Study uncovers how Salmonella avoids the body's immune response

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UC Irvine researchers have discovered how *Salmonella*, a bacterium found in contaminated raw foods that causes major gastrointestinal distress in humans, thrives in the digestive tract despite the immune system's best efforts to destroy it.

Their findings help explain why Salmonella is difficult to eradicate and point to new approaches for possible treatments. Most people infected with *Salmonella* suffer from diarrhea, fever and abdominal cramps for up to seven days before the infection resolves.

Lead researcher Manuela Raffatellu, a UCI assistant professor of microbiology & molecular genetics, and colleagues identified a novel molecular mechanism that allows *Salmonella* to survive. Results of their study appear in the March issue of *Cell Host & Microbe*.

Pathogens like *Salmonella* flourish and cause disease in humans through a process by which they acquire metal ions, such as zinc, from the body. One of the body's key immune responses is to flood the infected area with antimicrobial proteins that include calprotectin, which removes zinc. Without enough of this vital element, most pathogens eventually die.

Raffatellu's team found, however, that salmonellae overcome this immune response by expressing specialized transporter proteins that enable the bacteria to acquire zinc in spite of calprotectin reducing the amount available in the digestive tract. This distinctive mechanism lets

salmonellae continue proliferating.

At the same time, calprotectin inadvertently promotes *Salmonella* growth by killing the microbes that normally reside within the intestines and help the immune system battle pathogenic bacteria.

"We're beginning to learn more about the mechanisms that allow pathogens like *Salmonella* to evade our natural defenses and make us sick," Raffatellu said. "In light of this, if we can devise therapies that block the acquisition of zinc and other metals by *Salmonella* specifically, we can fight this infection."

Additionally, she said, the new findings may have relevance for other illnesses, such as inflammatory bowel disease and colon cancer, in which high levels of calprotectin are detected.

Provided by University of California - Irvine