

SWINE HEALTH

Title: Development of Edible Vaccines against PRRSV: A Proof of Concept Study – NPB #04-171

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Abstract

Porcine reproductive and respiratory syndrome (PRRS) has devastated swine industry and resulted in tremendous economic losses worldwide. Currently, the control of PRRS has largely relied on modified live-attenuated vaccines (MLVs). However, the versatility and safety of MLVs are of major concerns as MLVs such as Ingelvac® PRRS MLV have been shown to revert to a pathogenic phenotype and causes diseases in pigs. On the other hand, edible plant vaccines have been shown to be able to elicit mucosal and systemic immune responses and confer protection. The long-term goal of this project is to develop transgenic corns expressing PRRSV immunogens as edible recombinant vaccines to help eliminate the PRRS virus from swine herds. PRRSV ORF5 (GP5) and ORF6 (M) proteins will be expressed in transgenic corn as recombinant vaccines since they have been shown to induce neutralizing antibodies. Corn is selected as the recombinant protein expression host because it is the primary feedstock for swine and previous researches have found that corn grain provides natural protection, “bioencapsulation”, for recombinant proteins to defer gastroenteric degradations during immunogen delivery. To achieve the overall goal, the feasibility of expressing recombinant GP5 and M protein will be evaluated in transgenic corn callus followed by optimizing the expression levels of the proteins by using different transgene constructs; the immunogenicity of separately or co- expressed proteins will be tested in pigs, and finally, the efficacy of the recombinant subunit vaccines will be evaluated.

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