Sem 4
Practical Revision
CNS & Endocrine

By

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Contents:

- **CNS practical:**
  1. **Anti-depressants & Anti-anxiety**
  2. **Anti-epileptics**
  3. **Narcotic analgesics**

- **Endocrine practical:**
  1. **Hyperthyroidism and Hypothyroidism**
  2. **Anti-DM**

Stress on:

- ✓ Drug names (group/members)
- ✓ Uses and Choice
- ✓ Mechanism of action
- ✓ Adverse effects
- ✓ Drug interactions

Practical on CNS

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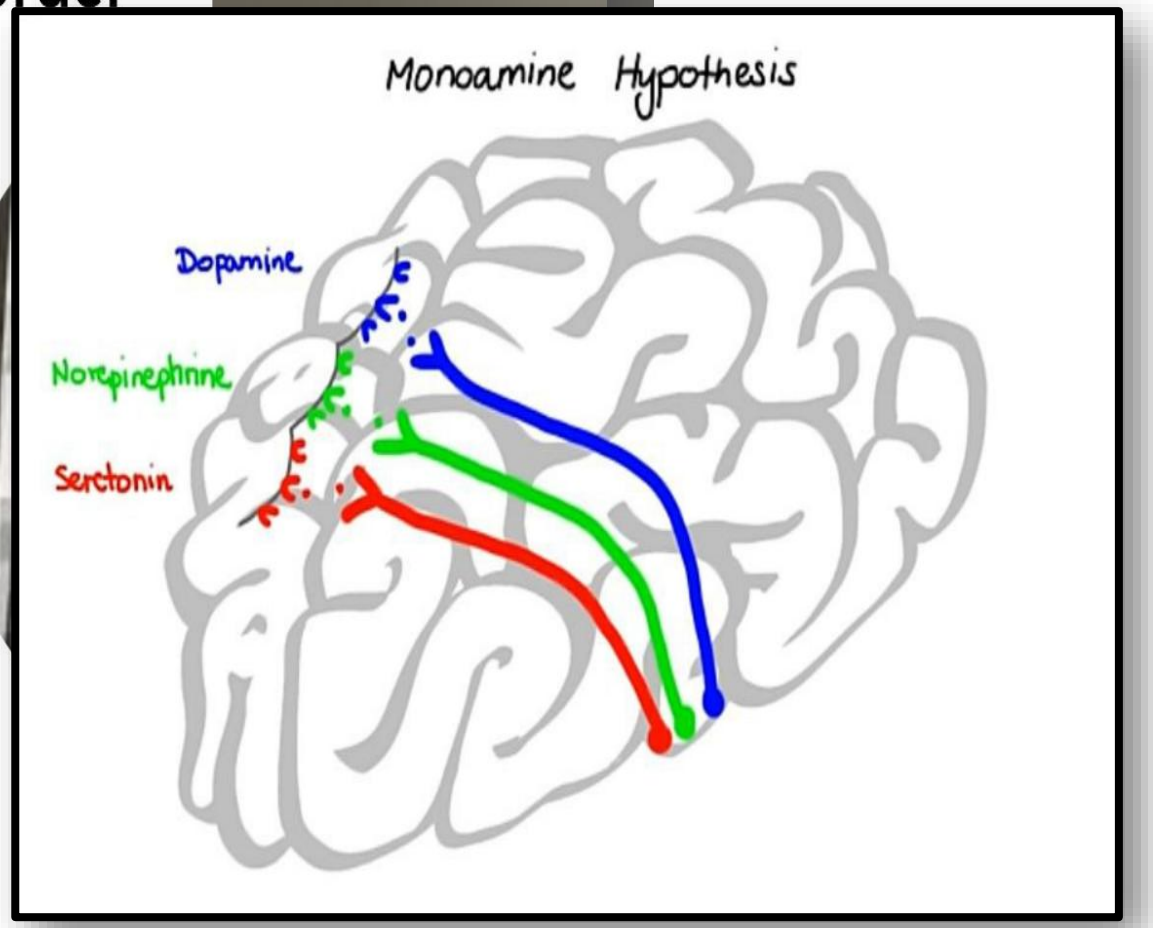
Anti-depressants

Major depressive disorder

- Depressed **mood**
- Loss of interest or pleasure in life
- Feelings of worthlessness
- Diminished ability to think or concentrate
- Sleep disturbances
- Eating disturbances
- Recurrent thoughts of **suicide**.



Anti-depressant drugs

SSRIs

SNRIs

Bupropion

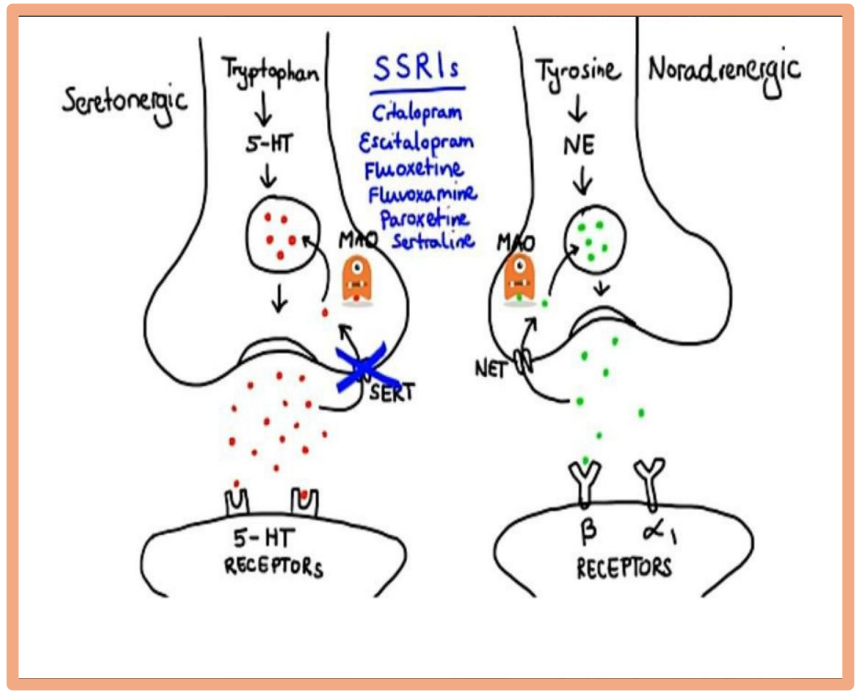
Mirtazapine

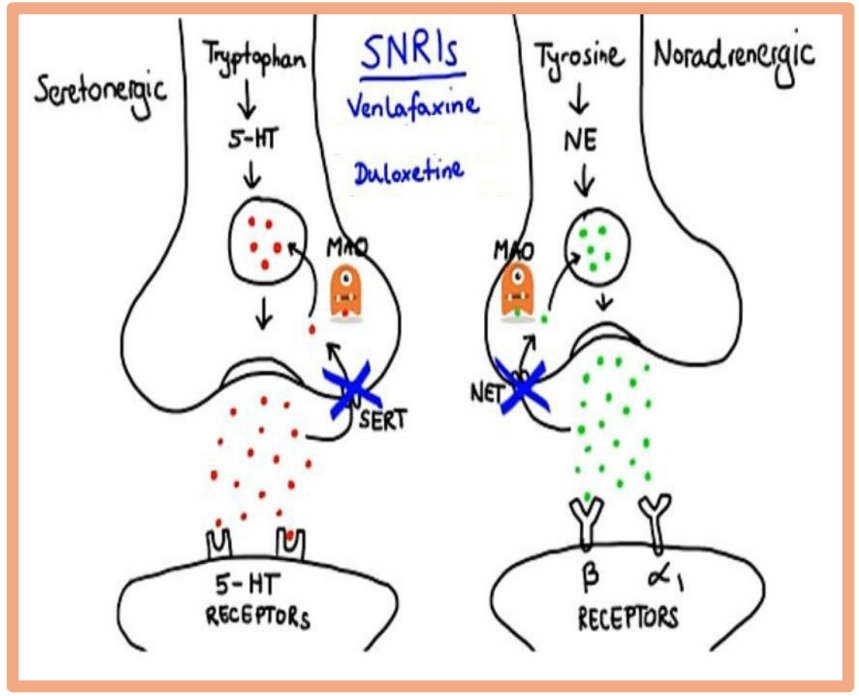
Trazodone

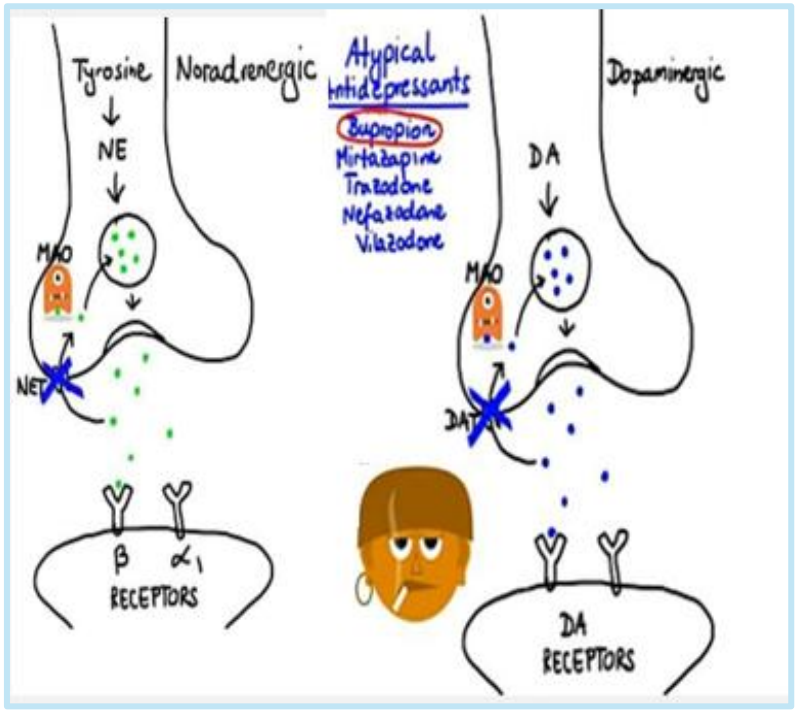
Nefazodone

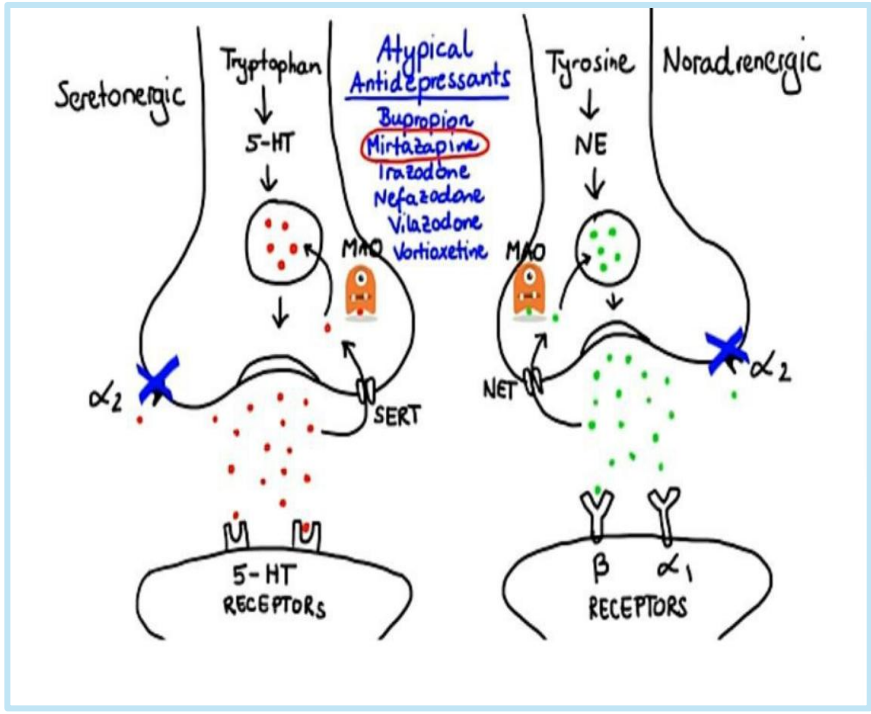
TCAs

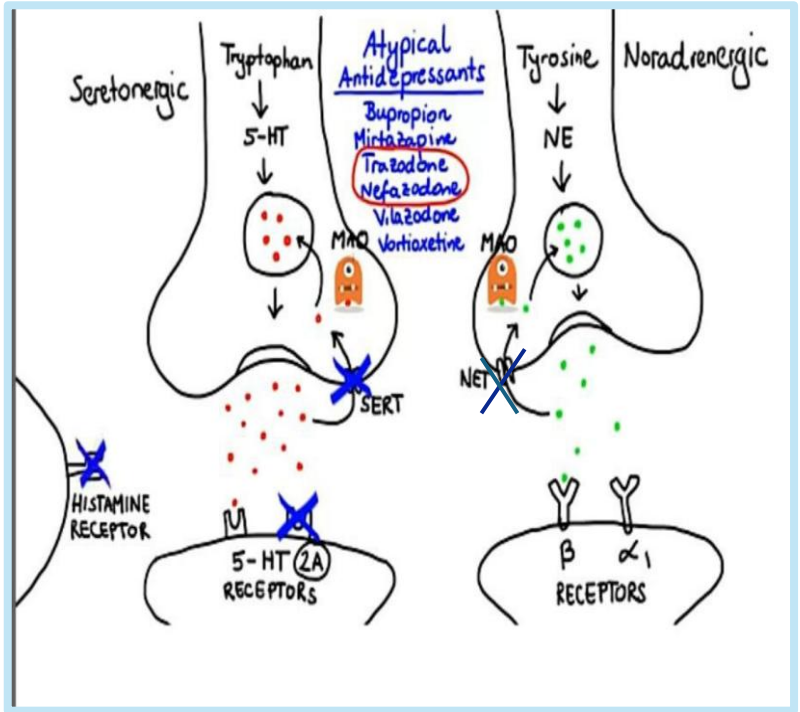
MAOIs

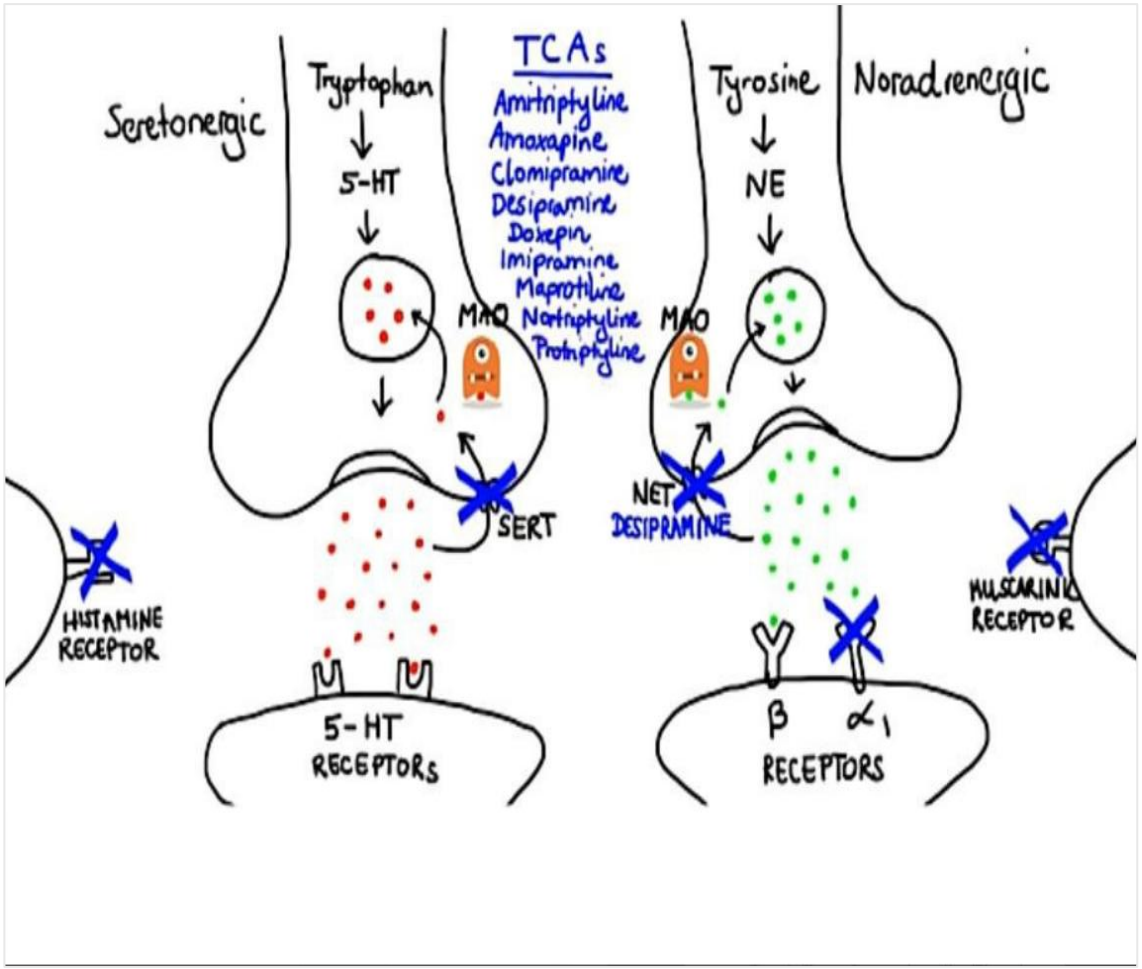

Seretonergic
Tryptophan
5-HT
MAO
SERT
5-HT RECEPTORS
SSRIs
Citalopram
Escitalopram
Fluoxetine
Fluvoxamine
Paroxetine
Sertraline
Tyrosine
NE
Noradrenergic
MAO
NET
β
α1
RECEPTORS

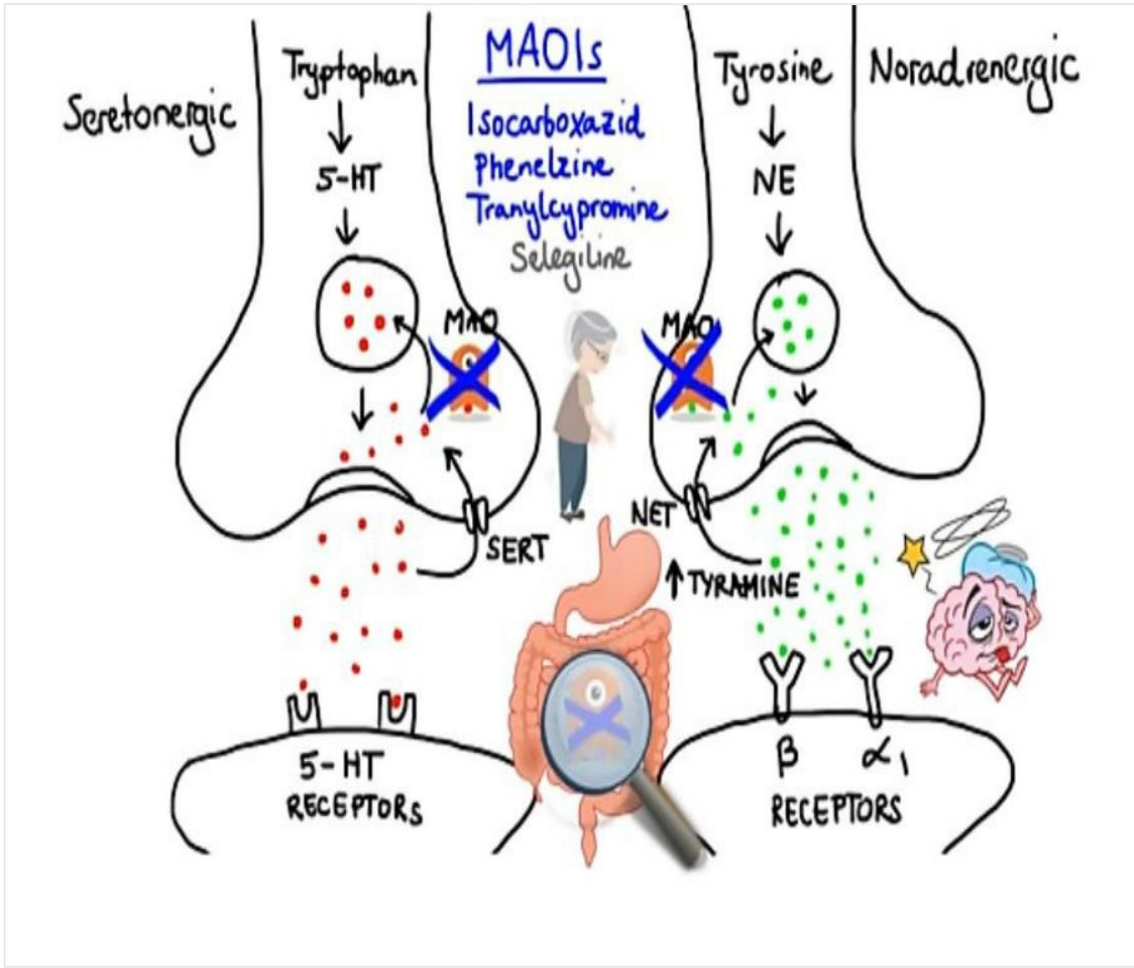

Seretonergic
Tryptophan
5-HT
MAO
SERT
5-HT RECEPTORS
SNRIs
Venlafaxine
Duloxetine
Tyrosine
NE
Noradrenergic
MAO
NET
β
α1
RECEPTORS


Tyrosine
NE
Noradrenergic
MAO
NET
β
α1
RECEPTORS
Atypical Antidepressants
Bupropion
Mirtazapine
Trazodone
Nefazodone
Vilazodone
DA
Dopaminergic
MAO
DAT
DA RECEPTORS


Seretonergic
Tryptophan
5-HT
MAO
α2
SERT
5-HT RECEPTORS
Atypical Antidepressants
Bupropion
Mirtazapine
Trazodone
Nefazodone
Vilazodone
Vortioxetine
Tyrosine
NE
Noradrenergic
MAO
NET
α2
β
α1
RECEPTORS


Seretonergic
Tryptophan
5-HT
MAO
SERT
HISTAMINE RECEPTOR
5-HT 2A RECEPTORS
Atypical Antidepressants
Bupropion
Mirtazapine
Trazodone
Nefazodone
Vilazodone
Vortioxetine
Tyrosine
NE
Noradrenergic
MAO
NET
β
α1
RECEPTORS


Seretonergic
Tryptophan
5-HT
TCAs
Amitriptyline
Amoxapine
Clomipramine
Desipramine
Doxepin
Imipramine
Maprotiline
Nortriptyline
Protriptyline
MAO
SERT
HISTAMINE RECEPTOR
5-HT RECEPTORS
Tyrosine
NE
Noradrenergic
MAO
NET
DESIPRAMINE
MUSCARINIC RECEPTOR
β
α1
RECEPTORS


Seretonergic
Tryptophan
5-HT
MAOIs
Isocarboxazid
Phenelzine
Tranylcypromine
Selegiline
MAO
SERT
5-HT RECEPTORS
Tyrosine
NE
Noradrenergic
MAO
NET
TYRAMINE
β
α1
RECEPTORS

A 39-year-old woman is taking **fluoxetine** for **major depression**

- **What is the mechanism of action?**
- **What are the adverse effects ?**

A 34-year-old male patient who was prescribed **citalopram** for **depression** has decided he wants to stop taking the drug. When questioned, he said that it was affecting his **sexual performance**. You find out that he is also trying to overcome his dependency on **tobacco products**. If you decide to reinstitute drug therapy in this patient, the best choice would be:

A. Amitriptyline
B. Bupropion
C. Fluoxetine
D. Imipramine
E. Venlafaxine

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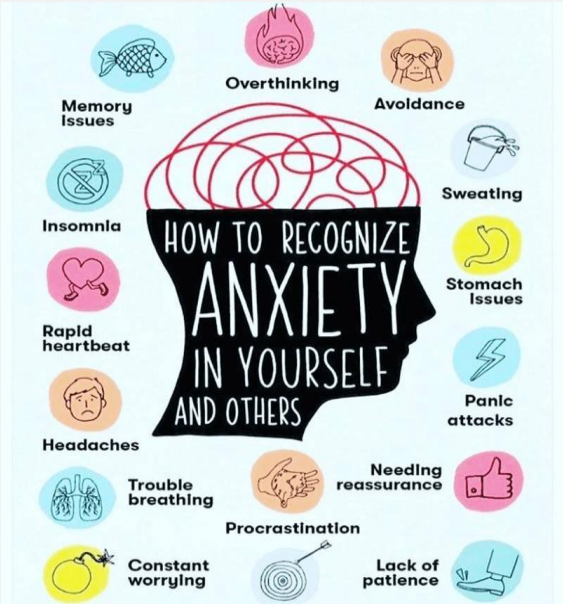
Anti-anxiety (Sedatives)



Anti-anxiety drugs

SSRIs

BZD

Buspirone

Hypnotics

Hypnotics

BZD

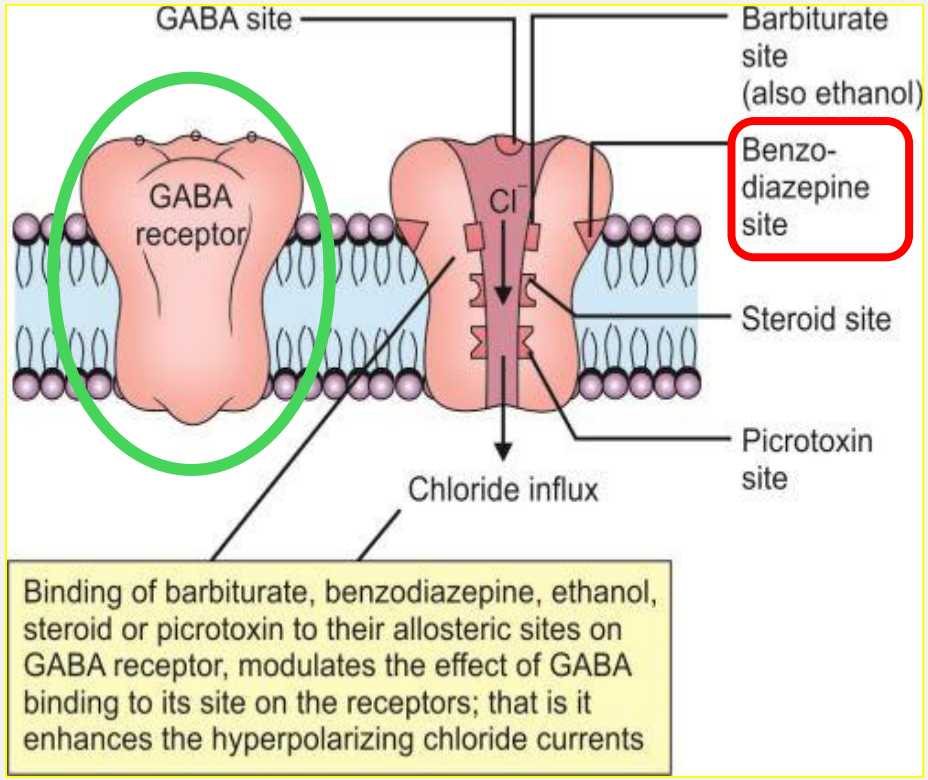
Z hypnotics

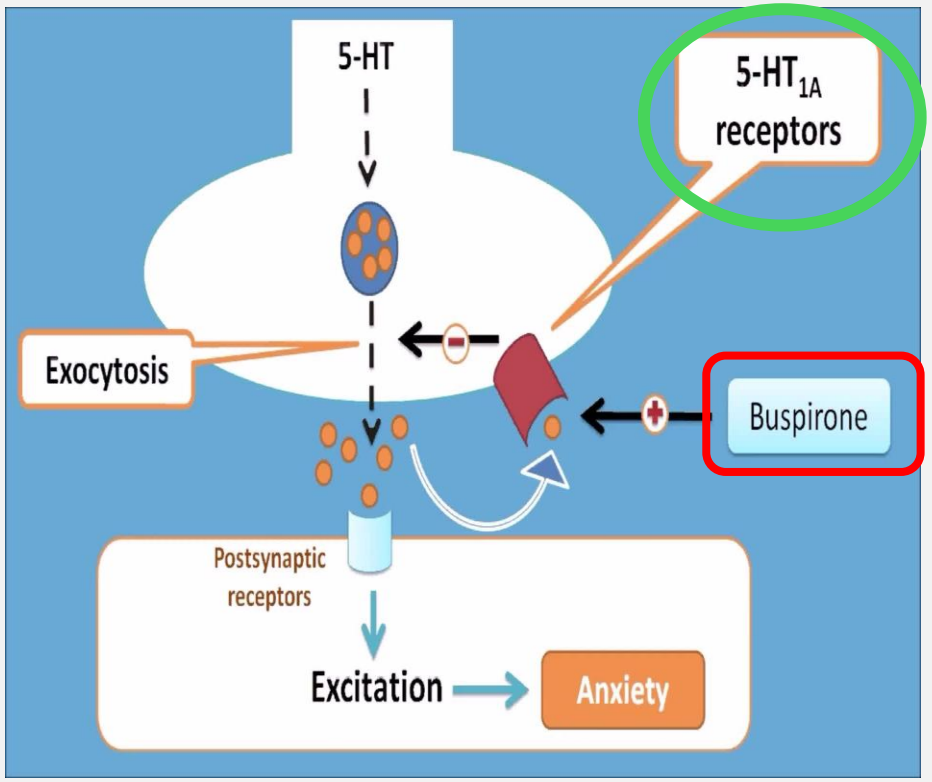
Ramelteon

Suvorexant

Anti-anxiety(Sedatives)

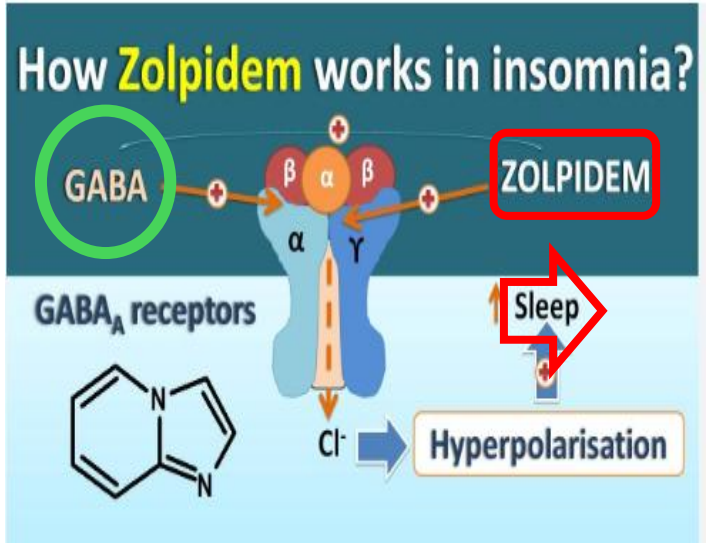
(SSRIs-BZD-Buspirone)

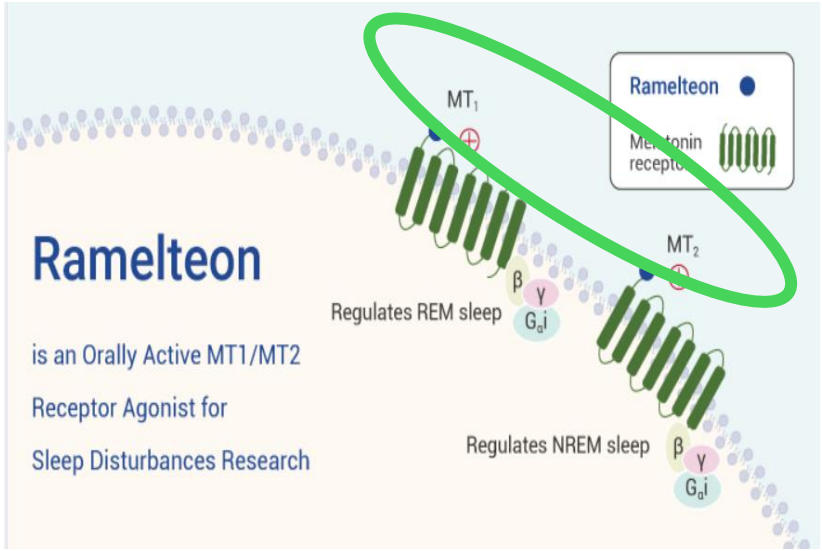




Hypnotics

(BZD-Z hypnotics-Ramelteon-Suvorexant)





A 35-year-old woman comes to her physician complaining of **not being able to sleep** for the past week. She is prescribed **zolpidem** to be taken at bedtime.

- **Classify zolpidem and what is its mechanism of action?**
- **What are the advantages of zolpidem?**

A 32-year-old woman is taking **ramelteon** for **chronic insomnia**.

Ramelteon binds to:

A. Melatonin receptors M1 and M2.
B. Muscarinic receptors M3.
C. Nicotinic receptors.
D. α1-adrenergic receptors.
E. D2 dopaminergic receptors.

A 24-year-old **stockbroker** has developed a "**nervous personality**." He worries about minor matters and sometimes complains of **stomach cramps**. There is **no history of drug abuse**. Diagnosed as suffering from **generalized anxiety disorder**, he is prescribed **buspirone**.

The patient should be informed to anticipate:

A. A need to continually increase drug dosage because of **tolerance**.
B. A significant effect of the drug on **memory**.
C. Additive CNS depression with **alcoholic beverages**
D. That the drug is likely to **take a week or more to begin working**
E. That if he stops taking the drug abruptly, he will experience **withdrawal signs**

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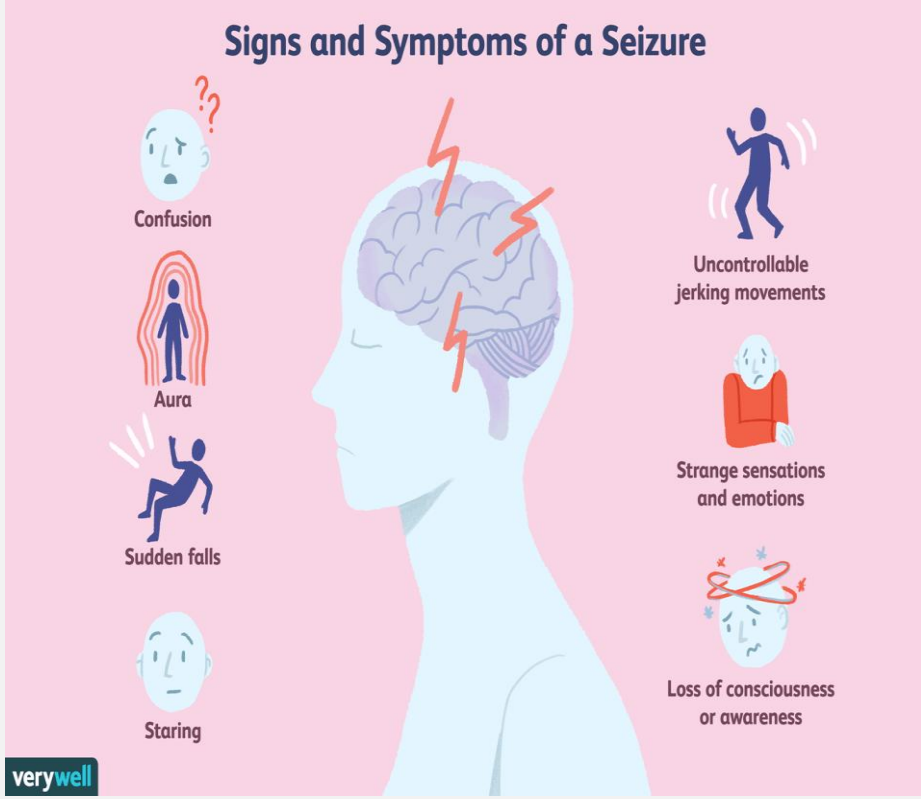
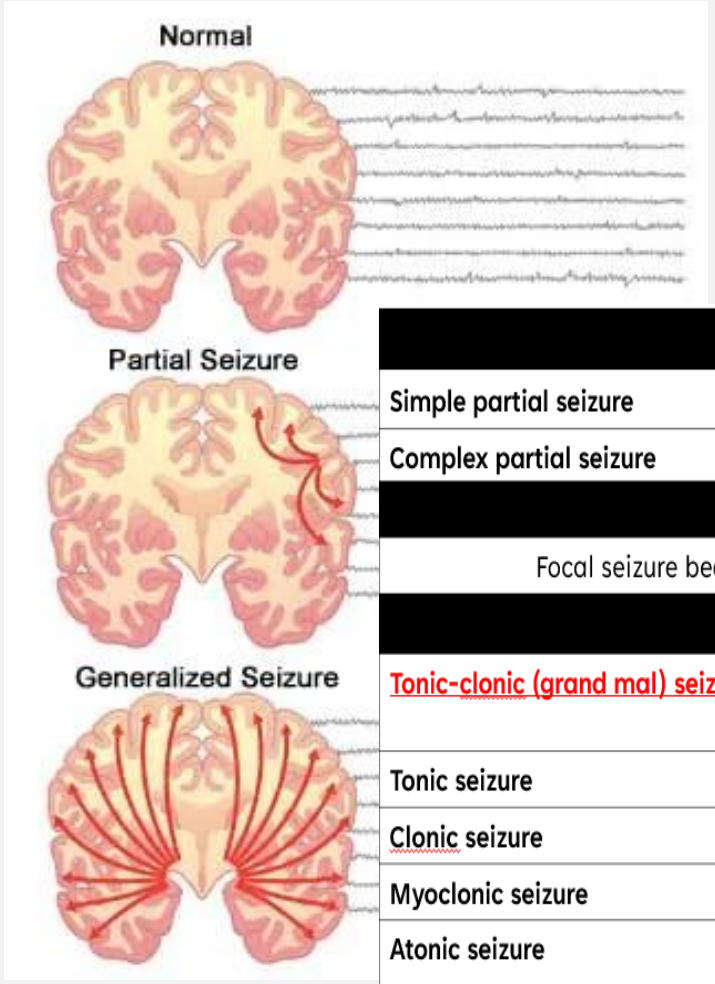
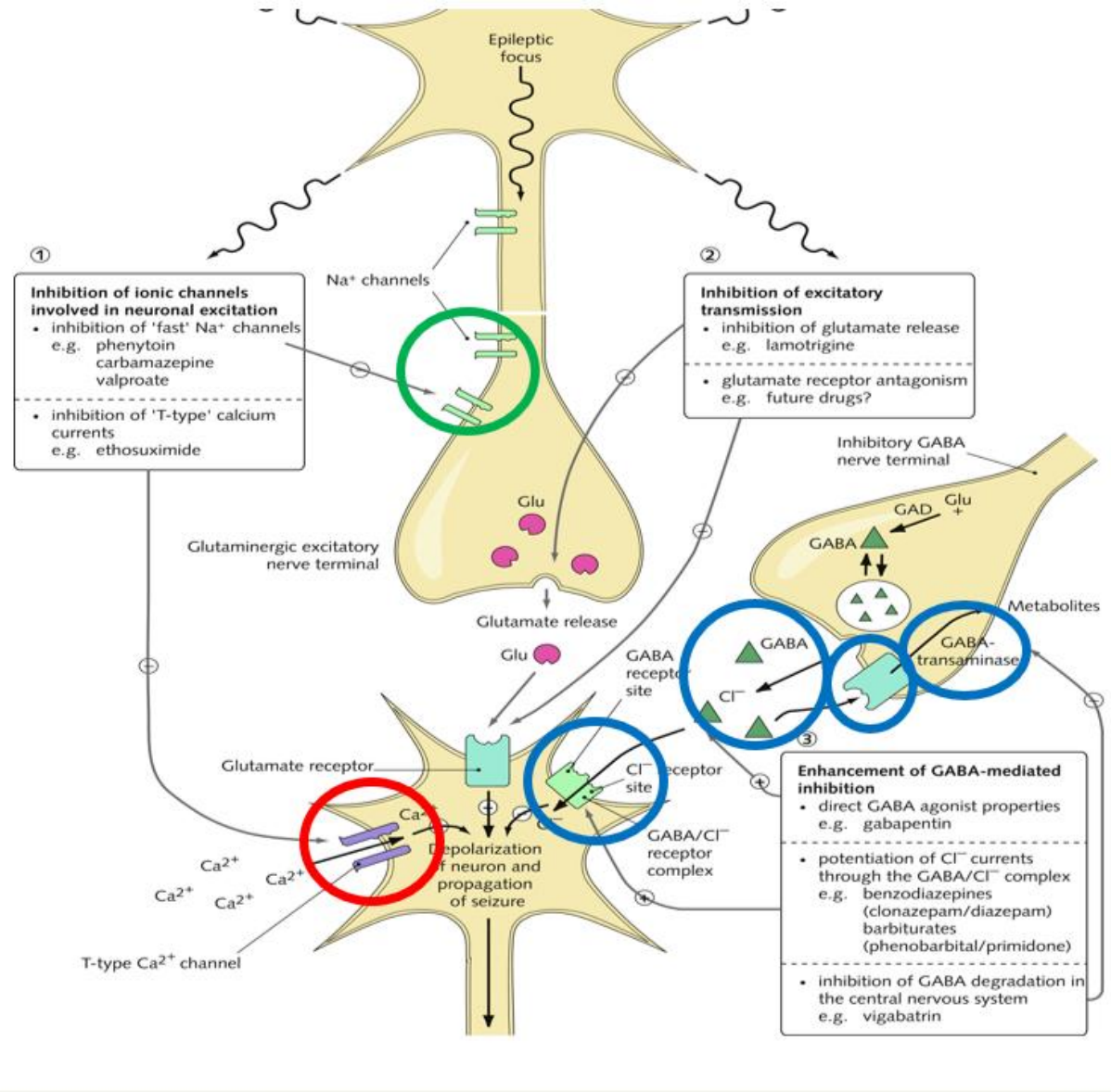
Anti-epileptics





Partial (focal)	
Simple partial seizure	No alteration of consciousness
Complex partial seizure	Altered consciousness, automatisms, and behavioral changes
Secondarily generalized seizure	
Focal seizure becoming generalized and accompanied by loss of consciousness	
Generalized seizures	
Tonic-clonic (grand mal) seizure	Increased muscle tone followed by spasms of muscle contraction and relaxation
Tonic seizure	Increased muscle tone
Clonic seizure	Spasms of muscle contraction and relaxation
Myoclonic seizure	Rhythmic, jerking spasms
Atonic seizure	Sudden loss of all muscle tone
Absence (petit mal) seizure	Brief loss of consciousness (less than 10s), with minor muscle twitches and eye blinking



Seizure type	1st choice	2nd choice
Partial and generalized tonic-clonic seizures	• Carbamazepine • Sodium valproate	▪ Lamotrigine ▪ Phenytoin ▪ Gabapentin ▪ Vigabatrin ▪ Phenobarbital
Absence seizures	▪ Ethosuximide (children) ▪ Sodium valproate (adults) ▪ Lamotrigine	
Status epilepticus	▪ Lorazepam ▪ Diazepam	▪ Phenytoin or fosphenytoin ▪ Phenobarbital

A 12-year-old girl has her first **tonic-clonic seizure** while at school. Her seizure was preceded by **lip smacking** and lasted about **1 minute**, during which she **lost consciousness.** She was started on **carbamazepine**.

- **What is the mechanism of action of carbamazepine?**
- **What are the adverse effects of carbamazepine?**

An 8-year-old boy presents to the emergency department after **seizure-like activity**. During class, the teacher noted that the boy **stare off for about 45 s**. He has done this **three times in the past**. He **did not respond** to her during the episode and was **confused for about 1 min following it**. What is **the most appropriate** first-line therapy for this child?

A. Carbamazepine.
B. Ethosuximide.
C. Lamotrigine.
D. Phenytoin.
E. Valproic acid.

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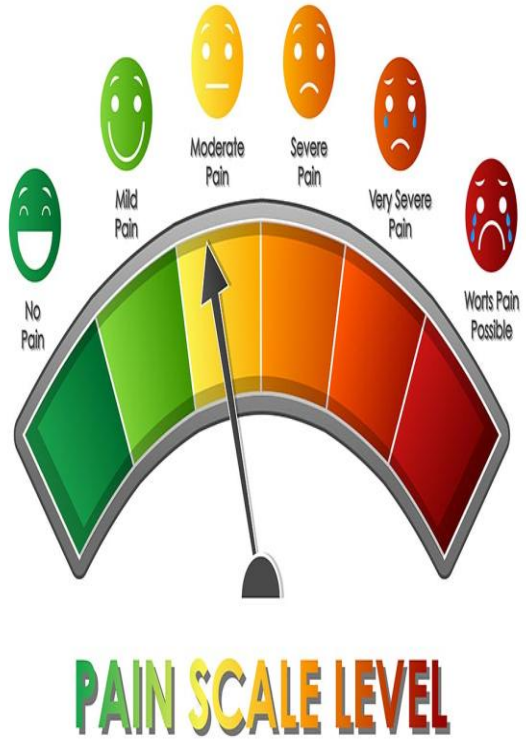
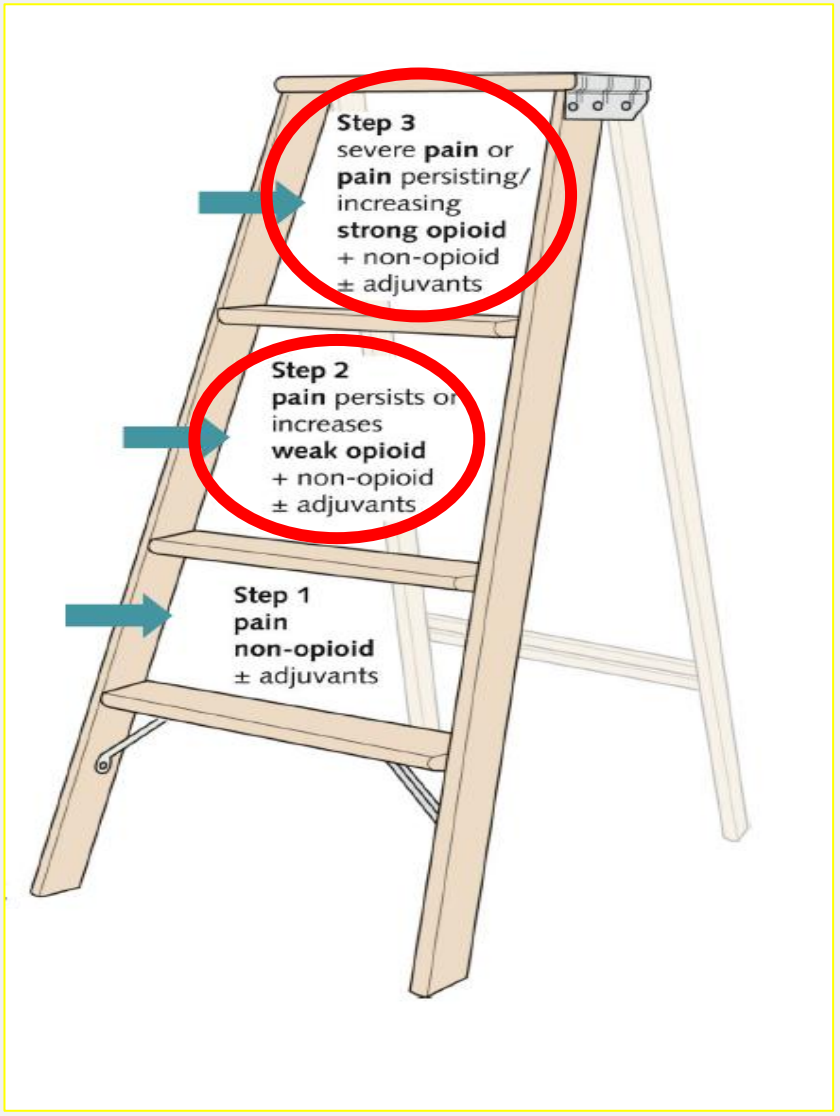
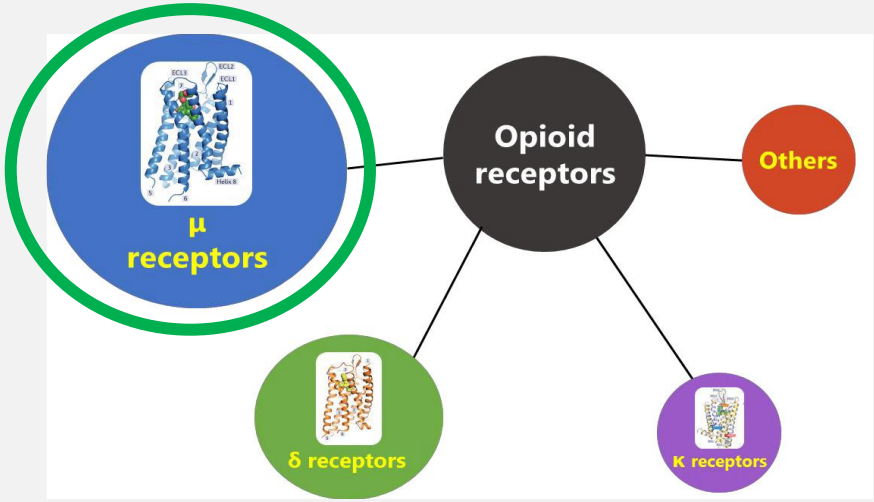
Narcotic analgesics





Strong μ agonists	Weak/moderate μ agonists	Partial μ agonists (Mixed agonist-antagonists)
• Morphine • Meperidine • Methadone • Fentanyl	• Codeine • Oxycodone • Hydrocodone	• Pentazocine → partial μ agonist & κ agonist • Buprenorphine → partial μ agonist & κ antagonist



A 22-year-old man is brought to the emergency room following an **injury to his knee**. Although he is in **considerable pain**, it is relieved by a small dose of **morphine**. He reports that his pain is still present, but it is less bothersome. He says the morphine 'feels good'.

- What is the **mechanism of action** for morphine and other opiate ligands to produce **analgesia**?

- What are the **adverse effects** that should be taken into account when treating chronic pain with opiates?

A 47-year-old woman is recovering from a **hysterectomy**. Her physician prescribes an **opioid analgesic** as needed for **postoperative pain**. Opioids can cause many effects in addition to **analgesia** including **constipation**, **respiratory depression**, **euphoria**, **miosis**, and **drowsiness**. With prolonged use, **tolerance** develops to most of these effects.

Which of the following effects **persists despite tolerance**?

A. Analgesia
B. Constipation
C. Drowsiness
D. Euphoria
E. Nausea and vomiting