A Neuronal Avalanche Size (NAS) Assay to Screen for Cognitive Enhancers and Anti-Epileptics

Published date: Feb. 1, 2012

Technology description

Summary

Currently available methods of detecting and measuring EEG activity only crudely classify normal and abnormal activity or distinguish epileptic activity early in the onset of its deviation from normal activity. Available for licensing are methods for recognizing a new pattern of EEG activity called neuronal avalanche size (NAS) that has been correlated with cognitive function and epilepsy. The NAS uses extracellular field potentials to measure the distribution of synchronized neurons in the cortex (neuronal avalanches) and thus the state of the cortical network. When the avalanche size reaches a power law with a slope of -3/2, the system is in the critical state and the cortical network is functioning optimally to spread information throughout the network. If the system slope deviates from -3/2, the system is outside the critical state and is either epileptic or sub-critical. In animal studies measurement of NAS quantified a drug’ s potential to increase cognitive functioning and induce or reduce epilepsy. The NAS assay may thus enable high-throughput in vitro screens to select anti-epileptics and cognitive enhancing drugs for continued drug development. Because avalanches represent scale-invariant dynamics they can also be recorded using surface (EEG) electrodes. This technology may thus be useful in assessing cognitive function, epileptic pathology and in selecting and monitoring drug therapy for epileptic patients.

Market:

Epilepsy affects approximately 2.7 million people in the United States, and over 50 million people worldwide.

The cost of epilepsy in the United States is $12.8 billion per year, where eighty percent of this cost is due to patients with intractable seizures.

The cost for developing and commercializing new drugs is approximately $1 billion.

Schizophrenia affects about 1 out of 100 people in the United States, resulting in a public health burden of $40 billion per year in the U.S. alone.

Atypical neuroleptics alleviate cognitive deficits in schizophrenia and are now prescribed to more than 70 percent of all schizophrenic patients, totaling annual sales of $8.7 billion in 2003.

Atypical neuroleptics have variable efficacy in alleviating symptoms, and act on multiple, poorly understood pathways simultaneously resulting in many side effects.

The proposed in vitro screen could tremendously facilitate the development of more efficient and selective psychotropic drugs to alleviate cognitive deficits in schizophrenia.

Application area

In vitro screen to assess drugs for potential use as anti-epileptics for drugs with the propensity to cause epilepsy.
In vitro screen to assess drugs with the ability to enhance cognitive function, and ultimately, relieve cognitive defects associated with psychiatric illnesses and neurological disorders.
EEG monitoring of patients for diagnosis and drug selection and monitoring.

Institution

NIH - National Institutes of Health

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com