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The immunity raised by recent European subtype 1 PRRSV strains allows a better replication of East European subtype 3 PRRSV strain Lena than the immunity raised by an older strain -increased risk for spatial expansion of PRRSV Lena-like strains

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The spatial distribution of PRRSV-1 subtypes in Europe is quite stable, most probably due to a strong population immunity induced by the local PRRSV strains. In this study, we evaluated the potential of the immunity induced by several West European subtype 1 PRRSV strains (2007 isolate 07V063 and 2013 isolates 13V091 and 13V117) to provide a protection against the highly virulent East European subtype 3 PRRSV strain Lena. Eleven-week-old pigs were inoculated with subtype 1 PRRSV strains (07V063, 13V091 or 13V117). Seven weeks later, the pigs were challenged with PRRSV strain Lena. Clinical, virological and serological parameters were monitored upon challenge. Number of fever days was higher ($P < 0.05$) in the non-immune control group (7.6 ± 1.7 days) compared to animals from immune groups (07V063-immune: 4.0 ± 1.2 days, 13V091-immune: 4.6 ± 1.1 days, 13V117-immune: 4.0 ± 2.9 days). In all groups, protection was characterized by reduction ($P < 0.05$) of AUC values of nasal shedding (control: 14.6 ± 5.6 , 07V063-immune: 3.4 ± 3.4 , 13V091-immune: 8.9 ± 6.1 , 13V117-immune: 8.0 ± 6.1) and viremia (control: 28.1 ± 11.0 , 07V063-immune: 5.4 ± 4.4 , 13V091-immune: 9.0 ± 1.5 , 13V117-immune: 8.3 ± 4.8). Reduction of respiratory disease, nasal shedding (mean AUC and mean peak values) and viremia (mean AUC and mean peak values) was more pronounced in 07V063-immune ($P < 0.05$) than in 13V091-immune and 13V117-immune animals. Inoculation of animals with subtype 1 PRRSV strains caused a priming of Lena-specific VN antibody response. Upon challenge with PRRSV Lena a serological booster effect was observed for neutralizing antibodies against strains used for the first inoculation. Our results indicate that immunity elicited by inoculation with subtype 1 PRRSV strains can partially protect against antigenically divergent subtype 3 strains. We conclude that the lower protection level elicited by recently isolated subtype 1 PRRSV strains may facilitate spatial expansion of subtype 3 strains from East Europe to West Europe.