RESEARCH ABSTRACT

SWINE HEALTH

Title: Development of swine influenza virus platform vector vaccines to control swine influenza virus and porcine epidemic diarrhea virus -NPB #15-013

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Scientific Abstract:
Influenza A virus (IAV) is a major cause of morbidity and economic loss in the swine industry. The newly discovered influenza D virus (IDV) is a seven-segmented virus that was initially isolated from swine but subsequently shown to exist in a bovine reservoir. Experimental inoculation of swine with IDV failed to produce any clinical disease and replication was limited to the upper respiratory tract. These results, in conjunction with a low seroprevalence in pigs (9.5%), suggest IDV is not a primary swine pathogen. A chimeric IAV was engineered by replacement of the IAV hemagglutinin (HA) gene with the hemagglutinin esterase fusion gene from IDV and replacement of the IAV neuraminidase gene with the S1 gene of porcine epidemic diarrhea virus (PEDV). This chimeric virus was further attenuated by mutating the HA trypsin-dependent cleavage site to an elastase-sensitive motif. Pigs were vaccinated twice intranasally with the chimeric viruses and challenged with a heterosubtypic IAV. No serological response to IAV or PEDV was measured following vaccination and in contrast to our previous study, vaccine virus shedding was not detected following initial vaccination. Significantly higher IAV titers were measured in bronchoalveolar lavage fluids on day 3 post challenge for vaccinates as compared to controls however there were no differences between groups on day 5. Similarly, significantly higher PEDV titers were measured in feces from vaccinated pigs on days 2 and 4 post challenge as compared to controls. The shedding results for IAV and PEDV suggest a vaccine associated enhancement of infection however there were no differences between vaccine groups' histopathology scores. Of note, widespread severe clinical disease due to *Streptococcus suis* was manifest immediately following initial vaccination and may have adversely affected the immune system's ability to respond to the vaccine. Likewise, a number of viral co-infections were identified from the pigs during the experiment which may have adversely impacted vaccine performance.