PIGS VACCINATED WITH A PRRSV1 MLV DEVELOPED POTENT IMMUNITY AGAINST JAPANESE PRRSV2 STRAINS

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Background & Objectives

PRRS is one of the most economically significant diseases in the swine industry. PRRS Modified live vaccines (MLV) are a reasonable choice for pig immunization. Cell-mediated immunity (CMI) after MLV vaccination is responsible for limiting the duration of viraemia and the spread of the virus (1, 2). For PRRS, humoral immunity provided by neutralizing antibodies (NA) is developed slowly and do not reach high titres (3, 4). Evaluation of CMI and NA provided by MLV PRRS vaccines is important to assess protection against field strains. The objective of this trial was to determine the humoral (NA) and cellular (CMI) immunity conferred by a PRRSV1 MLV against Japanese PRRSV2.

Materials & Methods

10 naïve pigs were vaccinated with UNISTRAIN® PRRS (PRRSV1 MLV, HIPRA) at 2 weeks of age. Peripheral blood mononuclear cells (PBMC) and serum were collected 4 weeks after vaccination. CMI and NA were evaluated against 7 Japanese PRRSV2 (Table 1). CMI was evaluated by IFN-γ-SC using ELISPOT assay (5). Humoral immunity was measured by virus neutralization assay. VP-046 (vaccine virus) was included in the panel of strains tested and its stimulation acts as the comparative response to the Japanese strains by means of Kruskal-Wallis test (Non-parametric).

Results

Animals vaccinated developed IFN-γ-SC response against the Japanese PRRSV2 analysed. This response was comparable to the response against vaccine virus (except Nagasaki11-14) demonstrating an equal cellular activation. Moreover, between 70-100% of the vaccinated animals responded when stimulated with each virus strain (Table 2). Vaccinated animals produced NA against 3 Japanese strains (Nagasaki11-14, EDRD1 and 345). However, although CMI provided by these strains was remarkable, results of NA of strains P192-5, PRRSKU-27-156K, 338 and 348 were not conclusive (Table 3).

Strain	Origin
VP-046 BIS	PRRSV1 - UNISTRAIN® PRRS
Nagasaki11-14	Dr. Michihiro Takagi, Animal Health Research Division, National Institute of Animal Health (NIAH), National Agriculture and Food Research Organization (NARO)
P192-5	
EDRD1	
PRRS KU-27-156K (6)	Dr. Makoto Ozawa, Kagoshima University
338	Dr. Kazuo Watanabe, Piglets Co., Ltd.
345	
348	

Table 1. Origin of the strains used in this trial.

Strain	Spots*	SD	Non-responders	p-value
VP-046 BIS	26.3	15.2	--	--
Nagasaki11-14	8.7	5.7	20%	p < 0.05
P192-5	11.7	9.3	30%	p > 0.05
EDRD1	27.4	20.8	10%	p >0.05
PRRS KU-27-156K	22.1	11.7	10%	p >0.05
338	27.8	16.3	10%	p > 0.05
345	21.0	16.1	0%	p > 0.05
348	24.0	12.2	0%	p > 0.05

Table 2. Mean values of the number of IFN-γ-SC.
*Mean value of secreting cells
** Non-responders: <5 spots

Strain	SNI*	Result
VP-046 BIS	5.50	+
Nagasaki11-14	3.17	+
P192-5	0.50	-
EDRD1	2.34	+
PRRS KU-27-156K	0.33	-
338	1.00	-
345	3.83	+
348	1.67	-

Table 3. Serum Neutralization Index (SNI) obtained for each strain tested.
*SNI=titre virus without serum/titre virus incubated with antiserum. Log SNI equal or higher than 2 will confirm the reaction with the virus tested.

Discussion & Conclusion

PRRS NA production after a single dose of any MLV is limited, developed slowly, and doesn't reach high titres. Thus, the CMI generated by a PRRS vaccine plays an important role in protection against the challenge. These results confirms that UNISTRAIN® PRRS can confer NA against 40% of the strains tested. Regarding CMI, this vaccine induced potent CMI against almost all the strains tested. Consequently, this PRRSV1 MLV is a good choice to control Japanese PRRSV2.

Acknowledgment

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References

1. Díaz et al., 2012
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3. Díaz et al., 2006
4. Zuckerman et al., 2007
5. Diaz et al., 2005
6. Fukunaga et al., 2021

Code assign: IMM-PP-18