An effective method for controlling gut motility using electrical stimulation in the colon

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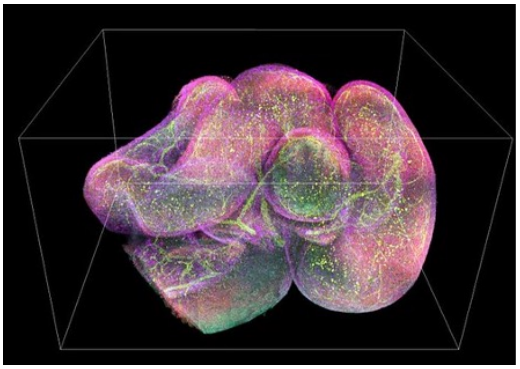

Unmet Need

Pathology in the gut especially in the enteric nervous system can lead to functional gastrointestinal and motility disorders (FGIMD) characterized by symptoms of dysmotility that impact 1 in 5 persons in the US. Patients with FGIMD account for 40% of the GI problems seen by doctors and therapists. Pharmaceutical interventions have been unsuccessful in treating these disorders. Electrical stimulation of the gastrointestinal (GI) tract to treat gut dysmotility has seen limited success due to the lack of understanding of the effects of electrical stimulation on gut motility and enteric nervous system circuitry. As a result, there is a need for understanding the stimulation parameters of the gastrointestinal tract as well as treatments for gastrointestinal motility disorders.

Technology

Duke inventors have reported a method for controlling gut motility. This is intended to be integrated with implantable neuromodulation devices to treat patients with various gastrointestinal disorders. Rather than traditional stimulation paradigms, this technology uses sinusoidal stimuli to entrain interstitial cells of Cajal (ICC), the oscillatory pacemaker cells responsible for slow-wave propagation. Entraining ICCs are used to control gut motility by either speeding up or slowing down ICC oscillations. A computation model of the enteric nervous system and gut motility to was developed to enable exploration of stimulation parameters and potential mechanistic understanding of the gastrointestinal stimulation. The technology demonstrated that effecting low frequency (0.5Hz) sine wave stimulation was more effective at increasing gut motility than conventional current pulses in awake rodent studies.

Advantages

- A more effective method for controlling gut motility than conventional methods
- Demonstrated in awake rodent studies
- Offers therapeutic applications for a variety of gastrointestinal and motility disorders including irritable bowel syndrome, fecal incontinence, and constipation

Duke File (IDF)

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Links

- From the lab of Dr. Warren Grill

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Publications

- Electrical stimulation of gut motility guided by an in silico model. (J Neural Eng, 2017)
- US Patent App 16/624,673