**Push hard on bacterial cells to fight drug-resistant superbugs: Study**

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A new research found that despite superbugs getting resistant to antiobiotics, if pushed hard against bacterial cells, they can still beat the bug.

Antibiotics can still kill superbugs if they ‘push’ hard enough into bacterial cells, according to a new research that paves the way for new therapies against antibiotic resistance.

Researchers from University College London (UCL) in the UK used sensitive equipment to measure the mechanical forces that four different antibiotics exerted on bacterial cells.

“Antibiotics work in different ways, but they all need to bind to bacterial cells in order to kill them,” said Joseph Ndieyira from UCL.

“Antibiotics have ‘keys’ that fit ‘locks’ on bacterial cell surfaces, allowing them to latch on. When a bacterium becomes resistant to a drug, it effectively changes the locks so the key won’t fit any more,” said Ndieyira.

“Incredibly, we found that certain antibiotics can still ‘force’ the lock, allowing them to bind to and kill resistant bacteria because they are able to push hard enough. In fact, some of them were so strong they tore the door off its hinges, killing the bacteria instantly,” Ndieyira added.

The researchers tested bacteria that were susceptible to antibiotics and those that had developed resistance. The antibiotics all exerted similar forces on susceptible bacteria, but the forces they exerted on resistant bacteria varied significantly.

The antibiotics tested included vancomycin, a powerful antibiotic used as a last resort treatment for MRSA and other infections and oritavancin, a modified version of vancomycin used against complex skin infections.

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“We found that oritavancin pressed into resistant bacteria with a force 11,000 times stronger than vancomycin,” said Ndieyira.

“Even though it has the same ‘key’ as vancomycin, oritavancin was still highly effective at killing resistant bacteria,” said Ndieyira.

“Until now it was not clear how oritavancin killed bacteria, but our study suggests that the forces it generates can actually tear holes in the bacteria and rip them apart,” Ndieyira added.

Oritavancin is a fast-acting antibiotic that can kill bacteria in 15 minutes, whereas vancomycin takes 6-24 hours.

Vancomycin works by disrupting vital processes in bacteria so they slowly stop functioning and die.

Although oritavancin is a modified version of vancomycin, the new study suggests that it kills bacteria in a completely different way.

The team developed a detailed mathematical model to describe how antibiotics behave at the surface of bacterial cells. The model could be used to screen promising new antibiotics, identifying new drugs that can kill bacteria by using brute force.

“Our findings will help us not only to design new antibiotics but also to modify existing ones to overcome resistance,” said Ndieyira.

The study was published in t