



PROFESSIONAL SERVICES

Boehringer Ingelheim Vetmedica, Inc.

# TECHNICAL BULLETIN

## Express® FP/Breed-Back® FP Vaccines

### Unsurpassed Protection against BVD Persistent Infection

#### Introduction

Five fetal protection efficacy studies have been completed with the Express® FP/Breed-Back® FP family of vaccines. Two studies have involved challenge with BVDV Type 1 strains and three studies have involved challenge with BVDV Type 2 strains. The objective of each study was to provide proof that the vaccine protects the fetus against persistent infection with the challenge strain of BVD virus.

#### BVDV Type 1 Fetal Protection Studies

DESIGN		
	Study #1	Study #2
Vaccinates	11	18
Controls	8	10
Vaccination (days prior to breeding)	-45 days	-53 days
Challenge (day of gestation)	Day 75 (+/-15)	Day 75 (+/-7)
Fetal Harvest (day of gestation)	Day 150 (+/-15)	Day 200 (+/-7)
BVDV Challenge Strain (intranasal challenge)	KE9 – Type 1b non-cytopathic	BJ – Type 1a non-cytopathic
Test used to detect virus in fetus	rt-PCR	VI and rt-PCR

RESULTS				
	Treatment	# of Heifer Deaths and Abortions	# of PI positives/total	Percent Protected
Study #1	Vaccinates	0	1 of 11	91%
	Controls	0	8 of 8	0%
Study #2	Vaccinates	0	0 of 18	100%
	Controls	0	10 of 10	0%

## BVDV Type 2 Fetal Protection Studies

DESIGN			
	Study #1	Study #2	Study #3
Vaccinates	10	19	17
Controls	7	8	14
Vaccination (days prior to breeding)	-53 days	-53 days	-31 days
Challenge (day of gestation)	Day 75 (+/-7)	Day 75 (+/-7)	Day 77
Fetal Harvest (day of gestation)	Day 200 (+/-7)	Day 200 (+/-7)	Day 155 & 156
BVDV Challenge Strain (intranasal challenge)	NY93 – Type 2 non-cytopathic	PA131 – Type 2 non-cytopathic	PA131 – Type 2 non-cytopathic
Test used to detect virus in fetus	rt-PCR	VI and rt-PCR	VI and re-PCR

RESULTS				
	Treatment	# of Heifer Deaths and Abortions	# of PI positives/total	Percent Protected
<b>Study #1</b>	Vaccinates	0	0 of 10	100%
	Controls	6 (3 of 3)	7 of 7	0%
<b>Study #2</b>	Vaccinates	0	1 of 19	95%
	Controls	0	8 of 8	0%
<b>Study #3</b>	Vaccinates	0	1 of 17	94%
	Controls	3 (2 and 1)	14 of 14	0%

SUMMARY OF ALL TRIALS			
Challenge	Treatment	# Positive/Total	Percent Protected
<b>BVDV Type 1 (2 studies)</b>	Vaccinates	1 of 29	96%
	Controls	18 of 18	0%
<b>BVDV Type 2 (3 studies)</b>	Vaccinates	2 of 46	96%
	Controls	29 of 29	0%

### Conclusion

These results show that after challenge with four different non-cytopathic BVD strains, a Type 1a, Type 1b, and two Type 2, Express® FP/Breed-Back® FP successfully prevented BVD persistent infection in the offspring of vaccinated cattle. In each of the studies, **100% of the unvaccinated control heifers had persistently infected offspring**; however, the vaccine consistently held against the severe BVDV challenge.

### Implications

Due to the strength of the data, and the level of protection demonstrated by Express® FP/Breed-Back® FP, APHIS has granted a “**Prevention of persistently infected calves caused by BVD Types 1 and 2**” label claim for Express® FP/Breed-Back® FP vaccines.

### References:

1. F. Kovacs, T. Magyar, C. Rinehart, et al. *The live attenuated bovine viral diarrhea virus components of a multi-valent vaccine confer protection against fetal infection.* Veterinary Microbiology 96 (2003) 117-131.
2. K. Fairbanks, C. Rinehart, W. Ohnesorge, et al. *Evaluation of fetal protection against experimental infection with type 1 and type 2 bovine viral diarrhea virus after vaccination of the dam with a bivalent modified-live virus vaccine.* JAVMA, Vol. 225, No. 12, Dec. 2004.
3. C. Rinehart, W. Ohnesorge, C. Chase, et al. *BVDV fetal protection vaccine proof of efficacy studies: Requirements include both consistency and diversity.* Poster presentation at the BVDV: The Future is Now Conference; Denver, CO, Jan. 2006.