

Fraction 1 Capsular Antigen (F1) from *Yersinia pestis*, Recombinant from *Escherichia coli*

Catalog No. NR-44223

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Contributor and Manufacturer:

BEI Resources

Product Description:

NR-44223 is a recombinant form of the *Yersinia pestis* (*Y. pestis*) fraction 1 capsular antigen (F1). F1 is a plasmid (pFra)-encoded proteinaceous capsule synthesized in large quantities by *Y. pestis* and reported to confer antiphagocytic properties on the pathogen by interfering with complement-mediated opsonization.¹ The protein is highly immunogenic and has been indirectly associated with eliciting a protective immune response in humans.² The amino acid sequence is shown in Figure 1. A recombinant protein lacking the native signal sequence but including an N-terminal hexa-histidine tag, a thrombin cleavage site, and amino acid residues 22 to 170 of F1 from *Y. pestis* (GenPept: [AAS58714](#))^{3,4} was expressed in *Escherichia coli* and purified by nickel affinity chromatography. Treatment with immobilized bovine thrombin resulted in a protein with four non-F1 residues at the amino terminus. The thrombin-cleaved protein was further purified by anion exchange chromatography and another round of nickel affinity chromatography to remove the cleaved hexa-histidine tag. NR-44223 has a theoretical molecular weight of 15.97 kilodaltons and has 153 residues. The crystal structure of F1 has been solved at 1.99 Å resolution (PDB: [1P5U](#)).

Material Provided:

Each vial contains approximately 200 to 240 µg of purified recombinant protein in PBS (pH 7.4) phosphate-buffered saline. The concentration, expressed as milligrams per milliliter, is shown on the Certificate of Analysis.

Packaging/Storage:

NR-44223 was packaged in cryovials. The product is provided frozen on dry ice and should be stored at -80°C or colder immediately upon arrival. Freeze-thaw cycles should be avoided.

Functional Activity:

NR-44223 reacts with monoclonal antibody to *Y. pestis* F1 antigen in Western blot assays.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Fraction 1 Capsular Antigen (F1) from *Yersinia pestis*, Recombinant from *Escherichia coli*, NR-44223."

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.

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References:

- Williams, R. C. Jr., et al. "Effects of Fraction I from *Yersinia pestis* on Phagocytosis *In Vitro*." *J. Infect. Dis.* 126 (1972): 235-241. PubMed: 4559742.
- Meyer, K. F., et al. "Plague Immunization. VI. Vaccination with the Fraction I Antigen of *Yersinia pestis*." *J. Infect. Dis.* 129 (1974): Suppl: S41-S45. PubMed: 4825248.
- Simpson, W. J., et al. "Recombinant Capsular Antigen (Fraction 1) from *Yersinia pestis* Induces a Protective Antibody Response in BALB/c Mice." *Am. J. Trop. Med. Hyg.* 43 (1990): 389-396. PubMed: 2240367.
- Andrews, G. P., et al. "Fraction 1 Capsular Antigen (F1) Purification from *Yersinia pestis* CO92 and from an

Escherichia coli Recombinant Strain and Efficacy against Lethal Plague Challenge." *Infect. Immun.* 64 (1996): 2180-2187. PubMed: 8675324.

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Figure 1: Predicted Protein Sequence

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1  GSHMADLTAS TTATATLVEP ARITLTYKEG APITIMDNGN IDTELLVGTL
51 TLGGYKTGTT STSVNFTDAA GDPMYLTFTS QDGNNHQFTT KVIGKDSRDF
101 DISPKVNGEN LVGDDVVLAT GSQDFFVRSI GSKGGKLAAG KYTDAVTVTV
151 SNQ

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Non-F1 residues - Residues 1 to 4