

Addictions and the Brain

Acknowledgements

- La Hacienda Treatment Center
- American Society of Addiction Medicine
- National Institute of Drug Abuse

Definition

- A primary, progressive biochemical, psychosocial, genetically transmitted chronic disease of relapse who's hallmarks are denial, loss of control and unmanageability.

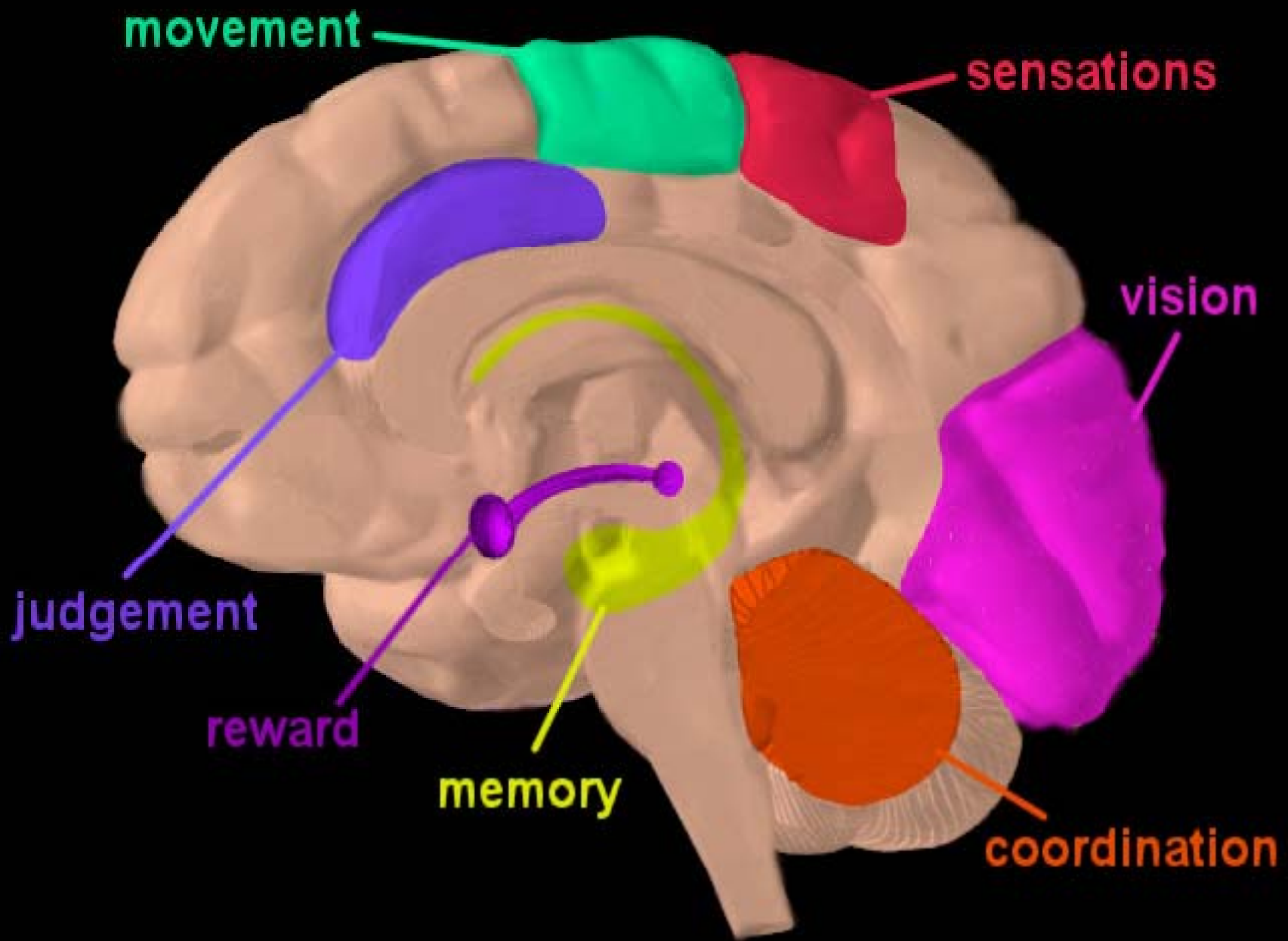
DSM IV Criteria for dependency:

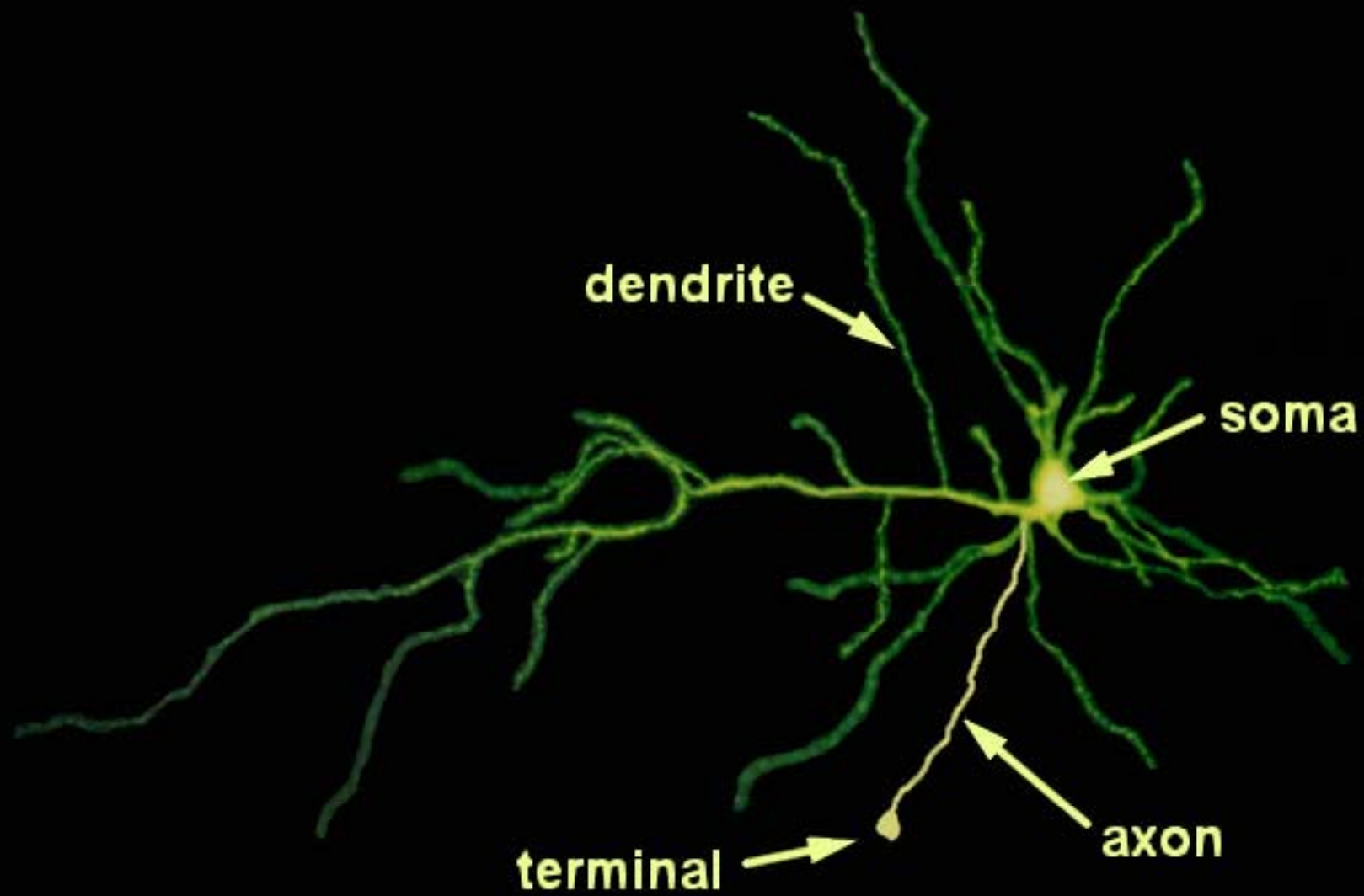
At least 3 of the 7 below

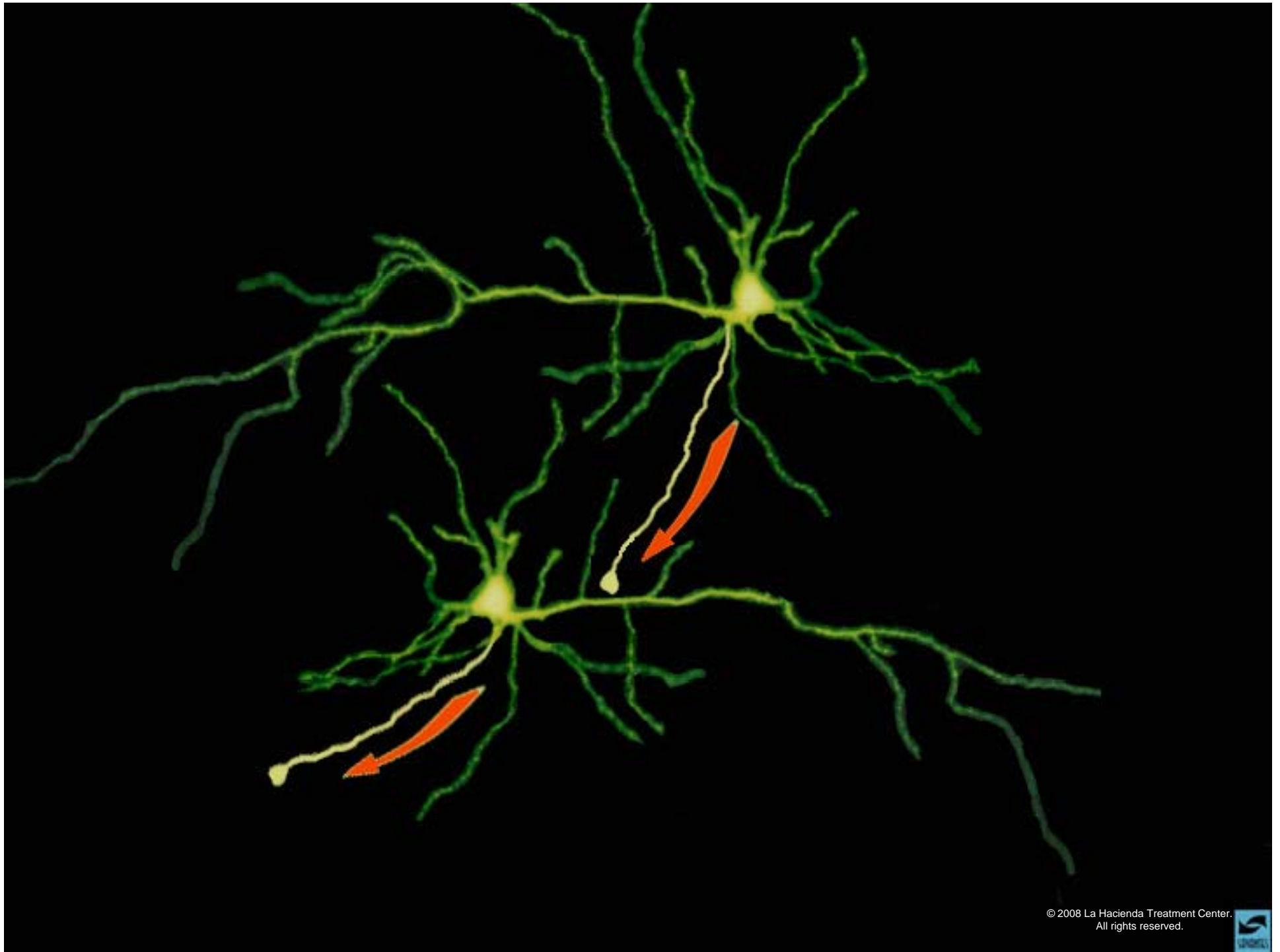
1. Withdrawal
2. Tolerance
3. The substance is taken in larger amounts or over a longer period than was intended.
4. There is a persistent desire or unsuccessful efforts to cut down or control substance use.
5. A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects.
6. Important social, occupational, or recreational activities are given up or reduced because of the substance use.
7. The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.

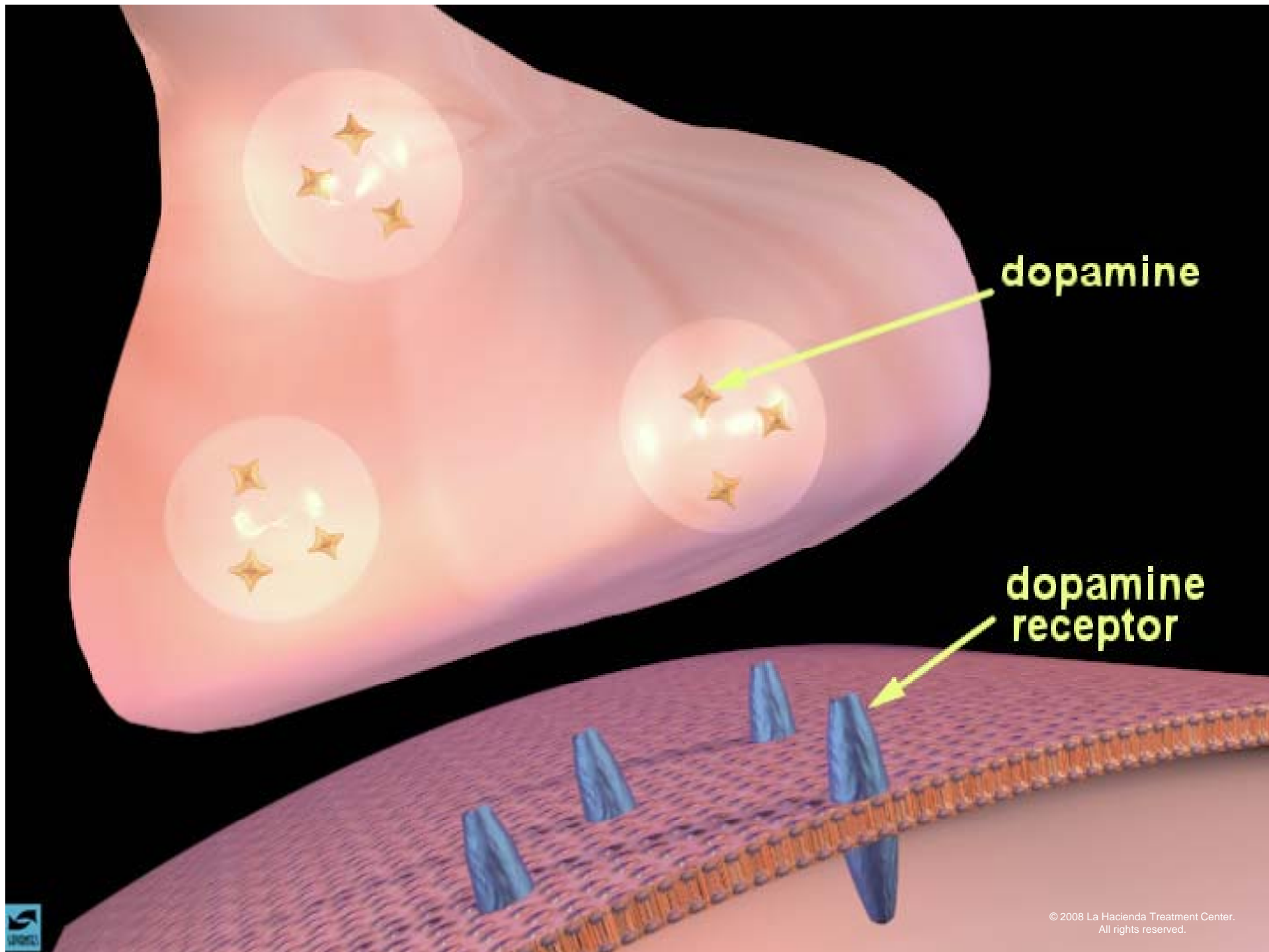
Dispute between behavior and disease

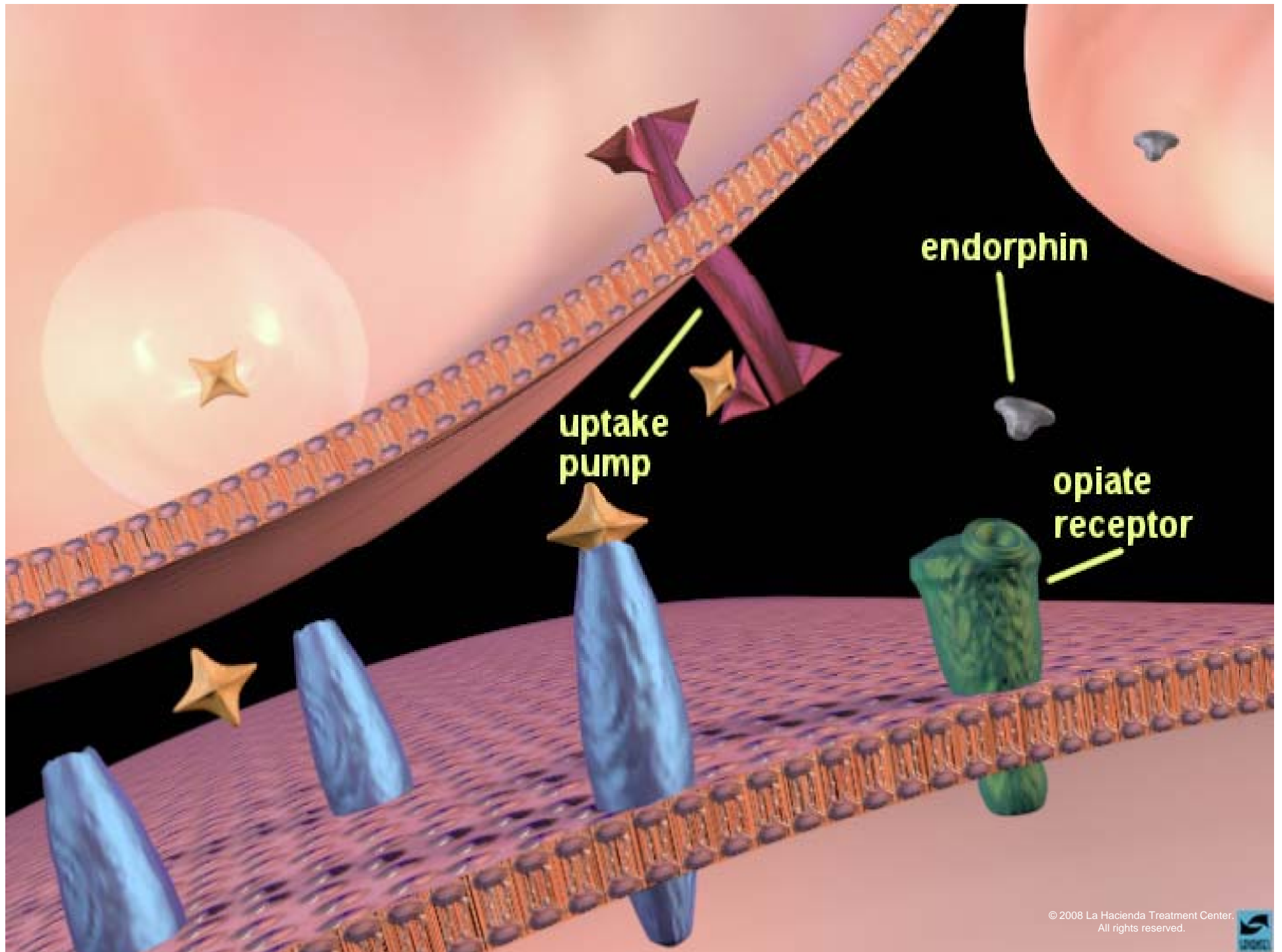
Present understanding of the
Hypothalamus location of the
disease hypothesis.



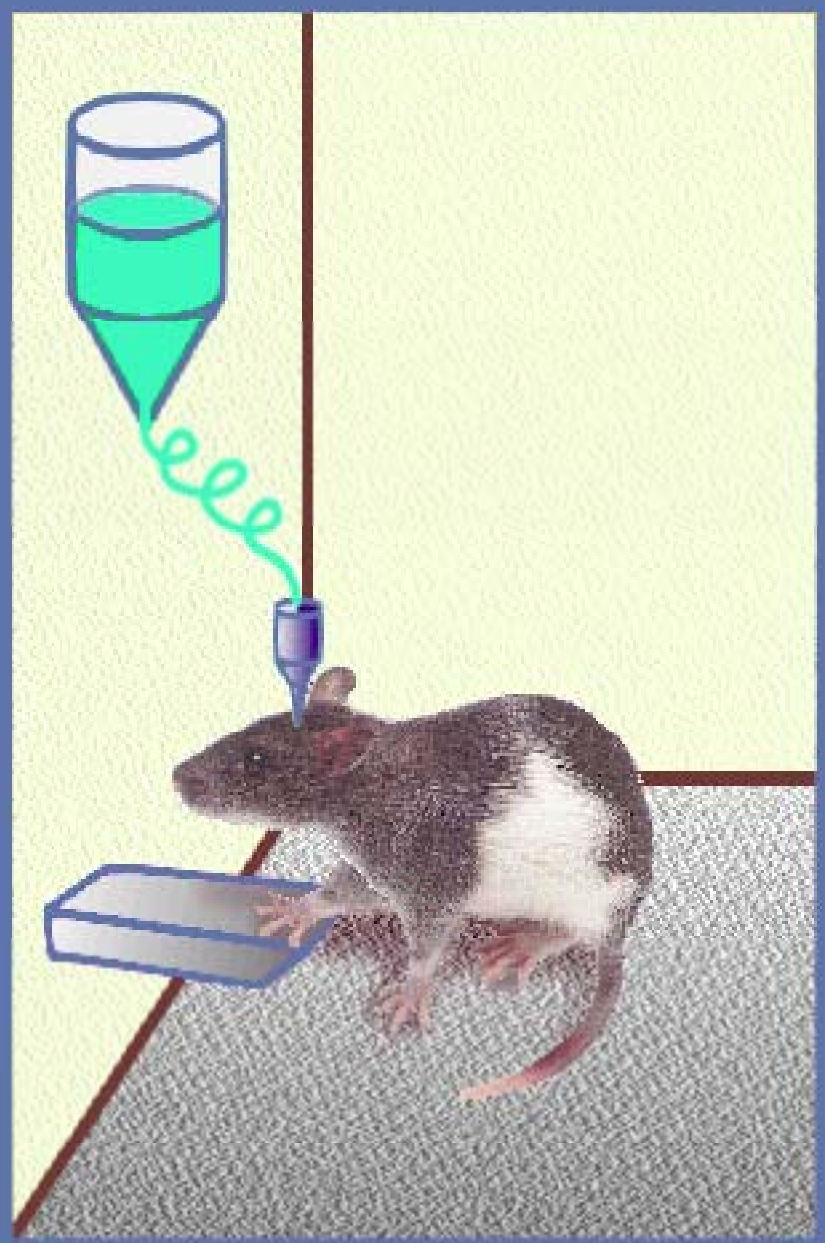








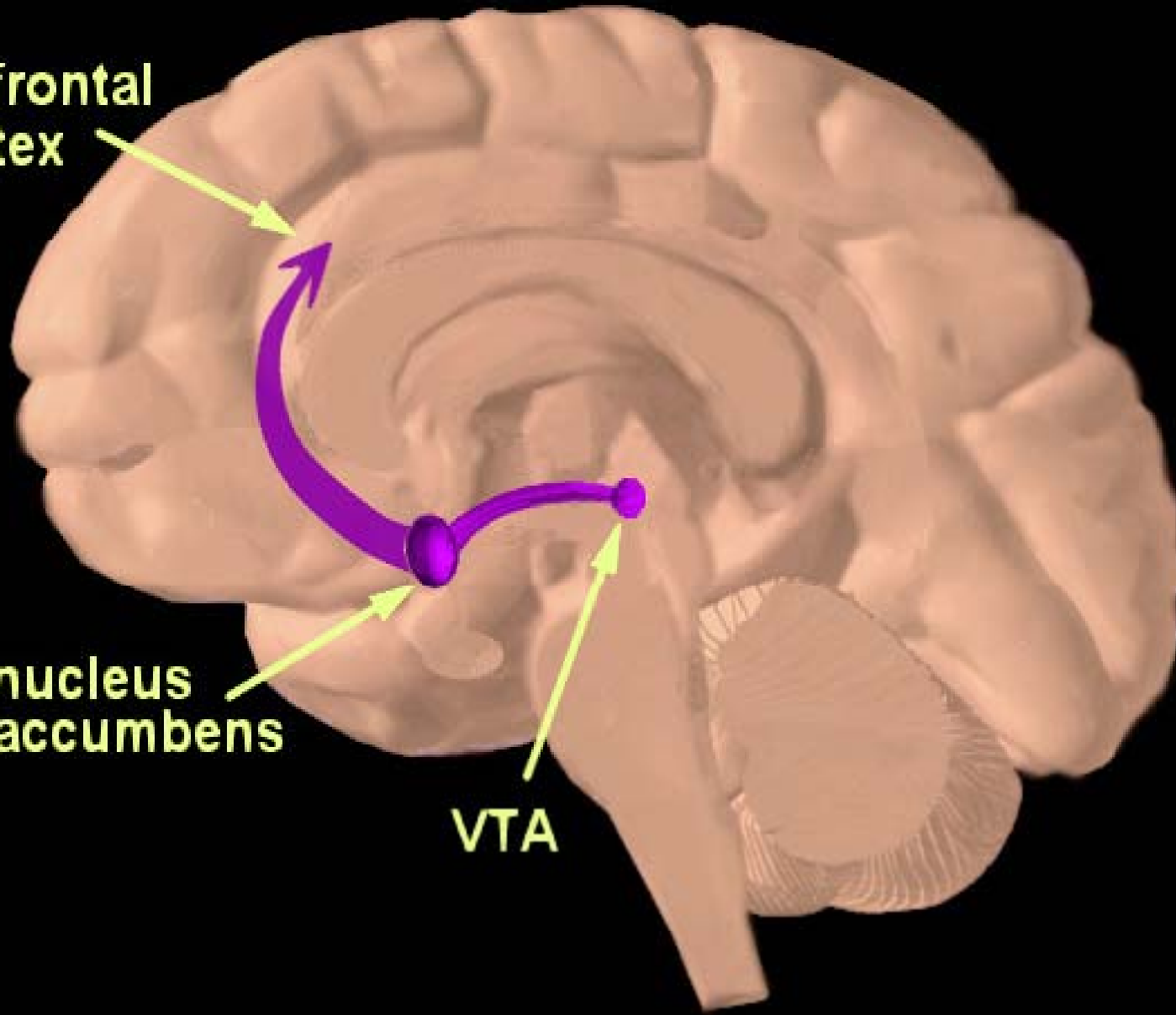
Dispute regarding behavior versus disease



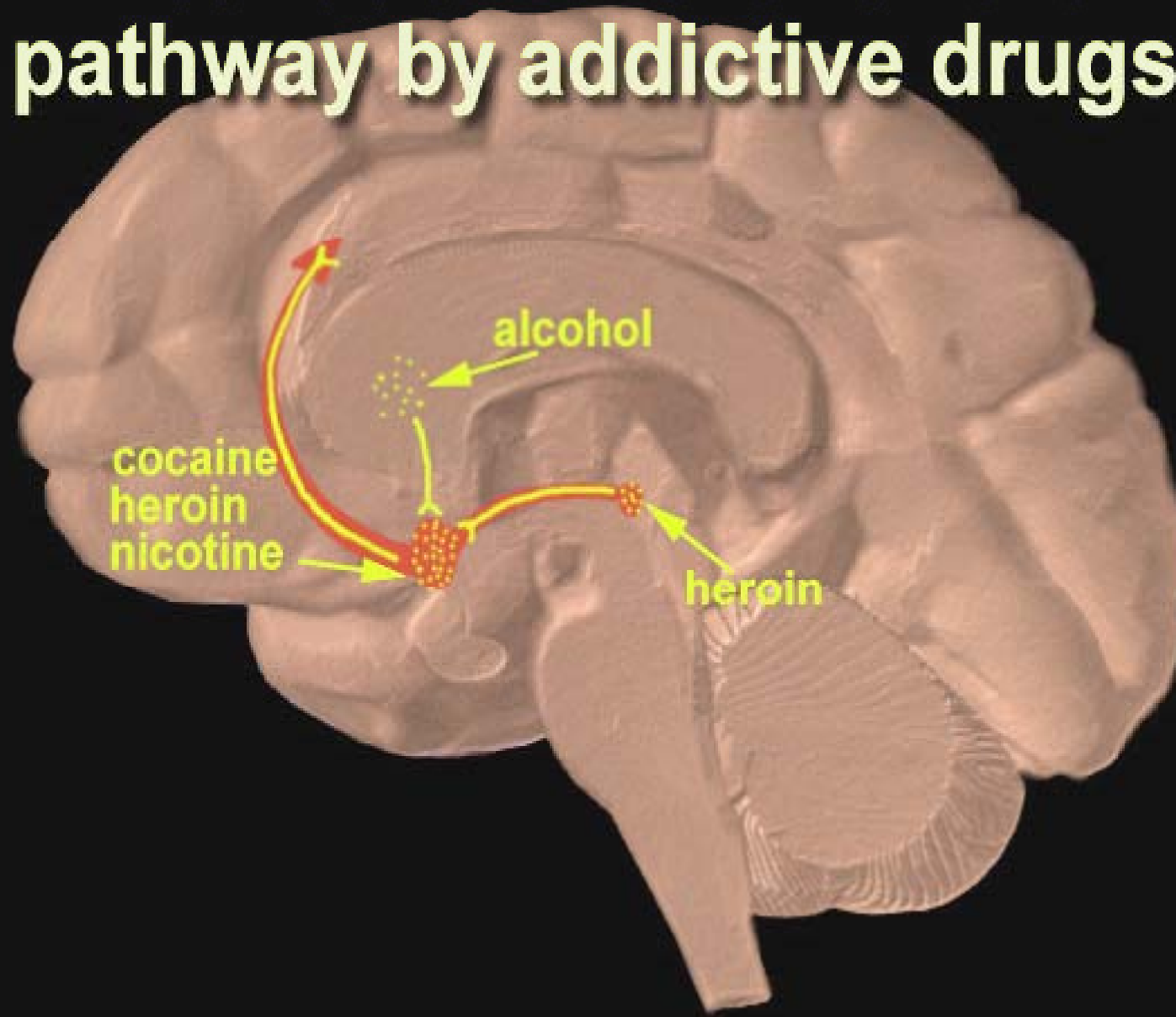
**prefrontal
cortex**

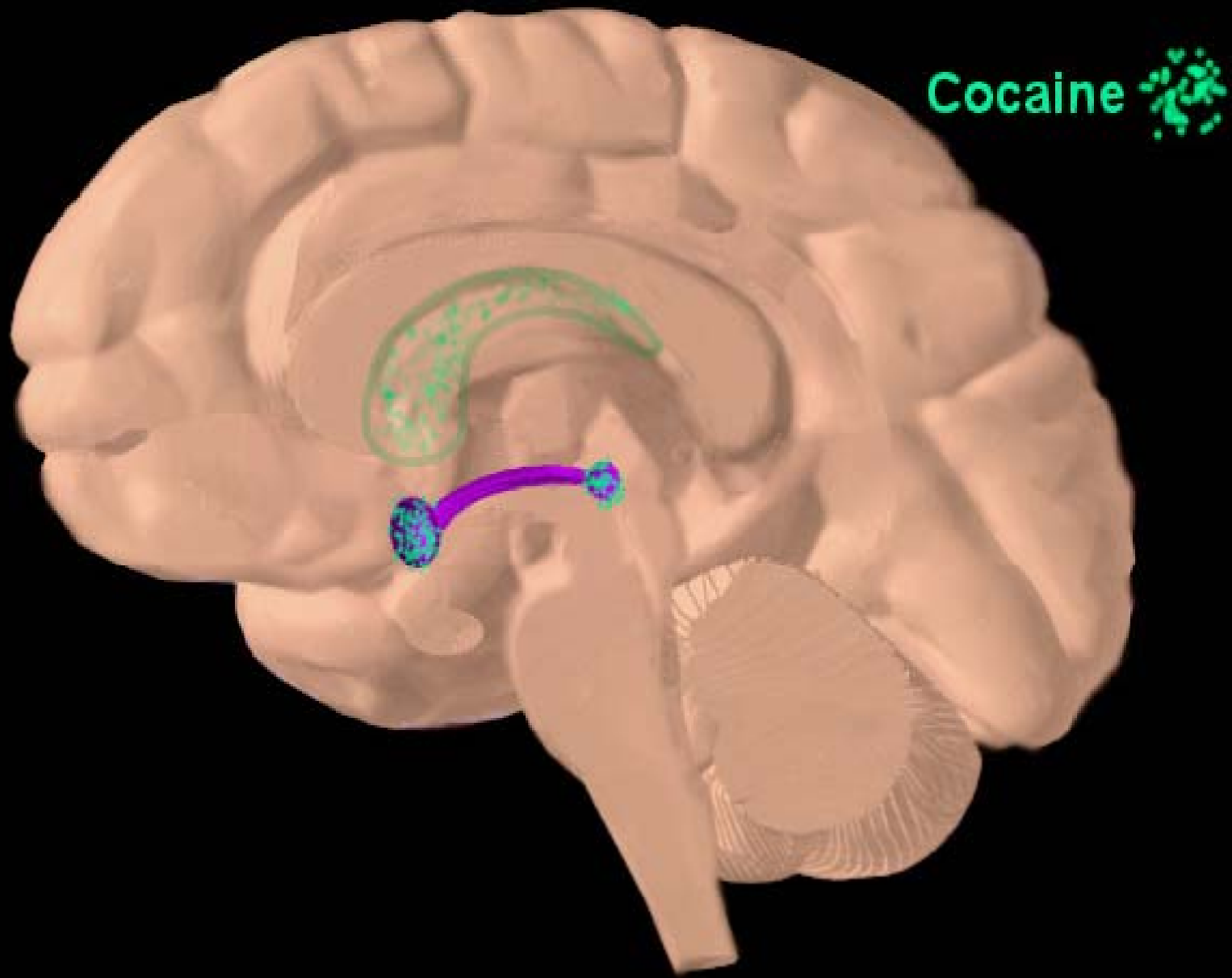
**nucleus
accumbens**

VTA



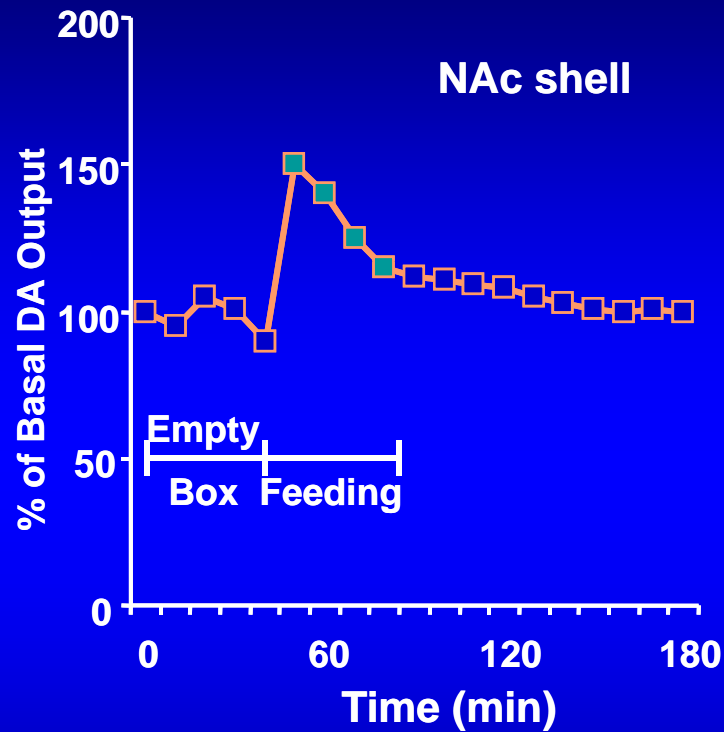
Activation of the reward pathway by addictive drugs





Natural Rewards Elevate Dopamine

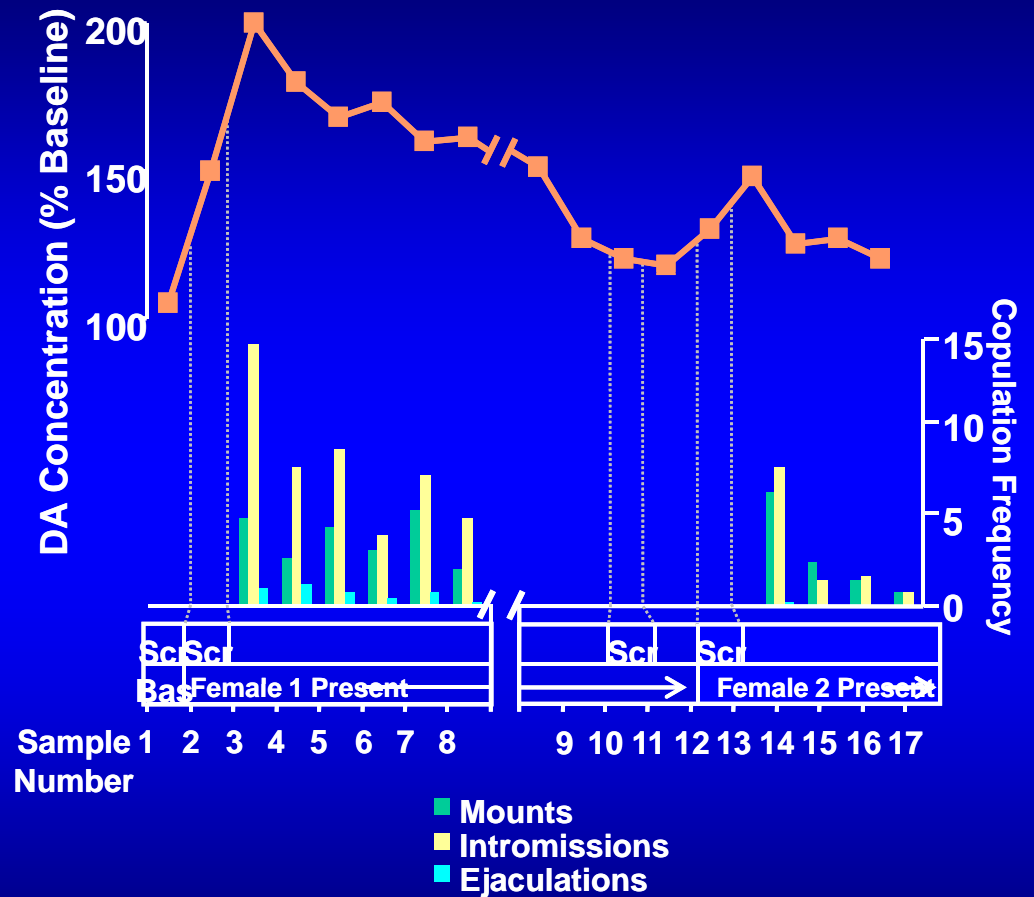
FOOD



Source: Di Chiara et al.

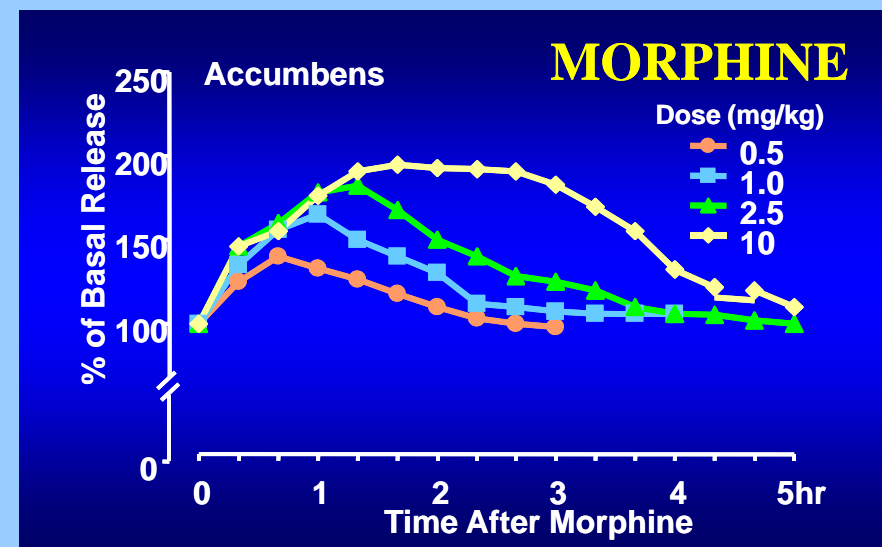
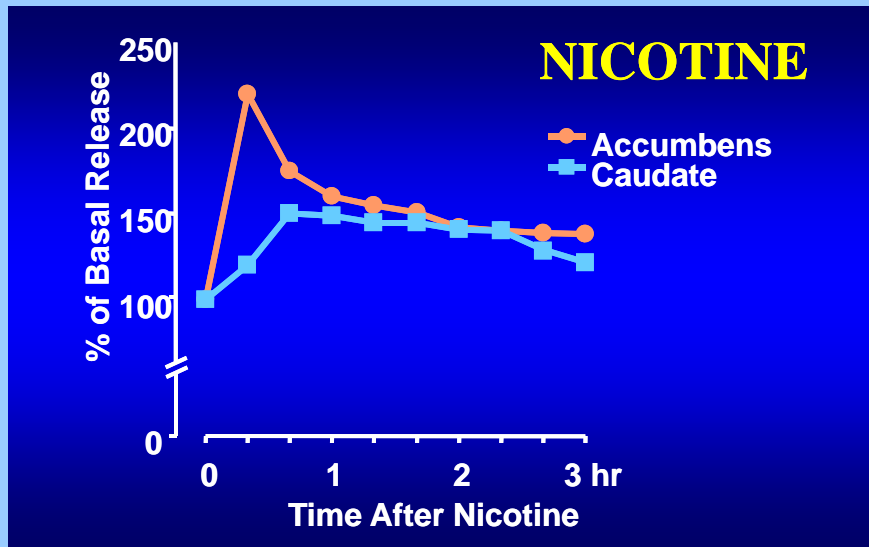
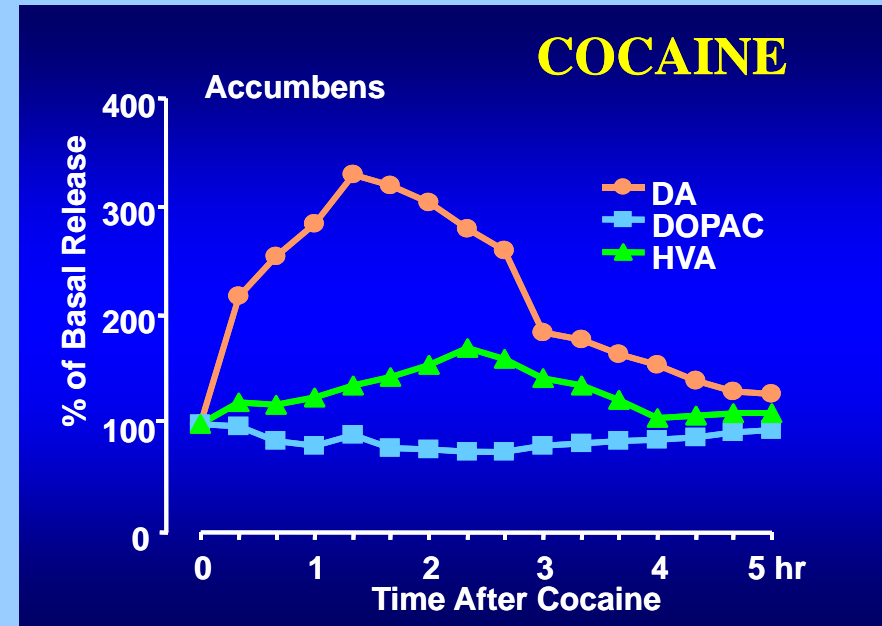
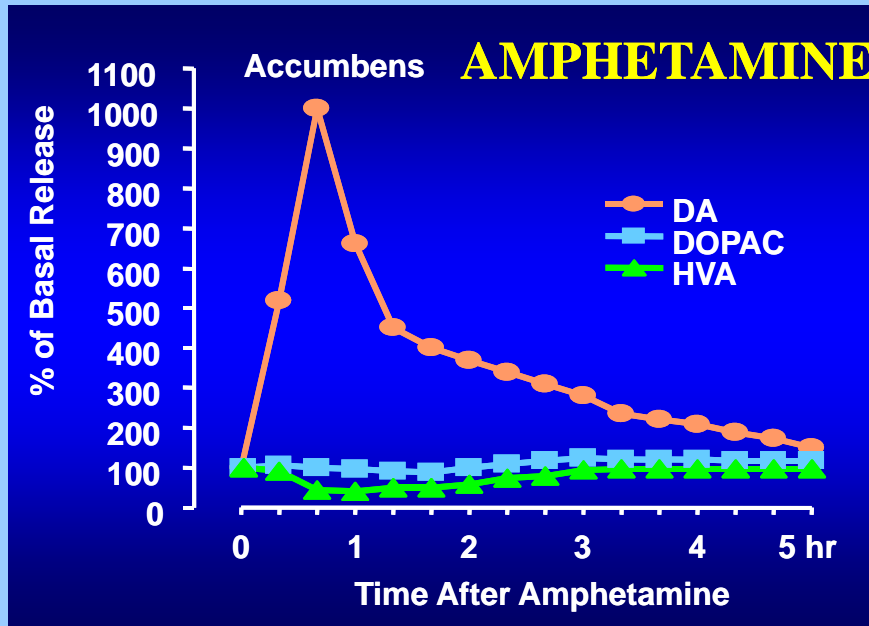
Levels

SEX



Source: Fiorino and Phillips

Effects of Drugs on Dopamine Levels



Source: Di Chiara and Imperato

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Striatal FDOPA Activity

Pre-Amphetamine/Control



Post-Chronic Amphetamine (10 days)

4 weeks



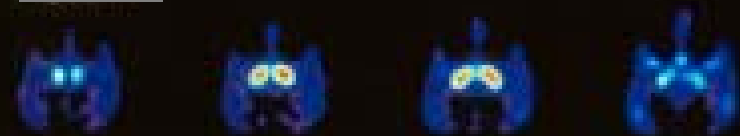
6 months



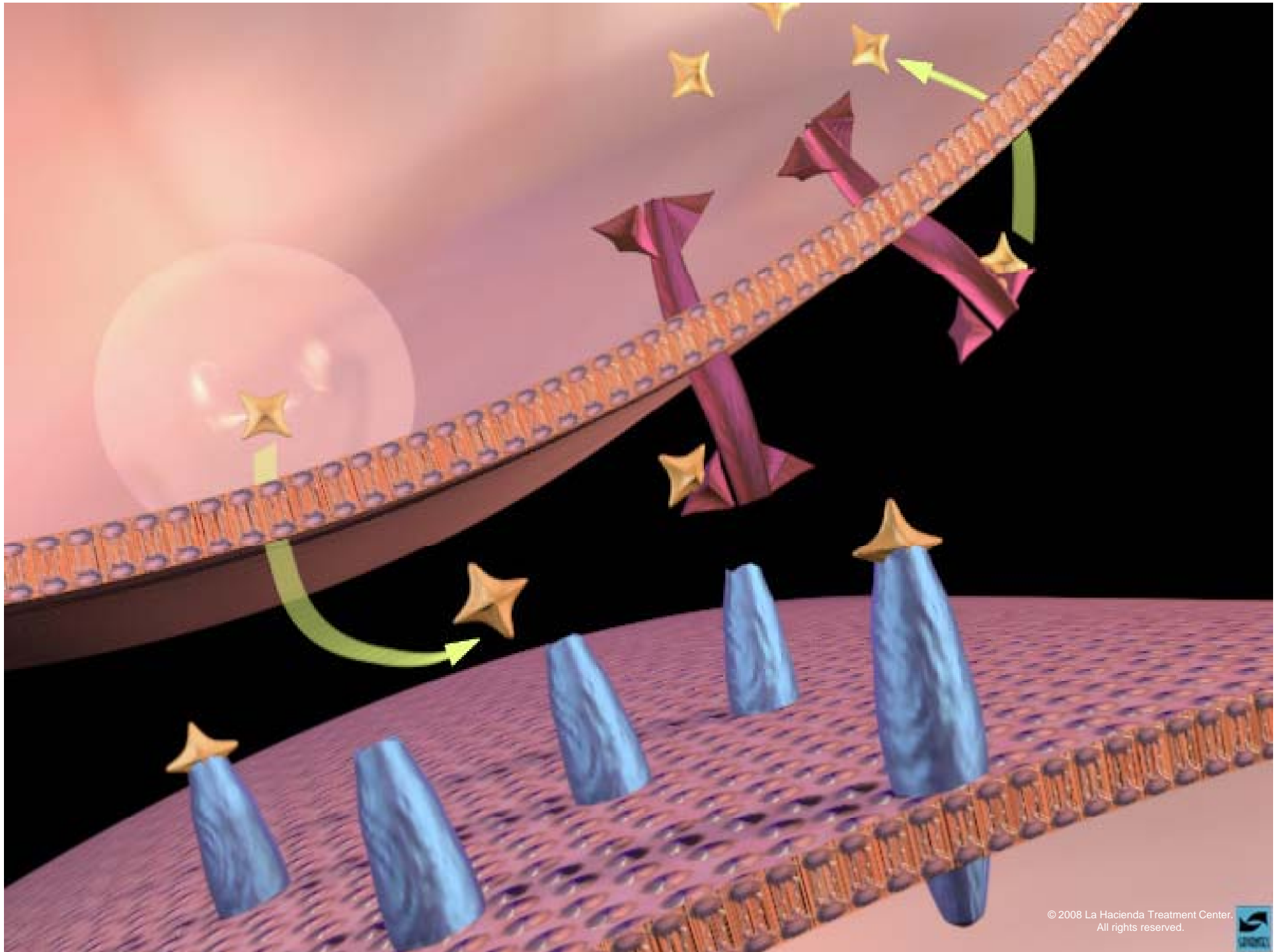
1 year

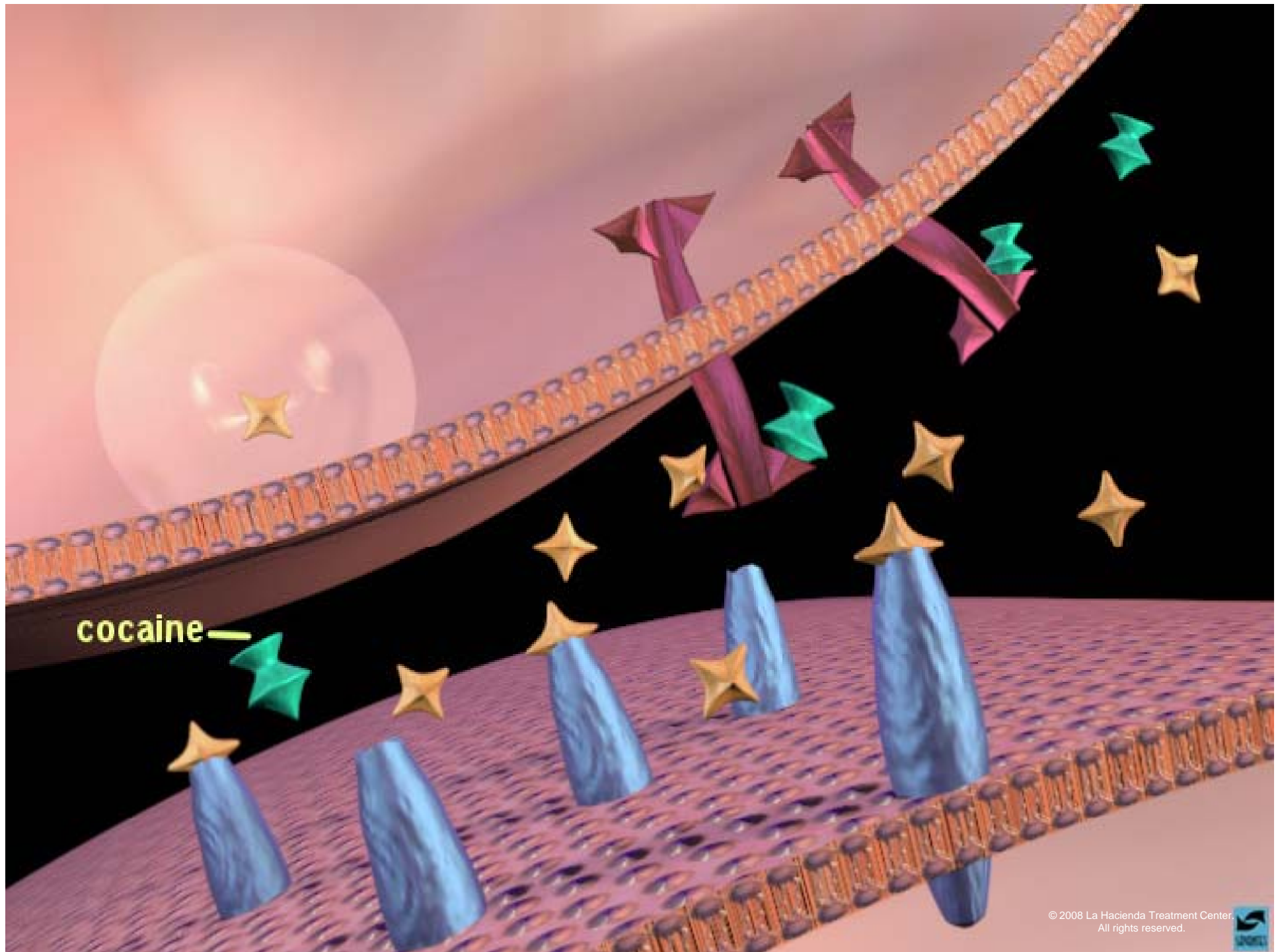


2 years

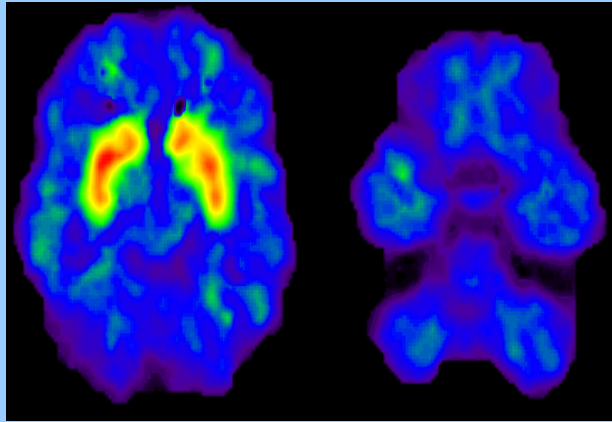


Superior —————> Inferior

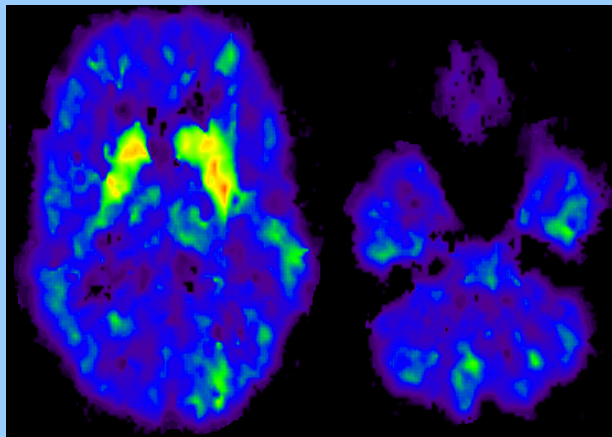




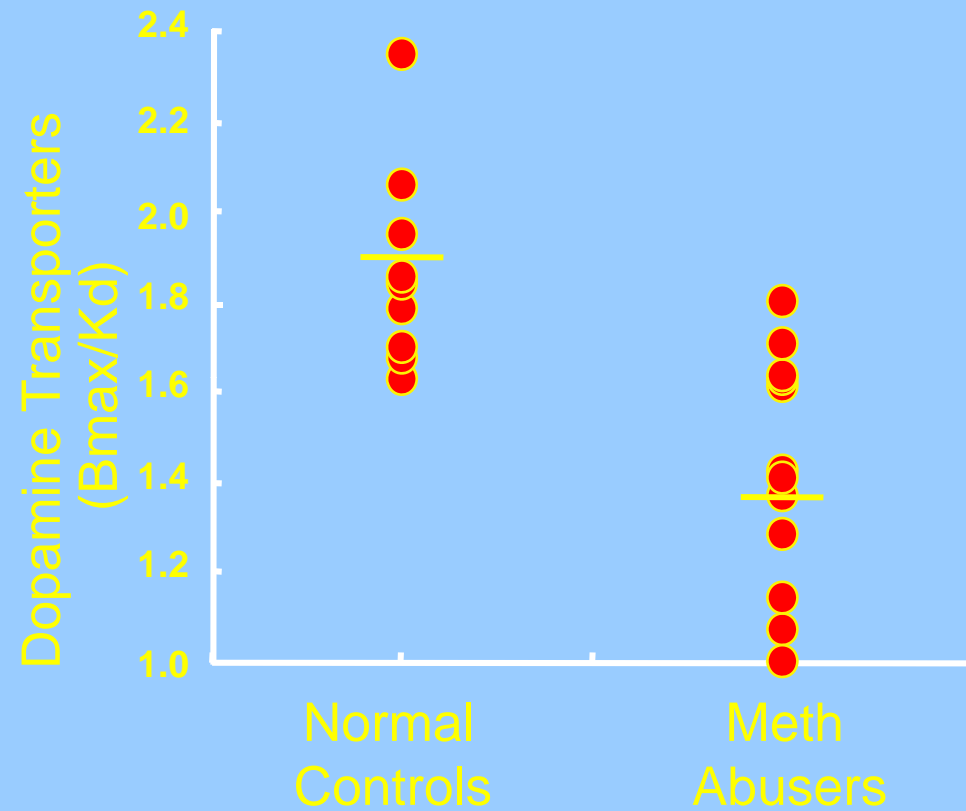
Dopamine Transporters in Methamphetamine Abusers



Normal Control



Methamphetamine Abuser



$p < 0.0002$

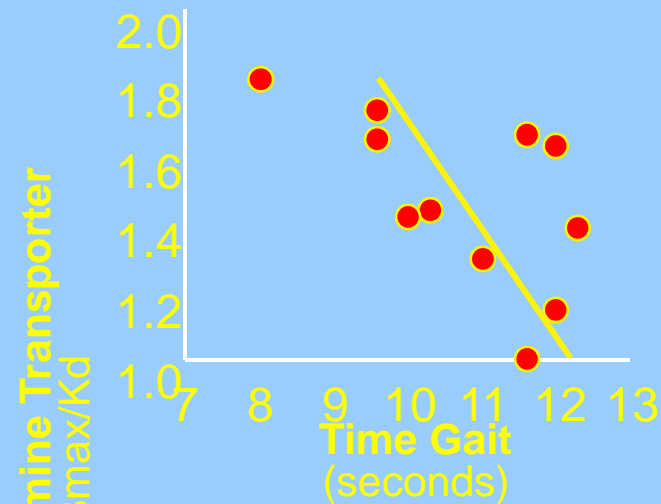


Methamphetamine abusers have significant reductions in dopamine transporters.

Dopamine Transporters in Methamphetamine Abusers

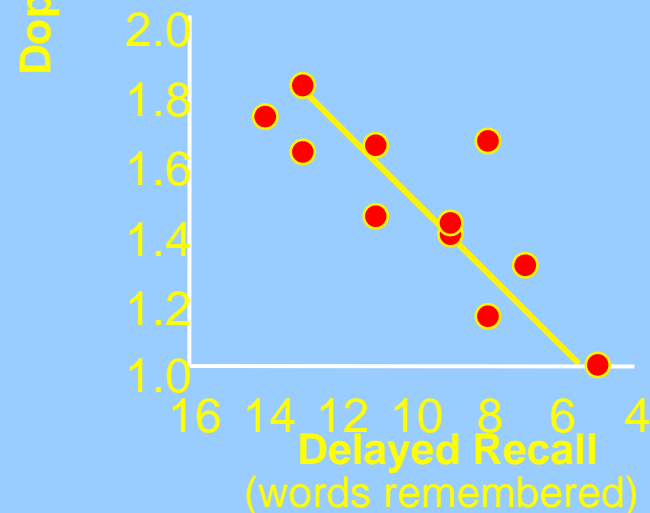
Motor Task

Loss of dopamine transporters in the meth abusers may result in slowing of motor reactions.



Memory Task

Loss of dopamine transporters in the meth abusers may result in memory impairment.

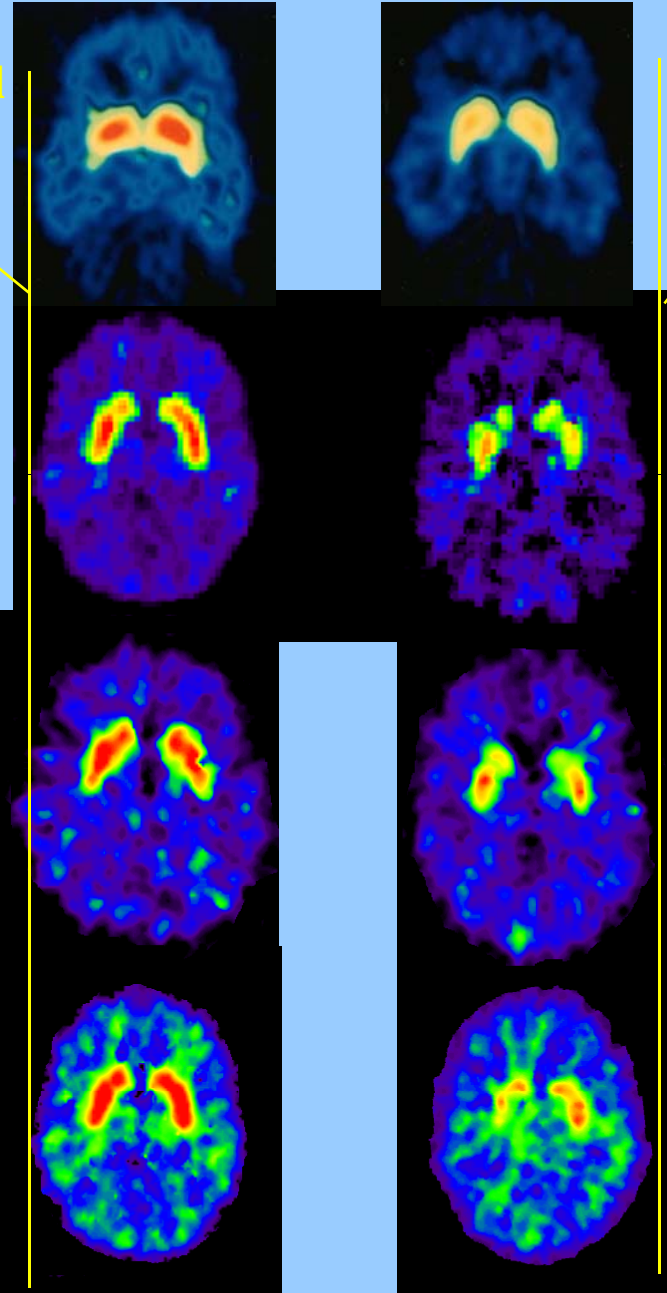


Dopamine D2 Receptors in Addiction



Control
groups

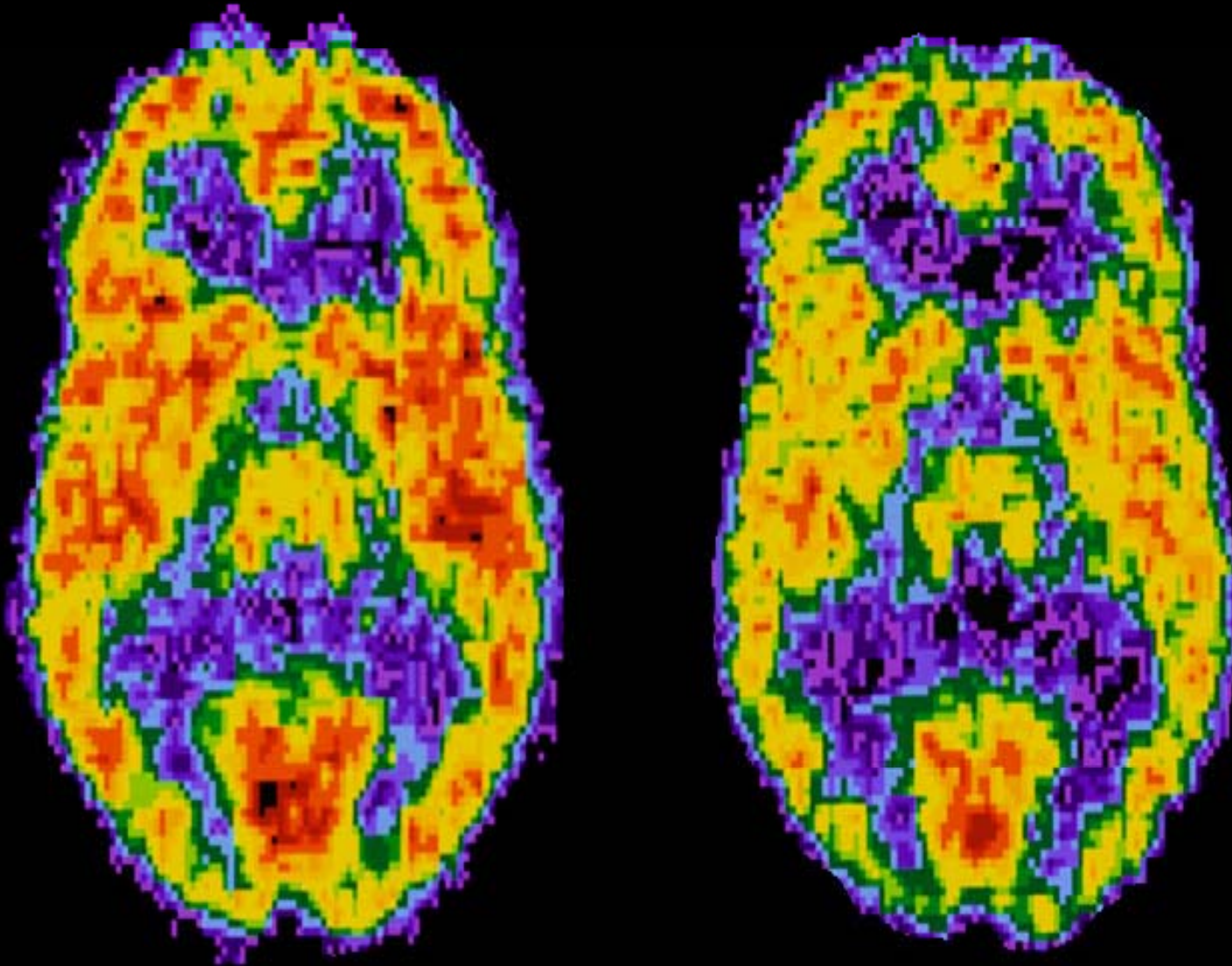
Experimental
groups

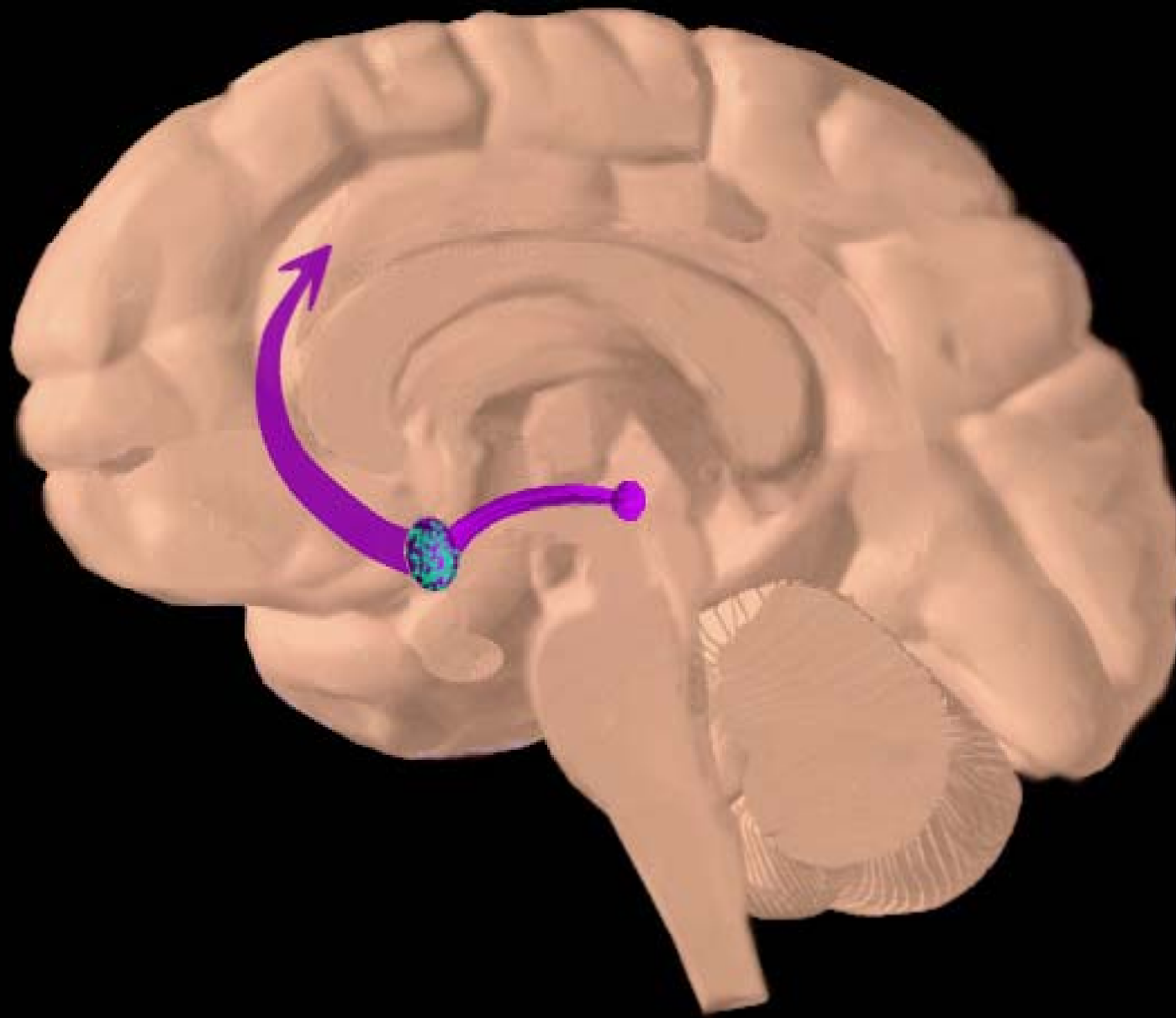


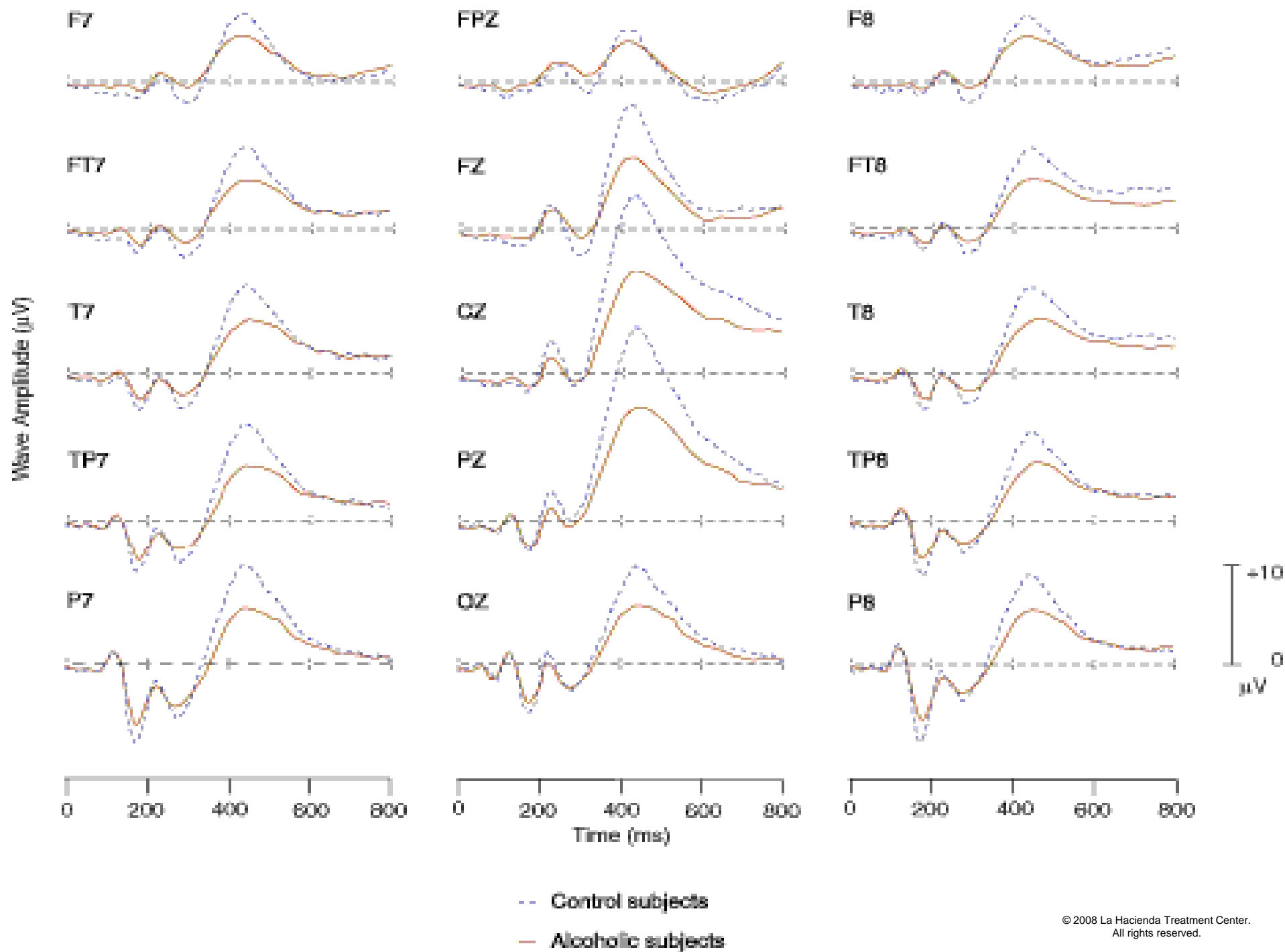
DA D2 Receptor Availability



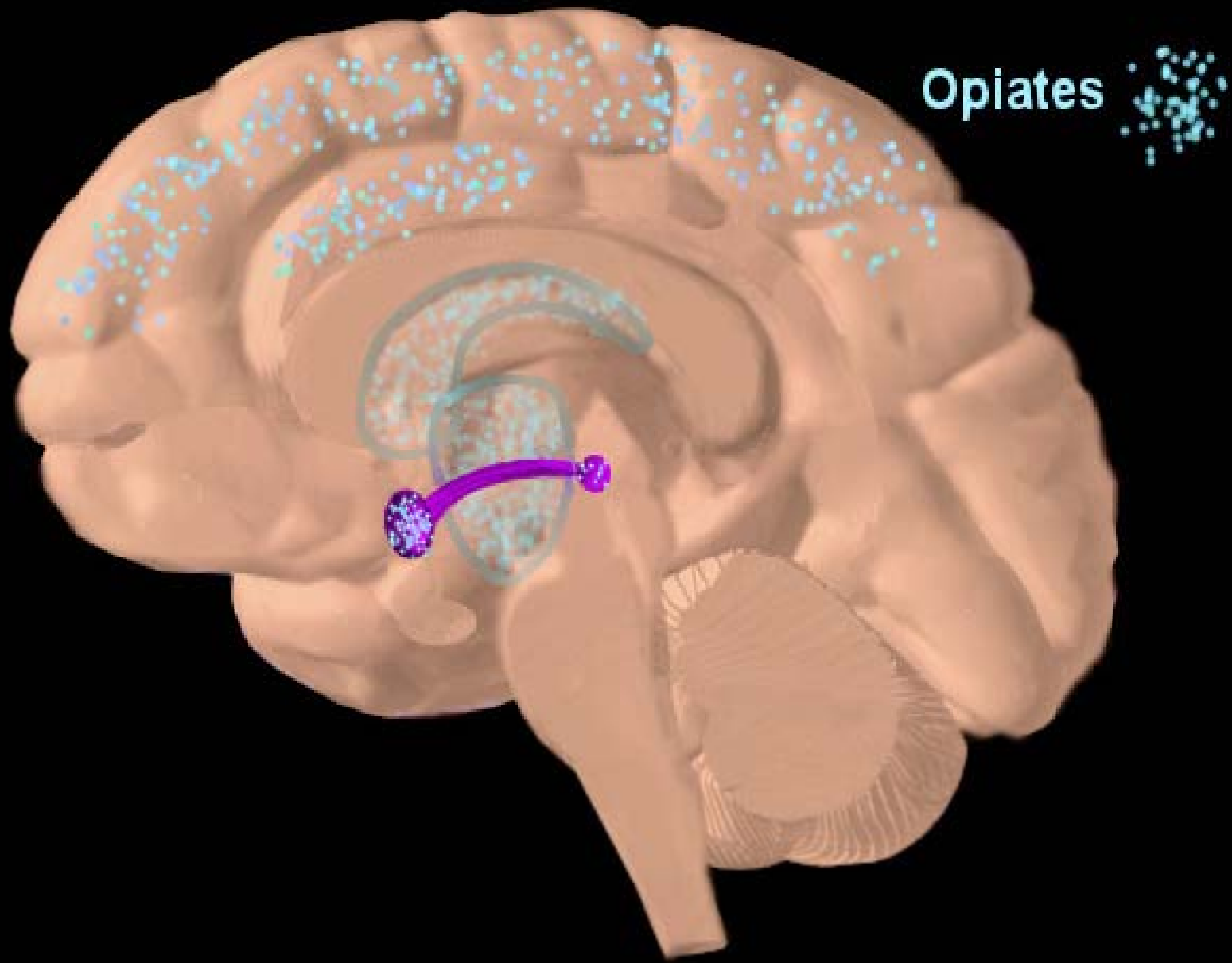
on cocaine

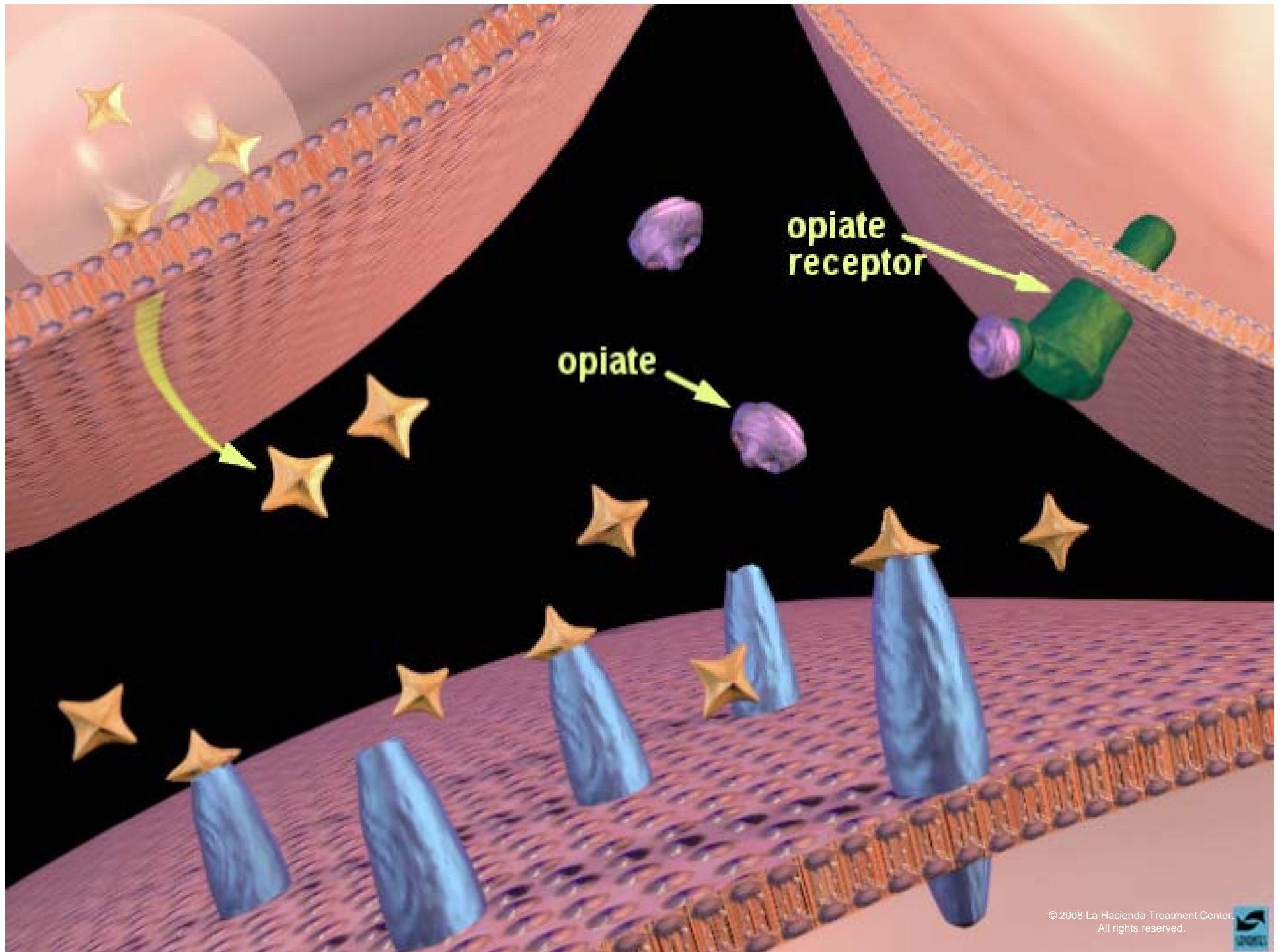


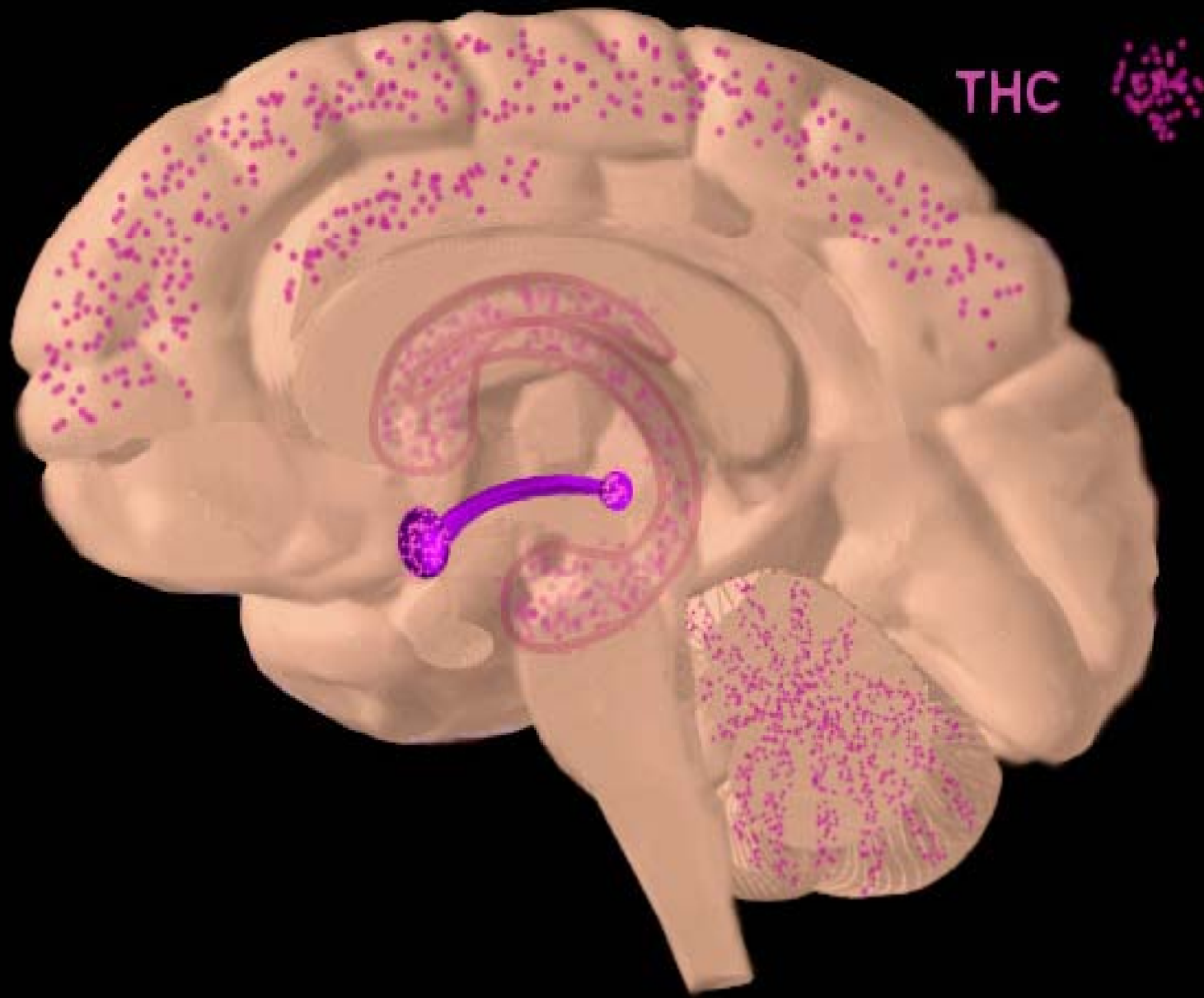


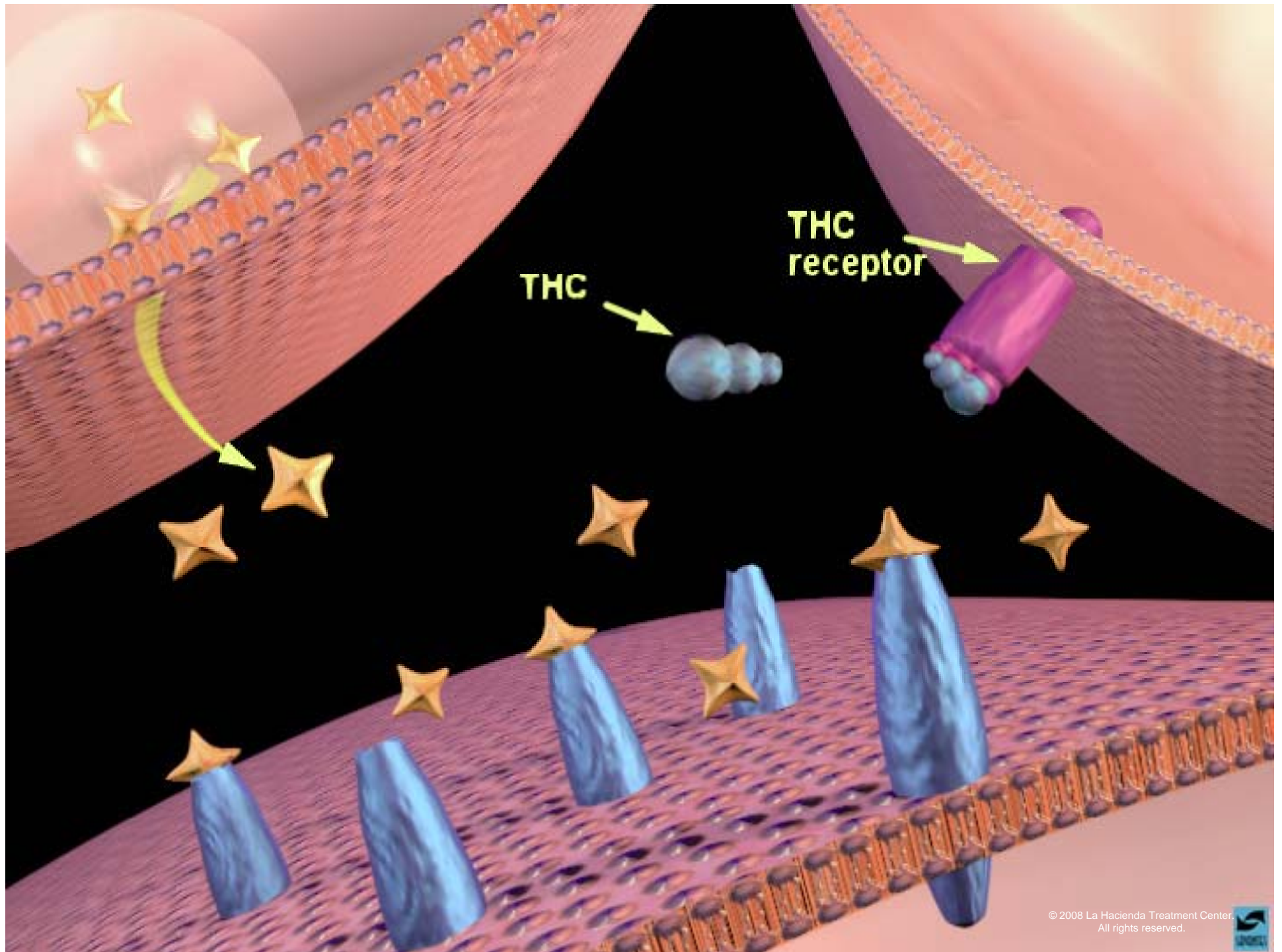












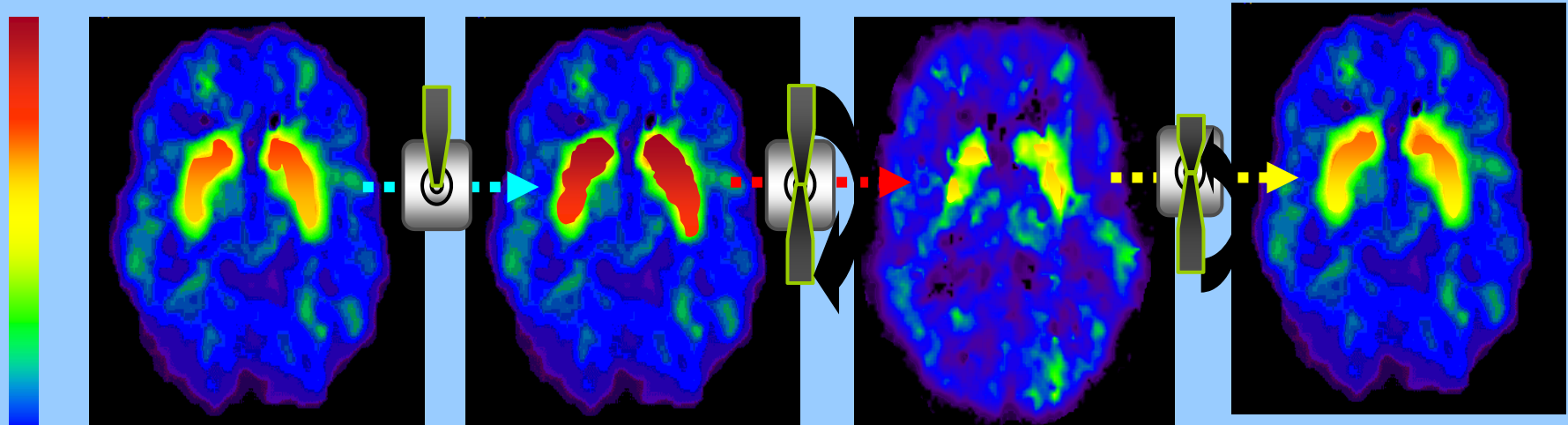
Challenge:

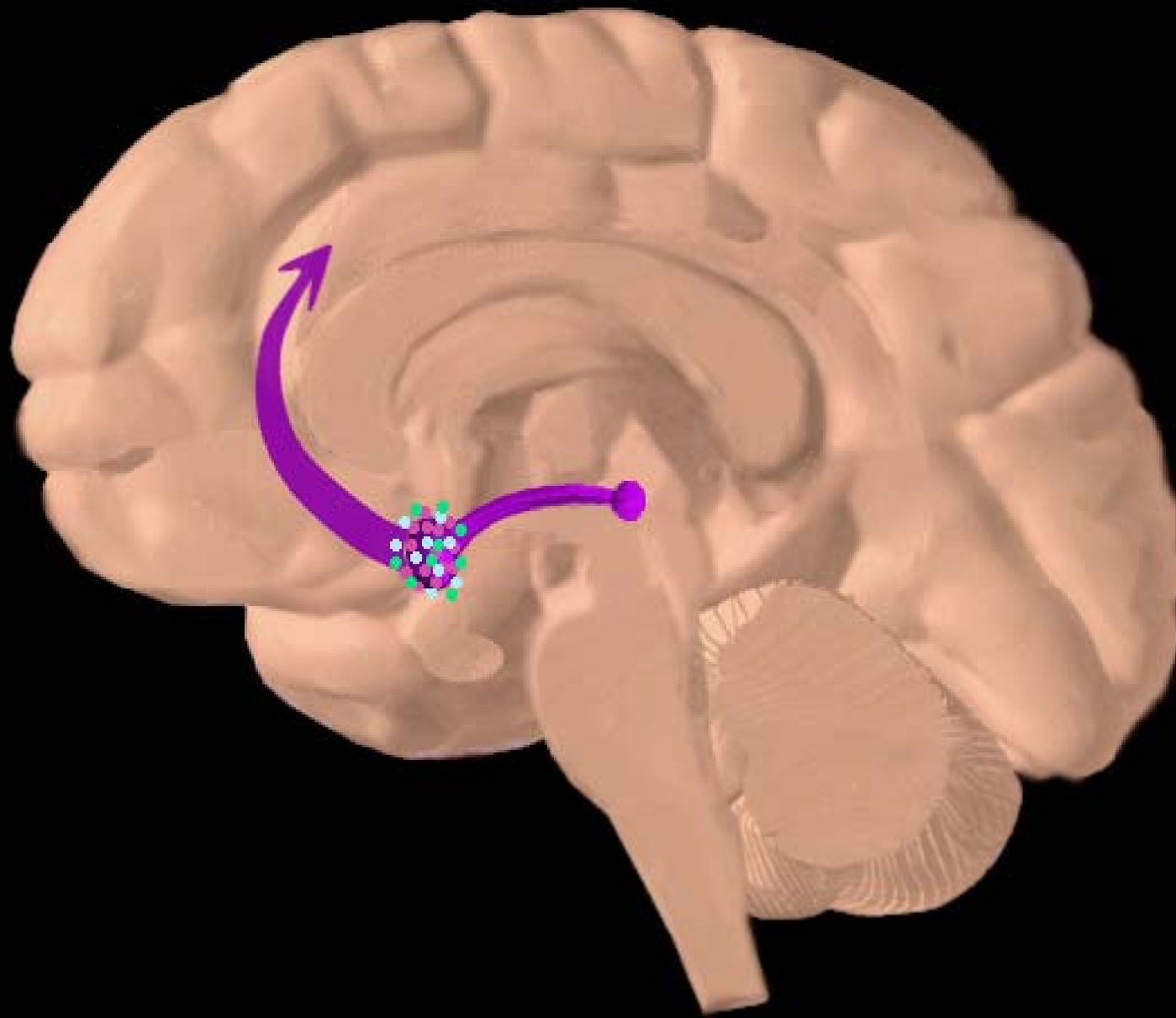
Normal

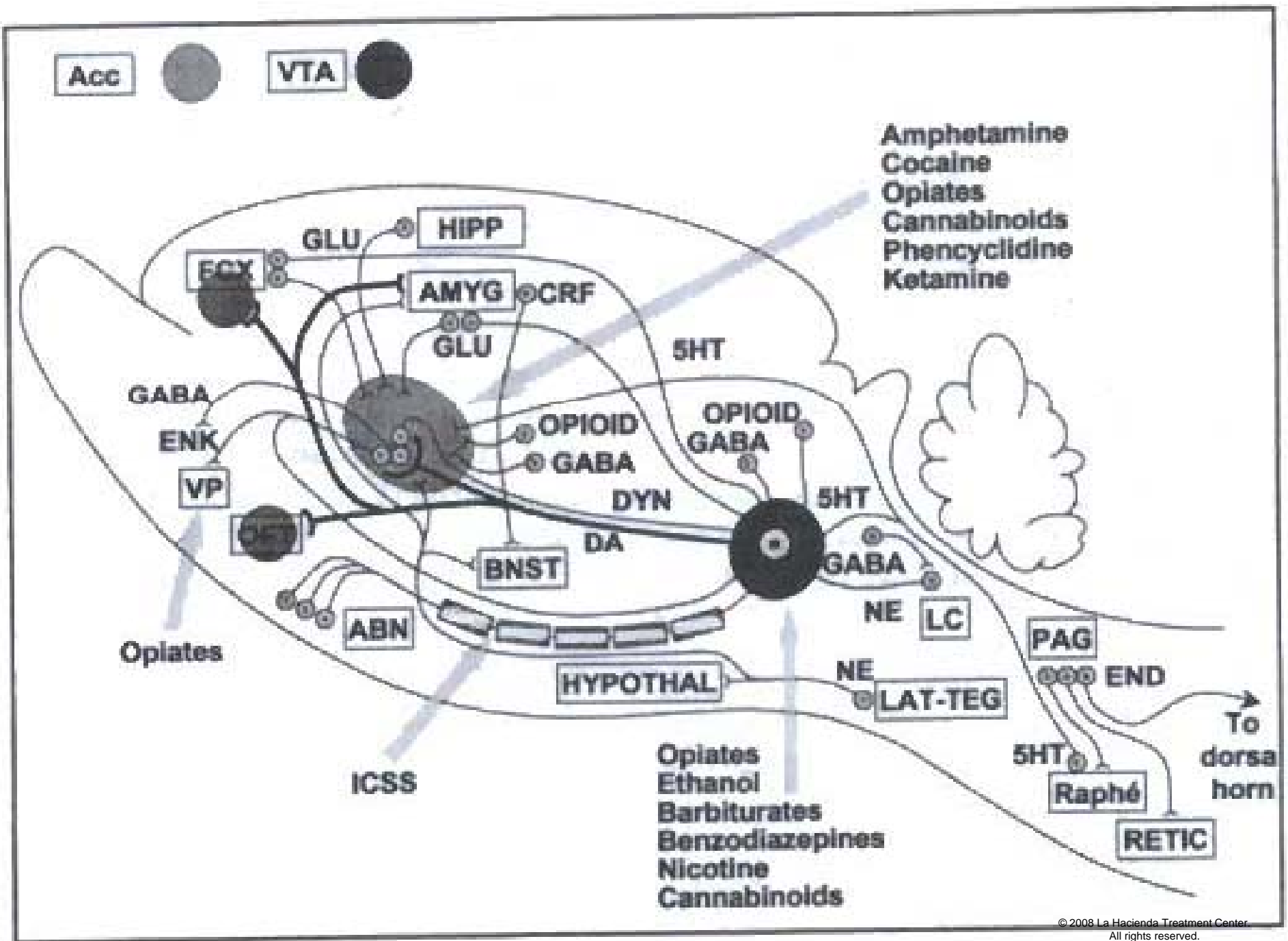
Drug Use

Addiction

Treatment







Three Major Relapse Pathways

- I. Cross Addicting Drugs
- II. People/Place/Things
- III. B.H.A.L.T.

Cross Addicting Drugs

- a. Chemical of choice
- b. Related drugs
- c. Tobacco
- d. Life long relapse pathway

People/Place/Things

- a. History of discovery
- b. Three month limit for relapse

B.H.A.L.T.

- a. Boredom
- b. Hunger
- c. Anger/emotions
- d. Loneliness
- e. Tiredness

Relapse Prevention Medications

- I. Antabuse
- II. Campral
- III. ReVia
- IV. Vivitrol
- V. Off label

Antabuse

- a. Mechanism of action
- b. Dosing
- c. Side Effects
- d. Efficacy

Campral

- a. Mechanism of action
- b. Dosing
- c. Side Effects
- d. Efficacy

ReVia

- a. Mechanism of action
- b. Dosing
- c. Side Effects
- d. Efficacy

Vivitrol

- a. Mechanism of action
- b. Dosing
- c. Side Effects
- d. Efficacy

Off label

Phase 3 Clinical Trials

On A Number of Promising Drugs

Cocaine

Cabergoline

Disulfiram (Antabuse)

Reserpine

Selegiline

Methamphetamine

Bupropion

Opiates

Lofexidine

Methamphetamine Addiction Pharmacotherapies in Clinical Trials

Phase I

Bupropion
Disulfiram
Lobeline
Reserpine
Selegiline

Phase II

Amlodipine
Baclofen
Desipramine
Fluoxetine
Flupenthixol
Gabapentin
Isradipine
Olanzapine
Ondansetron
Pemoline
Selegiline
Venlafaxine

Opiate Medication Development Projects

Phase I

Cycloserine
Depot Naltrexone
Enadoline
Lamotrigine
Tramadol

Phase II

Bupropion
Buspirone
Clonidine
Lofexidine
Memantine
Methylphenidate
Midazolam/N20
Naloxone
Naltrexone
Nefazodone

Phase III

Buprenorphine
Buprenorphine/Naloxone
Lofexidine

Cocaine Medication Development Projects

Phase I

Butorphanol
DAS 431
GBR 12909
Metyrapone
Modafinil
NS 2359
Tolcapone

Phase II Screen

BP 4897
Cocaine Vaccine
Dextromethorphan
Isradipine
Lamotrigine
Memantine
Ondansetron
Sibutramine

Phase II

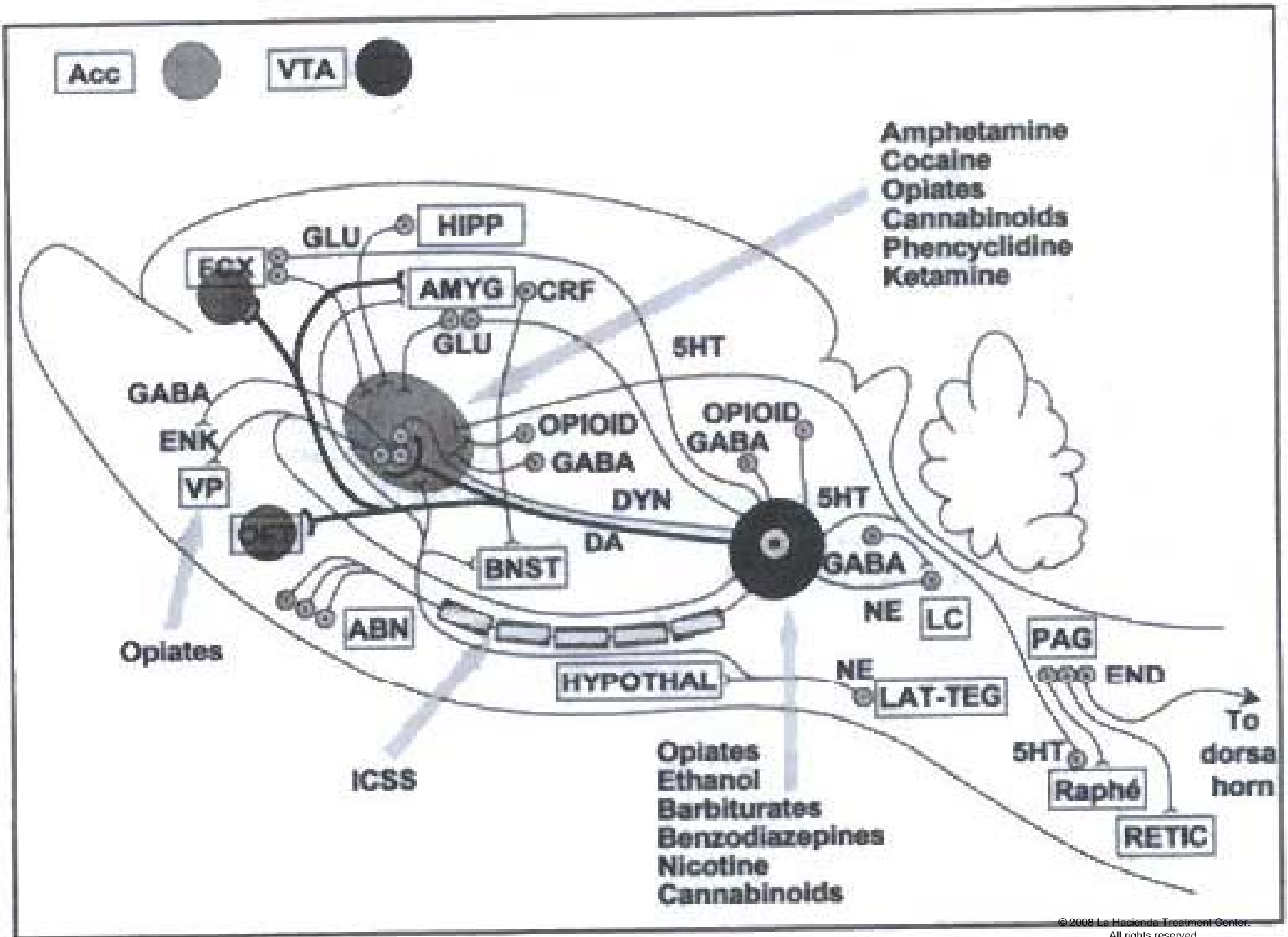
Amantadine
Amlodipine
Baclofen
Bupropion
Butorphanol
Cabergoline
Captopril
Clopidogrel
Disulfiram
Gabapentin
Memantine
Methylphenidate
Naltrexone
Oxazepam
Pemoline
Propranolol
Reserpine
Risperidone
Sertraline
Taurine
Tiagabine
Venlafaxine

Phase III

Disulfiram
Selegiline TS

Dual Diagnosis

1. Prevalence
2. Testing
3. Treatment



Spiritual Component of Recovery

Dr. Daniel Boone

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