

Recombinant SARS-CoV-2 Spike RBD

#R00597

Size: 100 µg

Stability & Storage

Use a manual defrost freezer and avoid repeated freeze-thaw cycles.

- 12 months from date of receipt, -20 to -70 °C as supplied.
- 1 month, 2 to 8 °C under sterile conditions after reconstitution.
- 3 months, -20 to -70 °C under sterile conditions after reconstitution.



Warning: This product is intended for scientific research only. It is not to be used for medical or diagnostic procedures in humans or animals, nor as a food, cosmetic, or household product.

Background

SARS-CoV-2, which causes the global pandemic coronavirus disease 2019 (Covid-19), belongs to a family of viruses known as coronaviruses that are commonly comprised of four structural proteins: Spike protein (S), Envelope protein (E), Membrane protein (M), and Nucleocapsid protein (N). SARS-CoV-2 Spike Protein (S Protein) is a glycoprotein that mediates membrane fusion and viral entry. The S protein is homotrimeric, with each ~180-kDa monomer consisting of two subunits, S1 and S2. In SARS-CoV-2, as with most coronaviruses, proteolytic cleavage of the S protein into two distinct peptides, S1 and S2 subunits, is required for activation. The S1 subunit is focused on attachment of the protein to the host receptor while the S2 subunit is involved with cell fusion. Based on structural biology studies, the receptor binding domain (RBD), located in the C-terminal region of S1, can be oriented either in the up/standing or down/lying state.

The standing state is associated with higher pathogenicity and both SARS-CoV-1 and MERS can access this state due to the flexibility in their respective RBDs. A similar two-state structure and flexibility is found in the SARS-CoV-2 RBD. Based on amino acid (aa) sequence homology, the SARS-CoV-2 S1 subunit RBD has 73% identity with the RBD of the SARS-CoV-1 S1 RBD, but only 22% homology with the MERS S1 RBD. The low aa sequence homology is consistent with the finding that SARS and MERS bind different cellular receptors. The S Protein of the SARS-CoV-2 virus, like the SARS-CoV-1 counterpart, binds Angiotensin-Converting Enzyme 2 (ACE2), but with much higher affinity and faster binding kinetics. Before binding to the ACE2 receptor, structural analysis of the S1 trimer shows that only one of the three RBD domains in the trimeric structure is in the "up" conformation. This is an unstable and transient state that passes between trimeric subunits but is

nevertheless an exposed state to be targeted for neutralizing antibody therapy. Polyclonal antibodies to the RBD of the SARS-CoV-2 protein have been shown to inhibit interaction with the ACE2 receptor, confirming RBD as an attractive target for vaccinations or antiviral therapy. There is also promising work showing that the RBD may be used to detect presence of neutralizing antibodies present in a patient's bloodstream, consistent with developed immunity after exposure to the SARS-CoV-2 virus. Lastly, it has been demonstrated the S Protein can invade host cells through the CD147/EMMPRIN receptor and mediate membrane fusion.

AA Sequence

RVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNR
KRISNCVADYSVLVNSASFSTFKCYGVSPSTKLNDLCF
TNVYADSFVIRGDEVQRQIAPGQTGKIADYNYKLPDDF
TGCVIAWNSNNLDSKVGGNVNYLYRLFRKSNLKPFE
RDISTEIQAGSTPCNGVEGFNCYFPLQSYGFQPTN

GVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKC
VNF

Reconstitution

We recommend that the vial is briefly centrifuged prior to opening to bring the contents to the bottom. Reconstitute in 10 mM HCl to a concentration of 0.1-1.0 mg/mL. Stock solutions should be apportioned into working aliquots and stored at ≤ -20 °C. Further dilutions should be made in appropriate buffered solutions.

Product Specification	
Species	SARS-CoV-2
Source	Escherichia coli.
Molecular Weight	Approximately 25.1 kDa, a single non-glycosylated polypeptide chain containing 223 amino acid residues.
Purity	> 90% by SDS-PAGE.
Biological Activity	Testing in progress.
Physical Appearance	White lyophilized (freeze-dried) powder.
Formulation	Lyophilized from a 0.2 μm filtered concentrated solution in 30% acetonitrile and 0.1% TFA.
Endotoxin	Less than 0.1 EU/μg of rSARS-CoV-2 Spike RBD as determined by LAL method.
Shipping	The product is shipped at

ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
