

SWINE HEALTH

Title: Construct and Test Recombinant Adenoviruses Vectoring African Swine Fever Virus Genes in Inducing Immune Protection in Pigs -
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Scientific Abstract:

African swine fever (ASF) is a highly lethal swine viral disease caused by African swine fever virus (ASFV). Despite extensive research, there are currently no commercial vaccines available due to the biological complexity of this virus. Some experimental vaccines using live attenuated ASFV can induce full protection against the challenge of the same or similar wildtype strains, indicating that antigen-specific immunity is involved in the protection. However, the attenuated ASFV cannot be immediately commercialized mostly due to the safety issues. To develop an alternative vaccine platform that avoids these drawbacks, we adapted a genomic and bioinformatic approach to select eight ASFV genes as vaccine antigens according to the expression profiles and biological functions of virus and host genes in pig macrophages infected with ASFV Georgia strain and used a replication-defective adenovirus to vector the selected antigens. Additionally, we applied knowledge learned from published scientific literatures to design the vaccine to specifically induce immunities that are most likely to be protective based on the nature of ASFV, protein structures, and known immune mechanisms. Two porcine genes were also included in the vaccine design in order to enhance the immune responses to the vaccination. Four replication defective recombinant adenoviruses inserted with ASFV and/or porcine genes were produced according to the design. A vaccine candidate consisting of the four recombinant adenoviruses has been produced for animal testing; however, the animal experiment could not be conducted due to the shutdown of animal facility at PIADC for repair of waste water treatment system. We tried to use the animal facility in Kansas State University but could not find the space for the experiment in the funding period.

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 This report has not been peer-reviewed.

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