Foodborne pathogens are very common and usually benign, but certain virulent strains of pathogens can result in severe disease and even death. Distinguishing specific strains of pathogens can help scientists better understand them and develop biomarkers to help detect them in patients, expediting diagnosis and treatment.

University at Buffalo researchers have now completed the genomic analysis of a specific strain of Shiga-toxin E. coli (STEC) that can cause severe disease outbreaks and is increasingly common. The research could play a role in expanding the understanding of STEC infections and, potentially, in developing vaccines against them.

According to the Centers for Disease Control and Prevention, STEC are estimated to cause more than 265,000 infections per year in the U.S., and are associated with more than 3,600 hospitalizations and approximately 30 deaths.
The findings reveal how this emerging STEC causes severe disease and that it may be as virulent, or even more virulent, than more common STEC strains, leading to severe and even deadly disease in susceptible hosts," he said. "It also provides information on how this potentially preventable infection continues to affect vulnerable individuals."

**Virulence genes**

A key finding of the study, he said, was that this 0145:H25 serotype leads to particularly severe infection. Moreover, in addition to carrying virulence genes present in 0157 STEC, it has additional genes and new potential virulence genes as compared to other non-0157 strains that have been studied. "These findings deserve further analysis to understand the pathogenesis of these emergent STEC infections," said Gómez-Duarte.

The analysis was conducted through a collaboration between the Department of Pediatrics researchers and colleagues at UB’s New York State Center of Excellence in Bioinformatics and Life Sciences, whose expertise in bioinformatics and whole genome sequencing analysis allowed the team to uncover the genetic information critical to understanding where these strains are derived from and how they may be traced to unique reservoirs, such as contaminated food products or infected livestock.

Gómez-Duarte is an expert in infectious gastrointestinal diseases and diarrhea in children. He established a global health research program, the International Enteric Vaccines Research Program (IEVRP), dedicated to studying the epidemiology, pathogenesis and vaccine development of childhood gastrointestinal infections within the U.S. and abroad. He has also conducted vaccine development research for pediatric infectious diseases.


Provided by University at Buffalo