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Study sheds light on why virus affects whole body

Understanding means by which Covid-19 persists will help shape patient care, US researchers say

South China Morning Post · 28 Dec 2021 · B12 · Bloomberg

The coronavirus that causes Covid-19 can spread quickly from airways to the heart, brain and almost every organ in the body, where it may persist for months, a study has found.

In what they described as the most comprehensive analysis to date of the virus's distribution and persistence in the body and brain, scientists at the US National Institutes of Health said they found the pathogen was capable of replicating in human cells well beyond the respiratory tract.

The results, released online in a manuscript under review for publication in the journal *Nature*, pointed to delayed viral clearance as a potential contributor to the persistent symptoms wracking so-called long Covid sufferers.

Understanding the means by which the virus persists, along with the body's response to any viral reservoir, promised to help improve care for those afflicted, the authors said.

"This is remarkably important work," said Ziyad Al-Aly, head of the clinical epidemiology centre at the Veterans Affairs St. Louis Health Care System in Missouri state. "For a long time now, we have been scratching our heads and asking why long Covid seems to affect so many organ systems. This paper sheds some light, and may help explain why long Covid can occur even in people who had mild or asymptomatic acute disease."

The coronavirus' propensity to infect cells outside the airways and lungs is contested, with studies providing evidence for and against the possibility.

The research at the NIH in Bethesda, Maryland state, is based on analysis of tissues taken during autopsies on 44 patients who died from Covid-19 in the first year of the pandemic in the US.

The burden of infection outside the respiratory tract and time to viral clearance is not well characterised, particularly in the brain, wrote Daniel Chertow, who runs the NIH's emerging pathogens section, and his colleagues.

The group detected persistent Sars-CoV-2 RNA in multiple parts of the body, including regions throughout the brain, for as long as 230 days following symptom onset. This may represent infection with defective virus, which had been described in persistent infection with the measles virus, they said.

The focus on multiple brain areas is especially helpful, said Al-Aly at the Veterans Affairs St. Louis Health Care System. "It can help us understand the neurocognitive decline or 'brain fog' and other neuropsychiatric manifestations of long Covid," he said.

"We need to start thinking of Sars-CoV-2 as a systemic virus that may clear in some people, but in others may persist for weeks or months and produce long Covid – a multifaceted systemic disorder."