

## SWINE HEALTH

**Title:** Development of Edible Vaccines against PRRSV: A Proof of Concept Study – NPB #06-128

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### Scientific Abstract:

Porcine reproductive and respiratory syndrome virus (PRRSV) has caused a pandemic that has proven extremely costly for the world pork industry. Insufficient vaccination methods are one reason the emergence of PRRSV has had such brutal consequences. Current modified live virus (MLV) vaccines have several shortcomings: they are often ineffective against varying strains of PRRSV and can revert back to pathogenic PRRSV.

The aim of this work was to investigate the possibility of developing a subunit vaccine in maize as an alternative to current MLVs against PRRSV. A maize-optimized ORF5 DNA sequence was designed for glycoprotein 5 (GP5), the major envelope protein of PRRSV. This DNA sequence was used to create a vector to transform maize callus via particle bombardment. Maize callus was transformed. Callus was cultivated, and screened for ORF5 DNA by PCR and GP5 protein by SDS-PAGE and western blot. Protein was extracted from callus, and tested in vivo in mice for antigenic response to GP5. Mouse immune response in serum was determined using ELISA

Screening revealed several lines of maize callus that produced detectable quantities of GP5. Protein extract from this callus, when administered intramuscularly, with or without adjuvant, or administered orally, however, did not produce conclusive results about the immunogenicity of the protein. The main reason is that the expression level of the recombinant protein is low. Although clearly detectable, the protein's quantity could not be affirmatively determined, and that created a problem in determining the quantity administered to the test animals. The lack of strong antibody response over that of negative controls could very well be attributed to the insufficient amount of target protein administered. Thus, investigating new transgene construct with different promoters will be of high priority to increased recombinant protein expression level in maize, since this determines whether or not transgenic maize could be ultimately used as vaccines for PRRSV.

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