MAYO CLINIC LABORATORIES

Test Definition: CBBRP

Coxiella burnetii (Q Fever), Molecular Detection, PCR, Blood

Overview

Useful For

Aiding in the diagnosis of *Coxiella burnetii* infection (eg, Q fever)

Testing Algorithm

For information see Infective Endocarditis: Diagnostic Testing for Identification of Microbiological Etiology.

Special Instructions

- Infective Endocarditis: Diagnostic Testing for Identification of Microbiological Etiology

Method Name

Real-Time Polymerase Chain Reaction (PCR)

NY State Available

Yes

Specimen

Specimen Type

Whole Blood EDTA

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 *Coxiella burnetii* DNA is unlikely.

Container/Tube:
Preferred: Lavender top (EDTA)
Acceptable: Royal blue top (EDTA), pink top (EDTA), or sterile vial containing EDTA-derived aliquot
Specimen Volume: 1 mL
Collection Instructions: Send whole blood specimen in original tube (preferred).

Forms

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

Specimen Minimum Volume

0.5 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole Blood EDTA	Refrigerated (preferred)	7 days	
	Frozen	7 days	

Clinical & Interpretive

Clinical Information

Coxiella burnetii, the causative agent of Q fever, is a small obligate intracellular bacterium that is distributed ubiquitously in the environment. Acquired through aerosol exposure, it generally causes mild respiratory disease. A small number of these acute cases will advance to a chronic condition, which typically manifests as endocarditis. If left untreated, cases of Q fever endocarditis are fatal.

Current diagnostic methods of Q fever endocarditis include serologic studies and histopathologic examination of excised cardiac tissue. These current methods are subjective and nonspecific, limiting usefulness in patient diagnostics.

Evaluation of infected tissue, blood, or serum using polymerase chain reaction (PCR) has been shown to be an effective tool for diagnosing *C burnetii* infection. Mayo Clinic Laboratories has developed a real-time PCR test that permits rapid identification of *C burnetii*. The assay targets a unique sequence of the shikimate dehydrogenase gene (*aroE*) present in *C burnetii*.

The assay targets a unique sequence of the shikimate dehydrogenase gene (*aroE*) present in *C burnetii*.

Reference Values

Not applicable

Interpretation

A positive result indicates the presence of *Coxiella burnetii* DNA.

A negative result indicates the absence of detectable *C burnetii* 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 *C burnetii* DNA in quantities less than the limit of detection of the assay.

Cautions

Test results should be used as an aid in diagnosis and not be considered diagnostic in themselves. A 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.

Supportive Data

This assay was clinically validated in a blinded manner using 52 archived, formalin-fixed, paraffin-embedded heart valve specimens from patients with endocarditis. A single sample within this set determined to contain polymerase chain

reaction (PCR) inhibitors was omitted from the final analysis set. Compared with existing diagnostic data, PCR had a sensitivity of 100% (8/8) and specificity of 100% (43/43). All samples were assayed with a second PCR assay targeting the IS*1111* element.(1) Complete concordance was noted between the 2 assays (P >0.999). The limit of detection of the assay is 2.16 targets/mcL for EDTA whole blood.

Clinical Reference

1. Frangoulidis D, Meyer H, Kahlhofer C, Splettstoesser WD: 'Real-time' PCR-based detection of *Coxiella burnetii* using conventional techniques. FEMS Immunol Med Microbiol 2012 Feb;64(1):134-136.
2. Liesman RM, Pritt BS, Maleszewski JJ, Patel R. Laboratory diagnosis of infective endocarditis. J Clin Microbiol. 2017 Sep;55(9):2599-2608. doi: 10.1128/jcm.00635-17.
3. Kersh GJ, Bleeker-Rovers CP: Coxiella: Evaluation, interpretation, and reporting results. In: Carroll K, Pfaller M, eds. Manual of Clinical Microbiology. 12th ed. ASM Press; 2019:1185-1186.
4. Anderson A, Bijlmer H, Fournier PE, et al: Diagnosis and management of Q fever-United States, 2013: recommendations from CDC and the Q Fever Working Group. MMWR Recomm Rep 2013;62(RR-03):1-30.

Performance

Method Description

Bacterial nucleic acid is extracted from the specimen using the automated MagNA Pure instrument. The purified DNA is placed on the LightCycler instrument, which amplifies and monitors by fluorescence the development of target nucleic sequences after each PCR cycle. A specific target sequence from *Coxiella burnetii* is amplified and the resulting segment is detected using specific hybridization probes. Detection of the *C burnetii* target is performed through melting curve analysis using the LightCycler software.(Cockerill FR, Uhl FR: 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, 2002:3-27; Kersh GJ, Bleeker-Rovers CP: Coxiella. In: Carroll K, Pfaller M, eds. Manual of Clinical Microbiology. 12th ed. ASM Press; 2019:1180-1188)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

Same day/1 to 4 days

Specimen Retention Time

1 week

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

Test Definition: CBBRP

Coxiella burnetii (Q Fever), Molecular Detection, PCR, Blood

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
CBBRP	Coxiella burnetii (Q fever) PCR, B	90443-3

Result ID	Test Result Name	Result LOINC® Value
35191	Specimen Source	31208-2
35192	Coxiella burnetii PCR	90443-3