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Oral Presentation

Biomarkers for Epilepsy

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Abstract

A biomarker is defined as an objectively measured characteristic of a normal or pathologic biologic process. Identification and proper validation of biomarkers of epileptogenesis (the development of epilepsy) and ictogenesis (propensity to generate spontaneous seizures) might predict the development of an epileptic condition; identify the presence and severity of tissue capable of generating spontaneous seizures; measure progression after the condition is established; and determine pharmacoresistance. Such biomarkers could be used to create animal models for more cost-effective screening of potential antiepileptogenic and antiseizure drugs and devices, and to reduce the cost of clinical trials by enriching the trial population and acting as surrogate markers to shorten trial duration. Research to identify reliable biomarkers may also reveal underlying mechanisms that could serve as therapeutic targets for the development of new antiepileptogenic and antiseizure compounds. Target mechanisms for biomarkers include cell loss, axonal sprouting, synaptic reorganization, altered neuronal function such as gene expression profiles and protein products, neurogenesis, altered glial function and gliosis, inflammatory changes, angiogenesis, and altered excitability and synchrony. Potential biomarkers include hippocampal changes on MRI, interictal EEG spike features including BOLD patterns on fMRI, pathological high-frequency oscillations, excitability as measured by transcranial magnetic stimulation, AMT-PET imaging, and gene expression profiles. Identification of reliable epilepsy biomarkers is a high priority area of current research.

Keywords: Biomarkers, Epilepsy, Neuronal Function, Expression.

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