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SEROLOGY OF H3N2 AND H1N1 SWINE INFLUENZA VIRUS IN PIGS VACCINATED WITH MAXIVAC® EXCELL™

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The serology of swine influenza (SI) virus has become more complex with the introduction of new testing technology and due to the antigenic variation of strains within subtypes. This study compares the results from hemagglutination inhibition (HI) and ELISA tests from different laboratories utilizing serum harvested from pigs vaccinated twice with Schering-Plough Animal Health's (SPAH) bivalent SIV vaccine, MaxiVac Excell.

Fifty pigs from a herd serologically negative to and free of SIV, were vaccinated twice, 2 weeks apart, with 4 different production serials of MaxiVac Excell and 15 pigs were maintained as unvaccinated controls. Pigs were bled 9 days after the booster vaccination and sera were tested at SPAH for HI antibodies to inactivated homologous antigen preparations using the kaolin procedure with rooster RBCs as the indicator cell. Sera were also sent to Diagnostic Laboratory A (DLA) for HI testing. The classical H1N1 strain A/Sw/IA/73 and the H3N2 strain A/Sw/Tx/98 provided by NVSL were used by DLA for HI. A different H1N1 antigen provided by Pfizer Animal Health (PAH) was also utilized. Sera were sent to Diagnostic Lab B (DLB) for HI testing using the H3N2 NVSL antigen. An HI titer ≥ 10 was used as the positive cut off in all HI tests. Sera were also tested for H1N1 antibodies using the Herdchek™ Swine Influenza Antibody Test Kit (H1N1) (IDEXX Laboratories Inc., Westbrook, Maine USA 04092). Additionally, sera were tested using an H3N2 antibody ELISA under development at IDEXX laboratories. For both ELISAs, the pos/neg cut off was ≥ 0.4 S/P.

Figure 1: H1N1 SIV HI antibody titers

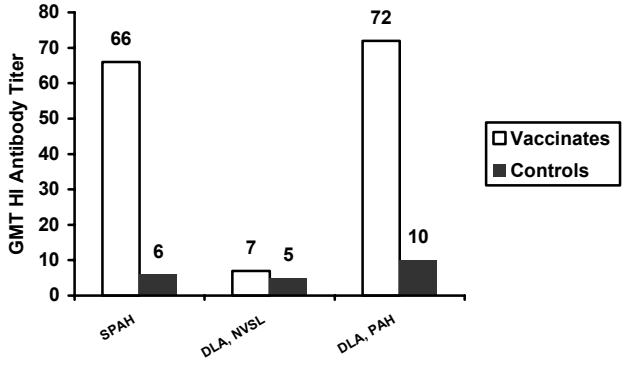

Table 1. Percent positive to H1N1 tests

	HI Tests			IDEXX ELISA	
	SPAH	NVSL	PAH	% Pos	Mean S/P
Vaccinates	100 %	30 %	88 %	84%	0.55
Controls	13 %	0 %	27%	0%	-0.01

Figure 2. H3N2 SIV HI antibody titers

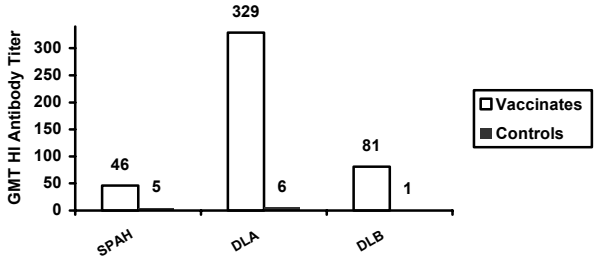

Table 2. Percent positive to H3N2 tests

	HI Tests			IDEXX ELISA	
	SPAH	DLA	DLB	% Pos	Mean S/P
Vaccinates	100 %	100 %	100 %	92%	0.75
Controls	0 %	6.7 %	8.3 %	0%	-0.01

The NVSL H1N1 test antigen had limited ability to detect seroconversion to the H1N1 fraction of MaxiVac Excell, which contains a more contemporary H1N1 strain (Figure 1 and Table 1). In contrast, the PAH antigen was almost as sensitive as homologous virus in detecting seroconversion to the H1N1 fraction of MaxiVac Excell (Table 1), indicating antigenic similarity between the two viruses. The IDEXX H1N1 SIV ELISA test detected seroconversion to the H1N1 fraction in a high percentage of vaccinates and with a lower false positive rate than the HI tests (Table 1). Seroconversion was detected in 100% of vaccinates using the homologous H3N2 strain at SPAH and in 100% of vaccinates using the NVSL strain (A/Sw/Tx/98) in HI at DLA and DLB. However, there were considerable differences in the geometric mean HI titers (Figure 2 and Table 2). The H3N2 ELISA test detected 92% of vaccinates and 0% of controls as positive (Table 2). The ELISA tests matched homologous HI testing very well, with lower false positives in the case of H1N1. Use of an HI cut off ≥ 10 for both H3N2 and H1N1 at the diagnostic laboratories resulted in an HI test sample positive rate similar to the homologous HI and ELISA tests but created a higher false positive rate than observed in the ELISA tests.