Understanding SARS-COV-2 proteins is key to improve therapeutic options for COVID-19

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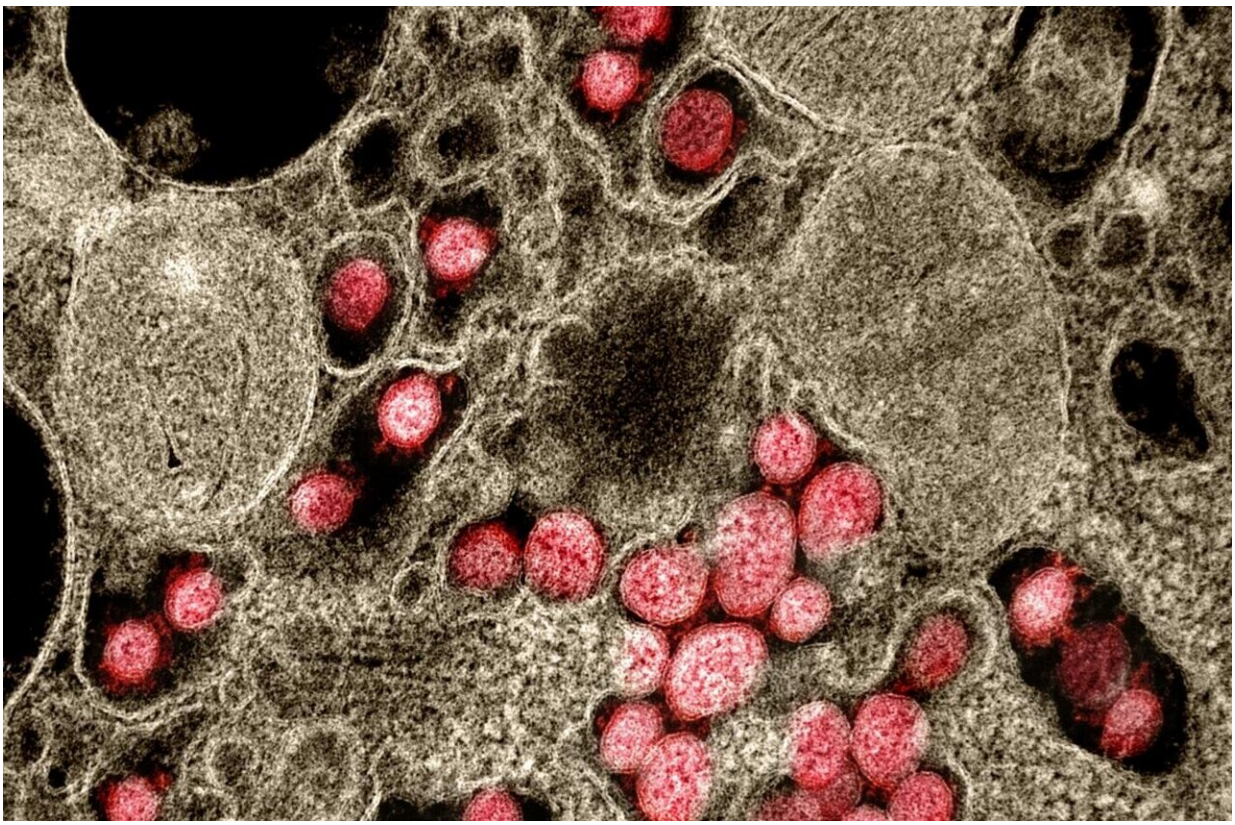

Transmission electron micrograph of SARS-CoV-2 virus particles isolated from a patient. Credit: NIAID

COVID-19 has had a significant impact since the pandemic was declared

by WHO in 2020, with over 3 million deaths and counting, Researchers and medical teams have been hard at work at developing strategies to control the spread of the infection, caused by SARS-COV-2 virus and treat affected patients. Of special interest to the global population is the developments of vaccines to boost human immunity against SARS-COV-2, which are based on our understanding of how the viral proteins work during the infection in host cells. Two vaccines, namely the Pfizer/BioINtech and Oxford/AZ vaccine rely on the use of delivering the gene that encodes the viral spike protein either as an mRNA or through an adenovirus vector to promote the production of relevant antibodies. The use of monoclonal antibodies has also been approved by the US Food and Drug Administration.

It is very clear that viral proteins provide interesting and potentially effective targets for neutralizing viruses, and SARS-COV-2 is no exception. A recent review published in *Current Molecular Medicine* presents a summary of SARS-COV-2 proteins. The review, authored by M. E. A. Mohammed (King Khalid University, Saudi Arabia) presents tabular information about 3 major types of SARS-COV-2 proteins: functional proteins (which represent enzymes responsible for viral replication, receptor binding, viral invasion and virion assembly and release), structural proteins (which are associated with the viral protein coat), and accessory proteins (which help in viral replication and virus-host interactions). In addition to informative tables, the review also provides current information about individual proteins in detail in terms of structure and molecular function.

The author points out that SARS-COV-2 proteome consists of proteins that have an increased number of amino acids (nsp3 and spike protein), deleted proteins (orf3b and orf9b) and inserted proteins (orf10). The list of proteins has been compared with variants in SARS-COV and another bat coronavirus species (RATG13). A number of structural and nonstructural proteins of SARS-COV-2 are conserved among the

coronavirus species. The list of proteins provides a good starting point for researchers to search for possible pharmaceutical targets for combatting SARS-COV-2 infections.

More information: Mohammed Elimam Ahamed Mohammed, SARS-CoV-2 proteins: Are they useful as targets for COVID-19 drugs and vaccines?, *Current Molecular Medicine* (2021). DOI: 10.2174/1566524021666210223143243

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