

**- Virus****COVID-19 found to cause brain changes**

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Hundreds of brain scans of people before and after they had COVID-19 — even mild cases — have revealed shrinkage and tissue damage in regions of the brain linked to smell and mental capacities, according to a British study published on Monday.

The study, published in the journal *Nature*, was done at the University of Oxford. It is the first major study involving people who underwent brain scans before they contracted the coronavirus and months after.

Assessing the brain itself through a series of MRI scans, the researchers found evidence of an average decline in the overall size of the brain following COVID-19. The scans showed signs of tissue damage in areas of the brain related to smell, as well as a reduction in gray matter in parts linked to smell and memory.

Previous studies have shown people with significant and repeated loss of smell also have an associated loss of gray matter. However, this study did not evaluate whether patients actually experienced the loss of smell.

Gwenaëlle Douaud, lead author of the study and associate professor of neurosciences at the University of Oxford, told NBC News that the excess loss of brain volume she and her colleagues observed in brain scans is equivalent to at least one extra year of normal aging.

“It is brain damage, but it is possible that it is reversible,” she said. “But it is still relatively scary because it was in mildly infected people.”

Douaud explained that it is normal for people to lose 0.2 to 0.3 percent of gray matter every year in the memory-related areas of the brain as they age. But in the study evaluation, patients who had been infected with the coronavirus lost an additional 0.2 to 2 percent of tissue compared with those who had not been infected.

Richard Isaacson, neurologist and director of the Florida Atlantic University Center for Brain Health, told CNN that the study’s findings were noticeable for clinicians, but he added that the overall impact on individuals was difficult to determine and could be small.

**Impact unclear**

Neurological experts not involved in the research told *The New York Times* that the implications of the changes were unclear and did not necessarily suggest that people might have lasting damage or that the changes might profoundly affect thinking, memory or other functions.

The study also noted that the results were representative of an average and not all patients who have had COVID-19 will display brain abnormalities.

The study also had some limitations, including the lack of information on how severe the individual cases of COVID-19 were, though researchers accounted for which cases resulted in hospitalization.

The Oxford researchers analyzed data from brain scans and tests collected from participants before they were infected with the disease and from a second round conducted later, close to five months on average after they tested positive. Compared with 384 uninfected control subjects, those who tested positive for COVID-19 had greater overall brain shrinkage and more gray matter shrinkage, particularly in areas linked to smell.

Last year, a survey published by the Centers for Disease Control and Prevention found close to two-thirds of US residents who tested positive for the coronavirus reported at least one long-term symptom more than four months after being infected — 55.5 percent included “cognitive dysfunction”, like difficulty in concentrating or memory loss.

Separate research also published in *Nature* and done by researchers at the University of Edinburgh identified 16 new genetic variants associated with severe illness from COVID-19 and named a number of existing drugs that could be repurposed to prevent patients from getting severely ill, some of which are already in clinical trials.

“These results explain why some people develop life-threatening COVID-19, while others get no symptoms at all. But more importantly, this gives us a deep understanding of the process of disease and is a big step forward in finding more effective treatments,” said Kenneth Baillie, a consultant in critical care medicine at the university who led the researchers. These results explain why some people develop life-threatening COVID-19, while others get no symptoms at all.”

Kenneth Baillie, consultant in critical care medicine at University of Edinburgh