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## Why Don't Medicines for Epilepsy Always Work?

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Epilepsy is one of the most common neurological conditions seen in all countries. In developed countries with good access to all of the available antiepileptic medications approximately two-thirds of patients with epilepsy will have their seizures brought under good control. However, one third of patients continue to have seizures even though they may have tried or are taking multiple medications. These patients often have medication side effects that reduce their quality of life. Failure of the medications to control seizures remains a major public health problem, but at present we don't understand why some patients respond to the medications with good seizure control while others do not.

Part of the problem is that we do not completely understand how the medications work, but in the last 15 years, new data coming from research laboratories are starting to give us ideas about why the medications may not work. To be effective but not cause side effects the perfect antiepileptic medications should do several things. First they should go

only to the part of the brain that is causing the seizures and nowhere else. The medications' presence in parts of the brain that do not cause the epilepsy may result in side effects, which is a major problem for patients. There is now much evidence that drugs for epilepsy go to many parts of the brain, and sometimes more to parts that are not involved with seizures. A second feature of the perfect medication is that it should only effect those abnormalities that are causing the seizures, so that normal neurons can work normally. However, many of the drugs are more effective at "normal" channels and receptors than at "epileptic" ones. This means that the drugs will change the activity of normal regions while having little effect at abnormal ones.

In this presentation we will examine these and other possible causes for drug resistance in epilepsy and discuss how we might overcome these problems so that we can treat all seizures successfully and without side effects.