RESEARCH ABSTRACT
SWINE HEALTH

Title: Porcine Adenovirus 3 Based Vaccine for Porcine Respiratory and Reproductive Syndrome (PRRS). **NPB #06-126**

Investigator: Dr. Suresh Tikoo

Institution: University of Saskatchewan Saskatoon SK Canada

Date Submitted: June, 2008

Abstract

Infectious diseases remain the major cause of death and economic losses in animals. One way to reduce this is by vaccination. The use of safe and effective vaccines against diseases is crucial not only to improve the health of the animals but also to reduce the widespread use of antibacterial drugs, which can end up as contaminants in meat products. Although immunization has a great impact on the economics of livestock production and on animal suffering, today's vaccines produced by conventional means are still imperfect in many respects including excessive virulence and less-than-optimal efficacy. Through the use of genetic engineering, we are now able to generate live vaccines that are safer and possibly more effective than conventional vaccines. By introducing multiple gene deletion mutations in a directed way in the genome of a virus, one can virtually eliminate the agent's ability to cause disease, and the chance of reversion, as well as make room for the insertion of genes encoding vaccine antigens.

As porcine adenovirus (PAdV)-3 infects pigs but often does not produce disease, it is a good candidate as a live vaccine. We characterized PAdV-3 at the molecular level by determining the complete genome sequence and transcriptional map. We also have demonstrated the feasibility of manipulating and constructing recombinant PAdV-3 expressing vaccine antigens. We also demonstrated the feasibility of a) constructing synthetic genes encoding vaccine antigens of the porcine respiratory and reproductive (PRRS) virus and b) constructing recombinant PAV-3s expressing these vaccine antigens of the PRRS virus. Here, we demonstrate that use of synthetic (codon optimized) PRRS virus glycoprotein genes helped to increase the level of expression of these glycoproteins in mammalian cells. However, increased expression was not sufficient to induce protective inmmune responses in pigs.