Researchers develop gastrointestinal imaging capsule for esophagus surveillance and interventions

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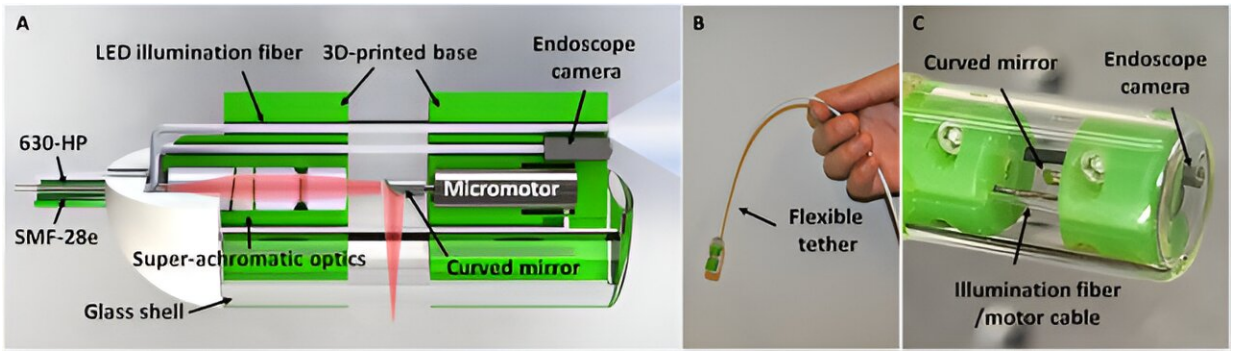

(A) Schematic illustration of the MAGIC. Two single-mode fibers for the dual-wavelength OCT imaging and laser ablation and the endoscope camera with an LED illumination fiber were all integrated inside a single device with an 11-mm diameter and a 26-mm length. (B and C) Photographs of the assembled MAGIC with a flexible tether. Credit: Biophotonics Imaging Technology Lab @ JHU.

In an advancement in gastrointestinal health, researchers from Johns Hopkins University have developed the Multifunctional Ablative Gastrointestinal Imaging Capsule (MAGIC)—a gastrointestinal imaging capsule for esophagus surveillance and interventions.

The findings are published in the journal *BME Frontiers*.

MAGIC combines the latest optical coherence tomography (OCT) technology with an ultracompact endoscope camera and an ablation laser, offering unprecedented capabilities in esophageal imaging and potential treatment. Operating at dual wavelengths of 800 and 1300 nm, MAGIC provides superior resolution and imaging contrast, enabling doctors to detect early lesions with unmatched accuracy.

The integrated ablation laser further extends MAGIC's functionality, allowing for potential ablative treatment of esophageal abnormalities. This means that doctors can not only detect problems but also treat them, all within a single procedure.

The MAGIC technology is a major step forward in addressing the clinical need for a comprehensive esophagus surveillance and treatment solution. Current tethered capsule endoscopy (TCE) technologies, while promising, have been limited by suboptimal resolution, imaging contrast, and lack of visual guidance. MAGIC overcomes these limitations, paving the way for wider clinical adoption and improved patient outcomes.

The researchers are excited about the potential impact of MAGIC and look forward to its further development and clinical application. This innovative technology holds the promise of transforming esophageal health care and improving the lives of patients worldwide.

This research was led by Professor Xingde Li from Johns Hopkins University, with Dr. Hyeon-Cheol Park, also from Johns Hopkins University, contributing to the study. Other authors include Dr. Da Wei Li from Johns Hopkins University, Dr. Rongguang Liang from the University of Arizona, and Gina Adrales from the Johns Hopkins University School of Medicine.

More information: Hyeon-Cheol Park et al, Multifunctional Ablative Gastrointestinal Imaging Capsule (MAGIC) for Esophagus Surveillance

and Interventions, *BME Frontiers* (2024). DOI: 10.34133/bmef.0041