Energy Efficient Electrode Design to Treat Neurological Disorders

Track Code: 2017-LEE-67993

Categories:
- Biomedical Engineering
- Medical/Health

Keywords:
- Biomedical Engineering
- Energy Efficient
- Medical Devices
- Medical/Health
- Neurological Disorders

Numerous neurological impairments, including neuromotor deficit, hearing loss, chronic pain, and epilepsy, require the restoration and replacement of bodily functions by virtue of implantable neuroprosthetic devices. Advancements in neuroscience have increased the total market size considerably for various neural stimulation devices that target the spinal cord, cochlear, cerebral cortex, and other peripheral nerves. With advances in neurostimulation technologies, the demand for more precise targeting of neural substrate has fueled the development of higher density electrode arrays to improve the resolution of stimulation outcomes while minimizing unwanted side effects; however, chronic overstimulation is known to cause nerve damage. There is a need for developing higher efficiency, more durable electrodes.

Researchers at Purdue University have developed new electrode designs to prolong the lifetime and function efficacy of implantable pulse generators. It was found that certain shapes can be used to more efficiently deliver electrical charge for stimulating the nervous system. Data shows that the electrode design reduces power consumption by up to 50 percent while increasing functionality effectiveness. This new electrode design could be used in implantable simulation systems that are used to treat a large number of neurological disorders. It will work in existing platforms or in a standalone system.

Advantages:
-Energy efficient
-Increases lifetime of system
-Increases functionality effectiveness
-Compatible with existing platforms

Potential Applications:
-Implantable neuroprosthetic devices
-Implantable pulse generators
-Other implantable devices

People:

- Lee, Hyowon (Project leader)
- Park, Hyunsu

Intellectual Property:

Application Date: July 26, 2018
Type: Utility Patent
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

Application Date: July 27, 2017
Type: Provisional-Patent
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475
Fax: (765) 463-3486
Email: otcip@prf.org