

***Staphylococcus aureus*, Strain SA LinR #14**

Catalog No. NR-45926

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Contributor:

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Manufacturer:

BEI Resources

Product Description:

Bacteria Classification: *Staphylococcaceae*, *Staphylococcus*

Species: *Staphylococcus aureus*

Strain: SA LinR #14

NARSA Catalog Number: NRS121

Original Source: *Staphylococcus aureus* (*S. aureus*), strain SA LinR #14 was isolated in 2001 from an 85-year-old male with dialysis-associated peritonitis in Massachusetts, USA.^{1,2}

Comments: *S. aureus*, strain SA LinR #14 is a methicillin-resistant *S. aureus* (MRSA) strain.¹ It was deposited as resistant to linezolid; positive for *mec* (subtype IV); MLST sequence type (ST) 507; eGenomic *spa* type 7, eGenomic *spa* repeats YHGCMBQBLO; Ridom *spa* type t064.¹ *S. aureus*, strain SA LinR #14 was co-isolated with SA LinR #12 (NRS119) and SA LinR #13 (NRS120) from the first clinically reported case of a MRSA infection that demonstrated resistance to linezolid. Based on pulsed-field gel electrophoresis, SA LinR #12 and SA LinR #13 are identical and SA LinR #14 is closely related to both. While each strain has a different antibiogram, all three are resistant to linezolid due to a G2576T mutation in domain V in one or more 23S rRNA genes (*Escherichia coli* numbering).^{1,2} Note: Methicillin is no longer clinically used, however, the term methicillin-resistant *S. aureus* (MRSA) continues to be used to describe *S. aureus* strains resistant to all penicillins.

S. aureus is a Gram-positive, cluster-forming coccus that normally inhabits human nasal passages, skin and mucus membranes. It is also a human pathogen and causes a variety of pus-forming infections as well as food-poisoning and toxic shock syndrome. In 1961, two years after the introduction of methicillin, a penicillinase-resistant penicillin, *S. aureus* developed methicillin-resistance due to acquisition of the *mecA* gene. Subsequently, MRSA infections have become widespread in both hospital and community settings.³ MRSA infections have been increasingly difficult to treat as this organism has developed resistance to a number of commonly used antibiotics, including the preferred antibiotic of choice for the treatment of MRSA infections, vancomycin.⁴ More recently, strains have been isolated that

are resistant to linezolid. These linezolid-resistant *S. aureus* (LRSA) strains typically have the same G2576T point mutation in their 23S rRNA genes preventing linezolid from binding to its site of action.⁵⁻⁷ A second, rarer mechanism of resistance is due to the presence of *cf*, which encodes for a ribosomal methyltransferase that modifies a specific rRNA nucleotide located in the site of the drug action. While the *cf* gene was initially identified on plasmids isolated from animal sources, an increasing number of human cases have been reported.⁸⁻¹¹

Material Provided:

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:

NR-45926 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:

Brain Heart Infusion broth or Tryptic Soy broth or equivalent Brain Heart Infusion agar or Tryptic Soy agar with 5% defibrinated sheep blood 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 18 to 24 hours.

Citation:

Acknowledgment for publications should read "The following reagent was provided by the Network on Antimicrobial Resistance in *Staphylococcus aureus* (NARSA) for distribution by BEI Resources, NIAID, NIH: *Staphylococcus aureus*, Strain SA LinR #14, NR-45926."

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:

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8. Locke, J. B., et al. "Genetic Environment and Stability of *cfr* in Methicillin-Resistant *Staphylococcus aureus* CM05." Antimicrob. Agents Chemother. 56 (2012): 332-340. PubMed: 22024827.
9. Morales, G., et al. "Resistance to Linezolid Is Mediated by the *cfr* Gene in the First Report of an Outbreak of Linezolid-Resistant *Staphylococcus aureus*." Clin. Infect. Dis. 50 (2010): 821-825. PubMed: 20144045.
10. Locke, J. B., et al. "Identification and Characterization of Linezolid-Resistant *cfr*-Positive *Staphylococcus aureus* USA300 Isolates from a New York City Medical Center." Antimicrob. Agents Chemother. 58 (2014): 6949-6952. PubMed: 25136008.
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