

***Staphylococcus aureus*, Strain HIP13419**

Catalog No. NR-46413

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Contributor:

Centers for Disease Control and Prevention, Atlanta, Georgia, USA

Manufacturer:

BEI Resources

Product Description:

Bacteria Classification: *Staphylococcaceae*, *Staphylococcus*

Species: *Staphylococcus aureus*

Strain: HIP13419 (also known as VRSA3b)¹

NARSA Catalog Number: VRS3b

Original Source: *Staphylococcus aureus* (*S. aureus*), strain HIP13419 was isolated in 2004 in New York, USA, from a polymicrobial infected nephrostomy tube exit site of a 64-year-old female who had no recent history of vancomycin therapy. It was co-isolated with *S. aureus*, strain HIP13170. The strains are similar in most aspects except the vancomycin resistant phenotype for HIP13170 is less stable than that of HIP13419.^{1,2}

Comments: *S. aureus*, strain HIP13419 is a vancomycin-resistant *S. aureus* (VRSA) strain. *S. aureus*, strain HIP13419 was deposited as positive for *mec* (subtype IV), *vanA* and resistance genes against tetracycline, macrolides, lincosamides and aminoglycosides; negative for *vanB*, *vanC1*, *vanC2*, *vanD* and *vanE*; pulsed-field type USA800; MLST (ST) 5; *spa* repeats TJMBMDMGMK; Ridom *spa* type t002.^{1,2,3,4,5,6} Unlike the other VRSA strains, it is believed that this strain obtained *vanA* from *Enterococcus faecium* rather than *Enterococcus faecalis*.³ *S. aureus*, strain HIP13419 is a USA800/Pediatric isolate. USA800 isolates have the same MLST profile (ST 5), *agr* group (II), *SCCmec* subtype (IV), *spa* motif (MDMGMK) and Ridom *spa* types (t002 and related) and are positive for *sem* and *seo* toxin genes. USA800 isolates are resistant to β -lactams with some isolates being resistant to additional antibiotics.^{6,7,8} While first isolated in pediatric patients, USA800 strains recently have been isolated in adults.⁹ *S. aureus*, strains HIP13170 and HIP13419 were isolated from the third documented case of VRSA infection in the United States and are believed to be identical. Because of this, characterization has primarily been performed for strain HIP13170 (VRS3a).^{2,5} The complete genome sequences of *S. aureus*, strain HIP13170 (VRS3a) and *S. aureus*, strain HIP13419 (VRS3b) are available (GenBank: [AHBM000000000](https://www.ncbi.nlm.nih.gov/nuccore/AHBM000000000) and [NBCP000000000](https://www.ncbi.nlm.nih.gov/nuccore/NBCP000000000), respectively).

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.¹⁰ 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.^{10,11} 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*.^{10,11,12} The *vanA* gene is carried by the Tn1546 transposon that resides on a plasmid in all VRSA strains.¹¹ 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.^{12,13} Combination therapy, therefore, may be a more effective treatment option for VRSA infections than monotherapy with either antibiotic.^{12,13}

Material Provided:

Each vial contains approximately 0.5 mL of bacterial culture in Tryptic Soy broth containing 6 μ g/mL vancomycin supplemented with 10% glycerol.

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

Packaging/Storage:

NR-46413 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 VRS3b be 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 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 1 day.

Citation:

Acknowledgment for publications should read "The following reagent was provided by the Network on Antimicrobial Resistance in *Staphylococcus aureus* (NARSA) for distribution through BEI Resources, NIAID, NIH: *Staphylococcus aureus*, Strain HIP13419, NR-46413."

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/bmlb5/index.htm.

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