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Researchers identify components in C. diff that may lead to better treatment

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Rhode Island Hospital researchers have identified components in *Clostridium difficile* (*C. diff*) that may lead to new diagnostic tools, and ultimately more timely and effective treatment for this often fatal infection. *C. diff* is a spore-forming bacterium that causes severe diarrhea and is responsible for 14,000 deaths annually in the U.S. The study is published online in advance of print in the *Journal of Molecular Diagnostics*.

In this study, researchers identified components of the *C. diff* bacteria that can be used to develop a rapid diagnostic test to determine if a patient with a diarrheal illness has *C. diff* infection and, if so, if the infection is due to a hypervirulent strain of this bacterium. Such a determination may lead to more rapid initiation of appropriate antibiotics in infected patients with the hope of improving their outcome.

"*C. diff*icle can be a life-threatening infection," said Leonard Mermel, D.O., medical director of the department of epidemiology and infection control at Rhode Island Hospital. "We believe that rapid identification of this bacterium will assist in timely initiation of antimicrobial therapy and admission to a setting where the patient is more appropriately observed based on his or her signs, symptoms and strain of bacteria causing the infection."

The technology revealed in this study can be integrated as a point-of-care device to help quickly detect and identify *C. diff* strains that pose

significant health threats in hospitals and other health care settings.

According to the Centers for Disease Control and Prevention, the most serious *C. diff* cases are in the elderly and individuals with certain medical problems. *C. diff* spores can live outside the human body and may be transferred to bed linens, bed rails, bathroom fixtures and medical equipment, and other areas in the infected person's environment.

The incidence of *C. diff* has been on the rise and is increasing in severity and mortality in the U.S. and Europe. The cost of treating *C. diff* in the U.S. in 2008 topped $4 billion; and in 2006-07 it was responsible for an estimated 14,000 deaths in the U.S.

"With the emergence of a more severe *C. diff* strain (NAP1/027/B1), there is an urgent need for a highly sensitive and rapid method of detection and strain typing," Mermel said.

Current methods of diagnosing *C. diff* include stool cultures, toxin testing, enzyme immunoassays and polymerase chain reaction. While often effective, they may be impractical for use in an urgent care setting or emergency department where patients are presenting with gastrointestinal symptoms "The assay we have developed has the potential to quickly and accurately indicate the presence of specific markers of certain hypervirulent strains of *C. diff*," Mermel said. "We're confident this will lead to more timely, accurate diagnosis and treatment, with the hope that fewer patients will develop serious complications from this infection."

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