

## PORK SAFETY

**Title:** Broadly protective nasal mucosal vaccine for influenza A virus of swine – NPB #16-060)

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### **Scientific Abstract:**

The substantial genetic diversity represents the greatest challenge for the development of a broadly protective vaccine against IAV-S. We sought to expand the antigenic coverage of IAV-S vaccines by computationally designed a consensus HA antigens using a large set of natural HA sequences. In this particular project, we constructed a consensus H3 gene (designated H3-CON) based on a set of 1,112 natural H3 sequences of IAV-S deposited on GenBank from 2011 to 2015. The H3-CON protein was expressed by using the baculovirus expression system, followed by affinity purification by immobilized metal affinity chromatography. The purified H3-CON protein was emulsified in an oil-in-water adjuvant, and injected to pigs twice with 3-week interval. For comparative purposes, the HA protein of a naturally occurring H3N2 IAV-S strain TX98 was also expressed and purified. The H3-TX98 protein was emulsified and injected to pigs in the same manner as the H3-CON. Pigs vaccinated with H3-CON antigen elicited a broader spectrum of neutralizing antibodies than those vaccinated with H3-TX98 antigen. After challenge infection with a heterologous H3 IAV-S strain, pigs vaccinated with H3-CON antigen shed less virus than those vaccinated with H3-TX98 antigen. Collectively, the data indicate that H3-CON antigen elicited broader cross-neutralizing antibodies and better heterologous protection than did TX98 antigen. Therefore, the consensus immunogen approach might be an attractive approach to broaden the antigenic coverage of an IAV-S vaccine.

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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 This report has not been peer-reviewed.

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