RESEARCH ABSTRACT

SWINE HEALTH

Title: Identification of protective epitopes toward developing a vaccine providing broad cross-protection against various PRRS viruses – **NPB #07-130**

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Scientific abstract:

Suboptimal cross-protection between heterologous PRRS viruses is a strong obstacle to effective control of the disease by vaccination. GP5 is known to play a major role in the induction of anti-PRRS virus neutralizing antibody. Yet, our recent study has demonstrated that GP3 and M protein also significantly contribute to cross-neutralization between different PRRS viruses. Furthermore, GP3 was more critical than GP5 or M in overall virus neutralization against a strain like VR2332 whose GP5 is highly glycosylated. Therefore, it was hypothesized that a chimeric virus of 2 distinctive PRRS viruses can confer better cross-protection against those viruses if necessary genes from the 2 viruses are combined together in an organized manner. To test the hypothesis, 3 chimeric viruses designated as JAP5, JAP56 and JAP2-6, respectively, were generated from the VR2332 infectious cDNA clone by replacing its ORF5, ORFs 5 and 6 or ORFs 2-6 with that/those of the JA142 strain that is genetically and antigenically distinct from the VR2332 strain. A total of 114, 3-week-old pigs were divided into 6 groups and each group was inoculated with one of the chimeric viruses, VR2332, JA142, or a sham inoculum. At 44 days dpi, 8 pigs each within each group were randomly selected, housed separately and challenged intranasally with VR2332, JA142, or a sham inoculum to determine if protective immunity was conferred by inoculation of the chimeric viruses. All of the pigs were bled periodically until 72 dpi and tested for viremia and antibody response. Half of the pigs in each room were necropsied at 14 days after the challenge and the remaining at 28 days for pathological evaluation. Based on viremia pattern and lung pathology, the prior inoculation with JAP5 or JAP56 effectively protected the pigs from the challenge with VR2332 while the pigs inoculated with JAP56 or JAP2-6 demonstrated protection against JA142 infection. In conclusion, the JAP56 chimeric virus may be used as a vaccine candidate to induce broad cross-protection against both VR2332 and JA142.