

**N1 Neuraminidase (NA) Protein with N-Terminal Histidine Tag from Influenza Virus, A/California/04/2009(H1N1)pdm09, Recombinant from Baculovirus**

**Catalog No. NR-19234**

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**Contributor and Manufacturer:**

BEI Resources

**Product Description:**

A recombinant form of the N1 neuraminidase (NA) protein from influenza A virus, A/California/04/2009 (H1N1)pdm09 containing an N-terminal histidine tag was produced in Sf9 insect cells using a baculovirus expression vector system and purified by nickel affinity chromatography. The predicted ectodomain coding region of the NA gene was fused to a synthetic gene segment encoding an N-terminal octa-histidine tag followed by a 43 amino acid tetramerization domain from vasodilator-stimulated phosphoprotein (VASP) and a thrombin cleavage site, as described for the 1918 pandemic virus.<sup>1,2</sup> The predicted protein sequence is shown in Figure 1. NR-19234 has a theoretical molecular weight of approximately 50.3 kilodaltons. The crystal structure of the 1918 human N1 NA precursor has been solved at 2.40 Å resolution (PDB: [2HT8](#)). The full-length NA precursor protein is 469 residues (GenPept: [ACP44158](#)).

**Material Provided:**

Each vial contains approximately 50 µg of purified recombinant NA protein in phosphate buffered saline PBS (pH 7.4). The protein content in µg and the concentration, expressed as µg/mL, are shown on the Certificate of Analysis.

**Packaging/Storage:**

Purified recombinant NA protein was packaged aseptically in screw-capped plastic cryovials. This product is shipped on dry ice and should be stored at -20°C immediately upon arrival. For long-term storage, freezing at -80°C or colder is recommended. Multiple freeze-thaw cycles should be avoided.

**Functional Activity:**

NR-19234 was demonstrated to be functionally active based on its ability to cleave the fluorogenic substrate 2'-(4-methylumbelliferyl)-α-D-N-acetylneuraminic acid (4-MUNANA).<sup>3</sup>

**Citation:**

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: N1 Neuraminidase (NA) Protein with N-Terminal Histidine Tag from Influenza Virus, A/California/04/2009(H1N1)pdm09, Recombinant from Baculovirus, NR-19234."

**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 \(BMBL\)](#), 6th ed. Washington, DC: U.S. Government Printing Office, 2020.

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**References:**

1. Kühnel, K., et al. "The VASP Tetramerization Domain is a Right-Handed Coiled Coil Based on a 15-Residue Repeat." *Proc. Natl. Acad. Sci. USA* 101 (2004): 17027-17032. PubMed: 15569942.
2. Xu, X., et al. "Structural Characterization of the 1918 Influenza Virus H1N1 Neuraminidase." *J. Virol.* 82 (2008): 10493-10501. PubMed: 18715929.
3. Wetherall, N. T., et al. "Evaluation of Neuraminidase Enzyme Assays Using Different Substrates to Measure Susceptibility of Influenza Virus Clinical Isolates to Neuraminidase Inhibitors: Report of the Neuraminidase

Inhibitor Susceptibility Network." *J. Clin. Microbiol.* 41 (2003): 742-750. PubMed: 12574276.

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Figure 1: Predicted Protein Sequence

1	ADPHHHHHH	<u>HSSSDYSDLQ</u>	<u>RVKQELLEEV</u>	<u>KKELQKVKEE</u>	<u>IIEAFVQELR</u>
51	<u>KRGLVPRGS</u>	<u>PSRSEFVKLA</u>	<u>GNSSLCPVSG</u>	<u>WAIYSKDNSV</u>	<u>RIGSKGDVFF</u>
101	<u>IREFFISCS</u>	<u>LECRFFFLTQ</u>	<u>GALLNDKHSN</u>	<u>GTIKDRSPYR</u>	<u>TLMSCPIGEV</u>
151	<u>PSPYNSRFES</u>	<u>VAWSASACHD</u>	<u>GINWLTIGIS</u>	<u>GPDNGAVAVL</u>	<u>KYNGIITDTI</u>
201	<u>KSWRNNILRT</u>	<u>QESECACVNG</u>	<u>SCFTVMTDGP</u>	<u>SNGQASYKIF</u>	<u>RIEKGKIVKS</u>
251	<u>VEMNAPNYHY</u>	<u>EECSCYPDSS</u>	<u>EITCVCRDNW</u>	<u>HGSNRPWVSF</u>	<u>NQNLLEYQIGY</u>
301	<u>ICSGIFGDNP</u>	<u>RPNDKTGSCG</u>	<u>PVSSNGANGV</u>	<u>KGFSFKYGNG</u>	<u>VWIGRTKSIS</u>
351	<u>SRNGFEMIWD</u>	<u>PNGWTGTDNN</u>	<u>FSIKQDIVGI</u>	<u>NEWSGYSGSF</u>	<u>VQHPELTGLD</u>
401	<u>CIRPCFWVEL</u>	<u>IRGRPKENTI</u>	<u>WTSGSSISFC</u>	<u>GVNSDTVGWS</u>	<u>WPDGAELPFT</u>
451	IDK				

Plasmid-derived amino acids – Residues 1 to 3 and 61 to 66

His Tag – Residues 4 to 11

Tetramerization domain – Residues 12 to 54

Thrombin cleavage sequence – Residues 55 to 60

NA protein – Residues 67 to 453 [represents amino acid residues 83 to 469 of the native NA protein (GenPept: [ACP44158](#))]