



Summary of Studies Supporting USDA Product Licensure

Establishment Name	Intervet Inc.
USDA Vet Biologics Establishment Number	165A
Product Code	4575.20
True Name	Bovine Rotavirus-Coronavirus Vaccine, Killed Virus, Clostridium Perfringens Types C & D-Escherichia Coli Bacterin-Toxoid
Tradename(s) / Distributor or Subsidiary (if different from manufacturer)	Bovilis Guardian - Merck Animal Health Guardian - Intervet, Inc. - Merck Animal Health Guardian - Merck Animal Health
Date of Compilation Summary	October 22, 2020

Disclaimer: Do not use the following studies to compare one product to another. Slight differences in study design and execution can render the comparisons meaningless.

Study Type	Efficacy
Pertaining to	Group A Rotavirus, <i>Escherichia coli</i> and <i>Clostridium perfringens</i> Types C and D
Study Purpose	To demonstrate passive immunity against neonatal diarrhea due to bovine Group A rotaviruses, enterotoxigenic <i>E. coli</i> , and enterotoxemia due to <i>C. perfringens</i> Types C & D in calves
Product Administration	Subcutaneous to pregnant cattle
Study Animals	Bovine
Challenge Description	
Interval observed after challenge	
Results	Study data were evaluated by USDA-APHIS prior to product licensure and met regulatory standards for acceptance at the time of submission. No data are published because this study was submitted to USDA-APHIS prior to January 1, 2007, and APHIS only requires publication of data submitted after that date.
USDA Approval Date	September 4, 2001

Study Type	Efficacy
Pertaining to	Bovine Coronavirus
Study Purpose	To demonstrate passive immunity against neonatal calf diarrhea in calves caused by bovine coronavirus in calves
Product Administration	Subcutaneous to pregnant heifers
Study Animals	Bovine
Challenge Description	
Interval observed after challenge	
Results	Study data were evaluated by USDA-APHIS prior to product licensure and met regulatory standards for acceptance at the time of submission. No data are published because this study was submitted to USDA-APHIS prior to January 1, 2007, and APHIS only requires publication of data submitted after that date.
USDA Approval Date	March 6, 2003

Study Type	Efficacy									
Pertaining to	<i>Escherichia coli</i> pilus type K99									
Study Purpose	To demonstrate passive immunity against neonatal diarrhea due to K99 pilus-expressing <i>E. coli</i> in calves									
Product Administration	Two doses administered 30 days apart by the subcutaneous route to pregnant heifers with first dose administered at approximately 3 months of gestation (6 months prior to calving)									
Study Animals	31 pregnant heifers, 21 vaccinates and 10 controls									
Challenge Description	K99 <i>E. coli</i> given to neonatal calves, calved from vaccinated heifers, 4 – 8 hours after nursing									
Interval observed after challenge	All calves were monitored daily for 10 days post-challenge for clinical signs of disease and mortality									
Results	<p>Mortality was assessed for each calf.</p> <p>Summary of calf mortality</p> <table border="1"> <thead> <tr> <th>Group</th> <th>No. of calves died/Total challenged</th> <th>% Mortality</th> </tr> </thead> <tbody> <tr> <td>Control</td> <td>8/10</td> <td>80</td> </tr> <tr> <td>Vaccinate</td> <td>3/21</td> <td>14</td> </tr> </tbody> </table> <p>Raw data: See attached.</p>	Group	No. of calves died/Total challenged	% Mortality	Control	8/10	80	Vaccinate	3/21	14
Group	No. of calves died/Total challenged	% Mortality								
Control	8/10	80								
Vaccinate	3/21	14								
USDA Approval Date	April 28, 2009									

Day of Mortality of Calves Following Challenge

Group	Heifer Id	Calf Id	Day of death following challenge
Vaccinate	909	909B	2
	911	911B	2
	920	920B	2
Control	900	900B	1
	902	902B	1
	906	906B	1
	913	913B	1
	916	916B	1
	928	928B	1
	929	929B	2
	932	932B	1

Severity of Scours (Score) in Calves Born to Vaccinated and Control Heifers Following Heterologous Challenge with *E. coli*

Groups	Calf ID	Pre-challenge	Days Post Challenge										Highest score
			1	2	3	4	5	6	7	8	9	10	
Vaccinates	901B	0	4	1	0	1	1	0	0	0	0	0	4
	903B	0	0	0	0	0	0	0	0	0	0	0	0
	904B	0	0	1	0	0	0	0	0	0	0	0	1
	905B	0	2	2	0	2	2	2	0	0	0	0	2
	907B	0	4	4	0	0	0	0	0	0	0	0	4
	908B	0	2	2	2	0	0	0	0	0	0	0	2
	909B	0	4	Dead									4
	910B	0	0	0	2	0	0	2	1	0	0	0	2
	911B	0	4	Dead									4
	914B	0	3	4	3	1	0	0	0	0	0	0	4
	915B	0	1	0	0	0	0	0	0	0	0	0	1
	917B	0	0	1	1	1	0	0	0	0	0	0	1
	918B	0	1	0	0	1	0	0	0	0	0	0	1
	919B	0	3	0	0	0	0	0	0	0	0	0	3
	920B	0	4	Dead									4
	922B	0	0	1	1	2	1	1	0	0	0	0	2
	924B	0	0	0	0	0	1	0	0	0	0	0	1
	925B	0	2	3	3	2	1	0	0	0	0	0	3
	927B	0	0	0	0	0	0	0	0	0	0	0	0
	930B	0	1	1	1	0	0	0	0	0	0	0	1
931B	0	2	0	0	1	1	0	0	0	0	0	2	
												-	
Controls	900B	0	4*	Dead								4	
	902B	0	4*	Dead								4	
	906B	0	4*	Dead								4	
	912B	0	1	1	2	2	0	0	0	0	0	2	
	913B	0	4*	Dead								4	
	916B	0	Dead									-	
	921B	0	3	1	1	1	1	0	0	0	0	3	
	928B	0	Dead									-	
	929B	0	4	4*	Dead							4	
	932B	0	4*	Dead								4	
												-	

Footnote:
 Scours scores: 0=normal, 1=soft, 2=mild diarrhea, 3=moderate diarrhea, and 4=severe diarrhea.
 * = Calf died later this day following observations

Degree of Dehydration/Depression in Calves Born to Vaccinated and Control Heifers Following Heterologous Challenge with *E. coli*

Groups	Calf ID	Pre-challenge	Days Post Challenge										Highest score	
			1	2	3	4	5	6	7	8	9	10		
Vaccinates	901B	0	1	0	0	0	0	0	0	0	0	0	0	1
	903B	0	0	0	0	0	0	0	0	0	0	0	0	0
	904B	0	0	0	0	0	0	0	0	0	0	0	0	0
	905B	0	0	2	0	0	0	0	0	0	0	0	0	2
	907B	0	0	0	0	0	0	0	0	0	0	0	0	0
	908B	0	0	0	0	0	0	0	0	0	0	0	0	0
	909B	0	3	Dead										3
	910B	0	0	0	0	0	0	0	0	0	0	0	0	0
	911B	0	2	Dead										0
	914B	0	0	0	0	0	0	0	0	0	0	0	0	0
	915B	0	0	0	0	0	0	0	0	0	0	0	0	0
	917B	0	0	0	0	0	0	0	0	0	0	0	0	0
	918B	0	0	0	0	0	0	0	0	0	0	0	0	0
	919B	0	0	0	0	0	0	0	0	0	0	0	0	0
	920B	0	0	Dead										0
	922B	0	0	0	0	0	0	0	0	0	0	0	0	0
	924B	0	0	0	0	0	0	0	0	0	0	0	0	0
	925B	0	0	0	0	0	0	0	0	0	0	0	0	0
927B	0	0	0	0	0	0	0	0	0	0	0	0	0	
930B	0	0	0	0	0	0	0	0	0	0	0	0	0	
931B	0	0	0	0	0	0	0	0	0	0	0	0	0	
Controls	900B	0	4*	Dead									4	
	902B	0	3*	Dead									3	
	906B	0	4*	Dead									4	
	912B	0	0	0	0	0	0	0	0	0	0	0	0	
	913B	0	4*	Dead									4	
	916B	0	Dead										-	
	921B	0	0	0	0	0	0	0	0	0	0	0	0	
	928B	0	Dead										-	
	929B	0	3	4*	Dead								4	
	932B	0	4*	Dead									4	

Footnote:
 Dehydration Scores: 0=normal, 1=mild dehydration, loss of skin elasticity, 2=moderate dehydration, rough skin/slightly depressed, 3=severe dehydration, sunken eyes, cold extremities, and 4=subnormal temperature, severely depressed
 * = Calf died later this day following observations

Study Type	Safety
Pertaining to	ALL
Study Purpose	Demonstrate safety under typical field conditions
Product Administration	Subcutaneous
Study Animals	Bovine
Challenge Description	
Interval observed after challenge	
Results	Study data were evaluated by USDA – APHIS prior to product licensure and met regulatory standards for acceptance at the time of submission. No data are published because this study was submitted to USDA – APHIS prior to January 1, 2007, and APHIS only requires publication of data submitted after that date.
USDA Approval Date	November 5, 2003

Study Type	Safety
Pertaining to	ALL
Study Purpose	Demonstrate safety in pregnant cattle
Product Administration	Subcutaneous
Study Animals	Bovine
Challenge Description	
Interval observed after challenge	
Results	Study data were evaluated by USDA – APHIS prior to product licensure and met regulatory standards for acceptance at the time of submission. No data are published because this study was submitted to USDA – APHIS prior to January 1, 2007, and APHIS only requires publication of data submitted after that date.
USDA Approval Date	November 3, 2003