RESEARCH ABSTRACT

SWINE HEALTH

Project Title: A novel PRRS vaccine in a bacterial vector known to stimulate strong cell-mediated and humoral immunity - **NPB #03-086**

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Abstract: In this study, we have explored the usefulness of a newly developed bacterial vaccine vector, *Brucella abortus* RB51, for generating an efficacious vaccine for PRRS. The gene coding for GP5, a known protective protein, of PRRS virus was amplified via RT-PCR and cloned in plasmid pBBGroE. *B. abortus* RB51 transformed with the recombinant plasmid stably maintained the plasmid and expressed the GP5 antigen. The recombinant RB51 strain was used to immunize twelve 3-week old piglets by a single subcutaneous inoculation of 10^{10} colony forming units of the bacteria. The vaccinated pigs developed GP5-specific antibodies by 4 weeks post-vaccination as determined by the Western blot analysis of their serum samples. The presence of low titers of virus neutralization antibodies were also detected in these serum samples. However, the blood lymphocytes collected from the vaccinated pigs did not secrete significant amounts of interferon-gamma upon in vitro stimulation with either recombinant GP5 protein or whole PRRS virus antigen, suggesting a poor T cell-mediated immune response to the vaccine. In order to determine the protective efficacy of the induced immune responses, the vaccinated pigs were challenged by intranasal inoculation of highly virulent PRRSV strain P129. Another group of 12 unvaccinated pigs similarly challenged with the virus served as positive controls for the infection. The clinical signs of the challenged pigs were scored on daily basis, and the viral shedding in their nasal secretions and the viral load in their blood were determined twice a week for 3 weeks. At 1, 2, and 3 weeks post-challenge a minimum of 3 pigs each from the vaccinated and unvaccinated groups were euthanized to assess the gross and microscopic lesions in their lungs. Based on the RT-PCR detection, pigs in both vaccinated and unvaccinated groups equally shed the virus up to 2 weeks post-challenge. No difference was also detected between the two groups with regard to the clinical signs, blood viral load, and gross and microscopic lesions in the lungs. Taken together, these findings indicate that the level of GP5-specific antibody response induced by the recombinant RB51 strain vaccination does not confer any protection against intranasal challenge with virulent PRRS virus.