



ANTI- EPILEPTICS

Sources

- Bertram G. katzung Basic & Clinical
 Pharmacology 15th Edition
- Goodman and Gilman's The Pharmacological Basis of Therapeutics 13th edition





MOTTO AND VISION



- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine







4rd Year Pharmacology LGIS			
Core Subject – 60%			
Pharmacology			
Horizontal Integration – 10%			
Same Year Subjects	•	Eve	
Sume real Subjects		Pathology	
		rathology	
Vertical Integration – 10%			
Clinical Subjects	•	Medicine	
		Surgery	
Spiral Integration – 15%			
Different Year Basic Sciences	•	Physiology (10%)	
Subjects	•	Biochemistry (5%)	
Research & Bioethics, Digital library – 05%			





- Mechanismof action:
 - Prolongs Na channel inactivation
 - Decrease Ca mediated current
 - facilitate glutamic acid decarboxylase
 - inhibit GABA-transaminase , inhibit GAT-1
 - Increase K conductance





Uses of valproic acid



Generalized tonic clonic attacks

• Certain types of infantile epilepsy

• Absence seizures

• Migraine prophylaxis

• Mania & bipolar illness



Adverse effects



- Relatively few unwanted effects:
- Commonly GIT symptoms like anorexia, nausea
- Teratogenicity spina bifida
- Alopecia , increased appetite , increased weight
- liver damage (rare, but serious)
- Valproate undergo auto metabolism
- Its an enzyme inhibitor

Ethosuximide

- The main drug used to treat absence seizures
- Also called pure petit mal drug
- Mechanism of action
 - Acts by blocking T-type Ca²⁺-channels
- Adverse effects
- > mainly nausea and anorexia.
- fatique , drowsiness
- Drug interactions
- Valporic acid decreases ethosuximide clearance







Lamotrigine



- Prolong Na channel inactivation
- Blocks voltage gated Ca channels particularly N and P/Q type channels
- Decrease release of glutamate
- Use:
 - All types of seizure except infantile seizures
 - Adverse effects:
 - Dizziness, diplopia
 - HSV
 - vomiting





Gabapentin & Pregabalin



- Mechanism of action:
 - GABA analogs
 - Modify synaptic or non synaptic release of GABA
 - Bind avidly to $\alpha 2\delta$ subunit of voltage gated Ca channels
 - Decrease Ca entry with predominant effect on presynaptic N type channels
 - Decrease in synaptic release of glutamate



Uses of gabapentin



- Partial seizures
- Generalized tonic clonic seizures
- Neuropathic pain
- Post herpetic neuralgia
- Painful diabetic neuropathies

Adverse effect

- Sedation
- Dizziness
- Ataxia

Vigabatrin









- Uses
 - Partial seizures
 - Infantile spasm (DOC)

Adverse effects:

- Drowziness
- Weight gain
- Visual field defects



Tiagabine



• MOA:

➢GABA reuptake inhibitor

- Use:
- Partial seizures
- Adverse effects:
 - ➢ Dizziness, confusion
 - ➤Tremors
 - ≻Ataxia





LEVETIRACETAM



• Levetiracetam binds selectively to a synaptic vesicular protein SV2A.

 The function of this protein is not understood but it is likely that levetiracetam modifies the synaptic release of glutamate and GABA through an action on vesicular function.





- Partial seizures
- Primary generalized tonic clonic seizures

- ADVERSE EFFECT
- somnolence, asthenia, and dizziness.



FELBAMATE



• MOA

 It produces a use-dependent block of the NMDA receptor, with selectivity for the NR1-2B subtype.

 \succ It also potentiates GABA_A receptor responses.

USES





Partial seizures

S/E

- Aplastic anemia
- Severe hepatitis

D/I

 Felbamate increases plasma phenytoin and valproic acid levels but decreases levels of carbamazepine.



LACOSAMIDE



 Enhances slow inactivation of voltage gated Na channels.

 It also binds to the collapsin response mediator protein CRMP-2, thereby blocking the effect of neurotrophic factors such as BDNF and NT3 on axonal and dendritic growth



• Use in Partial seizures

Adverse effects include

• Dizziness, headache

• Diplopia

• Nausea



PRIMIDONE



 Converted into phenobarbital and phenylethylmalonamide

• May be more like that of phenytoin

• Partial seizures

• Generalized tonic clonic seizures







• Prolongation of Na channels

• Act on L type Ca channel

GABA potentiator

 Depresses excitatory action of kainate on glutamate receptors





• Uses:

- Partial and generalized tonic clonic seizures
- Lennox Gastaut syndrome
- Infantile spasms
- Migraine
- Adverse effects:
- ✓ Dizziness
- ✓ Fatique
- ✓ Acute myopia and glaucoma
- ✓ urolithiasis



Zonisamide



• MOA:

- Na channel blocker
- T type Ca channel blocker

• Uses

- Generalized
- Complex partial
- Infantile spasm
- Adverse effects
 - same







• Diazepam: preferred drug for Status epilepticus

• Nitrazepam: myoclonic seizures and infantile spasms.

• Clonazepam: is one of the effective drug in absence seizure.



Barbiturates



• Phenobarbital:

 useful in the treatment of generalized tonic-clonic seizures and statue epilepticus.

• Mechanism:

- (1) block Ca²⁺ currents presynaptic membrane and decrease neurotransmitter release.
- (2) prolong the openings of the Cl⁻ channel in postsynaptic membrane and decrease it's response.

• Adverse effects:

- sedation, depression, drug interaction.

GABAergic synapse





STATUS EPILEPTICUS



- Diazepam I/V
- Lorazepam (relativ. Longer acting than diazepam0
- Phenytoin (I/V)
- Fosphenytoin (I/V Safer)
- Phenobaritone (I/V)
- Lignocaine for generalized tonic-clonic seizures
- Gene. Anesthesia for resistant cases
- Neuromuscular blocker





RESEARCH/ AI/BIOETHICS



- Mobed A, Shirafkan M, Charsouei S, Sadeghzadeh J, Ahmadalipour A. Biosensors technology for anti-epileptic drugs. Clinica Chimica Acta. 2022 Aug 1;533:175-82.
- Obaidullah AJ, Almehizia AA. Analysis experimental and modeling of the solubility of an antiepileptic drug, Levetiracetam, in supercritical solvent. Journal of Molecular Liquids. 2023 Nov 15;390:123065.
- Ammendolia I, Mannucci C, Cardia L, Calapai G, Gangemi S, Esposito E, Calapai F. Pharmacovigilance on cannabidiol as an antiepileptic agent. Frontiers in Pharmacology. 2023 Feb 10;14:1091978.

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http://www.digitallibrary.edu.pk

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- 3. A page will appear showing the universities from Public and Private Sector and other Institutes which have access to HEC National Digital Library (HNDL).
- 4. Select your desired Institute.
- 5. A page will appear showing the resources of the institution
- 6. Journals and Researches will appear
- 7. You can find a Journal by clicking on JOURNALS AND DATABASE and enter a keyword to search for your desired journal.



EOLA



- A patient with epilepsy is started on Phenytoin and experiences a rash, fever, and lymphadenopathy. What is the suspected diagnosis?
- A) Hypersensitivity reaction
- B) Toxic epidermal necrolysis
- C) Stevens-Johnson syndrome
- D) Drug-induced lupus
- E) Viral infection



EOLA



- A patient with epilepsy is taking Phenytoin and warfarin concurrently. What is the expected effect on warfarin's anticoagulant activity?
- A) Increased
- B) Decreased
- C) Unchanged
- D) Variable
- E) Reversible

