



An interview with
Jose Angulo, DVM
PRRS Specialist,
Managing Veterinarian
Zoetis

“ The primary site of PRRS virus infection is the lung, not blood. Sampling blood or oral fluids is therefore not a direct measure of virus replication. ”

Herd performance best measure of PRRS vaccine efficacy

Q: There are a few questions in the field about monitoring the porcine reproductive and respiratory syndrome (PRRS) status of swine herds vaccinated with Foster[®] PRRS. How can you tell if these herds are protected?

JA: When commercial pigs are tested by ELISA (enzyme-linked immunosorbent assay) at various ages after vaccination with a modified-live PRRS vaccine, the results may be inconsistent. Serology is a valuable tool for measuring exposure, but it doesn't necessarily reveal the level of protection provided by a PRRS virus vaccine.¹ We've also seen vaccinated pigs test negative on PCR (polymerase chain reaction) after vaccination with a modified-live PRRS vaccine.²

It's important to remember that inconsistent or negative ELISA or PCR results don't indicate a lack of protection.

Q: Why don't the tests indicate protection after PRRS vaccination?

JA: The primary site of PRRS virus infection is the lung, not blood.³ Sampling blood or oral fluids is therefore not a direct measure of virus replication. That's why we don't recommend serology or PCR to determine efficacy with a modified-live vaccine. In addition, despite decades of intensive research, we still don't completely understand the PRRS virus protective immune response. As a result, we lack commercial tests for measuring protection.⁴

Q: Are there other reasons test results may be inconsistent or negative?

JA: Partial dosing will affect test results. More often, the reason is the presence of maternally derived antibodies to the PRRS virus, which can delay seroconversion and the duration of viremia after vaccination.⁵ Viremia — the level of virus in blood — may be too low to detect or present for only a day or two. To find it, sampling would have to be done every day.

Q: Do piglets vaccinated with Foster[®] PRRS shed the vaccine virus?

JA: Not for long, and that's a good feature of this vaccine.⁶ Less virus shed and spread reduces the likelihood of virus reversion and recombination.

continued

¹ Christopher-Hennings J, et al. Porcine reproductive and respiratory syndrome (PRRS) diagnostics: Interpretation and limitations. *J Swine Health Product.* 2002;10(5):213-218.

² O'Loughlin M, et al. A pilot study evaluating maternal antibody interference with Ingelvac PRRS® MLV and Fosterera® PRRS vaccines. *Proceedings Am Assoc Swine Vet.* 2015;333.

³ Porcine Reproductive & Respiratory Syndrome (PRRS). *The Pig Site.* <http://www.thepigsite.com/diseaseinfo/97/porcine-reproductive-respiratory-syndrome-prrs/> Accessed June 12, 2018.

⁴ Murtaugh M, et al. Immunological solutions for treatment and prevention of porcine reproductive and respiratory syndrome (PRRS). *Vaccine.* 2011;29:8192-8204.

⁵ Misener M, et al. Delayed PRRS virus seroconversion after vaccinating neonatal pigs. *Proceedings International Pig Vet Soc.* 2002;534.

⁶ 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.

⁷ Angulo J, et al. Efficacy of a PRRSV MLV vaccine against a genetically diverse range of PRRSV isolates. 2015 Allen D. Leman Swine Conference.

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 Fosterera® PRRS. *Proceedings Am Assoc Swine Vet.* 2017;207-211.

¹⁰ Data on file. Study Report No. 12PETBIO01, Zoetis LLC.

¹¹ Welch SKW, et al. A brief review of CD163 and its role in PRRSV infection. *Virus Res.* 2010 Dec.;154 (1-2):98-103.

¹² Pearce DS, et al. Live virus determination of PRRSV vaccines on primary porcine alveolar macrophages. *Proceedings International Pig Vet Soc.* 2014;158.

¹³ Jeong J, et al. Vaccination with a porcine.

¹⁴ Aljets K, et al. Field evaluation of vaccination.

“ Since challenge studies are impractical for most producers, the best indicator of vaccine efficacy in the field is how pigs perform — mortality, growth rate, feed conversion, days to market... ”

Q: Without dependable test results, what assurance is there that Fosterera PRRS is effective?

JA: The gold standard for measuring protection after PRRS vaccination is the respiratory challenge model. Fosterera PRRS has been tested this way in numerous studies, providing clear evidence the vaccine confers cross-protection against genetically diverse wild-type PRRS viruses.⁷

In field trials, pigs vaccinated at processing with Fosterera PRRS have performed better than unvaccinated controls.^{8,9} Furthermore, clinical studies with naïve pigs have consistently shown positive ELISA and PCR responses after vaccination with Fosterera PRRS.¹⁰

Since challenge studies are impractical for most producers, the best indicator of vaccine efficacy in the field is how pigs perform — mortality, growth rate, feed conversion, days to market, etc. — in the face of PRRS infection. Zoetis can also objectively help evaluate the vaccine's efficacy using statistical process-control charts.

Q: Is Fosterera PRRS unique in any way?

JA: It is. In 2004, Zoetis scientists discovered that CD163 — the primary receptor for all PRRS viruses — confers susceptibility to PRRS.¹¹ Fosterera PRRS is attenuated by passage on pig and hamster cells that express the porcine CD163 receptor. This attenuation method enables Fosterera PRRS to readily infect pulmonary alveolar macrophages. The vaccine initiates protection quickly but is cleared by the immune system after inducing robust immunity.¹²

Q: What can producers do to ensure best results with Fosterera PRRS?

JA: Timing is critical. Piglets need time to generate a robust immune response. Having a label claim of 1 day of age provides the benefit of early vaccination. If wild-type PRRS virus circulation in the nursery is a problem, we advise vaccinating at processing with Fosterera PRRS, which is safe as well as effective.^{13,14}

Last but not least, remember that a vaccine is only effective if it's stored, handled and administered correctly. Make sure vaccination crews are properly trained and use the correct dose. There's no room for error when vaccinating, especially for PRRS.

For more information on Fosterera PRRS, contact Dr. Angulo (jose.angulo@zoetis.com) or your Zoetis representative.

toolbox

All trademarks are the property of Zoetis Services LLC or a related company or a licensor unless otherwise noted.

Ingelvac PRRS is a registered trademark of Boehringer Ingelheim Vetmedica GmbH.

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.

To contact *Pig Health Today*:
editor@pighealthtoday.com
PIGHEALTHTODAY.COM

Copyright © 2018, Pig Health Today.

To contact Zoetis:
888.963.8471
ZOETISUS.COM/PORK

FSTRA-00148