

University of Coimbra scientists' study tick-borne bacteria



A team of researchers from the Center for Neuroscience and Cell Biology of the University of Coimbra (CNC-UC) discovered how *Rickettsia*, a bacterium responsible for diseases like Bontonneuse fever, manages to escape our immune system. This discovery opens the door to the development of new therapeutics against infectious diseases.

Contrary to what most people think, tickborne diseases are caused by the microorganisms carried by ticks and not by ticks themselves. *Rickettsia* species are one of the bacteria that can be found in parasites such as ticks, fleas, or lice, and that can be transmitted to humans through its bite. Currently, climate change favors these parasites, as the increase in global temperature allows them to be active longer during the year. As a result, there is a greater geographic dispersion of parasites that can carry bacteria that are dangerous to human health.

To understand how these bacteria, invade and infect our organism, Pedro Curto and Isaura Simões, researchers at CNC-UC, studied a protein present at the surface of *Rickettsia*, the

APRc. «**After being bitten by an infected tick, *Rickettsia* enters the bloodstream where it will be exposed to all the machinery of our immune system. At this point, the bacteria's priority will be to protect itself and enter our cells at all costs, as their survival and capacity of infection depend on it**», explains Pedro Curto, first author of the study.

«**Infectious microorganisms use multiple mechanisms to escape our immune system. We already suspected that the APRc protein, present at the surface of *Rickettsia*, plays an important role in evasion of the bacteria, but in this study, we found that, in addition, it also protects it, preventing the immune system from eliminating it**», explains Isaura Simões, leader of the study.

This work, already published in the journal *mBio*, showed that APRc binds to antibodies present in the bloodstream, preventing the immune system from attacking and acting as a shield. It was also found that APRc offers extra protection to the bacteria against the bactericidal activity of proteins present in the serum (part of the blood).

«**This is an important step in fundamental biology and a contribution to the development of new therapeutics against infectious diseases, which unfortunately are assuming an increasing role in today's world**», stress the authors of the research.

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The scientific article is available at <https://journals.asm.org/doi/10.1128/mBio.03059-21>.

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