

EVOLUTION OVER TIME OF THE DIVERGENCE OF PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS (PPRSV) WITH COMMERCIAL MODIFIED LIVE VIRUS VACCINES (MLV)

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Background and Objectives

PPRSv vaccination efficacy is partly dependent on the similarity between MLVs and the field strains. The objective of this study was to assess PRRSv field strains' Open Reading Frame 5 (ORF) average estimate of evolutionary divergence), referred to as the 'divergence, from four commercial MLVs.

Material and Methods

ORF5 sequences of PRRSv were used to assess divergence. Sequences of 251 different PRRSv type 1 European field isolates obtained by PCR amplification of the ORF5 region followed by SANGER sequencing (Pathosense, Belgium). Four vaccine ORF5 sequences (vaccines A, B, C, and D) were sourced from GenBank. ORF5 sequences were aligned using CLUSTALW (MEGA software V11). Sequences were analyzed in temporally separated groups; 1991-2000, 2000-2010, 2010-2020, and 2020-2023. Differences were considered statistically significant when $p < 0.05$.

Results

An increase in the divergence between field isolates and vaccine strains suggests less similarity. Conversely, a reduction in the divergence suggests the strains in the field are becoming more like the vaccine strains. Vaccine B, initially the only commercially available vaccine divergence with field strains was 0.0747 from 1991 to 2000; 0.102 from 2000 to 2010, 0.118 between 2010 and 2020. Between 2010 and 2020, vaccines A, C and D appeared in the market with divergence values of 0.140, 0.132 and 0.114, respectively. From 2020 to 2023, divergence increased for all the MLVs, except for vaccine C, which was reduced from 0.132 to 0.131. Conversely, vaccines A, B, and D's divergence values increased to 0.147, 0.137, and 0.129, respectively.

Discussion and Conclusion

This study shows field strains' divergence with three out of four MLVs increased over time. Vaccine C divergence decreased, indicating persistence of the vaccine strain on the farm and/or recombination events with field isolates. With increasing divergence, commercial vaccine protection may be lower than when the vaccine was originally made available. These results highlight the need to evaluate traditional vaccination protocols and consider alternative solutions such as autogenous vaccines.