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Scientists funded by the Medical Research Council (MRC) and working at the University of Nottingham have confirmed that both toxin A and toxin B - the two main toxins responsible for the healthcare-associated infection *Clostridium difficile* (*C. difficile*) - can cause the disease independently of each other. This discovery has major implications for the diagnosis of *C. difficile* as well as for the development of new vaccines and drugs for patients.

This study counters previous results published in *Nature* in 2009 which proposed that toxin A alone could not cause *C. difficile* infection. By re-creating the equivalent strains of *C. difficile* which were used in the 2009 study, researchers led by Professor Nigel Minton have confirmed that both toxins working independently or together can prove deadly.

This knowledge is vital for researchers and industry partners developing tests for diagnosis, new vaccines and drugs to prevent and treat *C. difficile*, as it demonstrates that both toxins should be treated as significant. In light of this study, researchers who have been developing tests over the last 12 months to diagnose *C. difficile* by targeting toxin B alone may need to re-evaluate their strategy in order to curb infection effectively.

Clostridium difficile is the most significant cause of healthcare-associated diarrhoea in Europe and North America and is five times more deadly than *Methicillin-resistant Staphylococcus aureus* (MRSA).

Professor Nigel Minton, head of the Clostridia Research Group at the University of Nottingham, said:

"For many years, scientists have worked towards settling on whether toxin A or toxin B is the ringleader that causes fatalities in Clostridium difficile. In our research we were able to show that a mutated C. difficile strain which produced only toxin A could prove deadly. However, our results do still bear out that the mutant strain producing toxin B alone does cause the disease to be more severe. As a conclusion, we strongly believe that new strategies to improve the management of this disease should target both bacterial toxins."

Basic science linking laboratory-based knowledge to clinical investigation is crucial in delivering discoveries that guide the development of new treatments or medical practices. The MRC invests strongly in basic and other research on natural mechanisms that protect the body against disease.

The role of toxin A and toxin B in Clostridium difficile infection is published online today in *Nature*.

Ends

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Notes to editors:

1. *Toxin B is essential for the virulence of Clostridium Difficile* published 2009 is available from *Nature*.

2. For almost 100 years the Medical Research Council has improved the health of people in the UK and around the world by supporting the highest quality science. The MRC invests in world-class scientists. It has produced 29 Nobel Prize winners and sustains a flourishing environment for internationally recognised research. The MRC focuses on making an impact and provides the financial muscle and scientific expertise behind medical breakthroughs, including one of the first antibiotics penicillin, the structure of DNA and the lethal link between smoking and cancer. Today MRC funded scientists tackle research into the major health challenges of the 21st century. www.mrc.ac.uk

3. The University of Nottingham, described by *The Times* as Britain's 'only truly global university', has award-winning campuses in the United Kingdom, China and Malaysia. It is ranked in the UK's Top 10 and the World's Top 75 universities by the Shanghai Jiao Tong (SJTU) and the QS World University Rankings.

The University is committed to providing a truly international education for its 39,000 students, producing world-leading research and benefiting the communities around its campuses in the UK and Asia.

More than 90 per cent of research at The University of Nottingham is of international quality, according to the most recent Research Assessment Exercise, with almost 60 per cent of all research defined as 'world-leading' or 'internationally excellent'. *Research Fortnight* analysis of RAE 2008 ranked the University 7th in the UK by research power.

The University's vision is to be recognised around the world for its signature contributions, especially in global food security, energy & sustainability, and health.

