RESEARCH ABSTRACT

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SWINE HEALTH

Title: Development of pseudotyped reporter viruses for detection and characterization of neutralizing antibody response to PEDV and Deltacoronavirus – **NPB #14-181**

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Scientific Abstract:

One impediment to current PEDV and PDCoV research is the lack of good cell cultures systems to assess virus replication. The overall objective of this research was to generate biological reagents for detection and characterization of neutralizing antibody to PEDV and Porcine Deltacoronavirus. (PDCoV). The specific goal was to generate luciferase reporter viruses that express the spike (S) protein of PEDV and PDCoV and to use these reagents for detection and quantitation of virus-neutralizing antibody. The PEDV and PDCoV S genes were synthesized, inserted into pcDNA3 expression plasmids, and shown to express high levels of protein in cells. To generate reporter virus, the PEDV and PDCoV S gene expression plasmids were co-transfected with plasmids containing lentivirus core genes and luciferase reporter genes. Virus-like particles were produced but were found to be poorly infectious in Vero cells and MDCK. Expression plasmids containing deletions or mutations in the endoplasmic retention signal were made, and resulted in increased expression of the PEDV S protein at the cell surface; however, this did not restore infectivity of the reporter virus. A variety of cell-culture conditions were tested to improve yield and infectivity of PEDV reporter virus, but we were not able to reproducibly generate high-titered PEDV pseudovirus stocks. PEDV appears to differ from SARS and MERS coronaviruses in that the S protein alone may not be sufficient for production of infectious pseudotyped virus. At present, live infectious virus will be needed for analyses of neutralizing antibody in PEDV-infected or suspect pigs.

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 This report has not been peer-reviewed.

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