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# INCIDENCE OF PATHOLOGICAL CHANGES IN SHEEP SEROPOSITIVE TO MAEDI-VISNA

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Maedi is a multisystemic disease of adult sheep caused by a lentivirus from the retrovirus family. The disease produces affections in lung, brain, joints and mammary glands (1). In Spain the disease was described in 1984 (2). Epidemiological surveys in some parts of Spain demonstrate that Maedi has a high prevalence and is the most important respiratory disease in adult sheep. There are no data on the percentage of infected sheep that develop lesions and clinical disease. The aim of this work is to get an estimation of the relationship between the seropositivity to Maedi Visna Virus (MVV) and the presence of lesions in the lungs and mammary glands.

## Material and methods

124 randomly selected Rasa breed sheep killed in a slaughterhouse in Zaragoza, were studied between 1988 and 1989. Their age ranged from 2 to 7 years. Blood samples were taken and both, mammary glands and lungs were removed for pathological and microbiological studies. With the purpose of serological studies an AGID test, using a WLC-1 antigen was carried out. The lungs and mammary glands were macroscopically studied and samples for microscopical studies were taken and processed by applying routine techniques. In order to estimate the severity of the lesions, we carried out the following methods: *Lungs*: The two histological changes, Hyperplasia of Lymphoid Follicles (H.L.F.) and Interstitial Pneumonia (I.P.), which are considered to be the most characteristic lesions of Maedi, were evaluated. These lesions were classified as follows: Number of lymphoid follicles found in the whole section, +: 2 to 5, ++: 6 to 15, +++: above 15. I.P.: +: slight, ++: moderate, +++: severe. *Mammary gland*: Similar changes, Hyperplasia of Lymphoid Follicles (H.L.F.) and Interstitial Infiltrate (I.I.) of the parenchyma, were also evaluated. These lesions were classified as follows. Number of lymphoid follicles: As in lungs. I.I.: (slight inflammatory infiltration was not considered pathological), +: moderate infiltration, ++: severe infiltration. Samples from the mammary glands were taken for bacteriological examination by standard methods in order to isolate and identify Mycoplasma and other bacteria.

## Results

74 animals were seropositive to MVV and the other 50 were seronegative. Pathological findings in lungs (table 1): 21 seropositive animals showed typical gross lesions of Maedi. The microscopic lesions were seen in 40 seropositive sheep, amongst which were the 21 with gross lesions. H.L.F. was detected in 38 animals and I.P. was seen in 28. The number of follicles in these seropositive animals was variable, ranging from only a few in some animals to a large number in others. Likewise, the intensity of the interstitial pneumonia was variable. There was no relationship between the number of follicles and the intensity of the interstitial pneumonia. 12 animals had H.L.F. (from + to +++), without I.P. and 2 had I.P. (++) without H.L.F. Finally, 26 sheep presented a mixed form with H.L.F. and I.P., but all the combinations of these two lesions could be found. Thus some

animals with +++ of H.L.F. had only a + of I.P. and sheep with +++ of I.P. had only + of H.L.F. Pathological findings in mammary gland: Microscopic lesions were detected in 43 seropositive sheep, 30 of these with H.L.F. and 27 with I.I. Most of the animals showed a middle-low number of follicles. The I.I. was generally mild. No relationship was found between the number of follicles and the intensity of I.I.: 16 animals had H.L.F. only; 13 had I.I. only, and 14 H.L.F. and I.I. In these 14 sheep, all the combinations of lesions could be found. Pathological findings in seronegative animals: There were 50 sheep seronegative to Maedi. We observed maedi-like lesions in 8 animals. Two sheep with a few lymphoid follicles in the lungs were detected. Lesions in the mammary glands were found in 6 animals. These lesions showed several degrees of H.L.F. General Results: 19 sheep amongst the 74 seropositive animals had none of the lesions described above. 55 showed lesions related to Maedi; 12 had them in the lungs only, and 15 exclusively in mammary gland. 28 sheep had lesions in both organs.

Lung	sheep	Mammary gland	sheep
Gross pathology:	21	Gross pathology:	none
Microscopically	40	Microscopically	43
H.L.F.:	38	H.L.F.:	30
++:	7	++:	20
+++:	17	+++:	8
++:	14	++:	2
I.P.:	28	I.I.:	27
++:	13	++:	22
+++:	8	+++:	5
++:	7		
Presentation			
H.L.F. only: 12		H.L.F. only: 16	
H.L.F. and I.P.: 26		H.L.F. and I.I.: 14	
I.P. only: 2		I.I. only: 13	

Table 1: Gross and microscopic results of the 74 seropositive animals

## Discussion

The high seropositive rate (60%) against Maedi-Visna virus found in this study, carried out with randomly selected sheep, must be pointed out. This fact shows that Maedi is a very common disease in our geographical area.

With respect to the occurrence of lesions in seropositive sheep, the simultaneous involvement of both lungs and mammary glands (38%) is an outstanding feature of this study, when compared with the lower percentage of animals showing only one of the two organs affected

(lungs 16%, mammary glands 20%). This results seems to agree with other studies (3, 4). A relatively high number of seropositive animals (25%) did not show lesions in either organ.

With respect to the type and severity of the lesions, the predominance of the H.L.F. over the I.P. was observed in lungs, whereas in the mammary glands this relationship was not noted.

On the other hand, even when occurring in both organs, the lesions did not show the expected proportion in terms of either type or importance.

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### **OCCURRENCE OF CANINE DISTEMPER VIRUS INFECTION IN NON-DOMESTIC CARNIVORES AND DISTRIBUTION OF VIRAL ANTIGEN IN BRAIN TISSUES**

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Canine distemper virus (CDV) belongs to the genus Morbillivirus in the Paramyxoviridae family and causes an acute to subacute systemic and/or neurologic disease in dogs and other carnivores throughout the world (1,4,5). Within the order Carnivora are a number of families including Canidae and Mustelidae that have been shown to be susceptible to CDV. As a result of the widespread use of modified-live CDV vaccines the incidence of CDV infection in domestic dogs has dramatically declined. However, isolated epidemic recurrence of CDV infection in dogs and the recent epizootic among harbor seals due to infection with a CDV-like virus raise the question of the importance of wildlife species as a reservoir source for infection (3,6). Surprisingly, little is known about occurrence and details of histological and immunohistological findings in noncanid species (5,7).

Therefore, the purpose of the present study was twofold, (i) to record the seasonal incidence of CDV infection among mustelids originating from the same geographical area and, (ii) to characterize histologically and immunohistologically CDV-associated brain lesions in these animals.

Brain tissues from 41 beech martens (*Martes foina*), 2 pine martens (*Martes martes*) and 3 european polecats (*Mustela putorius*), which were submitted for rabies diagnosis to the Staatliche Institut für Gesundheit und Umwelt, Abteilung Veterinärmedizin, in Saarbrücken over a 12 months period (April 1989–March 1990), were collected. Impression smear preparations were taken from brain tissues for rabies diagnosis and half of each brain was fixed in 10% non-buffered formalin. For histological examination, tissues were embedded in paraffin wax, stained with hematoxylin and eosin (HE) and selected sections with luxol fast blue and cresyl violet. Immunohistological demonstration of CDV antigen was performed as described (2).

Clinically, the mustelids showed abnormal behavior including aggressiveness and lack of fear or they were found dead with no premonitory signs. CDV antigen was demonstrated immunohistolo-

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gically in 18 (39.1%) and rabies virus infection was diagnosed in 5 animals (10.9%). CDV infection in mustelids had a peak incidence in the winter months. Histological lesions in mustelids with CDV infection varied but were in general mild to minimal. Intranuclear and intracytoplasmic inclusion bodies were not observed. Minimal to mild perivascular and/or meningeal mononuclear cell infiltrates were observed in 12 cases. Two animals exhibited single foci of demyelination with or without reactive astrogliosis in the cerebellar white matter or the medulla oblongata. Four cases were without significant microscopic brain lesions. Concurrent brain lesions were caused by toxoplasmosis or cerebral nematodiasis in two cases. Immunohistochemically, CDV antigen was present predominantly in the cerebellar and cerebral grey matter, to a lesser extent in meningeal cells and rarely in the white matter.

Summarized, the present findings show a high incidence of naturally occurring CDV infection in wild mustelids with minimal to mild histological brain lesions. In addition, CDV antigen was prominent in the grey matter and white matter involvement was rarely observed.

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