Heterologous cell-mediated immune responses against PRRS virus in gilts vaccinated with UNISTRAIN® PRRS

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INTRODUCTION

Vaccination is one of the main tools to minimize porcine reproductive and respiratory syndrome (PRRS) impact in endemic areas. Current knowledge of PRRS virus (PRRSV) immunology is still limited but it seems clear that modified live vaccines (MLV) are a reasonable choice for the immunization of pigs (1). Induction of neutralizing antibodies (NA) after one single dose of a MLV is limited (2). In this scenario, cell-mediated responses after MLV vaccination could be responsible for limiting the duration of viremia, and consequently the spread of the virus (1,2). The aim of the present study was to assess the cell-mediated response against several heterologous PRRSV isolates in vaccinated gilts with a commercial genotype 1 live vaccine (UNISTRAIN® PRRS, HIPRA).

MATERIALS AND METHODS

Eight Landrace x Pietrain six-month-old gilts were selected from a PRRSV-free farm. Negative PRRSV status was individually confirmed by quantitative RT-PCR (qRT-PCR) and ELISA (CIVTEST® SUIS PRRS, HIPRA). Six gilts were IM vaccinated with 2 ml of UNISTRAIN® PRRS ($10^{5,2}$ $TCID_{50}$/dose; HIPRA) and two gilts were IM injected with 2 ml of PBS (controls). Heparinized blood samples were collected at the day of vaccination (D0) and at days 14, 28, 42 and 56 post-vaccination (pv) to obtain peripheral blood mononuclear cells (PBMC). Frequencies of PRRSV-specific IFN-γ-secreting cells (IFN-γ-SC) were measured as reported before (3) to assess the heterologous responses against five genotype 1 isolates retrieved from clinical outbreaks in 4 to 10 week-old piglets (Table 1).

Table 1. Field PRRSV isolates used in the present study with detail of the ORF5 similarity to the vaccine strain.

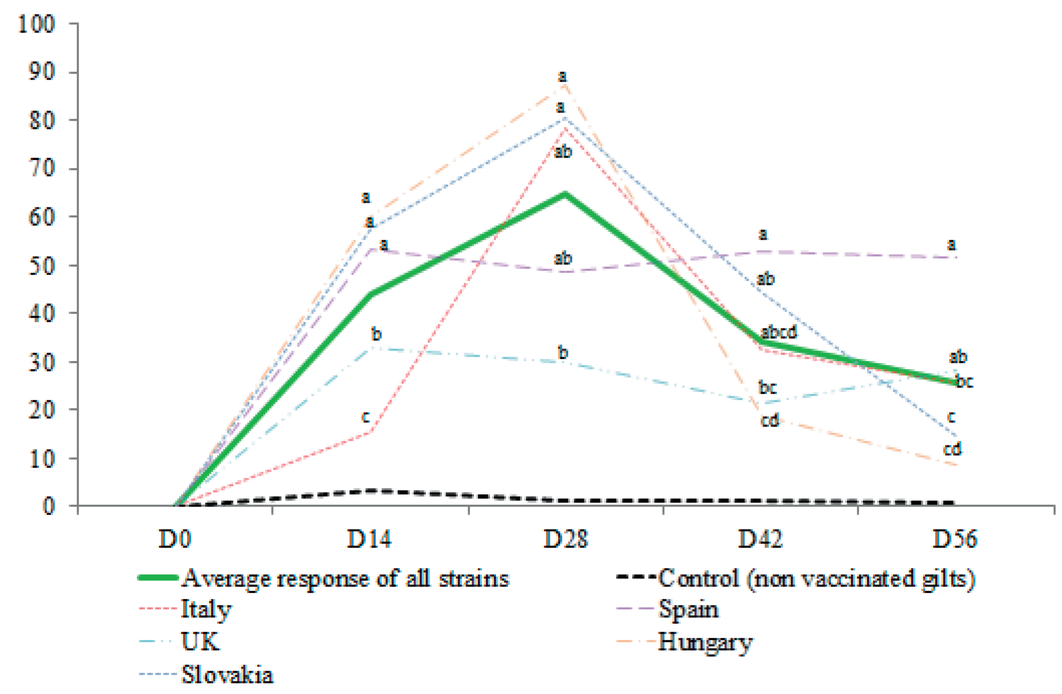
Country of isolation	Year of isolation	Similarity to the vaccine strain (ORF5)
Slovakia	2005	90%
UK	2011	88%
Hungary	2011	98%
Spain	2005	92%
Italy	1992	89%

Comparison of frequencies of IFN-γ-SC for each isolate was done by means of the Kruskal-Wallis test using Statsdirect 2.8.0.

RESULTS

For all strains, IFN-γ-SC were already detected at day 14 pv (Figure 1). The peak of secreting cell frequencies was observed at day 14 pv for two isolates (Spain and UK), and at day 28 pv for three isolates (Italy, Hungary and Slovakia). As it was expected, IFN-γ-SC mean values for all strains were null or <5 in control groups.

Figure 1. IFN-γ-SC per $5x10^5$ PBMC against 5 genotype-1 field isolates in vaccinated and control gilts.



Different superscript letters indicated statistically significant differences (p<0.05) among the five isolates.

DISCUSSION AND CONCLUSIONS

Genetic/antigenic diversity and variability in the immunobiological properties of the PRRSV (3,4) may compromise the heterologous protection generated by vaccination in PRRS control strategies. Although PRRS immunity is not yet fully understood, the significance not only of the NA but the cell-mediated immunity is important for a better understanding of vaccine performance (3). The present study showed that primo-immunization of naïve gilts with UNISTRAIN® PRRS induced a significant specific cell-mediated immunity against 5 heterologous PRRSV strains. The mean IFN-γ-SC response was significantly higher than non-vaccinated group regardless the virus strain origin, year of isolation and genetic homology. Briefly, the results demonstrate that a single immunization with UNISTRAIN® PRRS of replacement gilts can generate an optimal cell-mediated response against pathogenic field PRRSV.

REFERENCES

1. Zuckermann *et al.* 2007. Vet Microbiol 123, 69-85
2. Díaz I *et al.* 2006. Virology 351, 249-259
3. Díaz I *et al.* 2012. Vet Res 43, 30
4. Darwich *et al.* 2011. Vet Microbiol 150, 49-62

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