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SARS-CoV-2 spike and nucleocapsid proteins as well as HIV-GP120 protein were detected in extracellular vesicles or as free proteins in the bronchoalveolar lavage fluids from post-COVID patients up to two years after acute COVID-19 and from HIV-positive subjects on

The infection with severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2) can lead to a new disease called long-COVID-19 or post-acute COVID-19 syndrome (PACS).

Long/post-COVID syndrome represents a heterogeneous nosological entity, despite similar or overlapping symptoms between patients, and clear diagnostic criteria are yet to be established. The American authors investigated the presence of the SARS-CoV-2 spike (S) and nucleocapsid (N) proteins as well as the human immunodeficiency virus (HIV)-GP120 protein in the bronchoalveolar lavage (BAL) fluid of patients with post-COVID lung disease and HIV-positive subjects on highly active antiretroviral (HAART) therapy with undetectable blood viral loads. Their findings were presented at the American Thoracic Society (ATS) International Conference, which took place in San Francisco from May 16-21, 2025.

Bronchoalveolar lavage (BAL) is a diagnostic procedure used in pulmonary medicine to obtain a fluid sample from the lungs' bronchoalveolar spaces. During BAL, a bronchoscope is inserted into the airways, and a small amount of sterile saline is instilled and then suctioned back, collecting cells and other components for analysis. This technique is valuable in diagnosing various lung conditions, such as infections, interstitial lung diseases, and malignancies, providing clinicians with essential insights into the underlying pathology and guiding appropriate treatment strategies. Patel PH, Antoine MH, Sankari A, et al. Bronchoalveolar Lavage. In StatPearls Publishing; 2025.

<https://www.ncbi.nlm.nih.gov/books/NBK430762/>



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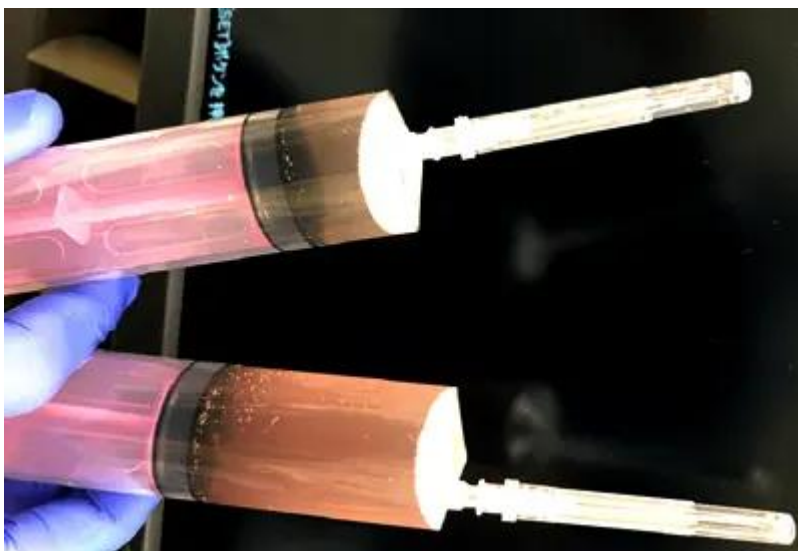
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About the Study and Results

Acellular BAL fluid, pooled extracellular vesicle fractions, and free protein fractions were analyzed for SARS-CoV-2 S and N proteins using commercially available ELISA kits. HIV GP120 in HIV samples and the common extracellular vesicle markers CD9, CD81, CD63, and syntenin-1 were analyzed by Western blot.

The analysis showed that SARS-CoV-2 S and N proteins persisted in the BAL fluids of patients with post-COVID lung disease for up to two years after acute infection. Most S proteins (56%) were contained in the extracellular vesicles, and the rest (44%) were detected as free proteins. Similar results were observed for SARS-CoV-2 N proteins.

In contrast, most of the HIV-GP120 proteins were present as free proteins in the BAL fluid of HIV-positive subjects on HAART therapy with undetectable blood viral loads. The HIV-GP120 protein was also easily identified in the extracellular vesicle fractions by Western blot. According to the authors, these results may reflect continued low-grade viral replication in latent HIV infection.



Conclusion

This study showed that SARS-CoV-2 spike and nucleocapsid proteins as well as HIV-GP120 protein could be detected in extracellular vesicles and as free proteins in the human

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SARS-CoV-2 spike and nucleocapsid proteins as well as HIV-GP120 protein were detected in extracellular vesicles or as free proteins in the bronchoalveolar lavage fluids from post-COVID patients up to two years after acute COVID-19 and from HIV-positive subjects on antiretroviral therapy with well-controlled blood viral load. Interestingly, most S and N proteins were contained in the extracellular vesicles in the BAL fluids from patients with post-COVID lung disease. In contrast, most HIV-GP120 proteins were present as free proteins in the BAL fluids from HIV-positive subjects.

The researchers also pointed out that they are currently investigating whether these proteins serve as chronic antigens that cause the chronic lung diseases diagnosed in patients with both, post-COVID lung disease and well-controlled HIV infection.

Journal Reference

Fraser ME, Smith P, Belanger A, et al. SARS-CoV-2 Spike Protein, SARS-CoV-2 Nucleocapsid Protein, and HIV GP120 Protein From Human BAL Are Contained Within Extracellular Vesicles and as Free Protein. Abstract. The American Thoracic Society ATS International Conference Abstracts, May 16-21, 2025, San Francisco. Am J Respir Crit Care Med 2025; 211: A4991. <https://doi.org/10.1164/ajrccm.2025.211.Abstracts.A4991>

