

LABSTRACT – October 2019

Fungal Serology Update – Test algorithms and methodologies

Audience

Health care providers and laboratories involved in submission of specimens for fungal serology testing.

Overview

Beginning October 2019, the fungal serology testing algorithms and methodologies for *Aspergillus*, *Histoplasma capsulatum*, *Blastomyces dermatitidis* and *Coccidioides immitis* used at Public Health Ontario have changed. All assays are now Health Canada licensed. Complement fixation (CF) assays have been discontinued.

Summary of fungal serology assay methods now in use at PHO Laboratory

Serologic Test Ordered	Method used at PHO	Analyte Detected
<i>Aspergillus</i>	Enzyme Immunoassay (EIA)	IgG antibodies
<i>Histoplasma</i>	Immunodiffusion	M and H band precipitins
<i>Blastomyces</i>	Immunodiffusion	A band precipitins
<i>Coccidioides</i>	Screen, EIA	IgM (against TP antigens) and IgG (against CF antigens)
	Confirmation, Immunodiffusion	IDTP and IDCF band precipitins

Background information

Please note, culture remains the gold standard for the diagnosis of most invasive fungal infections. However, fungal infections can be challenging to diagnose as symptoms are often non-specific and can mimic bacterial, viral, other fungal infections or malignancy. Results of fungal serological tests can be used to aid in the diagnosis and/or management of specific fungal infections and fungal allergies.

Aspergillus species are ubiquitous environmental moulds which people inhale each day. While invasive disease is typically restricted to immunocompromised individuals, immunocompetent individuals can have certain allergic manifestations, or develop chronic pulmonary aspergillosis (CPA).

Histoplasma capsulatum*, *Blastomyces dermatitidis* and *Coccidioides immitis are endemic, dimorphic fungi which can infect otherwise healthy individuals. Most infected individuals are exposed by inhaling fungal spores from the environment and present with initial clinical symptoms of respiratory illness. Left untreated, these infections can disseminate, particularly in the immunocompromised. Culture is the gold standard for diagnosing these infections, and serology can be used as an adjunctive tool when culture is not available or is negative and these infections are still clinically suspected.

Each of these fungi have distinct geographic distributions:

- ***H. capsulatum*** can be found throughout Canada but is highly endemic in eastern Ontario and Quebec along the St. Lawrence River valley. The Ohio and Mississippi river valleys are also endemic regions. *H. capsulatum* is also known to be associated with bird and bat droppings.
- ***B. dermatitidis*** is endemic to large areas of North America, and in Canada is most common in Manitoba, Quebec and Ontario, however cases have also been reported in other provinces. The north-western part of Ontario is a hyperendemic area of *B. dermatitidis* although cases are known to have been acquired in the southern and eastern parts of the province as well. In the USA, Michigan, Wisconsin, Minnesota and the Mississippi and Ohio River valleys are known endemic regions. Blastomycosis cases are often linked to exposure to water, decaying wood or soil.
- ***Coccidioides immitis*** is endemic to the southwestern USA, or northern Mexico and causes coccidioidomycosis (Valley Fever). It is not endemic to Canada but can be seen in people that have returned from travel to endemic areas.

Specimen Collection Requirements

For fungal serology testing, submit 5 ml clotted whole blood or 1 ml serum.

Testing Schedule and Turnaround Time (TAT)

TAT for *Aspergillus* is up to 14 days after receipt at test site.

TAT for *Histoplasma*, *Blastomyces* and *Coccidioides* serology is up to 10 days after receipt at test site.

Interpretation of Results

For all fungal serology tests, results must be interpreted in conjunction with other diagnostic tests such as direct mycological, cytological and radiological examination as well as the clinical context of the patient and exposure history. As with other serological tests, negative results do not rule out the possibility of current infection and a new specimen should be resubmitted if clinically indicated.

Aspergillus IgG EIA

Results will be reported as “Non-Reactive”, “Indeterminate” or “Reactive”. A negative result does not rule out the possibility of current infection. This test may be useful in the diagnosis and monitoring of immunocompetent, adult patients where allergic bronchopulmonary aspergillosis (ABPA), chronic pulmonary aspergillosis (CPA), or fungal sinusitis are due to *Aspergillus*.

Histoplasma capsulatum and Blastomyces dermatitidis Serology by Immunodiffusion

Histoplasma capsulatum serology results will be reported as “Non-Reactive”, “Partial” or “Reactive”. Reactive results will indicate presence of M or H bands (precipitins), or both M and H bands. M band is indicative of recent/acute infection, as well as those who have recently recovered from histoplasmosis. H bands appear later and less frequently than M bands, and rarely in the absence of M bands. Bands may be reported as partial which is an indeterminate result.

Blastomyces dermatitidis serology results will be reported as “Non-Reactive”, “Partial” or “Reactive”. Reactive results will indicate presence of A band (precipitins). The A band may be reported as partial band which is an indeterminate result. Reactive A band provides presumptive evidence of infection.

Coccidioides immitis Serology by EIA and Immunodiffusion

Samples requesting *Coccidioides immitis* serology will first be screened by EIA for the detection of *Coccidioides immitis* IgM (against TP antigens) and IgG antibodies (against CF antigens). Results will be reported as “Non-Reactive”, “Indeterminate” or “Reactive”. Samples which are reactive for IgG or IgM will be further tested by Immunodiffusion.

Coccidioides immitis Immunodiffusion results will be reported for both ID-TP and ID-CF bands (precipitins) as “Non-Reactive”, “Partial” or “Reactive”. Formation of ID-TP band is evidence of acute or recent infection. Formation of ID-CF bands is evidence of recent past or chronic *Coccidioides* infection. ID-TP and ID-CF bands may be reported as partial bands; this should be interpreted as an inconclusive result.

References

<https://www.aspergillus.org.uk/content/antibody-testing-0>

Kit Inserts:

Pulse Scientific Fungal Antibody Identification Test, Rev. December 2009

Premier Coccidioides, Rev. 04/16

BioRad Platelia Aspergillus IgG, 881123-2013/11

For further information

- [Fungal Serology Test Information Sheet](#)
- [Fungus Culture – Blood/Bone Marrow Test Information Sheet](#)
- [Fungus Culture – Body Fluids Test Information Sheet](#)
- [Fungus Culture – Cerebrospinal Fluid Test Information Sheet](#)
- [Fungus Culture – Respiratory Test Information Sheet](#)
- [Fungus Culture – Subcutaneous infections/Tissues Test Information Sheet](#)
- Contact the PHO Laboratory Customer Service Centre at 416-235-6556 or 1-877-604-4567 (toll-free), or by email at customerservicecentre@oahpp.ca
- For PHO Laboratory specimen collection information and previous Lababstracts, refer to publichealthontario.ca/test-directory
- The current version of the PHO Laboratory General Test Requisition and other forms are available at publichealthontario.ca/Requisitions
- To subscribe to future Lababstracts, [register on our website](#)
- To register for Autofax and receive laboratory reports by fax directly from our laboratory information system as soon as they are released, contact the PHO Laboratory Customer Service Centre.