

# Bovine viral diarrhea virus transmission from persistently infected cattle to non-persistently infected cattle when commingled: an evaluation of serum neutralizing antibody titers

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## Introduction

Worldwide, bovine viral diarrhea virus (BVDV) infects cattle of all ages, resulting in huge economic loss due to ensuing morbidity and death. Persistent infection (PI) of calves results from in utero infection of a fetus with a non-cytopathic strain of BVDV prior to the development of immunocompetency. A PI calf is infected for life and constantly sheds virus in its mucosal secretions. Exposure of naïve cattle to BVDV results in a transient infection (TI), in which the virus is cleared within weeks of infection. The objective of this study was to detect the presence of BVDV in cattle following direct exposure to PI cattle.

## Materials and Methods

Through funding from the Kansas State Veterinary Diagnostic Laboratory, 53 cattle were commingled with 10 PI cattle for 27 days. Serum, plasma, buffy coat, nasal swab, and ear notch samples were collected throughout the study and analyzed for the presence of BVDV RNA with a PCR assay. Positive samples were submitted for genotype determination by 5' UTR sequencing. Serum neutralization assays (SN) were performed on serum collected prior to the commingling (day 1) and on days 8, 13, 20 and 27 to monitor for seroconversion subsequent to infection.

## Results

Viral RNA was detected in buffy coat samples from 50 of 53 cattle commingled with the PI cattle, which was indicative of TI. Viral RNA was detected in samples from day 4 through day 25. Analysis of SN and PCR data indicated that all cattle that did not have serum antibodies against BVDV on day 1 became infected and developed a high serum antibody titer against at least 1 of the BVDV strains carried by the 10 PI cattle. Cattle that had serum antibody titers against BVDV on day 1 developed a lower viral titer and had viremia of shorter duration than did their seronegative counterparts as determined by PCR assay on buffy coat samples. Among those cattle that were seropositive for antibodies against BVDV on day 1, those with the highest antibody titers developed lower viral titers, shorter viremia, and were refractile to infection.

## Significance

These findings indicate the importance of proper immunization of cattle against BVDV prior entry into the feedlot.