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BEEF CATTLE RESEARCH COUNCIL

RESEARCH FACTS

RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

IN PROGRESS

Persistence of Shiga toxin-producing Escherichia coli (STEC) in Cattle and Association with Clinical Infections in the Same Geographic Region

Project Title:

Persistence of Shiga toxin-producing Escherichia coli (STEC) in Cattle and Association with Clinical Infections in the Same Geographic Region

Researchers:

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Project Code:

FOS.01.18

Completed:

In Progress. Results expected in March 2022.

Background

Human illnesses associated with Shiga toxin-producing E. coli (STEC) like E. coli O157:H7 are more prevalent in areas where there are more cattle. So there's often an assumption that cattle harbor STEC strains that persist in the environment and are responsible for human illness. This hasn't ever been tested, though. Cattle carry a lot of different STEC strains, but they may not all be equally likely to cause human illness. Regardless, STEC are commonly perceived as a cattle and beef issue. This perception not only undermines consumer and public confidence in our industry, it may stand in the way of effective progress towards reducing the transmission of food- or water-borne STEC outbreaks. New genomics-based technologies may allow us to more clearly determine whether a particular STEC isolated from a sick person really originated from a cattle source.

Objectives

Compare STEC found in cattle and humans at the genetic level to understand how STEC in Alberta have evolved by:

1. Compare STEC strains isolated from cattle and humans in Alberta and Germany through comparative whole genome analysis and ancestral host reconstruction.

2. Test the association between human infections and abundant STEC strains, defined as strains isolated on cattle farms and feedlots in Alberta monthly for 4 months.
3. Identify and evaluate genetic signatures indicative of abundant STEC strains associated with high rates of human illness for future use in a detection assay.

What they will do

This project will bring together Canadian cattle experts and German human health experts to map the genetic relatedness between STEC strains isolated from cattle and people in both Canada and Germany and find out if the strains that pose the greatest risk to people are also more persistent in cattle and the environment.

Implications

This research will shed some light on the degree to which beef cattle act as a reservoir for STEC. If this project finds that there are cattle-associated STEC that are not hazardous to people, it might help limit or focus beef recalls, and lead someday contribute to the development of an affordable, accurate, rapid test to help refine food safety tracebacks.

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