Researchers at the University of South Florida have developed a method for harvesting human neural stem cells and epileptic neural cells, as well as a novel series of microRNAs (miRNAs) associated with epilepsy as biomarkers for the disorder.

Over three million Americans suffer from some form of epilepsy. Mesial temporal lobe epilepsy (MTLE) is the most common, arising from temporal lobe brain structures including the amygdala, hippocampus and parahippocampal gyrus. While many antiepileptic drugs are available, surgery to remove part of the temporal lobe continues to be the most effective treatment for MTLE. When studying this disorder, many researchers use animal models and other in vitro methods that do not fully recapitulate the human disease pathology. This highlights the need for more accurate human models to facilitate a greater understanding of the disorder.

USF researchers have developed a novel method for harvesting human neural stem cells and epileptic neural cells from adult patients undergoing neurosurgeries. Moreover, novel miRNAs associated with epilepsy have been identified from these extracted cells. The profiles of these novel miRNAs in the brain not only provide deep insight into the understanding of the disease pathology, but also identify an optimal source of neural stem cells for cell culture laboratory work. These harvested neural cells can be used as biomarkers, diagnostic tools, and for autologous and allogeneic transplantation. Furthermore, this method may be applied to other neurological disorders where a neurosurgical resection, ablation, electrode implantation or similar brain tissue manipulation is typically used.