

## Mechanism of action of different anti-epileptics

Prolongation of Na <sup>+</sup> channel inactivation	Facilitation of GABA mediated Cl <sup>-</sup> channel opening	Inhibition of T-type Ca <sup>++</sup> channel	Decrease of Excitatory Neurotransmitter	Hormone $\downarrow$ ACTH	Others
▪ Phenytoin	✓ E ethosuximide		❖ Lamotrigine	○ Levetiracetam	
▪ Carbamazepine	➢ Barbiturate	✓ Trimethadione	❖ Felbamate	○ Pregabalin	
▪ Valproate	➢ Benzodiazepine	✓ Valproate	❖ Topiramate	○ MgSO <sub>4</sub>	
▪ Lamotrigine	➢ Vigabatrin			○ Acetazolamide	
▪ Topiramate	➢ Gabapentin			○ Ketogenic diet	
▪ Zonisamide	➢ Tigabine			○ Vagal nerve stimulation	
▪ Lacosamide					
▪ Rufinamide					

## Chemical Classification:-

- 1. Hydantoins:** Phenytoin, fosphenytoin
- 2. Barbiturates:** Phenobarbitone, Mephobarbitone
- 3. Iminostilbenes:** Carbamazepine, oxcarbazepine
- 4. Succinimides:** Ethosuximide
- 5. BZDs:** Clonazepam, Diazepam, lorazepam, Clobazam,
- 5. Aliphatic carboxylic acid derivative:** Valproic acid
- 6. Deoxybarbiturates:** Primidone
- 8. Phenyltriazine:-** Lamotrigine, Gabapentin, Vigabatrin
- 9. Cyclic GABA analogue:-** Gabapentin, pregabalin

## Newer drugs:-

Topiramate, Zonisamide, Levetiracetam, Tiagabine, Lacosamide

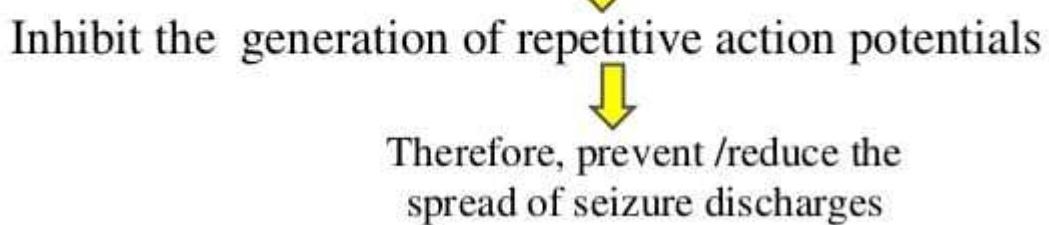
## Phenytoin

- Hydantoin derivative
- One of the most commonly used drug
- Does not produce significant Drowsiness
- Effective against all types of Partial and Tonic clonic seizures but not absence seizures

### Mechanism:-

Phenytoin

Bind to voltage dependent  $\text{Na}^+$  channels  
(Prolongs the inactivated state) and prevent  
further entry of  $\text{Na}^+$  ions into the neuron.  
(Stabilize neuronal membrane )



### Other mechanism :-

- At high conc. **Phenytoin**
- reduce  $\text{Ca}^{2+}$  influx(during depolarization) into the neurons

↓  
Suppresses repetitive firing of neurons & NT

- Reduces glutamate levels
- increases GABA responses

### • Pharmacokinetics:-

- Absorption- slowly after **oral** administration
- **Highly** bound to plasma proteins
- Metabolism- by **Hydroxylation**(CYP2C9,CYP2C19) and glucuronide conjugation, Repeated doses cause *enzyme induction*