Summary of Studies Supporting USDA Product Licensure

Establishment Name	Medgene Labs
USDA Vet Biologics Establishment Number	474
Product Code	9PP0.R0
True Name	Prescription Product, Killed Baculovirus Vector
Tradename(s) / Distributor or Subsidiary (if different from manufacturer)	
Date of Compilation Summary	August 28, 2024

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	Safety
Pertaining to	Prescription Platform Product
Study Purpose	Safety
Product Administration	Intramuscular
Study Animals	Swine
Results	This product was qualified as a prescription production platform based on demonstrated safety as shown in the Product Summary of Establishment 474, Code 19A5.R9. As a prescription platform product, the manufacturer may update the gene insert in this vaccine under expedited procedures to respond to emerging needs per Veterinary Services Memorandum 800.214. Study data to support these updates were evaluated by USDA-APHIS and found acceptable based on regulations and policies at the time of approval. Additional safety studies may not have been required for these updates. An identifier for the gene sequence found in a given serial (numbered batch) of vaccine is listed on the product labeling.
USDA Approval Date	June 09, 2020

<table>
<tr><td>Study Type</td><td>Safety</td></tr>
<tr><td>Pertaining to</td><td>ALL</td></tr>
<tr><td>Study Purpose</td><td>Demonstration of safety in cattle under typical field conditions</td></tr>
<tr><td>Product Administration</td><td>One dose administered subcutaneously, followed by a second dose 3 weeks later. The vaccine contained genes from Bovine Coronavirus S1, Bovine Rotavirus Type A, VP4, and two Bovine Influenza D virus HE antigens.</td></tr>
<tr><td>Study Animals</td><td>702 cattle, 472 of which were 3 days of age or younger. The study included three distinct geographical locations</td></tr>
<tr><td>Challenge Description</td><td>Not applicable</td></tr>
<tr><td>Interval observed after challenge</td><td>Cattle were observed daily, and injection site palpations were conducted one day after each injection and 14 days after the second injection.</td></tr>
<tr><td>Results</td><td>Table 1, Size of injection site reactions:

<table>
<tr><th>Serial</th><th>Vaccination</th><th>< 1.5 cm</th><th>1.5 – 5 cm</th></tr>
<tr><td>1</td><td>1st</td><td>63</td><td>7</td></tr>
<tr><td>1</td><td>2nd</td><td>50</td><td>27</td></tr>
<tr><td>2</td><td>1st</td><td>75</td><td>12</td></tr>
<tr><td>2</td><td>2nd</td><td>52</td><td>44</td></tr>
</table>

Table 2, Duration (days) of injection site reactions by age:

<table>
<tr><th>Age</th><th>Vaccination</th><th>Min</th><th>Q1</th><th>Median</th><th>Q3</th><th>Max</th></tr>
<tr><td rowspan="2">≤ 3 days</td><td>1st</td><td>4.0</td><td>14.0</td><td>15.0</td><td>34.0</td><td>42.0</td></tr>
<tr><td>2nd</td><td>1.0</td><td>9.0</td><td>14.0</td><td>14.0</td><td>32.0</td></tr>
<tr><td rowspan="2">> 3 days</td><td>1st</td><td>1.0</td><td>2.0</td><td>6.0</td><td>18.0</td><td>35.0</td></tr>
<tr><td>2nd</td><td>4.0</td><td>4.0</td><td>6.0</td><td>10.0</td><td>14.0</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td>Table 3, Percentages of cattle with specific clinical observations:

<table><tr><th>Adverse Event</th><th>Number Affected</th><th>Percent Affected</th></tr><tr><td>Injection site edema</td><td>247</td><td>35.2</td></tr><tr><td>Diarrhea</td><td>159</td><td>22.6</td></tr><tr><td>Pneumonia</td><td>93</td><td>13.2</td></tr><tr><td>Hyperthermia</td><td>70</td><td>10.0</td></tr><tr><td>Mortality*</td><td>10</td><td>1.4</td></tr><tr><td>Lethargy</td><td>7</td><td>0.99</td></tr><tr><td>Anorexia</td><td>5</td><td>0.71</td></tr><tr><td>Lameness</td><td>2</td><td>0.28</td></tr><tr><td>General pain</td><td>1</td><td>0.14</td></tr><tr><td>Trauma*</td><td>1</td><td>0.14</td></tr></table>*Due to causes other than vaccination as affirmed by licensee</td></tr>
<tr><td>USDA Approval Date</td><td>April 4, 2022</td></tr>
</table>

Study Type	Safety
Pertaining to	ALL
Study Purpose	Demonstration of safety in swine under typical field conditions.
Product Administration	One dose administered intramuscularly, followed by a second dose 3 weeks later. The vaccine contained Porcine Parvovirus 1 VP2 antigen.
Study Animals	Swine, 21 days of age or less. The study was conducted in three distinct geographic locations: 230 pigs at Site 1; 225 pigs at Site 2; 230 pigs at Site 3.
Challenge Description	Not applicable
Interval observed after challenge	Pigs were monitored immediately after each injection, one day after each injection, and 14 days after the second injection.
Results	Table 1, Size of injection site reactions by site:

Site	Vaccination	< 1.5 cm in size	1.5 – 5 cm in size
1	1st	8	0
	2nd	10	1
2	1st	1	0
	2nd	1	0
3	1st	1	0
	2nd	47	19

Table 2, Duration (days) of injection site reactions by site:

Site	Vaccination	Min	Q1	Median	Q3	Max
1	1st	1.0	1.0	2.0	10.5	20.0
	2nd	1.0	1.0	1.0	7.0	10.0
2	1st	1.0	1.0	1.0	1.0	1.0
	2nd	1.0	1.0	1.0	1.0	1.0
3	1st	1.0	1.0	1.0	1.0	1.0
	2nd	1.0	1.0	2.0	6.0	19.0

Table 3, Duration (days) of injection site reactions by serial:

Serial	Vaccination	Min	Q1	Median	Q3	Max
1	1st	1.0	1.5	4.0	13.0	20.0
	2nd	1.0	1.0	3.0	7.0	17.0
2	1st	1.0	1.0	1.0	2.0	15.0
	2nd	1.0	1.0	1.0	4.0	19.0

Table 4, Swine with specific clinical observations:

Adverse Event	Number of Animals Affected	Percent
Injection site oedema	86	12.6
Death*	18	2.6
Anorexia	17	2.4
Diarrhea	9	1.3
Lameness	6	0.88
Arthritis	4	0.58
Anaphylaxis	3	0.44
Ataxia	2	0.29
Injection site reaction NOS	2	0.29
Dyspnea	1	0.15
Lethargy	1	0.15
Oedema NOS	1	0.15
Poor feed conversion	1	0.15

*Death not attributable to vaccination as affirmed by licensee

USDA Approval Date	May 5, 2022

<table>
<tr><td>Study Type</td><td>Safety</td></tr>
<tr><td>Pertaining to</td><td>ALL</td></tr>
<tr><td>Study Purpose</td><td>Demonstration of safety in cattle under typical field conditions</td></tr>
<tr><td>Product Administration</td><td>One dose administered subcutaneously, followed by a second dose 3 weeks later. The vaccine contained genes from Bovine Viral Diarrhea Virus, Type 1a</td></tr>
<tr><td>Study Animals</td><td>658 cattle, 41% of which were 3 days of age or younger. The study included three distinct geographical locations</td></tr>
<tr><td>Challenge Description</td><td>Not applicable</td></tr>
<tr><td>Interval observed after vaccination</td><td>Cattle were observed daily, and injection site palpations were conducted one day after each injection and 14 days after the second injection and longer if reactions observed.</td></tr>
<tr><td>Results</td><td>Table 1, Size of injection site reactions for each vaccination:
<table>
<tr><th>Vaccination</th><th>< 1.5 cm</th><th>1.5 – 5 cm</th></tr>
<tr><td>1st</td><td>32</td><td>5</td></tr>
<tr><td>2nd</td><td>44</td><td>36</td></tr>
</table>
Table 2, Duration (days) of injection site reactions:
<table>
<tr><th>Vaccination</th><th>Min</th><th>Q1</th><th>Median</th><th>Q3</th><th>Max</th></tr>
<tr><td>1st</td><td>1.0</td><td>3.0</td><td>5.0</td><td>6.0</td><td>33.0</td></tr>
<tr><td>2nd</td><td>1.0</td><td>1.0</td><td>4.5</td><td>12.0</td><td>66.0*</td></tr>
</table>
*4/658 cattle had reaction beyond 42 days post-vaccination

Table 3, All Adverse Events by Type (Each type of AE is counted once per animal):
<table>
<tr><th>Adverse Event</th><th>Total Affected</th></tr>
<tr><td>Injection site edema</td><td>109</td></tr>
<tr><td>Otitis externa</td><td>20</td></tr>
<tr><td>Lethargy</td><td>14</td></tr>
<tr><td>Respiratory tract disorder NOS</td><td>12</td></tr>
<tr><td>Death</td><td>9</td></tr>
<tr><td>Diarrhea</td><td>8</td></tr>
<tr><td>Anorexia</td><td>6</td></tr>
<tr><td>Cough</td><td>6</td></tr>
<tr><td>Lameness</td><td>6</td></tr>
<tr><td>Dyspnea</td><td>4</td></tr>
<tr><td>Eye disorder NOS</td><td>2</td></tr>
<tr><td>Hyperthermia</td><td>2</td></tr>
<tr><td>Arthritis</td><td>1</td></tr>
<tr><td>Central nervous system infection NOS</td><td>1</td></tr>
<tr><td>General pain</td><td>1</td></tr>
</table></td></tr>
<tr><td>USDA Approval Date</td><td>March 15, 2024</td></tr>
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