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## Microbial association with esophageal adenocarcinoma and reflux disorders

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For unclear reasons, the incidence of esophageal adenocarcinoma (EA) arising out of Barrett's esophagus (BE) and reflux esophagitis (RE) has risen more than 600% in the United States since the 1970s. Although specific host factors might predispose one to disease risk, such rapid increase in incidence must be predominantly environmental. The widespread use of antibiotics since 1950s could have contributed to this drastic change. Antibiotic exposure prior to 1980s could have unintentionally eradicated *Helicobacter pylori* which plays a protective role against EA, BE and RE. Both human and animal studies suggest that exposure to antibiotics changes the colonic microbiome in favor of obesity. Case control studies showed microbiome is altered in the distal esophagus in patients with reflux disorders including EA. The microbiome in esophageal diseases is more diversified than in controls. This effect is not only seen in the esophagus but also observed in the mouth and stomach. Overall, esophageal diseases tend to be associated with depletion of Gram-positive bacteria and enrichment of Gram-negative bacteria. The relative abundance of *Streptococcus*, the most abundant Gram-positive bacteria in the foregut, tends to decrease along the disease progression from normal to reflux, Barrett's esophagus and adenocarcinoma in both the mouth and esophagus. Microbiome alteration often extended to the mouth and sometimes to the stomach and rectum. The altered microbiome could play a more direct role in the initiation and progression of reflux disorders than *H. pylori* or obesity by *in situ* induction of chronic inflammation and/or activation of carcinogens.

### Biography

Zhiheng Pei has obtained his PhD in Microbiology and Immunology and did Residency in Anatomic Pathology and Fellowship in Molecular Pathology at Vanderbilt University School of Medicine. He is currently a tenured Associate Professor of Pathology at New York University School of Medicine and Staff Physician at the Department of Veterans Affairs New York Harbor Healthcare System. He has been evaluating and pioneering a new concept microecological disease in several NIH-sponsored projects involving cancers in the mouth, esophagus and stomach as well as disease in tonsils.

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