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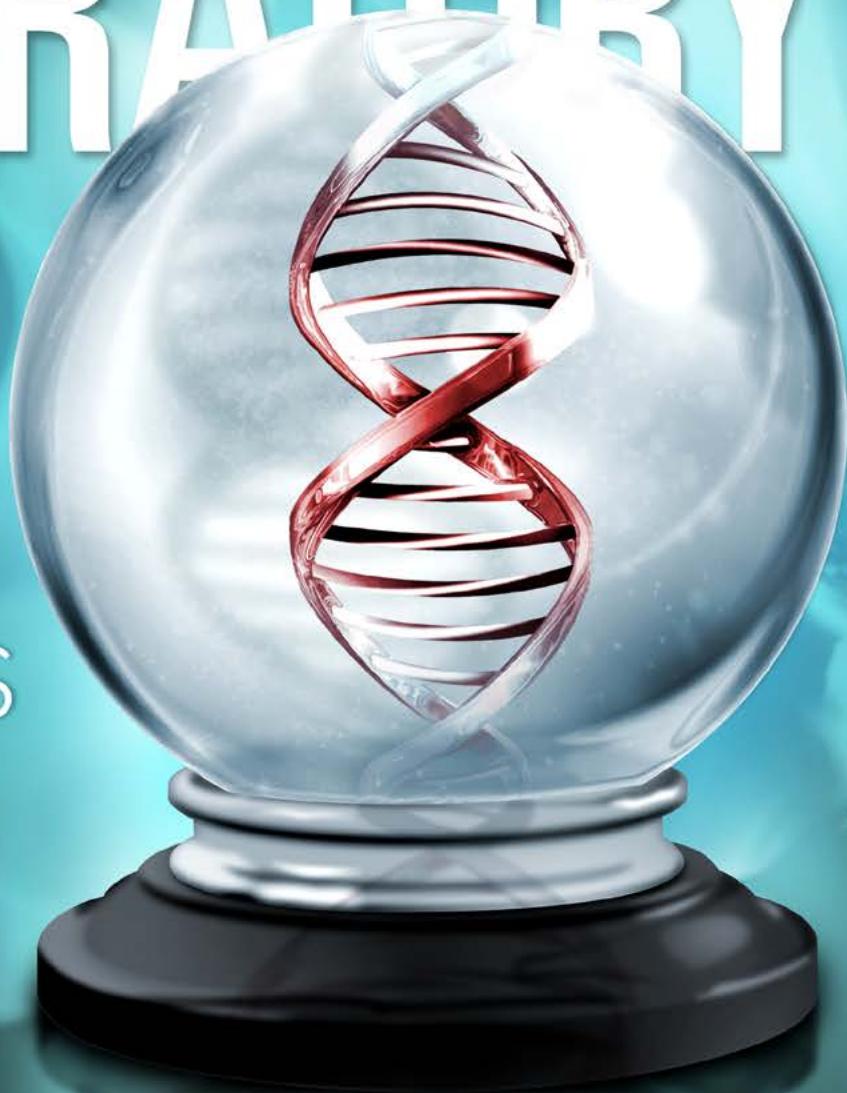
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## PREDICTIVE MOLECULAR DIAGNOSTICS & CHRONIC DISEASE

CAN MOLECULAR DIAGNOSTICS  
AID IN THE DIAGNOSIS  
AND PROGNOSIS OF COMPLEX  
CHRONIC DISEASES?



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Recent focus is on the use of single nucleotide polymorphisms.

Illustration by Matthew Taraborrelli



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# PINNING CHRONIC FATIGUE SYNDROME

Labs are making strides in identifying catalysts and eliminating like conditions

By Lindsey Nolen

**E**xperiencing extreme, debilitating exhaustion? Subject to frequent headaches, muscle and joint pain, reoccurring throat sores or memory and concentration problems? These symptoms signify Chronic Fatigue Syndrome (CFS), a medical condition of unknown cause. Despite no singular blood test existing to diagnose the disorder, the laboratory has played an important role in diagnosing and monitoring patients by ruling out other potential conditions and testing B12 levels.

## A Difficult Diagnosis

While sleeping poorly and awakening fatigued can be signs of CFS, they may also point to a number of other conditions including anemia, celiac disease, systemic lupus erythematosus or Lyme disease. Additionally, because the intensity and type of symptoms can vary from day-to-day and from person to person, this syndrome is exceedingly hard to diagnose.

Misguidedly, some physicians have been known to wrongfully attribute their patients' symptoms to depression or stress, or to believe they are simply symptoms of another, as yet undiagnosed, disease or disorder.<sup>2</sup>

"There's a saying in medicine, 'When you hear hoof beats, you first think horses and later look for zebras.' So professionals might first look

for chronic viral infections, and/or use these results to later diagnose criteria for CFS," explained Chad Larson, NMD, DC, CCN, CSCS in Solana Beach, CA. "The bigger challenge is trying to get to the underlying cause. Five people with CFS might all have five different underlying causes."

Ultimately, distinguishing an initial cause is the primary problem researchers, physicians and patients have encountered when seeking to identify CFS conditions, especially because symptoms may be both undetectable and immeasurable. However, a list of criteria has been developed by the CDC in conjunction with an international panel of CFS research experts stating that diagnoses of this syndrome must include six consecutive months or longer of severe chronic fatigue which significantly interferes with daily activities and work. Other known medical conditions must also be excluded by clinical diagnosis.

"It often seems that when people have this disorder they also have an immunodeficiency. This means that they might catch ▶▶

things other people aren't catching or have longer periods of symptoms when they get a basic cold," expressed Larson. "True chronic fatigue affects nearly every organ system in the body. Chronic fatigue syndrome can also be the result of autoimmune sensitivity and there are tests, like those from Cyrex Laboratories, which can be extremely valuable in determining the underlying causes of an issue like chronic fatigue syndrome."

Furthermore, four of the following eight symptoms must be simultaneously present: substantial impairment in short-term memory or concentration; sore throat that is frequent or recurring; tender lymph nodes in the neck or armpit; muscle pain; multi-joint pain without swelling or redness; headaches of a new type, pattern or severity; unrefreshing sleep; or post-exertion malaise lasting more than 24 hours. These symptoms must have persisted or recurred during six or more consecutive months of illness and must not have predated the fatigue.

### Laboratory Advances

Although a single cause of CFS has yet to be identified, researchers have determined that the disorder may have multiple catalysts. Triggers of the condition could include viral infection such as the Epstein Barr virus; immune dysfunction provoked by trauma, stress, food allergy; or nutritional deficiency. Abnormally low blood pressure to the point of causing fainting and stress that activates the hypothalamic-pituitary-adrenal axis may also induce CFS.

Along with identifying possible triggers, health practitioners must

## Related Content

- ▶ Chronic fatigue syndrome (CFS) costs the United States over \$9 billion each year in lost productivity. More ... <http://laboratory-manager.advanceweb.com/Article/The-High-Price-of-Fatigue.aspx>

fully utilize a patient's detailed history, thorough physical examination, mental status screening and laboratory screening tests before achieving a diagnosis, according to the CDC's Chronic Fatigue Syndrome: A Toolkit for Providers.<sup>3</sup>

After screenings are complete, a number of laboratory tests are now able to be conducted. These tests can include a comprehensive metabolic panel to examine electrolytes, proteins, liver and kidney function, calcium, and glucose; a complete blood count to determine if anemia, white or red blood cell abnormalities are present; or an erythrocyte sedimentation rate test to indicate inflammation. Thyroid testing to rule out hypothyroidism, iron testing to rule out iron storage abnormalities and a urinalysis to search for infections can further rule out alternative conditions and point to a CFS diagnosis.

### Treatment Options

No single medication has been found to cure CFS, however various techniques better manage the syndrome. For example, cognitive behavioral therapy and sleep management practices can potentially assist a patient's constant exhaustion. Relaxation and stress-reduction practices; medication to reduce pain, discomfort and fever; and medication to treat anxiety and depression can also help patients potentially suffering from CFS.

Many CFS patients also have found that a high dosage of vitamin B12 can substantially reduce their cognitive dysfunction.<sup>4</sup> The recommended forms of vitamin B12 are methylcobalamin or hydroxocobalamin. Injectable vitamin B12 doses are around 1000 mcg three times a week; if taken sublingually instead, the dose is 5000 mcg daily. Improvements in symptoms usually appear after a few weeks of taking B12, for cerebrospinal fluid levels of vitamin B12 in these patients may be initially depleted.<sup>4</sup>

While CFS may not be entirely curable, diagnosis and appropriate treatment steps can ensure its manageability in daily life. ■

*Lindsey Nolen is on staff at ADVANCE. She can be reached at [lnolen@advanceweb.com](mailto:lnolen@advanceweb.com)*

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