study animals died prior to April 30, 2004. The animal health events of all study animals that occur during the feeding period will be followed until the study animals are sent for slaughter. Twelve animals (0.27%) have been identified as persistently infected (PI) with BVDV. To April 30, 2004, seven of these PI animals have died. Three animals died of mucosal disease, one animal died of peritonitis, and three animals died of BRD. The prevalence of PI animals observed at one feedlot was 0.11% with a corresponding overall mortality rate of 1.71%. The prevalence of PI animals observed at the second feedlot was 0.51% with a corresponding overall mortality rate of 2.33%. During the presentation, complete BVDV testing survey results and the complete animal health data will be summarized and the associations between BVDV and morbidity and mortality will be discussed. Additional pens of candidate animals will be enrolled on the study when appropriate study candidates become available in the fall of 2004.

Significance

Results of this study will improve our understanding of the role of PI animals on the transmission and dissemination of BVDV and its subsequent impact on the UF/BRD morbidity and mortality. In addition, the results of this study will improve our understanding of the association of immunohistochemical (IHC) identification of BVDV from postmortem samples and all causes of mortality that occur throughout the entire feeding period.

Prevention of Bovine Viral Diarrhea Virus Persistent Infection after a Heterologous Type 1 or Type 2 Challenge in Animals Vaccinated with a Combination Modified Live Virus Vaccine Containing Bivalent BVDV

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Introduction

Bovine viral diarrhea virus (BVDV) infections in cattle result in a broad spectrum of clinical syndromes ranging from asymptomatic infections to peracute hemorrhagic disease with high mortality. Acute BVDV infection causes respiratory, gastrointestinal and/or reproductive disease that results in a febrile response along with leukopenia. Due to BVDV shedding, persistently infected (PI) animals are a long term threat to herdmates, and may develop mucosal disease resulting in the death of the animal.

Acute BVDV infection of pregnant cattle with either cytopathic (CP) or noncytopathic (NCP) BVDV can result in a variety of fetal syndromes, depending on the virulence of the strain and age of the fetus. In early gestation, BVDV infection can result in early embryonic death and fetal absorption. Between 40-125 days of gestation, infection with NCP BVDV can result in PI calves that shed NCP BVDV for their entire lives.

The purpose of this study was to determine the efficacy of a commercial MLV combination vaccine containing bivalent BVDV diluted to contain minimum protective levels of BVDV type 1 and 2 in providing fetal protection against a heterologous challenge with type 1 or type 2 BVDV. Two groups of animals were vaccinated with a single dose of the commercial vaccine. Protection against persistent infection of the fetus was measured following challenge.

Materials and Methods

Heifers were vaccinated with either a commercial MLV combination vaccine containing minimum protective levels of type 1 and type 2 BVDV or sham vaccine and bred 44-53 days later. Bred heifers were challenged

with BVDV type 1 (study 1) or type 2 (study 2) at 75-80 days gestation. Heifers were assessed for clinical signs of BVDV infection including viremia and leukopenia for 14-24 days following challenge. Fetuses were recovered at 152-156 days gestation, and fetal tissues were analyzed for BVDV by virus isolation.

Results

In study 1, no fetuses from vaccinated heifers and all control fetuses were positive for BVDV type 1. In study 2, one fetus from vaccinated heifers and all control fetuses were positive for BVDV type 2.

Significance

Examination of the ability of a BVDV vaccine to prevent disease has historically centered on the magnitude of the antibody response induced by the vaccine. The current study provided evidence that a single dose of a bivalent BVDV vaccine diluted to contain minimum protective levels of type 1 and type 2 BVDV can stimulate a high level of protective immunity to prevent BVDV fetal infections.

A commercial MLV combination vaccine containing type 1 and type 2 BVDV protected 100% of fetuses from BVDV type 1 infection and 95% of fetuses from type 2 infection. The use of a bivalent BVDV MLV vaccine with a comprehensive BVDV control program should result in decreased incidence of BVDV persistent infections and, therefore, minimize the risk of BVDV infections in the herd.

Rapid Detection of Bovine Viral Diarrhea Virus using a Conductometric Biosensor

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Introduction

Bovine viral diarrhea virus (BVDV) is one of the most important viral pathogens of cattle worldwide. A key to controlling BVDV is identifying and eliminating carriers of the virus, better known as cattle persistently infected (PI) with BVDV. PI's shed large amounts of virus and serve as the major source of virus transmission within and between farms. Several laboratory methods are currently available to detect PI's including virus isolation, antigen capture ELISA's, skin immunohistochemistry/fluorescent antibody and PCR. The development of a rapid and cost effective field based system to detect PI's would be beneficial for more practical implementation of BVDV control strategies. In this study, a conductometric biosensor previously developed for use in detecting foodborne pathogens was adapted to detect BVDV in cell culture media and blood. The architecture of this biosensor allows for rapid field based applications.

Materials and Methods

A biosensor was developed using an architecture previously designed by one of the investigators (Alocilja). The biosensor uses antibodies as the biological sensing element and polyaniline as the transducer and molecular switch. The principle of detection can be described briefly as follows: A liquid sample containing the antigen (Ag) is dropped on the sample application membrane. The sample containing the antigen flows to the conjugate membrane by capillary action and binds to the primary antibody (Ab) that is conjugated to the conductive polyaniline molecules (Pan). The bound Ag forms a soluble Pan-Ab-Ag complex that is transported by capillary flow to the electrical capture membrane that is