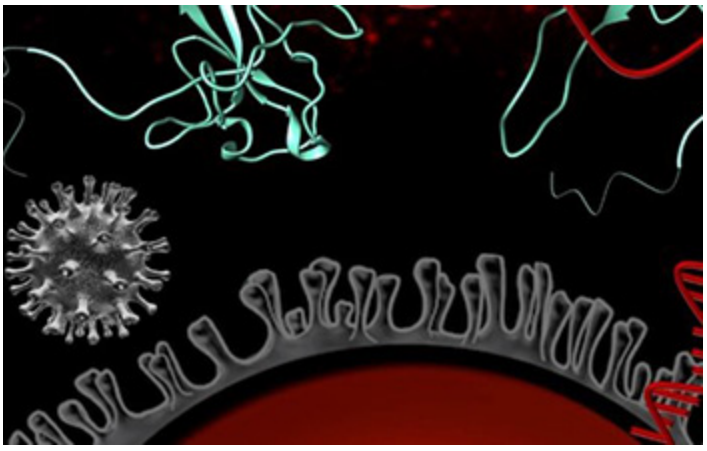
Research News

Deep dive into key COVID-19 protein is step toward new drugs, vaccines

Virus' nucleocapsid protein is a prime target for disease-fighting interventions



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Researchers at Oregon State University (/cgi-bin/good-bye?https://today.oregonstate.edu/news/deep-dive-key-covid-19-protein-step-toward-new-drugs-vaccines) have taken a key step toward new drugs and vaccines for combating COVID-19 with a detailed biophysical study of one protein's interactions with the SARS-CoV-2 genetic material; SARS CoV-2 is the virus that causes COVID-19. A U.S. National Science Foundation <https://www.nsf.gov/awardsearch/showAward?AWD_ID=2034446&HistoricalAwards=false> grant supported the research.

The virus' nucleocapsid protein, or N protein, has multiple functions, including packaging the RNA genome and interacting with other structural proteins during virion assembly. The N protein has critical roles in the coronavirus' infection cycle and, because it mutates at a comparatively slow pace, drugs and vaccines targeting the N protein could be highly effective for longer periods of time, making them less susceptible to resistance.

Published in *Biophysical Journal*, the findings (/cgi-bin/good-bye?https://www.sciencedirect.com/science/article/pii/S0006349521002538) are an important jumping-off point for understanding how the N protein and its interactions with RNA contribute to SARS-CoV-2 replication and transmission.

Elisar Barbar, a biochemist and biophysicist, and researcher Heather Masson-Forsythe led the study. The scientists used biophysical techniques that measure changes in N protein size, shape and flexibility when bound to an RNA fragment -- 1,000 nucleotides of the 30,000-nucleotide genome.

"The genome is rather large for a virus and requires many copies of the N protein to stick to the RNA to give the virus the spherical shape that is necessary for the virus to make more copies of itself," Barbar said. "Our study helps us quantify how many copies of N are needed and how close they are to each other when they stick to the RNA."

Added Manju Hingorani, a program director in NSF's Division of Molecular and Cellular Biosciences, "This study underscores the importance of basic research in finding new approaches to combat not just COVID-19 but future viral pandemic threats."

Developing drugs that thwart the N protein's flexibility or disrupt the N protein-RNA complexes could be a fruitful avenue of pharmaceutical research.

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