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# Mitigation of poultry-borne *Campylobacteriosis* by an engineered enteric commensal

**Richard McLean**
University of Lethbridge, Alberta, Canada

*Campylobacter jejuni* is the leading cause of human gastroenteritis in the developed world with cases in of *Campylobacteriosis* in Canada numbering nearly 50% of all bacterial foodborne illness. Primary infections are typically self-limiting however numerous secondary sequelae can develop including reactive arthritis, irritable bowel disorder, inflammatory bowel disease, and Guillain-Barre syndrome, the leading cause of acute flaccid paralysis in North America. Because as much as 70% of human *Campylobacteriosis* can be traced to the consumption of contaminated poultry, this project aims to prevent *C. jejuni* from proliferating in the chicken gut. Numerous approaches have been attempted previously including the addition of bacteriophages or bacteriocins to the feed, chicken vaccination, positive selection of *C. jejuni* free birds and a variety of methods to limit physical exposure of the birds to the bacterium. This project uses a synthetic biology approach to engineer the human gut commensal *Bacteroides thetaiotaomicron* to produce and secrete nanobodies within the chicken gut. Nanobodies were raised against *C. jejuni* flagella and the focus of this project was to establish adequate expression levels, integrate required genes into the genome of *B. theta* and demonstrate the secretion of functional protein. The benefit of this approach will be the continued production of *Campylobacter*-active compounds within the chicken gut, which would be an economic and technological advancement over feed supplementation. In addition, this approach will enable the rational selection of therapeutic targets to help avoid the development of resistance.

## Biography

Richard McLean is a master student at University of Lethbridge Canada. McLean contributed to a ground-breaking study that was recently published in Nature, the world's most-cited interdisciplinary science journal with work he accomplished as an undergraduate student in an Applied Study setting with Dr. Wade Abbott, an adjunct chemistry and biochemistry professor.

richard.mclean@uleth.ca

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