"Treating Substance Abuse Across All Practice Settings"

Al Rundio, PhD, DNP, APRN, CARN-AP, NEA-BC, LNHA, LCADC
Clinical Professor of Nursing
Assistant Dean; Advanced Practice Nursing
Chair, Doctor of Nursing Practice Program
Drexel University
Philadelphia, PA
President-Elect ; International Nurses Society on Addictions

Learning Objectives

- 1. Identify the various chemical substances currently abused in the US population.
- 2. Explain the epidemiology and pathophysiology of substance abuse/chemical dependency.
- 3. Describe two medical interventions for chemically dependent clients.
- 4. Describe the major pharmaceutical agents utilized for the treatment and relapse prevention of alcohol dependency & other commonly abused substances

Substance Abuse in the USA

- Current economic cost estimates exceeds $186 billion annually
- It is estimated that 26.2 million patients are affected by substance abuse in the USA each year
- 132,000 premature deaths were related to chemical dependency in 1992
- Between 1988 and 1995 Americans spent $57.3 billion on illicit drugs alone

Substance Abuse in the USA

- 40% of the population above age 25 years have at some time used marijuana, hallucinogens, cocaine, or heroin
- Results of use may be adverse behavioural and/or health consequences
- Many patients have dual diagnoses today, for example, multiple substances abused and psychiatric disorders such as major depression or bipolar disorders

My Belief About Addiction

- A biopsychosocial & spiritual disease model
- A chronic disease, that is, one that is never cured but one that is managed and controlled
- Relapse prevention is a vital concept to understand, explore & embrace
- One does not elect to become addicted
- Every person has some type of addiction
- Addictions is a disease of the BRAIN

Four Primary Areas

- Ventral Tegmental Area (VTA)
- Nucleus Accumbens
- Amydala
- Prefrontal Cortex

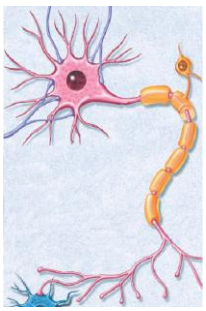
Structure & Function

When it Goes Wrong

Drugs

Wild Card

What is the name of the brain cell shown in the picture below?



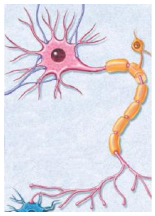
Structure & Function

When it Goes Wrong

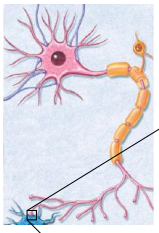
Drugs

Wild Card

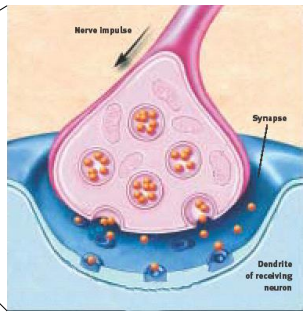
Neurons communicate by sending signals to each other at specialized connections.



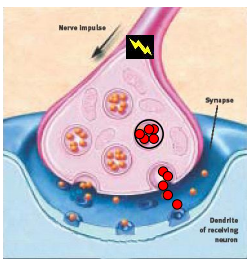
What is the connection between two neurons called?



SYNAPSE!



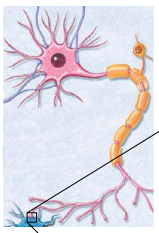
The Synapse: Sending and Receiving



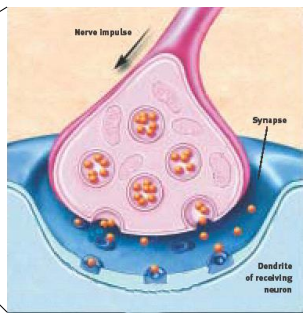
The terminals of the sending neuron has **vesicles** packed with **neurotransmitters**

Neurotransmitters are released when the sending neuron fires

Neurotransmitters send the signal by binding to specific **receptors** on dendrites of the receiving neuron



SYNAPSE!



Alcoholism

- 90% of US population uses alcohol
- Amount & frequency of use vary
- Approximately 10% of men meet DSM-IV criteria
- Approximately 3% to 5% meet DSM-IV criteria
- Elderly drink less frequently and lesser amounts of alcohol resulting in their disease being less identifiable according to the criteria established

Medical Complications of Alcoholism

- GI Tract
- Cardiovascular System
- Metabolic Changes
- Central Nervous System Changes
- Nutritional Deficiencies
- Hematopoietic System Changes

Major Diagnostic Tests

- CAGE Questionnaire
- Elevated Liver Enzymes, especially GGT (gamma glutamyl transpeptidase)
- Increased Mean Corpuscular Volume

CAGE

- CAGE
- Have you tried to CUT DOWN on your drinking?
- Are you ANNOYED by people telling you to stop drinking?
  Do you feel GUILTY about your drinking?
  Do you drink on first getting up in the morning (EYE OPENER)?
- Two or more yes responses = (+) test

Detoxification Treatment

- Thiamine 100 mg IM or PO either daily or BID for 3 days, then Thiamine 100 mg po daily for LOS
- Folate 1 mg po daily for LOS
- Tegretol 200 mg po BID for LOS (in select patients)
- Serum Tegretol level after 5 - 7 days
- Patients must be weaned off of Tegretol

Detoxification Treatment

- Librium 50 mg po every 6 hours
- Librium 25 mg po every 6 hours prn for increased s/s of withdrawal
- Decrease dosing daily according to patient response until completely weaned off of medication
- Clonidine 0.1 mg po every 6 hours with holding parameters of systolic BP< 100 or heart rate < 50 - decrease dose on daily basis until weaned off of medication

Detoxification Treatment

- Ativan instead of Librium
- Serax effective when liver impairment is present
- Counseling/psychotherapy
- AA
- 12 Step Program
- ALANON

Relapse Prevention

- Campral 666 mgs. TID
- Naltrexone (Revia) 25 mgs. daily at bedtime x 3 nights then increase Naltrexone to 50 mgs. daily at bedtime daily thereafter
- Naltrexone oral challenge
- Vivitrol 380 mgs. once monthly
- Combination of Vivitrol and Campral therapy

Counseling and Psychotherapy

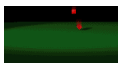
- No relapse prevention medication can be effective without counselling and psychotherapy.
- The issues and triggers in a patient's life that contribute to dependence and addiction must be explored and addressed.

Detox Treatment

- Long Librium or Phenobarbital taper
- Antiseizure medication with Tegretol as previously described or Depakote ER (up to 2000 mgs. daily in split dosage)
- Monitoring of serum levels of Tegretol or Depakote

Structure & Function

When it Goes Wrong



Drugs

Wild Card

Morphine is a powerful pain killer used in hospitals

What street drug of abuse is related to morphine?

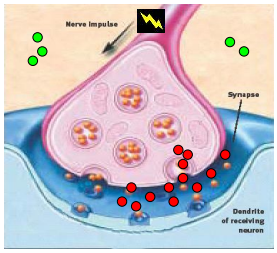
Heroin (also opium & methadone)

What's happening outside?

Behavioral effects of heroin use include:

- "rush" = euphoria, reduced anxiety, nausea, drowsiness
- "withdrawal" = intense muscle aches & pain, piloerection, fever, diarrhea, irritability, increased lacrimation (rhinorrhea, tearing of eyes)
- Primarily snorted or used intravenously
- DEATH by respiratory arrest

What's happening inside?

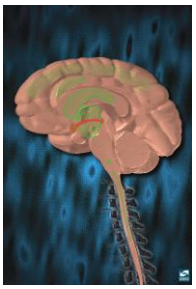


Activation of opioid receptors = increased transmission = "rush"

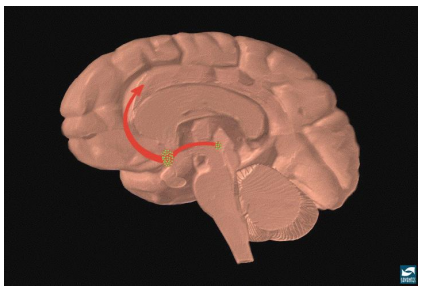
Opioid Addiction

- Morphine
- Heroin
- Codeine
- Oxycodone
- Meperidine
- Fentanyl

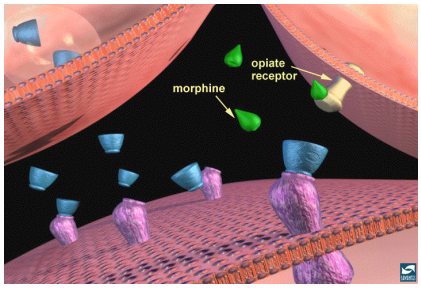
Action of Heroin



Action of Morphine



Morphine and Opiate Binding Sites



Opioids

- If dependence develops, drug procurement often dominates the individual's life and often leads to criminal behavior.

Opioids

- Heroin (diacetylmorphine) is more lipid soluble than Morphine and therefore crosses the blood brain barrier more easily
- Causes more intense euphoria and sedation
- Quickly metabolized
- Excreted in the urine as free or conjugated morphine
- Euphoria, sedation, and analgesia are the desired effects

Heroin

- Overdoses may cause respiratory depression, bradycardia, hypothermia, and death.

Method of Use

- Intravenous
- Nasal Insufflation (snorting)

Complications

- Overdoses may result from variability in the potency of the heroin purchased on the street, rapid loss of tolerance after abstinence, and concurrent use of other central nervous system depressants.
- Other physical complications

Withdrawal

- Symptoms start within 2 to 48 hours of last use
- Abrupt withdrawal of heroin, which has a short half-life, causes prompt and severe withdrawal symptoms

Withdrawal Symptoms

- Restlessness
- Lacrimation
- Rhinorrhea
- Nausea
- Mydriasis
- Muscle Aches
- Diarrhea

Withdrawal Symptoms

- Piloerection
- Tachycardia
- Hypertension

Management

- Clonidine
- Phenobarbital
- Librium
- Suboxone or Subutex
- Symptomatic, for example, Tigan for nausea and vomiting
- Levsin & Robaxin, Flexeril
- Counseling/Psychotherapy/Alternative Therapies

Relapse Prevention

- Naltrexone in dosages previously described
- Note – Can NOT begin Naltrexone Rx. until the patient is opioid naïve for 10 days
- Suboxone
- Subutex
- Methadone

Suboxone

- Buprenorphine, a partial opioid receptor agonist/antagonist
- Drug Addiction Treatment Act of 2000 allows qualified physicians to treat opioid-dependent patients with sublingual Suboxone in their practices
- Suboxone provides a new management option for opioid dependent clients

Suboxone

- Physicians must complete an approved 8 hour course on Suboxone treatment
- Physicians can only have a maximum of 30 (recently changed to 100) clients in their practice at one time
- If more than one physician is in the practice, then an additional clients can be added per physician as long as above requirements are met
- DEA monitors physicians prescribing Suboxone
- ***Advanced Practice Nurses can not prescribe Suboxone***

Suboxone

- Occupies opioid receptor sites
- Blocks effects of opioid agonists
- Not easily displaced by other opioids
- Lower potential for abuse
- Less physical dependence
- Reduced cravings
- Greater safety in accidental overdose

Suboxone

- Initiation of therapy can vary
- Administered sublingually as a tablet
- Now available as melt away strip
- Once daily dosing
- Milder withdrawal profile
- Can be dispensed for take home use
- Maintains clients in outpatient treatment
- Best results are when pharmacology is combined with psychosocial treatment and counselling

Butrans

- Buprenorphine Transdermal System for chronic pain

Methadone

- Most frequently used medication for opioid addiction treatment
- Allows patients to socialize and function normally
- Prevents physical withdrawal symptoms
- Relieves the craving of opioids

Benefits of Methadone

- Administered orally
- Once daily dosing
- Minimal side effect profile
- Safe and effective when dosed correctly

Pharmacology of Methadone

- Long-acting full opioid receptor agonist
- Functions at mu receptor sites
- Mu receptor sites exist on the surfaces of brain cells
- Belief is that the activation of the mu receptors are responsible for the analgesic and euphoric effects of opioids

Methadone Kinetics

- 80% bioabsorption
- Blood levels peak within 2 – 4 hours
- Pain relief within 4 – 6 hours
- Half life is 24 – 36 hours
- Steady state reached within 5 – 7.5 days
- *Note: Blood levels are influenced by absorption, metabolism, protein binding, urinary pH, other medications, diet, age, physical activity level, pregnancy & vitamins*

Methadone Induction

- Induction is the most risky phase of methadone maintenance treatment.
- START LOW & GO SLOW!!!
- Treatment must be individualized
- Optimal doses for patients will vary
- Understand the cumulative property of methadone
- Communicate with patients

Initial Dose

- Use COWS (Clinical Opiate Withdrawal Scale)
- Score Maximum Initial Dose
- 0 – 5 (no wd) 0 mg.
- 5 – 12 (mild wd) up to 15 mg.
- 13 – 24 (Moderate wd) up to 20 mg.
- 25 – 36 (Mod.Sev.wd) up to 25 mg.
- > 36 (Severe wd) up to 30 mg.
- *Note: If withdrawal does not follow, methadone treatment cannot be initiated.*

Goals of Methadone Therapy

- Ensure individualized and "adequate dose."
- Titrate dose to achieve a steady-state with methadone levels (clinically determined) in the "comfort zone" throughout and beyond the dosing interval.
- Allow time to react to the initial dose
- Allow time to react to a dose increase (3-5 days).
- Avoid overly aggressive (toxicity, overdose) and ultra-slow titration of dosing (continued illicit drug use).
- Continued assessment and monitoring of the patient is essential.

Methadone's Cumulative Effect

- Dose A is 30 mgs. daily with no increase for 6 days. Cumulative effect by day 6 is equivalent to 59.0625 mgs. of the drug.
- Dose B has an initial dose of 30 mgs. On day 1 and then the dose is increased daily by 10 mgs. for another 5 days, i.e. day 2 the dose is 40 mgs., 50 mgs., 60 mgs., 70 mgs., 80 mgs. Thus by day 6 the cumulative effect of dosing is 139.6875 mgs.

Keys to Methadone Therapy

- ANY SIGN OR SYMPTOM OF OVER-MEDICATION DURING THE EARLY INDUCTION PHASE REQUIRES A DOSE REDUCTION!!!
- Beware of the subtle signs/symptoms of overmedication; i.e. feeling good, extra energy, staying awake at work, etc.
- Patients may need more TIME, not more MEDICATION!!!

Adverse Reactions

- Constipation
- Excessive sweating
- Paresthesias in hands and feet
- Weight gain
- < libido/sexual dysfunction
- Rash

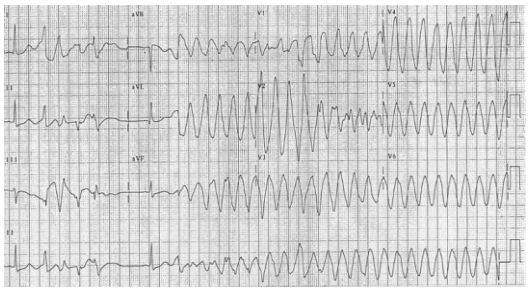
Health Conditions That May Affect Dose

- Age
- Hepatitis C
- HIV/AIDS
- Cardiac Risk
- Pain
- Pregnancy
- Lactation

Cardiac Adverse Effects

- **FDA Black Box Warning**
- Prolonged QT syndrome in doses greater than 200 mgs. or with IV administration
- QT prolongation may lead to Torsades de Pointes
- Need to assess individual risks
- EKG pre administration???

Torsades de Pointes



Drug Interactions

- Multiple drug interactions exists:
- Sedatives
- Antidepressants
- HIV Medications
- Antibiotics & Antifungals especially Cipro, Fluconazole and Rifampin
- Inducers and Inhibitors of the CYP 450 enzyme system

Relapse Prevention

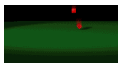
- No relapse prevention medication can be effective without counselling and psychotherapy.
- The issues and triggers in a patient's life that contribute to dependence and addiction must be explored and addressed

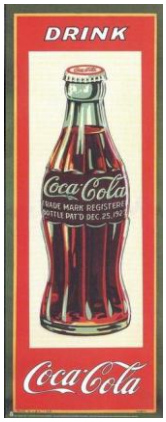
Structure & Function

When it Goes Wrong

Drugs

Wild Card





What street drug was an ingredient

in Coca-Cola from 1886 – 1906?

This street drug was also utilized as a health tonic and was made into a wine.

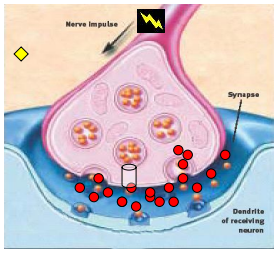
COCAINE

What's happening outside?

Behavioral effects of cocaine use include:

- "high" = excitement and euphoria, headaches and anxiety, elevated heart rate blood pressure
- "crash" = depression, paranoia, exhaustion – patients are at high risk for suicide
- DEATH by heart attack or stroke secondary to vasoconstriction and/or vasospasm of vessels; tamponade also occurs

What's happening inside?



Blockage of dopamine removal = increased dopamine = "high"

Cocaine & Amphetamines

- Recreational use of cocaine has increased in the past decade

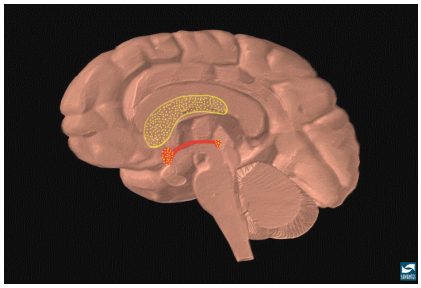
Cocaine

- Inhaled nasally
- Smoked
- Ingestion
- Intravenous use
- Smoking and injection produce the highest serum concentrations and greatest toxicity, as does free basing (produced by heating with diethyl ether)

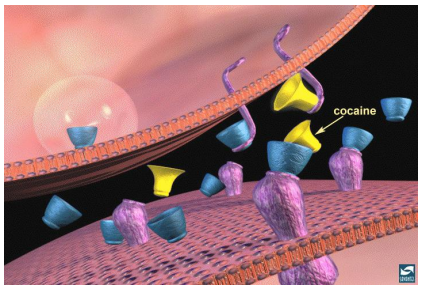
Amphetamines

- Have effects similar to those of cocaine but a substantially longer duration of action

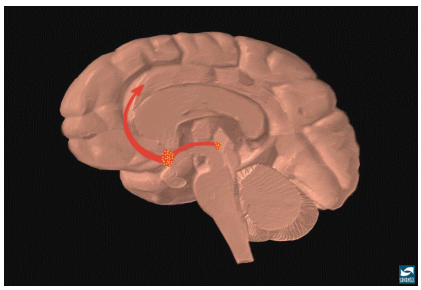
Action of Cocaine



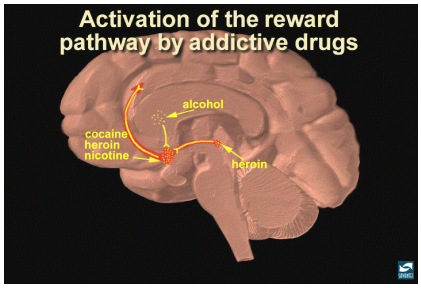
Cocaine Binding Sites



Cocaine Dependence



Reward Pathways



Cocaine & Amphetamines

- Euphoria
- Feeling of elation probably as a result of central nervous system release of catecholamines
- Larger doses may cause restlessness, tremor, tachycardia, and hypertension

Complications of Cocaine

- Acute myocardial infarction
- Cardiac dysrhythmias
- Rupture of the ascending aorta
- CVA
- HTN
- Hyperpyrexia
- Seizures in acute overdoses

Chronic Use of Cocaine

- Rhinitis
- Nasal mucosal atrophy
- Nasal perforation
- Acute & chronic paranoid psychoses with both heroine and cocaine
- Diffuse vasculitis in amphetamine use, which may lead to renal failure, CVS and Cor pulmonale

Withdrawal

- Dependence is characterized by binge use - the main purpose of which is to maintain the euphoria and sense of power that these drugs provide
- After bingeing, a period of intense depression, anxiety, and agitation follow
- Craving for sleep

Withdrawal

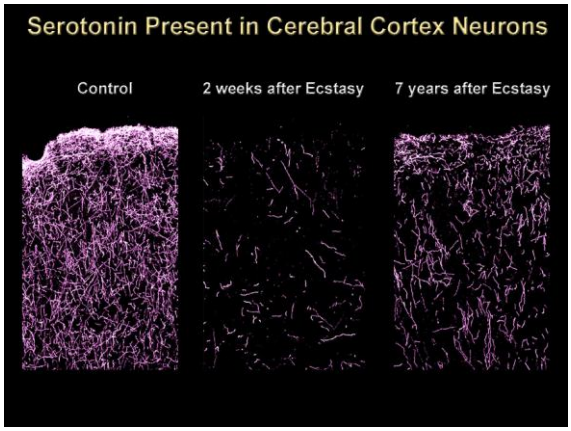
- Lassitude
- Sleep disorders
- Nightmares
- Depression
- Psychomotor retardation may persist for 6 to 18 weeks after the period of hypersomnolence

Management

- Phenobarbital as previously described
- Antidepressants, such as desipramine
- Counseling Therapy
- Management of Symptoms
- Baclofen has been trialed for relapse prevention – has not been demonstrated to be effective to date

MDMA (Ectasy)

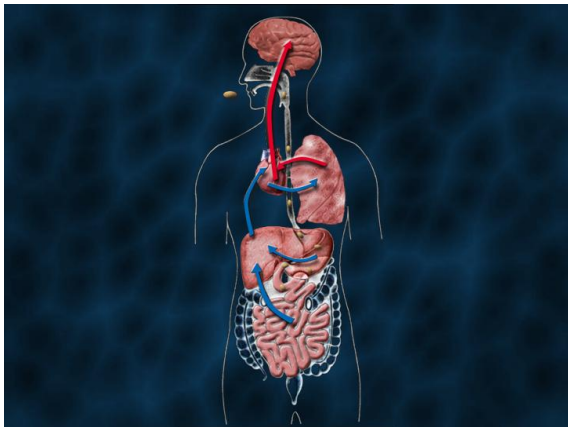
- Tablets are marketed in a variety of colors
- The diamond “Mitsubishi” corporate logo is a common design scored into Ectasy tablets
- Common street names are E, Adam, XTC, X, M, Bean, Roll, and Hug Drug
- Ingested orally
- Users claim Ectasy provides them with an increased sense of energy and heightened sensory perception to enhance their experience at the “clubs” or “raves”



Defining Ecstasy

A derivative of amphetamine

MDMA, XTC, E, essence, Adam



What we know:

Ecstasy has short-term & long-term effects on the brain

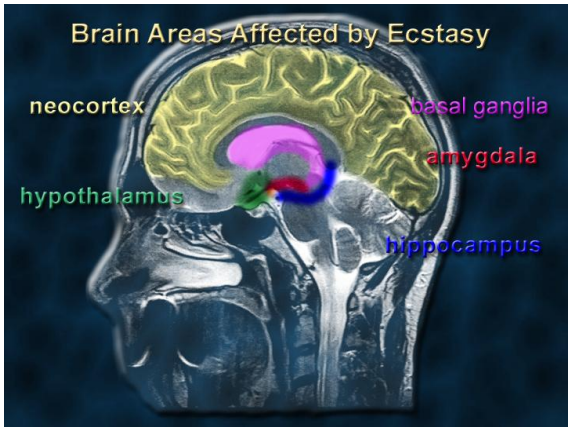
Short term:

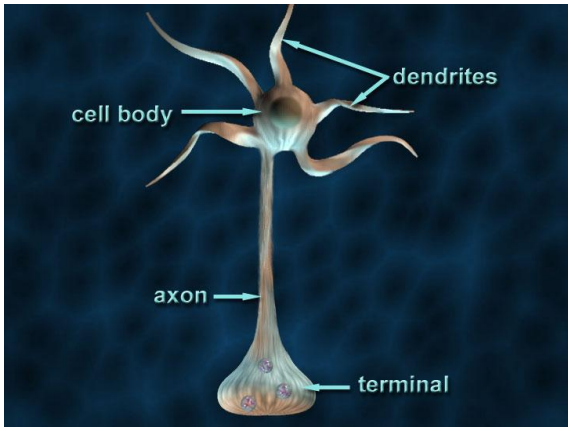
changes brain chemistry, behavior

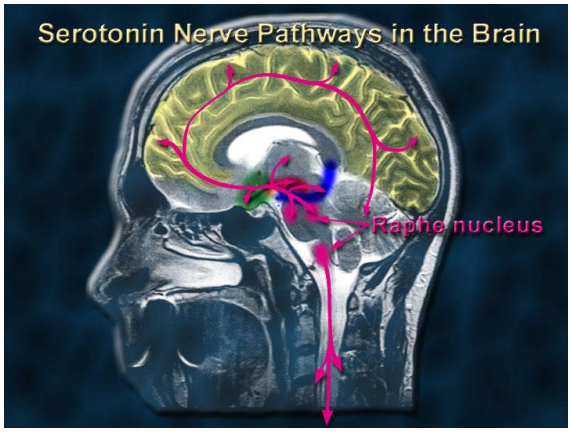
Long term:

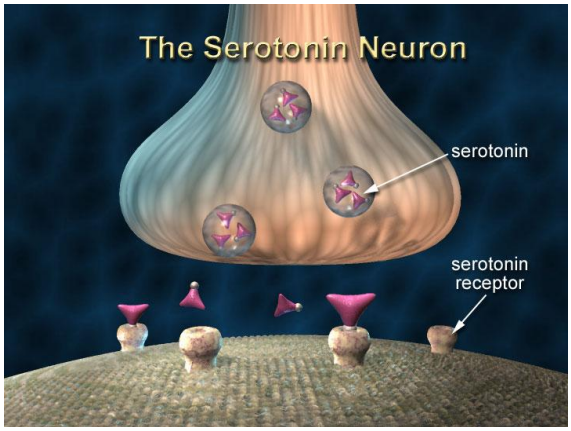
changes brain structure, behavior

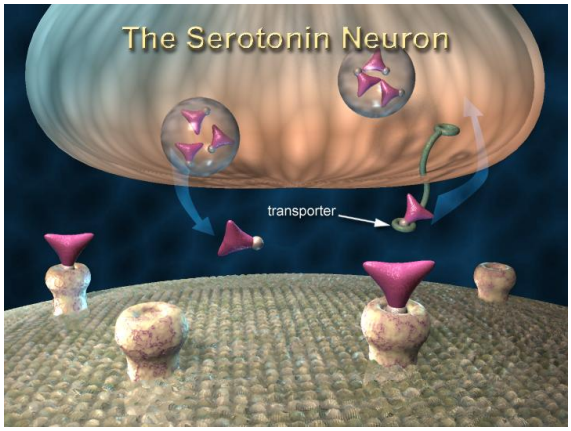

How Do We Know ?
Scientific research in animals and humans

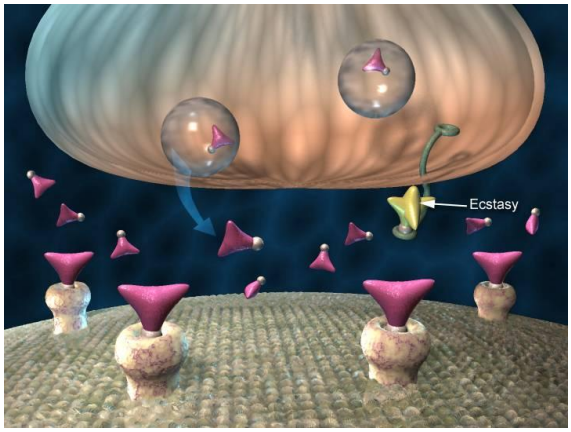

Brain Areas Affected by Ecstasy
neocortex
basal ganglia
amygdala
hypothalamus
hippocampus

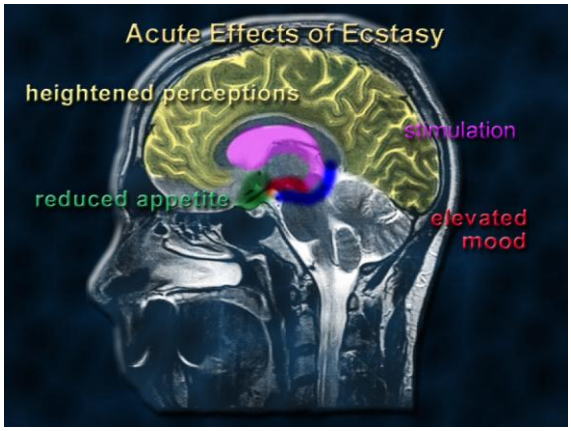

dendrites
cell body
axon
terminal

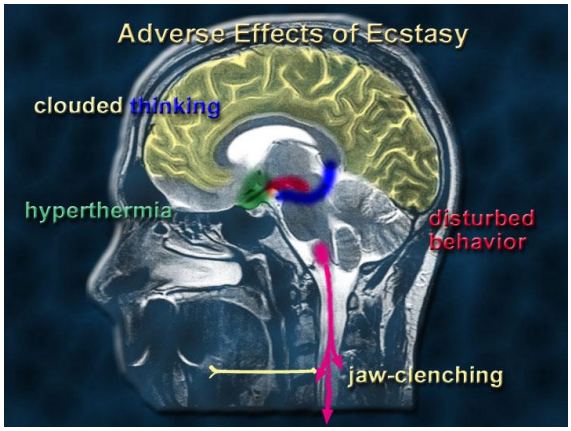

Serotonin Nerve Pathways in the Brain
Raphe nucleus

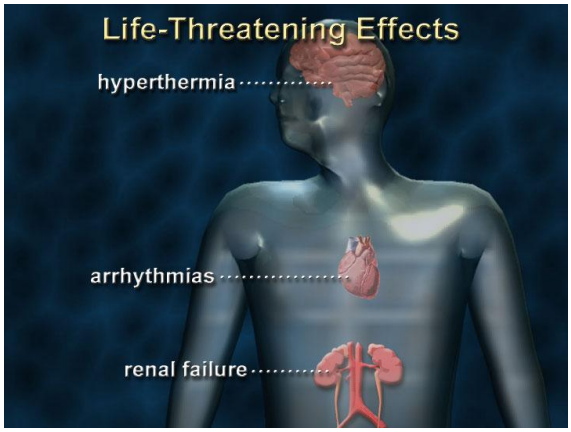

The Serotonin Neuron
serotonin
serotonin receptor

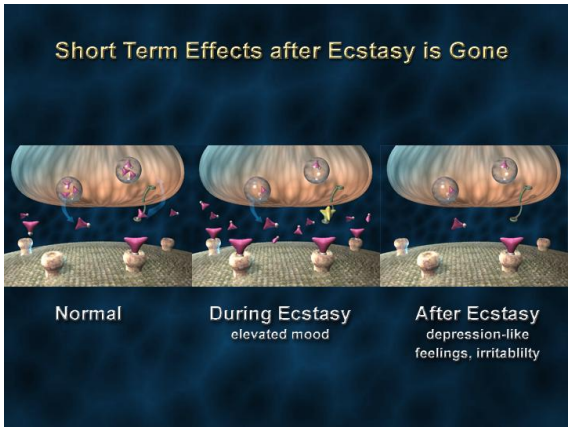

The Serotonin Neuron
transporter


Ecstasy


Acute Effects of Ecstasy
heightened perceptions
stimulation
reduced appetite
elevated mood


Adverse Effects of Ecstasy
clouded thinking
hyperthermia
disturbed behavior
jaw-clenching

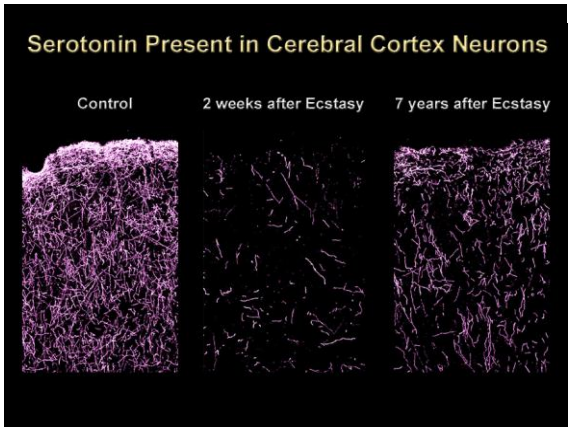




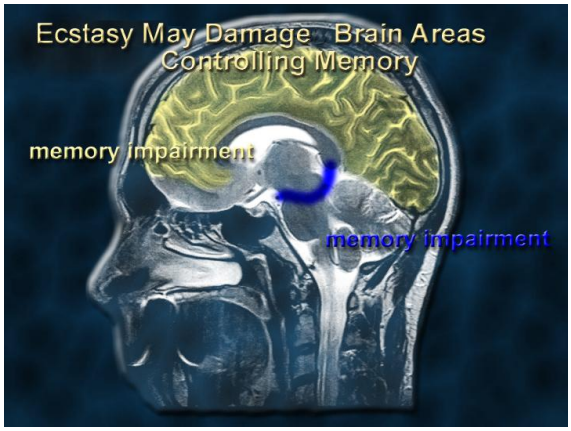
Long Term Effects of Ecstasy: Animal Studies Indicate Neurotoxicity

Brain chemistry changes
- serotonin reduced
- serotonin metabolites reduced

Brain structure changes
- serotonin transporters reduced
- serotonin terminals degenerate


Serotonin Present in Cerebral Cortex Neurons
Control
2 weeks after Ecstasy
7 years after Ecstasy


Ecstasy Causes Degeneration of Serotonin Nerve Terminals


Ecstasy May Damage Brain Areas Controlling Memory
memory impairment
memory impairment

Effects

- Mental confusion, depression, sleep disorders, drug cravings, restlessness, severe anxiety, and paranoia
- Elevated heart rate and blood pressure
- Elevated body temperature reaching up to 106 degrees F
- Loss of appetite, dehydration, muscle tension, involuntary teeth clenching, nausea, blurred vision, fully dilated pupils, rapid eye movement, faintness, and chills or sweating

Effects

- Long term damage to parts of the brain critical to thought and memory
- Duration of the short term effects last up to 4 – 6 hours

GHB

- In liquid form, GHB is colorless and odorless
- GHB has a salty or soapy taste
- GHB is sold in powder or capsule form
- It is made of lye or drain cleaner mixed with GBL, a chemical cousin of GHB and an industrial solvent to strip floors

GHB

- GBL itself is often abused and produces the same effects as GHB
- GBL and another chemical cousin, 1,4 butanediol (1,4BD), convert to GHB in the body
- Recipes for GHB can be easily found on the internet
- Some GHB users brew the drug in bathtubs at home

Who Abuses GHB?

- Majority of users are young adults
- Most common use is among white, middle-class males between ages 13 and 30
- Many do not realize that GHB affects each person differently
- Differences vary in the purity and strength of the dose, which can mean the difference between life and death
- Misinformation on the Internet, a medium widely used by young adults, may also contribute to the problem

Other Uses of GHB

- Bodybuilders (stimulates the release of growth hormones)
- Alcoholics may use it to try to eliminate alcohol cravings
- Sleep aid

Legitimate Use of GHB

- Treatment for cataplexy, a symptom of the sleep disorder narcolepsy in which muscles lose strength
- US Food and Drug Administration approved GHB under the brand name of Xyrem on July 17, 2002
- US Food and Drug Administration mandated some of the most severe restrictions every imposed on a medicine
- On February 18, 2000, the Hillary J. Farias and Samantha Reid Date-Rape Drug Prohibition Act of 2000 became law, making GHB a Schedule 1 drug

Nicotine Dependence

- 29% of the US population smokes
- Decreasing by 0.5% annually
- CDC estimates that 434,000 smoking-related deaths occur annually
- Over 1.2 million years of life before age 65 are lost each year as a result of smoking
- Diagnosis is well accepted and based on the DMS IV-R criteria

Diagnosis

- 2 Key Questions
- Does the patient smoke within 30 minutes of awakening?
- Does the patient smoke more than 25 cigarettes a day?
- Patients who answer yes to both questions benefit most from drug therapy

Treatment Plan

- Begins with a good, thorough clinical assessment
- Assessment for depression & suicide
- Medical Detoxification & Monitoring
- Continued pharmacology for symptom relief post detoxification (dependent upon use history, substance used, and symptoms of the patient)

Treatment Plan

- Relapse Prevention Strategies
- Relapse Prevention Plan
- 12 Step Program
- Counseling
- Psychotherapy

Maintaining a Substance Free Facility

- Stress values upfront
- 0 tolerance policy
- Pre offer of employment drug screen
- Periodic random drug screens on all employees
- On going education
- Consult experts in the field

Case Study 1

- Mr. Smith is a 39 year-old caucasian male who had been abusing IV heroin. He was in recovery attending 12 step meetings at a church. He relapsed on IV heroin and shot heroin into his jugular vein. He seeded an MRSA infection in his chest, and then his meninges and brain. He required acute care hospitalization, surgery and IV antibiotics. Following hospitalization he was admitted to a subacute nursing unit for continued treatment.

Case Study 2

- Mrs. Jones drank alcohol a good part of her life. She was employed as a hair dresser. She would go to the gym after work. Then she would make dinner and always have a few glasses of wine from that day forward. Mrs. Jones passed out one day and was vomiting blood. She was treated as an inpatient at an acute care facility. She was then transferred to a subacute nursing facility for continued physical rehabilitation.

Case Study 2 (continued)

- After one month or so of treatment, Mrs. Jones became forgetful and at times was a little disoriented.

Questions

- That's All Folks!!!

Contact Information

- Al Rundio, PhD, DNP, APRN, CARN-AP, NEA-BC
- Cell Phone #: 609-892-1844
- E-mail: arundio@aol.com or aar27@drexel.edu