MAYO CLINIC LABORATORIES

Test Definition: BILHA

Schistosoma species Antibody, IgG, Serum

Overview

Useful For

Detection of antibodies to *Schistosoma* species

Highlights

This assay can be used as a screening test for detection of antibodies to *Schistosoma* species.

Positive results should be interpreted alongside clinical findings and suitable exposure history.

A single negative result should not be used to rule-out *Schistosoma* infection.

False-positive results may occur in individuals with other helminth infections.

Method Name

Enzyme Immunoassay (EIA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions: Centrifuge and aliquot serum into plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Kidney Transplant Test Request
-Infectious Disease Serology Test Request (T916)

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Heat inactivated	Reject

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Schistosoma species (class Trematoda) are flukes, characterized by their flat, leaf-like morphology as adults and use of gastropod mollusks (eg, snails) as an intermediate host. The schistosomes are also referred to as the "blood flukes" of which there are 5 species known to infect humans: *Schistosoma mansoni, Schistosoma japonicum, Schistosoma haematobium, Schistosoma mekongi,* and *Schistosoma intercalatum*. Among these *S mansoni, S japonicum* and *S haematobium* are most common.

These species have a defined geographic distribution, with *S mansoni* occurring throughout sub-Saharan Africa, the Middle East, and islands in the Caribbean; *S haematobium* found in much of the African continent and the Middle East; and *S japonicum* localized to China, Indonesia, and the Philippines.

Humans are definitive hosts for all *Schistosoma* species except for *S japonicum*, and infection begins with skin penetration of cercariae in contaminated water sources. The cercariae shed their bifurcated tails, becoming schistosomulae and migrate through the vascular system to the lungs, heart, and the portal venous system in the liver. There they mature to adults, pair off and migrate to the mesenteric venules of the bowel and rectum (*S mansoni, S japonicum*) or venus plexus of the bladder (*S haematobium*). Females will shed eggs, which are moved progressively towards the lumen of the intestine (*S mansoni, S japonicum*) and bladder (*S haematobium*) and are eliminated in the feces or urine, respectively. These eggs will hatch under ideal conditions, releasing miracidia, which penetrate specific snail (mollusk) intermediate hosts and develop into cercariae, continuing the life cycle.

While many infections are asymptomatic, acute schistosomiasis (Katayama fever), due to *S mansoni* or *S japonicum*, may occur weeks after initial infection. Symptoms include fever, cough, abdominal pain, diarrhea, hepatosplenomegaly, and eosinophilia. Central nervous system infection is uncommon; however, cerebral granulomatous disease may be caused by migration of *Schistosoma* eggs into the brain or spinal cord. Cystitis and ureteritis with hematuria are associated with *S haematobium* infection and can progress to bladder cancer.

Diagnosis of schistosomiasis can be made by detection of eggs in fecal or urine samples as appropriate for each species. Antibody detection can be useful for patients who reside in nonendemic areas but have recently traveled to regions

where *Schistosoma* species are found and in whom eggs cannot be identified in fecal or urine examinations.

Reference Values

Negative

Interpretation

Negative: No IgG antibodies to *Schistosoma* species detected.

Equivocal: Recommend follow-up testing in 10 to 14 days if clinically indicated.

Positive: IgG antibody to *Schistosoma* species detected. Differentiation between *Schistosoma* species is not possible by this assay. Serologic cross-reactivity may occur in individuals with other helminth infections, including *Echinococcus* or *Taenia* species.

Cautions

This assay is designed to specifically detect IgG-class antibodies to *Schistosoma mansoni*, which are likely cross-reactive to other *Schistosoma* species.

Sensitivity for detection of antibodies to each of the *Schistosoma* species has not been evaluated for this assay.

Patients may remain seropositive by this assay following appropriate treatment and clearance of the infection.

Positive results should be confirmed with other laboratory findings (eg, ova and parasite examination), clinical symptoms, and suitable exposure history.

Supportive Data

The Mayo Clinic Infectious Disease Serology laboratory evaluated the accuracy of the NovaTec *Schistosoma mansoni* IgG enzyme-linked immunosorbent assay (ELISA) (as performed in our laboratory) using 64 serum samples that were previously tested by a fluorescent microsphere immunoassay at Focus Diagnostics. A comparison of the results is shown in Table 1.

Table 1. Accuracy of the NovaTec Schistosoma IgG assay compared to the Focus (Quest) Diagnostics assay

n = 64		Focus (Quest) Diagnostics FMI	
		Positive	Negative
NovaTec ELISA	Positive	31	1
	Negative	1	20
	Equivocal	5	6

Positive agreement (95% CI): 83.8% (68.5-92.6%)
Negative agreement (95% CI): 96.3% (80.2-100%)
Overall agreement (95% CI): 89.1% (82.6-97%)

The Mayo Clinic Infectious Disease Serology laboratory also evaluated the analytic specificity of the NovaTec *S mansoni* IgG ELISA using 36 serum samples positive for antibodies to other helminth and protozoa. The results are shown in Table 2 below.

Table 2. Analytical specificity studies

Specimen	No. of specimens tested	No. of sera positive or equivocal by the *S mansoni* IgG ELISA
Entamoeba histolytica IgG Ab	6	0
Echinococcus species IgG Ab	6	3
Strongyloides ratti IgG Ab	6	2
Taenia solium IgG Ab	6	2
Trichinella spiralis IgG Ab	6	3
Trypanosoma cruzi IgG Ab	6	1

The reference range for the NovaTec *S mansoni* IgG ELISA was established by testing serum from 50 normal donors; 47/50 (94%) of healthy individuals were negative by this ELISA.

Clinical Reference

1. Weerakoon KG, Gobert GN, Cai P, McManus DP. Advances in the diagnosis of human schistosomiasis. Clin Microbiol Rev. 2015;28(4):939-967

2. McManus DP, Dunne DW, Sacko M, Utzinger J, Vennervald BJ, Zhou XN. Schistosomiasis. Nat Rev Dis Primers. 2018;4(1):13

Performance

Method Description

The qualitative immunoenzymatic determination of IgG-class antibodies against *Schistosoma mansoni* is based on the enzyme-linked immunosorbent assay (ELISA) technique.

Microtiter strip wells are precoated with *Schistosoma mansoni* antigens to bind corresponding antibodies of the specimen. After washing the wells to remove all unbound sample material, horseradish peroxidase-labelled protein A conjugate is added. This conjugate binds to antigen-antibody complexes. The immune complex formed by the bound conjugate is visualized by adding tetramethylbenzidine substrate, which gives a blue reaction product.

The intensity of this product is proportional to the amount of *Schistosoma*-specific IgG antibodies in the specimen. Sulfuric acid is added to stop the reaction. This produces a yellow endpoint color. Absorbance at 450 nm is read using an ELISA microwell plate reader.(Package insert: NovaLisa Schistosoma mansoni, Gold Standard Diagnostics; V SCHG0410engl,dt,fr,it,es18082009-JH Rev 01)

PDF Report

No

Day(s) Performed

Tuesday, Thursday

Report Available

Same day/1 to 5 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

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 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 US Food and Drug Administration.

CPT Code Information

86682

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BILHA	Schistosoma Ab, IgG, S	33317-9

Result ID	Test Result Name	Result LOINC® Value
BILHA	Schistosoma Ab, IgG, S	33317-9