Crucial pathway to fight gut infection discovered

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The researchers found virulent *E. coli* bacteria blocked a pathway that would normally protect the gut from infection. These infections are particularly serious in young children and can result in diarrhoea and other complications such as kidney damage.

The role of this pathway in fighting gut infection was previously unknown but defects in it are associated with inflammatory bowel disease.

The research, published tomorrow in *Nature*, provides much needed insight into how the gut fights infection.

Lead author Professor Elizabeth Hartland from the University's Department of Microbiology and Immunology said the research improved our understanding of what happens when this pathway doesn't work as well as it should.

"This research provides a model where we can look at how these bacteria switch off a critical pathway in our body that helps fight infection and contributes to normal intestinal function," she said.

"Using this fundamental knowledge, we can conduct further studies and work towards improving therapies and treatments for people with inflammatory bowel disease, which affects around 5 million people worldwide"

The researchers found the diarrhoea-causing bacteria use a needle-like structure to inject a toxin into the gut cell that blocks cell death. This allows the bacteria to survive and spread in the gut, causing a range of diseases.

The injected toxin paralyses the infected cell's ability to send messages to immune cells which would normally sense and eliminate dangerous microbes from the body as well as alert the broader immune system to mount a response to the infection.

"This is a significant contribution to global research in this field as the role of this pathway in intestinal defence and the way bacteria go about blocking this pathway was not known."

Diarrhoeal infections are predominantly a problem in developing countries where sanitation is poor, yet cases of virulent *E. coli* also occur in developed countries including Australia.

The international study was conducted in collaboration with the Walter and Eliza Hall Institute, Bio21 Institute and international universities.

More information: A type III effector antagonizes death receptor signalling during bacterial gut infection, DOI: 10.1038/nature12524

Provided by University of Melbourne

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