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Evaluation of a 25-Week Duration of Immunity of RespiSure One® In *Mycoplasma Hyopneumoniae* Seronegative and Seropositive Pigs

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Introduction and Objectives

Mycoplasma hyopneumoniae is the primary causative agent of enzootic pneumonia, which is a chronic and highly prevalent swine disease that has been estimated to cost the swine industry up to 1 billion dollars annually. One or two dose vaccines with various durations of immunity are used to control mycoplasma pneumonia in pigs. As sows can also be vaccinated, concerns exist that maternally derived antibodies can reduce vaccine efficacy in pigs vaccinated at a younger age (1).

Pigs from seronegative (Study 1) or seropositive (Study 2) dams were vaccinated with RespiSure ONE® at one week of age and challenged 25 weeks later to evaluate duration of immunity and impact of maternal antibody.

Materials and Methods

For Study 1, 52 pigs from *M. hyopneumoniae* seronegative sows or gilts were randomly assigned by litter into placebo and vaccinate groups. All pigs were seronegative at the start of the study (ELISA OD< 0.5, Veterinary Diagnostic Laboratory, Iowa State University, Ames, IA, USA). For Study 2, 52 pigs from *M. hyopneumoniae* seropositive sows or gilts were randomly assigned by litter into placebo and vaccinate groups. Study 2 pigs were M. hyopneumoniae seropositive at the start of the study (ELISA OD > 0.5). At 1 week of age, pigs in the vaccinated group (Day 0) were administered 2 ml of RespiSure ONE®, intramuscularly in the neck, while pigs in the placebo group received 2 ml of PBS. Blood samples for *M. hyopneumoniae* serology were collected at key time points.

Twenty-five weeks following vaccination, all pigs were anesthetized and intranasally challenged on three consecutive days. Challenge material was a lung tissue homogenate containing a derivative of M. hyopneumoniae strain 11 at a dilution of 1:25 in 5 mL (106 – 107 CCU/ml) of mycoplasmal Friis medium (E. Thacker, ISU, Ames, IA, USA)(2). Pigs were euthanized 4 weeks following the first challenge. Lungs lesions were sketched and percent consolidation estimated. A lung sample was collected from the right middle lung lobe for *M. hyopneumoniae* PCR. All data were statistically analyzed using SAS.

Results and Discussion

Lung lesion scores and serology results for both studies are summarized in Tables 1 and 2, respectively.

In Study 1, lung tissue was *M. hyopneumoniae* positive in 23/24 placebo pigs and 18/20 vaccinated pigs. In Study 2, lung tissue was *M. hyopneumoniae* positive in 8/26 placebo pigs and 8/22 vaccinated pigs.

Table 1. Comparison of lung lesion scores

Treatment	n	Lung Score	Range
STUDY 1			
Placebo	24	5.9[a]	0 – 36.0
Respisure ONE®	20	0.3[b]	0 – 6.0
STUDY 2			
Placebo	26	4.5[a]	0 – 36.7
Respisure ONE®	22	2.0[b]	0 – 13.7

[a,b]Numbers with different superscripts within a study were statistically significant ($p < 0.05$)

Table 2. *M. hyopneumoniae* serology results

Treatment	Pre-Vx	Pre-Ch	Necropsy
STUDY 1			
Placebo	0.12	0.10[a]	0.67[a]
Respisure ONE®	0.14	0.27[b]	1.16[b]
STUDY 2			
Placebo	2.16	0.15	0.46[a]
Respisure ONE®	2.11	0.15	1.24[b]

[a,b]Numbers with different superscripts within a study were statistically significant ($p < 0.05$)

One-week-old, sero-negative or sero-positive pigs, vaccinated once with RespiSure ONE®, had significantly fewer lung lesions than placebo pigs following an experimental challenge with M. hyopneumoniae 25 weeks later. In both studies, vaccination did not have any effect on the number of pigs with M. hyopneumoniae positive (PCR) lung tissue. Lastly, a clinically significant *M. hyopneumoniae* immune response was only measured 4 weeks following challenge and was more prominent in vaccinated than placebo pigs.

References

1. Thacker B et al. 2000. Proc. 15th IPVS Congress, Birmingham, England, Vol 2:155.

2. Ross RF et al. 1984. *Am J Vet Res* 45:1899-1905.

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