

The Effects of Coronavirus on the Brain

*COVID-19 has been found to have side effects on the brain - but how can a respiratory virus affect the brain?
A team of scientists have found a clue.*

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A RESEARCH ARTICLE REPORTING ON:

YANG, A. C., KERN, F., LOSADA, P. M., AGAM, M. R., MAAT, C. A., SCHMARTZ, G. P., FEHLMANN, T., STEIN, J. A., SCHAUM, N., LEE, D. P., CALCUTTAWALA, K., VEST, R. T., BERDNIK, D., LU, N., HAHN, O., GATE, D., MCNERNEY, M. W., CHANNAPPA, D., COBOS, I., ... WYSS-CORAY, T. (2021, JUNE 21). DYSREGULATION OF BRAIN AND CHOROID PLEXUS CELL TYPES IN SEVERE COVID-19. NATURE NEWS.

The SARS-CoV-2 virus affects us in many ways. It mainly affects our respiratory systems - but new studies show that the virus can also affect the brain[1]. Up until recently, this connection wasn't understood — but a team of researchers may have provided scientists with an explanation.

The researchers aimed to identify which areas of the brain the COVID-19 virus penetrated following infection. The team examined 30 different samples from the choroid plexus (a part of the brain that helps cushion the brain from damage) and the frontal cortex (the part of the brain involved in higher level cognition), 14 from individuals without Covid-19, and 8 from coronavirus patients. The researchers isolated the nuclei of the samples using centrifugal force. Finally, they used a cell sequencing device to read and record the genes, which they could then use for analysis.

After analysis, the researchers discovered no traces of the COVID-19 virus in the brain in any of the people sampled - however, they did find abnormalities in the brain tissue. The researchers found that when the immune system discovers the virus, the message that is sent out is intercepted by the barrier cells of the choroid plexus. This intercepted message is then sent to the brain to alert it of the virus, resulting in inflammation in the brain as a defensive strategy.

Normally, one would think inflammation would be beneficial — since once your body learns of a threat, it can start fighting it. However, in the brain, the cells responsible for fighting threats, called microglial cells,

do so by demolishing everything in the area — which can lead to unnecessary damage to neural tissue, resulting in a loss of cognitive ability. The researchers found several of these microglial cells, resulting from COVID, in the samples, displaying similar traits as the microglial cells from patients suffering from other neurological diseases, such as Alzheimer's disease, multiple sclerosis, and Huntington's disease.

This research shows us that COVID-19 doesn't need to infect our brains to damage it - barrier cells in the brain surrounding organs like the choroid plexus can sense the damage in other parts of our body and inflame the brain. The research also shows us how microglial cells, while trying to fight COVID-19, can harm tissue in our own brain.

The human impact of these discoveries is that they can be applied to other neural disorders that originate from neural inflammation, such as Alzheimer's Disease[2] and Parkinson's Disease[3], as we can see several similarities in terms of the effects and causes. We can then build upon this information to use our understanding of the topic to produce a cure for these disorders.

It is important to note that this study had limitations. One key limitation was the fact that they took samples from only 22 individuals, as a smaller sampling group may not well represent the general population of humans. In addition, all the brain samples were from deceased individuals - which might affect the status of the brain.