VACCINATION WITH MODIFIED LIVE BOVINE VIRAL DIARRHEA VIRUS (BVDV) TYPE 1A VACCINE COMPLETELY PROTECTED CALVES AGAINST CHALLENGES WITH BVDV TYPE 1B STRAINS

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Introduction: Bovine viral diarrhea virus (BVDV) causes a wide range of clinical manifestations in cattle, resulting in tremendous economic losses to the cattle industry worldwide. Vaccination plays a great role in BVD control. BVDV includes two distinct species of virus, BVDV-1 and BVDV-2, and many subgenotypes have been identified. Among BVDV-1 subgenotype, BVDV-1b is predominant, representing more than 75% of field isolates of BVDV-1 in North America. However, nearly all commercially available BVDV type-1 vaccines contain BVDV-1a strains, and studies have indicated that anti-BVDV sera induced by BVDV-1a viruses have less neutralization power to BVDV-1b isolates.

Objectives: The objective of this study was to evaluate a BVDV-1a MLV vaccine in animal vaccination / challenge experiments, to determine its efficacy against BVDV-1b viruses.

Materials and methods: The study included 2 separate experiments. A multivalent MLV vaccine (Vista 5, Intervet Schering-Plough Animal Health), containing a BVDV-1a and a BVDV-2 strain, parainfluenza 3, BRSV and IBR virus, was used to vaccinate calves. The vaccine was administered subcutaneously to 3 month old calves (22 vaccinated and 12 control calves) in Experiment #1 and calves were challenged with BVDV-1b strain NY-1 at 4 weeks post-vaccination. In Experiment #2, the duration of immunity of BVDV-1a vaccine against BVDV-1b infection was studied. Fourteen 6 to 8 week old calves were vaccinated intranasally and challenged 6 months later with BVDV-1b strain T1186a. Post-challenge, calves were observed for clinical diseases associated with BVDV infection, including diarrhea, fever, leukopenia and virus shedding.

Results: In both experiments, control calves developed clinical diseases and exhibited significantly (p< 0.05) higher clinical scores and rectal temperatures than the vaccinated calves. White blood cell counts were significantly (p< 0.05) lower in control calves than in vaccinated calves post-challenge. All control calves shed virus for a longer period after challenge and the titers of shed viruses were significantly (p< 0.05) higher for control groups, compared to the vaccinated groups.

Conclusions: The BVDV-1a vaccine completely protected calves against BVDV-1b challenges, when the vaccine was administered either subcutaneously or intranasally. The immunogenicity of the vaccine lasted at least for 6 months, when the vaccine was intranasally administered.

Keywords: BVDV, modified-live vaccine