Sponsors

University of Minnesota
College of Veterinary Medicine

College of Agricultural, Food and Environmental Sciences

Extension Service

Swine Center

Editors
W. Christopher Scruton
Stephen Claas

Layout
David Brown

Logo Design
Ruth Cronje, and Jan Swanson;
based on the original design by Dr. Robert Dunlop

Cover Design
Sarah Summerbell

Protection of Swine Vaccinated with a Single Dose of Mycoplasma Hyopneumoniae Bacterin Against a Severe Field Exposure to *Mycoplasma hyopneumoniae*

Vicki J. Rapp-Gabrielson and Terri L. Wasmoen
Schering-Plough Animal Health Corporation, 21401 West·Center Road, Elkhorn, NE 68022 U.S.A.

Introduction

Most efficacy trials involve vaccination of serologically-negative animals and subsequent experimental challenge with pure cultures of *Mycoplasma hyopneumoniae.* Field efficacy trials often are conducted in herds that already have some degree of herd immunity due to the presence of maternal and active immunity as a result of endemic mycoplasma infection and vaccination practices. Neither of these approaches can duplicate field experiences where the presence of immunologically naïve pigs and secondary bacterial and viral pathogens within a herd may influence the course of mycoplasma infection and the success of a vaccination program.

Materials and Methods

In this study, swine from a high-health herd that was free of *M. hyopneumoniae*, swine influenza virus, PRRS, and pseudorabies virus, were randomized into treatment groups, one of which was vaccinated with a single 2 mL dose of Schering-Plough Animal Health's *M. hyopneumoniae* bacterin. Serum samples, taken at 4-week intervals, were tested at the Veterinary Medical Research Institute (VMRI) for *M. hyopneumoniae* antibodies using the Tween 20 ELISA. An outbreak of mycoplasma pneumonia in this negative herd was detected three months after the start of the study when a lung specimen taken at necropsy of a pig that died of acute hepatic hemorrhage also showed pneumonia and was PCR postive for *M. hyopneumoniae*. One month later (four months after vaccination) the vaccinated and nonvaccinated control swine were moved to research facilities where they were necropsied in order to evaluate whether a single vaccination protected immunologically naïve swine against a natural field exposure to *M. hyopneumoniae.*

Results and Conclusions

The pigs were still exhibiting severe coughing when moved to the isolation facilites. Histopathology, immunohistochemistry, and PCR of representative lung specimens confirmed a diagnosis of mycoplasma pneumonia with a secondary suppurative bronchopneumonia. *Pasteurella multocida* was isolated in pure culture from 6/6 lungs. Gross lung lesions were scored for percent consolidation and data analyzed using 1-tailed Wilcoxon (Mann-Whitney) Exact Rank Sum Tests. The median lung score of nonvaccinated pigs was 7.2% compared to a median score of 1.6% for vaccinates, which represents a significant reduction in lesions ($P = 0.042$). However, the variability within treatment groups was high, likely due to the influence of the secondary bacterial involvement and the fact that, in a natural field exposure, the timing and dose of the challenge for each pig cannot be controlled.

As expected, the single vaccination did not elicit a strong ELISA antibody response. Two months after the single vaccination, less than 30% of vaccinates had a detectable antibody titer. Following the natural field exposure, an anamnestic response was evident in vaccinated pigs (90% seropositive) while only 11% of the nonvaccinated pigs were serologically positive at the time of necropsy. These data indicate that a single dose of vaccine will effectively prime the immune system of a naïve pig.

Acknowledgements

The authors would like to thank Diane Sweeney for the statistical analysis; Linda Gergen for technical assistance; Drs. Ryan Saltzman, Lyle Kesl and the staff at Veterinary Resources, Inc. for conducting the necropsy procedures; and Dr. Eileen Thacker and staff at VMRI for conducting the Tween 20 ELISA testing.