

PROTECTION PROVIDED BY PRRSV MLV (PRRSV1 AND PRRSV2) AGAINST AN ASIAN PRRSV2 FIELD STRAIN

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Introduction

Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) vaccines have been shown to mitigate the impact of the infection.^{1,2} This study assesses the effectiveness of two commercial live vaccines - based on PRRSV1 (UNISTRAIN® PRRS; HIPRA) and PRRSV2 (strain VR-2332) - against an Asian PRRSV2 field strain.

	0 dpv (3 woa)	7-10-21 dpv	0 dpv (7 woa)	2-4-6-8- 11-13-16 dpi	21 dpv (10 woa)
G1 (n=5; vaccine PRRSV1 MLV)					
G2 (n=4; vaccine PRRSV2 MLV)					
INF (n=5; no vaccine)					
CTRL (n=5; no vaccine & no challenge)					

Blood sampling: Samples were submitted to PRRSV ELISA testing (Civitest® Suis ES and AM), PRRSV neutralization testing and PRRSV isolation.

Vaccination against PRRSV: G1 - PRRSV1 MLV; G2 - PRRSV2 MLV

Challenge with an Asian PRRSV2: Strain Chiba NOSAI. Intranasal application: 102.5 TCID50/mL (1 mL each nostril)

Euthanasia and tissue sample collection: Samples from lungs, tonsils, and lymph nodes (submandibular and bronchial) were submitted to PRRSV isolation.

Table 1. Experimental design. Between 0 and 21 days post-infection (dpi), clinical protection was measured daily in terms of clinical signs and rectal temperatures in all groups.

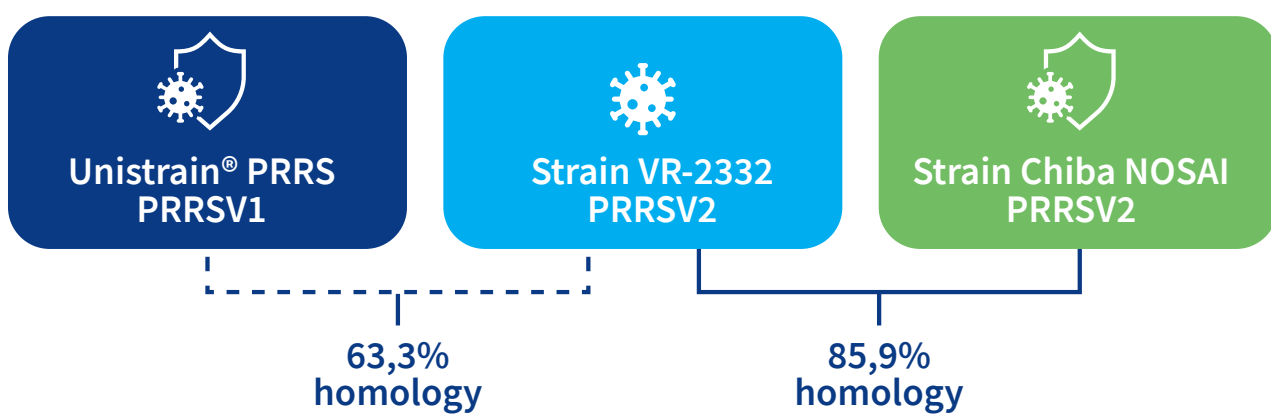


Figure 1. Homology between strains (ORF5). The Asian field strain used to challenge the pigs had a greater homology to the strain VR-2332 (G2).

Results

At necropsy (21 days after the challenge), tissue analysis revealed a similar pattern, with the G1 showing the lowest viral load in tonsils ($p < 0.05$), a common site of viral presence. One animal in that group was negative in all tissues.

	PRRSV in blood		PRRS in tissues
	Positives/total	AUC	Positives/total
G1	19/35 ^b	12.8±7.7 ^b	6/20 ^a
G2	19/28 ^b	16.2±4.3 ^b	9/16 ^a
INF	33/35 ^a	22.1±3.5 ^a	11/20 ^a
CTRL	0/35 ^c	0.0±0.0 ^c	0/20 ^b

Table 2. Positivity to PRRSV in blood and tissue samples: proportion of positive samples/total group samples and average ± SD of virus titers. AUC - Area Under de Curve. Superscript letters show significant differences among groups.

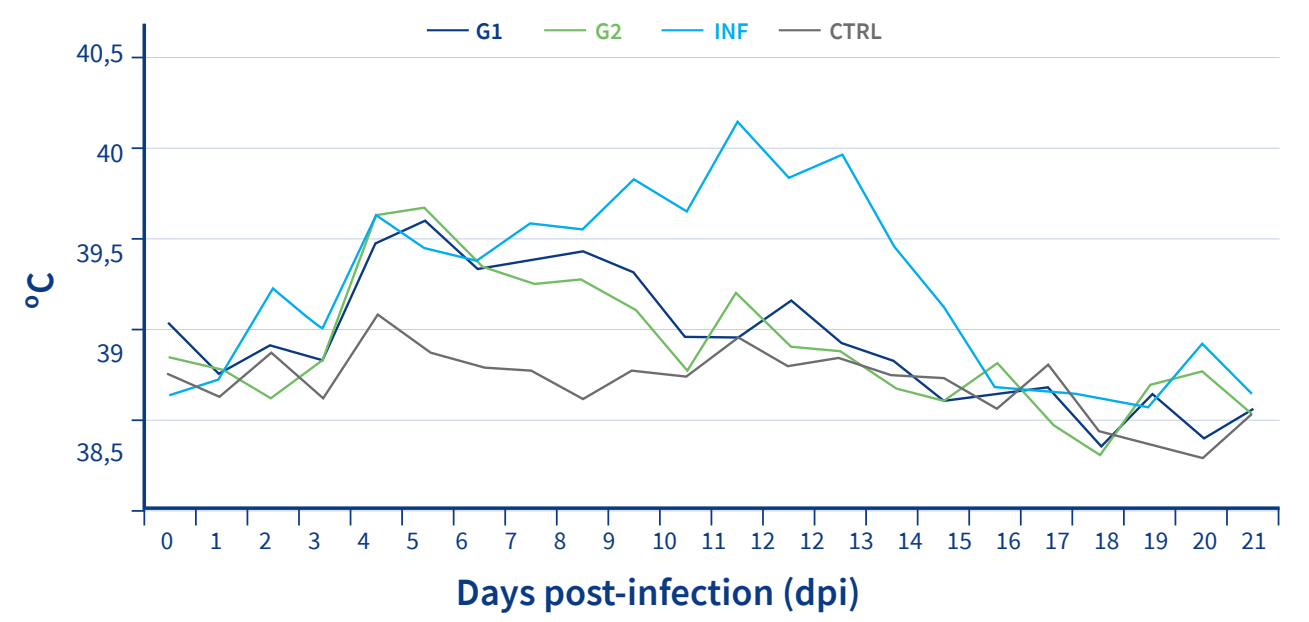


Figure 2. Average rectal temperature in all groups between 0 and 21 dpi.

Group	PRRSV2-MLV specific-NA (dpv)					PRRSV2-MLV specific-NA (dpi)						
	0	7	14	21	28 (0 dpi)	21 (0 dpi)	0	7	14	21	28 (0 dpi)	21 (0 dpi)
G1	-	-	-	-	-	-	-	2/5 1.0±1.7	3/5 1.4±1.7	4/5 2.0±1.4	5/5 4.4±2.1 ^a	-
G2	-	-	-	-	-	4/4 2.2±0.5	-	-	-	-	-	-
INF	-	-	-	-	-	-	-	-	-	-	-	-
CTRL	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. Viral neutralization test results. Proportion of positive samples and average ± SD of titers (log₂). The Friedman test was used to compare kinetics inside group G1.

dpv, days post-vaccination; dpi, days post-infection; PRRSV, porcine reproductive and respiratory syndrome virus; MLV, modified-live vaccine; NA, neutralizing antibodies.

^aSignificant increase compared to titer detected at 0 dpi ($p = 0.01$).

Discussion & Conclusion

UNISTRAIN® PRRS, despite the lower genetic similarity to the challenge strain, provided comparable or even better protection than the vaccine belonging to the same species. A lower presence of virus in tissues and blood was observed, and the animals vaccinated with this PRRSV1 MLV were the only ones to develop detectable neutralizing antibodies before challenge (with a significant enhancement after challenge ($p < 0.05$)). These results suggest that immunological properties may be more important than genetic similarities for cross protection³.

The study highlighted the potential for cross-protection between strains with varying genetic similarities, indicating the complexity of PRRS vaccine efficacy.

References

- Madapong et al, Vet Microbiology. 2020; 244:108655
- Bonckaert et al, Porcine Health Manag. 2016; 2:12
- Díaz et al., Virology. 2006; 351(2):249-59.

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