Review Article

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Clinical Pharmacology of Modern Antiepileptic Drugs

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ABSTRACT

This article describes current antiepileptic drugs (AEDs) that are available for treatment of epilepsy. Epilepsy is characterized by repeated occurrence of seizures. Epileptic seizures are classified into focal and generalized types. Around two-dozen AEDs are available for treating epilepsy. AEDs act on diverse molecular targets to selectively modify the abnormal excitability of neurons by reducing the focal seizure discharges or preventing spread of excitation. AEDs suppress seizures by blocking the voltage-gated sodium channels (phenytoin, carbamazepine, valproate, lamotrigine, oxcarbazepine, topiramate), voltage-activated calcium channels (ethosuximide, gabapentin), potentiation of GABA inhibition (barbiturates, benzodiazepines, tiagabine), and reduction of glutamate excitation (felbamate, parampanel). Carbamazepine, phenytoin, and valproate are the first-line agents for partial seizures and generalized tonic-clonic seizures. Ethosuximide is the drug of choice for absence seizures. AEDs are orally-active and show unique pharmacokinetic features. Some AEDs cause enzyme induction and hence produce drug-drug interactions. Newer AEDs such as gabapentin, levetiracetam, tiagabine, and pregabalin do not cause enzyme induction. Despite many advances in epilepsy research, nearly 30% of people with epilepsy have drug-resistant or intractable seizures. Presently, there is no cure for epilepsy. Thus, newer and better AEDs that can better prevent refractory seizures and modify the disease are needed for curing epilepsy.

KEYWORDS: Epilepsy; Seizure; Phenytoin; Carbamazepine; Valproate; Ethosuximide; Levetiracetam.