RESEARCH ABSTRACT
SWINE HEALTH

**Title:** Evaluation of carrier state and protection against a contemporary Senecavirus A isolate in pigs previously infected with an historical strain – **NPB #18-034**

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## Scientific Abstract

An increasing concern in the swine industry due to Senecavirus A (SVA) infections has been arising since the previous recent years, due to it causing a vesicular disease that is indistinguishable from high-consequence foreign animal diseases, including foot-and-mouth disease. In the year of 2018, the total number of foreign animal investigations carried out in the United States was 2,072, of which 1,592 were caused by SVA infections in pigs. Such number highlights the amount of resources that are allocated into these investigations in order to rule out other vesicular diseases, and also brings attention to the matter of how to better deal with having an endemic vesicular disease in the swine population. Preliminary data demonstrated the presence of viable virus in the tonsils of naturally-infected pigs approximately 90 days after developing clinical disease, suggesting a potential for establishing persistent infections and an asymptomatic carrier state. Also, amino acid changes on the viral capsid may be driving the ability of contemporary isolates to escape from host immune responses previously built against historical isolates. This research project's goal is to investigate the ability of SVA to induce asymptomatic carrier state in pigs, and evaluate the susceptibility of pigs experimentally infected with a contemporary isolate after previous exposure with an historical strain. In addition, a comparison of different diagnostic methods was done on different time points of infection. A total of 28 three-week-old piglets were divided into three groups: Group HC, inoculated with the historical isolate from 1999 (n=12); Group CC, inoculated with contemporary isolate from 2017 (n=12); and a negative control group (n=4). At 49 days post-inoculation (dpi), 4 animals from each inoculated group and 2 from the control group had been necropsied, and then both groups were inoculated again at 50 dpi, with the contemporary strain. Sampling methods included oral, fecal and tonsil swabs, as well as tonsil scrapings, sera collection, and oral fluids. Samples were tested by SVA RT-qPCR, and serological

testing was done by indirect immunofluorescence (IFA). The time points for collections were on 1, 3, 7, 10, 14, 21, 28, 35, 42, and 48 dpi, and 2, 5, 7, 14 and 21 after re-challenge. Serological response was first detected at 10 dpi on the CC group and 14dpi on the HC group, with 100% of animals from each group showing seropositivity at 42 and 28 dpi respectively. The tonsils of the soft palate from pigs in both groups showed to be able to harbor SVA up to 49 dpi, and it was also found in tonsils of animals that were necropsied at 21 days after the second inoculation. Tonsil scraping in live animals was able to detect SVA positive animals up until 48dpi in both groups, 13 days after last detection in fecal swabs, with 7/12 in the HC and 2/12 in the CC groups yielding mean Ct values of 34 in both groups. Shedding of viruses in saliva and feces was only detected on day 2 after the second inoculation, while it was found up to 35 days after the first inoculation. These results show that animals can be asymptomatically infected with SVA after being thought to be clear of the virus, and could potentially be a source of infection to naïve animals. Also, animals that were experimentally infected with historical and contemporary strains were not susceptible to the contemporary strain after the first exposure. Tonsil scraping might be an important tool for the detection of asymptomatically infected animals.