

Overview**Useful For**

Detection of antibodies to *Echinococcus* species, including *Echinococcus multilocularis* and *Echinococcus granulosus*

Method Name

Enzyme Immunoassay (EIA)

NY State Available

Yes

Specimen**Specimen Type**

Serum

Specimen Required**Container/Tube:**

Preferred: Serum gel

Acceptable: Red top

Specimen Volume: 0.5 mL

Forms

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

Specimen Minimum Volume

0.2 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	30 days	
	Frozen	30 days	

Clinical and Interpretive

Clinical Information

Echinococcosis, also referred to as hydatidosis or hydatid disease, is 1 of the 17 neglected tropical diseases recognized by the World Health Organization and affects over 1 million people worldwide. *Echinococcus* species are tapeworms or cestodes, and 2 main species infect humans: *Echinococcus granulosus* and *Echinococcus multilocularis*.

With respect to geographic distribution, *E granulosus* can be found worldwide but, more frequently, is found in rural grazing areas where dogs may feed on infected sheep or cattle carcasses. *E multilocularis* is largely localized to the northern hemisphere. The definitive hosts for *E granulosus* are dogs or other canids, while the definitive host for *E multilocularis* are foxes and, to a much lesser extent, canids. *Echinococcus* tapeworms reside in the small intestine of definitive hosts and release eggs that are passed in the feces and ingested by an intermediate host, typically sheep or cattle in the case of *E granulosus* or small rodents for *E multilocularis*. The eggs hatch in the small bowel, releasing an oncosphere that penetrates the intestinal wall and migrates through the circulatory system to various organs where it develops into a cyst that gradually enlarges producing protoscolices and daughter cysts, which fill the interior. The definitive host becomes infected following ingestion of these infectious cysts. Humans become accidentally infected following ingestion of *Echinococcus* eggs.

In humans, *E granulosus* (cystic echinococcal disease) cysts typically develop in the lungs and liver, and the infection may remain silent or latent for years (5-20 years) prior to cyst enlargement and symptom manifestation. Symptomatic manifestations include chest pain, hemoptysis, and cough for pulmonary involvement and abdominal pain and biliary duct obstruction for liver infection. *E multilocularis* (alveolar echinococcal disease) infections manifest more rapidly than those of *E granulosus* and similarly to a rapidly growing, destructive tumor, resulting in abdominal pain and biliary obstruction. Rupture of cysts can produce fever, urticaria, and anaphylactic shock.

Diagnosis of echinococcal infections relies on characteristic finding by ultrasound or other imaging techniques and serologic findings. Fine-needle aspirates of cystic fluid may be performed; however, they carry the risk of cyst puncture and fluid leakage, which may potentially lead to severe allergic reactions. Importantly, infected individuals do not shed eggs in stool.

Reference Values

Negative

Reference values apply to all ages.

Interpretation

Negative:

The absence of antibodies to *Echinococcus* species suggests that the individual has not been exposed to this cestode. A single negative result should not be used to rule-out infection (see Cautions).

Equivocal:

Consider repeat testing on a new serum sample in 1 to 2 weeks.

Positive:

Results suggest infection with *Echinococcus*. False-positive results may occur in settings of infection with other helminths, or in patients with chronic immune disorders. Results should be considered alongside other clinical findings (eg, characteristic findings on imaging) and exposure history.

Cautions

Depending on cyst location, individuals may not develop high enough antibody titers to be detectable by serologic assays, leading to false-negative results. Cysts localized to the lungs, central nervous system or spleen, or cysts that are senescent, calcified, or dead are associated with lower serologic reactivity.

False-positive results may occur in patients with other helminth infections, including with *Taenia* species, *Schistosoma* species, and *Strongyloides*. Careful correlation with imaging findings and exposure history is required.

This assay may not detect antibodies to other species of *Echinococcus*, including *Echinococcus vogeli* and *Echinococcus oligarthrus*, both fairly uncommon causes of hydatid disease in humans.

Supportive Data

The Mayo Infectious Disease Serology laboratory evaluated the accuracy of the RidaScreen *Echinococcus* IgG enzyme-linked immunosorbent assay (ELISA) (as performed in our laboratory) using 58 serum samples previously tested by the serologic assays offered at Focus Diagnostics. A comparison of the result is shown in Table 1.

Table 1. Accuracy of the RIDASCREEN <i>Echinococcus</i> IgG assay compared to the Focus Diagnostics assays			
n = 58		Focus Diagnostics ELISA/WB	
		Positive	Negative
RIDASCREEN IgG ELISA	Positive	19	5
	Negative	0	28
	Equivocal	2	4

Positive Agreement (95% CI): 90.5% (69.9-98.6)

Negative Agreement (95% CI): 86.5% (71.6-94.6)

Overall Agreement (95% CI): 87.9% (76.8-94.3)

The Mayo Infectious Disease Serology laboratory also evaluated the analytic specificity of the RidaScreen *Echinococcus* IgG ELISA by testing 36 serum samples positive for antibodies to other helminth and protozoa. The results are shown in Table 2.

Table 2. Analytical specificity studies.		
Specimen	No. of specimens tested	No. of specimens positive by the <i>Echinococcus</i> IgG ELISA
<i>Entamoeba histolytica</i> IgG Ab	6	1
<i>Schistosoma mansoni</i> IgG Ab	6	1
<i>Strongyloides ratti</i> IgG Ab	6	0
<i>Taenia solium</i> IgG Ab	6	4
<i>Trichinella spiralis</i> IgG Ab	6	0
<i>Trypanosoma cruzi</i> IgG Ab	6	0

The reference range for the RidaScreen *Echinococcus* IgG ELISA was evaluated by testing serum from 50 normal

donors; 49/50 (98%) of healthy individuals were negative by this assay.

Clinical Reference

1. Higueta A, Brunetti E, McCloskey C: Cystic echinococcosis. J Clin Microbiol. 2016;54(3):518-523
2. Sarkari B, Rezaei Z: Immunodiagnosis of human hydatid disease: Where do we stand? World J Methodol. 2015;5(4):185-195

Performance

Method Description

Purified antigens are bonded to a microwell plate. Antibodies that are present in the patient samples attach themselves to the antigens and are determined during the second phase of the test by using enzyme-labelled antihuman antibodies (the conjugate). The enzyme converts the colorless substrate (urea peroxide/TMP) to a blue endproduct. The enzyme reaction is stopped by adding sulfuric acid. The colour of the mixture then switches from blue to yellow. A final measurement is carried out in a photometer at 450 nm using a reference wavelength of > or =620 nm.(Package insert: RIDASCREEN Echinococcus IgG. R-Biopharm AG: 09/2015)

PDF Report

No

Day(s) and Time(s) Test Performed

Tuesday, Thursday; 9 a.m.

Analytic Time

Same day/1 day

Maximum Laboratory Time

5 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. For assistance, contact [Customer Service](#).

Test Classification

This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

86682

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
ECHNO	Echinococcus Ab, IgG, S	32171-1

Result ID	Test Result Name	Result LOINC Value
64985	Echinococcus Ab, IgG, S	32171-1