

# Chronic Fatigue 'Brain Fog' Clues in Spinal Fluid

Study reveals evidence that it's 'not made up,' researcher says

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TUESDAY, March 31, 2015 (HealthDay News) -- People with chronic fatigue syndrome show a distinct pattern of immune system proteins in their spinal fluid -- a finding that could shed light on the "brain fog" that marks the condition, researchers say.

The new study found that, compared with healthy people, those with chronic fatigue syndrome had lower levels of certain immune-system proteins called cytokines in the fluid that bathes the spinal cord and brain.

The exception was one particular cytokine, which was elevated in not only people with chronic fatigue, but also those with multiple sclerosis.

The finding could offer clues as to why people with chronic fatigue syndrome typically have problems with memory, concentration and thinking, said lead researcher Dr. Mady Hornig, a professor at Columbia University's Mailman School of Public Health in New York City.

The study also bolsters evidence that some type of immune dysfunction underlies the puzzling disorder, Hornig said.

Chronic fatigue syndrome is known medically as myalgic encephalomyelitis/chronic fatigue syndrome, or ME/CFS. In the United States, it affects up to 2.5 million people, according to the Institute of Medicine, a scientific panel that advises the federal government.

In February, the IOM released a report affirming that chronic fatigue syndrome is a legitimate medical condition that many health professionals still misunderstand -- or even dismiss as a figment of patients' imagination.

The term "chronic fatigue syndrome" was coined back in 1988, and in hindsight, it was a "lousy" choice, said Suzanne Vernon, a virologist and scientific director of the Solve ME/CFS Initiative, based in Los Angeles.

"People hear it and think, 'Oh, you're tired. I'm tired, too,'" said Vernon, who was not involved in the study. "But this is debilitating fatigue. It's like having a case of the flu that never goes away."

Plus, symptoms go beyond fatigue, and include what's been dubbed "brain fog" -- a collection of thinking-related problems such as confusion and difficulty with concentration and short-term memory.

For the new study, reported March 31 in the journal *Molecular Psychiatry*, Hornig's team studied spinal-fluid samples from 32 people with chronic fatigue syndrome, 40 with multiple sclerosis, and 19 healthy people.

Overall, the researchers found reduced levels of most cytokines in chronic fatigue syndrome patients' spinal fluid, versus the two other groups. But one cytokine, eotaxin, was elevated in people with chronic fatigue syndrome and those with multiple sclerosis.

The significance of that finding is not clear yet, Hornig said. But she said eotaxin is involved in allergy-like immune responses.

To Vernon, the findings offer "additional evidence of clear [biological] markers in ME/CFS."

"These biomarkers are indications of some kind of disease process," Vernon said. In other words, she added, chronic fatigue syndrome is "not made up."

Why did the study include people with multiple sclerosis? There are some similarities between MS and chronic fatigue syndrome, Hornig explained. MS patients suffer fatigue, and the disease is believed to be caused by an abnormal immune reaction -- in this case, against the body's own nerve tissue.

The precise cause of chronic fatigue syndrome is far from clear, but in general, it's thought to involve some type of immune system dysfunction, Hornig explained.

In a recent study, her team found that in people who've had chronic fatigue syndrome for a relatively short time -- fewer than three years -- cytokine levels in the blood were actually elevated. They dropped again, though, in people who'd had the disease for a longer time.

People in the current study had had chronic fatigue syndrome for about seven years. So the relatively low cytokine levels in their spinal fluid "parallel" what was seen in the earlier study, Hornig said.

"I think what we're seeing is an immune system exhaustion over time," Hornig speculated.

The theory is that the immune system may initially go into overdrive against an invader -- like a virus -- and then be unable to dial itself down, Hornig explained. That could account for the high cytokine levels in people who've had chronic fatigue syndrome for a short time.

Over time, though, the immune system may essentially wear itself down, leading to weak responses to mild infections that a healthy immune system would readily handle, Hornig suggested.

One hope, Hornig said, is that these findings could lead to objective tests that can diagnose chronic fatigue syndrome early.

An objective test, such as a blood test measuring cytokines, would be welcome, Vernon said. Right now, she noted, people often wait for years for a diagnosis, which is based on symptoms.

Understanding the biology of the disease could also lead to treatments, Hornig said.

"We can't promise this will translate into treatments around the corner," she said. "But we hope to start giving doctors some tools."

SOURCES: Mady Hornig, M.D., professor, epidemiology, Columbia University Mailman School of Public Health, New York City; Suzanne Vernon, Ph.D., scientific director, Solve ME/CFS Initiative, Los Angeles, Calif.; March 31, 2015, *Molecular Psychiatry*, online

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