The Psychopharmacology of Addiction

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Independent Practice

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A REVIEW OF ALCOHOL AND OTHER DRUGS

- **Discuss the neurological process involved in addiction.**
- **Discuss the Two (2) Stages of the addiction process.**
  (Hijacking the Brain), (Euphoric Recall)
- **Review the following substances and their impact on the body:**
  1. **Alcohol**
  2. **Benzodiazepines**
  3. **Opioids-Opiates (Narcotics)**
  4. **Marijuana (Synthetic marijuana)**
  5. **Stimulants (Meth. Cocaine and Designer stimulant drugs)**

Dawson's First "Rule"
of studying addictions

There are

NO

ABSOLUTES!

Dawson's Second "Rule" of studying addictions

In Order to Work Effectively in the Field of Addictions . . . You Must Understand How the Brain Works!!!

The average alcohol beverage unit (B.U.) "contains approx. one half (1/2) ounce of ethyl alcohol"

One (1) 12-ounce beer (4.9%) by volume equals one standard beverage unit (B.U.).

One (1) 5-ounce glass of wine (12%) by volume equals one standard beverage unit (B.U.).

One (1)
cocktail containing
1.5 ounces
of 80 proof
(40%)
by volume equals
one standard
beverage
(B.U.).

"Burning" questions about the human brain

How many neurons does the average human brain possess?

How many neurons do we use when thinking?

What are the various ways we can get a drug into the brain?

Where in the brain does addiction process occur?

Basic facts and regions of the human brain

The average human brain weighs approx. **three (3 lbs.)** pounds, possess approximately **100 billion neurons** and produces approximately **15 watts** of electricity.

The human brain has the same basic texture and consistency of

Jell-O

The brains vascular system requires a constant 20% of the body's blood supply to maintain normal activity

Delivering a Drug to the Brain

Oral Ingestion

(Introduction into the body via the mouth)

Sublingual Ingestion

(Under the Tongue)

Intranasal Inhalation

(Insufflation)

“Snorting“

Smoking Ingestion

(Into the Lungs)

Subcutaneous

(Below the Skin)

Transdermal Patch

(Through the Skin)

Intramuscular

(Into the Muscle)

Intravenous

(Into the Vein)

The
"FEEL GOOD"
Chemicals in the Brain

Three (3) Primary Neurotransmitters involved in Substance Abuse and Dependency

We are believed to possess Sixty (60) plus neurotransmitters in the brain and nervous system.

Here are the **Big Three (3):**

Dopamine (DA): Involved in seeking behaviour, experiencing pleasure and psychosis.

Serotonin (5ht): Effects self-confidence, feelings of well-being, anti-anxiety, anti-depression.

Norepinephrine (NE): Known to stimulates the brains four (4) "F" centers.

Centrally-Activating Drugs

(aka: Psycho-Active) Drugs

All Centrally Active Drugs are Designed to Either Imitate Your Body's "Feel Good" Chemicals . . .

-

Over stimulate their production and release . . .

-

or All of the Above!

Two Stages of the Addiction Cycle

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Stage One

"Hijacking the Brain"

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Stage Two

"Euphoric Recall"

Stage One

“Hijacking the Brain”

"Hijacking the Brain"

"Hijacking The Brain" is a phrase used in the field of addictionology to describe the following process:

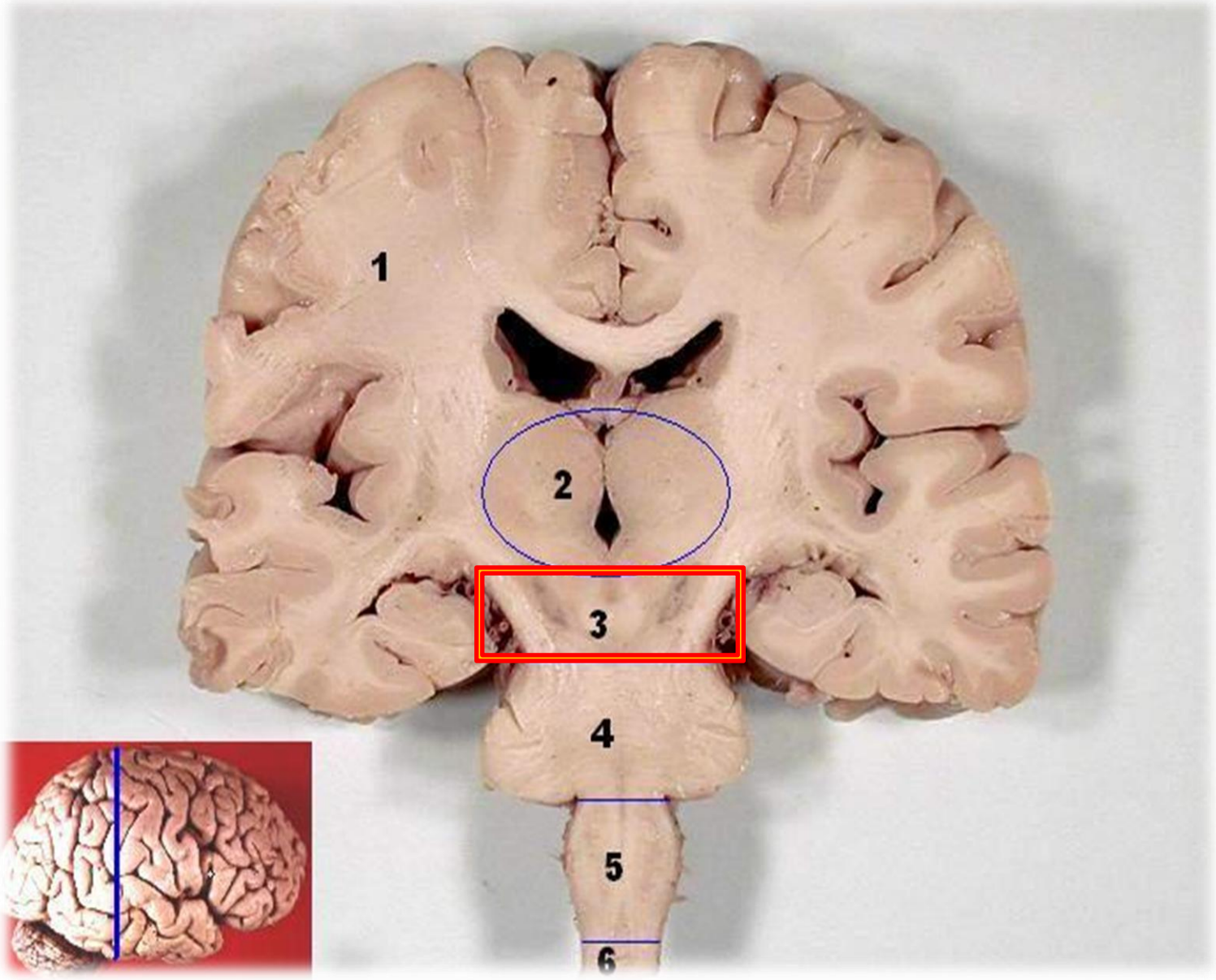
1. The process begins by introducing a drug into the body that is designed to intentionally effect the brain.

2. The presence of the drug creates a predictable chemical-electrical event that forces the brain to release it's pleasure producing chemicals (DA, 5ht, NE).

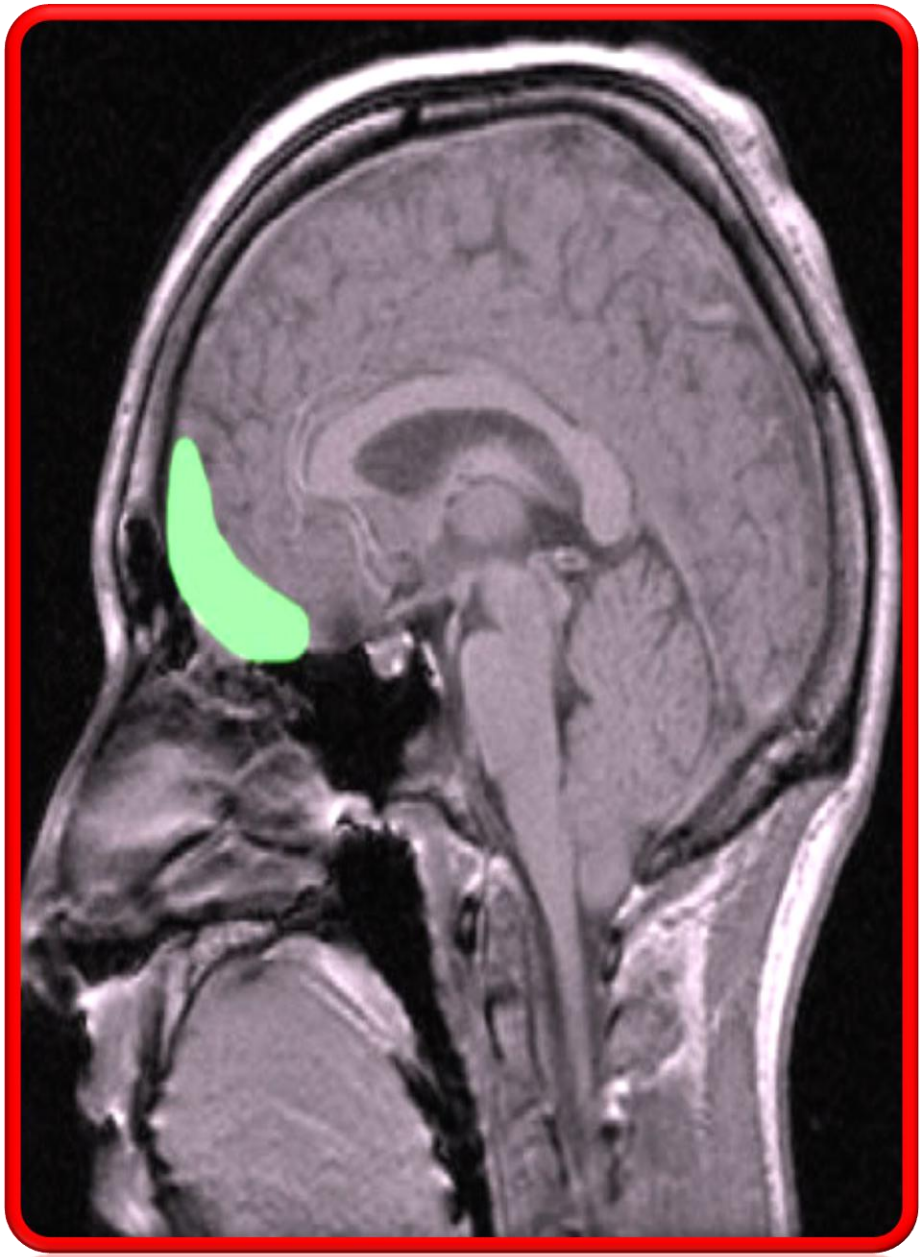
3. These "Pleasure Chemicals" are directed along specific pathways throughout the entire brain.

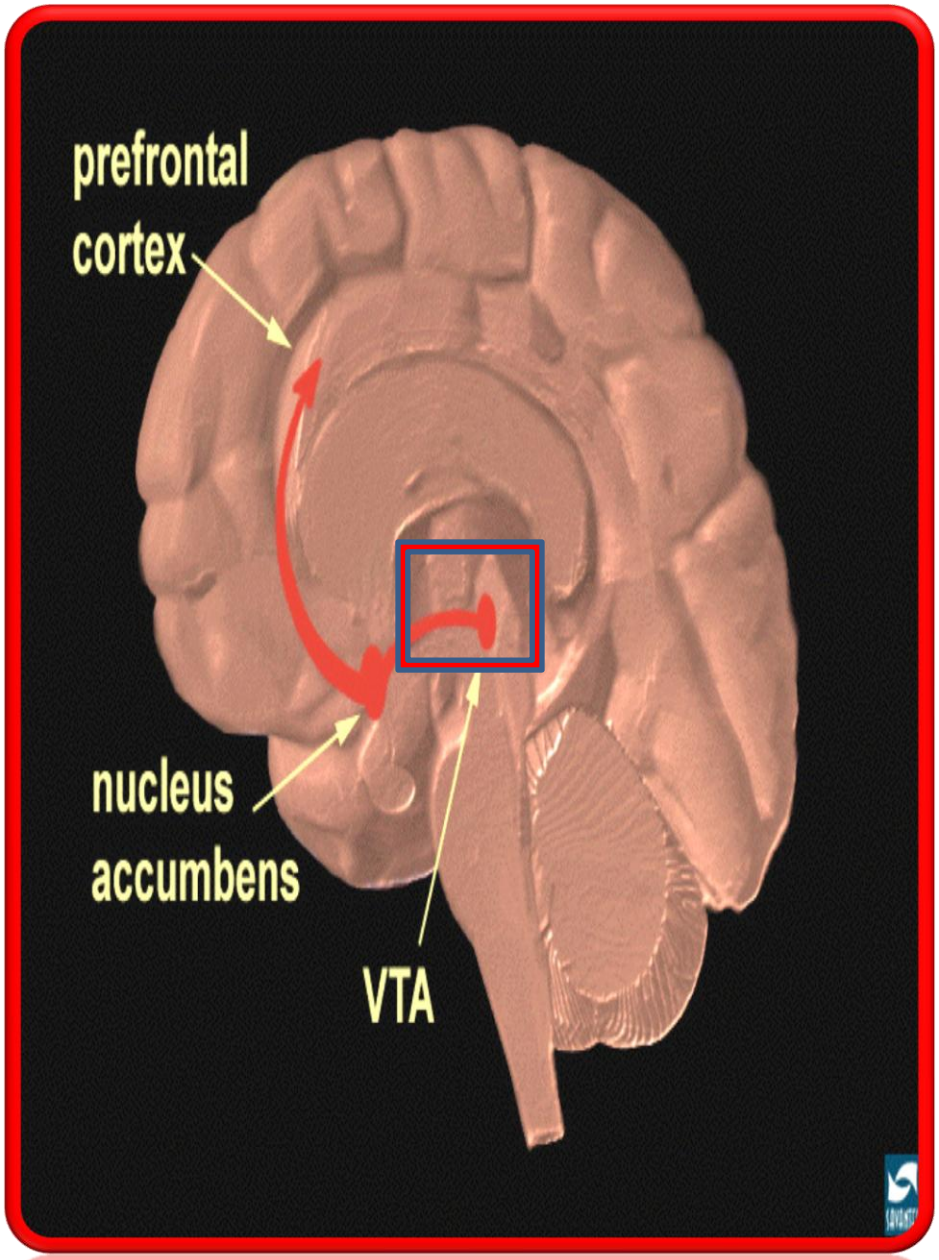
4. Once the drug is in the brain it will continue to maintain control over the brain, thus hijacking it until eliminated from the body.

Important Regions of the Human Brain

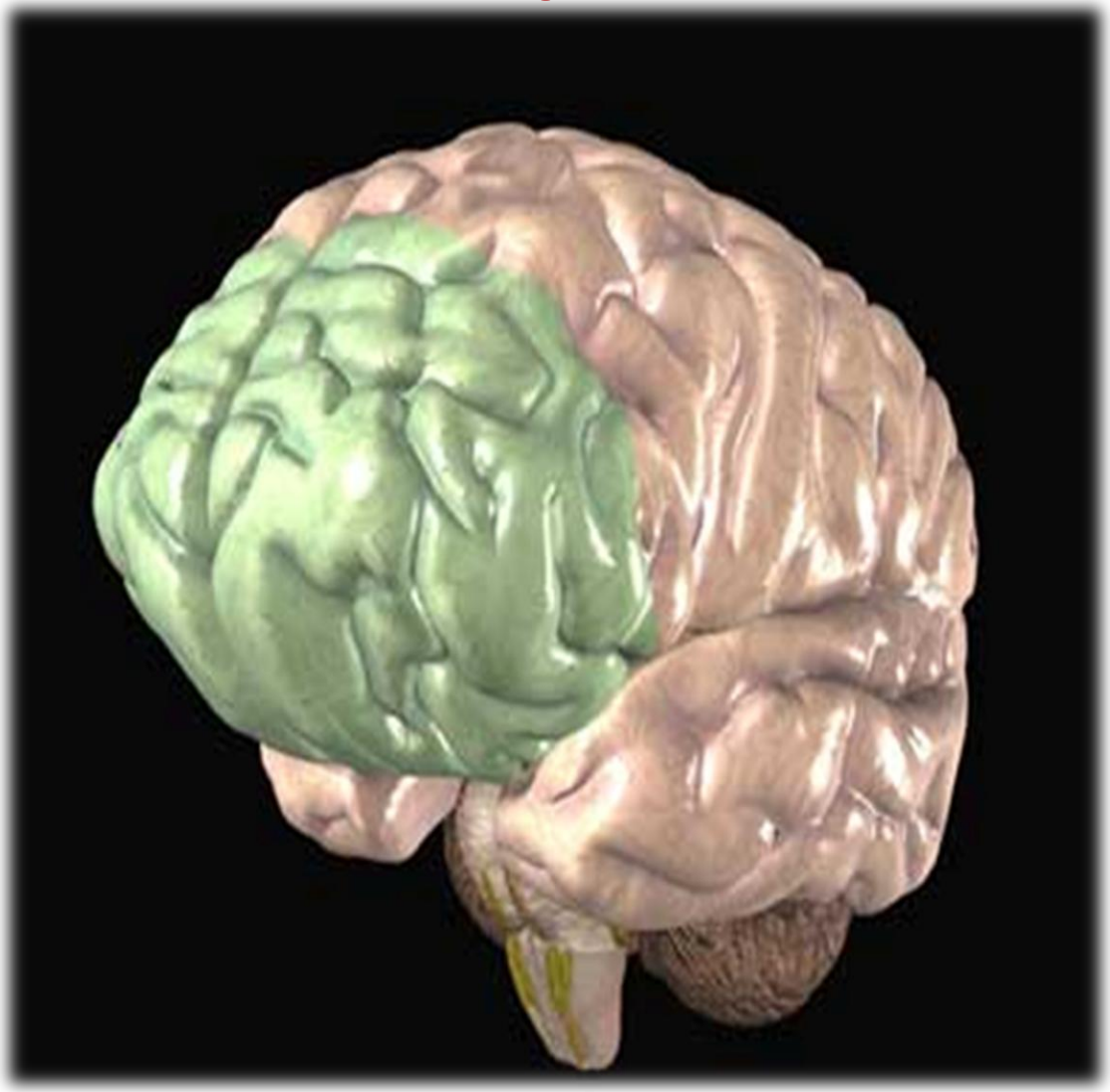


How pleasure pathways effect decision making

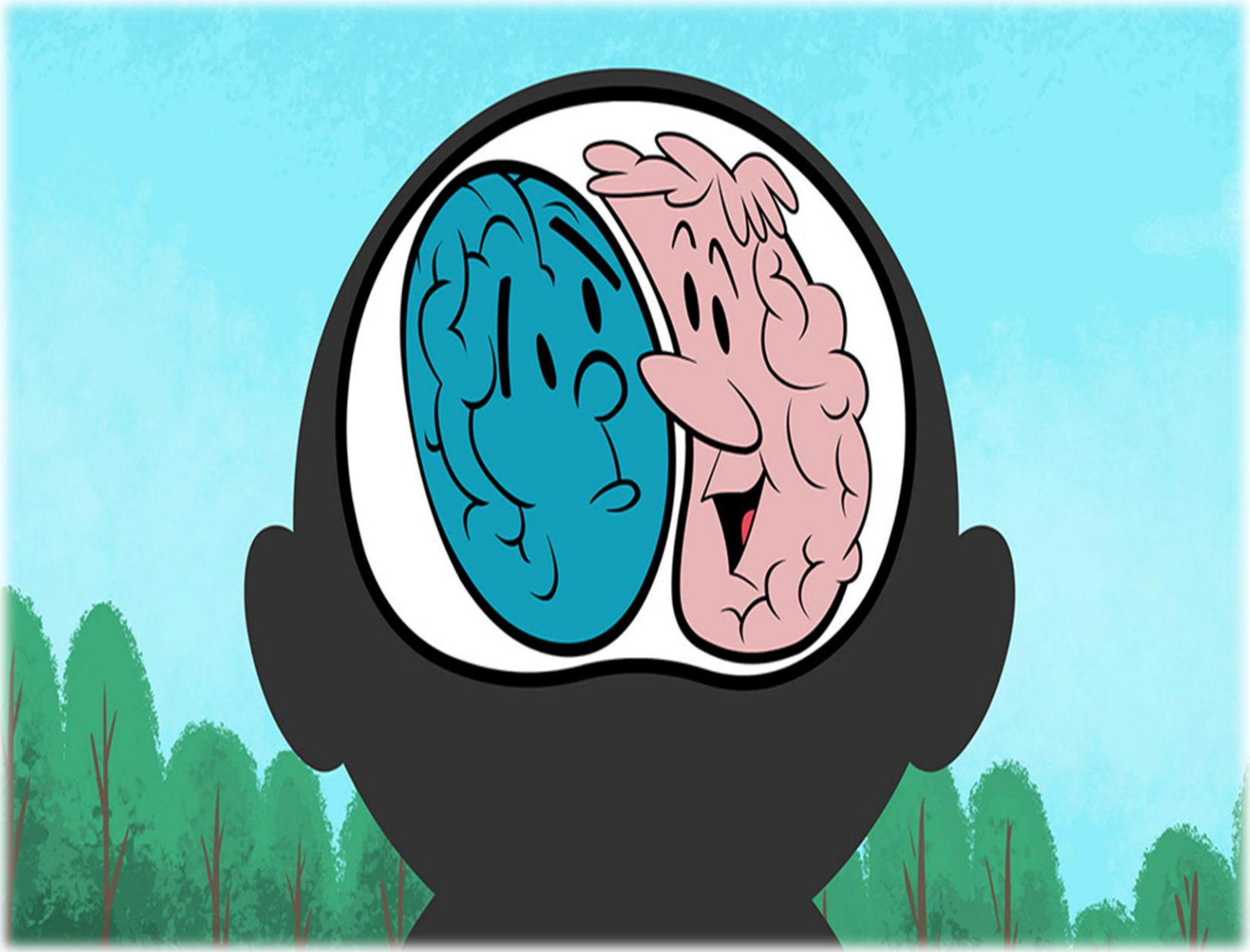




Orbital-Frontal lobes of the brain are centers for moral, ethical and personality development



Two sides of the human brain



Stage Two

"Euphoric Recall"

"those things that are to painful to remember, we simply choose to forget"

Barbra Streisand, "The Way We Were" (1973)

"Euphoric Recall"

"Euphoric Recall" is an old phrase used in the field of addictionology to describe the following neurological events:

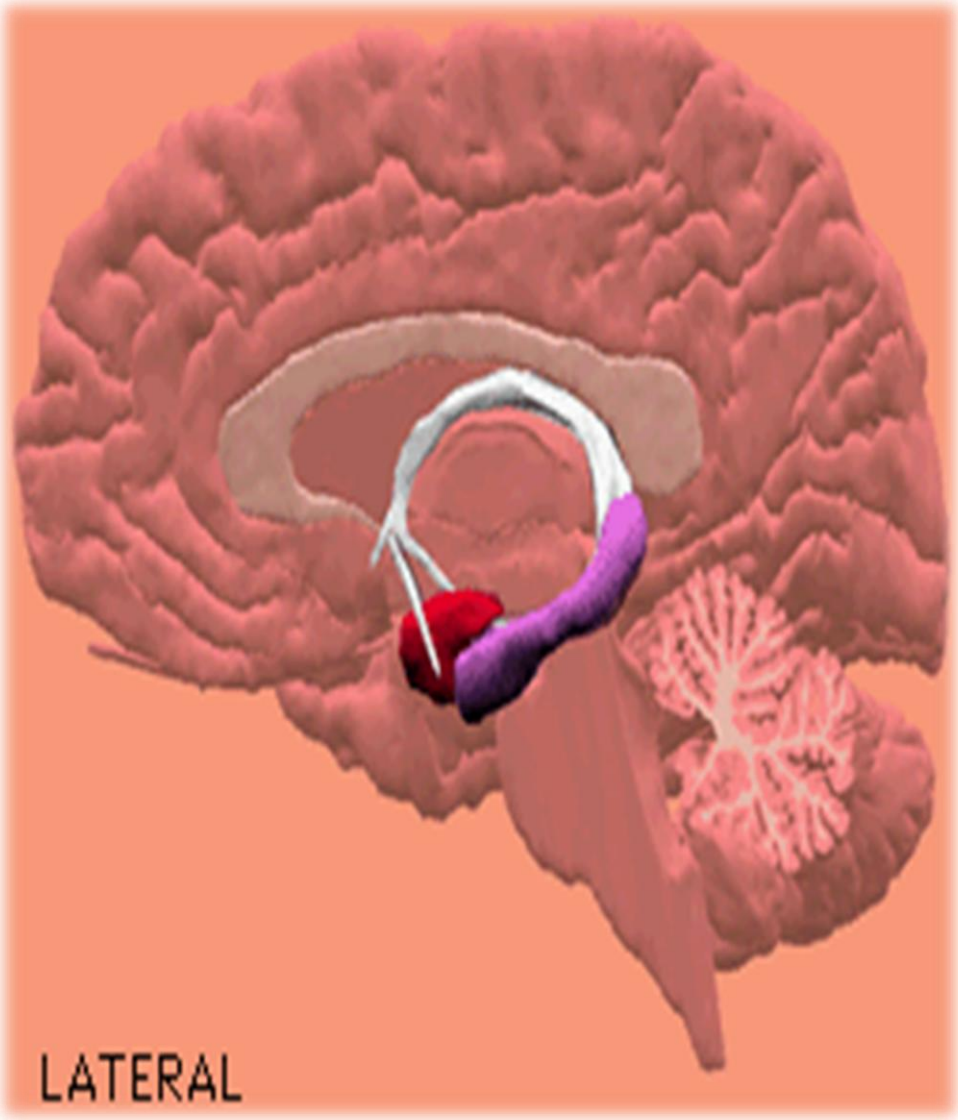
- **A unique neurological process where the brain attempts to download all of the activities surrounding the pleasurable experience for later reference.**

- **The two structures involved in this event include the Amygdala and the Hippocampus.**

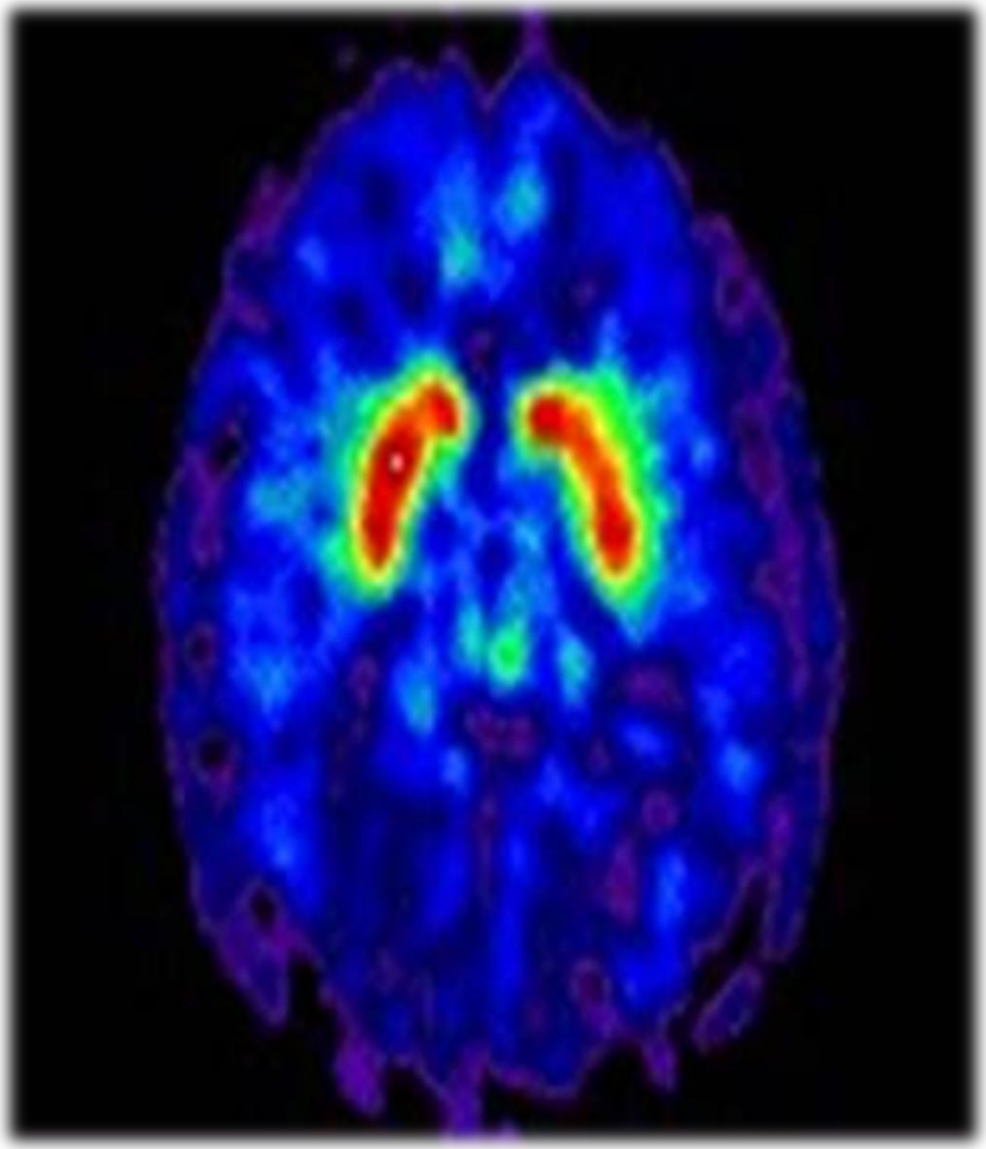
- **These are primary brain structures involved in remembering emotional and informational material.**

- **Depending on the strength of the drug, these two memory systems will actually "rewire" themselves in order to remember how to "recreate" the original event.**

Centers where the brain downloads memories



A PET scan image of the brains memory centers responding to a pleasurable event



Centrally-Activating Drugs

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Depressants

(Drugs that "Suppress" the activities of the brain)

Depressant drugs that Depress the activities of the brain

Depressants Drugs include the following:

1. **Alcohol (any substance containing ethyl alcohol).**

2. **Anti-Anxiety agents:**
   (Benzodiazepines . . . Barbiturates).

3. **Sleep Aids: (Sedative-Hypnotics).**

4. **Pain Relief: (Opioids/Opiates).**

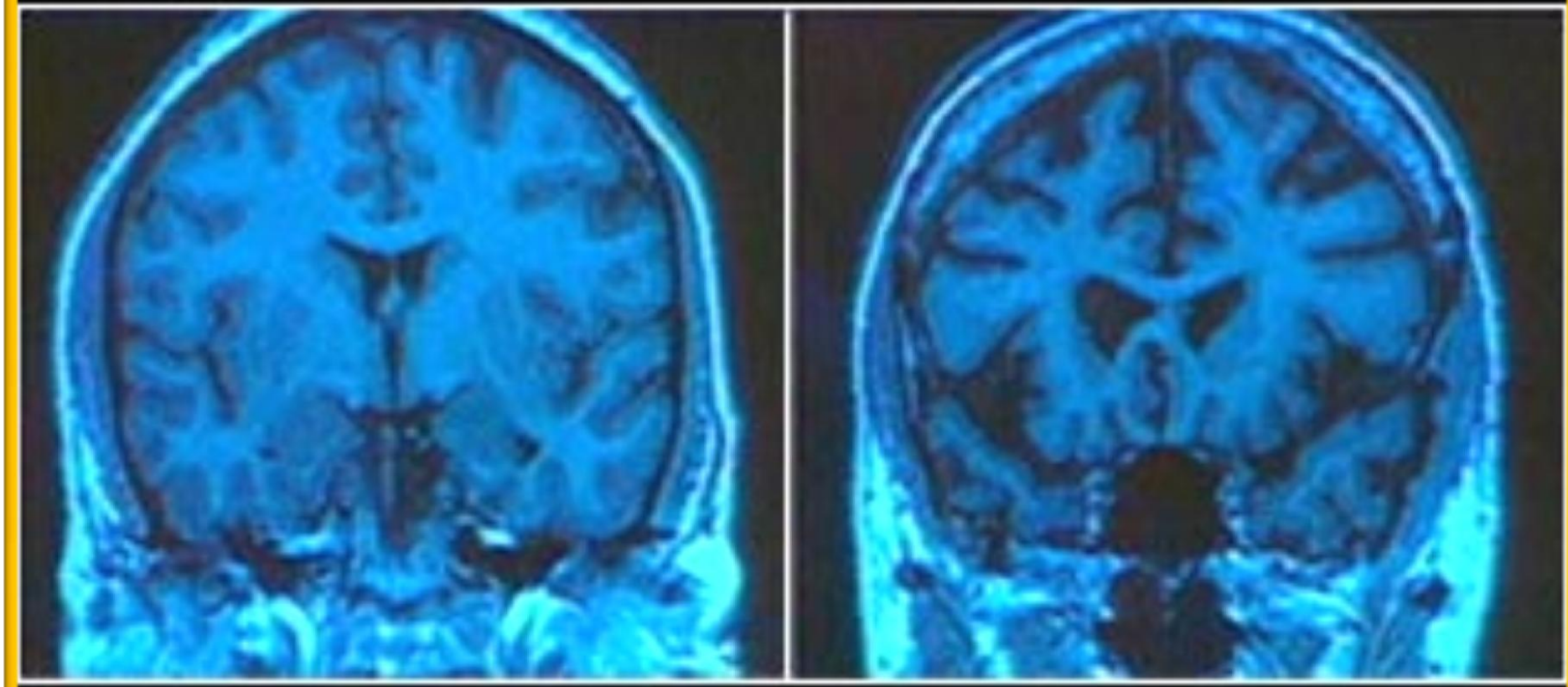
5. **Over the Counter (OTC) medications**
   Any agents found in the following:
   Cold and Flu preparations containing . . .
   "Antihistamines", "Diphenhydramine",

6. Anti-cough medications containing:
   "Dextromethorphan".

7. **Illicit drugs containing:**
   "Marijuana", "GHB" and "Inhalants".

Alcohol

Does Alcohol really kill brain cells ?



Normal
43-year-old

Alcoholic
43-year-old

Alcohol:

1. Central Nervous System (CNS) depressant.
2. Produces an "Additive Effect" (1+1=3).
3. Dehydrates the body (reducing body fluids and H_2O).
4. Astringent (Liquid "Sand Paper").
5. Steals O_2 from the cells and tissues of the body .
6. Vasodilator (Enlarges the blood vessels of the body).
7. Depletes the body of necessary vitamins and minerals.
8. Invades every living cell of the body.
9. The Liver treats alcohol as a poison (Toxin).
10. Acts as either an Opioid or a Benzodiazepine.
11. Metabolized by the Liver at a constant rate of one (1) ounce per every two (2) hours.

Benzodiazepine (Anti-Anxiety) and Sedative-Hypnotics (Sleep Aids)

Benzodiazepines

- Benzodiazepines medications possess a mild potential for abuse and dependence.

- Benzodiazepines overdose occurs at sixty (60) times the recommended dosage.

- Benzodiazepines medications are not recommended for use in combination with anti-alcohol or anti-opioid medications.

Benzodiazepines

- Benzodiazepines are metabolized by the liver similar to alcohol.
- They require extended detoxification.
- They directly inhibit short term memory and long term learning potentials.
- They interrupt necessary insight development required for progress in therapy.

Opioids / Opiates

(aka: Narcotics)

Opioid overdose can be lethal, either when used alone or in combination with other CNS depressants **(1+1=3)**.

Opioids are considered "Lipophilic" **(Loves Fat)**. Meaning they infiltrate high protein areas of the brain and body . . . Quickly. **(Heroin vs. Codeine)**

Opioid addicts become addicted to the "**RUSH**".

Opioid drugs that produce "**LESS OF A RUSH**" are typically less fat-soluble and serve as a possible alternative medication when treating Opioid Dependence. **(Methadone and Buprenophrine)**

Cannabis

(Marijuana and K_2)

Cannabis "Marijuana"

- Currently marijuana is considered to possess over four hundred and sixty (460) known chemicals.

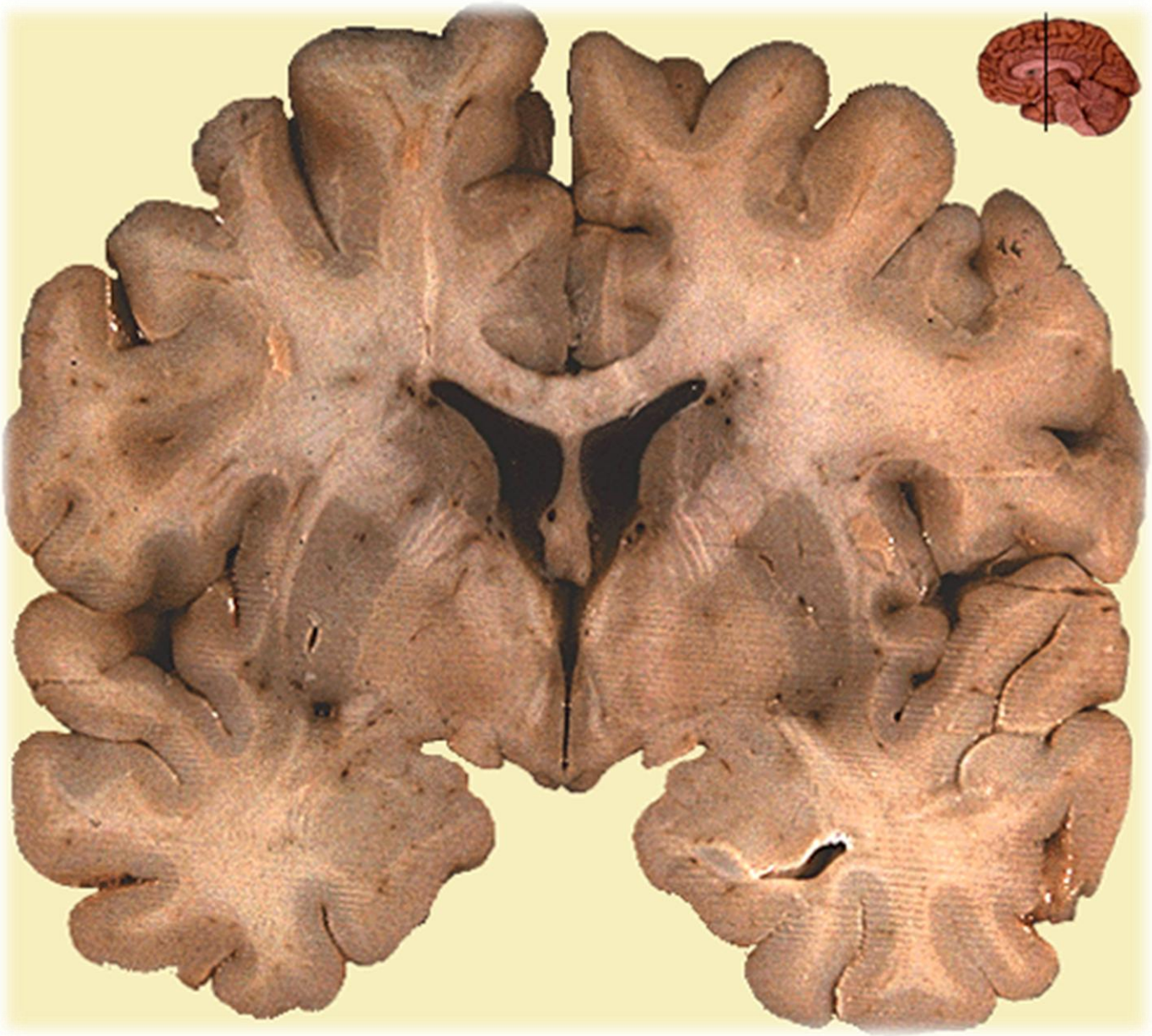
- More than sixty (60) are known to be cannabinoids.

- The user is only attempting to isolate two (2) cannabinoid chemicals … (Δ 8 & 9 THC).

Cannabis "Marijuana"

- 8 & 9 THC chemicals are attracted to the high protein areas of the brain.

The light regions of the brain are high protein areas



Marijuana and Alzheimers

Question:

Is there anything we can do to help prevent Alzheimer's ?

Does the Brain Produce it's own Marijuana?

Endo-cannabinoids

vs.

Tetra-Hydro-cannabinoids

ENDOCANNABINOIDS act as NEUROCHEMICAL POLICE . . .
directing each neurotransmission . . . and insuring . . .
that each neurotransmitter arrives safely at it's desired destination. .

Remember . . .

Second hand inhalation of marijuana smoke will NOT result in a "POSITIVE" urine screening analysis!


K2
Botanicals

K-2 "Spice" (Synthetic Cannabis)

- Created in the mid. 1990's by John W. Huffman (jwh), Clemson University.
- Considered to be 5x's more powerful than herbal Marijuana.
- Synthetic cannabis is sprayed on approximately three (3) grams of dried vegetable matter.

Cannabis Hyperemesis

- **Signs and Symptoms:**

1. Long term and Dosage dependent use of cannabis substances.

2. Believed to be impacting the hypothalamus.

3. Presents with severe morning nausea, vomiting and abdominal cramping.

4. Symptoms my cycle for months.

5. Temporary relief of symptoms are found by:
   a. Compulsive and frequent hot baths or showers.
   b. Discontinued use of cannabis.

Stimulate (Drugs that "ACTIVATE" the brain)

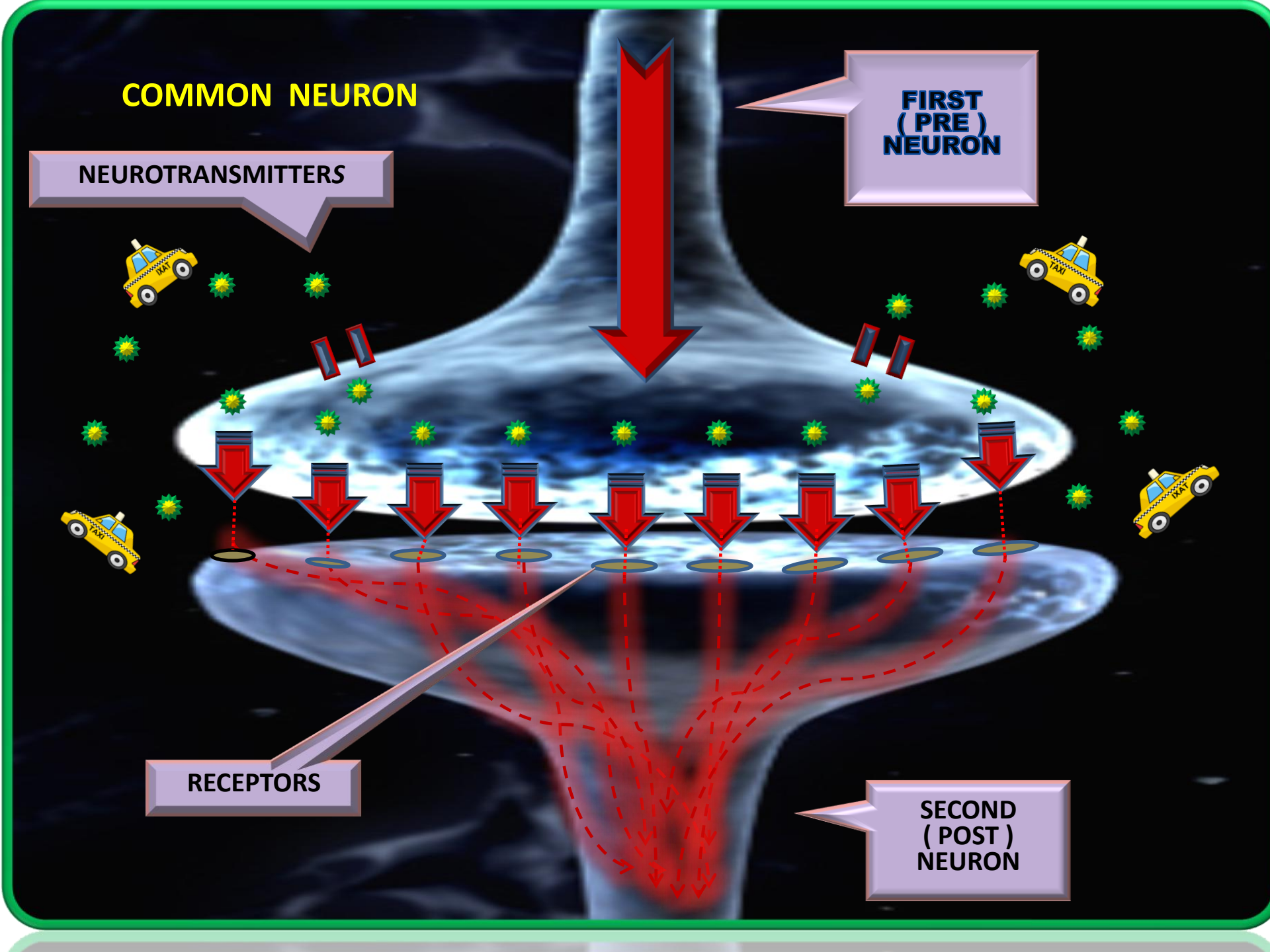
* Cocaine,
* Amphetamines,
* Methamphetamines
* Mephedrone-Cathinone (MCAT, Bliss, Plant food)
* Geranamine ("Pump It" powder)
* Methylenedioxy-N-Methlamphetamine (MDMA)
* 2C-I ("Smiles")

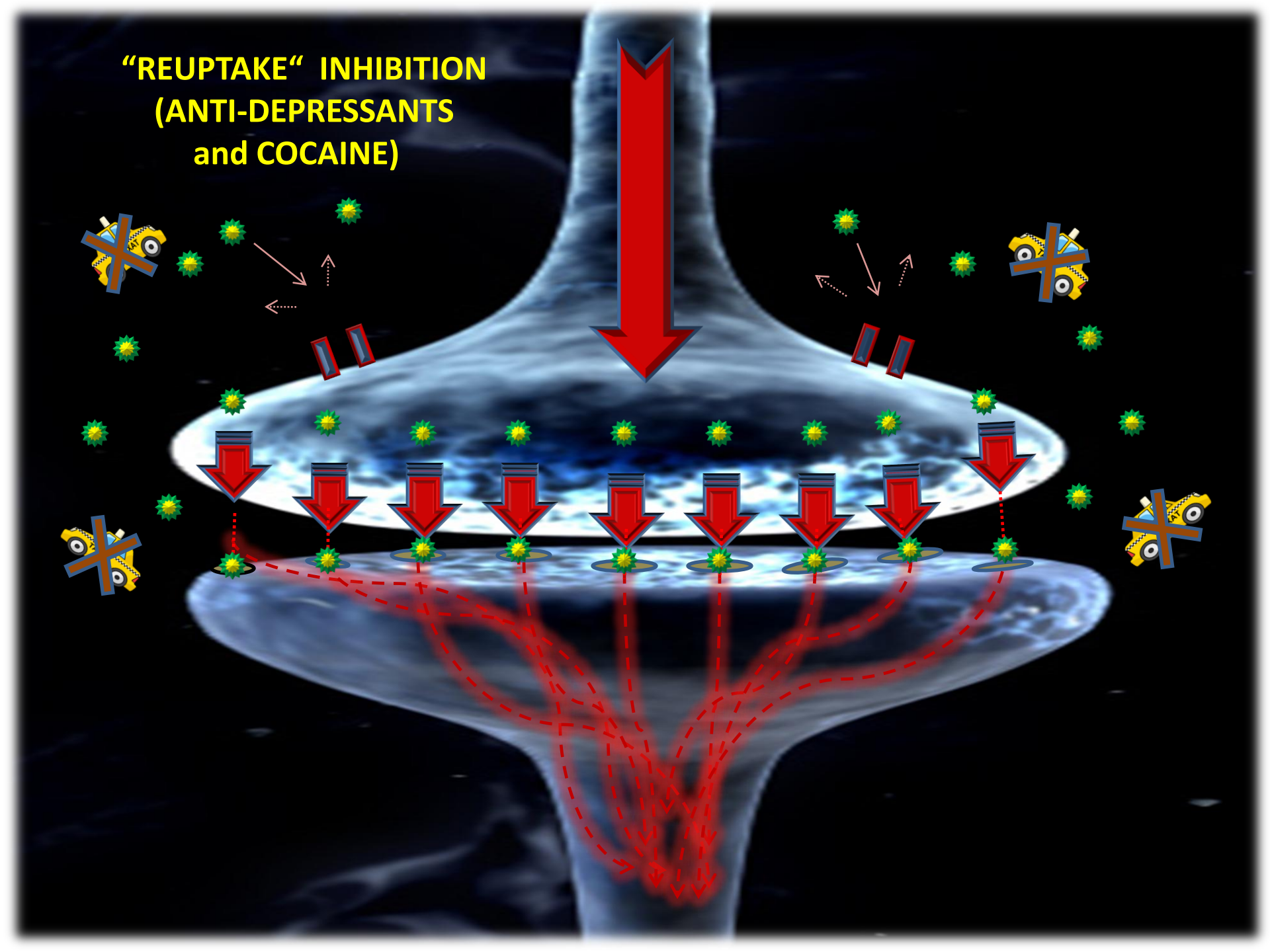
Mephedrome (Mcat)

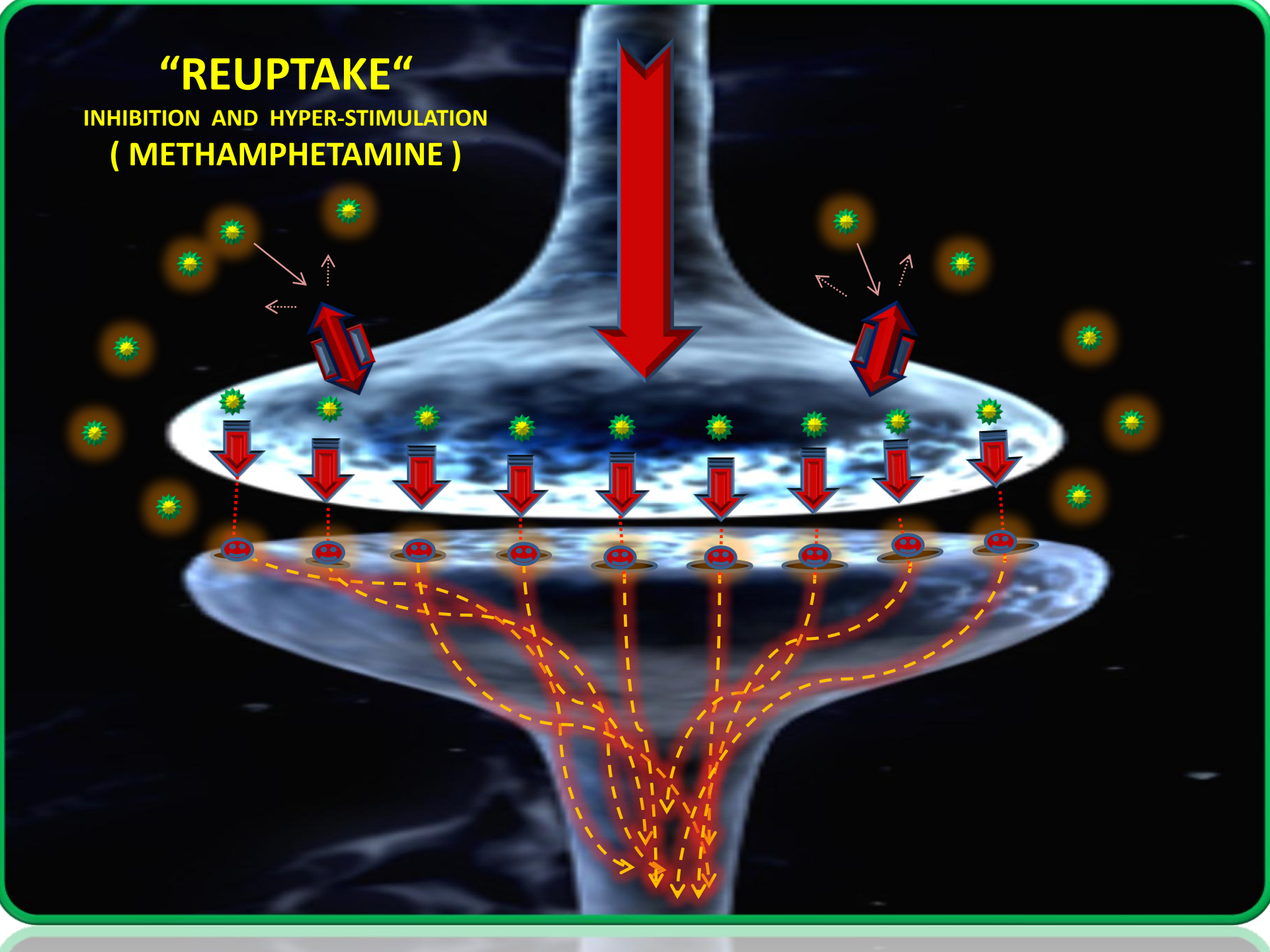
Geranamine (Pump-It) Powder

Designer "Hallucinogenic-Stimulant" Drugs (MDMA, Ecstasy)

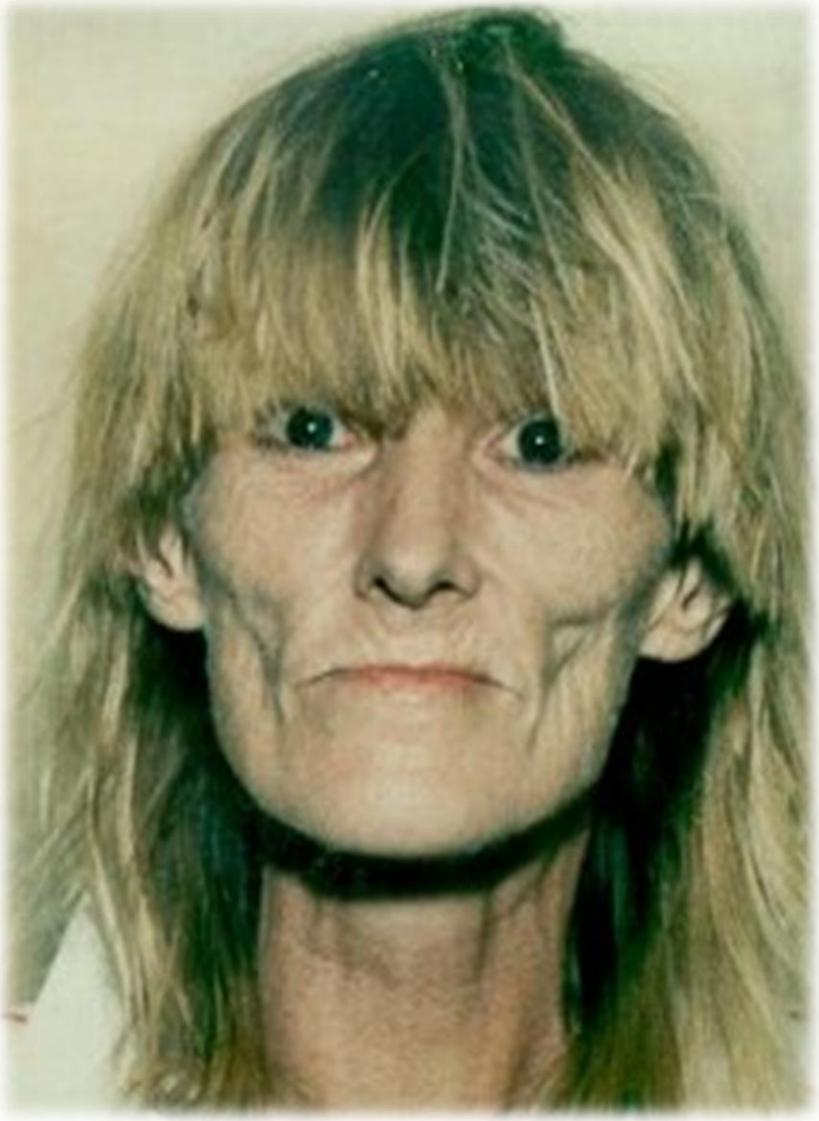
2C-I “Smiles” Synthetic Hallucinogenic (LSD), Stimulant (MDMA) combination


COMMON NEURON
FIRST (PRE) NEURON
NEUROTRANSMITTERS
RECEPTORS
SECOND (POST) NEURON


"REUPTAKE" INHIBITION
(ANTI-DEPRESSANTS
and COCAINE)


"REUPTAKE"
INHIBITION AND HYPER-STIMULATION
(METHAMPHETAMINE)

Extreme dehydration due to elevated body temperature



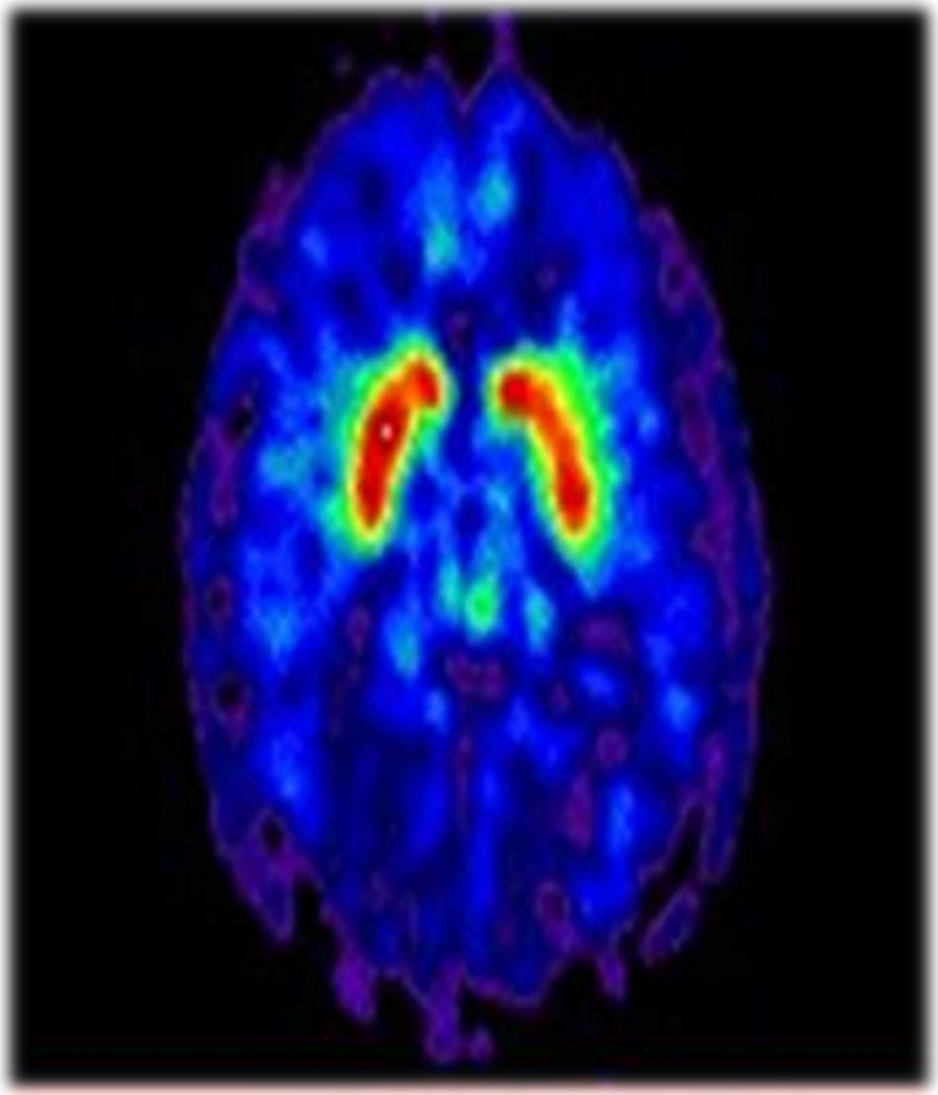
Facial ulcerations and infectious “Impetigo“

Extreme malnutrition resulting in "Meth" mouth

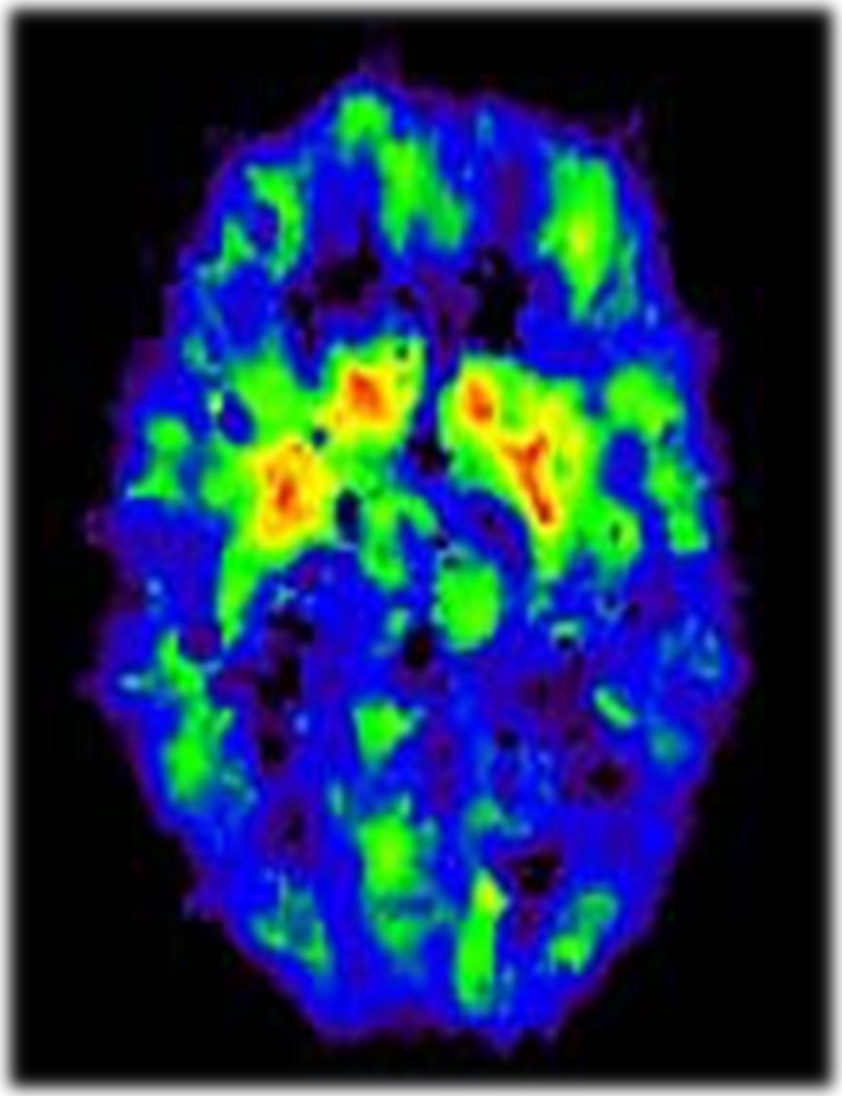
Stereotypical “Picking“ behaviors

Formication “Meth-Mites”

Control Brain



Meth. Brain



Question:

If given the chance, can or will the meth. brain ever heal?

Name that Drug?

Name that Drug

- This is a street drug named for putrefied human waste that is collected in a glass or plastic container or vessel and then allowed to ferment and produce gas.
- The gas is then captured by means of a rubber glove that is attached to the containers spout or narrow opening.
- The user inhales the gas into their lungs and holds it as long as possible, stealing the brain of 0_2, creating a momentary high due to hypoxia.
- The "high" is reported to last approximately 10 to 15 minutes.
- Signs of intoxication are similar to someone sniffing glue or solvents.

SO…

What's the "Take Away" Message from today's Lecture?

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Recommend Readings

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Substance Abuse and Mental Health Services Administration

Center for Substance Abuse Treatment

TREATMENT IMPROVEMENT PROTOCOL

(TIP) SERIES

Rockwall II, 5600 Fishers Lane

Rockville, MD 20857

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