**SARS-Cov-2 infections may produce antibody responses in multiple virus proteins**

*Study suggests vaccines, therapeutics, and diagnostics are not limited to spike protein*

All coronaviruses produce four primary structural proteins and multiple nonstructural proteins. However, the majority of antibody-based SARS-CoV-2 research has focused on the spike and nucleocapsid protein. A study published in PLOS Biology by Anna Heffron at University of Wisconsin-Madison, USA, and colleagues suggests immune responses may develop to protect against other SARS-CoV-2 proteins.

The immunogenicity of spike protein-based vaccines is variable and not everyone infected with SARS-CoV-2 produces detectable antibodies against spike or nucleocapsid proteins. Therefore, expanded antibody-based options may play an important role in improving vaccines, diagnostics, and therapeutics, particularly with the emergence of new variants. To investigate whether SARS-CoV-2 infection induces robust antibody responses throughout all SARS-CoV-2 proteins, researchers mapped 79 antigen components that antibodies bind to (called epitopes). They then tested whether antibodies that develop in response to SARS-CoV-2 also produce an immune response to the six other known human coronaviruses.

In addition to spike and nucleocapsid proteins, the authors located previously unknown, highly reactive B cell epitopes throughout the full array of proteins in SARS-CoV-2 and other coronaviruses. The researchers demonstrated that immune responses to SARS-CoV-2 is not limited to the spike and nucleocapsid proteins, expanding the potential for future vaccine and therapeutic development. Future research is needed, however, as the experiments did not include any variants of concern that have emerged since the beginning of the COVID-19 pandemic.

According to the authors, “Our extensive profiling of epitope-level resolution antibody reactivity in COVID-19 convalescent subjects, confirmed by independent assays, provides new epitopes that could serve as important targets in the development of improved diagnostics, vaccines, and therapeutics against SARS-CoV-2 and dangerous human coronaviruses that may emerge in the future”.

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