



# Research Reagents for SARS-CoV-2 Spike Protein Research



# SARS-CoV-2 Spike Antigen Research

Spike protein mediates receptor binding and membrane fusion. It contains two subunits, S1 and S2. S1 contains a receptor binding domain (RBD), which is responsible for recognizing and binding with the cell surface receptor. The spike protein is the common target for neutralizing antibodies and vaccines. SARS-CoV-2 can infect the human respiratory epithelial cells through interaction with the human ACE2 receptor.

Sino Biological has developed a comprehensive collection of SARS-CoV-2 S antigens including S protein and the S1, S2, and RBD subunits, spike trimers, spike mutants, and antibodies with high sensitivity and specificity. As the award-winning supplier in SARS-CoV-2 research, Sino Biological will continue to develop more high-quality reagents for research, diagnostics and the drug industry.



2022  
AWARDS

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WINNER

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in Sars-CoV-2 research

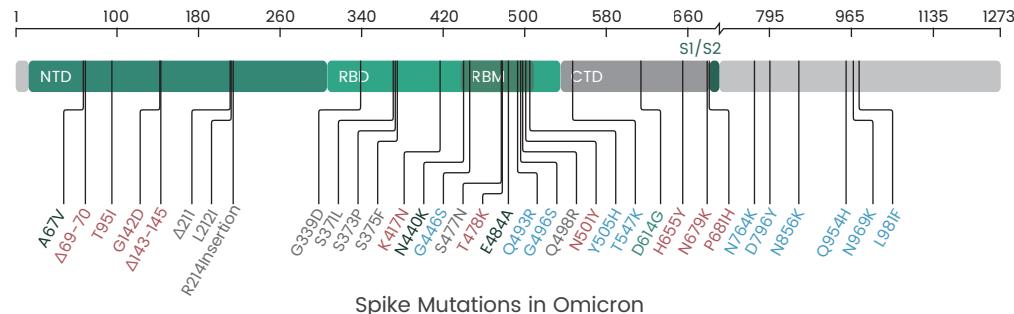


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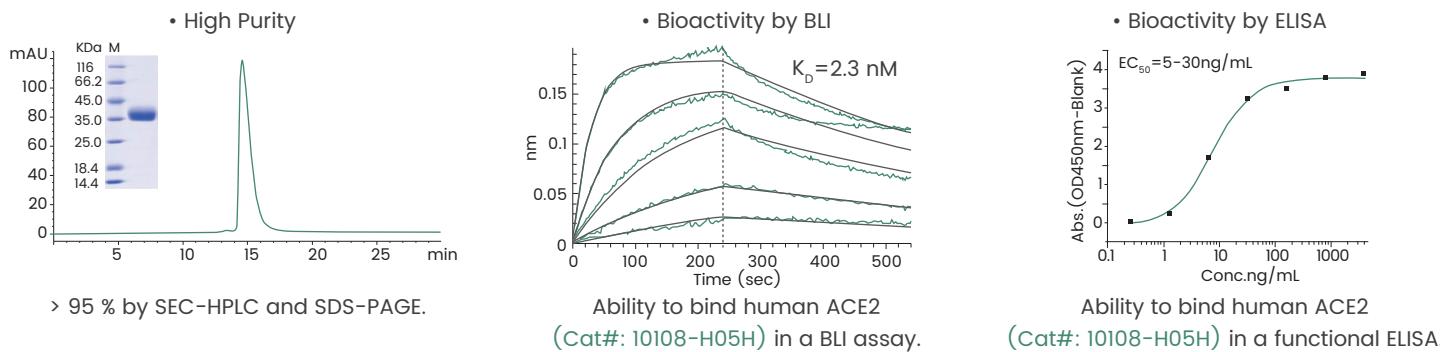
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# SARS-CoV-2 Omicron Spike Proteins

The Omicron (B.1.529) strain is by far the most divergent SARS-CoV-2 variant. It is critical to re-evaluate the effectiveness of the current diagnostics and therapeutics against this new variant. To support these studies, Sino Biological has developed a wide panel of recombinant Omicron spike proteins, covering Omicron BA.1.1 and BA.2 sublineage, and these reagents are also tested by SDS-PAGE, SEC-HPLC, BLI or ELISA.



## Featured Omicron (BA.2) Spike RBD Protein (Cat#: 40592-V08H123)



## More Recombinant Omicron Spike Proteins

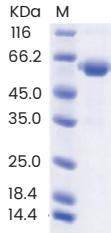
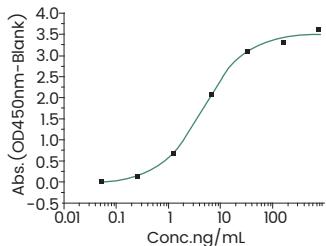
Label	Cat#	Antigen	Tag	Expressed	Host	Mutations
Omicron (BA.1.1)	40592-V08H129	RBD	C-His	HEK293	G339D, R346K, S371L, S373P, S375F, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	
	40592-V08H123	RBD	C-His	HEK293	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	
	40591-V08H43	S1	C-His	HEK293	T19I, L24S, del25-27, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H	
Deltacron (BA.1 x AY.4 recombinant)	40592-V08H121	RBD	C-His	HEK293	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	
	40592-V05H3	RBD	C-mouse IgG1-Fc	HEK293	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	
	40592-V08H122	RBD	C-His	HEK293	G339D, S371L, S373P, S375F, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	
	40592-V49H7-B	RBD	C-His-AVI	HEK293	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	
Omicron (B.1.529)	40591-V08H41	S1	C-His	HEK293	A67V, HV69-70 deletion, T95I, G142D, VYY143-145 deletion, N211 deletion, L212I, ins214EPE, G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H, T547K, D614G, H655Y, N679K, P681H	
	40591-V08H42	S-NTD	C-His	HEK293	A67V, H69del, V70del, T95I, G142D, V143del, Y144del, Y145del, N211del, L212I	
	40589-V08B33	S-ECD	C-His	Baculovirus-Insect	A67V, HV69-70del, T95I, G142D, VYY143-145del, N211del, L212I, ins214EPE, G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H, T547K, D614G, H655Y, N679K, P681H, N764K, D796Y, N856K, Q954H, N969K, L981F	

For more mutants, please visit <https://www.sinobiological.com/research/virus/sars-cov-2-spike-mutation>

# SARS-CoV-2 Delta Spike Proteins

## Delta (B.1.617.2) Spike RBD Protein

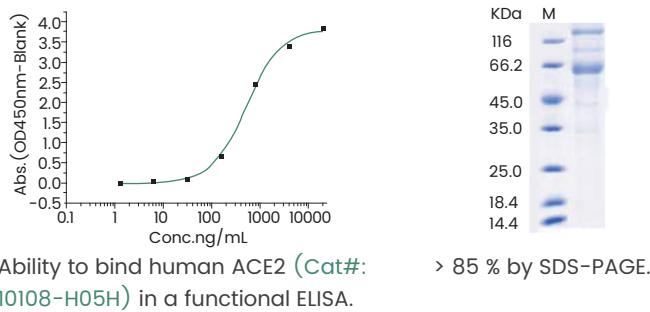
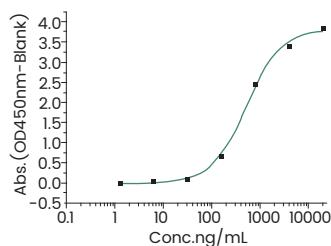
Cat#: 40592-V02H3



Ability to bind human ACE2 (Cat#: 10108-H05H) in a functional ELISA. > 90 % by SDS-PAGE.

## Delta (B.1.617.2) Spike ECD Protein

Cat#: 40589-V08B16



Ability to bind human ACE2 (Cat#: 10108-H05H) in a functional ELISA. > 85 % by SDS-PAGE.

## More Recombinant Delta Spike Proteins

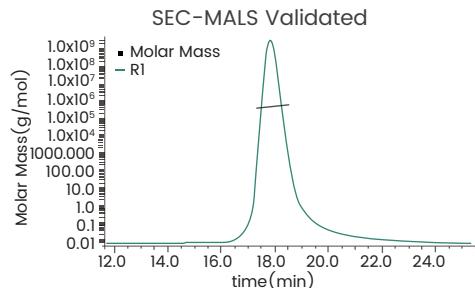
Label	Cat#	Antigen	Tag	Expressed	Host	Mutations
Delta (B.1.617.2)	40592-V02H3	RBD	C-human IgG1-Fc	HEK293	L452R, T478K	
	40592-V08H90	RBD	C-His	HEK293	L452R, T478K	
	40592-V08H91	RBD	C-His	HEK293	T478K	
	40592-V49H1-B	RBD	C-His-AVI	HEK293	L452R, T478K	
	40589-V49H1-B	RBD	C-His-AVI	HEK293	T19R, 156-157 deletion, R158D, L452R, T478K, D614G	
	40591-V08H36	S-NTD	C-His	HEK293	T19R, T95I, G142D, 156-157 deletion, R158G	
	40591-V08H23	S1	C-His	HEK293	T19R, G142D, E156G, 157-158 deletion, L452R, T478K, D614G, P681R	
	40591-V49H2-B	S1	C-His-AVI	HEK293	(157-158) deletion, T19R, G142D, E156G, L452R, T478K, D614G, P681R	
	40589-V08B16	S-ECD	C-His	Baculovirus-Insect	T19R, G142D, E156G, HR157-158 deletion, L452R, T478K, D614G, P681R, D950N	
	40589-V49B4-B	S-ECD	C-His-AVI	Baculovirus-Insect	157-158 deletion, T19R, G142D, E156G, L452R, T478K, D614G, P681R, D950N	
Delta/Delta plus(AY.1/AY.2)	40592-V08H115	RBD	C-His	HEK293	K417N, L452R, T478K	
	40592-V49H5-B	RBD	C-His-AVI	HEK293	K417N, L452R, T478K	
Delta/Delta plus(AY.1)	40591-V08H33	S1	C-His	HEK293	T19R, G142D, W258L, K417N, L452R, T478K, D614G, P681R	
	40589-V08B25	S-ECD	C-His	Baculovirus-Insect	T19R, G142D, W258L, K417N, L452R, T478K, D614G, P681R, D950N	
Delta/Delta plus(AY.2)	40589-V08B26	S-ECD	C-His	Baculovirus-Insect	T19R, V70F, E156G, 157-158 deletion, A222V, K417N, L452R, T478K, D614G, P681R, D950N	
	40591-V08H34	S1	C-His	HEK293	T19R, V70F, E156G, 157-158 deletion, A222V, K417N, L452R, T478K, D614G, P681R	
Delta/Delta plus(AY.3)	40591-V08H35	S1	C-His	HEK293	T19R, E156G, 157-158 deletion, L452R, T478K, D614G, P681R	
Delta/Delta plus(AY.3/AY.4)	40589-V08B27	S-ECD	C-His	Baculovirus-Insect	T19R, E156G, 157-158 deletion, L452R, T478K, D614G, P681R, D950N	
Delta/Delta plus(AY.4)	40591-V08H40	S1	C-His	HEK293	T19R, T95I, E156G, 157-158 deletion, L452R, T478K, D614G, P681R	
Delta/Delta plus(AY.4.2)	40589-V08B32	S-ECD	C-His	Baculovirus-Insect	T19R, E156G, 157-158 deletion, A222V, L452R, T478K, D614G, P681R, D950N	
	40591-V08H39	S1	C-His	HEK293	T19R, T95I, G142D, Y145H, E156G, 157-158 deletion, A222V, L452R, T478K, D614G, P681R	

For more mutants, please visit <https://www.sinobiological.com/research/virus/sars-cov-2-spike-mutation>

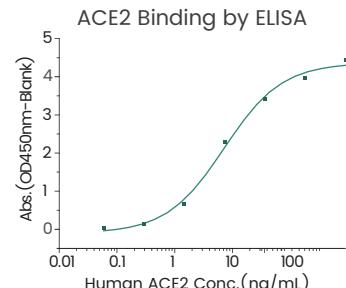
# SARS-CoV-2 Prefusion Trimeric Spike Variant Proteins

Prefusion SARS-CoV-2 spike trimer proteins are particularly critical to the development of vaccines, small-molecule drugs, neutralizing antibodies, etc. Sino Biological has successfully developed a series of highly stable trimeric spike proteins, covering multiple VOCs or VOIs, such as Omicron (B.I.1.529), Delta (B.I.617.2), Alpha (B.I.1.7) and Beta (B.I.351). Their purity, oligomeric status, and activity were validated by SDS-PAGE, SEC-MALS, BLI and ELISA, respectively, while the protein thermo-stability was validated by freeze-thaw experiments.

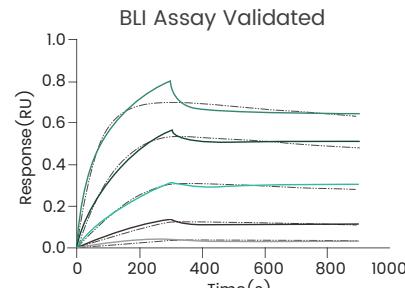
## His Tagged SARS-CoV-2 Omicron Spike Trimer (Cat#: 40589-V08H26)



The purity is more than 95% and the molecular weight of this protein is around 480-550 kDa verified by SEC-MALS.

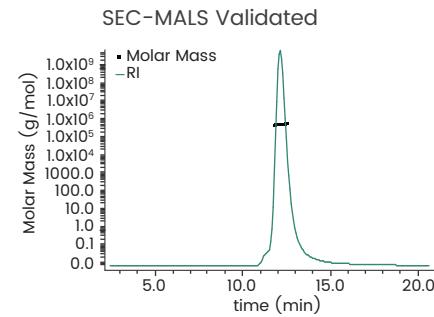


Immobilized human ACE2 protein (mFc tag) (Cat#: 10108-H05H) at 2  $\mu$ g/mL (100  $\mu$ L/well) can bind SARS-CoV-2 Omicron trimer protein, the EC<sub>50</sub> is 4-15ng/mL.

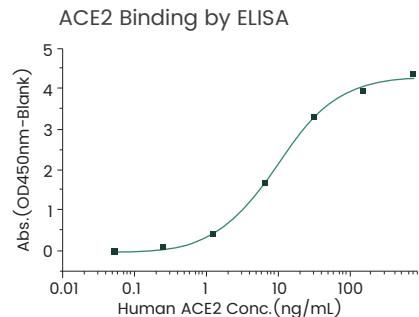


Human ACE2, mFc tag (Cat#: 10108-H05H) can bind SARS-CoV-2 Omicron spike trimer protein with an affinity constant of 1.52 nM as determined in a BLI assay.

## His Tagged SARS-CoV-2 Delta Spike Trimer (Cat#: 40589-V08H10)



The purity is more than 90% and the molecular weight of this protein is around 420-520 kDa verified by SEC-MALS.



Immobilized human ACE2 protein (mFc tag) (Cat#: 10108-H05H) at 2  $\mu$ g/mL (100  $\mu$ L/well) can bind SARS-CoV-2 Delta spike trimer, the EC<sub>50</sub> is 4-24 ng/mL.



Purity: > 90 %

## More SARS-CoV-2 Prefusion Trimeric Spike Variant Proteins (Partial)

Cat#	Label	Antigen	Tag	Expressed Host
40589-V08H29	Omicron (BA.1.1)	S-ECD Trimer	C-His	HEK293
40589-V08H28	Omicron (BA.2)	S-ECD Trimer	C-His	HEK293
40589-V08H26	Omicron (B.I.1.529)	S-ECD Trimer	C-His	HEK293
40589-V49H3-B	Omicron (B.I.1.529)	S-ECD Trimer	C-His-AVI	HEK293
40589-V08H10	Delta (B.I.617.2)	S-ECD Trimer	C-His	HEK293
40589-V08H14	Delta (AY.1)	S-ECD Trimer	C-His	HEK293
40589-V08H15	Delta (AY.2)	S-ECD Trimer	C-His	HEK293
40589-V08H16	Delta (AY.3/AY.3.1)	S-ECD Trimer	C-His	HEK293
40589-V08H25	Delta (AY.4.2)	S-ECD Trimer	C-His	HEK293
40589-V08H11	Kappa (B.I.617.1)	S-ECD Trimer	C-His	HEK293
40589-V08H12	Alpha (B.I.1.7)	S-ECD Trimer	C-His	HEK293
40589-V08H13	Beta (B.I.351)	S-ECD Trimer	C-His	HEK293
40589-V08H20	Mu (B.I.621)	S-ECD Trimer	C-His	HEK293
40589-V08H18	Lambda (C.I.2)	S-ECD Trimer	C-His	HEK293

# Recombinant SARS-CoV-2 Spike Mutants Bank

Mutations in: RBD, S1, S2, S1+S2 ECD

Various Fusion Tags: • His    • mFc, hFc, rFc    • AVI

Covering New Lineages:

- Alpha (B.I.1.7)
- Delta (B.I.617.2, AY.1, AY.2, AY.3)
- Iota (B.I.526)
- Mu (B.I.621)
- Beta (B.I.351, B.I.351.2, B.I.351.3)
- Epsilon (B.I.427/429)
- Kappa (B.I.617.1)
- Omicron (B.I.1.529 and BA.2)
- Deltacron (BA.1 x AY.4)
- Gamma (P.I.)
- Eta (B.I.525)
- Lambda (C.37)

## List of Recombinant SARS-CoV-2 Mutants (Partial)

Label	Cat#	Antigen	Mutations	Label	Cat#	Antigen	Mutations
Alpha (B.I.1.7)	40589-V08B6	S1+S2 ECD	H69del, V70del, Y144del, N501Y, A570D, D614G, P681H, T716I, S982A, D1118H	Epsilon (B.I.427)	40591-V08H27	S1	L452R, D614G
	40589-V49B-B	S1+S2 ECD	H69del, V70del, Y145del, N501Y, A570D, D614G, P681H, T716I, S982A, D1118H	Epsilon (B.I.429 / B.I.427)	40591-V08H17	S1	W152C, L452R, D614G
	40591-V08H12	S1	H69del, V70del, Y144del, N501Y, A570D, D614G, P681H	Kappa (B.I.617.1)	40589-V49B3-B	S1+S2 ECD	T95I, G142D, E154K, L452R, E484Q, D614G, P681R, Q107I
	40591-V49H4-B	S1	(HV69-70, Y145) deletion, N501Y, A570D, D614G, P681H	Kappa (B.I.617 / B.I.617.1 / B.I.617.3)	40591-V49H1-B	S1	T95I, G142D, E154K, L452R, E484Q, D614G, P681R
	40592-V02H1	RBD	N501Y	Kappa (B.I.617 / B.I.617.1 / B.I.617.3)	40592-V02H2	RBD	L452R, E484Q
	40592-V08H18	RBD	S494P	Alpha/ Beta/ Gamma (B.I.1.7 / B.I.351 / P.I.)	40592-V31H1	RBD	N501Y
	40592-V49H2-B	RBD	N501Y		40592-V08H13	RBD	L452Q, F490S
Beta (B.I.351)	40589-V08B11	S1+S2 ECD	D80A, L242del, A243del, L244del, R246I, E484K, K417N, N501Y, D614G, A701V	Lambda (C.37)	40589-V08B23	S1+S2 ECD	G75V, T76I, R246N, Δ247, Δ253, L452Q, F490S, D614G, T859N
	40591-V08H10-B	S1	K417N, E484K, N501Y, D614G		40591-V08H31	S1	G75V, T76I, R246N, Δ247, Δ253, L452Q, F490S, D614G
Beta (B.I.351 / B.I.351.2 / B.I.351.3)	40591-V08H13	S1 NTD	L18F, D80A, D215G, LAL242-244deletion, R246I	Iota (B.I.526)	40592-V08H12	RBD	S477N, E484K
	40591-V08H10	S1	K417N, E484K, N501Y, D614G		40591-V08H28	S1	L5F, T95I, D253G, S477N, E484K, D614G
Gamma (P.I) / (P.I.1) (P.I.2)	40589-V08B10	S1+S2 ECD	L18F, T20N, P26S, D138Y, R190S, K417I, E484K, N501Y, D614G, H655Y, T1027I, V1176F	Mu (B.I.621)	40592-V08H18	RBD	R346K, E484K, N501Y
	40591-V08H5	S1	T20N, D614G				
	40591-V49H6-B	S1	L18F, T20N, P26S, D138Y, R190S, K417T, E484K, N501Y, D614G, H655Y				
	40592-V02H5	RBD	K417T, E484K, N501Y				

# Recombinant SARS-CoV-2 Spike Mutants Bank

Neutralizing efficacy and binding activity have been assessed against SARS-CoV-2 mutants developed by Sino Biological. Data below showed that the neutralization and binding efficiency are diverse among different variants.

## Antigens:

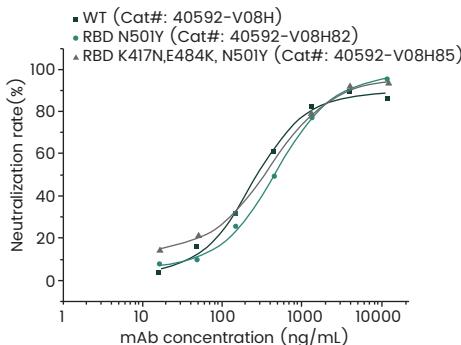
Wild type: 40592-V08H

Spike RBD N501Y (lineage B.1.1.7): 40592-V08H82

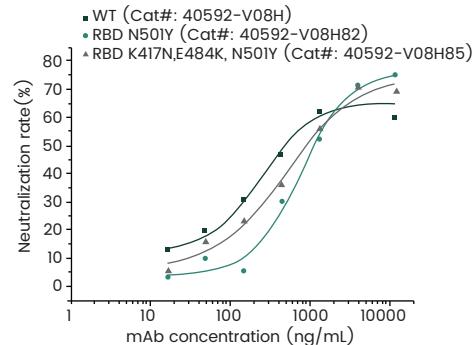
Spike RBD K417N, E484K, N501Y (lineage B.1.351): 40592-V08H85

## Neutralizing Efficacy Assays against SARS-CoV-2 Spike Mutants

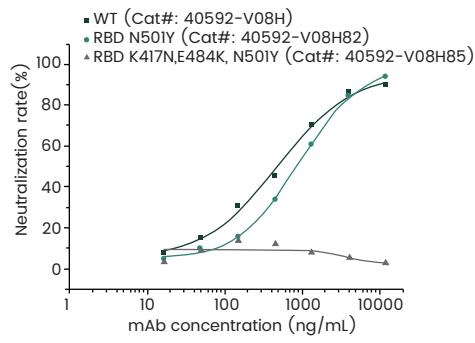
RBD Neutralizing Antibody (Cat#: 40150-D001)



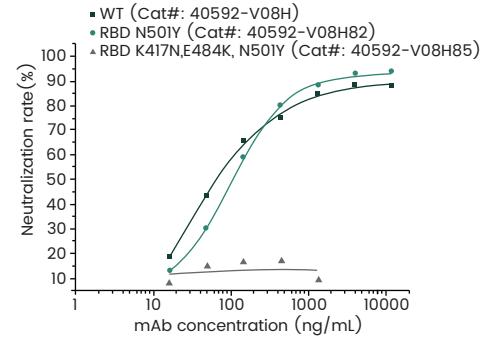
RBD Neutralizing Antibody (Cat#: 40150-D002)



RBD Neutralizing Antibody (Cat#: 40592-MM57)

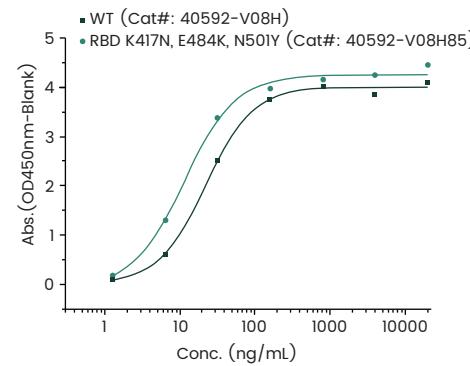
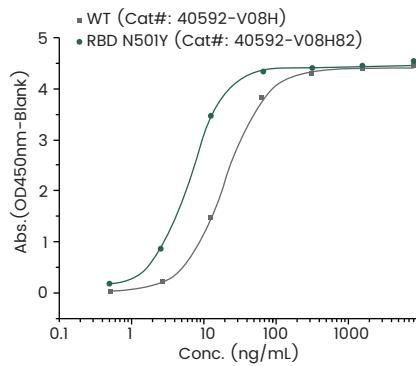


RBD Neutralizing Antibody (Cat#: 40592-R118)



## Binding Affinity to ACE2

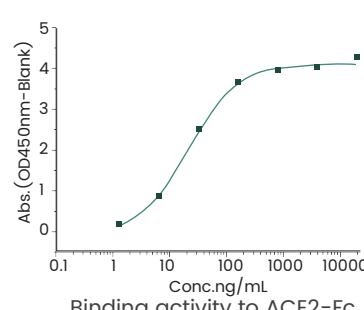
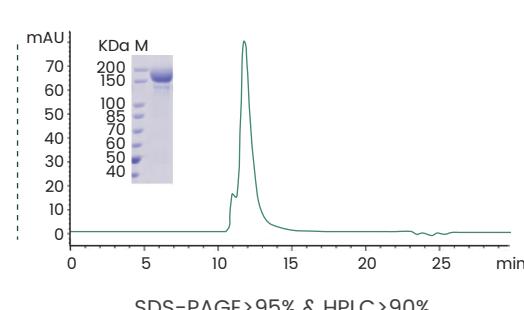
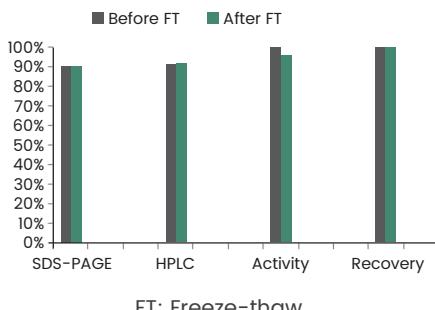
As shown below, both recombinant spike RBD N501Y of lineage B.1.1.7 (Cat#: 40592-V08H82) and spike RBD K417N, E484K, N501Y (Cat#: 40592-V08H85) of lineage B.1.351 revealed a higher binding affinity to ACE2 compared to the wild type.



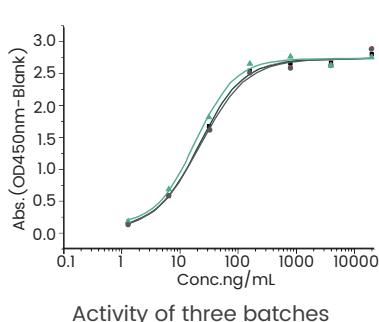
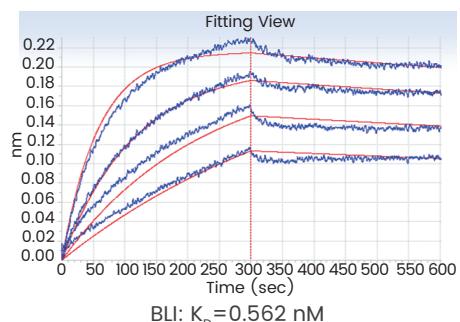
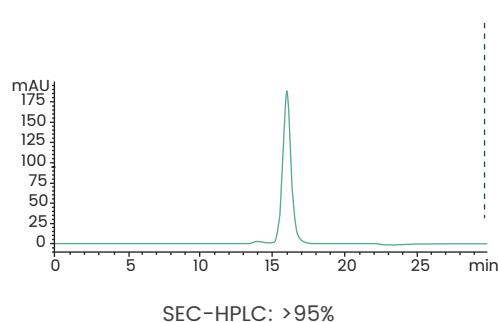
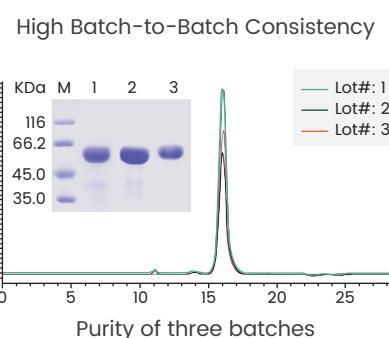
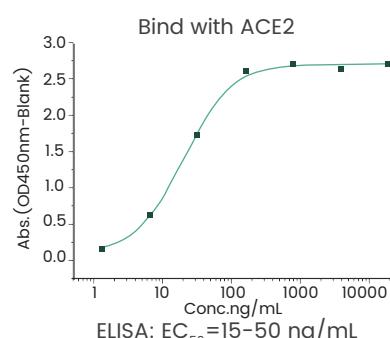
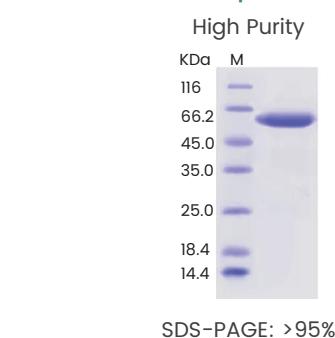
# More SARS-CoV-2 Spike Antigens

## Super Stable Prefusion Trimeric Spike Protein: HexaPro

With a unique design of specific mutations, HexaPro (Cat#: 40589-V08H4) can be produced and stored stably in a research lab. It is expected to significantly enhance COVID-19 basic and vaccine research.

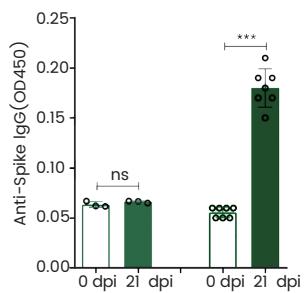


## SARS-CoV-2 Spike RBD-mFc (Cat#: 40592-V05H)



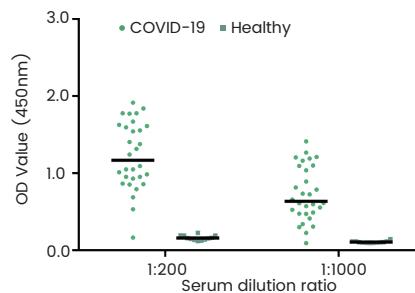
## Verified by Sera Samples Infected by SARS-CoV-2

### SARS-CoV-2 Spike S1 (Cat#: 40591-V08H)



Recognize the specific IgG of infected wild or transgenic mice

### SARS-CoV-2 Spike RBD (Cat#: 40592-V08B)



Recognize the antibody in serum of the convalescent patient

## Partial List of SARS-CoV-2 Spike Antigens



**40591-V05H1**  
(mFc tag | HEK293 expressed)  
**40591-V08H-B**  
(His tag | HEK293 expressed | Biotinylated)



**40590-V08B**  
(His tag | Insect expressed)  
**40590-V02H**  
(Fc tag | HEK293 expressed)



**40592-V02H**  
(Fc tag | HEK293 expressed)  
**40592-V31H**  
(rFc tag | HEK293 cell expressed)  
**40592-V27H-B**  
(Avi & His tag | HEK293 expressed | Biotinylated)  
**40592-V08H82-B**  
(His tag | HEK293 expressed | Biotinylated)

## SARS-CoV-2 Omicron Spike Antibodies

The spike protein of the Omicron Variant carries more than 30 mutations. It's critically important to understand whether these mutations allow the Omicron variant to escape from neutralizing antibodies. Sino Biological has screened a panel of previously established spike antibodies for their ability to detect the Omicron spike protein.

### Antibodies for the Detection of Omicron Spike

Cat#	Antibody Epitope/Recognition Segment	Recognize Omicron	Recognize Delta
40592-MM117	RBD (non-competing)	Yes	Yes
40592-R505	RBD (non-competing)	Yes	Yes
40591-MM45	RBD (non-competing)	Yes	Yes
40592-MM57	RBD (non-competing)	No	Yes
40592-R0004	RBD (competing)	Yes	Yes
40591-MM48	RBD (competing)	Yes	No
40592-MM135	RBD (competing)	No	Yes
40592-R831	RBD (competing)	No	Yes
40592-R117	RBD (competing)	No	Yes
40592-R118	RBD (competing)	No	Yes
40150-D001	RBD (competing)	No	Yes
40591-MM43	RBD (competing)	No	Yes
40592-R001	RBD (competing)	No	Yes
40150-D002	RBD (competing)	No	Yes
40150-D003	RBD	Yes	Yes
40150-D004	RBD	Yes	Yes
40150-D005	RBD	Yes	Yes
40150-D006	RBD	Yes	Yes
40150-R007	RBD	Yes	Yes
40591-MM41	RBD	Yes	Yes
40592-R190	RBD	Yes	Yes
40592-R493	RBD	Yes	Yes
40592-MM55	RBD	Yes	Yes
40590-D001	S2	Yes	Yes

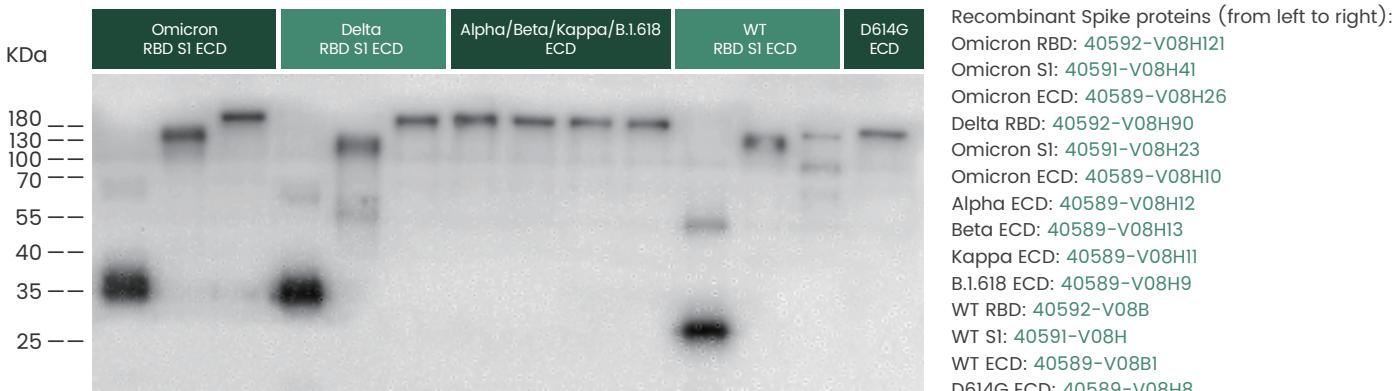
### Neutralizing Antibodies for Omicron and Delta Variant

Pseudovirus Microneutralization (MN) Assay					Competitive ELISA Assay		
	Ab Cat#	WT	Omicron	Delta	WT	Omicron	Delta
Neutralizing Antibody (non-competing)	40592-MM117	+	+	-	-	-	-
	40591-MM45	+	+	+	-	-	-
	40592-R505	+	-	-	-	-	-
Neutralizing Antibody (competing)	40592-R0004	++	+	++	++	+	+
	40591-MM48	++	+	+	++	+	+
	40592-R001	+++	-	+++	+++	-	+++
	40150-D001	++	-	++	++	-	++

## Featured Omicron Reactive Spike Antibody (Cat#: 40592-MM117)

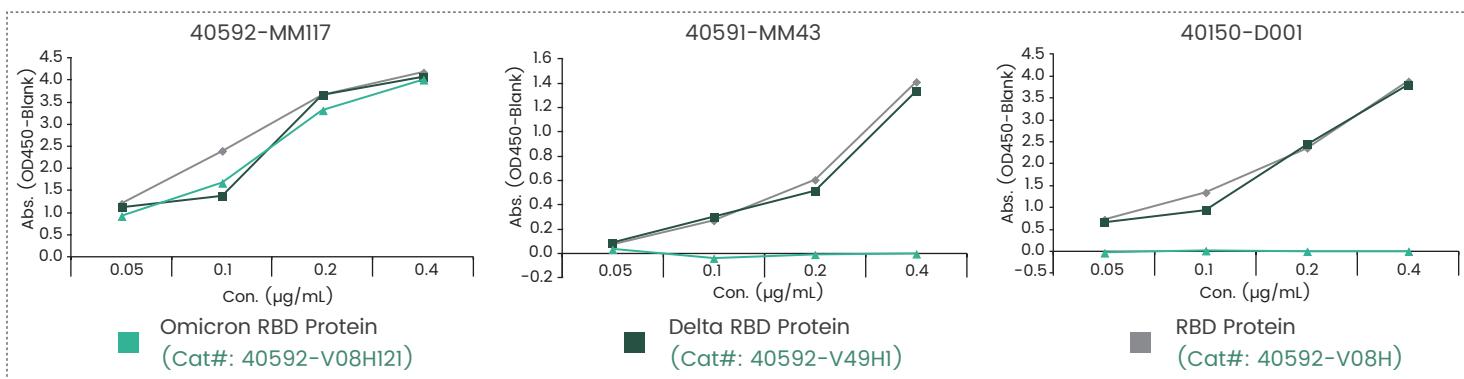
Cat#	Application	Ig Type	ACE2 Competing	WT Pseudovirus Neutralizing	Omicron Pseudovirus Neutralizing
40592-MM117	WB, ELISA, Neutralization	Mouse IgG1	No	Yes	$IC_{50}=9.42 \mu\text{g/mL}$

- Recognize Omicron and Other Major SARS-CoV-2 Variants

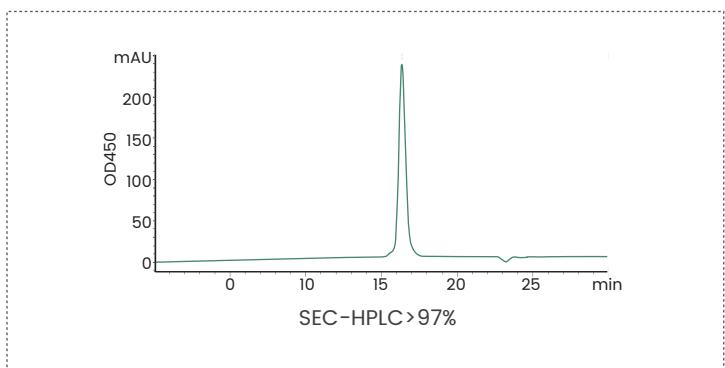


- Binding Activity by ELISA Assay against SARS-CoV-2 Variants

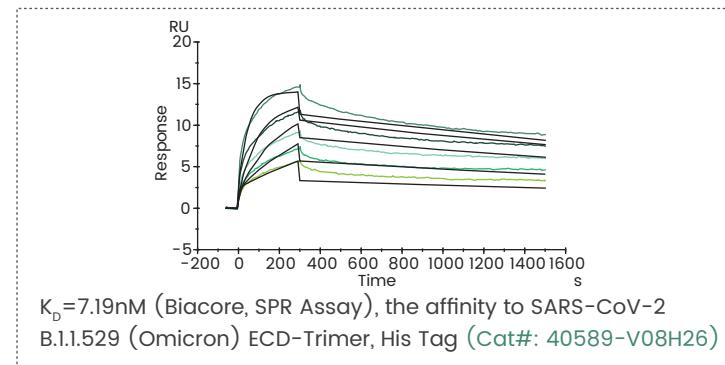
40592-MM117 shows binding activity against spike proteins of the Omicron variant. It also detects the wild type and Delta variants. In comparison, the other two broad-spectrum ACE2-competing neutralizing antibodies, 40591-MM43 and 40150-D001, do not bind with the Omicron variant.



### • High Purity



### • Validated Binding Affinity



## Antibody Pairs for the Detection of Omicron Spike Protein

Sino Biological has identified two top antibody pairs for the detection of Omicron spike protein.

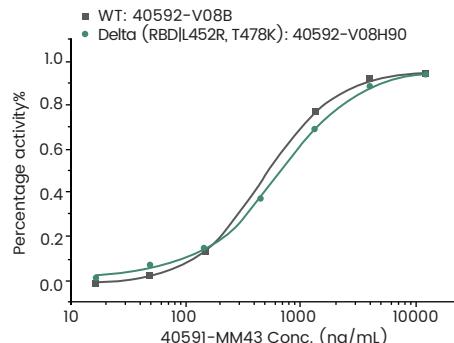
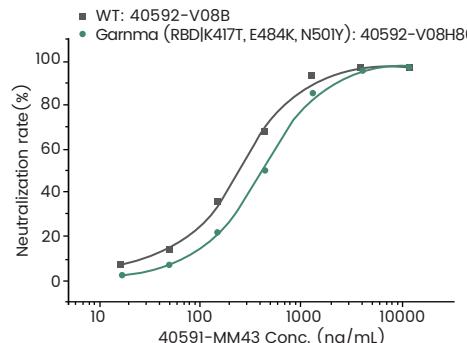
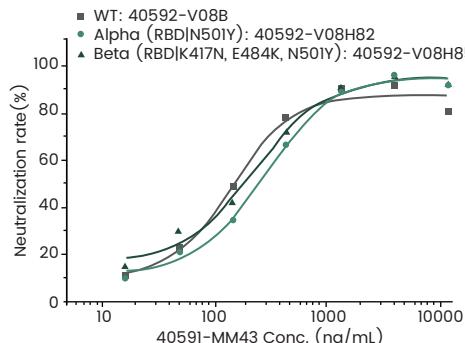
Antibody Pairs	Capture Ab	Detection Ab
Pair 1	40150-D005	40150-D004
Pair 2	40592-R0004	40591-MM41

# Neutralizing Antibodies for the Detection of Spike Mutants

Neutralizing antibodies have high applicable values for diagnostic research and vaccine development. We have expanded our panel of neutralizing antibodies for the detection of spike mutants. These antibodies have differential neutralizing activities against different variants validated by competitive ELISA assays.

Spike Mutants	Neutralizing Spike Antibodies									
	40150-D001	40150-D002	40591-MM43	40592-R001	40592-R118	40592-R117	40591-MM48	40592-MM135	40592-R004	40592-R831
40592-V08B   RBD (WT)	++	++	++	+++	+++	+++	++	++	++	++
40592-V08H82   RBD (B.I.1.7   Alpha Variant) N501Y	+	+	++	+++	+++	+++	-	++	TBD	+
40592-V08H85   RBD (B.I.351   Beta Variant) K417N, E484K, N501Y	++	+	++	-	-	-	-	-	TBD	+
40592-V08H86   RBD (P.1   Gamma Variant) K417T, E484K, N501Y	++	++	++	-	-	-	-	-	TBD	+
40592-V08H84   RBD (Mainly exist in B.I.351   Beta Variant) E484K	++	++	++	+++	-	-	++	TBD	TBD	++
40592-V08H88   RBD (B.I.617, B.I.617.1, B.I.617.3) L452R, E484Q	++	++	++	+++	+++	-	++	+	++	++
40592-V08H90   RBD (B.I.617.2   Delta Variant) L452R, T478K	++	++	++	+++	+++	-	+	++	+	++
40591-V08H19   S1 (B.I.617) E154K, E484Q, L452R, D614G, P681R	++	++	++	+++	+++	-	++	TBD	++	-
40591-V08H17   S1 (B.I.429) W152C, L452R, D614G	++	++	++	+++	+++	-	++	TBD	++	++
40592-V08H12   RBD (B.I.1.529   Omicron Variant) G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	-	-	-	-	-	-	+	-	+	-

+: Neutralizing Capacity

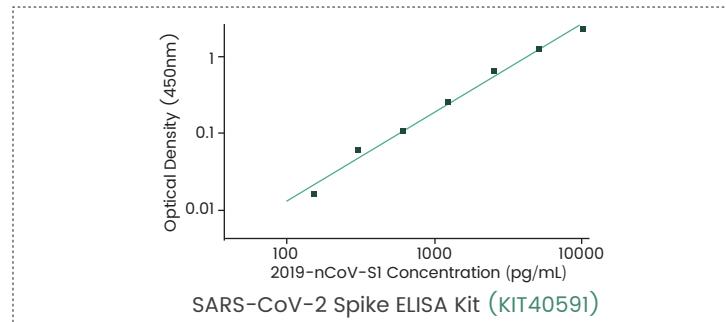


# Immunodetection for SARS-CoV-2 Spike Antigen

## Monoclonal Antibody Pairs for Spike Protein

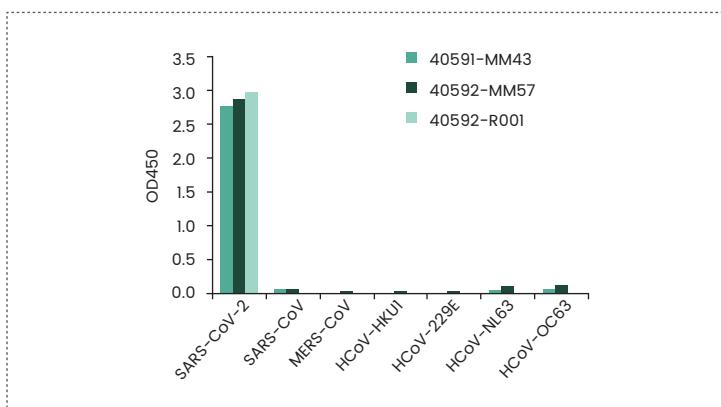
Sino Biological has identified three top antibody pairs against SARS-CoV-2 spike protein which are validated in the sandwich ELISA assay for their high sensitivity and specificity.

Antibody Pair	Capture Ab	Detection Ab
Pair I	40150-D003	40150-D001
Pair II	40150-D002	40150-D004
Pair III	40150-D006	40591-MM43



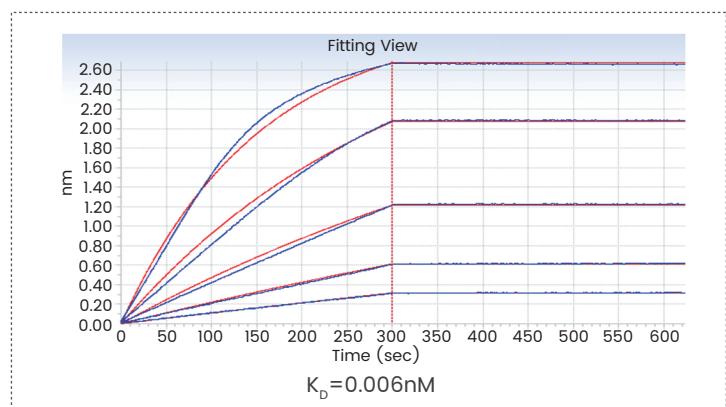
### Cross-reactivity Assay

Data shows that anti-spike antibodies are specific to SARS-CoV-2 spike antigen without cross-reactivity with SARS-CoV, MERS-CoV, 229E, NL63, HKU1, OC43 assessed in ELISA.



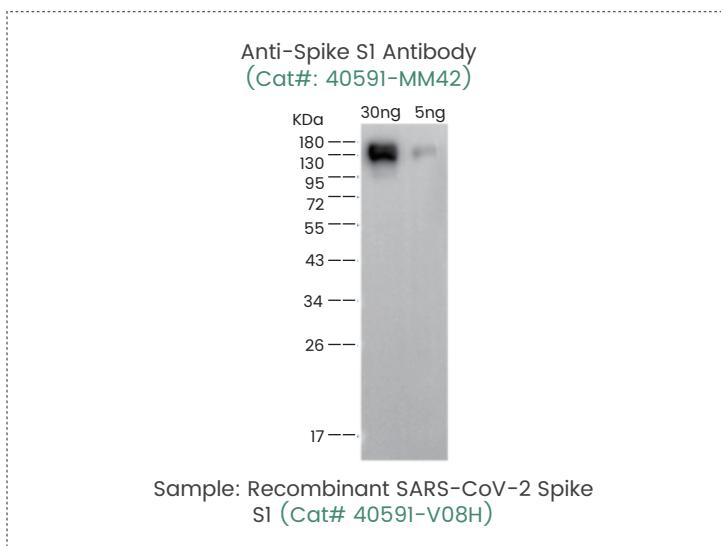
### Affinity Assay

Anti-spike antibody (Cat#: 40592-R001) can bind to spike antigen (Cat#: 40592-V08B-B) with high affinity determined by BLI assay.

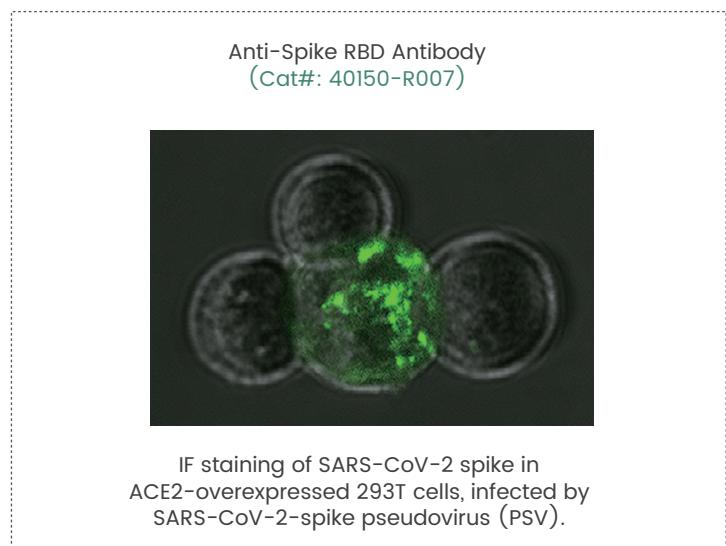


### Multiple Applications of SARS-CoV-2 Antibodies

#### ○ Western Blot



#### ○ Immunofluorescence Staining



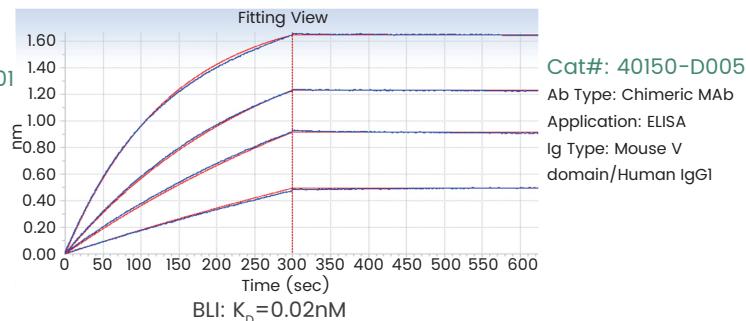
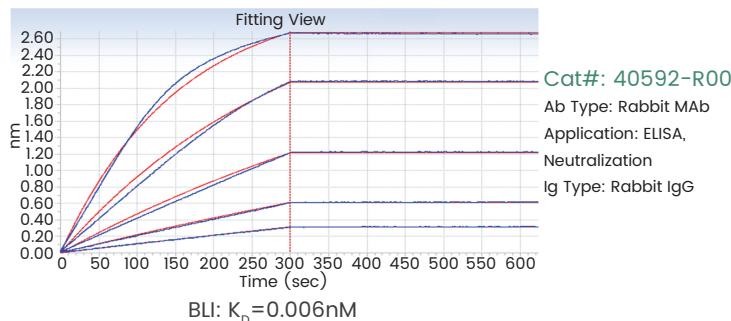
# More SARS-CoV-2 Anti-Spike Antibodies

Sino Biological has developed a large collection of SARS-CoV-2 antibodies for research. Technical information about specificity and sensitivity, cross-reactivity, neutralizing potential, and their validated applications are illustrated here.

## High Affinity

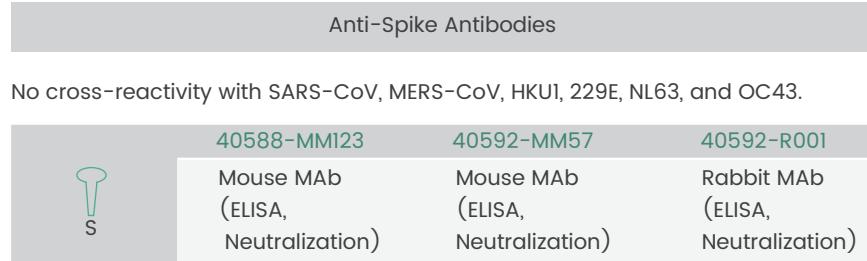
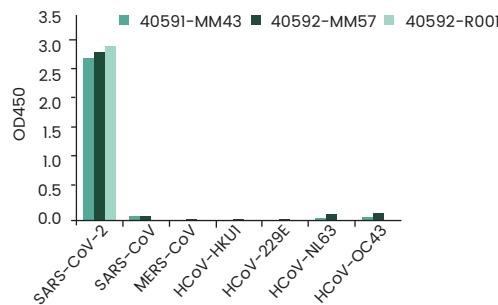
Binding affinity has been validated by BLI assay.

### ○ Anti-Spike Antibodies



## High Specificity

ELISA assay has been taken to validate the cross-reactivity with antigens from different Human Coronaviruses.



## List of SARS-CoV-2 Anti-Spike Antibodies (Partial)

Except for the above antibodies, Sino Biological also provides a large panel of monoclonal and polyclonal antibodies against the spike protein of SARS-CoV-2.

	Mouse MAb	40592-MM55 (ELISA, Non-Neutralizing)						
	Rabbit MAb	40592-R0004 (ELISA, Neutralization)		40592-R493 (ELISA, Non-Neutralizing)		40592-R117 (ELISA, Neutralization)		40592-R118 (ELISA, Neutralization)
		40150-D001 (ELISA, Neutralization)		40150-D001-H (ELISA)		40150-D002 (ELISA, Neutralization)		40150-D004 (ELISA, IF)
		40150-D006 (ELISA)		40590-D001 (ELISA)				
	Mouse PAb	40592-MP01 (ELISA)						
		40150-T30 (ELISA)		40589-T62 (WB, ELISA)		40590-T62 (WB, ELISA)		
		40591-T62 (WB, ELISA)		40592-T30 (ELISA)		40592-T62 (WB, ELISA)		





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