

Bacillus anthracis* Edema Factor (Native Sequence), Recombinant from *Escherichia coli

Catalog No. NR-13413

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Contributor and Manufacturer:

BEI Resources

Product Description:

The native protein sequence of *Bacillus anthracis* (*B. anthracis*) edema factor (EF) was expressed in *Escherichia coli* and purified by ion exchange chromatography.¹ NR-13413 has a theoretical molecular weight of approximately 89 kilodaltons. The predicted amino acid sequence of NR-13413 is shown below in Table 1. The crystal structure of EF in complex with calmodulin and 3'-deoxy-ATP has been determined to 3.35 Å (PDB: [1XFV](#)).²

EF is a calmodulin-dependent adenylate cyclase, and its enzymatic activity results in an increase in intracellular cAMP levels. In addition, EF inhibits the immune response by removing calmodulin from involvement in calcium-triggered signaling. *In vivo*, recombinant EF binds to a cleaved form of recombinant protective antigen (PA), and is transported by cleaved PA into the cytosol of the mammalian cell, where EF exerts its pathogenic effect.³⁻⁵

Material Provided:

Each vial contains approximately 100 µg of NR-13413 in PBS. The concentration, expressed as mg per mL, is shown on the Certificate of Analysis.

Packaging/Storage:

NR-13413 was packaged aseptically in cryovials. The product is provided frozen on dry ice and should be stored at -70°C or colder immediately upon arrival. Freeze-thaw cycles should be avoided.

Functional Activity:

NR-13413 reacts with antibody to *B. anthracis* EF protein as shown by western blot analysis, and is enzymatically active in the presence of calmodulin and inorganic pyrophosphate. See Certificate of Analysis for details.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: *Bacillus anthracis* Edema Factor (Native Sequence), Recombinant from *Escherichia coli*, NR-13413."

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](#). 5th ed. Washington, DC: U.S. Government Printing Office, 2009; see www.cdc.gov/biosafety/publications/bmbl5/index.htm.

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References:

1. Cooksey, B. A., et al. "Production of Biologically Active *Bacillus anthracis* Edema Factor in *Escherichia coli*." [Biotechnol. Prog.](#) 20 (2004): 1651-1659. PubMed: 15575695.
2. Shen, Y., et al. "Calcium-Independent Calmodulin Binding and Two-Metal-Ion Catalytic Mechanism of Anthrax Edema Factor." [EMBO J.](#) 24 (2005): 929-941. PubMed: 15719022.
3. Leppla, S. H. "Production and Purification of Anthrax Toxin." [Methods Enzymol.](#) 165 (1988): 103-116. PubMed: 3148094.
4. Leppla, S. H. "Purification and Characterization of Adenylyl Cyclase from *Bacillus anthracis*." [Methods Enzymol.](#) 195 (1991): 153-168. PubMed: 1903483.

5. Escuyer, V., et al. "Structural Homology between Virulence-Associated Bacterial Adenylate Cyclases." Gene 71 (1988): 293-298. PubMed: 2906312.

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Table 1 – Predicted Protein Sequence

1	MNEHYTESDI	KRNHKTEKNK	TEKEKFKDSI	NNLVKTEFTN	ETLDKIQQTQ
51	DLLKKIPKDV	LEIYSELGGE	IYFTDIDLVE	HKELQDLSEE	EKNSMNSRGE
101	KVPFASRFVF	EKKRETPKLI	INIKDYAINS	EQSKEVYYEI	GKGISLDIIS
151	KDKSLDPEFL	NLIKSLSDDS	DSSDLLFSQK	FKEKLELNK	SIDINFIKEN
201	LTEFQHAFSL	AFSYFAPDH	RTVLELYAPD	MFEYMNKLEK	GGFEKISESL
251	KKEGVEKDRI	DVLKGEKALK	ASGLVPEHAD	AFKKIARELN	TYILFRPVNK
301	LATNLIKSGV	ATKGLNVHGK	SSDWGPVAGY	IPFDQDLSKK	HGQQLAVEKG
351	NLENKKSITE	HEGEIGKIPL	KLDHLRIEEL	KENGIILK GK	KEIDNGKKYY
401	LLESNNQVYE	FRI SDENNEV	QYKTKEGKIT	VLGEKFNWRN	IEVMAKNVEG
451	VLKPLTADYD	LFALAPSLTE	IKKQIPQKEW	DKVVNTPNSL	EKQKGVTNLL
501	IKYGIERKPD	STKGTL SNWQ	KQMLDRLNEA	VKYTG YTG GD	VVNHGTEQDN
551	EEFPEKDNEI	FIINPEGEFI	LTKNWEMTGR	FI EKNI TGKD	YLYYFNRSYN
601	KIAPGNKAYI	EWTDPITKAK	INTIPTSAEF	IKNLSSIRRS	SNVGVYKDSG
651	DKDEFKAKES	VKKIAGY LSD	YYNSANHIFS	QEKRRKISIF	RGIQAYNEIE
701	NVLKSKQIAP	EYKNYFQYLK	ERITNQVQLL	LTHQKSNI EF	KLLYKQLNFT
751	ENETDNFEVF	QKIIDEK			