



In search of epilepsy's cause

Florida has about 6 percent of the U.S. population – but about 12 percent of the epilepsy. Fortunately, Florida also has top neuroscientists exploring what happens in the brain during epilepsy's electrical storm. One of those researchers is in the College of Medicine.

"Epilepsy has escaped a cure for thousands of years," said Sanjay Kumar, assistant professor of biomedical sciences and neuroscience. "It's very hard to get at the underlying cause."

In December he was among researchers honored by the American Epilepsy Society for receiving an Epilepsy Foundation grant in 2009. He focuses on the most common type in adults: temporal lobe epilepsy.

"Lots of people study temporal lobe epilepsy in the hippocampus," he said. But he thinks the "hyperexcitability" of neurons that characterizes this type of epilepsy actually may originate in part of the brain called the entorhinal cortex. For the two-year Epilepsy Foundation grant of \$50,000, he proposed studying the role of an adjacent, relatively unknown area of the temporal lobe called the presubiculum.



Eventually, he thinks answers might be revealed in scrutinizing how the brain fires nerve impulses.

"I like to study things at the level of the synapse," Kumar said. "What basic research like this does is to fill in the blanks between what happens at the cell level and circuit level in an epileptic brain."

He sees a definite application of this work to stem cells: "All these pieces of information become very important for people to take stem cells, differentiate them into the type of neurons that exist in these regions, and implant these cells there. Once that's done, they could actually prevent the occurrence of seizures.

"So there is hope that you could use this knowledge to make lives better down the line."

The Epilepsy Foundation of Florida reports that 200,000 U.S. residents are diagnosed with epilepsy every year. As for Florida's high rate, one theory is that it's related to the state's high geriatric population. A stroke can trigger an epileptic seizure, as can head trauma, high fever and many other conditions. There's still much to discover.

"The brain is the only organ that has not been well understood," Kumar said. "We are just scratching the surface."