Do scours vaccines protect against Western Canada's scour pathogens?

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Completed: *In Progress. Results expected in April 2024.*

Project Title:

Infectious causes of calf diarrhea (scours) and efficacy of current vaccination strategies to prevent scours in beef calves in Western Canada (phase 1)

Researchers:

Frank van der Meer frank.vandermeer@ucalgary.ca

Karin Orsel, John Gilleard, Dongyan Niu, John Campbell, Dale Godson, and Yanyun Huang.

Background

Scours accounts for up to half of preweaning mortality, but can be caused by many different bacterial, viral and protozoan pathogens. Calf scours in the first week of life is caused by *E. coli.* Rotavirus can cause scours in calves in the first two weeks. Coronavirus scours is most common between 5 days and three weeks after birth. Cryptosporidium and coccidiosis can cause scours in calves up to two after birth.

Aside from fluids and electrolytes there are no effective treatments for scours. Scours vaccines produce an immune response in cows, and the dam's antibodies are passed to calves through their colostrum, but it's not clear that there's actually a protective benefit to the calf. Two big Western Canadian studies found no association between scours vaccination in cows and the frequency of scours treatment in calves. This team will examine whether the pathogens that are causing scours in Western Canada are the same pathogens that the vaccines were designed to protect against.

Objectives

1. Assess the impact of scours on cow calf operations in Western Canada as reported by cow calf ranchers,
2. Determine which pathogen (species/strains) can be detected in scours cases in Western Canada,
3. Describe the gastro-intestinal microbiome of calves with neonatal calf diarrhea, and
4. Detect minor or emerging pathogens associated with neonatal calf diarrhea.

What they will do

This team will look at 50 cow-calf herds from the Canadian Cow-Calf Surveillance Network and gather information on the impact of scours in these operations. They'll ask participants to collect scour samples before treatment and at different ages and seasons. The samples will be screened to see what bacteria, viruses and protozoans are circulating. They will genetically characterize them to find out whether the circulating field strains are the same strains that the vaccines protect against, and what other potential

pathogens may be circulating. They will also compare the microbiome of scouring calves to healthy age-matched controls to look at short-and long-term changes in the gastrointestinal tract caused by scours.

Implications

Effective scours vaccines could help significantly reduce pre-weaning death losses. Follow up studies will look at whether current vaccines provide an effective immune response against current field strains (Phase 2) and protection / reduce incidence in large field trials (Phase 3).

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