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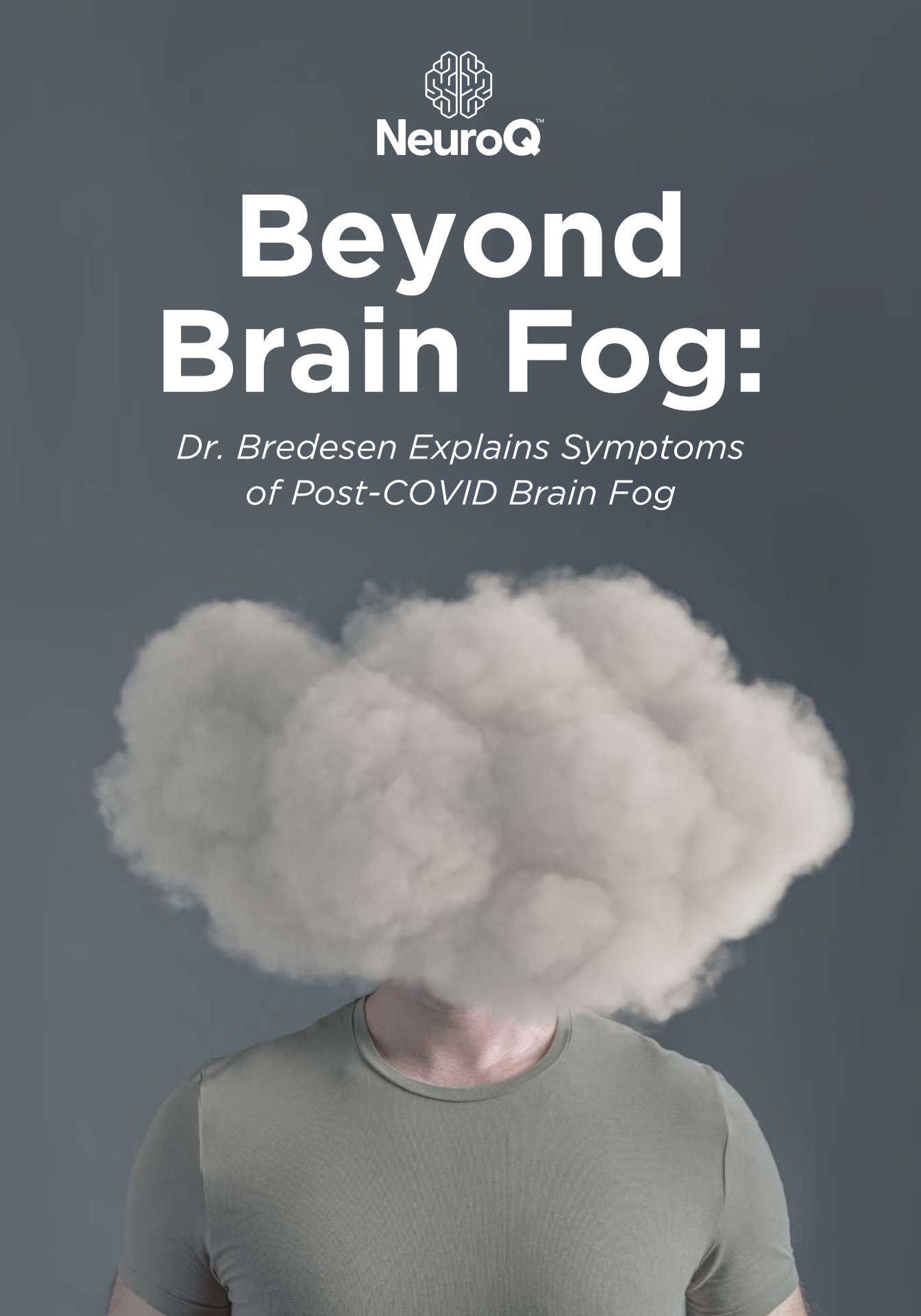
Beyond Brain Fog:

Dr. Bredesen Explains Symptoms of Post-COVID Brain Fog



Post-COVID Brain Fog

Since the start of the pandemic, over three-quarters of those infected with long COVID symptoms (beyond four weeks) report experiencing brain fog. Brain fog describes a range of symptoms that affect your ability to think.

New research explores the effects of long COVID on the brain and approaches to recovering from neurological symptoms caused by the virus, including brain fog. We sat with leading neurologist and expert on cognitive decline, Dr. Dale Bredesen, to hear his recommendations on post-COVID brain fog treatment.

What Is Post-COVID Brain Fog?

• One-third of people who tested positive for SARS-CoV-2, commonly referred to as COVID-19, still experienced at least one symptom six weeks after infection, a condition called long COVID.

• 78% —**more than three-quarters**—of people with long COVID symptoms report difficulties with concentration and memory, which many are calling "post-COVID brain fog".

• Common symptoms of post-COVID brain fog include forgetfulness, slow thinking, confusion, and poor concentration.

[1] One-third of patients may experience 'long COVID'. Medical News Today. https://www.medicalnewstoday.com/articles/one-third-of-patients-may-experience-long-covid. Accessed April 28, 2022.

[2] Guo P, Benito Ballesteros A, Yeung SP, et al. COVCOG 1: Factors predicting physical, neurological and cognitive symptoms in long covid in a community sample. A first publication from the COVID and cognition study. *Frontiers in Aging Neuroscience*. 2022;14. doi:10.3389/fnagi.2022.804922

During the early stages of the pandemic, many will remember the initial confusion and varying symptoms of COVID-19, ranging from a dry cough to severe difficulty breathing. As the virus spread globally and variants emerged, so too have its symptoms evolved. Some people experience symptoms weeks or months after their initial infection, a syndrome often called long COVID or post-acute COVID.

Post-acute COVID-19, or long COVID, refers to a syndrome characterized by continued long-term symptoms and/or delayed complications beyond four weeks of infection.

Neurological symptoms seem to appear in those with long-COVID. Studies have begun to shed light on how the infection impacts the risk of cognitive and psychological conditions, such as brain fog, loss of taste and smell, and depression. Although we are still learning the effects of post-COVID brain fog, common symptoms include forgetfulness, slow thinking, confusion, and poor concentration.

How Do I Know if I Have Post-COVID Brain Fog?

Brain fog describes a range of symptoms that affect your ability to think. Grogginess and fatigue cloud your head, making it difficult to think clearly or focus. If you have brain fog, you may also feel confused, disorganized, or forgetful.

Brain fog symptoms include:

- Difficulty paying attention
- Lack of focus
- Trouble remembering
- Mood swings
- Confusion
- Headaches
- Low energy and fatigue

Brain fog isn't just a symptom of COVID. It can happen for a variety of reasons.

Lifestyle habits, like lack of sleep, drug or alcohol use, overworking, and stress, can all cause brain fog. Some experience it as the symptom of an illness, like a cold, flu, or allergies. Pregnant women may experience brain fog, often nicknamed "baby brain" or "pregnancy brain". Medications, such as sedatives, pain medicine, and antihistamines, can also lead to grogginess and fatigue. In some cases, brain fog may indicate a more serious condition, such as early signs of dementia.

Post-COVID Brain Fog Symptoms

Neurological conditions are a significant complication of the coronavirus disease, resulting in symptoms like brain fog.

Signs of post-COVID brain fog may include:

- Losing your train of thought easily
- Problems concentrating
- Trouble keeping up with conversations
- Issues multitasking
- Difficulties with memory

To more closely observe the impact of the virus on cognition, the Universities of Cambridge and Exeter in the United Kingdom conducted a study of 181 long COVID patients.[1]

During the study, participants completed tasks designed to test memory and decision-making. They used brain games for adults, such as remembering words in a list and recalling which two images appeared together.

Long COVID patients showed observable, consistent symptoms of cognitive decline:

- 77.8% experienced difficulty concentrating
- 69% experienced brain fog
- 67.5% experienced forgetfulness
- 59.5% experienced difficulty recalling a specific word
- 43.7% experienced typing or saying an unintended word

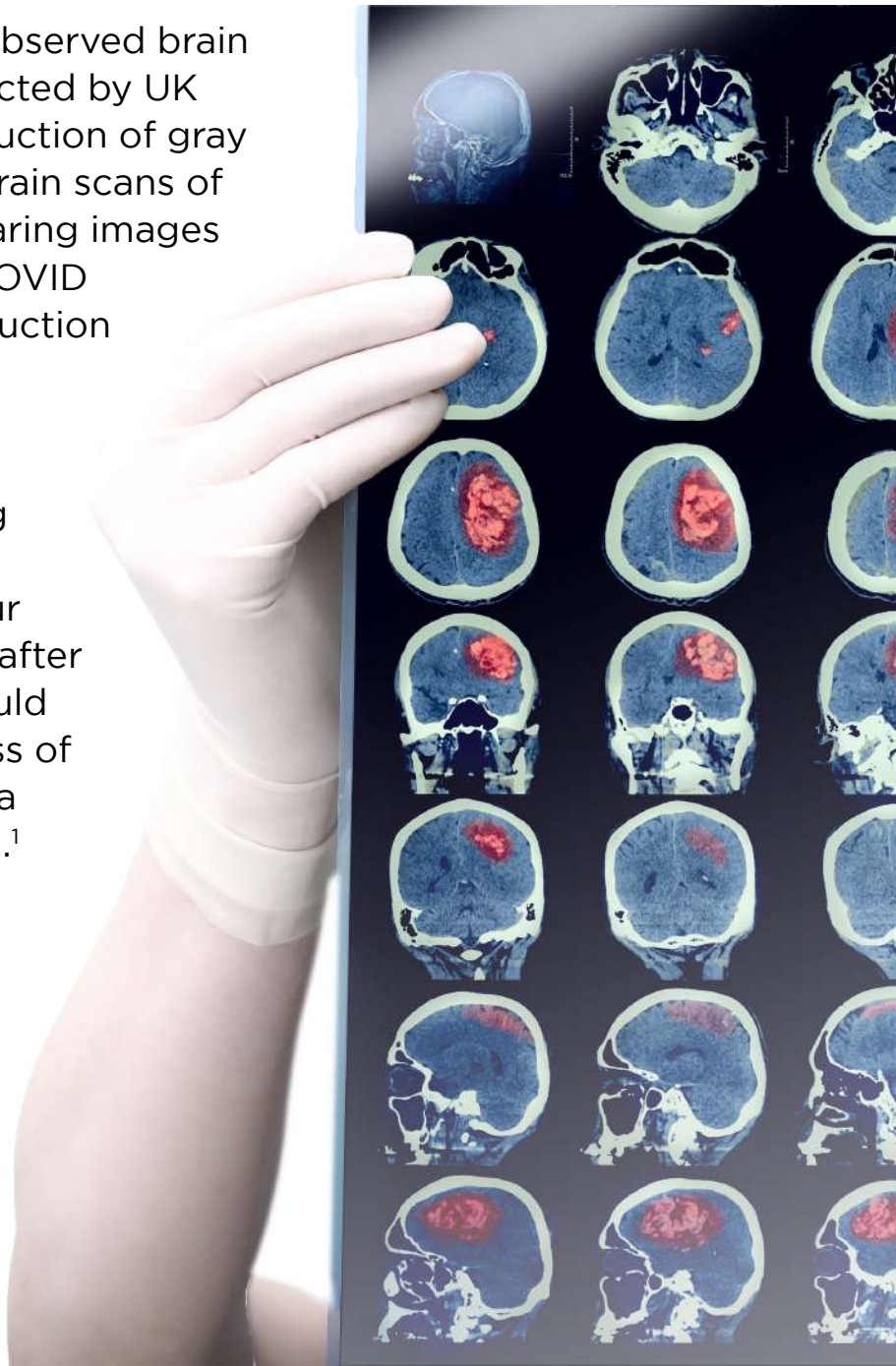
Although not known, it appears that earlier variants of COVID cause more severe symptoms, including brain changes. In virtually all cases, the vaccination seems to reduce negative outcomes caused by the virus. Individuals with concerns about vaccine side effects should consult a physician.

[1]Guo P, Benito Ballesteros A, Yeung SP, et al. COVCOG 1: Factors predicting physical, neurological and cognitive symptoms in long covid in a community sample. A first publication from the COVID and cognition study. *Frontiers in Aging Neuroscience*. 2022;14. doi:10.3389/fnagi.2022.804922

How Does COVID Affect the Brain?

Millions of people have survived long COVID, and we still have a lot to learn when it comes to its long-term effects on the body, including the brain. A small number of studies have begun to examine its specific effects on the brain and common symptoms in patients recovering from long COVID.

Researchers that observed brain imaging data collected by UK Biobank saw a reduction of gray matter based on brain scans of 785 people, comparing images before and after COVID diagnosis. This reduction of gray matter can potentially shrink important areas of the brain, including the brain's "smell center," around four and a half months after diagnosis. This would also explain the loss of taste and smell as a common symptom.[1]



[1] Douaud G, Lee S, Alfaro-Almagro F, et al. SARS-COV-2 is associated with changes in brain structure in UK Biobank. *Nature.* 2022;604(7907):697-707. doi:10.1038/s41586-022-04569-5

A study published in *Nature Communications* reveals similar damage caused by COVID in the brains of monkeys. The study of infected monkeys observed cognitive issues such as neuroinflammation, cell death, microhemorrhages, and signs of lack of oxygen to the brain.[1] The results may indicate potential neurological concerns for human patients, although they are not conclusive.

Even those who don't report serious symptoms may experience problems after recovering from a mild case of COVID. A study published by researchers in Germany revealed that participants who had COVID performed significantly worse on memory and attention tasks than those did not test positive for the virus. The good news: these effects seemed to improve over time, with memory recovering by six months and attention improving after nine months.[2]

> **Dr. James Jackson, director of behavioral health at the ICU recovery center at Vanderbilt University, advocates using the word "brain damage" rather than "brain fog" when referring to COVID's impact on the brain. He recommends that those experiencing the symptoms follow protocols similar to those undergoing cognitive rehabilitation due to brain injuries.**[3]

As the population of people who have recovered from COVID grows, scientists will have more information to make more accurate conclusions about the prolonged effects of the infection.

[1] Rutkai I, Mayer MG, Hellmers LM, et al. Neuropathology and virus in brain of SARS-COV-2 infected non-human primates. *Nature Communications*. 2022;13(1). doi:10.1038/s41467-022-29440-z

[2] Zhao S, Shibata K, Hellyer PJ, et al. Rapid vigilance and episodic memory decrements in COVID-19 survivors. *Brain Communications.* 2022;4(1). doi:10.1093/braincomms/fcab295

[3] Long COVID: Primate study reveals forms of 'brain injury.' Medical News Today. https://www.medicalnewstoday.com/articles/long-covid-primate-study-reveals-forms-of-brain-injury. Accessed April 28, 2022.

Tips to Improve Brain Fog from a Leading Neurologist

There is hope.

Leading neurologist Dr. Dale Bredesen specializes in cognitive decline and has worked with thousands of patients with Alzheimer's disease and other forms of dementia. His research resulted in hundreds of peer-reviewed publications and his New York Times Best-seller, *The End of Alzheimer's.*

After three decades of research, Dr. Bredesen developed a combination of strategies to support neuroplasticity—the brain's ability to heal and grow new neurons. He has hope that applying similar approaches can help with post-COVID brain fog treatment and other neurological symptoms caused by long COVID.

According to Dr. Bredesen, COVID causes a mismatch in the innate and adaptive immune systems:

• The body stays in fight mode: A heightened innate immune system (the body's first line of defense) stays active, causing inflammation and damage even to healthy cells.

• The virus remains in the body: A compromised adaptive immune system (the body's ability to eliminate pathogens) fails to clear the virus.

Dr. Bredesen recommends the following to balance the immune system and clear the virus:

1. **Immune Support:** Support your overall health and overcome symptoms of long COVID by getting enough zinc and vitamin D daily.

2. **Reduce Inflammation:** Bring down inflammation by taking Omega-3 supplements.

   ***In special cases, like those with compromised adrenals, he suggests taking small amounts of pregnenolone. Some may need dexamethasone to reduce the cytokine storm syndrome.*

3. **Support healthy brain function:** Support a healthy brain with therapeutic doses of huperzine A, critical to learning and brain function.

4. **Resilience:** Support physical resilience, the body's ability to recover, by getting enough sleep and eating a nutritious diet. Consume brain-healthy ingredients like brain-derived neurotrophic factor (BDNF), available in coffee fruit extract. Curcumin and propolis damp down the inflammatory process.

Overcoming an illness requires having a system that works well together. This combination of approaches gives you the best system to keep you in good health.

Only as more data emerges over time will we learn the true impact of COVID on the brain. If you continue to experience health concerns, especially severe ones, make an appointment with a physician who can make a professional diagnosis and personalized treatment for long COVID symptoms.

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