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# SARS-CoV-2 (COVID-19) Spike S2 Antibody [4F10]

Infectious Disease, COVID-19
Catalog # ASC12201

## Product Information

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| **Application** | WB, IHC-P, IF, E |
| **Primary Accession** | P0DTC2 |
| **Other Accession** | QHD43416 |
| **Host** | Mouse |
| **Clonality** | Monoclonal |
| **Isotype** | IgG1 |
| **Clone Names** | S |
| **Calculated MW** | 141178 |
| **Concentration (mg/ml)** | 1 mg/mL |
| **Conjugate** | Unconjugated |
| **Application Notes** | WB: 1 µg/mL; IF: 20 µg/mL. IHC: 0.5 µg/mL<br>Antibody validated: Immunofluorescence and Western blot in human samples. Immunohisochemistry in COVID-19 patient samples. SARS-CoV-2 (COVID-19) Spike S2 antibody can be used for the detection of SARS-CoV-2 (COVID-19) Spike full length protein in ELISA. It will detect 4 ng of free peptide at 1 µg/mL. PM-9428 cannot be used for detection of SARS-CoV-2/SARS-CoV Spike S1, Spike ECD, Spike S2 ECD proteins. ) All other applications and species not yet tested. |

## Additional Information

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| **Gene ID** | 43740568 |
| **Alias Symbol** | S |
| **Other Names** | SARS-CoV-2 (COVID-19) Spike S2 Antibody: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), Surface Glycoprotein, Spike protein |
| **Reconstitution & Storage** | SARS-CoV-2 (COVID-19) Spike S2 antibody can be stored at 4˚C for three months and -20˚C, stable for up to one year. As with all antibodies care should be taken to avoid repeated freeze thaw cycles. Antibodies should not be exposed to prolonged high temperatures. |
| **Precautions** | SARS-CoV-2 (COVID-19) Spike S2 Antibody [4F10] is for research use only and not for use in diagnostic or therapeutic procedures. |

## Protein Information

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| **Name** | S {ECO:0000255\|HAMAP-Rule:MF_04099} |
| **Function** | [Spike protein S1]: Attaches the virion to the cell membrane by interacting with host receptor, initiating the infection. The major receptor is host ACE2 (PubMed:32142651, PubMed:32155444, PubMed:33607086). When S2/S2' has |

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| | been cleaved, binding to the receptor triggers direct fusion at the cell membrane (PubMed:34561887). When S2/S2' has not been cleaved, binding to the receptor results in internalization of the virus by endocytosis using host TFRC and GRM2 and leading to fusion of the virion membrane with the host endosomal membrane (PubMed:32075877, PubMed:32221306, PubMed:34903715, PubMed:36779763). Alternatively, may use NRP1/NRP2 (PubMed:33082294, PubMed:33082293) and integrin as entry receptors (PubMed:35150743). The use of NRP1/NRP2 receptors may explain the tropism of the virus in human olfactory epithelial cells, which express these molecules at high levels but ACE2 at low levels (PubMed:33082293). The stalk domain of S contains three hinges, giving the head unexpected orientational freedom (PubMed:32817270). |
| **Cellular Location** | Virion membrane {ECO:0000255\|HAMAP-Rule:MF_04099, ECO:0000269\|PubMed:32979942}; Single-pass type I membrane protein {ECO:0000255\|HAMAP-Rule:MF_04099, ECO:0000269\|PubMed:34504087}. Host endoplasmic reticulum-Golgi intermediate compartment membrane {ECO:0000255\|HAMAP-Rule:MF_04099, ECO:0000269\|PubMed:34504087}; Single- pass type I membrane protein {ECO:0000255\|HAMAP-Rule:MF_04099}. Host cell membrane {ECO:0000255\|HAMAP-Rule:MF_04099, ECO:0000269\|PubMed:34504087}; Single-pass type I membrane protein {ECO:0000255\|HAMAP-Rule:MF_04099}. Note=Accumulates in the endoplasmic reticulum-Golgi intermediate compartment, where it participates in virus particle assembly. Some S oligomers are transported to the host plasma membrane, where they may mediate cell-cell fusion (PubMed:34504087). An average of 26 +/-15 S trimers are found randomly distributed at the surface of the virion (PubMed:32979942) {ECO:0000255\|HAMAP-Rule:MF_04099, ECO:0000269\|PubMed:32979942, ECO:0000269\|PubMed:34504087} |

## Background

Coronavirus disease 2019 (COVID-19), formerly known as 2019-nCoV acute respiratory disease, is an infectious disease caused by SARS-CoV-2, a virus closely related to the SARS virus (1). The disease is the cause of the 2019–20 coronavirus outbreak (2). The structure of 2019-nCoV consists of the following: a Spike protein (S), hemagglutinin-esterease dimer (HE), a membrane glycoprotein (M), an envelope protein (E) a nucleoclapid protein (N) and RNA. Coronavirus invades cells through Spike (S) glycoproteins, a class I fusion protein. It is the major viral surface protein that coronavirus uses to bind to the human cell surface receptor. It also mediates the fusion of host and viral cell membrane, allowing the virus to enter human cells and begin infection (3). The spike protein is the major target for neutralizing antibodies and vaccine development (4). The protein modeling suggests that there is strong interaction between Spike protein receptor-binding domain and its host receptor angiotensin-converting enzyme 2 (ACE2), which regulate both the cross-species and human-to-human transmissions of COVID-19 (5). The recent study has shown that the SARS-CoV-2 spike protein binds ACE2 with higher affinity than SARS-CoV spike protein (6).

## References


Gorbalenya. bioRxiv: 2020.
Hui et al. Int J Infect Dis. 2020;91:264-266.
Belouzard et al. Viruses. 2012;4(6):1011-33.
Lee et al. J Virol. 2006;80(8):4079-87.
Wan et al. J Virol. 2020.
Wrapp et al. Science. 2020.


## Images

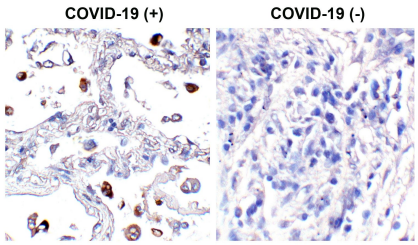


Figure 1 Immunohistochemistry Validation of SARS-CoV-2 (COVID-19) Spike in COVID-19 Patient Lung
Immunohistochemical analysis of paraffin-embedded COVID-19 patient lung tissue using anti-SARS-CoV-2 (COVID-19) Spike S2 antibody (ASC12201, 0.5 µg/mL). Tissue was fixed with formaldehyde and blocked with 10% serum for 1 h at RT; antigen retrieval was by heat mediation with a citrate buffer (pH6). Samples were incubated with primary antibody overnight at 4˚. A goat anti-mouse IgG H&L (HRP) at 1/250 was used as secondary. Counter stained with Hematoxylin. Strong spike protein signal was observed in macrophages of COVID-19 patient lung, but not in non-COVID-19 patient lung.

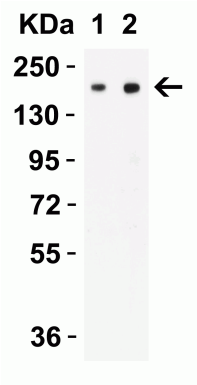


Figure 2 Overexpression Validation in Spike Transfected 293 Cells
Loading: 5 µg per lane of 293 cell lysate. Antibodies: SARS-CoV-2 (COVID-19) Spike S2, ASC12201, 1h incubation at RT in 5% NFDM/TBST. Secondary: Goat anti-rabbit IgG HRP conjugate at 1:10,000 dilution. Lane 1: 0.5 µg/mL and Lane 2: 1 µg/mL

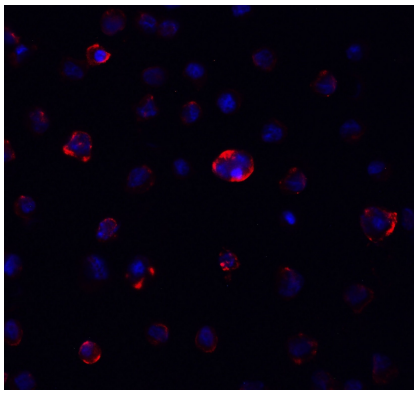

Figure 3 Immunofluorescence Validation of SARS-CoV-2 (COVID-19) Spike in 293T Cells
Immunofluorescent analysis of 4% paraformaldehyde-fixed 293T cells labeling SARS-CoV-2 (COVID-19) Spike S2 with ASC12201 at 20 µg/mL, followed by goat anti-mouse IgG secondary antibody at 1/500 dilution (red) and DAPI staining (blue).

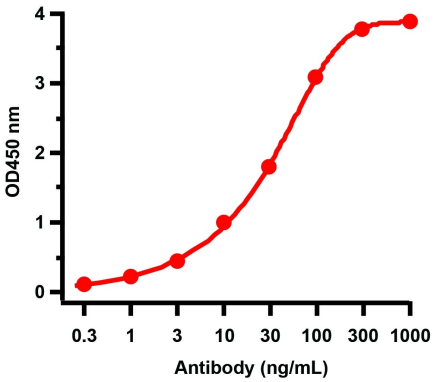


Figure 4 ELISA Test
Antibodies: SARS-CoV-2 (COVID-19) Spike S2 antibody, ASC12201 (1 µg/mL). A direct ELISA was performed using immunogen or control peptide as coating antigen and the anti-SARS-CoV-2 (COVID-19) Spike antibody as the capture antibody. Secondary: Goat anti-mouse IgG HRP conjugate at 1:5,000 dilution. Detection range is from 0.3 ng/mL to 1,000 ng/mL.