Evaluation of IgG/IgM Line Immunoblots for the confirmation of Lyme Borreliosis

R. Lienhard, L. von Allmen, A. Resenterra * and O. Péter*
ADMED Microbiologie, La Chaux-de-Fonds et *ICHV Microbiologie, Sion

Purpose
Diagnosis of Lyme borreliosis is mainly based on clinical features and serological tests. The two-tier strategy consisting of screening tests followed by a confirmation test is recommended by EUCALB. We evaluated new rapid IgG and IgM immunoblot assays for serological confirmation of Lyme borreliosis.

Material and Methods
Patients’ sera have been selected from the serotheque of our 2 laboratories in order to balance the proportion of recent, localized or disseminated and late, Lyme borreliosis. The selection included 50 erythema migrans (EM), 7 lymphocytoma (LCB), 20 neuroborreliosis (NB) with specific intrathecal antibody production, 12 Lyme arthritis (ARTH) et 10 acrodermatitis chronica atrophicans (ACA). All sera were clinically and serologically defined cases.

Results
Blood donors (n=50) were selected from the endemic region of Neuchâtel to measure the seroprevalence detected by each tests. Sera were evaluated by each laboratory with their own sera according to the kit instructions. Any discrepant result on a serum has been retested in the second laboratory.

Blot interpretation. The Borrelia Europe Line (Virotech) immunoblot includes a reference (borderline) band and all reactivity above this threshold is considered as positive. The IgG interpretation criteria are : 1 band is considered as equivocal and >1 band as positive.

Results were compared with our home-made Western blots (hmWB) including various genospecies as B. burgdorferi sensu stricto, B. garinii, B. afzelii and B. Payload.

Discussion
The Borrelia Europe LINE IgG immunoblots had a 100 % sensitivity in detecting late borreliosis like ACA and ARTH. For EM, the cumulative results for IgG and IgM yielded a global sensitivity of 77,5 % (Virotech) and 75,5 % (hmWB).

And for NB the sensitivity reached 100 % (Virotech) versus 85% (hmWB).

The IgG seroprevalence among blood donors gave 20 % (Virotech) versus 10 % (hmWB).

The number of equivocal results obtained has 26/150 (Virotech) compared to 8/150 (hmWB).

Conclusion
In the Borrelia Europe LINE IgG immunoblots the presence of 1 band (anyone of them) above the cut-off density yield an equivocal result.

The high level of equivocal blot results observed in this study led to high numbers of undetermined confirmation. This was particularly true with neuroborreliosis (35% of equivocal results) and would therefore be of no help to the physician's final decision.

VlsE-mix and DhpA-mix were the main reactive proteins giving equivocal results. Quality or quantity of each protein should be reconsidered to minimize this problem. Adding one or two other borrelial proteins may help to define a better cut-off.