

Flexible Stretchable Electrode And Recording Method For Gastrointestinal Prostheses

Tech ID: 29928 / UC Case 2015-025-0

SUMMARY

UCLA researchers in the Department of Bioengineering and Surgery have developed an electrode for stimulation and recording of intestinal peristalsis that uses a novel impedance-based sensing method.

BACKGROUND

The gastrointestinal (GI) system is crucial for the digestion and processing of food and nutrients that enter the body. Food is moved along the esophagus, stomach, and intestines through muscle contractions called peristalsis. Electrical signals travel through the muscles that line the GI tract, mediating a wave of muscle contraction and relaxation that push food through. Dysfunctional muscles or nerves within the GI tract can lead to reduced motility, causing a range of symptoms including vomiting and nausea. The current method in which these electrical signals are recorded by an electrogastrogram (EGG). However, there are limitations to using EGG, as the contraction signal frequencies of the intestine are very low. In addition to recording peristalsis, recent studies have been working on stimulating contractions within the intestines to address various motility disorders. These studies have also been riddled with obstacles such as implantation efficiency. Improvements upon these systems, for diagnostic and therapeutic purposes, is necessary.

INNOVATION

UCLA researchers have designed a novel electrode system that can be implanted over the intestines to stimulate and record contraction movement waves. This electrode is designed to allow good adhesion via biocompatible epoxy or sutures. Furthermore, the association between the recording and stimulation electrodes allows for the generation of a stimulation-induced contraction in a damaged tissue that mimics the neighboring healthy tissue. Unlike other methods of recording peristalsis that require an amplifier to measure low frequency contraction signals, this electrode is uses an impedance measurement method to quantify the contraction, forgoing the need for an amplifier.

APPLICATIONS

- ▶ Measure, induce, and control organ contraction/peristalsis

ADVANTAGES

- ▶ Adhesion nodes provide good fixture when implanted onto the tissue
- ▶ Closed-loop intestine control system induces continuous contraction waves through damaged tissue
- ▶ Does not require an amplifier to capture low frequency contraction signals

STATE OF DEVELOPMENT

The researchers have developed the system and are planning to conduct more animal tests prior to submission of the results for publication.

PATENT STATUS

| Country | Type | Number | Dated | Case |
|--------------------------|---------------|------------|------------|----------|
| United States Of America | Issued Patent | 10,391,310 | 08/27/2019 | 2015-025 |

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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OTHER INFORMATION

KEYWORDS

electrode, gastrointestinal, intestine, peristalsis, prostheses, impedance, contraction, electrical stimulation, recording

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
- ▶ **Medical**
 - ▶ Devices
 - ▶ Disease: Digestive System
- ▶ **Engineering**
 - ▶ Other

RELATED CASES

2015-025-0

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