Investigation of a novel U.S strain of highly pathogenic porcine reproductive and respiratory syndrome virus (PRRSV)

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Key Points:

- We investigated a PRRS strain that appeared to be highly virulent as reflected by higher viral load in the serum of inoculated and contact pigs as well as based on the severity of the histological lesions observed in lungs and brain.

- We detected a high concentration of PRRSV in the air suggesting that this strain could be transmitted airborne. More studies are needed to confirm whether airborne spread plays a role in the dissemination of this strain in the field.

How did the idea come up?

A group of farms experienced severe losses and unusual clinical presentation (neurological signs) due to infection by a new strain of PRRS virus. Clinical reports of such a presentation have been published from China but none in United States.

What did we do?

We allocated 28 weaning-age pigs from a PRRSV-negative farm to 3 groups. Four pigs served as negative controls, 8 pigs were inoculated with a 1-8-4 virulent strain (MN) and 8 pigs were inoculated with the new virulent strain (OK). Four piglets were added to each inoculated group to serve as contact sentinel pigs.

We recorded body temperatures every day and collected blood samples and air samples on days 1, 3, 6, 9, 12, and 14 post-inoculation. On day 14 post-inoculation, pigs were humanely euthanized and necropsied at the University of Minnesota, Veterinary Diagnostic Laboratory.

What did we find?

Pigs infected with the OK strain (either inoculated intramuscularly or by contact) did not show neurological signs but showed more severe depression and respiratory signs (cough and dyspnea) than the pigs infected with the MN strain.

The viral load, estimated by real-time PCR, was higher (lower Ct values) in the serum of the pigs inoculated with the OK strain.

Brain and lung tissues had more severe lesions histologically in the pigs infected with the OK strain than in pigs infected with the MN strain.

There was a higher viral load in the air in the room housing the pigs infected with the OK strain than in the room housing the pigs infected with the MN strain.

What does it mean?

We failed to reproduce the neurological signs experience on the farm but corroborated the fact that PRRSV can cause brain lesions in pigs.