

Yersinia pestis*, Strain Kuma Derivative 8 (D8)*Catalog No. NR-4691****For research use only. Not for human use.****Contributor:**

Robert R. Brubaker, Ph.D., Professor, Department of Microbiology and Molecular Genetics, Michigan State University, East Lansing, Michigan

Product Description:

Bacteria Classification: *Enterobacteriaceae*, *Yersinia*

Species: *Yersinia pestis*

Biotype/Biovar: Antiqua

Strain: Kuma derivative 8 (D8)

Source: Derivative 8 of the Kuma strain, which was originally a human isolate from Manchuria¹

Yersinia pestis (*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 Kuma(D8) contains the pMT1 and pPCP1 plasmids, but lacks the pCD1 plasmid that is essential for virulence as well as the unstable chromosomal *pgm* locus.⁵

The presence of the pMT1 and pPCP1 plasmids in NR-4691 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-4691 was packaged aseptically in screw-capped plastic cryovials. The product is provided frozen and should be stored at -80°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 Brain Heart Infusion Broth

Tryptic Soy Agar or Sheep Blood Agar

Incubation:

Temperature:⁶ 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 tubes and plate at 28°C or 37°C for 24 to 48 hours.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through the NIH Biodefense and Emerging Infections Research Resources Repository, NIAID, NIH: *Yersinia pestis*, Strain Kuma Derivative 8 (D8), NR-4691."

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, 2007; see www.cdc.gov/od/ohs/biosfty/bmbl5/bmbl5toc.htm.

Disclaimers:

You are authorized to use this product for research use only. It is not intended for human use.

Use of this product is subject to the terms and conditions of the BEI Resources Material Transfer Agreement (MTA). The MTA is available on our Web site at www.beiresources.org.

While BEI Resources uses reasonable efforts to include accurate and up-to-date information on this product sheet, neither ATCC® nor the U.S. Government make any warranties or representations as to its accuracy. Citations from scientific literature and patents are provided for informational purposes only. Neither ATCC® nor the U.S. Government warrants that such information has been confirmed to be accurate.

This product is sent with the condition that you are responsible for its safe storage, handling, use and disposal. ATCC® and the U.S. Government are not liable for any damages or injuries arising from receipt and/or use of this product. While reasonable effort is made to ensure authenticity and reliability of materials on deposit, the U.S. Government, ATCC®, their suppliers and contributors to BEI Resources are not liable for damages arising from the misidentification or misrepresentation of products.

Use Restrictions:

This material is distributed for internal research, non-commercial purposes only. This material, its product or its derivatives may not be distributed to third parties. Except as performed under a U.S. Government contract, individuals contemplating commercial use of the material, its products or its derivatives must contact the contributor to determine if a license is required. U.S. Government contractors may need a license before first commercial sale.

References:

1. Lucier, T. S. and R. R. Brubaker. "Determination of Genome Size, Macrorestriction Pattern Polymorphism, and Nonpigmentation-Specific Deletion in *Yersinia pestis* by Pulsed-Field Gel Electrophoresis." J. Bacteriol. 174 (1992): 2078-2086. PubMed: 1551830.
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. Chu, M. C. Laboratory Manual of Plague Diagnostic Tests. Centers for Disease Control and Prevention, Atlanta, 2000.
7. Brubaker, R. R. "How the Structural Gene Products of *Yersinia pestis* Relate to Virulence." Future Microbiol. 2 (2007): 377-385. PubMed: 17683274.
8. Brubaker, R. R. "Factors Promoting Acute and Chronic Diseases Caused by *Yersiniae*." Clin. Microbiol. Rev. 4 (1991): 309-324. PubMed: 1889045
9. Sikkema, D. J. and R. R. Brubaker. "Resistance to Pesticin, Storage of Iron, and Invasion for HeLa Cells by *Yersiniae*." Infect. Immun. 55 (1987): 572-578. PubMed: 3818085.

ATCC® is a trademark of the American Type Culture Collection.

