Nucleocapsid-Fc

Soluble SARS-CoV-2 nucleocapsid protein fused to a human IgG1 Fc tag

Catalog code: fc-sars2-n

https://www.invivogen.com/sars2-nucleocapsid-proteins

For research use only, not for diagnostic or therapeutic use

Version 20I19-NJ

PRODUCT INFORMATION

Contents:
- 50 µg of lyophilized Nucleocapsid-Fc protein
- 1.5 ml endotoxin-free water

Protein construction:
Full-length Nucleocapsid [M1-A419] with a human IgG1 Fc tag in C-terminus

Accession sequence: P0DTC9

Species: SARS-CoV-2 (2019-nCoV); Wuhan-Hu-1 (D614) isolate

Tag: C-terminal human IgG1 Fc

Total protein size: 669 a.a. (secreted form)

Molecular weight: ~79 kDa (SDS-PAGE)

Purification: Protein A affinity chromatography

Purity: >95% (SDS PAGE)

Formulation:
0.2 µm filtered solution in a sodium phosphate buffer with glycine, saccharose, and stabilizing agents

Storage:
- Product is shipped at room temperature. Store lyophilized product at -20 °C. Lyophilized product is stable for at least 1 year.
- Reconstituted protein is stable for 1 month when stored at 4°C and for 1 year when aliquoted and stored at -20 °C. Avoid repeated freeze-thaw cycles.

Quality control:
- The size and purity of the protein has been confirmed by SDS-PAGE.
- Nucleocapsid-Fc has been functionally validated by ELISA using an Anti-SARS Nucleocapsid antibody.
- Absence of bacterial contamination (e.g. lipoproteins and endotoxins) has been confirmed using HEK-Blue™ TLR2 and TLR4 cellular assays.

BACKGROUND

The SARS-CoV-2 Nucleocapsid (N) is an important structural protein that plays important roles in the viral life cycle including replication, transcription, and genome packaging[1]. The SARS-CoV-2 N features two important NTD and CTD functional domains in N-terminal and C-terminal, respectively[1-6]. NTD interacts with both the RNA genome and M proteins to form virion particles. The N protein interaction with the RNA forms the virus ribonucleoprotein core which is packed as a helical "beads-on-a-string" conformation. CTD allows RNA synthesis through binding of the replication-transcription complexes (RTCs), oligomerization of multiple N proteins through its dimerization domain, and genome incorporation into the new virion. N is a major immunogen of SARS-CoV-2. Indeed, elevated Anti-SARS-CoV-2 N IgG and IgM antibody titers have been reported in COVID-19 patients' sera[7-9]. These observations make SARS-CoV-2 N an attractive tool for early diagnosis[7-9] and a potential therapeutic drug-target[3].

PRODUCT DESCRIPTION

Nucleocapsid-Fc is a soluble protein generated by fusing the full-length SARS-CoV-2 nucleocapsid [M1-A419] to a C-terminal human IgG1 Fc tag with a TEV (Tobacco Etch Virus) sequence linker. This fusion protein has a molecular weight of ~79 kDa on a SDS PAGE gel. Nucleocapsid-Fc has been generated by recombinant DNA technology, produced in HEK293 cells, and purified by protein G affinity chromatography.

APPLICATIONS

- **Vaccination studies:** using combinations of Nucleocapsid protein antigens and adjuvants.
- **Antibody screening:** finding anti-Nucleocaspid antibodies in COVID-19 patients' sera.
- **Inhibitor screening:** finding small molecules able to block the SARS-CoV-2 nucleocapsid interaction with replication-transcrption complexes (RTCs).

METHODS

Nucleocapsid-Fc resuspension (100 µg/ml)

Note: Ensure you see the lyophilized pellet before resuspension.
- Add 500 µl of endotoxin-free water to the vial and gently pipette until completely resuspended.
- Prepare aliquots and store at -20 °C or 4°C.

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PROTEIN SEQUENCE

M E I K V L F A L I C I A V A E A K P T E L E M S D N G P Q N Q R N A
P R I T F G G P S D S T G S N Q N G E R S G A R S K Q R R P Q G L P
N N T A S W F T A L T Q H G K E D L K F P R G Q G V P I N T N S S P
D D Q I G Y Y R R A T R R I R G G D G K M K D L S P R W Y F Y Y L G
T G P E A G L P Y G A N K D G I I W V A T E G A L N T P K D H I G T
R N P A N N A A I V L Q L P Q G T T L P K G F Y A E G S R G G S Q A
S S R S S S R S R N S S R N S T P G S S R G T S P A R M A G N G G D
A A L A L L L L D R L N Q L E S K M S G K G Q Q Q Q Q G Q T V T K K S
A A E A S K K P R Q K R T A T K A Y N V T Q A F G R R G P E Q T Q G
N F G D Q E L I R Q G T D Y K H W P Q I A Q F A P S A S A F F G M S
R I G M E V T P S G T W L T Y T G A I K L D D K D P N F K D Q V I L L
N K H I D A Y K T F P P T E P K K D K K K K A D E T Q A L P Q R Q K
K Q Q T V T L L P A A D L D D F S K Q L Q Q S M S S A D S T Q A R T
E N L Y F Q G S G S E P K S S D K T H T C P P C P A P E A E G G P S V
F L F P P K P K D Q L M I S R T P E V T C V V V D V S H E D P E V K F
N W Y V D G V E V H N A K T K P R E E Q Y N S T Y R V V S V L T V L
H Q D W L N G K E Y K C K V S N K A L P A S I E K T I S K A K G Q P
R E P Q V Y T L P P S R E E M T K N Q V S L T C L V K G F Y P S D I A
V E W E S N G Q P E N N Y K T T P P V L D S D G S F F L Y S K L T V D
K S R W Q Q G N V F S C S V L H E A L H N H Y T Q K S L S L S P G K

Green: signal sequence
Purple: stabilizing amino acid sequence
Blue: Nucleocapsid sequence
Black: TEV cleavage sequence
Red: human IgG1 Fc sequence

REFERENCES

1. Mu, J. *et al.*, 2020. SARS-CoV-2-encoded nucleocapsid protein acts as a viral suppressor of RNA interference in cells. Sci China Life Sci 63, 1-4. **2. Chang C. *et al.*, 2006.** Modular organization of SARS coronavirus nucleocapsid protein. J. Biom. Sci. 13:59-72. **3. Krokhin O. *et al.*, 2003.** Mass spectrometric characterization of proteins from the SARS virus. Mol. & Cell. Prot. 2:346-356. **4. Cubuk, J. *et al.*, 2020.** The SARS-CoV-2 nucleocapsid protein is dynamic, disordered, and phase separates with RNA. bioRxiv. doi:10.1101/2020.06.17.158121. **5. Kang, S. *et al.*, 2020.** Crystal structure of SARS-CoV-2 nucleocapsid protein RNA binding domain reveals potential unique drug targeting sites. Acta Pharm Sin B. doi:10.1016/j.apsb.2020.04.009. **6. Khan, M.T. *et al.*, 2020.** SARS-CoV-2 nucleocapsid and Nsp3 binding: an in silico study. Arch Microbiol. doi: 10.1007/s00203-020-01998-6. **7. Liu, W. *et al.*, 2020.** Evaluation of Nucleocapsid and Spike Protein-Based Enzyme-Linked Immunosorbent Assays for Detecting Antibodies against SARS-CoV-2. J Clin Microbiol 58. **8. Guo L. *et al.*, 2020.** Profiling Early Humoral Response to Diagnose Novel Coronavirus Disease (COVID-19). Clinical Infectious Diseases. 71(15) :778-785. **9. To K. K-W. *et al.*, 2020.** Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study. The Lancet Infectious Diseases. 20(5):565-574.

RELATED PRODUCTS

Product	Catalog Code
Nucleocapsid-His	his-sars2-n
Spike-S1-Fc	fc-sars2-s1
Spike-S1-His	his-sars2-s1
Spike-RBD-Fc	fc-sars2-srbd
Spike-RBD-His	his-sars2-srbd

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