Could rotavirus genome be key to COVID-19 vaccine for kids?

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Since the pandemic struck the United States more than a year ago, Indiana University Bloomington virologist John Patton, graduate student Asha Philip and others have been working on a COVID-19 vaccine for young children, based on a well-established childhood vaccine for the common illness rotavirus.

Currently, no available COVID-19 vaccines have been authorized for use in children younger than 16.

By reverse-engineering the rotavirus genome to serve as a vector for the now-familiar SARS-CoV-2 spike protein, the research team succeeded in generating genetically stable recombinant rotaviruses that contain portions of the spike protein, which could lead to a combined rotavirus-COVID-19 vaccine to replace current widely used rotavirus vaccines.

"Our findings raise the possibility of constructing rotavirus vaccine strains that are capable of protecting against not only rotavirus but also COVID-19," Philip said.

Patton is a professor of biology and Blatt Chair of Virology in the College of Arts and Sciences at IU Bloomington. Philip is a Ph.D. student in Patton's lab and lead author on the study.

Preliminary findings from their research have been posted in the preprint "Rotavirus as an Expression Platform of the SARS-CoV-2 Spike Protein" on the open-access platform bioRxiv and as part of the National Institutes of Health Preprint Pilot. Preprints are working papers awaiting peer review.

Rotavirus is common among young children, causing nausea and diarrhea, but vaccination has long reduced its spread in many countries. A combined rotavirus-COVID-19 targeted vaccine would be a huge step forward, Philip said.

By leveraging rotavirus immunization programs already in place, a combined vaccine could be distributed and administered to infants and young children around the world. Although children make up a tiny fraction of COVID-19 infections and deaths, they may be asymptomatic carriers of the disease, compromising our ability to reach herd immunity.

A vaccine for young children would also allow schools to open up more freely, enabling activities that involve close contact. And the process used to create rotavirus-based combination vaccines may also prove useful for vaccines against other intestinal viruses such as norovirus.

The IU team is now working to determine how successful the combined rotavirus-SARS-CoV-2 vaccine is at producing the desired antibody response. Meanwhile, their current results emphasize the potential of a combined vaccine becoming a routine immunization for children in the not-too-distant future.

More information: Asha A. Philip et al. Rotavirus as an Expression Platform of the SARS-CoV-2

Spike Protein, *bioRxiv* (2021). DOI: 10.1101/2021.02.18.431835

Provided by Indiana University

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