Porcine Epidemic Diarrhea virus Antibody tests available at ISU-VDL

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Following the successful isolation and propagation of PEDV in cell culture at the ISU-VDL, an indirect immunofluorescence assay (IFA) was developed and implemented in September 2013 for the detection of PEDV antibodies in swine serum. The diagnostic sensitivity and specificity of IFA was initially estimated to be 95.6% and 98.7%, respectively, using a dilution of ≥ 1:40 as cut-off.

Concurrently, we continued the development of a PEDV "whole virus" (WV) indirect IgG ELISA. ELISA offers specific testing advantages over IFA, including: amenable to handling large number of samples, rapid turn-around, and greater diagnostic sensitivity.

The performance of the PEDV WV IgG ELISA was compared to the PEDV IFA test using serum samples collected from 4-week-old pigs inoculated with PEDV USA/Iowa/18984/2013 under research conditions (Table 1). Anti-PEDV IgG serum antibody was detected between 7 (ELISA) and 10 (IFA) days post-inoculation (DPI). All animals were positive by DPI 21, but the detection rate and sensitivity of the IFA test declined over time. Thus, the IFA and ELISA have similar detection rates at early stages of the infection, but the ELISA detected antibody longer than the IFA.

The diagnostic specificity of the PEDV WV ELISA was further evaluated using +500 serum samples collected in December 2011 and January 2012, i.e., these samples were collected when the U.S. swine herd was still free of PEDV. Diagnostic specificity of the ELISA was estimated to be 98.5% in that sample set.

In September 2014, ISU-VDL began using the PEDV WV ELISA for the detection of IgG in serum. During the onboarding process of this new assay, the ISU VDL is further evaluating the utility of this assay as a PEDV antibody screening assay and continuing to use the PEDV IFA as confirmatory test when needed.

Table 1. Comparative sensitivity of PEDV whole virus-based indirect ELISA and PEDV IFA on serum samples collected from 4-weeks-old pigs over time after inoculation with PEDV under experimental conditions

Assay	Days post-inoculation (DPI)									
	0	7	10	14	21	28	35	42	49	54
IFA	0	0	85%	95%	100%	100%	100%	95%	90%	60%
WV ELISA	0	15%	85%	95%	100%	100%	100%	100%	100%	100%