Researchers profile clinical, gene and protein changes in 'brain fog' from long COVID

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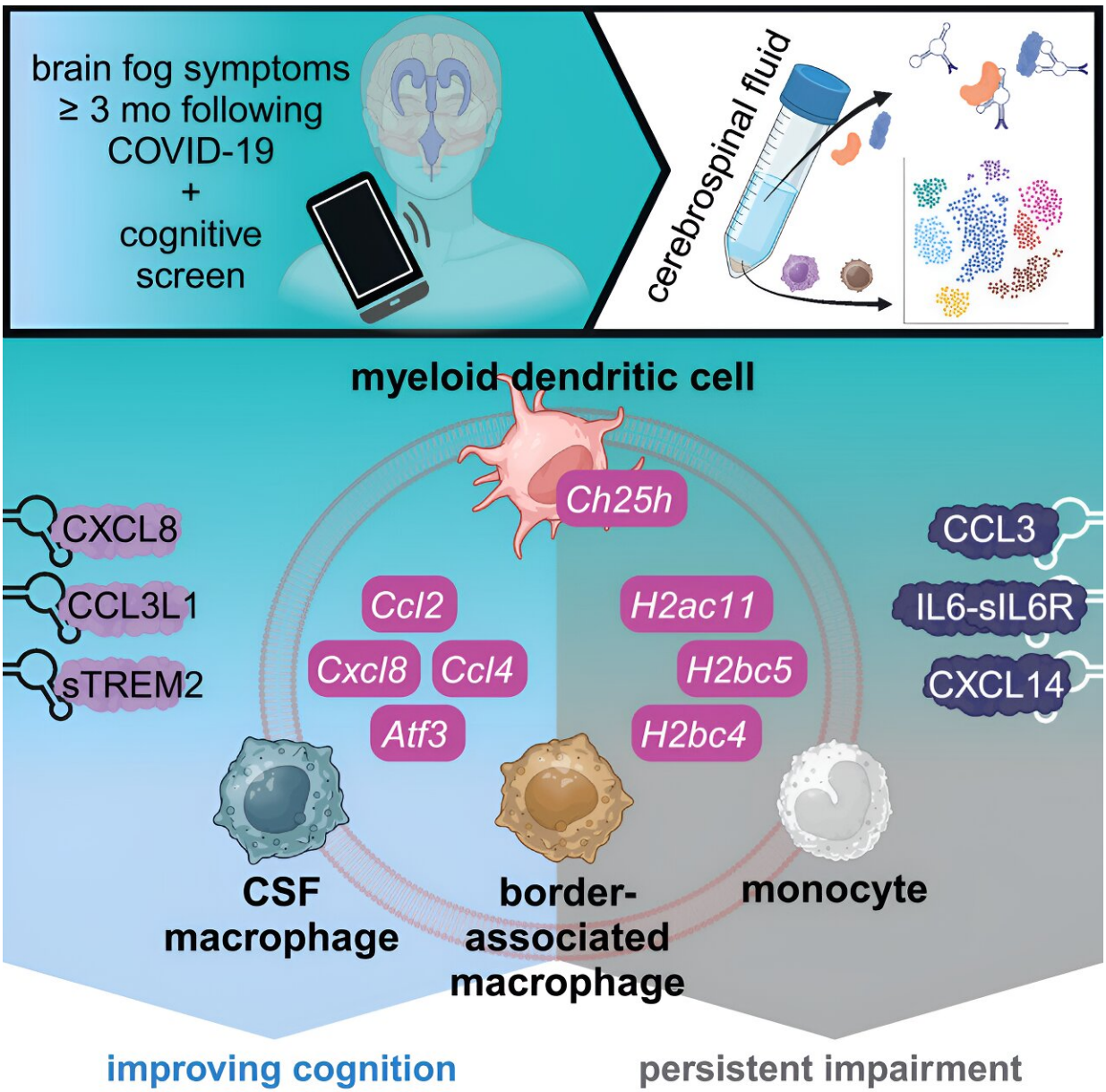

Credit: *Cell Reports Medicine* (2024). DOI: 10.1016/j.xcrm.2024.101561

Long COVID is associated with active inflammatory changes in the nervous system, but the condition is distinct from Alzheimer's disease and other neurodegenerative disorders, according to a Rutgers Health study.

The study, published in *Cell Reports Medicine*, was one of the most detailed investigations into "brain fog," a common long COVID symptom in which patients experience difficulty thinking or concentrating. Researchers examined people who recovered from COVID-19 in the New York City-New Jersey area to better understand the factors that impact long COVID.

The condition encompasses a wide-range of health problems that people experience after being infected with COVID-19 including brain fog, fatigue, shortness of breath, headaches and sleep problems, among other symptoms, according to the Centers for Disease Control and Prevention. The symptoms may be difficult to explain and manage because of limited understanding of the condition.

"Participating in this research study helped validate everything I was feeling, including the brain fog," said a Rutgers Health study participant, who has been struggling with long COVID symptoms for over three years. "It's so important for people to consider clinical trials so we can get accurate information about long COVID, and people can go on to do whatever is necessary to help them improve."

Scientists previously had proposed that long COVID may display molecular features of Alzheimer's disease, but in the most recent study, Rutgers Health researchers found that long COVID doesn't elicit

Alzheimer's-type changes. Instead, they found that cerebrospinal fluid immune cells in persistent brain fog from long COVID bears a closer resemblance to viral infections than to Alzheimer's disease or post-infectious processes.

"The findings from our study lead us to believe that interferon—the body's natural antiviral—and other drugs which target COVID-19 will be most beneficial in people with long COVID," said William Hu, director of the Center for Healthy Aging Research at Rutgers Institute for Health, Health Care Policy and Aging Research and senior author of the study.

Researchers also found that recovery from long COVID symptoms is often very slow, with 50 percent of the patients experiencing cognitive improvement after two years.

"Because brain fog—nine months after initial COVID-19—shares gene signatures with acute infections, future clinical trials should focus on interferon- and antiviral-based therapies instead of rehabilitation or brain training to expedite the recovery time for patients experiencing brain fog and other long COVID symptoms," said Hu, an associate professor and the chief of Cognitive Neurology and Alzheimer's Disease Clinic at Rutgers Robert Wood Johnson Medical School (RWJMS).

More information: William T. Hu et al, Clinical and CSF single-cell profiling of post-COVID-19 cognitive impairment, *Cell Reports Medicine* (2024). DOI: 10.1016/j.xcrm.2024.101561

Provided by Rutgers University

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