

## Issues Surrounding Lyme Disease Testing

**PerTrinity Biotech:** <https://ticktalkireland.files.wordpress.com/2013/02/elisa-trinity-vise.pdf>

*“serological tests for antibodies to B. burgdorferi are known to have low sensitivity and specificity, and because of such inaccuracy, these test cannot be relied upon for establishing a diagnosis of Lyme disease”.*

Lyme disease (LD), also known as Lyme Borreliosis (LB), is diagnosed via 2 tier testing, 1<sup>st</sup> tier is an Elisa antibody test, then if positive the 2<sup>nd</sup> tier test known as Western Blot (WB) or Immuno Blot is run by Porton Down labs in the UK. Both tests must usually be positive to be considered diagnostic.

The problem with antibody tests is that it's 'assumed' you get Lyme, you produce antibodies (over the coming weeks or months) & they remain in the body for life, so a person with Lyme will show antibodies...

However, in one study they found that **antibodies wax & wane** which would most certainly affect test results: <http://www.hindawi.com/journals/isrn/2012/719821/> (63%) were constantly IgG negative and (5%) constantly positive. (10%) seroconverted from initially positive to negative and (3%) from negative to positive. (12%) who were primarily negative seroconverted to positive and then back to seronegative.

**Also early antimicrobials can affect results:** <http://www.ncbi.nlm.nih.gov/pubmed/2613324> Antibiotic therapy may abrogate the antibody response to the infection as shown in our patients. We conclude that early stage of the disease as well as chronic Lyme disease with persistence of B. burgdorferi after antibiotic therapy cannot be excluded when the serum is negative for antibodies against B. burgdorferi.

In another study they found **antibodies** can be **bound in immune complexes** creating false negative serology: <http://jid.oxfordjournals.org/content/182/2/534.full> One potential explanation for the absence of serological reactivity with OspA in standard serological assays in many patients with later manifestations of LD may be that anti-OspA antibodies are sequestered within IC [immune complex- rather than free floating antibodies.]

Plus it's **possible to have a negative Elisa test but a positive Western Blot** -the patient however, is not usually offered the 2<sup>nd</sup> test when the 1<sup>st</sup> test is negative. <http://www.ncbi.nlm.nih.gov/pubmed/20437826> All patients had specific antiborrelial antibodies confirmed by using the western blot **in spite of negative ELISA**. Immunological investigations revealed a deficiency of cellular immunity in all patients.

**In recent years a newer improved test (C6 Elisa)** was introduced however even this **may cause problems for some:** <http://www.ncbi.nlm.nih.gov/pubmed/17234451> C6 ELISA results correlated better with B. burgdorferi sensu stricto [American strain] than with B. garinii IgG results [European strain], especially in sera from patients with facial palsy. Thus, antibody specificity to peptides may vary according to the infecting Borrelia species. In some manifestations of the disease, C6 ELISA may not cover all LB cases.

**Strains of borrelia may also affect results** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC88929/> a number of European studies showed that the antibody responses in LB patients to the three B. burgdorferi sensu lato pathogens varied with disease manifestations.

Even **gender can play a role** <http://www.ncbi.nlm.nih.gov/pubmed/20869632> Among the 62 patients with a serologic test as part of their clinical evaluation, 50% of men had a positive, 2-tier result compared with 32% of women. The median number of immunoglobulin G (IgG) bands were significantly higher among men.

In a sample of ticks collected by Prof Gray in 1990's up to 50% of infected ticks carried a **strain VS116** (borrelia valaisiana) <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC168399/> **This strain is not picked up in testing** & therefore has the potential to miss many patients. Considered 'non pathogenic' by some but in studies has been shown to appear in rashes & spinal fluid of Lyme patients, therefore there is a need for further research in this area. <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-0691.1997.tb00259.x/full/> / <http://www.thefreelibrary.com/Borrelia+valaisiana+in+cerebrospinal+fluid.-a0122552757>

## Why use overseas labs?

Antibody testing may be useful for some patients but not all. Igenex in America offer a broader range of protein bands in their Western Blot including some of the Lyme specific ones not being tested in UK & Ireland (some bands used for antibody testing were taken out during the development of vaccines in the 90s). German labs offer a sensitive T cell test, which can be used for staging the disease (for instance results may be high & begin to lower as treatment progresses, enabling the doctor to see if treatment is successful).

## LTT/Elispot – Lymphocyte Transformation Test (T Cell) Studies:

- \* The sensitivity of LTT was superior to serological investigation of antibodies in the ELISA or immunoblot tests and correlated well with clinical symptoms. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3751012/>
- \* The ELISPOT technology has proven to be extremely sensitive in detecting even low frequencies of antigen reactive T cells and has been approved by the FDA for use in the diagnosis of tuberculosis <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3972671>
- \* The Lymphocyte Transformation Test for Borrelia Detects Active Lyme Borreliosis and Verifies Effective Antibiotic Treatment <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3474945/>
- \* The level of detection by ELISPOT was 10 to 200 times more sensitive than ELISA performed on culture supernatants. <http://www.ncbi.nlm.nih.gov/pubmed/7999925>
- \* After therapy, most patients (90.7%) showed negative or markedly reduced lymphocyte reactivity correlating with clinical improvement. <http://www.ncbi.nlm.nih.gov/pubmed/16876371>

## Microscopy:

Darkfield microscopy is another method of testing but due to cost & time constraints is very rarely offered. This site has an amazing array of still images & video showing spirochetes (lyme disease bacteria) in the blood of patients who were negative in 2 tier testing but positive in overseas labs. This highlights that patients being told they don't have Lyme, due to negative testing, may in fact harbour an active infection. <http://counsellingme.com/microscopy/SpirocheteBloodMorphology2.html>

## Notifiable Status:

In 2012, Lyme disease became a notifiable illness, however only 2 tier positive cases reaching stage 3 of the disease (ie neuroborreliosis) are recorded. 2 tier testing will not record all cases due to many pitfalls listed above. A patient can be recorded if they have positive culture but culture tests are very rarely offered (if at all). **Patients opting for T cell tests abroad are outside the 2 tier system & therefore are not recordable patients either. This will undoubtedly lead to under reporting of true cases.**

## The following improvements will help patients:

- \* Allow acceptance of overseas test results, or at the very least publicise the shortfalls in antibody testing.
- \* Encourage doctors to recognise symptoms of ALL stages of disease so they can clinically diagnose it rather than relying solely on testing (this also means recognising that a rash is not always in rings or present at all).
- \* Record patients who are diagnosed by overseas labs, even if it means putting them in the 'suspected' cases list. Better still; record ALL patients, not just those at stage 3 neuroborreliosis stage.
- \* If possible, look more closely at strain VS116 & its potential for causing a Lyme like illness; plus encourage more research into improved Lyme disease testing & case number tracking.

For more on testing & advances in research go to: <https://ticktalkireland.wordpress.com/lyme-links/testing/>