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NEWS ABOUT PIG HEALTH PRODUCTS

An interview with
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Performance — *not* serology or PCR — is best indicator of modified-live PRRS vaccine efficacy

Q: Testing commercial pigs after vaccination with a modified-live vaccine for porcine reproductive and respiratory syndrome (PRRS) can yield variable results. Specifically, enzyme-linked immunosorbent assay (ELISA) findings may be inconsistent, and not all pigs are going to be positive on polymerase chain reaction (PCR). Do these results reflect a lack of protection?

NG: Inconsistent or negative ELISA and PCR results after vaccination do not reflect poor protection.

In pigs *naïve* for PRRS, ELISA as well as PCR responses are consistently positive in pigs vaccinated with a modified-live PRRS vaccine.[1,2] However, these vaccines are primarily used in commercial pigs, which usually have maternally derived antibodies (MDAs). MDAs can delay seroconversion and the duration of viremia after vaccination.[3] Partial dosing will also affect test results.

Q: Will the impact of MDAs on test results be the same with all modified-live PRRS vaccines?

NG: The impact appears to be similar. One of the studies we conducted was on a commercial sow farm with pigs that had detectable MDA levels.[4] The pigs were vaccinated with Fostera® PRRS or another modified-live PRRS vaccine. At 7 days post-vaccination, the serologic response and PCR levels were similar in both groups.

Q: Would you say that blood sampling is pointless for assessing modified-live PRRS vaccine efficacy?

NG: In pigs with MDAs, we don't recommend serology and PCR because they just aren't good tools for assessing vaccine efficacy. Keep in mind the PRRS virus replicates primarily in lungs, not blood.[5] Blood sampling is an indirect measure, and virus in blood can be below the limit of detection. In addition, any PRRS virus that's circulating might only be present for a day or two at various times after vaccination. To detect it, you'd have to sample daily.

We also know that protection with Fostera PRRS tends to start fast due to the way the vaccine is attenuated; it induces immunity, then it's cleared by the immune system.[6]

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continued

> "The vaccine has been shown to provide cross-protection against genetically diverse wild-type PRRS viruses."

[1] Dee S, et al. Comparison of immunological response, shedding profiles, and production performance between Fostera PRRS and Ingelvac PRRS MLV in the face of heterologous PRRSV challenge. Proceedings Am Assoc Swine Vet. 2016;175-178.

[2] Madapong A, et al. Humoral immune responses and viral shedding following vaccination with modified live porcine reproductive and respiratory syndrome virus vaccines. Arch Virol. 2017;162:139.

[3] Misener M, et al. Delayed PRRS virus seroconversion after vaccinating neonatal pigs. Proceedings Internat Pig Vet Soc. 2002;534.

[4] O'Loughlin M, et al. A pilot study evaluating maternal antibody interference with Ingelvac PRRS MLV and Fostera PRRS vaccines. Proceedings Am Assoc Swine Vet. 2015;333-38.

[5] Porcine reproductive and respiratory syndrome (PRRS), Iowa State University. https://vetmed.iastate.edu/vdpam/FSVD/swine/index-diseases/porcine-reproductive Accessed March 21, 2021.

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[8] Jeong J, et al. Vaccination with a porcine reproductive and respiratory syndrome virus vaccine at 1-day-old improved growth performance of piglets under field conditions. Vet Microbiol. 2018;214:113-124.

[9] Aljets K, et al. Field evaluation of vaccination of piglets at processing using Fostera® PRRS. Proceedings Am Assoc Swine Vet. 2017;207-211.

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Q: What's the significance of a fast start and early finish?

NG: A fast start and early finish mean less virus shed and spread, which minimizes the likelihood of virus reversion and recombination.

Q: You mentioned attenuation. How is Fostera PRRS attenuated?

NG: The vaccine is attenuated by passage on pig and hamster cells that express the porcine CD163 receptor. CD163 is the primary receptor for all PRRS viruses, which was discovered by Zoetis scientists. The attenuation method used is why Fostera PRRS is able to readily infect pulmonary alveolar macrophages, which are the primary target cells for PRRS virus replication. Other modified-live PRRS vaccines are attenuated on a monkey kidney-cell line.[7]

Q: Since you don't recommend serology or PCR testing, how can producers tell if a modified-live PRRS vaccine is effective?

NG: The best way would be to challenge pigs vaccinated with a PRRS virus that is different from the vaccine virus, but that's seldom practical. I recommend looking at production performance. To get the best results, however, the vaccine has to be stored, handled and administered correctly. The timing of vaccination is critically important.

Q: Explain why the timing of vaccination is so important.

NG: Fostera PRRS is the only vaccine of its kind labeled for use as early as 1 day of age. That's a major advantage, especially when wild-type PRRS virus is a problem in the nursery because piglets need time to develop a robust immune response. In field trials, pigs vaccinated at processing with Fostera PRRS have performed better than unvaccinated controls.[8,9]

The vaccine has been shown to provide cross-protection against genetically diverse wild-type PRRS viruses.[10] Couple that with the benefit of early vaccination and Fostera PRRS gives producers an opportunity for effective PRRS management.

For more information on Fostera PRRS, contact Dr. Garbes (noel.garbes@zoetis.com) or your Zoetis representative.

toolbox

Toolbox is a series of interviews with veterinarians about their experiences managing antimicrobials, vaccines and other tools for swine health. It is produced by the editors of *Pig Health Today*® on behalf of the US Pork Business of Zoetis.

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