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**HKU Department of Microbiology Documented**

**the World’s First Case of COVID-19 Re-infection**

Researchers from Department of Microbiology, Li Ka Shing Faculty of Medicine, The University of Hong Kong (HKU), have proven the first instance of human re-infection by SARS-CoV-2 by using the next generation sequencing. The team showed that the genome sequence of the virus strain in the first episode of COVID-19 infection is clearly different from the genome sequence of the virus strain found during second episode of infection. This is the world’s first documentation of a patient who recovered from COVID-19 but got another episode of COVID-19 afterwards. The work has been accepted by the international medical journal *Clinical Infectious Diseases* on 24 August 2020.

**Background**

Before this report, many believe that recovered COVID-19 patients have immunity against re-infection because most developed a serum neutralizing antibody response. However there is evidence that some patients have waning antibody level after few months. Moreover there are also reports that the virus RNA can wax and wane in the respiratory secretions of convalescent patients for up to 3 months. It is unclear whether these patients are prolonged virus shedders or have re-infection by another strain of SARS-CoV-2 as no viral genome sequencing is performed to differentiate these two possibilities.

**Study method and findings**

An apparently young and healthy patient had a second episode of COVID-19 infection which was diagnosed 4.5 months after the first episode. Viral genomes from first and second episodes belong to different clades/lineages. A total of 24 nucleotides were different between the viruses from the first and second episode. Amino acid differences can be found be found in 9 proteins, including a 58-amino acid truncation of ORF8 protein that was present only in the virus from the first infection.

**Research implications**

This case illustrates that re-infection can occur just after a few months of recovery from the first infection. Our findings suggest that SARS-CoV-2 may persist in the global human population as is the case for other common-cold associated human coronaviruses, even if patients have acquired immunity via natural infection. Since the immunity can be short lasting after natural infection, vaccination should also be considered for those with one episode of infection. Patients with previous COVID-19 infection should also comply with epidemiological control measures such as universal masking and social distancing.

**About the research team**

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