New drug candidate against COVID-19

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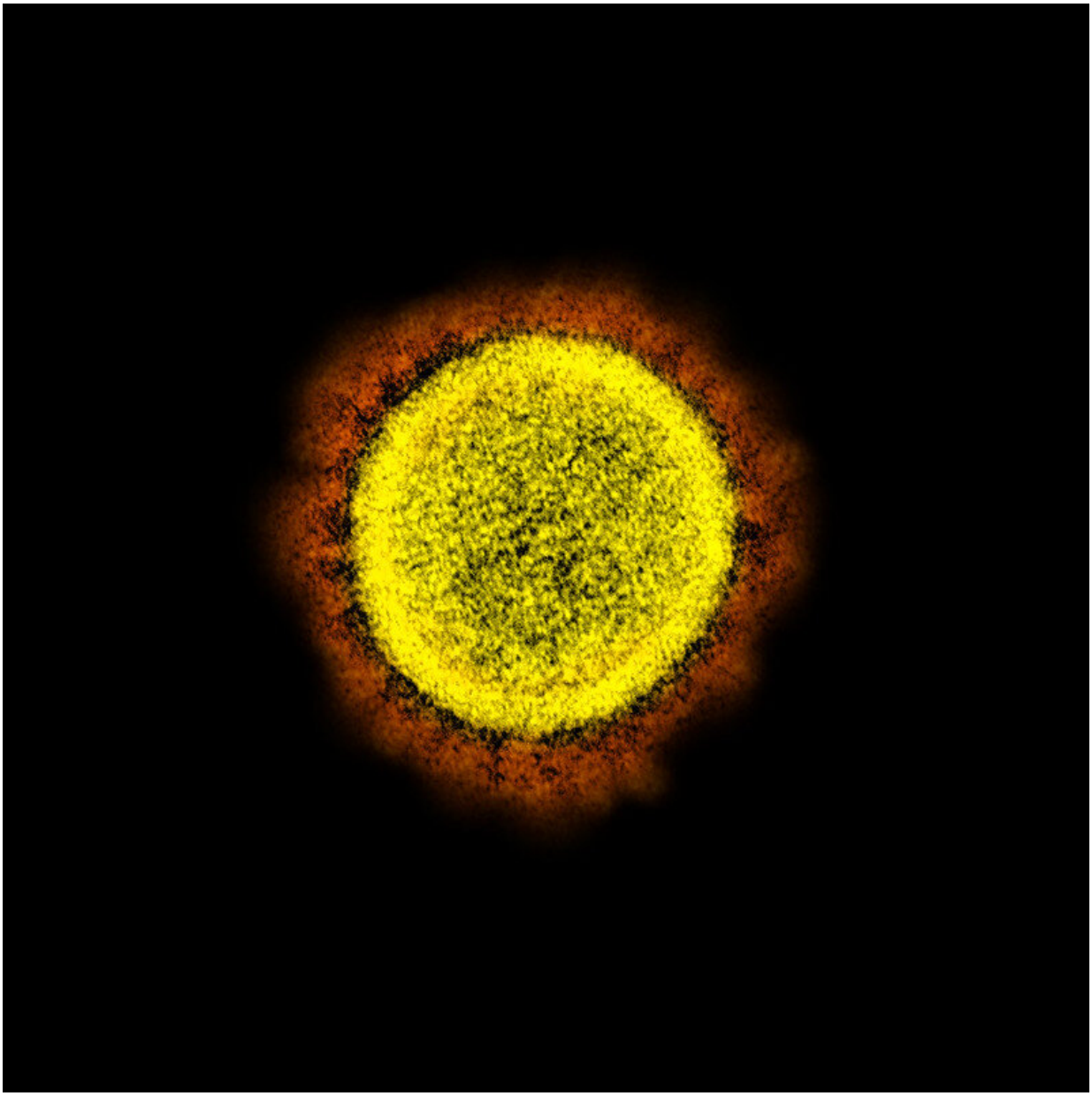

Novel Coronavirus SARS-CoV-2 Transmission electron micrograph of SARS-

CoV-2 virus particles, isolated from a patient. Image captured and color-enhanced at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland. Credit: National Institute of Allergy and Infectious Diseases, NIH

SARS-CoV-2, the virus responsible for the COVID-19 pandemic, arrived one year ago and turned our lives upside-down.

While worldwide vaccination programs are currently ongoing, we do not yet know for how long the vaccine will provide immune protection against infection, and if the currently approved vaccines can provide protection against the emerging virus variants.

In addition, it appears that vaccines cannot prevent illness for people who have already been infected. In contrast to vaccines, there are currently no effective drugs that act against the virus SARS-CoV-2.

New research by Associate Professor Jasmin Mecinovic and co-workers from the Department of Physics, Chemistry and Pharmacy, University of Southern Denmark, now presents a compound that might provide a basis for the development of drugs against COVID-19.

The work has been recently published in *Chemical Communications*.

"Our approach is based on mimicking Nature, and the idea is to prevent the virus from entering the body's cells. If the virus does not enter the cells, it cannot survive. Instead, the immune system destroys the viral particles, thus preventing an infection," explains Jasmin Mecinovic.

SARS-CoV-2 belongs to the family of coronaviruses, which are named after their characteristic crown shaped envelope that shields its RNA from being damaged. This crown is made up out of viral spike proteins,

which act as the lock-picks used by the virus to break into a host cell.

The SARS-CoV-2 spike protein specifically interacts with an enzyme, called ACE2 receptor, to initiate cell entry and infection.

The ACE2 receptor is found on the surface of cells in many different tissues and is especially common in the lungs. For this reason, SARS-CoV-2 infection leads to (severe) respiratory disease symptoms for many people.

Mecinovic and colleagues have found that peptides (a small part of protein), made to look exactly like the ACE2 receptor can act as a decoy and prevent binding of the of the SARS-CoV-2 spike protein.

"This suggests that molecular decoys based on the ACE2 receptor might be an effective therapeutic to prevent infection by the virus," says Ph.D. student Marijn Maas, the first author of the article.

"Getting a new drug to the market is a long journey. Next step is to continue studying our synthetic peptide—for example by making variations of it to see if we can improve its potency," says Jasmin Mecinovic.

More information: Marijn N. Maas et al, Targeting SARS-CoV-2 spike protein by stapled hACE2 peptides, *Chemical Communications* (2021). DOI: 10.1039/D0CC08387A

Provided by University of Southern Denmark