



Press Release

A potential lifesaver lies unrecognized in the human body

Tübingen researchers have discovered that bacteria from the human nose produces a novel antibiotic which is effective against multiresistant pathogens

Tübingen, 27 July 2016

A potential lifesaver lies unrecognized in the human body: Scientists at the University of Tübingen and the German Center for Infection Research (DZIF) have discovered that *Staphylococcus lugdunensis* which colonizes in the human nose produces a previously unknown antibiotic. As tests on mice have shown, the substance which has been named Lugdunin is able to combat multiresistant pathogens, where many classic antibiotics have become ineffective. The research results will be published on 27 July in the scientific journal Nature.

Infections caused by antibiotic-resistant bacteria – like the pathogen *Staphylococcus aureus* (MRSA) which colonizes on human skin – are among the leading causes of death worldwide. The natural habitat of harmful *Staphylococcus* bacteria is the human nasal cavity. In their experiments, Dr. Bernhard Krismer, Alexander Zipperer and Professor Andreas Peschel from the Interfaculty Institute for Microbiology and Infection Medicine Tübingen (IMIT) observed that *Staphylococcus aureus* is rarely found when *Staphylococcus lugdunensis* is present in the nose.

“Normally antibiotics are formed only by soil bacteria and fungi,” says Professor Andreas Peschel. “The notion that human microflora may also be a source of antimicrobial agents is a new discovery.” In future studies, scientists will examine whether Lugdunin could actually be used in therapy. One potential use is introducing harmless Lugdunin-forming bacteria to patients at risk from MRSA as a preventative measure.

Researchers from the Institute of Organic Chemistry at the University of Tübingen closely examined the structure of Lugdunin and discovered that it consists of a previously unknown ring structure of protein blocks and thus establishes a new class of materials.

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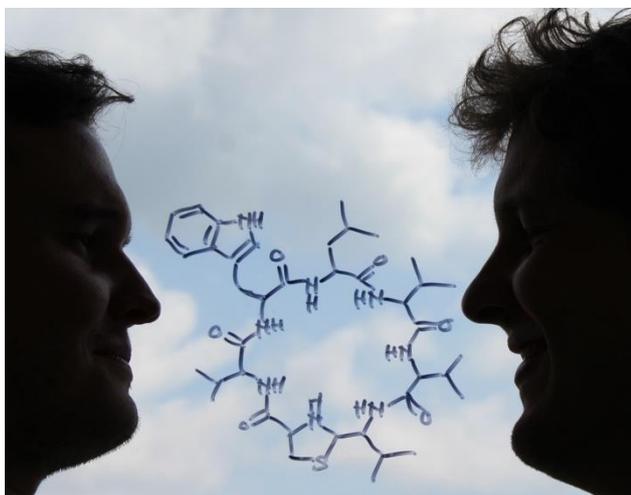
Antibiotic resistance is a growing problem for physicians. "There are estimates which suggests that more people will die from resistant bacteria in the coming decades than cancer," says Dr. Bernhard Krismer. "The improper use of antibiotics strengthens this alarming development" he continues. As many of the pathogens are part of human microflora on skin and mucous membranes, they cannot be avoided. Particularly for patients with serious underlying illnesses and weakened immune systems they represent a high risk – these patients are easy prey for the pathogens. Now the findings made by scientists at the University of Tübingen open up new ways to develop sustainable strategies for infection prevention and to find new antibiotics – also in the human body.

Publication:

Alexander Zipperer, Martin C. Konnerth, Claudia Laux, Anne Berscheid, Daniela Janek, Christopher Wicker Maier, Marc Burian, Nadine A. Schilling, Christoph Slavětínský, Matthias Marschal, Matthias Willmann, Hubert Kalbacher, Birgit Schitteck, Heike Brötz Oesterhelt, Stephanie Grond, Andreas Peschel & Bernhard Krismer: Human commensals producing a novel antibiotic impair pathogen colonization. *Nature*, 27 July 2016. doi:10.1038/nature18634

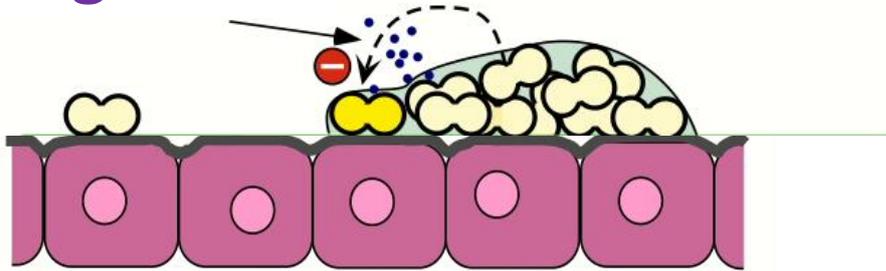
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The chemical structure of newly discovered antibiotic Lugdunin. Also in the photograph: the two lead authors Alexander Zipperer (left) and Martin Christoph Konnerth (right). Photograph: Martin Christoph Konnerth

Lugdunin



Graphic demonstrating the function of Lugdunin. *Staphylococcus lugdunensis* (white) colonize on human nasal epithelial cells (pink) and combat the *Staphylococcus aureus* pathogen (yellow) by producing Lugdunin. Graphic: Professor Andreas Peschel