

**“Alcohol and Other Drugs-Psychopharmacology and Substance Related Disorders”**

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**Alcohol and Other Drugs-Psychopharmacology and Substance Related Disorders**

After completing this section, participants will be able to:

- Discuss the neurological process involved in addiction.
- Describe the Two (2) Stages of the addiction process. (Hijacking the Brain), (Euphoric Recall)
- Describe the following substances and their impact on the body:
  1. Alcohol
  2. Benzodiazepines-Sedative Hypnotics (Sleeping medications)
  3. Barbiturates
  4. Opioids-Opiates (Narcotics)
  5. Marijuana (Synthetic marijuana)
  6. Hallucinogens-Dissociative Anesthetics
  7. Stimulants (Meth. Cocaine and Designer stimulant drugs)
  8. Name that Drug?

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!!!**

**Three (3) Major Points  
#1.**

The term **“Addiction”**, in this presentation, represents engaging in **continuous, compulsive behaviors** in spite of the negative **social, biological and psychological consequences**.

It is characterized by a **progressive** behavioral pattern of involvement starting with **Abusive** use, leading to physical **Dependency**, expressed through the development of **Physiological Tolerance**, **Withdrawal** and the presences of **Pathological Cravings**.

**Three (3) Major Points  
#2**

There exists a strong **Genetic** basis for all addictive behavior.

Several **“Candidate”** genes exist that have been identified in the addiction process.

The genetic predisposition to addiction, **does not guarantee** that a person will become an addict.

## THE "TWO HIT" THEORY

**REMEMBER:** YOUR GENETIC CODE DOES NOT GUARANTEE AN OUTCOME.

RESEARCHERS IN THE SCIENCE OF GENETICS CURRENTLY INDICATE THAT THE ENVIRONMENT CONTRIBUTES AS MUCH TO THE PREDICTABILITY OF ALCOHOL AND OTHER DRUG DEPENDENCIES AS DOES THE INDIVIDUALS GENETIC CODE.

- HIT ONE (1) "GENETICS" (60%).
- HIT TWO (2) "ENVIRONMENT" (40%).

## Three (3) Major Points

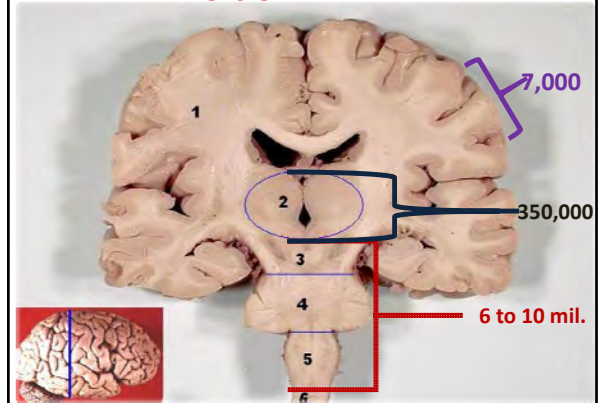
### #3

All addictions have a biological basis. The same neurological processes are present in all addictive behaviors whether we are discussing, abuse of drugs, alcohol, gambling, junk foods, video games or porn.

All addictions include the activation of the brain's "Reward" cycle, which results in the **up-regulation (stimulation)** and the **down-regulation (numbing)** of key neurological structures surrounding the **greater than normal** release of **Dopamine (DA)**, resulting in either temporary or permanent changes to the brain.

**ALL OF THE MYSTERIES  
OF HUMAN BEHAVIOR  
ARE THE RESULT OF JUST  
ONE PERSON !!!**

## AGES OF THE BRAIN



**AN "OZARK'S" EXAMPLE  
OF  
ABUSE vs. DEPENDENCE**

- ALCOHOL AND DRUGS WILL DISCRIMINATE BETWEEN MEN AND WOMEN.

- GENDER DIFFERENCES WITH ALCOHOL

ABUSE = (CUCUMBER).

**WOMEN:** FIVE (5 yrs.).

**MEN:** TEN (10 yrs.).

DEPENDENCE = (PICKLE).

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

**“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**



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

**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

**Neurotransmitters involved in the Addiction process**

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

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

Dopamine (DA): Involved in learning, self-control,  
seeking-searching behaviours, cravings, euphoria, pleasure  
and at extreme levels.....Parkinson's signs and  
symptoms and psychosis.

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

Norepinephrine (NE): Stimulates the brain's four (4) "F's".

**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**

-  
Stage One

**"Hijacking the Brain"**

-  
Stage Two

**"Euphoric Recall"**

Stage One

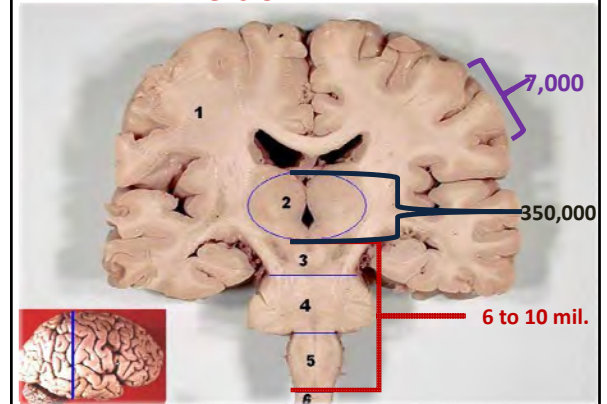
**"Hijacking the Brain"**

### "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.

### AGES OF THE BRAIN

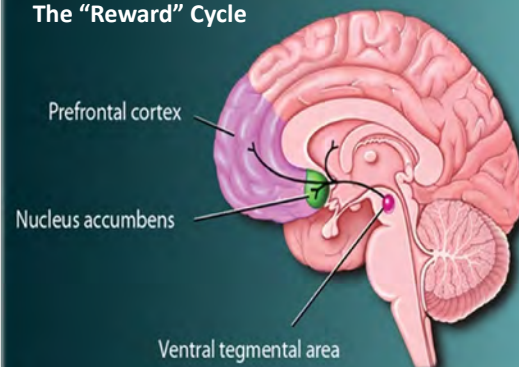


### Three Structures Responsible for the "Reward" Cycle

- The three (3) primary structures that facilitate the brain's "Reward" sequence include:

1. Ventral Tegmental Area (VTA).
2. Nucleus Accumbens (NAc).
3. Prefrontal-Orbital frontal Cortex (PF-OFC).

### The "Reward" Cycle



### Prefrontal-Orbital frontal Cortex

- Most recent development of the human brain 7,000 years old.
- The most evolved area of all currently evolved brains.
- Begins it's embryological development early, but does not complete it's full development (myelination) until the middle to late 20's.
- Down loads the morals, practices, and bias of the individual's culture and community.
- PF-OFC also hard wires for personality and character development.
- PF-OFC is responsible for executive functioning, decision making, planning and past-present problem solving.

### Prefrontal-Orbital frontal Cortex Cont.

- PF-OFC is responsible for making ethical decisions or "Making the Harder Choice".
  - Stimulates the VTA-NAc neural circuits when good decisions are made.
- Responsible for memories associated with previous choices, consequences and predictions of current decisions and outcomes.
- Known to receive a greater number of neuronal projections from the meso-cortical pathway leading from the VTA to the PF-OFC, then returning neuronal projections from the PF-OFC to the VTA. This neuronal fact results in our emotions having a stronger influence over our intellectual and rational decision making.
  - Experiences cell death (cortical atrophy) due to chronic drug and alcohol use.

## Stage Two “Euphoric Recall”

“those things that are so painful to remember,  
we simply choose to forget”

Barbra Streisand, “The Way We Were” (1973)

In another words: “Pleasure is more reinforcing than Pain”

## PERCENTAGES OF DOPAMINE (DA) RELEASED DURING THE FOLLOWING EVENTS

ASSUME THAT NORMAL BASELINE IS ZERO.

( 0% )

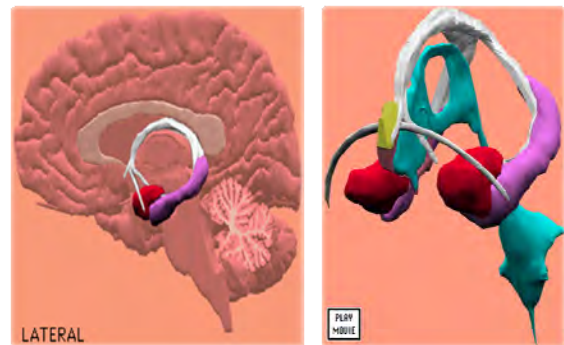
SINCE DOPAMINE (DA) IS THE  
BRAINS MOST POWERFUL “PLEASURE”  
CHEMICAL . . . HOW MUCH DOPAMINE (DA)  
IS TYPICALLY RELEASED DURING  
FOLLOWING ACTIVITIES?

### “Euphoric Recall”

“Euphoric Recall” is a 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 and predictability.
- The two (2) structures involved in this process  
include the **Amygdala** and the **Hippocampus**.
- These are primary brain structures involved  
in **emotional** and **informational** memory.
- Depending on the **surprise (reward)** and **strength (pleasure)** of the drug, these  
two (2) memory systems will actually **“rewire”**  
themselves in order to remember how to **“recreate”** the original event.

### Centers where the brain downloads memories



## Centrally-Activating Drugs

(aka: Psycho-Active) Drugs

### REMEMBER:

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!

## 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

Alcohol is the **forth (4<sup>TH</sup>)** leading cause of death in Adults.

Alcohol is the **First (1<sup>ST</sup>)** leading cause of death in adolescence.

Half of all car accidents resulting in death are alcohol or drug related.

**24** year old and younger are **3.5x's** more likely to die in substance use related accident.

**Midnight to 4:00 am (80%)** per of all accidents.

**4 out of 5** suicide attempts are attempted under the influence of substances.

**66%** of documented abused children are from alcohol and drug abusing family systems.

**80% to 90%** of adult males who abuse substances also batter.

**50%** of reported childhood sexual abuse and incest are from substance abusing family systems.



The World Health Organization (WHO) claims:  
consuming 2-3 alcohol (B.U.), 2 or 3 times per week, reduces a persons life expediency to One-Forth or the same as a person possessing Type II diabetes.

Ninety (90%) of most individuals seeking recovery will relapse approx. one time before they establish permanent recovery.

One (1) in ten (10) adults that drink will develop a significant problem with alcohol.

Ninety (90%) of treatment occurs after the person completes formal treatment.

### Alcohol:

1. Central Nervous System (CNS) depressant.
2. Produces an "Additive Effect" (1+1=3).
3. Dehydrates the body (reducing body fluids and H2O).
4. Astringent (Liquid "Sand Paper").
5. Steals O2 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.

#### • Low Risk Drinking

NIAAA: For women, consuming less than 3 alcohol (B.U.) per day or 7 alcohol (B.U.) per week. For men, less than 4 alcohol (B.U.) per day or less than 14 alcohol (B.U.) per week.

#### • Binge Drinking

NIAAA: Consuming 4 alcohol (B.U.) per women and 5 alcohol (B.U.) per man with in 2 hours.

Nat. Survey on Drug Use and Health: Consuming 5 or more alcohol (B.U.) on at lease 1 day in the past 30 days.

#### • Heavy Drinking

SAMHSA: Consuming more than 5 alcohol (B.U.), 5 or more days within the past 30 days.

## 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 required for progress in therapy.**

## SEDATIVE (HYPNOTICS) "SLEEP AIDS"

### SEDATIVE (HYPNOTICS) "SLEEP AIDS"

- SEDATIVE (HYPNOTIC) MEDICATIONS ARE CONSIDERED SLEEP AIDS.
- SEDATIVE (HYPNOTICS) ARE TYPICALLY PRESCRIBED FOR SLEEP DISORDERS **INSOMNIA**: DIFFICULTY BEING ABLE TO PRODUCE SLEEP, OR THE INABILITY TO STAY A SLEEP.
- SEDATIVE (HYPNOTICS) ARE CONSIDERED CNS DEPRESSANTS AND ARE CREATED FROM VARIATIONS OF BARBITURATES, BENZODIAZEPINES OR NON-BENZODIAZEPINES MEDICATIONS.
- CURRENTLY MOST SEDATIVE (HYPNOTIC) MEDICATIONS ARE NOT RECOMMENDED TO BE TAKEN LONGER THAN **TWO (2) TO SIX (6) WEEKS**.

## BARBITURATES

### BARBITURATES

- BARBITURATES ARE MORE POWERFUL THAN BENZODIAZEPINE TYPE MEDICATIONS.
- BARBITURATES ARE NOT PRESCRIBED AS ROUTINELY AS BENZODIAZEPINES . . . DUE TO A RAPID PHYSICAL TOLERANCE AND DANGEROUS WITHDRAWAL SYMPTOMS.
- BARBITURATES HAVE A **HIGH** POTENTIAL FOR LOW DOSAGE SEIZURE ACTIVITY.
- BARBITURATES POSSESS A HIGH POTENTIAL FOR ABUSE AND DEPENDENCE.

## Opioids/Opiates (aka: Narcotics)

- OPIATES ARE CONSIDERED ANALGESIC (**PAIN-RELIEVING**) MEDICATIONS.
- OPIATES IMITATE THE BODY'S OWN PAIN-RELIEVING SUBSTANCES FOUND NATURALLY IN THE HUMAN BODY, TYPICALLY THESE ARE REFERRED TO AS OPIOIDS. (**ENKEPHALINES, ENDORPHINS and DYNORPHINS**)
- ALL OPIATE SUBSTANCES ARE EITHER MORPHINE BASED OR BREAK DOWN INTO MORPHINE IN THE BODY.

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 Buprenorphine**)

## OPIOIDS

- OPIATE SUBSTANCES ARE KNOWN TO PRODUCE PSYCHOLOGICAL AND PHYSICAL **ABUSE** AND **DEPENDENCE**.
- THE MOST COMMON CAUSE OF OPIATE/OPIOID DEATH IS RESPIRATORY ARREST. (**STOPS BREATHING**)

## Designer Opioid Drugs (Krokodil, China White)

### CHINA WHITE (beta-hydroxide-methal-fentanyl)

- CHINA WHITE IS AN EXTREMELY POWERFUL OPIATE TYPE SUBSTANCE.
- CHINA WHITE IS CONSIDERED **6,000** TIMES MORE POWERFUL THAN PURE NATURAL HEROIN.

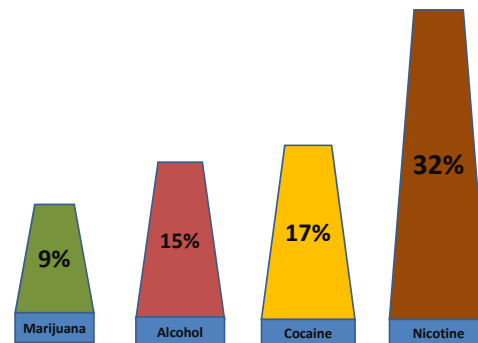
## Cannabis (Marijuana and K2)

### Random Facts About "Marijuana"

- Marijuana is the dried, shredded flowers and leaves of the *Cannabis sativa* plant.
- The Controlled Substances Act (1970) made it illegal to buy, use or sell marijuana in the U.S. CSA classified it as a Schedule 1 drug.
- After alcohol, marijuana is the most popular recreational drug used world wide.
- Approx. 69 million Americans have tried Marijuana at least once.
- It would take 800 joints to kill a person-however the death would be due to carbon monoxide poisoning.

- 2007, approx. 900,000 arrests for marijuana were made in the U.S. 90% were arrested and charged for possession only.
- 1937, Samuel Caldwell was the first U.S. citizen arrested for not paying taxes on the new Marijuana Tax Act and sentenced to four years of hard labor in Leavenworth, Ks.
- 2003, Canada became the first country to allow medical marijuana.
- Supporters of medical marijuana claim that the marijuana has value in treatment for AIDS, glaucoma, cancer, MS, epilepsy and chronic pain.
- Worldwide, approx. 162 million adults use marijuana at least one time per year, and approx. 22.5 million use on a daily basis.

### How the "Addictive" potential of Marijuana compares with Other Drugs of Abuse (DoA)



## Does the Brain Produce it's Own Marijuana?

Endo-cannabinoids  
vs.  
Tetra-Hydro-cannabinoids

### • NO!

- Scientists at St. Louis University, Medical School (1988) found a cannabinoid type receptors in the brain.
- In 1992 scientists found a natural brain cannabinoid called "Anandamide". They have since found other Anandamides.
- These chemicals are currently referred to as "Endogenous (produced from inside the body) cannabinoids", or "Endo-cannabinoids".
- These natural cannabinoids do not initiate the release of Dopamine (DA) in the brain.

### Anandamides, THC and Interference Learning

- Research has found that anandamides/cannabinoids assist the memory system by removing unwanted memory clutter.
- Unnecessary information from yesterday might interfere with the acquisition of important "NEW" information today.
- **Proactive Interference** is defined as: Old information interfering with the encoding of new or current information.
- Anandamides are believed to provide proactive interference in order to keep the memory systems clean.
- THC apparently removes yesterday's information so effectively, that important short term/working memory may also be lost.

### Does the Brain Produce it's Own Marijuana?

- The Cannabis sativa plant produces a chemical known as delta-9-tetrahydrocannabinol (THC). We refer to it as Marijuana.
- THC is an "Exogenous" cannabinoid since it is produced outside of the body in the Cannabis sativa plant.
- THC's molecular structure mimics the endogenous cannabinoids (Anandamides) naturally produced by the brain.
- After ingesting Marijuana, the brain **mistakenly** allows the exogenous cannabinoid (THC) to activate it's receptors, causing neurotransmitter confusion and the activation of the Dopamine (DA) releasing reward cycle, starting with the stimulation of the VTA.

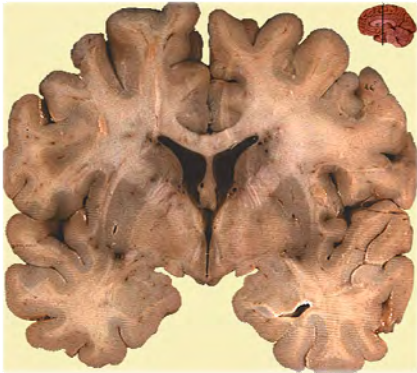
### Cannabis "Marijuana"

- 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 ... (▲ 8 & 9 THC).

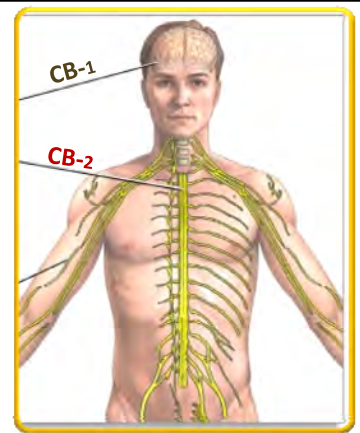
### Cannabis "Marijuana"

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

The light regions of the brain are high protein areas

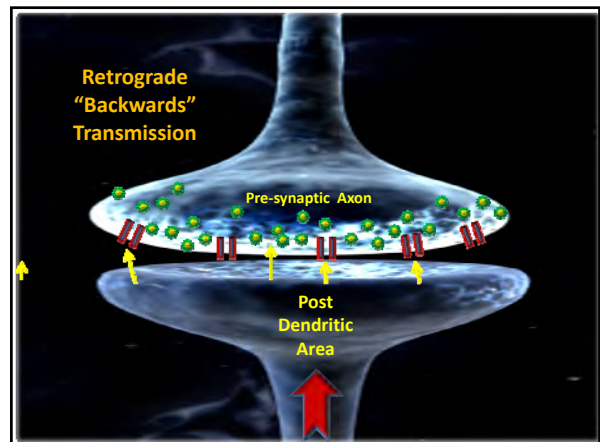


The greatest amount of **CB-1** receptors are found in the brain, while **CB-2** receptors are routinely found throughout the spinal cord and body.



### Marijuana and Retrograde (Backward) Transmission

- The neurons in the brain do not store cannabinoids in the tiny vesicles of the pre-synaptic axons like other neurotransmitters.
- Neurons produce cannabinoids, as needed, in the fatty regions of the post synaptic (dendritic) areas of a neuron.
- Instead of cannabinoids acting like typical neurotransmitters, by releasing chemicals from pre-synaptic axons and attaching to post-synaptic synaptic (dendritic) receptors, they release from the post-synaptic region of a neuron and float back towards the pre-synaptic neuron in order to regulate the neural activity of the pre-synaptic axon. This is known as **Retrograde Transmission**.



**Remember . . .**

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

**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.**

**THE SYNTHETIC CANNABIS IS A FULL CANNABINOID RECEPTOR AGONIST.**

- MARKETED AS “HERBAL INCENSE” AND “HERBAL SMOKING BLENDS”.
- SYNTHETIC CANNABIS DOES NOT TEST POSITIVE FOR CANNABINOIDS IN A REGULAR URINE SCREEN BUT IT METABOLITES CAN BE FOUND IN HUMAN URINE.
- ON MARCH 1, 2011, THE U.S. DEA CLASSIFIED ALL FIVE (5) SYNTHETIC CANNABINOIDS AS SCHEDULE 1 DRUGS.

- ONE GROUP OF RESEARCHERS FOUND THAT LONG TERM USE OF SYNTHETIC CANNABIS DISPLAYS OPIATE **“LIKE”** WITHDRAWAL SYMPTOMS WHEN DISCONTINUED .
- ANOTHER GROUP OF RESEARCHERS FOUND THAT AN INDIVIDUAL WHO HAD PREVIOUSLY SUFFERED FROM A CANNABIS INDUCED PSYCHOTIC EPISODE EXPERIENCED AN REBOUND EPISODE WHEN USING SYNTHETIC CANNABIS .
- PROFESSOR HUFFMAN WAS REPORTED TO HAVE STATED **“PEOPLE WHO USE IT ARE IDIOTS”!**

**HALLUCINOGENS**

Substances that mimic the neurochemicals that exist only in the body’s sensory systems  
(Eyes, Taste, Touch, Smell, Hearing)

Hallucinogenic drugs are known to produce a **physical tolerance**, and **psychological dependency** but are **not** believed to produce a **physical dependence**.

**HALLUCINOGENIC TERMS**

- **Psychedelic:** (**Mind manifesting**) A term used by early addictionologist, who believed that hallucinogenic drugs expanded the creative and insightful abilities of the human mind.
- **Psychotomimetic:** A term used by early addictionologist, which believed that hallucinogens mimic psychotic signs and symptoms.
- **Psychotogenic:** A term used by early addictionologist, which believed that prolonged use of hallucinogens could created or produced psychotic signs and symptoms.
- **Synesthesia:** A term currently used that describes the **“mixing”** of the senses.

**HALLUCINOGENIC:**

1. LYSERGIC ACID DIETHYLAMIDE (LSD) "Acid".
2. Mescaline "Found in Peyote cactus".  
(Mescaline derivatives: MDA and MDMA)
3. PEYOTE "Cactus".
4. PSILOCYBIN "Magic Mushrooms".

**DISSOCIATIVE ANESTHETIC:**

6. PHENCYCLIDINE (PCP) "Angel Dust".
7. KETAMINE (Special "K").

**OTC'S THAT PRODUCE HALLUCINATIONS:**

8. ANTIHISTAMINES - DEXTROMETHORPHAN

**Stimulate (Drugs that "ACTIVATE" the brain)**

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

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