**Title:**

**A nanoparticle vaccine platform for African swine fever virus**

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**Abstract:**

African swine fever (ASF) has been called “pig ebola” due to its high mortality, up to 100%, and ability to cause hemorrhagic lesions in infected pigs. African swine fever virus (ASFV) has never been found in North America but has recently gained a foothold in China, rapidly spreading throughout Asian swine herds costing the swine industry billions of dollars. It appears ASFV will soon jump to the United States (U.S.) with dire consequences unless preventative measures are put into place. While some attenuated modified live ASFV vaccines are becoming available, they have limited safety profiles and can cause unwanted side effects in vaccinated pigs. Unfortunately, there are currently no subunit ASF vaccines that can fully protect against any of 24 genotypes of ASFV. Recent work has identified epitopes of the ASFV that have limited protective immune responses when used in subunit vaccines. Identifying the optimal epitopes and coupling them with existing nanoparticle technology to enhance their efficacy should generate a vaccine that helps prevent introduction of ASF into the U.S. or mitigate the effects of the disease should it be introduced into our swine herds. To develop a commercial ASF vaccine, we need a vaccine platform which induces increased virus-specific mucosal IgA, IgG, and T cell responses in pigs. Thus, utilizing a nanoparticle-based subunit vaccine based upon chitosan and Poly (lactic-co-glycolic acid) (PLGA) combined with known and predicted T cell epitopes from critical ASFV proteins should prove effective at eliciting a protective immune response against the strains circulating in Europe and China and potentially provide cross protection against other genotypes. Our studies will combine partially protective and novel epitopes from ASFV proteins into nanoparticle vaccines that will be used to vaccinate pigs. We will then evaluate immune correlates and ability of antibodies from vaccinated pigs to neutralize ASFV in vitro.

**Keywords:** African swine fever, nanoparticle subunit vaccines, pig disease, virus