

Spike Glycoprotein S1 Domain from SARS-Related Coronavirus 2, HV69-70del Variant with C-Terminal Histidine Tag, Recombinant from HEK293 Cells

Catalog No. NR-55416

ACROBiosystems Catalog No. S1N-C52Hd

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Contributor and Manufacturer:

ACROBiosystems, Newark, Delaware, USA

Product Description:

A recombinant form of the spike (S) glycoprotein S1 domain from severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2), HV69-70del variant was produced by transient transfection in human embryonic kidney HEK293 cells and purified by affinity chromatography.¹ NR-55416 lacks the signal sequence, contains 668 residues of the SARS-CoV-2 S glycoprotein (amino acid residues V16 to R685) and features a C-terminal poly-histidine tag. NR-55416 is a variant of SARS-CoV-2 which contains the HV69-70del mutation in the S glycoprotein as compared to the SARS-CoV-2 reference sequence (GenPept: [QHD43416](#)).^{1,2} The predicted protein sequence is shown in Figure 1.¹ NR-55416 has a theoretical molecular weight of approximately 76,700 daltons. The crystal structure for the wild-type S glycoprotein from SARS-CoV-2 has been solved at 2.8 Å resolution (PDB: [6VXX](#)).³ Representative SDS-PAGE results are shown in Figure 2.¹

The S glycoprotein mediates viral binding to the host angiotensin converting enzyme 2 (ACE2). This protein forms a trimer, and when bound to a host receptor allows fusion of the viral and cellular membranes.⁴ New SARS-CoV-2 mutations in the S glycoprotein are currently under study, and a United Kingdom variant (also known as 20B/501Y.V1, VOC202012/01 or B.1.1.7 lineage) includes the HV69-70del mutation.^{1,5}

Material Provided:

Each vial contains approximately 100 µg of purified recombinant protein lyophilized in phosphate-buffered saline, pH 7.4 and 10% trehalose.

Packaging/Storage:

NR-55416 was packaged aseptically in glass vials. The product is provided lyophilized and should be placed in a closed, dry environment with desiccants and stored at -20°C or colder immediately upon arrival. A frost-free freezer should be avoided, since changes in moisture and temperature may affect protein stability.

Functional Activity:

The biological activity of NR-55416 was measured by its binding ability in a functional ELISA (Figure 3), in which immobilized NR-55416 at 2 µg per mL (100 µL per well) can

bind human ACE2 protein (Fc tag) (ACROBiosystems AC2-H5257); the linear range is 0.1 to 2 ng per mL.¹ Immobilized NR-55416 at 2 µg per mL (100 µL per well) can bind anti-SARS-CoV-2 RBD neutralizing antibody, human IgG1 (ACROBiosystems SAD-S35) with a linear range of 0.1 to 2 ng per mL (Figure 4) and biotinylated human ACE2, his, Avitag™ (ACROBiosystems AC2-H82E6) with a linear range of 0.4 to 13 ng per mL (Figure 5).

Reconstitution:

NR-55416 should be reconstituted with 167 µL sterile deionized water to a stock solution of 600 µg per mL. Add water at room temperature with occasional gentle mixing. Carrier protein [e.g. 0.1% (w/v) bovine serum albumin] must be included in the reconstitution buffer if the final protein concentration is lower than recommended or NR-55416 is aliquoted to less than 10 µg per vial. Note: Avoid vigorous shaking or vortexing.

Storage of Reconstituted Protein:

Reconstituted NR-55416 should be stored at -70°C or colder immediately and used within 3 months. Avoid repeated freeze-thaw cycles.

Citation:

Acknowledgment for publications should read “The following reagent was obtained through BEI Resources, NIAID, NIH: Spike Glycoprotein S1 Domain from SARS-Related Coronavirus 2, HV69-70del Variant with C-Terminal Histidine Tag, Recombinant from HEK293 Cells, NR-55416.”

Biosafety Level: 1

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the following publication: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health. Biosafety in Microbiological and Biomedical Laboratories. 6th ed. Washington, DC: U.S. Government Printing Office, 2020; see www.cdc.gov/biosafety/publications/bmb15/index.htm.

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References:

1. Chen, J., Personal Communication.
2. Wu, F., et al. "A New Coronavirus Associated with Human Respiratory Disease in China." *Nature* 579 (2020): 265-269. PubMed: 32015508.
3. Walls, A. C., et al. "Structure, Function, and Antigenicity of the SARS-CoV-2 Spike Glycoprotein." *Cell* 181 (2020): 281-292. PubMed: 32155444.
4. Hulswit, R. J. G., C. A. M. de Haan and B. -J. Bosch. "Coronavirus Spike Protein and Tropism Changes." *Adv. Virus Res.* 96 (2016): 29-57. PubMed: 27712627.
5. Shen, L., et al. "Rapidly Emerging SARS-CoV-2 B.1.1.7 Sub-Lineage in the United States of America with Spike Protein D178H and Membrane Protein V70L Mutations." *Emerg. Microbes Infect.* (2021): *in press*. PubMed: 34125658.

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Figure 1: Predicted Protein Sequence

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1  VNLTRTRQLP  PAYTNSFTRG  VYYPDKVFRS  SVLHSTQDLF  LPFFSNVTWF
51  HAISGTNGTK  RFDNPVLPFN  DGVYFASTK  SNIIRGWIFG  TTLDSKTQSL
101 LIVNNATNVV  IKVCEFQFCN  DPFLGVYHK  NNKSWMESEF  RVYSSANNCT
151 FEYVSQPFLM  DLEGKQGNFK  NLREFVFKNI  DGYFKIYSKH  TPINLVRDLP
201 QGFSALEPLV  DLPIGINITR  FQTLALHRS  YLTPGDSSSG  WTAGAAAYV
251 GYLQPRTFLL  KYNENGTITD  AVDCALDPLS  ETKCTLKSFT  VEKGIYQTSN
301 FRVQPTESIV  RFPNITNLCP  FGEVFNATRF  ASVYAWNRKR  ISNCVADYSV
351 LYNSASFSTF  KCYGVSPTKL  NDLCFTNVYA  DSFVIRGDEV  RQIAPGQTGK
401 IADYNYKLPD  DFTGCVIAWN  SNNLDSKVG  NNYLYRLFR  KSNLKPFRD
451 ISTEIYQAGS  TPCNGVEGFN  CYFPLQSYGF  QPTNGVGYQP  YRVVLSFEL
501 LHAPATVCGP  KKSTNLVKNK  CVNFNFNGLT  GTGVLTESNK  KFLPFQQFGR
551 DIADTTDAVR  DPQTLIILDI  TPCSFGGVSV  ITPGTNTSNQ  VAVLYQDVNC
601 TEVPVAIHAD  QLTPTWRVYS  TGSNVFQTRA  GCLIGAEHVN  NSYECDIPIG
651 AGICASYQTQ  TNSPRRARGG  GSGGGSHHHH  HHHHHH
    
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S1 domain – **Residues 1 to 668** (represents amino acid residues 16 to 685)
 Poly-histidine tag – Residues 677 to 686

Figure 2: Representative SDS-PAGE

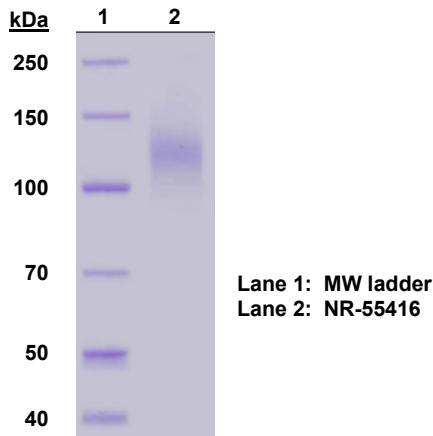


Figure 3: Representative ELISA

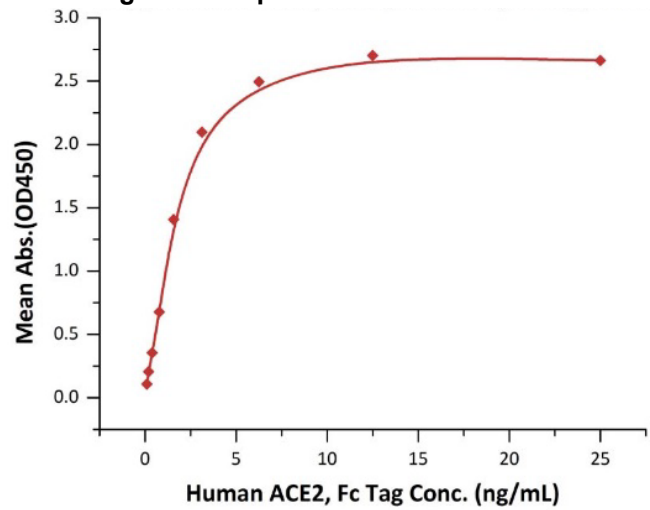


Figure 4: Representative ELISA

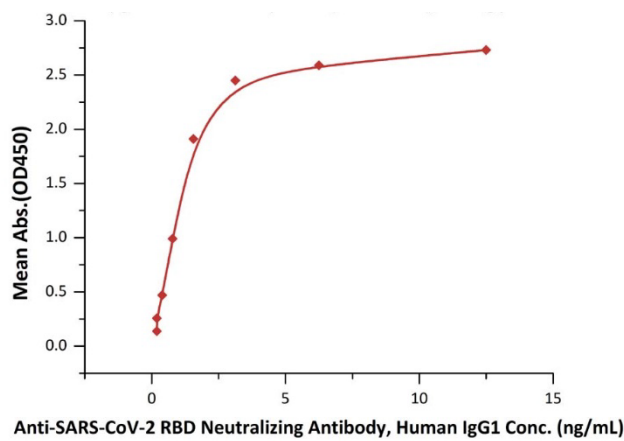


Figure 5: Representative ELISA

