

EMERGENCE OF FOX RABIES IN NORTH-EASTERN ITALY

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Italy has been classified as rabies-free since 1997. In October 2008, two foxes have been diagnosed with rabies in the Province of Udine, north-east Italy. One case of human exposure caused by a bite from one of the foxes has occurred and was properly treated.

On 17 October 2008, the national reference centre for rabies at the Istituto Zooprofilattico Sperimentale delle Venezie of Legnaro in Padova, Italy, identified a rabid red fox (*Vulpes vulpes*) in the municipality of Resia (Province of Udine, Northeast of Italy) (Figure 1) [1]. The fox had bitten a 69-year-old man on the ankle on 10 October. The victim received first aid assistance and complete post-exposure treatment at the local health unit. The exposed person is currently under active health surveillance.

Laboratory analysis

A brain sample from the fox initially tested negative in the fluorescent antibody test (FAT) for rabies virus (RABV). However, the virus was successfully isolated on murine neuroblastoma cell culture [2], and was confirmed as RABV by RT-PCR using specific

primers. When the FAT was repeated on other brain specimens, the test was weakly positive.

The complete open reading frame (1,350 nt) of the gene encoding the nucleoprotein (N) was sequenced (GenBank Acc. Number FJ424484) and compared to the sequences available in public databases. Phylogenetic analysis was performed using the neighbour-joining method with 1,000 times bootstrapping, as implemented by the Mega 4 programme [3]. Phylogenetic analysis (Figure 2) identified the isolate as *Lyssavirus* genotype 1, "classical" rabies virus, according to the classification made by Kissi et al. [4], clustered in the Western European group [5]. As expected, it was closely related to RABV isolated from eastern neighbouring countries (Slovenia, Bosnia and Herzegovina and the former Federal Republic of Yugoslavia) and shared 99% homology with the complete N gene sequence of the strain 86111YOU and 100% homology with a 400 nt fragment of the N gene sequence of the strain 9494SLN, red fox isolates from Bosnia-Herzegovina and Slovenia, respectively.

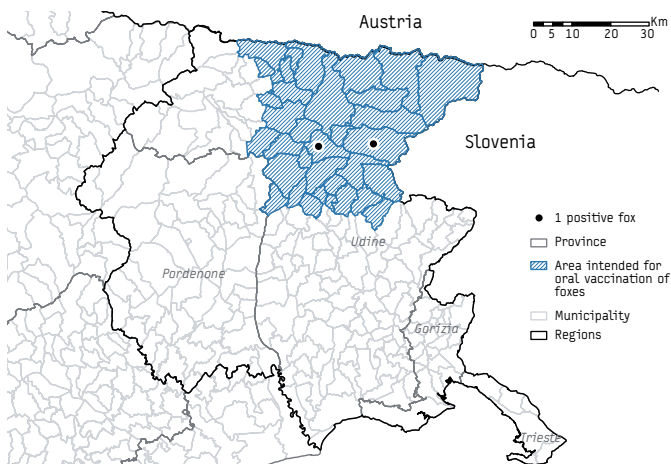
According to the characteristics of the isolate it seems reasonable to believe that the emergence of sylvatic rabies in north-eastern Italy could be linked to infection in the bordering territories of Slovenia, although no cases are currently reported in the area.

Rabies situation in Italy

The north-eastern territories of the Italian region of Friuli Venezia Giulia have been affected by rabies in the 1970s and 1980s, and more recently in the period from 1991 to 1995 [6]. The municipality of Resia was affected until 1992. At that time, the epidemic of sylvatic rabies was linked to the epidemiological situation of infection in Austria and the nearby territories of former Yugoslavia, now Slovenia. For this reason, the risk of rabies in the northern and eastern border regions of Italy has long been recognised. The rabies surveillance carried out in that region accounted for an annual number of 310, 210, 123, 94 and 85 foxes analysed from 2004 to October 2008, respectively. Vaccination campaigns using oral rabies vaccine baits have been conducted targeting the wild fox population in these areas in 1989 and between 1992 and 2004. The last case of rabies in Italy was diagnosed in a fox in the province of Trieste on the border with Slovenia in December 1995.

FIGURE 1

Map of Friuli Venezia Giulia region, Italy, showing the two reported cases as well as the area where oral vaccination of foxes is being implemented



Italy has been classified as rabies-free since 1997. At present, Austria is rabies free, while in Slovenia, rabies cases in foxes are still being reported from the South Eastern regions bordering Croatia [7]. In this area oral vaccination campaigns are systematically conducted in the fox population since the mid-1990s in the framework of a national rabies eradication programme [8].

On 27 October 2008, a second fox was found dead and diagnosed with rabies in the municipality of Venzone (Province of Udine) (Figure 1), 12 km west to the one infected earlier the same month. No human exposure has been reported related to this second infected fox.

Measures taken

Following these outbreaks, the preventative measures implemented in the affected areas of Italy include compulsory rabies vaccination of dogs and domestic herbivores at risk of infection (i.e. cows, horses, sheep and goats kept outdoors), prohibition of hunting with dogs, enhanced surveillance in the wild animal population and implementation of oral vaccination of foxes (Figure 1). Furthermore, an informative campaign on the risk for the local population, as well as visitors and tourists, has been implemented

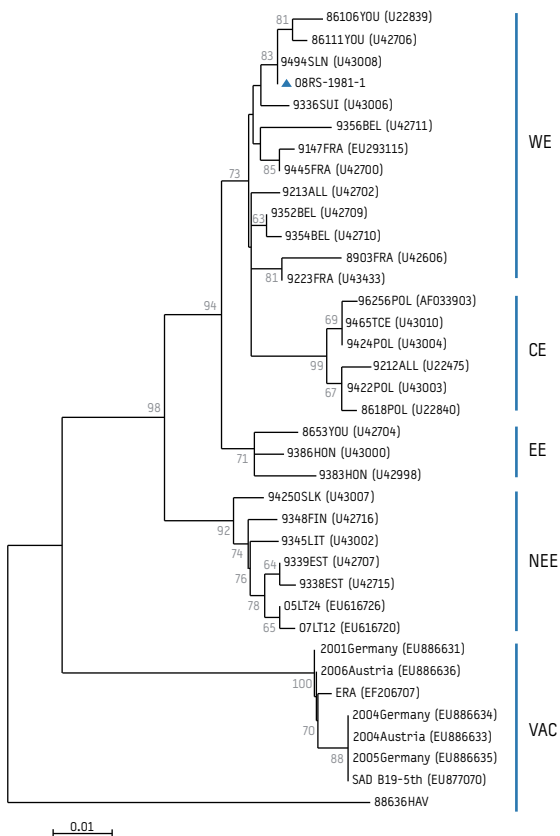
and a protocol for post-exposure prophylaxis and recommendations for pre-exposure immunisation for individuals at high risk (such as hunters, forest workers, game wardens, veterinarians) have been sent to all healthcare facilities and medical associations in the affected area.

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FIGURE 2

Phylogenetic tree (neighbour-joining method) of the nucleoprotein gene of a rabies virus isolated from a fox in Italy, October 2008



The sequence of the Italian isolate is identified with a blue triangle. Sequences of the other genes of this isolate can be found in GenBank.

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