

Product Information Sheet for NR-4681

Yersinia pestis, Strain KIM Derivative 19 (D19)

Catalog No. NR-4681

For research use only. Not for human use.

Contributor:

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Manufacturer:

BEI Resources

Product Description:

Bacteria Classification: *Enterobacteriaceae*, *Yersinia*

Species: *Yersinia pestis*

Biotype/Biovar: Medievalis

Strain: KIM derivative 19 (D19)

Original Source: Derivative 19 was derived from the highly virulent KIM strain of *Yersinia pestis* (*Y. pestis*), which was originally isolated from a Kurdistan Iran man (KIM).

Comments: The complete genome of *Y. pestis*, strain KIM has been sequenced (GenBank: [AE009952](#)).¹

Y. pestis is the etiologic agent of bubonic, septicemic and pneumonic plague. Three biovars have been associated with the three historically recognized pandemics of *Y. pestis*: Antiqua, Medievalis, and Orientalis. Rodents are the main reservoir and the organism is transmitted to humans through the bite of an infected flea. Humans and other animals can also serve as hosts.²

Y. pestis is an aerobic, non-spore-forming, Gram-negative, rod-shaped bacterium. Virulence-associated genes are located on the chromosome and on three plasmids found in typical *Y. pestis* strains: 1) pMT1 (pFra; ~ 110 kb), which encodes a murine toxin and capsular protein with anti-phagocytic activities, 2) pCD1 (pYV; ~ 70 kb), which encodes a type III secretion system and is essential for virulence and 3) pPCP1 (pPla; ~ 9.5 kb), which encodes a protease that facilitates the initial dissemination of the bacteria to the lymph nodes.³ Virulence factors on the chromosome are located in an unstable locus, *pgm*.⁴

Y. pestis, strain KIM(D19) contains all three virulence plasmids, but lacks the unstable *pgm* locus.⁵ The complete sequence of the chromosome (4,600,755 bp; GenBank: [AE009952](#)),¹ pMT1 (100,984 bp; GenBank: [AF074611](#)), pCD1 (70,504 bp; GenBank: [AF074612](#)), and pPCP1 (9,610 bp; GenBank: [AF053945](#)) from *Y. pestis*, strain KIM have been determined.⁶

The presence of the pMT1, pCD1, and pPCP1 plasmids in NR-4681 has been confirmed by PCR amplification of

plasmid-specific sequences from extracted DNA.

Material Provided:

Each vial contains approximately 0.5 mL of bacterial culture in 0.5X Tryptic Soy Broth supplemented with 10% glycerol.

Note: If homogeneity is required for your intended use, please purify prior to initiating work.

Packaging/Storage:

NR-4681 was packaged aseptically in screw-capped plastic cryovials. The product is provided frozen and should be stored at -60°C or colder immediately upon arrival. For long-term storage, the vapor phase of a liquid nitrogen freezer is recommended. Freeze-thaw cycles should be avoided.

Growth Conditions:

Media:

Tryptic Soy Broth or equivalent

Tryptic Soy Agar with 5% defibrinated sheep blood or equivalent

Incubation:

Temperature:⁷ 28°C or 37°C

Atmosphere: Aerobic

Propagation:

1. Keep vial frozen until ready for use; thaw slowly.
2. Transfer the entire thawed aliquot into a single tube of broth.
3. Use several drops of the suspension to inoculate an agar slant and/or plate.
4. Incubate the tube, slant and/or plate at 28°C or 37°C for 24 to 48 hours.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: *Yersinia pestis*, Strain KIM Derivative 19 (D19), NR-4681."

Biosafety Level: 2

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. Deng, W., et al. "Genome Sequence of *Yersinia pestis* KIM." *J. Bacteriol.* 184 (2002): 4601-4611. PubMed: 12142430. GenBank: AE009952.
2. Huang, X. Z., M. P. Nikolich and L. E. Lindler. "Current Trends in Plague Research: From Genomics to Virulence." *Clin. Med. Res.* 4 (2006): 189-199. PubMed: 16988099.
3. Parkhill, J., et al. "Genome Sequence of *Yersinia pestis*, the Causative Agent of Plague." *Nature* 413 (2001): 523-527. PubMed: 11586360.
4. Hare, J. M. and K. A. McDonough. "High-Frequency RecA-Dependent and -Independent Mechanisms of Congo Red Binding Mutations in *Yersinia pestis*." *J. Bacteriol.* 181 (1999): 4896-4904. PubMed: 10438760.
5. Robert R. Brubaker, personal communication.
6. Hu, P., et al. "Structural Organization of Virulence-Associated Plasmids of *Yersinia pestis*." *J. Bacteriol.* 180 (1998): 5192-5202. PubMed: 9748454.
7. Chu, M. C. *Laboratory Manual of Plague Diagnostic Tests*. Centers for Disease Control and Prevention, Atlanta, 2000.
8. Brubaker, R. R. "Factors Promoting Acute and Chronic Diseases Caused by *Yersiniae*." *Clin. Microbiol. Rev.* 4 (1991): 309-324. PubMed: 1889045.
9. Brubaker, R. R. "How the Structural Gene Products of *Yersinia pestis* Relate to Virulence." *Future Microbiol.* 2 (2007): 377-385. PubMed: 17683274.

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