

## ASK A SPECIALIST

## Ask a Pathologist

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Received: September 12, 2017 Accepted: September 22, 2017 Published: November 9, 2017

*Am J Hosp Med* 2017 Oct;1(4):2017.030 <https://doi.org/10.24150/ajhm/2017.030>

**Question:** I ordered serologic testing for Lyme disease for one of my patients and I'm not sure how to interpret the results of the Western blot. The blot shows a few dark bands, but the report indicates it is not sufficient to definitively diagnose Lyme disease. Is it possible to have a "partial positive" result?

**Answer:** A definitive diagnosis of Lyme disease can be challenging in the absence of the classic *erythema migrans* rash. Unlike erlichiosis or babesiosis, which can be easily identified by molecular methodologies like PCR, Lyme disease is most often diagnosed via serologic techniques. The CDC recommends a two-step approach to serologic diagnosis. The first step is a sensitive screening test, such as an EIA or ELISA, to determine whether the patient's serum contains antibodies to *Borrelia burgdorferi*. If the results of the screening test are positive or equivocal, the second step – a Western blot – is performed. The Western blot has a higher specificity than the EIA or ELISA and is useful for ruling out any false-positives detected by the screening test.

A Western blot can be used to identify the presence of either IgM or IgG antibodies to *Borrelia* surface proteins in the patient's serum. A blot may be positive for IgM as early as 1-2 weeks after inoculation with *Borrelia*, whereas an IgG blot may not detect antibodies until 4-6 weeks after inoculation. While IgM antibodies are visible earlier, they are also more likely to

yield a false positive result if used to diagnose acute Lyme disease in patients with more than four weeks of symptoms. Multiple sclerosis, amyotrophic lateral sclerosis, autoimmune disorders, other spirochetal diseases, and influenza may also cause false-positive results. Both IgM and IgG Western blots are susceptible to false negative results, in which the antibody titer is too low to produce a positive result on the test.

The criteria for interpreting a blot as positive for anti-*Borrelia* antibodies depend on whether the antibody being tested for is IgM or IgG. According to CDC guidelines:

- **Positive IgM:** has bands in **at least 2** of the following regions: 24kDa (OspC); 39kDa (BmpA); 41kDa (Fla).
- **Positive IgG:** has bands in **at least 5** of the following regions: 18kDa; 21kDa (OspC); 28kDa; 30kDa; 39kDa (BmpA); 41kDa (Fla); 45kDa; 58kDa; 66kDa; and 93kDa.

Two positive bands for IgM and/or five positive bands for IgG are the **minimum serologic criteria** for the diagnosis of Lyme disease. There are no "partial positive" or

“partial negative” results. In the event of a positive test result, clinical correlation is required to provide context for final interpretation.

#### Notes

**Author contributions:** All authors have seen and approved the manuscript, and contributed significantly to the work.

**Financial support:** Authors declare that no financial assistance was taken from any source.

**Potential conflicts of interest:** Authors declare no conflicts of interest. Authors declare that they have no commercial or proprietary interest in any drug, device, or equipment mentioned in the submitted article.

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