Scientists go into battle to disarm superbug

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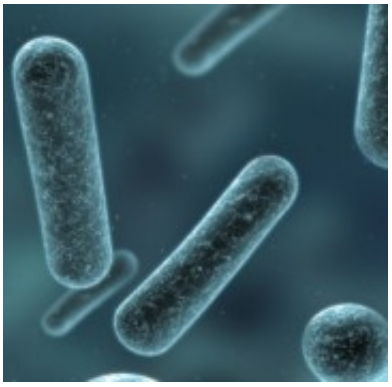

(PhysOrg.com) -- Two recent pieces of research from Imperial College London reveal new ways of tackling the armour and weapons of Clostridium difficile, the ‘superbug’ that causes severe infections in hospital patients and the elderly.

C. difficile is a bacterium that can cause severe gut infections in humans, particularly in those taking antibiotics. Some strains of *C. difficile* are resistant to treatment with most antibiotics, earning them the name ‘superbugs’.

C. difficile infection is a major problem in healthcare settings and scientists are taking different approaches to tackling the problem. At Imperial, two of the groups involved in this work have published their research this month: one targets the bacterium’s protective coat and the

other investigates its toxin.

The antibiotic resistance of C. difficile is helped by a thick protein coat that functions as protective armour. In the current issue of ACS Chemical Biology, Imperial researchers announce their discovery of a chemical that interferes with the formation of this protein coat. The team, led by Dr Ed Tate from the Department of Chemistry, hopes this chemical could ultimately be developed into a drug to block the formation of the coat, leaving the way open for antibiotics to attack C. difficile.

As well as its armour, C. difficile has a potent weapon: protein toxins. These toxins, which cause the symptoms of disease in infected patients, are each made up of four molecular parts. Until now, scientists have known relatively little about the way these pieces fit together.

Professor Neil Fairweather, Dr Kate Brown and their postdoctoral researcher Dr David Albesa-Jové from the Department of Life Sciences at Imperial, reveal this in the 3D structure of the toxin, published in the current issue of the *Journal of Molecular Biology*. By understanding how these pieces fit together, the researchers hope it may be possible in the future to design vaccines to target the toxin.

More information:

1. "Chemical Probes of Surface Layer Biogenesis in Clostridium difficile" *ACS Chemical Biology*, March 2010 issue

2. "Four Distinct Structural Domains in Clostridium difficile Toxin B Visualized Using SAXS" *Journal of Molecular Biology*, March 2010 issue

Provided by Imperial College London