

Spinal fluid proteins distinguish Lyme disease from chronic fatigue syndrome

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Patients who suffer from Neurologic Post Treatment Lyme disease (nPTLS) and those with the Chronic Fatigue Syndrome report similar symptoms. However unique proteins discovered in spinal fluid can distinguish those two groups from one another and also from people in normal health, according to new research conducted by a team led by Steven E. Schutzer, MD, of the University of Medicine and Dentistry of New Jersey - New Jersey Medical School, and Richard D. Smith, Ph.D., of Pacific Northwest National Laboratory. This finding, published in the journal *PLoS ONE* (February 23, 2011), also suggests that both conditions involve the central nervous system and that protein abnormalities in the central nervous system are causes and/or effects of both conditions.

The investigators analyzed [spinal fluid](#) from three groups of people. One group consisted of 43 patients who fulfilled the clinical criteria for [Chronic Fatigue Syndrome](#) (CFS). The second group consisted of 25 patients who had been diagnosed with, and treated for, Lyme disease but did not completely recover. The third group consisted of 11 healthy control subjects. "Spinal fluid is like a liquid window to the brain," says Dr. Schutzer. By studying the spinal fluid, the research team hoped to find abnormalities that could be used as markers of each condition and could lead to improvements in diagnosis and treatment.

Taking advantage of previously unavailable methods for detailed analysis of spinal fluid, the investigators analyzed the fluid by means of high powered mass spectrometry and special protein separation techniques. They found that each group had more than 2,500 detectable proteins. The research team discovered that there were 738 proteins that were identified only in CFS but not in either healthy normal controls or patients with nPTLS and 692 proteins found only in the nPTLS patients. Previously there had been no available candidate biomarkers to distinguish between the

two syndromes, nor even strong evidence that the central nervous system is involved in those conditions.

This research represents the most comprehensive analysis of the complete CSF proteome (collection of proteins) to date for both Chronic Fatigue Syndrome and Neurologic Post Treatment Lyme disease (nPTLS). Prior to this study, many scientists believed that CFS was an umbrella category that included nPTLS. However these results call those previous suppositions into question.

According to Dr. Schutzer, spinal fluid proteins can likely be used as a marker of disease, and this study provides a starting point for research in that area. "One next step will be to find the best biomarkers that will give conclusive diagnostic results," he says. "In addition, if a protein pathway is found to influence either disease, scientists could then develop treatments to target that particular pathway."

"Newer techniques that are being developed by the team will allow researchers to dig even deeper and get more information for these and other neurologic diseases," says Dr. Smith. "These exciting findings are the tip of our research iceberg"

Provided by Public Library of Science

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