ASSESSMENT OF THE EFFICACY OF A LIVE ATTENUATED VACCINE AGAINST AN EXPERIMENTAL CHALLENGE WITH A HIGHLY VIRULENT PRRSV1 STRAIN

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INTRODUCTION

In 2020, atypical PRRSV1 outbreaks began to be reported in northeastern Spain, characterized by high abortion rates, severe respiratory signs and high mortality rates (>50%) in affected nurseries. Sequencing revealed the emergence of a new highly virulent PRRSV1 (HP-PRRSV1) strain, commonly referred to as Rosalia[1].

The aim of the present study was to evaluate the efficacy of a live attenuated PRRS vaccine against experimental infection with a Rosalia strain isolated from the field in 2020.

METHODS

Seventy piglets free of PRRS antibodies and naïve to virus were randomly assigned to two groups and vaccinated intradermally at 3 weeks of age: Group A received UNISTRAIN® PRRS while group B received a placebo treatment (PBS). Five weeks post vaccination, all the piglets were experimentally infected by intranasal route with the highly virulent PRRSV1 Rosalia strain, ($10e^{3.55}$ CCID50/animal). After the infection, clinical signs were evaluated daily up to 28 days (Figure 1), while body temperature was monitored only for the first 14 days.

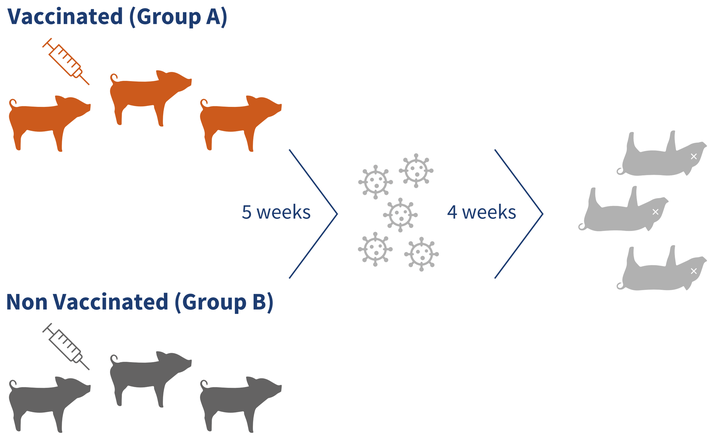

Figure 1. Experimental design of the study. Experimental design of the study. Treatments: Vaccinated (Unistrain PRRS) vs. Non vaccinated (PBS)

Clinical signs were scored using a system adapted from Prieto et al. (2011)[2] and Li et al. (2016)[3] and added to Martelli's temperature score (2009)[4]. This combined global score was evaluated for significance using the Mann-Whitney non-parametric test. Group mortality was compared using Fisher's exact test.

Finally, blood samples were periodically collected to assess the development of humoral response (IDEXX PRRS X3).

RESULTS

Following the experimental infection, 80% of the animals in Group B died within the first 20 days, with the peak occurrence between days 10 and 14 (Figure 2). In contrast, only 8.8% of the animals in Group A died due to the HP-PRRSV1 infection ($p < 0.001$), corresponding to a reduction in mortality of 89%.

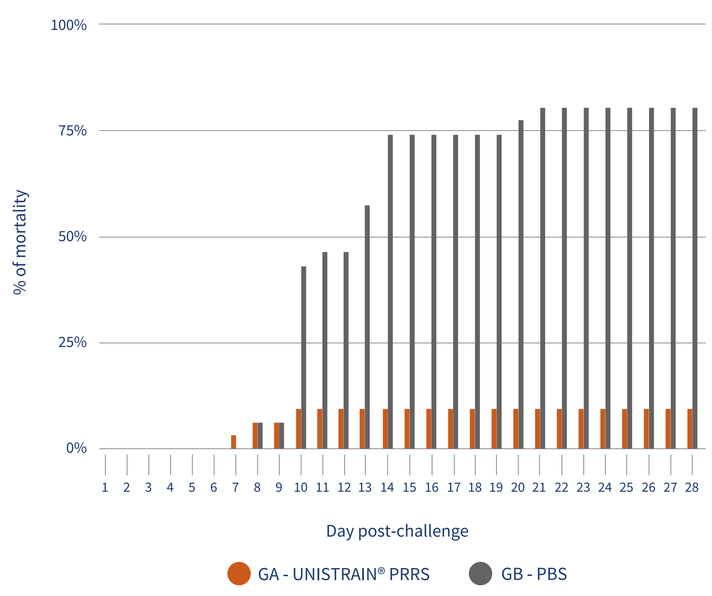

Figure 2. Cumulative mortality in each group after HP-PRRSV1 challenge.

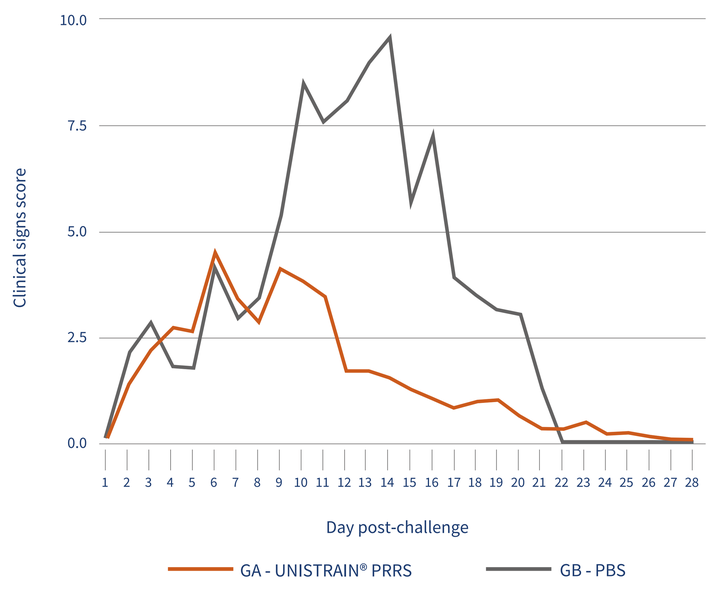

Figure 3. Clinical signs score after HP-PRRSV1 challenge by day and group.

The global clinical signs score was significantly higher in Group B compared to Group A (4.00 vs 1.73 respectively, $p < 0.001$), so that clinical disease was reduced by 57%, as shown in Figure 3.

Vaccinated animals exhibited a significantly higher humoral response after the challenge ($p<0.001$).

CONCLUSIONS

The results of the present study demonstrated that UNISTRAIN® PRRS provides significant protection against mortality and clinical disease caused by a highly virulent PRRSV1 Rosalia strain.

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