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Technical note

Serological evidence of caprine herpesvirus type 1 infection in goats in Mexico

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Abstract:

Serologic studies of caprine herpesvirus type 1 infection (CpHV-1) have not been done to date in Mexico. A serological survey was conducted to identify the presence of anti-CpHV antibodies with two widely used blocking ELISA tests for detection of antibodies against bovine herpesvirus type 1 glycoprotein B (gB) and anti-glycoprotein E (gE). Of the 838 tested animals, 123 (14.68 %) were positive with the ELISA test. Anti-CpHV-1 antibodies were detected in samples from the states of Puebla, Morelos, Nuevo Leon, Mexico City, Guanajuato and Queretaro. This is the first report of the presence of antibodies against caprine herpesvirus-1 in Mexico.

Key words: Caprine, Herpesvirus, Mexico, Goats, Seroprevalence, ELISA.

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Viruses belonging to the Herpesviridae family are distributed widely in nature and affect a large number of animal species[1,2]. One of the main herpesviruses affecting goat production is caprine herpesvirus type 1 (CpHV-1) which causes significant financial losses in goat production systems. Distributed worldwide, CpHV-1 has especially high seroprevalences in the Mediterranean basin[3-8]. It infects epithelial cells *in vivo* and *in vitro*, producing a cytolytic infection and establishing a latent infection in the sacral and trigeminal ganglia. The latent state remains throughout an animal's life and can be reactivated under stressful conditions. The virus causes abortions, neonatal death, vulvovaginitis and balanoposthitis in adults, as well as systemic disease in kids[2,6].

Caprine herpesvirus type 1 (CpHV-1) is a wrapped virus containing a large number of glycoproteins, with glycoprotein B (gB), glycoprotein C (gC) and glycoprotein D (gD) being the most abundant[9]. Phylogenetic analysis of the nucleotide and amino acid sequences of gB and gD has revealed that CpHV-1 is the most distant virus among the alphaherpesvirus affecting ruminants, which include bovine herpesvirus type 1 (BoHV-1), bovine herpesvirus type 5 (BoHV-5), cervid herpesvirus type 1 and 2 (CvHV-1, CvHV-2), and moose herpesvirus (RanHV-1)[10].

Based on the complete gB sequence, which is the most frequently preserved among the herpesviruses, the identity percentage between CpHV-1 and BoHV-1 is 78.5%[9]. Due to the presence of a homology between bovine herpesvirus and caprine herpesvirus, and the lack of commercial CpHV-1 antibodies for serological diagnosis, commercial detection kits for infectious bovine rhinotracheitis (IBR) gB antibodies have been used to detect CpHV-1[8,11].

No seroepidemiological studies for CpHV-1 have been done in Mexico to date, although the disease may have been responsible for a suspicious outbreak in a goat herd in the state of Queretaro in 2008[12]. With the aim of beginning characterization of CpHV-1 epidemiological status in Mexico, a serological study was done of goats from eight states using a commercial ELISA for antibody detection of BoHV-1. Antigenic difference between BoHV-1 and CpHV-1 allowed use of an antibody detection test against gE from BoHV-1 to distinguish between the two viruses. Analyses were done of 838 serum samples from seven states: Queretaro, Puebla, Guanajuato, Mexico City, Veracruz, Nuevo León and Morelos. Two commercial ELISA blocking tests were used [Herdchek Anti-IBR gB (Idexx, Germany) and Herdchek Anti-IBR gE (Idexx, Germany)], and samples processed following manufacturer instructions[3].

Antibodies against CpHV-1 were in samples from the states of Puebla, Morelos, Nuevo León, Mexico City and Guanajuato. Of the 838 samples, gB antibodies were detected in 123 (14.68 %). Analyses for gE were done in 93 of these 123 positives, and produced two positives and two suspected positive samples. Positivity was 33.33 % in Puebla, 32.72 % in Nuevo León and 27.34 % in Mexico City, but only 10 % in Queretaro and negative in Veracruz (Table 1). Positive results for the gB of BoHV-1 in 14.68 % of the analyzed samples, as well as the lack of positivity in most of the samples in the confirmation gE

detection test (99.9 %), suggest that these animals could have be in contact with CpHV-1 based on previous reports[1, 3,7].

Table 1: ELISA results by State

States	Samples analyzed	ELISA gB		ELISA gE	
		Positives	(%)	Positives	Suspicious
Querétaro	427	43	10.07		
Puebla	51	17	33.33	1	1
Guanajuato	106	3	2.83		
Mexico City	139	38	27.34	0	
Veracruz	52	0	0.00		
Nuevo León	55	18	32.73	1	1
Morelos	8	4	50.00	0	0
Total	838	123	14.68	2	2

In one study the anti-gB blocking ELISA test exhibited 93% sensitivity in experimental goats infected with CpHV-1, so this method is considered effective in detection of caprine herpesvirus infection via gB cross-antigenicity[9].

Natural BoHV-1 infection in goats is rare[11], suggesting that the two gE positives may be due to high immunization levels caused by recent contact. Of note is that both gE-positive samples had blocking levels greater than 90% in the gB test. Another reason for this positivity could be a certain degree of cross-antigenicity between CpHv-1 gE and BoHV-1 gE due to the epitopes shared between the two; this has been reported for the pseudorabies virus[13].

The present is the first report of the presence of antibodies against herpesvirus in goats in Mexico. The results suggest that caprine herpesvirus type 1 is found in Mexico. In cases of abortion in goats, CpHv-1 should be considered as a presumptive diagnosis. Although only 10.47% of the samples from Queretaro were positive these came from a herd with suspicious lesions possibly due to CpHV-1, a situation reported previously[12]. In addition, the CpHV-1 positive tissue samples were identified by immunohistochemistry using monoclonal antibodies. These results suggest that CpHV-1 circulates in this region of Mexico.

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