

**Title:** Effect of porcine epidemic diarrhea virus infectious doses on outcomes of infection in naïve conventional neonatal and weaned pigs- **NPB #14-231**

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**Scientific Abstract:**

Porcine epidemic diarrhea virus (PEDV) was identified in the United States (U.S.) swine population for the first time in April 2013 and rapidly spread nationwide. However, no information has been published regarding the minimum infectious dose (MID) of PEDV in different pig models. The main objective of this study was to determine the oral minimum infectious dose of PEDV in naïve conventional neonatal piglets and weaned pigs. A U.S. virulent PEDV prototype isolate (USA/IN19338/2013) with known infectious titer was serially ten-fold diluted in virus-negative cell culture medium. Dilutions with theoretical infectious titers from 560 to 0.0056 TCID<sub>50</sub>/ml together with a medium control were orogastrically inoculated (10ml/pig) into 7 groups of 5-day-old neonatal pigs (n=4 per group) and 7 groups of 21-day-old weaned pigs (n=6 per group). In 5-day-old pigs, 10ml of inoculum having titers 560 – 0.056 TCID<sub>50</sub>/ml, corresponding to polymerase chain reaction (PCR) cycle threshold (Ct) values 24.2 – 37.6, resulted in 100% infection in each group; 10ml of inoculum with titer 0.0056 TCID<sub>50</sub>/ml (Ct>45) caused infection in 25% of the inoculated pigs. In 21-day-old pigs, 10ml of inoculum with titers 560 – 5.6 TCID<sub>50</sub>/ml (Ct 24.2 – 31.4) resulted in 100% infection in each group while 10ml of inoculum with titers 0.56 – 0.0056 TCID<sub>50</sub>/ml (Ct values 35.3 – >45) did not establish infection in any pigs under study conditions as determined by clinical signs, PCR, histopathology, immunohistochemistry, and antibody response. These data reveal that PEDV infectious dose is age-dependent with a significantly lower MID for neonatal pigs compared to weaned pigs. This information should be taken into consideration when interpreting clinical relevance of PEDV PCR results and when designing a PEDV bioassay model. The observation of such a low MID in neonates also emphasizes the importance of strict biosecurity and thorough cleaning/disinfection on sow farms.

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