

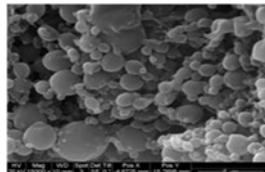
Combining Vaccination with Genetic Resistance to Protect Caribou Against CWD

Chronic Wasting Disease (CWD) is a fatal prion disease that effects cervids. Prion diseases are deadly infectious disorders of the central nervous system in animals and humans, with a very long incubation time. CWD infectivity is spreading across Canada, and overall positivity rate in hunted mule deer tested for CWD in Alberta is 15%. It is a matter of time until CWD reaches caribou habitats, and it is known that reindeer/caribou are susceptible to CWD. Caribou are a major food source for First Nation and Northern populations, so their food security and food safety are at risk. Not all caribou are equally susceptible to CWD, and we have fine mapped the distribution of caribou prion protein genotypes across Alberta. The research team will combine genetic resistance with vaccination, which both alone only provide partial protection, and ask whether this results in better protection, ideally complete protection. This vaccine approach has shown very promising results in mouse and reindeer models.

**Caribou
genotype
resistance**
138 S/N



Nano-vaccines



RECIPIENT:

**University of
Calgary, Dr.
Hermann Schaeztl**



PARTNERS:

**Alberta
Environment and
Parks / GOA]**



TOTAL BUDGET:

\$312,500



AI FUNDING:

\$250,000



PROJECT DATES:

**JAN 2022 –
DEC 2023**



PROJECT TRL:

**Start: N/A
End: N/A**

APPLICATION

The research team takes a comprehensive approach to address vaccine effects on prion infection and prion shedding. The project will aim to protect caribou against chronic wasting disease (CWD) through the development of a vaccine. The team has developed vaccine candidates that provide a relative protection in CWD challenge models, and new mouse models that recapitulate accurately CWD pathogenesis found in deer and elk.

ALBERTA INNOVATES CLEAN RESOURCES

AGRI-FOOD INNOVATION

Prion Research

PROJECT GOALS

- The research team's long-term goal is to develop a vaccine to protect caribou from contracting CWD.
- To control the spread of CWD among farmed and wild cervids.
- The team will combine genetic resistance with vaccination and ask whether this results in better protection, ideally for the complete protection against CWD transmission to caribou.
- University of Calgary HQP will be trained in wildlife management by the Parks Canada collaborator.
- The team will test experimental model of the combined effect of caribou PrP genetics and vaccination on CWD survival.
- Test for the effects on shedding and vaccination efficacy of CWD prions will be performed on a reindeer herd setting the stage for future vaccinations of caribou.

BENEFITS TO ALBERTA

- Reduction of the risk of transmission of CWD in farmed and wild cervids through the development of a vaccine.
- Through the use of vaccine, reduce the negative impact of CWD in cervids and decrease prion contamination of the environment.
- Outcomes will benefit elk and reindeer farming, and hunting and tourism industries and ensure market access for Alberta's agricultural exports.
- A vaccine would be a benefit to Albertan's by:
 - Reducing the spread of CWD prion in the environment;
 - Slowing the spread of the risk of caribou to get infected;
 - Protect a valued food source for Albertans; and
 - Reducing the risk transmission to humans from a zoonotic infection.



2 Publications



4 Students
Trained



1 Patent



1 Project Job



1 New
Product/Service



1 New Policy

CURRENT STATUS

APR 2023

The research team has vaccinated the knock-in mice that express various prion protein alleles associated with genetic resistance and have inoculated them with reindeer-derived CWD prions. Mice are currently incubating. Characterization of immune responses is close to finalization. Read-outs for CWD prion shedding in urine and feces were successfully established and effects of vaccination on prion shedding are currently tested. Optimization of oral vaccines is ongoing.