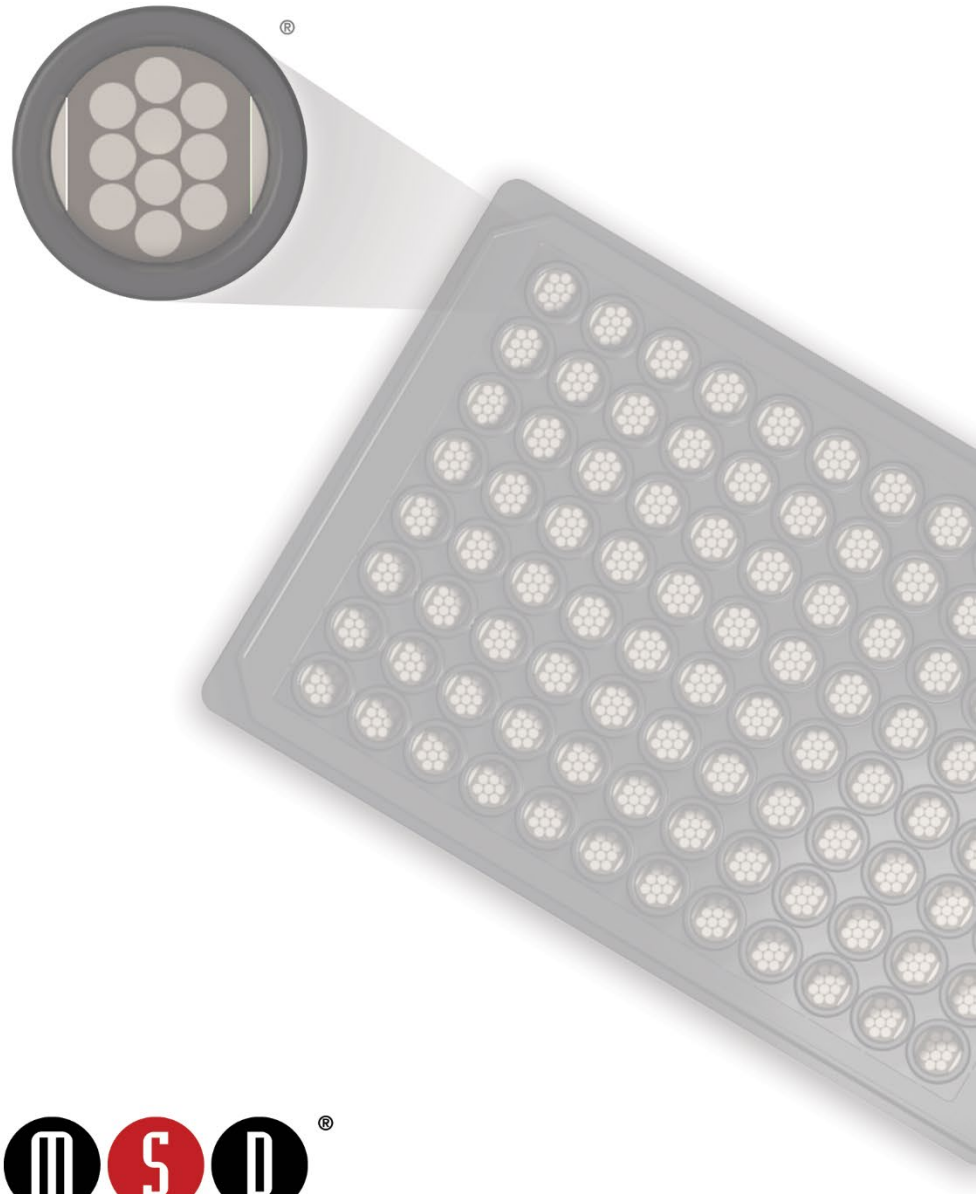
MSD® MULTI-SPOT Assay System

COVID-19 ACE2 Neutralization Kits

V-PLEX®



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V-PLEX® COVID-19 ACE2 Neutralization Kits

The V-PLEX COVID-19 ACE2 Neutralization Kits include multiple panels to measure antibodies that block the binding of angiotensin-converting enzyme 2 (ACE2) to the SARS-CoV-2 Spike and RBD antigens, including variants of the SARS-CoV-2 virus.

This package insert must be read in its entirety before using this product.

FOR RESEARCH USE ONLY.

NOT FOR USE IN DIAGNOSTIC PROCEDURES.

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Introduction

The V-PLEX COVID-19 ACE2 Neutralization Kits measure antibodies that block the binding of angiotensin-converting enzyme 2 (ACE2) to the SARS-CoV-2 Spike and RBD antigens, including variants of the SARS-CoV-2 virus. The assay serves as a high-throughput alternative to traditional neutralization assays.

Principle of the Assay

The V-PLEX COVID-19 ACE2 Neutralization Kits quantitatively measure antibodies that block the binding of ACE2 to its cognate ligands (Table 1 and 2). Plates are provided with antigens on spots in the wells of a 96-well plate (Figure 1). Blocking antibodies in the sample bind to antigens on the spots, and human ACE2 protein conjugated with MSD SULFO-TAG™ is used for detection. The plate is read on an MSD® instrument, which measures the light emitted from the MSD SULFO-TAG.

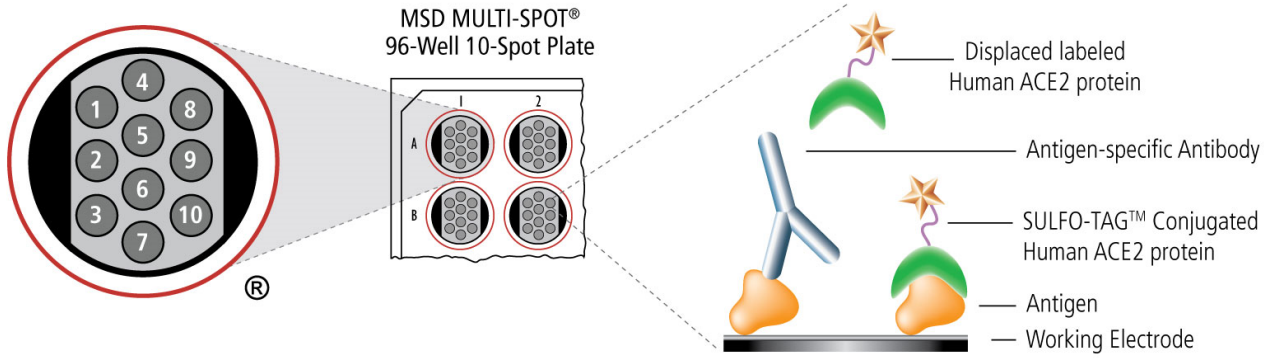

Figure 1. Schematic for V-PLEX COVID-19 ACE2 Neutralization Kits.

Kit Components

V-PLEX COVID-19 ACE2 Neutralization Kits are available as panels defined by a set of viral antigens coated on a 10-spot MULTI-SPOT® 96-well plate. A kit includes a calibration reagent for quantification, human ACE2 protein as detection reagent, plate(s), and all other reagents necessary to conduct the assay.

The relevant antigens for the ACE2 neutralization assays – SARS-CoV-2 Spike and SARS-CoV-2 S1 RBD – are present in several V-PLEX COVID-19 panels. ACE2 Neutralization kits are available for all panels as a convenience to users who may wish to use the same plates or panels in both serological and neutralization assays, even though some antigens in the kits are not relevant to the ACE2 assays (and are not intended to be analyzed).

Table 1 describes the available plates and the locations of antigens on each plate. Table 2 shows the relationship between the V-PLEX COVID-19 ACE2 Competition Kits and the plates included in those kits. Together, Table 1 and Table 2 help users select the kits that contain their preferred antigens. Table 3 provides a list of components included in each kit. Table 4 provides information about the SARS-CoV-2 variant antigens, including their amino acid modifications, lineages, and common designation.

Table 1. *List of antigens and their spot assignments on the MULTI-SPOT 96-Well, 10-Spot plates*

Plate Description	SARS-CoV-2 Plate 1	SARS-CoV-2 Plate 2	SARS-CoV-2 Plate 5	SARS-CoV-2 Plate 6
Spot 1	SARS-CoV-2 Spike	SARS-CoV-2 Spike	SARS-CoV-2 Spike	SARS-CoV-2 Spike
Spot 2	*BSA*	*BSA*	*BSA*	SARS-CoV-2 Spike (D614G)
Spot 3	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid
Spot 4	SARS-CoV-1 Spike	*BSA*	*BSA*	*BSA*
Spot 5	*BSA*	*BSA*	*BSA*	*BSA*
Spot 6	*BSA*	*BSA*	*BSA*	*BSA*
Spot 7	*BSA*	*BSA*	SARS-CoV-2 Spike (P.1)	SARS-CoV-2 Spike (P.1)
Spot 8	SARS-CoV-2 S1 NTD	*BSA*	SARS-CoV-2 Spike (B.1.1.7)	SARS-CoV-2 Spike (B.1.1.7)
Spot 9	*BSA*	*BSA*	SARS-CoV-2 Spike (B.1.351)	SARS-CoV-2 Spike (B.1.351)
Spot 10	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	*BSA*	SARS-CoV-2 S1 RBD

Table 1 *(continued)*

Plate Description	SARS-CoV-2 Plate 7	SARS-CoV-2 Plate 8	SARS-CoV-2 Plate 9	SARS-CoV-2 Plate 11
Spot 1	SARS-CoV-2 Spike	SARS-CoV-2 Spike	RBD (B.1.427; B.1.429; B.1.526.1)	RBD (B.1.427; B.1.429; B.1.526.1)
Spot 2	SARS-CoV-2 S1 RBD (B.1.351; B.1.351.1)	SARS-CoV-2 S1 RBD (B.1.427; B.1.429; B.1.526.1)	RBD (B.1.351; B.1.351.1)	RBD (B.1.351; B.1.351.1)
Spot 3	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid	RBD (B.1.525; B.1.526; B.1.618; P.2; R.1)	RBD (B.1.525; B.1.526; B.1.618; P.2; R.1)
Spot 4	SARS-CoV-2 S1 RBD (P.1)	SARS-CoV-2 S1 RBD (B.1.525; B.1.526; B.1.618; P.2; R.1)	RBD (P.1)	RBD (P.1)
Spot 5	*BSA*	BSA	RBD (B.1.526.2)	RBD (B.1.526.2)
Spot 6	SARS-CoV-2 S1 RBD (B.1.1.7)	SARS-CoV-2 S1 RBD (B.1.526.2)	RBD (B.1.1.7)	RBD (B.1.1.7)
Spot 7	SARS-CoV-2 Spike (P.1)	BSA	RBD (B.1.1.7+E484K; P.3)	RBD (B.1.1.7+E484K; P.3)
Spot 8	SARS-CoV-2 Spike (B.1.1.7)	SARS-CoV-2 Spike (B.1.526)	RBD (B.1.617; B.1.617.1; B.1.617.3)	RBD (B.1.617; B.1.617.1; B.1.617.3)
Spot 9	SARS-CoV-2 Spike (B.1.351)	SARS-CoV-2 Spike (B.1.429)	RBD (B.1.214.2)	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)
Spot 10	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD

Plate Description	SARS-CoV-2 Plate 12	SARS-CoV-2 Plate 13	SARS-CoV-2 Plate 14	SARS-CoV-2 Plate 15
Spot 1	RBD (A.23.1)	SARS-CoV-2 Spike	SARS-CoV-2 Spike	SARS-CoV-2 Spike
Spot 2	RBD (C.37)	Spike (P.2)	Spike (A.23.1)	Spike (AY.1)
Spot 3	RBD (B.1.525; B.1.526; B.1.618; P.2; R.1)	Spike (B.1.617.1)	Spike (A.VOI.V2)	Spike (AY.2)
Spot 4	RBD (BV-1)	Spike (B.1.617.2)	Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) **Alt Seq 1**	Spike (B.1.617.2+ΔY144)
Spot 5	RBD (B.1.1.519)	Spike (B.1.617.3)	Spike (C.37)	Spike (B.1.620)
Spot 6	RBD (A.VOI.V2)	Spike (B.1.617)	Spike (R.1)	Spike (B.1.258.17)
Spot 7	RBD (B.1.1.7+E484K; P.3)	Spike (P.1)	Spike (P.3)	Spike (B.1.466.2)
Spot 8	RBD (B.1.617; B.1.617.1; B.1.617.3)	Spike (B.1.1.7)	Spike (B.1.525)	Spike (B.1.1.7+E484K)
Spot 9	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)	Spike (B.1.351)	Spike (B.1.1.519)	Spike (B.1.351.1)
Spot 10	SARS-CoV-2 S1 RBD	Spike (B.1.526.1)	Spike (BV-1)	Spike (B.1.618)

Note: Alternative S-GENE mutations for Spike of B.1.617.2 are listed as "**Alt Seq #**."

Table 1 *(continued)*

Plate Description	SARS-CoV-2 Plate 16	SARS-CoV-2 Plate 17	SARS-CoV-2 Plate 18	SARS-CoV-2 Plate 19
Spot 1	RBD (AY.1; AY.2)	SARS-CoV-2 Spike	SARS-CoV-2 Spike	SARS-CoV-2 Spike
Spot 2	RBD (B.1.351; B.1.351.1)	SARS-CoV-2 Spike (D614G)	Spike (P.2)	Spike (B.1.621)
Spot 3	RBD (B.1.525; B.1.526; B.1.618; P.2; R.1)	SARS-CoV-2 Nucleocapsid	Spike (B.1.617.1)	Spike (AY.2) **Alt Seq 1**
Spot 4	RBD (B.1.620)	SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) **Alt Seq 1**	Spike (B.1.617.2; AY.4) **Alt Seq 2**	Spike (B.1.617.2; AY.4) **Alt Seq 2**
Spot 5	*BSA*	*BSA*	Spike (B.1.617.3)	Spike (C.37)
Spot 6	*BSA*	*BSA*	Spike (B.1.617)	Spike (AY.12)
Spot 7	RBD (B.1.1.7+E484K; P.3)	SARS-CoV-2 Spike (P.1)	Spike (P.1)	Spike (P.1)
Spot 8	RBD (B.1.258.17; B.1.466.2)	SARS-CoV-2 Spike (B.1.1.7)	Spike (B.1.1.7)	Spike (AY.1) **Alt Seq 1**
Spot 9	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)	SARS-CoV-2 Spike (B.1.351)	Spike (B.1.351)	Spike (B.1.351)
Spot 10	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	Spike (B.1.526.1)	Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) **Alt Seq 1**

Note: Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as "**Alt Seq #**."

Plate Description	SARS-CoV-2 Plate 20	SARS-CoV-2 Plate 22	SARS-CoV-2 Plate 23	SARS-CoV-2 Plate 24
Spot 1	SARS-CoV-2 Spike	RBD (B.1.1.529; BA.1; BA.1.15)	SARS-CoV-2 Spike	SARS-CoV-2 Spike
Spot 2	Spike (B.1.617.2 +4)	RBD (B.1.351; B.1.351.1)	Spike (B.1.1.529; BA.1; BA.1.15)	Spike (B.1.1.529; BA.1; BA.1.15)
Spot 3	Spike (B.1.617.2 +3)	*BSA*	Spike (AY.4.2)	SARS-CoV-2 Nucleocapsid
Spot 4	Spike (B.1.617.2; AY.4) **Alt Seq 2**	RBD (P.1)	Spike (B.1.617.2; AY.4) **Alt Seq 2**	Spike (B.1.617.2; AY.4) **Alt Seq 2**
Spot 5	Spike (B.1.617.2 +2)	*BSA*	*BSA*	*BSA*
Spot 6	Spike (B.1.617.2 +1)	RBD (B.1.1.7)	*BSA*	*BSA*
Spot 7	Spike (P.1)	*BSA*	Spike (P.1)	Spike (P.1)
Spot 8	Spike (B.1.1.7)	*BSA*	Spike (B.1.1.7)	Spike (B.1.1.7)
Spot 9	Spike (B.1.351)	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)	Spike (B.1.351)	Spike (B.1.351)
Spot 10	Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) **Alt Seq 1**	SARS-CoV-2 S1 RBD	Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) **Alt Seq 1**	SARS-CoV-2 S1 RBD

Note: Alternative S-GENE mutations for Spike of B.1.617.2 are listed as "**Alt Seq #**."

Table 1 (continued)

Plate Description	SARS-CoV-2 Plate 25	SARS-CoV-2 Plate 26	SARS-CoV-2 Plate 27	SARS-CoV-2 Plate 28
Spot 1	SARS-CoV-2 Spike	RBD (B.1.1.529; BA.1; BA.1.15)	SARS-CoV-2 Spike	RBD (BA.2.12.1)
Spot 2	Spike (B.1.1.529; BA.1; BA.1.15)	RBD (B.1.351; B.1.351.1)	Spike (BA.2.12.1)	RBD (B.1.351; B.1.351.1)
Spot 3	Spike (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.12)	RBD (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.10.1; BA.2.12)	Spike (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.12)	RBD (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.10.1; BA.2.12)
Spot 4	Spike (B.1.617.2; AY.4) **Alt Seq 2**	RBD (P.1)	Spike (B.1.617.2; AY.4) **Alt Seq 2**	RBD (BA.2+L452M)
Spot 5	Spike (BA.3)	*BSA*	Spike (BA.3)	RBD (BA.2+L452R)
Spot 6	Spike (BA.1+R346K; BA.1.1; BA.1.1.15)	RBD (B.1.1.7)	Spike (BA.2+L452M)	RBD (B.1.1.7)
Spot 7	Spike (BA.1+L452R)	*BSA*	Spike (BA.2+L452R)	RBD (BA.4; BA.5)
Spot 8	Spike (B.1.1.7)	RBD (BA.1.1; BA.1.1.15)	Spike (BA.4)	RBD (BA.3)
Spot 9	Spike (B.1.351)	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)	Spike (B.1.351)	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+Δ144)
Spot 10	Spike (B.1.640.2)	SARS-CoV-2 S1 RBD	Spike (BA.5)	SARS-CoV-2 S1 RBD

Note: Alternative S-GENE mutations for Spike of B.1.617.2 are listed as "**Alt Seq #**."

Plate Description	SARS-CoV-2 Plate 29	SARS-CoV-2 Plate 30	SARS-CoV-2 Plate 31	SARS-CoV-2 Plate 32	SARS-CoV-2 Plate 33
Spot 1	SARS-CoV-2 Spike	RBD (BA.2.12.1)	SARS-CoV-2 Spike	SARS-CoV-2 Spike	RBD (B.1.1.529; BA.1; BA.1.15)
Spot 2	Spike (BA.2.12.1)	RBD (B.1.351; B.1.351.1)	*BSA*	Spike (B.1.1.529; BA.1; BA.1.15)	RBD (BQ.1.1)
Spot 3	Spike (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.12)	RBD (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.10.1; BA.2.12)	SARS-CoV-2 Nucleocapsid	Spike (XBB.1)	RBD (BA.2.75.2)
Spot 4	Spike (B.1.617.2; AY.4) **Alt Seq 2**	*BSA*	*BSA*	Spike (BF.7)	RBD (BA.4.6; BF.7)
Spot 5	*BSA*	*BSA*	*BSA*	Spike (BA.2.75.2)	*BSA*
Spot 6	*BSA*	RBD (B.1.1.7)	*BSA*	Spike (BQ.1.1)	RBD (XBB.1)
Spot 7	Spike (BA.2.75)	RBD (BA.4; BA.5)	*BSA*	Spike (BA.2.75)	RBD (BA.4; BA.5)
Spot 8	Spike (BA.4)	RBD (BA.2.75)	Spike (BA.5)	Spike (BA.4.6)	RBD (BA.2.75)
Spot 9	Spike (B.1.351)	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+Δ144)	RBD (BA.4; BA.5)	Spike (BQ.1)	RBD (BQ.1)
Spot 10	Spike (BA.5)	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	Spike (BA.5)	SARS-CoV-2 S1 RBD

Note: Alternative S-GENE mutations for Spike of B.1.617.2 are listed as "**Alt Seq #**."

Table 1 *(continued)*

Plate Description	SARS-CoV-2 Plate 34	SARS-CoV-2 Plate 36	SARS-CoV-2 Plate 37
Spot 1	SARS-CoV-2 Spike	SARS-CoV-2 Spike	SARS-CoV-2 Spike
Spot 2	Spike (B.1.1.529; BA.1; BA.1.15)	Spike (B.1.1.529; BA.1; BA.1.15)	Spike (FL.1.5.1)
Spot 3	Spike (XBB.1)	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid
Spot 4	Spike (BF.7)	Spike (XBB.1.16.1)	Spike (BA.2.86)
Spot 5	Spike (XBB.1.5)	Spike (XBB.1.5)	Spike (XBB.1.5)
Spot 6	Spike (BQ.1.1)	Spike (BQ.1.1)	Spike (EG.5.1)
Spot 7	Spike (BA.2.75)	Spike (XBB.1.16)	Spike (XBB.1.16)
Spot 8	Spike (BN.1)	Spike (XBB.2.3)	Spike (XBB.2.3)
Spot 9	Spike (BQ.1)	Spike (XBB.1)	Spike (XBB.1.16.6)
Spot 10	Spike (BA.5)	Spike (BA.5)	Spike (BA.5)

Note: Alternative S-GENE mutations for Spike of B.1.617.2 are listed as **"Alt Seq #."**

Plate Description	SARS-CoV-2 Key Variant Spike Plate 1	SARS-CoV-2 Key Variant RBD Plate 1
Spot 1	SARS-CoV-2 Spike	RBD (BA.2.12.1)
Spot 2	Spike (BA.2.12.1)	RBD (B.1.351; B.1.351.1)
Spot 3	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid
Spot 4	Spike (BA.2.75)	RBD (B.1.1.529; BA.1; BA.1.15)
Spot 5	Spike (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.12)	RBD (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.10.1; BA.2.12)
Spot 6	Spike (B.1.1.529; BA.1; BA.1.15)	RBD (B.1.1.7)
Spot 7	Spike (B.1.617.2; AY.4) **Alt Seq 2**	RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)
Spot 8	Spike (B.1.1.7)	RBD (BA.2.75)
Spot 9	Spike (B.1.351)	RBD (BA.4; BA.5)
Spot 10	Spike (BA.5)	SARS-CoV-2 S1 RBD

Plate Description	Coronavirus Plate 1	Coronavirus Plate 2	Coronavirus Plate 3	Respiratory Plate 1
Spot 1	SARS-CoV-2 Spike	SARS-CoV-2 Spike	SARS-CoV-2 Spike	Flu B/Brisbane/2008 HA
Spot 2	Flu A/Hong Kong/2014 H3	HCoV-NL63 Spike	HCoV-NL63 Spike	Flu A/Shanghai/2013 H7
Spot 3	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid	SARS-CoV-2 Nucleocapsid	*BSA*
Spot 4	SARS-CoV-1 Spike	SARS-CoV-1 Spike	SARS-CoV-1 Spike	Flu A/Michigan/2015 H1
Spot 5	*BSA*	*BSA*	*BSA*	*BSA*
Spot 6	SARS-CoV-2 S1 NTD	SARS-CoV-2 S1 NTD	MERS-CoV Spike	*BSA*
Spot 7	HCoV-HKU1 Spike	HCoV-HKU1 Spike	HCoV-HKU1 Spike	RSV Pre-Fusion F
Spot 8	HCoV-OC43 Spike	HCoV-OC43 Spike	HCoV-OC43 Spike	Flu A/Hong Kong/2014 H3
Spot 9	MERS-CoV Spike	HCoV-229E Spike	HCoV-229E Spike	*BSA*
Spot 10	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	SARS-CoV-2 S1 RBD	Flu B/Phuket/2013 HA

Table 2. *Antigen plates included in V-PLEX COVID-19 ACE2 Neutralization Kits*

Kit	Plate(s) Included
V-PLEX SARS-CoV-2 Panel 1 Kit	SARS-CoV-2 Plate 1
V-PLEX SARS-CoV-2 Panel 2 Kit	SARS-CoV-2 Plate 2
V-PLEX SARS-CoV-2 Panel 5 Kit	SARS-CoV-2 Plate 5
V-PLEX SARS-CoV-2 Panel 6 Kit	SARS-CoV-2 Plate 6
V-PLEX SARS-CoV-2 Panel 7 Kit	SARS-CoV-2 Plate 7
V-PLEX SARS-CoV-2 Panel 8 Kit	SARS-CoV-2 Plate 8
V-PLEX SARS-CoV-2 Panel 9 Kit	SARS-CoV-2 Plate 9
V-PLEX SARS-CoV-2 Panel 11 Kit	SARS-CoV-2 Plate 11
V-PLEX SARS-CoV-2 Panel 12 Kit	SARS-CoV-2 Plate 12
V-PLEX SARS-CoV-2 Panel 13 Kit	SARS-CoV-2 Plate 13
V-PLEX SARS-CoV-2 Panel 14 Kit	SARS-CoV-2 Plate 14
V-PLEX SARS-CoV-2 Panel 15 Kit	SARS-CoV-2 Plate 15
V-PLEX SARS-CoV-2 Panel 16 Kit	SARS-CoV-2 Plate 16
V-PLEX SARS-CoV-2 Panel 17 Kit	SARS-CoV-2 Plate 17
V-PLEX SARS-CoV-2 Panel 18 Kit	SARS-CoV-2 Plate 18
V-PLEX SARS-CoV-2 Panel 19 Kit	SARS-CoV-2 Plate 19
V-PLEX SARS-CoV-2 Panel 20 Kit	SARS-CoV-2 Plate 20
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V-PLEX SARS-CoV-2 Panel 26 Kit	SARS-CoV-2 Plate 26
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V-PLEX SARS-CoV-2 Panel 29 Kit	SARS-CoV-2 Plate 29
V-PLEX SARS-CoV-2 Panel 30 Kit	SARS-CoV-2 Plate 30
V-PLEX SARS-CoV-2 Panel 31 Kit	SARS-CoV-2 Plate 31
V-PLEX SARS-CoV-2 Panel 32 Kit	SARS-CoV-2 Plate 32
V-PLEX SARS-CoV-2 Panel 33 Kit	SARS-CoV-2 Plate 33
V-PLEX SARS-CoV-2 Panel 34 Kit	SARS-CoV-2 Plate 34
V-PLEX SARS-CoV-2 Panel 36 Kit	SARS-CoV-2 Plate 36
V-PLEX SARS-CoV-2 Panel 37 Kit	SARS-CoV-2 Plate 37
V-PLEX SARS-CoV-2 Key Variant Spike Panel 1 Kit	SARS-CoV-2 Key Variant Spike Plate 1
V-PLEX SARS-CoV-2 Key Variant RBD Panel 1 Kit	SARS-CoV-2 Key Variant RBD Plate 1
V-PLEX COVID-19 Coronavirus Panel 1 Kit	Coronavirus Plate 1
V-PLEX COVID-19 Coronavirus Panel 2 Kit	Coronavirus Plate 2
V-PLEX COVID-19 Coronavirus Panel 3 Kit	Coronavirus Plate 3
V-PLEX COVID-19 Respiratory Panel 2 Kit	Coronavirus Plate 2
	Respiratory Plate 1
V-PLEX COVID-19 Respiratory Panel 3 Kit	Coronavirus Plate 3
	Respiratory Plate 1
V-PLEX Respiratory Panel 1 Kit	Respiratory Plate 1

Table 3. Reagents and Components

Reagent	Storage	Catalog Number	Size	Quantity Supplied	
				5-Plate Kit	25-Plate Kit
MULTI-SPOT 96-Well, 10-Spot plate	2–8 °C	—	10-Spot	5 plates	25 plates
SULFO-TAG Human ACE2 Protein (200X)	2–8 °C	D21ADG-3	100 µL	1 vial	5 vials
ACE2 Calibration Reagent (10X)‡	2–8 °C	C01ADG-2	65 µL	1 vial	5 vials
ACE2 Calibration Reagent 2 (10X)‡	2–8 °C	C01AJZ-2	65 µL	1 vial	5 vials
ACE2 Calibration Reagent 3 (10X)‡‡	≤-70 °C	C01APE-2	65 µL	1 vial	5 vials
Diluent 100	2–8 °C	R50AA-2	200 mL	1 bottle	5 bottles
MSD Wash Buffer (20X)	RT	R61AA-1	100 mL	1 bottle	5 bottles
Blocker A	RT	R93BA-2	250 mL	1 bottle	5 bottles
MSD Phosphate Buffer (5X)	RT	R93SA-2	50 mL	1 bottle	5 bottles
MSD GOLD™ Read Buffer B	RT	R60AM-2	90 mL	1 bottle	5 bottles
Microplate Adhesive Film	RT	—	—	15 sheets	75 sheets

RT = room temperature

‡ACE2 Calibration Reagent 2 (C01AJZ-2) is supplied with V-PLEX SARS-CoV-2 ACE2 Assay Kits from Panels 22 to 34. ACE2 Assay Kits prior to Panel 22 are supplied with ACE2 Calibration Reagent (C01ADG-2).

‡‡ACE2 Calibration Reagent 3 (C01APE-2) is supplied with V-PLEX SARS-CoV-2 ACE2 Assay Kits starting from Panel 36. ACE2 Calibration Reagent 3 is also available as a stand-alone product for use as an assay calibrator in all other V-PLEX COVID-19 ACE2 Neutralization Kits.

Table 4. Information about the SARS-CoV-2 variant antigens included in V-PLEX COVID-19 ACE2 Neutralization Kits

SARS-CoV-2 Spike Antigens

Lineages	Amino Acid Modifications	Common Designation
A.23.1	F157L, V367F, Q613H, P681R	Uganda
A.VOI.V2	D80Y, ΔY144, ΔI210, D215G, Δ246-248, L249M, W258L, R346K, T478R, E484K, H655Y, P681H, Q957H	Tanzania
AY.1	T19R, Δ157/158, K417N, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
AY.1	**(Alt Seq 1):** T19R, T95I, G142D, E156G, Δ157/158, W258L, K417N, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
AY.2	T19R, V70F, G142D, Δ157/158, A222V, K417N, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
AY.2	**(Alt Seq 1):** T19R, V70F, G142D, E156G, Δ157/158, A222V, K417N, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
AY.4.2	T19R, T95I, G142D, Y145H, Δ156/157, R158G, A222V, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
AY.12	T19R, Δ156/157, R158G, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
BA.1+L452R	A67V, Δ69-70, T95I, G142D/Δ143-145, Δ211/L212I, ins214EPE, G339D, S371L, S373P, S375F, K417N, N440K, L452R, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H, T547K, D614G, H655Y, N679K, P681H, N764K, D796Y, N856K, Q954H, N969K, L981F	**Omicron** sublineage
BA.1+R346K; BA.1.1; BA.1.1.15	A67V, Δ69-70, T95I, G142D/Δ143-145, Δ211/L212I, ins214EPE, G339D, R346K, 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	**Omicron** sublineages
BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.12	T19I, (L24-A27)toS, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineages
BA.2+L452M	T19I. (L24-A27)toS, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452M, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.2+L452R	T19I, (L24-A27)toS, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.2.12.1	T19I, (L24-A27)toS, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452Q, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, S704LN764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.2.75	T19I, L24-A27>S, G142D, K147E, W152R, F157L, I210V, V213G, G257S, G339H, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, G446S, N460K, S477N, T478K, E484A, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.2.75.2	T19I, L24-A27>S, G142D, K147E, W152R, F157L, I210V, V213G, G257S, G339H, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, G446S, N460K, S477N, T478K, E484A, F486S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K, D1199N	**Omicron** sublineage

Lineages	Amino Acid Modifications	Common Designation
BA.2.86	T19I, R21T, L24-A27>S, S50L, H69del, V70del, V127F, G142D, Y144del, F157S, R158G, N211del, L212I, V213G, L216F, H245N, A264D, I332V, G339H, K356T, S371F, S373P, S375F, T376A, R403K, D405N, R408S, K417N, N440K, V445H, G446S, N450D, L452W, N460K, S477N, T478K, N481K, V483del, E484K, F486P, Q498R, N501Y, Y505H, E554K, A570V, D614G, P621S, H655Y, I670V, N679K, P681R, N764K, D796Y, S939F, Q954H, N969K, P1143L	**Omicron** sublineage
BA.3	A67V, H69-V70del, T95I, G142D, V143-Y145del, (N211-L212)toI, G339D, S371F, S373P, S375F, D405N, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.4	T19I, (L24-A27)toS, del69/70, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N658S, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.4.6	V3G, T19I, L24-A27>S, H69-V70del, G142D, V213G, G339D, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N658S, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BA.5	T19I, (L24-A27)toS, del69/70, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BF.7	T19I, L24-A27>S, H69-V70del, G142D, V213G, G339D, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BN.1	T19I, L24-A27>S, G142D, K147E, W152R, F157L, I210V, V213G, G257S, G339H, R346T, K356T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, G446S, N460K, S477N, T478K, E484A, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BQ.1	T19I, L24-A27>S, H69-V70del, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, K444T, L452R, N460K, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BQ.1.1	T19I, L24-A27>S, H69-V70del, G142D, V213G, G339D, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, K444T, L452R, N460K, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
BV-1	H69-V70, ΔY144, Q493R, N501Y, A570D, D614G, P681H, T716I, S982A, D1118H	Texas BV-1
B.1	D614G	-
B.1.1.519	T478K, D614G, P681H, T732A	Mexico/Texas BV-2
B.1.1.529; BA.1; BA.1.15	A67V, ΔH69-V70, T95I, G142D, Δ143-145, Δ211/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	**Omicron** sublineages
B.1.1.7	ΔH69-V70, ΔY144, N501Y, A570D, D614G, P681H, T716I, S982A, D1118H	**Alpha**
B.1.1.7+E484K	ΔH69-V70, ΔY144, E484K, N501Y, A570D, D614G, P681H, T716I, S982A, D1118H	U.K.
B.1.258.17	ΔH69-V70, L189F, N439K, D614G, V772I	Europe
B.1.351	L18F, D80A, D215G, Δ242-244, R246I, K417N, E484K, N501Y, D614G, A701V	**Beta**
B.1.351.1	D80A, D215G, K417N, E484K, N501Y, D614G, A701V	Botswana
B.1.429	S13I, W152C, L452R, D614G	**Epsilon**
B.1.466.2	W152R, N439K, D614G, P681R	Indonesia
B.1.525	Q52R, A67V, ΔH69-V70, ΔY144, E484K, Q677H, D614G, F888L	**Eta**
B.1.526	L5F, T95I, D253G, E484K, D614G, A701V	**Iota**
B.1.526.1	D80G, ΔY144, F157S, L452R, D614G, T859N, D950H	New York
B.1.617	L452R, E484Q, D614G	India
B.1.617.1	T95I, G142D, E154K, L452R, E484Q, D614G, P681R, Q1071H	**Kappa**
B.1.617.2	T19R, Δ157/158, L452R, T478K, D614G, P681R, D950N	**Delta** sublineage
B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14	**(Alt Seq 1):** T19R, G142D, Δ156/157, R158G, L452R, T478K, D614G, P681R, D950N	**Delta** sublineages
B.1.617.2 +1	T19R, G142D, Δ156/157, R158G, L452R, T478K, E484K, D614G, P681R, D950N	**Delta** +1
B.1.617.2 +2	T19R, G142D, Δ156/157, R158G, L452R, T478K, E484K, N501Y, D614G, P681R, D950N	**Delta** +2
B.1.617.2 +3	T19R, G142D, Δ156/157, R158G, K417N, L452R, T478K, E484K, N501Y, D614G, P681R, D950N	**Delta** +3
B.1.617.2 +4	T19R, G142D, Δ156/157, R158G, K417N, N439K, L452R, T478K, E484K, N501Y, D614G, P681R, D950N	**Delta** +4
B.1.617.2; AY.4	**(Alt Seq 2):** T19R, T95I, G142D, Δ156/157, R158G, L452R, T478K, D614G, P681R, D950N	**Delta** sublineages
B.1.617.2+ΔY144	T19R, ΔY144, Δ157/158, L452R, T478K, D614G, P681R, D950N	Vietnam
B.1.617.3	T19R, G142D, L452R, E484Q, D614G, P681R, D950N	India

Lineages	Amino Acid Modifications	Common Designation
B.1.618	ΔY145/146, E484K, D614G	India
B.1.620	P26S, ΔH69-V70, V126A, ΔY144, Δ242-244, H245Y, S477N, E484K, D614G, P681H, T1027I, D1118H	Europe
B.1.621	T95I, Y144T, Y145S, ins146N, R346K, E484K, N501Y, D614G, P681H, D950N	**Mu**
B.1.640.2	P9L, E96Q, C136-Y144del, R190S, D215H, R346S, N394S, Y449N, E484K, F490S, N501Y, D614G, P681H, T859N, D1139H	France (IHU)
C.37	G75V, T76I, ΔR246, ΔS247, ΔY248, ΔL249, ΔT250, ΔP251, ΔG252, D253N, L452Q, F490S, D614G, T859N	**Lambda**
EG.5.1	T19I, L24-A27>S, Q52H, G142D, Y144del, H146Q, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, F456L, N460K, S477N, T478K, E484A, F486P, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
FL.1.5.1	T19I, L24-A27>S, G142D, Y144del, H146Q, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, F456L, N460K, S477N, T478R, E484A, F486P, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, A701V, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
P.1	L18F, T20N, P26S, D138Y, R190S, K417T, E484K, N501Y, D614G, H655Y, T1027I, V1176F	**Gamma**
P.2	E484K, D614G, V1176F	**Zeta**
P.3	Δ141-143, E484K, N501Y, D614G, P681H, E1092K, H1101Y, V1176F	Philippines
R.1	W152L, E484K, D614G, G769V	Kentucky
XBB.1	T19I, L24-A27>S, G142D, Y144del, H146Q, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, N460K, S477N, T478K, E484A, F486S, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
XBB.1.16	T19I, L24-A27>S, G142D, Y144del, H146Q, E180V, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, N460K, S477N, T478R, E484A, F486P, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
XBB.1.16.1	T19I, L24-A27>S, G142D, Y144del, H146Q, E180V, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, N460K, S477N, T478R, E484A, F486P, F490S, Q498R, N501Y, Y505H, T547I, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
XBB.1.16.6	T19I, L24-A27>S, G142D, Y144del, H146Q, E180V, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, F456L, N460K, S477N, T478R, E484A, F486P, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
XBB.1.5	T19I, L24-A27>S, G142D, Y144del, H146Q, Q183E, V213E, G252V, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, N460K, S477N, T478K, E484A, F486P, F490S, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage
XBB.2.3	T19I, L24-A27>S, G142D, Y144del, H146Q, Q183E, V213E, D253G, G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, N460K, S477N, T478K, E484A, F486P, F490S, Q498R, N501Y, Y505H, P521S, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K	**Omicron** sublineage

- = Not applicable

Note: Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as "**Alt Seq #**."

SARS-CoV-2 S1 RBD Antigens

Lineages	Amino Acid Modifications	Common Designation
A.23.1	V367F	Uganda
A.VOI.V2	R346K, T478R, E484K	Tanzania
AY.1; AY.2	K417N, L452R, T478K	**Delta** sublineages
AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144	L452R, T478K	**Delta** sublineages
BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.10.1; BA.2.12	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	**Omicron** sublineages
BA.2+L452M	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452M, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	**Omicron** sublineage
BA.2+L452R	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	**Omicron** sublineage
BA.2.12.1	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452Q, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	**Omicron** sublineage
BA.2.75	G339H, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, G446S, N460K, S477N, T478K, E484A, Q498R, N501Y, Y505H	**Omicron** sublineage
BA.2.75.2	G339H, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, G446S, N460K, S477N, T478K, E484A, F486S, Q498R, N501Y, Y505H	**Omicron** sublineage

Lineages	Amino Acid Modifications	Common Designation
BA.3	G339D, S371F, S373P, S375F, D405N, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	**Omicron** sublineage
BA.4; BA.5	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H	**Omicron** sublineages
BA.4.6; BF.7	G339D, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H	**Omicron** sublineages
BQ.1	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, K444T, L452R, N460K, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H	**Omicron** sublineage
BQ.1.1	G339D, R346T, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, K444T, L452R, N460K, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H	**Omicron** sublineage
BV-1	Q493R, N501Y	Texas BV-1
B.1.1.519	T478K	Mexico/Texas BV-2
B.1.1.529; BA.1; BA.1.15	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	**Omicron** sublineages
BA.1.1; BA.1.1.15	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H	**Omicron** sublineages
B.1.1.7	N501Y	**Alpha**
B.1.1.7+E484K; P.3	E484K, N501Y	U.K.; Philippines
B.1.214.2	Q414K, N450K	Belgium
B.1.258.17; B.1.466.2	N439K	Europe; Indonesia
B.1.351; B.1.351.1	K417N, E484K, N501Y	**Beta;** Botswana
B.1.427; B.1.429; B.1.526.1	L452R	**Epsilon** lineages; New York
B.1.525; B.1.526; B.1.618; P.2; R.1	E484K	**Eta; Iota;** India**; Zeta;** Kentucky
B.1.526.2	S477N	New York
B.1.617; B.1.617.1; B.1.617.3	L452R, E484Q	India; **Kappa**; India
B.1.620	S477N, E484K	Europe
C.37	L452Q, F490S	**Lambda**
P.1	K417T, E484K, N501Y	**Gamma**
XBB.1	G339H, R346T, L368I, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, V445P, G446S, N460K, S477N, T478K, E484A, F486S, F490S, Q498R, N501Y, Y505H	**Omicron** sublineage

Additional Materials and Equipment

- ❑ Appropriately sized tubes for reagent preparation
- ❑ Deionized water
- ❑ 0.2 µM filter needed for Blocker A preparation
- ❑ 96-well plates
- ❑ Microtiter plate shaker capable of shaking at ~700 rpm
- ❑ Microcentrifuge tubes for making serial dilutions
- ❑ Automated plate washer or other efficient multi-channel pipetting equipment for washing 96-well plates
- ❑ Appropriate liquid handling equipment for desired throughput capable of accurately dispensing 50 µL and 150 µL into a 96-well microplate
- ❑ Vortex mixer

Safety

Use safe laboratory practices and wear gloves, safety glasses, and laboratory coats when handling kit components. Handle and dispose of all hazardous samples properly in accordance with local, state, and federal guidelines.

Additional product-specific safety information is available in the applicable safety data sheet(s) (SDS), which can be obtained from MSD Customer Service or at www.mesoscale.com®.

Best Practices

- Mixing or substituting reagents from different sources or different kit lots is not recommended. Lot information is provided in the lot-specific certificate of analysis (COA).
- Assay incubation steps should be performed at 20-26 ºC to maximize consistency in signals between runs.
- Avoid prolonged exposure of the detection ACE2 protein (stock or diluted) to light. During the antibody incubation step, plates do not need to be shielded from light except for direct sunlight.
- Avoid bubbles in wells at all pipetting steps as they may lead to variable results. Bubbles introduced when adding read buffer may interfere with signal detection.
- Do not touch the pipette tip on the bottom of the wells when pipetting into the MSD plate.
- Use reverse pipetting when necessary to avoid introduction of bubbles. For empty wells, pipette gently to the bottom corner. Do not touch the pipette tip to the bottom of the wells when pipetting into the MSD plate.
- Plate shaking should be vigorous, with a rotary motion between 500-1,000 rpm. Binding reactions may reach equilibrium sooner if shaken in the middle of this range (~700 rpm) or above.
- When performing manual plate washing using a multi-channel pipette, plates should be washed using at least 150 µL of wash buffer per well. Excess residual volume after washing should be removed by gently tapping the plate on a paper towel.
- Do not allow plates to dry after washing steps. Solutions associated with the next assay step should be added to the plate immediately after washing.
- Make sure that the read buffer is at room temperature when adding to the plate.
- To improve interplate precision, keep time intervals consistent between adding read buffer and reading the plate. Unless otherwise directed, read the plate as soon as possible after adding read buffer.
- Do not shake the plate after adding read buffer.
- Remove the plate seals before reading the plate.
- If the sample results are above the top of the calibration curve, dilute the samples, and repeat the assay.
- We do not recommend using a partial plate when running this panel.

Recommended Protocol

Bring all plates, calibration reagent and diluents to room temperature. Thaw samples on ice.

A sample plate layout is shown in Figure 3 (below).

Prepare Blocker A Solution

Follow the preparation procedure in the product insert provided with the Blocker A Kit to prepare the Blocker A solution. You may store unused Blocker A solution according to the instructions in the Blocker A product insert available at www.mesoscale.com.

Prepare Wash Buffer

MSD provides 100 mL of Wash Buffer as a 20X stock solution. Dilute the stock solution before use. PBS + 0.05% Tween-20 can be used as an alternative to MSD Wash Buffer.

For one plate, combine:

- ❑ 15 mL of MSD Wash Buffer (20X)
- ❑ 285 mL of deionized water

Assay Diluent

Use Diluent 100 as assay diluent.

STEP 1: Prepare Plate

- ❑ Remove the plate from its packaging.
- ❑ Add 150 µL/well of Blocker A solution to the plate.
- ❑ Seal the plate with an adhesive plate seal and incubate at room temperature with shaking (~700 rpm) for 30 minutes.

During this time, prepare samples and calibrators.

Sample Preparation:

Prepare the samples by diluting with Diluent 100. The optimal dilution for samples should be determined empirically by the user. Typically, serum and plasma samples are measured at a dilution between 10-fold and 100-fold to keep samples within the measurable range. To allow accurate and meaningful comparison between samples, compare results obtained using the same sample dilution.

Notes: For other sample types, users should run a pilot dilution series to determine the optimal dilution.

This protocol provides guidance for preparing 10-fold and 100-fold dilutions.

1. To make an intermediate 1:10 dilution in a 2 mL tube, or 96-well plate, combine:
    - ❑ 10 µL of sample
    - ❑ 90 µL of Diluent 100
2. To make a 1:100 dilution in a 2 mL tube, or 96-well plate, combine:
    - ❑ 10 µL of the 1:10 dilution from Step 1
    - ❑ 90 µL of Diluent 100

Calibrator Preparation:

The kits include a Calibration Reagent, which is used to establish a calibration curve in the assay. Calibration Reagent for the competition assay (COVID-19 neutralizing antibody) is supplied at a 10-fold higher concentration than the recommended highest calibrator. We recommend a 7-point calibration curve with 4-fold serial dilution steps and a zero calibrator blank (Figure 2). Equilibrate the 10X calibrator stock to room temperature, and then add to Diluent 100 to make the calibration curve solution. For the lot-specific concentration of 10X Calibrator Stock, refer to the COA supplied with the Calibration Reagent. You can find a copy of the COA at www.mesoscale.com.

Notes:

- The monoclonal antibody present in the ACE2 Calibration Reagent (C01ADG-2) does not bind to the Omicron Spike and RBD. The ACE2 Calibration Reagent 2 (C01AJZ-2) includes a blend of monoclonal antibodies that bind to all pre-Omicron SARS-CoV 2 variants and limited sublineages of the Omicron variant, including BA.1.1.529, BA.1, BA.2, and BA.3. The ACE2 Calibration Reagent and ACE2 Calibration Reagent 2 reports concentration in units/mL where 1 unit/mL corresponds to neutralizing activity of 1 µg/mL monoclonal antibody to SARS CoV-2 Spike Protein.
- ACE2 Calibration Reagent 3 (C01APE-2) is a serum-based calibrator that demonstrates neutralizing activity against Spike and RBD antigens from all SARS-CoV 2 variants on the V-PLEX COVID-19 ACE2 Neutralization Kits. The ACE2 Calibration Reagent 3 reports assigned values for neutralizing antibodies against multiple antigens in MSD Inhibitory Antibody Units per mL (IAU/mL), where 1 IAU/mL is the concentration that provides 90% inhibition of the binding of ACE2 to a target antigen.

Volumes below are enough for up to 2 replicates.

1. To make the CAL-01 in a 2 mL tube, combine:
   - ❑ 10 µL of the 10X Calibrator Stock
   - ❑ 90 µL of Diluent 100
2. To prepare a 4-fold dilution for the next calibrator, CAL-02, in a 2 mL tube combine:
   - ❑ 25 µL of the diluted calibrator from Step 1
   - ❑ 75 µL of Diluent 100
3. Repeat 4-fold serial dilutions 5 additional times to generate 6 calibrators
4. The 8th standard CAL-08 is Diluent 100 (zero calibrator)

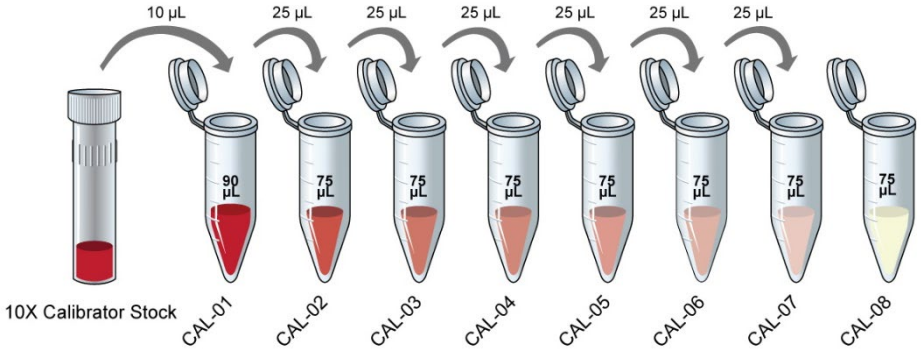

Figure 2. Dilution schema for preparation of calibrator solutions.

STEP 2: Sample and Calibrator Addition

After the Blocker A incubation step, wash the plate 3 times with at least 150 µL/well of 1X MSD Wash buffer.

- ❑ Add 25 µL/well of diluted samples and calibrator to the plate.
- ❑ Seal the plate with an adhesive plate seal and incubate at room temperature with shaking (~700 rpm) for 1 hour.

Note: **Do not aspirate or wash the plate prior to addition of detection solution.**

During this time, prepare the ACE2 detection solution.

ACE2 Detection Solution Preparation:

SULFO-TAG Human ACE2 Protein is provided as a 200X stock solution. The working solution is 1X. You will need 3 mL per plate. To prepare a 1X solution of SULFO-TAG Human ACE2 Protein, combine:

- ❑ 2,985 µL of Diluent 100
- ❑ 15 µL of 200X SULFO-TAG Human ACE2 Protein

STEP 3: ACE2 Detection Addition

After the sample and calibrator incubation, **do not aspirate or wash the plate prior to addition of detection solution**.

- ❑ Add 25 µL/well of 1X SULFO-TAG Human ACE2 Protein detection solution to the plate.
- ❑ Seal the plate with an adhesive plate seal and incubate at room temperature with shaking (~700 rpm) for 1 hour.

STEP 4: Read Buffer Addition

After the detect incubation step, wash the plate 3 times with at least 150 µL/well of 1X MSD Wash buffer.

MSD provides MSD GOLD Read Buffer B ready for use. Do not dilute.

- ❑ Add 150 µL/well of the MSD GOLD Read Buffer B.
- ❑ Read the plate on the MSD instrument. No incubation in read buffer is required before reading the plate. Read plate immediately after adding read buffer. Do not shake the plate after adding read buffer.

STEP 5: Analysis of Results

Results can be reported as percent inhibition, calculated using the equation below. Highly positive samples show high percent inhibition whereas negative or low samples show low percent inhibition.

$$\%\ Inhibition = 1 - \frac{Average\ Sample\ ECL\ Signal}{Average\ ECL\ signal\ of\ Calibrator\ 8\ (Diluent\ only)}\ x\ 100$$

Alternatively, the calibration curve can be used to calculate neutralizing antibody concentrations in samples, by backfitting the measured signals for samples to the calibration curve. Correcting for dilution provides the final neutralizing antibody concentrations in undiluted samples. For example, if 100-fold diluted samples are tested, multiply the backfitted concentrations by 100.

Notes:

- Calibration curves used to calculate antibody concentrations are established by fitting the signals from the calibrators to a 4-parameter logistic (or sigmoidal dose-response) model with a $1/Y^2$ weighting. Best quantification of unknown samples is achieved by generating a calibration curve for each plate using a minimum of two replicates at each calibrator level.
- To allow accurate and meaningful comparison between samples, compare results obtained using the same sample dilution.

Protocol at a Glance

Note: Bring all plates, calibration reagent, and diluents to room temperature. Thaw samples on ice.

- ❑ Add Blocker A solution; incubate for at least 30 minutes, wash.
- ❑ Add samples and calibrators; incubate for 1 hour, do not wash.
- ❑ Add Detection ACE2 solution; incubate for 1 hour, wash.
- ❑ Add Read Buffer and analyze plate.

Plate Layout

	1	2	3	4	5	6	7	8	9	10	11	12
A	CAL-01		Sample-01		Sample-09		Sample-17		Sample-25		Sample-33	
B	CAL-02		Sample-02		Sample-10		Sample-18		Sample-26		Sample-34	
C	CAL-03		Sample-03		Sample-11		Sample-19		Sample-27		Sample-35	
D	CAL-04		Sample-04		Sample-12		Sample-20		Sample-28		Sample-36	
E	CAL-05		Sample-05		Sample-13		Sample-21		Sample-29		Sample-37	
F	CAL-06		Sample-06		Sample-14		Sample-22		Sample-30		Sample-38	
G	CAL-07		Sample-07		Sample-15		Sample-23		Sample-31		Sample-39	
H	CAL-08		Sample-08		Sample-16		Sample-24		Sample-32		Sample-40	

Figure 3. Sample plate layout that can be used for the assay. Each sample and calibrator is measured in duplicate in side-by-side wells.

Appendix A: Clinical Sensitivity and Specificity

Clinical sensitivity, specificity, and cutoff values were established for two SARS-CoV-2 antigens using receiver operating characteristic curve (ROC) analysis. Commercially sourced serum samples from pre-2019 healthy adults (N=200) and PCR-confirmed COVID-19 patients (N=214) were tested. PCR-positive samples were grouped by time from diagnosis: 0 to 14 and 15+ days. The cutoff values shown in the table below were determined based on samples run at 10-fold dilution.

	ACE2				
Antigen	Cutoff Value*	Units	Early Sensitivity (Day 0-14)‡	Late Sensitivity (Day 15+)‡	Specificity‡
SARS-CoV-2 S1 RBD	0.726	µg/mL	86.8% (71.9%–95.6%)	97.7% (94.3%–99.4%)	98.5% (95.7%–99.7%)
SARS-CoV-2 Spike	0.533	µg/mL	92.1% (78.6%–98.3%)	98.3% (95.1%–99.6%)	99.5% (97.2%–100%)

*Dilution-adjusted sample concentration. Cutoff values provided for RUO purposes only
‡95% Confidence Interval shown in parenthesis

Appendix B

Coated Antigens

Antigens	Antigen Description *	Antigen Modifications
SARS-CoV-2 Nucleocapsid	Severe Acute Respiratory Syndrome Coronavirus 2 Nucleocapsid Protein	Full length Nucleocapsid; C-terminal His-Tag
SARS-CoV-2 S1 NTD	Severe Acute Respiratory Syndrome Coronavirus 2 N-Terminal Domain of the S1 subunit	Q14-L303 of the SARS-CoV-2 Spike Sequence; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 S1 RBD	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 Spike	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 S1 RBD (A.23.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Uganda variant A.23.1 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (A.VOI.V2)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Mexico/Texas BV-2 variant B.1.1.519 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (AY.1; AY.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Delta variant AY.1 and AY.2 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (AY.3; AY.4; AY.4.2; AY.5; AY.6; AY.7; AY.12; AY.14; B.1.617.2; B.1.617.2+ΔY144)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Delta variant AY.3, AY.4, AY.4.2, AY.5, AY.6, AY.7, AY.12, AY.14, B.1.617.2, and B.1.617.2+ΔY144 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.1.1; BA.1.1.15)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.1.1 and BA.1.1.15 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.10.1; BA.2.12)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.2, BA.2.1, BA.2.2, BA.2.3, BA.2.5, BA.2.6, BA.2.7, BA.2.8, BA.2.10, BA.2.10.1, and BA.2.12 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.2+L452M)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.2+L452M sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag;
SARS-CoV-2 S1 RBD (BA.2+L452R)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.2+L452R sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag

Antigens	Antigen Description *	Antigen Modifications
SARS-CoV-2 S1 RBD (BA.2.12.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.2.12.1 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.2.75)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.2.75 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.2.75.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.2.75.2 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.3)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.3 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.4; BA.5)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.4 and BA.5 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BA.4.6; BF.7)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BA.4.6 and BF.7 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BQ.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BQ.1 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BQ.1.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant BQ.1.1 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (BV-1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Texas BV-1 variant	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.1.519)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Mexico/Texas BV-2 variant B.1.1.519 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1; BA.1.15)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant B.1.1.529, BA.1, and BA.1.15 sublineages	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.1.7)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Alpha Variant B.1.1.7 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.1.7+E484K; P3)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit U.K. variant B.1.1.7+E484K lineage and Philippines variant P.3 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.214.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Belgium variant B.1.214.2 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.258.17; B.1.466.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Europe variant B.1.258.17 lineage and Indonesia variant B.1.466.2 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.351; B.1.351.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Beta variant B.1.351 lineage and Botswana variant B.1.351.1 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.427; B.1.429; B.1.526.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Epsilon variant B.1.427 and B.1.429 lineages, and New York variant B.1.526.1 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag; L452R
SARS-CoV-2 S1 RBD (B.1.525; B.1.526; B.1.618; P.2; R.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Eta variant B.1.525 lineage, Iota variant B.1.526 lineage, India variant B.1.618 lineage, Zeta variant P.2 lineage, and Kentucky variant R.1 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag; E484K
SARS-CoV-2 S1 RBD (B.1.526.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit New York variant B.1.526.2 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.617; B.1.617.1; B.1.617.3)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit India variant B.1.617 and B.1.617.3 lineages, and Kappa variant B.1.617.1 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (B.1.620)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Europe variant B.1.620 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (C.37)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Lambda variant C.37 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (P.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Gamma variant P.1 lineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 S1 RBD (XBB.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Receptor Binding Domain of the S1 subunit Omicron variant XBB.1 sublineage	R319-F541 of the SARS-CoV-2 Spike Sequence; C-terminal His-Tag
SARS-CoV-2 Spike (D614G)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein D614G	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag

Antigens	Antigen Description *	Antigen Modifications
SARS-CoV-2 Spike (A.23.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Uganda variant A.23.1 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (A.VOI.V2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Tanzania variant A variant of interest	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (AY.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant AY.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (AY.1) **Alt Seq 1**	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant AY.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag; **Alt Seq 1**
SARS-CoV-2 Spike (AY.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant AY.2 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (AY.2) **Alt Seq 1**	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant AY.2 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag; **Alt Seq 1**
SARS-CoV-2 Spike (AY.4.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant AY.4.2 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (AY.12)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant AY.12 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.1+L452R)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.1+L452R sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.1+R346K; BA.1.1; BA.1.1.15)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.1+R346K, BA.1.1, and BA.1.1.15 sublineages	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2; BA.2.1; BA.2.2; BA.2.3; BA.2.5; BA.2.6; BA.2.7; BA.2.8; BA.2.10; BA.2.12)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2, BA.2.1, BA.2.2, BA.2.3, BA.2.5, BA.2.6, BA.2.7, BA.2.8, BA.2.10, and BA.2.12 sublineages	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2+L452M)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2+L452M sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2+L452R)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2+L452R sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2.12.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2.12.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2.75)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2.75 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2.75.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2.75.2 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.2.86)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.2.86 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.3)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.3 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.4)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.4 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.4.6)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.4.6 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BA.5)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BA.5 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BF.7)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BF.7 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BN.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BN.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BQ.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BQ.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BQ.1.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant BQ.1.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (BV-1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Texas BV-1 variant	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.1.519)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Mexico/Texas BV-2 variant B.1.1.519 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.1.529; BA.1; BA.1.15)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant B.1.1.529, BA.1, and BA.1.15 sublineages	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.1.7)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Alpha. variant B.1.1.7 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag

Antigens	Antigen Description *	Antigen Modifications
SARS-CoV-2 Spike (B.1.1.7+E484K)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein U.K. variant B.1.1.7+E484K lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.258.17)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Europe variant B.1.258.17 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.351)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Beta variant B.1.351 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.351.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Botswana variant B.1.351.1 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.429)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Epsilon variant B.1.429 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.466.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Indonesia variant B.1.466.2 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.525)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Eta variant B.1.525 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.526)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Iota variant B.1.526 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.526.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein New York variant B.1.526.2 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein India variant B.1.617 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Kappa variant B.1.617.1 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant B.1.617.2 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) **Alt Seq 1**	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant B.1.617.2, AY.3, AY.5, AY.6, AY.7, and AY.14 sublineages	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag; **Alt Seq 1**
SARS-CoV-2 Spike (B.1.617.2 +1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta +1 variant	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.2 +2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta +2 variant	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.2 +3)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta +3 variant	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.2 +4)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta +4 variant	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.2; AY.4) **Alt Seq 2**	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Delta variant B.1.617.2 and AY.4 sublineages	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag; **Alt Seq 2**
SARS-CoV-2 Spike (B.1.617.2+ΔY144)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Vietnam variant B.1.617.2+ΔY144 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.617.3)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein India variant B.1.617.3 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.618)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein India variant B.1.618 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.620)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Europe variant B.1.620 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.621)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Mu variant B.1.621 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (B.1.640.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein France (IHU) variant B.1.640.2 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (C.37)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Lambda variant C.37 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (EG.5.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant EG.5.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (FL.1.5.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant FL.1.5.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (P.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Gamma variant P.1 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (P.2)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Zeta variant P.2 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag

Antigens	Antigen Description *	Antigen Modifications
SARS-CoV-2 Spike (P.3)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Philippines variant P.3 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (R.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Kentucky variant R.1 lineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (XBB.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant XBB.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (XBB.1.16)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant XBB.1.16 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (XBB.1.16.1)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant XBB.1.16.1 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (XBB.1.16.6)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant XBB.1.16.6 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (XBB.1.5)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant XBB.1.5 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-2 Spike (XBB.2.3)	Severe Acute Respiratory Syndrome Coronavirus 2 Spike Protein Omicron variant XBB.2.3 sublineage	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
SARS-CoV-1 Spike	Severe Acute Respiratory Syndrome Coronavirus 1 Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
MERS-CoV Spike	Middle East Respiratory Syndrome Coronavirus Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
HCoV-229E Spike	Human Coronavirus 229E Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
HCoV-HKU1 Spike	Human Coronavirus HKU1 Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
HCoV-NL63 Spike	Human Coronavirus NL63 Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
HCoV-OC43 Spike	Human Coronavirus OC43 Spike Protein	Soluble ectodomain with T4 trimerization domain; C-terminal Strep-Tag and His-Tag
Flu A/Hong Kong/2014 H3	Influenza A Hemagglutinin Protein from A/Hong Kong/4801/2014 (H3N2)	Soluble ectodomain with T4 trimerization domain; C-terminal His-Tag
Flu A/Michigan/2015 H1	Influenza A Hemagglutinin Protein from A/Michigan/45/2015 (H1N1)	Soluble ectodomain with T4 trimerization domain; C-terminal His-Tag
Flu A/Shanghai/2013 H7	Influenza A Hemagglutinin Protein from A/Shanghai/2/2013 (H7N9)	Soluble ectodomain with T4 trimerization domain; C-terminal His-Tag
Flu B/Brisbane/2008 HA	Influenza B Hemagglutinin Protein from B/Brisbane/60/2008 (B Victoria Lineage)	Soluble ectodomain with T4 trimerization domain; C-terminal His-Tag
Flu B/Phuket/2013 HA	Influenza B Hemagglutinin Protein from B/Phuket/3073/2013 B Yamagata Lineage)	Soluble ectodomain with T4 trimerization domain; C-terminal His-Tag
RSV Pre-Fusion F	Respiratory Syncytial Virus Pre-Fusion F Protein	Soluble ectodomain with T4 trimerization domain; C-terminal His-Tag and Strep-Tag

*EXPI293 cell line used as an expression system
Note: Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as "**Alt Seq #**."

Calibrator Reagents

- ACE2 Calibration Reagent (10X): SARS-CoV/SARS-CoV-2 Spike Monoclonal Antibody.
- ACE2 Calibration Reagent 2 (10X): SARS-CoV/SARS-CoV-2 Spike Monoclonal Antibody blend.
- ACE2 Calibration Reagent 3 (10X): Serum-based calibration reagent.

Detection Reagent

Recombinant Human Angiotensin-Converting Enzyme 2 (ACE2).

Catalog Numbers

Table 6. Catalog Number for the V-PLEX COVID-19 ACE2 Neutralization Kits

Kit Name	ACE2	
	5-Plate Kit	25-Plate Kit
Multiplex Kits on the MULTI-SPOT 96-Well, 10-Spot plate		
V-PLEX SARS-CoV-2 Panel 1 Kit	K15375U-2	K15375U-4
V-PLEX SARS-CoV-2 Panel 2 Kit	K15386U-2	K15386U-4
V-PLEX SARS-CoV-2 Panel 5 Kit	K15432U-2	K15432U-4
V-PLEX SARS-CoV-2 Panel 6 Kit	K15436U-2	K15436U-4
V-PLEX SARS-CoV-2 Panel 7 Kit	K15440U-2	K15440U-4
V-PLEX SARS-CoV-2 Panel 8 Kit	K15447U-2	K15447U-4
V-PLEX SARS-CoV-2 Panel 9 Kit	K15451U-2	K15451U-4
V-PLEX SARS-CoV-2 Panel 11 Kit	K15458U-2	K15458U-4
V-PLEX SARS-CoV-2 Panel 12 Kit	K15462U-2	K15462U-4
V-PLEX SARS-CoV-2 Panel 13 Kit	K15466U-2	K15466U-4
V-PLEX SARS-CoV-2 Panel 14 Kit	K15471U-2	K15471U-4
V-PLEX SARS-CoV-2 Panel 15 Kit	K15502U-2	K15502U-4
V-PLEX SARS-CoV-2 Panel 16 Kit	K15519U-2	K15519U-4
V-PLEX SARS-CoV-2 Panel 17 Kit	K15527U-2	K15527U-4
V-PLEX SARS-CoV-2 Panel 18 Kit	K15535U-2	K15535U-4
V-PLEX SARS-CoV-2 Panel 19 Kit	K15543U-2	K15543U-4
V-PLEX SARS-CoV-2 Panel 20 Kit	K15554U-2	K15554U-4
V-PLEX SARS-CoV-2 Panel 22 Kit	K15562U-2	K15562U-4
V-PLEX SARS-CoV-2 Panel 23 Kit	K15570U-2	K15570U-4
V-PLEX SARS-CoV-2 Panel 24 Kit	K15578U-2	K15578U-4
V-PLEX SARS-CoV-2 Panel 25 Kit	K15586U-2	K15586U-4
V-PLEX SARS-CoV-2 Panel 26 Kit	K15596U-2	K15596U-4
V-PLEX SARS-CoV-2 Panel 27 Kit	K15609U-2	K15609U-4
V-PLEX SARS-CoV-2 Panel 28 Kit	K15617U-2	K15617U-4
V-PLEX SARS-CoV-2 Panel 29 Kit	K15627U-2	K15627U-4
V-PLEX SARS-CoV-2 Panel 30 Kit	K15635U-2	K15635U-4
V-PLEX SARS-CoV-2 Panel 31 Kit	K15645U-2	K15645U-4
V-PLEX SARS-CoV-2 Panel 32 Kit	K15671U-2	K15671U-4
V-PLEX SARS-CoV-2 Panel 33 Kit	K15679U-2	K15679U-4
V-PLEX SARS-CoV-2 Panel 34 Kit	K15693U-2	K15693U-4
V-PLEX SARS-CoV-2 Panel 36 Kit	K15716U-2	K15716U-4
V-PLEX SARS-CoV-2 Panel 37 Kit	K15722U-2	K15722U-4
V-PLEX SARS-CoV-2 Key Variant Spike Panel 1 Kit	K15654U-2	K15654U-4
V-PLEX SARS-CoV-2 Key Variant RBD Panel 1 Kit	K15662U-2	K15662U-4
V-PLEX COVID-19 Coronavirus Panel 1 Kit	K15376U-2	K15376U-4
V-PLEX COVID-19 Coronavirus Panel 2 Kit	K15378U-2	K15378U-4
V-PLEX COVID-19 Coronavirus Panel 3 Kit	K15402U-2	K15402U-4

Plate Diagram

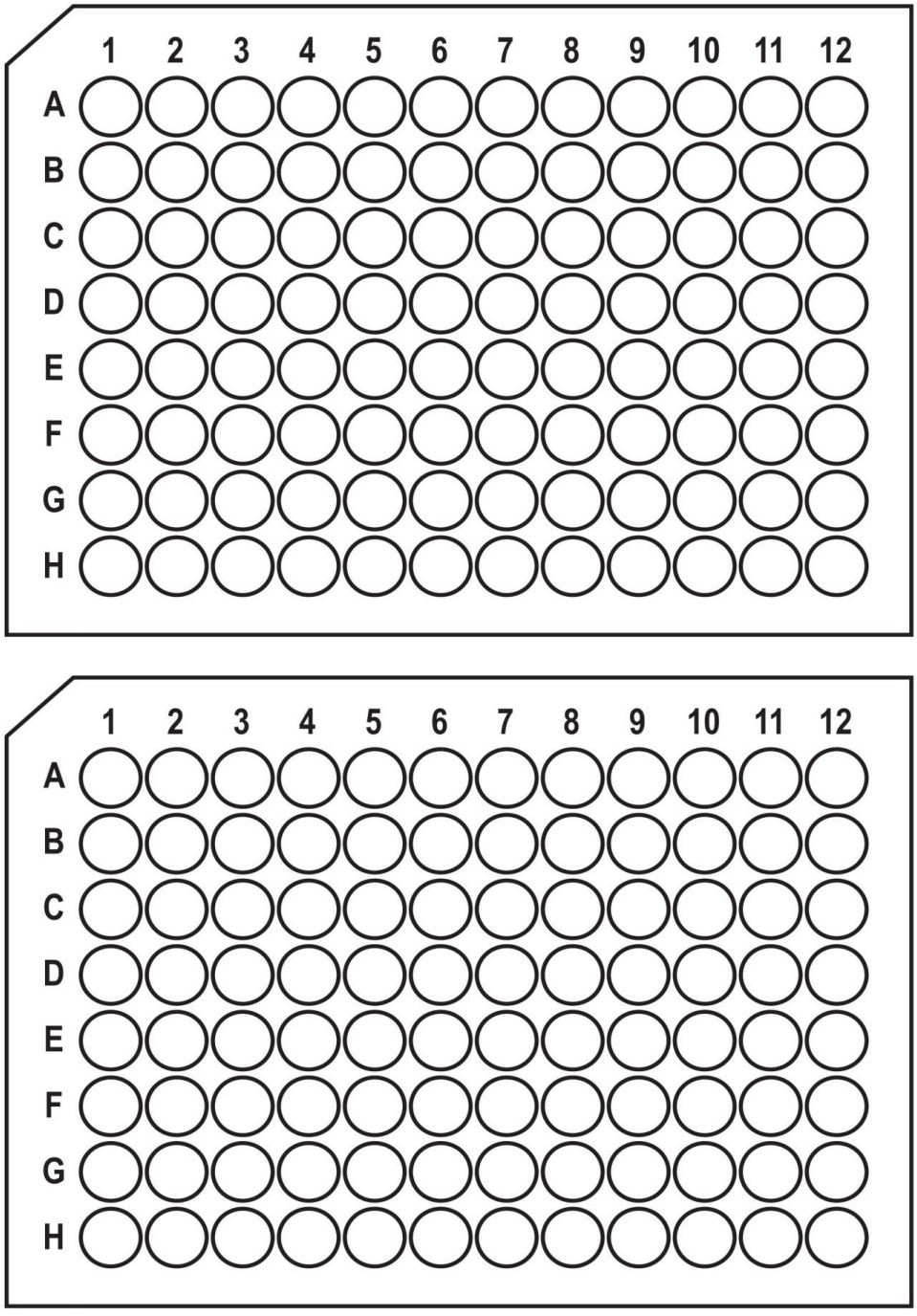

Figure 4. Plate diagram.