

FIRST REPORT OF EUROPEAN BROWN HARE SYNDROME VIRUS (EBHSV) IN FREE-RANGING EUROPEAN BROWN HARES (*LEPUS EUROPAEUS*) FROM SWITZERLAND AND ARGENTINA

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Extended Abstract

In 1989, Lavazza and Vecchi (1989) found viral particles in European brown hares (*Lepus europaeus*) which had died from European brown hare syndrome (EBHS) by negative staining immune electron microscopy of the liver. The causative agent of EBHS is a small (30 to 35 nm) icosahedral, non-enveloped and hemagglutinating virus (Gavier-Widen and Mörner, 1991) and is classified as a calicivirus (Ohlinger and Thiel, 1991). European brown hare syndrome has been demonstrated in European brown hares and in mountain hares (*Lepus timidus*), and has been reported in many European countries (Morisse, 1988; Eskens and Volmer, 1989; Marcato et al., 1989; Henriksen et al., 1989; Okerman et al., 1989; Chasey and Duff, 1990; Sostaric et al., 1991; Gavier-Widen and Mörner, 1993; Salmela et al., 1993; Steineck and Nowotny, 1993; Nauwynck et al., 1993; Gortazar and de Luco 1995; Frölich et al., 1996; Slamecka et al., 1997). However, until now neither EBHSV-antigen nor corresponding pathology has been found in lagomorphs in Switzerland. Only one report exists for antibodies against caliciviruses in European brown hares in this country (Büttner, 1996). Our objective was to determine, whether free-ranging European brown hares and mountain hares were naturally infected by EBHSV in Switzerland. From 1997 to 2000, complete necropsy and histopathological investigations were performed on 157 free-ranging European brown hares found dead throughout Switzerland. Organ samples of all these individuals (157 livers and 107 spleens available) were tested for European brown hare syndrome virus (EBHSV)-antigen by enzyme-linked immunosorbent assay (ELISA) test kit (Frölich et al., 1996). Furthermore, 60 blood samples available were tested for antibodies against EBHSV by ELISA. In addition, liver samples of 87 free-ranging mountain hares hunted in 1996 were tested for EBHSV-antigen. In two European brown hares from southern Switzerland lesions suggestive of changes induced by EBHSV were present, and high titers of EBHSV-antigen were detected in both liver and spleen samples of the same animals. The two liver samples were positive up to a dilution of 1: 1,000 and the two spleen samples were positive when diluted 1: 10,000 and 1:1,000, respectively. Major histological lesions were restricted to the liver parenchyma and characterized by midzonal- and perilobular, large extensive to coalescing areas of coagulative and lytic necrosis and partial replacement of the parenchyma by erythrocytes. Additional lesions were characterized by multiple subendocardial hemorrhages and tubular nephrosis. Based on negative staining electron microscopy investigations of liver and spleen homogenates, we observed calicivirus in one antigen-positive hare. These viral particles morphologically resemble those observed by Poli et al. (1991) in spleen and liver of hare with acute hepatic necrosis. Low EBHSV-antigen titers were found in three additional European brown hares from central and western Switzerland, but EBHS-

lesions were absent. Antibodies against EBHSV were not detected in any of the sera of European brown hares, and EBHSV-antigen was not found in the samples of mountain hares. The two individuals showing EBHS originated from a region south of the Alps. This local subpopulation unit is part of the European brown hare metapopulation of northern Italy, where the disease is known to be widespread (Sciicluna et al., 1994).

EBHS has been reported in many different European countries (Frölich et al., 2001) but until now it was not known outside Europe (Lenghaus et al., 2001). In 1888, imported European brown hares were released for hunting in the province of Santa Fé in Argentina. Genetic studies on European brown hares from Argentina might indicate their European origin (Faber, pers. comm.). However, detailed genetic investigations about the origin of European brown hares from Argentina do not exist until now. Due to the presence of optimal habitat the hare populations increased rapidly and in 1907 the European brown hare was officially declared a pest. As a consequence, commercial hunting started in the early 1930's (Kujawski, 1998). Our objective was to determine whether European brown hares in Argentina were naturally infected with EBHSV. From 1998 to 2000, serum samples of 80 shot European brown hares from Argentina were examined for antibodies against European brown hare syndrome virus (EBHSV) and 80 spleen samples were investigated for EBHSV-antigen by enzyme linked immunosorbent assay (ELISA). Nine hares were positive for EBHSV-antigen and antibodies against EBHSV were detected in only one individual. Based on negative staining electron microscopy investigations of spleen homogenates, we observed calicivirus in one of five EBHSV-antigen-positive hares. However, EBHS has not been reported to have caused any mortality. Consequently, a less pathogenic variant of EBHSV may be present in the population which does not cause clinical symptoms suggestive of EBHS.

In conclusion, this is the first report of EBHS in Switzerland and of specific antibodies to EBHSV, EBHSV-antigen and electron microscopy findings in free-ranging European brown hares from South America.

Zusammenfassung(??)

Résumé(??)

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