

***THE OPIATE CRISIS: UNDERSTANDING
AND TREATING THE OPIATE ADDICT***

***EMPHASIS ON HEROIN, FENTANYL
AND ITS ANALOGUES***

CARDWELL C. NUCKOLS, PhD

CNUCKOLS@ELITECORP1.COM

GENETICS AND ADDICTION

- Regardless of the drug involved about 50% of the risk is genetic within a range of about 40-60%
- Certain variations of certain genes can increase the risk of developing addiction
- A gene is a giant molecule that carries information
- A gene is a section of a chromosome with a recipe for a certain molecule

GENETICS AND ADDICTION

- *Anandamide* is specifically responsible for regulating anxiety
- It produces calmness and relaxation when released
- If you make less of it you will probably be prone to anxiety
- In fact many who smoke marijuana (specifically THC) do so to reduce anxiety

GENETICS AND ADDICTION

- FAAH stands for fatty acid amide hydrolase
- FAAH is an enzyme that deactivates anandamide
- FAAH is a protein and like every protein the instructions on how to make it are encoded on a specific gene
- There is a variation of the FAAH gene that weakens it (less FAAH is available)
- Less FAAH equals more anandamide
- *People with this variant are less prone to anxiety and actually have an aversion to marijuana*

GENETICS

- **A1 ALLELE OF THE DOPAMINE D2 RECEPTOR GENE**
 - Found in one-third of the population
 - Reduced density of D2 DA receptors in the striatum
 - The more severe the addiction the higher the association with the A1 allele
 - ***LOW CNS DA TONE***

NOBLE. ADDICTION AND ITS REWARD PROCESS THROUGH POLYMORPHISMS OF THE D2 DOPAMINE RECEPTOR GENE: A REVIEW. *EUR PSYCHIATRY*, 2000;15: 79-89.

GENETICS

- A shortage of D2 receptors, some researchers surmise, could predispose a person to addiction.
- Nora Volkow, NIDA Director, led two studies that involved artificially increasing the number of D2 receptors in rats by administering adenoviral vectors directly into their brains. Viral vectors transmit their genetic material and makeup into foreign cells, in this case *increasing the number of D2 receptors in the new cells to match their own.*

GENETICS

- In one study involving rats and alcohol, the increased number of D2 receptors led the rodents to consume less alcohol, compared with their baseline intake.
- In the other study, the D2-receptor increase caused rats to significantly reduce their intake of cocaine.

GENETICS

- Michael Nader, a researcher at Wake Forest School of Medicine, is investigating *ways to raise D2-receptor levels naturally*.
- One experiment he helped conduct focused on five separate groups of four monkeys. Each had been self-administering cocaine to the point of habit and were then deprived of the drug for an eight-month period. To create a picture of D2-receptor availability, the monkeys were given a radioactive tracer that competes with dopamine for receptors.

GENETICS

- The monkeys were then randomly put in social groups of four and given the opportunity to self-administer the drug again.
- Positron emission tomography (PET) imaging of the monkeys over time showed fluctuations in dopamine levels, which allowed the researchers to estimate the changing numbers of available D2 receptors.
- After only three months, *the socially dominant monkeys in each group had naturally increased their numbers of D2 receptors.*

GENETICS

- There was no increase in the subordinate monkeys. Further, the subordinate monkeys reverted to using cocaine at much higher levels than the dominant monkeys.
- "There is an interesting relationship between D2-receptor numbers and vulnerability to drug addiction," Nader said. "It appears that individuals with low D2 measures are more vulnerable compared to individuals with high D2-receptor numbers."

GENETICS

- Why did the socially dominant monkeys show D2-receptor increases? "One hypothesis," Nader said, "is *environmental enrichment*." For the monkeys, it seems, being dominant was the enriching trigger.
- One physiological consequence of involvement in 12-step meetings, therefore, could be an increase in the natural production of D2 receptors.

OPRM1 A118G

- Found in 30 % of Caucasians and 60% of Asians
- Variant of mu opioid receptor gene OPRM1
- *Implicated in pain and analgesia, drug addiction and responses to treatment*
- Overall reduction of mu opioid receptors
- Increases the risk for opiate addiction

OPRM1 A118G

- Associated with *higher Neuroticism scores specifically vulnerable to stress and mood disorders*
- Associated with increased anxiety to negative stimuli, the development of chronic pain after injury or surgery and lowered response to placebo

Neuropsychopharmacology (2015) **40**, 957–965

GENETICS, EPIGENETICS AND ADDICTION

- Genes can increase or reduce risk
- However there is another very important part of the formula.
- *Environment, upbringing and exposure to stress are some of the factors that can trump genetics*
- *Epigenetics is the science of understanding what increases or decreases the activities of certain genes*
- *Epigenetics control whether risk factors become disorders*

GENETICS, EPIGENETICS AND ADDICTION

- Severe early life stress dramatically increases the risk of addiction and the risk increases with greater trauma exposure
- Swedish study where children who lost their parents, experienced a parent's diagnosis of cancer or observed domestic violence had twice the risk of substance use disorder in life
- *Both stress and addiction can induce some of the same epigenetic changes in stress systems and those involved in pleasure*

OPIOIDS AND CHILDHOOD LOSS AND TRAUMA

- ABOUT 50 % OF OPIOID ADDICTS HAVE CO-OCCURRING DISORDERS
 - Anxiety, depression and post-traumatic stress disorder are common
 - *The more childhood loss and trauma someone has experienced the higher the risk of addiction.*
 - Boys who experienced six or more childhood traumas had a 46 times greater risk of becoming an IV addict (<http://goo.gl/6KalC>- ACE Study)

WHY OPIATES?

- *Relieves stress*
 - Action on mu receptors on amygdala
- *Feeling of being warm, fed and cared for*
- *Dissociation from negative feeling states*
- *Cognitively intact*
- *Dopamine high and enhanced sense of well-being*
 - Dopamine signal from reward center to prefrontal cortex

CRUDE LATEX



HEROIN



PAREGORIC



OPIOIDS

- Naturally occurring in poppy
 - Morphine
 - Codeine
- Semi-synthetic derived from morphine, codeine and thebaine
 - Heroin (diacetyl morphine)
 - Oxycodone
 - Tylox
 - Percodan
 - OxyContin
 - Hydromorphone
 - Dilaudid

OPIOIDS

- **Semi-synthetic**
 - **Buprenorphine (thebaine derivative)**
- **Synthetics**
 - **Fentanyl and analogues including Carfentanil**
 - **Methadone**
 - **Propoxyphene**
 - **Lomotil**



HEROIN

- Pure heroin is a white powder with a bitter taste that predominantly originates from Afghanistan and the surrounding areas. In the Eastern part of North America, heroin comes from South America. “Black tar” heroin is sticky like roofing tar or hard like coal and is predominantly produced in Mexico.
- IV heroin is believed to be three times as powerful as IV morphine.

HEROIN

- **Controlled Drug and Substances Act permits doctors to apply for permission under the federal Special Access Program to offer their addicted patients diacetylmorphine**
- **Permit doctors to prescribe pharmaceutical-grade heroin to treat severe addicts who have not responded to more conventional approaches.**

HEROIN

- **Crosstown, a clinic in Vancouver, will be able to expand its special heroin-maintenance program, in which addicts come in as many as three times a day and receive prescribed injections of legally obtained heroin from a nurse. This is a free service.**

FENTANYL

- During the 1970s, heroin containing drugs from the fentanyl group often made it to the illegal drug market under names such as “Tango and Cash,” “Synthetic Heroin” or “China White.” Regrettably, this trend is now beginning to surface again. However, the most worrisome trend is the production of counterfeit pharmaceutical preparations containing varying proportions of fentanyl and its analogues.

FENTANYL PATCHES

- Fentanyl is a synthetic pain medication that is 50 to 100 times more powerful than morphine and 20-40 times stronger than heroin
- Both used and unused fentanyl patches have been injected, smoked, snorted or taken orally with fatal consequences.
- Duragesic is a time-release patch containing anywhere from 12.5 micrograms/hour to 100 micrograms/hour over 72 hours

HEROIN AND FENTANYL OVERDOSE



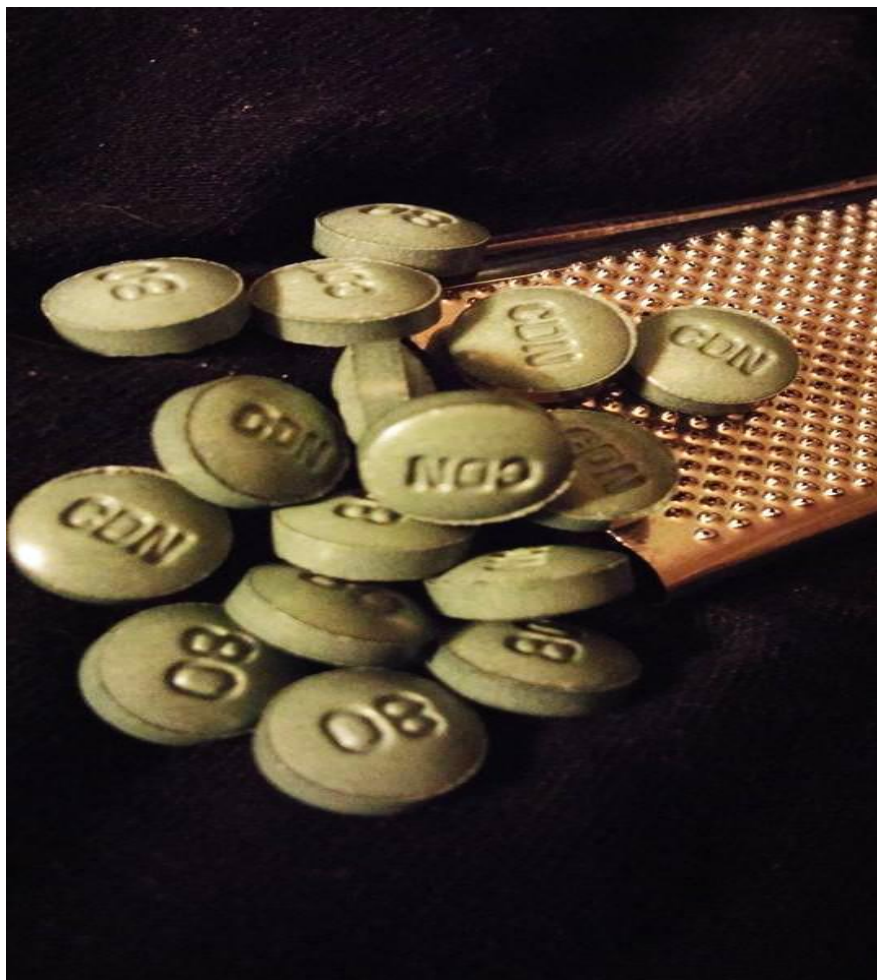
FENTANYL

- STREET NAMES INCLUDE...
- China White, Synthetic Heroin, Drop Dead, Flatline, Lethal Injection, Apache, China Girl, Chinatown, Dance Fever, Great Bear, Poison, Tango & Cash, TNT. Perc-o-Pops and Lollipops are street names for Actiq

FENTANYL

- Mexican cartels are adding the drug to heroin smuggled into North America.
- Chinese suppliers are providing both raw fentanyl and the machinery necessary for the assembly-line production of the drug
- One kilogram of fentanyl can be purchased in China for \$3,000 to \$5,000 and then generate over \$1.5 million in revenue through illicit sales

FENTANYL



FENTANYL

- The China connection is allowing local drug dealers in North America to mass produce fentanyl in pill form, in some cases *producing tablets that look identical to an oft-abused version of the prescription painkiller OxyContin. It also has been added to Xanax pills. Fentanyl pills made to resemble the painkiller hydrocodone (also Norco)* were blamed for a wave of overdoses in the Sacramento area

FENTANYL

- Individuals addicted to the drug develop tolerance and dependence in no time, reaching extreme levels. *Fentanyl abuse can cause depression, slowed heart rate, sleepiness and hallucinations.* See more at: <https://www.sovhealth.com/treatment/surge-fentanyl-influx-may-exacerbate-ongoing-opioid-crisis/#sthash.ZSaofw9r.dpuf>

FENTANYL SEIZED IN ALBERTA



FENTANYL

- In British Columbia, police took down a lab at a custom car business that was allegedly shipping 100,000 fentanyl pills a month to nearby Calgary, Alberta where 90 people overdosed on the drug last year. The investigation began when border authorities intercepted a package in December containing pharmaceutical equipment shipped from China.

ACETYL FENTANYL

- Acetyl fentanyl is an opiate analgesic with no recognized medical use. It is five to 15 times stronger than heroin. Users typically use it intravenously as a direct substitute for heroin or pharmaceutical-grade opioids, though many are unaware that what they are consuming is not plain heroin

John M. Stogner. **The Potential Threat of Acetyl Fentanyl: Legal Issues, Contaminated Heroin, and Acetyl Fentanyl “Disguised” as Other Opioids.** *Annals of Emergency Medicine*, 2014; DOI:[10.1016/j.annemergmed.2014.07](https://doi.org/10.1016/j.annemergmed.2014.07).

CARFENTANIL

- *100 TIMES STRONGER THAN FENTANYL AND 10,000 TIMES STRONGER THAN MORPHINE*
- Two milligrams can knock out a 2000 pound elephant (Wildnil)
- Sufentanil (10-20 times stronger than fentanyl and 500-1000 times stronger than morphine) is the maximum strength used with humans. (Sufenta)

CARFENTANIL

- *Comes in many forms*
 - *Powder*
 - *Blotter paper*
 - *Tablets*
 - *Spray*

CARFENTANIL

- **Dangerous to users and also to first responders and medical personnel because it can be absorbed through the skin or inhaled**
 - **Need to wear protect gear**
 - **Do not touch or scatter**
 - **As little as one microgram (1,000,000 of a gram) can affect a human**

CARFENTANIL

- Overdose victims may require a higher dose or multiple doses of naloxone (Narcan)
- Carfentanil bonds very tightly to the opiate receptor and naloxone has difficulty dislodging it
- Stays in system a long time so can revive the overdose victim and hours later they pass out again

CARFENTANIL

- *In cases of exposure*
 - Move victim into fresh air and wash out eyes and mouth with cool water (works best with inhalation)
 - Administer a dose of naloxone every two to three minutes until the individual is breathing on their own or until EMS arrive
 - *Do not take samples or otherwise disturb the substance*

NARCAN NASAL SPRAY

- A new naloxone aerosol formulation makes rescuing victims of opioid overdose simple and quick for friends, families, and emergency responders. A single activation of NARCAN[®] Nasal Spray, directed into a nostril, restores respiration near-instantly. *No needles are required, and the medication works whether or not the patient is breathing when it is given*

NARCAN NASAL SPRAY



W-18

- Similar to carfentanil in potency (100 times more potent than fentanyl)
- Like carfentanil is often mixed with heroin for the “intensified effect”
- Synthetic painkiller developed in the 1980’s
- Like carfentanil and fentanyl most seems to be manufacture in China and smuggled in through Mexico and sea ports

OXYCODONE

- OxyContin's off the Canadian market, its tamper-resistant replacement tougher to get. But Canadians are popping more pills than ever: In 2010, for the first time, Canada edged past the United States to become the highest opioid-consuming country, per capita, in the world.

OXYCONTIN



OXYCONTIN



OXYCODONE

- The Canadian government has finally approved a new drug that is intended to be a solution to the spreading OxyContin abuse epidemic in Canada. OxyContin is the strong, time-release opioid painkiller that has been abused by millions in the US and Canada since its introduction in 1996. In Canada alone, it is estimated that 200,000 people are abusing and are addicted to this drug.

OXYNEO

- Hard to crush but when taken orally, the body will still extract the medication from the pill. Those taking the pill are warned that they may find an intact pill in their body waste, but they still received the dosage intended (10-80 mg).
- It will not burn sufficiently to provide any intoxication. And those who want to dissolve it will find that it will just turn to a jelly (polyethylene oxide) that cannot be injected.

OXYNEO



PREGABALIN AND GABAPENTIN

- *These drugs are especially dangerous when used with heroin or other opioids.*
- Interviews with heroin users reported that pregabalin (Lyrica) and gabapentin (Neurontin) were easy to access and that taking them was associated with a *feeling of loss of control and an enhanced effect of heroin including respiratory depression*

PREGABALIN AND GABAPENTIN

- **The number of deaths in England and Wales involving gabapentoids increased from fewer than one per year prior to 2009 to 137 in 2015 of which 79 per cent also involved opioids such as heroin**

University of Bristol. "Combining heroin, commonly prescribed non-opioid pain killers leads to a significant rise in overdose deaths." ScienceDaily.

ScienceDaily, 11 May 2017.

<www.sciencedaily.com/releases/2017/05/170511113513.htm>.

OPIOID RECEPTORS

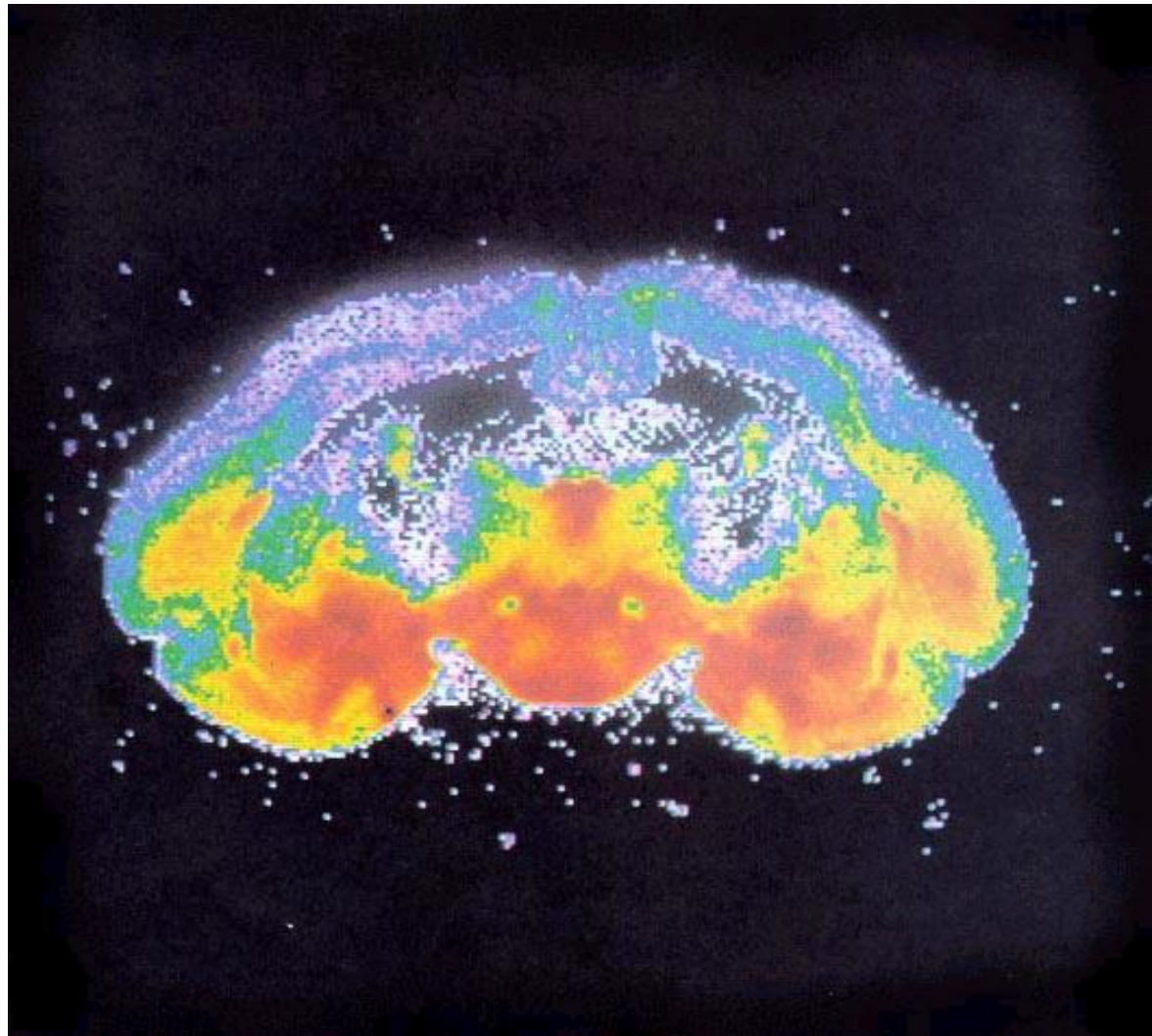
- The list of brain receptor targets for opiates reads like a fraternity: *Mu Delta Kappa*. The *mu opioid receptor is the primary target for morphine and endogenous opioids like endorphin, whereas the delta opioid receptor shows the highest affinity for endogenous enkephalins*. The kappa opioid receptor is the least understood of the opiate receptor family.

OPIOID RECEPTORS

- Opiate receptors are distributed in distinct patterns in the brain
- *Highest densities of opiate receptors are concentrated in areas involved in pain pathways*
- Dense in *substantia gelatinosa* of the spinal cord, where sensory nerves make 1st contact
- Also concentrated in the medial area of the thalamus - conveys sensory input associated with deep pain
- *Dense clusters in the periaqueductal gray zone of the midbrain – integrates pain information*
- *Dense in the limbic system – a major regulator of emotional behavior – explains euphoria and probably dissociation*

OPIOID RECEPTORS

The distribution of opiate receptors in the brain of a guinea pig. Red areas = highest density; yellow = moderate density, blue, purple & white = low density.



OPIOID ADDICTION

- ADDICTION LOOP

- *First step is liking the drug or at least finding it eases emotional problems*

- *Endorphins and enkephalins relieve stress by making you feel warm, safe, fed and loved*

- If you are a trauma survivor these drugs are especially appealing reinforcing the connection between the drug and life's fundamental comforts

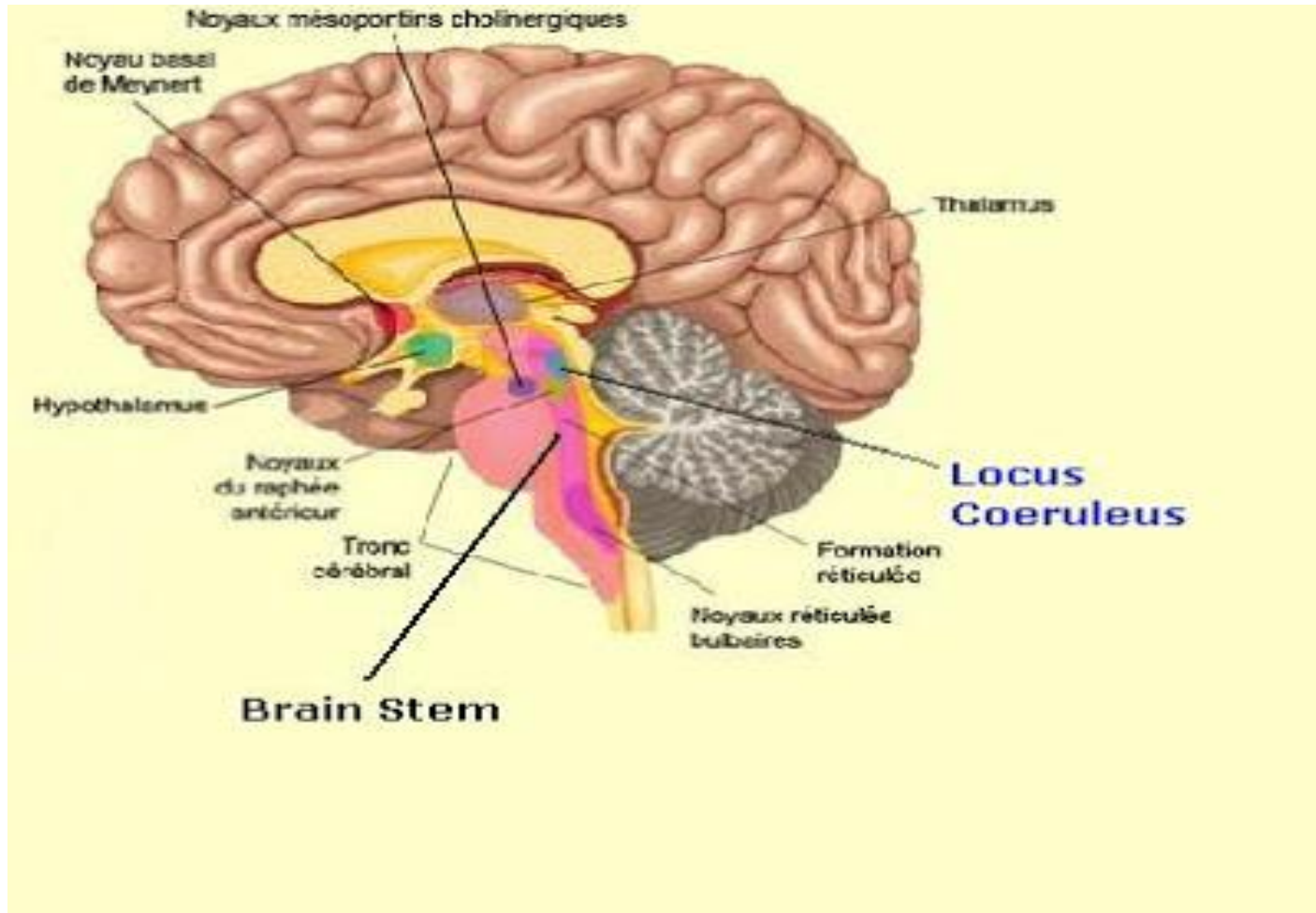
OPIOID ADDICTION

- **ADDICTION LOOP**

- *Secondly, another feedback loop begins involving the unconscious brain and **HOMEOSTASIS***

- When opioid levels get too high the brain kicks out cortisol reducing dopamine levels and causing a feeling of being irritable and discontent
- The Locus Coeruleus (LC) puts out more norepinephrine to counteract the CNS depression

LOCUS COERULEUS



OPIOID ADDICTION

- ADDICTION LOOP

- *More drug needed to get the same effect-
TOLERANCE*
- Now one needs the drug just to feel normal
- Without the drug one is overwhelmed by negative emotions and an acute abstinence syndrome
- *Dopamine replaced by glutamate and drug seeking as the predominant driving force*

OPIOID ADDICTION

- Changes in brain glutamate signaling induced by chronic drug exposure causes a wide variety of neurological effects instrumental in the transition from abuse to addiction (Kavalis, 2009)
- *These neural alterations limit the ability to adapt to new information (to stop taking drugs in spite of adverse consequences) and strengthens the power of drug learned associations*

OPIOID ADDICTION

- *Addiction as impairment in reversal learning*
IN ADDICTION...

“WHEN I USE DRUGS I FEEL GOOD”

CHANGES TO

“WHEN I USE DRUGS BAD THINGS HAPPEN”

NEW RULE BUT CANNOT ADAPT

OPIOID ADDICTION

- Addicts can learn a new rule but run into problems when the rule changes
 - Cocaine and alcohol abusers were asked to press key each time they saw a green rectangle on the screen
 - After 500 repetitions told not to press key when viewing the green rectangle
 - Controls easily adapted while addicts kept pushing the key when the green rectangle appeared even after given feedback
 - **IMPAIRED *REVERSAL LEARNING* DUE TO DRUG USE AND NOT GENETICS**

OPIOID ABSTINENCE SYNDROME

- Increased anxiety followed by...
- Increased Noradrenergic activity
- Timing influenced by half-life (*fentanyl has short half-life and day 1 and 2 more pronounced*)
- Typically begins 10-12 hours after last dose
- Peaks at 2-3 days
- Lasts 7-10 days

OPIOID ABSTINENCE SYNDROME

- Addicts Experience
 - A hyper-aroused state (“fight or flight”)
 - Increased (vital signs):
 - Heart rate
 - Blood pressure
 - Restlessness
 - Tremors
 - Hypervigilence
 - Dilated pupils

OPIOID ABSTINENCE SYNDROME

- Addicts experience
 - Worst case of flu imaginable
 - Nausea and vomiting
 - Runny nose
 - Cold (cannot get warm), shivering
 - Cramping
 - Tearing
 - Diarrhea

TREATMENT OF DEPENDENCE

- **PHARMACOTHERAPY**

- Methadone
- Buprenorphine
- Naltrexone/naloxone

- **PSYCHOLOGICAL/PSYCHOTHERAPY**

- **EDUCATION**

- **WELLNESS**

- **SPIRITUAL**

METHADONE

- **Methadose, Dolophine**
- **The drug is available in oral solutions, tablets, and injectable forms. And although there is no one manufacturer responsible for producing methadone, the active ingredient is always the same: methadone hydrochloride**

METHADONE

- Methadone is a synthetic, narcotic analgesic (pain reliever). Often used by and associated with the treatment of heroin addicts it is also used for other medical purposes such as pain relief. *The drug shares many of the same effects and characteristics of morphine and acts in similar ways to it and other narcotic medications. Methadone has a gradual and mild onset of action reducing the intense euphoric effects experienced by insufflation and injection.*

METHADONE

- The *SAMSHA (2012, Tip 43) guidelines allow for those who are not physically dependent on opiates to receive methadone.* While initially the goal was to wean patients off, SAMSHA (2012) advises directors of clinics when a patient requests a dosage reduction that they should “educate” the patients on the importance of staying on their Medication Assisted Treatment (MAT).

METHADONE

- There is no duration limit on MAT. Moreover, there is no longer a limit on dosage. Given that stress is a reliable precipitant to relapse in drug abusers, SAMSHA discusses increasing dosage during stressful times (see page 77, in SAMSHA's *Tip 43, Medication-Assisted Treatment*).

METHADONE

- Methadone maintenance has been proven to...
 - Reduce incidence of HIV
 - Reduction of illegal substances of abuse
 - Criminal behavior
 - Mortality
 - Sexually transmitted diseases

METHADONE

- Like all pharmacological agents used for maintenance in opioid addiction treatment, other modalities are necessary for positive results
 - Urinalysis
 - Psychosocial assistance
 - “Wrap around” services
 - Psychotherapy

BUPRENORPHINE

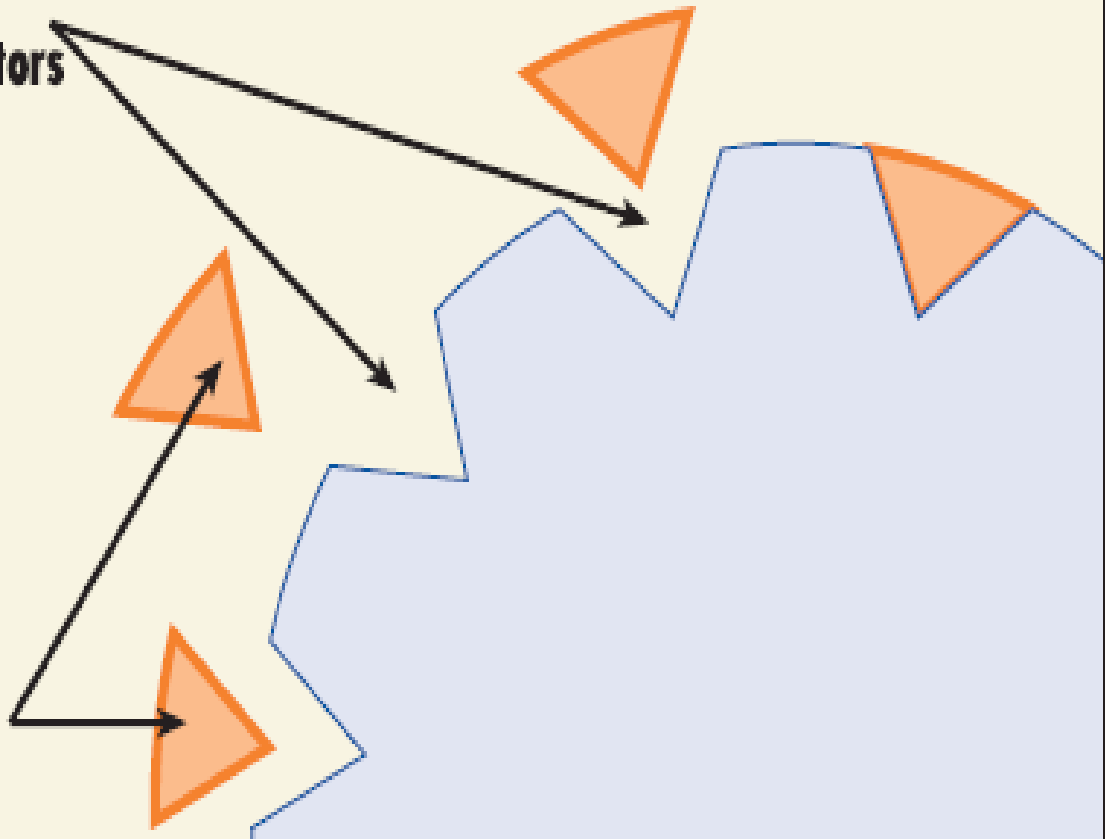
- **Subutex-Buprenorphine. sublingual (SL)**
 - 2mg and 8mg tablets
- **Suboxone-Buprenorphine/Naloxone SL tablets and film**
- **Zubsolv sublingual**
- **Bunavail buccal**
- **Partial agonist**
 - Increasing dose does not increase effect like a full agonist
 - “Ceiling Effect”

PURE AGONISTS

Complete opioid agonists (e.g., heroin) fit the receptors almost perfectly and strongly stimulate them.

Opiate Receptors

Opioid Agonist



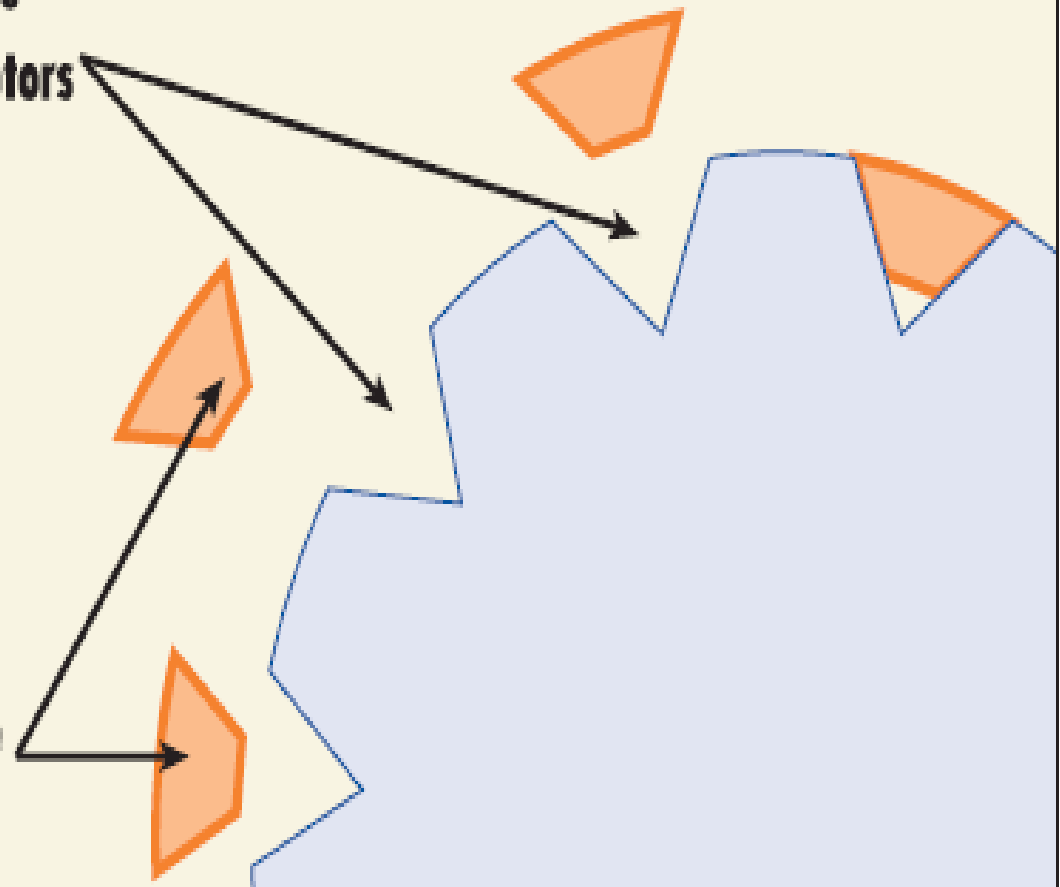
PARTIAL AGONIST

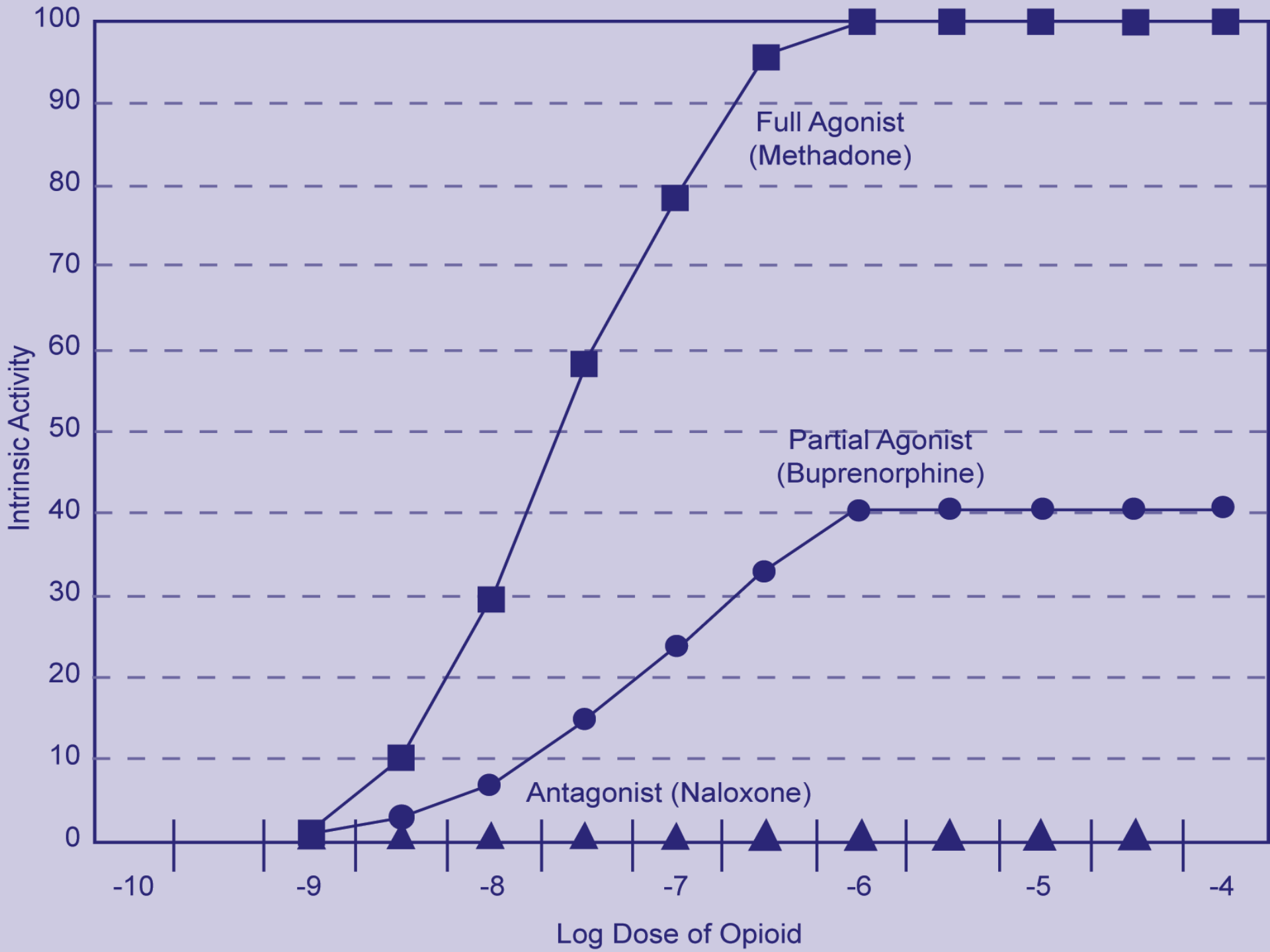
**Partial opioid agonist
(Buprenorphine)**

has a strong affinity for the receptors, but fits only partially. This prevents withdrawal symptoms and reduces or blocks the effects of other opioids.

Buprenorphine

**Opiate
Receptors**





BUPRENORPHINE/NALOXONE

- **Buprenorphine equally effective as 60 mg of Methadone per day**
- **If patient needs 80-100 or more mgs of Methadone to be comfortable, Buprenorphine probably will not work**
- **With client dependent on short-acting opioids**
 - **Instruct client to abstain for 12-24 hours**
 - **Need to be in mild withdrawal before first dose**

BUPRENORPHINE-AFFINITY AND DISSOLUTION

- **Very high affinity for mu opioid receptor (pleasure and pain relief)**
- **Kappa-receptor antagonist**
 - **Kappa-receptor plays role in opposing the rewarding effect of drugs of abuse**
 - **Blocking this dysphoric effect elevates mood**
 - **Blocking may play role in analgesic effects**
- **Mu receptor will choose buprenorphine over other opioids**
- **Buprenorphine will displace other opioids**

BUPRENORPHINE-AFFINITY AND DISSOLUTION

- **Slow dissolution from mu receptor**
 - **Half-life on receptor is 34-36 hrs**
 - **Heroin on and off receptor in millisecond**
 - **At Buprenorphine dose of 16mg almost no binding to other opioids**
- **Street use**
 - **Used on street for “bridging” and often combined with benzodiazepines**
 - **“Bupe” combined with promethazine (phenothiazine with antihistaminic effect-Phenergan), hydroxyzine (antihistamine and CNS depressant-Atarax and Vistaril), and benzodiazepines are “new heroin substitute”**

BUNAVAIL-BUPRENORPHINE BUCCAL ADMINISTRATION

- **BUNAVAIL is the first and only buccal film for the maintenance treatment of opioid dependence. Unlike other treatments, it sticks to the inside of your cheek—the buccal mucosa—and dissolves while delivering your medication.**
- **Buccal film: BUNAVAIL 2.1 mg buprenorphine/0.3 mg naloxone; BUNAVAIL 4.2 mg buprenorphine/0.7 mg naloxone and BUNAVAIL 6.3 mg buprenorphine/1 mg naloxone**

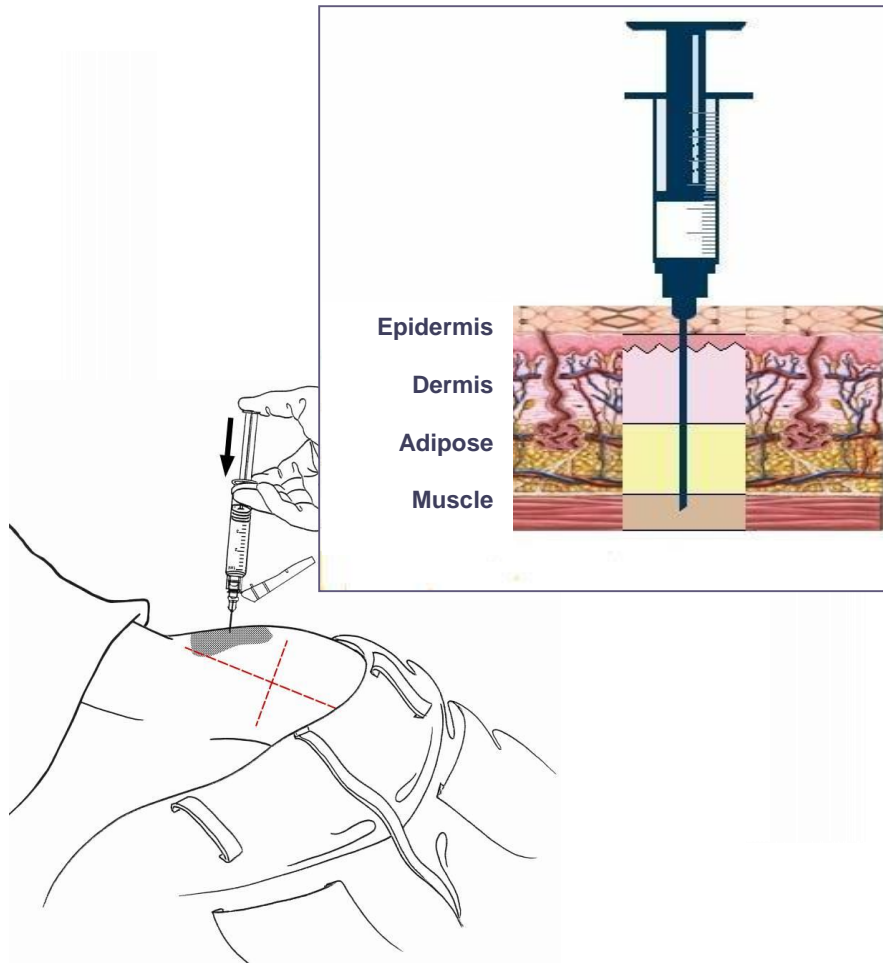
NALTREXONE/NALOXONE

- **Naltrexone (Revia, Vivitrol, Depade)**
 - **Pure antagonist**
 - **Poor compliance**
 - **Less than 10% for street addicts**
 - **Better compliance**
 - **Healthcare professionals**
 - **Parole/Probation**
 - **Suspension with q30d administration increases compliance and reliability of drug**

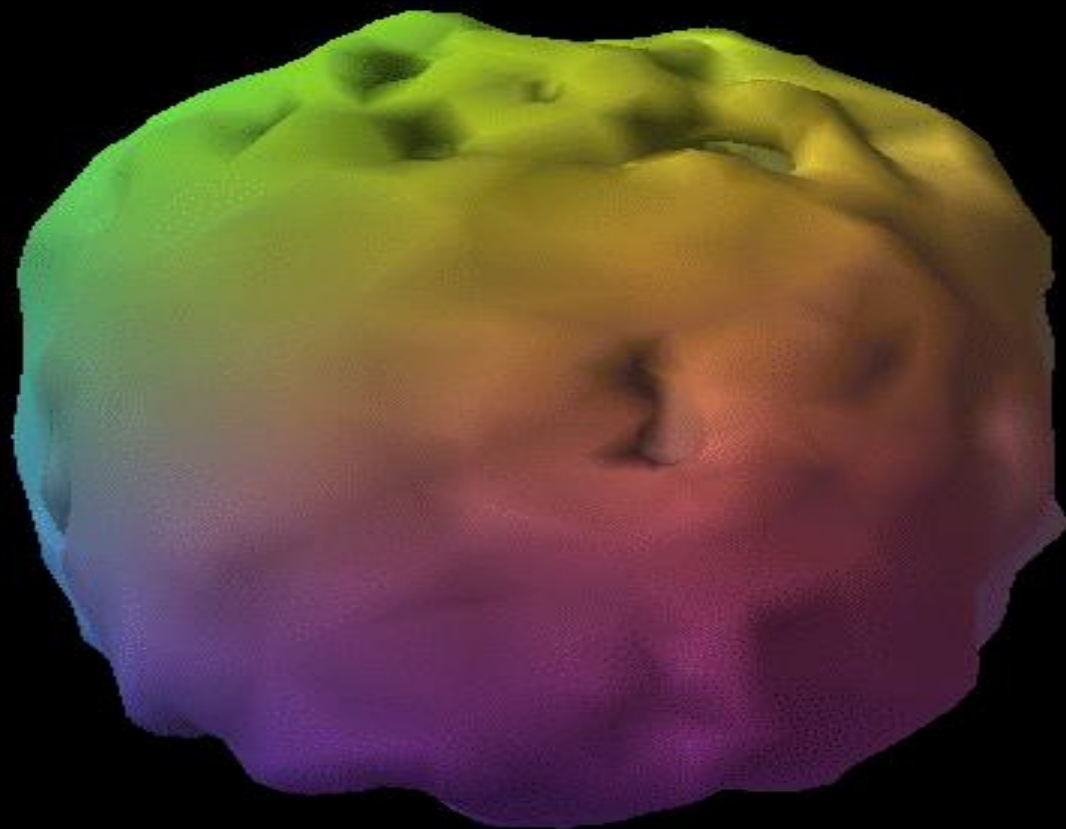
VIVITROL



VIVITROL



- **VIVITROL** is given as an intramuscular (IM) gluteal injection every 4 weeks or once a month
 - **VIVITROL** should not be given subcutaneously or in the adipose layer
- **VIVITROL** must not be administered intravenously
- **VIVITROL** should be administered by a healthcare professional, into alternating buttocks each month
- **VIVITROL** should be injected into the upper outer quadrant of the buttock, deep into the muscle-not the adipose.



PSYCHOLOGICAL

First consideration:

*Is the patient a candidate for rehabilitation
or do they need habilitation?*

PSYCHOLOGICAL

If Habilitation

Emphasis is on:

*Neuroplastic development of the prefrontal
cortex*

Staff as healthy family

Discharge planning

PSYCHOLOGICAL

- PREFRONTAL TAKES AROUND 25 YEARS TO DEVELOP IN A GOOD ENVIRONMENT

0-----5-----10-----20-----25



0-5 YEARS OLD-NURTURANCE

10-20 YEARS OLD- SUPERVISION

PSYCHOLOGICAL

Second consideration:

*Where is the patient in regard to their
desire to change?*

PSYCHOLOGICAL

- If patient is in *precontemplation* or *contemplation* (*Stages of Change Model*), the use of Motivational Interviewing techniques are warranted
- *Education and assessment can serve as confrontational tools*
 - To create cognitive dissonance

PSYCHOLOGICAL

Third consideration:

Is there presence or absence of a recovery-oriented environment and/ or support system?

RECOVERY CAPITAL

PSYCHOLOGICAL

Fourth consideration:

Understanding and treating the patients that
struggle

*History of trauma with or without self-injurious
behavior*

Earlier onset of use and other self-destructive behaviors

Personality immaturity

High levels of distress (Neuroticism)

Nonenriched environment

Lack of recovery capital

PSYCHOLOGICAL

- **What is the function of self-injury?**
 - **Did patient want to die?**
 - Usually “No” (MAY BE SEEN AS A SUICIDE PREVENTION STRATEGY-form of self-management, self-soothing and self-care)
 - **A way to tolerate inescapable and unbearable emotions, most often intense anxiety**
 - Stuck in a bad situation and cannot find another way to cope
 - **Self-injury is reinforced to the extent the behavior is effective**

PSYCHOLOGICAL

- Early childhood trauma changes the density of opiate receptors and level of B-endorphin baseline
 - May find injuring less painful and subsequent opioid release more pleasurable
 - Patients with only one episode of self-injurious behavior say “It hurt” and didn’t repeat behavior
- Non-suicidal self injury (NSSI) may be the best predictor of suicide attempt (Wilkinson P et al, *Am J Psychiatry* 2011; February 1)
 - *70% of people who engage in NSSI eventually attempt suicide*

PSYCHOLOGICAL

- High levels of neuroticism associated with suicide.
- The risk for suicide death was over 2-fold for men with Opioid Use disorder. For women, it was more than 8-fold.
- Hidden behind the terrible epidemic of opioid overdose deaths looms the fact that many of these deaths are far from accidental. They are suicides.

PSYCHOLOGICAL

- **DIALECTICAL BEHAVIOR THERAPY (MARSHA LINEHAN)**
 - An innovative form of CBT
 - *Helps detect and correct distorted thoughts*
 - *Counteract problematic behaviors and associated emotions*
 - *Incorporates meditative practices*
 - *Self-soothing techniques to manage mood swings(deep breathing, taking walks, listening to music, etc.)*
 - *Buildig healthy relationships*

PSYCHOLOGICAL

- Managing feelings
 - *Psychoeducation- “The opioid experience”*
 - *Emotional management strategies such as cognitive-behavioral options*
- Sleep
- Education
- Spiritual
- Self-help
- Wellness

THE OPIOID EXPERIENCE

- *Coming off opioids seems to create an experience of being overwhelmed with no ending in sight.*
 - Cognitively help patient to understand that this distress is time limited and map out the process with them
 - Behaviorally help take what looks insurmountable and break it into small and very doable parts
 - *What About Bob* and “Baby Steps” therapy

THE OPIOID EXPERIENCE

HIGH

ABNORMALLY NORMAL

SUBJECTIVE W/DRAWAL

ACUTE ABSTINENCE SYN.

THE OPIOID EXPERIENCE

- Parasympathetic Nervous System
- Dissociation mediated by endorphins/enkephalins
- In the Abnormally Normal stage of the experience the addict is functional and *experiences little or no negative emotions*
- During Subjective Withdrawal the negative emotions come back
- In early recovery when flooded with emotions the addict may leave AMA

THE OPIOID EXPERIENCE

- *Distress intolerance is defined as the perceived or actual inability to cope with adverse somatic or emotional stress*
- Study found robust differences in distress intolerance between adults with chronic pain, with and without opioid medication misuse.
- Distress intolerance, however, was not associated with greater pain sensitivity but was linked with *higher pain-related anxiety*.

THE OPIOID EXPERIENCE

- *Research suggests those with chronic pain who misuse their opioids exhibit higher levels of distress in general, as well as heightened reactivity to that distress*
- **Distress intolerance is targeted extensively in cognitive behavioral therapy and can be modified with treatment.**

R. Kathryn McHugh, Roger D. Weiss, Marise Cornelius, Marc O. Martel, Robert N. Jamison, Robert R. Edwards. **Distress Intolerance and Prescription Opioid Misuse Among Patients With Chronic Pain.** *The Journal of Pain*, 2016; 17 (7): 806

MANAGING NEGATIVE FEELING STATES

- *TWO MINUTES OF SILENCE*
 - The auditory cortex has a separate network of neurons that fires when silence begins
 - Two hours of silence per day prompted cell development in the hippocampus
 - Silence helps newly generated cells to differentiate into neurons and integrate into the system
 - Creates a state of “environmental enrichment”
 - Two minutes of silence allows the “default mode”-situated in the prefrontal cortex- to activate

MANAGING NEGATIVE FEELING STATES

- *TWO MINUTES OF SILENCE (continued)*
 - The “default mode” gathers and evaluates information. Focused attention curtails this scanning activity
 - It is observed most closely during the psychological task of reflecting on one’s personality and characteristics (self-reflection)
 - It integrates external and internal information (Joseph Moran, *Frontiers in Human Neuroscience*, 2013)

Gross, DA. “This is Your Brain on Silence.” *Brain in the News*. September 2016, pgs. 5-6.

MANAGING NEGATIVE FEELING STATES

- *DANCE*
 - By yourself put on music that makes you feel like moving
 - Let your body lead
 - When you start to tire gradually slow down
 - Take two minutes in silence to appreciate the changes that have occurred in your brain's emotional system
- *BREATHING FROM YOUR HEART (HEARTMATH)*
 - Focus on the area of your chest that houses your heart
 - Breath in and out from the heart

MANAGING NEGATIVE FEELING STATES

- *BREATHING FROM YOUR HEART* (HEARTMATH)
(continued)
 - The breathes should be a little deeper than usual
 - 5-6 seconds on the in-breath and 5-6 seconds on the out-breath
 - Appreciate the differences in your feeling state
- *APPRECIATION BREATHE*
 - 2-3 times per day
 - Bring into your mind something or someone you appreciate

MANAGING NEGATIVE FEELING STATES

- *APPRECIATION BREATHE* (continued)
 - Might consider using a nice note or email from a friend that you carry with you
 - Could be a prayer or Bible verse
 - Discern the changes you experience as you read or recall the positive experience
- *BE OF SERVICE*
 - *“I’VE LEARNED THAT PEOPLE WILL FORGET WHAT YOU SAID, PEOPLE WILL FORGET WHAT YOU DID, BUT PEOPLE WILL NOT FORGET HOW YOU MAKE THEM FEEL.”* Maya Angelou

MANAGING NEGATIVE FEELING STATES

- *BE OF SERVICE* (continued)
 - Focus on you environment
 - Remember everything is God
 - Kindly act to be of service to people, places and things
 - Notice how you feelings change as you direct love outward
 - The more you give of yourself the more we are filled with Love

MANAGING NEGATIVE FEELING STATES

- *LETTING GO*
 - *Letting go is a mechanism of the mind and causes a sense of relief and lightness*
 - *Example: I was with a friend and we were talking about all of the problems we had to deal with on a work project. We both broke out in laughter. The problems still existed but they were no longer our problems (i.e. some deficit in us)*
 - *Technique: Letting go consciously and frequently at will*
 - *NO LONGER THE VICTIM*

MANAGING NEGATIVE FEELING STATES

- **WELCOMING PRAYER**

- Become aware of a feeling (sensation) without labeling the sensation, venting, resisting, moralizing and judging
- Ignore all thoughts as they are just excuses and get us nowhere
- Let the sensation in and just stay with it
- Let it run its course without trying to make it different; just let the energy run out

MANAGING NEGATIVE FEELING STATES

- WELCOMING PRAYER (continued)
 - If stay with anger, hatred, resentments and self-pity...
 - All have *secondary gains (THE VICTIM)*
 - It is our ego-mean, competitive, cheap, mistrusting, vindictive, judgmental, guilty, ashamed, vain (little energy) and resentful

MANAGING NEGATIVE FEELING STATES

- *OTHER APPROACHES*

- Grounding
- Taking a walk in nature
- Playing with dogs, cats and small children
- Taking a shower
- Writing in a journal
- Listening to certain music such as classical, improvisational jazz, Tibetan Incantations, Gregorian Chant, etc.
- Physical exercise

SLEEP

- Abnormal findings are commonly reported in chronic opioid users despite development of tolerance. *These abnormalities include increased sleep latency, increased awakening, decreased total sleep time, and decreased sleep efficiency.* Slow-wave sleep time and REM sleep are decreased compared to baseline, while duration of stage 2 sleep is increased similar to acute use.

SLEEP

- *Several studies have reported changes in patterns of sleep with progressive abstinence from opiates. At around 5–7 days of acute abstinence from chronic heroin use, decreased total sleep time, slow-wave sleep, REM, and stage 2 sleep and increased sleep latency, wake after sleep onset, and REM latency compared to healthy sleepers.*

SLEEP

- During the first 3 weeks of abstinence, prolonged sleep latency, decreased sleep efficiency, decreased TST, increased arousal index, increased stage 1 and 2, and decreased slow-wave sleep were prominent compared to healthy sleepers. After 6 weeks and up to 6 months of abstinence from methadone, there is a rebound increase in SWS and REM time to a higher level than baseline

SLEEP

- *More than three-quarters of persons receiving methadone maintenance therapy still report sleep complaints*
- *Forty-two patients with opiate use disorder were treated with either methadone or buprenorphine and gradually tapered down over the course of 2–3 weeks. Buprenorphine-treated patients had 2.5 % lower sleep efficiency and 9 % shorter actual sleep time*

SLEEP

- Consider using the program called Conquering Insomnia which can be found at CBTforINSOMNIA.com or teach basic sleep hygiene
- Evidence-based program developed by Dr. Greg Jacob at Harvard Medical School and funded by a NIH grant
- In a study conducted at Harvard was found to be more effective than Ambien

SLEEP

- **INSOMNIA**
 - **5 session interactive program**
 - **SESSION 1: BASIC FACTS ABOUT SLEEP**
 - **SESSION 2: SLEEP SCHEDULING AND STIMULUS CONTROL**
 - **SESSION 3: COGNITIVE RESTRUCTURING AND SLEEP MEDICATION TAPERING TECHNIQUES**
 - **SESSION 4: DAYTIME RELAXATION TECHNIQUES**
 - **SESSION 5: BEDTIME RELAXATION TECHNIQUES**

SLEEP

- The journal SLEEP demonstrated online CBT program for insomnia effective for improving sleep in 80% of patients
- *The interactive version in a study by NIH showed it was comparable to the results garnered from face-to-face CBT*
- Wake time after sleep onset was reduced from over an hour to less than 30 minutes per night
- Sleep onset latency decreased from over 30 minutes to less than 20 minutes per night
- Total sleep time increased about an hour

SLEEP HYGIENE

- Go to bed and get up at the same times each day. ■ Use natural light (that comes through a window) to remind yourself of when it's time to be asleep and awake. This can help you set a healthy sleep–wake cycle. ■ Exercise regularly. ■ If you take naps, keep them short and before 5 p.m. ■ Don't eat or drink too much when it is close to bedtime.

SLEEP HYGIENE

- Avoid caffeine (in coffee, tea, chocolate, cola, and some pain relievers) and nicotine for several hours before bedtime. ■ Wind down before going to bed (e.g., take a warm bath, do light reading, practice relaxation exercises). ■ Keep the bedroom a relaxing place—avoid working or paying bills in bed. ■ Sleep in a dark, quiet room that isn't too hot or too cold. ■ Don't lie in bed awake. If you can't fall asleep within 20 minutes get up

SLEEP

- **PHARMACOTHERAPY**

- Melatonin-a metabolite of serotonin is a hormone secreted by the pineal gland; plays a role in maintenance of sleep-wake cycle (suprachiasmatic nucleus)
- Valerian (could damage the liver)
- Tryptophan-precursor amino acid to serotonin
- Antidepressants- Trazodone is a popular choice although not backed by formal clinical studies
- Quetiapine (Seroquel) and gabapentin (mixed results)

SLEEP

- Transcranial Electrical Stimulators
 - *Stimulates the brain to produce serotonin and melatonin while reducing cortisol* (the stress hormone) and calming the brain's Default Mode Network. The device is effective in treating the following types of insomnia:
 - Chronic Insomnia
 - Onset Insomnia
 - Comorbid Insomnia
 - Maintenance Insomnia: Difficulty staying asleep through the night (waking up often or waking up too early).

EDUCATION

- Cognitive deficits in chronic drug abuse
 - Withdrawal produces cognitive symptoms
 - Cocaine-deficits in cognitive flexibility
 - Amphetamine-deficits in attention and impulse control
 - *Opioids-deficits in cognitive flexibility*
 - Ethanol-deficits in working memory and attention
 - Cannabis-deficits in cognitive flexibility and attention
 - Nicotine-deficits in working memory and declarative learning

EDUCATION

- Utilize short and simple didactic or film clips to teach basic recovery points
- Use a feedback mechanism to determine comprehension
 - *I think.....*
 - *I feel.....*
 - *I learned.....*
 - *My future behavior will change.....*

NOVELTY

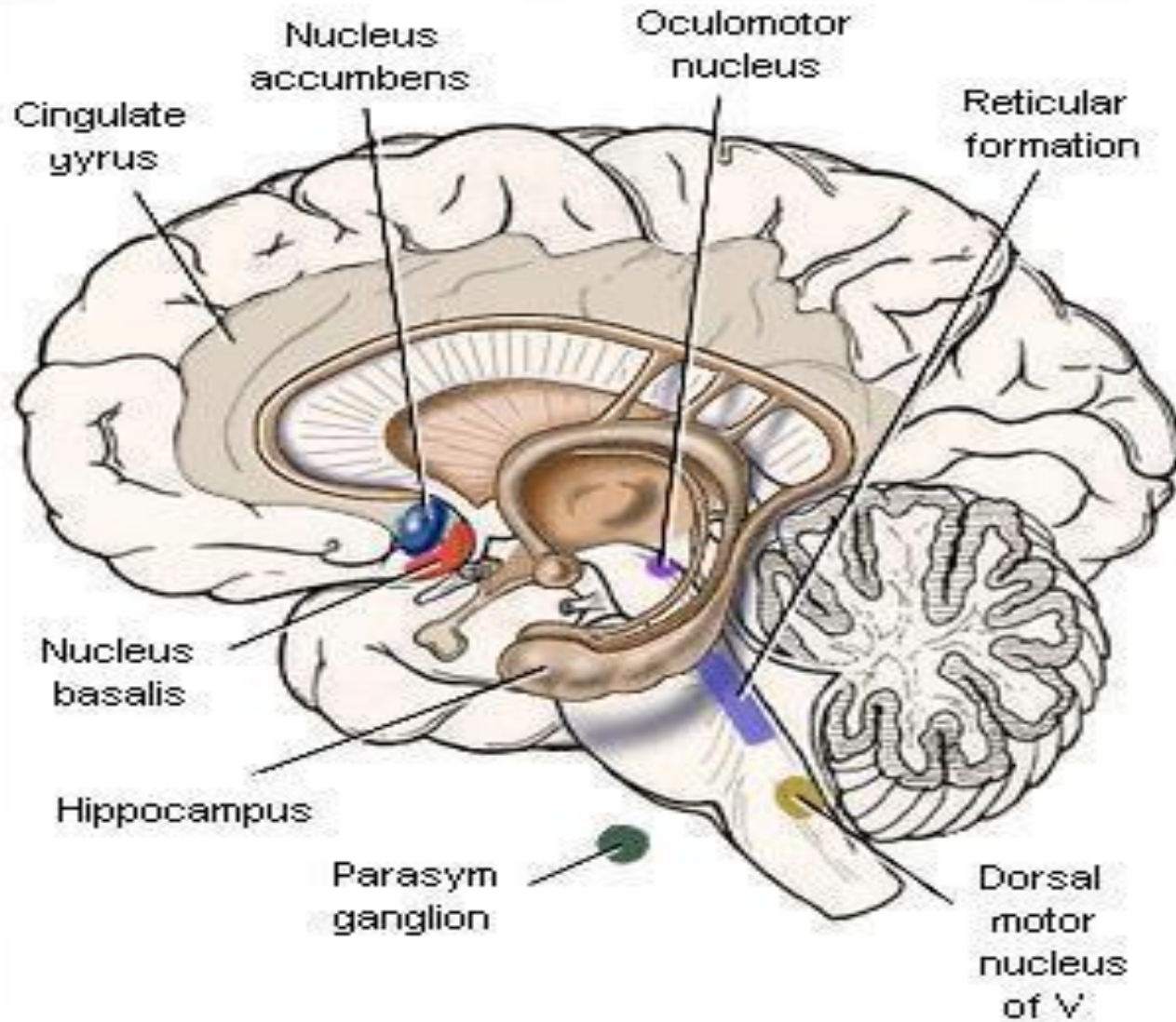
- The study revealed three major findings. *First, as expected, when people were highly curious to find out the answer to a question, they were better at learning that information.* More surprising, however, was that *once their curiosity was aroused, they showed better learning of entirely unrelated information* (face recognition) that they encountered but were not necessarily curious about. People were also better able to retain the information learned during a curious state across a 24-hour delay. *Curiosity may put the brain in a state that allows it to learn and retain any kind of information.*

NOVELTY

- *When curiosity is stimulated, there is increased activity in the brain circuit related to reward*
- *When curiosity motivated learning, there was increased activity in the hippocampus, a brain region that is important for forming new memories, as well as increased interactions between the hippocampus and the reward circuit. So curiosity recruits the reward system, and interactions between the reward system and the hippocampus seem to put the brain in a state in which you are more likely to learn and retain information, even if that information is not of particular interest or importance*

Matthias J. Gruber, Bernard D. Gelman, Charan Ranganath. **States of Curiosity Modulate Hippocampus-Dependent Learning via the Dopaminergic Circuit.** *Neuron*, 2014 DOI: [10.1016/j.neuron.2014.08.060](https://doi.org/10.1016/j.neuron.2014.08.060)

NUCLEUS BASALIS



NEUROPLASTICITY

THE NUCLEUS BASALIS IS...

NOVELTY

**THE MODULATORY CONTROL
CENTER FOR PLASTICITY**

THE SCIENCE OF RECOVERY: NEUROPLASTICITY

YOU ARE NEUROPLASTICIANS!

WHAT ENHANCES PLASTICITY?

- NOVELTY
- THERAPEUTIC RELATIONSHIPS
 - PHYSICAL EXERCISE
 - MINDFULNESS

PSYCHOTHERAPY

- *Cognitive-behavioral approaches*
 - Foundation Program
 - Safety Plans
 - Change Patterns
 - People, Places and Things experiential exercises
- *Contingency Management*

FOUNDATION PROGRAM

- In an inpatient setting the patient schedule serves this purpose
- On an outpatient basis or upon discharge from inpatient a recovery plan or contract is appropriate
- Remember that most addicts have little or no recent experience living a drug free lifestyle

FOUNDATION PROGRAM

TASK	MON	TU	WED	THU	FRI	SAT	SUN
SH							
TX							
FUN							
NUT							
PEX							

SAFETY PLAN

MY PERSONAL SAFETY PLAN

- Remember that craving go away
- I can write in my journal
- I can call my sponsor (299-289-5555)
- I can call my lover (299-426-1776)
- I can read from my favorite recovery book
- I can read affirmations

SAFETY PLAN

- TH: *“On the back of the index card, come up with a saying or a prayer that gives you strength.”*
- CT: *“I have always liked ‘Lord help me to be the best possible person I can be today’.”*

PEOPLE, PLACES AND THINGS WORKSHEET

	CAN CHANGE	CANNOT CHANGE
PEOPLE		
PLACES		
THINGS		

PSYCHOTHERAPY

- *Approaches such as contingency management (CM) and cognitive-behavioral therapy have been shown to effectively treat heroin addiction, especially when applied in concert with medications. Contingency management uses a voucher-based system in which patients earn “points” based on negative drug tests, which they can exchange for items that encourage healthy living. Cognitive-behavioral therapy is designed to help modify the patient’s expectations and behaviors related to drug use and to increase skills in coping with various life stressors*

TREATMENT-CM

Research has demonstrated the effectiveness of treatment approaches using contingency management (CM) principles, which involve giving patients tangible rewards to reinforce positive behaviors such as abstinence. Studies conducted in both methadone programs and psychosocial counseling treatment programs demonstrate that incentive-based interventions are highly effective in increasing treatment retention and promoting abstinence from drugs.

TREATMENT-CM

- **To Reduce Unwanted Behavior**
 - Present something undesirable (additional chores)
 - “Positive Punishment”
 - Keep something desirable (restrict access to video games)
 - “Negative Punishment”
- **To Increase Desired Behavior**
 - Provide something desirable (borrow the car)
 - “Positive Reinforcement”
 - Remove or reduce aversive conditions
 - “Negative Reinforcement”

CRAVING MANAGEMENT

- **Situational triggers**
 - **Environment (People, Places And Things)**
- **Emotional triggers**
 - **Internal (Hungry, Angry, Lonely, Tired, Reward and Bored)**
- **Acute Abstinence Syndrome**
- **Stress (Clonidine is helpful by blocking the effects of norepinephrine)**

CHANGING PATTERNS

31 yo Nicki-a recovering heroin addict- just got her first paycheck. Her thoughts went back to her “friends” in the old community and how much fun they used to have. She cashed her check and cruised thru the neighborhood where she used to score dope. Rock music blared from her speakers. Soon she was thinking, "I worked hard all week. I deserve a little fun.”