



B CoV-LSDV Dual Vaccine for Cattle



A recombinant dual vaccine to immunise cattle against Lumpy Skin Disease Virus

Background

Bovine Coronavirus (BCoV) and Lumpy Skin Disease Virus (LSDV) are major infectious diseases affecting cattle worldwide. BCoV leads to severe diarrhoea and respiratory distress, particularly in neonatal calves, while LSDV causes painful skin lesions, weight loss, and economic losses. Current vaccines require multiple doses and do not provide long-lasting immunity, leading to increased costs for farmers and vaccine manufacturers.

Neonatal calves are particularly susceptible to BCoV due to their immature immune systems, with transmission occurring through oral-faecal secretions, nasal secretions, and contaminated environments. The virus is highly prevalent globally, with over 90% of cattle exposed during their lifetime. BCoV infections contribute to severe diarrhoea, dehydration, and respiratory disease, impacting weight gain, milk production, and reproductive performance. Given the syndromic nature of BCoV symptoms, existing vaccine regimens often target multiple pathogens, but no current option provides a combined BCoV-LSDV solution.

LSDV, widespread in Africa, the Middle East, and Asia, causes fever, nodular skin lesions, and severe economic losses due to reduced productivity and trade restrictions. While multiple animal health companies produce LSDV vaccines, none leverage a recombinant expression system like this novel dual vaccine, offering the candidate vaccine a significant competitive advantage.

UCT Ref.: LSDV-BCoV/T0196

Technology Overview

The recombinant LSDV-BCoV vaccine is an innovative dual vaccine designed to provide simultaneous protection against Lumpy Skin Disease Virus (LSDV) and Bovine Coronavirus (BCoV). It utilizes a recombinant LSDV vector to express key BCoV antigens, including the spike (S1 and S2 subunits) and nucleocapsid proteins. These modifications ensure a strong immune response against both pathogens while leveraging the safety and stability of LSDV as a vaccine platform.

This vaccine aims to address key challenges associated with BCoV infections, particularly in neonatal calves, which are highly vulnerable due to their immature immune systems. BCoV is responsible for both gastrointestinal and respiratory diseases in cattle, leading to severe diarrhoea, dehydration, and even death in young animals. Transmission occurs through close contact with infected animals via oral-faecal routes, contaminated secretions, or respiratory droplets. The virus is highly persistent in the environment, making control difficult.

This candidate vaccine was derived from the LSDV-Bovine Ephemeral Fever Vaccine (LSDV-BEFV), which has demonstrated strong safety, genetic stability, host immune response, and potential maternal immunity transfer in cattle. Researchers expect these benefits to extend to the LSDV-BCoV vaccine as well.

Experimental results to date have confirmed that immunized mice demonstrated an immune response in binding antibody titre experiments.

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Benefits

The potential value propositions of the recombinant UCT LSDV-BCoV that could aid the differentiation of the candidate vaccine against the competitors are:

- It could provide dual protection and immunity against both LSDV and BCoV, therefore covering the adverse effects of the LSDV in cattle and the diarrhoea and respiratory attributed to BCoV viral infections especially among neonatal calves, which is associated with the syndromic disease in these animals.
- A dual vaccine against both diseases could provide simplified vaccination regimes, potentially reducing the number of doses.
- A reduction in the doses could assist in the cost reduction to the farmer, especially since the efficacy of the current live attenuated vaccines has a short duration. It is also hypothesized that vaccinated cattle would be able to pass down immunity to their calves, reducing the risk of neonatal calves developing enteritis and respiratory problems associated with BCoV infections.

Opportunity

The University of Cape Town seeks partnerships with the relevant researchers and pharma companies in the cattle vaccine industry.

We would like to license the manufacture, sales and distribution of the vaccine to the appropriate partner.

The UCT will collaborate with the licensee partners to complete the development of the remaining research and facilitate the technology transfer.

The key roles and partnerships needed include:

- a clinical trial partner with access to compliant animal facilities and resources to complete the requisite horse challenge trials to demonstrate efficacy;
- a manufacturer capable of at scale, compliant with GMP standards for the supply of the candidate vaccines for trials and later for supply to Pharma;
- access to funders who could invest in the opportunity to complete the planned activities; and a sales, marketing and distribution partner or network that the partner could access.
- It is a possibility to license the candidate vaccine to a single partner who could co-ordinate the activities needed to bring this vaccine to market.

If you are interested in knowing more about this technology and opportunity, feel free to contact:

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PATENTS

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SEEKING

- Licensee
- Development partner
- Pharma