
Groundbreaking MRI Unveils Brain Changes in Individuals with Long-COVID



New research to be presented at the upcoming annual meeting of the Radiological Society of North America (RSNA), reveals distinctive brain changes in individuals with long COVID, different to those who have fully recovered from COVID-19.

Long COVID sufferers experience a wide variety of different symptoms which may persist for long time after infection. Some of these symptoms include difficulty concentrating, fatigue, joint pain and more. The basis of the condition remains insufficiently understood. A novel MRI technique, known as diffusion microstructure imaging (DMI), is a promising approach to bridge this gap.

DMI studies how water molecules move in different directions and at various speeds, detailing the information on the microstructure of the brain. Unlike conventional MRI, DMI is capable at detecting even the subtlest changes in the brain, offering a valuable tool for unfolding the mysteries of long COVID.

Dr. Rau, one of the study's lead authors, and his colleagues compared brain scans of three groups. The study comprised 89 patients experiencing long-term symptoms of COVID-19, 38 individuals who had contracted COVID-19 but did not exhibit any prolonged symptoms, and 46 healthy controls without a history of COVID-19.

A comparative analysis of the three groups were conducted to identify differences in the microstructure of the brain. DMI parameters were examined for the gray matter in the brain. Comprehensive analyses of the entire brain were conducted to detail the spatial distribution of alterations and associations with clinical data, including long-COVID symptoms such as fatigue, cognitive impairment or impaired sense of smell.

The findings demonstrated no evidence of brain volume loss or any lesions that could account for the symptoms associated with long COVID. Nevertheless, COVID-19 infection resulted in a distinct pattern of microstructural changes in different brain regions, and this pattern was different for those who had long COVID and those who did not.

Dr. Rau said, "This study allows for an in vivo insight on the impact of COVID-19 on the brain".

"Here, we noted gray matter alterations in both patients with long-COVID and those unimpaired after a COVID-19 infection. Interestingly, we not only noted widespread microstructural alterations in patients with long COVID, but also in those unimpaired after having contracted COVID-19."

Dr. Rau noted that post-COVID symptoms is linked to specific affected cerebral networks, implying a potential pathophysiological basis for this syndrome.

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