Product Information Sheet for NR-45881

Staphylococcus aureus, Strain LIM 2

Catalog No. NR-45881

For research use only. Not for human use.

Contributor:
Network on Antimicrobial Resistance in *Staphylococcus aureus* (NARSA), NIAID, NIH

Manufacturer:
BEI Resources

Product Description:
Bacteria Classification: *Staphylococcaceae, Staphylococcus*
Species: *Staphylococcus aureus*
Strain: LIM 2
NARSA Catalog Number: NRS36
Original Source: *Staphylococcus aureus* (*S. aureus*), strain LIM 2 was isolated in 1995 from the bloodstream of a 2-year-old female patient with leukemia in France.[1,2]
Comments: *S. aureus*, strain LIM 2 is a methicillin-resistant *S.* aureus (MRSA) and a vancomycin-intermediate *S. aureus* (VISA) strain.[1,2] *S. aureus,* strain LIM 2 was deposited as positive for *mec* (subtype I); negative for *vanA*, *vanB*, *vanC1*, *vanC2*, *vanD*, and *vanE*; eGenomic *spa* type 4, eGenomic *spa* repeats YHFGFMBQBLO*;* Ridom *spa* type t051.[1] Strain LIM 2 was the second MRSA isolate recovered from this patient. During the course of treatment, which included the use of glycopeptides, three additional MRSA strains, LIM 1 (NRS35), LIM 3 (NRS37) and LIM 4, were isolated. LIM 1 was the first strain isolated from the patient and has a vancomycin-sensitive *S. aureus* (VSSA) phenotype whereas LIM 3 and LIM 4 have a VISA phenotype. Results from pulsed-field gel electrophoresis suggest that the three VISA strains were selected from LIM 1.[2] Note: Methicillin is no longer clinically used, however, the term methicillin-resistant *Staphylococcus 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] Vancomycin has been the preferred antibiotic of choice for the treatment of MRSA infections.[4] However, there have now been MRSA strains isolated that also have reduced susceptibility or resistance to vancomycin.[5,6] It is believed that this decreased sensitivity primarily arises through mutations affecting the production of peptidoglycans, resulting in a thickened cell wall and a reduction of vancomycin at its site of action.[7] While much rarer, resistance can also occur through the acquisition of the vancomycin resistance gene, *vanA,* from *Enterococcus faecalis*.[5,7,8]

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-45881 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 LIM 2, NR-45881."

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.

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

BEI Resources
www.beiresources.org
E-mail: contact@beiresources.org
Tel: 800-359-7370
Fax: 703-365-2898

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.

References:

1. NARSA, NRS36
2. Ploy, M. C., et al. “First Clinical Isolate of Vancomycin-Intermediate *Staphylococcus aureus* in a French Hospital.” Lancet 351 (1998): 1212. PubMed: 9643727.
3. Deurenberg, R. H. and E. E. Stobberingh. "The Evolution of *Staphylococcus aureus*." Infect. Genet. Evol. 8 (2008): 747-763. PubMed: 18718557.
4. Hiramatsu K. "Vancomycin-Resistant *Staphylococcus aureus*: a New Model of Antibiotic Resistance." Lancet Infect. Dis. 1 (2001): 147-155. PubMed: 11871491.
5. Hiramatsu, K., et al. "Methicillin-Resistant *Staphylococcus aureus* Clinical Strain with Reduced Vancomycin Susceptibility." J. Antimicrob. Chemother. 40 (1997): 135-136. Pubmed: 9249217.
6. Hanaki, H., et al. "Activated Cell-Wall Synthesis is Associated with Vancomycin Resistance in Methicillin-Resistant *Staphylococcus aureus* Clinical Strains Mu3 and Mu50." J. Antimicrob. Chemother. 42 (1998): 199-209. Pubmed: 9738837.
7. Howden, B. P., et al. "Reduced Vancomycin Susceptibility in *Staphylococcus aureus*, Including Vancomycin-Intermediate and Heterogeneous Vancomycin-Intermediate Strains: Resistance Mechanisms, Laboratory Detection, and Clinical Implications." Clin Microbiol. Rev. 23 (2010): 99-139. PubMed: 20065327.
8. Chang, S., et al. "Infection with Vancomycin-Resistant *Staphylococcus aureus* Containing the *vanA* Resistance Gene." N. Engl. J. Med. 3 (2003): 1342-1347. PubMed: 12672861.

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

Support Provided by NIAID