



Promoting Wellness and Recovery

John R. Kasich, Governor  
Tracy J. Plouck, Director

## **Biology of Addiction: with emphasis on opioids**

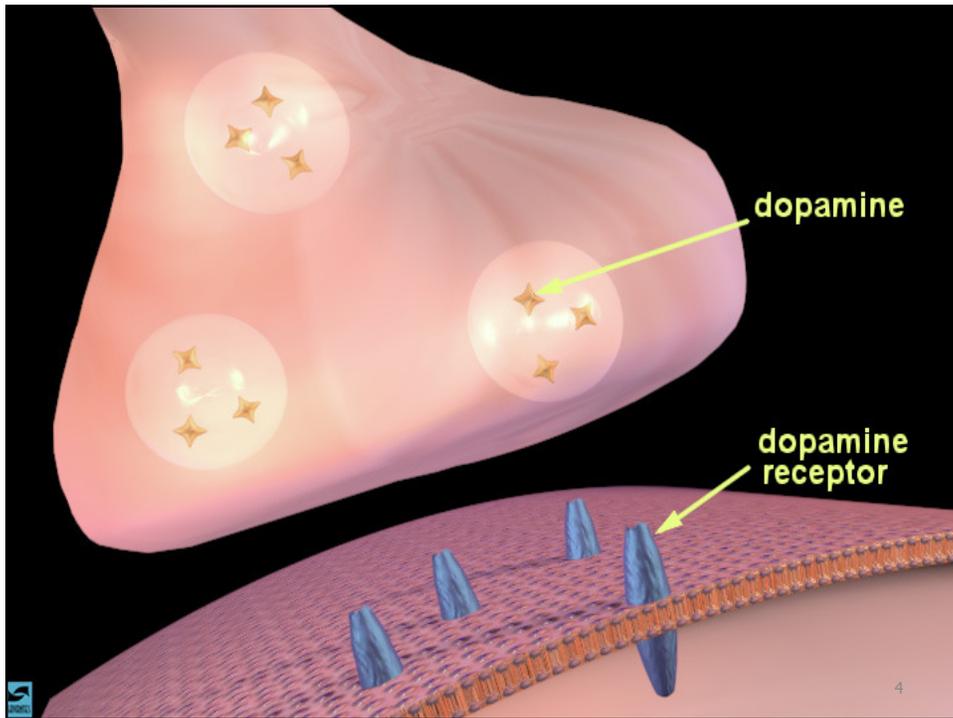
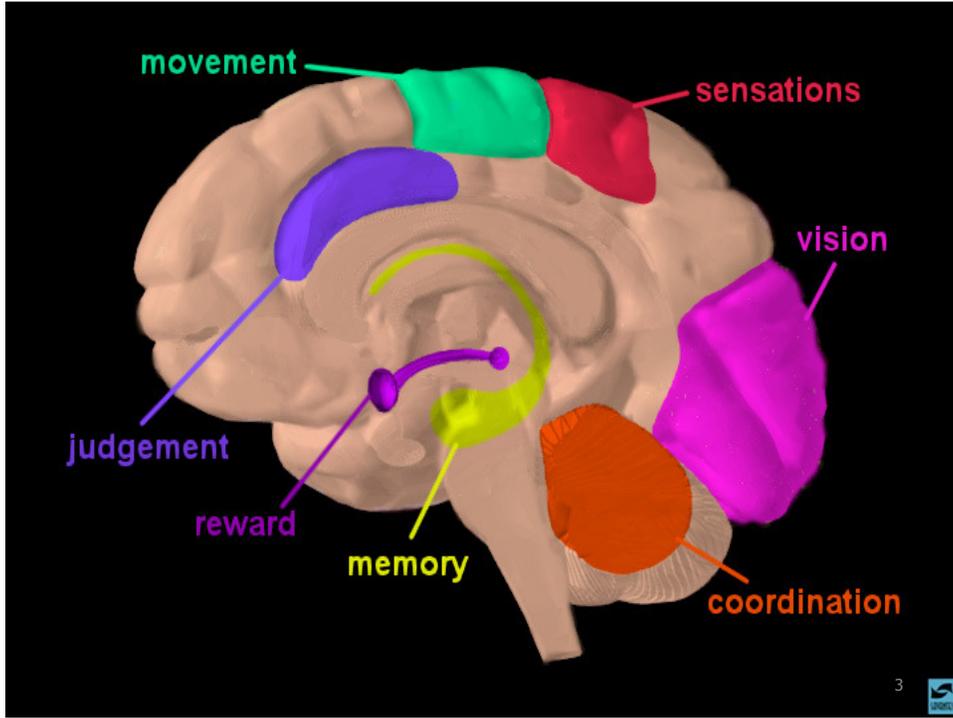
**Mark Hurst, M.D., Medical Director  
Ohio Department of Mental Health  
and Addiction Services**

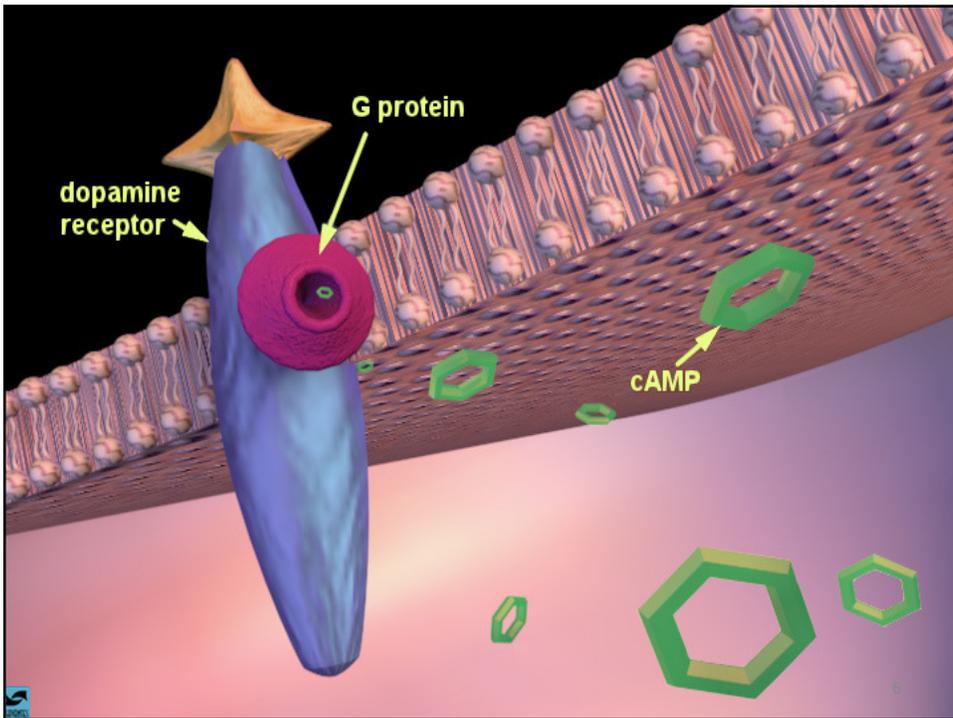
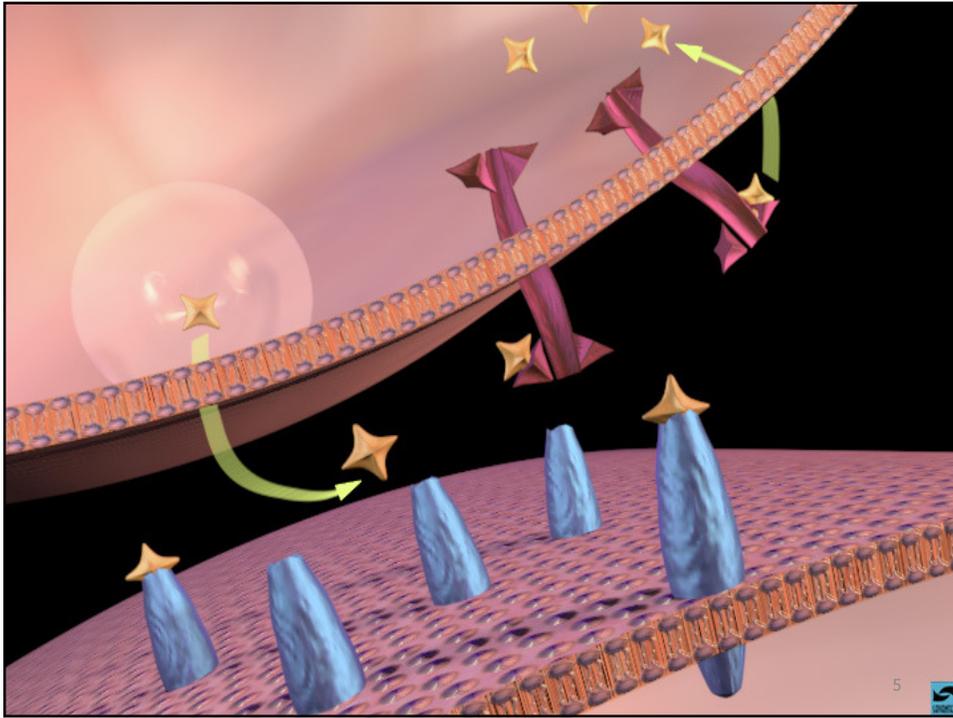
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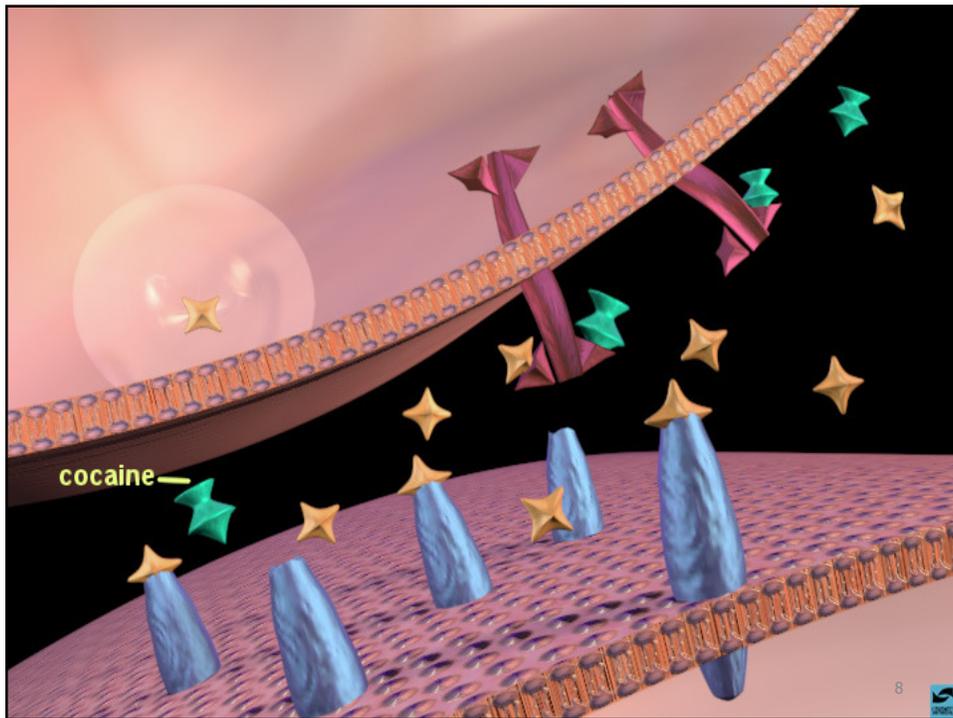
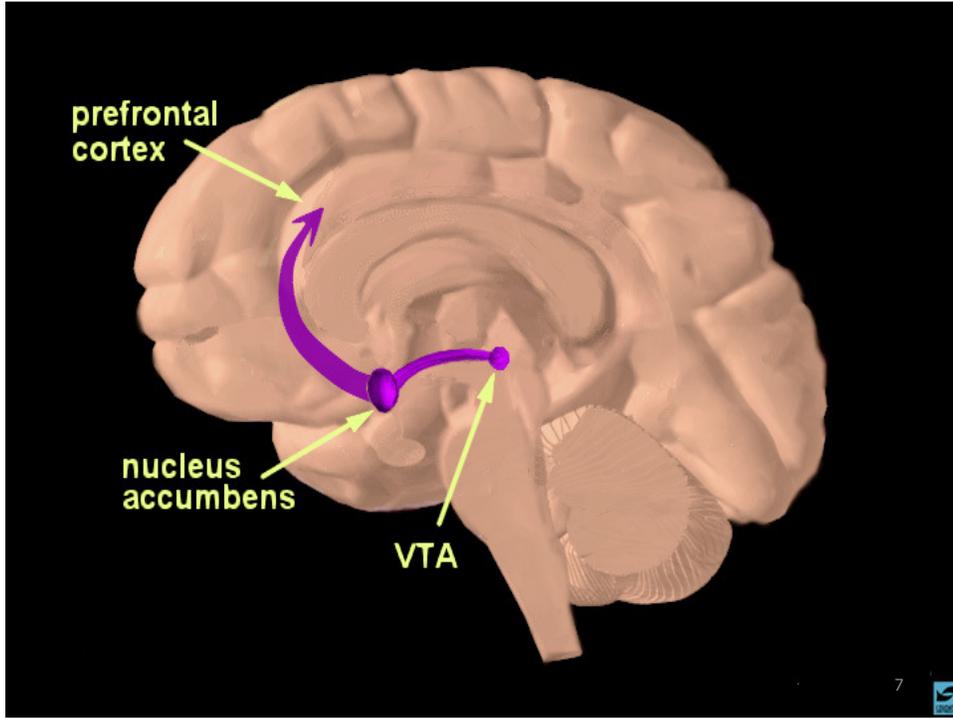
## **Addictive drugs: fundamentals**

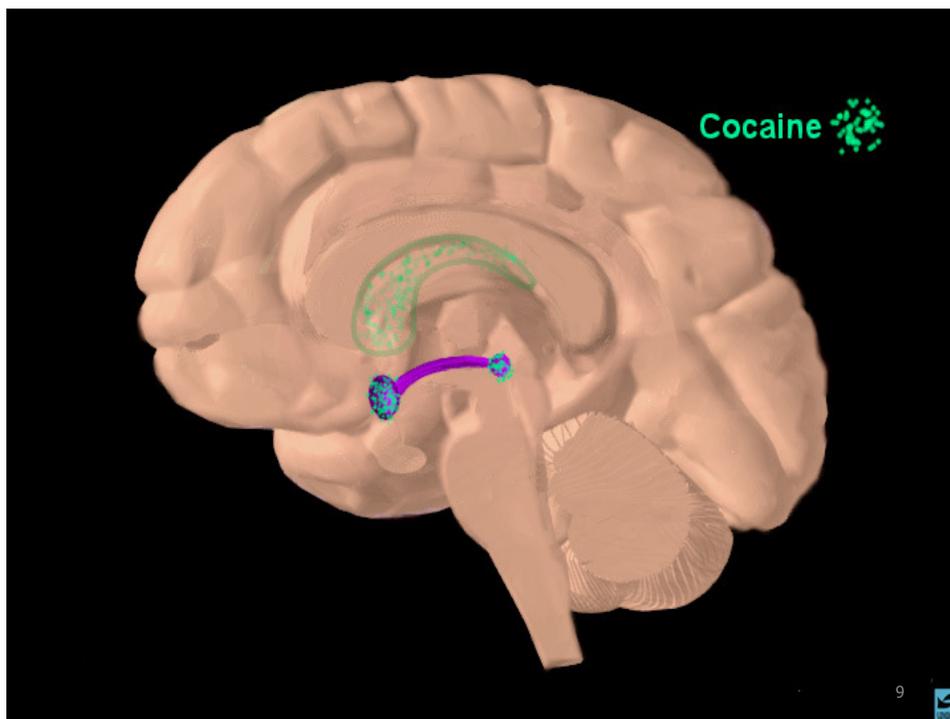
- All addictive drugs work on our endogenous neurotransmitter systems and mimic their activities in some manner
- All addictive drugs have effects on our biological reward centers, which gives them their reinforcing effects.
- These reward centers are the same areas that are activated when we perform activities that are required for our survival or survival of species
- Drugs of abuse “trick” us in to believing their use is necessary for survival (and nothing is farther from the truth)











9 

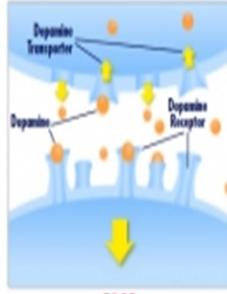
### DRUGS OF ABUSE TARGET THE BRAIN'S PLEASURE CENTER

**Brain reward (dopamine) pathways**

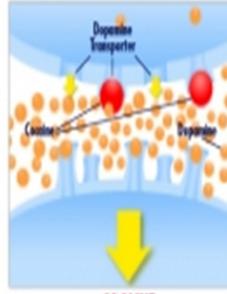


These brain circuits are important for natural rewards such as food, music, and sex.

**Drugs of abuse increase dopamine**



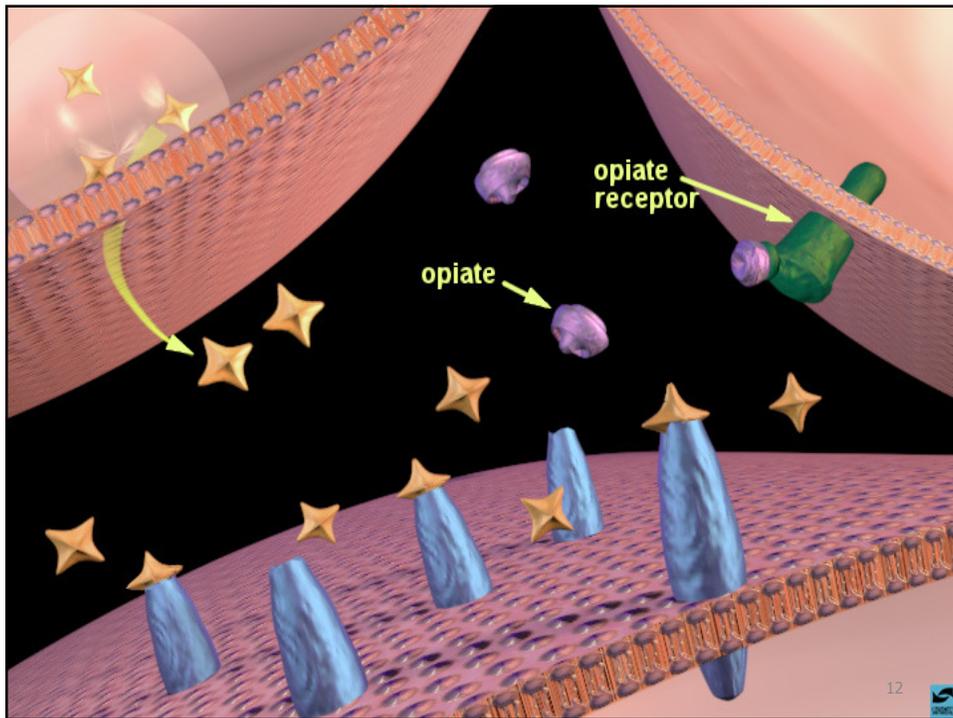
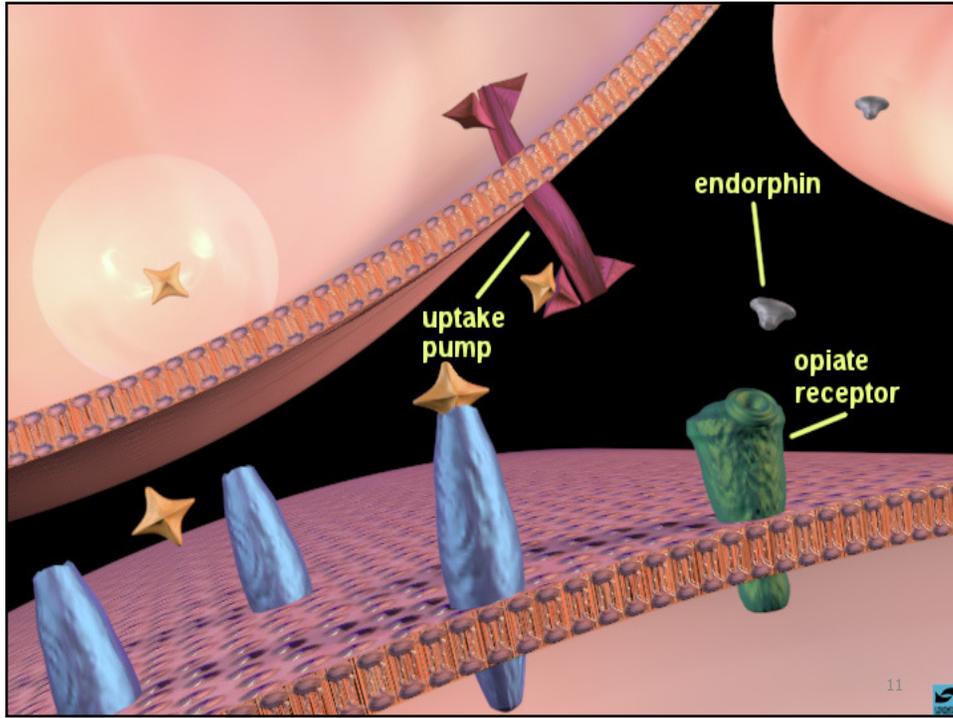
**FOOD**

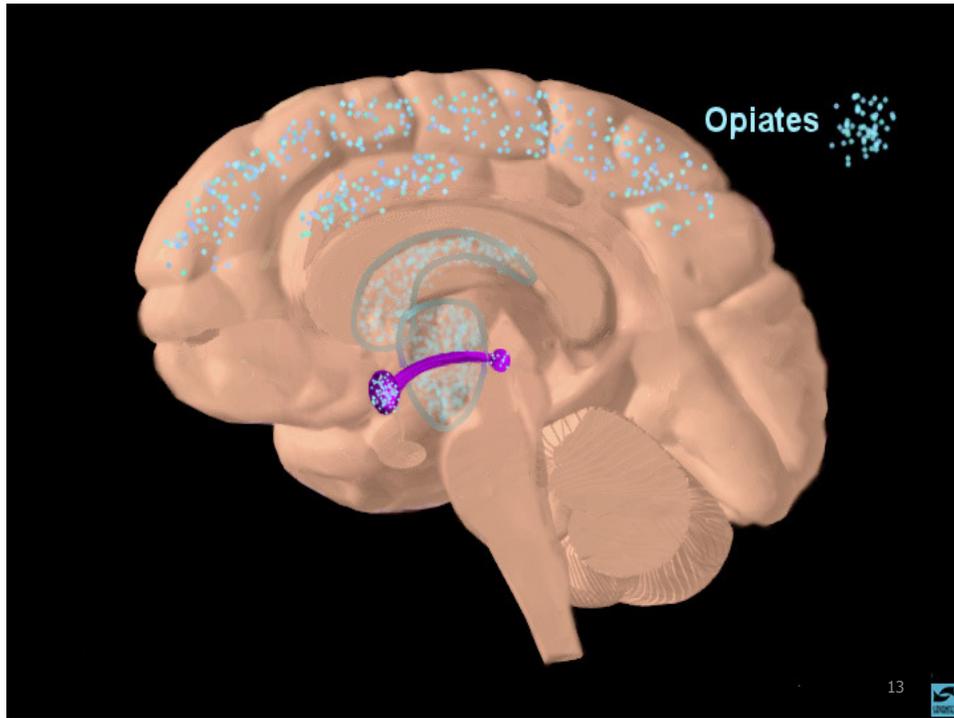


**COCAINE**

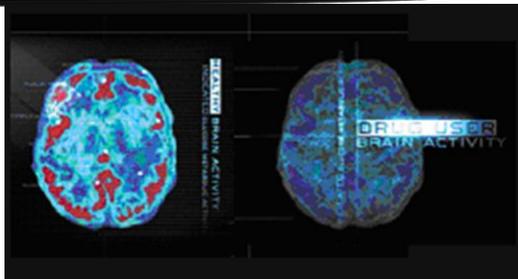
Typically, dopamine increases in response to natural rewards such as food. When cocaine is taken, dopamine increases are exaggerated, and communication is altered.

10





## Addiction is a Brain Disease

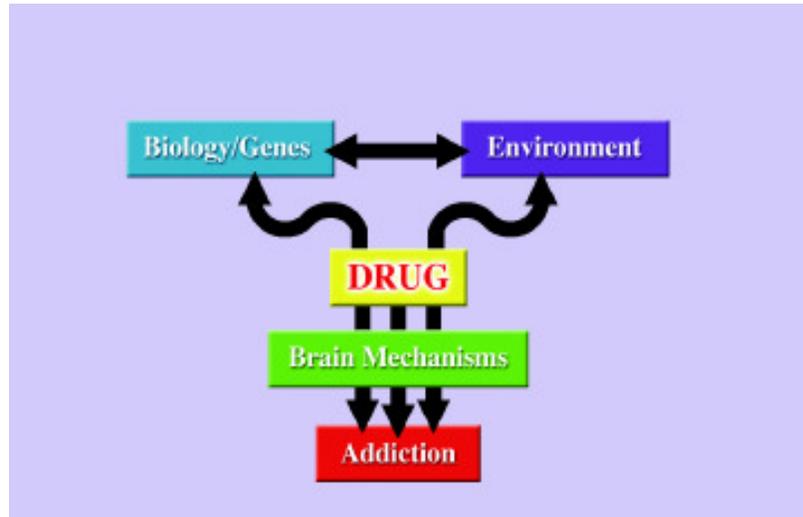


Characterized by:

- Compulsive Behavior/craving
- Continued abuse of drugs despite negative consequences
- Persistent changes in the brain's structure and function



## What causes addiction?



15

## Addiction is similar to other chronic illnesses because...

- It has biological and behavioral components, both of which must be addressed during treatment
- Recovery from it--protracted abstinence and restored functioning--is often a long-term process requiring repeated episodes of treatment
- Relapses can occur during or after treatment, and signal a need for treatment adjustment or reinstatement
- Participation in support programs during and following treatment can be helpful in sustaining long-term recovery
- *Recovery can occur with appropriate treatment and supports*



16

**Treating a biobehavioral disorder like addiction must go beyond just medication**

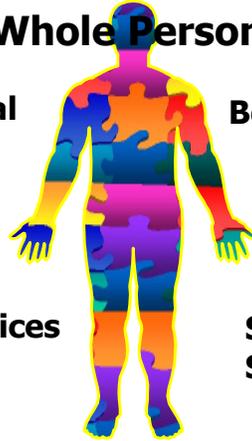
**We Need to Treat the Whole Person!**

**Pharmacological Treatments (Medications)**

**Behavioral Therapies**

**Medical Services**

**Social Services**



**In Social Context**



**Bill Wilson and Dr. Robert Smith**

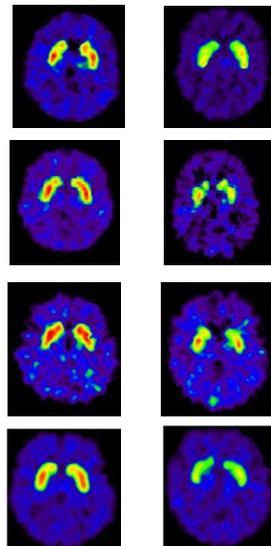


# Treatment of Opioid Addicted Patients

- Assessment
- Detoxification
- 12 step groups and counseling
- Medication



# Long-term use of addictive drugs causes decrease in dopamine receptors



## Why Medication Assisted Therapy?

- The risk of relapse among individuals with Opioid addiction is exceedingly high (up to 90%) over the course of a year without MAT
- Cravings and preoccupation decreases capacity to learn coping skills and change lifestyle
- Medication Assisted Therapy (MAT) can appreciably decrease risk of relapse and associated morbidity and mortality
- MAT alone is not adequate treatment

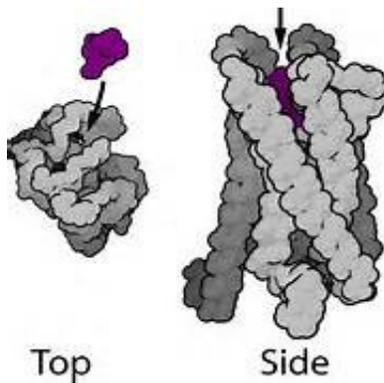


## MAT (continued)

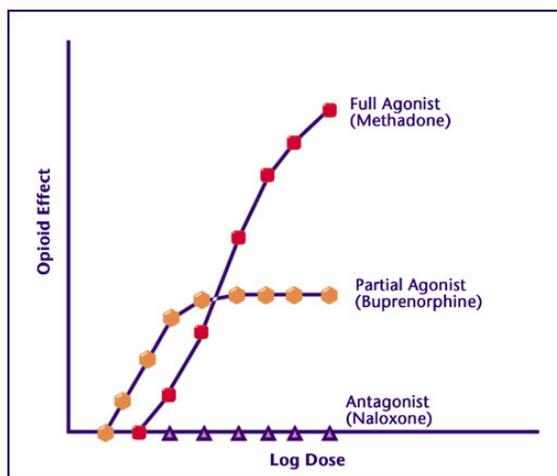
- Medications to reduce relapse:
  - Antagonist therapy (naltrexone)
  - Partial agonist therapy (buprenorphine)
  - Full agonist therapy (methadone)
- Goal: occupy the opioid receptor and
  - Opioid blockade
  - Decrease drug craving
  - Decrease risk of relapse d/t protracted withdrawal
  - Eliminate addicted behaviors and achieve social stability



## Mu opiate receptor



## Effects at opioid receptors



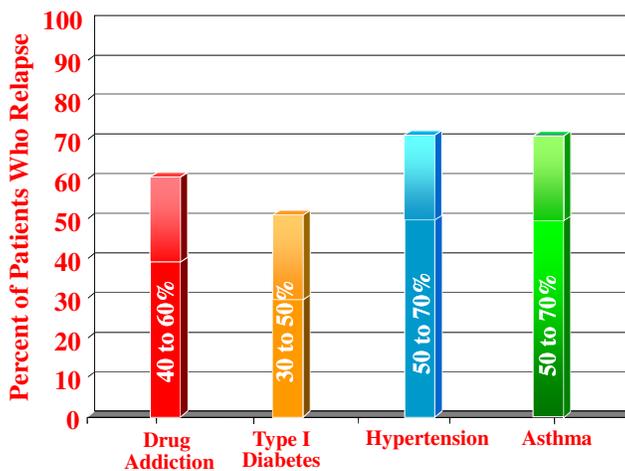
## All MATs improve abstinence rates

Medication	With MAT (% Opioid Free)	Without MAT (% Opioid Free)
Naltrexone ER	36 %	23 %
Buprenorphine	20-50 %	6%
Methadone	60 %	30 %

References: Krupitsky 2011, Mattick 2009, Fudala 2003, Weiss, 2011



## Relapse Rates Are Similar for Drug Addiction & Other Chronic Illnesses



*McLellan et al., JAMA, 2000.*

## Specific MATs

- Opioid antagonists: naltrexone
  - Oral (duration of action 24-48 hours)
  - Long-acting injection (Vivitrol) duration of action 4 weeks)
  - FDA approved, but least well-studied of MATs
  - Also FDA approved for treatment of Alcohol Dependence
  - Oral naltrexone has demonstrated decreased relapse rates in highly motivated/supervised patients (healthcare professionals-80% success)
  - Must be off opioids 7-10 days before starting



## Specific MATs

- Methadone:
  - Best studied and longest used medication for treatment of opioid addiction
  - Schedule II and only used in certified centers
  - Not “substituting one addiction for another”
  - Approved in pregnancy
  - Contributes to social stability
  - Good for > 18 y.o., over a year of addiction, severe addiction



## Specific MATs

- Buprenorphine
  - Approved for office-based treatment of opioid addiction in 2002
  - Prescribing inpatient physician must be specifically certified by CSAT/DEA (DATA 2000)
  - Little effect on respiratory function or cardiac function
  - Can be used in pregnancy (buprenorphine without naloxone)



## In Treating Addiction...

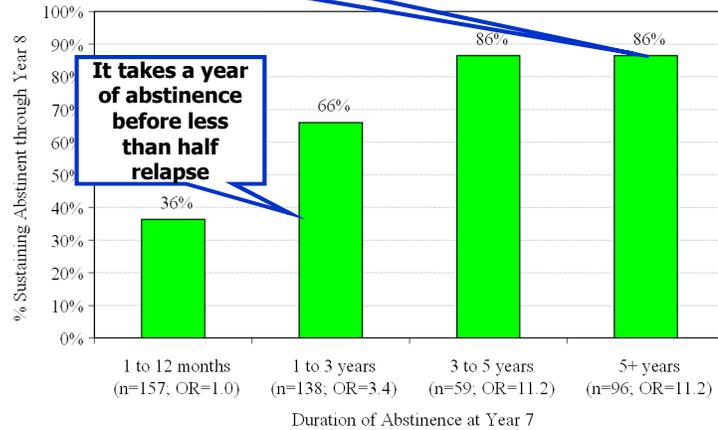
**We Need to Keep Our Eye on the Real Targets!**



30

## Extended Abstinence is Predictive of Sustained Recovery

After 5 years – if you are sober,  
you probably will stay that way.



Dennis et al, Eval Rev, 2007

31

## Summary

- Opioid addiction is rampant in Ohio, as articulated by Orman Hall last week.
- Appropriate identification and treatment success is predicated on addressing the biological, *and* social aspects of the disease in a comprehensive manner and generally require both non-medication and medication treatments.
- Director Plouck will address some of the necessary social supports in her testimony next week.



32