RESEARCH ABSTRACT

SWINE HEALTH

Title: ***Exploiting the potential of leader proteinase coding sequence of foot-and-mouth disease virus to derive attenuated strains suitable for pathogenesis studies and development of improved countermeasures*** **– NPB** #12-023

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Scientific Abstract: We have previously demonstrated that the foot-and-mouth disease virus (FMDV) leader proteinase (Lpro) is a virulence factor. Viruses with deletions of Lpro coding region (leaderless) are viable and display an attenuated phenotype in vivo in swine and cattle. Attempts to use the leaderless virus as a vaccine have shown promising results but with limitations. In some instances the virus was virulent and in others adaptive immunity fell short of inducing protection against challenge. Recently, we have found that viruses with mutations in Lpro SAF-A/B, Acinus and PIAS domain (SAP mutant) are viable and can mount a strong adaptive immunity in swine. Remarkably, SAP mutant virus inoculated animals developed a strong neutralizing antibody response and were completely protected against challenge with WT FMDV as early as 2 and for at least 21 days post inoculation. However, in rare occasions, SAP mutant virus reverted to virulence. Here we have evaluated the possibility of adding other mutations in the Lpro coding region to increase stability and safety. We observed that some mutations (H* mutants) were tolerated standing alone but not in combination with SAP, however other mutants (CTE) were viable and stable rendering viable viruses. We are currently characterizing these new viruses for further development into live attenuated vaccine candidates. On the other hand, we have evaluated the possible serotype cross protection rendered by SAP mutant attenuated virus in early challenge experiments.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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