Antiepileptic drugs, or AEDs, are the primary form of treatment for people with epilepsy. Up to 70% of people with this condition rely on AEDs to control their seizures.

Just as epilepsy can take many different forms, AEDs come in a variety of formulations. The specific mechanism of each drug may differ, but most AEDs share a common goal: calming the excessive electrical activity of neurons that cause seizures. Increasingly, these drugs are being recognized for their usefulness in non-epileptic neurological disorders as well, such as neuropathic pain, migraine, bipolar disorder and fibromyalgia.

More than 15 new AEDs have been approved in the last 25 years, and epilepsy research continues to unveil versions that are more effective, better tolerated, safer and/or have improved drug interaction profiles. These advances have made it easier for patients to take consistently and have raised the quality of life for numerous people with epilepsy.

Despite this exciting progress, however, more than 400,000 Americans continue to live with treatment-resistant epilepsy. Since 1975, this problem has been tackled by thousands of researchers at universities, biotech companies, and traditional pharmaceutical companies around the globe through collaboration in the National Institutes of Health Federal Anticonvulsant Screening Program, a remarkably effective public-private partnership.

Researchers in this program screen an average of 800 new chemical entities annually using a series of laboratory or live cell (in vitro or in vivo) models. The research in this program goes two ways -- new compounds are developed to impact the behavior of different types of neurons known to be active in many types of epilepsy and scientists take drugs that are found to have antiepileptic properties and break them down to better understand what makes them work. The results of these studies can be evaluated against a global database of other research findings and existing AEDs, enhancing global collaboration and shaving years from the lengthy process of drug development.

These new discoveries - and many others in progress- are providing much-needed hope for people suffering from the side effects of current AEDs and those afflicted with poorly controlled or drug-resistant seizures.

Sources: