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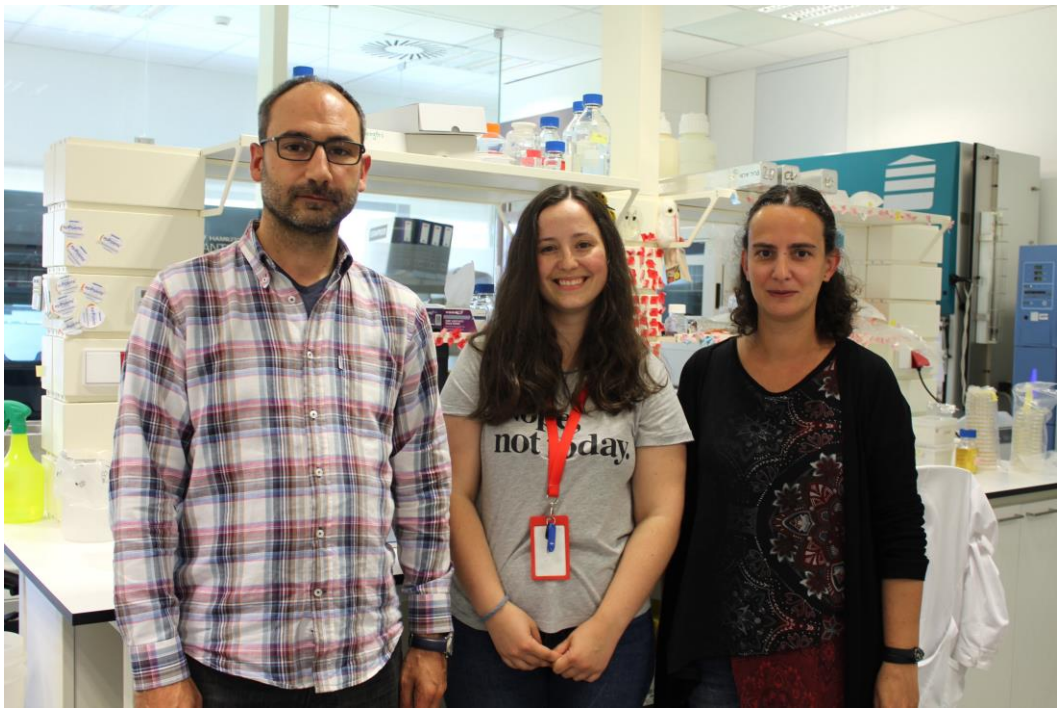
Scientists discover a new mechanism responsible for the spread of infection by the *Salmonella* bacterium



An international study led by researchers from the University of Coimbra (UC) revealed a new *Salmonella* infection mechanism. This mechanism may be important for the development of new therapeutic approaches to halt infections caused by this bacterium. The infection caused by *Salmonella* occurs after eating contaminated food and affects mainly the digestive tract. Infected people can develop nausea, cramps, diarrhea, fever and vomiting.

The results of this research, which had the collaboration of the Universities of Würzburg (Germany) and Córdoba (Spain) and the Institutes of Mathematical Sciences and Homi Bhabha (India), were recently published in the journal Nature Communications.

Usually, cells in the human body, when infected with viruses or bacteria, communicate with healthy neighboring cells to orchestrate a response against infection. In this study, the researchers show the opposite effect: cells infected with *Salmonella* release proteins that facilitate the infection of neighboring cells. For this reason, it was necessary to evaluate and identify "key molecules" involved in the infection and in the dissemination process, in order to better understand where to act to prevent the infection.

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In particular, the researchers identified a protein, the E2F1, which is decreased during *Salmonella* infection, either in the host's cells, which are infected with the bacterium, or in the neighboring cells. The decrease in the E2F1 protein leads to the deregulation of the expression of molecules involved in the control of bacteria-host interaction, particularly of microRNAs (small non-coding RNA sequences), which in turn promotes the multiplication of bacterium in the infected cells.

Furthermore, it was discovered that the initially infected cells release molecules into the extracellular space (outside the cells), in particular the HMGB1 protein, which activates neighboring cells making them more receptive to *Salmonella* infection. According to the study's leader, Ana Eulálio, principal investigator at the Center of Neurosciences and Cell Biology of the University of Coimbra (CNC), "this is a new mechanism that increases our knowledge about the complex interactions established between our cells and microorganisms, in this case of the *Salmonella* bacterium".

The great novelty associated with this work, is the fact that, "contrary to the existing paradigm, we have found that Salmonella, besides manipulating infected human cells, also modifies neighboring non-infected cells in order to increase their susceptibility to infection and, thus, facilitate the spread of the bacterium".

The results now published were obtained through studies in cells and in animal models, with the aid of bioinformatics and cellular and molecular biology tools. These data may play a crucial role in preventing the progression of infection by this bacterium. Miguel Mano, a CNC researcher and also author of the study, clarifies that "the knowledge of the molecular mechanisms explored by *Salmonella* can enable the development of therapeutic strategies capable of blocking the spread of infection".

The article is available here.

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