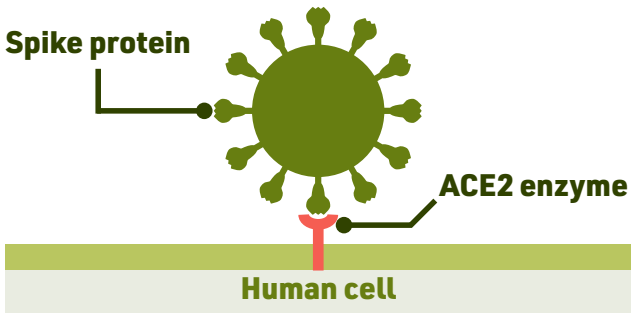
FEB
2020

CHEM VS. COVID TIMELINE

Structures of SARS-CoV-2 spike protein published

What is the spike protein?



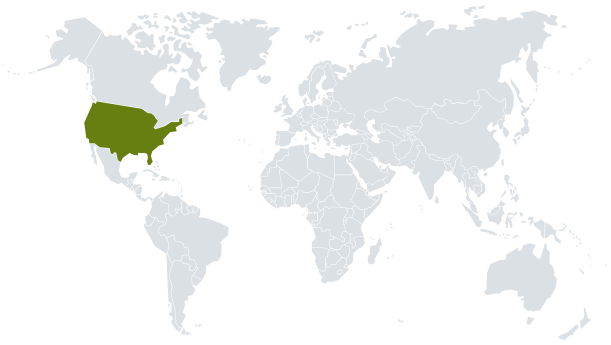
The spike protein binds to an enzyme (ACE2) found in cell membranes in parts of our body including the lungs. This helps the virus enter cells, initiating infection.

Subunit 1
The part of the protein that binds to the ACE2 enzyme.

Subunit 2
The part of the protein that fuses with the human cell membrane, helping the virus enter the cell.

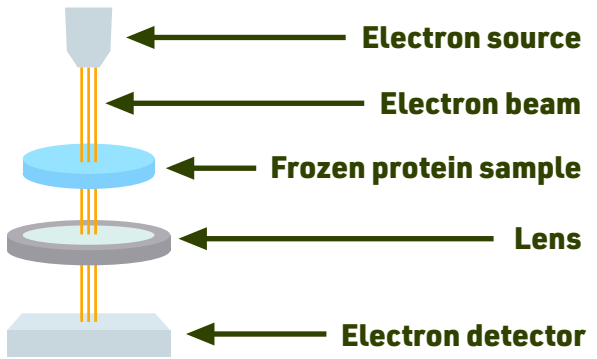
Sugar molecules called glycans coat the spike proteins, camouflaging them from our immune system as they enter the body.

From February 2020, studies identified structures of the SARS-CoV-2 spike protein using electron microscopy. Scientists at the University of Texas were amongst the first to determine the structure.

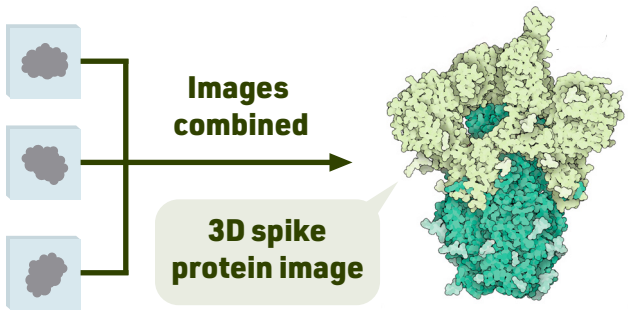


Determining the structure

Cryo-electron microscopy (cryo-EM) uses the deflection of electrons to determine the structure of the protein.



Thousands of 2D images are combined to make a 3D, atomic-scale image of the protein. This lets us understand how the protein helps the virus infect our cells, and how medicines might interact with it.



How did it help?

Vaccines
Many vaccines for COVID-19 depend on the spike protein. For example, the Novavax vaccine uses nanoparticles made up of spike proteins.

Treatment
Knowing the structure of the spike protein lets researchers identify drugs which could target it. This could lead to new treatments for COVID-19.

Understanding mutations
Some mutations can introduce changes to the spike protein structure. Knowing its original structure lets us identify how these changes affect it.

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