Expression and Immunogenicity of an Alphavirus Replicon African Swine Fever Virus Vaccine Candidate in Swine

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Summary and Implications

African swine fever virus (ASFV) proteins were expressed in an alphavirus based replicon expression system. Pigs vaccinated with the recombinant vectors developed ASFV-specific antibodies. This is the first known use of this technology against ASFV.

Introduction

African swine fever virus is the cause of acute hemorrhagic fever in swine. The virus is endemic to Africa and parts of Eurasia. ASFV represents a significant threat to the US swine industry as a foreign animal disease. Alphavirus-derived replicon particles (RP) are safe and effective vaccine vectors, and have recently been approved for use in swine by USDA.

Materials and Methods

The ASFV p30 and p72 genes were cloned into the replicon DNA plasmid and confirmed intact by sequencing. A histidine tag sequence was added to the 3' end of each gene for use in expression assays. Replicon RNA was generated by *in vitro* transcription using T7 RNA polymerase. RP were produced by co-electroporation of p30 and p72 replicon RNA and helper RNAs into Vero cells. The RP were harvested by affinity chromatography and titer was determined by immunofluorescence assay. Vero cells were infected with RP expressing either p30 or p72, and cell lysates were analyzed by Western blot using anti-histidine tag antibodies. Young pigs (n=3) were vaccinated twice with a combination of RP expressing ASFV p30 or p72, and serum samples were analyzed for anti-ASFV response.

Results and Discussion

Western blot confirmed that RP were capable of expressing ASFV p30 and p72 (Figure 1). Western blot analysis of RP-vaccinated pig serum showed specific anti-ASFV antibodies. Future work will evaluate the ability of RP-based vaccine candidates to protect pigs in ASFV challenge studies.

Figure 1. Expression of ASFV p30 and p72 using RP.