



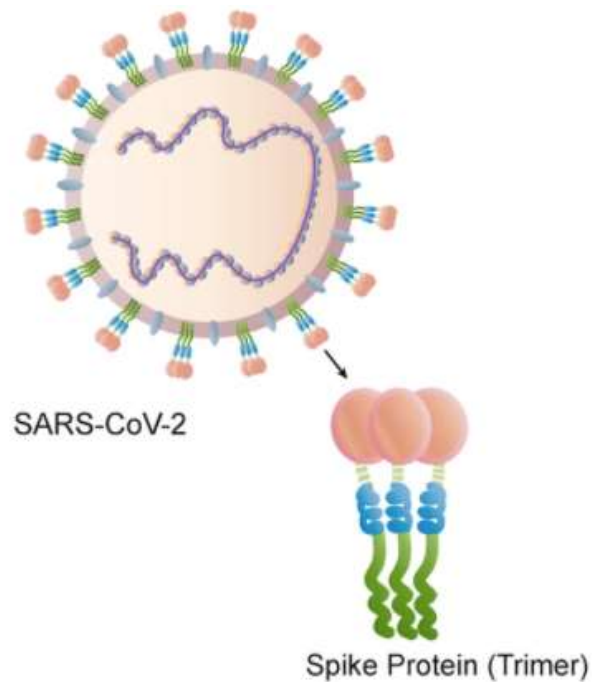
STRUCTURAL BIOLOGY OF SARS-COV-2 SPIKE PROTEIN

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WHAT DO STRUCTURAL BIOLOGISTS DO?

- It is a multi-disciplinary field intersecting biology, biochemistry and biophysics.
- Study of the structure and dynamics of the biomolecules such as proteins, RNA (Ribonucleic Acid), DNA (De-oxyribonucleic acid) etc.
- Techniques such as NMR (Nuclear Magnetic Resonance), X-Ray Crystallography, Cryo-EM etc.

SARS-COV-2 SPIKE PROTEIN



- SARS-CoV-2 is a single-stranded RNA-enveloped virus.
- Spike protein is 1273 amino acids, 180-200 kDa.

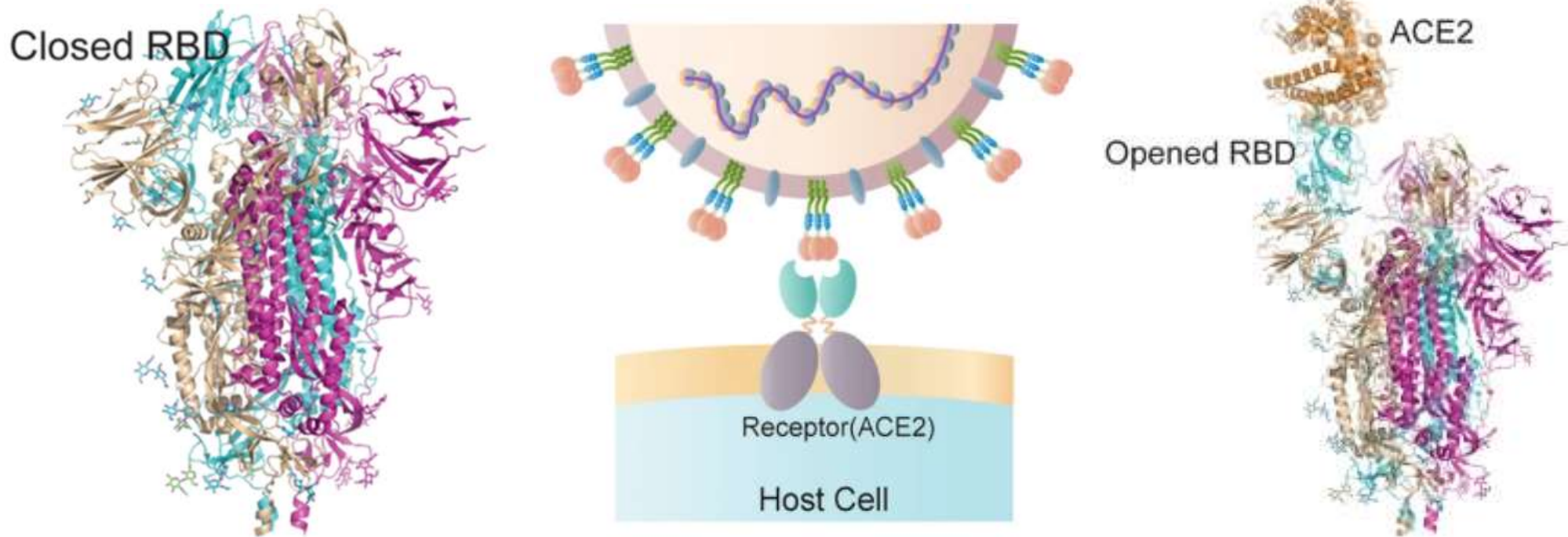
CRYO-EM

- Cryogenic Electron Microscopy (Cryo-EM)
- Flash-freeze the sample
- Bombard with electrons

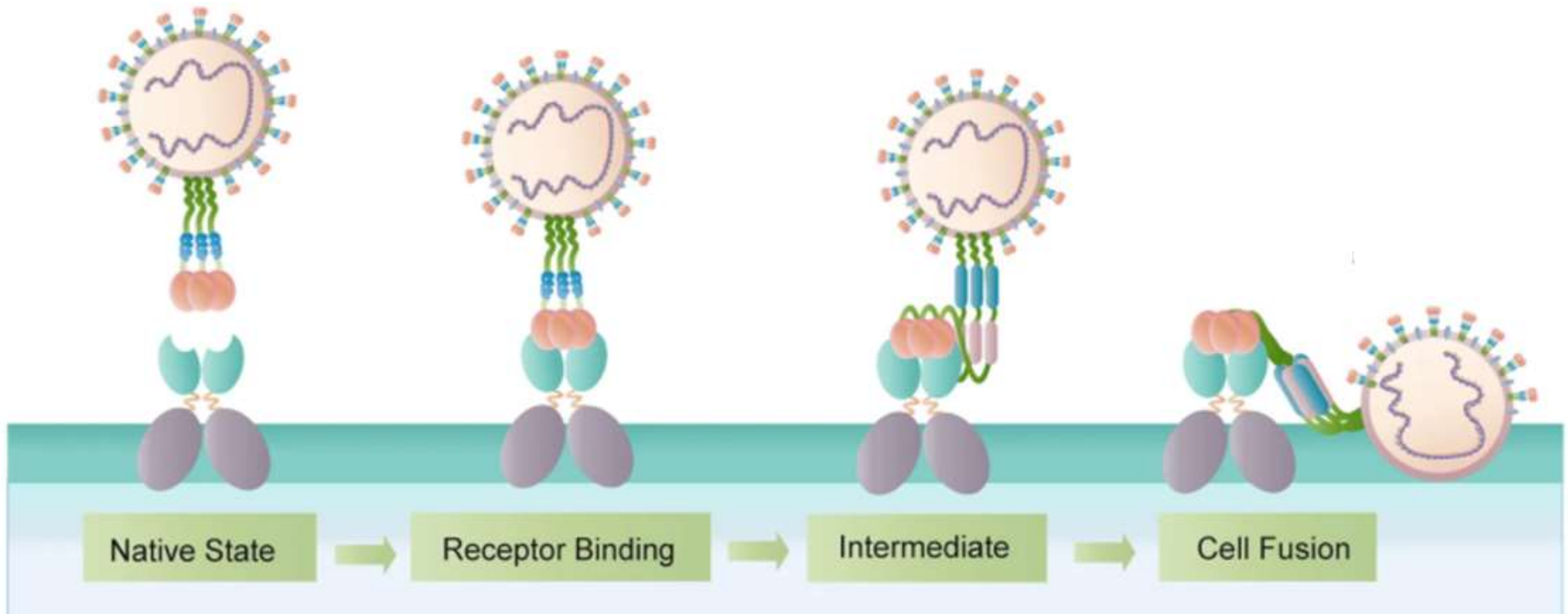


SARS-COV-2 SPIKE PROTEIN

ACE2 = angiotensin-converting enzyme 2, RBD = Receptor Binding Domain



SARS-COV-2 SPIKE PROTEIN MEDIATED VIRAL ENTRY



Source: Huang, Y., Yang, C., Xu, Xf. et al. Structural and functional properties of SARS-CoV-2 spike protein: potential antivirus drug development for COVID-19. *Acta Pharmacol Sin* 41, 1141–1149 (2020).

SUMMARY

- Structural biology is key to developing vaccine against the SARS-CoV-2.
- Structural biology lays the foundation for numerous therapeutic targets against diseases such as cancer.

HOLY QURAN

“Who has created *seven heavens in harmony*. No incongruity canst thou see in the creation of the Gracious God. Then look again: Seest thou any flaw?”

(Ch. 67: V. 4)



Jazakallah!