

SWINE HEALTH

Title: Development of modified live attenuated virus vaccine expressing porcine IL-18 – NPB #13-031 revised

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Scientific Abstract: Novel swine influenza vaccine development should focus on efficacy, route of delivery and improvement of heterosubtypic immunity. This proposal utilizes a new strategy to develop a modified live influenza vaccine expressing porcine IL-18 (TX/98NS1Δ126-swIL18) since IL-18 has been shown to be an important immuno-modulator that is able to enhance the development of antigen-specific immunity and vaccine efficacy. The TX/98NS1Δ126-swIL18 has been shown to stably express bioactive porcine IL18, and was tested in pigs challenged with heterovariant H3N2 and heterosubtypic H1N1 SIVs using the modified live influenza vaccine TX/98NS1Δ126 and the whole virus inactivated vaccine as controls. The results showed the TX/98NS1Δ126-swIL18 was able to reduce lung lesions, decrease viral nasal shedding and provide broad protection against multiple SIV strains including heterovariant and heterosubtypic SIVs, similar to the control vaccine TX/98NS1Δ126. However, the inactivated vaccine induced enhanced respiratory disease (evidenced by higher lung lesions) despite also decreasing virus shedding and virus replication. No difference in efficacy between two live vaccines is probably due to the fact that the TX/98NS1Δ126-swIL18 is too attenuated to replicate efficiently in pigs. The specific adjuvants enhance cell-mediated immunity of the whole virus inactivated vaccine that most likely contributes to decreasing virus shedding and clearance. This study proves the concept that heterosubtypic immunity can be improved with vaccines containing specific adjuvants or additional cytokines. The proposed project has improved our knowledge on influenza vaccine development and correlates of heterosubtypic immunity to better control swine influenza in swine herds.

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 This report has not been peer-reviewed.

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