

String probes for devastating childhood digestive disease

July 30 2008

A swallowed string may someday replace the invasive, uncomfortable endoscope now used to diagnose eosinophilic esophagitis, a devastating childhood disease of the esophagus.

Steven J. Ackerman of University of Illinois at Chicago College of Medicine and Dr. Glenn T. Furuta, his colleague at the University of Colorado Denver, were recently awarded three grants for an all-fronts attack on eosinophilic esophagitis, an inflammatory disease in which defense cells called eosinophils mistakenly attack the esophagus, causing it to narrow until food can't pass.

"Most cases are first encountered in the emergency room, where a child is brought in because something he ate is caught in his esophagus," said Ackerman, professor of biochemistry and molecular genetics at UIC.

To diagnose the disease, doctors insert an instrument called an endoscope down the esophagus and take six to eight samples of tissue, from the top, middle and distal end, near the stomach. Under a microscope, they count the number of eosinophils, "which are not normally present in the esophagus at all," Ackerman said. The procedure, he said, is not only expensive but uncomfortable and carries some risks. And because repeat testing is needed over the course of treatment, a child may need to undergo as many as 20 endoscopies within three or four years.

Ackerman and his colleagues hope they can replace the endoscope by

having children swallow a string encased in a gelatin capsule. As the capsule travels down the esophagus, the string plays out of the dissolving capsule, stretching through the esophagus, the stomach and the small intestine. The string is left in place overnight, then pulled out.

"We can determine which part of the string was in the esophagus, versus in the stomach, mouth or small intestine," said Ackerman. They then look on the string for certain inflammatory proteins that are expressed only by eosinophils.

The test will be done the day before an endoscopic test is planned. The researchers will compare the thread's measures of the eosinophil proteins with the cell counts obtained by endoscopy.

"Eventually, of course, our hope is to replace these repeated endoscopies with this simple procedure," Ackerman said.

The study, funded by the National Institute of Allergy and Infectious Diseases (one of the National Institutes of Health), will be done at two sites, UIC and Denver. Ackerman and Furuta are co-principal investigators on the team, which also includes Dr. Amir Kagalwalla of the UIC Department of Pediatrics.

The two other grants are from the American Gastroenterological Association (AGA) and the CURED Foundation (Campaign Urging Research for Eosinophilic Diseases).

The AGA awarded Ackerman and Furuta its 2008 translational research award to determine the mechanisms that regulate changes in the esophagus caused by the disease, including the growth of scar tissue. The researchers will use the string test to look for biomarkers of the changes that characterize the disease.

CURED awarded the team an unrestricted gift for research to investigate pathogenic mechanisms in eosinophilic esophagitis and related gastrointestinal diseases. CURED has raised more than \$1.4 million over the past five years, most recently as the beneficiary charity of the annual Highland Park (Ill.) High School fund-raising event, which raised \$500,000 this year.

The investigators are also planning a proteomics study that will measure all the proteins on the string to develop a more complete diagnostic profile of the disease, Ackerman said.

"These grants present us with an exciting opportunity to increase our understanding of this difficult, newly emerging disease, which has increased in detection, and also possibly in incidence."

Source: University of Illinois at Chicago

Citation: String probes for devastating childhood digestive disease (2008, July 30) retrieved 20 April 2024 from <https://medicalxpress.com/news/2008-07-probes-devastating-childhood-digestive-disease.html>

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