

# Experimental assessment of the efficacy of an MLV PRRS vaccine against challenge with highly virulent PRRSV-1 strain Rosalia

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## Background and Objectives

In 2020 a highly virulent PRRSV-1 isolate emerged in Spain. This strain rapidly spread and has become the predominant one in most new PRRS outbreaks in the North-eastern part of the country. The infection is characterized by abortion storms, sow mortality and mortality rates (>20%) in the affected nurseries (1). The aim of the present study was to assess the efficacy of a MLV PRRS vaccine against the challenge with one of those highly virulent isolates.

## Material and Methods

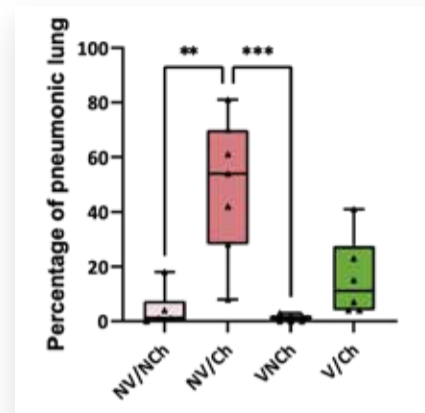
The study was conducted in 4 groups (G1-G4) of 13 four-week-old PRRSV-free pigs. After 1 week of acclimation groups G1 and G2 were intradermally vaccinated (V; Vaccinated) (Porcilis® PRRS, MSD Animal Health) whilst groups G3 and G4 only received the vaccine adjuvant (NV; Non-Vaccinated). Five weeks later, groups G1 (V/Ch; Vaccinated/Challenged) and G3 (NV/Ch; Non-Vaccinated/Challenged) were intranasally challenged with a highly virulent isolate (ON571708) ( $\geq 10^{5.4}$  TCID<sub>50</sub>/ml, 1 ml per nostril) and were followed for the development of clinical signs and lung lesions. Pigs from groups G2 (V/NCh; Vaccinated/Non-Challenged) and G4 (NV/NCh; Non-Vaccinated/Non-Challenged) were not challenged. Pigs were weighted before and after challenged to calculate weight gain and sampled periodically to determine viremia and nasal shedding as well as the development of humoral (ELISA) and cell-mediated immune responses (IFN- $\gamma$  ELISPOT).

## Results

After the challenge, animals in the unvaccinated group (NV/Ch) developed high fever (up to 41.9°C) that was evident from day 4 until day 9 post-challenge (pc) while for vaccinated animals (V/Ch), fever >41°C was only seen on day 9 pc.

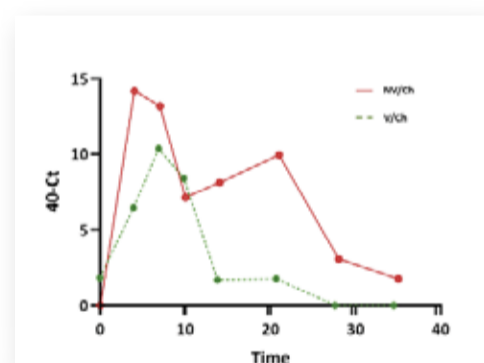
At day 10 pc, NV/Ch animals had extensive macroscopic lung lesions (49.1±25.2% vs. 15.7±14.5% of lung affected for NV/Ch and V/Ch, respectively) (Graph 1). At microscopic level, NV/Ch animals also showed more severe scores of interstitial pneumonia compared to vaccinated (V/Ch) pigs (3.1±0.8 vs 1.9±0.8, respectively).

Graph 1. Macroscopic lung lesions 10 days post-challenge in Non-Vaccinated/Non-Challenged (NV/NCh), Non-Vaccinated/Challenged (NV/Ch), Vaccinated/Non-Challenged (V/NCh) and Vaccinated/Challenged (V/Ch) pigs.



The area under the curve for the viremia of NV/Ch was significantly higher than the area for V/Ch (256.2 vs. 110.4 for NV/Ch and V/Ch, respectively) (Graph 2). Nasal shedding was also reduced in V/Ch. Vaccinated animals showed a significant anamnestic response in ELISPOT after challenge ( $p < 0.05$ ). Weight gain after challenge (days 0 to 35 pc) was better for vaccinated pigs (32.9±12.8 vs. 26.2±6.1 Kg for V/Ch and NV/Ch, respectively;  $p < 0.05$ ).

Graph 2. Areas under the curve (AUC) for viremia in challenged groups (red = NV/Ch; green = V/Ch)



## Discussion and conclusion

In conclusion, vaccination with a MLV vaccine administered intradermally resulted in significant clinical, pathological, virological and zootechnical protection against the challenge with highly virulent Rosalia.