

***Coccidioides immitis* (causing coccidioidomycosis):-**

C. immitis is a dimorphic saprophytic fungus that grows as a mycelium in the soil and produces a spherule form in the host organism. It resides in the soil in certain parts of the southwestern United States, most notably in California and Arizona. It is also commonly found in northern Mexico, and parts of Central and South America. *C. immitis* is dormant during long dry spells, then develops as a mold with long filaments that break off into airborne spores when it rains. The spores, known as anthroconidia, are swept into the air by disruption of the soil, such as during construction, farming, or an earthquake, Windstorms may also cause epidemics far from endemic areas. In December 1977 a windstorm in an endemic area around Arvin, CA led to several hundred cases, including deaths, in non-endemic areas hundreds of miles away.



A *Coccidioides immitis* spherules containing endospore

***Blastomyces dermatitidis* (causing blastomycosis):-**

Blastomyces dermatitidis is the causal agent of blastomycosis, an invasive and often serious fungal infection found occasionally in humans and other animals in regions where the fungus is endemic. The causal organism is a fungus living in soil and wet, decaying wood, often in an area close to a waterway such as a lake, river or stream. Indoor growth may also occur, for example, in accumulated debris in damp sheds or shacks. The fungus is endemic to parts of eastern North America, particularly boreal northern Ontario, southeastern Manitoba, Quebec south of the St. Lawrence River, parts of the U.S. Appalachian mountains and interconnected eastern mountain chains, the west bank of Lake Michigan, the state of Wisconsin, and the entire Mississippi Valley including the valleys of some major tributaries such as the Ohio River. In addition, it occurs rarely in Africa both north and south of the Sahara Desert, as well as in the Arabian Peninsula and the Indian subcontinent. Though it has never been directly observed growing in nature, it is thought to grow there as a cottony white mold, similar to the growth seen in artificial culture at 25 °C (77 °F). In an infected human or animal, however, it converts in growth form and becomes a large-celled budding yeast. Blastomycosis is generally readily treatable with systemic antifungal drugs once it is correctly diagnosed; however, delayed diagnosis is very common except in highly endemic areas.

***Paracoccidioides brasiliensis* (causing paracoccidioidomycosis):-**

P. brasiliensis is a thermally dimorphic fungus distributed in Brazil and South America. The habitat of the infectious agent is not known, but appears to be aquatic.

In biopsies, the fungus appears as a polygemulating yeast with a pilot's wheel-like appearance.



Paracoccidioidomycosis is a systemic mycosis caused by the dimorphic fungus *Paracoccidioides brasiliensis*. Strong evidence indicates this fungus infects the host through the respiratory tract. It frequently involves mucous membranes, lymph nodes, bone, and lungs. Unlike other systemic mycoses, it can cause disease in immunocompetent hosts, although immunosuppression increases the aggressiveness of the fungus. Also uniquely, it rarely causes disease in fertile-age women, probably due to a protective effect of estradiol.

Histoplasmosis:-

Is an infection caused by breathing in spores of a fungus often found in bird and bat droppings, Histoplasmosis is most commonly transmitted when these spores become airborne, often during cleanup or demolition projects.

Soil contaminated by bird or bat droppings also can transmit histoplasmosis, so farmers and landscapers are at a higher risk of contracting the disease. People can get histoplasmosis after breathing in the microscopic fungal spores from the air.

Although most people who breathe in the spores don't get sick, those who do may have a fever, cough, and fatigue. Many people who get histoplasmosis will get better on their own without medication, but in some people, such as those who have weakened immune systems, the infection can become severe

Symptoms of histoplasmosis include

Fever

Cough

* Fatigue (extreme tiredness)

Chills

Headache

Chest pain

Body aches

Symptoms of histoplasmosis may appear between 3 and 17 days after a person breathes in the fungal spores. Histoplasmosis is diagnosed by:

* Biopsy of the lung, skin, liver, or bone marrow

* Blood or urine tests to detect histoplasmosis proteins or antibodies

* Cultures of the blood, urine, or sputum (this test provides the clearest diagnosis of histoplasmosis, but results can take 6 weeks)

Histoplasma capsulatum

Histoplasma capsulatum is found in soil, often associated with decaying bat guano or bird droppings. Disruption of soil from excavation or construction can release infectious elements that are inhaled and settle into the lung.

People can get histoplasmosis after breathing in the microscopic fungal spores. from the air. Although most people who breathe in the spores don't get sick, those who do may have a fever, cough, and fatigue. Many people who get histoplasmosis will get better on their own without medication, but in some people, such as those who have weakened immune systems, the infection can become severe.

A dimorphic fungus species of worldwide distribution that causes histoplasmosis in humans and other mammals;

LABORATORY DIAGNOSIS

Serologic tests for antibodies form the basis for diagnosis in most patients with mild infections, while cultures, stains, and tests for antigens are more useful in those with more severe disease. Biopsy of the involved organ for histopathology and culture may be required in some patients in whom test for antibodies in serum and CSF, test for antigens in urine, serum and other body fluids, and cytological analysis are negative or in severely ill patients in whom an immediate diagnosis is judged to be necessary to begin antifungal therapy before antigen results can be obtained

Serologic Tests

Antibodies to *H. capsulatum* measured by immunodiffusion or complement fixation develop in most patients. H. precipitin bands can be demonstrated in less than 25% of patients and clear during the first 6 months following exposure. M bands occur in over three-quarters of cases and persist for years in some patients.

- Complement fixation titers of 1:8 or more are found in most patients with histoplasmosis while titers of 1:32 or higher are more suggestive of active infection.

Culture

Cultures are most useful in patients with disseminated or chronic pulmonary histoplasmosis. Culture is a particularly reliable diagnostic method for patients with disseminated histoplasmosis and HIV/AIDS. The sensitivity is only 10 to 15% in patients with other forms of histoplasmosis. In disseminated histoplasmosis, the highest yield is from bone marrow or blood, positive in over 75% of cases.

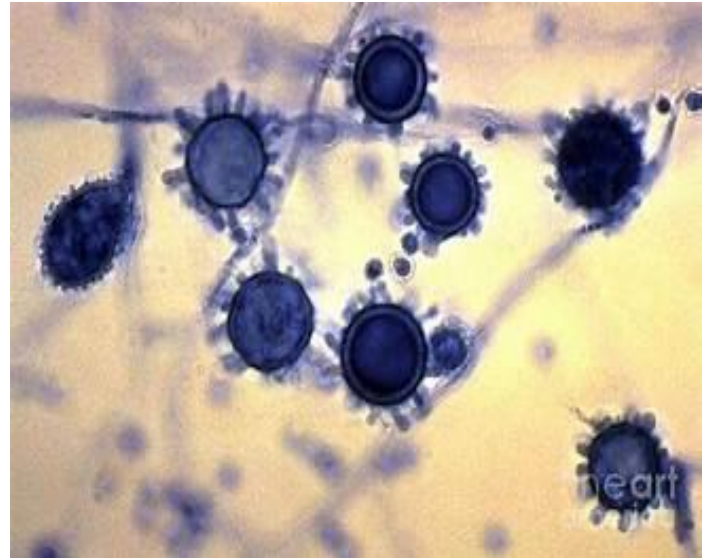
Organisms can be found in sputum or bronchoscopy specimens in 60 to 85% of cases of cavity histoplasmosis. Due to their time consuming nature, fungal cultures cannot be relied up for a rapid diagnosis of histoplasmosis especially in patients with severe disease where timely initiation of antifungal therapy might be lifesaving.

Antigen Detection

Sensitive methods for rapid diagnosis of histoplasmosis in patients with severe
Sensitive methods potential to allow prompt initiation of therapy. Fungal stain is
mailed out insensitive. Detection of antigen offers a valuable approach to the rapid
diagnosis, especially in patients with the "epidemic" form of acute pulmonary which
follows within a week or two of a heavy exposure and is characterized by diffuse
infiltrates and for disseminated histoplasmosis.

Fungal Stains

Silver stain of tissue sections or Wright stain of peripheral blood smears permits
rapid diagnosis but with a lower sensitivity than culture or antigen detection. Fungal
stains of tissues are positive in about half of cases of disseminated histoplasmosis.
Candida glabrata, *Cryptococcus neoformans*, *Blastomyces dermatitidis*, *Penicillium*
marneffeii, *Pneumocystis carinii*, *Toxoplasma gondii*, *Leishmania* and staining
artifacts may be misidentified as *H. capsulatum*.



Histoplasma capsulatum growing in BHI with
10% sheep blood Agar. Isolated after 3 days
from blood of a patient. MMRC-UTMB 1996

