

***Staphylococcus aureus*, Strain
AIS 1001095**

Catalog No. NR-46421

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Contributor:

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Manufacturer:

BEI Resources

Product Description:

Bacteria Classification: *Staphylococcaceae*, *Staphylococcus*

Species: *Staphylococcus aureus*

Strain: AIS 1001095 (also referred to as VRSA-11a)

NARSA Catalog Number: VRS11a

Original Source: *Staphylococcus aureus* (*S. aureus*), strain AIS1001095 was isolated in 2010 in Delaware, USA from wound drainage of a 63-year-old female with a prosthetic joint infection who had been unsuccessfully treated with continuous vancomycin therapy for 3 months.^{1,2} Strain AIS 1001095 is a co-isolate with strain AID 1001123 (VRS11b) from the same patient and they were isolated at the same time. Both are *mecA* positive but unlike strain AID 1001123, strain AIS 1001095 is phenotypically susceptible to oxacillin by the cefoxitin disk diffusion test.³

Comments: *S. aureus*, strain AIS 1001095 is a vancomycin-resistant *S. aureus* (VRSA) strain.¹ *S. aureus*, strain AIS 1001095 was deposited as positive for *mec* and *vanA*; negative for *vanB*, PVL and arginine catabolic mobile element (ACME); pulsed-field type USA100; *spa* repeats TJMBMDMGMK; Ridom *spa* type t002.³⁻⁷ *S. aureus*, strain AIS 1001095 is a USA100 isolate. USA100 isolates have the same MLST profile (ST 5), SCC*mec* (subtype II) and *spa* motif (MDMGMK) and are usually resistant to erythromycin and spectinomycin as well as being multiresistant to other commonly used therapeutic agents. USA100 is the most prevalent U.S health care-associated pulse-field type and is endemic in many U.S. hospitals.⁷ *S. aureus*, strain AIS 1001095 is partially dependent on vancomycin for growth due to a mutation in D-alanyl:D-alanine ligase (Ddl), an enzyme involved in biosynthesis of peptidoglycans. The presence of the *vanA* operon compensates for the Ddl mutation by providing alternative peptidoglycans for cell wall synthesis; however, some have found that the change in the type of peptidoglycans produced renders it susceptible to oxacillin.¹ The complete genome sequence of *S. aureus*, strain AIS 1001095 is available (GenBank: [AHBU00000000](https://www.ncbi.nlm.nih.gov/nuccore/AHBU00000000)).

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 septicemia and endocarditis. *S. aureus* infections are difficult to treat due to resistance to numerous antibiotics. The development and dissemination of methicillin-resistant *S. aureus* (MRSA) strains has proven to be particularly difficult to contain and treat.⁸ Vancomycin has been the preferred antibiotic of choice for the treatment of MRSA infections, however, there have now been MRSA strains isolated that are also resistant to vancomycin.^{8,9} It is believed that this resistance results from either mutations that ultimately lead to a reduction of vancomycin at its site of action or from the acquisition of the vancomycin resistance gene, *vanA*, from *Enterococcus faecalis*.⁸⁻¹⁰ The *vanA* gene is carried by the Tn1546 transposon that resides on a plasmid in all VRSA strains.⁹ For VRSA strains carrying both *mecA* and *vanA*, β -lactams and glycopeptides seem to have a synergistic effect against these strains, both *in vitro* and in an animal model.^{10,11} Combination therapy, therefore, may be a more effective treatment option for VRSA infections than monotherapy with either antibiotic.^{10,11}

Material Provided:

Each vial contains approximately 0.5 mL of bacterial culture in Brain Heart Infusion broth supplemented with 6 μ g/mL vancomycin and 10% glycerol.

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

Packaging/Storage:

NR-46421 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:

Note: For stability purposes, it is recommended that the strain is subcultured in the presence of vancomycin.

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 AIS 1001095, NR-46421."

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/bmb15/index.htm.

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