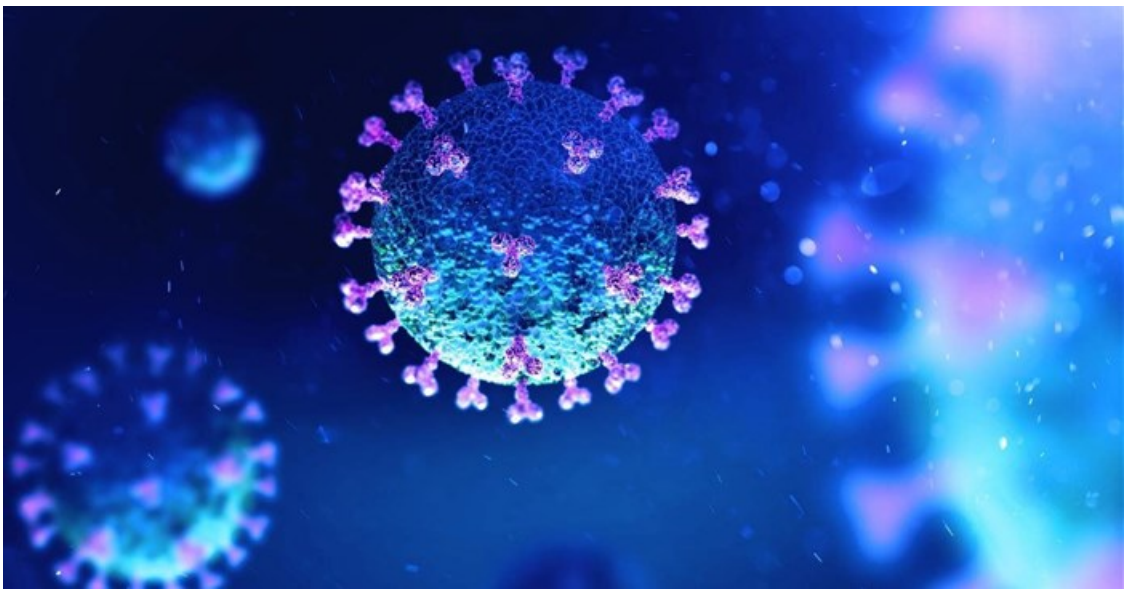
Viruses can hijack cellular process in order to block immune response

Research has found that viruses that cause diseases such as the common cold, measles, or Covid-19 can hijack an existing molecular process in the cell in order to block the body's antiviral immune response to a viral infection.



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As the current Covid-19 pandemic has proved, viral infection is a significant threat to the health of humans as well as livestock, pets, and plants. Discovery of a potentially druggable process that is hijacked by the virus to facilitate viral infection could have significant health and financial benefits to society.

This discovery is a breakthrough in the fields of immunobiology and gene expression, and further research will determine if targeting this cellular mechanism could be used to more effectively treat viral infections.

To conduct their study the researchers looked at how healthy cells control the levels of the molecules known as ‘Interferon-ß’ or ‘Interferon beta'. These molecules are used for communication between cells to trigger the protective defenses of the immune system that help eradicate pathogens, such as viral microbes. This communication between cells is essential for a functioning immune system.

New understanding

The researchers discovered a molecular process used by the virus that blocks the synthesis of Interferon-ß, therefore blocking the immune system.

“Our study has found that certain viruses hijack this natural process in order to neutralise Interferon-ß and block the immune system, resulting in unrestrained viral infection which can make people incredibly sick.

“We hope this new understanding of how viruses can hijack existing cellular processes in the body will lead to better treatments of viral infections and ultimately save lives," said Dr Seyed Mehdi Jafarnejad, principal Investigator from the Patrick G Johnston Centre for Cancer Research at Queen’s University.

“My lab was fortunate to continue our collaboration with Mehdi Jafarnejad to discover how the mRNA translational repressor, 4EHP, on which we reported first in 1998, inhibits the production of the host defense protein, interferon. This work is likely to have important implications for the understanding of how SARS-CoV-2 evades the human defense response to the virus," Professor Nahum Sonenberg, Gilman Cheney chair in biochemistry at McGill University, said.

The next step for the research is to study if managing this process could be used for successful treatment of various types of viruses, including SARS-CoV-2.

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