



## EXPRESS® FP Vaccine Studies

### Key Points

#### Repeat Challenge Studies Show Greater than 90% Protection Against Fetal Persistent Infection Due to BVD Type 1 and BVD Type 2 Following Vaccination with EXPRESS® FP 5 Viral Vaccine

- Study demonstrated high efficacy for fetal protection in preventing persistent infections (PI) due to BVD virus Type 1 and Type 2.
- After direct challenge with virulent heterologous USA strain of BVD Type 1 virus during gestation, 100% of vaccinates were protected.
- After direct challenge with virulent heterologous USA strain of BVD Type 2 virus during gestation, ~95% of vaccinates were protected.
- 100% of non-vaccinated control cattle had BVD persistently infected fetuses.

### Study Design

#### BVD Type 1 Challenge & BVD Type 2 Challenge Trials

Study animals	55 heifers serologically naïve for BVD antibody; tested for CMI to BVD virus; high CMI responders excluded
Location	South Dakota independent research facilities
Procedure	At ~4 weeks prior to insemination animals given a single 2 mL dose of vaccine At ~75 days gestation given direct intranasal challenge At ~75 days post-challenge fetuses harvested and tested for presence of BVD challenge virus to determine persistent infection Cerebellum, spleen, thymus, heart blood tested from each fetus BVD viremia checked in each heifer following challenge BVD antibody checked in all heifer during trials
Direct challenge strains	Heterologous, non-cytopathic BVD Type 1 & BVD Type 2 virulent strains known to cause BVD persistent infection

### Treatment Groups

#### BVD Type 1 Challenge Trials

	Number	Vaccination Timing	Vaccine
Group 1	18 heifers	4 weeks prior to breeding	<b>EXPRESS FP 5</b>
Group 2	10 heifers	No vaccination	Non-vaccinated controls

### Treatment Groups

#### BVD Type 2 Challenge Trials

	Number	Vaccination Timing	Vaccine
Group 1	19 heifers	4 weeks prior to breeding	<b>EXPRESS FP 5</b>
Group 2	8 heifers	No vaccination	Non-vaccinated controls

### Study Results BVD Type 1 Challenge Trial

#### BVD Type 1 Antibody Response

<b>DPV*</b> <b>DPC**</b>	<b>0</b>	<b>21</b>	<b>28</b>	<b>49</b>	<b>98</b>	<b>129</b> <b>0</b>	<b>143</b> <b>14</b>	<b>203</b> <b>74</b>
Vaccinates	<2	641	1842	3444	1520	1625	7019	2366
Controls	<2	<2	<2	<2	<2	<2	139	1664

#### BVD Type 2 Antibody Response

<b>DPV*</b> <b>DPC**</b>	<b>0</b>	<b>21</b>	<b>28</b>	<b>49</b>	<b>98</b>	<b>129</b> <b>0</b>	<b>143</b> <b>14</b>	<b>203</b> <b>74</b>
Vaccinates	<2	6	37	147	100	116	745	345
Controls	<2	<2	<2	<2	<2	<2	13	265

#### Heifer Viremia\*\*\* to BVD Type 1 Challenge Virus

	<b># Infected/ # Exposed</b>
Vaccinates	1/18
Controls	9/10

#### Fetal Infection Rate Following Challenge

	<b># Infected/ # Exposed</b>	<b>% Fetuses Infected</b>
Vaccinates	0/18	0% (100% protected)
Controls	10/10	100%

### Study Results BVD Type 2 Challenge Trial

#### BVD Type 1 Antibody Response

<b>DPV*</b> <b>DPC**</b>	<b>0</b>	<b>21</b>	<b>28</b>	<b>42</b>	<b>95</b>	<b>124</b> <b>0</b>	<b>138</b> <b>14</b>	<b>200</b> <b>74</b>
Vaccinates	<2	459	877	2572	1544	1475	37231	7971
Controls	<2	<2	<2	<2	<2	<2	30	347

#### BVD Type 2 Antibody Response

<b>DPV*</b> <b>DPC**</b>	<b>0</b>	<b>21</b>	<b>28</b>	<b>42</b>	<b>95</b>	<b>124</b> <b>0</b>	<b>138</b> <b>14</b>	<b>200</b> <b>74</b>
Vaccinates	<2	23	89	150	134	118	14289	3202
Controls	<2	<2	<2	<2	<2	<2	193	6889

#### Heifer Viremia\*\*\* to BVD Type 2 Challenge Virus

	<b># Infected/ # Exposed</b>
Vaccinates	0/19
Controls	8/8

#### Fetal Infection Rate Following Challenge

	<b># Infected/ # Exposed</b>	<b>% Fetuses Infected</b>
Vaccinates	1/19	5.3% (94.7% protected)
Controls	8/8	100%

### The Bottom Line

- Only one fetus from 37 vaccinated heifers had BVD persistent infection.
- 100% of 18 non-vaccinated control heifers had BVD persistent infection.
- Only one of 37 vaccinated heifers had viremia after BVD challenge.
- 17 of 18 non-vaccinated control heifers had viremia after BVD challenge.

\* Day post-vaccination

\*\* Day post-challenge

\*\*\* Viremia via positive virus isolation from WBC for at least one day