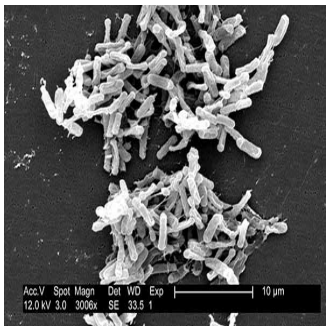
ICU
MANAGEMENT & PRACTICE

DNA Vaccine For C. Difficile



A recent research published in *Infection and Immunity* talks about an experimental vaccine that was able to protect 100% of animal models against Clostridium difficile, a highly infectious and virulent bacterium. This bacterium causes an intestinal disease that kills nearly 30,000 Americans annually. C-difficile associated disease (CDAD) is caused mainly by the antibiotic disruption of the gastrointestinal microflora followed by an overgrowth of C. difficile. The disease is mediated by the effects of two secreted toxins, toxin A (TcdA) and toxin B (TcdB).

Patients who get infected by C. difficile often develop serious complications such as severe diarrhoea, bowel perforation, toxic megacolon, multi-organ failure and even death. In most cases, the onset of disease symptoms from C. difficile occurs within ten to fourteen days.

Half a million C. difficile infections occur annually in the US and the cost of fighting these infections is approximately $10 billion a year. Both morbidity and mortality associated with this bacterium have been increasing over the last decade. It is thus important to develop a prophylactic treatment that can prevent the toxin-mediated cytopathology. A short vaccination regimen that could boost through either immunisation or natural infection would be ideal to prevent the onset of CDAD in high-risk patients.

Treatment of disease by C. difficile infections is especially difficult since the bacterial spores persist in the hospital environment. Most infections occur in such a setting. Moreover, since there is no standard or effective treatment for recurrent disease, there is a definite need to develop an improved therapy.

This particular research experiment was conducted with mice and non-human primates. The animal models were immunised intramuscularly followed by in vivo electroporation. The results indicated that the vaccine successfully protected the animals against the purified toxins of C.difficile. The animals were also protected from an orogastric spore infection, a laboratory model that mimicked the human disease. This protection was achieved after only two immunisations.

According to Michele Kutzler, a corresponding author from the Druxel University College of Medicine, Philadelphia, "Animals that received two immunisations did not get sick or show signs of C. difficile-associated disease."

This study demonstrates that once fully developed, this vaccine has the potential to prevent these effects and protect patients from the consequences of C. difficile.

The new vaccine works against C.difficile by mustering anti-toxin neutralizing antibodies. During this study, it was shown to be safe and effective after only two immunisations. The overall performance of the vaccine was excellent and the positive results indicate that further studies should be conducted with human patients to study the vaccine further as it could play an important role in the prevention and treatment of C.difficile associated disease.

Source: American Society for Microbiology
Image Credit: Wikimedia Commons

Published on : Tue, 5 Aug 2014