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Detection of Serum Antibodies to Ovine Progressive Pneumonia Virus in Sheep by Using a Caprine Arthritis-Encephalitis Virus Competitive-Inhibition Enzyme-Linked Immunosorbent Assay

Lynn M. Herrmann,[1]* William P. Cheevers,[2] Katherine L. Marshall,[3] Travis C. McGuire,[2] Melinda M. Hutton,[2] Gregory S. Lewis,[4] and Donald P. Knowles[1,2]

Animal Disease Research Unit, Agricultural Research Service, U.S. Department of Agriculture, Pullman, Washington 99164-6630[1]; Department of Veterinary Microbiology and Pathology, Washington State University, Pullman, Washington 99164-7040[2]; Animal Plant Health Inspection Service, U.S. Department of Agriculture, Fort Collins, Colorado 80523[3]; and U.S. Sheep Experiment Station, Agricultural Research Service, U.S. Department of Agriculture, Dubois, Idaho 83423[4]

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A competitive-inhibition enzyme-linked immunosorbent assay (cELISA) for detection of antibodies to the surface envelope (SU) of caprine arthritis-encephalitis virus (CAEV) was recently reported (L. M. Herrmann, W. P. Cheevers, T. C. McGuire, D. Scott Adams, M. M. Hutton, W. G. Gavin, and D. P. Knowles, Clin. Diagn. Lab. Immunol. 10:267-271, 2003). The cELISA utilizes CAEV-63 SU captured on microtiter plates using the monoclonal antibody (MAb) F7-299 and measures competitive displacement of binding of the anti-CAEV MAb GPB 74A by goat serum. The present study evaluated the CAEV cELISA for detection of antibodies to ovine progressive pneumonia virus (OPPV) in sheep. Three hundred thirty-two sera were randomly selected from 21,373 sheep sera collected throughout the United States to determine the sensitivity and specificity of cELISA and agar gel immunodiffusion (AGID) based on immunoprecipitation (IP) of [^{35}S]methionine-labeled OPPV antigens as a standard of comparison. A positive cELISA test was defined as >20.9 percent inhibition (% I) of MAb 74A binding based on two standard deviations above the mean % I of 191 IP-negative sheep sera. At this cutoff, there were 2 of 141 false-negative sera (98.6% sensitivity) and 6 of 191 false-positive sera (96.9% specificity). Sensitivity and specificity values for IP-monitored AGID were comparable to those for cELISA for 314 of 332 sera with unambiguous AGID results. Concordant results by cELISA and IP resolved 16 of the 18 sera that were indeterminate by AGID. Additional studies evaluated cELISA by using 539 sera from a single OPPV-positive flock. Based on IP of 36 of these sera, there was one false-negative by cELISA among 21 IP-positive sera (95.5% sensitivity) and 0 of 15 false-positives (100% specificity). We conclude that the CAEV cELISA can be applied to detection of OPPV antibodies in sheep with high sensitivity and specificity.

Most commonly used at diagnostic labs for SRLVs, including both OPP and CAE, VMRD's USDA-licensed cELISA was originally developed for CAE testing. It was also validated for sheep (note abstract above), but at a lower percent inhibition (% I) cut-off of 20.9%. However, the cut-off used by AAVLD accredited labs for cELISA testing of both sheep and goats is 35%. →

Comparative Review: Elitest ELISA (and) VMRD cELISA			
ANON - 11/17/20 D20-013704 (cELISA)	**MNVDL - 02/25/21 D21-006287 (Elitest)**	**cELISA % Inhibition**	**Elitest S/N ratio**
(5) 9008	1	23.46 Neg	1.4 POS
(12) 9069	2	24.86 Neg	1.5 POS
(13) 9017	3	73.05 POS	11.7 POS
(19) 9149	4	65.43 POS	11.9 POS
(20) 9067	5	66.02 POS	5.2 POS
(26) 9158	6	25.77 Neg	3.2 POS
(33) 6080	7	37.9 Suspect	8.4 POS
(36) 9221	8	54.35 POS	12.2 POS
(38) 9197	9	40.96 Suspect	5.4 POS
(39) 9007	10	45.43 POS	3.7 POS
(42) 7115	11	21.65 Neg	11.5 POS
(52) 8284-NT	12	58.86 POS	5.6 POS
ANON - 11/23/20 D20-013997 (cELISA)	**MNVDL - 02/25/21 D21-006287 (Elitest)**	**cELISA % Inhibition**	**Elitest S/N ratio**
(4) 9124	13	41.98 Suspect	10.5 POS
(11) 9184	14	69.48 POS	4.1 POS
(15) 9194	15	30.8 Neg	0.6 Neg
(16) 9003	16	61.75 POS	10.1 POS
(21) 9216	17	76.17 POS	10.2 POS
(38) 9072	18	41.12 Suspect	8.3 POS
(46) 9220	19	55.49 POS	9.2 POS
(48) 9187	20	65.66 POS	10.7 POS
(49) 9199	21	59.74 POS	11.6 POS
(52) 9034	22	80.66 POS	12.2 POS
(56) 9195	23	31.07 Neg	0.8 Neg
(57) 9131	24	53.72 POS	2.7 POS
(69) 9037	25	56.78 POS	12.2 POS
(85) 9066	26	50.91 POS	6.1 POS
(90) 9070	27	52.2 POS	9.9 POS
(109) 6115	28	46.42 POS	11.7 POS
ANON - 02/03/21 D21-001425 (cELISA)	**MNVDL - 02/25/21 D21-006287 (Elitest)**	**cELISA % Inhibition**	**Elitest S/N ratio**
(12) 47	29	25.13 Neg	7.8 POS
(17) 26	30	72.67 POS	11.9 POS
(21) 100	31	72.23 POS	6.1 POS
(23) 77	32	65.67 POS	7.7 POS
(26) 69	33	47.66 POS	9.2 POS
(33) 67	34	37.02 Suspect	10.9 POS
(36) 50	35	61.38 POS	8.1 POS
(48) 3	36	62.64 POS	9.5 POS