

The SARS-CoV-2 (P681H) Mutant

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Mar 9 2021

COVID-19 is a disease instigated by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus. The virus utilizes its Spike (S) glycoprotein to bind to cellular receptors such as ACE2, facilitating viral entry and replication. It is also this protein that gives the virus its unique crown-like appearance.

This potential for rapid transmission results in increased opportunity for the virus to evolve and mutate, producing variants that possess the enhanced binding ability and the capacity to evade host immune responses.

A new phylogenetic cluster has been identified in the United Kingdom, and this has been defined by multiple mutations in the Spike Protein; for example, N501Y, D614G, T716I, and P681H.

The [SARS-CoV-2 \(P681H\) mutant](#) known as the 20B/501Y.V1, VOC 202012/01, or B.1.1.7 lineage arose in Nigeria, the United Kingdom, rapidly spreading around the globe. The P681H mutation is found close to the cleavage site for protease furin-like enzymes.

This cleavage site located in the Spike protein between spike S1 and S2 domains is an essential tool employed by viruses for binding and entry into the host cells. This key mutation presents itself on the SARS-CoV-2 spike protein (S) in cases where:

1. The P681H is a proline to histidine substitution at amino acid position 681 in the Sars-CoV-2 S protein.

2019-nCoV spike protein S1 (P681H)

Catalog No. C19S1-G232H

Recombinant 2019-nCoV Spike protein S1 (P681H) (16-685) has been expressed in CHO cells using a C-terminal His tag.

SignalChem has developed the SARS-CoV-2 (P681H) mutant to assist in ongoing and new research into this new strain and its potential for rapid transmission. There are 14 defined mutations in the UK variant of SARS-CoV-2 (also referred to as VUI-2020/01 or lineage B.1.1.7).

The P618H mutation found in the Spike protein is adjacent to the furin cleavage site, therefore making it more appropriate for hydrolysis by TMPRSS2 as well as augmenting viral fusion.

It has also been hypothesized that this key mutation helps the virus evade the host's immune system response. It does this by avoiding neutralizing antibodies, therefore resulting in potential efficacy issues around vaccines that are currently being administered to the public.

The recombinant 2019-nCoV Spike protein S1 (P681H) has been expressed in CHO cells using a C terminal His tag. This Spike protein has been through stringent QC QA tests designed to quantify its activity using functional ELISA and purity using densitometry.

This particular recombinant variant has been found to be an effective candidate and is suitable for use in current COVID-19 research. It is ideal for use in the ongoing development of SARS-CoV-2 diagnostic kits as well as in anti-viral therapeutics aimed at treating these new variants.

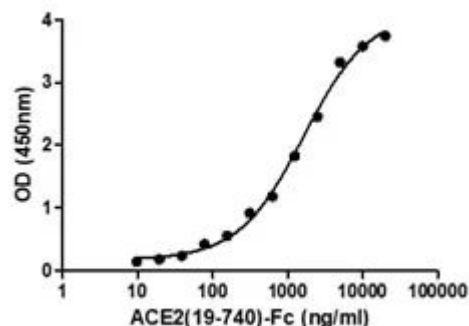


Figure 1. Binding of ACE2 (19-740) Protein (A51C2-G341F) to immobilized 2019-nCoV spike protein S1 (P681H) (C19S1-G232H) was determined by functional ELISA. Image Credit: SignalChem Biotech Inc.

SignalChem: A global leader in cell signaling

SignalChem is an industry leader in the fields of cell signaling and protein engineering. The company has been working with partners globally to research the novel coronavirus ever since its outbreak.

The company's scientists have invested significant resources in better understanding SARS-CoV-2's protein interaction map.

Their goal has been to successfully engineer active recombinant SARS-CoV-2 and human proteins, looking to offer these essential building blocks in drug discovery research projects to researchers worldwide.

By utilizing a combination of AI drug development software and advanced engineering technology, SignalChem has instigated a number of new projects with a view to investigating expression systems of key COVID-19 related proteins. These include vital hot drug targets such as proteases and non-structural proteins (NSPs).

This range of catalytically active proteins has been described as fully functional and is ready for use in an array of research projects into the development of drugs to treat SARS-CoV-2 and related coronavirus infections.

About SignalChem Biotech Inc.



SignalChem is a biotech company focused on the research, development, and production of innovative and high-quality human recombinant cell signaling products.

Throughout the years, Signalchem has capitalized on its core expertise in cellular signaling, molecular biology, and protein biochemistry to generate more than 2,000 functional protein products and has established itself as the leader in the industry to produce highly active human recombinant signaling enzymes, especially protein kinases, disease-related mutant kinases, lipid kinases, epigenetic enzymes, ubiquitination-related enzymes, and neurodegenerative disease-related enzymes and proteins.

SignalChem strives to support scientists in academia, pharma and biotech companies around the world by creating effective research tools to advance the basic research in life sciences and to facilitate the efforts in drug discovery and development.

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Last updated: Mar 16, 2021 at 6:58 AM

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