



PROFESSIONAL SERVICES

Boehringer Ingelheim Vetmedica, Inc.

## TECHNICAL BULLETIN

### Onset of Protection from Direct Challenge of BVD Type 1 Virus following Vaccination with Express® 5 Vaccine

#### KEY POINTS

Calves vaccinated with Express® 5, five or seven days prior to challenge, showed increased resistance against challenge with the NY1 strain of BVD Virus Type 1.

#### OBJECTIVE

Evaluate onset of protection against BVD Virus Type 1 following vaccination with Express® 5.

#### STUDY DESIGN

Forty beef calves from a farm with a known BVD free status were used in the study. The calves originated from a herd in which the cows had been vaccinated yearly with a killed virus vaccine. Calves were confirmed to be BVD-PI negative via ear notches and antigen capture ELISA and were confirmed to be seronegative (<1:4) to BVD Types 1 and 2 based on serum neutralization assay.

The calves were randomly assigned to one of four groups (n=10/group): Group 1 – non-vaccinated controls, Group 2 – vaccinated 3 days prior to challenge, Group 3 – vaccinated 5 days prior to challenge, and Group 4 – vaccinated 7 days prior to challenge.

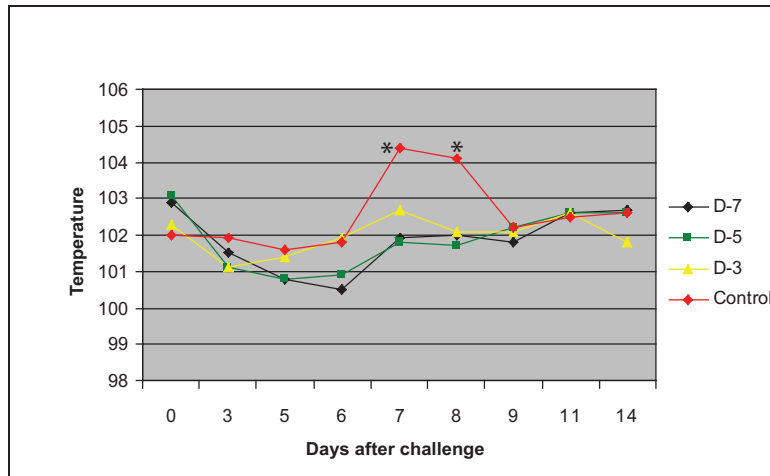
Vaccinates were given a 2 mL, subcutaneous dose of Express 5 (IBR, BRSV, PI<sub>3</sub>, BVD Types 1 & 2 – all MLV) in the neck. The Type 1 BVD strain in Express 5 is Singer and the Type 2 BVD strain in Express 5 is Bolin 296. Vaccine was taken from inventory and retested at the time of vaccination to show BVD Types 1&2 were within potency limits for release by USDA.

Each treatment group was housed separately and isolated from other cattle following vaccination. Following challenge the calves were co-mingled. The BVD Type 1 challenge virus (NY1) was administered via a nebulizer directly into each nostril.

Parameters evaluated daily following challenge included rectal temperature, leukocyte count, ocular discharge, nasal discharge, and virus isolation from nasal secretions and serum. Calves were weighed on Day 0 and Day 14 post-challenge. Laboratory personnel and personnel evaluating clinical signs, rectal temperatures, and body weight were blinded to the treatment groups.

## RESULTS

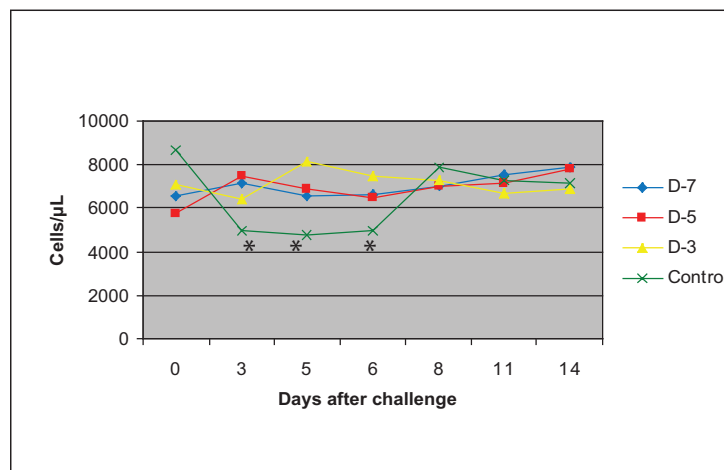
### Mean temperature of vaccinates and controls following challenge with NY1



D-3, D-5, and D-7 = Calves vaccinated 3, 5, and 7 days prior to challenge respectively

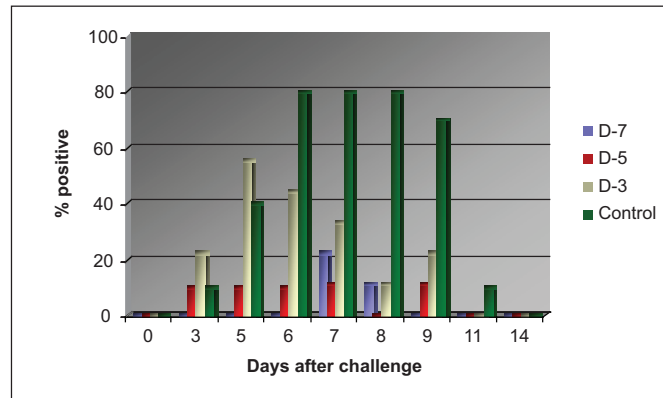
As compared to Day 0, the rectal temperature of the control calves increased significantly on Days 7 and 8 post-challenge ( $P < 0.01$ ). There was no significant increase in rectal temperature of the vaccinated calves. On Day 7, the control calves had a significantly higher temperature than the vaccinated calves ( $P < 0.05$ ).

### Leukocyte count (cells/ $\mu$ L) of vaccinates and controls following BVDv challenge



On Days 3, 5 and 6 following BVDv challenge, the controls had a significantly lower leukocyte count than on Day 0 ( $P < 0.001$ ). This decrease in the leukocyte count is associated with an acute BVD infection. There was no significant drop in leukocyte count of the vaccinated calves. On Days 3 and 6, the leukocyte count was significantly lower ( $P < 0.05$ ) in the control group as compared to the vaccinated groups. There was no difference among the vaccinated groups.

## Virus Isolation from Nasal Swabs



Virus isolation from nasal swabs was significantly lower in vaccinated animals than in non-vaccinated controls on Days 7, 8 and 9 ( $P < 0.05$ ). Between Days 3 and 11, all animals in the control group had at least one nasal swab sample that was positive for BVDv. On Day 5, more animals in the D-3 group had positive virus isolation from nasal swabs compared to the other two vaccinated groups ( $P < 0.05$ ).

## Virus Isolation from Serum

On post-challenge Day 6 and 7, four of ten Control calves, one of ten D-3 calves, one of ten D-7 calves, and zero of ten D-5 calves had virus isolation positive serum samples.

## Clinical Signs and Body Weight

No statistical differences ( $P > 0.05$ ) were noted in ocular and nasal discharge or body weight gain/loss between vaccinates and non-vaccinates.

## SUMMARY

As compared to controls, calves vaccinated with Express<sup>®</sup> 5, five or seven days prior to challenge, had increased resistance against BVDv Type 1 based on:

- No significant increase in rectal temperature
- No significant drop in leukocytes
- Significantly less virus shedding in nasal secretions

Previously published research has shown that calves were protected when vaccinated with Express<sup>®</sup> 5:

- Five days prior to a BVDv Type 2 challenge (Strain 1393)
- Three days prior to an IBR challenge (Cooper Strain)



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## TECHNICAL BULLETIN

**Additional Technical Bulletins:**  
[www.productionvalues.com](http://www.productionvalues.com)

### IBR

- TB04-108 Rapid Onset of Protection Against IBR with a Modified Live Virus Multi-Valent Vaccine
- TB06-120 A Study to Determine Interference of MLV IBR Vaccine on Titer Response to *Mannheimia haemolytica* Bacterin/Toxoid

### BVD

- TB02-111 One PI Calf is One Too Many
- TB03-101 BVDv Persistent Infection Increase Costs
- TB03-113 Express<sup>®</sup> FP/Breed-Back<sup>®</sup> FP Vaccine Studies
- TB03-114 Express<sup>®</sup> FP/Breed-Back<sup>®</sup> FP Vaccine Studies
- TB04-107 BVD Infection Cost in a Dairy Herd
- TB04-109 BVD Type 1b
- TB04-110 Incidence of Agents in Feedlot Fatalities
- TB06-121 BVD Type 1 & 2 SN Titer Response in Weaning Age Beef Calves Following the Administration, in Various Combinations, of Two MLV Vaccines Containing Different BVD Strains
- TB06-122 BVD Type 2 Onset of Protection
- TB07-125 Unsurpassed Protection Against BVD Persistent Infection

