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RESEARCH FACTS

RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

IN PROGRESS

Better understanding calf immunity

Project Title:

Broad spectrum immunity to enteric pathogens by training innate intestinal immunity in young calves

Researchers:

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Project Code:

POC.16.20

Completed:

In Progress. Results expected in August 2022.

Background

Although the concept of immunity has been understood in a general sense for a long time, there is still a lot of unknowns in the area. There is an evolving area of immunity research around how cells are trained to become immune to certain diseases. Some studies have focused on respiratory pathogens, but few have focused on trained immune cells in the intestines. In previous studies, this group has shown that one kind of immune cell in the intestines increases with an injectable *Mycobacterium paratuberculosis* (MAP) vaccine. This suggests that activating the innate immune system through vaccination has the potential to reduce infection in the small intestine. Their hypothesis is that by activating this system at a young age calves may have an increased overall immunity.

Objectives

- Determine if an injectable *Mycobacterium bovis* BCG vaccine or *Mycobacterium paratuberculosis* (MAP) bacterin vaccine can train innate immunity in neonatal calves to provide enhanced immune responses.
- Determine if trained innate immune cells primed using an injectable BCG or MAP bacterin vaccine can populate lymphoid tissues in the ruminant small intestine and display enhanced responses to microbial stimuli.

What they will do

Twelve ten-to-fourteen-day old calves will receive either a placebo, a BCG vaccine or MAP bacterin vaccine. At six weeks of age white blood cells will be isolated and restimulated with various different pathogens to see if they mount an immune response.

Calves will be euthanized at 6 weeks and intestinal samples will be collected and also exposed to pathogens to evaluate immunity.

Implications

This is novel, basic research that will help us to better understand how immunity works, and how we can better prepare calves for pathogens in the future.

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