

Researchers identify structure of bacteria responsible for traveler's diarrhea

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Researchers at Boston University School of Medicine (BUSM), the Naval Medical Research Center and the National Institutes of Health, have solved the structure of thin hair-like fibers called "pili" or "fimbriae" on the surface of bacteria that cause traveler's diarrhea. The findings, appear in the June issue of the *Proceedings of the National Academy of Sciences*, and have important implications for creating better therapeutics against diarrheal diseases.

According to the World Health Organization, enterotoxigenic Escherichia coli (ETEC) bacteria causes the largest number of recorded community-acquired cases of childhood diarrhea in the developing world, and is the most common culprit in traveler's diarrhea.

ETEC uses surface "pili" or "fimbriae" to attach to host intestinal epithelia, an early, vital step in <u>diarrhea</u> pathogenesis. These fibers are essential for initiation of infection in the intestines by ETEC. According to the researchers, this study elucidates the mechanics of assembly of the fimbriae helical fibers as they exit the bacterium through a pore on the bacterial surface.

"Atomic resolution detail of the proteins in the fibers and analysis of genetic variability among different clinical strains were combined to show that each bacterial strain presents a different outer surface of the major protein while preserving the protein components that are buried within the fiber," said senior author Esther Bullitt, an associate professor in the department of physiology and biophysics at BUSM. "Because of



this, the antibodies produced against ETEC during one episode of infection are often not protective against later infections by other strains," she added.

As a result of this new study, the researchers believe that developing a cross-protective vaccine will require a strategy that focuses on use of the tip protein as an antigen. "The structural findings reported here have bearing on research to help guide vaccine development."

Source: Boston University Medical Center

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