

# Factor D Protein: Covid-19

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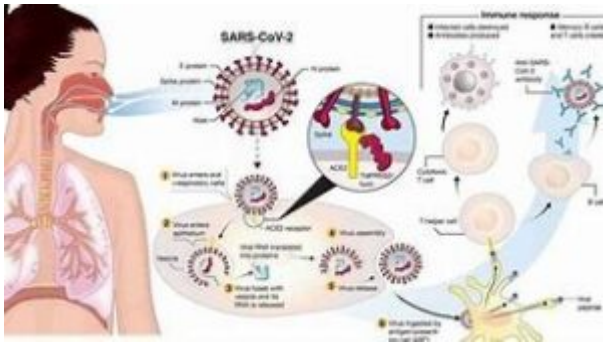
## In News

- A new study by Johns Hopkins Medicine researchers suggests that blocking a human protein factor D may reduce the deadly inflammatory reactions that many patients have due to COVID-19.

## Key Points

- **Method:** The new study used normal human blood serum and three subunits of the SARS-CoV-2 spike protein to discover exactly how the virus hijacks the immune system and endangers normal cells.
- **Focus:** Team focused on two proteins, factor H and factor D, which are known as “complement” proteins, because they help the immune system clear pathogens from the body.
- **Findings:** The researchers discovered that Covid-19’s spike protein causes factor D to overstimulate the immune response, which in turn prevents factor H from mediating that response.
- Spike proteins on the surface of SARS-CoV-2 are the means by which it attaches to cells targeted for infection.
- The spikes first grab hold of a molecule called heparan sulfate.
- Facilitated by its initial binding with heparan sulfate, SARS-CoV-2 then uses another cell-surface component, the protein known as **angiotensin-converting enzyme 2 (ACE2)**, as its doorway into the attacked cell.
- When SARS-CoV-2 attacks the ACE2 receptors to proliferate and infect more cells in the human body, it also prevents **Factor H** from using the sugar molecule to bind with cells.

- The team found that by blocking **factor D**, they were able to stop the destructive chain of events triggered by **SARS-CoV-2**.



## Important Terms

**Heparan sulfate** is a large, complex sugar molecule found on the surface of cells in the lungs, blood vessels and smooth muscle making up most organs.

## ACE2

- **ACE2** is a protein on the surface of many cell types.
- It is an enzyme that generates small proteins – by cutting up the larger protein angiotensinogen – that then go on to regulate functions in the cell.

**Factor H's** main function is to regulate the chemical signals that trigger inflammation and keep the immune system from harming healthy cells.