Product Information Sheet for NR-22060

Salmonella enterica subsp. *enterica*, Strain 9640 (Serovar Dublin)

Catalog No. NR-22060

For research use only. Not for human use.

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Manufacturer:
BEI Resources

Product Description:
Bacteria Classification: *Enterobacteriaceae*, *Salmonella*
Species: *Salmonella enterica*
Subspecies: *Salmonella enterica* subsp. *enterica*
Serovar: Dublin
Strain: 9640
Original Source: *Salmonella enterica* (*S. enterica*) subsp. *enterica*, strain 9640 was isolated in 2004 from cattle feces in Washington State, USA.[1]
Comments: *S. enterica* subsp. *enterica*, strain 9640 is a multi-drug resistant strain that is reported to be resistant to ampicillin, chloramphenicol, gentamicin, kanamycin, sulfa-trimethoprin, streptomycin, tetracycline, triple sulfa (sulfadiazine, sulfamethazine and sulfamerazine) and ceftazidime. Strain 9640 is reported to contain an approximately 200 kilobase pair plasmid containing many genes responsible for these resistances. Additionally, this strain tested positive for the virulence associated markers *spvC* and *spvRA* and negative for *repA* by PCR.[1]

S. enterica are Gram-negative, rod-shaped, flagellated bacteria. The species is divided into six subspecies (I, II, IIIa, IIIb, IV, VI) where only subspecies I, subsp. *enterica*, is considered of clinical relevance.[2] Salmonellosis (non-typhoidal), due to the greater than 1500 serovars of *S. enterica* subsp. *enterica*, is one of the most common food-borne diseases with approximately 1 million cases that occur in the United States every year.[3] Pathogenicity results from a variety of virulence factors found in plasmids, prophages, and five pathogenicity islands which allow these organisms to colonize and infect host organisms.[4,5]

S. enterica subsp. *enterica* serovar Dublin (formerly *Salmonella dublin*) is a host-adapted, cattle-specific serovar that is very uncommon in other species.[1] Clinical signs associated with acute enteritis in cattle include fever, anorexia, depression, reduced milk yield, abortion and diarrhea.[6,7] Human infections are rare but severe, representing less than seven percent of all reported serovars.[1] Antimicrobial resistance observed in this serovar is believed to have emerged in cattle, unaffected by the use of antimicrobials in human populations (in contrast to *S. enterica* subsp. *enterica* serovar Typhimurium, whose selection focus could be within any of the many host species that this serovar infects).

The genomic sequence of several strains of *S. enterica* subsp. *enterica* serovar Dublin have been completed[8,9] and several others are in progress.[10]

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-22060 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 or equivalent
Incubation:
Temperature: 37°C
Atmosphere: Aerobic
Propagation:
1. Keep vial frozen until ready for use; then thaw.
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 37°C for 24 hours.

Citation:
Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: *Salmonella enterica* subsp. *enterica*, Strain 9640 (Serovar Dublin), NR-22060."

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. Davis, M. A., et al. "Antimicrobial Resistance in *Salmonella enterica* Serovar Dublin Isolates from Beef and Dairy Sources." Vet. Microbiol. 119 (2007): 221-230. PubMed: 17034963.
2. Grimont, P. A. D. and F.-X. Weill. Antigenic Formulae of the *Salmonella* Serovars, 2007, 9th edition. Paris: WHO Collaborating Centre for Reference and Research on *Salmonella*, Pasteur Institute.
3. Scallan, E., et al. "Foodborne Illness Acquired in the United States – Major Pathogens." Emerg. Infect. Dis. 17 (2011): 7-15. PubMed: 21192848.
4. Lavigne, J. P. and A. B. Blanc-Potard. "Molecular Evolution of *Salmonella enterica* Serovar Typhimurium and Pathogenic *Escherichia coli*: From Pathogenesis to Therapeutics." Infect. Genet. Evol. 8 (2008): 217-226. PubMed: 18226587.
5. Parsons, D. A. and F. Heffron. "*sciS*, an *icmF* Homolog in *Salmonella enterica* Serovar Typhimurium, Limits Intracellular Replication and Decreases Virulence." Infect. Immun. 73 (2005): 4338-4345. PubMed: 15972528.
6. Nielsen, L. R. "Review of Pathogenesis and Diagnostic Methods of Immediate Relevance for Epidemiology and Control of *Salmonella* Dublin in Cattle." Vet. Microbiol. 162 (2013): 1-9. PubMed: 22925272.
7. Alexander, K. A., L. D. Warnick and M. Wiedmann. "Antimicrobial Resistant *Salmonella* in Dairy Cattle in the United States." Vet. Res. Commun. 33 (2009): 191-209. PubMed: 18792798.
8. Betancor, L., et al. "Genomic Comparison of the Closely Related *Salmonella enterica* Serovars Enteritidis and Dublin." Open Microbiol. J. 6 (2012): 5-13. PubMed: 22371816.
9. Fricke, W. F., et al. "Comparative Genomics of 28 *Salmonella enterica* Isolates: Evidence for CRISPR-Mediated Adaptive Sublineage Evolution." J. Bacteriol. 193 (2011): 3556-3568. PubMed: 21602358.
10. Allard, M. W., et al. "On the Evolutionary History, Population Genetics and Diversity among Isolates of *Salmonella* Enteritidis PFGE Pattern JEGX01.0004." PLoS One 8 (2013): e55254. PubMed: 23383127.

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