Standard Lyme IgG & IgM immunoblot interpretation criteria based on single study each

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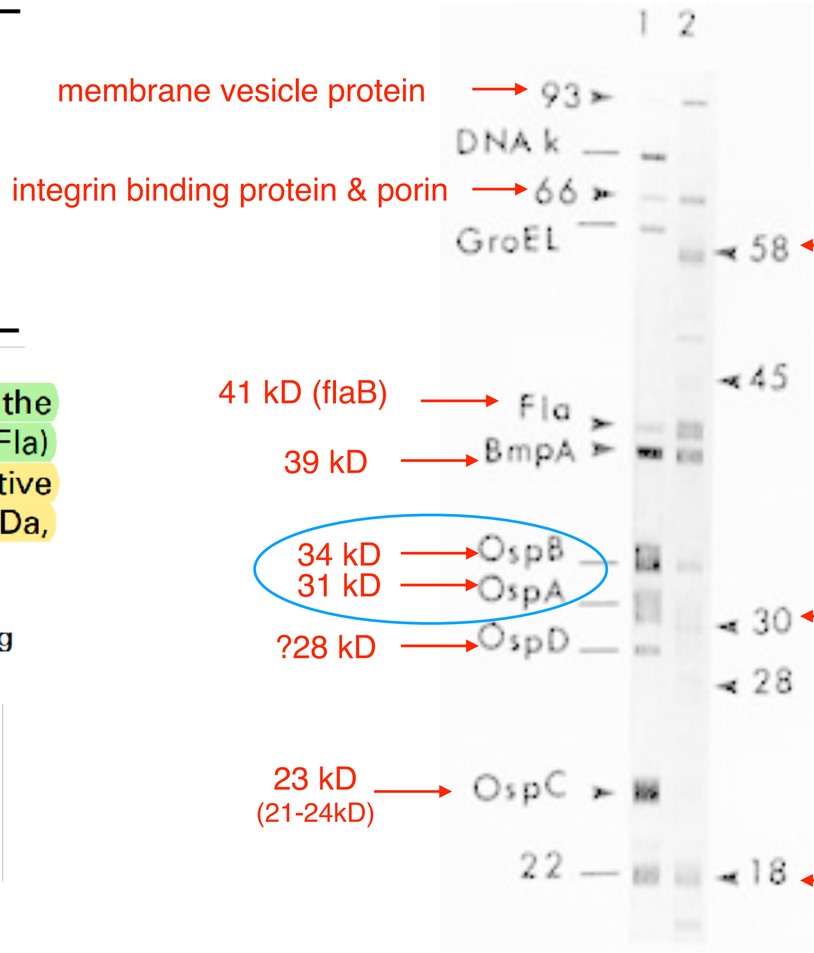
It was recommended that an IgM immunoblot be considered positive if two of the following three bands are present: 24 kDa (OspC)*, 39 kDa (BmpA), and 41 kDa (Fla) (*1*). It was further recommended that an that IgG immunoblot be considered positive if five of the following 10 bands are present: 18 kDa, 21 kDa (OspC)*, 28 kDa, 30 kDa, 39 kDa (BmpA), 41 kDa (Fla), 45 kDa, 58 kDa (not GroEL), 66 kDa, and 93 kDa (*2*).

*The apparent molecular mass of OspC is dependent on the strain of *B. burgdorferi* being tested. The 24 kDa and 21 kDa proteins referred to are the same.

References

1. Engstrom SM, Shoop E, Johnson RC. Immunoblot interpretation criteria for serodiagnosis of early Lyme disease. J Clin Microbiol 1995;33:419–22.
2. Dressler F, Whelan JA, Reinhart BN, Steere AC. Western blotting in the serodiagnosis of Lyme disease. J Infect Dis 1993;167:392–400.



Standard IgG immunoblot interpretation criteria for late Lyme disease have been critiqued as poorly sensitive for neuroborreliosis

Western Blotting in the Serodiagnosis of Lyme Disease

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- **Retrospective** substudy: Patients w/ EM, meningitis, arthritis or late neurologic disease (encephalopathy, polyneuropathy (n= 25 each)

- **Prospective** substudy: Lyme arthritis (n=25) or neuroborreliosis (meningitis, chronic encephalopathy, polyneuropathy) (n=29)

- Sensitivity of their proposed WB IgG criteria (≥5 of 10 select bands)
  - Overall sensitivity 83%
  - **Retrospective:** meningitis 64%
    arthritis 100%
    late neuro 84%
  - **Prospective:** arthritis 96%
    neuroborreliosis 72%
    (calculable from study data in their Table 4)

- Two independent studies using CDC reference panel of serum samples and CDC-recommended immunoblot interpretation criteria reported similarly low or even lower sensitivity (43% and 44-74%)

- Several subsequent studies reported high sensitivity (97-100%) in late Lyme disease but w/ problematic selection bias inherent in study design

  - Inclusion criteria: Required lab confirmation by CDC surveillance criteria or even +2-tier serology in late-disease patients

  - Studies w/ separate figures for arthritis vs neurologic disease patients included few late neuro cases (2 in one study, 11 in another) with ≥ 1/2 of the few neuro patients also having current or previously treated arthritis

Dressler Whalen Reinhardt et al, J Infect Dis 1993
Ledue Collins Craig, J Clin Microbiol 1996
Tilton Sand Manak, Clin Infect Dis 1997

Bacon Biggerstaff Schreifer et al, J Infect Dis 2003
Steere McHugh Dame et al, Clin Infect Dis 2008

Branda Augero-Rosenfeld Ferraro et al, Clin Infect Dis 2010
Branda Linskey Kim et al, Clin Infect Dis 2011
Bransfield Mao Greenberg, Healthcare 2023