

Coronavirus Spike Protein

Kunal Ramchandra Konde

Dattakala College of Pharmacy, Swami Chincholi

Abstract: *The coronavirus spike protein is a multifunctional molecular that mediates coronavirus entry into the host cell. This is more clearly the last 15 year by the emergence of two zoonotic CoVs, the severe acute respiratory syndrome (SARS) and middle east respiratory syndrome (MERS) CoV. The primary determinant of CoV is the viral spike (S) entry protein. This article review current knowledge about structure of spike coronavirus.*

Keywords: Coronavirus spike protein, SARS, MERS

1. Introduction

Coronavirus (CoVs) (order Nidovirales, Family- *Coronaviridae*, Sub- family- *Coronavirinae*) are enveloped, positive- sense RNA viruses contains largest known RNA genomes. The length of this RNA genomes is up to 32kb. Coronavirus pose serious health threats to human and other animals. They can be classified into four genera-

- a) Alphacoronavirus ,
- b) Betacoronavirus,
- c) Gammacoronavirus,
- d) Deltacoronavirus.

Alphacoronavirus and Betacoronavirus infected mammals species.

Gammacoronavirus infected avians species.

Deltacoronavirus infected both the mammals as well as avians species.

The coronavirus spike contains three segments i.e. large ectodomain, a single pass transmembrane anchor and a short intracellular tail.

1.1 Structure of Coronavirus s-protein

SARS- CoV-2 particles are spherical and has protein called spike. The spike protein is a class I viral fusion protein.

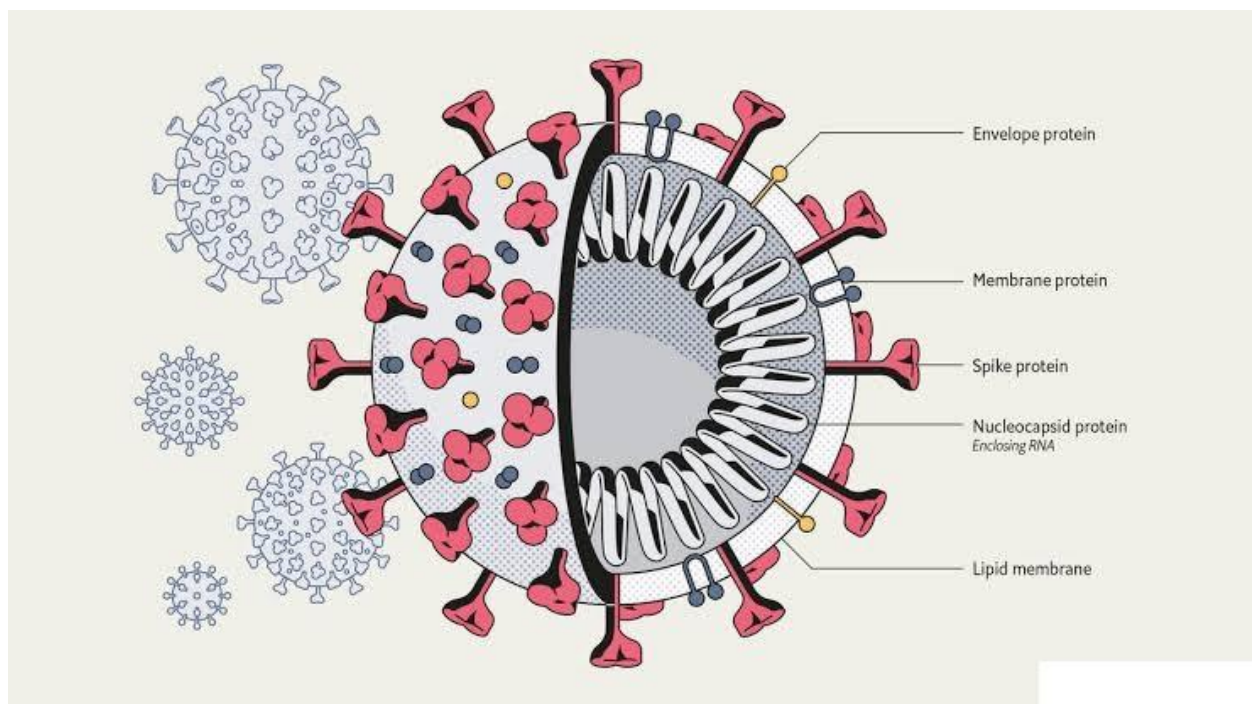


Figure: structure of coronavirus

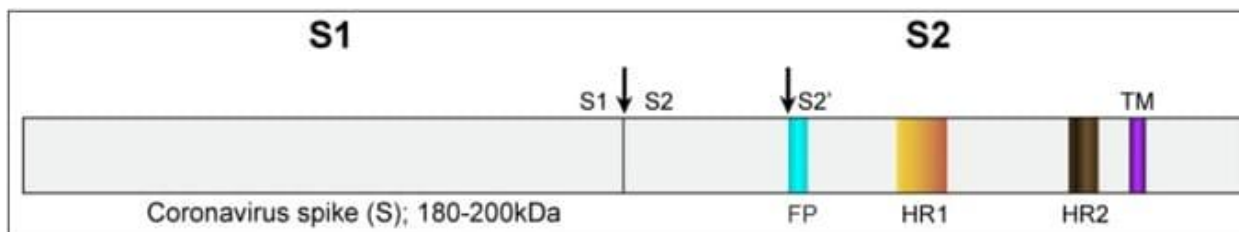


Figure: Coronavirus spike protein

The viral spike protein have decorting sugar moieties that help defend against our immune system. Club shaped spike decorates the membrane surface of the CoV particles.

Cryo-EM and single partical analysis revealed the atomic structure of coronavirus spike protein.

1.2 Structure of the S1 subunit

Spike protein are mainly divided into two CoV particles-
 a) S1 subunit,
 b) S2 subunit.

The S1 subunit of betacoronavirus spike protein displays a multidomains and structurally in four different domins i.e. A, B, C, D.

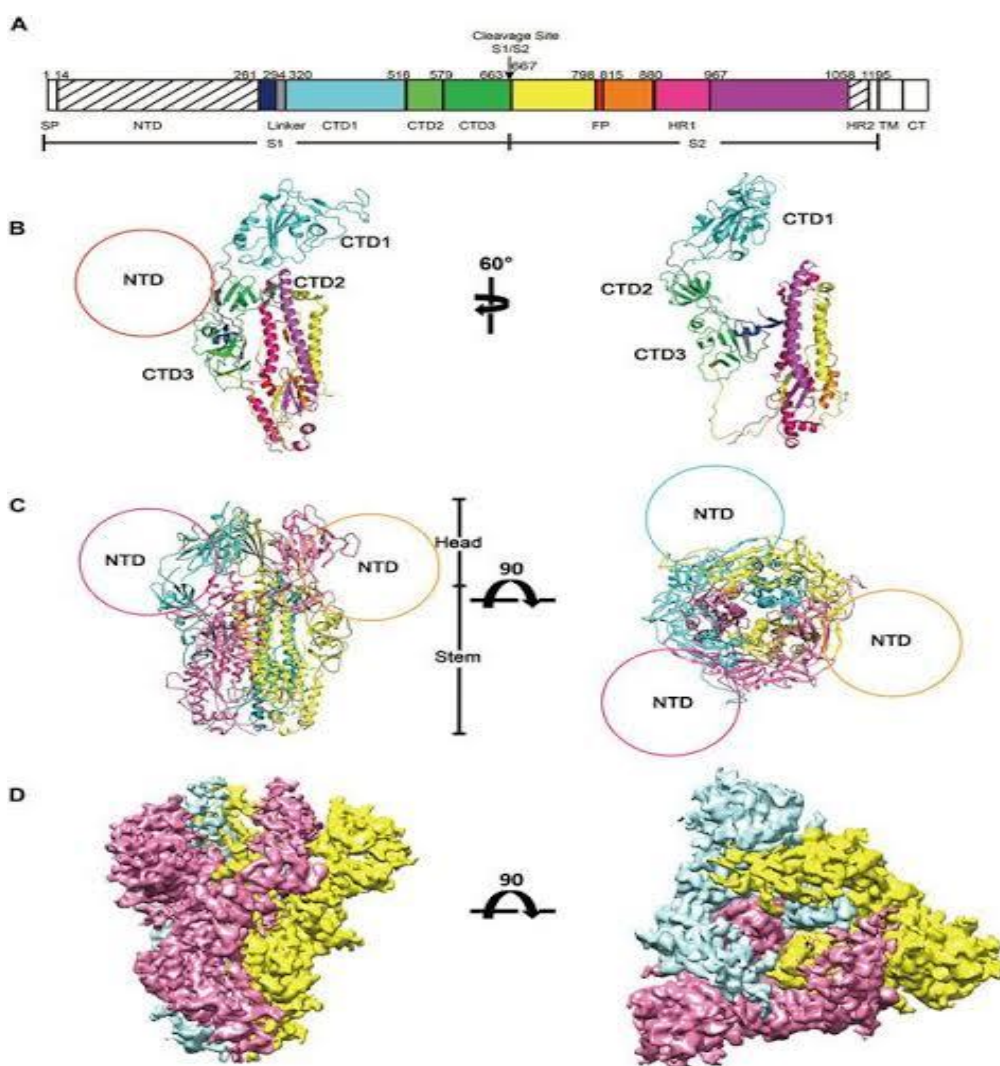


Figure: S1 subunit

The domain A shows gelectin like β - sheet sandwich fold.

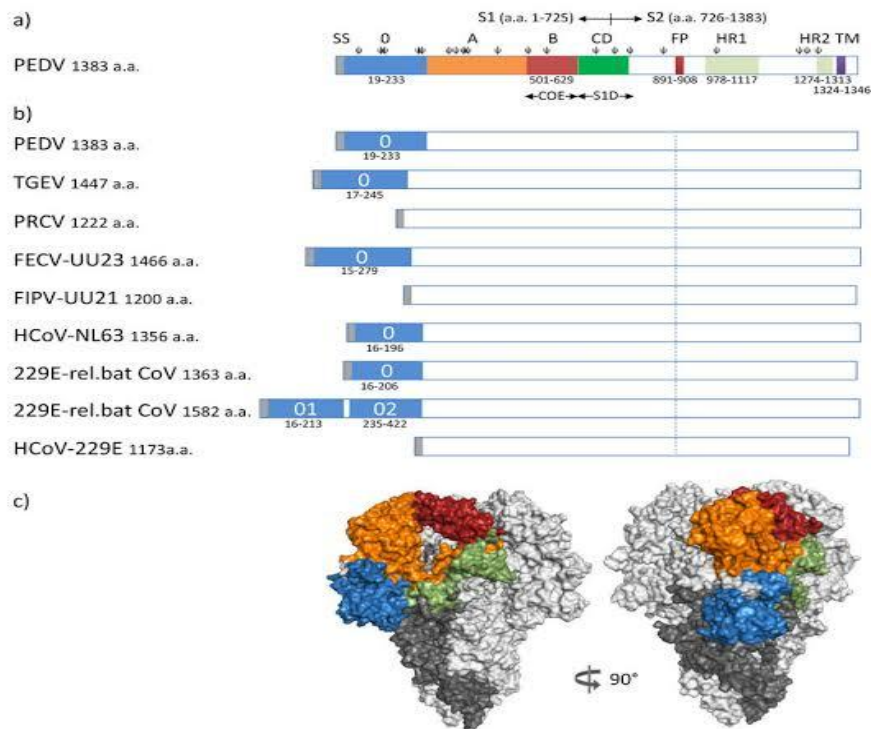
The S1 subunit have two independently folding domains of α coronavirus spike.

The domain B having antiparallel β -sheets.

1.3 Structure of the S2 subunit

S1 subunit shows low level of sequence conversation among species of different CoV genera than S2 subunit.

S2 subunit contains the key protein segment which is facilitate virus cell fusion. These contain two heptad repeat regions (HR1and HR2).



2. Conclusion

Review about the spike protein CoV which is the mediates coronavirus entry into host cells.

References

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