RESEARCH ABSTRACT

SWINE HEALTH

Title: Defining PEDV maternal humoral immunity and correlates of neonatal protection – **NPB #13-264**

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SCIENTIFIC ABSTRACT

The level and isotype (IgG, IgA, and neutralizing antibodies) of anti-PEDV antibody necessary to protect neonatal pigs against clinical PEDV infection was investigated using laboratory measurements. As a first step, all tools [virus isolation, PCR (feces), IFA (IgG in serum), FNN (neutralizing antibodies in serum and colostrum/milk), ELISA (IgG and IgA antibodies in serum and colostrum/milk)] required for this study were developed and validated. The experiment was conducted in two phases.

In the first phase, we evaluated protection (passive maternal immunity) against PEDV in piglets from sows previously exposed to PEDV (at ~100 days of gestation). Piglets from 2 negative control and 8 PEDV-immune sows were inoculated with 10^3 TCID50 PEDV at 3 days of age and monitored for 14 days to observe clinical profiles and PEDV shedding. Serum and colostrum/milk samples were tested for PEDV-specific VN, IgG and IgA antibodies. Fecal samples were tested individually pooled by litter by PEDV rRT-PCR. No clinical sign were observed in control sow litters, with a piglet mortality <7%. In litters from PEDV immune sows, diarrhea was observed in 27.3 to 100% of piglets and mortality ranged from 0 to 40%. IgG antibody levels in colostrum from PEDV immune sows significantly decrease after 48-72 h post-partum (milk). A linear relationship between milk IgA levels and virus shedding from piglets were observed where piglets receiving milk with higher IgA titers had lower PEDV shedding in feces (*p* value = 0.04).

In the second phase, we investigated the role of systemic antibody in the protection of PEDV infection in naïve piglets. At 2 days of age, new born piglets from 7 PEDV naïve sows were intraperitoneally administered 1 of 6 levels of PEDV antibody harvested from PEDV immunized sows. Piglets were orally inoculated with 10^3 TCID50 PEDV at 5 days of age. Observation, sampling, and testing were performed as in Phase 1. Fecal samples were tested individually by PEDV rRT-PCR. Correlation between clinical profiles, PEDV shedding from piglet feces and immunity levels administered to each pig will be analyzed to determine the systemic antibody level necessary

to provide piglet protective immunity against PEDV infection. All piglets (100%) develop diarrhea within 48h post-inoculation and mortality by treatment ranged from 50 to 100%. Efficient uptake of the injected antibodies into the circulation was evidenced by the correlation between the level of antibodies injected (1 of 6 levels) and the titers of VN, IgG, and IgA in serum from piglets grouped for specific treatment.). A linear relationship (log2) between treatment levels and virus shedding in piglets were observed. However, comparative mortality rates showed that piglets received milk from PEDV immune sows (Phase 1) had higher survival rates to piglets from PEDV naive sows (Phase 2) after experimental PEDV inoculation. Thus, lactogenic antibodies may play more important role than systemic antibodies in protecting new born piglets against PEDV infection.