USF Available Technologies

Technology Transfer Office

Methods of Treating Epilepsy Using Neural Stem Cells Which Express Various Factors

Researchers at the University of South Florida have developed a method of diagnosing and treating epilepsy or an epilepsy-related disorder.

Epilepsy is a neurological disorder which causes abnormal brain activity such as seizures. Over three million Americans suffer from some form of epilepsy. While many antiepileptic drugs are available, brain surgery is still the definitive treatment for intractable temporal lobe epilepsy. Although there are *in vitro* models for the study of epilepsy, most neurological disease models use animal tissues/cells, thus they do not fully recapitulate the human disease pathology. There is therefore a need for a humanized *in vitro* model for the study of epilepsy.

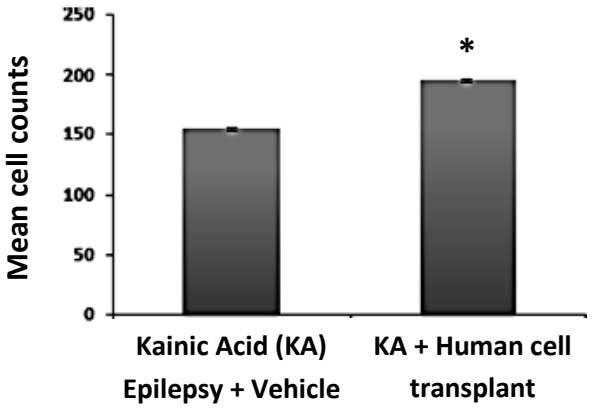
USF researchers have developed a method of diagnosing, prognosing, and treating epilepsy or an epilepsy-related disorder via non-epileptic and epileptic neural cells and cell cultures. These human neural stem cells and epileptic neural cells are harvested from adult patients undergoing neurosurgical resection procedures. Novel miRNAs associated with epilepsy have been identified from these extracted cells. The profiles of these miRNAs in the brain provide deep insight into the understanding of the epileptic disease pathology. These cells have been found to express various transcription factors, proteins, and surface antigens such as nanog, SSEA-4, OCT-4, MIR-34B, MIR-34C and MIR-592 which can be used as biomarkers, as diagnostic tools, and for transplantation. This novel method may be applied to other neurological disorders as well where a neurosurgical resection, ablation, electrode implantation or similar brain tissue manipulation is typically used.

ADVANTAGES:

- A novel epileptic biomarker
- Potential allogeneic and autologous stem cell treatment
- Human cell derived epileptic models
- Increased epileptic understanding

Novel Biomarkers and Harvesting Methods for Epileptic Neural Cells

Cell Survival in CA3 Region (Left Side)



Subjects with KA-Induced Epilepsy who Received Transplanted Human Cortical Cells Displayed Significantly Higher Cell Survival

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University of South Florida | Technology Transfer Office
813.974.0994 (office) | 813.974.8490 (fax)
patents@research.usf.edu
http://www.usf.edu/research-innovation/pl/