MAYO CLINIC LABORATORIES

Test Definition: KKRP

Kingella kingae, Molecular Detection, PCR, Varies

Overview

Useful For
Aiding in the diagnosis of *Kingella kingae* infection using tissue or synovial fluid specimens

Method Name
Real-Time Polymerase Chain Reaction (PCR)

NY State Available
Yes

Specimen

Specimen Type
Varies

Necessary Information
Specimen source is required.

Specimen Required
The high sensitivity of amplification by polymerase chain reaction requires the specimen to be processed in an environment in which contamination of the specimen by *Kingella kingae* DNA is unlikely.

Submit only 1 of the following specimens:

Specimen Type: Synovial fluid
Preferred: Lavender top (EDTA)
Acceptable: Pink top (EDTA), royal blue top (EDTA), sterile vial containing EDTA-derived aliquot, red clot tube (no anticoagulant), or sterile container
Specimen Volume: 0.5 mL
Collection Instructions: Send specimen in original tube (preferred).
Specimen Stability Information: Refrigerated (preferred) <7 days /Frozen <7 days

Specimen Type: Fresh tissue or biopsy
Sources: Bone, joint, synovium, heart valve, aorta, or endocardium
Container/Tube: Sterile container
Specimen Volume: Entire collection or 5 mm(3)- approximately the size of a pencil eraser
Collection Instructions:
1. Collect fresh tissue specimen.
2. Submit tissue only, do not add fluid to tissue

3. Refrigerate or freeze specimen.
Specimen Stability Information: Refrigerated (preferred) <7 days/ Frozen <7 days

Preferred Paraffin-embedded tissue block:
Specimen Type: Formalin-fixed, paraffin-embedded tissue block (FFPE)
Sources: Bone, joint, synovium, heart valve, aorta, or endocardium
Supplies: Tissue Block Container (T553)
Container/Tube: Tissue block
Collection Instructions: Submit a formalin-fixed, paraffin-embedded tissue block to be cut and returned.
Specimen Stability Information: Ambient (preferred)/Refrigerated

Acceptable Paraffin-embedded tissue block:
Specimen Type: Formalin-fixed, paraffin-embedded tissue block (FFPE)
Sources: Bone, joint, synovium, heart valve, aorta, or endocardium
Container/Tube: Sterile container for each individual cut section (scroll).
Collection Instructions: Perform microtomy and prepare five separate 10-micron sections. **Each section (scroll) must be placed in a separate sterile container for submission.**
Specimen Stability Information: Ambient (preferred)/Refrigerated

Forms

If not ordering electronically, complete, print, and send a Microbiology Test Request (T244)with the specimen.

Specimen Minimum Volume

Fluid/fresh tissue or biopsy: See Specimen Required
Paraffin-embedded tissue block: Two 10-micron sections

Reject Due To

Tissue in formalin, formaldehyde, or acetone Decalcified bone Bone marrow Slides	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Varies	Varies		

Clinical & Interpretive

Clinical Information

Kingella kingae is a fastidious short gram-negative bacillus that may colonize the oropharynx of young children. Colonization may occasionally lead to invasive disease via hematogenous dissemination, primarily in children younger than 4 years of age. This most commonly results in bone and joint infection; *K kingae* is the most frequent cause of osteomyelitis and septic arthritis in children aged 6 to 36 months. *K kingae* may also cause endocarditis, involving both native and prosthetic valves, in patients of any age and is considered part of the HACEK (*Haemophilus* species, *Aggregatibacter* species, *Cardiobacterium hominis, Eikenella corrodens*, and *Kingella* species) group of organisms, known for causing culture-negative endocarditis. *K kingae* produces a repeat-in-toxin (RTX) toxin.

Diagnosis of *K kingae* infection may be challenging due to the fastidious nature of the organism in culture. Evaluation of cardiac, bone, joint tissue, or fluid by polymerase chain reaction is a useful tool for the diagnosis of some cases of *K kingae* infection.

Reference Values

Not applicable

Interpretation

A positive result indicates the presence of *Kingella kingae* DNA.

A negative result indicates the absence of detectable *K kingae* DNA but does not negate the presence of the organism and may occur due to inhibition of PCR, sequence variability underlying primers or probes, or the presence of *K kingae* DNA in quantities less than the limit of detection of the assay.

Cautions

Test results should be used as an aid in diagnosis. The single assay should not be used as the only criteria to form a clinical conclusion, but results should be correlated with patient symptoms and clinical presentation. A negative result does not negate the presence of the organism or active disease.

This assay does not detect species of *Kingella* other than *kingae* or *negevensis* (see Supportive Data).

This assay cross-reacts with *Kingella negevensis*.(1)

Supportive Data

This assay was validated by testing 30-spiked positive samples and 10-negative samples for each accepted sample type; fresh tissue, formalin-fixed paraffin-embedded tissue (FFPE), synovial fluid, and EDTA blood. No PCR inhibition was encountered. The assay was 100% sensitive and specific. The assay showed no cross-reactivity when tested with a panel of 67 bacterial isolates, including *Kingella* species other than *kingae*. The limit of detection (LOD) in fresh tissue and FFPE was 73.7 CFU/mcL. The LOD of synovial fluid was 1.3 CFU/mcL.

Clinical Reference

1. El Houmami N, Bzdreng J, Durand GA, et al: Molecular tests that target the RTX locus do not distinguish between Kingella kingae and the recently described Kingella negevensis species. J Clin Microbiol. 2017 Oct;55(10):3113-3122
2. Murphy TF: Moraxella catarrhalis, Kingella, and other gram-negative cocci. In: Bennett JE. Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Elsevier; 2020:chap 213
3. Yagupsky P: Kingella kingae: carriage, transmission, and disease. Clin Microbiol Rev. 2015 Jan;28(1):54-79

4. Madigan T, Cunningham SA, Ramanan P, et al: Real-time PCR assay for detection of Kingella kingae in children. J Pediatr Infect Dis. 2018;13(3):216-233. doi: 10.1055/s-0038-1641603

Performance

Method Description

Nucleic acid is extracted from the specimen using the automated MagNA Pure instrument. Target specific primers are used to amplify the *rxtB* gene region of *Kingella kingae*; amplification is monitored by detecting fluorescence produced by target specific fluorescence resonance energy transfer hybridization probes. This real-time polymerase chain reaction (PCR) takes place on a LightCycler instrument. Detection of the *K kingae* target is performed through melting curve analysis using the LightCycler software.(Cockerill FR, Uhl JR: Applications and challenges of real-time PCR for the clinical microbiology laboratory. In: Reischl U, Wittwer C, Cockerill F, eds. Rapid Cycle Real-Time PCR Methods and Applications. Springer-Verlag, 2002:3-27; Zbinden R: Aggregatibacter, Capnocytophaga, Eikenella, Kingella, Pasteurella, and other fastidious or rarely encountered gram-negative rods. In: Carroll K, Pfaller M, eds. Manual of Clinical Microbiology. 12th ed. ASM Press; 2019:656-669)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

2 to 7 days

Specimen Retention Time

1 week

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

87798

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
KKRP	Kingella kingae PCR	65809-6

Result ID	Test Result Name	Result LOINC® Value
KKSRC	Specimen Source	31208-2
48324	Kingella kingae PCR	65809-6