

DESCRIPTION

Source	Human embryonic kidney cell, HEK293-derived sars-cov-2 Spike protein		
	<p>SARS-CoV-2 BA.4/BA.5 Spike (Val16-Lys1211) (Thr191Ile, Leu24del, Pro25del, Pro26del, Ala27Ser, His69del, Val70del, Gly142Asp, Val213Gly, Gly339Asp, Ser371Phe, Ser373Pro, Ser375Phe, Thr376Ala, Asp405Asn, Arg408Ser, Lys417Asn, Asn440Lys, Leu452Arg, Ser477Asn, Thr478Lys, Glu484Ala, Phe486Val, Gln498Arg, Asn501Tyr, Tyr505His, Asp614Gly, His655Tyr, Asn679Lys, Pro681His, Arg682Ser, Arg685Ser, Asn764Lys, Asp796Tyr, Gln954His, Asn969Lys, Lys986Pro, Val987Pro) Accession # YP_009724390.1</p>	GCN4-IZ	6-His tag
	N-terminus		C-terminus

N-terminal Sequence Val16

Analysis

Structure / Form Labeled with Alexa Fluor® 488 via amines
Excitation Wavelength: 488 nm
Emission Wavelength: 515–545 nm

Predicted Molecular Mass 138 kDa

SPECIFICATIONS

SDS-PAGE	141-170 kDa, under reducing conditions.
Activity	Measured by flow cytometry for its ability to bind HEK293 human embryonic kidney cells transfected with human ACE-2 at 0.500-2.00 µg/mL (100 µL/well). Please Note: Optimal dilutions should be determined by each laboratory for each application.
Endotoxin Level	<1.0 EU per 1 µg of the protein by the LAL method.
Purity	>95%, by SDS-PAGE visualized with Silver Staining and quantitative densitometry by Coomassie® Blue Staining.
Formulation	Supplied as a 0.2 µm filtered solution in PBS with BSA as a carrier protein. See Certificate of Analysis for details.

PREPARATION AND STORAGE

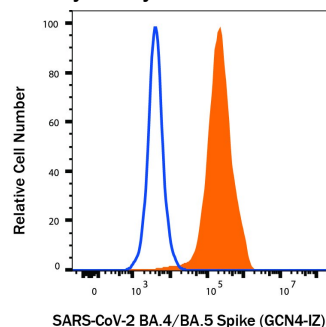
Shipping The product is shipped with dry ice or equivalent. Upon receipt, store it immediately at the temperature recommended below.

Stability & Storage **Protect from light. Use a manual defrost freezer and avoid repeated freeze-thaw cycles.**

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

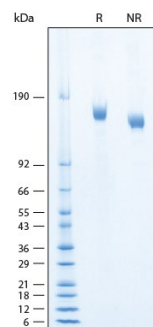
DATA

Flow Cytometry



Detection of ACE-2 on HEK293 Transfectants with Recombinant SARS-CoV-2 BA.4/BA.5 Spike GCN4-IZ His-tag Alexa Fluor® 488 Protein by Flow Cytometry. HEK293 human embryonic kidney cells transfected with human ACE-2 were stained with (A) Recombinant SARS-CoV-2 BA.4/BA.5 Spike GCN4-IZ His-tag Alexa Fluor® 488 (Catalog # AFG11229, filled histogram) or (B) unstained (open histogram).

SDS-PAGE



Recombinant SARS-CoV-2 BA.4/BA.5 S Alexa Fluor® 488 Protein SDS-PAGE. 2 µg/lane of Recombinant SARS-CoV-2 BA.4/BA.5 S Alexa Fluor® 488 Protein (Catalog # AFG11231) was resolved with SDS-PAGE under reducing (R) and non-reducing (NR) conditions and visualized by Coomassie® Blue staining, showing bands at 141-170 kDa.

BACKGROUND

SARS-CoV-2, which causes the global pandemic coronavirus disease 2019 (Covid-19), belongs to a family of viruses known as coronaviruses that also include MERS-CoV and SARS-CoV-1. Coronaviruses are commonly comprised of four structural proteins: Spike protein (S), Envelope protein (E), Membrane protein (M) and Nucleocapsid protein (N) (1). The SARS-CoV-2 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 (2). In SARS-CoV-2, as with most coronaviruses, proteolytic cleavage of the S protein into 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 (3-5). The S Protein of the SARS-CoV-2 virus, like the SARS-CoV-1 counterpart, binds a metalloproteinase, Angiotensin-Converting Enzyme 2 (ACE-2), but with much higher affinity and faster binding kinetics through the receptor binding domain (RBD) located in the C-terminal region of S1 subunit (6). It has been demonstrated that the S Protein can invade host cells through the CD147/EMMPRIN receptor and mediate membrane fusion (7, 8). Polyclonal antibodies to the RBD of the SARS-CoV-2 protein have been shown to inhibit interaction with the ACE-2 receptor, confirming RBD as an attractive target for vaccinations or antiviral therapy (9). 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 (10). The S protein of SARS-CoV-2 shares 75% and 29% aa identity with S protein of SARS-CoV-1 and MERS, respectively. Several emerging SARS-CoV-2 genomes have been identified including the Omicron, or B.1.1.529, variant. First identified in November 2021 in South Africa, the Omicron variant quickly became the predominant SARS-CoV-2 variant and is considered a variant of concern (VOC). The Omicron variant contains 32 mutations in the S protein, 3 to 4 times more than in other SARS-CoV-2 variants, that potentially affect viral fitness and transmissibility (11). Of these mutations, 15 are located in the RBD domain and allow the Omicron variant to bind ACE-2 with greater affinity and, potentially, increased transmissibility (11, 12). Several additional mutations throughout the S protein have been shown or are predicted to enhance spike cleavage and could aid transmission (13-15). The study of the Omicron variant's impact on immune escape and reduced neutralization activity to monoclonal antibodies along with an increased risk of reinfection, even among vaccinated individuals, remains ongoing (16). The BA.4/BA.5 subvariant shows faster spreading rate than the original Omicron variant..

References:

1. Wu, F. *et al.* (2020) *Nature* **579**:265.
2. Tortorici, M.A. and D. Veasler (2019) *Adv. Virus Res.* **105**:93.
3. Bosch, B.J. *et al.* (2003) *J. Virol.* **77**:8801.
4. Belouzard, S. *et al.* (2009) *Proc. Natl. Acad. Sci.* **106**:5871.
5. Millet, J.K. and G.R. Whittaker (2015) *Virus Res.* **202**:120.
6. Ortega, J.T. *et al.* (2020) *EXCLI J.* **19**:410.
7. Wang, K. *et al.* (2020) *bioRxiv* <https://www.biorxiv.org/content/10.1101/2020.03.14.988345v1>.
8. Isabel, S. *et al.* (2020) *Sci Rep.* **10**, 14031. <https://doi.org/10.1038/s41598-020-70827-z>.
9. Tai, W. *et al.* (2020) *Cell. Mol. Immunol.* **17**:613.
10. Okba, N. M. A. *et al.* (2020). *Emerg. Infect. Dis.* <https://doi.org/10.3201/eid2607.200841>.
11. Shah, M. and Woo, H.G. (2021) *bioRxiv* <https://doi.org/10.1101/2021.12.04.471200>.
12. Lupala, C.S. *et al.* (2021) *bioRxiv* <https://doi.org/10.1101/2021.12.10.472102>.
13. Zhang, L. *et al.* (2020) *Nat Commun.* **11**:6013.
14. Lasek-Nesselquist, E. *et al.* (2021) *medRxiv* <https://doi.org/10.1101/2021.03.10.21253285>.
15. Scheepers, C. *et al.* (2021) *medRxiv* <https://doi.org/10.1101/2021.08.20.21262342>.
16. Callaway, E. and Ledford, H. (2021) *Nature* **600**:197.

PRODUCT SPECIFIC NOTICES

This product is provided under an agreement between Life Technologies Corporation and R&D Systems, Inc. and the manufacture, use, sale or import of this product is subject to one or more US patents and corresponding non-US equivalents, owned by Life Technologies Corporation and its affiliates. The purchase of this product conveys to the buyer the non-transferable right to use the purchased amount of the product and components of the product only in research conducted by the buyer (whether the buyer is an academic or for-profit entity). The sale of this product is expressly conditioned on the buyer not using the product or its components (1) in manufacturing; (2) to provide a service, information, or data to an unaffiliated third party for payment; (3) for therapeutic, diagnostic or prophylactic purposes; (4) to resell, sell, or otherwise transfer this product or its components to any third party, or for any other commercial purpose. Life Technologies Corporation will not assert a claim against the buyer of the infringement of the above patents based on the manufacture, use or sale of a commercial product developed in research by the buyer in which this product or its components was employed, provided that neither this product nor any of its components was used in the manufacture of such product. For information on purchasing a license to this product for purposes other than research, contact Life Technologies Corporation, Cell Analysis Business Unit, Business Development, 29851 Willow Creek Road, Eugene, OR 97402, Tel: (541) 465-8300. Fax: (541) 335-0354.