

Title: Pathogenesis of the S-INDEL PEDV in nursing piglets and cross-protection against the US original highly virulent PEDV strains - **NPB #14-265**

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Scientific Abstract

Although the original US porcine epidemic diarrhea virus (PEDV) was confirmed as highly virulent by multiple studies, the virulence of spike-insertion deletion (S-INDEL) PEDV strains is undefined. In this study, 3-4 day-old conventional suckling piglets were inoculated with S-INDEL PEDV Iowa106 (4 litters) to study its virulence. Two litters of age-matched piglets were inoculated with either original US PEDV PC21A or mock as positive and negative controls, respectively. Subsequently, all pigs were challenged with original US PEDV PC21A on 21-29 post-inoculation-day (PID) to assess cross-protection. All S-INDEL Iowa106- and original US PC21A-inoculated piglets developed diarrhea. However, the severity of clinical signs, mortality (0-75%) and fecal PEDV RNA shedding titers varied among the four S-INDEL Iowa106-inoculated litters. Compared to original PC21A, piglets euthanized/died acutely from S-INDEL Iowa106 infection had relatively milder villous atrophy, lower antigen scores and more limited intestinal infection. Two of four S-INDEL Iowa106-infected sows and the original PC21A-infected sow showed anorexia and watery diarrhea for 1-4 days. After original PC21A challenge, a subset (13/16) of S-INDEL Iowa106-inoculated piglets developed diarrhea, whereas no pigs in the original PC21A-inoculated pigs had diarrhea. Our results suggest that the virulence of S-INDEL PEDV Iowa106 was less than the original US PEDV PC21A in suckling pigs, with 100% morbidity and 18% (6/33) overall (0 to 75%) mortality in suckling pigs depending on factors such as the sow's health and lactation and the piglets' birth weight. Prior infection by S-INDEL Iowa106 provided partial cross-protection to piglets against original PC21A challenge at 21-29 PID.

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