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## THE CANADIAN TRAUMA & ADDICTIONS CONFERENCE: HELPING INDIVIDUALS HEAL AND RECOVER

CO-SPONSORED BY SUNSHINE COAST HEALTH CENTRE AND  
GEORGIA STRAIGHT WOMEN'S CLINIC

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WEDNESDAY, MAY 19, 2020

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PRESENTED BY GABOR MATÉ, M.D., STANTON PEELE,  
PH.D., EBONI WEBB, PSY.D., HSP, DARRYL S. INABA,  
PHARM.D. & MARTIN BROKENLEG, ED.D.

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This virtual Canadian Trauma and Addictions Conference will feature new interactive learning tools including digital handouts, polls and a live Q&A with the presenters. Join Gabor Maté MD, Martin Brokenleg Ed.D., Stanton Peele, Ph.D., Eboni Webb, Psy.D., and Darryl S. Inaba, Pharm.D for this special event.



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8:15 AM – 8:30 AM	<b>INTRODUCTION</b>	
8:30 AM – 10:00 AM	<b>THE HUNGRY GHOST:</b> A Biopsychosocial Perspective on Addiction, from Heroin to Workaholism	<b>Gabor Maté</b> M.D.
10:00 AM – 10:15 AM	Break	
10:15 AM – 11:45 AM	<b>THE HUNGRY GHOST:</b> Continued	<b>Gabor Maté</b> M.D.
11:45 AM – 12:30 PM	Lunch Break	
12:30 PM – 1:30 PM	<b>HARM REDUCTION, THE DISEASE MODEL &amp; TRAUMA</b>	<b>Stanton Peele</b> Ph.D.
1:30 PM – 1:45 PM	Break	
1:45 PM – 2:45 PM	<b>TRAUMA &amp; ATTACHMENT ACROSS THE LIFESPAN</b>	<b>Eboni Webb</b> Psy.D., HSP
2:45 PM – 3:00 PM	Break	
3:00 PM – 4:00 PM	<b>CURRENT SCIENCE OF ADDICTION RECOVERY:</b> Dispelling the Stigma	<b>Darryl S. Inaba</b> Pharm.D.
4:00 PM – 4:15 PM	Break	
4:15 PM – 5:15 PM	<b>TRANSFORMING CULTURAL TRAUMA INTO RESILIENCE</b>	<b>Martin Brokenleg</b> Ed.D.

All times are in Pacific Standard Time

## **TAMING THE HUNGRY GHOSTS: A Biopsychosocial Approach to Addiction**

*Dr. Gabor Maté*

What is addiction, really? It is a sign, a signal, a symptom of distress. It is a language that tells us about a plight that must be understood.

Alice Miller

*Breaking Down the Wall of Silence*

The meaning of all addictions could be defined as endeavours at controlling our life experiences with the help of external remedies... Unfortunately, all external means of improving our life experiences are double-edged swords: they are always good and bad. No external remedy improves our condition without, at the same time, making it worse.

Thomas Hora M.D.

*Beyond the Dream: Awakening to Reality*

### **Introduction:**

The three ways of knowing

Mindful awareness, bare attention, reflexive cf. reflective

*“Be at least as interested in your own reactions as in the people and situations that evoke those reactions.”*

Eckhart Tolle

### **Addiction**

Any repeated behaviour, substance-related or not, in which a person feels compelled to persist, regardless of its negative impact on his life and the lives of others. Addiction involves:

1. compulsive engagement with the behaviour, a preoccupation with it
2. impaired control over the behaviour
3. persistence or relapse, despite evidence of harm
4. dissatisfaction, irritability or intense craving when the object—be it a drug or other goal—is not immediately available.

### **Models of Addiction**

1. Choice
2. Disease model: genetic--
  - a., the evidence
  - b. what it misses
  - c., “concurrent disorders”

3. Biopsychosocial—interpersonal neurobiology: the basis for dysfunction and maldevelopment, but also for healing

### **Dependence cf. Addiction**

### **What Is The Mind**

A system for the processing of information flow

Not identical with the brain

Mind can shape the brain, just as brain is the major template for the mind

### **“Concurrent Disorders”**

ADHD  
Depression  
Anxiety  
PTSD  
Social Phobias  
Personality Disorders  
Bipolar Illness

### **The Brain Circuits of Addiction**

1. Opiates: Reward/Pleasure/Pain relief
2. Dopamine: Incentive/Reward/Motivation
3. Emotional Self-Regulation and Impulse Control
4. Stress Regulation and Stress Response

### **How the human brain develops**

- a. Biology does not equal heredity, physiology is not ruled by genetics: epigenetic influences

- b. Neural Darwinism
- c. The orbitofrontal cortex: it's role, and how its development is influenced by the psycho-emotional environment
- d. Attunement in brain development
- e. The hereditary component: sensitivity; predisposition does not equal predetermination

*The necessary condition for all the brain circuits discussed above is access to a consistently available, emotionally stable, non-stressed nurturing parental care giver*

“Human connections create neuronal connections.”

(Dr. Daniel Siegel, a founding member of UCLA’s Center for Culture, Brain and Development.<sup>i)</sup>)

“For the infant and young child, attachment relationships are the major environmental factors that shape the development of the brain during its period of maximal growth . . . Attachment establishes an interpersonal relationship that helps the immature brain use the mature functions of the parent’s brain to organize its own processes.”<sup>ii</sup> (Dr. D. Siegel)

“At any point in this process you have all these potentials for either good or bad stimulation to get in there and set the microstructure of the brain.”<sup>iii</sup>

(Dr. Robert Post, chief of the Biological Psychiatry Branch of the [U.S.] National Institute of Mental Health )

“[An] abnormal or impoverished rearing environment can decrease a thousand fold the number of synapses per axon [the long extension from the cell body that conducts electrical impulses toward another neuron], retard growth and eliminate billions if not trillions of synapses per brain, and result in the preservation of abnormal interconnections which are normally discarded over the course of development.

. . . environmentally induced deficits include a reduced ability to anticipate consequences or to inhibit irrelevant or inappropriate, self-destructive behaviours, and humans and other animals demonstrate severe disturbances in all aspects of social, emotional, expressive and perceptual functioning.”<sup>iv</sup>

(Dr. Rhawn Joseph, brain researcher)

**The biology of loss:**

- a., intrapartum stress
- b., early separation: rats, monkeys
- c., postpartum stress
- d., childhood abuse and adversity

**Genes and epigenetics**

**Dislocation:** the social basis of addiction  
the addicted society

**The Peer Factor** (another important pathway to disordered attachments and addiction)

**Stress (addictions as stress relievers)**

- 1. Stressor
- 2. The Processing Apparatus: implicit memory, interpretation, story
- 3. The physiological stress response

**The Mind/Body Unity: Psychoneuroimmunology**

- 1. The physiological template: the HPA axis
- 2. Emotional correlates: lack of expression
- 3. Emotional triggers for the physiological stress response
  - a. lack of information/uncertainty
  - b. loss of control (helplessness)
  - c. unresolved conflict
  - d. emotional isolation

### **Implicit Memory**

“...when people are influenced by past experience without any awareness that they are remembering.”

“[The] implicit effects of past experiences shape our emotional reactions, preferences, and dispositions—key elements of what we call personality...”

(Dr. Daniel Schacter, *Searching for Memory: The Brain, The Mind and The Past*)

- 1) Emotional memory
- 2) Template for world view
- 3) Template for relationships
- 4) Body memories and responses
- 5) Priming

### **The Universal Addiction Process**

- 1} Cross-addictions: one addiction often accompanied or followed by others
- 2) Biological relatives also at greater risk
- 3) Common pathways of neurobiological activity, structure and development
- 4) Similar premorbid patterns of psychiatric disorders
- 5) People with other disorders, e.g., bulimia, sexual addiction, gambling more likely to develop psychoactive substance disorders

### **The Addiction-Prone Personality**

- Chronic emotional distress, conscious or unconscious, not related to specific situations
- Poor self-regulation
- Impaired impulse control
- Sense of deficient emptiness
- Incomplete differentiation (functional vs. genuine)

**ADHD**: a major risk factor for addictions

### **Addiction and Freedom of Choice**

The neurobiology of choice

The psychology of choice, implying resilience vs. defendedness

### **The Phylogenetic Neurovisceral Systems**

1. Reptilian: immobilization (freeze, dissociation)
2. Mammalian: flight or fright
3. Social engagement: the myelinated vagus: the neuroception of safety being the essential condition

#### **4. The Three Primary Brain Defenses**

1. Emotional shutdown
2. Divided attention (dissociation)
3. Detachment

### **Healing Addiction: The Ecology of Recovery**

1. Compassionate Curiosity
2. Mindful Awareness: the Impartial Observer (see below)
3. The External Environment: triggers, stressors, supports, structures
4. War on Drugs or War on Drug Addicts? Know Thine Enemy.

### **Goals of treatment: recovery**

Sobriety cf. abstinence

Harm reduction: techniques

### **The Four Compassions**

Basic: Emotional

Understanding

Recognition

Transformation/possibility: healing

Neuroplasticity

### **Identification cf. Empathy**

### **The Island of Relief:**

Unconditional acceptance

Working with judgments

Mindfulness, bare attention

Being triggered

The five modes of stopping and calming:

- Recognition
- Acceptance
- Embracing
- Deep looking
- Insight

### **The Role of Conscious Awareness**

- a. In the therapeutic relationship
- b. In healing

### **Addiction and the Spiritual Quest**

Spirituality cf. religious belief

Two meanings of spirituality

*"All problems are psychological, but all solutions are spiritual."*

Thomas Hora, M.D.

**The Twelve Steps Revisited**

- What's valuable
- What's missing

**Families and caregivers**

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<sup>i</sup> D. Siegel, *The Developing Mind: Toward a Neurobiology of Interpersonal Experience* (New York: The Guildford Press, 1999), 85.

<sup>ii</sup> Ibid, 67 and 85.

<sup>iii</sup> quoted in R. Kotulak, *Inside the Brain: Revolutionary Discoveries of How the Mind Works* (Kansas City: Andrews and McMeel, 1996).

<sup>iv</sup> R. Joseph, "Environmental Influences on Neural Plasticity, the Limbic System, Emotional Development and Attachment: A Review," *Child Psychiatry Hum Dev* 29(3) (Spring 1999): 189–208.

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### **Books by Gabor Maté**

*Scattered Minds: A New Look at the Origins and Healing of Attention Deficit Disorder*, Vintage Canada, 2000.

*When The Body Says No: The Cost of Hidden Stress*, Vintage Canada, 2004.

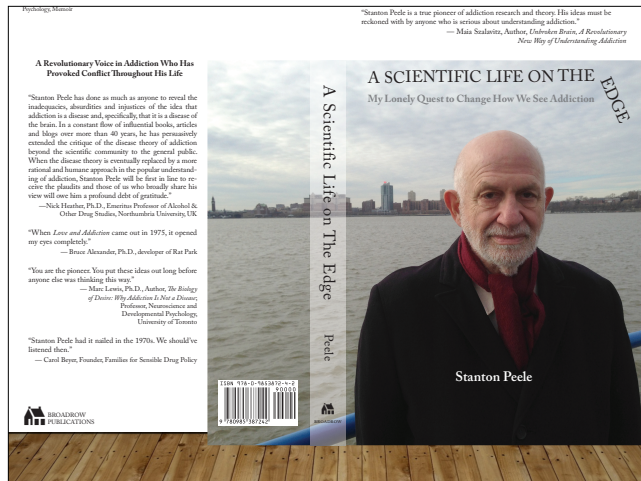
*Hold On To Your Kids: Why Parents Need to Matter More Than Peers*, Vintage Canada, 2005.

*In The Realm of Hungry Ghosts: Close Encounters With Addiction*, Vintage Canada, 2009.

# HARM REDUCTION, THE DISEASE MODEL & TRAUMA

WESTERN CANADIAN CONFERENCE ON  
TRAUMA AND ADDICTIONS

Stanton Peele, Ph.D., J.D.



## FAIR WARNING: WHAT I'M DOING

Rethinking addiction theory and treatment

This is a new way of thinking

- I challenge your basic beliefs

I am “A psychologist who challenges  
much conventional wisdom in the field.”

ADDRESS 5 BASIC QUESTIONS  
IN THE ADDICTION FIELD

- 1. **How** are we doing?
- 2. **What** are we doing?
- 3. What's the **impact**?
- 4. What **should** we be doing?
- 5. How can we **improve**?

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HERE’S THE BOTTOM LINE

Drug use  
follows all  
the normal  
rules of  
human  
behavior

Addiction is  
an extension  
of ordinary  
behavior  
with which  
we are all  
familiar

Addiction  
can't be  
solved  
without  
addressing  
individual  
lives and  
society

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1. HOW ARE WE  
DOING?

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## HOW ARE WE DOING?

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- In an environment dominated by the disease and trauma theory and treatment
- With the US the model

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## 2019 WORLD HAPPINESS REPORT

### Chapter 7: Addiction and Unhappiness in America

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- “The average life evaluation in the United States has declined during the past dozen years (2006-2018).”
- There has been a “rapid rise of adolescent depression, suicidal ideation, and self harm after 2010, and a marked decline in subjective well-being (SWB).”

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## GLOBAL BURDEN OF DISEASE

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- 196 countries
- DALYs (disability-adjusted life years)
- US
  - 4<sup>th</sup> OVERALL mental disorders
  - 5<sup>th</sup> anxiety DALYs lost
  - 11<sup>th</sup> depressive disorders

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## 2019 HAPPINESS REPORT

### WHY?

- Chapter 5: "The Role of Digital Media" (Jean Twenge)
- "Over the last decade, the amount of time adolescents spend on screen activities (especially digital media such as gaming, social media, texting, and time online) has steadily increased, accelerating after 2012 after the majority of Americans owned smartphones."



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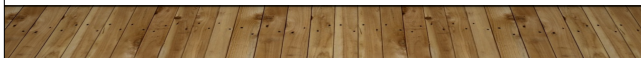
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## GLOBAL BURDEN OF DISEASE

- 196 countries
- DALYs (disability-adjusted life years)
- US
  - 1<sup>st</sup> in cocaine DALYs lost
  - 2<sup>nd</sup> in amphetamines
  - 3<sup>rd</sup> in opioid DALYs



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## DEPRESSION, SUICIDE AND DRUGS [HAPPINESS REPORT]

- "The US is in the midst of epidemics of several addictions, both of substances and behaviors."
- "Most of the people who died by their own hands had alcohol or some sort of drug in their blood, including tranquilizers and opioids."



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## AND, SO, WE NEED MORE TREATMENT

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- [Headline] Addiction Is on the Rise
- [Follows] The National Addiction Center reported that an estimated 21 million Americans have at least one addiction, yet only 10% receive treatment!
- We've GOT to get more people in treatment



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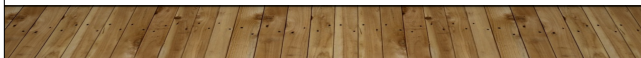
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## WHAT DO I KNOW?

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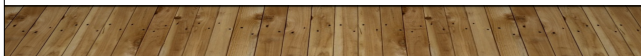
## STANTON PEELE LESSON 1 “OASIS OF SOBRIETY”

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(2007 Times)

### In Florida, Addicts Find an Oasis of Sobriety

- Delray Beach, a funky outpost of sobriety between Fort Lauderdale and West Palm Beach, is the epicenter of the country's largest and most vibrant recovery community, with scores of halfway houses, more than 5,000 people at 12-step meetings each week, recovery radio shows, and a coffeehouse that boasts its own therapy group.
- Recovery communities are springing up outside the walls of rehab centers for alumni seeking the safety in numbers.



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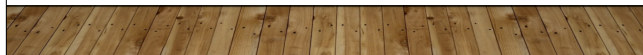
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## HOW DO I REACT?

### EXCEPT for Dr. Peele

- This society-within-a-society gets mixed reviews from addiction experts. **A few** find it insular and cultish. "Cutting off contact with the outside world, is that a sign of mental health?" asked Stanton Peele, a **psychologist who challenges much conventional wisdom in the field**.
- **But many more experts** note that a recovery community like Delray Beach may provide a promising environment for certain addicts.



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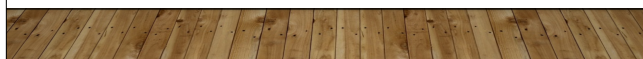
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## DIAL FORWARD TEN YEARS (TIMES 2017)

- In a nation awash in opioids, there are few, if any, places where this kind of scene plays out more often than Delray. Last year, Delray had 748 overdose calls; 65 ended in fatalities. In all, Palm Beach County dealt with 5,000 overdose calls.
- Most of the young people who overdose in Delray Beach come for opioid addiction treatment and recovery help to a **town that has long been hailed as a lifeline for substance abusers**. But what many of these addicts find here is a crippled and dangerous system, and they **fall deeper into addiction**.



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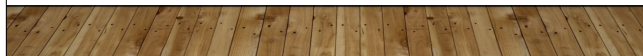
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## WE CURRENTLY HAVE A SUICIDE EPIDEMIC IN U.S.

- Suicide rates rose steadily in nearly every state from 1999 to 2016, increasing 25 percent nationally, the Centers for Disease Control and Prevention reported (in 2018).
- A "morbid puzzle": The rise in suicide rates has coincided over the past two decades with a vast increase in the number of Americans given a diagnosis of depression or anxiety, and treated with antidepressant medication. More than 15 million Americans have been on the drugs for more than five years, a rate that has more than tripled since 2000.



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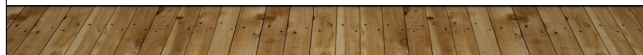
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## 2020 REPORT ISSUED: COMMONWEALTH FUND

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- The U.S. spends more on health care than any other high-income country but has the lowest life expectancy.
- The U.S. has the highest suicide rate among wealthy nations.



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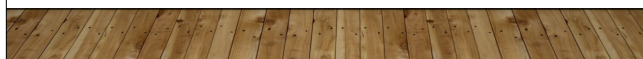
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## HOW ARE WE DOING?

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- The 2019 *World Happiness Report* says over the last decade Americans' contentment has declined markedly, particularly young people's.
- The 2017 *Global Burden Report* found that, out of 196 economically advanced and not advanced nations, the U.S. ranked #1 for cocaine, #2 for amphetamines, #3 for opioids in quality-life-years lost to drugs.
- The U.S. ranked 4<sup>th</sup> in DALYs lost to overall mental disorders.
- A 2020 Commonwealth Fund report found, compared with ten other wealthy nations, that the U.S. spent by far the most on health care, but that Americans had the shortest life span — and the highest suicide rate.



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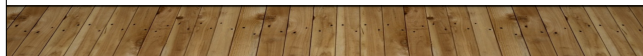
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## 2. WHAT ARE WE DOING?



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## AMERICA: THE MOST ADVANCED TREATMENT SYSTEM IN WORLD?

- AA and the 12 steps
- Chronic brain disease
- MAT
- Trauma treatment

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## WHAT IS TRAUMA-INFORMED TREATMENT?

- Does it focus on the past?
- Is it coping skills oriented?

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## MARTIN SELIGMAN'S LESSON: DEPRESSION AND HAPPINESS

- Human emotions are less reactions to the present than guides to future behavior. Therapists are exploring new ways to treat depression now that they see it as primarily not due to past traumas and present stresses but because of skewed visions of what lies ahead.
- While most people tend to be optimistic, those suffering from depression and anxiety have a bleak view of the future – and that in fact seems to be the chief cause of their problems, not their past traumas nor their view of the present.
- While traumas do have a lasting impact, **most people actually emerge stronger afterward**. Others continue struggling because they **over-predict failure and rejection**.

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## STANTON PEELE'S LESSONS: "WE NEED MORE THERAPY"

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- In 1985, I wrote:

What Treatment for Addiction Can Do  
and What It Can't

What Treatment for Addiction Should  
Do and What It Shouldn't.

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## STANTON PEELE LESSON 2

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What should we be doing?

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## STANTON PEELE REACTS TO "WE NEED MORE THERAPY"

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- I disagree radically with the point of view that we need more treatment for addiction. We already have too much addiction treatment. We search for innovative new ways to recruit clients for an expanding treatment network — such as the widespread reliance on mandatory referrals from employee assistance programs and from the courts . . . . While more and more people are in treatment, our addiction problems as a society worsen all the time. . . .
- In the case of drug abuse and addiction, an even more (than with alcohol) stark increase in both treatment and abuse has occurred over the past half century. Therapy for addiction has not been able to, it cannot, reduce substance abuse in our society. The best hope for eliminating addiction is to enhance each individual's personal and situational resources; the single best means yet discovered for accomplishing this is for a person to grow up.

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### STANTON PEELE LESSON 3: “WE NEED MORE THERAPY”

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Treatment will succeed to the extent it:

- enhances self-esteem and esteem-gathering opportunities
- enhances the skills that enable people to control their situations and directs people to more manageable environments
- enhances interpersonal skills and helps people become involved in more fruitful relationships
- enhances work habits and encourages people to find manageable tasks and satisfying endeavors
- increases people's tolerance for imperfection and discomfort while removing them from painful circumstances inimical to life



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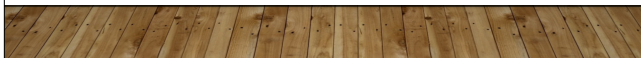
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### STANTON PEELE LESSON 4: “WE NEED MORE THERAPY”

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*Therapy for addiction only rarely and very inexactly accomplishes these things, because addiction treatment is preoccupied with the nature of the substance involvement rather than with the person's relationship to self, others, and the world. Addiction treatment shares with most therapy an overemphasis on the experience of therapy itself rather than on the person's life structure.*



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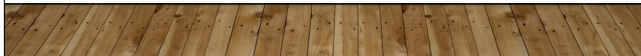
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### WHERE IS YOUR FOCUS?

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- Remember Seligman?
  - in my LPP we write memoirs
  - emphasize the bad
  - emphasize the good
  - emphasize the future



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## 2. MODERN DRUG DISEASE THEORY AND TREATMENT

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### The Disease Theory, Redux

AA→alcoholism is a chronic relapsing disease

+ Volkow

= addiction a chronic relapsing BRAIN disease

Is this a scientific statement?

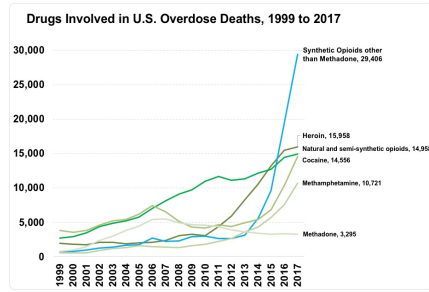
**It's a cultural point of view**

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## THE DISEASE THEORY

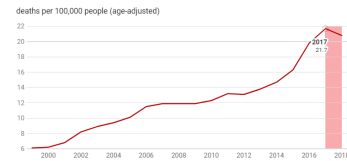
- Regular drug use inexorably causes irreversible addiction
    - disease of the free will (Volkow)
    - chronic relapsing brain disease
  - Does everyone in the room believe this? Yes
  - Despite ample contradictory evidence/experience
- 
- Disastrous damage to policy, treatment, soul

## MEDICINE IS SOLVING ADDICTION



## DRUG DEATHS 2018

Drug overdose deaths in the U.S. dropped in 2018 for only the second time in two decades



\*data for 2018 are for the second quarter of the year  
Chart: Ellyn Wofford for TIME • Source: U.S. National Center for Health Statistics • [Get the data](#) • [Created with Datawrapper](#)

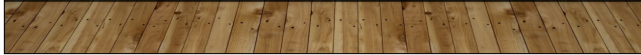
## BIG PHARMA CAUSES DEATHS!

- 2013-2017 rapid drop in opioid prescriptions
- Analgesic doctors announce a new emergency—too little analgesic!

## INTO THE PRESENT

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- 2017: 71,000 deaths
- 2018: 67,000 deaths
- 2019: New record in deaths
- 2020: 83,000 deaths
- **16,000 more deaths than 2017**
- 400% annual increase since 2000



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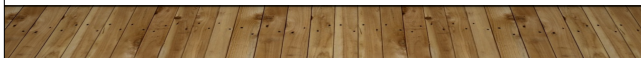
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## LET'S ASK ESSENTIAL QUESTION

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- If there has been a rapid drop in prescribed opioids
- And if MAT has increased nationwide
- Why are drug deaths increasing radically?



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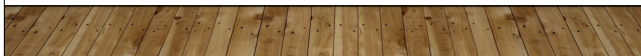
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## MAT-NALOXONE

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- Naloxone (NARCAN) blocks or reverses the effects of opioids.
- With opioid death crisis, many states allow local pharmacies to dispense naloxone without a written prescription.
- MAT=MAT **TREATS** addiction to opioids with narcotic substitutes, including buprenorphine, methadone, Suboxone (buprenorphine /naloxone).



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## WHAT IS HARM REDUCTION?

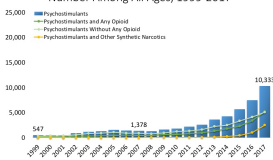
- There's a debate in the US
- Harm reductionists complain
- "Backwards people don't accept harm reduction"
- There are Suboxone billboards all over US

## PEELE LESSON 5: WHAT IS HARM REDUCTION?

- Harm reduction focuses on overall life/function
- Whether person uses drug, or how much, comes second

## DEATHS FROM METH

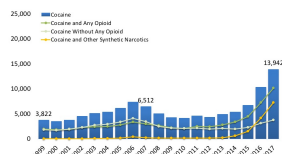
Figure 6. National Drug Overdose Deaths Involving Psychostimulants With Abuse Potential (Including Methamphetamine), by Opioid Involvement Number Among All Ages, 1999-2017



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Causes of Death, 1999-2017 on CDC WONDER Online Database, released December, 2018

## DEATHS FROM COCAINE

Figure 7. National Drug Overdose Deaths Involving Cocaine, by Opioid Involvement  
Number Among All Ages, 1999-2017



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death, 1999-2017 or CDC WONDER Online Database, released December, 2018.

## MAT WILL SOLVE ADDICTION

- The Centers for Disease Control and Prevention announced a 4 percent in overall drug deaths in 2018.
- Yet some states actually saw double-digit increases. Missouri, in which deaths increased 17 percent, was one of 18 such states.
- “Over the last several years, Missouri has received \$65 million in federal grants to address the opioid crisis,” [researcher Rachel] Winograd says ... They’ve focused on expanding access to medication-assisted treatment ... “The fact that the numbers didn’t go down and that people were dying at an even higher rate—it was devastating.”

## DISEASE THEORY LOST & FOUND

## PEELE LESSON 6: Addiction NOT equal opportunity

West Virginia #1 in addiction, Dr. Rahul Gupta:

“If you’re a male between the ages of 35 to 54, with less than a high school education, you’re single and you’ve worked in a blue-collar industry, you are at a very, very high risk of overdosing.”



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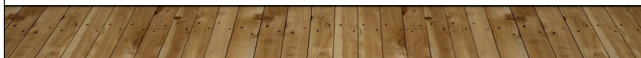
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## Addiction is NOT equal opportunity

Baltimore/DC (70+/100,000)

Office of Medical Examiner, Washington, D.C.

“Overall opioid deaths among black men **between the ages of 40 and 69** increased 245 percent from 2014-2017.”



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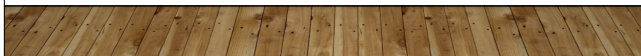
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## PEELE LESSON 7 Why the disease theory prevails

- We don’t *care* if victims die.
- Real change—community, housing, purpose, health—is impossible in America.
- The disease view is the go-to American vision.
- *We are addicted to the disease theory of addiction.*



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## PEELE LESSON 8: You believe the disease theory if. . .

Your discussions of your or others' addiction and recovery focus on:

The substance (e.g. heroin or Fentanyl), biology, genes, trauma, intergenerational, brain, AA, treatment, a Higher Power, MAT,

AND you don't discuss social circumstances, values, life stage, personal maturation and meaning, intimacy, and community (other than AA),

And if you consider a conversation ended when you say, "I'm/he's an alcoholic" or "I'm/she's an addict,"

AND if you've never had an original idea about addiction and alcoholism in general, or a specific case of each.



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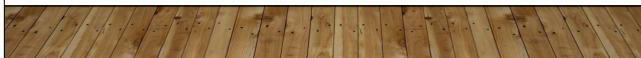
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## Drug policy reform, harm reduction & the new drug war

Old Reform	New Reform
Anti-supply side	Blame Pharma!
Consumer-driven pain relief	Cut down pain killers!
Anti-drug scare	Fentanyl!
Change society	More treatment!



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## WHAT WE LOST/GOT

- The truth
- Forced treatment
- Death toll
- The greatest loss—control of our souls



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## 5. MY THEORY OF ADDICTION

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## PEELEOVISION

- Addiction not limited to drugs
- Harm reduction
- Endorphins, genes → cure addiction (NOT)
- Natural recovery
- Environmental factors/treatment
- Economic/community context

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## PEELE LESSON 9: WHAT IS ADDICTION?

What are addiction and recovery?

*Addiction is a preoccupation with one activity or object, sought to satisfy emotional and situational needs, that grows to overwhelm the individual.*

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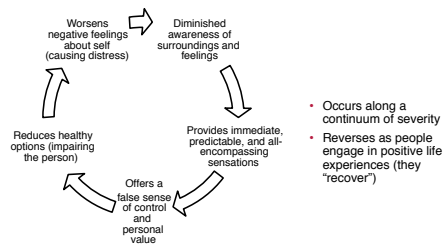
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## ADDICTION ISN'T A DRUG PROBLEM

- Three factors in addiction:
  - experience (involvement)
  - person
  - situation
- Rat Park, Vietnam

## DEFINING ADDICTION EXPERIENCE

### The Addiction Process



## Can love be addictive?

NY Times front page, June 27, 2019:

The Ramirez sisters, identical twins, had a problem: They were involved with the same man. Just before sunrise last Saturday, they started arguing, then screaming at one another. Then one sister stabbed the other in the chest, fatally wounding her.

### Are digital media addictive?

- Absorb consciousness, feelings
- Immediate predictable sensations
- Artificial sense of control, self-esteem
- *Depreciate* life options (impairs)
- *Worsen* sense of self (distresses)



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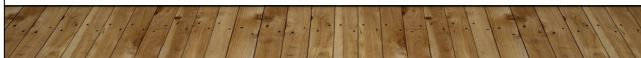
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### SAMHSA redefines recovery

“Recovery is a process of change whereby individuals work to improve their own health and wellness and to live a meaningful life in a community of their choice while striving to achieve their full potential.”



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### SAMHSA RECOVERY PILLARS

- **HEALTH:** overcoming or managing one's disease(s) as well as living in a physically and emotionally healthy way;
- **HOME:** a stable and safe place to live that supports recovery;
- **PURPOSE:** meaningful daily activities—job, school, volunteerism, family caretaking, or creative endeavors;
- **COMMUNITY:** relationships and social networks that provide support, friendship, love, and hope.



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## WHAT DOES NORA VOLKOW SAY?

### (2019 NIDA Director's Blog)

- With other members of NIDA leadership, we toured Prevention Point, a private non-profit organization providing harm reduction services to Philadelphia. . . .
- **Philadelphia's rate of overdose deaths skyrocketed this past decade**, tripling the city's number of homicide deaths and greatly exceeding the peak number of deaths from AIDS in 1994.
- **Whenever I ask people on the front lines of America's drug crisis what more we can do to support and help their work, they remind me how essential it is to address the basic needs of individuals with addiction, such as stable and safe housing, food, basic medical care, and an opportunity for employment**
- I'm on the board of Above and Beyond

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## WHAT DOES NORA VOLKOW SAY?

### (NIDA Director's Blog)

- "medications cannot take the place of an individual's willpower"
- "Viewing addiction this way minimizes its important social and environmental causes"
- "addiction is not fundamentally different from other experiences that redirect our basic motivational systems" [like falling in love]
- **"Some critics also point out, correctly, that a significant percentage of people who do develop addictions eventually recover without medical treatment. It may take years or decades, may arise from simply aging out" of a disorder that began during youth, or may result from any number of life changes that help a person replace drug use with other priorities."**

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## HOW DOES THIS HAPPEN?

- It's a mystery to Volkow: look for genes that allow recovery
- Gene Heyman: The correlates of quitting include the absence of additional psychiatric and medical problems, marital status (singles stay addicted longer), economic pressures, fear of judicial sanctions, concern about respect from children and other family members, worries about the many problems that attend regular involvement in illegal activities, more years spent in school, and higher income. Put in more personal terms, addicts often say that they quit drugs because they wanted to be a better parent, make their own parents proud of them, and not further embarrass their families.

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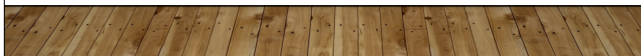
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## PEELE LESSON 10: EFFECTIVE THERAPY

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- Addresses real needs
- Is community based
- NEVER attacks, but builds, self-agency
- Creates healthy, self-sustaining people within a community



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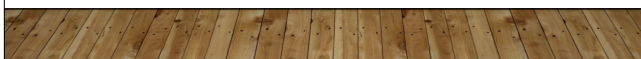
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## STANTON PEELE LESSON 11: Life Process Program ®

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- Change for the real world (this ain't Delray Beach)
- Build on people's natural curative process (self-efficacy)
- Focus on values, purpose, meaning (purpose)
- Encourage personal development and growth (purpose)
- Identify personal successes and resources (self-efficacy)
- Build relationships and community (community)
- Always reflect back on person's agency (self-efficacy)



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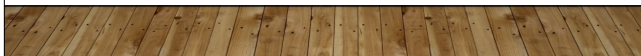
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## PEELE 12 The Trauma Trap

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- Tracing addiction to childhood trauma
- Make social causes→therapy fodder
- Ineffective: people must plan and cope
- New version of permanent disease
- Gabor Maté trick—find the hidden trauma



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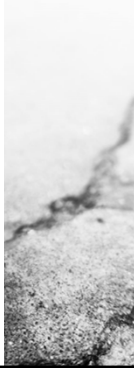
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# Trauma & Attachment Across the Lifespan

Tools & Strategies to Address Complex Clients



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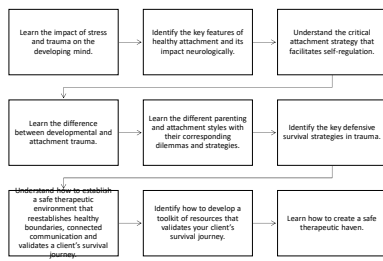
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## Workshop Overview



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Often and often afterwards, the beloved Aunt would ask me why I had never told anyone how I was being treated. Children tell little more than animals, for what comes to them they accept as eternally established.

Rudyard Kipling



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# The Neurobiological Building Blocks of Trauma

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## Overview

- Children can suffer from emotional vulnerabilities
- Emotional vulnerabilities can come from many sources (e.g., attachment issues, loss, trauma), but is often assumed to be biological
- Chronic and consistent invalidation exacerbates emotional vulnerabilities
- An ongoing, reciprocal relationship exists between emotional vulnerabilities and environments



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## What is Trauma?



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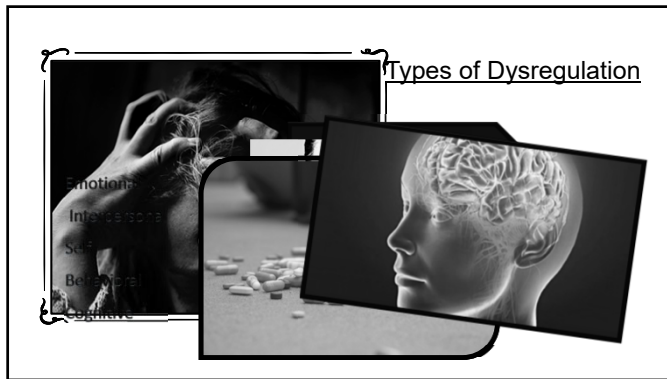
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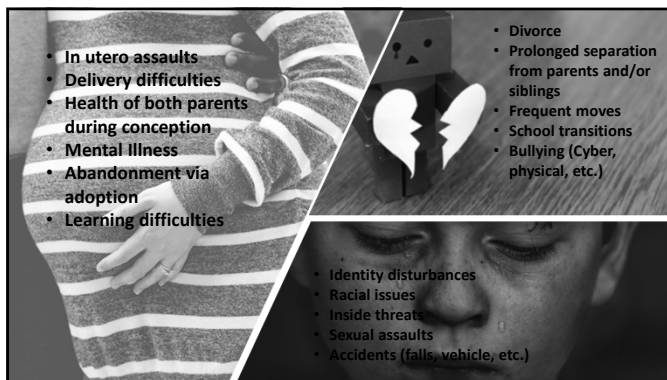
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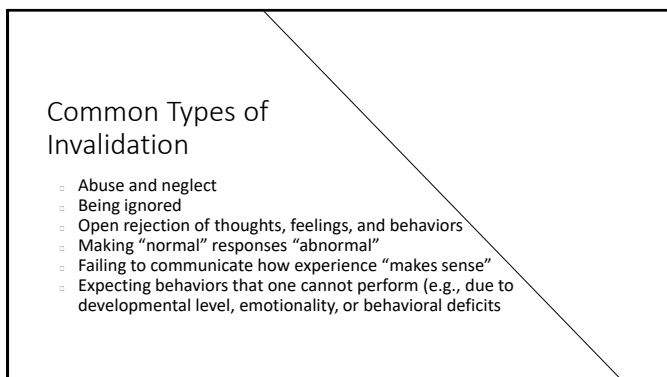
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### Excessive Cortisol Effects

- Neurotoxicity to Hypothalamus
- Neuron Death
- Clogging of the corpus callosum connecting the left and right hemispheres
- Suppression of the immune system

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### The Powerful Amygdala



#### Key Features

- Reactionary
- Triggers Sensory System (Smell and Touch are the most direct pathways)
- Controls autonomic responses

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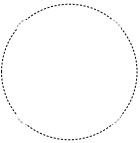
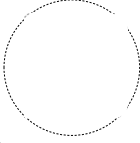
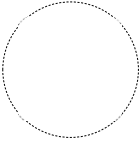
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### What Happens During A Stress/Trauma Response?

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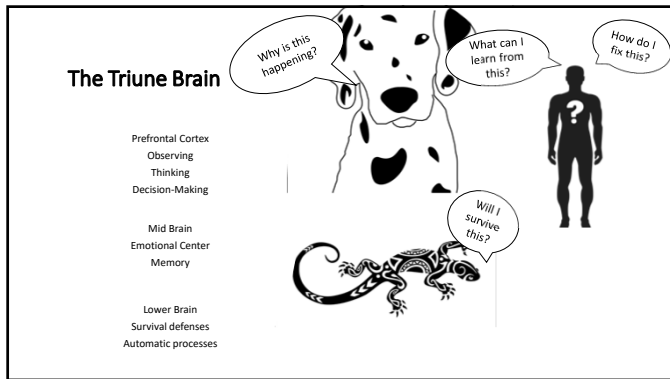
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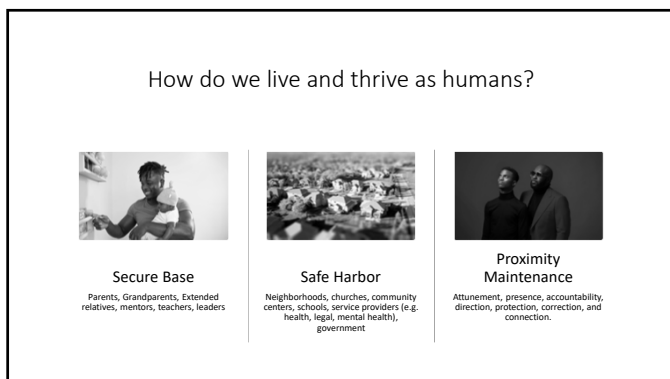
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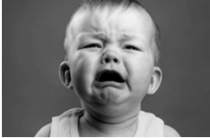
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**Dysregulation**



**Co-regulation**



**Self-regulation**



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**Social Engagement System**

- Eye-gazing
- Language
- Prosody
- Touch
- Proximity



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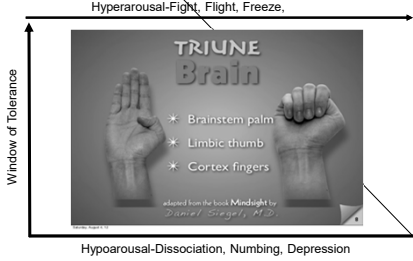
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**Affect Regulation**



Sensorimotor Psychotherapy Institute®  
Sensorimotor Psychotherapy founder, "Pat Ogden"

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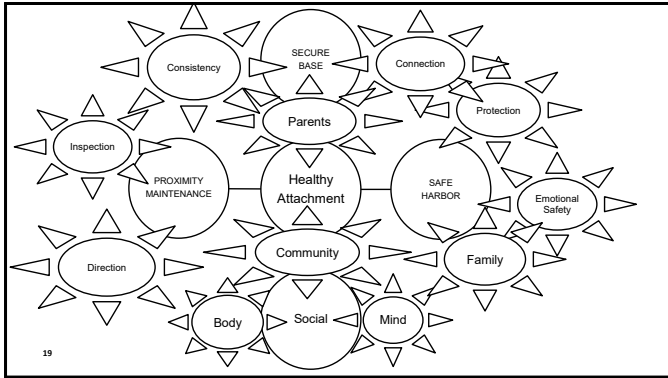
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### Developmental vs. Attachment Trauma




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### What is Your Attachment Style?

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**Democratic-Authoritative Parenting**

High nurturance, expectations, and control  
Moderate communication



**Abusing-Authoritarian Parenting**

High expectations and control  
Low nurturance and communication



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**Neglecting-Uninvolved Parenting**

Low nurturance, expectations, control and communication



**Indulgent-Permissive Parenting**

High nurturance, moderate communication, low expectations, and control



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**Window of Tolerance**

Sensorimotor Psychotherapy Institute/Sensorimotor Psychotherapy founder, Pat Ogden

**HYPERAROUSAL**

**HYPOAROUSAL**



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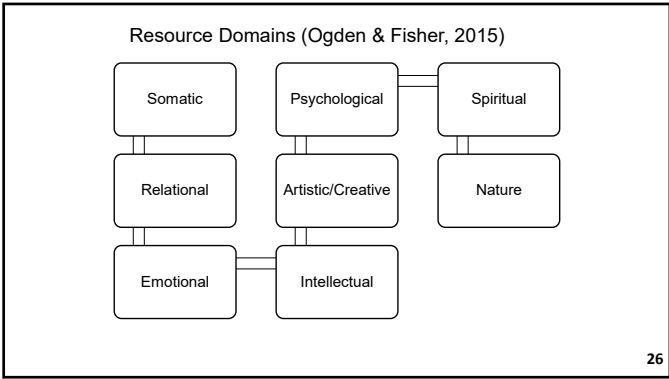
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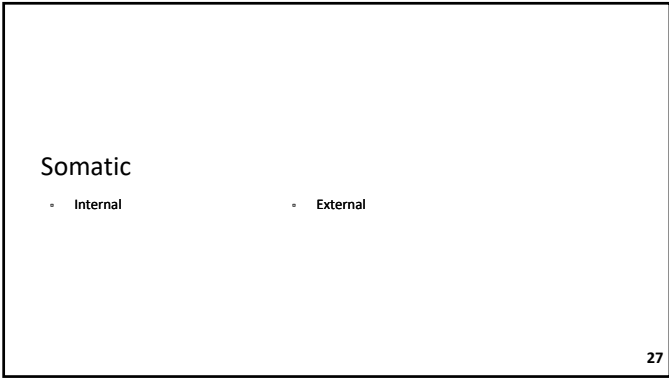
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Relational

Internal

- Sense of “love and belonging” (Brown)
- Ability to reach out and experience connection
- Establishing healthy boundaries

External

- Friends
- Family
- Mentors
- Spouses/Partners
- Pets

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Emotional

Internal

- Access to the full range of emotions, expressions, and sensations
- Ability to modulate high to low arousal
- Ability to tolerate intensity of emotionality

External

- Relationships to give and receive emotional support
- “Sister or Brother”-circles
- Activities that elicit high and low emotional arousal

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Intellectual

Internal

- Creative thinking
- Dreaming
- Imagination
- Learning

External

- School
- Classes
- Study groups
- Puzzles
- Books

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### Artistic/Creative

Internal

- Capacity to access creative processes
- Imagination
- Vision

External

- Art materials
- Creative writing groups
- Cooking classes
- Music (e.g. cds/access to music)
- Museums

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### Material

Internal

- Ability to work (e.g what I get to do and have to do)
- To enjoy the comforts of life
- Experiencing pleasure

External

- Jobs
- Home
- Comfortable bedding
- Life hacks

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### Psychological

Internal

- Strong sense of self
- Self-awareness
- Esteem
- Compassion
- Nonjudgmental
- Resiliency

External

- Access to a therapist
- Workbooks
- Manuals
- Support groups

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### Spiritual

Internal

- Ability to develop connection with a Someone or Something greater than one's self
- Capacity to connect with one's own spiritual essence

External

- Meditation
- Contemplative Prayer
- Shabbat
- Spiritual mentors

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### Nature

Internal

- Utilizing your senses to take in the world around you
- Sensory bathing

External

- Gardens
- Parks
- Hiking
- Plants in the home

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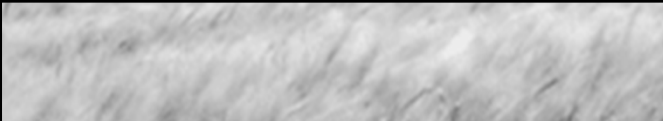
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### Critical Interventions: Building the Therapist's Resource Toolkit



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Prosody

Authoritative Therapy:  
Attuned and Moderate Communication

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Prosodic Communication

- Pitch
- Intonation
- Rhythm
- Loudness
- Tempo
- Stress

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The Therapeutic Space

Authoritative Therapy:  
Creating a Safe Haven

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The Therapeutic Space

Seating  
Windows  
Lighting  
Smells  
Fidgets  
Food  
Weighted blankets  
Spacing

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Validation  
The Keys to the Kingdom

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Levels of Validation

(Linehan, 1997)

- Level 1: Being acutely attentive
- Level 2: Reflecting verbal communication
- Level 3: Describing non-verbal communication
- Level 4: Expressing how experience makes sense given history or biology
- Level 5: Expressing how experience makes sense in the present moment and context
- Level 6: Being in genuine, human contact

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### Reciprocal Communication

- Engaging and responsive, taking clients wants and needs seriously
- Being authentic and genuine, not staying in a “therapist” role
- Using self-disclosure thoughtfully in the service of therapy

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### Reciprocal Communication: Self-involving disclosure

- Sharing “benign” and human examples of skill use and practice
- Using examples of how you have approached and solved a problem
- Sharing when you would have felt, thought, or responded similarly to how a client reports in a given situation
- Sharing your reactions to the client in the moment, providing information that manages relationship contingencies (creating new learning)
- Letting the client know about the current state of the relationship, to manage contingencies or address feared reactions

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### Self-disclosure of Personal Information

- Personal information may not relate to client or the therapy; if it is not relevant, do not share it as a rule
- Observe and disclose your limits in regard to personal information when needed (ok to explore what personal inquiries mean to the client)
- Never share personal problems/issues!
- Does it pass the “public” test? In other words, would you share it in front of an audience of your colleagues?

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## In Summary

**Trauma:** Is broad, self-perceived, and activates survival defenses to cope. It can come in multiple forms including single-incidents and developmental.

**Stress Response:** Dysregulation is a learned response that is neurobiologically driven and socially maintained.

**Attachment:** Human survival and attachment is dependent on communication, eye-gazing, and finding a way to "fit." It is essential when working with trauma to see behaviors as "attachment-seeking behaviors"

**Whole Body Healing:** We must seek healing of the body in order to heal the mind. Our functioning isn't either or but both and.

**Complex Treatment Strategies:** Treatment must be multifaceted including top-down and bottom-up processing techniques. DBT, EMDR, SP, and somatic therapies must be utilized to address the lasting impact of trauma.

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46

The impulse to heal is real and powerful and lies within the client. Our job is to evoke that healing power, to meet its tests and needs and to support it in its expression and development. We are not the healers. We are the context in which healing is inspired.

Ron Kurtz




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47

## Thank-You

- Eboni Webb PsyD, HSP  
ewebb@webbjamconsulting.com  
615-589-1018

The Village of Kairos  
1451 Elm Hill Pike, Suite 250  
Nashville, TN 37210

367 Riverside Drive, Suite 104  
Franklin, TN 37064



**Webb JAM**  
CONSULTING, LLC

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48

**Uppers, Downers,  
All-Arounders**  
Physical and Mental Effects  
of Psychoactive Drugs

DARRYL S. INABA, PHARM.D. WILLIAM E. COHEN  
Eighth Edition

**Current Science of  
Addiction and  
Recovery: Dispelling  
the Stigma**

**2021 Canada Spring  
Virtual Mental Health  
Summit 5/19/21**

Darryl Inaba, PharmD., CATC-V,  
CADC III  
Addictions Recovery Center &  
CNS Production, Inc.

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**DOMINION  
DIAGNOSTICS**  
ADVANCING PATIENT CARE  
THROUGH TRUSTED DIAGNOSTICS

**JOURNAL OF  
PSYCHOACTIVE DRUGS**  
A Multidisciplinary Forum

Volume 43, Number 4 December 2011

**Growing Roots:  
Native American Evidence  
Based Practices**  
Edited By:  
Staff of Family & Child Guidance Clinic,  
Native American Health Center

**CNS PRODUCTIONS, INC.**

Darryl S. Inaba, PharmD., CADC III, CATC-V, Director of Clinical and Behavioral Health, Addictions Recovery Services; Director of Research and Education, CNS Productions, Inc., Medford Oregon

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**Thank you, Mental Health Summit for  
keeping us safe by making this a virtual  
conference and for understanding the  
need for continued addiction education  
efforts during the COVID Pandemic**

**STAY HOME**  
Even if you're feeling healthy, social distancing will help us stop the spread of COVID-19.

**STAY SAFE**  
Wash your hands frequently, cover coughs and sneezes, and stay home if you're feeling ill.

**STAY AWARE**  
Reputable sources include Governor Hogan, Maryland state agencies, and the CDC.

**STAY CALM**  
No need to panic, hoard, or listen to rumors. We will all get through this together.

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**Thank you, Canadian Addiction service providers for your heroic efforts to provide essential services to those struggling with addictive disorders during this pandemic, please take care to be as safe and healthy**

**Health and Safety in line with COVID-19 Guidelines**

**Social distancing**  
Classrooms organised to ensure seating is at least 2 metres apart. No congregating in groups and a one-way system will be implemented in corridors.

**2m DISTANCE**

**Registration**  
2m queuing system, temperatures checked on arrival, plastic screens in reception and health check questionnaire.

**PPE**  
Visors, goggles, safety glasses, aprons & gloves are available. PPE provided for all employees working onsite.

**H&S Training**  
Health & Safety training provided to all students and visitors at the beginning of every day.

**Hygiene**  
Hand washing for 20 seconds. Alcohol sanitizers available. Surfaces cleaned with bleach or disinfectant wipes. Samples will be isolated for 72 hours to allow any potential virus to die.





Keep your hands clean to prevent the spread of COVID-19

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**Evolving Science of Addiction & Recovery: Dispelling The Stigma**



Darryl S. Inaba, PharmD., CATC-V, CADC III  
 Director Clinical & Behavioral Health Services - ARC  
 Director of Research & Education – CNS  
 Lifetime Fellow Haight Ashbury Clinic/Health Right 360

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5

**Substance-Related and Addictive Disorder is Treatable and Manageable with Positive Outcomes That Compare Favorably to Treatment of Other Chronic Persistent Medical Disorders (Hypertension, Diabetes, Depression) Yet, Addicts have less Access to Treatment Than Any Other Medical Conditions**

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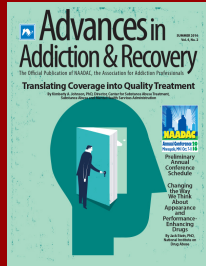
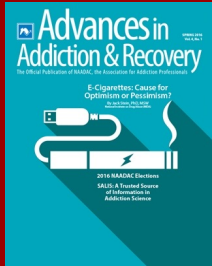
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Inaba, DS (2016). Understanding Addiction, Adv. Add. & Rec., 4(1):20-21 & continued in 4(2):23-27




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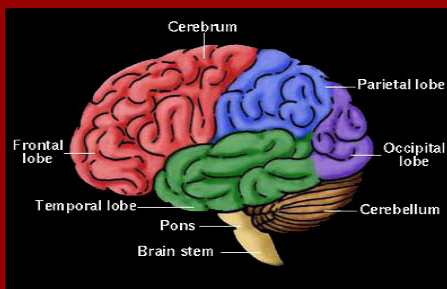
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## Current Science of Addiction and Recovery



Epilog (time permitting): Addiction Treatment Developments

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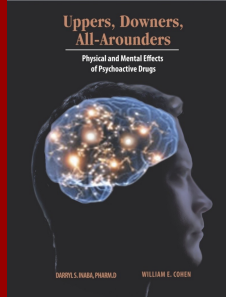
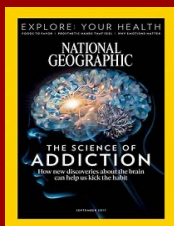
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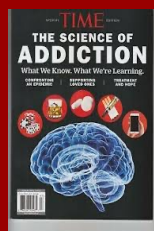
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## Moving into Mainstream Science National Geographic September 2017 Time December 2019



UDAA since 1989




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**PERSPECTIVE** - the faculty of seeing all the relevant data in a meaningful relationship

**rel-e-vance** *n.*

1. Pertinence to the matter at hand.

**Relevance** is a term used to describe how pertinent, connected, or applicable some information is to a given manner.

When we shift our perception, our experience changes.  
-Lindsay Wagner



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10

### Substance-Related and Addictive Disorders In America Results in:

- **More Deaths and More Hospitalizations than any other public health threat (Mortality/Morbidity)**
- **More Incarceration and Criminal Justice Interventions**
- **Once, Greater Financial Costs than all other Expenses (now more spent on COVID-19)**

**Yet, Addiction is the most treatable and preventable of chronic persistent medical disorders**

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### 2020 COVID-19 impact on US Health March 5 – January 31, 2020

- **Confirmed infections 19,940,419**  
(21 mil. in US have addiction only 10% access tx.)
- **Deaths – 345,182**

**COVID-19 Pandemic**

**Addiction in USA Endemic**

**Addictions and Drug OD Deaths Surging in Pandemic**

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12

## Covid-19 Impact on Canada March 1, 2020 – March 15, 2021

- **Confirmed Infections – 917,287**  
(Last monitoring survey 2012 - 8 mil met addiction criteria)
- **Deaths – 22,548**

**Like the US, COVID-19 Pandemic and  
Addiction is Endemic in Canada**

**Addictions and Drug OD Deaths Surging  
in Pandemic?**

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## Annual U.S. Lives Lost to Addiction



**LEGAL Drugs:**  
Tobacco-Nicotine 480,000  
Beer/wine/Booze-Ethanol 130,000  
Rx Medications- opioids/benzos/etc.  
38,000 so ~650,000 LD deaths  
**ALL ILLEGAL DRUGS COMBINED:**  
(Heroin, methamphetamine, cocaine, etc)  
~24,000, 2017 ~60,000 Op deaths

Thus, Deadliest drugs are Legal and now Pot is Legal!

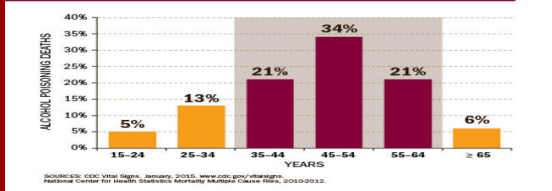
**Consider: Civil War (4 yrs.) 750,000**  
**WWI (2 yrs.) 116,516**  
**WWII (5 yrs.) 405,399**  
**Vietnam (20 yrs.) 58,209**

Addiction kills more people in 1 year than 27 years of WWI, WWII & Vietnam

14

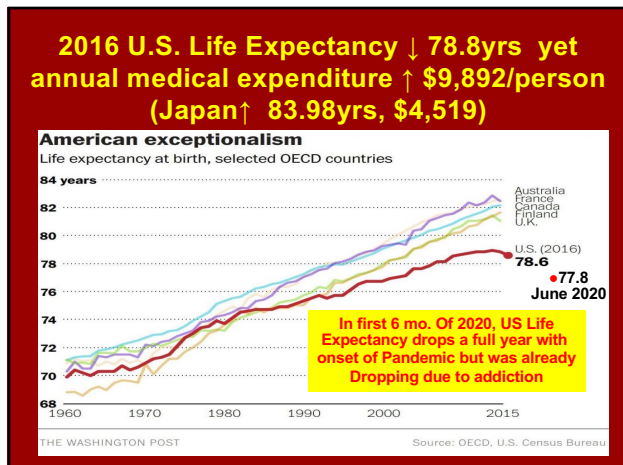
## 6 Americans Die Daily from Alcohol Poisoning, 1 every 4 hours

**Alcohol poisoning deaths are most  
common among middle aged adults**



**2021: 8-9 Americans will die from opioid  
overdose every hour!; US life expectancy  
drops 4 years in a row, last seen in 1962-63**

15



16

**Opioid Epidemic or are we really in an Addiction Epidemic**

**Increase Opioid Use Disorder and OD Deaths**

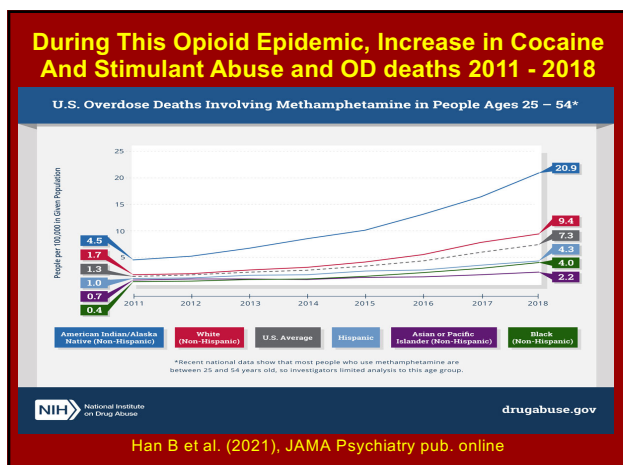
**Also Increase in Stimulant (Cocaine & Methamphetamine) Abuse and OD Deaths**

**BENZODIAZEPINE ABUSE: The Facts About Overdose Rates**

**Increased Benzo/Opioid OD Deaths during "Opioid Epidemic"**

1999-2017 US alcohol-related deaths more than Doubled from 36,000 to ~73,000 per year  
2007 to 2017 35% increased alcohol deaths in US with 85% increase alcohol deaths in women!

17



18

## “Speedballing?": Increased Cocaine–Opioid OD Deaths

- 1.35/100,000 pop. Cocaine deaths; 0.57 Cocaine/Op.-related deaths in 2010
- 2.13/100,000 pop. Cocaine; 1.36 Cocaine/Op.-related deaths in 2015



Jones-McCall et al. (2017) Am. J. of Public Health, 107(3)

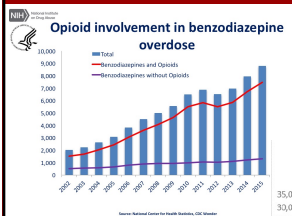
- Past Mo. Use of Methamphetamine in Opioid Users seeking treatment ↑ from 18.8% in 2011 to 34.2% in 2017

Ellis, et al. (2018) Drug Alc Dep., 193(1):14-20

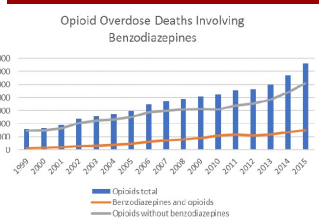
19

## Increase Benzodiazepine-Involved OD Deaths especially in combo with Opioids

NIH/NIDA 2018



1996-2013 Benzo filled Rx's Increased 67% And amount filled increased 140%



Combined use of Benzo and Opioid increase OD death risk 10-fold! 75% Benzo OD deaths Involved Opioids and 23% of Opioid OD deaths also tested Positive for Benzos in 2015

20

## U.S. Alcohol-Related Deaths ↑ 35% especially dramatic increase in women 85% 2007-2017 From 1999 U.S. Alcohol-Related more than doubled to almost 73,000 in 2017

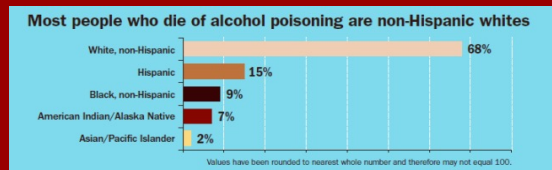


Institute for Health Metrics and Evaluation (IHME) November 2018  
White AM et al. (2020) Alc. Cl. & Exp. Research

21

## Annual U.S. Costs due to excessive drinking was \$223.5 Billion in 2006

CDC Vital Signs 2015

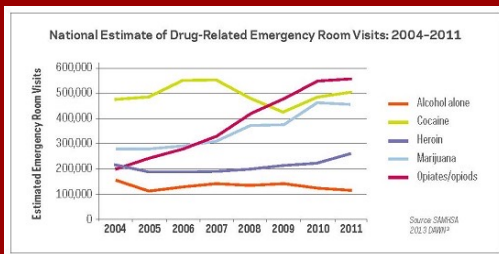


- Each Drink results in \$1.90 economic costs to U.S.
- Excessive Drinking results in \$746 annual costs for every U.S. Man, Woman and Child

**Est. U.S. Annual Costs 2017: Alcohol Abuse - \$249 Billion; Opioid Crisis - \$504 Billion\*; Drug Abuse - \$193 Billion**  
 Surgeon General's Report Nov. 2016; \*Council Econ. Advisors Nov. 2017

22

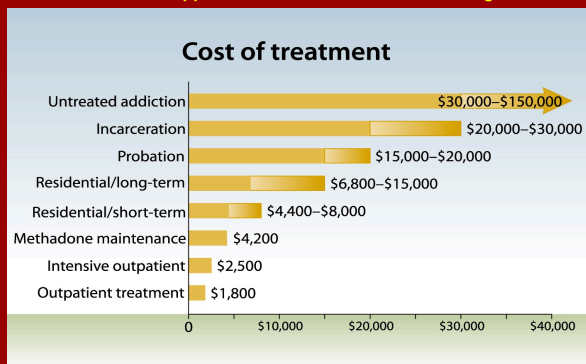
## Morbidity: Hospitalizations for Abuse and Addiction



Since 2015 Rates of Overdose from Opiates and Cocaine greatly increased illnesses resulting from addiction and abuse and subsequently make these the primary cause of all hospitalizations in our society

23

**The crime is that the cost of treatment is much more financially efficient than Incarceration or Ignoring treatment for those in need but treatment continues to be underappreciated and under resourced - Stigma?!**



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## Substance-Related and Addictive Disorders

DSM-5 May 18, 2013

- Misconceptions, Misunderstandings, Myths & Stigma [weak, bad, stupid, crazy]
- 60% illicit drugs sold in suburbia or rural US
- 75% Hard-Core drug users: actively and even gainfully employed
- <5% Alcoholics fit “Wino” stereotype
- US lifetime prevalence = 30% (Inc. Mensa)
- Irresponsible pleasure seekers: Willful Misconduct? [James White (2011). 1970 British Cohort Study]

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## Disease/Disorder

A pathological impairment of health or a condition of abnormal functioning associated with specific symptoms and signs caused by internal or external factors that result in an expected (predictable) set of discomforts or dysfunctions

Organ→Defect & Cause→Symptoms

(Anomaly, Difference)

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## Addiction is a Chronic Persistent Medical Disorder

- Chronic (persistent)
- Progressive
- Relapsing
- Incurable but Treatable/Manageable and often Preventable
- Fatal if untreated

Diabetes analogy to Addiction Disorders

Pathomimetic Symptoms 3 Polys / 6 Cs

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## Inherited Differences in Drug Effect Sympathomimetic Signs of Predisposition

### "Hollow Leg"

Can drink more than others and show less effect

### "Hangover Less"

Minimal hangovers compared to amount of drinking / drugging

### "Atypical response"

Energizing effect from opioids, slowing from stimulants

### "Risk taking"

Use in hazardous situations with deadened "stop signal"

### "Early onset addiction"

Antisocial behavior, high tolerance, risk tolerance, high "like" index

[P300 EEG amplitude anomaly and THIQ liver metabolite of ethanol controversy]

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## Hypodopaminergic Function Impairs Reward-Dependent Behaviors

- Inability to cope with stress
- Reduction of energy expenditure
  - Lower BMR (Energy Conservation) and Fatigue
- Increased carbohydrate & fat cravings
- Increased food intake
  - Energy consumption
- Increased blood pressure
- Increased % body fat
- Higher Body Mass Index
- Blunted reward response to pleasurable experiences
- Intensified bingeing behavior
- Addictive behaviors
- Thrill-seeking behaviors
- Impulsive behaviors
- Compulsive behaviors
- Personality disorders
- Poor executive function
- Reduced global cognition

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## Reward Deficiency Syndrome

reward deficiency syndrome			
addictive behavior	impulsive behavior	compulsive behavior	personality disorder
severe alcoholism	attention-deficit disorder, hyperactivity	aberrant sexual behavior	conduct disorder
polysubstance abuse	Tourette syndrome		antisocial personality
smoking		pathological gambling	
obesity	autism		aggressive behavior

Courtesy of Dr. John Fennino

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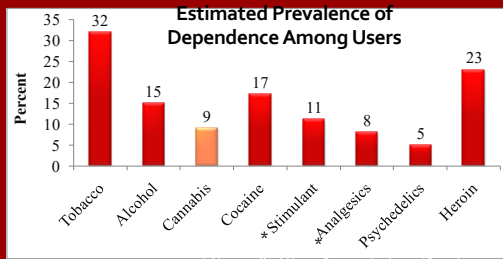
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**Addiction: About 9% of Pot users may become dependent, 1 in 6 who start in adolescence and 25-50% of daily users**



\* Nonmedical Use Source: Anthony JC et al., 1994

American Psychiatric Association's Diagnostic Manual (DSM) has included marijuana use disorders since 1980. 2013 DSM-5 added Marijuana Withdrawal as a diagnosis & Pathologic Gambling Disorder: 0.4-1% of all who gamble est. to meet Diagnostic Criteria

31

## Multiple Indicators, Multiple Causes (MIMIC)

Identifies Three Neurofunctional Domains Critical to development of the addiction cycle:

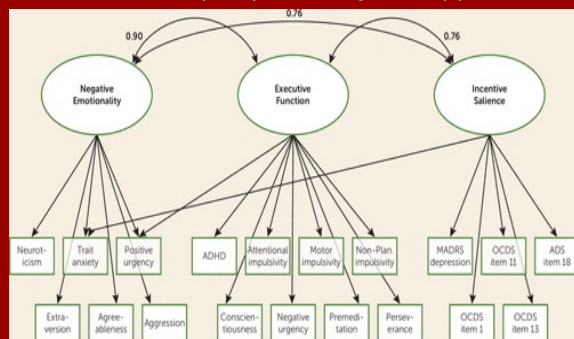
- **Negative Emotionality:** Neuroticism, Trait anxiety, Positive Urgency, Extraversion, Agreeableness, Aggression
- **Executive Dysfunction:** ADHD, Attention impulsivity, Motor impulsivity, Non-Plan impulsivity, Conscientiousness, Negative urgency, Premeditation, Perseverance
- **Incentive Salience:** Montgomery-Asberg Depression Rating Scale (MADRS depression), Obsessive-Compulsive Drinking Scale (OCDS) item 11, Alcohol Dependence Scale (ADS) item 18, OCDS item 1, OCDS item 13

Kwako LE et al. (2019) Am. J. Psych, 176(9):744-53

32

## Neurofunctional Domains of Substance Use Disorder, TAY more vulnerable

Kwako LE et al. (2019) Am. J. Psych, 176(9):744-53



33

## Diathesis-Stress Model of Substance-Related & Addictive Disorders

- **HEREDITY – Type I**
- **ENVIRONMENTAL – Type II**  
Stress (esp. Trauma) & Poor Nutrition
- **PSYCHOACTIVE DRUG TOXICITY – Type III**

**Note: each phenotype has to have elements of the others to be activated**

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## GARS Study: Candidate Genes

GENE/ALLELE				
Caspi MAOA uVNTR				
Caspi MAOA uVNTR				
DRD4				
DAT				
5HTTLR diallelic				
COMT				
DRD2 Taq1				
DRD3				
OPRM1				
GABRA3				
GABRA3				
Number of Subjects	Percentage of Low Risk	Percentage of Moderate Risk	Percentage of High Risk	ASL Lifetime Risk Composite
70	14	81	5	

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## Press Releases

### Quest Diagnostics Introduces Comprehensive Opioid Therapy Genetic Test Based on CYP450 Biomarker License with Transgenomic

Believed to be first clinical test to identify variants of four enzymes that mediate drug metabolism, providing greater insights for guiding treatment for the more than 100 million Americans with chronic pain

Aug 8, 2013

MADISON, N.J., Aug. 8, 2013 /PRNewswire/ -- Quest Diagnostics (NYSE: DGX), the world's leading provider of diagnostic information services, today announced the availability of a new lab-developed genetic test to aid the delivery of personalized opioid pain-relieving treatment. It is believed to be the first clinical lab to offer testing for variants in all cytochrome P450 (CYP450) genes known to influence the CYP450 enzyme system, which affects metabolism of opioids and other medications.

(Logo: <http://photos.prnewswire.com/prmh/20130717/NY48934/LOGO>)

The test is based in part on gene variants owned by Transgenomic, Inc. (OTCBB: TBIO) through a non-exclusive licensing agreement between the two companies. Quest Diagnostics developed, validated and now offers the test service through its advanced Nichols Institute facility in San Juan Capistrano, Calif. Additional terms were not disclosed.

More than 100 million Americans in the United States suffer from chronic pain. Opioids, which include oxycodone and methadone, are widely used in the management of moderate to severe pain. While opioids are the most widely prescribed class of medications in the United States, they are also implicated in high rates of drug addiction and overdose.

Research demonstrates that genetic testing to identify gene variants that mediate the CYP450 enzyme system can help physicians predict the rate of opioid drug metabolism. With this information, physicians can decide to adjust doses or administer other therapies in order to improve the prospect for effective pain relief and reduce the likelihood of drug toxicity, drug interactions and other adverse outcomes.

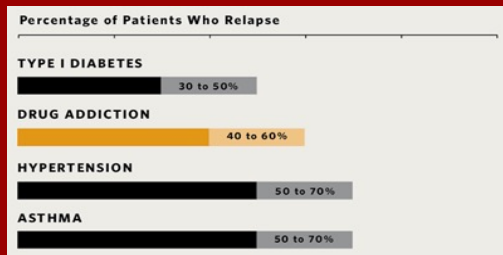
36

## S-R & Addict. D. Vs. Hypertension

- Genetics 50 - 60%      25 - 50%
- Relapse 40 - 60%      50 - 70%
- Initiation Alc./Drug use      Diet/Activity
- Permanent Potential      Same
- Due to and cause Physiologic Changes Both
- Abstinence/Meds      Meds/Lifestyle Changes
- Do Not reverse disorder, Both Incurable
- <50% 1 yr. Abstin.      <40% on meds &  
   <30% LS after 1 yr.

37

Relapse rates for drug-addicted patients are compared with those suffering from diabetes, hypertension, and asthma. Relapse is common and similar across these illnesses (as is adherence to medication). Thus, drug addiction should be treated like any other chronic illness, with relapse serving as a trigger for renewed intervention.



McLellan et al., JAMA, 284:1689-1695, 2000

38

## Rameses II 1350 BC



Make not thyself helpless in drinking in the beer shop. For will not the words of [thy] report repeated slip out from thy mouth without thy [that thou hast] uttered them? Falling down thy limbs will be broken, [and] no one will give thee [a hand to help] as for thy companions in the swilling of beer, they will get up and say, "Outside with this drunkard."

In Other Words: Drink Responsibly!

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### Mental Health Parity and Addiction Equity Act Oct. 2008 (implementation with ACA 2014)

- Addiction is a biologic & psychological **Medical Disorder** due to anomalous neurocellular, neuro-chemical & neuro-functional features of vulnerable individuals
- 10 U.S. TAMF Addiction Medicine Residency programs launched on 7/1/12; 46 by 2018 plus 46 ACGME Addiction Psychiatry Fellowships **ABAM now TAMF 2018 & ACGME 2018**
- **Certified Addiction Nursing** - International Nurses Society on Addictions (IntNSA) and **Certified Addictions Registered Nurse Addiction** - Nursing Certification Board

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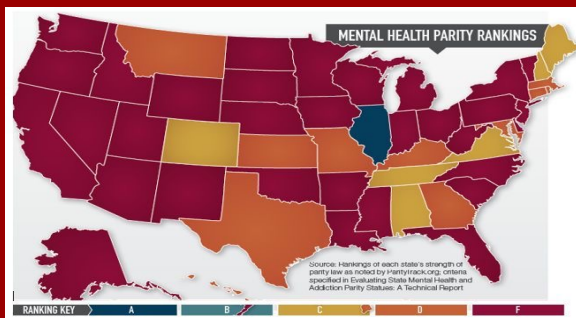
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### Despite 12 years (AEA 2008-2020) Little Progress in treatment access and parity



Milliman Report, et al. 2019-2020

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### DSM-5 May 18, 2013 Impulse Control Disorders of DSM IV-TR redefined as Substance-Related and Addictive Disorders

**Pathological Gambling** accepted as such  
**Compulsive Buying?**  
**Compulsive Sexual Behavior** maybe  
**Internet or Compulsive Computer Use?**  
**Others:** Trichotillomania, Kleptomania, Pyromania, Intermittent Explosive Disorder

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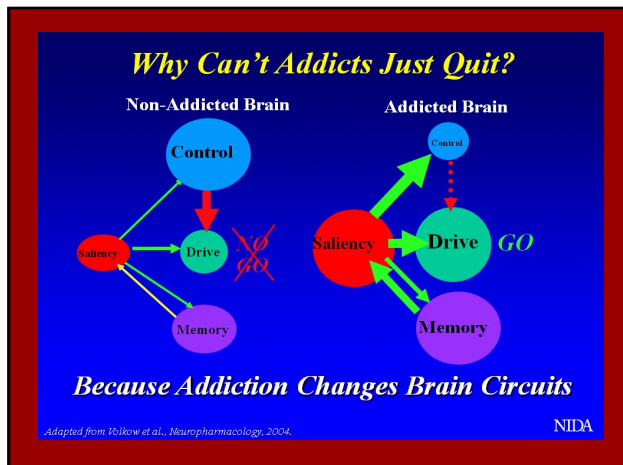
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### Addiction Pathway Brain Circuits & Processes

- **Reward/Reinforcement (Go)**  
*[I prefer Survival/Reinforcement]  
Hyperactivity then Hypoactivity*
- **Control (Stop)**  
*Impaired, dysfunctional or  
disconnection of Go and Stop*

**Bill Cohen: "Overactive go, Damaged Stop & Lack of  
Communication between them"**

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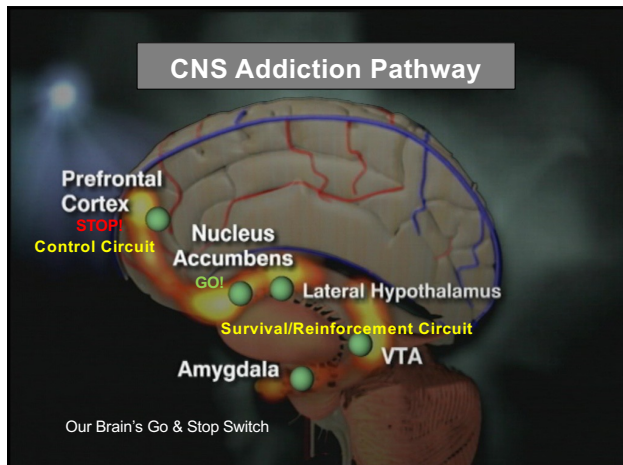
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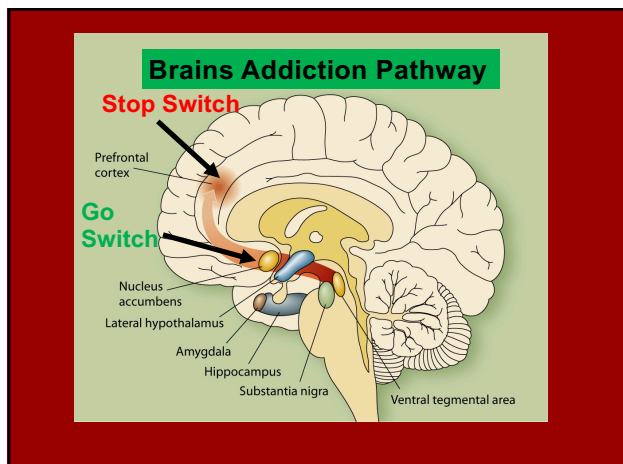
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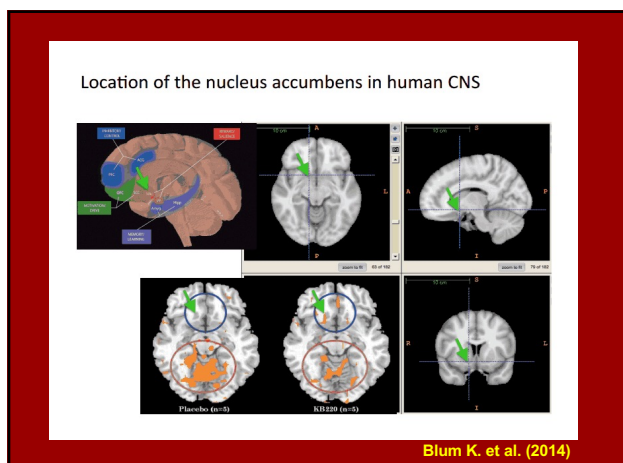
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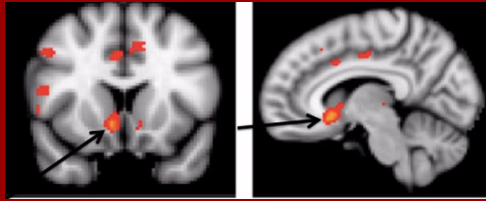
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## Activation of Nucleus Accumbens Septi by Alcohol



Gilman JM et al. (2008). Why We Like to Drink: A Functional Magnetic Resonance Imaging Study of the Rewarding and Anxiolytic Effects of Alcohol. *J. of Neuroscience*, April 30, 2008, 28(18):4583– 4591

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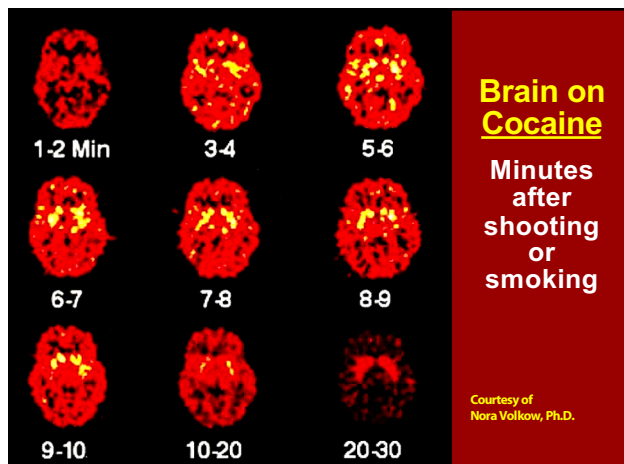
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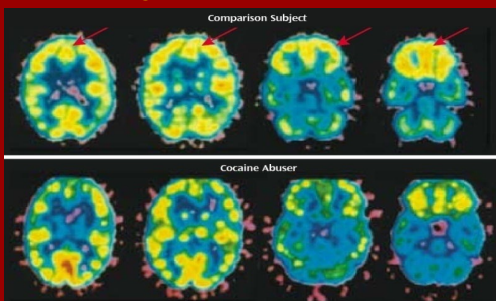
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## Cocaine affects addict's brain differently than a Normies brain



Glucose metabolism in Prefrontal Cortex & Cingulate Gyrus

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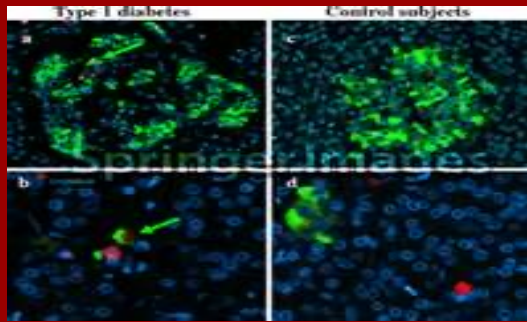
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## Diabetes = Pancreas Beta Cell Anomaly



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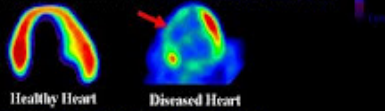
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### 3. ADDICTION IS A DISEASE OF THE BRAIN *as other diseases it affects the tissue function*

Decreased Brain Metabolism in *Drug Abuse Patient*



Decreased Heart Metabolism in *Heart Disease Patient*



Sources: From the laboratories of Drs. N. Volkow and H. Scherbert

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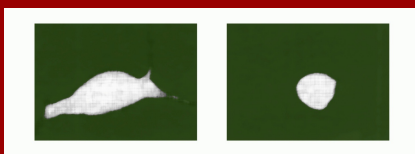
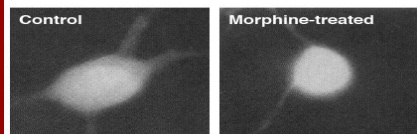
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## VTA Dopamine Cells of Opiate Addict vs. Non Addict Rat

VTA dopamine neurons:



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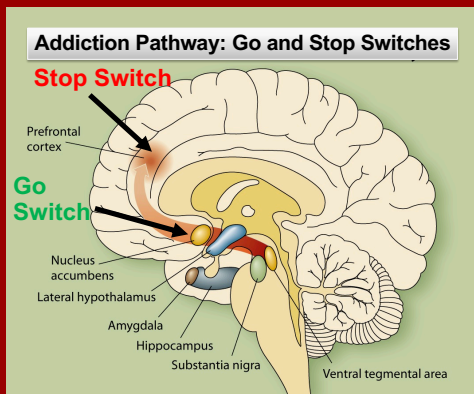
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## Last Area of Brain to Develop is Prefrontal Cortex

Medial PFC = Value  
Lateral PFCs = Costs  
or consequences



Functional  
at age 25!

Fully Developed  
At age 40+

Reasoning, Impulse Control, Temporal Processing, Planning, Judgment

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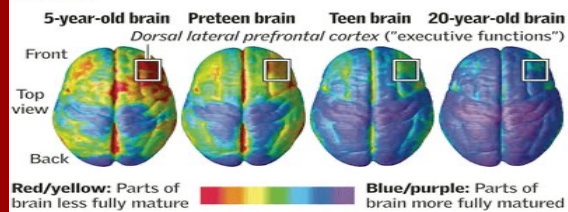
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## Why we all make such “great” decisions before age 25

### Judgment last to develop

The area of the brain that controls “executive functions” — including weighing long-term consequences and controlling impulses — is among the last to fully mature. Brain development from childhood to adulthood:



Sources: National Institute of Mental Health;  
Paul Thompson, Ph.D., UCLA Laboratory of  
Neuro Imaging

Thomas McKay | The Denver Post

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## Control Circuitry = Stop Switch

- **Orbital Prefrontal Cortex** – Especially left ventral medial OFC
- **Fasciculus Retroflexus** (anterior)
- **Lateral Habenula** (posterior and mesocortex terminal)

Age of first use correlation to future addiction

58

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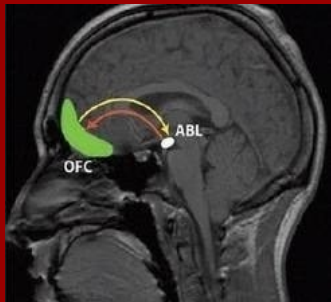
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## Diffusion Tensor Imaging



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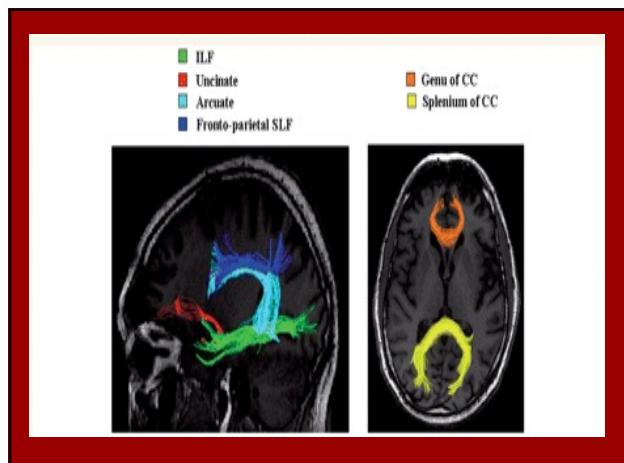
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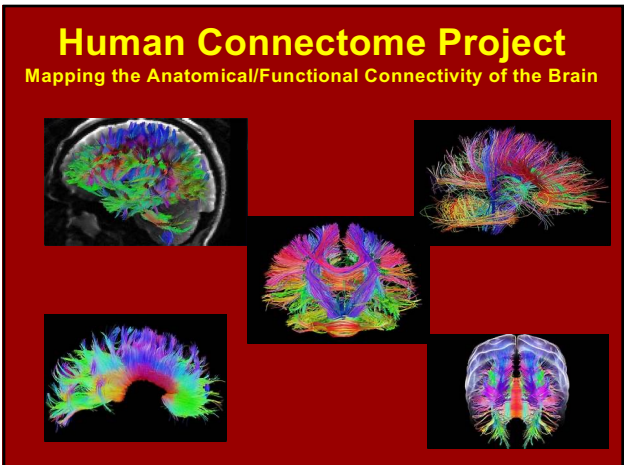
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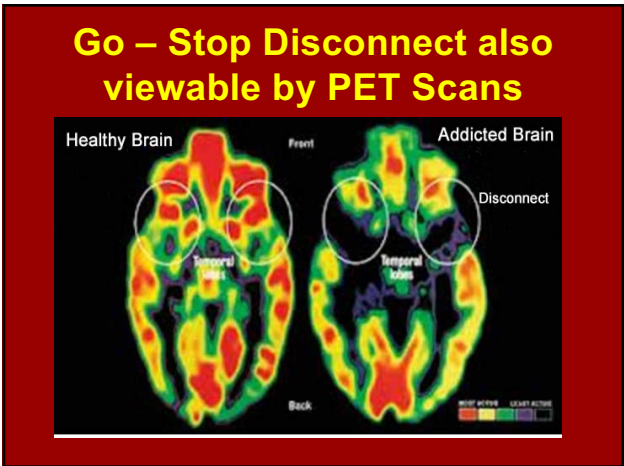
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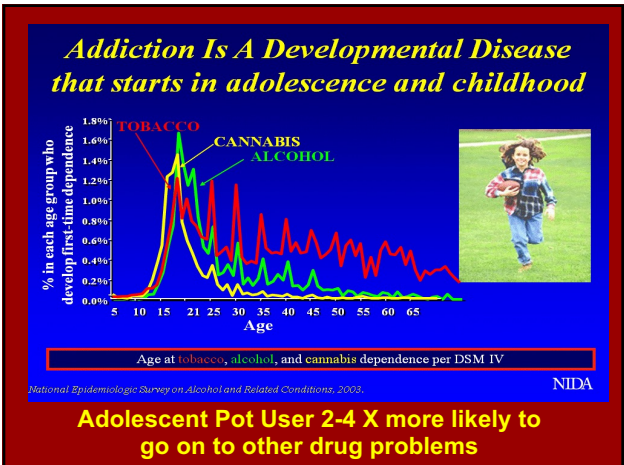
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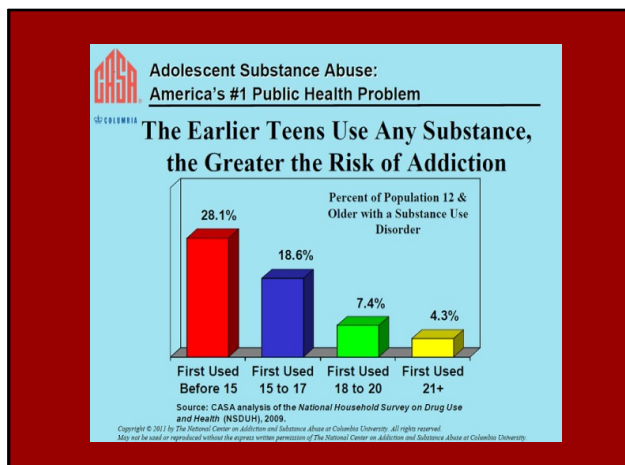
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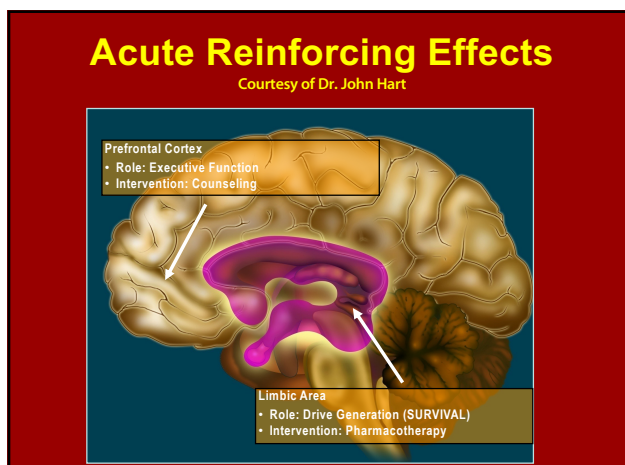
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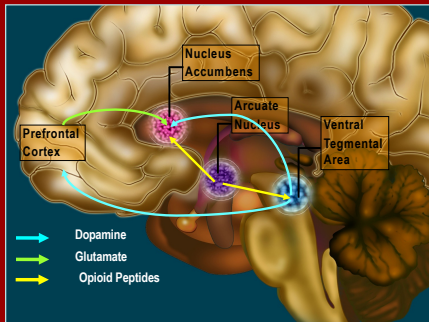
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## Brain Reward Pathways

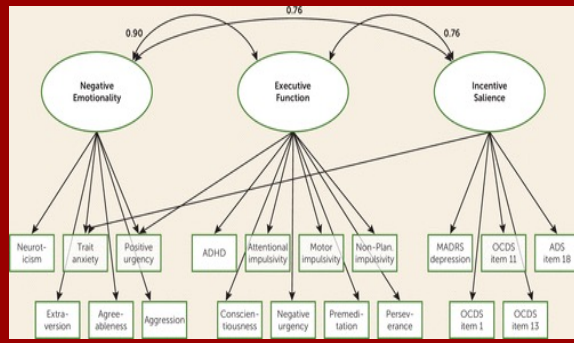


Courtesy of Dr. John Hart, Portland, Oregon

67

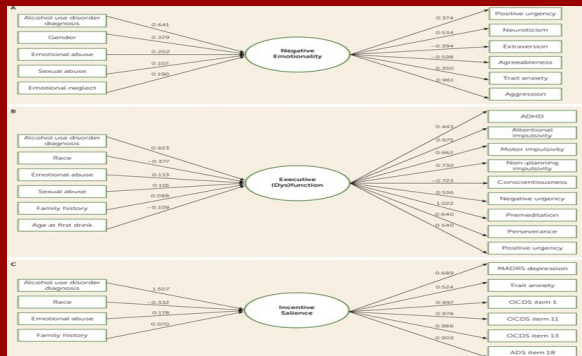
## Neurofunctional Domains of Substance Use Disorder, TAY more vulnerable

Kwako LE et al. (2019) Am. J. Psych, 176(9):744-53



68

## Negative Emotionality: Executive Dysfunction: Incentive Saliency



69

## Relapse Related Brain Circuits and Processes

- Stay Stopped (Slip Decisions)
- Emotional Memory (Cravings)
- Stress Hormone Cycle (Hypersensitivity)

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## Brain Processes of Relapse

### A. Slip/Stay Stopped Brain Anomalies

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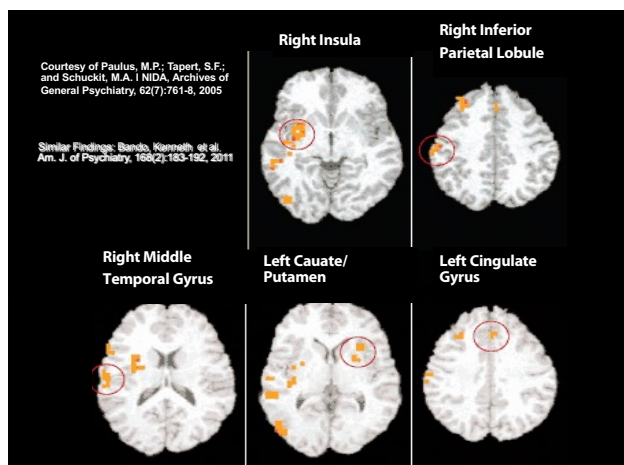
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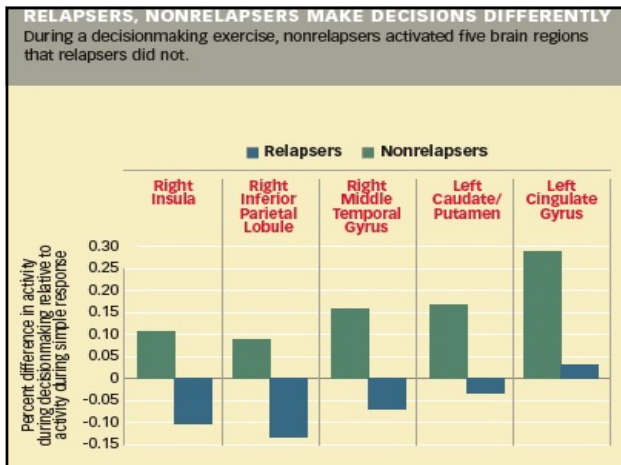
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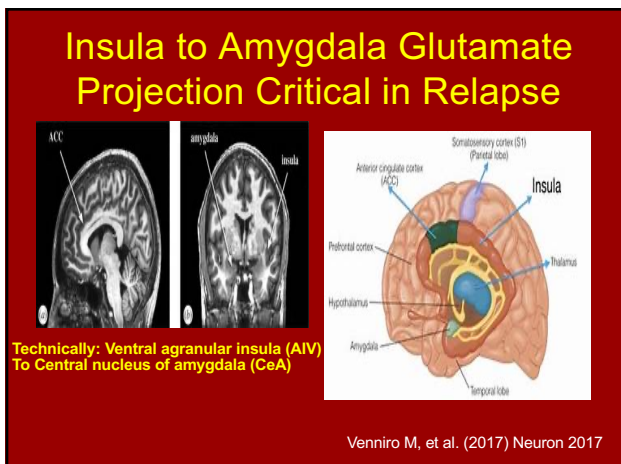
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**Brain Processes of Relapse**

**B. Memories Formation & Role In Drug Cravings**

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## Neuro-development of Memories

### Dendritic spines, bumps or protrusions

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### Dendritic Memory Spines

- Amygdala process emotional memories, hippocampus all other memories
- Also known as Bumps, Spikes – I like the term memory protrusions = less triggering
- 4 to 6 sensory inputs of the same stimulus per hour results in development of a semi-permanent memory protrusion
- The more often a memory protrusion is activated the larger it grows and the more permanent it becomes

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All Addiction Memories are processed as emotional memories via the amygdala, these are faster and have a more powerful influence on Behavior than hippocampal working memories

© Magal Mondin and Daniel Choquet, CNRS, Université Bordeaux 2

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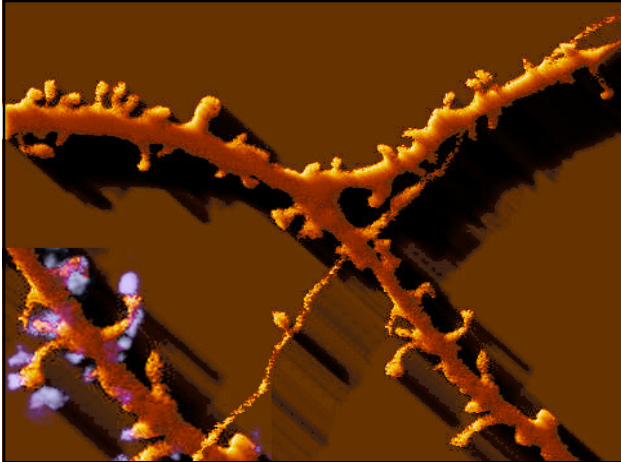
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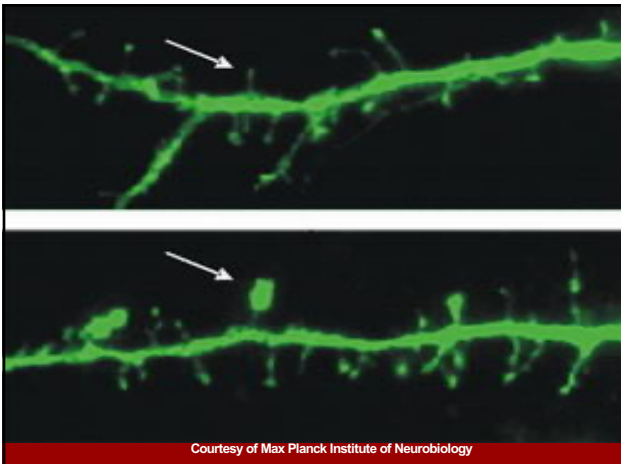
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### Meso-Limbic Reward-Reinforcement Circuitry of the MFB

- Phase I – Endogenous/Environmental Cue or memory triggers the Ventral Tegmental Area to release dopamine which activates core of Nucleus Accumbens Septi = anticipation of use **ON A MISSION!** If initiated difficult to stop
- Phase II – Cues or actual use of addictive drug activates dopamine “go” switches of lateral hypothalamus and Nucleus Accumbens (core and shell): **COMPULSION FOR MORE!**
- Phase III – Control circuitry of the prefrontal cortex is inactivated, while the cingulate (bonding) is activated: **results in LOSS OF CONTROL, CONTINUE DESPITE NEGATIVE CONSEQUENCES**

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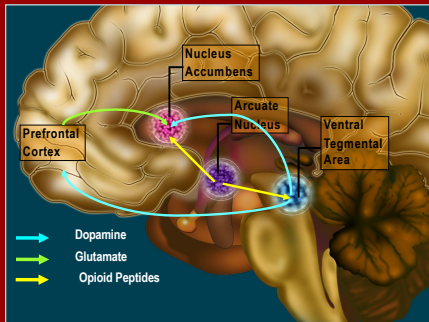
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### Brain's Addiction Pathway



Courtesy of Dr. John Hart, Portland, Oregon

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### New NIH Details on Addiction Craving Brain Pathway

- Hippocampal memory process activates
- Lateral Septum via glutamate and this in turn activates
- Ventral Tegmental Area (VTA) via gamma-aminobutyric acid (GABA) that then activates
- Nucleus Accumbens Septi ("go Switch") via dopamine

Luo, AH, et al. Science 7/15/11

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### Brain Processes of Relapse

## C. Stress Hormone Cycle Hypersensitivity

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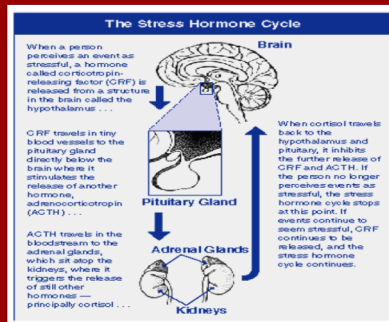
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## Hypersensitivity of Stress Hormone Cycle in Addiction

1. Stress activates hypothalamus release of corticotropin Releasing factor (CRF)
2. CRF activates pituitary release of adrenocorticotrophic hormone (ACTH)
3. ACTH activates kidney adrenal glands to release cortisol



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## "Addiction is a stress-induced defect in midbrain's ability to perceive pleasure"

Dr. Kevin McCauley

- CRF & ACTH are neurotransmitters as well as hormones they modulate novelty-seeking and dopamine activity in the brain
- Severe stress increase risk-taking behaviors in all and suppress dopamine's ability to perceive reward, survival reinforcement, "pleasure?" resulting in anhedonia since
- CRF & ACTH as neurotransmitters produce the unpleasant emotional reactions associated with stress
- Cortisol usually turns off these secretions to terminate a stress reaction but extreme stress overrules cortisol

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## Addictive drugs first release of dopamine in the midbrain fools it as being a coping mechanism for the relieve of stress

- Opiates & endorphins shown to also inhibit CRF & ACTH as cortisol would naturally do
- But, withdrawal from opiates cause increase release of CRF, ACTH and creates hypersensitivity to stress that overrule cortisol's regulation of cycle = craving
- Cocaine directly releases the CRF and ACTH mistaken as part of or covered by the rush, stimulant withdrawal also activates the stress mechanism = craving
- Research: metyrapone validation (shuts off cortisol production increasing CRF & ACTH) and CP-154,526 treatment (blocks CRF and thus suppresses ACTH release)

Heilig and Koob 2007, Lowery et al. 2008

87

## Also Neural Crux of Relapse with Stress March 2013

VTA's (ventral tegmental area): GABA-releasing neurons, dopamine-releasing neurons and Kappa opioid receptors interaction in stress. Drugs and natural satiations release dopamine in the VTA. GABA applies a brake to this via strengthening synapses (known as long-term potentiation or LTP) but stress interrupts this process leading to unabated dopamine reinforcement. Nor-BNI blocks Kappa receptors in the VTA and prevents stressed out rats from relapsing to cocaine use

Graziane, Polter, Briand, Pierce, Kauer (2013), J. Neuron

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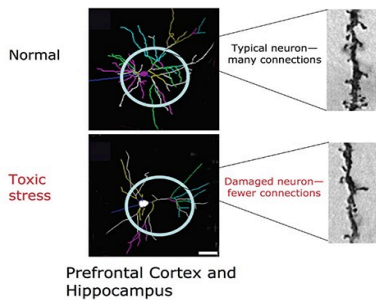
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## Persistent Stress Changes Brain Architecture



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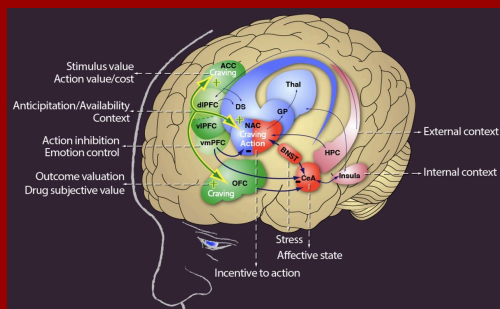
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## Craving: Conspiracy of “hijacked” brain to continue Addiction



Oliver, G and Koob G (2013)

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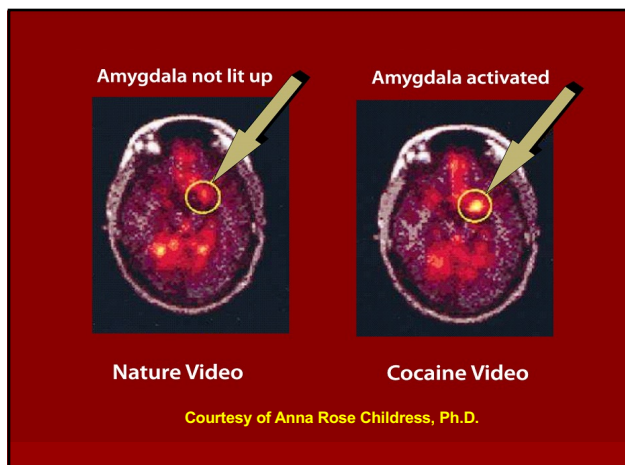
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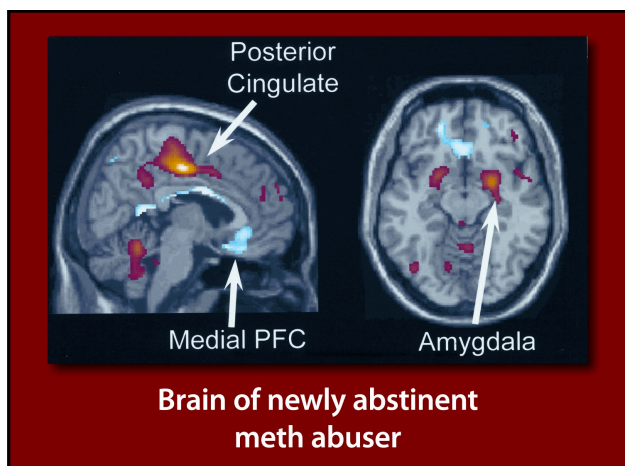
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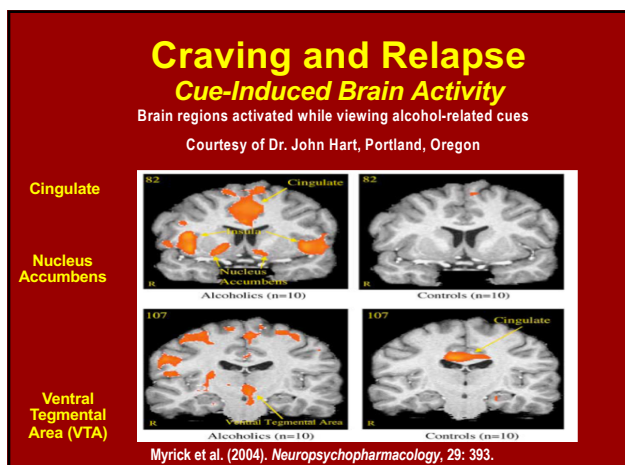
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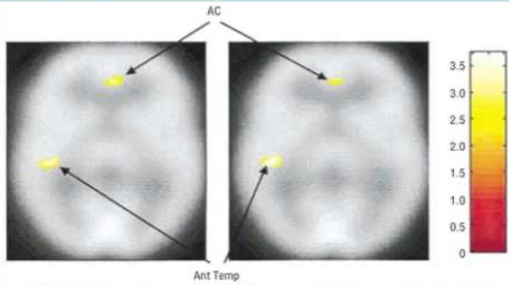
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### Behavioral Conditioning



PET SCAN: showing regions of increased brain metabolic activity when heavy smokers are exposed to cigarette related cues.  
From: Dwyer et al. Arch Gen Psychiatry 2002; Dec; 59:1162-72

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## Physiology of Craving

- Increased heart and pulse rate
- Specific electrical changes in skin activity and spindle effects on EEG
- Increased peristalsis activity of gut
- Pupil dilatation and cortisone stress reaction
- Two degree or more core temperature drop

Childress AR, McLellan T, O'Brien CP Br. J. of Addict. 1986

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## Craving Extinction & The Resilient Brain

Childress, AR, McLellan, T, O'Brien, CP, (1986). British J. of Addictions, 81(5):655-660, May.

Yan-Xue, X et al. (2012). Science, 336(6078)241-245

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## Key: Never Initiate any action to use ~ 95% of Slips = Relapse

### Stop Signal Test (SST) Research

- Lawrence, AJ, Luty, J, Bogdan, NA, Sahakian, BJ, Clark, L, (2009). Impulsivity and response inhibition in alcohol dependence and problem gambling. *Psychopharm.(Berl.)*, 207(1):163-72, Nov.
- London, Edythe, Director Center for Addictive and Biobehavioral Sciences, UCLA

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## Relapse Prevention “tool kits”

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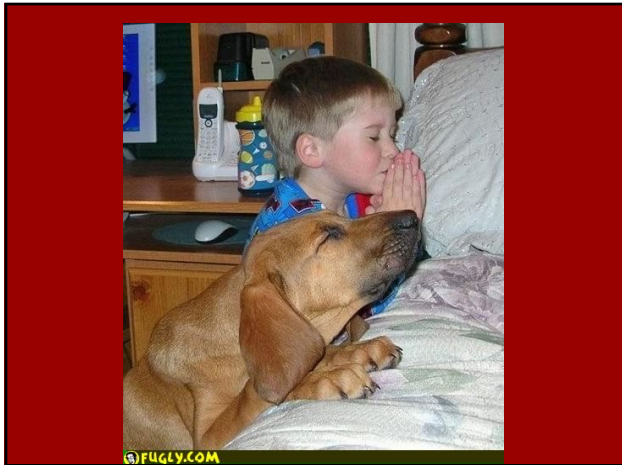
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## AA Prayers (Spiritual Practices) Reduce Craving fMRI Studies

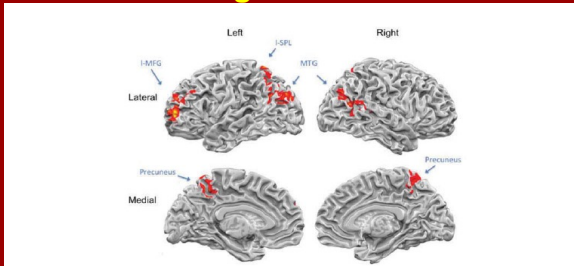


Figure 1. Brain areas activated for main contrast (prayer > passive + news). The left-anterior middle frontal gyrus (l-MFG; BA 10), left-superior parietal lobule (l-SPL; BA 7), bilateral precuneus (BA 7), and bilateral posterior middle temporal gyrus (MTG; BA 39). Two-tail t-test (df 17) = 2.56, FWE alphaism  $p < 0.05$  corrected,  $k = 104$ . The brain is displayed in neurological convention (right = right).

Galante M. et al. (2017). An initial fMRI study on neural correlates of prayer in members of Alcoholics Anonymous. *Am J Drug Alcohol Abuse*. 2017 Jan;43(1):44-54

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## Brain Region Activation by AA Prayers fMRI

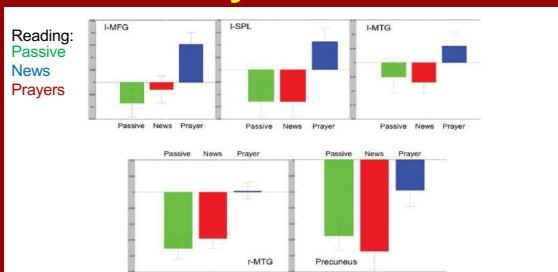


Figure 2. General linear model (GLM) beta plots for the main contrast regions of interest (ROIs). See Table 2 for details. Green - Passive; Red - News; Blue - Prayer. x-axis: conditions, y-axis: percent BOLD signal change. The left-anterior middle frontal gyrus (l-MFG; BA 10), left-superior parietal lobule (l-SPL; BA 7), left- and right-posterior middle temporal gyrus (l/r-MTG; BA 39), and bilateral precuneus (BA 7).

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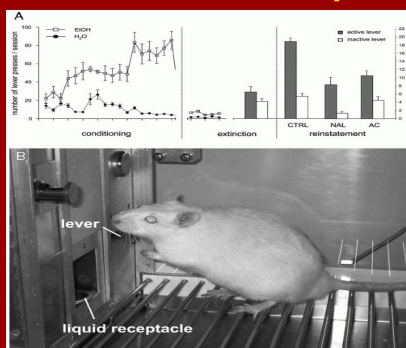
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## Other Effective Relapse Prevention Tools

- Emotional Freedom Techniques (EMDR, Brain Spotting, Tapping, Elastic Snapping)
- Yoga Breaths, Somatics, Figure 8 Pacing
- Mindfulness meditation & other grounding interventions, acupuncture, Laughter Yoga
- Consequence Reminders (family photo, car keys, consequence cards)
- Paradoxical Interventions (emptied Librium capsules, empty Copenhagen can, turn shirt inside out, wash off and reapply makeup, et al.)

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## Pharmacological Cue Extinction via naltrexone and acamprostate



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## Research on Nac Modulation to prevent addiction relapse

O'Neal, T.J., Nooney, M.N., Thien, K., Ferguson, S.M. (2019). Chemogenetic modulation of accumbens direct or indirect pathways bidirectionally alters reinstatement of heroin-seeking in high- but not low-risk rats. *Neuropsychopharmacol.* (2019)


90 Genetically diverse Sprague Dawley rats identified 40 that developed heroin addiction (40%; human vulnerability is about 24%) these were deemed high-risk rats. Once addicted researchers found that modulation of addicted mice NAc could decrease opioid relapse and speculate any addiction relapse as well. NAc direct and indirect medium spiny neuron pathways (dMSNs and iMSNs) have oppositional roles in reward seeking relapse behavior. Viral mediated gene transfer (CRISPR CAS9) of DREADDs demonstrated that transient inactivation of dMSNs or activation of iMSNs suppresses cue-activation of relapse in high-risk but not of low-risk rats. They were not able to discern motivation for high-risk vs low-risk mice to use heroin.

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## Long-Term Sobriety is a battle between the old primal brain and the new brain




Fish



Cat



Chimpanzee



Human

Note: Part of the old brain is covered by the new brain.

Fish
Cat
Chimpanzee
Human fr. 5Ma

Old Brain = Survival (5X faster and more powerful) than Neocortex = Control, Planning and Decision Making

© 2007, CNS Productions, Inc.

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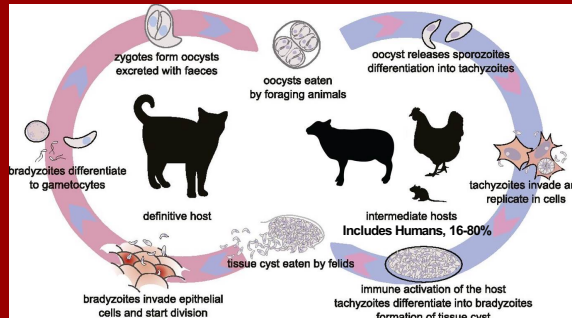
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## Addiction = Hijacking of brain's Survival Instincts

### Relapse = Conspiracy of that brain to get back to use ASAP



"Zombie" Parasite *Toxoplasma gondii* analogy

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## Historic Evolution of Addiction Science



**Dr. Nora Volkow**  
Nat. Instl. On Drug Abuse



**Dr. Anna Rose Childress**  
Ctr. Studies of Addictions Univ. of Penn

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1774 - Anthony Benezet essay on alcoholism  
 1784 - Dr. Benjamin Rush brain effects of alcohol and spectrum of alcoholism  
 1825 - Rev. Lyman Beecher sermons on signs of alcoholism  
 1849 - Magnus Huss coins term of alcoholism  
 1876 - Am. Ascn for Cure of Inebriety  
 1879 - Dr. Leslie Keeley drunkenness is a disease  
 1934 - Dr. William Silkworth "Allergy" of alcoholism  
 1943 - Yale Ctr. Of Alcohol Studies moves to Rutgers in 1962  
 1960 - EM Jellinek Disease Concept of Alcoholism  
 1998 - William White Am. History of Addiction Treatment

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**Dr. Kevin McCauley cites modern scientific research on addiction**

1. **Genetic Vulnerability** (Schuckit et al., 2000)
2. **Incentive-sensitization of Reward** (Robinson & Berridge, 2008)
3. **Pathology of Learning & Memory** (Hyman, Everitt & Robbins, 2005)
4. **Stress and Allostasis** (Koob & LeMoal, 2001)
5. **Pathology of Motivation and Choice** (Kalivas & Volkow, 2005; Hyman, 2009, Ellison, 1992)

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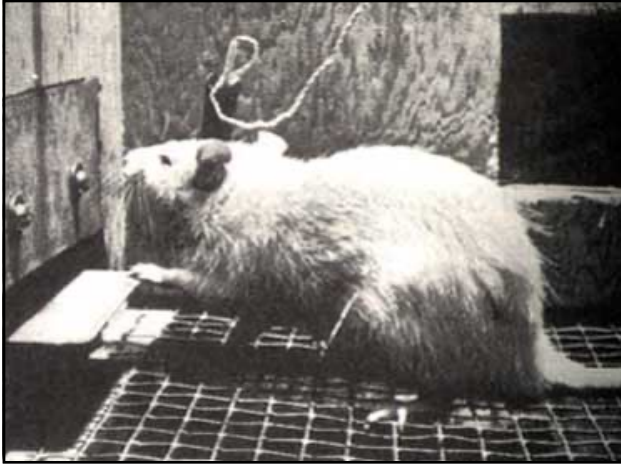
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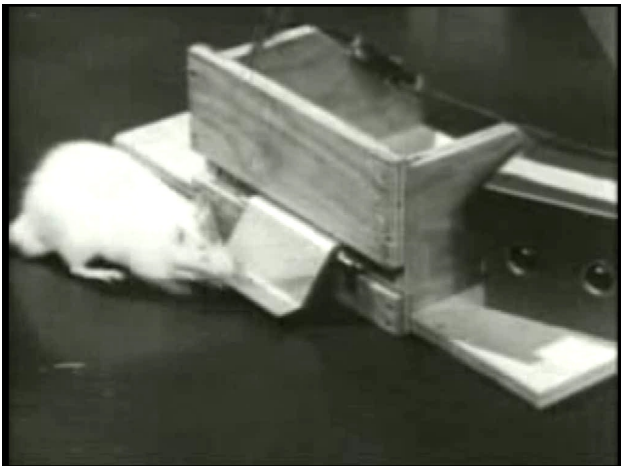
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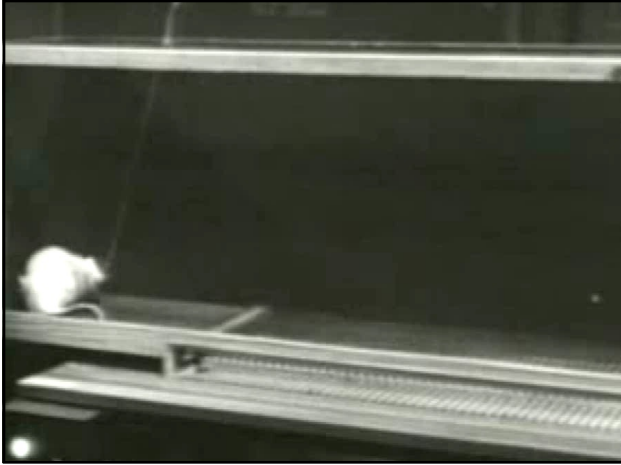
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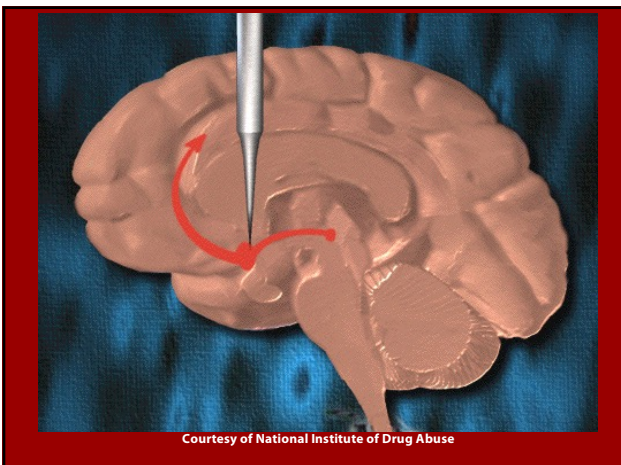
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## American Society of Addiction Medicine Definition

Addiction is a primary, chronic  
disease of brain reward, motivation,  
memory and related circuitry

Adopted April 19, 2011

A Brain Reward Disorder

Dr. Kenneth Blum 1990

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## ADDICTION DEFINITION American Society of Addiction Medicine



- is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.

– (ASAM definition, Short Version)

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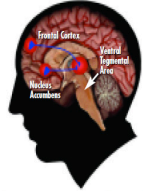
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## National Institute on Drug Abuse (NIDA) View of Addiction

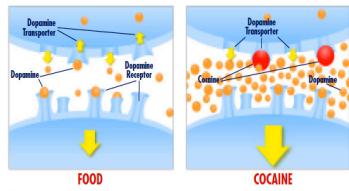
### DRUGS OF ABUSE TARGET THE BRAIN'S PLEASURE CENTER

#### Brain reward (dopamine) pathways



These brain circuits are important for natural rewards such as food, music, and sex.

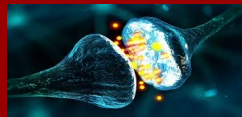
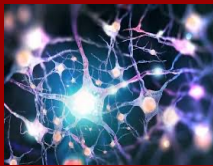
#### Drugs of abuse increase dopamine



Typically, dopamine increases in response to natural rewards such as food. When cocaine is taken, dopamine increases are exaggerated, and communication is altered.

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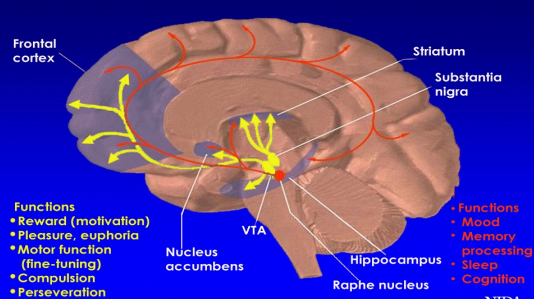
## Brief Review of Brain Cells and their communication processes



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## Better Understanding of Neurochemical Allostasis and Neuronal Connectivity/Plasticity

### Dopamine Pathways



- Reward (motivation)
- Pleasure, euphoria
- Motor function (fine-tuning)
- Compulsion
- Perseveration

### Serotonin Pathways

- Functions
- Mood
- Memory processing
- Sleep
- Cognition

NIDA


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## Drugs that affect brain activity are Psychoactive

**WHAT ARE PSYCHOACTIVE DRUGS**

- Psychoactive Drugs: Drugs that alter the state of the brain (Ciccarelli & White, 2012).
- There are four types of psychoactive drugs (Ciccarelli & White, 2012):
  - Stimulants
  - Depressants
  - Narcotics
  - Hallucinogens

**AKA: Uppers, Downers, All Arounders (Psychedelics) or even Up Town, Downtown, Out of Town**



http://en.wikipedia.org/wiki/Pharmacology

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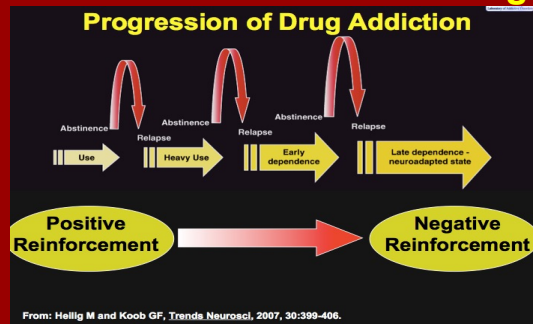
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## Drugs that cause the brain to be addictive are Reinforcing



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## Brain is the most vital organ in the body and thus the most protected



**Skin**

**Bone/Skull**

**Hair**

**All surround The Brain to protect it**

**Every thought, feeling, awareness and action is brain initiated**

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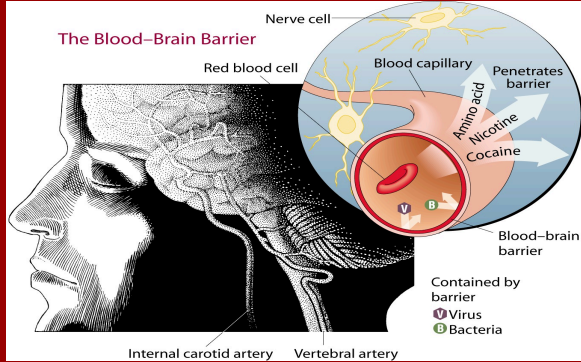
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## Brain is also protected internally by: Blood Brain & Cerebral Spinal Fluid Barriers



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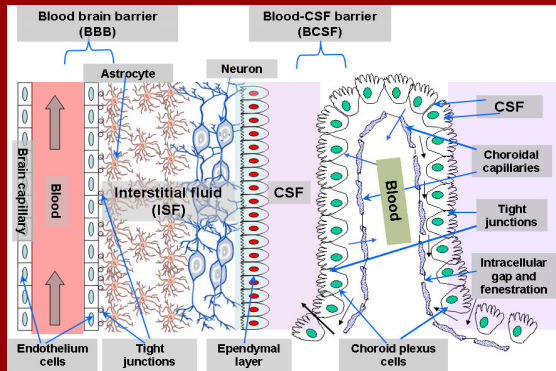
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## Blood-Cerebral Spinal Fluid Barrier



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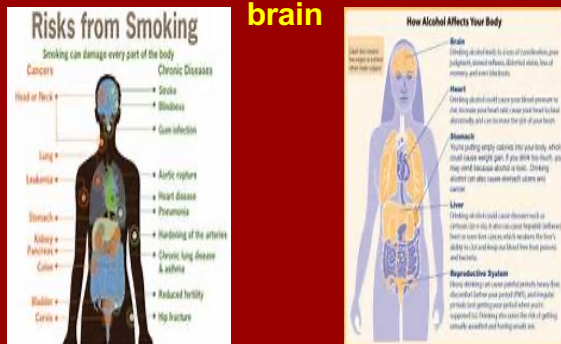
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## Thus, any psychoactive drug gets to and impacts all body organs not just the brain



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## The Human Brain: An Introduction

- At 4 weeks of gestation, brain cells – Neurons are forming at 250,000 per minute
- Brain is about 90% of its adult size by age 6
- Average adult brain has ~100 billion neurons and has formed 100 trillion synapses
- Neocortex is conscious human brain
- Mesocortex (Limbic System) is primitive survival, emotional brain

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## Brain Development

- 20 weeks of gestation  
Sees proliferation and organization of neuron synapses
- 24 weeks of gestation to 4 weeks after birth witnesses rapid “pruning” of gray matter and increasing development of white matter throughout the brain

**Younger brains are much more vulnerable to negative impact of Addictive Drugs**

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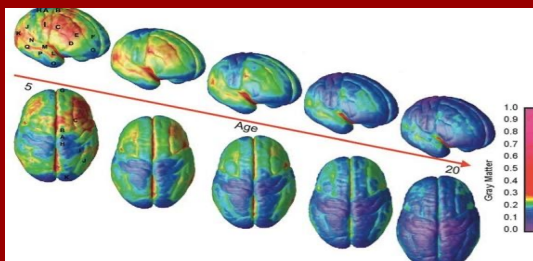
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## After Birth Brain Develops Slowly from the Back to the Front



Steady ~1%/yr. pruning of grey matter and expansion of myelinated axons (white matter) from age 5

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## Brain Cells or Neurons

- Unusual shapes: Unipolar, bipolar, pyramidal, purkinje, astrocyte, glial but all have “hair-like” projections
- More limited (less new ones) than other body cells
- Have no physical contact with each other
- Communicate via chemical messenger molecules that are made from the protein you eat

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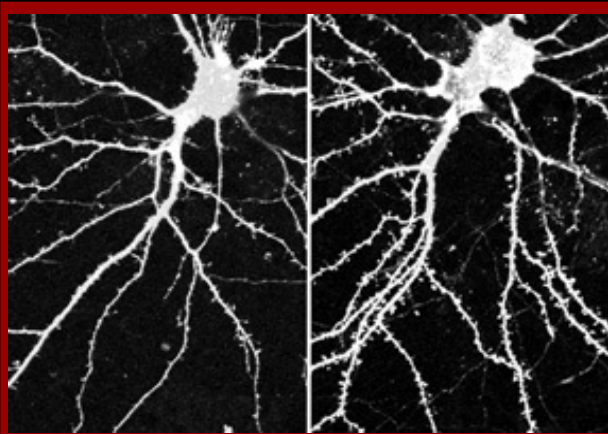
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Courtesy, Takeichi Laboratory, Nagoya, Japan

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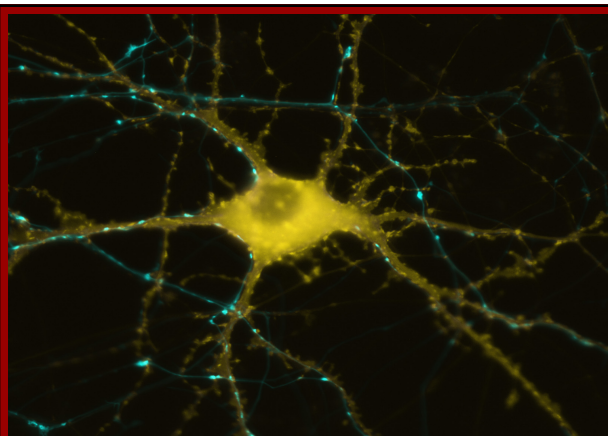
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Courtesy of UC, San Diego, Goda, Y., Sailor, M., Collins, B.

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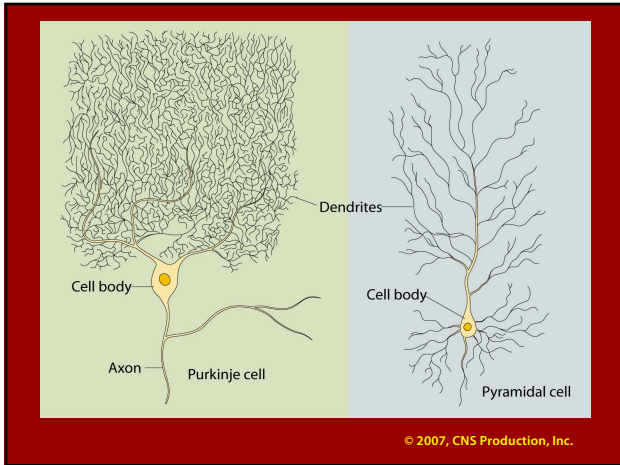
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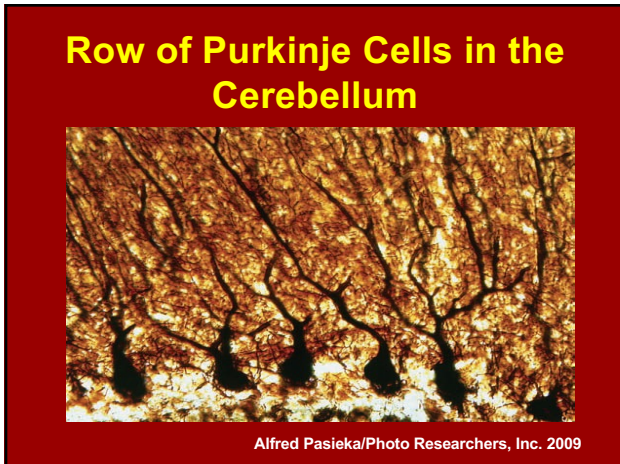
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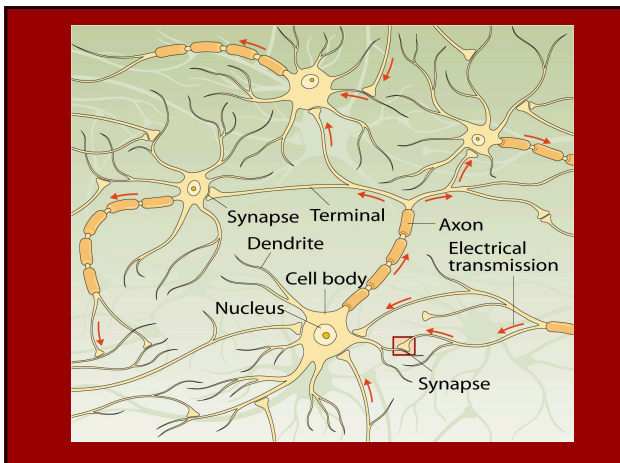
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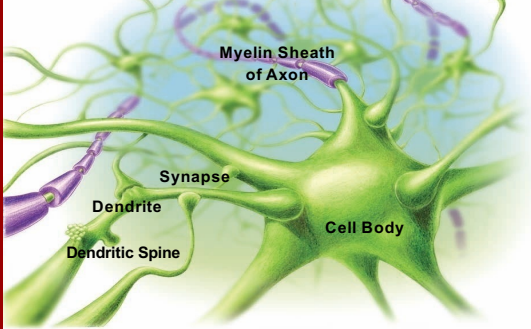
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**By Age 6 100 Billion Neurons and  
Development of a Quadrillion Synapses**



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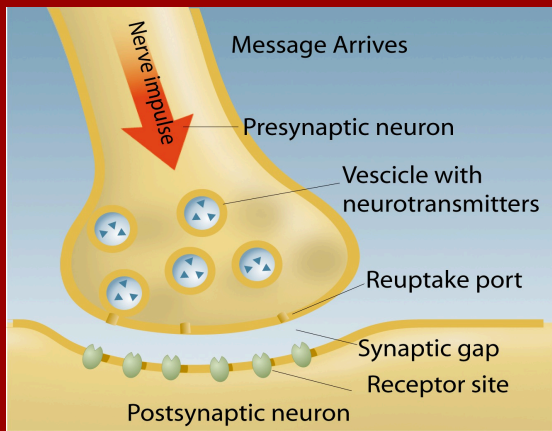
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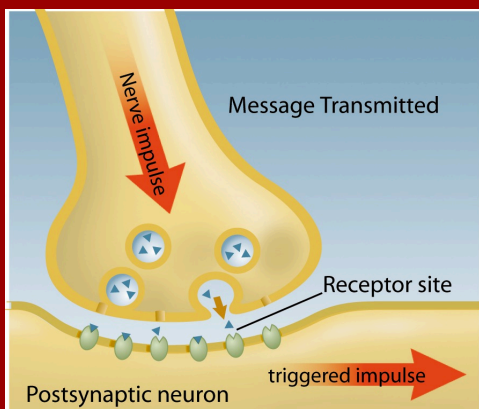
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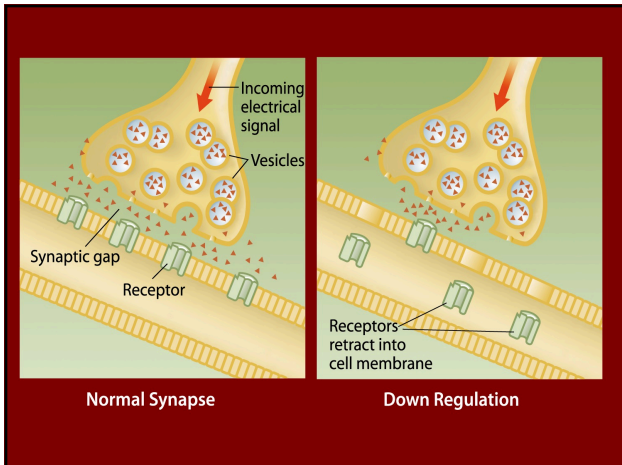
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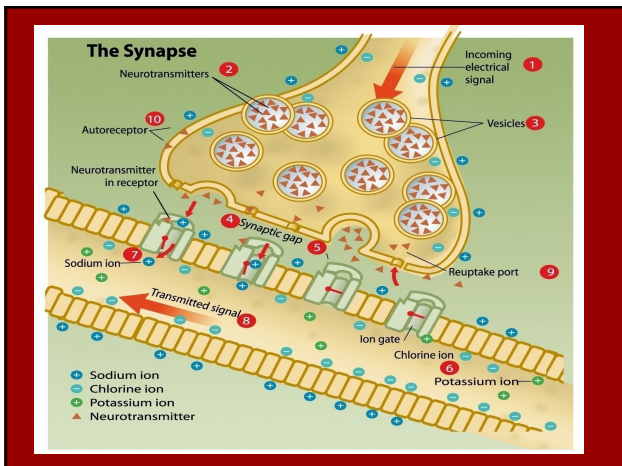
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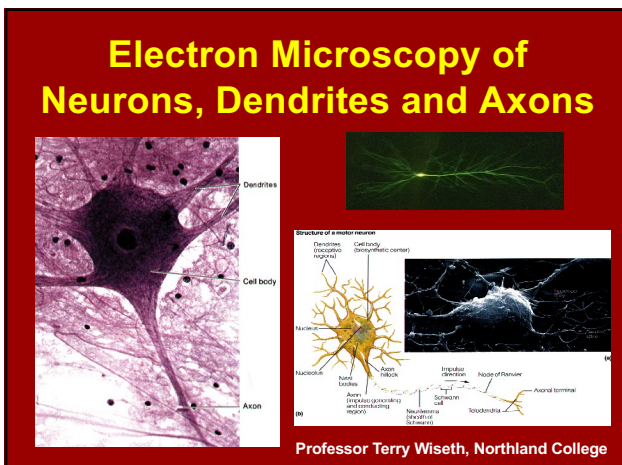
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## Neurotransmitters

Acetylcholine Substance "P"  
 Norepinephrine Anandamide  
 Epinephrine Glycine  
 Dopamine Histamine  
 Endorphin Nitric oxide  
 Enkephalin Glutamic acid  
 Serotonin (5HT) Cortisone  
 GABA Aspartic Acid  
 Oxytocin

© 2007, CNS Productions, Inc.

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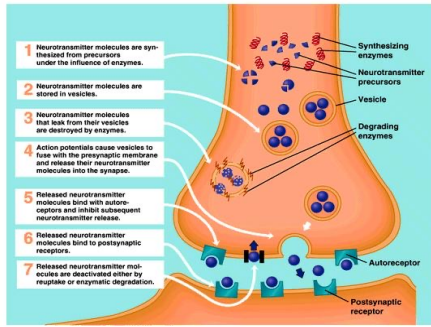
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### ► Seven Processes in Neurotransmitter Action



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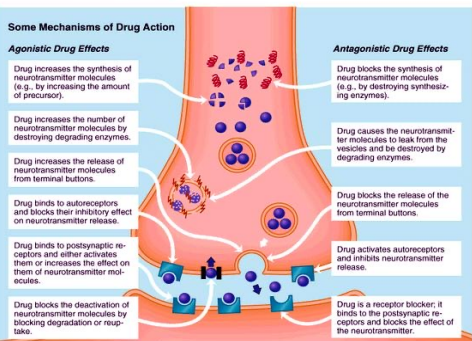
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### ► Mechanisms of Drug Effects



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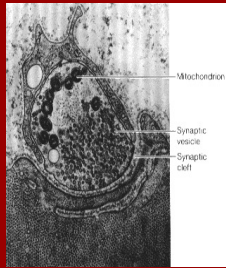
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## Synapse @ 50,000x Electron Microscopy



Courtesy of Thomas Deerinck,  
NCMIR/Photo Researchers, Inc.



Professor Terry Wiseth,  
Northland College

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## Synapse @ 50,000x Electron Microscopy



Courtesy of Thomas Deerinck, NCMIR/Photo Researchers, Inc.

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## Drugs Mimic, Disrupt, or Block Neurotransmitters

### SOME EXAMPLES -

**UPPERS:** Catecholamines (Norepinephrine, Epinephrine, Dopamine) + Serotonin and Acetylcholine

**DOWNERS:** Endorphin, Enkephalin, GABA, Serotonin

**PSYCHEDELICS:** Serotonin, Acetylcholine, Alpha Psychosin, Norepinephrine, Dopamine, Anandamide & endocannabinoids

**Critical Point:** The human Brain is a Pharmacy and any psychoactive substance merely mimic or disrupt neurotransmitters

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## Taking one: *Uptown, Downtown and "Outatown"*

- **CNS Stimulants** increase the electrical and chemical activity of the brain (caffeine to 'Ice')
- **CNS Depressants** decrease the electrical and chemical activity of the brain ('booze' to 'benzos' to opioids)
- **All Arounders** (Psychedelics) distort and interfere with brain perceptions to produce delusions, illusion, hallucinations, & synesthesia (DXM: 'Robo' to 'paka-lolo' to Sylvia d)
- **Misc:** Inhalants, Anabolic Rhoids, Behaviors

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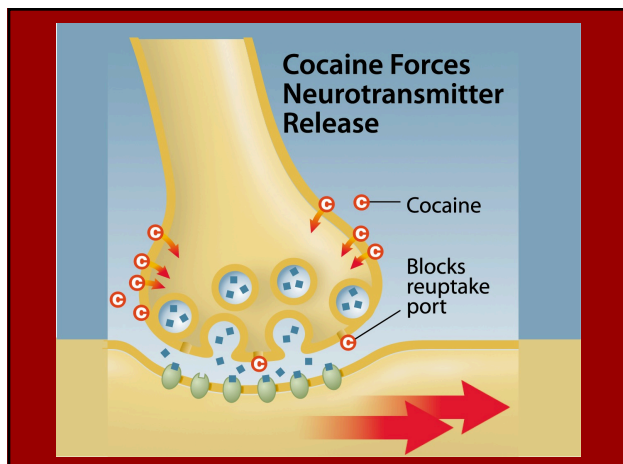
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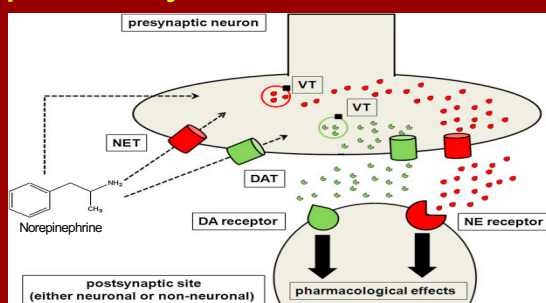
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## Amphetamines also force release of catecholamine neurotransmitters "high" is produced by brain's natural stimulants



Brodie, Cho, Stefano, Gessa (1969) Adv Biochem Psychopharm

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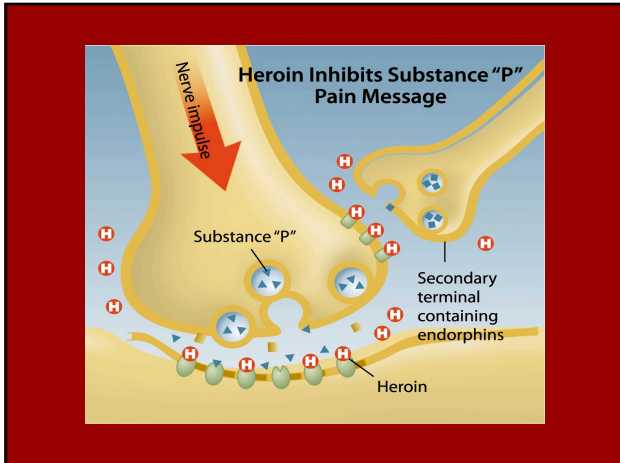
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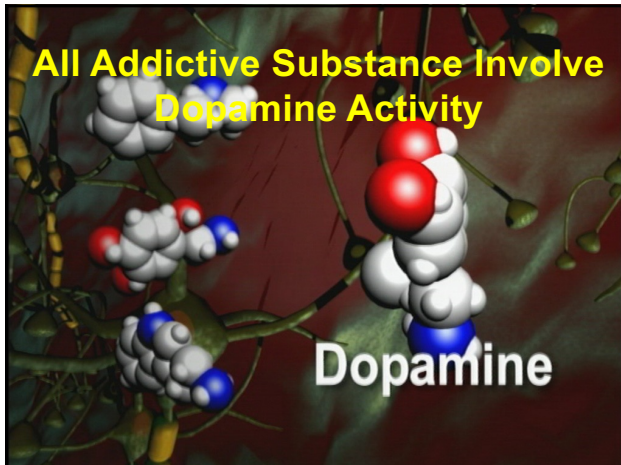
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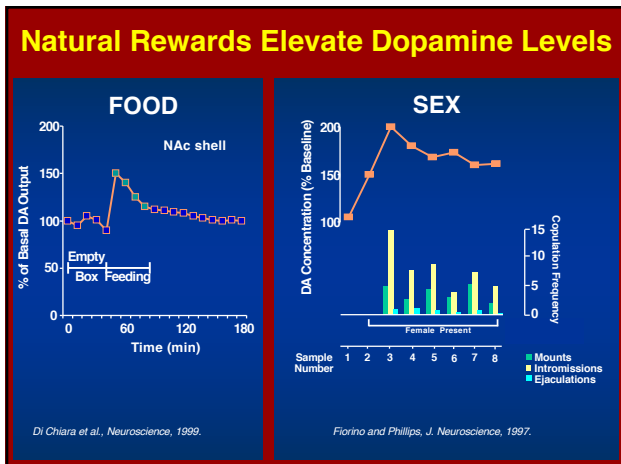
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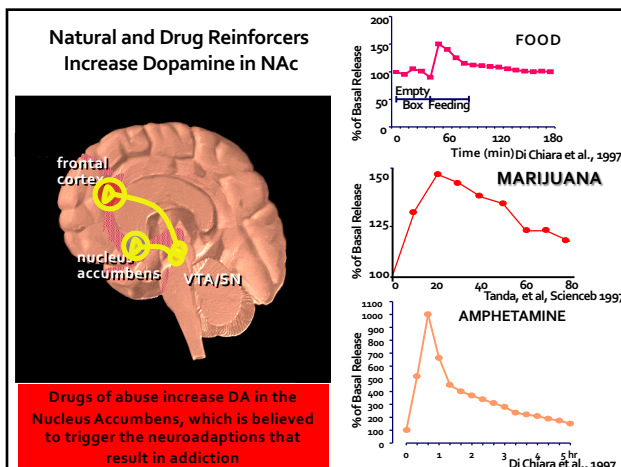
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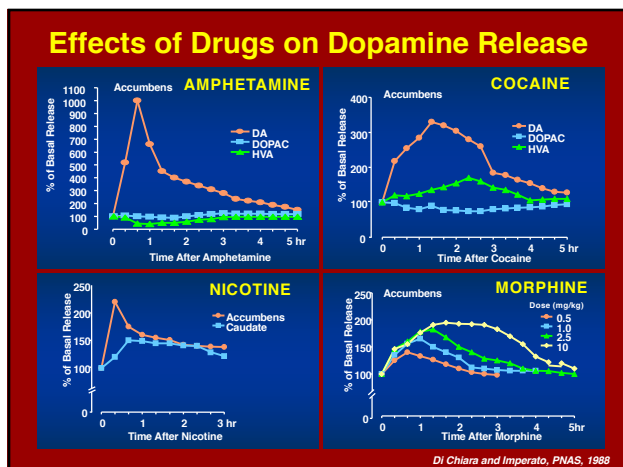
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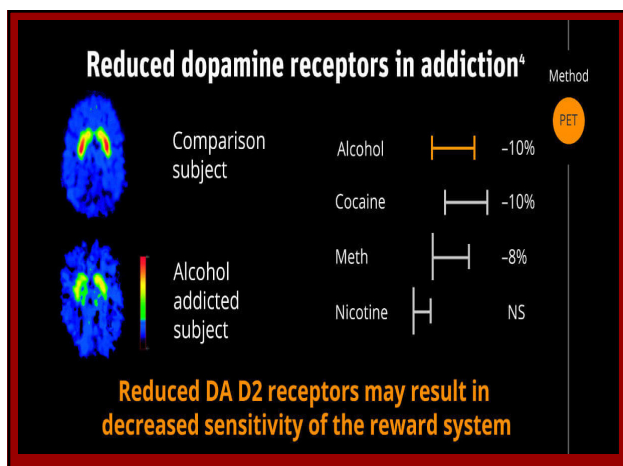
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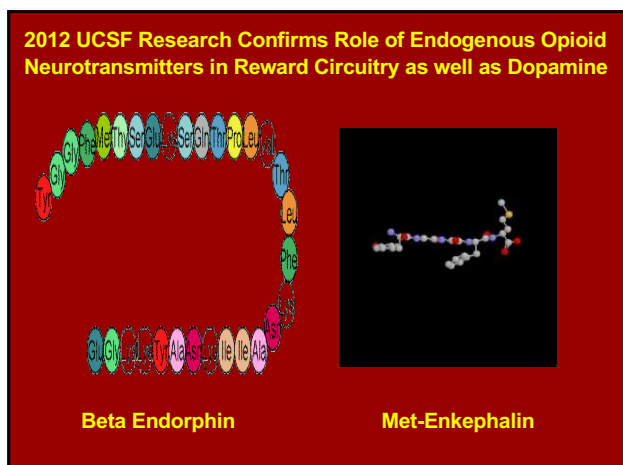
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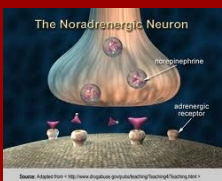


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**Also Excess Nor Epinephrine (Nor Adrenaline) and Less Transporters in Pathological Gamblers**



Oc1ccc(O)cc1[C@H](O)CN

Noradrenaline



Confirmed: Takahashi et al. 2012

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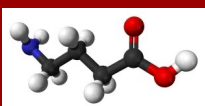

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**Expanding Role of GABA & Glutamate**



[NH3+]CCCC(=O)[O-]

Gamma-aminobutyric acid (GABA)

OC(=O)CC[C@H](N)C(=O)O

Glutamate  
(glutamic acid)

**Inhibitory**                      **Excitatory**

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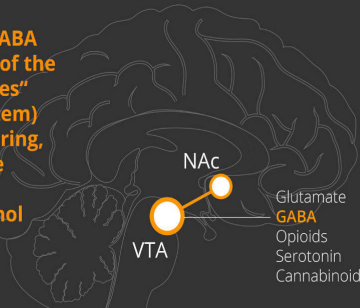
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**Dopamine is key for motivation and reward and is modulated by other transmitter systems<sup>s</sup>**

Method  
PET

Deficiency in GABA receptors, one of the principal "brakes" (inhibitory system) on dopamine firing, may contribute to the loss of control in alcohol dependence



VTA      NAc

Glutamate  
GABA  
Opioids  
Serotonin  
Cannabinoid

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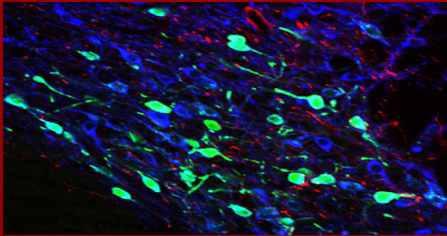
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## Glutamate role in Addiction Pathway confirmed Nov. 2014



Labeled neurons in rodent reward circuitry that starts in dorsal raphe with glutamate stimulation releasing dopamine to the VTA (pictured — ventral tegmental area). *Image courtesy Dr. Marisela Morales, NIDA IRP*

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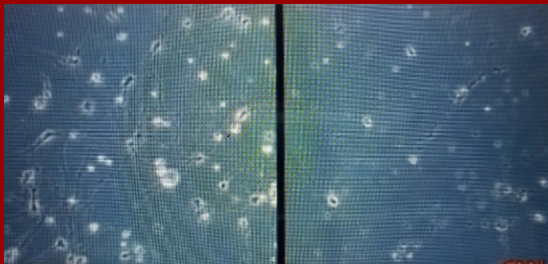
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## Glutamate Receptors decreased due to Addiction

Hurd, Yasmin



Courtesy of Green, R. (2019) NAADAC OUD 360 Presentation

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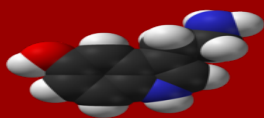
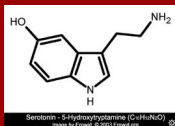
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## Serotonin aka 5-hydroxytryptamine also involved with all addictions?



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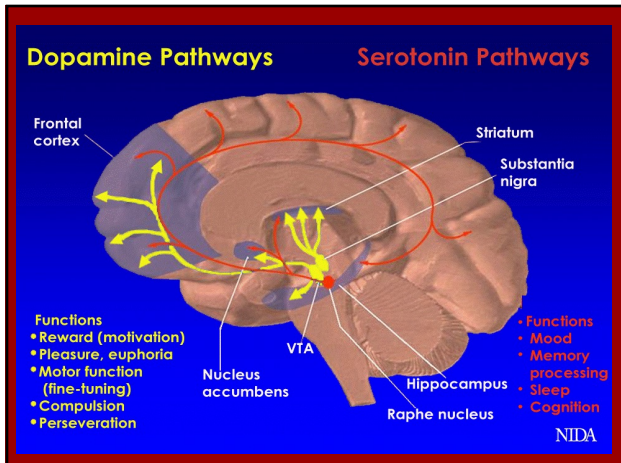
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**Brain Imaging**

**1980s – First MRI studies of brain development**

**1990s – fMRI find white matter increases and gray matter decreases with age**

**Thus, Process of Brain Development & Impact of Addiction Pathology Revealed**

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## Portable fMRI Halo Systems



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## Functional Near Infrared Optical Imaging (fNIR)



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## Addiction Pathology via new neuroimaging techniques

Anatomical (Structure)

*CT/CAT, MRI/MRI-GUI, X-Ray,  
dMRI,*

Functional

*ASL, DOI/DOT, EEG, EROS,  
fMRI/ Bold fMRI, MEG, PET,  
SPECT, SPM, DTI, et al. Scans*

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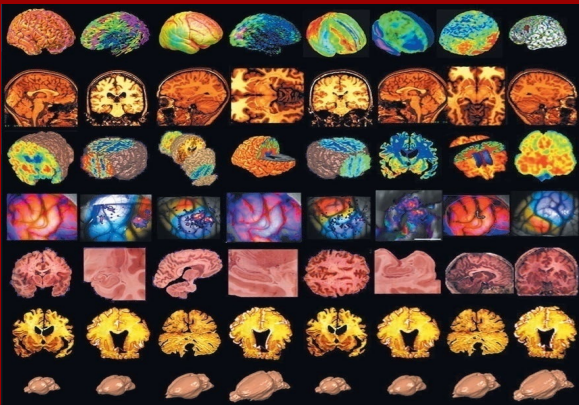
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## Multiple Brain Imaging Techniques



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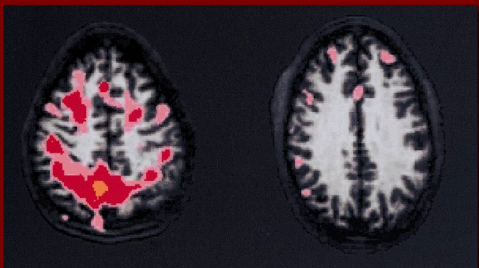
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15 year old male  
non-drinker

15 year old male  
heavy drinker

180

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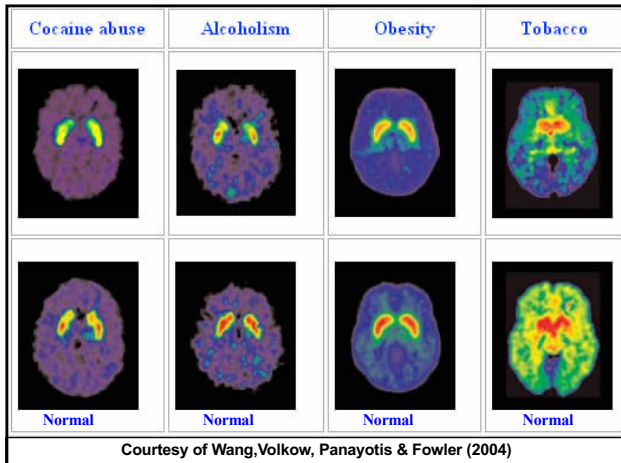
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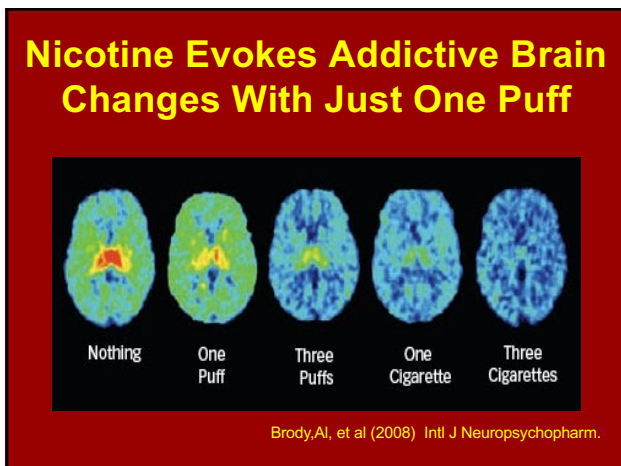
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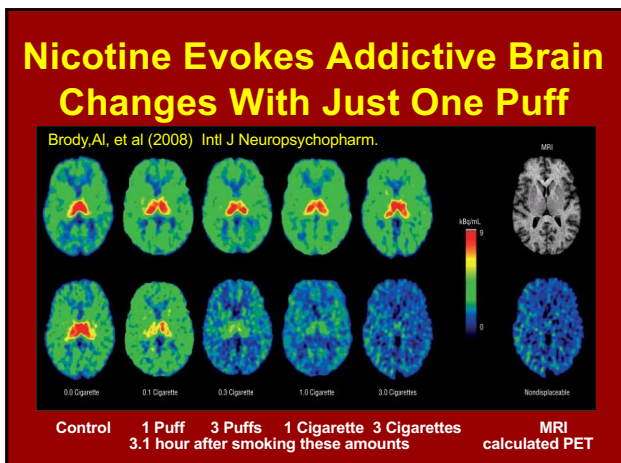
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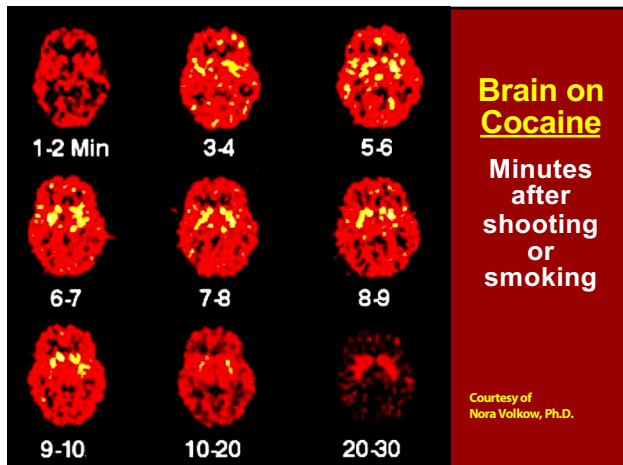
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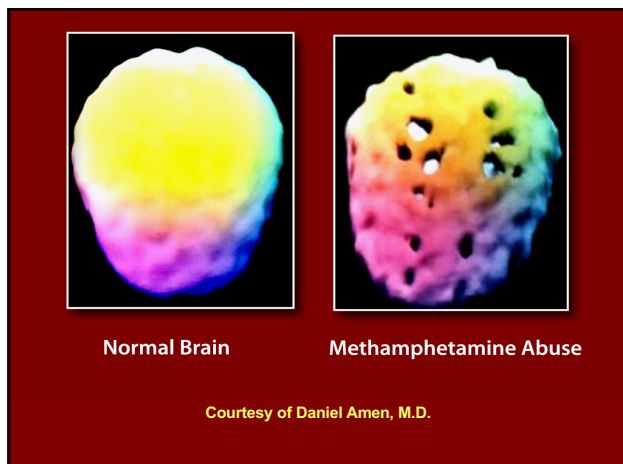
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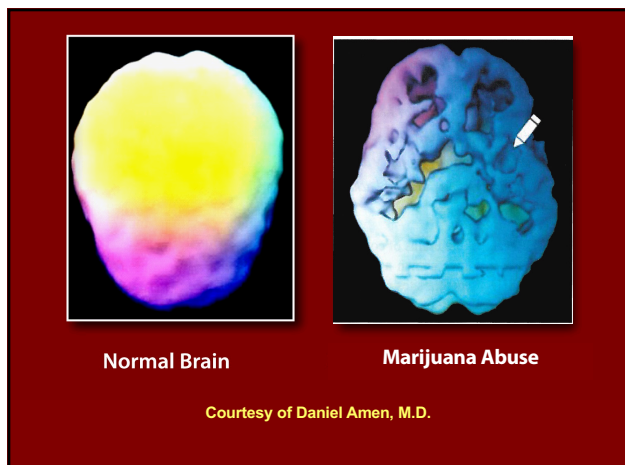
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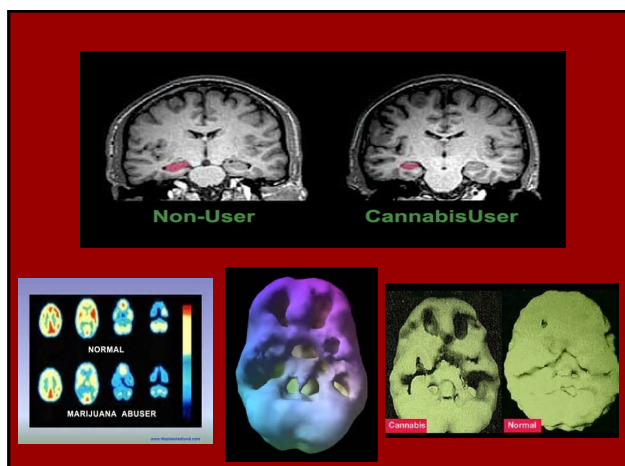
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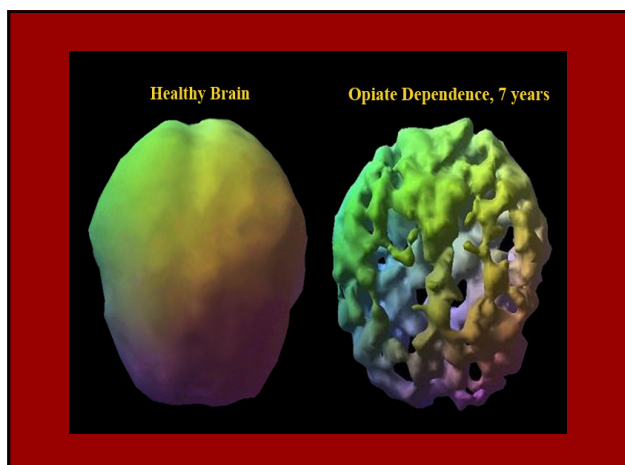
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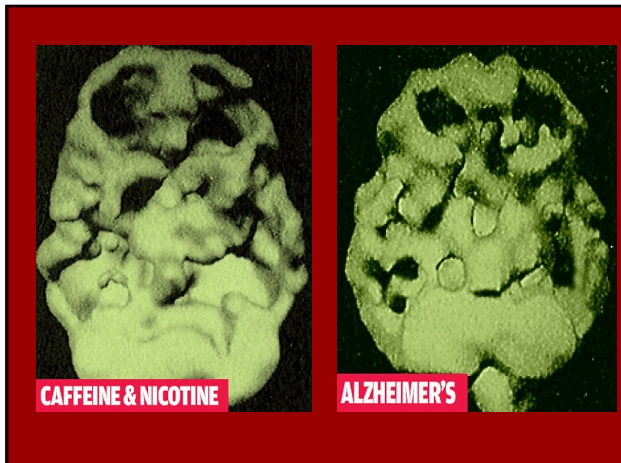
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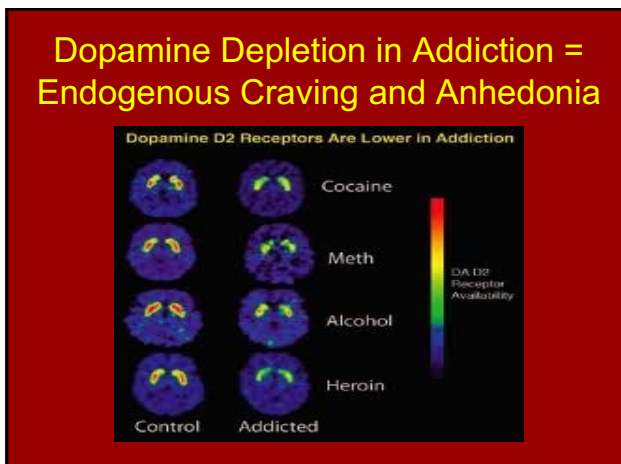
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**DSM-5 May 18, 2013**  
**Impulse Control Disorders of DSM IV-TR redefined as Substance-Related and Addictive Disorders**

**Pathological Gambling** accepted as such  
 Compulsive Buying?  
 Compulsive Sexual Behavior maybe  
 Internet or Compulsive Computer Use?  
 Others: Trichotillomania, Kleptomania, Pyromania, Intermittent Explosive Disorder

192

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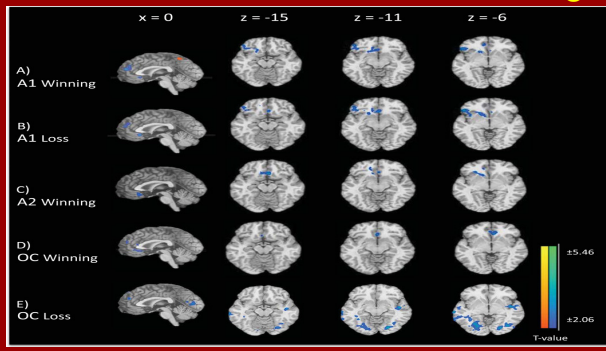
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## Brain Imaging Revealing Anomalies Of Process Addictions: Gambling



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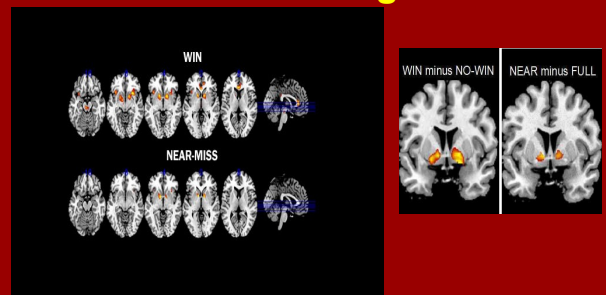
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## MRI scans show gambler's brain reacts similar to win or near miss in Skill-Learning areas



194

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### Phases of Gambling

- 1 Winning
- 2 Losing
- 3 Desperation
- 4 Giving-up



195

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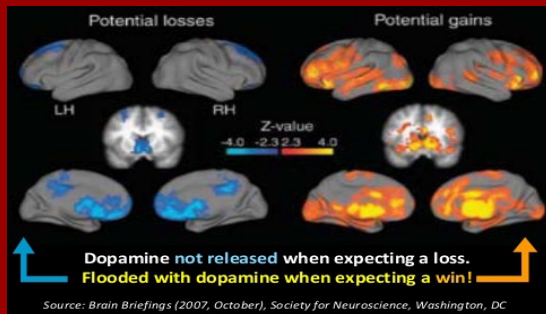
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## Win Expectation releases loads of dopamine in gambler's brain



196

## Drug Users vs. Compulsive Gamblers

- Always using/gambling or thinking about using/gambling
- Need greater and greater amounts of the drug or gambling chips
- Cessation of using/gambling triggers withdrawal symptoms
- Continue to use/gamble despite adverse consequences
- Have a strong tendency to use/gamble again

197

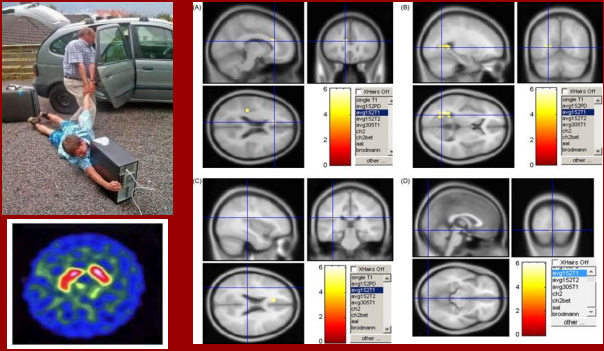
## Internet Addictions

Cybersex  
Net relationships  
Net compulsions  
Information  
Gambling  
Games



198

## Internet Including Gaming and Gambling On-Line



199

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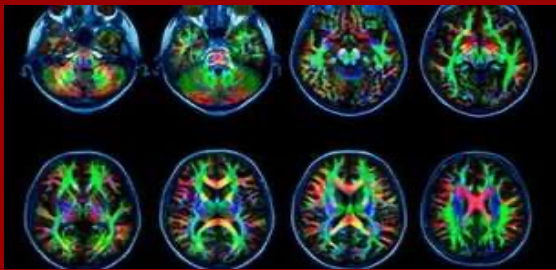
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## Internet Addiction Disorder (IAD): anomalies of white matter, decision making and self-control



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## Smartphone Addiction (SPA)



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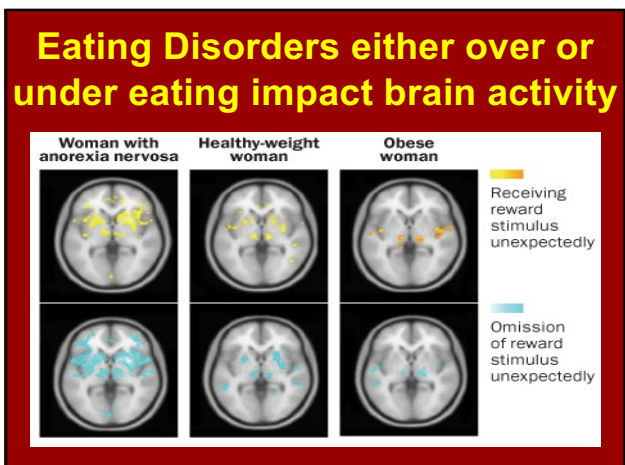
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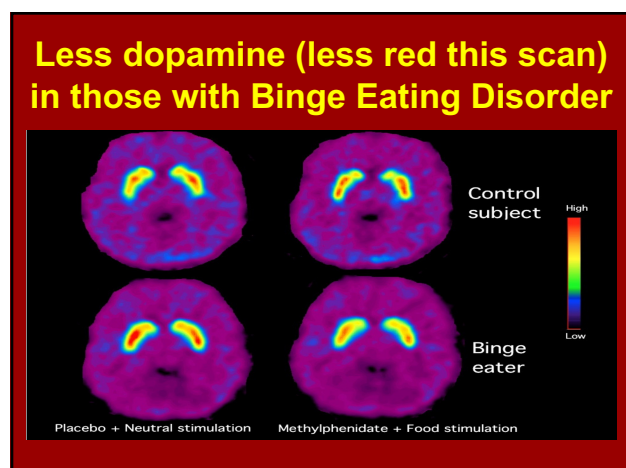
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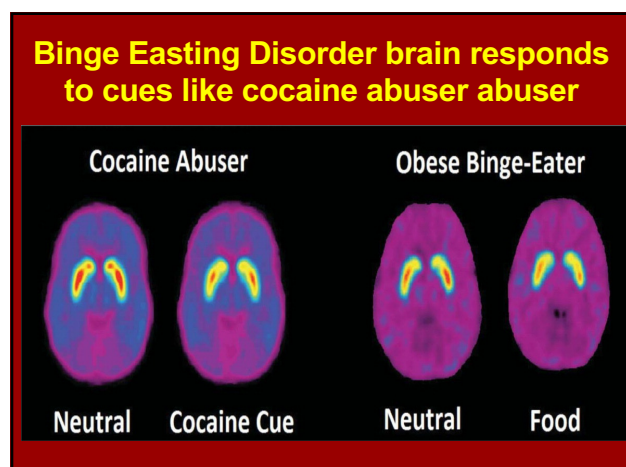
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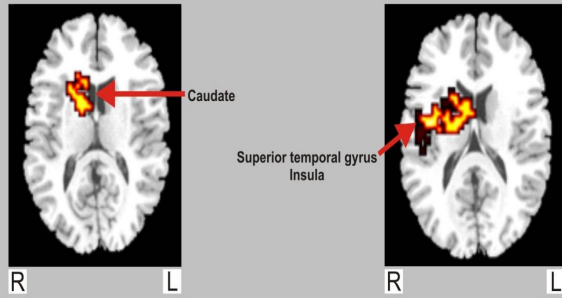
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## Bulimia activates brain greater than Anorexia

Bulimic > Anorexic patients



205

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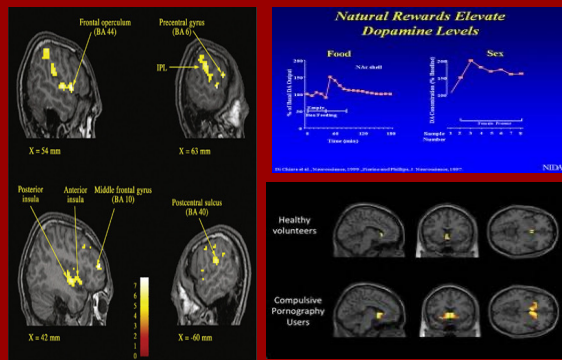
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## Sex Addiction



206

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## Pornography Addiction: same brain activity as in alcoholism and drug abuse



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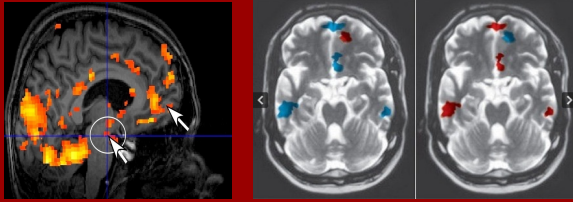
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## Romantic Passion = Love Addiction

Dr. Helen Fisher Rutgers & Dr. Lucy Brown Albert Einstein College



Brain scans of newly in love viewing photos of love vs. others show VTA activity to NAcS to Frontal Cortex same as drug addiction. Major Symptoms of Romantic Love: Craving for Emotional Union, Intense Thinking / Compulsion, and Motivation to win the person that are involuntary and hard to control

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## Dopamine Depletion in All Addictions = Endogenous Craving and Anhedonia results in Reward Deficiency Syndrome

Dopamine D2 Receptors Are Lower in Addiction



209

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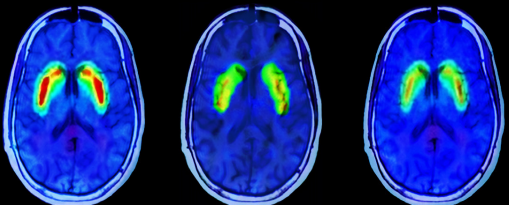
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Normal

Cocaine

Obese



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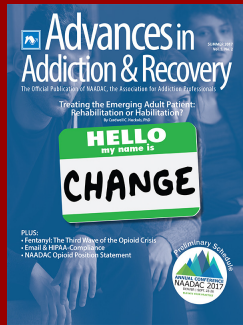
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**Inaba, DS (2017). Process Addictions: Brain Chemistry Correlates to Chemical Dependencies. Adv. Add. & Rec., 5(2):26-27**



211

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## Conclusions

- Addiction is not about morals, will power or character. It's about anomalous neurocellular, neurochemical and neurofunctional features of vulnerable brains that hijacks their reward and control circuits (really survival/preservation instincts) resulting in behaviors that are defined as Addiction – an impairment of choice
- The only reason psychoactive processes (drugs or behaviors) effect consciousness is that we already possess the ability to experience those feeling without taking drugs
- Good news is that the brain is resilient, it's plastic, it has ability to bring itself back to healthy functionality if given the chance to.

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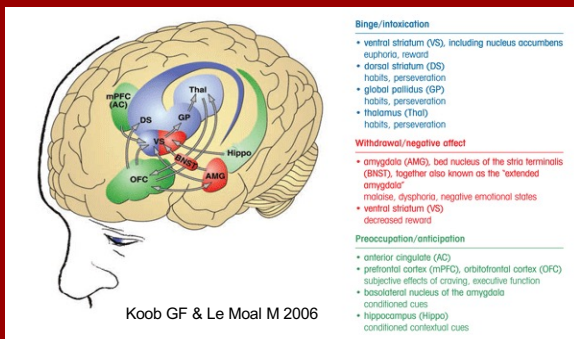
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## Neurobiology of the Three Stages of Addiction



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**A lot of information  
compressed in a very  
short time!**

**Questions?**



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### **Conclusion:**



- The Science of Addiction, Recovery and Relapse is advancing at an explosive rate subjecting those who work in the field to a vast spectrum of technical disciplines
- Addiction is a hijacking of one's Survival Instincts, relapse is a conspiracy of that hijacked brain to continue its destructive course
- Though complex, the recent discoveries continue to validate traditional understandings and interventions

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### **Epilog: Addiction Treatment Developments – Medication/Medical Device Assisted Treatment**



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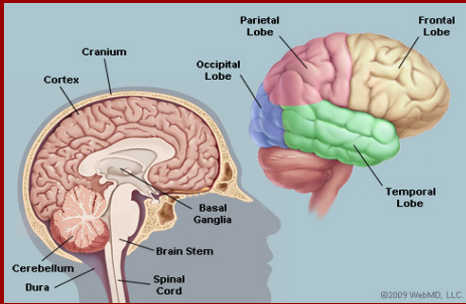
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**Remember: Both Cortical and Sub-Cortical parts of the brain involved in Addiction**

Neocortex: Aware Human Brain



Mesocortex, Limbic System, Basal Ganglia:  
Unconscious Survival Brain

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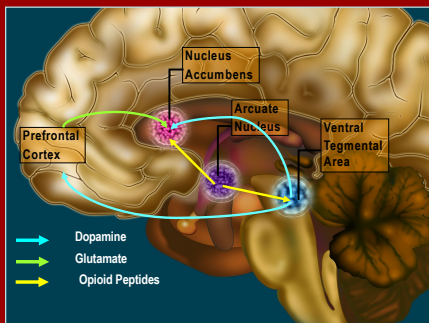
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217

### Brain's Addiction Pathway



Courtesy of Dr. John Hart, Portland, Oregon

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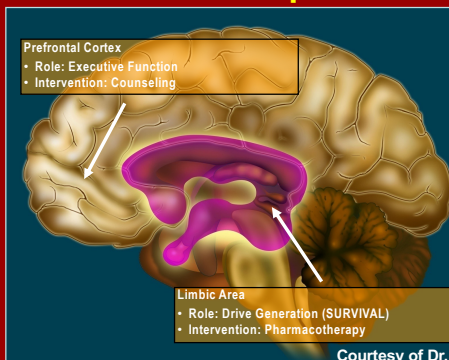
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218

**Thus, Both the Unconscious & Conscious Brain Require Treatment**



Courtesy of Dr. John Hart

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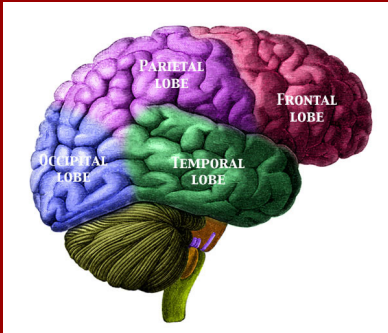
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## Clinical Treatments Targeted for Cortical (conscious) processes of Addiction



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## Clinical Interventions: Evidenced-Based & >100 yrs of Practiced-Based Interventions

- National Registry of Evidence-Based Program and Practices: SAMHSA & State
- Cognitive Behavioral Therapies: Motivational Interview/Enhancement, DBT
- Levels of Change
- Individual and/or Group Counseling (process, therapy, education, topical, open)
- Manual Driven Curricula (e.g. Matrix)
- Self-Help Groups (12-Steps, et. al.)

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## Family Disorder - New Paradigm of Addiction Treatment

Addiction is a systemic and family disorder.  
It impacts everyone not just the addict.

Studies now document that treatment of addiction in isolation, without the involved treatment of families and systems that are part of an addicts life will result in a more frequent return to the addictive roles and behaviors of their disorder.

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**25% of American Kids grow up in households where substance abuse is present**

**These children are more likely to suffer:**

- Poor school performance
- emotional and behavioral problems
- Low self-esteem
- Higher risk of physical, verbal, or sexual abuse
- Higher risk of anxiety or depression problems
- Early onset drug and/or alcohol use
- Greater risk of developing addiction

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## **Recovery Coach**

- Recovery Coach, Mentor, CRM
- Sober Companion, Escort, Mentor
- Recovery or Peer Support Specialist
- Family Recovery Coach
- Telephone or Virtual Recovery Coach
- Legal Support Specialist Recovery Coach
- Volunteer Peer Recovery Support Specialist

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## **Trauma Informed/Focused Care**



Trauma Informed Care is an organizational structure and treatment framework that involves understanding, recognizing, and responding to the effects of all types of trauma. Trauma Informed Care also emphasizes physical, psychological and emotional safety for both consumers and providers, and helps survivors rebuild a sense of control and empowerment.

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## "Recovery "Capital" Within All



Discover - Brain Heart The Guide Courage

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## Clinicians See The Great Potential In All Their Clients



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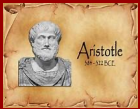
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## Attempts to Deal with addiction has a long history in humanity



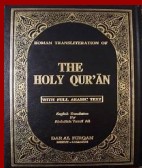
Greeks first to see genetics and addiction



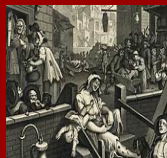
Inca's reserve coca use to select citizens



Native Americans use of peyote & shrooms for spirituality only



Muslim Ban on alcohol use



William Hogarth Gin Lane 1751

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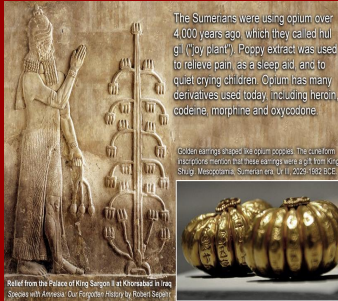
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## Sumer: earliest known civilization 5,500-4,000 BC, Firsts: written language, brew beer and opium use



Hul Gil Sumer for Joy Plant

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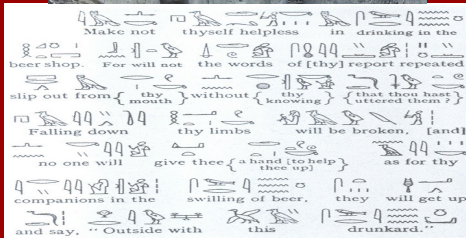
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## Rameses II 1350 BC



In Other Words: Drink Responsibly!

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## Manco Capac ~1200 AD Founder of Inca Empire



Limits and Controls  
Chewing of Coca  
Leaves in his Empire

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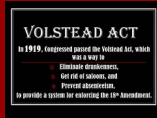
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## And our Temperance Movement → “failed?” Prohibition of 1919



Carrie A. Nation  
Women's Christian Temperance  
Union arrested 30 times between  
1900 - 1910



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**For millennia civilizations have  
combated Substance-Related and  
Addictive Disorders only targeting  
the conscious cortical brain**



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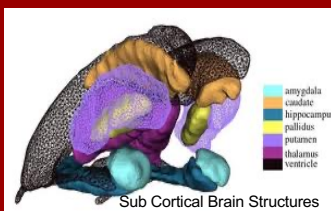
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## Treatments Targeted for Sub Cortical (unconscious) Processes of Addiction



i.e. ~400 vaccines, genetic therapy, pharmaco-  
genomics, and ~more medication treatments in  
developments than any other medical condition

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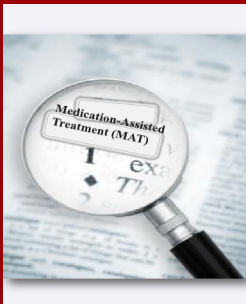
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Medication-Assisted Treatment (MAT) is the use of medication, combined with counseling and behavioral therapies, to provide a whole patient approach to the treatment of substance use disorders.  
<http://www.dpt.samhsa.gov>

**Realized Benefits:**  
**Decreased Overdose Drug Deaths**  
**Decreased Disease and Violent Crimes**  
**Increased Addiction Treatment Positive Outcomes**  
SAMHSA (2018) TIP 63

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## MAT – Medication-Assisted Treatment

Maintenance pharmacotherapy, replacement therapies, chemically assisted detoxification or recovery; agonist mediated “anti-priming” treatments, pharmacologic restoration of neurohomeostasis, addiction vaccines, pharmacogenomics and genetic treatment “resetting” the addicted brain. Such terms would have been incomprehensible or even oxymoronic in the recovery field just a few short years. Now, increased “medicalization” of addiction treatment.

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## Most opioid addicted individuals do not receive medications

- FDA-approved medications to treat OUD -- clinical and cost-effective
  - Saves lives, saves money
  - One component, along with psychosocial treatment
- 30% of treatment programs offer medications<sup>8</sup>
- Less than half of eligible patients in specialty treatment receive medications<sup>9</sup>
- Missed opportunity to utilize most effective treatments

Courtesy Dr. John Femino, MD; Meadows Edge Rec. Ctr., RI

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## Abstinence Based Data Outcome

### Does Abstinence-Based Treatment Work?

#### ➤ National Treatment Outcome Research Data on Opioid Addiction Pts

242 patients in residential treatment:

34% relapse w/in 3 days      50% relapse w/in 14 days  
45% relapse w/in 7 days      60% relapse w/in 90 days

➤ Multiple "Studies consistently show 2/3 of patients in abstinence-based programs relapse". Dr Batki, MD Prof of Psy, Upstate Med Center Syracuse

Courtesy Dr. John Femino, MD; Meadows Edge Rec. Ctr., RI

Do programs that only offer abstinence basis insufficient?

Should abstinence only based programs be approved?

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## ASAM not Divorcing Clinical Interventions, MAT viewed as added resource: Concept of Recovery Dose Equivalency/Recovery Skill Development

Concept of "dose equivalent" = reduction of withdrawal symptoms by non-drug techniques = social setting detoxification, supportive care

- Need to try non-pharmacological approaches
  - Change setting – go for a walk, exit strategies, re-arrange living environment
  - Asking for help
    - Calling sponsor
    - Speaking about feelings
  - Exercise
  - Attending meetings
  - HALT techniques
  - Hot baths / showers
  - Massage
  - Meditation, visualization
- Other pharmacotherapies
  - NSAID
  - Mood stabilizers
  - Antidepressants
  - Sleeping aids (often unnecessary when buprenorphine dose is adequate)

ASAM Nat. Practice Guideline in Addiction Treatment of OUD

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## OUD Treatment Gap



- Only 31% of U.S. illicit drug abusers receive any treatment for addiction
- Of those who received treatment only 20% were treated by addiction focused facility
- Of the 20%: 31% of OUD patients & 37% of heroin use disorders received MAT (but too short & low dose)
- OUD without MAT: 80% relapse; With MAT 50% relapse

Stein, JB. (2018). Adv. In Ad & Rec. 6(2): 22-25

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## Uncomfortable to Lethal Withdrawal Process for all Drugs Were Qualified and Quantified Later Leading to Effective Withdrawal Assessment Tools

- **CIWA-Ar** Clinical Institute Withdrawal Assessment of Alcohol-Revised
- **COWS**, Clinical Opiate Withdrawal Scale
- **ACSA**, Amphetamine Cessation Symptom Assessment Scale
- **BWAS**, Benzodiazepine Withdrawal Assessment Scale
- **WAT-1**, Withdrawal Assessment Tool
- **MSSA**, Modified Selective Severity Assessment Detoxification Scoring

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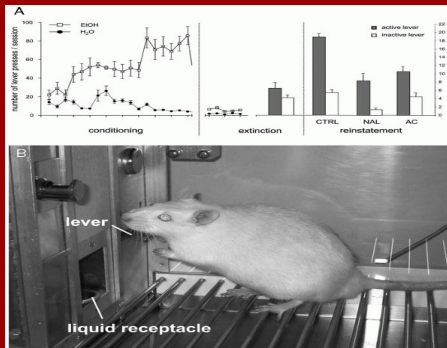
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## Initial Abstinence: Pharmacological Cue Extinction via naltrexone and acamprosate



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## Meds for Alcohol Treatment

- disulfiram (Antabuse®)
- naltrexone: (ReVia®, Depade® PO or Vivitrol® IM)
- acamprosate (Campral®)
- chlordiazepoxide (Librium®) or **Off-Label** phenobarbital, other benzodiazepine for short-term detox
- **Off-Label**: clonidine (Catapres®), lofexidine (Britlofex®), prazosin (Minipress®)
- **Off-Label** Anti-Seizure meds: topiramate (Topamax®), gabapentin (Neurontin®)
- Misc. **Off-Label**: ondansetron (Zofran®), flumazenil in - Prometa, baclofen (Lioresal®), nalmefene (Revex®, Selincro®)

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## Meds for Nicotine Treatment

- varenicline (Chantix®)
- bupropion (Zyban®, Wellbutrin®)
- Nicotine Replacement Therapies (NRT): gum (Nicorette®), patch (OTC-Nicotrol®, Nicoderm CQ®; Rx-ProStep®, Habitrol®), spray (Nicotrol NS®), inhaler (Nicotrol® aerosol), and lozenge (Commit®)
- Off-Label: nortriptyline, clonidine

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## Meds for Opioid Treatment

- buprenorphine (Suboxone®)
- naltrexone (Revia®, Trexan®, & Vivitrol®)
- methadone
- levo-alpha-acetyl-methadol (LAAM)
- Lofexidine (Lucemyra®) approved 5/16/18
- Off-Label: clonidine Off-Label: Rapid Opioid Detoxification (naloxone or naltrexone with midazolam, lorazepam, clonidine, Propofol or anesthetics, et al.)
- In research: Ibogaine and tabernanthalog (TBG); NAD
- New: CBD (Epidiolex®) for cravings; Zyprexa or Lyrica for withdrawal

ASAM (2020). J Addict Med., 14(25-1):1-91

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## Meds for Stimulant Treatment

Note: None FDA Approved so all are Off-Label

- Antidepressants: SSRI, TCA, bupropion
- MAOI-B: selegiline
- Neuroleptics: risperidone, olanzapine
- Sedatives: buspirone, lorazepam
- Dopaminergic: bromocriptine, amantadine
- Anti-seizures: topiramate, carbamazepine
- Amino Acids: tyrosine, phenylalanine
- Misc.: naltrexone, disulfiram, modafinil, ALKS-33

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## Meds for Sedative-Hypnotics

Note: None FDA Approved so all are Off-Label

- Usually cross-dependent medication is used and slowly tapered to detox
- Anti-seizure medications: phenobarbital + phenytoin or carbamazepine or gabapentin
- flumazenil post detox to block cravings
- SSRI, TCA, or buspirone for anxiety and/or restlessness
- Valproate (Depakote)

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## Meds for Marijuana Addiction

Note: None FDA Approved so all are Off-Label

- kynurenic acid
- N-Acetylcysteine dietary supplement
- bupropion,
- buspirone
- divalproex,
- naltrexone,
- lithium,
- antidepressants, and
- THC replacement

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## Evolving Developments in Addiction Treatment



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## Plethora of Medication Strategies for Addiction Treatment

- 400 Vaccines and New Antagonists
- New Replacement Agonists (GHB)
- Partial Agonist/Antagonist (cyclazocine)
- Anti-Craving medications (nalmefene, nor-BNI)
- Metabolism modulators (BChE)
- Dopamine modulators (amantadine)
- Amino Acid supplements (Synapta Gen X)
- Ca & Na channel blockers (nimodipine, riluzole)

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## Future of Neurobiology : Drugs

- Drug Development,
  - Safer Meds – pro-drug and combination - antagonists
  - Safer dispensation and storage
  - Non-Addictive Meds
  - Tamper Resistant formulations
  - Vaccine
  - Prescription Monitoring Programs
  - Therapeutic monitoring
  - Detection technology
  - Better Med Delivery Systems: Extended Release preps

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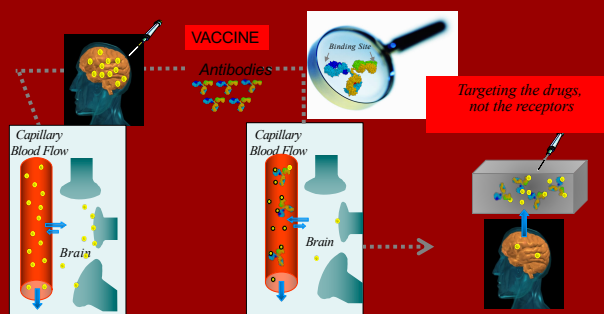
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## Immunotherapies for Addiction Treatment

*Vaccines : Antibodies Reduce Brain concentrations of Drug*



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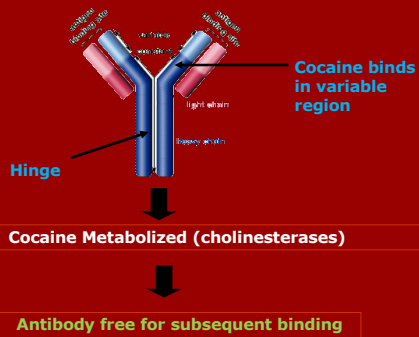
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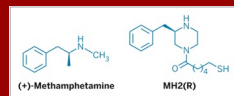
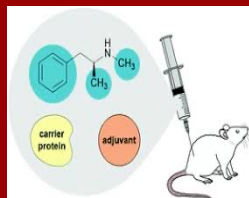
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## The Antibody: how it works



253

## Methamphetamine Vaccine Development

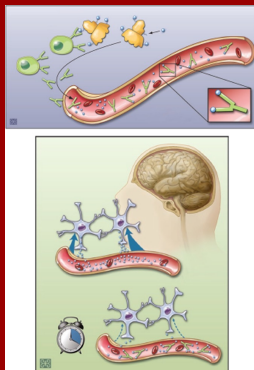


### MH2(R), E6020, and other Adjuvants in investigation

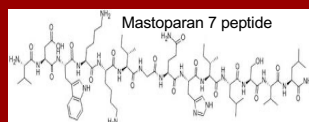
Hossain, MK (2020) Expert Review Vac. 19(12)1105-1114  
Arora R, et al. (2019) Am J Addict 28(2) 119-126

254

## Cocaine Vaccine TA-CD Xenova Group



Kosten, TR 2014. Drug Alc. Deprn 140:42-47

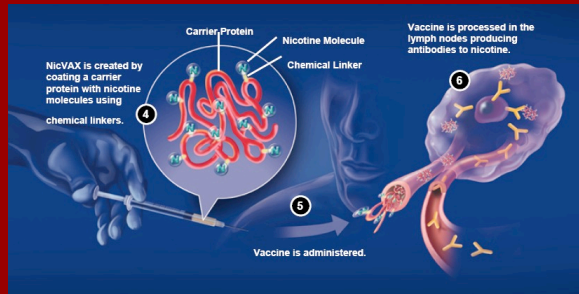


### Mastoparan-7 developed 2020 Improves cocaine Vaccine Efficiency

St. John AL et al. (2020) Npi Vaccines

255

## NicVAX – the vaccine



256

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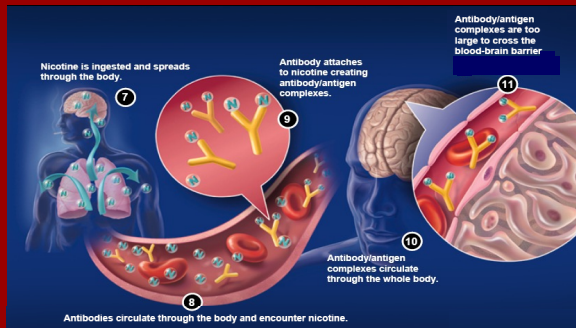
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## Prevent Binding to Brain Receptors



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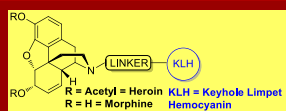
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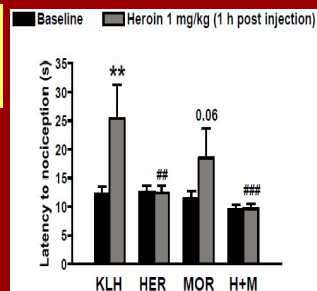
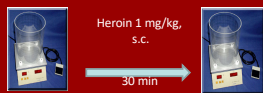
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## New Heroin Vaccine(s)

K.D. Janda & G.F. Koob Laboratories at TSRI



Hot Plate Test



\*\*p<0.01, \*\*\*p<0.001, significant reduction of analgesia vs. Control/KLH group, \*\*\*p<0.001, significant reduction of analgesia vs. Control/KLH group

258

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## Future of Neurobiology : Biology

### Genotype & Phenotype Analysis

#### Diagnostic tests

- Genetic testing – GARS
- Pharmacogenetic Guided Treatment
- Brain Imaging - functionality and connect ability
- EEG – Electroencephalographic
- Biofeedback
- Psychological and Neuro-psychological testing - CPT
- Addiction severity measurement
- Urine Drug Testing and Report Analysis

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## Diagnostic & Therapeutic Uses

- Identification of genetic variability
- Assess functioning of neuronal circuits
- Measure severity and reactivity of triggers
- Provide feedback to patient of status
- Biological basis of diagnosis and risk stratification – SBIRT
- Measure effectiveness of drug treatment

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260

## Research on NAc Modulation to prevent addiction relapse

O'Neal, T.J, Nooney, MN, Thien, K, Ferguson, SM (2019). Chemogenetic modulation of accumbens direct or indirect pathways bidirectionally alters reinstatement of heroin-seeking in high- but not low-risk rats. *Neuropsychopharmacol.* (2019)

90 Genetically diverse Sprague Dawley rats identified 40 that developed heroin addiction (40%; human vulnerability is about 24%) these were deemed high-risk rats. Once addicted researchers found that modulation of addicted mice NAc could decrease opioid relapse and speculate any addiction relapse as well. NAc direct and indirect medium spiny neuron pathways (dMSNs and iMSNs) have oppositional roles in reward seeking relapse behavior. Viral mediated gene transfer (CRISPR CAS9) of DREADDs demonstrated that transient inactivation of dMSNs or activation of iMSNs suppresses cue-activation of relapse in high-risk but not of low-risk rats. They were not able to discern motivation for high-risk vs low-risk mice to use heroin.

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261

### MAPK phosphorylation of Npas4 to facilitate its interaction with CBP could be key to treatment of drug addiction and behavioral disorders

**Reward circuit controls happy feelings**

Motivation  
Desire

Nucleus accumbens

Reward circuit

Reward circuit is involved in behavioral disorders  
Schizophrenia  
Drug addiction

**Novel mechanism for controlling reward-related behavior**

Dopamine

Synapse

Plasma membrane

D1 receptor

Activation

MAPK

Phosphorylation

Npas4

CBP

Binding

CBP

Npas4

DNA

Nucleus

Reward Memory

Neural plasticity

Gene expression

Promotion

[Yasuhiro Funahashi](#) et al. (2019), Cell Reports, 29(10):3235-3252

262

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### Medical Devices Treatment of Addiction

#### NSS-2 Bridge®

**FDA Approved 11/15/17**

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The NSS-2 BRIDGE is a percutaneous nerve field stimulator (PNFS) device system, that can be used as an aid to reduce the symptoms of opioid withdrawal, through application to branches of Cranial Nerves V, VII, IX, and X, as well as branches of the occipital nerves identified by transillumination

**FDA Approved 11/15/17**

Time Point	COWS Score (approx.)
Pre Device Placement	20
20 Min Post Placement	8*
30 Min Post Placement	4*
1 hr Post Placement	2*
5-day Post placement	1*

(\*p<0.001)

**Figure 1:** Opioid withdrawal scores before and after BRIDGE device placement. A significant decrease in scores was seen after just 20 minutes with an 84.6% reduction from baseline by 60 minutes and 97% after 5 days (\*p<0.001 vs baseline scores).

**Green R. 2019 NAADAC OUD 360 Presentation**

264

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## Repetitive Transcranial Magnetic Stimulation - rTMS



Bellamoli, E et al. (2014) Beh. Neurology

265

## Transcranial Magnetic EEG/EKG Guided Resonance Therapy (TMeR)

### Magnetic e-Resonance Therapy (MeRT)

MeRT (deep signal) across multiple bands, personalized to an individual's intrinsic profile, and guided by q-EEG to specifically targeted areas (brain navigation)

Addiction Treatment Evolution: Physical to Behavioral (Spiritual) to now Physiologic Health Interventions

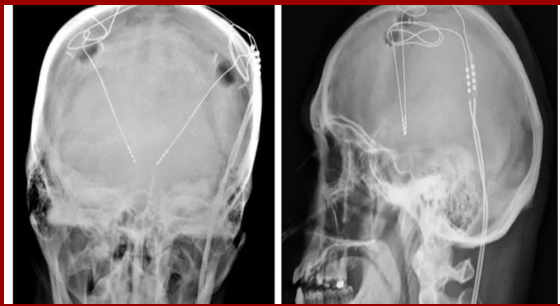
266

## Deep Brain Implants for Methamphetamine & Opioid Use Disorder



267

## Deep Brain Stimulation for Opioid Use Disorder Nov. 2019



University of West Virginia

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**Dr. Ali Rezai of West Virginia U. Rockefeller Neuroscience Institute studying: Focused Ultrasound, Wearable/Artificial Intelligence, Transcranial Magnetic Stimulation, & Deep Brain Stimulation to reduce addiction craving and behaviors**



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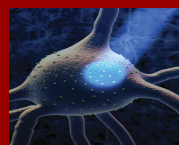
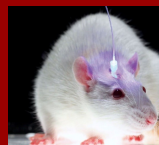
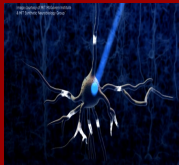
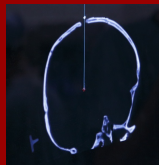
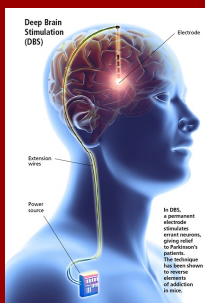
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## Deep Brain Stimulation and Optogenetics



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## Conclusion

Hope! Though the challenges to maintaining sobriety are daunting, developments in treatment continue to improve outcomes. Remember, the qualities in those that makes one vulnerable to addiction are also qualities we look for in our charismatic leaders.

Questions?



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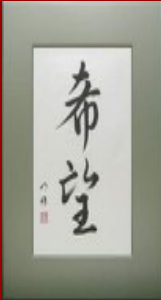
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## Epilog: Treatment Works!



Kibou

Kibou is the Japanese Kanji (calligraphy) meaning hope. It is comprised of Ki = hope and Bou = wish. Combined it symbolizes a good sign to overcome difficult situations or failures.

Addiction is one of the most treatable and manageable of all chronic, persistent medical disorders with positive treatment outcomes that favorably compare with the treatment of diabetes, hypertension, asthma, et al. chronic, persistent illnesses.

Relapse is prevalent in the treatment of all chronic medical disorders. Relapse rates after addiction treatment also compare favorably with treatment of other illnesses.

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272

## Research on the Brain in Recovery



Addiction Recovery

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## Recovery

- Continued Abstinence
- Discovery of Natural Highs
- Recovery of neurotransmitters and of natural brain functions
- Positive lifestyles and quality of life enhancements
- Remember: Not an Event but a Process

*One does not cure addiction, you treat it and manage it like any other chronic persistent medical disorder*

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## RECOVERY The Resilient Brain

8-10 Months Rigorous Uninterrupted  
Treatment for Reasonable Outcomes

Implies time needed for brain to  
become functional

Takes up to 2 years for greater  
functioning to return

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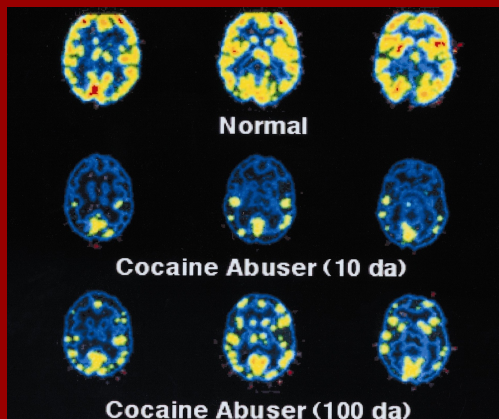
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Courtesy of Nora Volkow (Volkow, Hitzmann, Wong, et al 1992)

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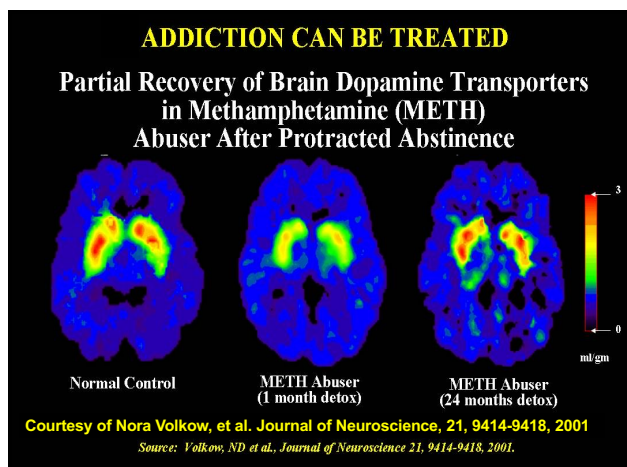
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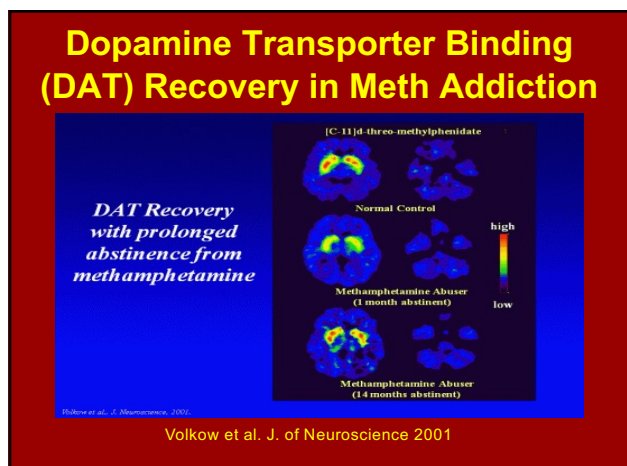
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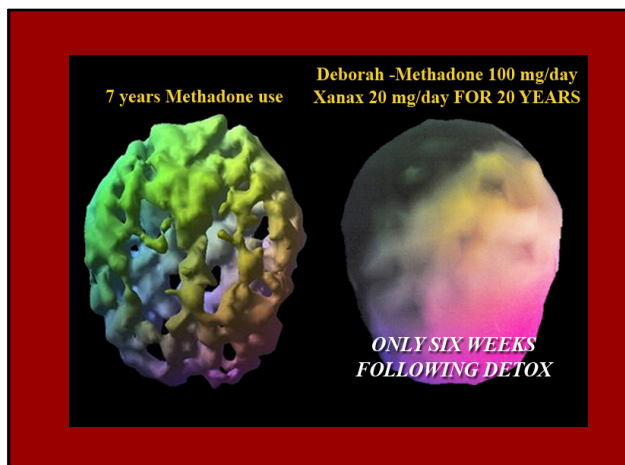
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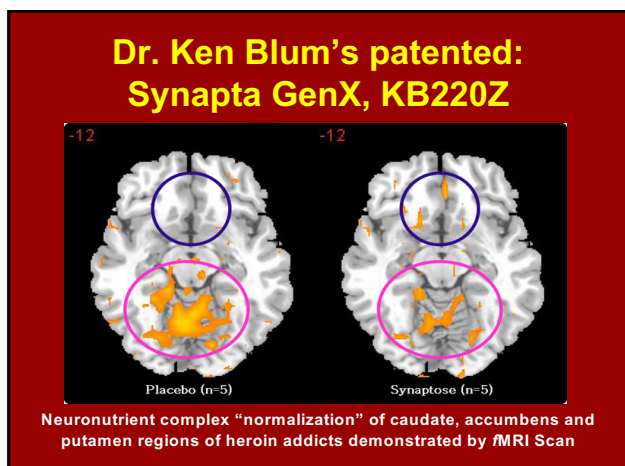
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**Treatment Works!**

- 3 to 5 Yrs. Continued sobriety = 50% (1yr 80%)
- Decrease Crime = 75%
- \$7-\$12 Savings for every \$1 Spent
- Positive results from 6-8 mo. Treatment
- Coerced treatment better than voluntary
- Decreased Psychiatric (40%), Family/Social (50-60%), Medical (15-20%), Employment Problems (15-20%)
- Culturally consistent better than generic treatments

Belenko, et al. 2005

282

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## Recovery

- Continued Abstinence
- Discovery of Natural Highs
- Recovery of neurotransmitters and of natural brain functions
- Positive lifestyles and quality of life enhancements
- Remember: Not an Event but a Process

*One does not cure addiction, you treat it and manage it like any other chronic persistent medical disorder*

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- **Good News!**

*Recovery Works and the brain is **resilient!***

- **Not so Good News**

*It takes time, several months to years to just become functional, and a bit more to enjoy life again*

- **Addiction Pathways**

*Shrink with Disuse and new alternate pathways become established ("Extinction") but addicted neurons are permanent and **Recovery is a Life-Long Process!***

284

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## Conclusions



Me about right now!

◆ Addiction treatment results in miraculous outcomes for those who commit to and maintain continuous recovery efforts.

◆ Developments in treatments of addiction continues to improve outcomes that improve lives and health for all.

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**Really, a lot of information  
thrown at you today!**



**Questions?**

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**Current Science of Addiction & Recovery  
Dispelling Stigma is Done!!**



**Great Work All and Thank You for Participating in  
The Spring MH Virtual Summit 2021**

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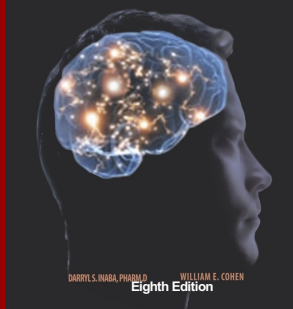
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**Uppers, Downers,  
All-Arounders**  
Physical and Mental Effects  
of Psychoactive Drugs



**Thank You!**

**Darryl Inaba,  
PharmD., CATC-V,  
CADC III**

**Addictions Recovery Center  
and CNS Productions, Inc.**

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**Thanks for participating in the Spring Mental  
Health Virtual Summit 2021**



*Thank you for your inspiration from all that you  
do to promote health and recovery!*

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**Healing Cultural Trauma**

**Dr. Martin Brokenleg**

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**Mato Wanbli - 1850s**

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**Huwegahan - 1870s**

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- Creating a group of people with identical interests.

## Colonization

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A social criticism describing a manipulated understanding of the experience of Indigenous people by western society.

-Dr. Eduardo Duran

## POST-COLONIAL:

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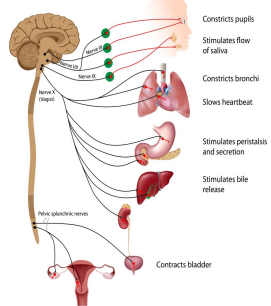
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### Parasympathetic System



- Pain, other sensations
- Sleeping, eating issue
- Hyper-Arousal
- Anxiety, depression
- Emotional flooding
- Forgetting or Indecisive
- Angry, troublemaker
- Addiction

## Signs of Trauma

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- A cumulative
- emotional, psychological, social, and spiritual wounding
- over the life-span and across generations
- resulting from massive group trauma.

-Dr. Maria Brave Heart

## **Intergenerational Trauma**

7

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- A cumulative
- emotional, psychological, social, and spiritual wounding
- over the life-span and across generations
- resulting from massive group trauma.

-Dr. Maria Brave Heart

## **Complex Post-traumatic Stress Response.**

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1948 Geneva definition of Genocide:

intent to destroy a national, ethnic, racial, or religious group.



## **Intergenerational Trauma**

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**Scotland**

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**Ireland**

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**Ukraine**

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**Ruwanda**

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**Syria**

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**ACE Questionnaire**

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1. Did a parent or other adult often swear at you, insult you, humiliate you or make you afraid of being physically hurt?

### **ACE Questionnaire 1.**

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2. Did a parent or other adult often push, grab, slap, throw something at you, or hit you hard enough to leave a mark or injure you?

### **ACE Questionnaire 2.**

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3. Did anyone, five years older than you, touch, fondle, have you touch them in a sexual way or try to have oral, anal, or vaginal sex with you.

### **ACE Questionnaire 3.**

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. 4. Did you often feel that no one in your family loved you, thought you were important or special? Did your family not look after one another, feel close to, or support one another.

### **ACE Questionnaire 4.**

19

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5. Did you often feel that you didn't have enough to eat, clean clothes to wear, or anyone to protect you?

### **ACE Questionnaire 5.**

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6. Were your parents ever separated or divorced?

### **ACE Questionnaire 6.**

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7. Was your mother or stepmother often pushed, grabbed, slapped, or had something thrown at her? Was she ever hit several times in a few minutes or threatened with a gun or knife?

### **ACE Questionnaire 7.**

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8. Did you ever live with someone who was a problem drinker, or alcoholic, or used street drugs?

### **ACE Questionnaire 8.**

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9. Was a household member depressed, mentally ill, or attempt suicide?

### **ACE Questionnaire 9.**

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10. Did a household member go to prison or jail?

☐ **ACE Questionnaire 10.**

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**Add total number of yes answers for your ACE score.**

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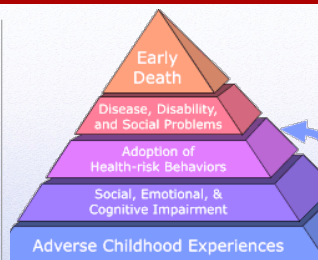
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**KINDS OF TRAUMA**

1. Addiction
2. Abuse
3. Domestic Violence
4. Incarceration
5. Neglect



**Adverse Childhood Experiences**

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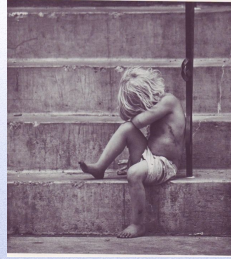
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- Generates grief which is not

- expressed,
- acknowledged, nor
- resolved.



## **Intergenerational Trauma**

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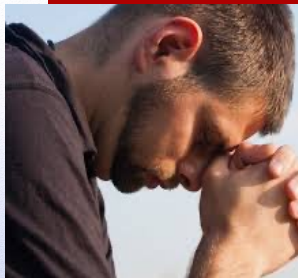
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- Two-thirds of all adults report.
- If four, two times rates of cancer and depression.
- If doctors open door to trauma, 35% reduction in visits.

## **Adverse Childhood Experiences**

29

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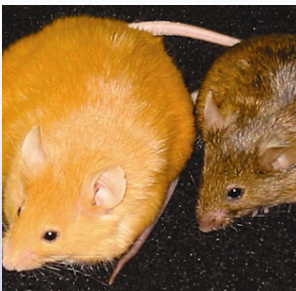
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### **Epi-genetics** (above genetics)

Non-genetic factors change how genetics "express themselves."

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# Trauma in Indigenous Life


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31

# Trauma in Indigenous Life

HISTORY		
1. Federal laws		
2. Provincial policy		
3. Residential schools		
4. Institution of the Church		

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32

# Trauma in Indigenous Life

HISTORY	POVERTY	
1. Federal laws	1. Housing	
2. Provincial policy	2. Health and nutrition	
3. Residential Schools	3. Education	
4. Institution of the Church	4. Employment	

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33

# Trauma in Indigenous Life

HISTORY	POVERTY	OPPRESSION
1. Federal laws	1. Housing	1. Social
2. Provincial policy	2. Health and Nutrition	2. Systems
3. Residential Schools	3. Education	3. Professional
4. Institution of the Church	4. Employment	4. Internalized

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34

# Rupert Ross: *Criminal Conduct and Colonization.*



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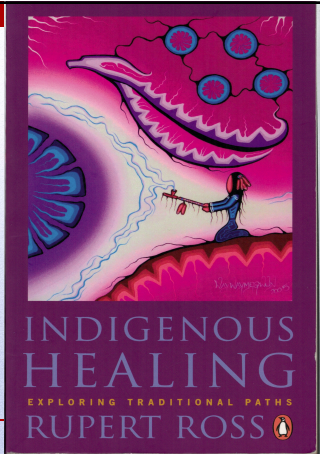
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36

- Child Neglect and Abuse
- Incarceration
- Early Death
- Violence
- Addiction
- Suicide



## Symptoms of Trauma in Indigenous Life

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What happened to you?  
---NOT---  
What's wrong with you?



## Trauma Informed Practice

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- Judges take judicial notice of the broad systemic and background factors affecting aboriginal people, and of the priority given in aboriginal cultures to a restorative approach to sentencing.

## Gladue Decision 2012

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1. See own, and inherited pain.
2. Know and express your own suffering.
3. Self-critique and self-improve.
4. Reclaim Aboriginal spirituality, community & culture.
5. Practice Indigeneity.
6. Forgive.

## The Tasks for Indigenous People

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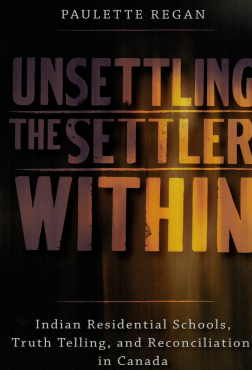
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- 1. Self-reflect to lose White innocence.
  - 2. Accept historical violence.
  - 3. Admit the full equality of Aboriginal people and ways.
- Dr. Paulette Regan

## Non-Aboriginal Decolonization

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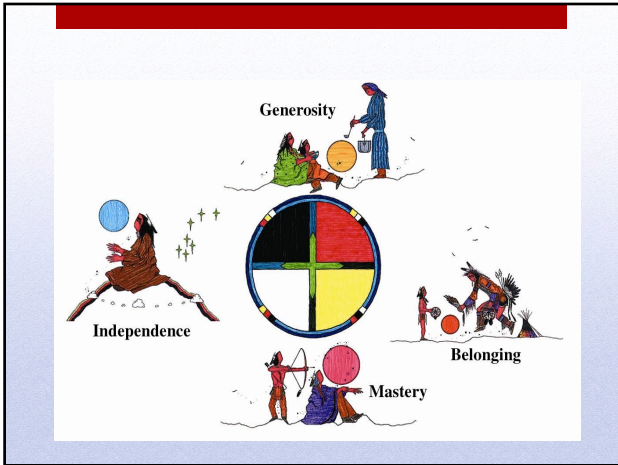
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