Implantable Intracranial Neural Interface System

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Inventors: P. Charles Garell, Justin Williams, Daryl Kipke, Jaimie Henderson, Jamille Hetke

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an integrated and minimally invasive microsystem for neural recording, stimulation, and delivery of chemical or biological substances.

Overview

One of the frontiers in biomedical science is the development of brain-computer interface (BCI) systems. A need exists for small-scale neurological interfaces that can potentially transmit information relating to neural activity, as well as transfer therapeutic substances to and from neurological systems.

The Invention

UW-Madison researchers have developed an implantable intracranial neural interface node, which provides an integrated and minimally invasive microsystem for neural recording, stimulation and delivery of chemical or biological substances. This system supports cross-modal neural interfaces to the cerebrum and other associated structures in the central nervous system.

The implant consists of a cylindrical chamber that is inserted into the cranium through a burr hole. The cylindrical housing contains electrical components for instrumentation and signal processing and fluidic components for the delivery of therapeutic substances. Microscale neuroprobe assemblies are connected to the electronic and fluidic processing elements via a flexible, multi-wire ribbon cable. The probe assemblies are inserted into the brain to provide electrical and chemical interfaces to specific brain regions, allowing for neural recording, electrical stimulation, sensing and sampling of chemicals, and delivery of chemicals, cells and genetic material.

Applications

- Localized drug delivery to brain tumors
- Cortical micro-stimulation for the treatment of pain
- Acquisition of control signals in a cortical prosthetic system

Key Benefits

- May improve quality of life for victims of Alzheimer's disease, stroke or injury
- Fully implantable and replaceable
- Minimally invasive – system components are housed in the intracranial chamber
- Does not contain trans-cutaneous devices
- Allows multiple modes of operation
- Fits more system complexity in a smaller package than any existing device
- Separate microelectrode arrays can be individually placed within a small volume of the brain
- Allows surgeons to directly visualize the insertion of the probes so as to avoid surface vasculature
- Able to transmit raw neural signals to an external processor for analysis

- Supports short-term or chronic neural interfaces
- Provides the first-known fully implantable, cross-modal device for long-term recording of neural signals

Additional Information

For More Information About the Inventors

- Justin Williams

Tech Fields

- Medical Devices : Neurological devices

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846