DETECTION OF COLOSTRAL ANTIBODIES TO OVINE PROGRESSIVE PNEUMONIA VIRUS

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In most laboratories, antibodies to ovine progressive pneumonia virus are detected in serum samples with the agar gel immunodiffusion (AGID) test. We compared AGID results on matched serum and colostrum samples from 102 ewes. Our findings indicate that colostrum samples may provide a screening tool as reliable as serum. Furthermore, colostrum does not require the equipment or bleeding skills necessary when working with serum samples.

Ovine progressive pneumonia (OPP) is a chronic, fatal disease affecting 30 to 70 percent of midwestern and western sheep (3). The causative agent is a slow virus similar to a number of other viruses in many parts of the world. Because signs develop gradually over a period of years, a large number of sheep may be affected before the disease is diagnosed (2, 4). Flocks are currently screened for the presence of specific antibodies to OPP virus by the agar gel immunodiffusion (AGID) test on serum. If antibodies could be detected reliably in the colostrum, sample collection for screening could be done easily by herdsmen and samples could be frozen. Our results indicate that antibody to OPP virus is detectable in colostrum with the AGID test.

MATERIALS AND METHODS

Colostrum was obtained within 6 hours of lambing from 102 ewes in two separate flocks. Five milliliters of thawed or fresh colostrum was combined with 0.1 milliliter of rennin and allowed to incubate at 37°C for 1 hour. The whey was removed and stored at 4°C.

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AGID slides were prepared by coating glass slides with an adhesive agar and overlaying with 2.5 milliliters of 1.5 percent 1S Ionager. The agar was allowed to solidify and was then set in a humidity chamber for 1 hour at room temperature.

Wells were cut in the agar in a pattern of six peripheral wells surrounding one central well. Twenty-seven microliters of OPP viral antigen was added to the central well. The peripheral wells were filled alternately with either calcium magnesium-free phosphate buffered saline or a known positive sample as negative and positive controls. On experimental slides, serum and colostrum samples to be tested were substituted for the negative controls.

The slides were then incubated in a humidity chamber at room temperature for five days. Results were read while observing the slides over an indirect light source. Positive samples indicated by the formation of precipitin lines midway between the central and sample wells.

RESULTS

Table 1 indicates the results of AGID screening for OPP virus antibodies in flocks 1 and 2. Samples from flock 2 were taken only from ewes previously determined to be OPP-positive by AGID on serum.

TABLE 1

Flock 1			Flock 2		
Sheep	Colostrum	Serum	Sheep	Colosrum	Serum
Red 13	—	—	533	+	+
14	—	—	9226	+	+
15	—	—	8476	+	+
50	—	—	9198	+	+
53	—	—	0273	+	+
Blue 2	+	+	80-633	+	+
7	—	—	80-209	+	+
19	—	—	8702	+	+
21	+	+	9-152	+	+
23	—	—	194	+	+
24	—	—	8317	+	+
25	—	—	7068	+	+
Orng 2	—	—	8034	+	+
3	+	+	2099	+	+
5	+	+	80-028	+	+
6	—	—	9-281	+	+
8	—	—	V-42	+	+
9	—	—	77-103	+	+
11	—	—	2013	+	+
14	+	+	9516	+	+
16	—	—	8701	+	+

Flock 1			Flock 2		
Sheep	Colostrum	Serum	Sheep	Colosrum	Serum
Orng 17	+	+	1362	+	+
25	+	+	81-13	+	+
26	—	—	77-464	+	+
29	—	—	80-098	+	+
40	+	—	80-194	+	+
41	—	—	77-396	+	+
42	—	—	9147	+	+
43	—	—	0382	+	+
44	—	—	81-109	+	+
45	—	—	7181	+	+
46	—	—	1629	+	+
47	—	—	P421	+	+
48	—	—	77-069	+	+
49	—	—	9052	+	+
50	—	—	7188	+	+
Gr 1	—	—	205	+	+
4	—	—	7137	+	+
11	+	+	7388	+	+
15	—	—	81-391	+	+
21	—	—	131	+	+
22	—		F80	+	+
			148	+	+
			9137	+	+
			239	+	+
			119	+	+
			81-623	+	+
			375	+	+
			78-304	+	+
			81-706	+	+
			846]	+	+
			30099	+	+
			No Tag	+	+
			5-027	+	+
			0129	+	+
			1362	+	+
			79-281	+	+
			8640	+	+
			T161	+	+
			8188	+	+

The near-perfect correlation between serum and colostrum samples on antibody screening is not surprising in light of the humoral immune mechanisms involved in ruminant colostrum. Immunoglobulin G (IgG), the primary immunoglobulin in sheep colostrum, is entirely serum derived and is found in much higher concentrations in the colostrum than in the serum. Therefore antibodies formed against OPP virus in the serum might be expected in the colostrum.

The disparity in the results for sheep 40, Flock 1 (which gave negative results with serum and positive results with colostrum) may have been due to the length of time which passed between serum and colostrum collection. During the weeks or months involved, the titer may have decreased significantly in the serum. It is also possible that since IgG is more concentrated in the colostrum than in the serum, weak positives would be more likely to appear in the colostrum samples.

Our results show that AGID testing on colostrum samples is a reliable method for screening for the presence of OPP virus antibodies.

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