

Docket #: S21-334

Robotic pill system for biomarker sampling in body cavities

Researchers at Stanford have developed a robotic pill platform to collect biomarkers, which serve as indicators of disease, from specified body cavities over prolonged sampling periods. For example, the gastrointestinal (GI) tract has limited accessibility, such that collecting samples requires invasive medical procedures and specialized facilities. Non-invasive methods to sample biomarkers have been recently developed but are limited in their ability to isolate biomarkers within localized environments. The inventors have developed a prototype of a robotic pill that successfully entraps microparticles, proteins, and bacteria from the GI tract as model target collectables. The robotic pill comprises of a propulsion engine to enable locomotion and retention of the device at a localized environment over a desired duration. Additionally, the device contains a tunable storage module that can collect samples at different locations and times in separate chambers. Such samples may be processed after collection to enable time-resolved analysis of biomarker concentrations.

Stage of Development

The inventors have developed a prototype to isolate biomarkers in the GI tract with high quantity and specificity, which can also be retained in specified locations.

Applications

- Disease diagnosis
- Disease risk-stratification
- Biometrics

Advantages

- Less invasive compared to current implantable devices

- Provides direct information about biomarkers specific to a particular body cavity
- High resolution sampling of biomarkers

Publications

- Soto F, Purcell E, Ozen MO, Sinawang PD, Wang J, Akin D, Demirci U. [Robotic Pill for Biomarker and Fluid Sampling in the Gastrointestinal Tract](#). Advanced Intelligent Systems n/a:2200030.

Patents

- Published Application: [WO2023091792](#)

Innovators

- Fernando Soto
- Utkan Demirci
- Demir Akin

Licensing Contact

Seth Rodgers

Licensing Manager, Life Sciences

[Email](#)