

The sting in the tail: Chance finding could lead to new antibiotics

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(Phys.org) —A whole new class of antibiotics could be possible after a chance discovery by academics at Newcastle University.

In a paper published in the journal *Molecular Microbiology*, the team describe how they were studying a protein derived from E.coli bacteria, called Colicin N, which kills competing bacteria in a very efficient way. Just one molecule of this protein can kill a whole cell.

As part of their investigations, researchers divided the [protein](#) into three parts: a receptor, which helps the protein lock-on to the bacteria; a toxic part that punches holes in the membrane of the bacteria to kill it; and a 'tail-like' part. The 'tail' was thought to help the protein sneak into the cell but assumed to be harmless to the bacteria itself.

They wanted to see what effect each part of the protein would have on E.coli bacteria. Amazingly when they introduced the translocation 'tail' into the environment of the bacteria, it killed them.

The discovery, that such a simple part of a protein can kill a bacteria, could mean that new antibiotics derived from this part could be developed. One of the existing stumbling blocks to the development of new protein based [antibiotics](#) is their complicated structure.

Professor of Structural Biochemistry at Newcastle University's Centre for Bacterial Cell Biology, Jeremy Lakey, who leads the research team that made the breakthrough, said: "The beauty of this is that the 'tail' of the protein is very simple and it will be relatively easy to make [new](#)

[antibiotics](#) out of it. Using the whole protein would just be too complicated."

But the research, which was funded by the Wellcome Trust, is still in its early days, as Professor Lakey explains: "It's an early stage basic discovery and it kills bacteria by a new and as yet unknown mechanism, so we need to do a lot more work to discover exactly what is happening here and whether it could be used for [new drugs](#). But it is unlike anything I have seen before and one of the most exciting things I have seen in 30 years research on antibacterials."

Antibiotics have saved millions of lives across the world but recently several world experts have warned that over use of them has lead to bacteria developing immunity and the drugs becoming ineffective. This has the potential to leave us vulnerable to disease and infection. By targeting only E. coli-like bacteria, the new molecule shows promise in combatting an increasingly important class of antibiotic resistant infections.

Dr Chris Johnson, the researcher who made the key discovery, said: "When I saw what had happened I didn't believe it. So we repeated it several times and the same thing happened, the [bacteria](#) died. This was certainly a result that we weren't expecting. We don't really know how this is all working so we will be looking at this in much more detail but it looks promising."

Provided by Newcastle University

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