Module and Method for Location Tracking of a Device within the Gastrointestinal Tract

TECHNOLOGY NUMBER: 2022-277

OVERVIEW

A novel approach for location tracking of an ingestible device through the entire GI tract

- Provides sensing of several variables such as pH, motility, pressure, and temperature
- Useful for circumstances as diverse as the diagnosis of disease and development of new drugs

BACKGROUND

Gastrointestinal (GI) diseases affect around 60 to 70 million Americans annually, and timely diagnosis of these illnesses can decrease morbidity and mortality. One method for screening and diagnosis of gastrointestinal diseases has been the use of an ingestible capsule that recovers samples from distinct regions along the gastrointestinal tract. While the detection of biomarkers from specific regions of the GI tract has been used to provide understanding of these diseases and to diagnose illnesses in individuals, the recovery of these fluid samples remains difficult and the delineation of the anatomic location for the recovered sample may prove uncertain.The traditional method for obtaining GI samples has included placement of specially designed catheters along the alimentary system. This approach is technically challenging, it causes discomfort, it requires medical supervision and anesthesia, and it permits only a limited reach to GI structures distal to the stomach and small intestine. A need exists for a more specific and less complex means by which to sample biomarkers from fluids along the GI tract.

INNOVATION

Researchers have invented a new approach for location tracking of ingestible devices that can travel along the GI tract and provide sensing of several variables (i.e., pH, motility, pressure, temperature, etc.), imaging, and sampling of specific anatomic sites. This approach uses miniature inertial sensors such as accelerometers embedded in the device to monitor instantaneous acceleration patterns as the instrument travels along the GI tract. The acceleration patterns are compared with distinct motility patterns in different segments of the GI tract to generate accurate location information of the device. This approach can track location of the ingested sampling device without having to use external imaging hardware or to physically confine the subject. Both the tracking function and its use in an ingestible GI device are considered novel technologies associated with this invention. The overall technology has been labeled as the wireless pharmaceutical analysis device (WPAD). The device has been verified *in vitro* in emulated GI fluids and *in vivo* using canine models.

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Category

Medical Devices
Life Sciences

Author(s)

Alexander Benken
Duxin Sun
Hsueh-Tsung Lu
Jeremy Felton
Manjunath Pai
Partha Dutta
Tao Li
Xiangyu Zhao
Yogesh Gianchandani

Further information

Tiefei Dong
tiefeid@umich.edu

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