E078

2-hour Educational Workshop

Laboratory support in the diagnosis of Lyme borreliosis

PCR diagnostics in Lyme borreliosis

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Lyme borreliosis, caused by *Borrelia burgdorferi* sensu lato, shows wide range of clinical signs and symptoms. While the presence of typical erythema migrans enables a reliable clinical diagnosis, the other clinical manifestations do not. Microbiological findings are therefore essential for the diagnosis of many unspecific clinical manifestations of borrelial infection, such as isolation of borrelia from clinical specimens, detection of borrelial DNA (by PCR, in tissue or body fluids), and detection of specific antibodies in blood, cerebrospinal or synovial fluid. Isolation of borrelia enables reliable confirmation of the etiology of the infection, but the procedure is long-lasting and has low sensitivity. In comparison with culture, PCR is faster and appears to be more sensitive as culture, additionally it confirms borrelia infection before serology. According to the clinical manifestations, appropriate body fluid samples (e.g., blood, CSF, or synovial fluid) can be collected for PCR; urine does not represent appropriate clinical specimen.

The sensitivity and specificity of the PCR is under influence of several factors: disease course, clinical specimens, extraction method, target gene and/or PCR method – classical (one step PCR, nested PCR, real-time PCR). The most crucial factor is selection of appropriate gene target. Different genes were employed as targets for PCR, for example 16 S rRNA gene, 5S-23S rRNA intergenic space, hbb, ospA, ospC, recA, fla, uvrA, glpQ, nifS, p66 and others. Recently, simultaneous usage of more targets also occurred.

PCR assays have good sensitivities for skin biopsies, 36 % – 88 % for erythema migrans, 57 %-100 % in the case of acrodermatitis chronica atrophicans and 42 % – 100 % for synovial fluid, depending of the study. PCR sensitivity in blood and CSF is in general low, around 10 – 20 %.

Despite some advantages, PCR has not been widely accepted for laboratory diagnosis. There are several limitations as standardization, low sensitivity (false negative results) because of low number borrelia cells in clinical specimens, and possible false positive results.