RESEARCH ABSTRACT
SWINE HEALTH

Title: Enhancement of efficacy of PRRSV vaccines by altering the glycosylation pattern of viral glycoproteins - NPB # 05-194

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Scientific Abstract:

PRRSV, the causative agent of PRRS is of major economic significance to the pork industry in the USA and around the world. Current commercial vaccine does not provide adequate protection against PRRSV outbreaks. Therefore, there is an urgent need for development of more efficacious vaccine to combat PRRS. Our previous studies have suggested that (i) induction of neutralizing antibody response is an important correlate of evaluating the efficacy of a vaccine; (ii) neutralizing antibodies can be enhanced by hypoglycosylation of the major surface glycoprotein (GP5). While it is known that GP5 plays a prominent role in neutralizing antibody induction, it has been suggested that other PRRSV glycoproteins, such as GP4 (which is known to be the target of a PRRSV-neutralizing monoclonal antibody) may also have a role. On the other hand, nothing is known about the possible role of PRRSV GP2 and GP3 in neutralization of PRRSV. We hypothesized that PRRSV neutralizing antibody response can be enhanced by hypoglycosylation of GP2, GP3, and GP4 proteins. Towards this goal, using the infectious cDNA clone (FL12) of PRRSV prepared in our laboratory, we generated a series of mutant PRRSVs containing hypoglycosylated forms of these minor glycoproteins. These viruses possessed different growth potential in vitro. When these viruses were inoculated into pigs and their neutralizing antibody response was examined, we observed that neutralizing antibody response in most of the mutant virus-infected pigs was lower than the wt PRRSV infected pigs. These results indicate that interactions of the wild-type minor glycoproteins with GP5 may be critical for neutralizing antibody response and that altering the glycosylation pattern of the minor glycoproteins may have negatively affected their interactions with GP5 resulting in lower neutralizing antibody response.