

Researchers identify key behavior of immune response to Listeria

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A team of University of British Columbia microbiologists has identified a key defence mechanism used by the immune system against Listeria with strong implications for the future development of vaccines.

Listeria is the bacteria that causes listeriosis, a food-borne infection that caused 22 deaths in Canada in an August 2008 outbreak in meat products produced by Maple Leaf Foods.

"We know a great deal about how our body's adaptive [immune system](#) reacts to viruses but generally very little about immune response against bacterial infections," says Wilfred Jefferies, a professor at UBC's Michael Smith Laboratories and Biomedical Research Centre.

The study, published today in the online journal [PLoS ONE](#), focuses on dendritic cells that help activate the immune system. Dendritic cells collect pathogen materials and present them to other parts of the immune system - such as T-cells - a mechanism called cross-presentation.

The UBC team also includes post-doctoral fellows Anna Reinicke and Genc Basha and graduate student Kyla Omilusik.

"[Dendritic cells](#) are gatekeepers; they are small in numbers but very active in patrolling tissues that are in contact with the external environment, such as the skin," says Jefferies, who is also a member of the UBC Blood Research Centre, the Brain Research Centre and the Vancouver Coastal Health Research Institute.

"Their job is to apprehend the pathogens while avoiding getting infected," says Jefferies. "We've found that they achieve this by sampling bits and pieces of the bacterial pathogens in the area surrounding infected cells, instead of directly approaching the bacteria."

Their research also shows that when cross-presentation is deactivated, the host becomes severely compromised in its ability to generate the appropriate T-cells to fight the Listeria infection.

"This study establishes the vital role of dendritic cell cross-presentation in fighting bacteria infections and sheds light on how we can manipulate and engage immune responses. This knowledge will ultimately aid in the design of vaccines against bacteria and other pathogens," says Jefferies.

The study was supported by funding from The Canadian Institutes of Health Research (CIHR). "Better understanding of the body's immune system is the key to develop new strategies for treating bacterial infections and for creating new vaccines for Listeria ", says Dr. Bhagirath Singh, Scientific Director at CIHR's Institute of Infection and Immunity. "Dr. Jefferies's work advances our collective effort to prevent listeriosis by focusing on the way our immune defences are wired and triggered upon initial infection by invading pathogens."

More information: The paper is available at [dx.plos.org/10.1371/journal.pone.0007210](https://doi.org/10.1371/journal.pone.0007210)

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