

# A Brief Look at the Science Behind Addiction, Opioid Use Disorder, and its Treatment

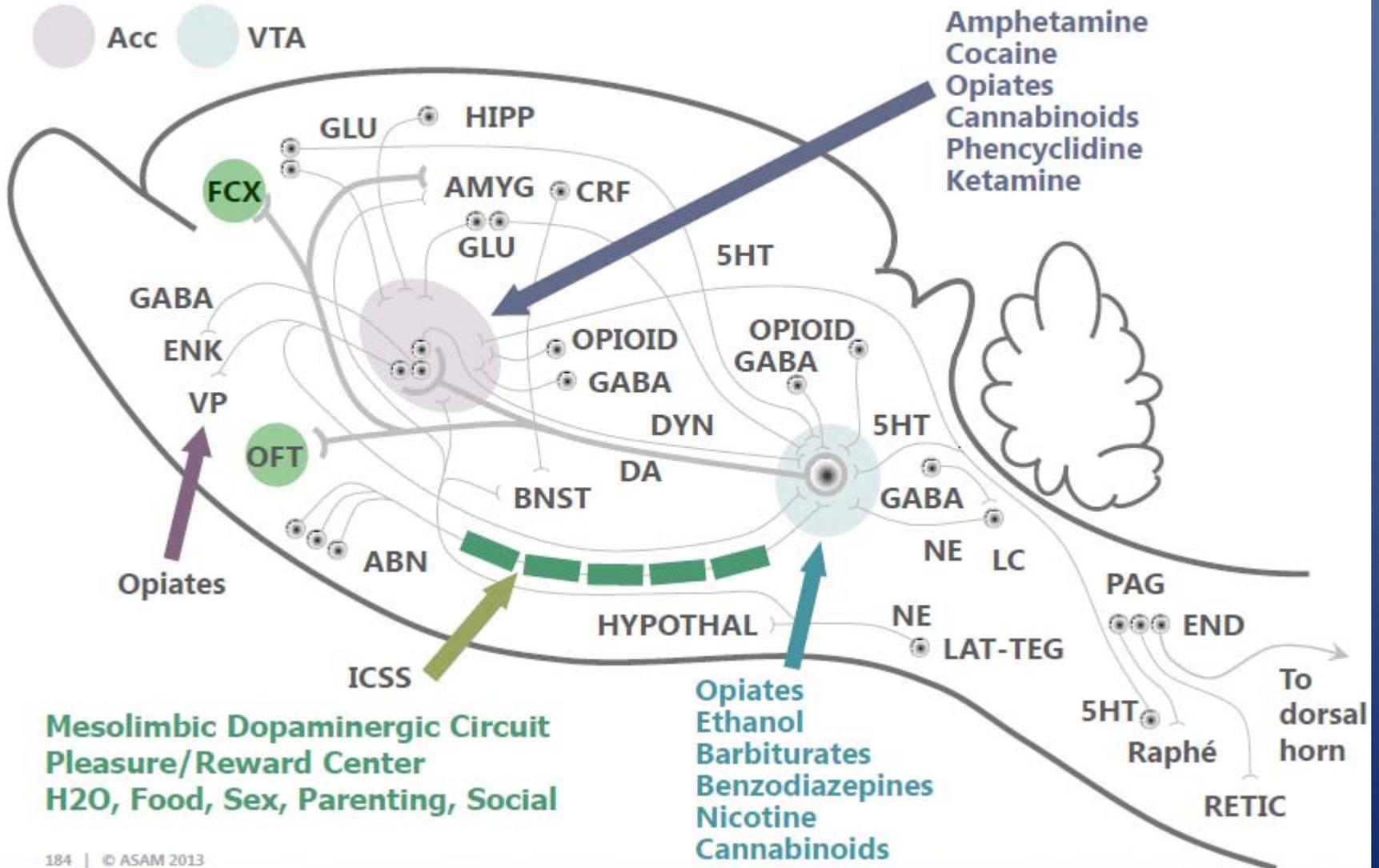
Yngvild Olsen, MD, MPH

MACo Summit

June 12, 2014

# Eliot Gardner

● Acc ● VTA



# Pain and Pleasure...



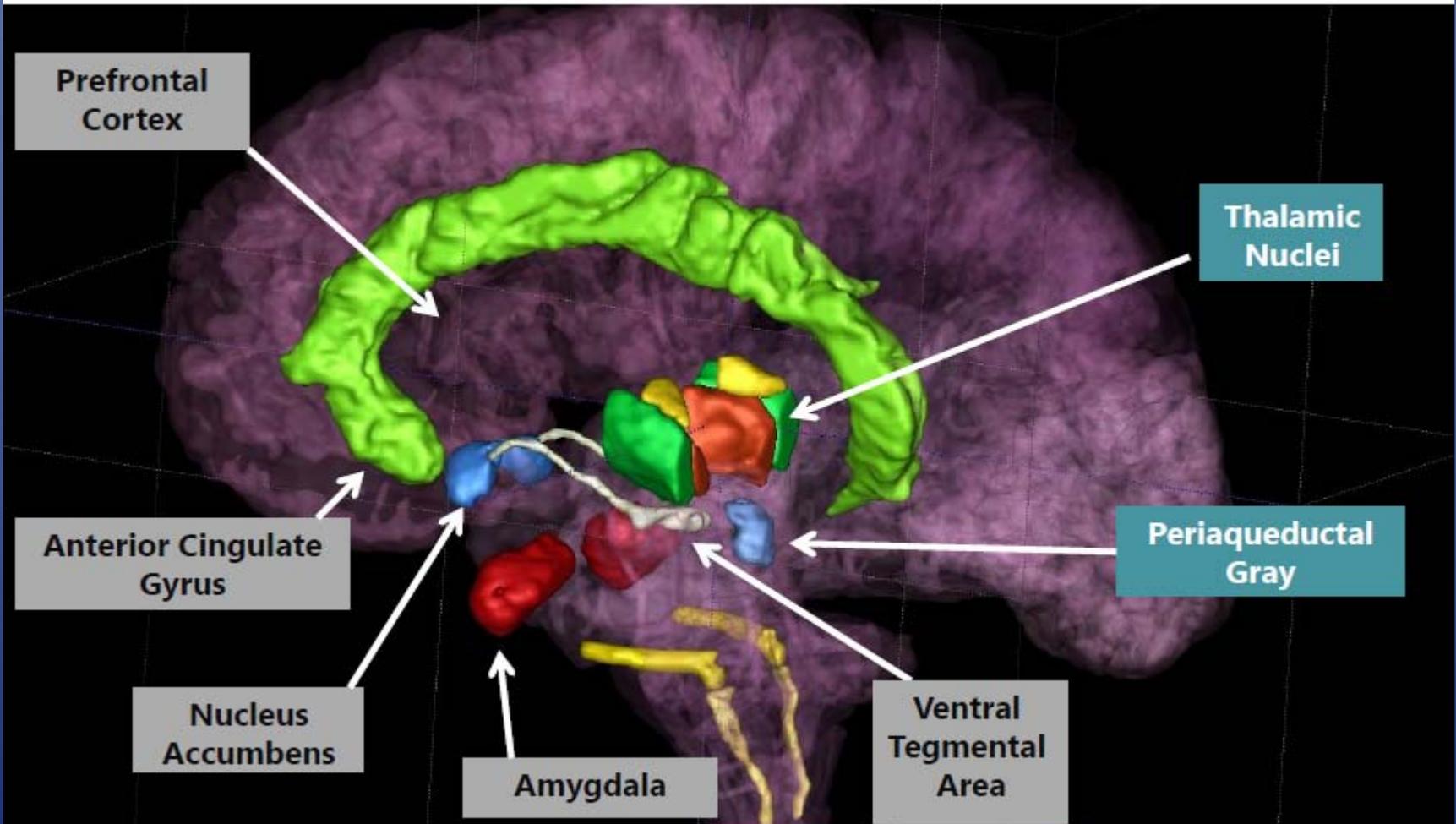
Pain



Pleasure



Both



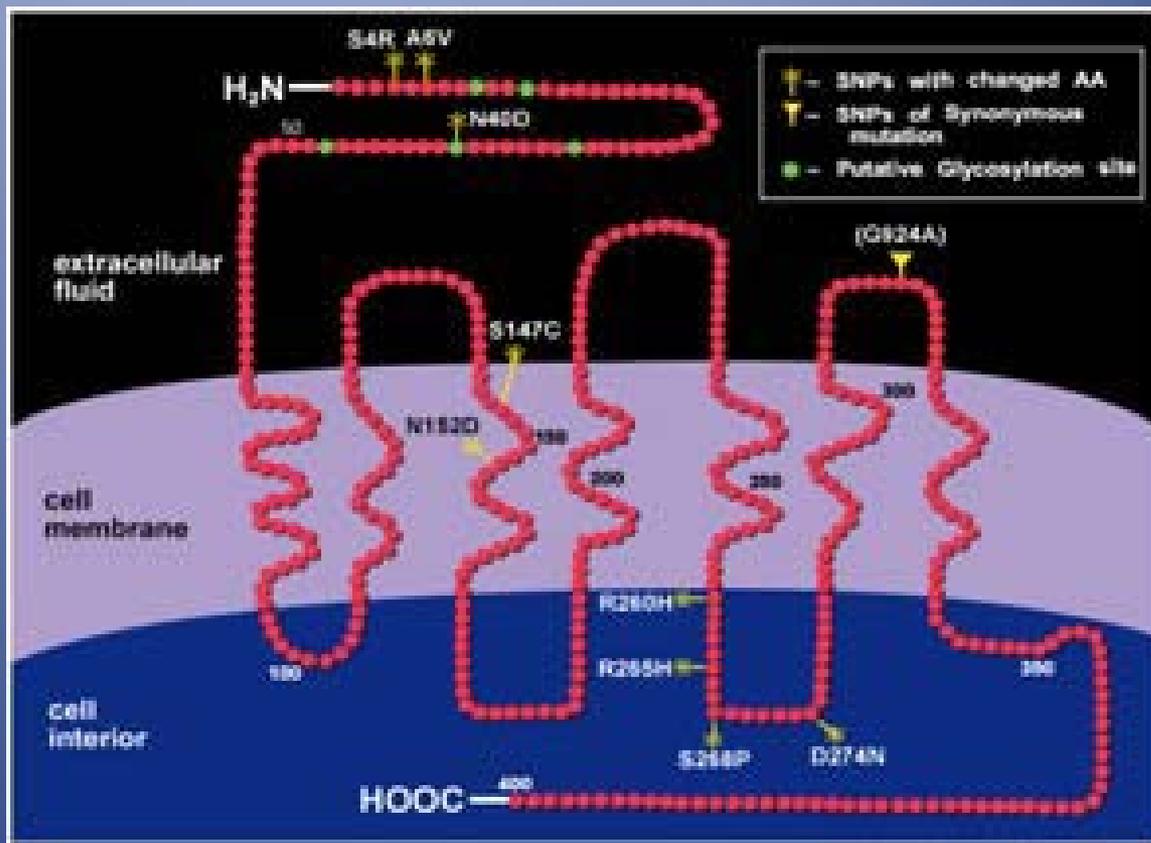
# Genetic Variants of the Human Mu Opioid Receptor: Single Nucleotide Polymorphisms in the Coding Region Including the Functional A118G (N40D) Variant

## HYPOTHESIS

Gene variants:

- Alter physiology  
“PHYSIOGENETICS”
- Alter response to medications  
“PHARMACOGENETICS”
- Are associated with specific addictions

Slide Source: Dr. Kreek





# Basic Definitions

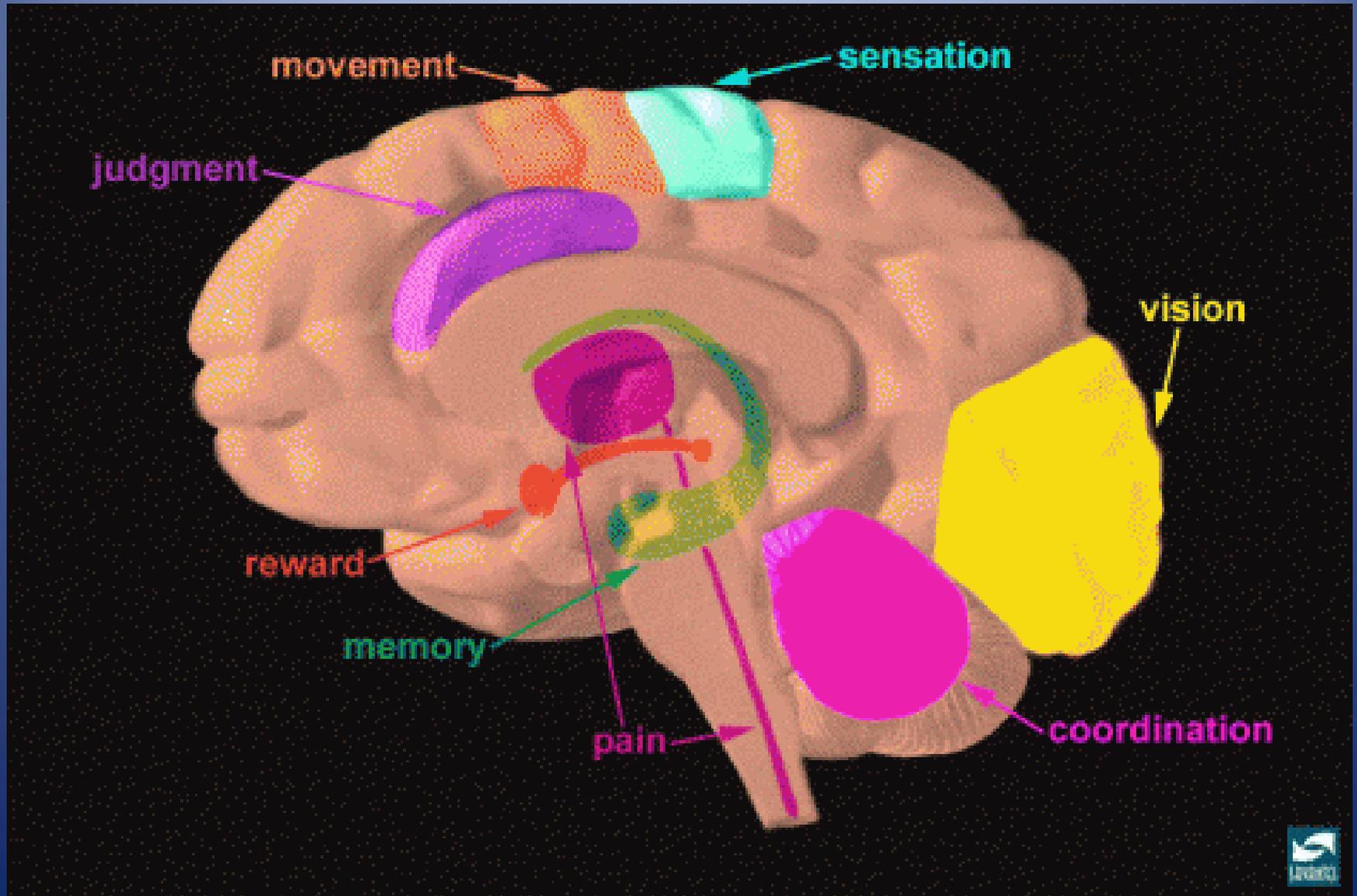
## Addiction

- A primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations.\*
- A chronic, relapsing disease characterized by compulsive drug seeking and use despite harmful consequences as well as neurochemical and molecular changes in the brain.\*\*
- A brain disease that affects behaviour.

\*American Society of Addiction Medicine

\*\*National Institute on Drug Abuse (NIDA)

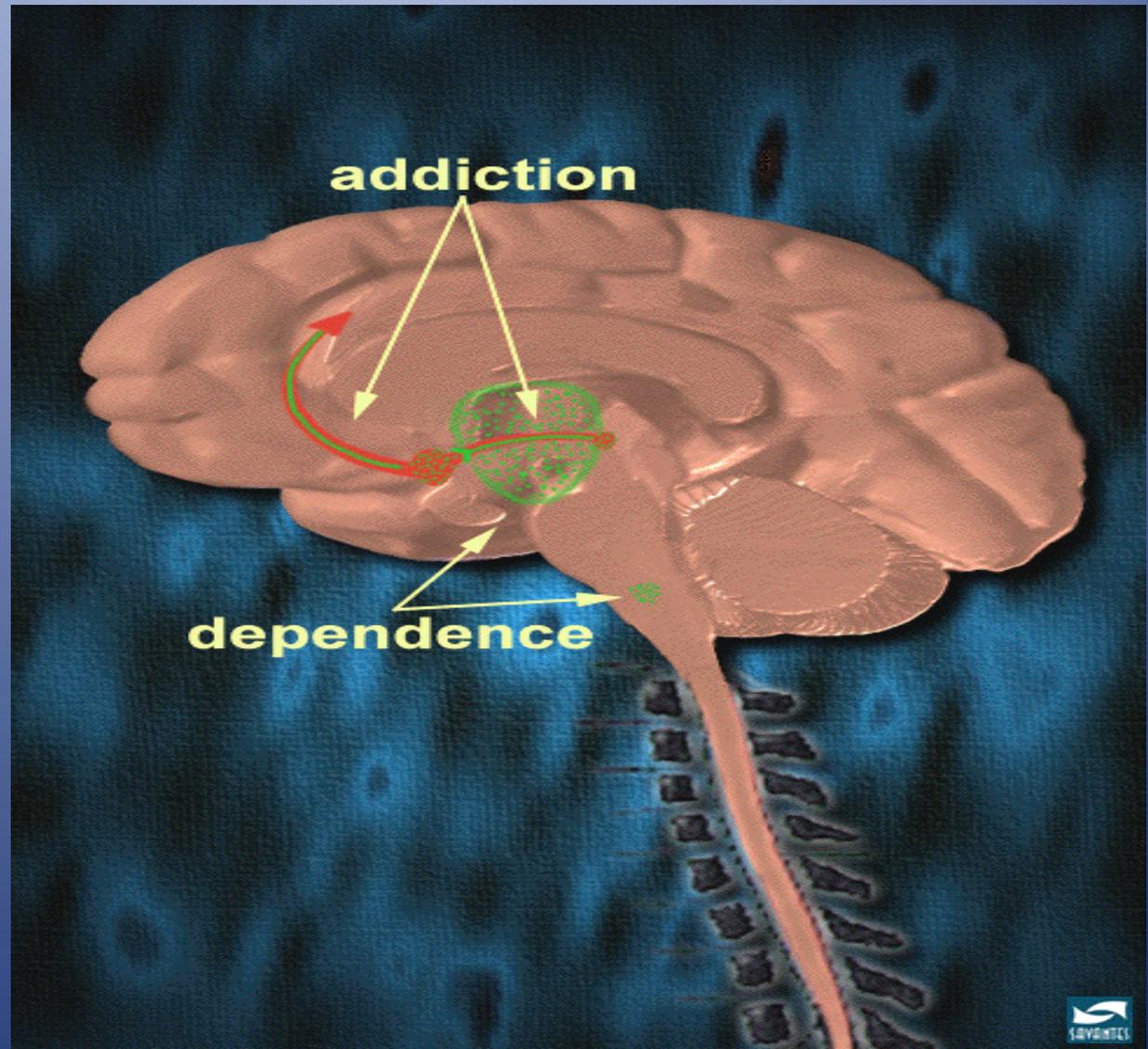
# The Human Brain



# Addiction Vs Physical Dependence

- Addiction is not physical dependence
  - Addiction is a brain disease that affects behaviour.
  - Physical dependence is an adaptation of the body to a specific substrate so that in the absence of that substrate a withdrawal syndrome develops.
- Physical dependence is associated with many medications
  - Everyone taking any opioid continuously for longer than a week develops physical dependence

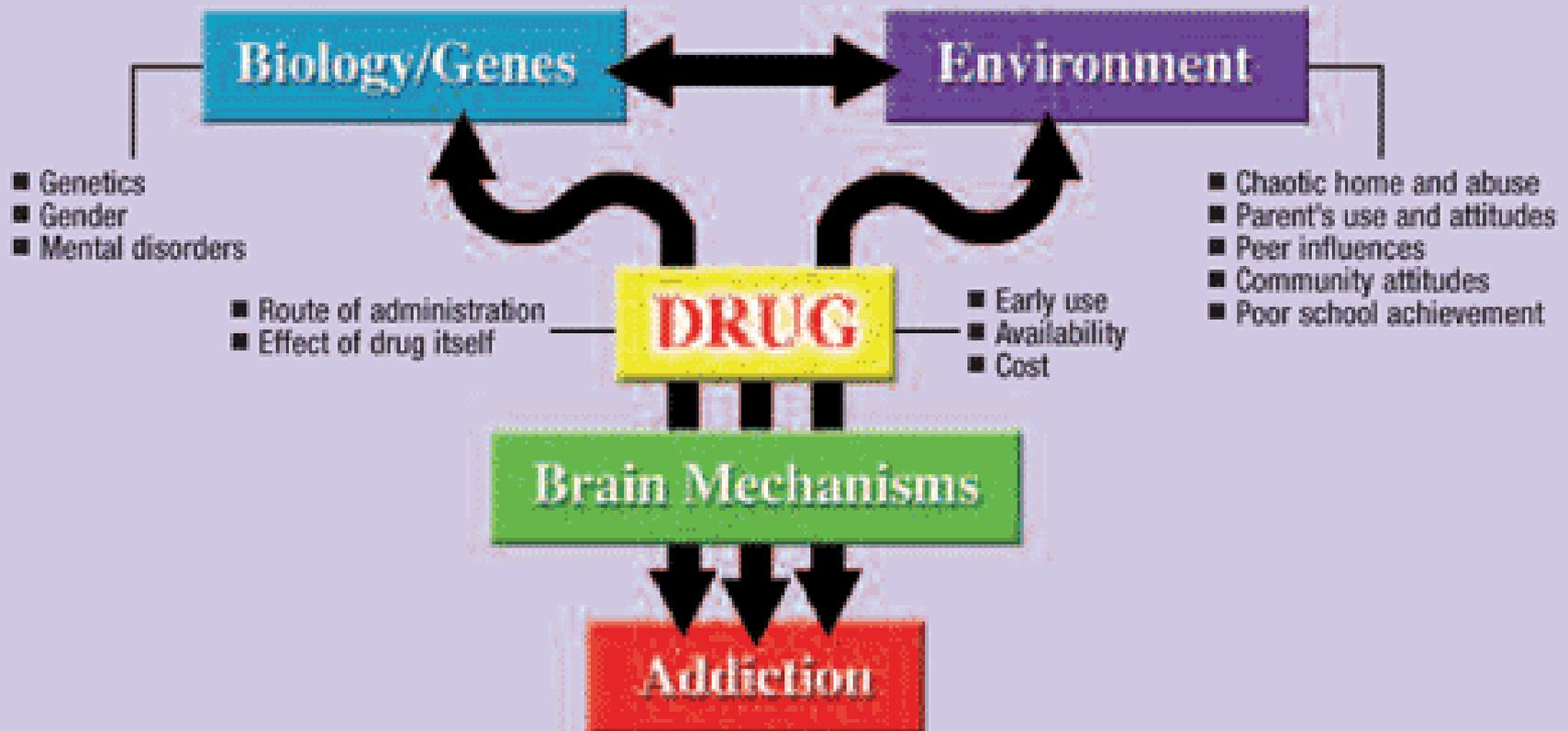
# Addiction Vs. Physical Dependence



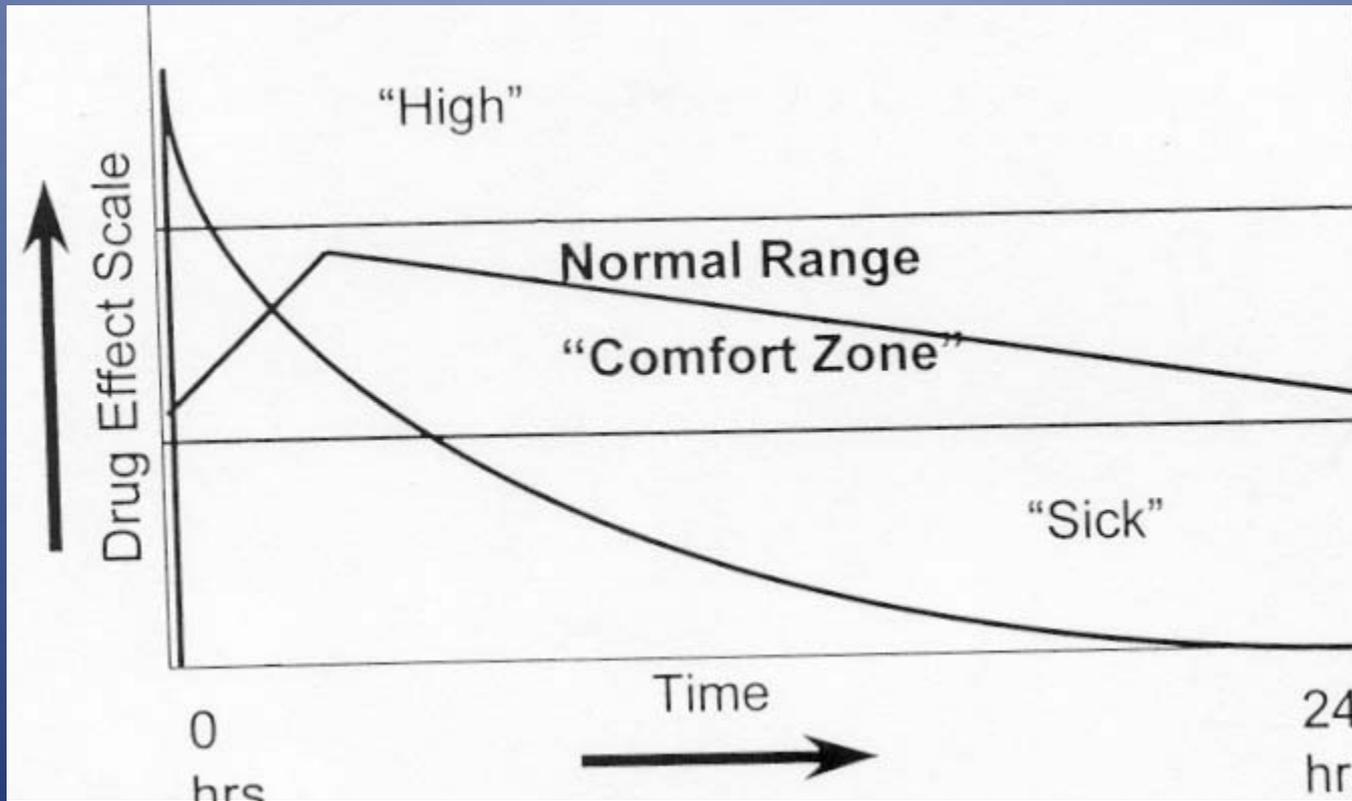
Source: NIDA.  
[www.drugabuse.gov](http://www.drugabuse.gov)

# Why do some people develop addiction?

## RISK FACTORS

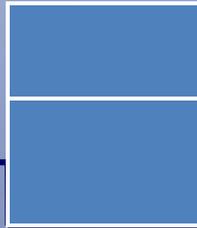


# Methadone/Suboxone Dose-Response



# *Mu* Receptor Activation

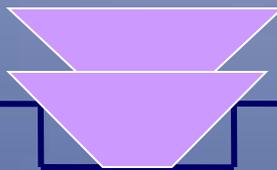
**Full agonist**



**methadone**

mu receptor site

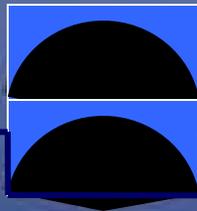
**Partial agonist**



**buprenorphine**

mu receptor site

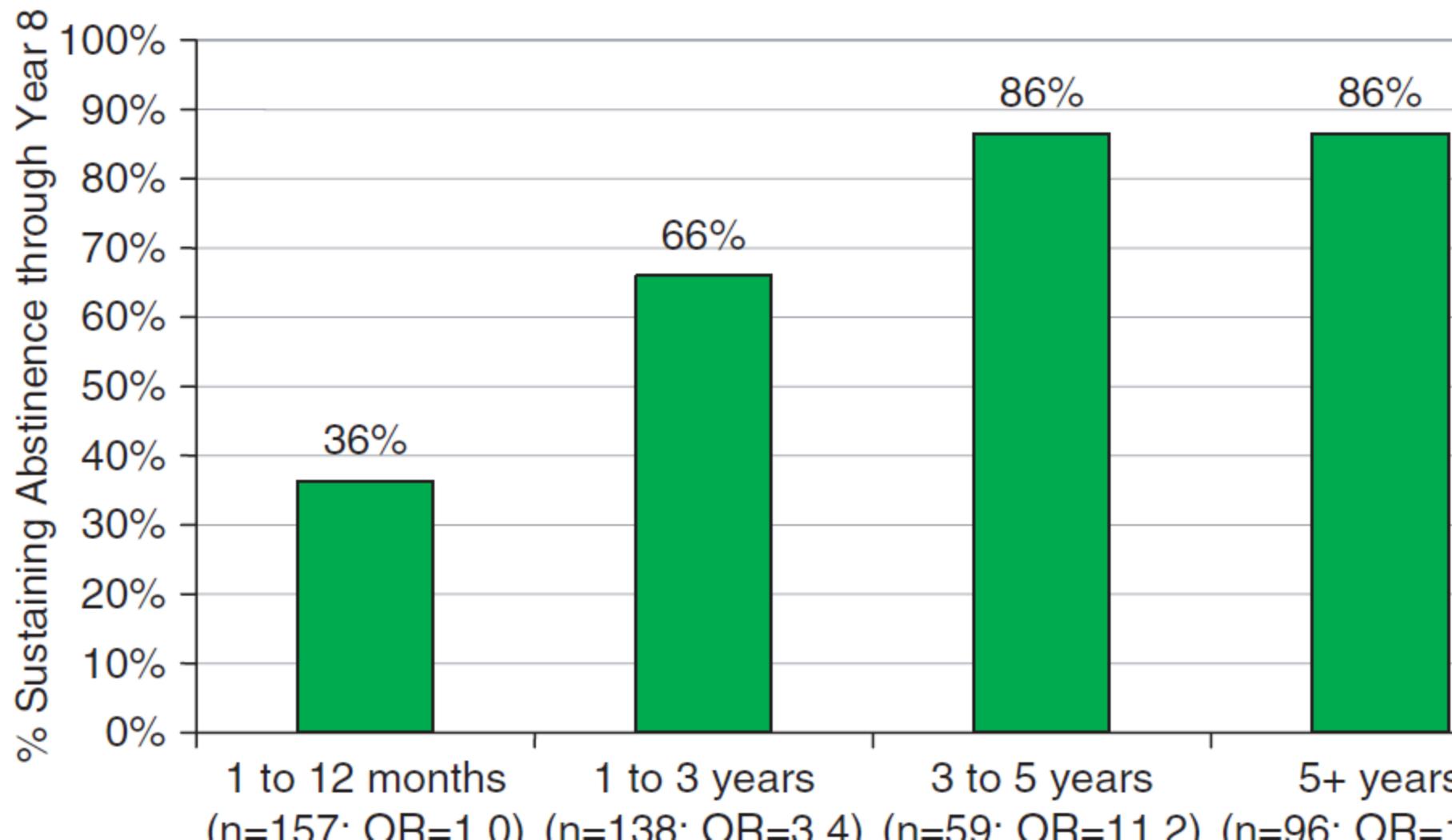
**Antagonist**



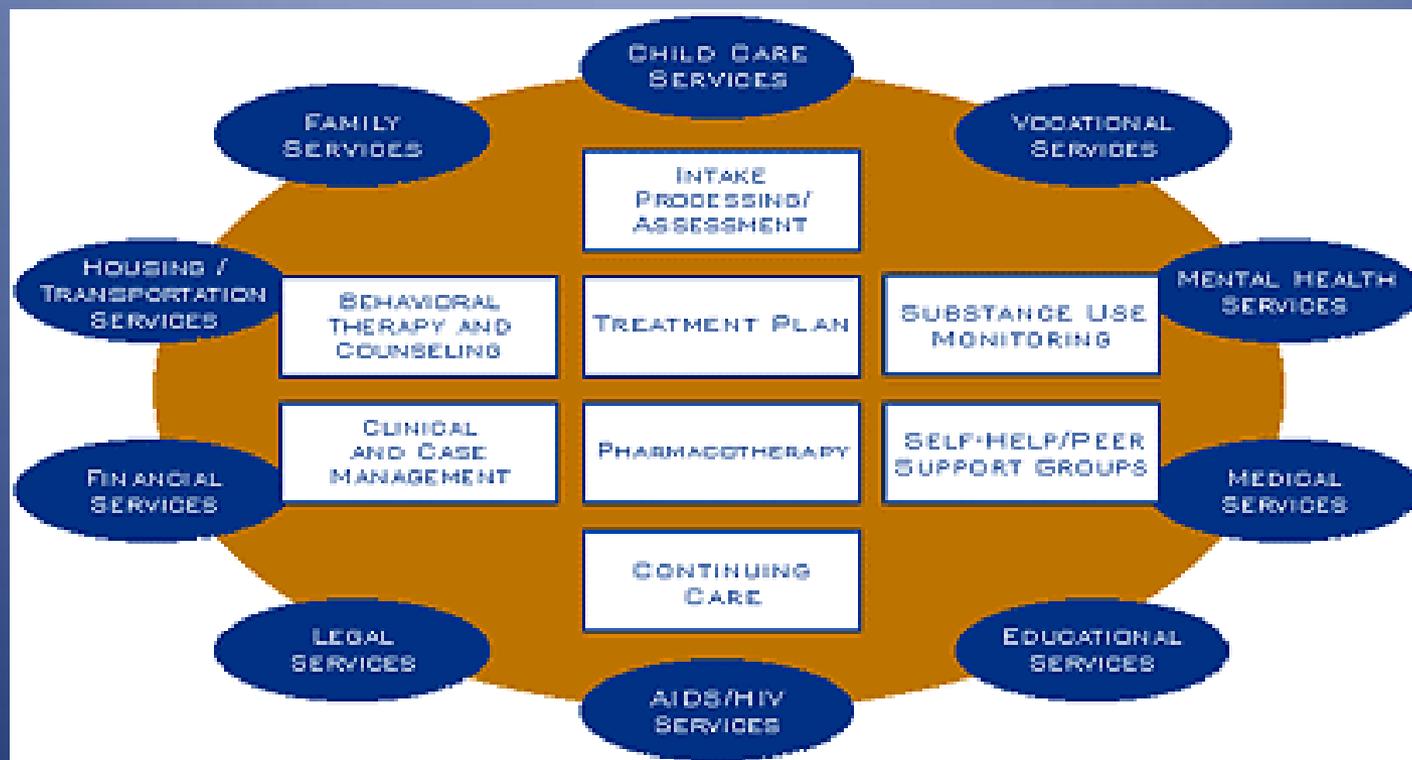
**naloxone**

mu receptor site

**Figure 1**  
**Percent Sustaining Abstinence Through Year 8**  
**by Duration of Abstinence at Year 7**



# Components of Comprehensive Drug Addiction Treatment





# MANY PATHS TO RECOVERY!



## Real Life



Methadone Client Profiles in Success

