Product Information Sheet for NR-55343

Spike Glycoprotein (Stabilized) from SARS-Related Coronavirus 2, D614G Variant with C-Terminal Histidine Tag, Recombinant from HEK293 Cells

Catalog No. NR-55343
BPS Bioscience Catalog No. 100810

For research use only. Not for use in humans.

Contributor and Manufacturer:
BPS Bioscience, San Diego, California, USA

Product Description:
A recombinant form of the spike (S) glycoprotein from severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2), D614G variant was produced in human embryonic kidney HEK293 cells and purified by affinity chromatography.[1] NR-55343 lacks the signal sequence (residues 1 to 15) and contains 1195 residues (ectodomain; S1 + S2) of the SARS-CoV-2 S glycoprotein; the recombinant protein was modified to remove the polybasic S1/S2 cleavage site (RRAR to A; residues 682 to 685), stabilized with a pair of mutations (K986P and V987P, wild type numbering) and includes a thrombin cleavage site, T4 foldon trimerization domain and C-terminal hexa-histidine tag.[1] NR-55343 is a variant of SARS-CoV-2 which contains the D614G mutation in the S glycoprotein as compared to the SARS-CoV-2 reference sequence (GenPept: QHD43416).[1,2,3] The predicted protein sequence is shown in Figure 1.[1] NR-55343 has a theoretical molecular weight of 137,000 daltons. The crystal structure for trimeric S glycoprotein from the SARS-CoV-2 D614G variant has been solved at 3.46 Å resolution (PDB: 6XS6).[3]

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] The D614G mutation is common to the current variants of interest and concern identified by the Centers for Disease Control and Prevention (CDC). This mutation was one of the first documented in the USA in the initial stages of the pandemic after having initially circulated in Europe.[5] Some evidence suggests that variants with the D614G mutation are more infectious than wild-type.[6]

Material Provided:
Each vial contains approximately 50 µg of purified recombinant protein in 8 mM phosphate pH 7.4, 110 mM NaCl, 2.2 mM KCl and 20% glycerol. The concentration and volume are shown on the Certificate of Analysis.

Packaging/Storage:
NR-55343 was packaged aseptically in cryovials. The product is provided on dry ice and should be stored at -80°C immediately upon arrival. Storage at warmer temperatures is not recommended due to a low bioburden. Freeze-thaw cycles should be avoided.

Citation:
Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Spike Glycoprotein (Stabilized) from SARS-Related Coronavirus 2, D614G Variant with C-Terminal Histidine Tag, Recombinant from HEK293 Cells, NR-55343."

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/bmbl5/index.htm.

Disclaimers:
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References:
1. Zhu, H., Personal Communication.
2. Wu, F., et al. "A New Coronavirus Associated with Human Respiratory Disease in China." Nature 579 (2020): 265-269. PubMed: 32015508.

BEI Resources
www.beiresources.org

E-mail: contact@beiresources.org
Tel: 800-359-7370
Fax: 703-365-2898

3. Yurkovetskiy, L., et al. "Structural and Functional Analysis of the D614G SARS-CoV-2 Spike Protein Variant." Cell 183 (2020): 739-751. PubMed: 32991842.
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. Emary, K. R. W., et al. "Efficacy of ChAdOx1 nCoV-19 (AZD1222) Vaccine against SARS-CoV-2 Variant of Concern 202012/01 (B.1.1.7): An Exploratory Analysis of a Randomised Controlled Trial." Lancet 397 (2021): 1351-1362. PubMed: 33798499.
6. Klumpp-Thomas, C., et al. "Effect of D614G Spike Variant on Immunoglobulin G, M, or A Spike Seroassay Performance." J. Infect. Dis. 223 (2021): 802-804. PubMed: 33257936.

Support Provided by NIAID

Figure 1: Predicted Protein Sequence

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1    VNLTTRTQLP PAYTNSFTRG VYYPDKVFRS SVLHSTQDLF LPFFSNVTWF
51   HAIHVSGTNG TKRFDNPVLP FNDGVYFAST EKSNIIRGWI FGTTLDSKTQ
101  SLLIVNNATN VVIKVCEFQF CNDPFLGVYY HKNNKSWMES EFRVYSSANN
151  CTFEYVSQPF LMDLEGKQGN FKNLREFVFK NIDGYFKIYS KHTPINLVRD
201  LPQGFSALEP LVDLPIGINI TRFQTLLALH RSYLTPGDSS SGWTAGAAAY
251  YVGYLQPRTF LLKYNENGTI TDAVDCALDP LSETKCTLKS FTVEKGIYQT
301  SNFRVQPTES IVRFPNITNL CPFGEVFNAT RFASVYAWNR KRISNCVADY
351  SVLYNSASFS TFKCYGVSPT KLNDLCFTNV YADSFVIRGD EVRQIAPGQT
401  GKIADYNYKL PDDFTGCVIA WNSNNLDSKV GGNYNYLYRL FRKSNLKPFE
451  RDISTEIYQA GSTPCNGVEG FNCYFPLQSY GFQPTNGVGY QPYRVVVLSF
501  ELLHAPATVC GPKKSTNLVK NKCVNFNFNG LTGTGVLTES NKKFLPFQQF
551  GRDIADTTDA VRDPQTLEIL DITPCSFGGV SVITPGTNTS NQVAVLYQGV
601  NCTEVPVAIH ADQLTPTWRV YSTGSNVFQT RAGCLIGAEH VNNSYECDIP
651  IGAGICASYQ TQTNSPASVA SQSIIAYTMS LGAENSVAYS NNSIAIPTNF
701  TISVTTEILP VSMTKTSVDC TMYICGDSTE CSNLLLQYGS FCTQLNRALT
751  GIAVEQDKNT QEVFAQVKQI YKTPPIKDFG GFNFSQILPD PSKPSKRSFI
801  EDLLFNKVTL ADAGFIKQYG DCLGDIAARD LICAQKFNGL TVLPPLLTDE
851  MIAQYTSALL AGTITSGWTF GAGAALQIPF AMQMAYRFNG IGVTQNVLYE
901  NQKLIANQFN SAIGKIQDSL SSTASALGKL QDVVNQNAQA LNTLVKQLSS
951  NFGAISSVLN DILSRLDPPE AEVQIDRLIT GRLQSLQTYV TQQLIRAAEI
1001 RASANLAATK MSECVLGQSK RVDFCGKGYH LMSFPQSAPH GVVFLHVTYV
1051 PAQEKNFTTA PAICHDGKAH FPREGVFVSN GTHWFVTQRN FYEPQIITTD
1101 NTFVSGNCDV VIGIVNNTVY DPLQPELDSF KEELDKYFKN HTSPDVDLGD
1151 ISGINASVVN IQKEIDRLNE VAKNLNESLI DLQELGKYEQ YIKWPLVPRG
1201 SGYIPEAPRD GQAYVRKDGE WVLLSTFLGG GHHHHHH
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Spike ectodomain – **Residues 1 to 1195** (represents WT amino acid residues 16 to 1213)
RRAR to A substitution of S1/S2 cleavage site – **Residue 667**
KV to PP stabilizing mutations – **Residues 968 and 969**
D614G mutation – **Residue 598**
Thrombin cleavage site – Residues 1196 to 1201
T4 foldon trimerization domain – Residues 1202 to 1228
Hexa-histidine tag – Residues 1232 to 1237

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