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Transmission of Porcine Reproductive and Respiratory Syndrome Virus from Persistently Infected Sows to Contact Controls

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Introduction: The objective of this study was to determine if porcine reproductive and respiratory syndrome virus (PRRSV) could persist in non-pregnant sows and if persistently infected sows could transmit virus to naïve contact controls. A PRRSV persistently infected non-pregnant sow was defined as an animal that had progressed beyond the acute phase of the PRRSV infection, yet still harbored detectable virus [1]. Clinical and diagnostic parameters used to define the acute phase of PRRSV infection included viremia, anorexia, fever (> 40 ^{0} C), and lethargy [2]. A non-pregnant sow was considered persistently infected if all 4 parameters were negative at the end of a specified testing period following experimental infection, but PRRSV was still detectable at necropsy.

Materials and methods: Twelve PRRSV-naïve non-pregnant sows (index sows) were infected with a field isolate of PRRSV and housed in individual isolation rooms for 42 to 56 days post-infection (pi) [3]. Following this period, 1 naïve contact sow was placed in each room divided by a gate allowing nose-to-nose contact with a single index sow. Index sows were not viremic at the time of contact sow entry. Sows were housed together for 30 days. Sera were collected weekly and tested by Taqman polymerase chain reaction and virus isolation. The ORF 5 region of recovered isolates was nucleic acid sequenced and compared to the index virus.

Results: PRRSV viremia in index sows was detected from 3-14 days pi. Transmission of PRRSV was detected in 3 of 12 replicates. PRRSV nucleic acid was detected by polymerase chain reaction, and infectious virus was detected by virus isolation in sera from 3 of the 12 contact sows at 49, 56, and 86 days pi. All 3 infected contacts developed PRRSV-antibodies. PRRSV was not detected in the serum of index sows during the period of shedding, despite frequent sampling. PRRSV nucleic acid was detected in lymphoid tissues of all 12-index sows necropsied at 72 or 86 days pi, and microscopic lesions of PRRSV infection (germinal centers with blast lymphocytes) were observed in multiple sites. PRRSV nucleic acid was detected in tonsil samples collected from 60% of the index sows [4]. Molecular sequencing indicated that representative samples from index and infected contacts were homologous (> 99%) to the PRRSV used to infect index sows at the onset of the study.

Conclusions: This study demonstrates that PRRSV can persist in non-pregnant sows and that persistently infected sows can transmit virus to naïve contacts. The inability to detect PRRSV in the sera of the 3 index sows during the period of shedding may indicate alternative routes of viral excretion, such as saliva. The remaining 9 index sows had the potential to shed, based on identification of PRRSV in multiple tissue sites; however, tonsil did not appear to be a representative site for PRRSV persistence in sows. Studies are ongoing to assess the duration of persistence in breeding age swine at 4-6 months pi.

References

1. Ahmed R, Morrison LA, Knipe DM. Persistence of viruses. In: Fields BN ed. Field's Virology. Philadelphia: Lippencott-Raven, 1996: 219-249.
2.Loula TJ. Mystery pig disease. Agri Prac 1991;12:23-34.
3.Bierk MD et al. A diagnostic investigation of chronic PRRS virus infection in a swine breeding herd. *Vet Rec.* 2001; 148: 687-690.
4.Rossow KD et al. Lymph node lesions in neonatal pigs congenitally exposed to PRRS virus. *J Vet Diagn Invest.* 1994; 6:368-371.