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Fully Wireless Implantable Device for Recording and Stimulating Bioelectric Events

A batteryless, fully implantable bionode enables long-duration, unrestricted bioelectric recording and stimulation in small animals within the largest reported wireless power transfer environment.

Longitudinal electrophysiology or behavioral modulation studies in mice are logistically challenging due to the need for frequent data collection or unrestricted testing environments. Wireless miniature devices have evolved from tethered recording systems, which placed restrictions on the type of environment and behavioral tasks performed during studies. Battery-powered implantable devices are excessively large due to the onboard battery and collects a limited amount of data based on the battery's capacity. These devices do not offer multiple functionalities such as biopotential recording with electrical stimulation.

Researchers at Purdue University have developed a batteryless, fully implantable device that can record and stimulate bioelectric activity in small animals, bypassing the limitations of battery-powered devices and decreasing restrictions on testing environments. The implantable bionode is compatible with the largest reported wireless power transfer (WPT) environment for rodents as small as mice. This device includes temperature sensing and electrode impedance measurement.

Advantages:

-Does not require batteries

-Wireless and implantable

-Expands testing environments

-Largest reported WTP environment

-Uses commercially available hardware

Potential Applications:

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Category
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

Authors
Gabriel Omar Albors
Muhammad Arafat
Rebecca Bercich
Pedro Irazoqui
John Jefferys
Thelma Lovick
Henry Mei
Daniel Pederson
Terry Powley
Christopher John Quinkert
Jesse Somann
Zhi Wang
Jack Douglas Williams
Quan Yuan

Further information
Patrick Finnerty
pwfinnerty@prf.org

View online

-Longitudinal studies in animals

-Behavioral modulation studies in animals

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Intellectual Property:

Provisional-Patent, 2016-06-10, United States | EP-Patent, 2017-06-12, Germany | PCT-Patent, 2017-06-12, WO | NATL-Patent, 2017-06-12, Japan | NATL-Patent, 2017-06-12, European Patent | NATL-Patent, 2018-12-07, United States | DIV-Patent, 2022-05-09, Europe | CON-Patent, 2022-12-12, United States | CON-Patent, 2024-04-24, United States

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