SURVEY OF LYME BORRELIOSIS IN HOKKAIDO: SEROEPIDEMIOLOGICAL STUDY AMONG HORSES AND ISOLATION OF *BORRELIA BURGDORFERI* FROM IXODID TICKS

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A seroepidemiological survey was performed among horses in Hokkaido in order to examine the prevalence of *Borrelia (B.) burgdorferi* in this area. Antibody titers were measured using the indirect fluorescent antibody technique (IFA) and the FAST-LYME test (FL-test), which is a variation of the enzyme-linked immunofluorescent assay. *B. burgdorferi* was isolated from Ixodid ticks (vector of Lyme borreliosis) collected from 3 areas in Hokkaido and the isolated strains were identified and compared for their antigenic characteristics. The results are summarized as follows.
1) Of 700 horse sera from different areas of Hokkaido, the average positive rate for IFA (antibody titer≧1 : 32) was 4.6% (32/700). Comparing positive rates from each district, the positive rates in Kushiro (20.0%), Abashiri (12.0%), Kamikawa (10.0%), and Tokachi (6.0%) were higher than those in other districts (less than 4%). Analysis of the results in different age groups from the 4 highly prevalent districts revealed that positive antibody titers were detected in none of the 1-year-old group, in 15.8% (15/95) of the 2–5 year-old group and in 9.8% (9/92) of the ≧6 year-old group.
2) Horse sera from the 4 prevalent districts were also examined by the FL test in which relative fluorescent signal values (%RS-value) of highly positive sera were determined. Based on the correlation between IFA titer and %RS-value, the cut-off point was determind to be 1 : 32 for IFA and 2 for %RS-value.
3) A total of 18 strains of *B. burgdorferi* were isolated from 100 Ixodid ticks collected from 3 areas in Hokkaido (overall isolation rate : 18.0%, 18/100). Isolation rates were 22.5% (9/40) from *Ixodes persulcatus* and 15.0% (9/60) from *I. ovatus*.
4) The antigenicities of the isolates were analyzed by IFA using 2 monoclonal antibodies (MAbs), H9724 specific to flagellin protein and H5332 specific to outer surface protein A (OspA). All isolates showed genus-specific reactions to MAb H9724; however, reactions to MAb H5332 varied depending on the isolate, suggesting the antigenic diversity of the isolates.