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Development of an ELISA for the Detection of Antibodies to Swine Influenza Virus in Swine Sera.

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Swine influenza is an acute infectious respiratory disease of swine caused by type A influenza viruses. An ELISA has been developed to detect antibody to swine influenza (SI) virus present in swine serum. This assay has been designed in the microtiter format, in which purified SI antigen has been coated onto the solid phase and an anti-swine IgG horseradish peroxidase conjugate is used for detection. This ELISA was designed as a rapid, standardized, herd screening method, to be used as an indicator of exposure to the virus. It has been shown to be sensitive and specific and correlates well with hemagglutination inhibition (HI) testing.

Sensitivity was assessed through the testing of temporal bleeds from pigs inoculated with swine influenza H1N1 vaccine. Five pigs of known negative serologic status for SI were inoculated according to the manufacturer's recommendation. Serum was collected from each animal at 0, 4, 7, 10, 14 and 21 days post inoculation. Samples were tested by HI at the Iowa State Vet Diagnostic Lab and tested on the experimental ELISA at IDEXX Laboratories. The ELISA test detected seroconversion for all five pigs by day 7, while the HI test detected day 7 seroconversion in four of the five animals. The fifth animal was seropositive by day 21 as determined by HI.

Additional sensitivity data, demonstrating correlation of the SI ELISA to HI was obtained through the testing of field samples from herds with positive HI titers. Samples were obtained from multiple sites with accompanying HI titers. Each serum sample was also assayed at IDEXX on the experimental SI ELISA. Because of variability between testing sites regarding the interpretation of the HI titers, samples with HI titers of 1:10 or 1:20 were considered suspect (+/-). At certain laboratories this range is considered to be a positive test result, while at others it is interpreted as negative. Of the 279 samples with positive HI titers ($\geq 1:40$) the SI ELISA detected

269 positives. This demonstrates a sensitivity of 96.4% relative to the HI for samples with a HI titer $\geq 1:40$. The overall correlation between the ELISA and HI was 95.3% for all of the samples tested.

A set of 761 field samples from HI negative herds, obtained from several sites in the United States, were used to evaluate specificity. Serum samples were assayed on the SI ELISA and results were compared to the individual laboratory's HI data. The specificity of this population was 99.7%.

The IDEXX Swine Influenza Antibody test described above provides good correlation to other serological methods in the detection of seropositive pigs, while maintaining excellent specificity. Studies are currently in progress to evaluate detection of antibody to H3N2 swine influenza subtypes.