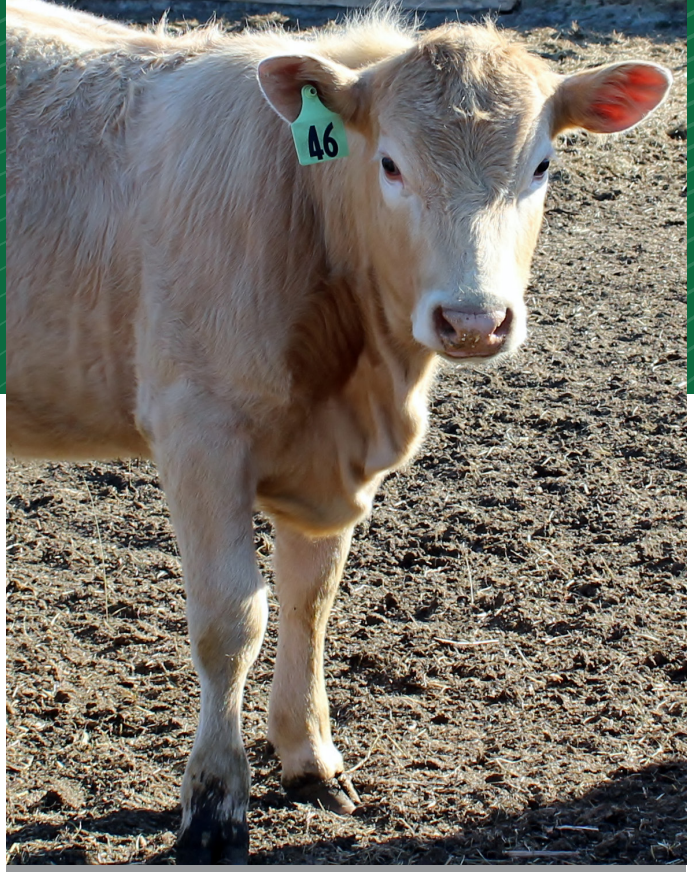
Fighting bovine tuberculosis



Bovine tuberculosis (bTB) is a debilitating and potentially fatal infectious disease that primarily affects cattle. Symptoms may include cough, fever, weakness and difficulty breathing.

Canada maintains bTB-free status as granted by the World Organization of Animal Health (WOAH), however the disease remains a serious and challenging threat. Losing bTB-free status would have significant economic consequences for the cattle industry due to the resulting loss of access to international markets through non-tariff trade barriers.

DISEASE TRANSMISSION

bTB is caused by *Mycobacterium bovis* (*M. bovis*) and was first identified in 1898.

bTB can be found in cattle worldwide but it is especially difficult to control in developing parts of the world. Although many countries have eliminated bTB from their cattle, the disease still circulates in certain wildlife species and can be transmitted to other livestock (i.e. sheep & goats). In Canada, *M. bovis* is known to infect wild bison and elk populations. *M. bovis* can also be transmitted from diseased animals to humans, termed "zoonotic transmission" and can cause tuberculosis.

An effective vaccine would protect wildlife and reduce the risk of transmission to cattle and to humans.

CURRENT STATE OF VACCINES

Some countries use the bacillus Calmette-Guerin (BCG) vaccine to prevent bTB. This vaccine is also used to prevent TB in humans. It is a live weakened *M. bovis* strain. However, the vaccine isn't overly effective and when cattle are vaccinated with BCG, and existing diagnostic tests are unable to **differentiate between infected or**

The Vaccine and Infectious Disease Organization (VIDO) is a world leader in infectious disease research and vaccine development. We are one of the world's largest and most advanced containment facilities and house a vaccine development centre for manufacturing vaccines.

We aim to improve animal health, protect Canadian livestock and ensure food safety and security by:

- Understanding how pathogens cause disease,
- Developing novel vaccines and therapeutics,
- Improving vaccine formulations and delivery methods, and
- Collaborating with world leading organizations.

Our work has resulted in 6 vaccines for cattle including for calf scours, pasteurellosis, haemophilosis and *E. coli* as well as several others for swine and poultry.

VIDO

vaccinated animals (DIVA). This could impact a country's bovine TB-free status.

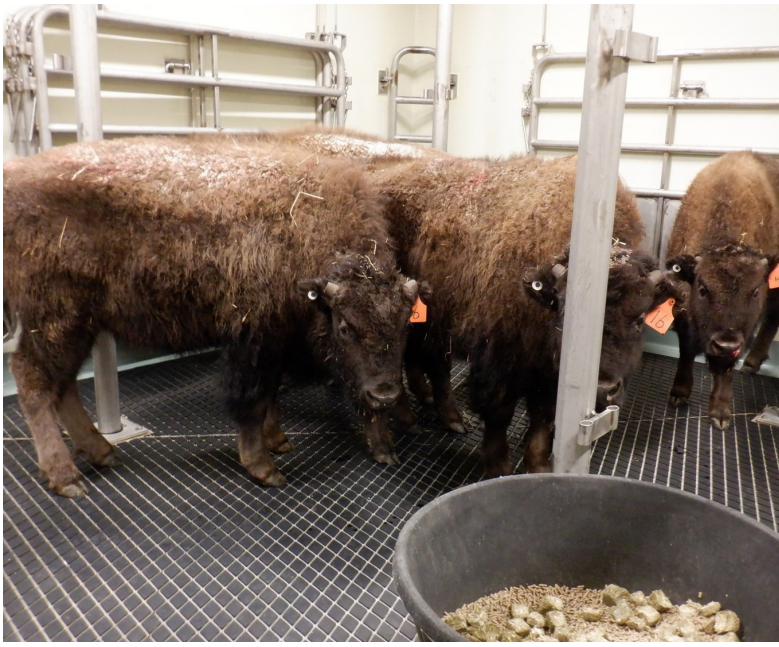
VIDO'S RESEARCH

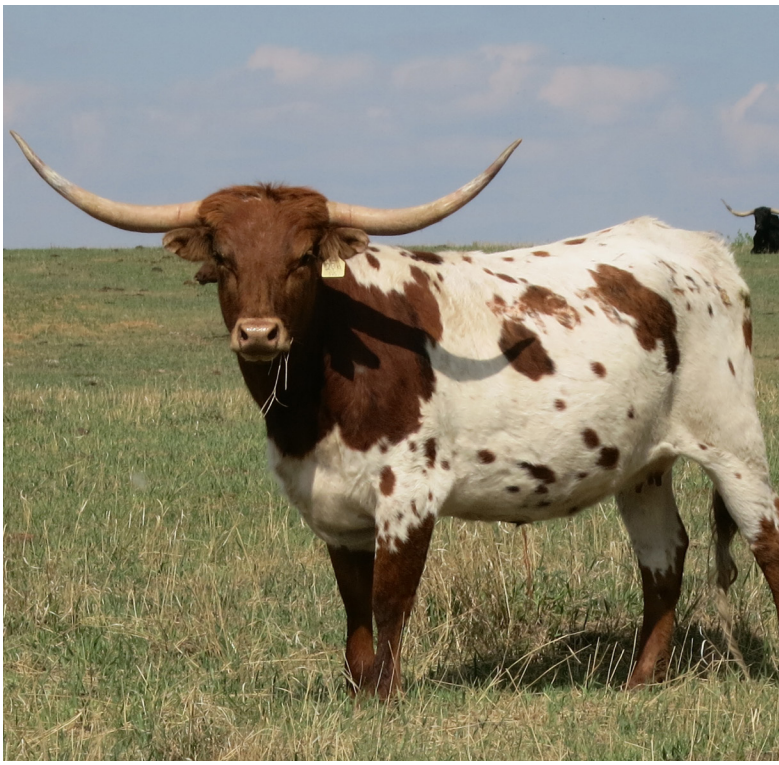
Our team is developing and testing different bTB vaccines for efficacy. We have screened hundreds of *M. bovis* proteins as a subunit bTB vaccine. In preliminary animal trials we have also identified a live weakened bTB vaccine that has multiple advantages over the original BCG vaccine. We have also been working to develop companion diagnostic tests to distinguish between cattle that are infected with *M. bovis* from those that are vaccinated (DIVA).

Our team is also collaborating with Parks Canada and the Western College of Veterinary Medicine to develop a combined bTB and brucellosis vaccine to protect wild Canadian bison herds from both bTB and brucellosis (a chronic and contagious infectious disease caused by Brucella bacteria that causes reproductive issues). Additionally with this project we are developing a more sensitive and field-deployable diagnostic test for bTB in wildlife. This approach will enable Parks Canada to rapidly diagnose bTB, remove infected bison, help protect healthy bison and reduce risk of transmission to cattle herds.

WHAT'S NEXT

Moving forward, we will continue to investigate the vaccine formulations for the best vaccine candidate and work with the Canadian Food Inspection Agency (CFIA) to bring our most promising bTB vaccine candidates to market.





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