Docket #: S08-033

A Device to Control Peripheral Nervous Tissue Containing Light-Gated Channels

Title: A device to photo-stimulate peripheral nervous tissue.

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Abstract:

The device emits light onto transgenic nervous tissue in the peripheral nervous system, making it possible to stimulate or inhibit various functions of the peripheral nervous system. Examples of these functions are muscle stimulation/inhibition, pain management, cardiac control, gastrointestinal and urinary management, etc...

Applications:

* Treatment of intractable depression or epilepsy by vagal nerve stimulation.

* Activation or inhibition of skeletal muscle activity for patients suffering from stroke, spinal cord injuries, cerebral palsy, etc...

* In pain management applications, it would be possible to inhibit stimulation of pain-sensing nerves.

* Stimulation or inhibition of gastrointestinal activity to ameliorate diseases such as irritable bowel syndrome.

* Control of heart rate and force produced during a contraction for patients suffering from cardiovascular disease

Advantages:

* Ability to inhibit or stimulate nervous tissue

* Highly specific in terms of cell type activated

* High temporal resolution

* Can be adapted to a wide range of applications

Applications

- The device emits light onto transgenic nervous tissue in the peripheral nervous system which activating these channels, it is possible to stimulate or inhibit various functions of the peripheral nervous system. Two examples are treating intractable depression or epilepsy by optically stimulating the vagus nerves after the afferent cell bodies in the parasympathetic ganglion have been modified for light stimulation.

Advantages

- Other methods would include electrical stimulation, which is not able to stimulate specific tissue types, has low spatial resolution and is unable to inhibit activity of nervous tissue.

Publications

- Llewellyn ME, Thompson KR, Deisseroth K, Delp SL. Orderly recruitment of motor units under optical control in vivo. Nat Med. 2010 Oct;16(10):1161-5. Epub 2010 Sep 26.
- PCT Application: PCT/US2009/049936

Patents

- Published Application: WO2010006049
- Published Application: 20110166632
- Published Application: 20130289675
- Published Application: 20140324133
- Published Application: 20170072219

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