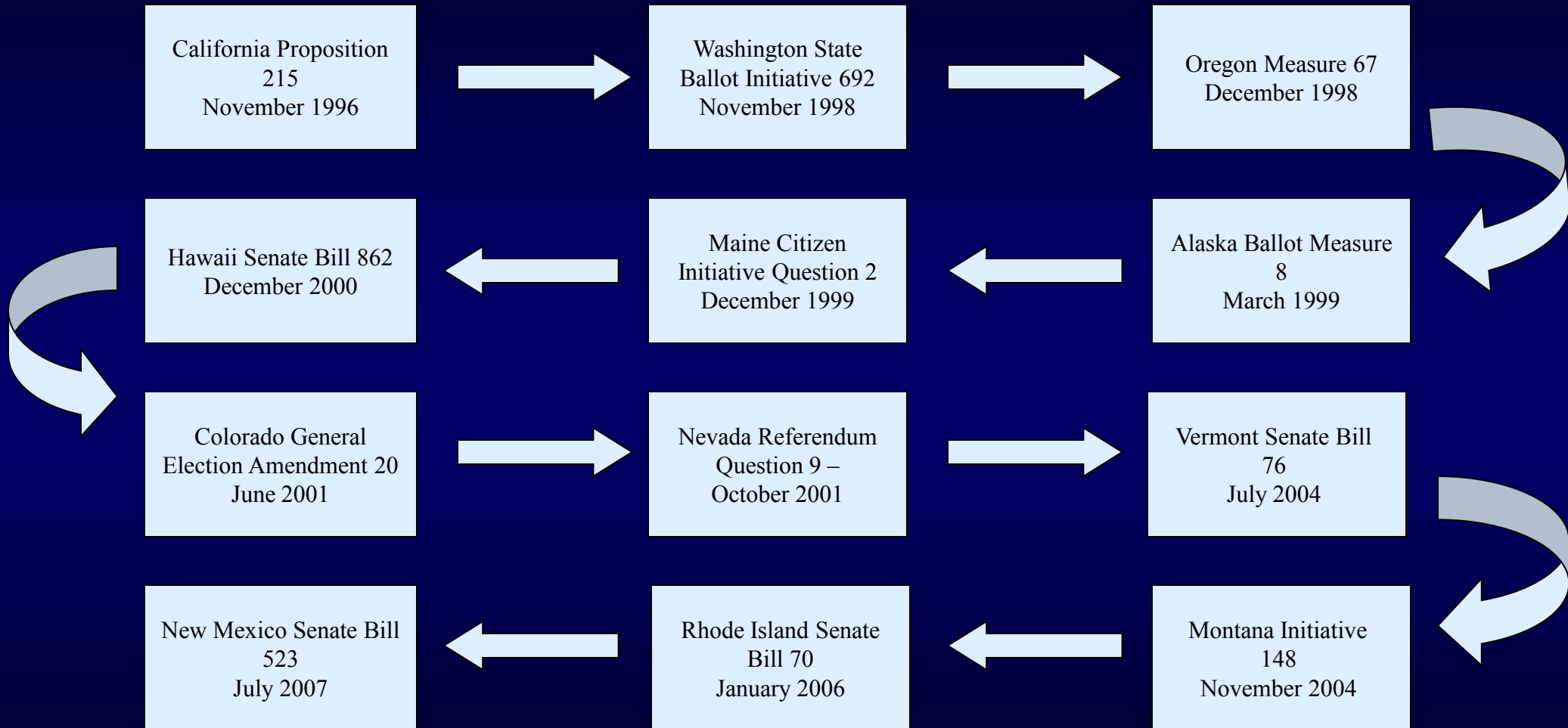


# **Medical Use of Marijuana** *In Michigan*

Medical Marijuana: The Good , The Bad, and The Ugly  
September 27, 2011

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**Former “Deputy Drug Czar”**  
**White House Office of National Drug Control Policy**

# TIMELINE OF MEDICAL MARIJUANA LEGISLATION



# Michigan Medical Marihuana Act

## The Law

- The people of the State of Michigan find and declare that:
  - *National Academy of Sciences' Institute of Medicine (IOM) report of 1999 has "found" / "discovered" beneficial uses of marihuana.*
  - *FBI's Uniform Crime Reports show that nearly 99 out of 100 marihuana arrests occur under "state" law rather than "federal" law. Consequently, changing state law will have the practical effect of protecting from arrest the vast majority of seriously ill people who have a medical need for marihuana.*
  - *States are not required to enforce federal law which prohibits the use of marihuana except under very limited circumstances. Michigan joins 12 other states which do not penalize the medical use and cultivation of marihuana.*

# Michigan Medical Marihuana Act

## The Law

- Protections:

- A *qualifying patient* (diagnosed by a licensed physician as having a debilitating medical condition) who has been issued and possesses a *registry identification card* (a document issued by the MDCH that identifies a person as a registered qualifying patient or *registered primary caregiver* (a person at least 21 years old who has agreed to assist with a patient's medical use of marihuana and who has never been convicted of a felony involving illegal drugs)) shall not be subject to arrest, prosecution, or penalty...for the medical use of marihuana in accordance with this act...may possess up to 2.5 ounces of usable marihuana, 12 marihuana plants kept in an enclosed, locked facility, and any incidental amount of seeds, stalks, and unusable roots.

# Michigan Medical Marihuana Act

## The Law

- Certification:

- *To be eligible for the Registry Identification Card one must:*

- ✓ Complete an application

- ✓ Complete information about a ‘primary caregiver’ – if applicable

- ✓ Patient’s physician must complete and sign the Physician Certification Form *and indicate the appropriate medical condition(s):*

*Cancer*

*Glaucoma*

*Cachexia/Wasting*

*Hepatitis C*

*ALS*

*Severe/Chronic Pain*

*Agitation of Alzheimer’s*

*Nail Patella*

*Severe nausea*

*HIV/AIDS+*

*Crohn’s Disease*

*Seizures*

*Severe Muscle Spasms*

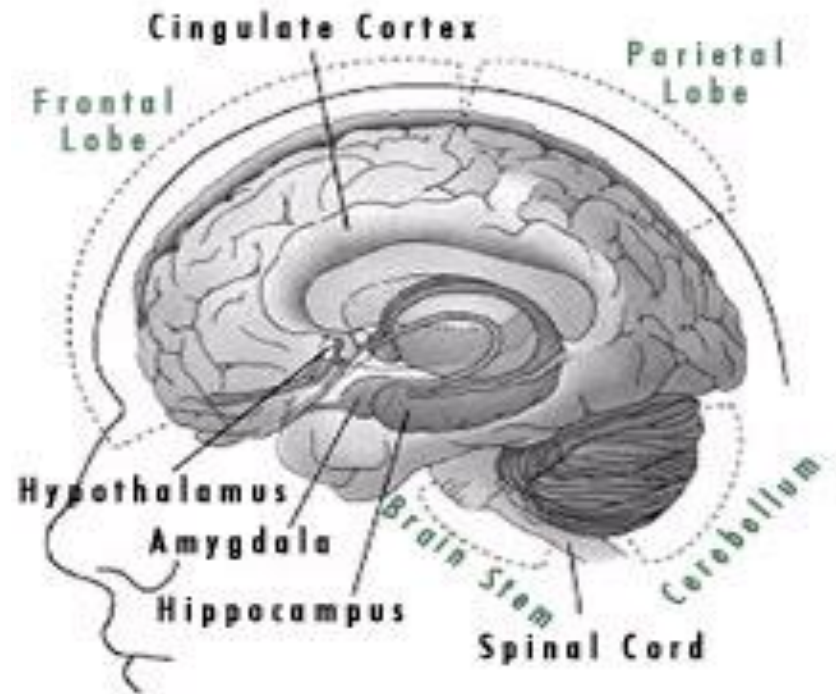
# CANNABINOIDS

- There are two main receptors for cannabinoids in humans
  - CB1(in brain) if stimulated produces
    - Euphoria
    - Impaired short term memory and sense of time
  - CB2 (in spleen, peripheral sites) if stimulated produces
    - Immunosuppressant activity
    - Not psychoactive

# CANNABINOIDS

- Receptors have also been found in the

- Cerebellum – body movement and coordination
- Cortex – higher cognitive functions
- Nucleus accumbens – reward
- Basal ganglia – movement control
- Hypothalamus – body temperature, salt and water balance, reproductive functions
- Amygdala – emotional responses, fear



# CANNABIS KINETICS

- Oral use
  - Psychoactive effects slowed to about one hour
  - Absorption is erratic
  - High is less intense, but lasts longer than if smoked
- IV use
  - Water insoluble so cannot be injected

# CANNABIS KINETICS

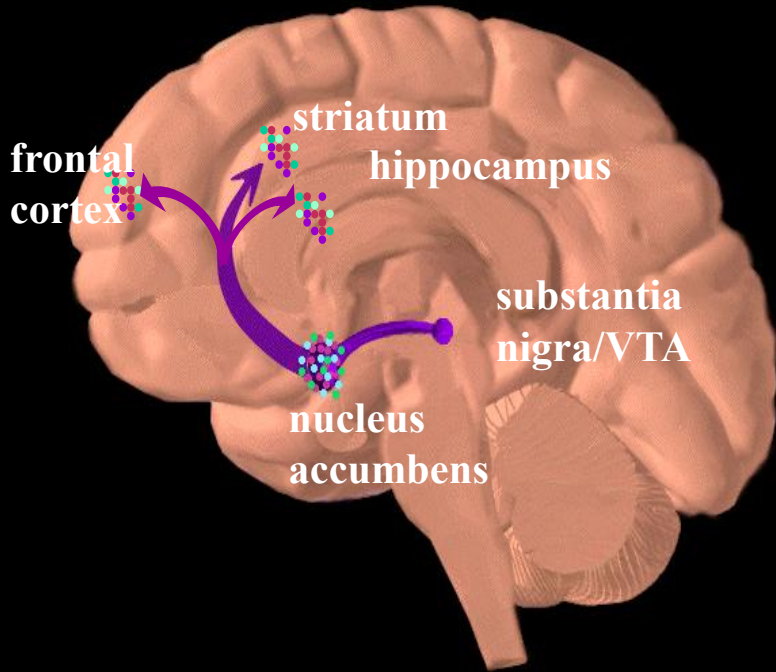
- SMOKING three cannabis joints will cause you to inhale the same amount of toxic chemicals as a whole packet of cigarettes.
  - The French Consumer Institute tested regular Marlboro cigarettes alongside 280 specially rolled joints of cannabis leaves and resin in an artificial smoking machine.
  - The tests examined the content of the smoke for tar and carbon monoxide, as well as for the toxic chemicals nicotine, benzene and toluene.
  - Cannabis smoke contains seven times more tar and carbon monoxide.
  - Someone smoking a joint of cannabis resin rolled with tobacco will inhale twice the amount of benzene and three times as much toluene as if they were smoking a regular cigarette, the study said.

# Cannabis Use and Later Life Outcomes

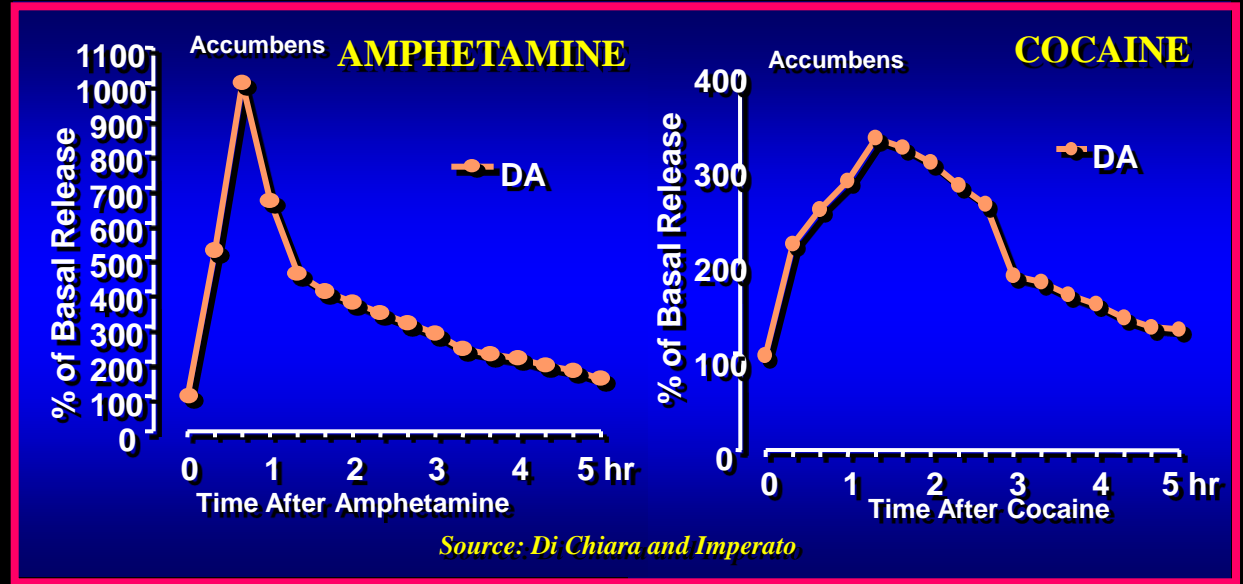
- The results of this study suggest that increasing cannabis use in late adolescence and early adulthood is associated with a range of adverse outcomes in later life. High levels of cannabis use are related to poorer educational outcomes, lower income, greater welfare dependence and unemployment and lower relationship and life satisfaction. The findings add to a growing body of knowledge regarding the adverse consequences of heavy cannabis use.

Source: Fergusson, David M.; Boden, Joseph M.; *Addiction* Volume 103, Number 6, June 2008 , pp. 969-976(8).

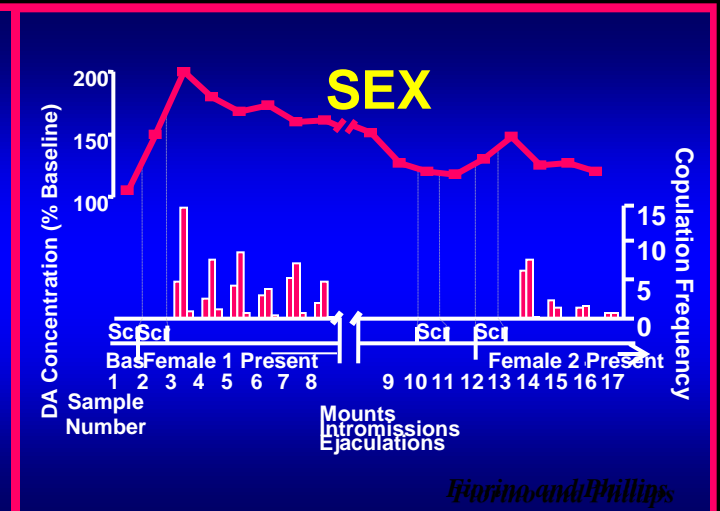
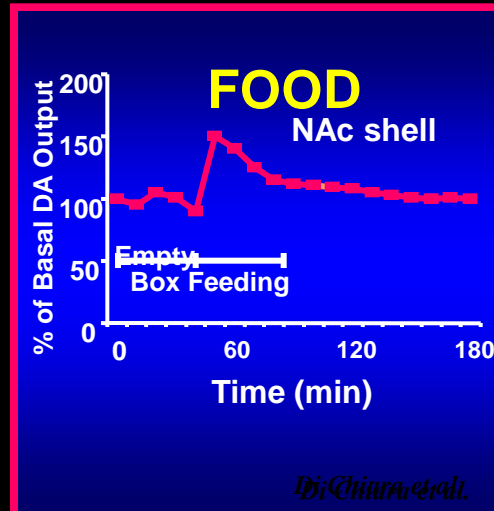
# Dopamine Pathways Principal "Pleasure" System of the Brain



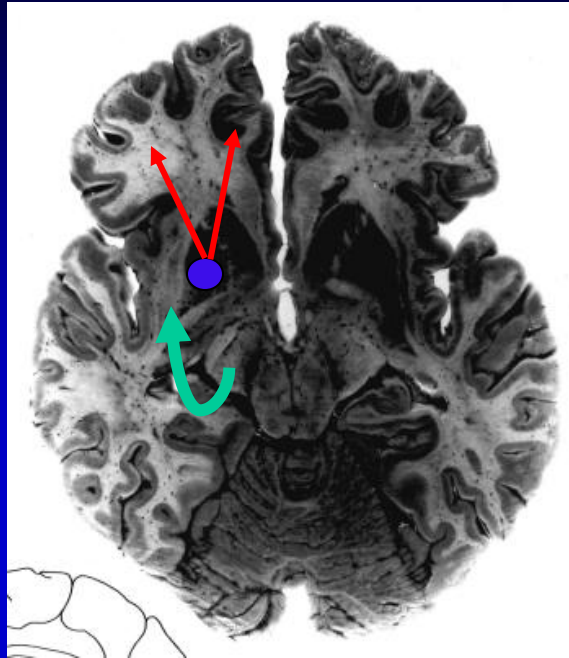
## Effects of Drugs on Dopamine Levels



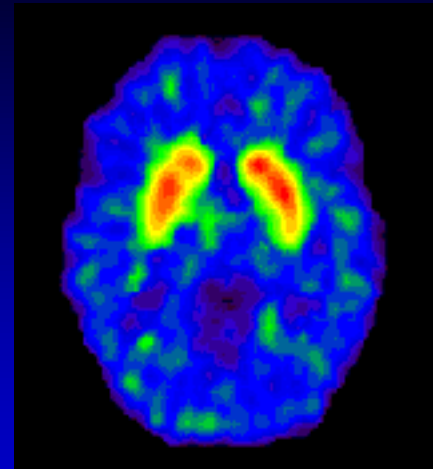
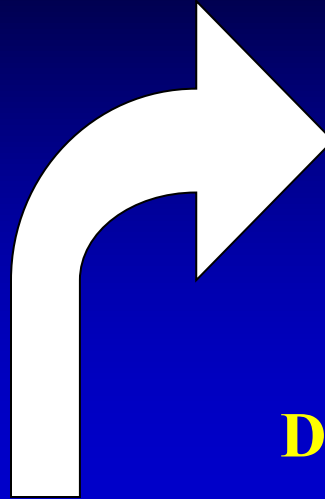
## Natural Rewards Elevate Dopamine Levels



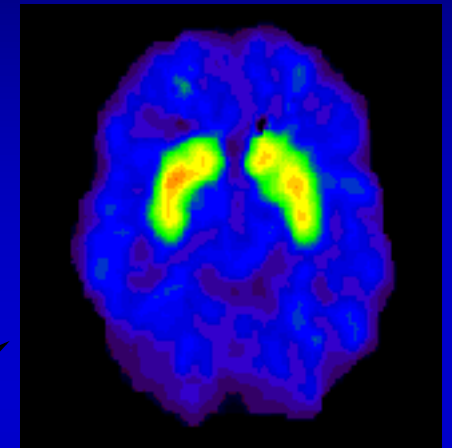
# Brain Dopamine System



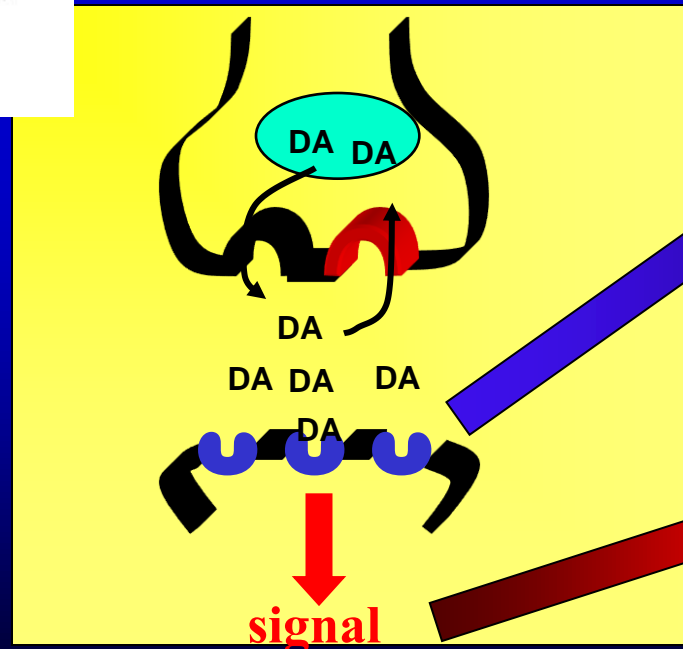
**Anatomy**



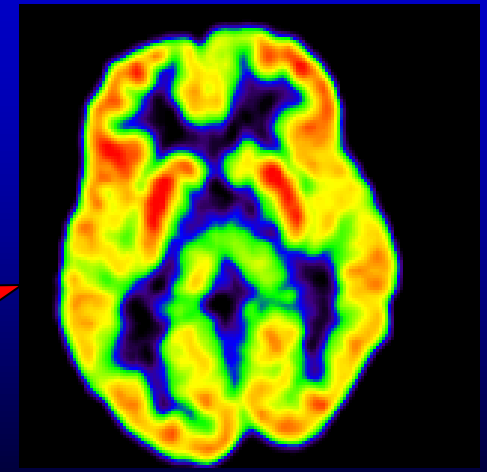
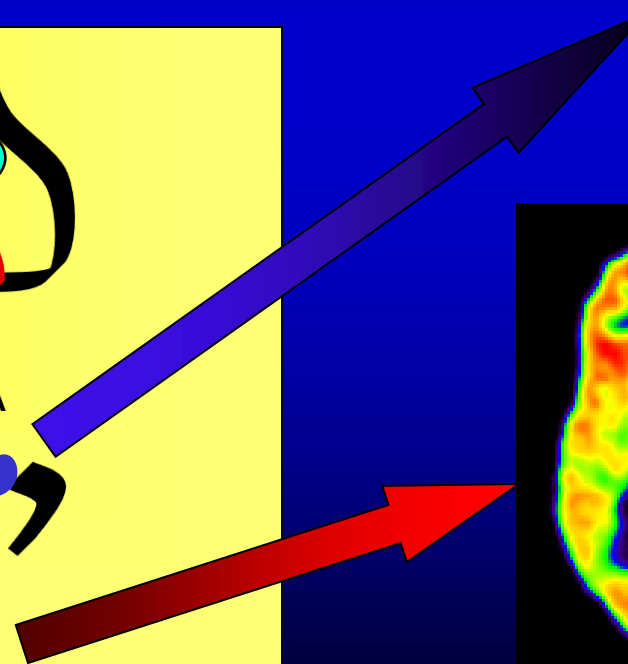
**DA Transporters**



**DA Receptors**

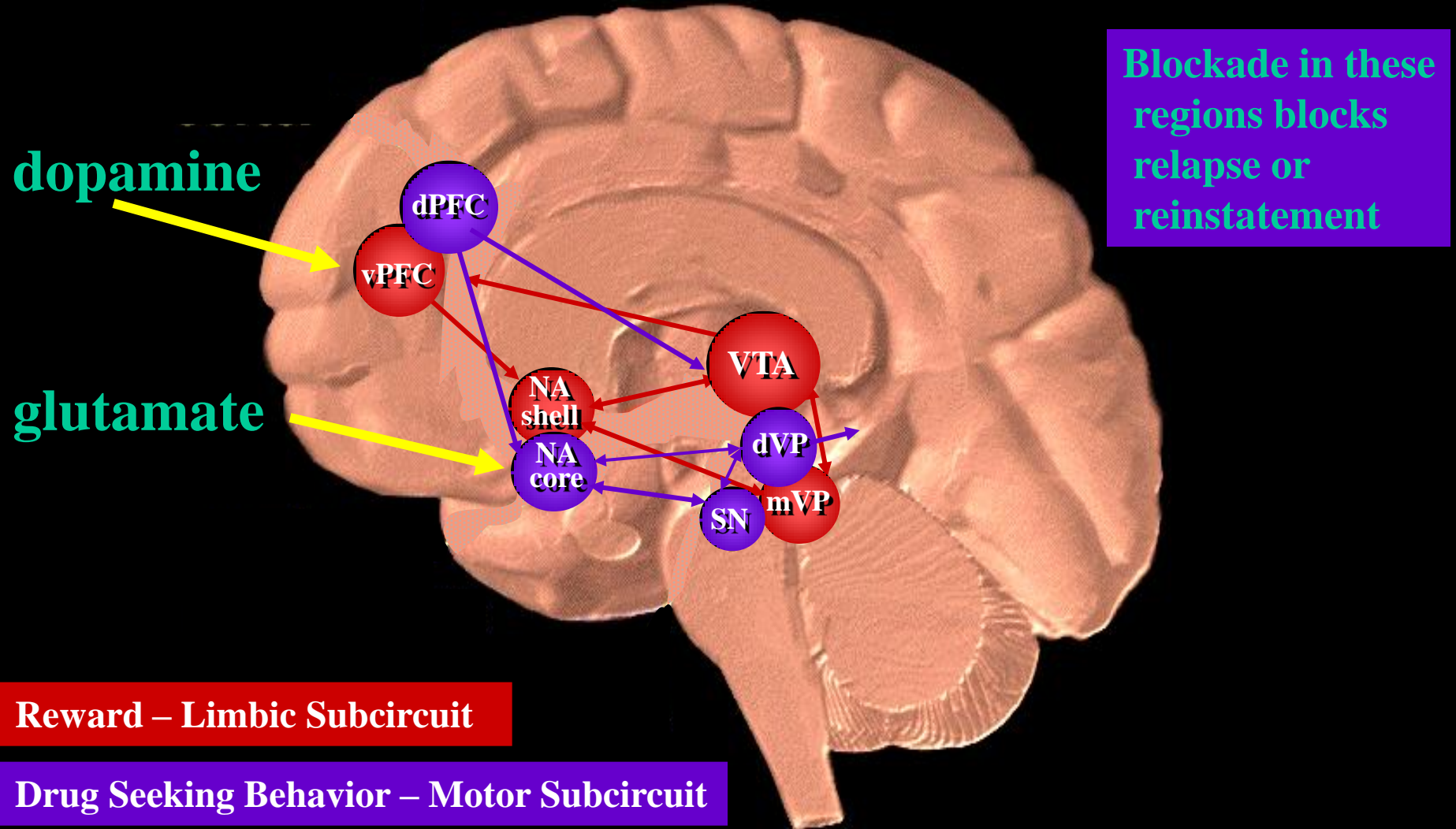


**Dopamine Cell**

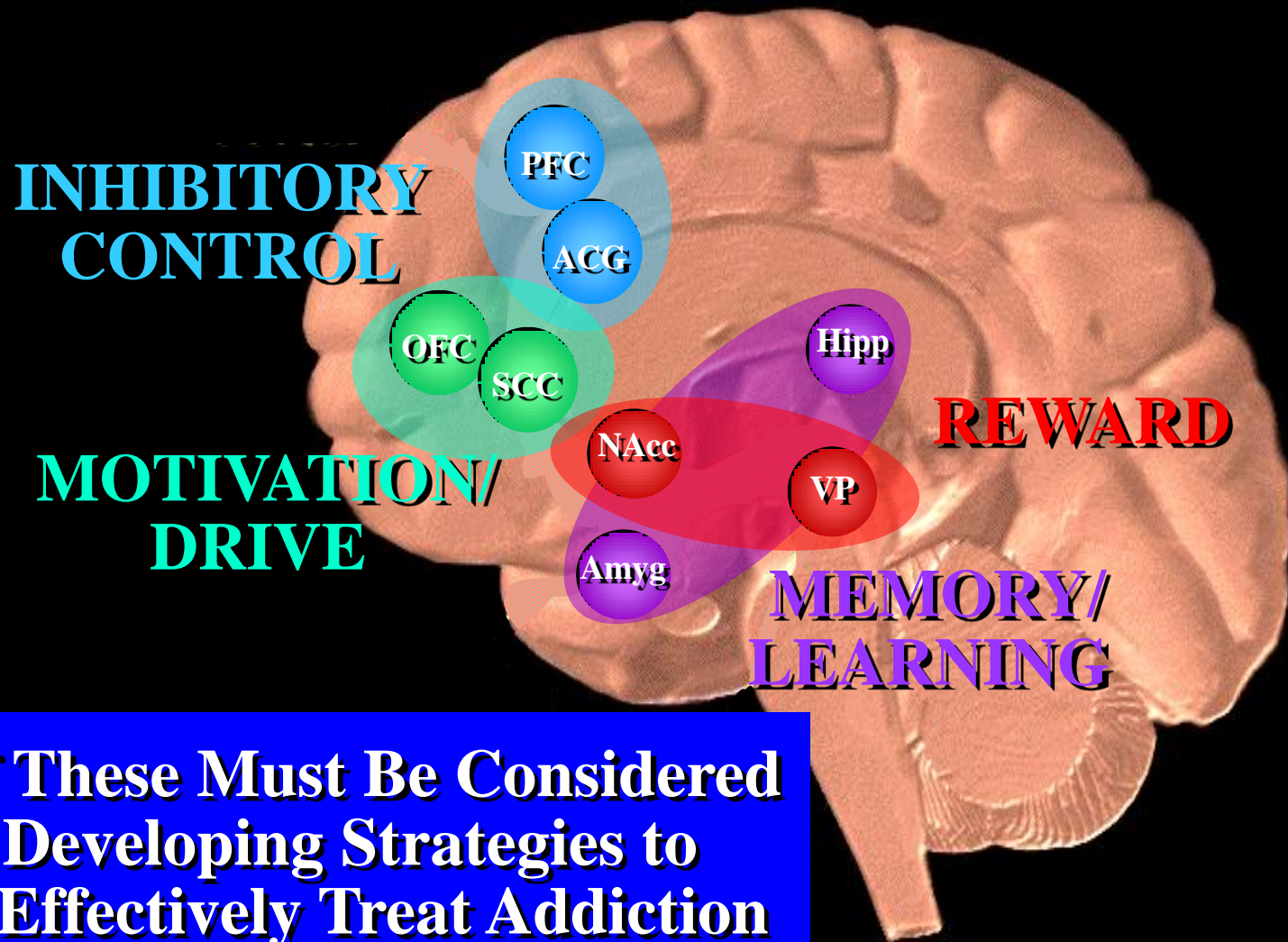


**Metabolism**

# Different Brain Circuitry Involved in Drug Reward and Drug Persistence Behavior

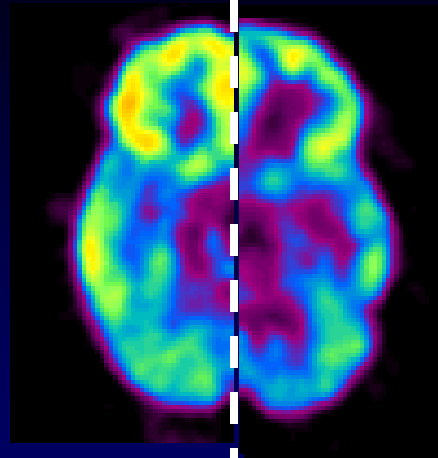
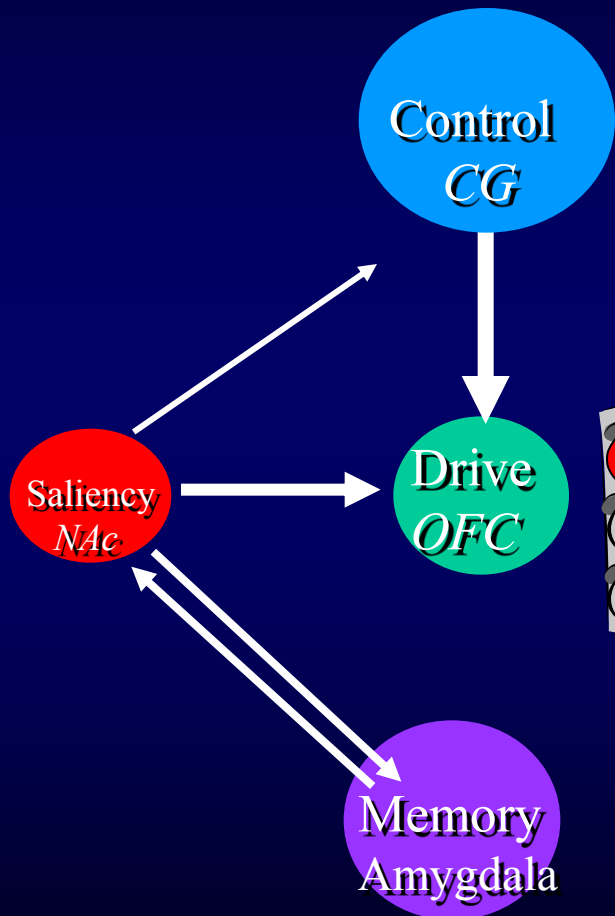


# Circuits Involved In Drug Abuse and Addiction

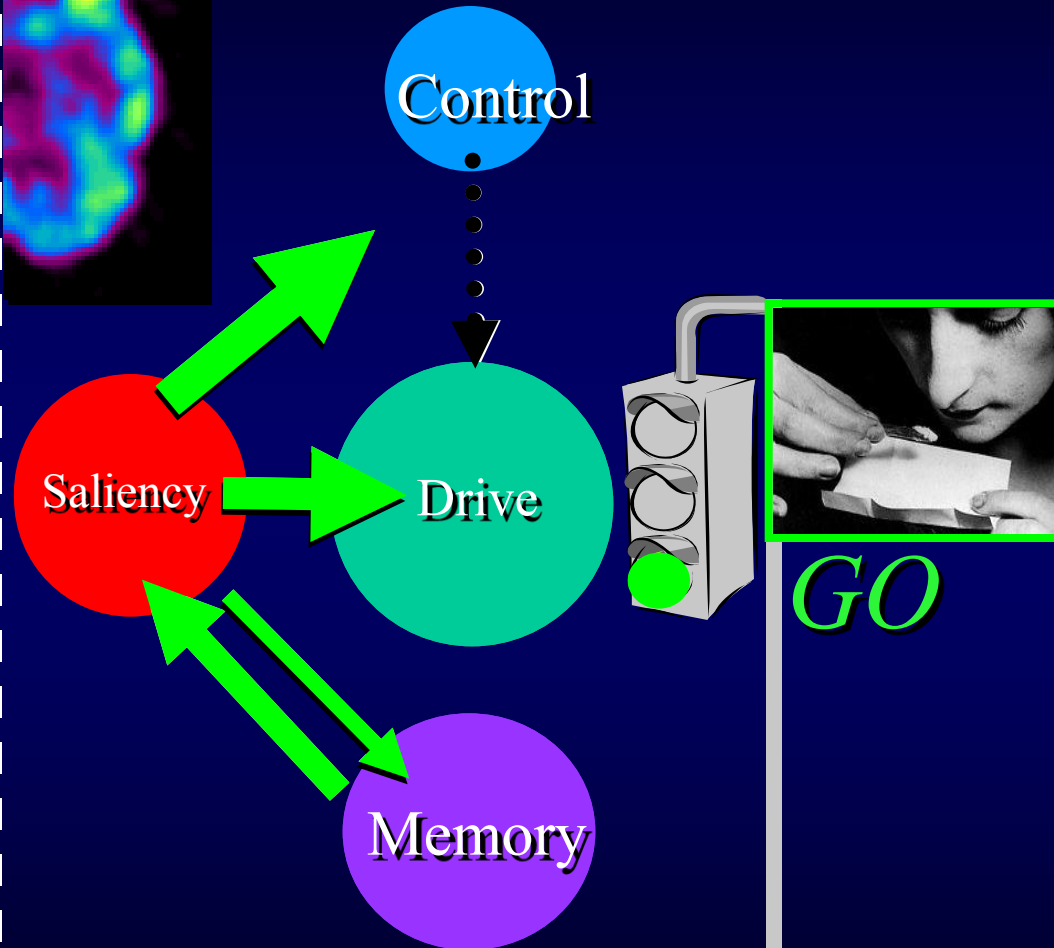


**All of These Must Be Considered  
In Developing Strategies to  
Most Effectively Treat Addiction**

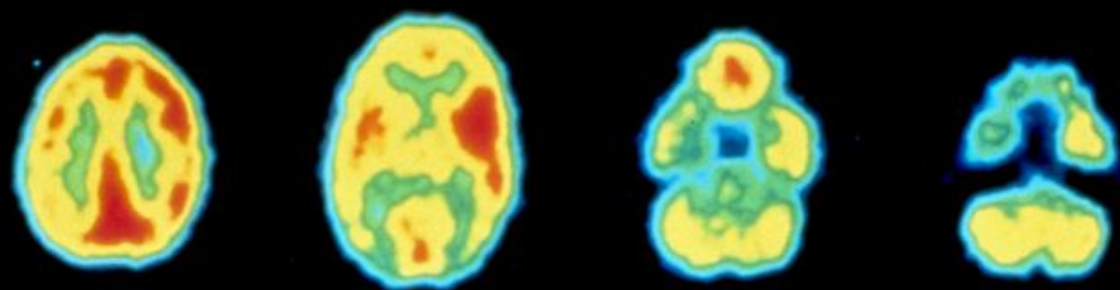
# Non-Addicted Brain



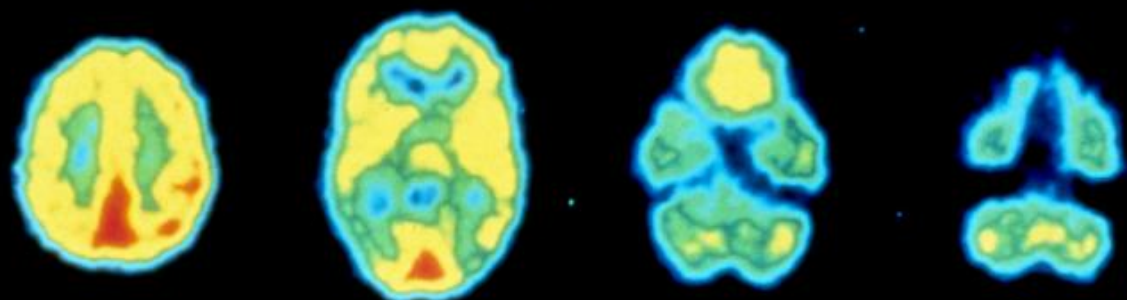
# Addicted Brain



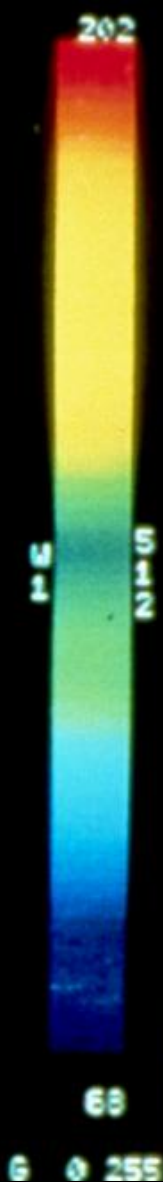
Adapted from: Volkow et al.,  
*J Clin Invest* 111(10):1444-1451, 2003



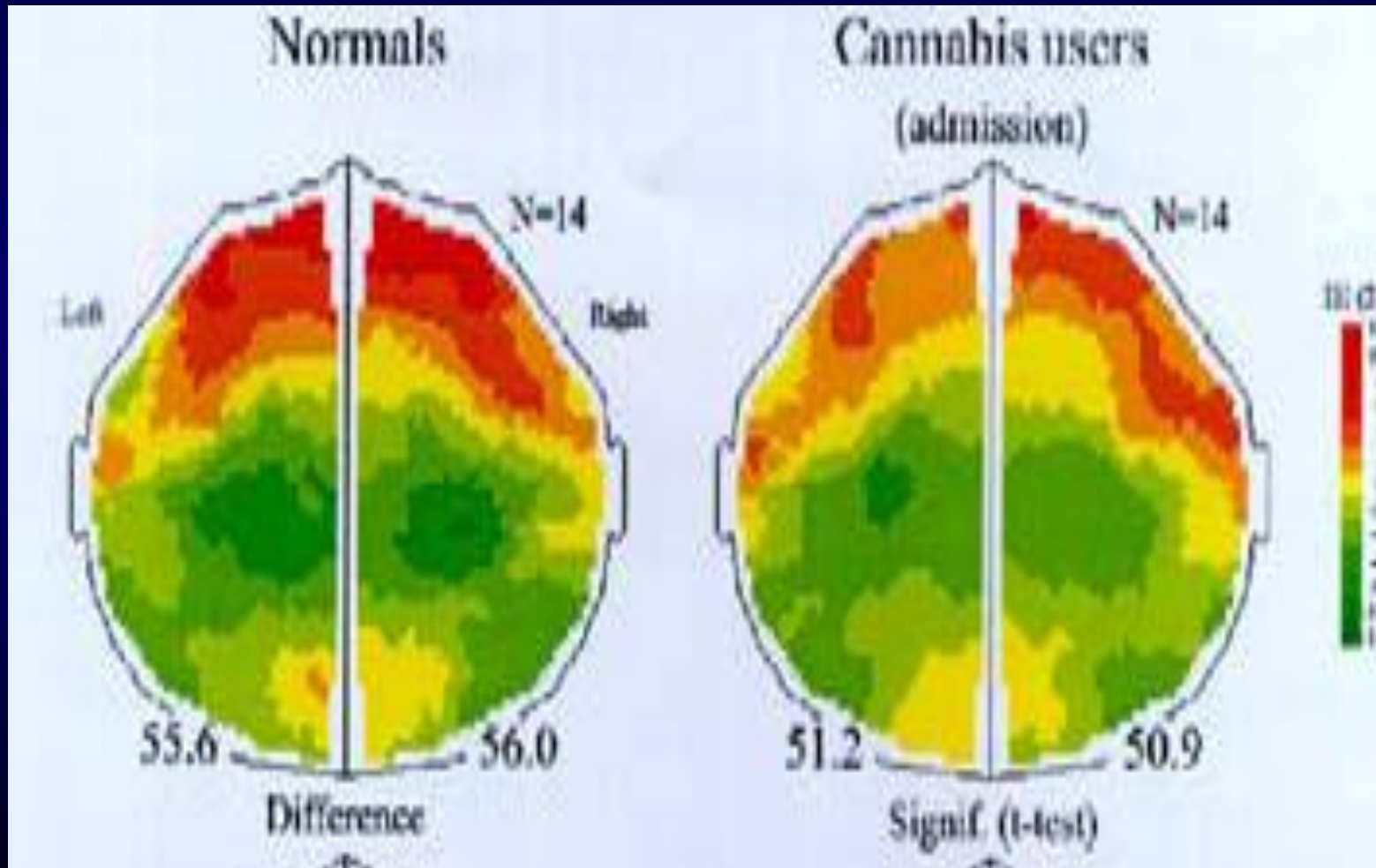
NORMAL



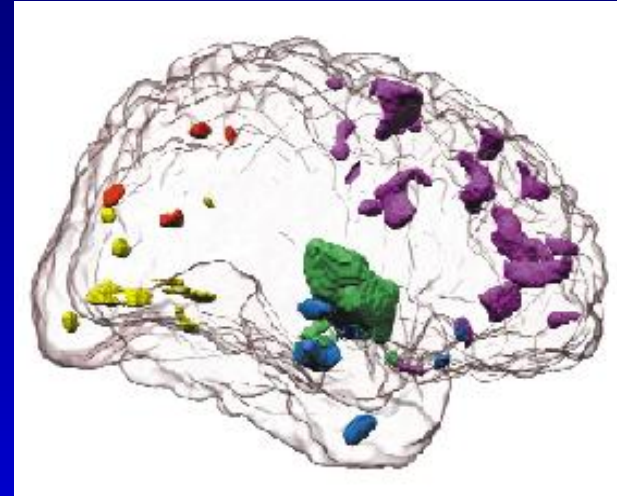
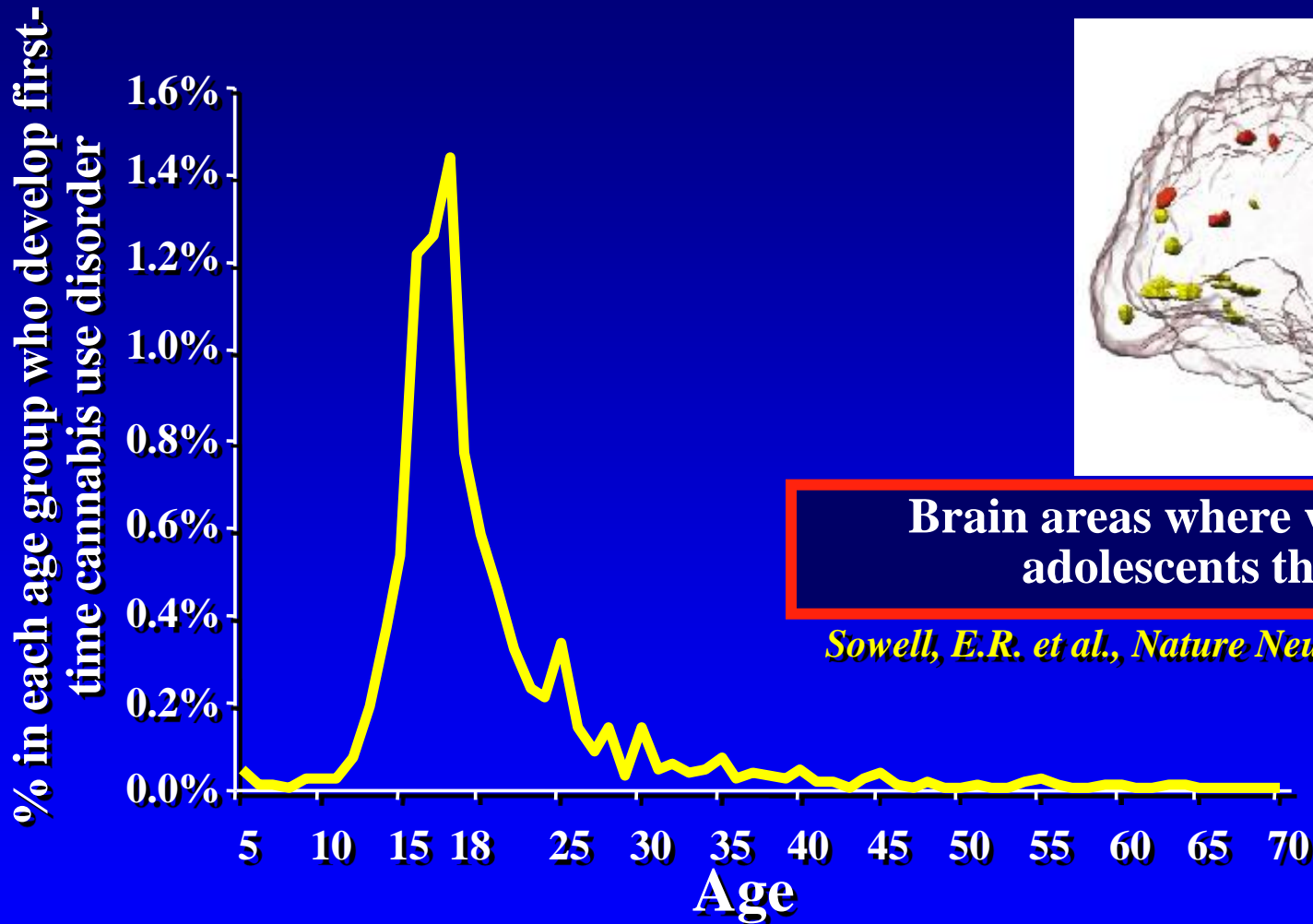
MARIJUANA ABUSER



# Marijuana brain changes



# ADDICTION IS A DEVELOPMENTAL DISEASE *starts in adolescence and childhood*



Brain areas where volumes are smaller in adolescents than young adults.

*Sowell, E.R. et al., Nature Neuroscience, 2: 859-861, 1999*

Age at cannabis use disorder as per DSM IV

*NIAAA National Epidemiologic Survey on Alcohol and Related Conditions, 2003*

**DRUG ABUSE AND ADDICTION  
INVOLVE  
MULTIPLE AND INTERACTIVE FACTORS**

