

***Staphylococcus aureus*, Strain
AIS 2006045**

Catalog No. NR-46417

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Contributor:

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Manufacturer:

BEI Resources

Product Description:

Bacteria Classification: *Staphylococcaceae*, *Staphylococcus*

Species: *Staphylococcus aureus*

Strain: AIS 2006045 (also referred to as VRSA-7)

NARSA Catalog Number: VRS7

Original Source: *Staphylococcus aureus* (*S. aureus*), strain AIS 2006045 was isolated in 2006 in Michigan, USA from a triceps wound of a 43-year-old female with necrotizing fasciitis of the right upper limb who had been recently treated with a five-week course of vancomycin.¹

Comments: *S. aureus*, strain AIS 2006045 is a vancomycin-resistant *S. aureus* (VRSA) strain and is reported to be resistant to a number of other antimicrobial agents.¹ *S. aureus*, strain AIS 2006045 was deposited as positive for *mec* (subtype II) and *vanA*; negative for *vanB*, *vanC1*, *vanC2*, *vanD*, *vanE*, PVL and arginine catabolic mobile element (ACME); pulsed-field type USA100; *spa* repeats TJBMDMGMK; Ridom *spa* type t002.¹⁻⁵ *S. aureus*, strain AIS 2006045 is a USA100 isolate. USA100 isolates have the same MLST profile (ST 8) and SCC*mec* (subtype II) and are usually resistant to β -lactams, erythromycin and spectinomycin as well as being multiresistant to other commonly used therapeutic agents. USA100 is the most prevalent U.S health care-associated pulsed-field type and is endemic in many U.S. hospitals.³ *S. aureus*, strain AIS 2006045 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 this change in the type of peptidoglycans produced renders it susceptible to oxacillin.⁶ The complete genome sequence of *S. aureus*, strain AIS 2006045 is available (GenBank: [AHBQ000000000](http://www.ncbi.nlm.nih.gov/GenBank/ABQ000000000)).

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.⁷ 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.^{7,8} 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*.^{7,9} The *vanA* gene is carried by the Tn1546 transposon that resides on a plasmid in all VRSA strains.⁸ 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.^{9,10} Combination therapy, therefore, may be a more effective treatment option for VRSA infections than monotherapy with either antibiotic.^{9,10}

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-46417 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 2006045, NR-46417.”

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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