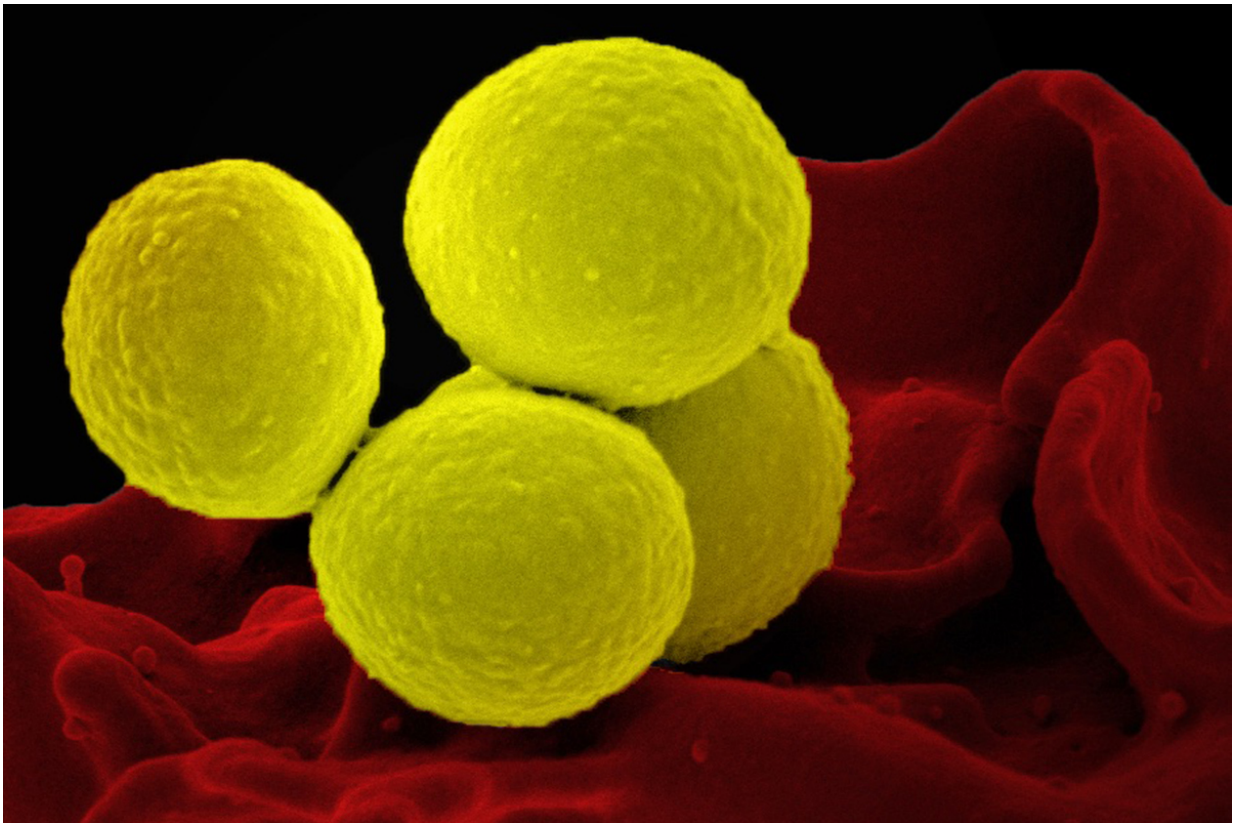


Scientists decipher a mechanism in serious skin infections

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Staphylococcus aureus, in yellow, interacts with a human white blood cell.
Credit: National Institute of Allergy and Infectious Disease

Staphylococcus aureus is one of the most feared, multi-resistant pathogens. The bacterium often causes life-threatening infections,

particularly in people with a weakened immune system. During the last few years, especially aggressive strains of *S. aureus* have appeared around the globe, known as so-called "Community-Associated Methicillin-Resistant *Staphylococcus aureus*" or CA-MRSA, and they can even trigger serious infections in the skin and tissue of healthy people. Scientists from the Interfaculty Institute of Microbiology and Infection Medicine, Tübingen (IMIT) and the German Center for Infection Research (DZIF) have been able to decipher an important mechanism in the occurrence of this infection. The results were published in the *Nature Microbiology* specialist journal on Monday.

The group of scientists has been able to demonstrate that CA-MRSA strains can change their outer cell envelope by inserting increasing amounts of a long-chain sugar polymer, the cell wall teichoic acid. "It's well-known that CA-MRSA strongly increases the secretion of toxins, which plays a major role in the serious progression of [skin infections](#)," said Dr. Christopher Weidenmaier, the head of the research group. "We've now also been able to prove that the increased insertion of the sugar polymer into the cell envelope creates a change in the immune reaction in the case of skin infections. This," he added, "increased the ability of these aggressive bacteria to cause particularly serious skin infections in animal experiments. However, additional research is required to determine if the results also hold true in humans.

The authors were in a position to more precisely decipher the molecular mechanisms that underlie the modification in the cell envelope. This will open up the possibility of deliberately preventing the modification process in serious skin infections caused by CA-MRSA strains in the future. "This kind of therapeutic approach would give the human immune system the chance to combat the infection more efficiently itself," Weidenmaier said. These so-called anti-virulence strategies have been increasingly explored in recent times; in this case, the pathogen itself is not attacked, but its pathogenic effect. "In contrast to classic

antibiotic treatment, an anti-virulence strategy should lead to lower resistance rates," the scientist explained. "Because the bacterial cell is not killed off or inhibited in its growth, it is subject to less evolutionary pressure."

More information: Stefanie Wanner et al. Wall teichoic acids mediate increased virulence in *Staphylococcus aureus*, *Nature Microbiology* (2017). [DOI: 10.1038/nmicrobiol.2016.257](https://doi.org/10.1038/nmicrobiol.2016.257)

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