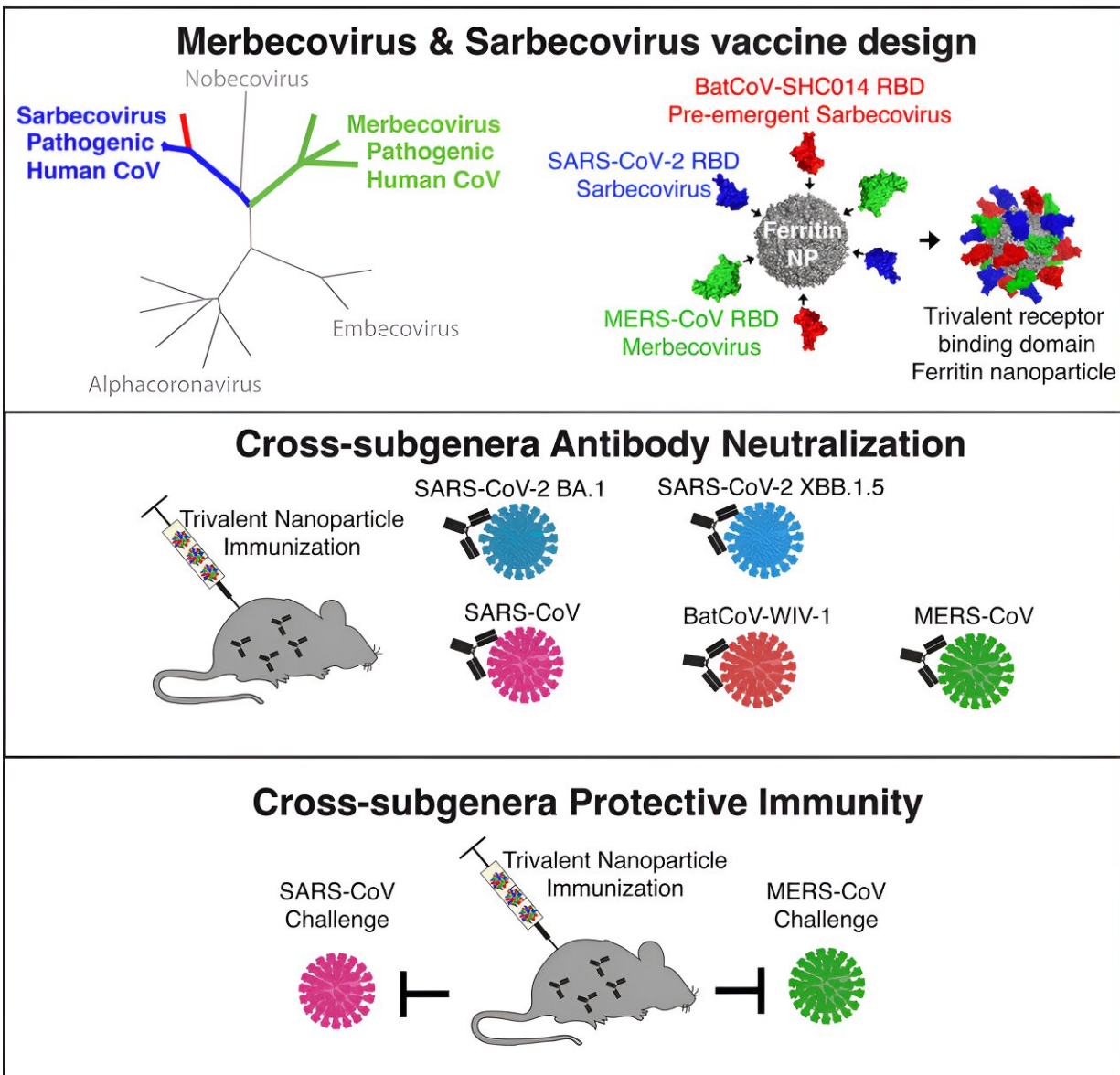


Single vaccine protects against three deadly strains of coronavirus

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Graphical Abstract. Credit: *Cell Reports* (2023). DOI: 10.1016/j.celrep.2023.113248

A vaccine designed to protect against three different deadly coronaviruses shows success in mouse studies, demonstrating the viability of a pan-coronavirus vaccine developed by researchers at the Duke Human Vaccine Institute.

[Published](#) in the journal *Cell Reports*, the single nanoparticle vaccine included components of a previous vaccine that was shown to protect mice and primates against multiple variants of SARS-CoV-2, which is the virus that causes COVID-19. In this study, the vaccine protected mice from SARS-CoV-1, another form of SARS coronavirus that can infect humans, and a MERS coronavirus that has led to periodic, deadly outbreaks around the world.

"We are making important progress toward a broadly protective coronavirus vaccine," said senior author Kevin O. Saunders, Ph.D., associate director of the Duke Human Vaccine Institute. "These are pathogens that cause or have the potential to cause significant human infections and loss of life, and a single vaccine that provides protection could slow down or even prevent another pandemic."

Saunders and colleagues built the tri-valent vaccine using a nanoparticle loaded with a key fragment called a receptor binding domain from each of the coronaviruses. The fragment—a docking site on the virus that enables it to infiltrate the body's cells—provides enough information for [immune cells](#) to build an effective response against actual coronaviruses that enter the body.

In earlier studies in mice and primates, the researchers demonstrated that

an earlier iteration of the nanoparticle vaccine was effective against multiple SARS-CoV-2 variants. Human tests are planned next year for a version that carries immunogens to different SARS-CoV-2 strains, including those that have dominated since the original outbreak in late 2019.

The current work expands the components of the vaccine to include an additional SARS-related virus and MERS [virus](#). In [lab studies](#), as well as in mice, the researchers found that the vaccine candidate generated inhibitory immune molecules called antibodies against all three pathogenic human coronavirus types.

Importantly, vaccinated [mice](#) did not grow sick when challenged with either SARS-like or MERS-like viruses.

"This study demonstrates proof-of-concept that a single [vaccine](#) that protects against both MERS and SARS viruses is an achievable goal," Saunders said. "Given that one MERS and two SARS viruses have infected humans in the last two decades, the development of universal coronavirus vaccines is a global health priority."

More information: Vaccine-mediated protection against Merbecovirus and Sarbecovirus challenge in mice, *Cell Reports* (2023). DOI: [10.1016/j.celrep.2023.113248](https://doi.org/10.1016/j.celrep.2023.113248). [www.cell.com/cell-reports/full ... 2211-1247\(23\)01260-3](https://www.cell.com/cell-reports/full-text/S2405-4724(23)01260-3)

Provided by Duke University Medical Center

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