





"All of us can have a seizure if provoked in a severe way," Dr. George said. "This mutation may just increase the susceptibility to seizures."

Dr. George and others suspect that many epilepsy patients have defects in their ion channels. One solid piece of evidence for this hypothesis lies in the channel blocker medications, which are highly successful in treating epilepsy, Dr. George said.

The defects may be the result of several minor genetic mutations rather than the single mutation that produces seizures in the rare, highly heritable forms of epilepsy.

Dr. George said he hoped that new models of seizure susceptibility would help lead to better medications to stem power surges. More effective medicines may help prevent childhood seizure disorders from becoming lifetime problems, he suggested. By stifling seizures early, doctors may be able to prevent changes in the brain that make future seizures more likely, Dr. George said.

In the past decade, studies have also shown that unsuppressed seizures can lead to the development of structures that make it easier for power to surge again and again in the brain.

After repeated seizures, neurons can start to sprout new branches that make the seizure circuit easier to complete.

"The brain is, in a sense, establishing excitability as a permanent feature," Dr. Pedley said.

An article in *The Lancet* in July, reviewing studies on brain changes linked to seizures, concluded that ample evidence showed that seizures could both change and damage the brain.

"The increasing experimental and human evidence about the adverse effects of repeated seizures, is a compelling argument for urgent treatment that achieves full control," concluded Dr. Sutula and his co-author, Asla Pitkanen of the University of Kuopio in Finland.