

New weapon against highly resistant microbes within grasp

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An active compound from fungi and lower animals may well be suitable as an effective weapon against dangerous bacteria. We're talking about plectasin, a small protein molecule that can even destroy highly resistant bacteria. Researchers at the Universities of Bonn, Utrecht, Aalborg and of the Danish company Novozymes AS have shed light on how the substance does this. The authors see plectasin as a promising lead compound for new antibiotics.

These results will be published in *Science* journal on 28th May.

More and more [bacteria](#) are becoming resistant to normal antibiotics. This is especially true for the methicillin-resistant [Staphylococcus aureus](#) (MRSA). Most of the pharmaceutical weapons are now useless against these MRSA strains . According to estimates, as many as every second patient in the USA treated by intensive-care medicine comes down with an MRSA infection.

Plectasin could shift the balance of power back in the doctors' favour. But how exactly does the little [protein molecule](#) do that? The Bonn researchers in Dr. Tanja Schneider and Professor Hans-Georg Sahl's team have answered these questions together with Danish and Dutch colleagues. Thus plectasin disrupts the forming of the cell wall in bacteria so that the pathogens can no longer divide.

Theft at the bacteria's construction site

In this process, plectasin behaves like a thief which steals the stones off a mason. 'It binds to a cell-wall building block called lipid II and thus prevents it from being incorporated ,' Professor Sahl explains. 'However, bacteria cannot live without a cell wall.' It comes as no surprise that the most famous antibiotic penicillin also inhibits cell-wall synthesis.

Yet plectasin is more similar in its mode of action to another widely used drug, vancomycin. Vancomycin had been the drug of choice in combating [MRSA](#) strains since the 1980s. Meanwhile, though, there are more and more bacteria that are also resistant to [vancomycin](#). 'However, these strains are still susceptible to plectasin,' Dr. Tanja Schneider emphasises. Nevertheless, there is no permanent solution to the resistance problem even with a new antibiotic . 'It is always just a question of time until the pathogens mutate and become insensitive ,' she says. 'It's a never ending arms race.'

Plectasin belongs to the class of defensins. These defence molecules are widespread among fungi, animals and also plants. Humans, for example, produce defensins on their skin and in this way nip infections in the bud. 'Defensins not only kill pathogens but also alert the immune system', Dr. Hans-Henrik Kristensen from the Danish company Novozymes AS explains. 'So the pharmaceutical industry is setting its hopes on them.'

Provided by University of Bonn

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