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Title	SURVEY OF LYME BORRELIOSIS IN HOKKAIDO : SEROEPIDEMIOLOGICAL STUDY AMONG HORSES AND ISOLATION OF BORRELIA BURGDORFERI FROM IXODID TICKS
Author(s)	TASAI, Masayuki
Citation	Japanese Journal of Veterinary Research, 41(1), 57-57
Issue Date	1993-05-27
Doc URL	https://hdl.handle.net/2115/2448
Type	departmental bulletin paper
File Information	KJ00002377661.pdf



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

Masayuki TASAI

*Department of Veterinary Public Health,
Faculty of Veterinary Medicine,
Hokkaido University, Sapporo 060, Japan*

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 $\geq 1:32$) 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 determined 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.