





TOPIC: BIOLOGICAL THERAPIES

Drug Therapies

◆ _____ main classes of drug therapies:

	Antipsychotics Primarily treat schizophrenia & disorders that involve _____.
	_____ depressants Primarily treat depression anxiety, & obsessive-compulsive disorder.
	Anti - _____ Primarily treat anxiety. Also called <i>tranquilizers</i> .
	_____ Stabilizers Primarily treat bipolar disorder.

◆ **Mechanism of Action:** The _____ chemical interaction through which a drug produces an _____.

◆ While drugs can be helpful, many patients _____ taking them due to side effects.

EXAMPLE

Draw a line matching each disorder below with a class of medication that could be used to treat it.

Bipolar disorder	Antianxiety Medications
Anxiety	Antipsychotics
Obsessive Compulsive Disorder	Mood Stabilizers
Schizophrenia	Antidepressants


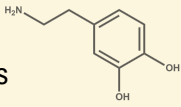

PRACTICE

Which class of drugs are also called tranquilizers?

- a) Antipsychotics. b) Antidepressants. c) Antianxiety. d) Mood stabilizers.

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Antipsychotics

<div> Antipsychotics:</div> <div>Class of drugs used to treat schizophrenia & disorders that involve psychosis</div> <div></div>			
Purpose: Shorten schizophrenic episodes and reduce symptoms of psychosis.			
Type of Drug	Generation	Mechanism of Action	Specific Side Effects
Typical Antipsychotics.	_____ (older)  1 st gen = 1 NT 2 nd gen = 2 NT	Blocks _____ receptors.	Muscle rigidity & involuntary muscle _____.
Atypical Antipsychotics.	Second (contemporary)	Block dopamine & _____ receptors.	Effect glucose regulation. Extreme _____ gain.

◆ Antipsychotics *generally* improve _____ symptoms, but don't have much effect on _____ symptoms.

PRACTICE

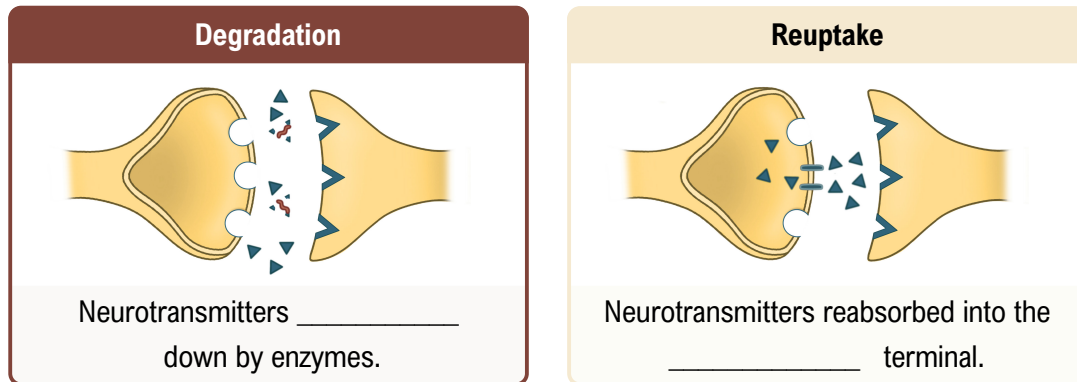
Which of the following correctly explains the difference between typical and atypical antipsychotics?


- a) Typical antipsychotics target dopamine; atypical psychotics target dopamine and serotonin.
- b) Typical antipsychotics help with negative symptoms; atypical psychotics help with positive and negative.
- c) Typical antipsychotics increase brain dopamine; atypical psychotics decrease dopamine.
- d) Typical antipsychotics are used for more extreme cases; atypical psychotics are used for more mild cases.

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Antidepressants

◆ *Recall:* Neurotransmitters in the synapse can be removed through degradation, diffusion, and reuptake.



 Antidepressants: Class of drugs used to treat depression, anxiety, and OCD.				
Purpose: Elevate mood.				
Type of Drug	Generation		Mechanism of Action	Specific Side Effects
Monoamine Oxidase Inhibitor (_____)	First	3	Prevents degradation of norepinephrine, serotonin, & dopamine.	Weight gain Sexual dysfunction
Tricyclics	First	2	Blocks _____ of norepinephrine & serotonin.	Emotional blunting Sleep disturbances
Selective Serotonin Reuptake Inhibitors (_____)	Second	1	Blocks reuptake of _____.	Generally have _____ side effects.

PRACTICE

Which of the following statements about antidepressants are true?

- All first and second-generation antidepressants target serotonin reuptake.
- Second-generation antidepressants generally have fewer side effects.
- Monoamine oxidase inhibitors (MAOI) increase the amount of serotonin in the synaptic gap.

a) I & II.


b) I & III.

c) II & III.

d) I, II, & III.

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Anti-anxiety

 Anti-anxiety: Class of drugs used to treat anxiety.		
Purpose: Have a calming, tranquilizing effect.		
Type of Drug	Mechanism of Action	Specific Side Effects
Tranquilizers (benzodiazepines)	Increases activity of gamma-aminobutyric acid (____). <i>Recall:</i> GABA is an _____ neurotransmitter.	Drowsiness & _____ Disorientation Slowed respiration.

- ◆ Designed for _____, short-term usage.
 - Can develop _____ and require higher doses if used long-term.


PRACTICE

Why might a psychiatrist be hesitant to prescribe a patient benzodiazepine?

- a) Benzodiazepines require months to take effect.
- b) Benzodiazepines can interact with specific foods, raising blood pressure.
- c) Patients can have adverse side effects, including involuntary muscle twitching.
- d) Patients can have adverse side effects, including drowsiness and sedation.

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Mood Stabilizers

 Mood Stabilizers: Class of drugs used to treat bipolar disorder.		
Purpose: Treat _____ depressive and manic episodes.		
Type of Drug	Mechanism of Action	Specific Side Effects
_____	_____ fully understood.	Excessive _____ & urination Weight gain _____ dysfunction (long-term use)

◆ Anti_____ medications are sometimes used for bipolar patients who don't respond well to lithium.

EXAMPLE

True or False: if false, choose the answer that best corrects the statement.

The mechanism of action for lithium is not well understood at this time.

- a) True.
- b) False; lithium blocks acetylcholine receptors, increasing the amount of acetylcholine in the synaptic gap.
- c) False; lithium is known to increase cerebral blood flow to the prefrontal cortex.
- d) False; lithium is known to target both GABA and glutamate.

PRACTICE

Which class of medications work through increasing GABA activity?

- a) Antipsychotics.
- b) Antidepressants.
- c) Antianxiety.
- d) Mood stabilizers.

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PRACTICE

Which class of medication is known for targeting serotonin?

- | | |
|----------------------------|----------------------|
| a) Typical antipsychotics. | c) Antidepressants. |
| b) Antianxiety. | d) Mood stabilizers. |

PRACTICE

If a patient presents with hallucinations, blunted affect, and delusions, which medication is a psychiatrist likely to prescribe?

- | | | | |
|----------------------------|------------------|-------------|----------|
| a) Atypical antipsychotic. | b) Tranquilizer. | c) Lithium. | d) SSRI. |
|----------------------------|------------------|-------------|----------|





PRACTICE

A patient comes in showing signs of depression. They are prescribed an SSRI but after 3 weeks, they are displaying symptoms of mania. Which medication may be more appropriate?

- | | | | |
|----------|---------------|----------|-------------|
| a) SNRI. | b) Tricyclic. | c) MAOI. | d) Lithium. |
|----------|---------------|----------|-------------|

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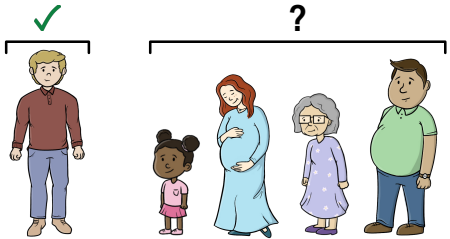
Review of Drug Classes

	Generation	Mechanism of Action	Specific Side Effects
 Antipsychotics	Purpose: Shorten schizophrenic episodes and reduce symptoms of psychosis.		
Typical	First	Blocks dopamine receptors.	Muscle rigidity & involuntary muscle movement
Atypical	Second	Block dopamine & serotonin receptors.	Effect glucose regulation. Extreme weight gain
 Antidepressants	Purpose: Elevate mood.		
Monoamine Oxidase Inhibitor (MAOIs)	First	Prevents degradation of norepinephrine, serotonin, & dopamine.	Weight gain Sexual dysfunction Emotional blunting Sleep disturbances *SSRI's have fewer side effects
Tricyclics	First	Blocks reuptake of norepinephrine & serotonin.	
Selective Serotonin Reuptake Inhibitors (SSRIs)	Second	Blocks reuptake of serotonin.	
 Anti-anxiety	Purpose: Have a calming, tranquilizing effect.		
Benzodiazepine	NA	Increases activity of gamma-aminobutyric acid (GABA)	Drowsiness & sedation Disorientation Slowed respiration
 Mood Stabilizers	Purpose: Treat both depressive and manic episodes.		
Lithium	NA	Not fully understood.	Excessive thirst & urination Weight gain Kidney dysfunction

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Considerations Regarding Drug Therapies

◆ When deciding if a medication is the right course of treatment, a provider must consider the following:

Non-medical treatment:	Side effects:	Unknown risks:
Other interventions, such as _____, often lead to similar improvements.	Unpleasant side effects can lead to _____ levels of discontinuation.	Drugs are tested on a _____ subset of the population.
	Appropriate _____ is difficult to achieve. 	

◆ **Placebo Effect:** When an intervention leads to improvement due to the _____ of improvement.

- To study drug efficacy, a placebo or _____ pill with no active ingredients is given.
- Patients often show improvement when taking placebos. See Kirsh et al., (2008) for example.

Note: Medication can be (and often is) life changing and life _____!

References

Kirsch, I., Deacon, B. J., Huedo-Medina, T. B., Scoboria, A., Moore, T. J., & Johnson, B. T. (2008). Initial severity and antidepressant benefits: a meta-analysis of data submitted to the Food and Drug Administration. *PLoS medicine*, 5(2), e45. doi: <https://doi.org/10.1371/journal.pmed.005004/>

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EXAMPLE

For each situation listed below, list a consideration that a doctor would have to make before prescribing medication to the patient.

- a) Joe goes to his general practitioner complaining of low mood and feeling apathetic lately. He asks to be put on medication for depression. _____
- b) Michelle is pregnant and showing signs of depression. She thinks medication might be helpful.

- c) Kathleen has anxiety and wants to start taking Xanax. Kathleen works in construction and frequently operates heavy machinery. _____

PRACTICE

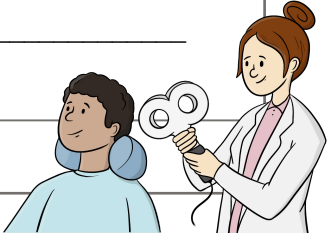
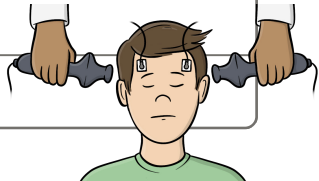
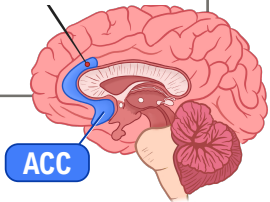
Which of the following is an example of the placebo effect?

- a) A patient starts feeling better after a few weeks of cognitive behavioral therapy.
- b) A patient in a drug trial shows improvement while taking a new medication inhibiting norepinephrine reuptake.
- c) A patient shows reduced symptoms of depression after joining a community support group.
- d) A patient in a drug trial shows improvement while taking a pill without active ingredients.

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Brain Surgery and Stimulation

- ◆ Some strategies aim to change brain activity through _____ and/or physical modification.
 - **Lobotomies:** 1930s “cure” for depression & schizophrenia that severed connections within the frontal lobe.
- ◆ All of these treatments are used as a _____ resort, when people are not improving with drugs or therapy.

Invasive ↓	Transcranial Magnetic Stimulation (TMS)	
	Indication	Severe _____ *
	Procedure	Coil that generates a magnetic field is placed over the head to _____ the prefrontal cortex.
	Additional Info	Minimal side effects. Does not require anesthesia.
		
	Electroconvulsive Therapy (_____ Therapy)	
	Indication	Severe depression*
	Procedure	<ol style="list-style-type: none">1. Patient put under anesthesia and given a muscle relaxant.2. _____ placed on side of the head and a brief current turned on.3. The current triggers a focused, controlled seizure.
	Additional Info	Minimal side effects. Does not require anesthesia.
		
	Anterior Cingulotomy	
	Indication	Severe depression & _____ * Note: The anterior cingulate cortex (ACC) plays a role in _____ and anxiety.
	Procedure	<ol style="list-style-type: none">1. Patient put under anesthesia.2. Electrode inserted through a hole in the skull into the anterior cingulate cortex.3. Tip of the electrode is heated creating a small, localized _____.
	Additional Info	Only about _____ of patients show meaningful improvement. Precision makes cognitive and personality side effects _____ likely.
		

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EXAMPLE

Match each treatment in the box with its description. Then, put a star next to the treatment(s) that are used to treat severe depression. Finally, place a triangle next to the least invasive treatment.

a. Procedure in which controlled seizures are induced using electrodes.	
b. Procedure in which a lesion is created in the anterior cingulate cortex.	
c. Procedure in which the prefrontal cortex is stimulated using a magnetic field.	

Treatments

- I. Transcranial Magnetic Stimulation.
- II. Electroconvulsive Therapy.
- III. Anterior Cingulotomy.

PRACTICE

Why might a clinician consider brain surgery or stimulation for a patient?

- a) They are often more effective than traditional treatment.
- b) They often work faster than traditional treatment.
- c) They are often cheaper than traditional treatment.
- d) They can be effective as a last resort when traditional treatment is not working.