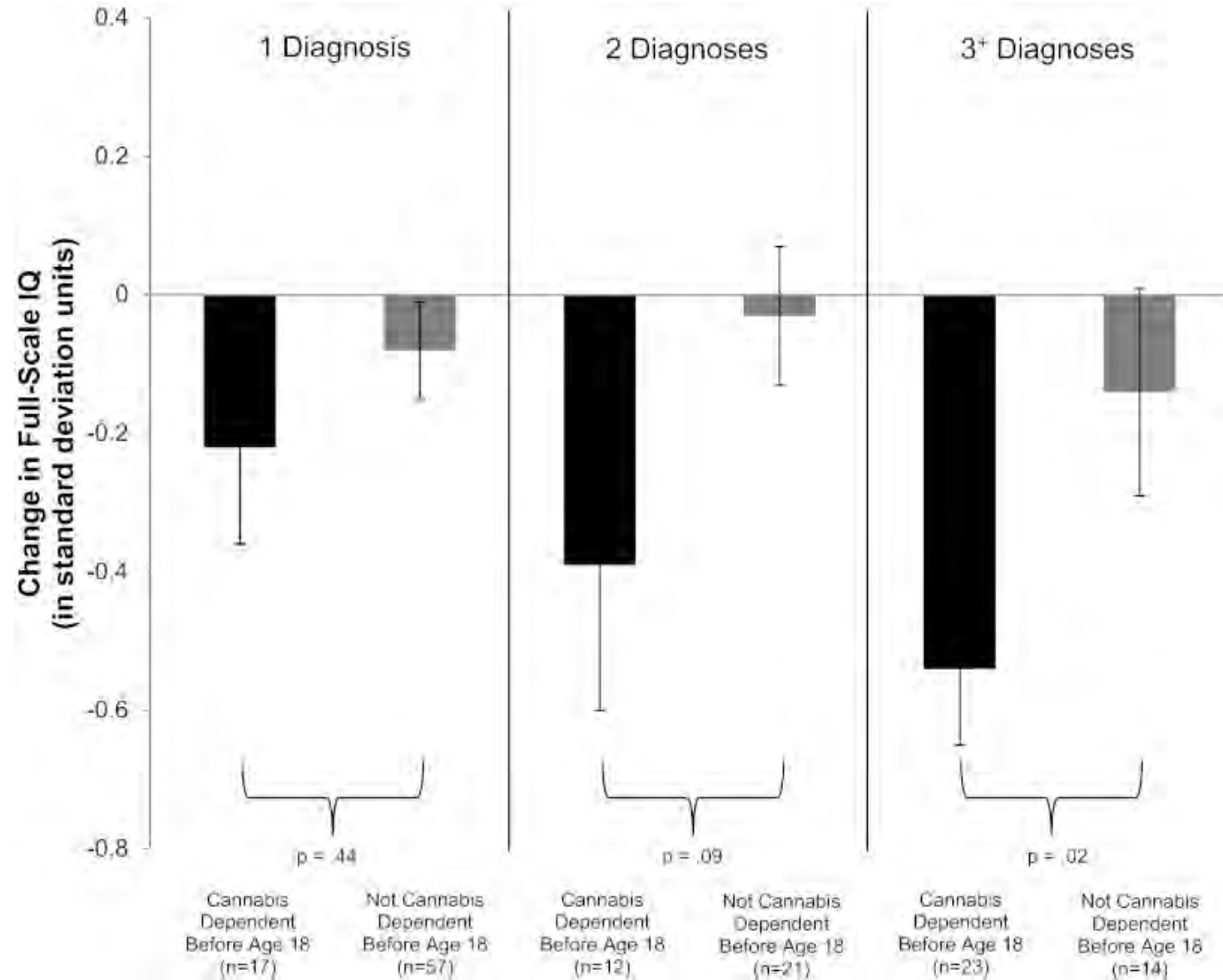
Reduces

- Emotional control
- Behavior control

Increases

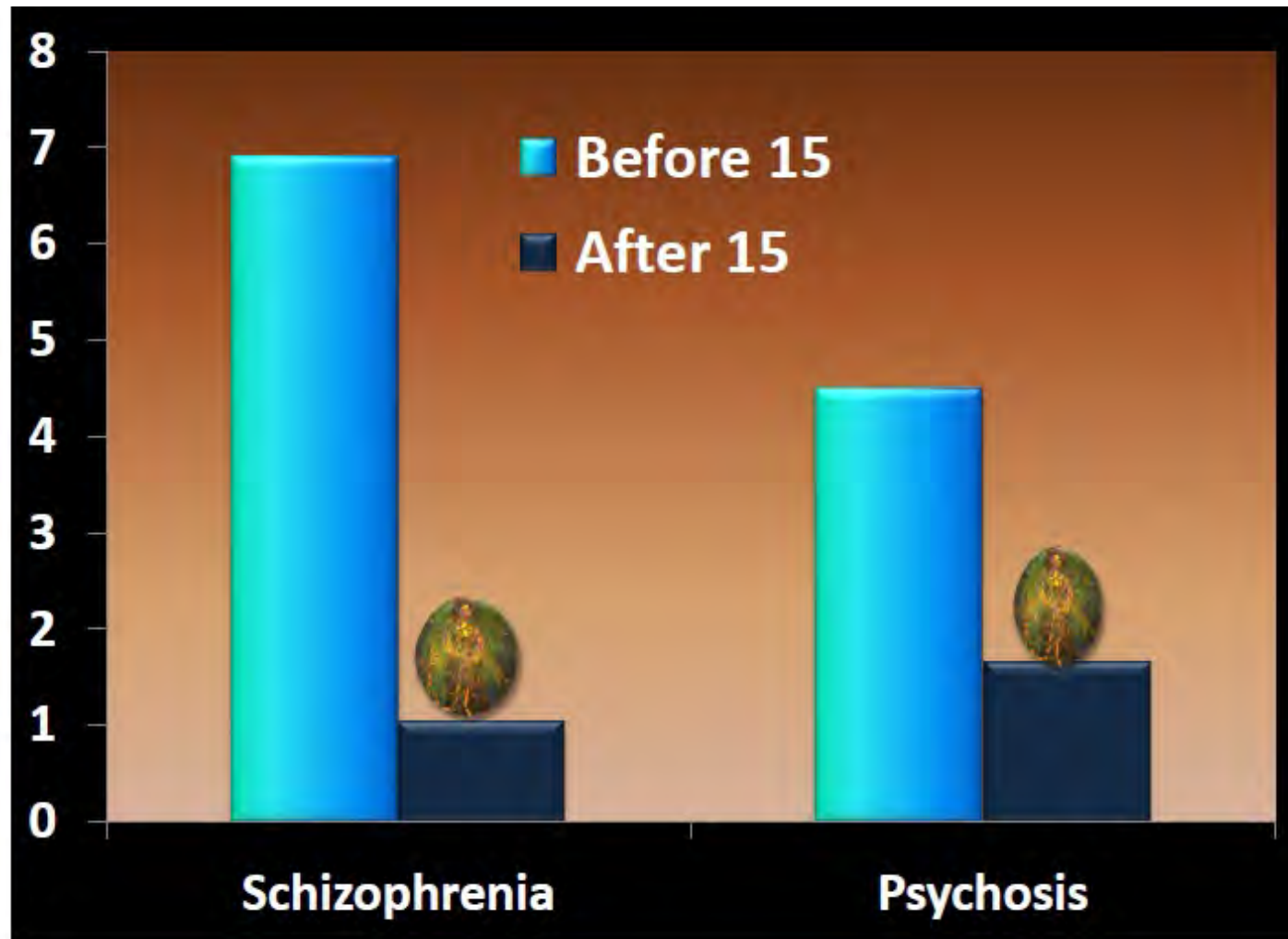
- Impulsivity
- Hunger

Marijuana use associated with reduced I.Q.



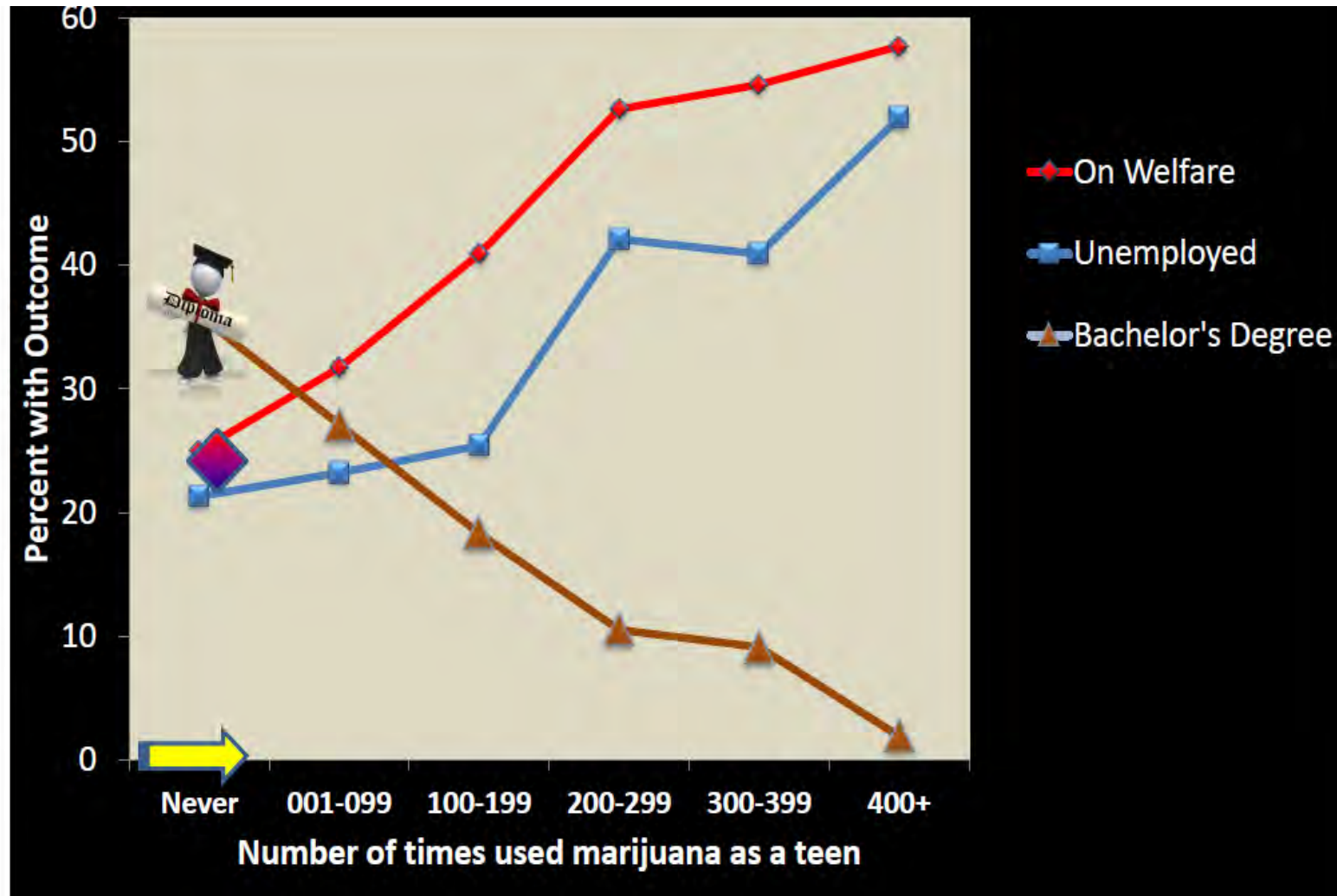
Courtesy of National Science Academy

Early medical use associated with psychosis in young adults



Courtesy Harvard Medical School

Teen marijuana use affects adult motivation



Courtesy Harvard Medical School

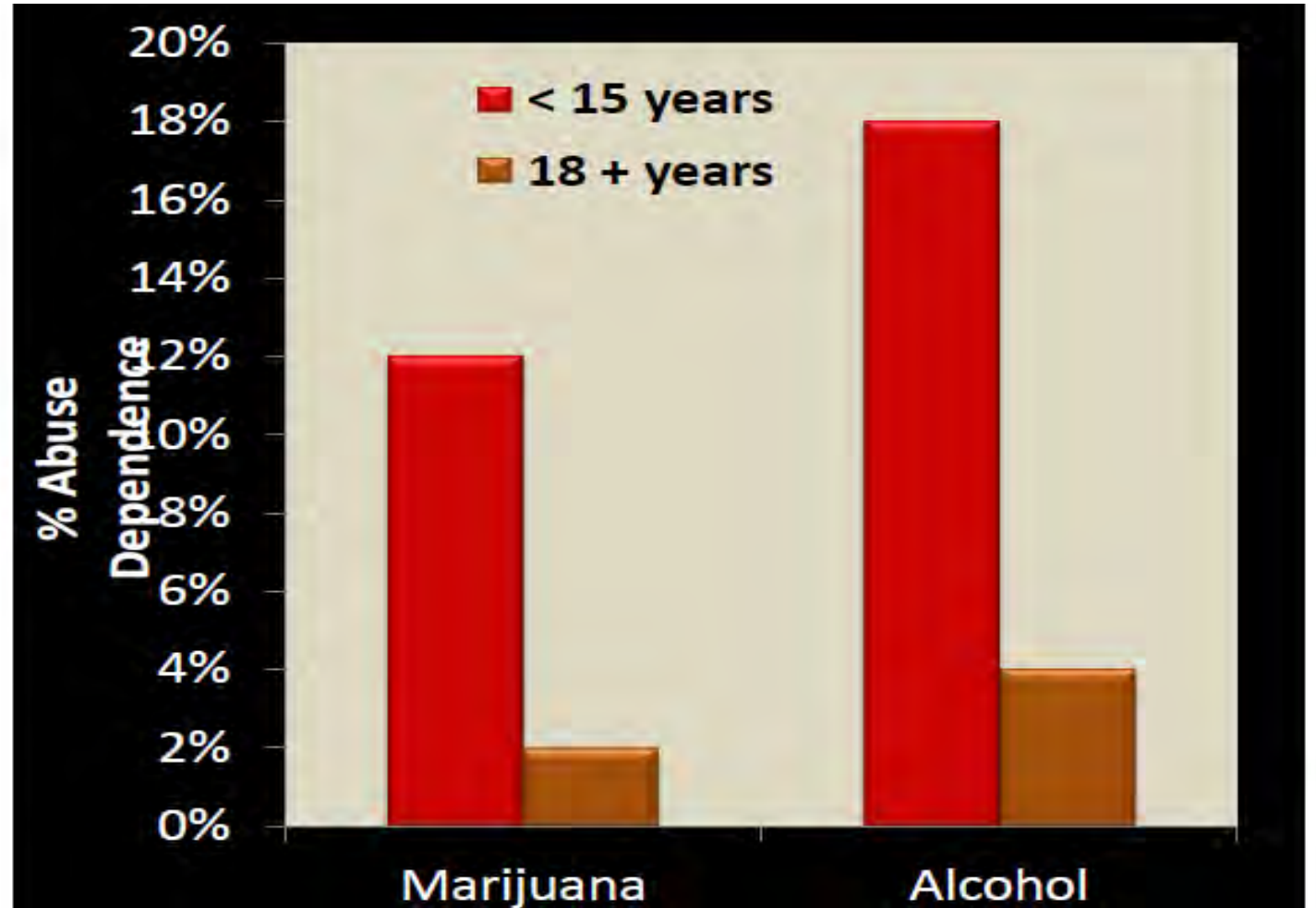
Cannabis Addiction Risk

Users	Ratio	Percent
All Users	1:10	10%
Mid-Teen	1:6	17%
Daily Use	1:2-3	30-50%

Courtesy Harvard Medical School

Risk of Initiation

- Nicotine
- Alcohol
- Marijuana
- Inhalants
- Simulants
- Cocaine
- Opioids
- Hallucinogens
- Anxiolytics



Courtesy SAMHSA 2013 National Drug Study

Cannabis withdrawal symptoms

1. Irritability, anger, or aggression
2. Nervousness or anxiety
3. Sleep difficulty
4. Restlessness
5. Depressed mood

Wrap up

Drugs change your brain chemistry *and* your behavior

The disorder

Using

too much

too often

too soon

develops dependence

The reality

Addictive Drugs

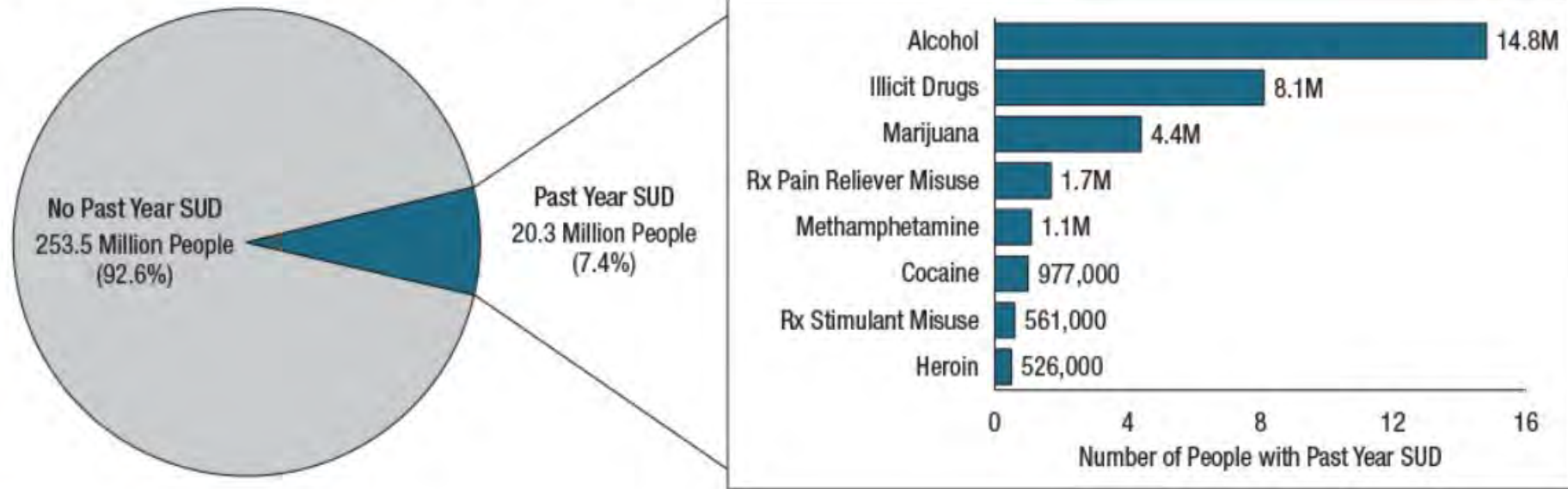
1. Target the brain's pleasure center.
2. Remain in the brain long after withdrawal symptoms end which causes multiple relapses.
3. Disrupt critical brain functions that control judgement, decision-making, and behavior which also causes stress.

What can we do?

Be the change

Don't be a statistic

Figure 42. People Aged 12 or Older with a Past Year Substance Use Disorder (SUD): 2018



Rx = prescription.

Note: The estimated numbers of people with substance use disorders are not mutually exclusive because people could have use disorders for more than one substance.

D

Don't try drugs

Because your brain might like them and...
You'll find you can't quit after it's too late.

Do be a person
with a fully
developed brain

What's your Nirvana?

Courtesy of Reddit (incase you couldn't tell)

DOING DRUGS



USING ALCOHOL



**LEADING A
HEALTHY LIFESTYLE
AND USING REDDIT**



USING MEMES



**USING MEMES AND REDDIT
AT THE EXACT SAME TIME**



imgflip.com

The End