

INVESTIGATION OF TICK-DERIVED LYME DISEASE BORRELIA STRAINS ISOLATED IN STYRIA, AUSTRIA

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ABSTRACT

In Styria, Austria, several areas are known to be endemic for Lyme disease. The *Borrelia* spirochetes which are the causative agent for this illness are transmitted by the tick vector *Ixodes ricinus*. The present study was undertaken to survey the tick population of Styria for the presence of *Borrelia* and to characterize the strains isolated. Ticks were collected in biotopes known to be natural foci of tick borne encephalitis, and *Borrelia* were cultivated from tick extracts. Each isolate was characterized by species and, from several strains, the sequence of the *ospC* gene was determined. Sixteen Lyme disease *Borrelia* strains were isolated, ten of which were further characterized. These included three *Borrelia burgdorferi* sensu stricto, three *Borrelia afzelii* and four *Borrelia garinii* isolates. Sequence analysis of two of the *Borrelia afzelii* isolates and three of the *Borrelia garinii* isolates indicated that two of the strains have *ospC* genes identical to alleles previously described (RFLP types 20 and 34), and three of the genes were novel variants. In conclusion, it was demonstrated for the first time that the three major Lyme disease *Borrelia* species are present in the tick population of Styria. The *ospC* genes of the analyzed strains showed a high degree of variability.

KEY WORDS

Lyme disease, borrelia strains, ospC gene, RFLP types, tick isolates, Styria

INTRODUCTION

Lyme disease (LD) is a vector-transmitted infection caused by spirochetes of the genus *Borrelia* (1,2). In the Austrian province of Styria, the primary vector transmitting the infective agent is the tick *Ixodes ricinus* (3,4). In humans, LD is a multi-systemic illness with a wide range of symptoms (dermatological, neurological, articular or cardiological) (5-8). Corre-

lations between clinical manifestations of LD and *Borrelia* species have been reported (9,10). The major species responsible for LD are *Borrelia burgdorferi* (*Bb*) sensu stricto, *B. afzelii* and *B. garinii*. LD *Borrelia* are extremely heterogeneous (11-13); one of the most variable proteins expressed by *Borrelia* is the outer surface protein OspC (14-16).

Prior to this study, no data was available regarding LD *Borrelia* strains present in the tick population of

