CENTER FOR NEUROSCIENCE
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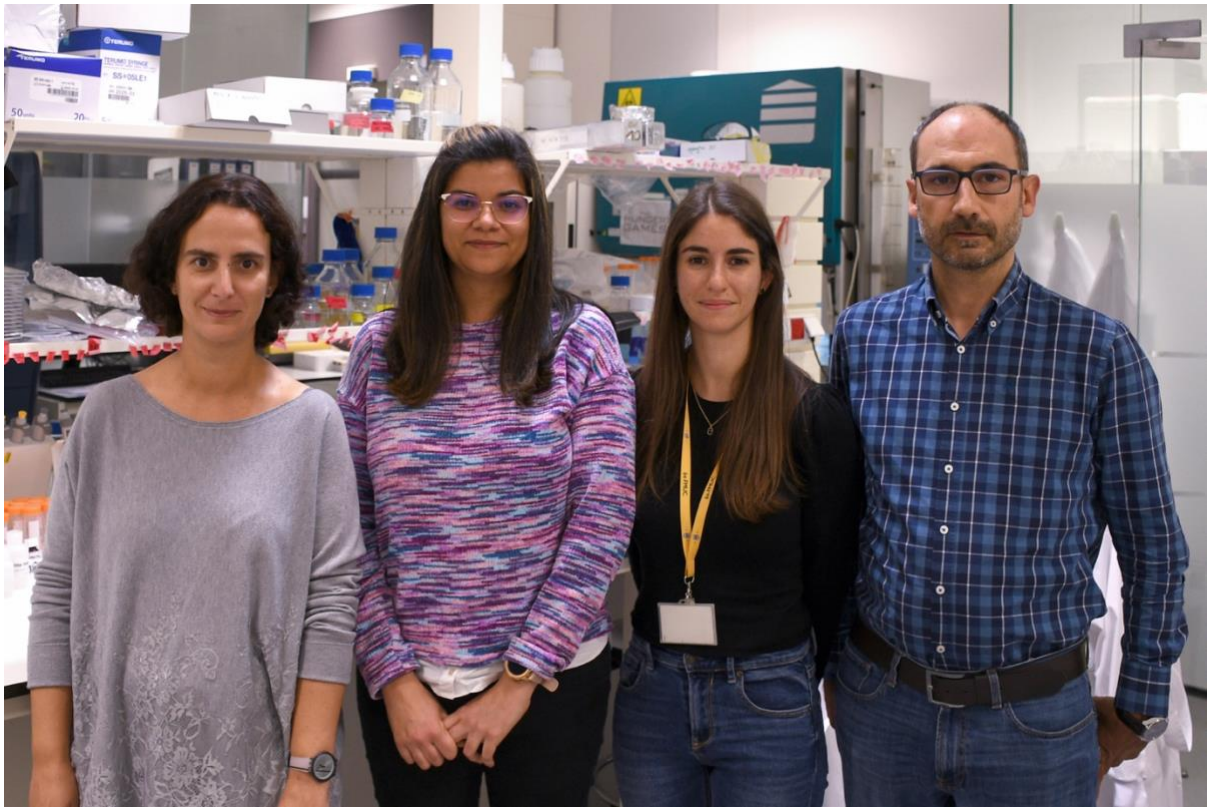
Study coordinated by the University of Coimbra suggests a paradigm shift in the treatment of infection by the bacterium *Staphylococcus aureus*



A new study led by scientists from the Center for Neurosciences and Cell Biology at the University of Coimbra (CNC-UC), now published in the scientific journal Nature Communications , reveals that the bacteria *Staphylococcus aureus* (*S. aureus*) has a predominant intracellular lifestyle (inside the host cell), , which may justify the change in clinical criteria for choosing antibiotics against this bacterium.

S. aureus it is a bacterium often found on the skin and in the nasal passages of healthy people. However, it can cause diseases ranging from simple skin infections (abscesses, cellulitis) to more serious infections, such as pneumonia, endocarditis, bacteremia (blood infection), among others.

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Multi-antibiotic-resistant bacteria are becoming more common, making the treatment of bacterial infections seriously difficult. *S.* aureus is a bacterium that is resistant to several antibiotics and is currently the second most common cause of death associated with antimicrobial resistance worldwide and the first in Portugal.

The study presents a large-scale analysis of 191 clinical isolates of *S. aureus* from patients with osteomyelitis (bone infection), infectious arthritis, *bacteremia* and endocarditis, and their interaction with various types of host cells (target cells of the bacteria) over time. This study reveals «**that although *S. aureus* is normally described as an extracellular pathogen, almost all of the clinical isolates of *S. aureus* tested in this study (over 98%) were internalized by various types of host cells, in context laboratory. It has also been proven that a large number of these isolates are capable of replicating and persisting inside host cells**», explains Miguel Mano, one of the leaders of the study, (researcher at CNC-UC and professor at the Department of Life Sciences at the Faculty of Sciences and Technology from the University of Coimbra – FCTUC).

The results of this work support the need for a paradigm shift in the treatment of *S. aureus* infections. «**The choice of therapy to effectively eliminate this pathogen should consider not only the bacteria's susceptibility profile to antibiotics, as is currently done, but also the different intracellular lifestyles of *S. aureus* The chosen therapy should ensure its elimination inside the cells, as the lack of intracellular effect of antibiotics can lead to treatment failure, resulting in recurrent and/or chronic infections**», explains Ana Eulálio, leader of this study (researcher at CNC-UC and iBiMED , University of Aveiro).

This work was carried out in collaboration with researchers from the International Center for Research in Infectious Diseases (CIRI) (Lyon, France), National Reference Center for Staphylococci, Institute of Infectious Agents (Lyon, France) and Center for Biotechnology, National Research Council of Spain (CNB-CSIC) . It benefited from funding through the

Foundation for Science and Technology (FCT), the ERA-NET Infect -ERA Consortium and the European Horizon 2020 Marie Sklodowska -Curie .

The complete study is available here.

Carolina Caetano & Sara Machado

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