A Closed Loop System for Responsive Precise Intraparenchymal Delivery of Adenosine for the Treatment of Epilepsy

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Technology description

The Need

Adenosinergic neuromodulation plays a crucial role in control of seizure activity and is described as the brain's endogenous anticonvulsant. Intraparenchymal infusion of adenosine into epileptogenic regions of the brain has been shown to control seizures (anti-ictogenic) and prevent progressive epileptogenesis and kindling in animal models. There is however a need for precise responsive intraparenchymal delivery of adenosine in humans. Normal levels of adenosine range between 20 to 300 nM, and acute surge in adenosine can trigger several downstream effects including several immune-modulatory systems that may trigger subsequent astrogliosis and epileptogenesis. The device that is the subject of this disclosure enables precise control of adenosine delivery to maintain intraparenchymal adenosine levels within a predefined range

The Technology

Ohio State University researchers, led by Dr. Chima Oluigbo, have developed a neuromodulation device that will aid in controlling seizures. The device has a sensing component and a delivery component. The electrochemical sensor measures extracellular adenosine concentration in vivo, and the delivery component is a programmable infusion pump which will vary its rate of adenosine infusion in a responsive manner based on the intraparenchymal adenosine concentration.
Medical device for controlling seizures.

Application area

Seizure control
Epilepsy treatment
Medical devices

Advantages

Ability to keep the intraparenchymal levels of a given neurotransmitter within strict levels
Has been shown to prevent progressive epileptogenesis in kindling animal models

Institution

Ventech Solutions

Inventors

Chima Oluigbo