EEG-based monitoring of brain recovery following stroke

Unmet Need
Stroke is the third leading cause of disability in the US, affecting 800,000 annually. Stroke occurs when blood supply to the brain is impeded, leading to brain damage. Currently, recovery from stroke is assessed by monitoring a patient’s vital signs. However, vital signs are insufficient for personalized care because they do not assess the brain’s recovery. There is a need for clinically relevant brain monitoring to guide early management, evaluate treatment response, and monitor recovery following stroke.

Technology
Duke inventors have developed a device that monitors the recovery of brain function following stroke using electroencephalography (EEG). This is intended to be used for prognosis and monitoring in stroke patients, and to enable treatment standards and guidelines based on improving brain function. Specifically, the device transforms EEG data and patient information into an individualized recovery trajectory assessment. This recovery trajectory is displayed on a digital monitor, along with other relevant patient data. The patient’s progress along their recovery trajectory is displayed in real-time. This is accomplished by machine learning (ML) algorithms trained on EEG recordings from a mouse model of ischemic stroke. The use of animal models is a key innovation that has enabled superior performance, by circumventing confounds present in clinical data (medication, sedation, biased sampling). The superb performance of this model has been demonstrated with clinical EEG data from four human patients who developed vasospasm ischemia (a condition which can lead to stroke).

Other Applications
This technology could also provide a new endpoint for clinical trials, providing a more direct measure of therapeutic impact for stroke treatments.

**Advantages**

- Integrates complex patient data and biosignals into an easily read estimate of recovery from stroke
- Continuous, real-time monitoring with EEG
- Enables care standards and guidelines based on improving brain function

**Duke File (IDF) Number**

IDF #: T-006297

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**Publication(s)**

**External Link(s)**

- From the lab of Dr. Bradley Kolls