POLSKY Center for Entrepreneurship and Innovation
THE UNIVERSITY OF CHICAGO

PEG-phosphate Compound for the Prevention of Anastomotic Leaks after Gastro-Intestinal Surgery

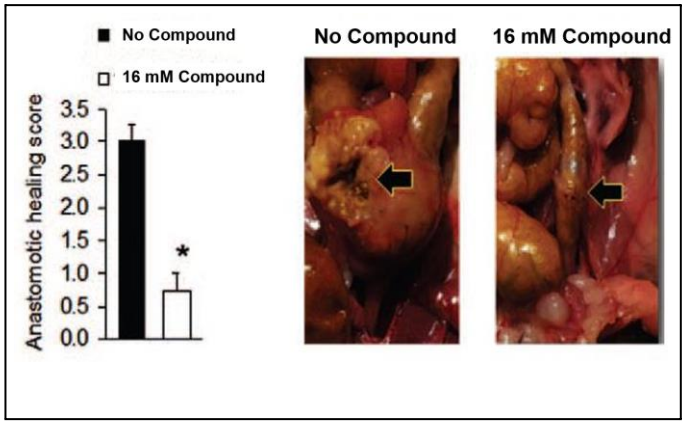
SUMMARY
Despite the refinement in surgical techniques, the development of ergonomic stapling devices, and the specialization of surgeons in gastrointestinal procedures, anastomotic leak remains a post-surgical problem. By applying a polyethylene glycol (PEG)-phosphate compound to the surgical wound, incidence of anastomotic leaks is significantly reduced.

KEY RESULTS
In a mouse model of colorectal anastomosis, Dr. Alverdy and his team compared wound healing and incidence of anastomotic leaks in groups that were given PEG-phosphate compounds or no compound. Mice that received PEG-phosphate had improved wound healing, reduced anastomotic leaks, and reduced infections by pathogenic gut bacteria.

ADVANTAGES
- Improved surgical outcomes.
- Inhibits intestinal bacteria.
- Maintains healthy microbiome.
- Consistent with existing patient preparation.
- Reduce need for antibiotics.
- Easy oral delivery route.

APPLICATIONS
- Pre-surgery patient preparation.
- Post-suture delivery.

PEG-phosphate compounds promote wound healing after surgery.



Administration of PEG-phosphate compounds promotes healing at the site of surgery as noted by the lower anastomotic healing score compared to no compound. Arrows indicate surgical site.

TECHNICAL DESCRIPTION
The most feared complication following intestinal or esophageal resection is anastomotic leakage despite improved surgical techniques and surgical healing products. Commensal intestinal microbes, such as *Pseudomonas aeruginosa, Serratia marcescens*, or *Enterococcus faecalis* are frequently the cause of infection in hospitalized patients following surgery. These microbes are naturally found in a benign state in the gut, but can become virulent in certain conditions such as surgical trauma, which prevent successful wound healing, leading to anastomotic leaks.

Dr. Alverdy and his team have expertise in the cause and progression of anastomotic leak. They have demonstrated that providing a PEG-phosphate prior to intestinal trauma suppressed microbial virulence and prevented the development of anastomotic leaks in mouse models. PEG-phosphate signals to the bacteria to remain in a benign state, thus supporting a healthy gut environment. The simple administration of PEG-phosphate prior to surgery would, not only prevent anastomotic leaks, but also maintain a healthy gut that is often disrupted by antibiotics given pre- and post-surgery.

REFERENCE
UCHI 2630, 2152

DEVELOPMENT STAGE
Pre-clinical

THERAPEUTIC AREAS
Intestinal/Esophageal Surgical Intervention
Pre-surgery preparation

PUBLICATION
Hyoju et al., 2017
Mao et al., 2017

INTELLECTUAL PROPERTY
US 14/421762
And Provisional Patent Pending

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Dr. John Alverdy is the Executive Vice-Chair of the Department of Surgery at the University of Chicago. He is a practicing clinician specializing in gastrointestinal surgery and a scientific founder of Midway Pharmaceuticals, Inc.

Matthew Tirrell is the Founding Pritzker Director of the Institute for Molecular Engineering (IME) at The University of Chicago. His personal research specializes in the manipulation and measurement of polymer surface properties.

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