



Factor D Protein: Covid-19

Why in News

A new study by Johns Hopkins Medicine researchers suggests that **blocking a human protein factor D** may curtail the **potentially deadly inflammatory reactions** that many patients have to the novel coronavirus (SARS-CoV-2).

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**.
 - **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.
 - 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.
 - 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.
 - 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.
 - **Factor H's main function** is to regulate the chemical signals that trigger inflammation and keep the immune system from harming healthy cells.
 - The team found that **by blocking factor D**, they were able to stop the destructive chain of events triggered by SARS-CoV-2.
- **Significance:**
 - It has provided a definite direction for research to tackle Covid-19.
 - There may already be drugs in development for other diseases that can block this protein, a positive sign for the study.

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