


Psychopharmacology for Therapists & Psychologists

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Outline

- Disclaimers
 - Brief overview of brain anatomy and function
 - Review main types of psychiatric disorders, their presentations & symptoms
 - Review psychotropic medication classes and therapeutic effects
 - Describe potential side effects, adverse effects signs and symptoms, do not miss signs
 - Novel Treatments
 - Medication Assisted Treatment (MAT)
- 



Collaborative Effort

- ▶ Time constraints during visits, especially insurance driven
- ▶ Appointment availability
- ▶ May not see prescriber as often as for therapy
- ▶ Many times embarrassed, have better rapport with therapist/psychologist
- ▶ Help client advocate for themselves
- ▶ Motivational interviewing, are you better with no meds?
- ▶ Progress farther in therapy



Some Vocabulary

- ▶ Psychopharmacology- the study of the effects of drugs on affect, behavior and cognition
- ▶ Agonist- drug that binds to and activates a receptor
- ▶ Antagonist- drug that binds to but does not activate instead blocks the receptor
- ▶ Efficacy- maximal therapeutic effect the drug can achieve
- ▶ Half-life- time necessary for half the drug to be removed from the system
- ▶ Neurotransmitters- chemical messengers
- ▶ Potency- the amount of drug needed to achieve maximum effect
- ▶ Receptors- molecules situated on the cells




Side Effect presentations/complaints in session

- ▶ Why are they getting up and moving around all the time?
- ▶ Lip smacking, sticking tongue out?
- ▶ Vivid dreams
- ▶ No sex drive or unable to have an orgasm
- ▶ Food tastes weird, Coke tastes flat
- ▶ Irritable
- ▶ Apathetic



Side effects (cont.)

- Shuffling feet
 - Vision changes
 - GI disturbances
 - Grinding teeth
 - Sunburn type rash
 - Seizures
 - Weight gain
- 




Brain Anatomy & Function

- ▶ “Your brain is a three pound universe that processes 70,000 thoughts each day using 100 billion neurons that connect at more than 500 trillion points through synapses that travel 300 miles/hour.” Cleveland Clinic

- ▶ <https://healthybrains.org/brain-facts/>



Brain Anatomy & Function

- ▶ Three main parts:
 - ▶ Cerebrum: largest part of the brain, remembering, thinking, feeling, problem solving and movement control are all done here
 - ▶ Cerebellum: located under cerebrum and in the back of the skull. Controls coordination and balance.
 - ▶ Brain Stem: located below the cerebrum and in front of the cerebellum. It connects the spinal cord to the brain. It is responsible for controlling breathing, heart rate, digestion and blood pressure.
- 

Brain Anatomy & Function

Brain Anatomy & Functions

Frontal lobe

Parietal lobe

Occipital lobe

Temporal lobe

Brain stem

Cerebellum

Cerebral Functions

- Higher Mental Function:** Problem Solving, Thinking, Planning, Judgement, Emotional Expression, Creativity, Behavioral Control
- Motor Functions:** Orientation, Head and Eye Movements, Posture
- Broca's Area:** Control of Muscles for Speech Production & Ability to Comprehend Grammatical Structure
- Motor Functions:** Initiation of Voluntary Muscles, Movement
- Sensory Functions:** Sensation from Skin and Muscles
- Sensory Association Functions**
- Visual Functions:** Coordination of Eye Movements, Perception, Image Recognition, Association, Visual Memory
- Association Area:** Short Term Memory, Equilibrium, Emotion

Cerebellar Functions

- Motor Functions:** Coordinates Voluntary Movements: Posture, Balance, Coordination, & Speech

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Antidepressants, do they work?

- ▶ Antidepressants and psychological therapies – of which the most frequently used is CBT (cognitive behavior therapy) – have similar success rates. Around 60% of people respond by about two months to the drugs with about a 50% reduction in their symptoms - an improvement in mood, better sleep and so on. But, he said, “about 80% of people stop antidepressants within a month”.

Comparative efficacy and acceptability of 21 antidepressant drugs for the acute treatment of adults with major depressive disorder: a systematic review and network meta-analysis. Over 500 trials examined

Andrea Cipriani, MD Psychiatry Oxford University



Monoamine Neurotransmitters

- ▶ There are three primary transmitters related to the monoamine hypothesis of depression:
- ▶ Serotonin – regulates mood, sleep, appetite, adds in attention, learning, libido, pain control, temperature regulation
- ▶ Norepinephrine – concentration, arousal, learning, memory
- ▶ Dopamine – regulating movement, working memory, attention, reward motivated behavior

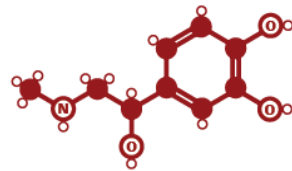
Neurotransmitters

THE STRUCTURES OF NEUROTRANSMITTERS

STRUCTURE KEY: ● Carbon atom ○ Hydrogen atom ○ Oxygen atom ○ Nitrogen atom ○ Rest of molecule

ADRENALINE

Fight or flight neurotransmitter



Produced in stressful or exciting situations. Increases heart rate & blood flow, leading to a physical boost & heightened awareness.

NORADRENALINE

Concentration neurotransmitter



Affects attention & responding actions in the brain, & involved in fight or flight response. Contracts blood vessels, increasing blood flow.

DOPAMINE

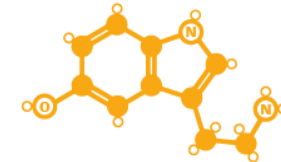
Pleasure neurotransmitter



Feelings of pleasure, and also addiction, movement, and motivation. People repeat behaviours that lead to dopamine release.

SEROTONIN

Mood neurotransmitter



Contributes to well-being & happiness; helps sleep cycle & digestive system regulation. Affected by exercise & light exposure.

GABA

Calming neurotransmitter



Calms firing nerves in CNS. High levels improve focus; low levels cause anxiety. Also contributes to motor control & vision.

ACETYLCHOLINE

Learning neurotransmitter



Involved in thought, learning, & memory. Activates muscle action in the body. Also associated with attention and awakening.

GLUTAMATE

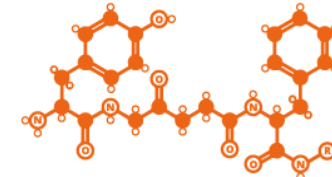
Memory neurotransmitter



Most common brain neurotransmitter. Involved in learning & memory, regulates development & creation of nerve contacts.

ENDORPHINS

Euphoria neurotransmitters



Released during exercise, excitement, & sex, producing well-being & euphoria, reducing pain. Biologically active section shown.

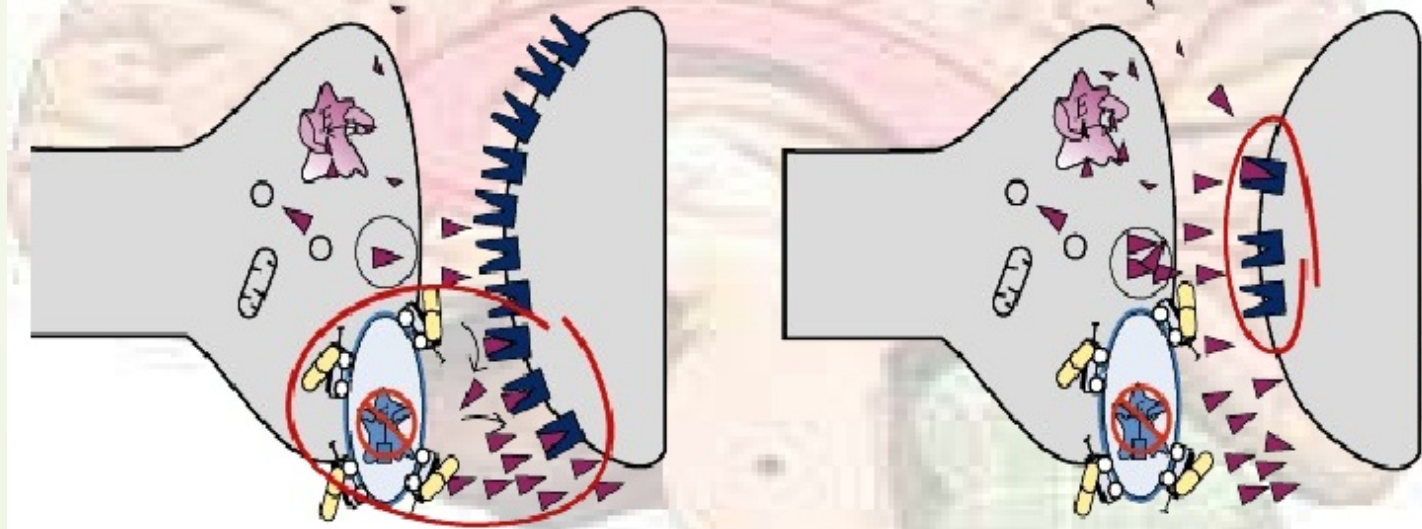


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Neurotransmitter Hypothesis

Neurotransmitter Receptor Hypothesis of Antidepressant Action



Antidepressant blocks the reuptake pump, causing more NT to be in the synapse

Increase in NT causes receptors to down-regulate



Evidence Supporting Monoamine Hypothesis

- ▶ A simplified theory of depression
- ▶ Idea that “normal” amounts of the neurotransmitters were depleted by stress, genetics, drug use or some disease process
- ▶ Certain drugs that were known to deplete these neurotransmitters could induce depression
- ▶ Antidepressants at the time of hypothesis were known to have an effect on the increase of the monoamines
- ▶ New evidence points more towards changes in gene expression in neurons targeted by the monoamines. “It is clear that antidepressant agents in current use require an intact monoamine system for their therapeutic effect”. Delgado PL. Depression: the case for a monoamine deficiency. *J Clin Psychiatry*. 2000;61 Suppl 6:7–11.



Depression Facts

- **Depression is a very common mental disorder. Globally, there are more than 264 million people of all ages suffer from depression**
- **Suicide is the second leading cause of death for 15-29 year old's**
- **Depression is a leading cause of disability worldwide and is a major contributor to the overall global burden of disease.**
- **Women are affected by depression more than men.**

<https://www.who.int/news-room/fact-sheets/detail/depression>



Depression



- ▶ Intense feelings of sadness, despair, hopelessness
- ▶ Unable to experience pleasure with activities that are usually pleasurable
- ▶ Crying spells
- ▶ Change in appetite
- ▶ Sleep pattern changes
- ▶ Suicidal thoughts



Anxiety-GAD, Panic, OCD (formerly under anxiety)

- ▶ GAD- persistent worry/anxiety in multiple facets of life, overthinking plans/ solutions, difficulty with uncertainty, indecisiveness, unable to let go, restless, fatigue, GI upset, irritable
- ▶ Panic- intense fear peaks in 10 minutes, palpitations, sweating, trembling, difficulty breathing, chest pain, GI upset, lightheaded, fainting, derealization, fears of dying or going crazy, numbing/tingling, especially lips, fear of it happening again
- ▶ OCD- Recurrent/persistent thoughts, urges, impulses that are intrusive/ unwanted, usually cause distress.



PTSD



- ▶ Recent studies from VA have concluded therapy hedges out medication but that both are preferred and more efficacious.
- ▶ Direct/indirect exposure/witnessing trauma, near death or sexual trauma, reexperienced nightmares, flashbacks, intrusive thoughts, triggers, negative thoughts that began/worsened after the trauma, hyperarousal, last longer than a month, distress/function in social/work life and not due to medication/substance use
- ▶ SSRI's first line
- ▶ Benzodiazepines decrease efficacy of CPT/PE/EMDR (VA requires vets to be off BZD before initiating treatment)

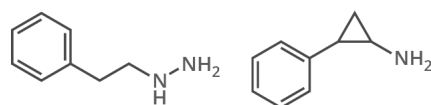
Classes of Antidepressants

MAJOR CLASSES OF ANTIDEPRESSANT DRUGS

Key: ● 'FIRST GENERATION' ANTIDEPRESSANTS ● 'SECOND GENERATION' ANTIDEPRESSANTS NOTE: DESIGNATIONS ARE ARBITRARY - DIFFERENT SOURCES CAN GROUP THEM DIFFERENTLY

MONOAMINE OXIDASE INHIBITORS (MAOIs)

THE FIRST CLASS OF MODERN ANTIDEPRESSANTS



Phenelzine (Nardil)

Tranylcypromine (Parnate)

EXAMPLES

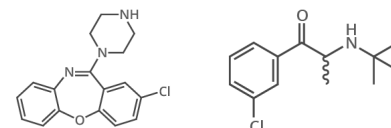
Iproniazid (discontinued), phenelzine (Nardil), isocarboxazid (Marplan), tranylcypromine (Parnate), selegiline (Emsam), moclobemide (Amira).

DETAILS

Inhibit monoamine oxidase, preventing breakdown of neurotransmitters. Rarely used due to toxicity and potentially lethal food & drug interactions.

TETRACYCLIC & UNICYCLIC ANTIDEPRESSANTS

PRIMARILY COMPOUNDS THAT DON'T FIT OTHER CLASSES



Amoxapine (Asendin)

Bupropion (Wellbutrin)

EXAMPLES

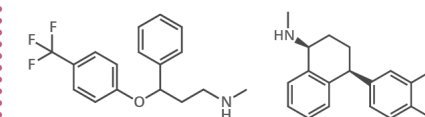
Bupropion (Wellbutrin), mirtazapine (Remeron), amoxapine (Asendin), maprotiline (Ludiomil).

DETAILS

Variably inhibit serotonin & norepinephrine reuptake. Some poorly understood. Bupropion is amongst the few antidepressants without sexual side-effects.

SSRIs

SELECTIVE SEROTONIN REUPTAKE INHIBITORS



Fluoxetine (Prozac)

Sertraline (Zoloft)

EXAMPLES

Fluoxetine (Prozac), sertraline (Zoloft), citalopram (Celexa), paroxetine (Paxil), fluvoxamine (Faverin), escitalopram (Lexapro).

DETAILS

Inhibit reuptake of serotonin. High toxic dose and mild side effects. The most widely prescribed antidepressants in many countries.

FIRST APPROVED 1950

1960

1970

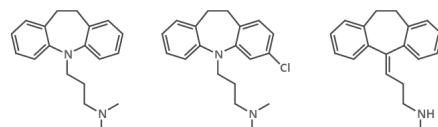
1980

1990

2000

TRICYCLIC ANTIDEPRESSANTS (TCAs)

DOMINANT CLASS UNTIL INTRODUCTION OF SSRIS



Imipramine (Tofranil)

Chloripramine (Anafranil)

Nortriptyline (Aventyl)

EXAMPLES

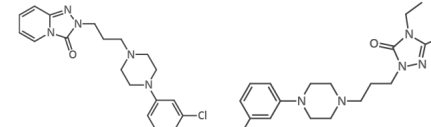
Chloripramine (Anafranil), imipramine (Tofranil), nortriptyline (Aventyl), lofepramine (Lomont), amitriptyline (Tryptomer).

DETAILS

Inhibit reuptake of neurotransmitters; mostly epinephrine, and serotonin. Due to side effects and potential for fatal overdose, now seldom used.

SARIs

SEROTONIN ANTAGONIST & REUPTAKE INHIBITORS



Trazodone (Desyrel)

Etoperidone (Axiomin)

EXAMPLES

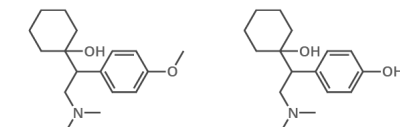
Trazodone (Desyrel), etoperidone (Axiomin), lorpiprazole (Normarex), mepiprazol (Psigodal), nefazodone (Serzone).

DETAILS

Prevent reuptake of serotonin, as well as stopping it binding to cell receptors. Nefazodone can be toxic to the liver and is no longer commonly prescribed.

SNRIs

SEROTONIN-NOREPINEPHRINE REUPTAKE INHIBITORS



Venlafaxine (Efexor)

Desvenlafaxine (Pristiq)

EXAMPLES

Venlafaxine (Efexor), desvenlafaxine (Pristiq), duloxetine (Cymbalta).

DETAILS

Inhibit both serotonin & norepinephrine reuptake. Studies have shown they may have a modest increase in efficacy compared to SSRIs. They also have slightly milder side effects.





Antidepressants/Antianxiety

- ▶ Tricyclic antidepressants (TCA)- amitriptyline, doxepin. Worked very well but had many drug interactions and highly lethal in OD
- ▶ Monoamine oxidase inhibitors (MAOI). Drug and food interactions with tyramine, Silence of the Lambs diet (red wine, fava beans, aged meats and cheeses)
- ▶ Selective Serotonin Reuptake Inhibitors (SSRI's)- Prozac was first SSRI approved in 1987. First line medication for depression/ anxiety. More tolerated, low lethality.
- ▶ Serotonin and Noradrenaline Reuptake Inhibitors (SNRI)- Cymbalta



Antidepressants/Antianxiety

- ▶ Norepinephrine and Dopamine Reuptake Inhibitor (NDRI)- Wellbutrin, also used for ADHD and smoking cessation (Zyban), combined with naltrexone is called Contrave, weight loss drug.
- ▶ Norepinephrine Reuptake Inhibitor (NRI)- Strattera most well-known to treat ADHD as non-stimulant
- ▶ Tetracyclic- Remeron, generally safer than tricyclics



SSRIs/SNRIs

- ▶ SSRI-Prozac, Zoloft, Lexapro, Celexa, Paxil
- ▶ Most prescribed, first line MDD/GAD, panic d/o, bulimia also used in OCD.
- ▶ Generally well tolerated
- ▶ SNRI- Effexor, Cymbalta
- ▶ Newer, increased efficacy and overall tolerability to TCAs
- ▶ Should take for minimum 9 months once effective, stopping sooner has increased chance of recurrent depression



Side Effects/Adverse Effects of SSRI/SNRI

- ▶ GI upset (nausea, diarrhea) usually in the beginning, take with food, start low dose
- ▶ Sexual dysfunction (SSRI's)
- ▶ Sedating or insomnia
- ▶ Headache (SSRI's, trazodone and Wellbutrin)
- ▶ Dry mouth
- ▶ Teeth grinding (SSRI's)
- ▶ Irritability



Side Effects/Adverse Effects of SSRI/SNRI

- ▶ Tremor (lithium, antipsychotics)
- ▶ Hyponatremia (especially in the older population and with Zoloft)
- ▶ GI bleeding
- ▶ Serotonin syndrome (emergency)
- ▶ Discontinuation syndrome- usually from abrupt cessation




Other depression/anxiety meds

- ▶ Wellbutrin – mainly depression, targets anhedonia, anergia, focus, concentration. Off label for ADHD in children. Also called Zyban (smoking cessation). Some evidence helping curb cravings for stimulants (meth and cocaine).
- ▶ Remeron- helps with sleep, higher doses used for MDD/GAD, combined with Effexor (California Rocket Fuel), known to cause weight gain.
- ▶ Trazodone- "mild antidepressant" at higher doses, commonly used off label for sleep, helps induce sleep, take and go to bed, read, don't wait for sedation. Common SE are headache and vivid dreams.




Other depression/anxiety meds

- ▶ Vistaril- prescription anti-histamine, non habit forming, fast, effective, some sedating effects
 - ▶ Clonidine- blood pressure med, used for anxiety, as well as opiate withdrawals, FDA approved for ADHD in children
 - ▶ Anti-psychotics, low dose Seroquel for anxiety/panic
- 




Key Points for Patients

- ▶ Antidepressants are effective
 - ▶ No evidence that they lose efficacy over time
 - ▶ Not known to cause long term side effects
 - ▶ Non addictive
- 



Benzodiazepines AKA Benzos

- ▶ Xanax, Valium, Ativan, Klonopin
 - ▶ Affects gaba receptors, drug effect felt is similar to alcohol
 - ▶ Can lead to short term memory & balance loss
 - ▶ Very effective for short term panic, anxiety, sleep
 - ▶ Also used to break catatonia and to manage side effects from antipsychotics
 - ▶ Highly Addictive
 - ▶ High lethality when combined with alcohol/opiates
 - ▶ Abrupt cessation at higher doses can cause seizures
- 




Bipolar



- ▶ Episodes of mania/hypomania lasting a week (type I and II), grandiosity, lack of need for sleep, racing thoughts, pressured speech, increase in goal-directed activity, impulsive, high risk behaviors later followed by periods of depression, anhedonia, anergia, recurrent thoughts of death/suicidal ideation all while sober




Borderline Personality Disorder

- ▶ Difficulty regulating emotion: chronic pit/sense of emptiness, fears of abandonment, idolizing/devaluing relationships, unstable self-image, impulsivity, explosive anger, dissociation, self harm, suicide attempts.
- 




“Mood Stabilizers”

- Include a few different classes of medications
 - Used to treat bipolar, border line PD and treatment resistant depression
 - Many are anti-convulsant medications with different mechanisms of action
 - Lithium-gold standard for bipolar, one of a few medications with indications for suicidality, used in conjunction with antidepressants for treatment resistant depression. Possible that it is altering the balance of NT signaling in the hypothalamus
- 



Mood Stabilizers

- ▶ Lamictal- known as a maintenance med to prevent mania, also used for borderline PD, takes time to ramp up due to protocols to prevent Stevens Johnson Syndrome
 - ▶ Depakote-often used for augmentation (lithium)
 - ▶ Tegretol
 - ▶ Antipsychotics (Neuroleptics) (Clozaril, Zyprexa, Seroquel, Abilify) Used to treat/extinguish acute mania and for bipolar depression.
- 



Schizophrenia

- ▶ Two or more of the following, each lasting the majority of time in a one month period (hallucinations, delusions, disorganized speech, grossly disorganized/catatonic behavior and negative symptoms).
- ▶ Effecting work/social/self care aspects
- ▶ Continuous signs of episode for at least 6 months (must include 1 months of the symptoms above, unless its successfully treated)



Antipsychotics (Neuroleptics)

- ▶ Two classes, first and second generation antipsychotics (SGA's)
- ▶ Used to treat psychosis (delusions, hallucinations, paranoia and disordered thought)
- ▶ First generation “typicals”, used mainly for positive symptoms such as delusions and hallucinations. Includes Haldol and Thorazine which was first antipsychotic, developed 1950, still used in some cases.
- ▶ Affects dopamine receptors, first generation consider toxic to brain by some researchers
- ▶ First generation have higher risk of EPS (Extra Pyramidal Symptoms): muscle spasms, tardive dyskinesia (irregular, jerky movements), parkinsonism (rigidity, speech changes), akathisia (restlessness, unable to sit still, need to move around to feel relief)



Antipsychotics (Neuroleptics)

- ▶ Second Generation “atypicals”, used to treat negative symptoms flat affect, apathy anhedonia as well as positive symptoms
- ▶ Less EPS symptoms but still possible
- ▶ Greater metabolic effects, weight gain, hypertension, increase risk of diabetes
- ▶ Increased risk of stroke in older patients
- ▶ Some claim more effective at treatment of schizophrenia but very limited evidence



ADHD



- ▶ Inattention and impulsivity/hyperactivity are the core symptoms
- ▶ Dx based on clinical assessment, age of onset and social impairment (ASRS v1.1, Wender Utah Rating Scale screening tools for Adults, Vanderbilt children)
- ▶ Strong genetic component
- ▶ Neurologic basis
- ▶ Affects both genders, worldwide prevalence, persists through adulthood in significant percentage of cases, however evidence of age-dependent decline
- ▶ Impacts multiple areas of function
- ▶ Highly treatable, most treatable disorder in psychiatry
- ▶ Stimulants are first line treatment

- ▶ Faraone et al. Nature Reviews Disease Primers 2015



Stimulants/Non-stimulants



- ▶ Methylphenidate and amphetamine based stimulants, MPH typically tried first with children, Ritalin the most common
- ▶ Work by increasing dopamine & norepinephrine levels in the prefrontal cortex in turn raises motivation, concentration/focus
- ▶ Many approved medications, multiple delivery forms, tablets, capsules, liquids, chewable
- ▶ With children need to be aware of diversion by parents/guardian

- ▶ **Non Stimulants**
- ▶ Atomoxetine (Stratera) – SNRI
- ▶ Clonidine (Kapvay) blood pressure drug
- ▶ (Bupropion) Wellbutrin
- ▶ Guanfacine (Intuniv)- blood pressure drug
- ▶ Fish oil



Side Effects/Adverse Effects

- Decreased appetite
- Insomnia
- Headache
- Moodiness/Irritability
- Tics
- Psychosis, rare but possible even at approved doses
- Cardiac/hypertension rare but possible

Mass General Hospital <https://advances.massgeneral.org/neuro/journal.aspx?id=1315>



Controlled Substances

► Schedule I

Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use and a high potential for abuse. Some examples of Schedule I drugs are: heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote

► Schedule II

Schedule II drugs, substances, or chemicals are defined as drugs with a high potential for abuse, with use potentially leading to severe psychological or physical dependence. These drugs are also considered dangerous. Some examples of Schedule II drugs are:

(Vicodin), cocaine, methamphetamine, methadone, hydromorphone (Dilaudid), meperidine (Demerol), oxycodone (OxyContin), fentanyl, Dexedrine, Adderall, and Ritalin

► Schedule III

Schedule III drugs, substances, or chemicals are defined as drugs with a moderate to low potential for physical and psychological dependence. Schedule III drugs abuse potential is less than Schedule I and Schedule II drugs but more than Schedule IV. Some examples of Schedule III drugs are:

(Tylenol with codeine), ketamine, anabolic steroids, testosterone



Controlled Substances

► Schedule IV

Schedule IV drugs, substances, or chemicals are defined as drugs with a low potential for abuse and low risk of dependence. Some examples of Schedule IV drugs are:

Benzodiazepines (Xanax, Valium, Ativan), Soma, Darvon, Darvocet, Ambien, Tramadol

► Schedule V

Schedule V drugs, substances, or chemicals are defined as drugs with lower potential for abuse than Schedule IV and consist of preparations containing limited quantities of certain narcotics. Schedule V drugs are generally used for antidiarrheal, antitussive, and analgesic purposes. Some examples of Schedule V drugs are:

(Robitussin AC), Lomotil, Motofen, Lyrica

<https://www.dea.gov/drug-scheduling>



Novel Treatments

- ▶ Ketamine – rapid antidepressant effects, nasal administration, Esketamine has FDA approval, however IV ketamine appears more efficacious
- ▶ Psilocybin – found in certain mushrooms, blocks serotonin uptake, about to enter phase 3 trials for nasal spray treatment of PTSD.
- ▶ MDMD (ecstasy)- being researched for PTSD
- ▶ DMT (Ayahuasca root)- possible benefits for PTSD, a few states allow its use for religious purposes
- ▶ LSD assisted psychotherapy – researched for PTSD



MAT-Medication Assisted Treatment

- ▶ Suboxone - opiate use
- ▶ Methadone – opiate use, requires daily visits in beginning to clinic
- ▶ Naltrexone/Vivitrol – FDA alcohol/opiate use, decreases cravings and blocks dopamine reward pathway. Off label gambling/compulsive sexual behavior/video gaming/binge eating/self harm
- ▶ Antabuse – alcohol use, reduces cravings, causes significant distress if taken with alcohol
- ▶ Acamprosate-cravings, needs three times daily dosing, odd dosage milligram number concerns some people (666mg)
- ▶ Gabapentin- alcohol/opiate cravings
- ▶ Topamax- alcohol, marijuana, food cravings
- ▶ Clonidine – opioid withdrawal/cravings