

## The important role of diagnostics in controlling PRRS in Europe

The recent launch of Suvaxyn PRRS MLV, an innovative vaccine by Zoetis containing a modified live European Porcine Reproductive and Respiratory Syndrome (PRRS) virus strain, is helping to raise awareness of the disease, says European Veterinary Specialist in Porcine Health Management, Professor Tomasz Stadejek.

Speaking to more than 300 veterinary professionals earlier this year at an annual swine meeting in Zaragoza, Spain, Prof. Stadejek encouraged continued research into European PRRS vaccines.

"In regions such as North America and Asia, PRRS is considered the most important infectious disease in swine, but in Europe that is not the case. Veterinarians and producers ignore the fact that the European strains of the virus are a lot more genetically diverse than the strains in North America or in Asia. The more diverse the virus, the greater the difference in virulence and pathogenicity, and this is a problem. PRRS is a difficult disease, so any new vaccine on the market is welcomed as companies are sharing their knowledge, and this knowledge is being passed on to stakeholders."

Prof. Stadejek says PRRS viruses are continuously and rapidly evolving, and the consequences of the molecular evolution for the virus properties are unpredictable. "The local emergence of 'diverse variants' of PRRS are most likely through the introduction from elsewhere, such as the movement of pigs, trucks, people, and modified live vaccines." Prof. Stadejek says the complex nature of PRRS requires sound diagnostic protocols and properly validated tools, as well as complex and evidence-based control approaches.

Dr Gerard Martin, Researcher at the Autonomous University of Barcelona, agrees that the new vaccine is useful in targeting PRRS in Europe which he describes as an 'extremely complex disease'. "PRRS is a devastating disease and requires good diagnostics and monitoring. This is the most difficult part as diagnostics and monitoring are not seen as an investment – they are considered a cost and, therefore, not a priority."

Zoetis wanted to develop a vaccine specifically for European pig producers that can be used in pigs from the first day of age, so that Suvaxyn PRRS MLV induces active immunity early in a lifetime, which lasts until the end of fattening. Pig protection is established 28 days after vaccination and lasts for 26 weeks after vaccination in fattening pigs, and 16 weeks after vaccination in gilts and sows. The vaccine reduces viraemia and nasal shedding of the virus.

Monica Balasch, Associate Director, Global Biologicals Research for Zoetis, says most vaccines currently on the market are conventional, modified live vaccines. "With Suvaxyn PRRS MLV, we used a different approach to attenuate the virus and we now have a new solution that uses a cell line that makes a porcine virus receptor instead of a cell line that makes a monkey virus receptor."

"Although the mechanism is still under investigation, removing the requirement for the vaccine virus to adapt to the monkey cell line correlates well with efficacy in very young pigs. Thus, Suvaxyn PRRS MLV in Europe and Fosterera PRRS in North America and Asia, which both used the new attenuation method, were able to achieve unprecedented label claims for use in pigs as young as one day of age," says Jay Calvert, Research Director, Global Biologicals Research for Zoetis. "The new vaccine represents a flexible alternative to allow for new customised PRRS control programs developed by veterinarians for producers."

To learn more, visit: <https://www.zoetis.co.uk/products/swine/suvaxyn-prrs-mlv/index.aspx>



## Vaccination at first day of age vital to protect against PRRS in Europe

Suvaxyn PRRS MLV, an innovative new vaccine from Zoetis, is the first to market providing the only piglet vaccination from the first day of age. It contains a modified live European Porcine Reproductive and Respiratory Syndrome (PRRS) virus strain.

Monica Balasch, Associate Director, Global Biologicals Research, for Zoetis, reports that clinical studies conducted with Suvaxyn PRRS MLV have delivered strong results when vaccinating pigs from the first day of age, inducing active immunity early in lifetime, which lasts until the end of the fattening.

“Our new vaccine is approved for use as the earliest protection in piglets, and to protect the whole herd against PRRS, and for use in gilts and sows,” she says.

Dr Balasch says pig protection is established 28 days after vaccination and lasts for 26 weeks after vaccination in fattening pigs, and 16 weeks after vaccination in gilts and sows.

“In Europe, PRRS is known for severe impacts on reproduction including lowering birth rates, increasing abortion, stillbirth, mummified, as well as weak live-born piglets, and death.

“The PRRS virus circulates early once pigs are weaned, so it’s important they move to the nursery already protected. If we vaccinate pigs when they are two weeks old the immune response takes four weeks to develop, so at four weeks old they will not be protected.

“In contrast, if we can vaccinate them at one day of age and we overcome maternal immunity, when they are weaned at four weeks of age they will already have immunity in place and be protected against the virus.”

Zoetis studies show pigs that are seropositive at one day of age can develop an immune response, even in the presence of maternal immunity.

Dr Balasch says one study involved seronegative sows vaccinated with Suvaxyn PRRS MLV at the maximum titre allowed to produce the worst-case scenario, so that piglets born would have the highest level of antibodies against the vaccine virus.

“The piglets were challenged with Suvaxyn PRRS MLV at one day of age, then at 10 weeks old. That was the point where the unvaccinated control animals lost maternal immunity.

“We challenged all of them, vaccinated and non-vaccinated, with a wild type PRRSV-1 virus heterologous to the vaccine strain and followed them for 10 days. We demonstrated that the vaccinated pigs had significantly lower viraemia, less nasal and oral virus shedding, and lower rectal temperatures, and the percentage of lung lesion at 10 days was numerically lower.”

Dr Balasch says one of the main drawbacks to developing vaccines against PRRS is that cross-protection is not high between vaccines and circulating strains in the field, so it is important to investigate new approaches.

“Having a new attenuated vaccine in the market adds to our arsenal of useful tools to defend against an ever-increasing array of new circulating field strains. Due to the radial pattern of evolution among PRRS viruses, with diversity increasing exponentially, older strains that resemble the common ancestor of all current field strains will share more immunological epitopes and are predicted to provide broad cross-protection against currently circulating strains.”

To learn more, visit: <https://www.zoetis.co.uk/products/swine/suvaxyn-prrs-mlv/index.aspx>

## Results released of new Suvaxyn PRRS MLV studies

Zoetis has released the results of a series of studies on the biological properties of Suvaxyn PRRS MLV, an innovative vaccine containing a modified live European Porcine Reproductive and Respiratory Syndrome (PRRS) virus strain.

Presenting the findings at a Zoetis meeting ahead of the 2018 European Symposium for Porcine Health Management in Spain, Research Director, Global Biologicals Research for Zoetis, Jay Calvert, said the results suggest that when tested against four competitor vaccines, Suvaxyn PRRS MLV has a higher affinity for porcine alveolar macrophages (PAMs), as it produces higher virus yields when titrated in PAMs in an in vitro test.

In vivo testing showed Zoetis' vaccine strain was detected sooner and at higher levels in broncho-alveolar fluids, which Dr Calvert explained indicates Zoetis' vaccine strain replicates faster than competitor vaccines. In the same in vivo study, the vaccine strain in Suvaxyn PRRS MLV had similar kinetics to one of the tested competitor vaccines<sup>1</sup>.

Dr Calvert said PAMs are the primary target for replication of PRRS virus in pigs, and CD163 – a macrophage differentiation antigen – is a key PRRS virus receptor that is essential for infection of PAMs. Suvaxyn PRRS MLV uses a cell line that expresses the porcine virus CD163 receptor.

"In the development of most modified-live PRRS virus vaccines, the strain selected is typically attenuated by multiple passages on a monkey cell line (MA-104 or similar). During the process of attenuation, the virus loses pathogenicity as it accumulates mutations that favour its replication in a different host cell (non-PAM and expressing a CD163 receptor of non-porcine origin).

"While the other live PRRS virus vaccines were produced using cells of simian origin, we used a different approach to attenuate the virus. Indeed, we use a new engineered cell line that expresses the specific virus CD163 porcine receptor instead of a cell line that expresses a non-porcine (monkey origin) CD163 receptor. The benefit is that the vaccine strain can replicate in the target cells, very quickly after vaccination, without the need for re-adaptation to the porcine receptor."

Traditionally, farmers who have vaccinated pigs against PRRS have done it around three to four weeks of age, when maternal antibodies are typically low enough not to affect the vaccine's ability to trigger an immune response against the virus.

Dr Monica Balasch, Associate Director, Global Biologicals Research for Zoetis, said the ability to administer the vaccine from day one is a game-changer in the PRRS protection paradigm.

"Being able to vaccinate from day one helps bridge the gap in protection between the loss of maternal immunity at three to four weeks of age and the onset of active immunity, which has been demonstrated four weeks after the vaccine is given.

"We have conducted studies with the vaccine (Suvaxyn PRRS MLV) that demonstrated a significant protective effect when administered as early as day one in the presence of maternal immunity, indicating that its efficacy was not affected by maternally-derived immunity. By having immunity in place by the time pigs are weaned, producers can better protect young pigs against early PRRS infection."

Dr Balasch said Suvaxyn PRRS MLV is currently the only one authorised for use from one day of age in Europe and is also approved for gilts and mass vaccination of sows, meaning it enables PRRS protection of the whole herd. She added that a single dose of the vaccine was shown to have an immunity duration of 26 weeks, meaning pigs were protected all the way until market.

<sup>1</sup>Data on file, study reports B820W-ES-17-725 and B820W-ES-17-726, Zoetis Inc.