

SWINE HEALTH

Title: Live-animal assay for identifying correlates of cross-protection for swine influenza virus vaccines when vaccinated in the presence of maternal antibody. **NPB#14-093**

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Date Submitted: 03/23/2016

Scientific Abstract: Live-attenuated influenza virus (LAIV) vaccines have been previously shown to confer protection against heterologous H3N2 IAV challenge in piglets with maternally-derived immunity (MDI) while whole-inactivated virus (WIV) vaccines were associated with enhanced disease. Protection in MDI positive piglets was associated with T cell priming measured in the periphery. This study was aimed at identifying a live-animal assay to predict cross-protection in piglets when vaccinated in the presence of WIV- or LAIV-induced MDI. At three days of age, piglets from each sow were vaccinated intranasally with LAIV or left non-vaccinated. Unexpectedly, LAIV vaccine transmitted from vaccinated litter mates to non-vaccinated litter mates (this did not occur in a preliminary test of vaccination in 3-week old pigs) resulting in all piglets being IAV antibody positive by 42 days post vaccination. Nonetheless, the presence of both WIV and LAIV MDI inhibited the development of IAV-specific IgA in the nasal wash compared to piglets vaccinated without MDI. At 42 days post vaccination, interferon-gamma (IFN γ) producing T cells in the periphery were not inhibited by MDI, however overall levels of IFN γ producing T cells were low. IFN γ production in the periphery significantly increased post-challenge in piglets without MDI or with WIV MDI, but not in piglets with LAIV MDI. This data suggests that piglets vaccinated with WIV MDI primed a T cell response that was measurable following challenge, while LAIV had a trend for a primed T cell response following challenge. Despite the unmeasurable immune response to the LAIV in pre-challenge samples from piglets with LAIV MDI, these vaccinates had significantly reduced lung lesions compared to piglets vaccinated without MDI or with WIV MDI suggesting these piglets were protected from lung pathology. Overall, LAIV vaccination in the presence of MDI provided protection against heterologous challenge, but a live-animal assay for evaluating vaccine immunogenicity in MDI-positive piglets has not been clearly identified.

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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