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Addiction



Topics



- Why study Addiction?
- Definition of Addiction.
- Common types of addictions.
- Predisposing factors for addiction.
- How does addiction develop?
- How does addiction affect behavior?
- Treatment of Addiction.

Why study Addiction?

- 1) Often begins at young age; severe problems can occur when individual continues to use substances despite consequences
- 2) Responsible for $\approx 22,000$ deaths/year in U.S. ≈ 5000 of them adolescents.
- 3) May mimic major psychiatric syndromes, at least temporarily, and make preexisting psychiatric syndromes worse and more difficult to treat.
- 4) Can lead to numerous medical conditions even death
- 5) It takes total control over people's lives.
- 6) To understand how it develops and hence avoid it.

The 2000 Monitoring the Future Study showed: Extent of Lifetime Drug Use among 12th graders

Alcohol 81%

Cigarettes 65%

Marijuana 65%

Inhalants 14%

LSD 11%

Cocaine 9%

Definition of Addiction

It is the **compulsive use** of substances or engagement of behaviors despite clear evidence to the user of consequent **harmful effects or death.**



Sin or Disease?

Addiction develops like a tornado that circulates around the person.

It affects four components of human life.

- Biological component (Brain disease)
- Psychological component (Mental disease)
- Social component (Social disease)
- Spiritual component. (Spiritual disease = Sin)
- So, the answer to the question is:

More than just “ Both”

It is a complex Bio-psycho-socio-spiritual disease and a sin.

Common types of addictions

Substance addictions:

Legalized substances:

- Caffeine.
- Alcohol.
- Tobacco.



Illegal substances:

- Marijuana.
- Cocaine.
- Heroin
- Amphetamines
- Hallucinogens e.g. (PCP, LSD & Ecstasy)
- Prescription drugs



Behavioral addictions:

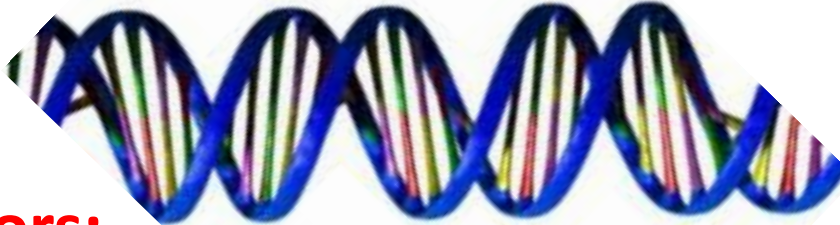
- Pornography.
- Gambling.
- Sex.
- Television.
- Internet.
- Video Games.
- Food.
- Exercise.
- Work.
- Money.



Predisposing factors for addiction

- **I. Biological factors:**

- Genetic.



- **II. Psychological factors:**

- Emotional difficulties such as depression and anxiety.
- Inner emptiness.
- Loneliness and boredom.



- **III. Social factors:**

- Addictive society.
- Temptations that are surrounding us very easily.
- Dysfunctional and fragmented families.

- **IV. Spiritual factors:**

- Distancing from God.
- Misconception of freedom.



A black and white photograph showing a person's hands clasped together in a prayer-like gesture. A computer mouse cord is wrapped around the wrists, with the mouse itself hanging down. The background is a wooden surface with a prominent grain pattern. The overall image conveys a sense of being trapped or controlled by technology.


How does the tornado of addiction develop?

The Tornado of Addiction: Biologically

1. The First experience.



2. The “high”.



3. Abuse



4. Dependence (Addiction)

I. First experience.

First experimentation usually starts with either:

Seeking a quick fix for a problem that is causing a negative feeling.

Trying to conform and “fit in” with peers.

Unintentionally, due to using unknown substances, addictive prescription drugs or engaging in a seemingly benign behavior such as internet surfing or playing video games.

II. “The high”

The immediate euphoric effect of the substance or behavior.

It is the function of the direct effect of the substance or “behavior “ on the brain.

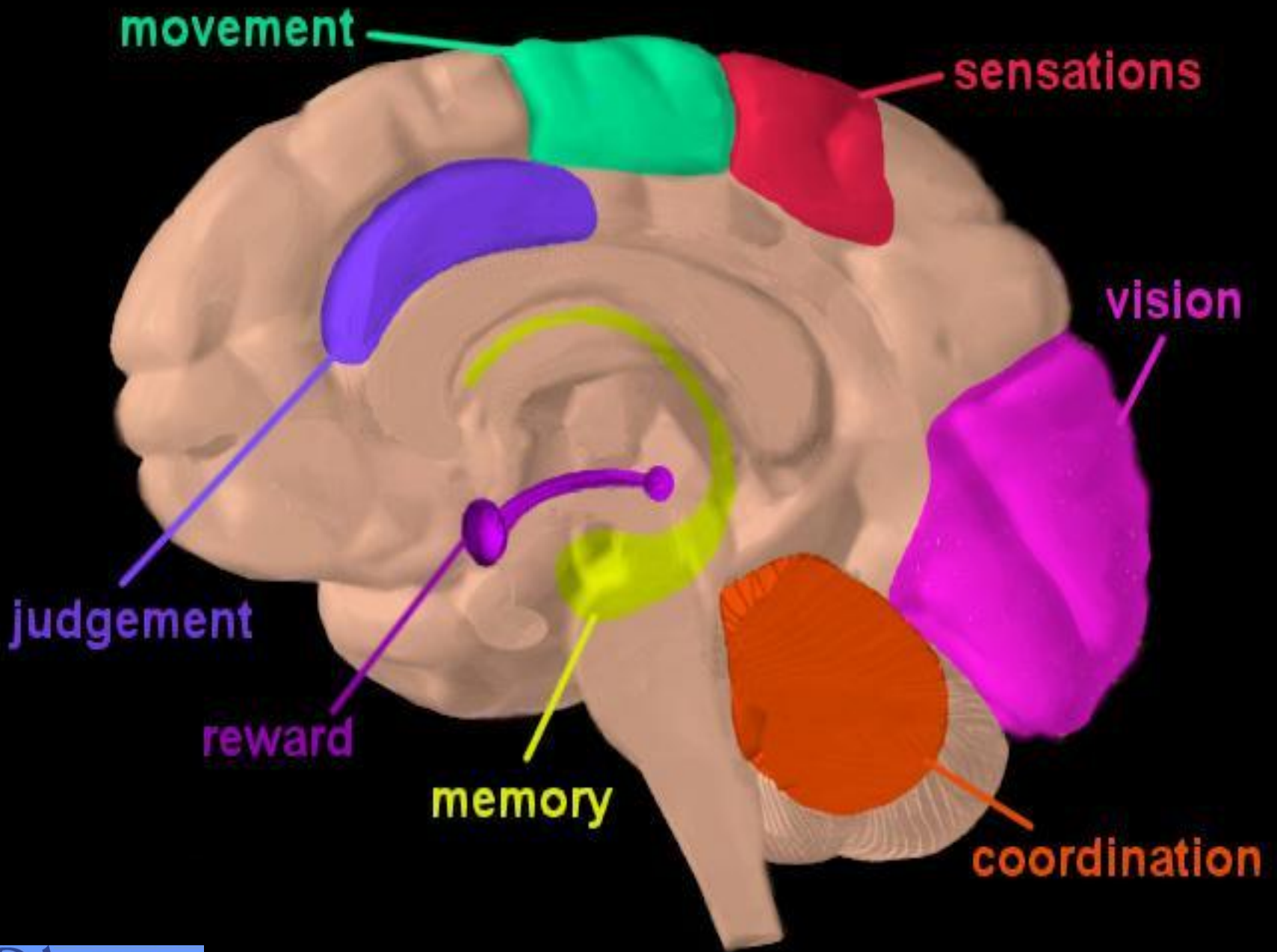
The fastness and the strength of “the high” determine the degree of addictive power.

The nature of the drug or behavior determines the nature of “the high” or intoxication symptoms.

How does the “high” happen?

All addictions involve stimulation of the pleasure centers of the brain known as the “reward circuit”

These are brain areas that God created for us to keep our appetite for pleasurable activities such as feeding, sex, hobbies, or to enjoy the company of friends or God.



movement

sensations

vision

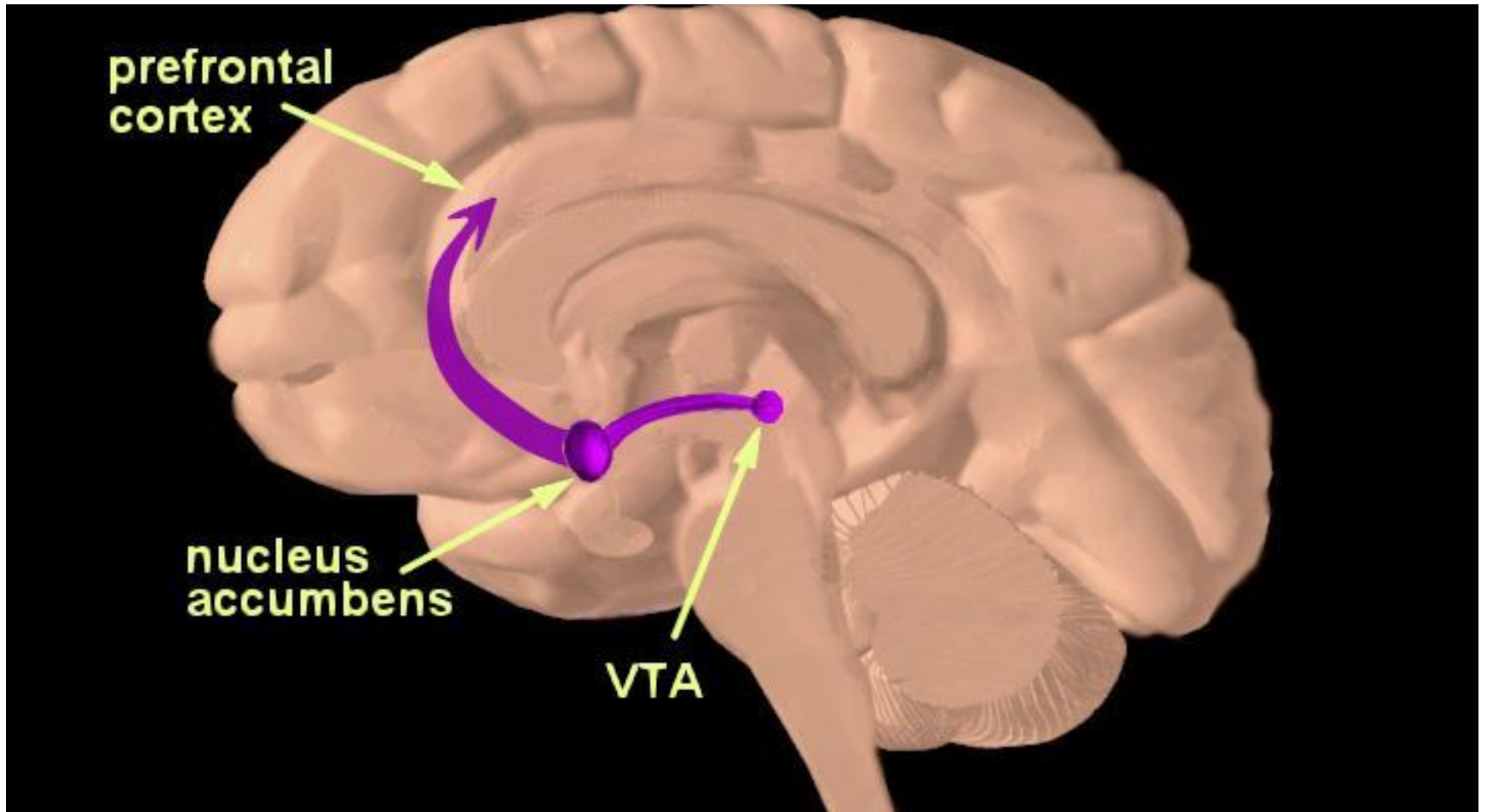
judgement

reward

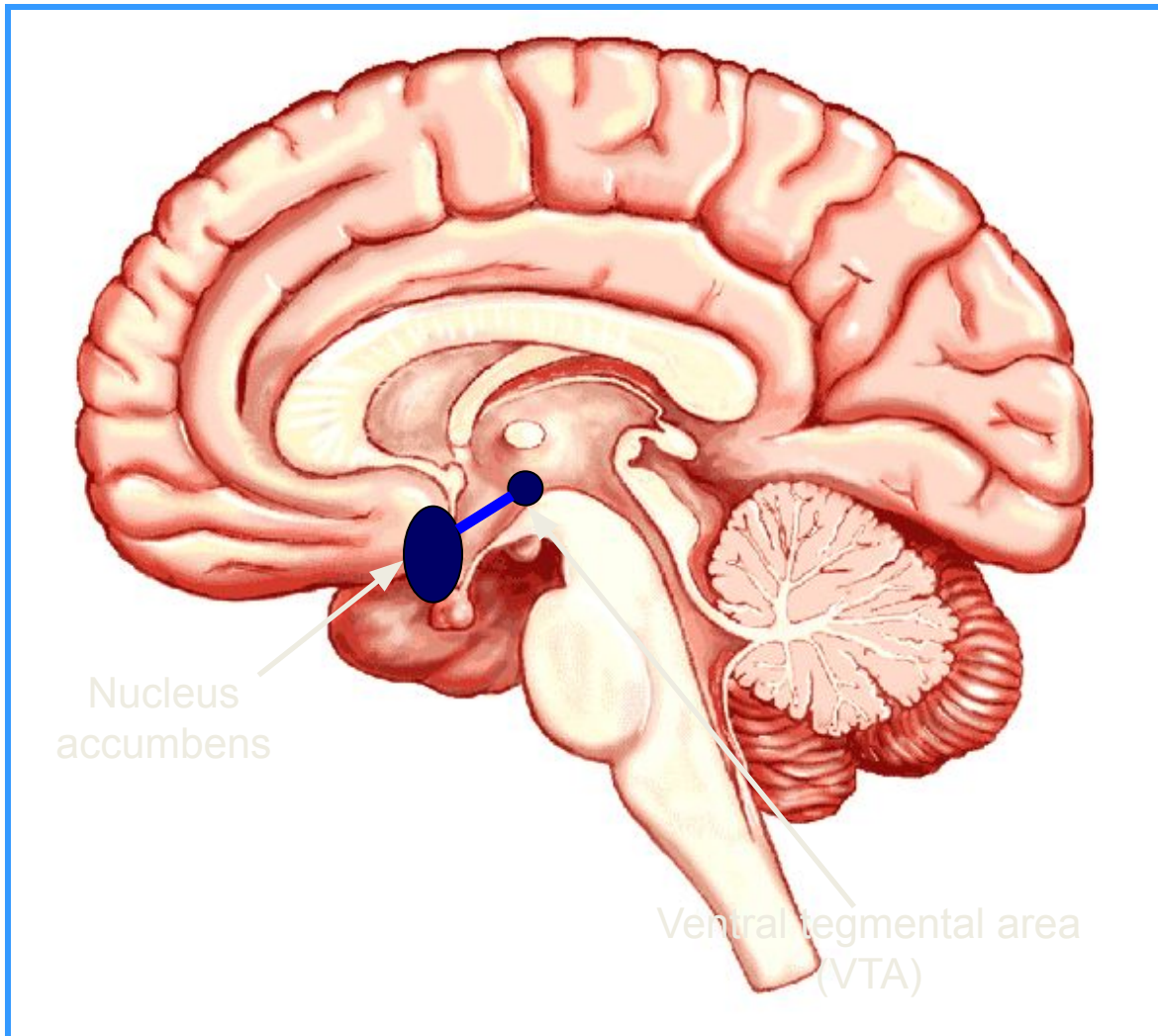
memory

coordination

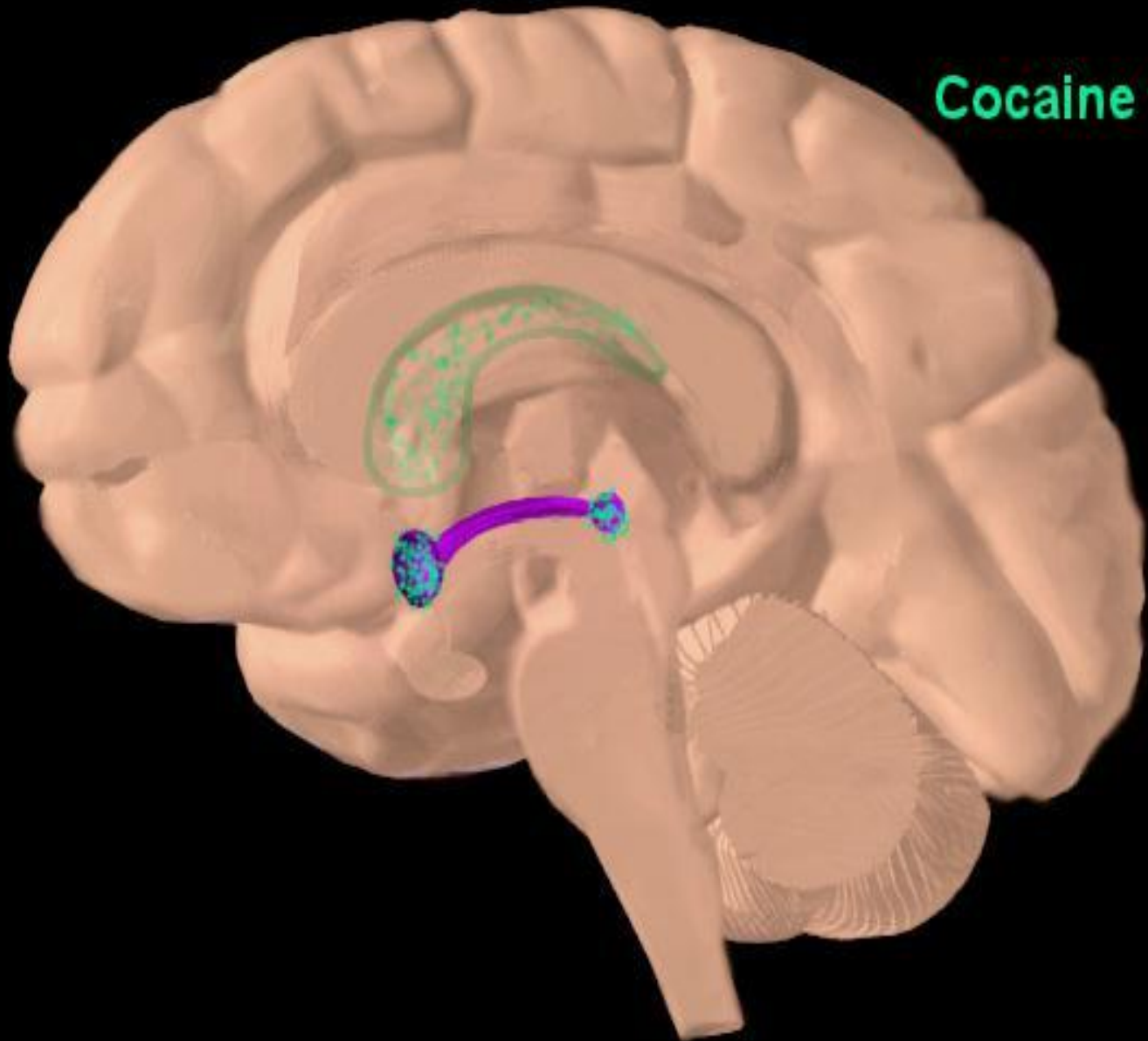
Reward Circuit



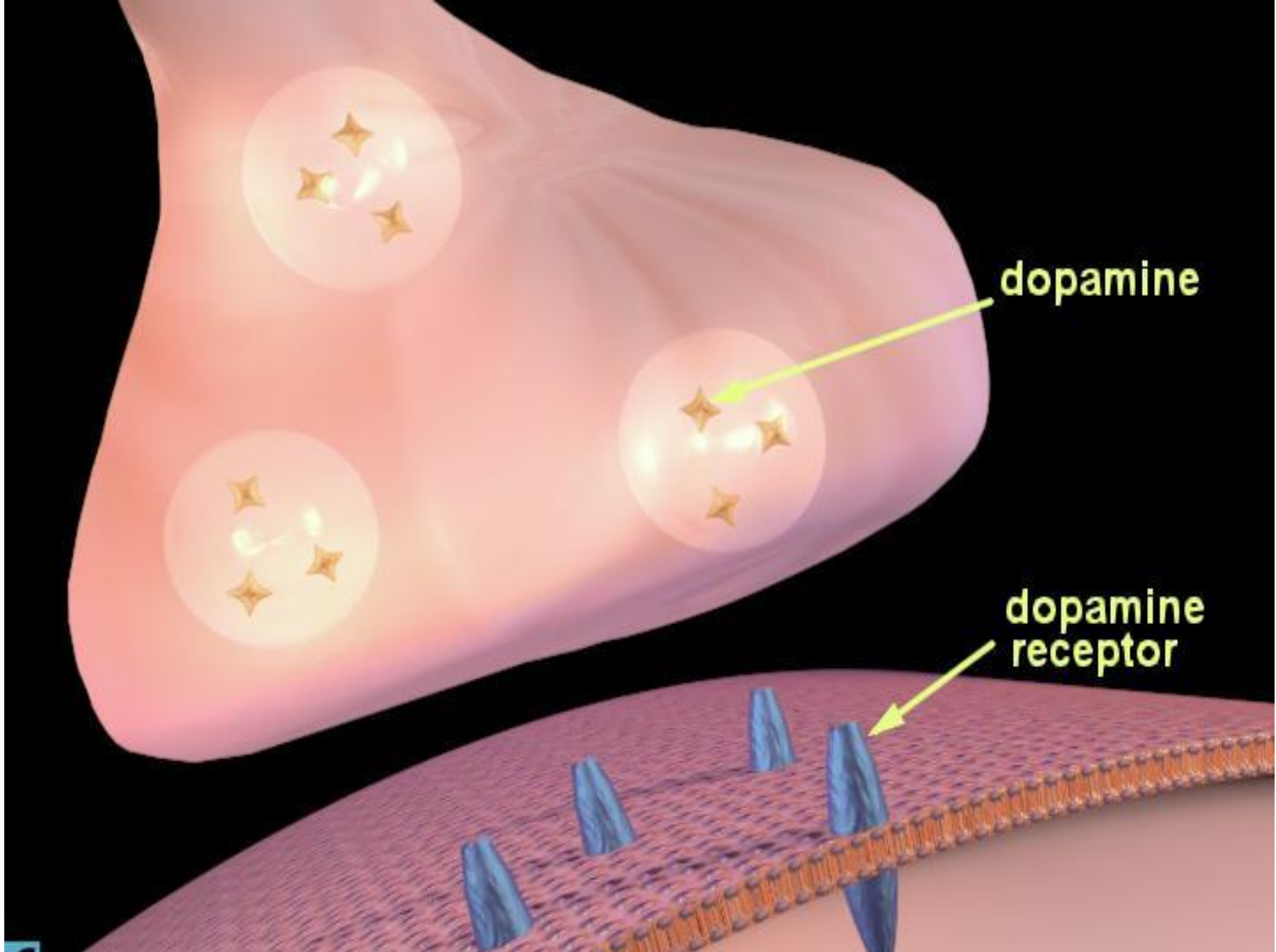
Brain Reward Pathways



- The VTA-nucleus accumbens pathway is activated by all drugs of dependence including alcohol
- This pathway is important not only in drug dependence, but also in essential physiological behaviors such as eating, drinking, sleeping, and sex

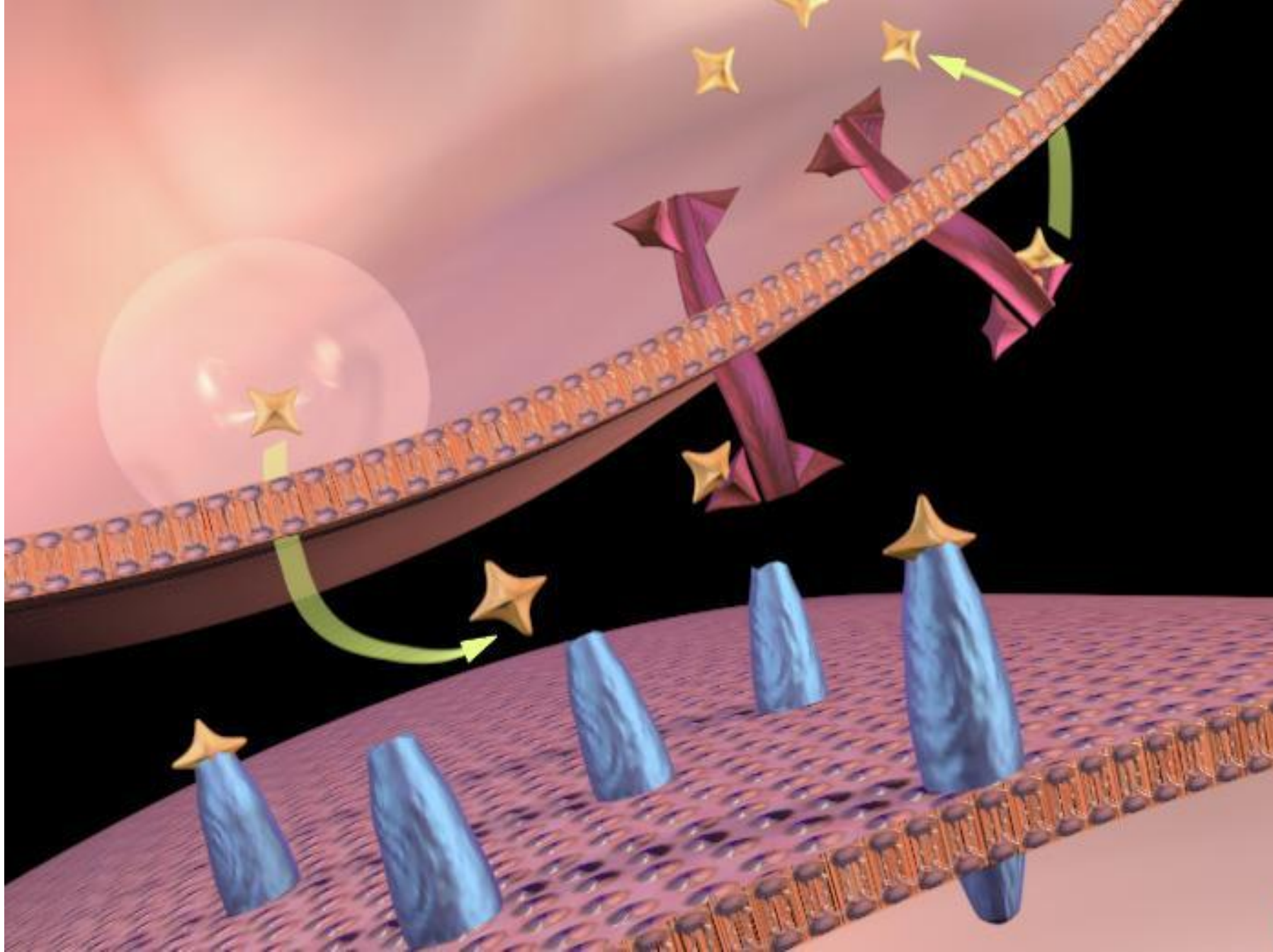


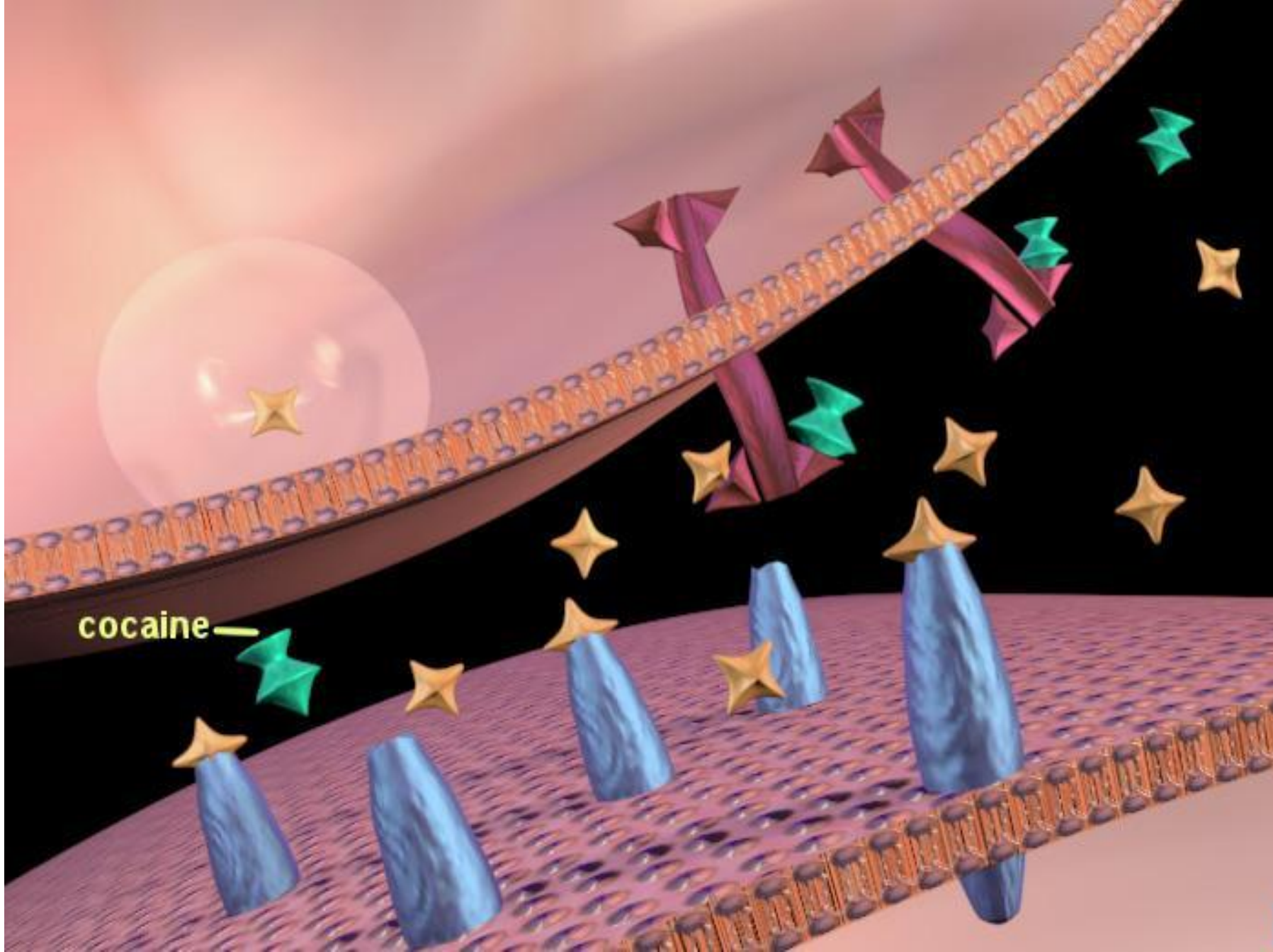
Cocaine 



dopamine

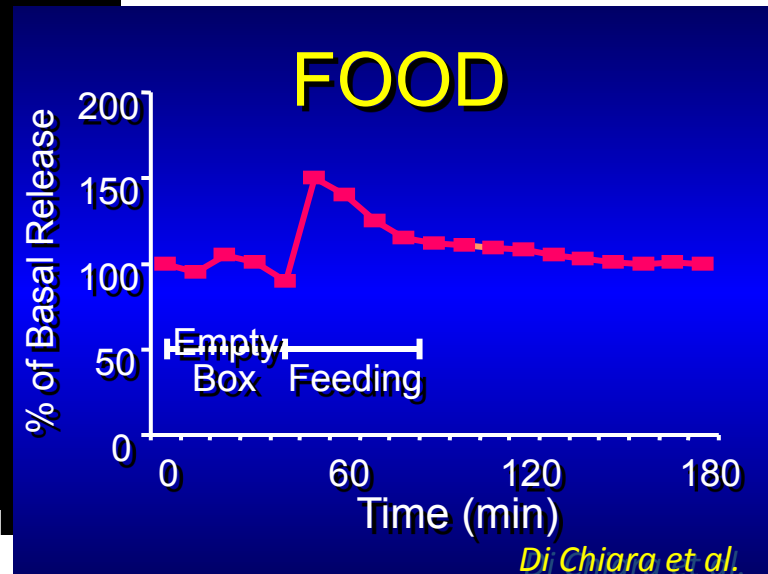
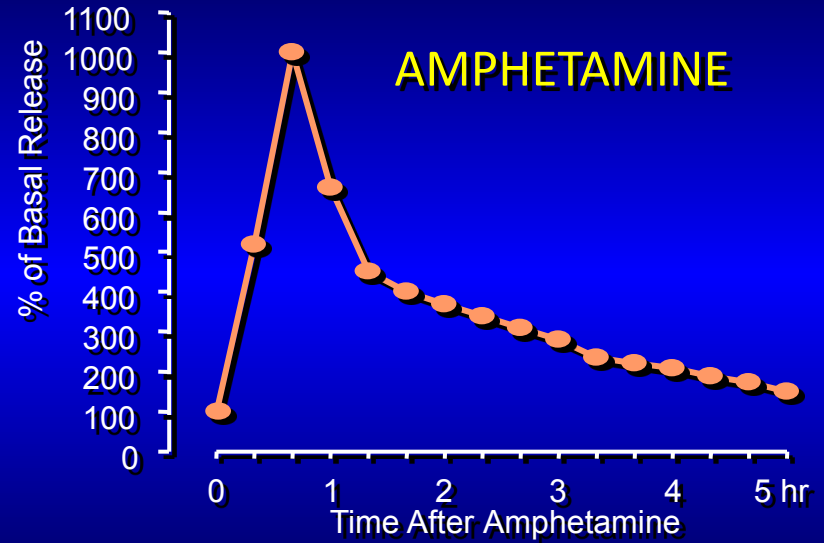
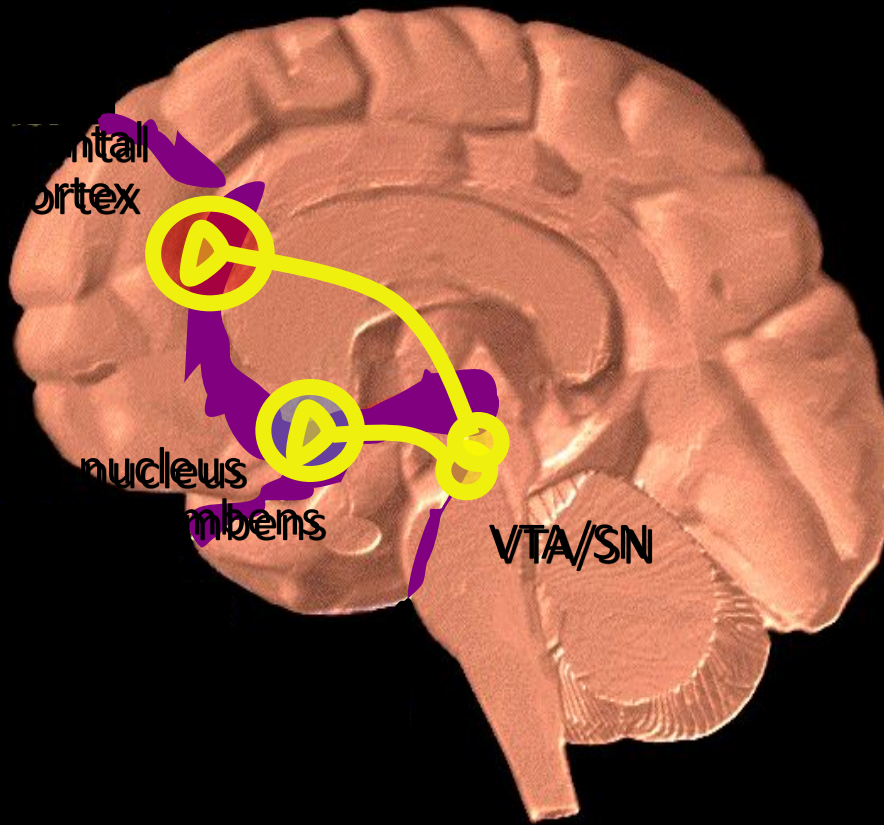
dopamine
receptor





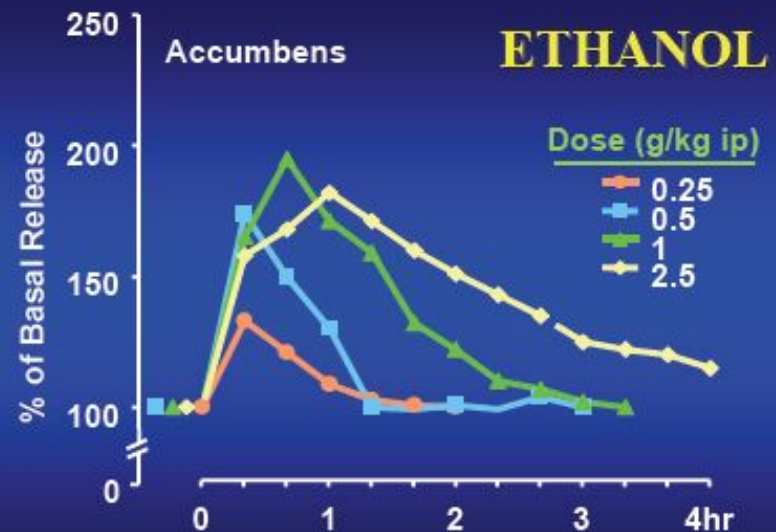
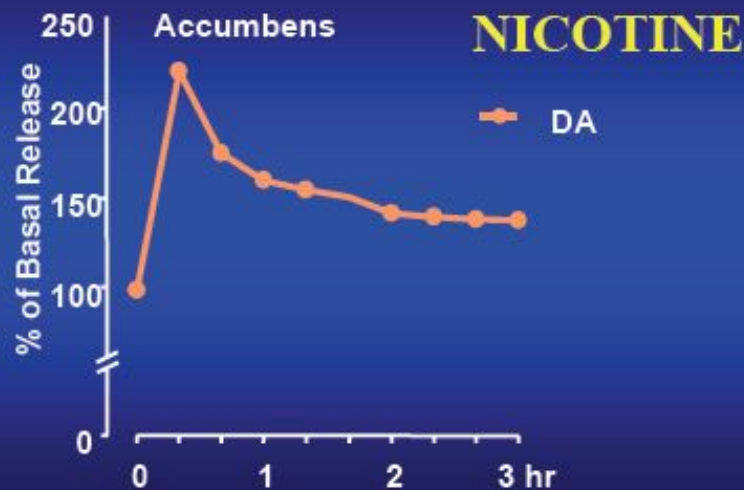
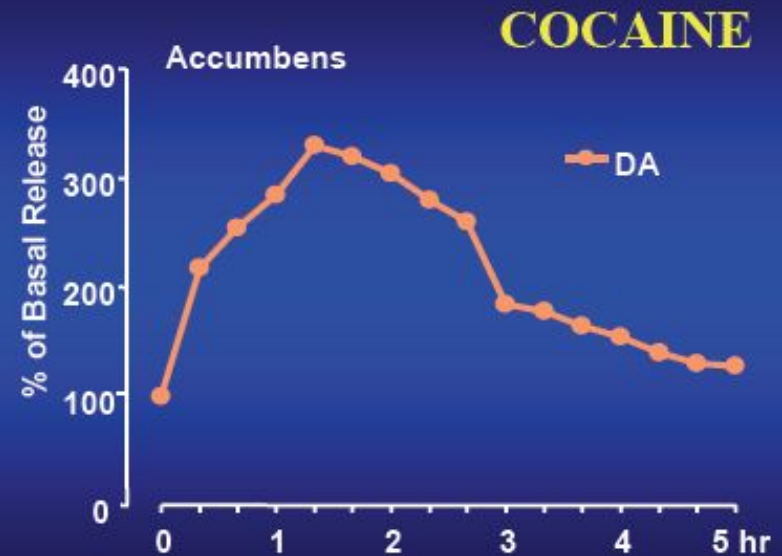
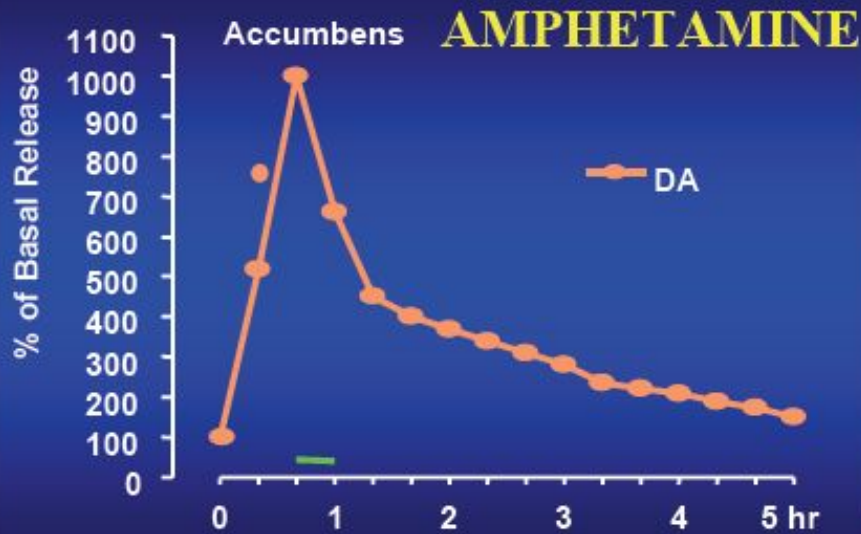
cocaine

Dopamine Neurotransmission



Di Chiara et al.

EFFECTS OF DRUGS ON DOPAMINE LEVELS



FIVE THINGS TO KNOW ABOUT ADOLESCENTS' BRAIN DEVELOPMENT

1. The brain's "front end," the part above the eyes, exists to slow us down or stop our impulsive behaviors. It considers the risks and benefits of our actions, and it helps us "hit the brakes" when we consider doing things that are too risky.

2. This front part of the brain is still developing connections to the rest of the brain until adulthood, so adolescents' brains lack some of the "wiring" that carries "brake" or "stop" messages to the rest of the brain.

3. Drugs of abuse are often available to adolescents. These drugs feel good, but they can be very harmful. Lacking some of the wiring for the "stop" message, adolescents' brains may not fully weigh the risks of drug use.

4. The two drugs that cause the most death are also the most available drugs: tobacco and alcohol. Late adolescence, before the brain is fully matured, is the peak time for developing dependence on these (and other) drugs.

5. Heavy drug use during times of critical brain development may cause permanent changes in the way the brain works and responds to rewards and consequences. Therefore, it is important to begin to address a developing substance use problem as early as possible.

III. Abuse Phase

1 or more of the following in a 12-month period

1. Recurrent use resulting in failure to fulfill major role obligation at work, home or school.

2. Recurrent use in physically hazardous situations.


3. Recurrent substance related legal problems.

4. Continued use despite persistent or recurrent social or interpersonal problems caused or exacerbated by substance.


(Symptoms must never have met criteria for dependence.)

Neuroadaptive changes of the brain

Over-stimulation of pleasure pathways causes them to neuroadapt, interfering with the normal experience of pleasure.



Addiction is a disease of the pleasure-producing chemistry of the brain; neuroadaptation is the mechanism of the disease.



Once neuroadaptation occurs, cessation of drug use leads to 'inversion of the high'; sobriety becomes pleasureless.

Neuro-adaptive changes of the brain

Drugs of abuse hijack the brain's reward circuit and dopamine system.

The hijacked brain becomes dependent on drugs because normal rewards are no longer producing normal levels of dopamine or pleasure

The addicted brain now used to receiving the huge flood of dopamine caused by the drug use reduces the natural production of the chemical.

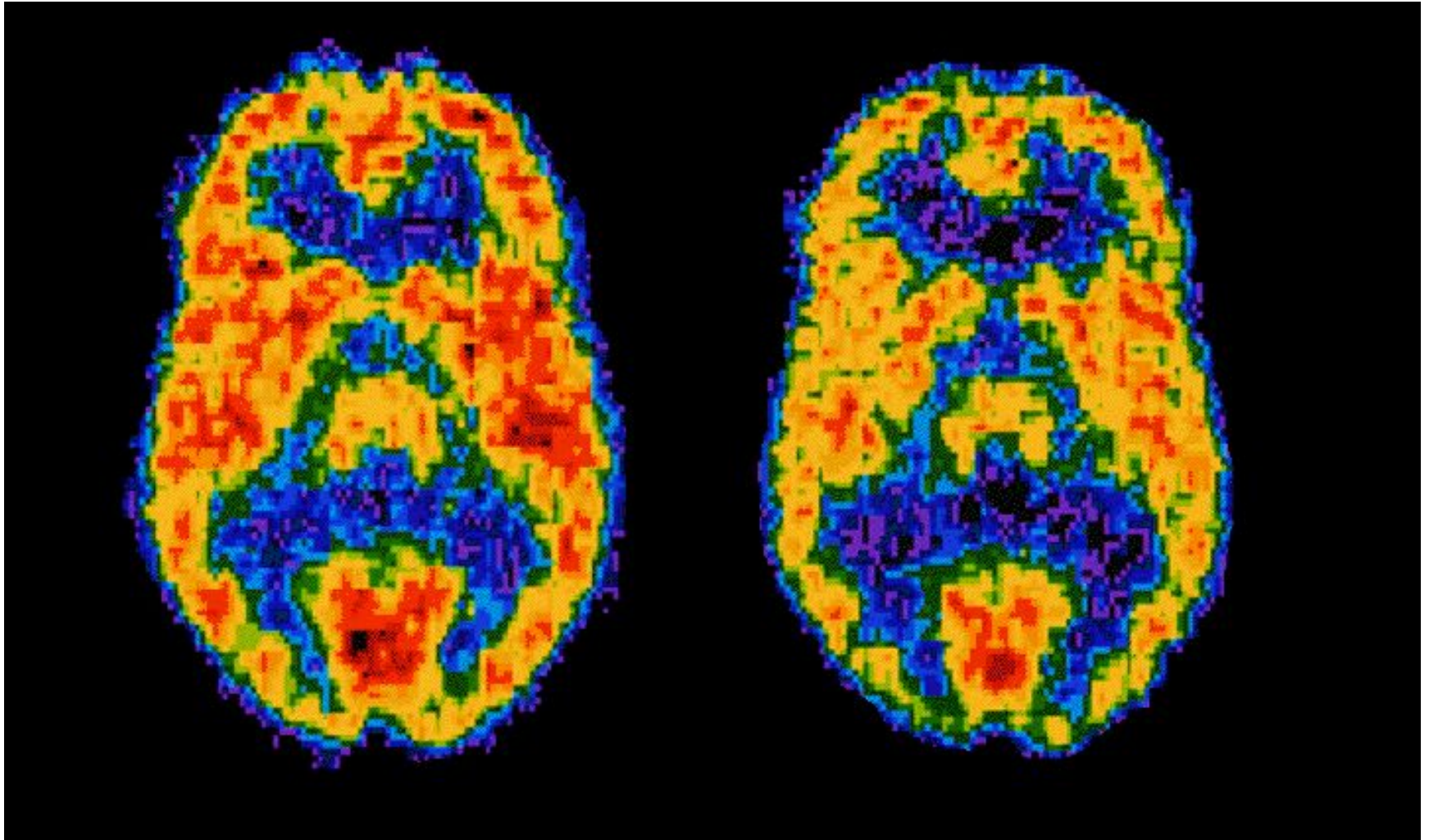
With the deficit of the naturally occurring dopamine comes inability to feel pleasure except through drug use. This is the primary motivation for relapse.

Positron Emission Tomography (PET)

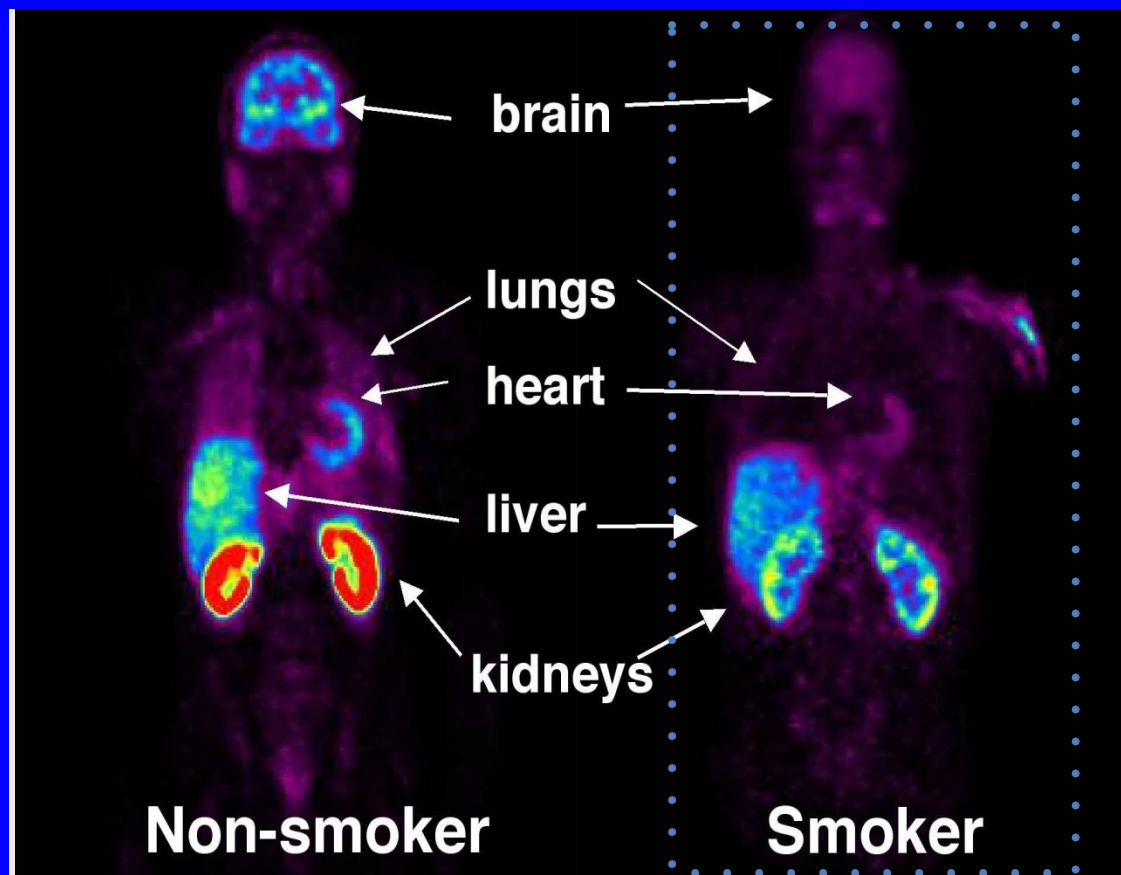


control

on cocaine



The Smoker's Body



Drugs don't just affect the BRAIN

Smokers have a 35-45% reduction in MAO B
in heart, lungs, kidneys and spleen

IV. Dependence Phase.

3 or more of the following in a 12-month period

1. Tolerance (marked increase in amount; marked decrease in effect)

2. Characteristic withdrawal symptoms; substance taken to relieve withdrawal

3. Substance taken in larger amount and for longer period than intended

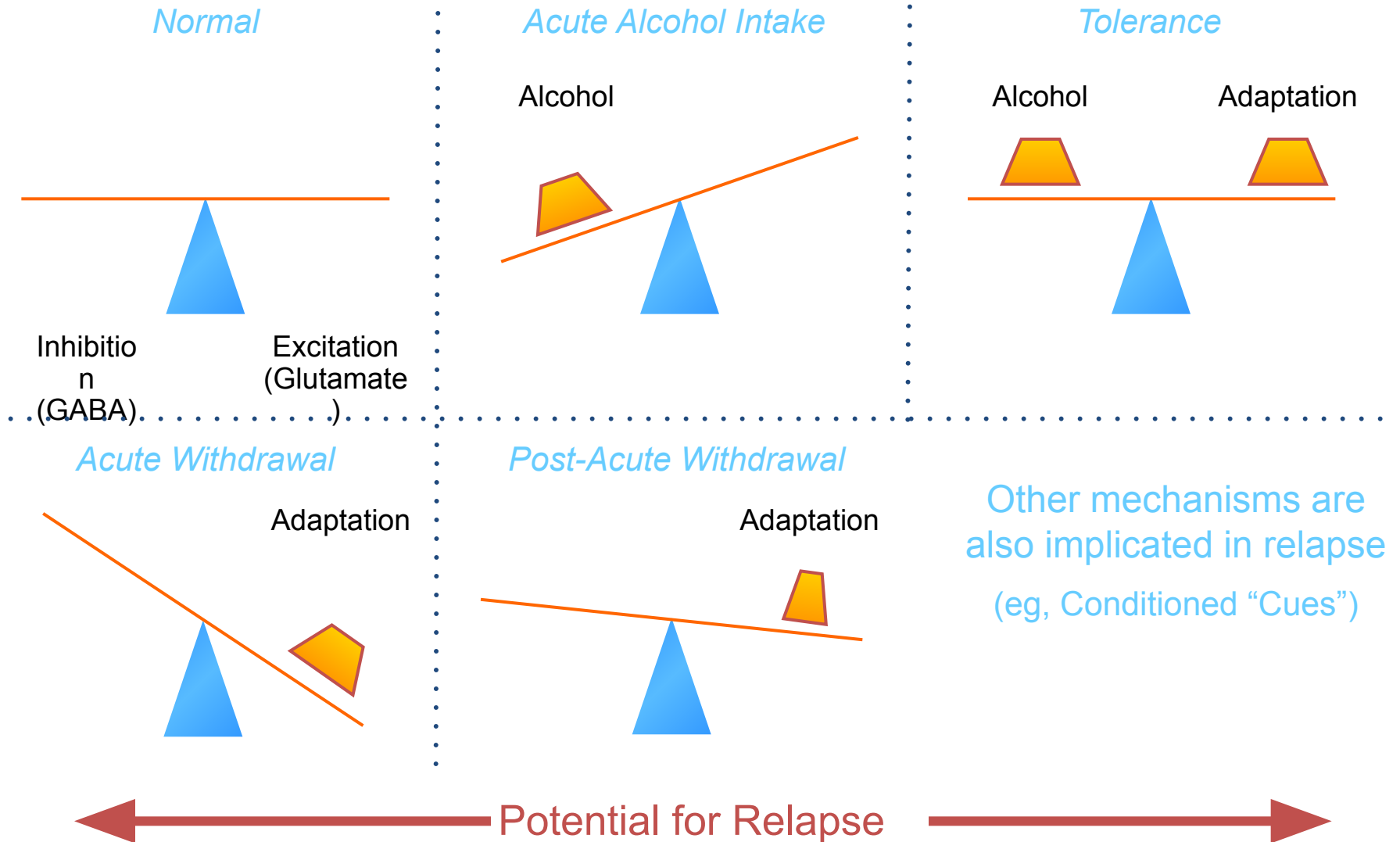
4. Persistent desire or repeated unsuccessful attempt to quit

5. Much time/activity to obtain, use, recover

6. Important social, occupational, or recreational activities given up or reduced

7. Use continues despite knowledge of adverse consequences (e.g., failure to fulfill role obligation, use when physically hazardous)

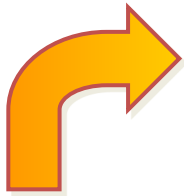
Neuroadaptation: Potential for Relapse



Effects of Alcohol on Neural Circuits

Glutamate System

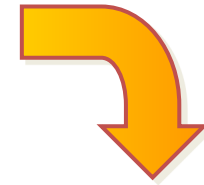
Administration
of Alcohol



Acute Alcohol Effect

- ◆ Inhibits NMDA receptors
- ◆ **Effect:** ↓ anxiety, ↑ sedation

Chronic
Alcohol Use



Alcohol Free
CNS Equilibrium

Adaptation


- ◆ ↑ # and/or function of NMDA receptors on neurons
- ◆ Balances acute alcohol effect
- ◆ **Effect:** tolerance, dependence

Withdrawal

- ◆ Increased glutamatergic activity
- ◆ **Effect:** - *Acute:* dysphoria, hallucinations
- *Post-acute:* sleep/mood disturbances

Removal of
Alcohol





Tolerance

Tolerance:

Repeated administrations of addictive substances causes decreasing results (despite consistent dosages); thus, increasing dosages required to achieve consistent effects.

Occurs with virtually all addictive substances, but at different rates and effects.

Tolerance to one agent produces cross-tolerance with similar agents; tolerance to benzodiazepines causes cross-tolerance with nearly all general nervous system depressants (eg, alcohol, barbiturates)

Sensitization:

Process wherein repeated administrations of substance produce increasingly strong effects; also increases effects of smaller dosages.

Tolerance and sensitization may occur simultaneously, but target separate drug effects (potentially dangerous).

Sensitization significantly more common with stimulants; *cocaine—tolerance to euphoric effects may encourage patients to increase dosages; however, sensitization to toxic effects (eg, lowering of seizure threshold) may increase, leading to seizures.*



Sensitization

Craving

Primary cause of relapses.

Events associated with cravings:

1. *Low dose of addictive substance.*

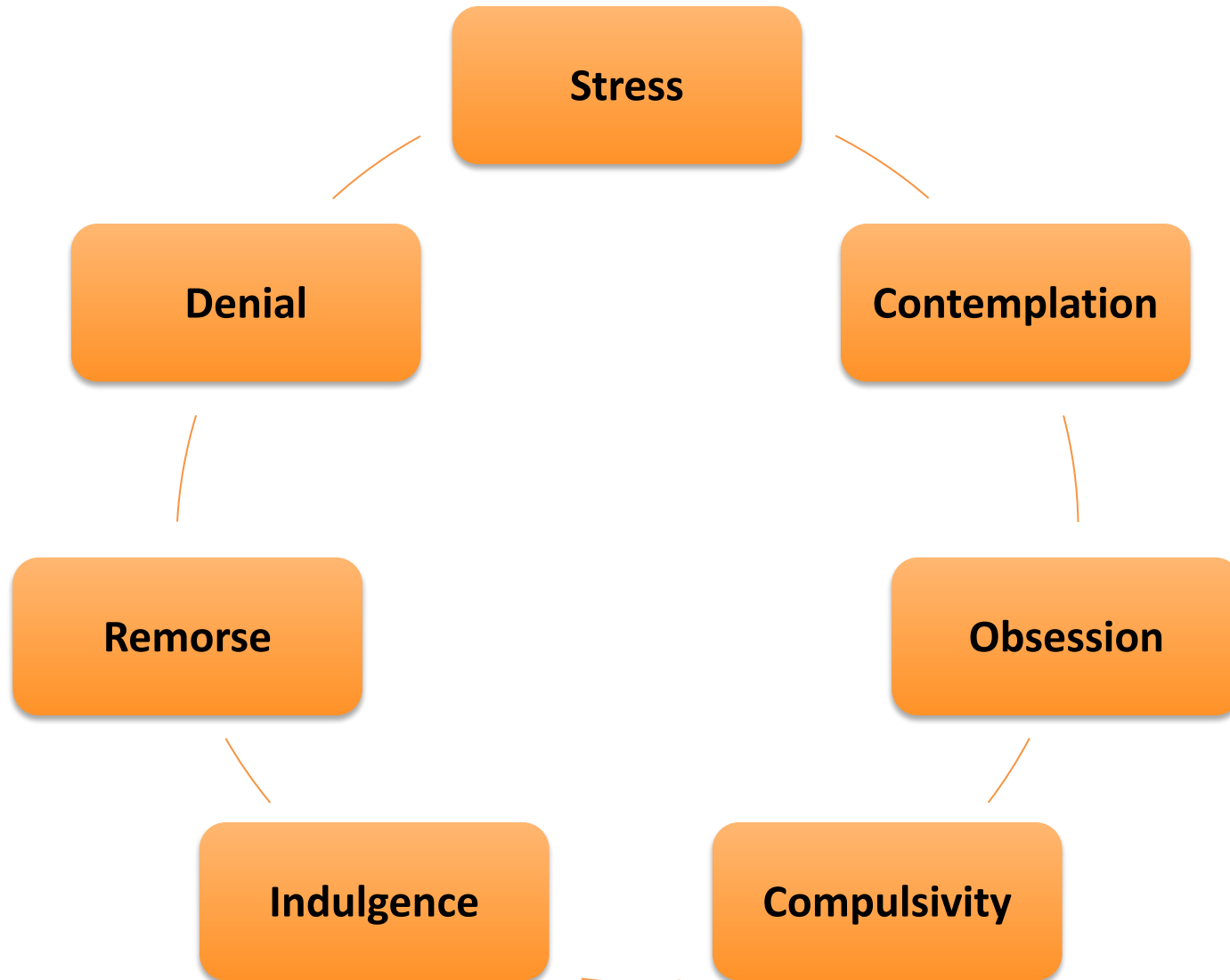
2. *Stress (produces small activation of reward pathways).*

3. Cues or stimuli associated with substances (capable of activating pathways in brain associated with substance use; constant and powerful stressor for patients recovering from addiction).

4. Cues associated with withdrawal (eg, *seeing room where patient experienced withdrawal* may trigger mild physical withdrawal symptoms; patients may seek substances to suppress withdrawal symptoms; causes life-long issues)

The Tornado of Addiction

Psychological:



The Tornado of Addiction: Social

Attempts to hide
addiction from family
and friends

Dishonesty and guilt

Becoming withdrawn
and difficult to reason
with

Strange behavior

More use leads to guilt
which leads to
depression

Sacrifice of personal
integrity, relationships,
job, savings and more
in attempt to maintain
addiction

Addiction becomes the
center of the addict's
life

Relationships and job
performance will go
dramatically downhill

The Tornado of Addiction: Spiritual

“Each one is tempted when he is drawn away by his own desires and enticed. Then when desire has conceived, it gives birth to sin; and sin, when it is full-grown, brings forth death.”

James 1: 14, 15

Desire

Temptation

Lust

Sin

Disease

Death

رومية 7

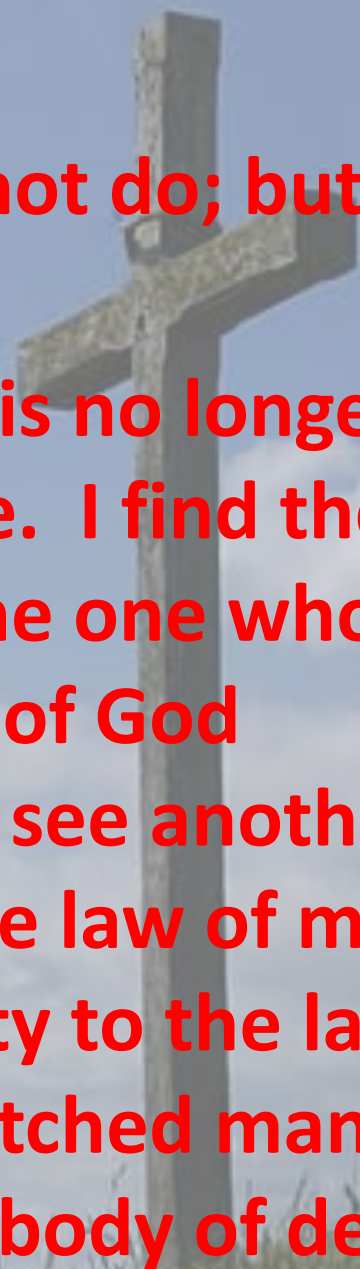
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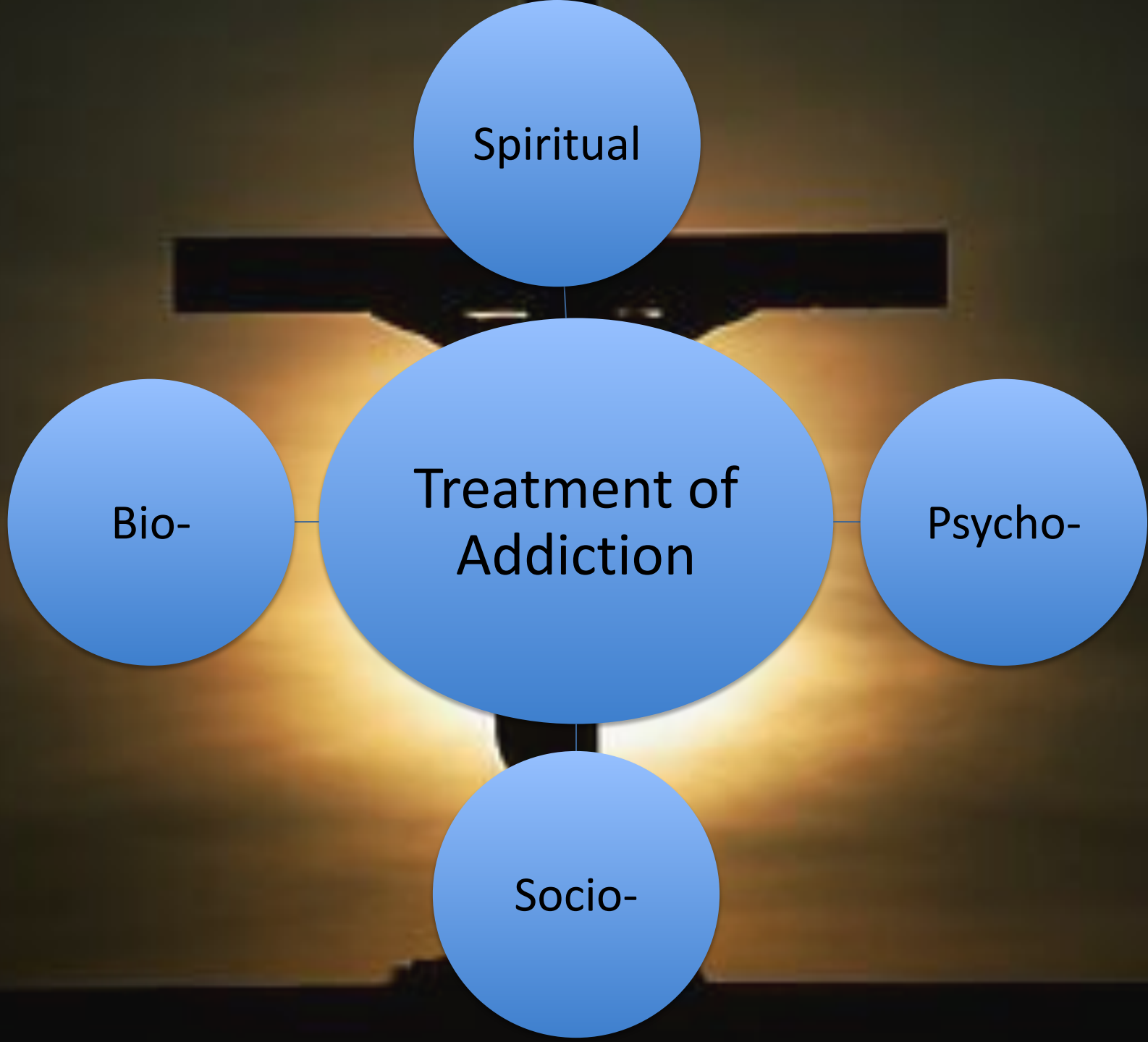
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Romans 7

For the good that I will to do, I do not do; but the evil I will not to do, that I practice.

Now if I do what I will not to do, it is no longer I who do it, but sin that dwells in me. I find then a law, that evil is present with me, the one who wills to do good. For I delight in the law of God according to the inward man. But I see another law in my members, warring against the law of my mind, and bringing me into captivity to the law of sin which is in my members. O wretched man that I am! Who will deliver me from this body of death? I thank God--through Jesus Christ our Lord!





STAGES OF CHANGE

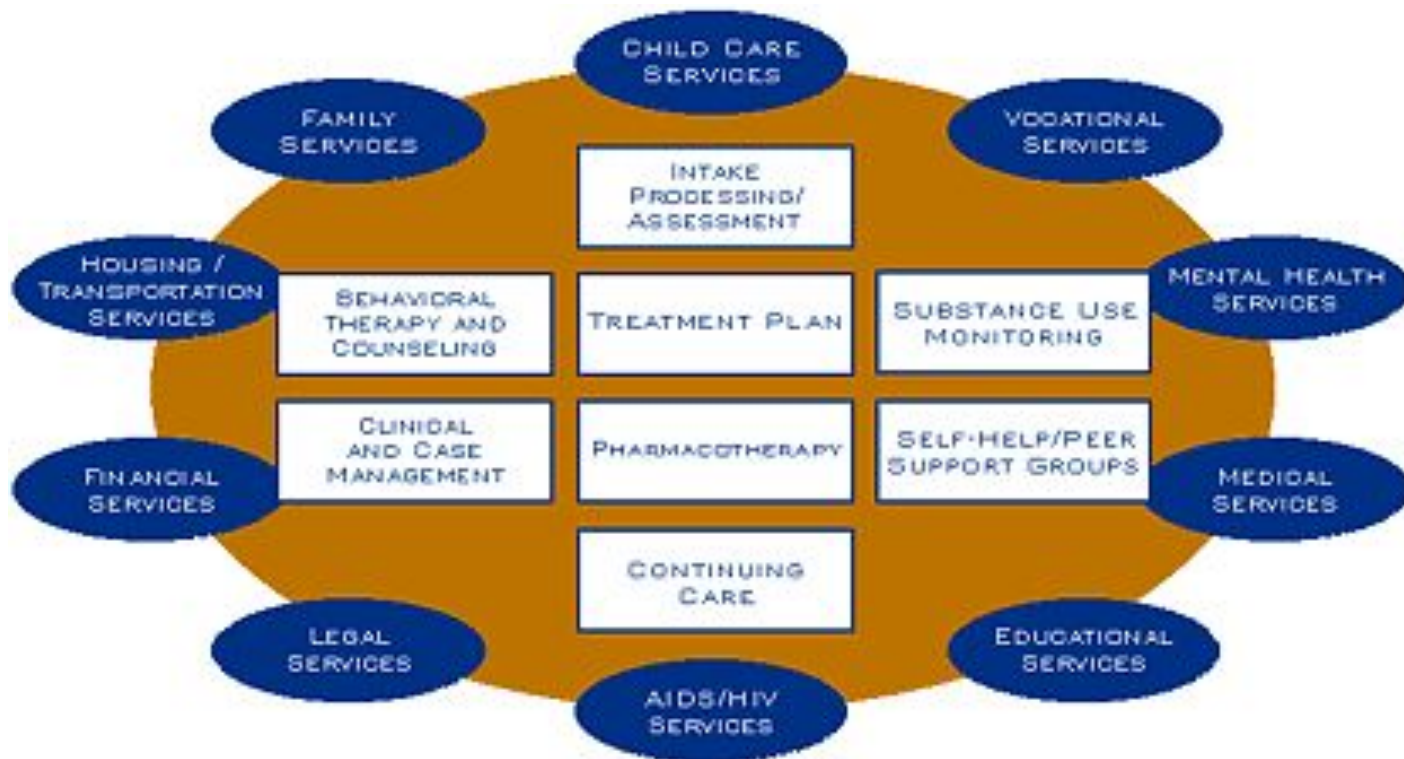




Motivation to Enter/ Sustain Treatment

- Effective treatment need not be voluntary
- Sanctions/enticements (family, employer, criminal justice system) can increase treatment entry/retention
- Treatment outcomes are similar for those who enter treatment under legal pressure vs voluntary

Components of Comprehensive Drug Addiction Treatment





Matching Patients to Individual Needs

- No single treatment is appropriate for all individuals
- Effective treatment attends to multiple needs of the individual, not just his/her drug use
- Treatment must address medical, psychological, social, vocational, and legal problems



Duration of Treatment

- Depends on patient problems/needs
- Less than 90 days is of limited/no effectiveness for residential/outpatient setting
- A minimum of 12 months is required for methadone maintenance
- Longer treatment is often indicated

Biological Treatment

Pharmacological treatment

A) Detoxification Phase:
Initial period for
treatment of withdrawal
Syndromes.

Could be very critical
and life threatening if
not done in a specialized
medical center.



B) Maintenance Phase:
Long term
pharmacological
treatment to normalize
brain changes from long
term addiction,
preventing relapse.

New developments in biological treatment

Alcohol:

*Acamprosate (Campral)

*Naltrexone long acting Injection (Vivitrol)

Tobacco:

Varenicline (Chantix)

Opioids:

*Buprenorphine (Suboxone/ Subutex)

Acamprosate (Campral) for Alcohol Dependence

Glutamate antagonist/GABA Agonist

Stabilizes neurobiological changes resulting from alcoholism

Has been successfully used in Europe for more than a decade

Recently approved by the FDA

Tablet: 333 mg

Dose: 666 mg PO TID

Acamprosate (Campral)

Indicated for maintenance treatment, after initial detoxification Stabilization.

Renal excretion, contraindicated in renal impairment.

Controversial side effect: Increase sociality

Could combine with other treatment options as Naltrexone with potentially added efficacy

Varenicline (Chantix) For Nicotine Dependence

Selectively binds to $\alpha 4\beta 2$ nicotinic acetylcholine receptors in the brain to provide a unique combination of effects.

Recently approved for smoking cessation.

Has shown superior efficacy over Zyban (Bupropion) in a recent head to head study.

Varenicline (Chantix)

Dual Action for Smoking Cessation:

1. Partial Agonist Effect:

Partially stimulates the receptor without creating a full nicotine effect on the release of dopamine.

2. Competitive Binding Effect:

Blocks nicotine stimulation of the meso-cortico-limbic dopamine system, the neuronal mechanism underlying the reward and reinforcement experience of smoking.

Buprenorphine: Mu Receptors

Properties:

1. Partial Agonist

2. High affinity

3. Slow dissociation

1- Partial Agonist

Weak intrinsic activity

Binds to and activates receptor but has a ceiling effect

Does not produce a “high”

Safer, with less accidental Overdose

Less abuse potential

Easier to stop, ie., detox

2- High Affinity

Competes with other opioids and blocks their effects

Hence if given during intoxication (other opioids on board), it precipitates withdrawal

On induction, patient has to be in a moderate withdrawal state

If the patient uses opioids while in treatment, doesn't feel the "high"

3- Slow dissociation

Long acting

Less euphoria, and “rush effect”

Less addictive

Easier to discontinue

Forms of Buprenorphine

Buprenex: IV form, approved for pain management

Subutex: Sublingual buprenorphine

Suboxone: Sublingual buprenorphine/ Naloxone combination

Subutex / Suboxone

FDA approved in 2002 for office based treatment of Opioid Dependence

Could be used for detoxification or maintenance treatment

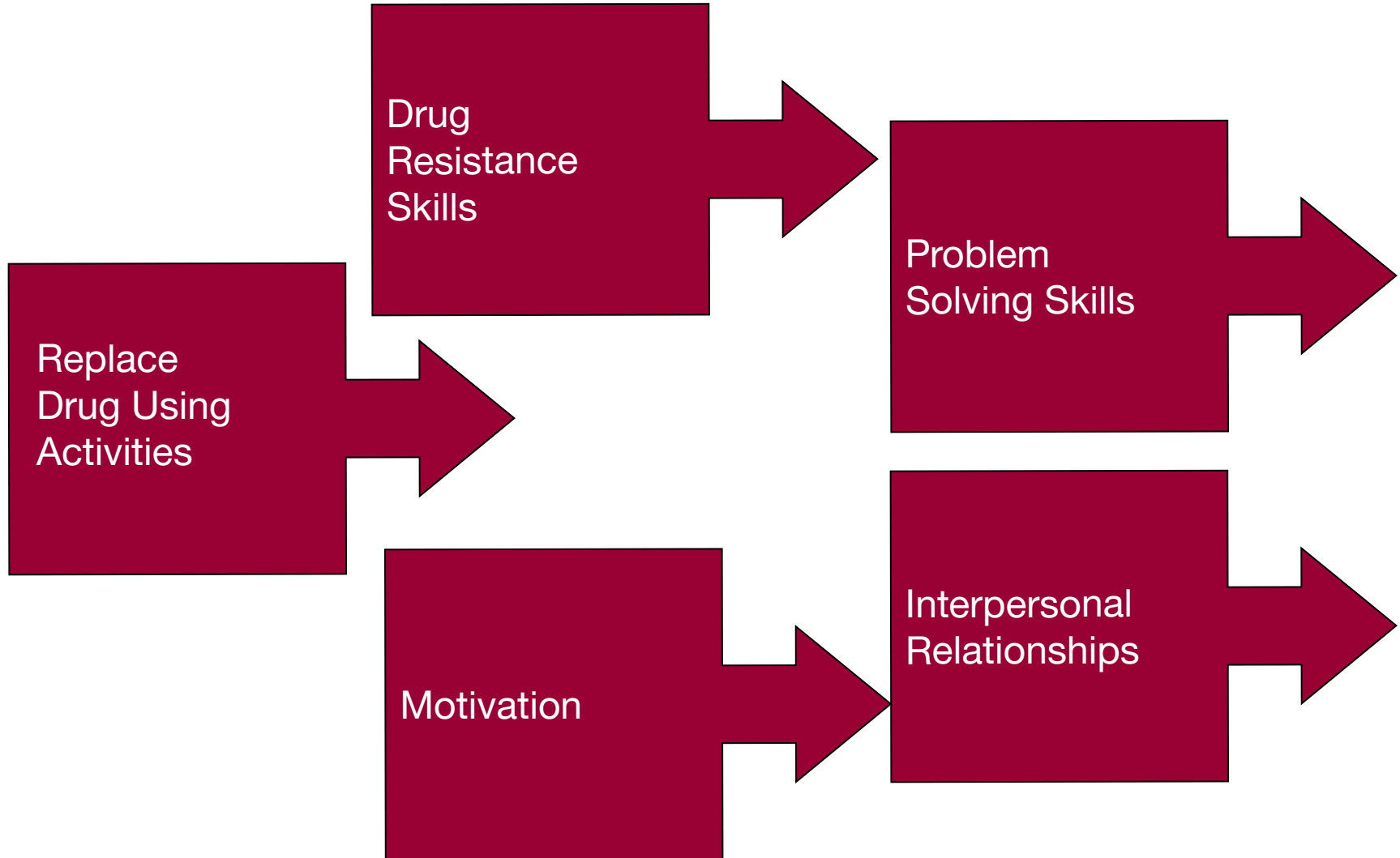
Naloxone component in Suboxone is inactive sublingually. There only to prevent street diversion. If injected, it will precipitate withdrawal



HIV/AIDS, Hepatitis and Other Infectious Diseases

- Drug treatment is disease prevention
- Drug treatment reduces likelihood of HIV infection by 6 fold in injecting drug users
- Drug treatment presents opportunities for screening, counseling, and referral

Counseling and Other Behavioral Therapies



Psychological Treatment

Psychotherapy

Motivational enhancement Therapy

Interpersonal Psychotherapy

Cognitive Behavioral Therapy (Cognitive restructuring)

Network Therapy

Group Therapy

Social Treatment

Social Rehabilitation

Short term rehabilitation programs. (21-28 days)

Long term rehabilitation programs. (months - years)

Avoid “people, places and things”

Family support (Al-Anon groups)

Family education



Effectiveness of Treatment

- Goal of treatment is to return to productive functioning
- Treatment reduced drug use by 40-60%
- Treatment reduces crime by 40-60%
- Treatment increases employment prospects by 40%
- Drug treatment is as successful as treatment of diabetes, asthma, and hypertension

رومية 7 Spiritual Treatment

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رومية 7 Spiritual Treatment

1 ام تجهلون ايها الاخوة. لاني اكلم العارفين بالناموس. ان الناموس
يسود على الانسان ما دام حيًا. 2 فان المرأة التي تحت رجل هي
مرتبطة بالناموس بالرجل الحي. ولكن **ان مات الرجل فقد تحررت**
من ناموس الرجل. 3 فاذا ما دام الرجل حيًا تدعى زانية ان صارت
لرجل آخر. ولكن ان مات الرجل فهي حرة من الناموس حتى انها
ليست زانية ان صارت لرجل آخر. 4 اذا يا اخوتي **انتم ايضا قد متم**
للناموس بجسد المسيح لكي تصيروا لآخر للذي قد أقيم من الاموات
لنتمير لله. 5 لانه لما كنا في الجسد كانت اهواء الخطايا التي
بالناموس تعمل في اعضائنا لكي نتمير للموت. 6 واما الآن فقد
تحررنا من الناموس اذ مات الذي كنا ممسكين فيه حتى نعبد بجدة
الروح لا بعشق الحرف

Spiritual

قال يسوع لليهود الذين آمنوا به انكم ان تثبتتم في كلامي فبالحقيقة تكونون تلاميذي وتعرفون الحق والحق يحرركم . اجابوه اننا ذرية ابراهيم ولم نستعبد لاحد قط . كيف تقول انت انكم تصيرون احرارا . اجابهم يسوع الحق الحق اقول لكم ان كل من يعمل الخطية هو عبد للخطية . والعبد لا يبقى في البيت الى الابد . اما الابن فيبقى الى الابد . فان حرركم الابن فبالحقيقة تكونون احرار

(يوحنا 8:36-31)

فاطلب اليكم ايها الاخوة برأفة الله ان تقدموا اجسادكم ذبيحة حية مقدسة مرضية عند الله عبادتكم العقلية . ولا تشاكلوا هذا الدهر . بل **تغيروا عن شكلكم بتجديد اذهانكم** لتختبروا ما هي ارادة الله الصالحة المرضية الكاملة .

رومية 12 : (1-2)

Spiritual Treatment (Romans 7)

For the good that I will to do, I do not do; but the evil I will not to do, that I practice. Now if I do what I will not to do, it is no longer I who do it, but sin that dwells in me. I find then a law, that evil is present with me, the one who wills to do good. For I delight in the law of God according to the inward man. But I see another law in my members, warring against the law of my mind, and bringing me into captivity to the law of sin which is in my members. O wretched man that I am! Who will deliver me from this body of death?

I thank God--through Jesus Christ our Lord!

Spiritual Treatment (contd.)

- *Then Jesus said to those Jews who believed Him, "If you abide in My word, you are My disciples indeed. And you shall know the truth, and the truth shall make you free." They answered Him, "We are Abraham's descendants, and have never been in bondage to anyone. How can you say, 'You will be made free'?" Jesus answered them, "**Most assuredly, I say to you, whoever commits sin is a slave of sin. And a slave does not abide in the house forever, but a son abides forever. Therefore if the Son makes you free, you shall be free indeed.** (John 8:31-36)*

Spiritual tools (Romans 6)

- Or do you not know as many of us as were baptized into Christ Jesus were baptized into his death?
- Therefore we were buried with Him through baptism into death, that just as Christ was raised from the dead by the glory of the Father even so we also should walk in the newness of life.
- Knowing this, that our old man was crucified with Him, that the body of sin might be done away with, that we should no longer be *slaves of sin*. (1-6)

Spiritual tools (Contd.)

- *Be transformed by the renewing of your mind, (Romans 12:2)*
- **How shall we who died to sin live any longer in it? (Romans 6)**



Self-Help and Drug Addiction Treatment

- **Complements and extends treatment efforts**
- **Most commonly used models include 12-Step (AA, NA) and Smart Recovery**
- **Most treatment programs encourage self-help participation during/after treatment**

The 12 step programs

Self help groups, that does not include any professional therapist or councilor.

Alcoholic Anonymous, Narcotic Anonymous etc..


It is a based on spiritual concepts.

First Three Steps

Admit powerlessness over addiction.



Belief in a “power greater than ourselves”




Turn will over to the care of God “as we understood Him”

Steps 4 through 7

Take a moral inventory



Admit to God, to ourselves, and to another human being the exact nature of our wrongs




Ready to have God remove all these defects of character



Ask Him to remove our shortcomings

Steps 8, 9 and 10

Make a list of all persons harmed and become willing to make amends to them all




Make direct amends wherever possible



Ongoing personal inventory and promptly admit when we are wrong

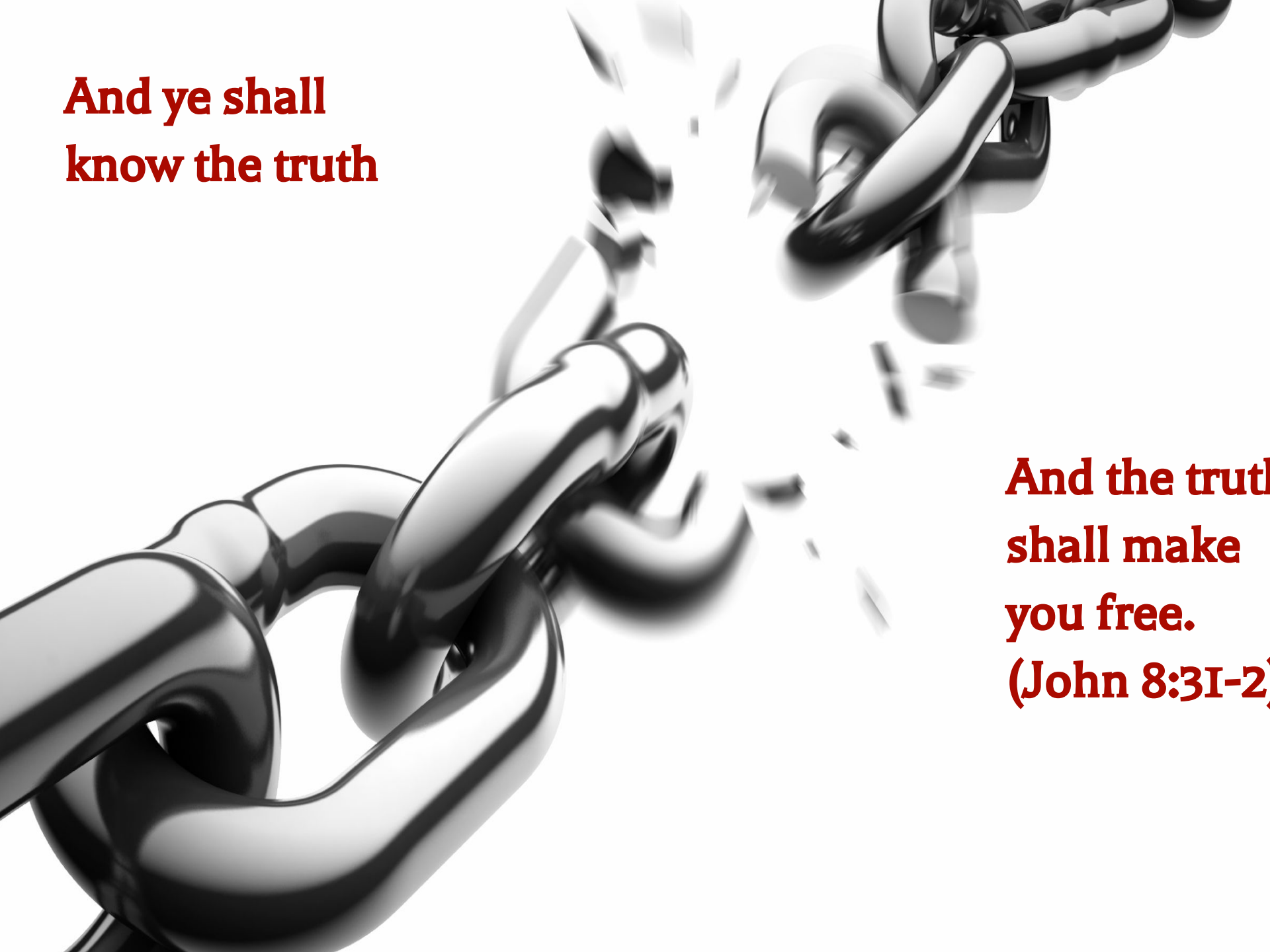
Final Two Steps

Through prayer and meditation improve our conscious contact with God, 'as we understood Him'



"Having had a spiritual awakening as the result of these steps, we tried to carry this message to other addicts, and to practice these principles in all our affairs"

**And ye shall
know the truth**



**And the truth
shall make
you free.
(John 8:31-2)**

