

# IMMUNE RESPONSE, IL-10 AND PROTECTIVE EFFICACY AGAINST A SINGLE HP-PRRSV CHALLENGE OR IN CONJUNCTION WITH PRRSV1 OF PIGS INTRADERMALLY AND INTRAMUSCULARLY VACCINATED WITH MODIFIED LIVE PRRSV1

Madapong<sup>1</sup>, A.; Saeng-Chuto<sup>1</sup>, K.; Miranda<sup>2</sup>, J.; Tantituvanont<sup>3</sup>, A.; Nilubol<sup>1</sup>, D.

<sup>1</sup>Department of Veterinary Microbiology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand. / <sup>2</sup>HIPRA, Amer (Girona), Spain. / <sup>3</sup>Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand.

\*Corresponding author (joel.miranda@hipra.com)

## INTRODUCTION

Co-existence of PRRSV1 and PRRSV2 has been increasingly reported in several Asian countries, including China, Korea, Vietnam and Thailand<sup>1</sup>. In the presence of co-infection with both PRRSV genotypes, clinical diseases are more severe compared to a single infection with either genotype. The study was conducted to test the efficacy of UNISTRAN<sup>®</sup> PRRS when administered intramuscularly or intradermally in pigs against a challenge with a PRRSV2 and a challenge with co-infection with PRRSV2 and PRRSV1.

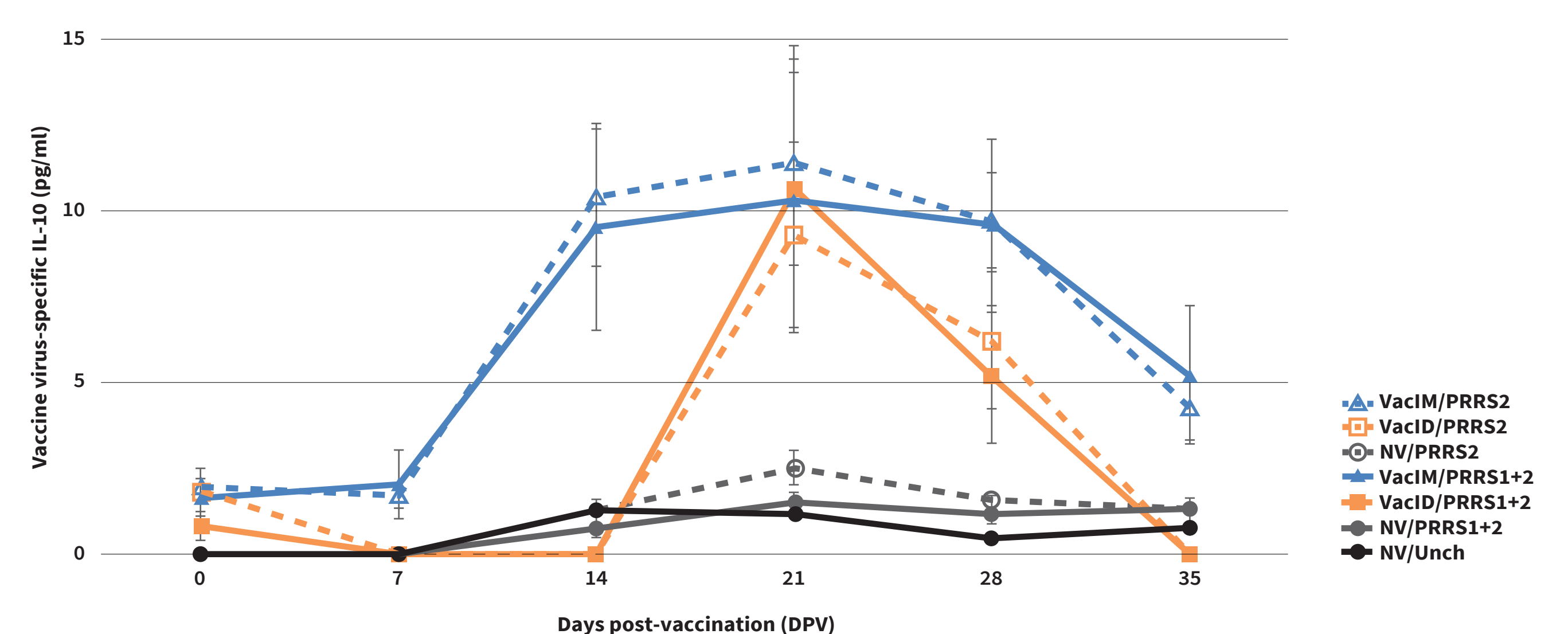
## MATERIALS AND METHODS

Forty-two PRRSV free pigs at 3 weeks of age were randomly allocated into 7 groups of 6 pigs each. Groups VacIM/PRRS2 and VacIM/PRRS1+2 were intramuscularly vaccinated with UNISTRAN<sup>®</sup> PRRS. Groups VacID/PRRS2 and VacID/PRRS1+2 were intradermally vaccinated with UNISTRAN<sup>®</sup> PRRS. Group NV/PRRS2, NV/PRRS1+2 and NV/Unch were vaccinated with PLACEBO. At 35 days post vaccination, groups VacIM/PRRS2, VacID/PRRS2 and NV/PRRS2 were intranasally challenged with FDT10US23 isolate (HP-PRRSV) and groups VacIM/PRRS1+2, VacID/PRRS1+2 and NV/PRRS1+2 were intranasally challenged with a co-infection of AN06EU4204 and FDT10US23 isolates (PRRSV1 and HP-PRRSV, respectively), at 1 ml of each isolate/nostril. Group NV/Unch was kept as non-vaccinated/non-challenge control. Following vaccination and challenge, pigs were monitored for PRRSV quantification by RT-qPCR, safety of the vaccine by IL-10, immune response including ELISA and IFN- $\gamma$ -PC and macroscopic lung lesions.

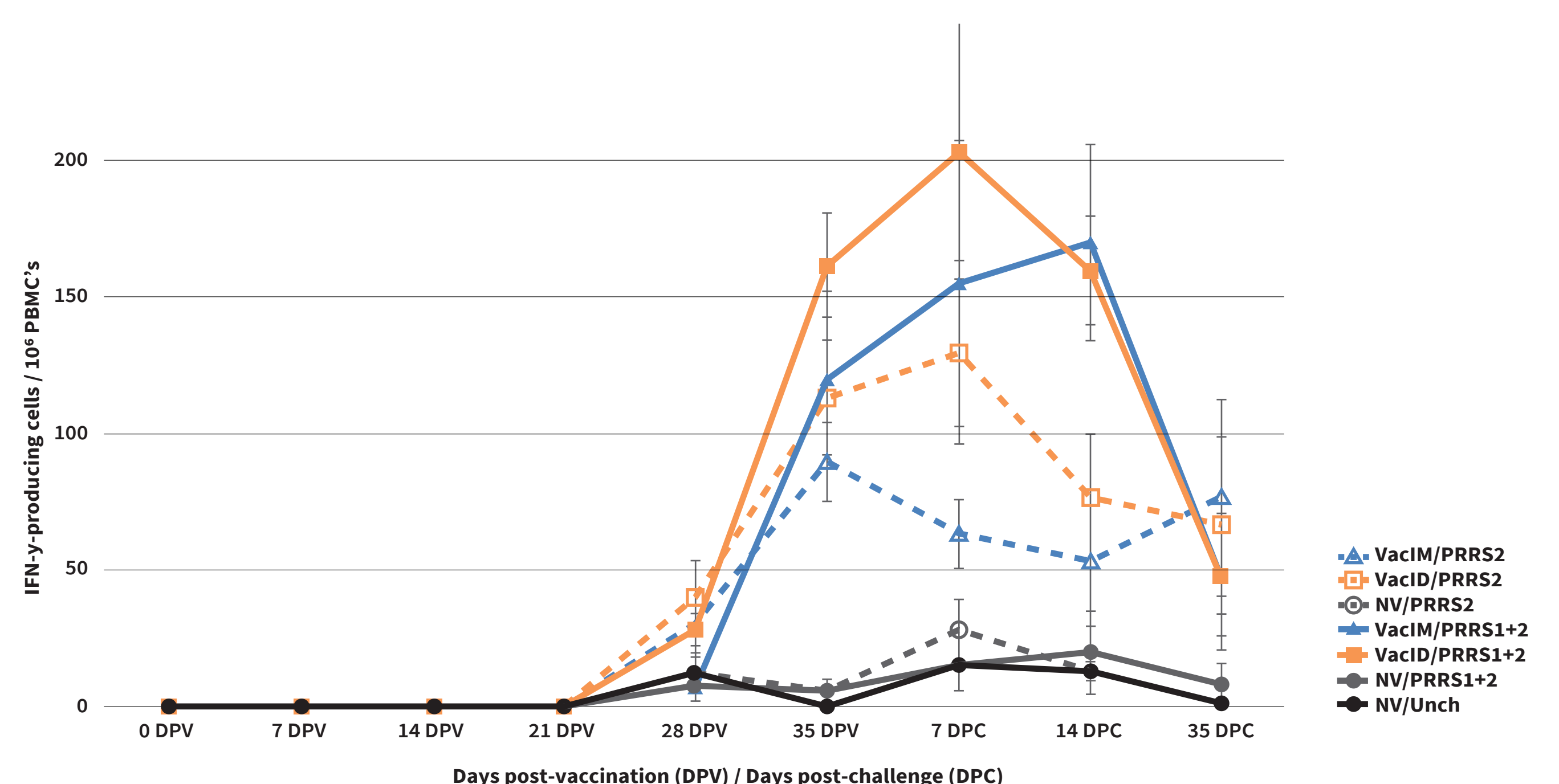
## RESULTS

Following vaccination, ID vaccinated pigs had shorter viraemic phase and lower RNA level compared to IM vaccinated pigs. ID vaccinated pigs had significantly lower IL-10 level than IM vaccinated pigs (Figure1), but IFN- $\gamma$ -PC were significantly higher (Figure2). There was no difference in antibody response.

No macroscopic lung lesions were observed in pigs of the NV/Unch group throughout the experiment. In contrast, pigs in the NV/PRRS2 and NV/PRRS1+2 groups had significantly higher scores compared to that of the vaccinated challenged groups at 7 DPC. The NV/PRRS1+2 groups had the significantly highest score. Macroscopic lung lesions in the VacID/PRRS2 and VacID/PRRS1+2 groups were significantly lower compared to that of the VacIM/PRRS2 and VacIM/PRRS1+2 groups.



**Figure 1:** Porcine interleukin-10 (IL-10) concentration in cell culture supernatants of stimulated PBMC with vaccine virus. Values are expressed as mean $\pm$ SEM. Different letters indicate statistical ( $P < 0.05$ ) differences among groups.



**Figure 2:** PRRSV-specific IFN- $\gamma$ -producing cells (IFN- $\gamma$ -PC) in stimulated PBMC with: (A) homologous virus; (B) heterologous type 1 PRRSV (AN06EU4204); and (C) heterologous type 2 PRRSV (FDT10US23). Values are expressed as mean $\pm$ SEM. Different letters indicate statistical ( $P < 0.05$ ) differences among groups.

## DISCUSSION

In conclusion, the results of the study suggested UNISTRAN<sup>®</sup> PRRS administered, either by ID or IM, can provide protection against challenge with HP-PRRSV, either alone or in conjunction with PRRSV1 as demonstrated by reduced lung lesion and viremia. ID route might represent an alternative to improve vaccine efficacy as it provided lower IL-10 and higher IFN- $\gamma$ -PC.

## REFERENCES

<sup>1</sup> Nilubol *et al.* 2013; Arch Virol; 158(5):943-53