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SARS-CoV-2 Spike P681H Antibody [7A4D12](Alpha, Mu Variant)

Infectious Disease, COVID-19
Catalog # ASC12232

Product Information

Application	WB, E
Primary Accession	P0DTC2
Other Accession	QHD43416
Host	Mouse
Clonality	Monoclonal
Isotype	IgG2a, Kappa
Clone Names	S
Calculated MW	141178
Concentration (mg/ml)	1 mg/mL
Conjugate	Unconjugated
Application Notes	WB: 1 µg/mL. Antibody validated: Western Blot in human samples. Anti-SARS-CoV-2 (COVID-19) P681H Mutant Specific Spike antibody can specifically detect SARS-CoV-2 Alpha Variant (B.1.1.7, UK) S1 protein, but not SARS-CoV-2 WT Spike S1 protein by ELISA and WB. It can also detect mutant peptide (681H), but not WT peptide (681P). All other applications and species not yet tested.

Additional Information

Gene ID	43740568
Other Names	SARS-CoV-2 (COVID-19) P681H Mutant Specific Spike antibody: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), Surface Glycoprotein, Spike protein
Target/Specificity	May cross-react with several virus of interest (VOI) variant lineages that contains P681H mutation, including B.11.318, B.1.621, B.1.621.1, P.3. But all of these lineages are rarely present in current pandemic.
Reconstitution & Storage	SARS-CoV-2 (COVID-19) P681H Mutant Specific Spike 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 Spike P681H Antibody [7A4D12](Alpha, Mu Variant) is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

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 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

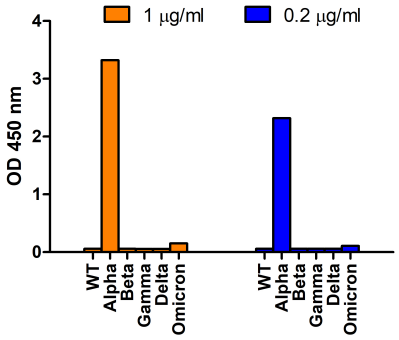
In September of 2020 a new lineage of SARS-CoV-2, known as B.1.1.7 and named as Alpha variant, was discovered in the United Kingdom. This lineage was found to have developed 14 lineage-specific amino acid replacements and 3 deletions prior to its discovery. The transmission of alpha variant (B.1.1.7 lineage) was increased at least 50%. Increased severity and higher death rate were also found in apha variant. Alpha variant will not affect the effectiveness of COVID19 vaccine. One of the mutations associated with this lineage is a N501Y in the spike protein of the virus. It is believed that this mutation is able to increase the spike protein's affinity for the host ACE2 receptor and it has been associated with increased infectivity and virulence. B.1.1.7 viruses have also been shown to have a P681H mutation in the cleavage site of spike protein. This location is one of the residues that make up the furin cleavage site between S1 and S2 in spike protein.

References

Duchene et al. Virus Evolution 6(2): veaa061.;Gu et al. Science 369(6511):1603-1607;Hoffmann et al. Molecular Cell 78(4):779-784.e5;Davies et al. Science 372(6538):eabg3055.;Davies et al. Nature. 593(7858):270-274.;Graham, et al. The Lancet Public Health. 6(5): e335-e345.;Horby et al. New & Emerging Threats Advisory Group. 2020;91:264-266.;;;;

Images

Figure 1 ELISA Validation of Alpha Variant Spike Antibodies



with Spike S1 Protein of SARS-CoV-2 Variants
Coating Antigen: SARS-CoV-2 spike S1 proteins WT, alpha variant (B.1.1.7), beta variant (B.1.351), gamma variant (P.1), delta variant (B.1.617.2), and omicron variant (B.1.1.529), 1 μg/mL, incubate at 4 ˚C overnight. Detection Antibodies: SARS-CoV-2 Alpha Variant Spike antibody, ASC12232, dilution: 200-1000 ng/mL, incubate at RT for 1 hr. Secondary Antibodies: Goat anti-mouse HRP at 1:5,000, incubate at RT for 1 hr. SARS-CoV-2 alpha variant spike antibody (ASC12232) can specifically detect alpha variant spike S1 protein, but not spike S1 protein of WT and other tested variants by ELISA.

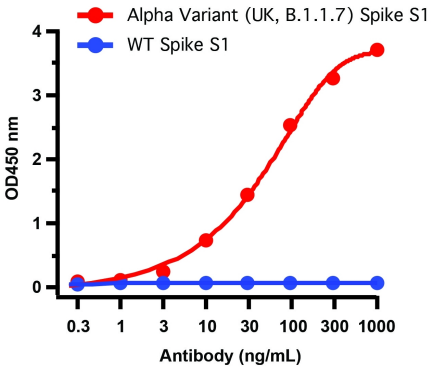


Figure 2 ELISA Validation of P681H Mutant Specific Spike Antibodies with SARS-CoV-2 Alpha Variant Spike S1 Protein
Coating Antigen: SARS-CoV-2 spike S1 proteins, including WT and alpha variant (B.1.1.7, UK), 1 μg/mL, incubate at 4 ˚C overnight. Detection Antibodies: SARS-CoV-2 Alpha Variant Spike antibody, ASC12232, dilution: 0.3-1000 ng/mL, incubate at RT for 1 hr. Secondary Antibodies: Goat anti-mouse HRP at 1:5,000, incubate at RT for 1 hr. SARS-CoV-2 P681H Mutant Specific Spike antibody (ASC12232) can specifically detect alpha variant spike S1 protein, but not WT spike S1 protein (10-300) by ELISA.

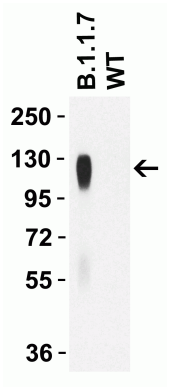


Figure 3 WB Validation of P681H Mutant Specific Spike Antibodies with SARS-CoV-2 Alpha Variant Spike S1 Protein
Loading: 50 ng of SARS-CoV-2 spike S1 proteins, including WT and alpha variant (B.1.1.7, UK). Detection Antibodies: SARS-CoV-2 P681H Mutant Specific Spike antibody, ASC12232, 1 μg/mL, incubate at RT for 1 hr. Secondary Antibodies: Goat anti-mouse HRP at 1:5,000, incubate at RT for 1 hr. SARS-CoV-2 P681H Mutant Specific Spike antibody (ASC12232) can specifically detect alpha variant spike S1 protein, but not WT spike S1 protein (10-300) by WB.