

Schistosoma IgG Antibody Detection by ELISA

FOR DIAGNOSING SCHISTOSOMA INFECTION

Test Highlights

- Simple serologic methodology that delivers a faster turnaround time
- Higher sensitivity than conventional methods such as Kato-Katz microscopic examination and antigen detection
- Can aid in the diagnosis of schistosomiasis in patients with low parasitemia

Clinical Background

- Symptoms of schistosomiasis are divided into acute and chronic classifications. Acute symptoms manifest themselves as a cutaneous rash or Katayama fever. The itchy rash characteristic of swimmer's itch is caused by the cercariae entering the skin and dying. Cases of swimmer's itch in temperate regions are usually caused by avian *Schistosoma*, where humans are dead-end hosts and cercaria die soon after penetration. Katayama fever is caused by a systemic hypersensitive response to migrating schistosomulae. Symptoms include fever, myalgia, non-productive cough, eosinophilia, and fatigue.
- Chronic symptoms are caused by an immune response to the migrating eggs. This can result in damage to the vesical and ureteral wall, intestines, liver, lungs, genitalia, and nerves. General symptoms such as fatigue and physical or cognitive impairment are common. In severe cases, death can occur from liver fibrosis or bleeding.¹

Disease Overview

- *Schistosoma* is a genus of blood-dwelling fluke worms that can cause schistosomiasis or bilharzia. The three main species that cause disease are *S. mansoni*, *S. haematobium*, and *S. japonicum*.¹ Treatment usually consists of a single dose of Praziquantel. Detection methods include microscopic examination of excreta such as the Kato-Katz method, radiography, and serological techniques.¹ Testing for antigens in the serum can be insensitive in patients with low worm burdens and egg output.² However, ELISAs that detect antibodies to *Schistosoma* can aid in the diagnosis of schistosomiasis in patients with low parasitemia.³
- *Schistosoma* goes through a complex lifecycle that involves at least two hosts to complete. Hosts for the initial stage include humans, pigs, cattle, cats, and dogs.⁴ The *Schistosoma* life cycle begins as an egg released in the perivesical or mesenteric venous plexus. Each egg contains a miracidium larva that migrates to the bladder or intestine and is then excreted. The eggs remain viable for up to seven days. When the egg contacts water, the miracidium hatches and seeks its snail intermediate host. Inside the snail, the miracidium develops into a cercaria. The cercariae leave the snail and remain in the surrounding water until they contact their definitive host. They travel through the skin of a suitable host, move to the liver through the blood, mate, and return to the perivesical or

Epidemiology

It is estimated that 200 million people are infected worldwide, particularly in Africa, China, Indonesia, the Philippines, and Brazil. *Schistosoma* is not endemic to the United States, so at-risk populations include immigrants from countries where *Schistosoma* is endemic, tourists, and volunteers that go to endemic areas.

Indications for Ordering

This test should be ordered if clinical symptoms and potential exposure would indicate *Schistosoma* infection.

Additional Ordering Notes

Paired specimens collected at different times should be used to show seroconversion and help confirm a positive diagnosis.

Interpretation

A positive result is strongly suggestive of past or current infection with *Schistosoma*.

Limitations

- Diagnosis of *Schistosoma* should not be made without clinical history or other data due to the potential for cross-reactivity with other parasites or conditions, varying sensitivity to less common species such as *S. intercalatum* and *S. mekongi*, and possible low immune response of the patient.
- This test cannot determine if *Schistosoma* antibodies are detected from a past or current infection unless paired specimens are compared.
- This assay has not been validated for specimens other than serum such as urine, CSF, stool, or whole blood.

Methodology

Patient serum samples are tested with a positive and negative control using an ELISA protocol. If antibodies are present in the serum sample, they bind to soluble egg antigens in the microwells. After washing, an enzyme conjugate is added to the well that binds to any antibodies that have been captured by the antigen. After a second wash, a substrate is added that turns blue in the presence of the enzyme complex. A stop solution turns the mixture yellow, and is then read with a spectrophotometer. Results are reported as optical density values (OD).

References

1. Gryseels B, Polman K, Clerinz J, Kestens L. Human schistosomiasis. *Lancet* 2006;368:1106-18.
2. Wilson M, Schantz PM, Nutman T, eds. *Molecular and immunological approaches for diagnosis of parasitic infection*, 7 ed. Washington, D.C.: American Society for Microbiology, 2006.
3. Silva RM, Kanamura HY, Camargo ED, Chiodelli SG, Nakamura PM, Gargioni C, Velloso SAG, Antunes JL. A comparative study on IgG-ELISA, IgM-IFT and Kato-Katz methods for epidemiological purposes in a low endemic area for schistosomiasis. *Memórias do Instituto Oswaldo Cruz* 1998;93 (Suppl. I):279-82.
4. Want TP, Shrivastava J, Johansen MV, Zhang SQ, Wang FF, Webster JP. Does multiple hosts mean multiple parasites? Population genetic structure of *Schistosoma japonicum* between definitive host species. *Int J Parasitol* 2006;36:1317-25.

Test Information

0099411 ***Schistosoma* Antibody, IgG**

For specific collection, transport, and testing information, refer to the ARUP Web site at www.aruplab.com.