

**Antimicrobial Resistance Panel 11:
Escherichia coli Resistance-Nodulation-
Division (RND) Efflux Pumps Mutants**

Catalog No. NR-55650

For research use only. Not for use in humans.

Contributor:

Thomas Krucker, Ph.D., and Jennifer Leeds, Ph.D., Novartis Institutes for BioMedical Research, Emeryville, California, USA

Manufacturer:

BEI Resources

Product Description:

NR-55650 consists of a three-member panel of *Escherichia coli* (*E. coli*), strain BW25113 derivatives in which genes encoding Resistance-Nodulation-Division (RND) family efflux pumps were deleted. Deletions were accomplished via recombineering using DNA fragments containing a kanamycin marker (*aph*) flanked by homologous sequences of the targeted genes. This panel of gene deletions is ideal for investigations involving the roles of RND family efflux pumps and lipopolysaccharide biosynthesis as potential antibiotic targets.

NR-51923 was created by the sequential deletion of genes *acrB*, *acrD*, *acrF*, *emrB*, *emrY*, *entS*, *macB*, *mdtBC* and *mdtF* via recombineering using DNA fragments containing a kanamycin marker (*aph*) flanked by homologous sequences of the targeted genes. The kanamycin marker was subsequently removed by FLP recombinase.¹

NR-51883 was created by replacing the *acrAB* locus in NR-51923 with the kanamycin resistance cassette (Km^R).^{1,2}

NR-51862 was generated by the serial passage of NR-51883 in the presence of argyrin B, an inhibitor of acyltransferase LpxA, which is the first enzyme in the lipopolysaccharide biosynthesis pathway. The resulting substitution mutation in LpxA (Q73L) exhibits reduced susceptibility to Argyrin B.²

Table 1: Mutant Strains

Item No.	Strain	Description
NR-51923	<i>E. coli</i> NB27079-CDY0099	$\Delta acrB$, $\Delta acrD$, $\Delta acrF$, $\Delta emrB$, $\Delta emrY$, $\Delta entS$, $\Delta macB$, $\Delta mdtBC$, $\Delta mdtF$
NR-51883	<i>E. coli</i> , NB27079-CDY0154	$\Delta acrAB::Km^R$, $\Delta acrD$, $\Delta acrF$, $\Delta emrB$, $\Delta emrY$, $\Delta entS$, $\Delta macB$, $\Delta mdtBC$, $\Delta mdtF$
NR-51862	<i>E. coli</i> , NB27079-TUP0093	$\Delta acrAB::Km^R$, $\Delta acrD$, $\Delta acrF$, $\Delta emrB$, $\Delta emrY$, $\Delta entS$, $\Delta macB$, $\Delta mdtBC$, $\Delta mdtF$, LpxA(Q73L)

Material Provided:

Each panel contains one vial of each of the bacterial strains listed in Table 1. Each vial contains approximately 0.5 mL of bacterial culture in Tryptic Soy broth supplemented with 10% glycerol.

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

Packaging/Storage:

Each isolate was packaged aseptically in 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 1 day.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Antimicrobial Resistance Panel 11: *Escherichia coli* Resistance-Nodulation-Division (RND) Efflux Pumps Mutants, NR-55650."

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 \(BMBL\)](#). 6th ed. Washington, DC: U.S. Government Printing Office, 2020.

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 makes 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. This material may be subject to third party patent rights.

References:

1. Jones, A. K., et al. "Determinants of Antibacterial Spectrum and Resistance Potential of the Elongation Factor G Inhibitor Argyrin B in Key Gram-Negative Pathogens." *Antimicrob. Agents and Chemother.* 61 (2017): e02400-16. PubMed: 28096160.
2. Wooseok, H. et al. "Two Distinct Mechanisms of Inhibition of LpxA Acyltransferase Essential for Lipopolysaccharide Biosynthesis." *J. Am. Chem. Soc.* 142 (2020): 4445-4455. PubMed: 32064871.

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

