

# NEUROLOGICAL IMPACTS OF LYME DISEASE

There is increasing evidence and recognition that Lyme borreliosis (LB) causes mental symptoms. Lyme borreliae, the causative agents of Lyme disease, can evade and suppress the immune system, leading to persistent inflammation and autoimmune symptoms. If undiagnosed for too long, Lyme borreliae can replicate and cross the blood-brain barrier, invading the central nervous system. Properly identifying the underlying cause of the symptoms is the first step in bringing recovery to patients with psychiatric symptoms that may be the result of an underlying infection.

## THE SYMPTOMS OF LYME DISEASE



Up to 40% of patients with Lyme disease develop neurologic involvement of either the peripheral or central nervous system. A broad range of psychiatric reactions have been associated with Lyme disease including paranoia, dementia, schizophrenia, bipolar disorder, panic attacks, major depression, anorexia nervosa, and obsessive-compulsive disorder. Psychiatrists who work in endemic areas need to include Lyme disease in the differential diagnosis of any atypical psychiatric disorder.

# THE IGENEX IMMUNOBLOT PROVIDES

## THE RIGHT ANSWER, RIGHT AWAY

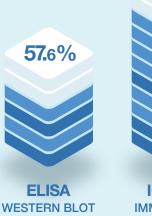
Standard serologies test for only a single *Borrelia* species, *B. burgdorferi B31*. This results in many positive patients being missed. Only the **IGeneX** ImmunoBlot tests for eight species of *Borrelia*. The ImmunoBlot has a sensitivity greater than 93%, whereas the ELISA and Western Blot two-tier testing protocol recommended by the CDC has a sensitivity of only 57.6%.

#### **STANDARD** TESTS

B. burgdorferi B31

#### **IGENEX IMMUNOBLOT**

- B. burgdorferi B31
- B. buradorferi 297
- B. californiensis
- B. mayonii
- B. afzelii
- B. garinii
- B. spielmanii
- B. valaisiana





93%

Source: Waddell LA, Greig J, Mascarenhas M, Harding S, Lindsay R, Ogden N (2016) The Accuracy of Diagnostic Tests for Lyme Disease in Humans, A Systematic Review and Meta-Analysis of North American Research. PLoS ONE 11(12): e0168613.

### A HISTORY OF INNOVATION IN LYME DISEASE TESTING

For over 25 years, IGeneX has been at the forefront of research and development of diagnostic tests for Lyme disease.

CDC criteria for Lyme disease testing has not changed since 1994. 1998 1975 1994 1997 1981-1982 1982-1994 Lyme disease first Scientist Willy Burgdorfer First-generation assays Two-tier testing IGeneX releases a **IGeneX** introduces reported in the town of discovers B. burdorferi, developed to detect protocol of ELISA/ Western blot made with Lyme Multiplex PCR B. burgdorferi antibodies Old Lyme, CT the causative agent of western blot two strains of Borrelia: Lyme disease established by the often lacked accuracy B. burgdorferi CDC B31 and 297 2008 2007 2005-2006 2003 1998-2002 300k cases of Lyme New strains of 200k cases of Lyme New strains of Borrelia IGeneX introduces disease diagnosed Borrelia discovered in disease diagnosed discovered in Europe: Epitope test to in the US the US: B. spielmanii. in the US B. afzelii, B. garinii, and improve specificity B. californiensis, and B. valaisiana of the Lyme B. texasensis western blot 2013 2016 2017 2019 2023 New strains of Borrella B. mayonii, discovered **IGeneX** begins offering IGeneX releases a IGeneX introduces are discovered in the by the Mayo Clinic, and more affordable a Multi-Species Lyme Culture Enhanced PCR US: B. miyamotoi and a *B. bissettii-*like strain ImmunoBlot test, which Lyme test, the Broad (cePCR) for Lyme B. americana are found in the US is inclusive of multiple Coverage Lyme Ab disease strains of Borrelia Assay

