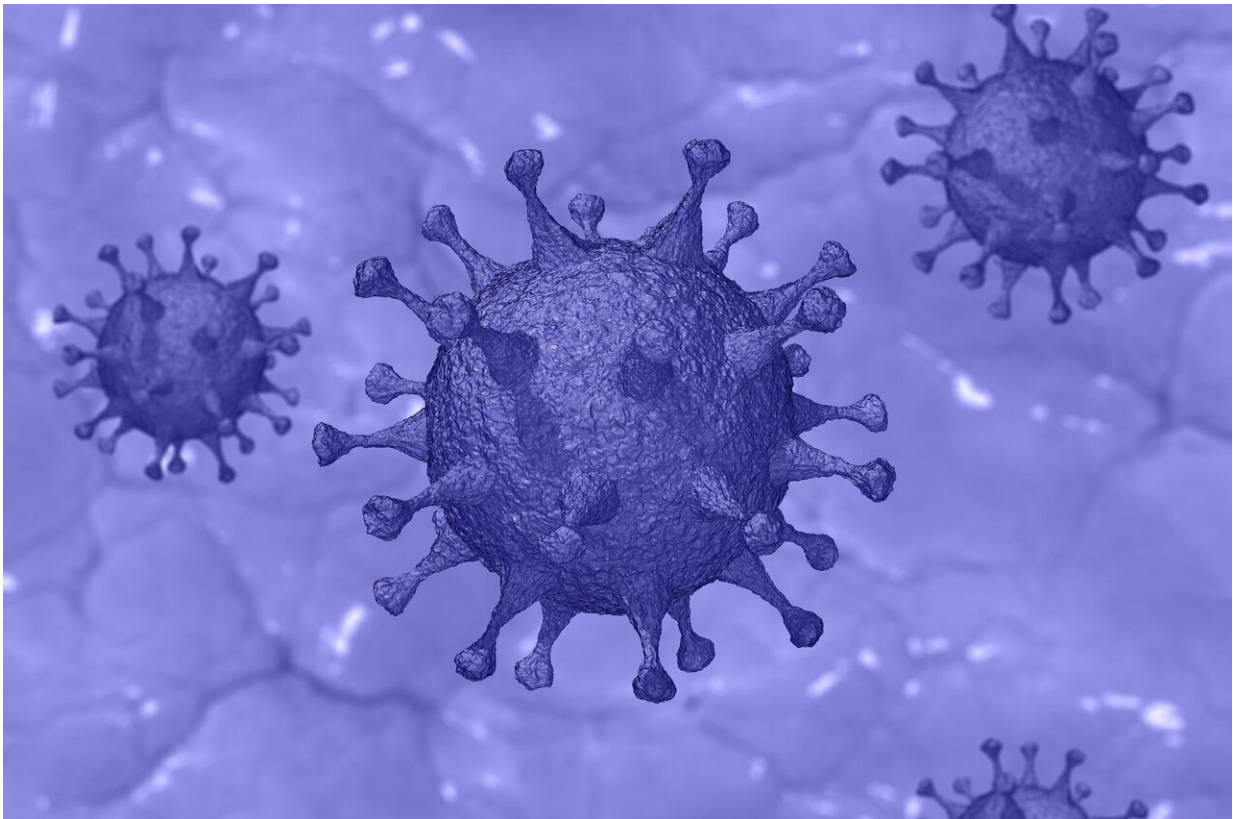


Lung and heart stem cell research paves way for new COVID-19 treatments

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Researchers have used heart and lung stem cells infected with the virus that causes COVID-19 to better understand how the disease impacts different organs, paving the way for more targeted treatments.

The research, co-led by Murdoch Children's Research Institute and the Peter Doherty Institute for Infection and Immunity (Doherty Institute), found the responses to SARS-CoV-2 varied significantly depending on the cell type, allowing the team to identify effective anti-viral drugs to treat infection in [heart](#) and [lung cells](#). The findings were published in the 10th anniversary edition of *Stem Cell Reports*.

Murdoch Children's Associate Professor David Elliott, also a principal investigator at The Novo Nordisk Foundation Center for Stem Cell Medicine (reNEW), said discovering that COVID-19 triggered variable cellular responses in different organs would provide new insights into treatment strategies.

"To further our knowledge on the impact of SARS-CoV-2 on different organs, we engineered human stem cells in the lab into lung and heart cells and infected with them with the virus," he said.

"We found the heart and lungs exhibit distinct antiviral and toxicity profiles that could inform better COVID-19 therapies and treat its complications.

"Our findings highlight the importance of using several [cell types](#) for the evaluation of antiviral drugs to determine the best [drug](#) combinations for effective treatment of a virus that affects multiple [organ systems](#)."

The Royal Melbourne Hospital and University of Melbourne Professor Kanta Subbarao, Virologist and Director of the WHO Collaborating Center for Reference and Research on Influenza at the Doherty Institute, said while SARS-CoV-2 primarily infected the [respiratory tract](#), lung and cardiac complications occur in severe cases of COVID-19.

Cardiac complications are observed in up to 78% of recovered COVID-19 patients and ongoing myocardial inflammation in 60% of

patients.

"Although COVID-19 vaccines are highly effective in preventing [severe illness](#) and death, antiviral compounds are required for the treatment of COVID-19, particularly with the emergence of variant viruses that evade immunity," Professor Subbarao said.

"To date, only a handful of drugs have been approved for use in hospitalized COVID-19 patients and more are needed."

The study also looked at approved drugs for treating COVID-19, including Remdesivir and Molnupiravir, with some found to be more effective than others at treating infection in lung and heart stem cells. It identified Alectinib and SPHINX31 as promising antivirals for SARS-CoV-2 in both heart and lung cells.

"We have provided valuable insights into virus-host interactions in tissues that are significantly affected in COVID-19, with implications that will further therapeutic options," Professor Subbarao said.

More information: Parallel use of human stem cell lung and heart models provide insights for SARSCoV-2 treatment, *Stem Cell Reports* (2023). [DOI: 10.1016/j.stemcr.2023.05.007](https://doi.org/10.1016/j.stemcr.2023.05.007)

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