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# Potential targets for COVID-19 vaccine found

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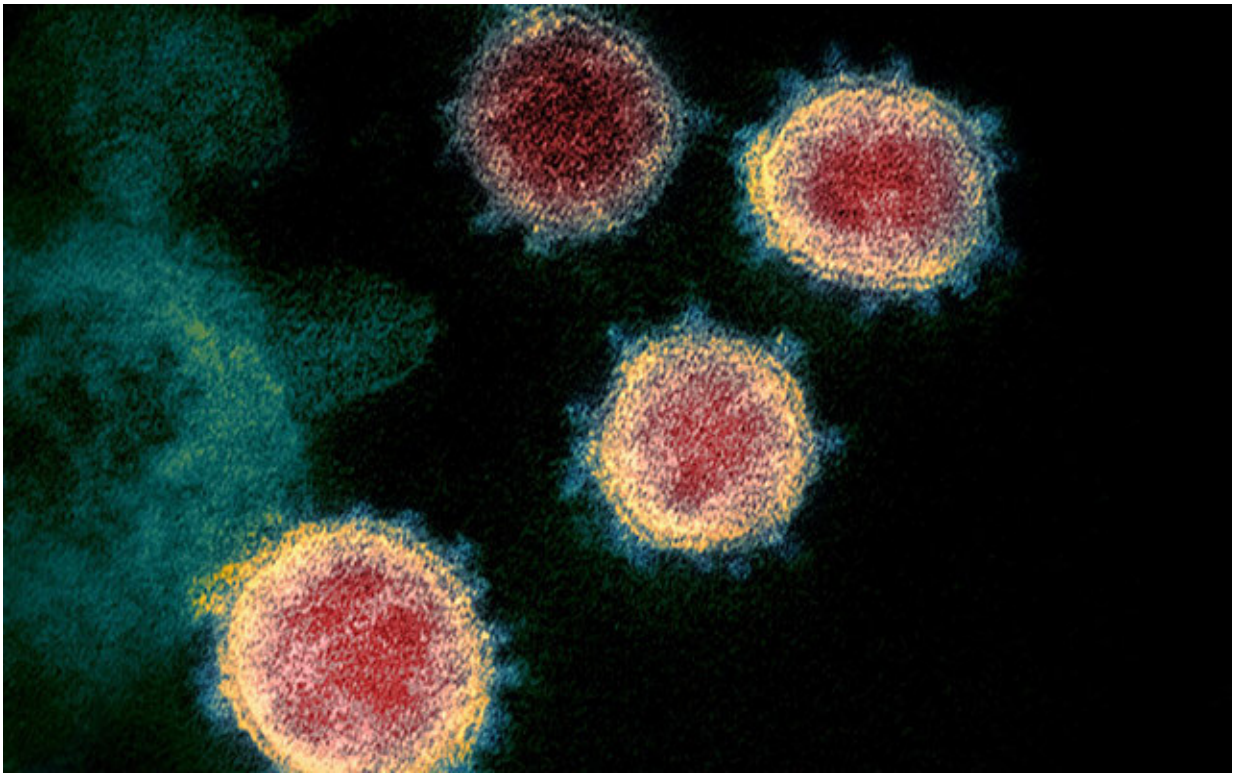

A colorized scanning electron micrograph of the SARS-CoV-2 virus. Credit: NIAID

Scientists from the University of Manchester have identified parts of the SARS-CoV-2 strain of coronavirus that activate an immune response and which could act as targets for vaccine development.

Writing in *Annals of the Rheumatic Diseases*, the small-scale study performed before the pandemic used new technology to analyse the total immune response in patients with the musculoskeletal disease dermatomyositis and identified a link to lifetime exposure to coronavirus infection.

Idiopathic inflammatory myopathies, such as dermatomyositis, are a group of diseases characterised by inflamed skeletal muscles that may also involve the lungs, heart and skin.

Although scientists do not know what causes myositis, they do know the immune system is involved and research suggests genetic and environmental factors, such as viral or bacterial infections, may contribute to disease risk.

The team used a novel unbiased method to identify antibodies produced by the immune system against all types of infection that were unique or enriched in individuals with dermatomyositis, compared to healthy patients, during their lifetime.

The work sheds new light on how microbial infections may contribute over time to this disease, although the team stress that identification of antibodies against coronaviruses in individuals with dermatomyositis does not necessarily mean the virus causes the disease.

Three specific sections of the bat coronavirus proteins that stimulated an immune response were highly similar to the human SARS-CoV-2 virus that causes COVID-19 disease.

Dr. Janine Lamb from The University of Manchester said: "A new coronavirus emerged from bats causing a global pandemic of severe acute respiratory syndrome in humans—COVID-19- so we decided to conduct a mini study of antibodies produced against coronaviruses.

"Comparison of the 20 individuals with dermatomyositis to 20 healthy controls has shed some light on the immune response against coronaviruses, and could suggest targets for vaccine development against COVID-19.

"However, the findings need to be extended to a larger sample of people with myositis, and could be investigated in individuals with other related diseases."

Autoantibodies against a group of proteins called TRIMs, particularly TRIM33 (TIF1γ), have an important role in myositis. TRIM proteins regulate the immune system leading to restriction of viral infections.

The team argue that if myositis patients with autoantibodies against TRIM33 are not able to regulate their immune system, they would not be able to efficiently constrain microbes.

The result of that would be either exposure of individuals with myositis to a higher number of microbes or to different microbes compared to individuals without myositis.

Dr. Lamb added: "Several risk factors are likely to contribute to disease development, including an individual's immune environment which relates to their lifetime microbial exposure, and genetic susceptibility. So it's impossible to know if coronavirus causes dermatomyositis.

Professor Ian Hampson from The University of Manchester said: "This study provides an excellent example of our novel Serum Antibody Repertoire Analysis (SARA) technology and its use to trace the microbes and self-proteins that the antibodies target. However, it is clear that binding of antibodies to these proteins does need to be confirmed experimentally."

**More information:** Spyridon Megremis et al. Antibodies against immunogenic epitopes with high sequence identity to SARS-CoV-2 in patients with autoimmune dermatomyositis, *Annals of the Rheumatic Diseases* (2020). DOI: 10.1136/annrheumdis-2020-217522

Provided by University of Manchester