WOVEN FABRIC BIOELECTRONIC DEVICE

Tech ID: 32435 / UC Case 2021-193-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Researchers at UC Berkeley and UCSF have developed a bioelectronic device composed of woven fabric to send impulses directly to the brain.

While vast scientific advances have been made in the last century in nearly every realm of biomedical science, neuroscience remains one of the last frontiers. While many scientists have made significant headway in terms of our understanding of the underlying mechanisms of brain functions, this progress has yet to result in a plethora of meaningful therapeutic advances. Because of this, many prominent neurological diseases, such as Alzheimer's, paraplegia, and multiple sclerosis, have few therapeutic options available and no known curative strategies. One therapeutic strategy for neurologic disorders that is currently being explored is through implantable devices. In this schema, devices are implanted directly into the brain to provide electrical stimulation. However, these devices have significant drawbacks including rigidity, a difficult fabrication process, and limited functionality.

Stage of Research

The inventors have established a new class of bioelectronic device. This device is composed of woven fabric and will conduct and send electrical signals, provide optical stimulation, as well as support a group of cells. These cells can range from inducible pluripotent stem cells (iPSCs), neural stem cells, or fully differentiated neurons. This method also represents several different weave methods to enable unique applications from the device depending on therapeutic need. This schema also provides for the addition of soluble factors as needed. These factors can include growth factors such as BDNF or VEGF to promote cell growth and survival, as well as anti-inflammatory factors such as IL-1ra. Overall, this device is perfectly positioned to enable brain lesion repair, something that has proved difficult in the past due to the terminally differentiated nature of neurons, which makes them unable to regenerate or divide past a certain point in development.

SUGGESTED USES

- Enable neurological lesion repair by introducing neural and/or stem cells
- Sensors can provide feedback on neurological lesion repair in real time
- Soluble factors such as growth or anti-inflammatory factors can be added to facilitate wound healing

ADVANTAGES

- Woven material provides a flexible interface with tissues while still providing much needed structural stability
- Neural and/or stem cells can be cultured directly on the bioelectronic device

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Systems For Pulse-Mode Interrogation Of Wireless Backscatter Communication Nodes

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OTHER INFORMATION

KEYWORDS

Wearable, bioelectronic, iPSC, neural stem cells, implantable, biosensor, brain lesion

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Medical**
  - Delivery Systems
  - Devices

RELATED CASES

2021-193-0

- Flexible Wound Healing Monitor
- Thin-Film Optical Voltage Sensor For Voltage Sensing

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