

Study confirms longer-term lung damage after COVID-19

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A study by Sheffield and Oxford researchers using a cutting-edge method of imaging has identified persistent damage to the lungs of COVID-19 patients at least three months after they were discharged from hospital, and for some patients even longer.

This damage was not detected by routine CT scans and [clinical tests](#), and the patients would consequently normally be told their lungs are normal.

Further early research by the team has shown that patients who have not been hospitalized with COVID-19 but who are experiencing long-term breathlessness may have similar damage in their lungs, and a larger study is needed to confirm this.

In a paper published in *Radiology*, the world's leading radiology journal, the researchers from the University of Oxford and University of Sheffield said that hyperpolarised xenon MRI (XeMRI) scans had found abnormalities in the lungs of some COVID-19 patients more than three months—and in some cases, nine months—after leaving hospital,

when other clinical measurements were normal.

Professor Jim Wild Head of Imaging and NIHR Research Professor of Magnetic Resonance at the University of Sheffield, said: "The findings of the study are very interesting. The ¹²⁹Xe MRI is pinpointing the parts of the [lung](#) where the physiology of oxygen uptake is impaired due to long standing effects of COVID-19 on the lungs, even though they often look normal on CT scans.

"It is great to see the imaging technology we have developed rolled out in other clinical centers, working with our collaborators in Oxford on such a timely and clinically important study sets a real precedent for multi-center research and NHS diagnostic scanning with ¹²⁹Xe MRI in the UK."

The study's principal investigator at Oxford Professor Fergus Gleeson, Professor of Radiology at the University of Oxford and Consultant Radiologist at Oxford University Hospitals (OUH) NHS Foundation Trust, said: "Many COVID-19 patients are still experiencing breathlessness several months after being discharged from hospital, despite their CT scans indicating that their lungs are functioning normally.

"Our follow-up scans using hyperpolarized xenon MRI have found that abnormalities not normally visible on regular scans are indeed present, and these abnormalities are preventing oxygen getting into the bloodstream as it should in all parts of the lungs."

The study, which is supported by the NIHR Oxford Biomedical Research Center (BRC), has now begun testing patients who were not hospitalized with COVID-19 but who have been attending long COVID clinics.

"Although we are currently only talking about early findings, the XeMRI scans of non-hospitalized patients who are breathless—and 70 percent of our

local patients with Long COVID do experience breathlessness—may have similar abnormalities in their lungs. We need a larger study to identify how common this is and how long it will take to get better." Professor Gleeson explained.

"We have some way to go before fully comprehending the nature of the lung impairment that follows a COVID-19 infection. But these findings, which are the product of a clinical-academic collaboration between Oxford and Sheffield, are an important step on the path to understanding the biological basis of long COVID and that in turn will help us to develop more effective therapies."

The Pulmonary, Lung and Respiratory Imaging Sheffield (POLARIS) research group led by Professor Jim Wild at the University of Sheffield pioneered the methods, development and clinical applications of hyperpolarised gas lung MRI in the UK, performing the first clinical research studies in the UK and the world's first clinical diagnostic scanning with this technology.

More information: James T. Grist et al, Hyperpolarized ¹²⁹Xe MRI Abnormalities in Dyspneic Participants 3 Months after COVID-19 Pneumonia: Preliminary Results, *Radiology* (2021). [DOI: 10.1148/radiol.2021210033](https://doi.org/10.1148/radiol.2021210033)

Provided by University of Sheffield

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