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PRESS RELEASE

Source: Toyohashi University of Technology, Japan, Committee for Public Relations

Release Title: 'A Bluetooth mouse'--you can wirelessly read a mouse's mind

Release Subtitle: A lightweight, compact, wireless Bluetooth-low-energy neuronal recording system for mice

Overview

A research team at the Department of Electrical and Electronic Information Engineering, Department of Computer Science and Engineering, Department of Applied Chemistry and Life Science, and the Electronics-Inspired Interdisciplinary Research Institute (EIIRIS) at Toyohashi University of Technology has developed a lightweight, compact, Bluetooth-low-energy-based wireless neuronal recording system for use in mice. The wireless system weighs <math><3.9\text{ g}</math> and measures Sensors and Actuators B: Chemical, on January 8, 2021.

Details

Electrophysiological recording, which uses micro-scale needle-like electrodes penetrated into the brain tissue, has made significant contributions to fundamental neuroscience and medical applications. Electrophysiological recording, however, requires improvements in signal quality, invasiveness, and cable use. Although wireless recording can meet these requirements, conventional wireless systems are heavy and bulky for use in small animals such as mice, and systems based on their own custom technologies are costly and lack versatility.

The research team developed a lightweight, compact, wireless Bluetooth-low-energy neuronal recording system. As explained by the first author of the article, Ph.D. candidate Shinnosuke Idogawa, "We tackled the challenge of developing a lightweight and compact wireless neuronal recording system for use in mice and developed a



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Development Background

The leader of the research team, Associate Professor Takeshi Kawano said "We demonstrated the wireless system for single channel recording as our first step, but we can increase the channel numbers based on our system, and we are currently developing wireless systems for four-channels and more. Because we use Bluetooth technology, the device features will help us further develop small wireless neurophysiology systems with the advantages of good versatility and low cost for a wide range of users."

Future Outlook

The research team believes that the wireless recording system can also be used to study the behavioral characteristics of mice as well as drug screening using mice. Because of its light weight, compactness, and Bluetooth technology, the developed wireless neuronal recording system can also be used with other species, including rats and monkeys.

Funding agency

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Reference

Shinnosuke Idogawa, Koji Yamashita, Riiki Sanda, Rika Numano, Kowa Koida, and Takeshi Kawano (2021). "A lightweight, wireless Bluetooth-low-energy neuronal recording system for mice," *Sensors and Actuators B: Chemical*, 10.1016/j.snb.2020.129423.

Further information

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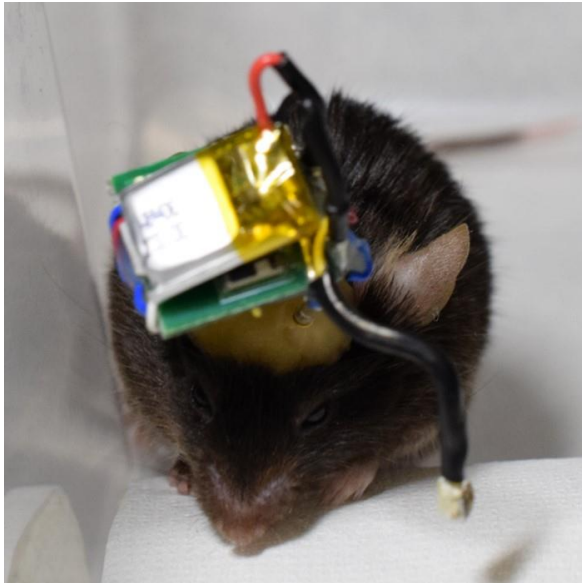
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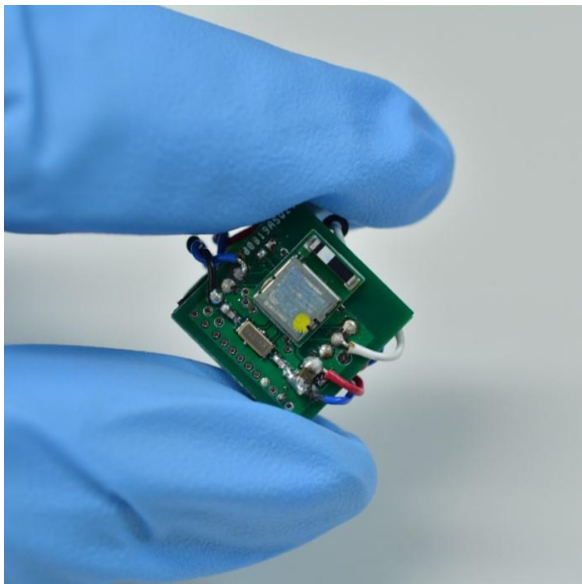


Figure1:



Caption: Mouse with a head-mounted Bluetooth wireless system that transmits neuronal signals from cortex implanted microneedle electrodes

Figure2:



Caption: Fabricated wireless neuronal recording system The system weighs <math><3.9\text{ g}</math> and measures

Keywords: BIOMEDICAL/ENVIRONMENTAL/CHEMICAL ENGINEERING, ELECTRICAL ENGINEERING/ELECTRONICS, NANOTECHNOLOGY/MICROMACHINES, TECHNOLOGY/ENGINEERING/COMPUTER SCIENCE