



## Imported mycosis: an update

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## Imported systemic mycoses

### Factors related to imported mycosis

- Increasing world travelling
- Migration
- Climate changes
- HIV pandemic



## Imported systemic mycoses

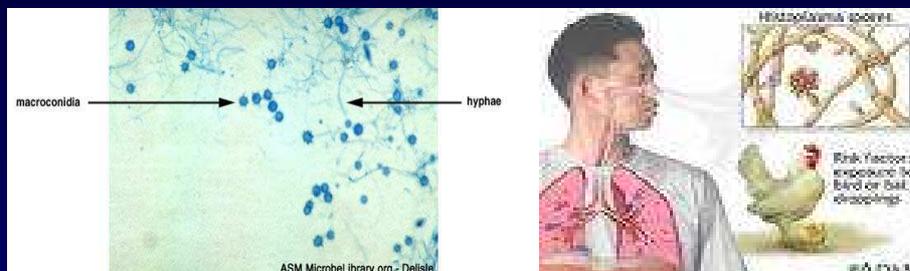
Most common

- \* Histoplasmosis
- \* Coccidioidomycosis
- Paracoccidioidomycosis
- \* Blastomycosis
- \* *Penicilliosis marneffei*



## Histoplasmosis

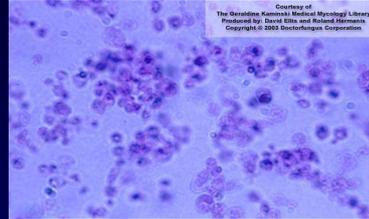
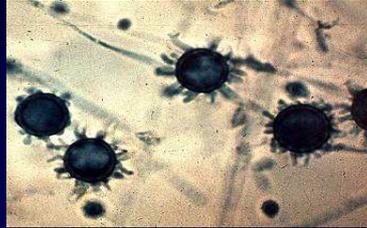
Caused by *Histoplasma capsulatum*



by inhalation of conidia



## Histoplasmosis



25°C  
mould



37°C  
yeast

thermally dimorphic fungus

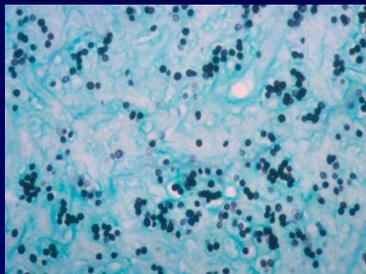


## Histoplasmosis

Phylogenetic studies: 8 clades

The African clade :

*H. capsulatum* var. *duboisii*,  
*H. capsulatum* var. *capsulatum*  
(*H. capsulatum* var. *farciminosum*)

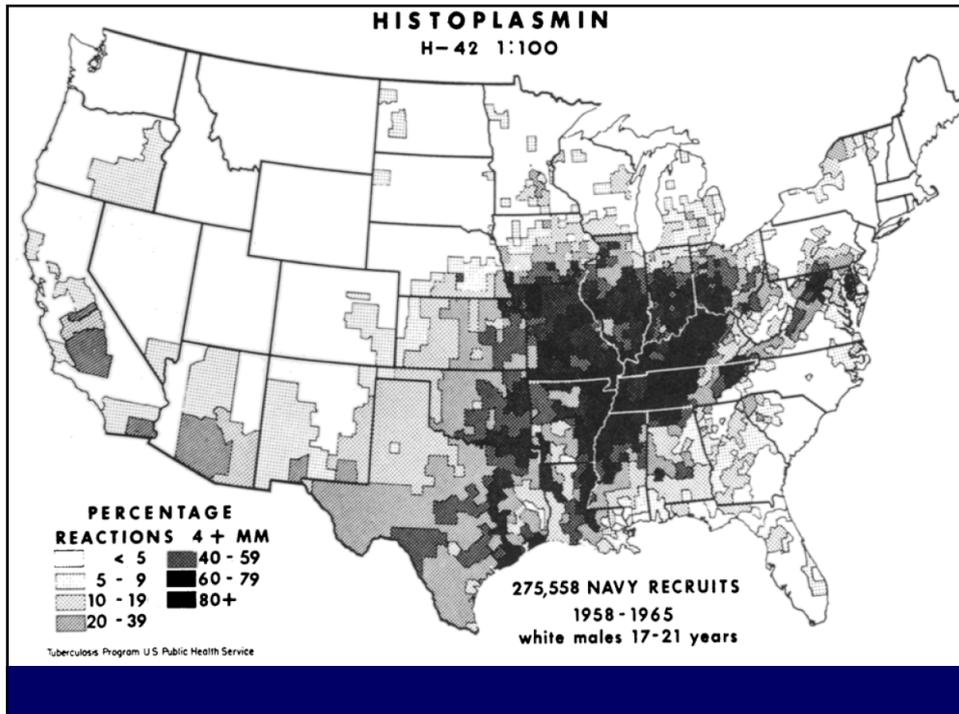


Distinct clinical  
picture



## Histoplasmosis Epidemiology

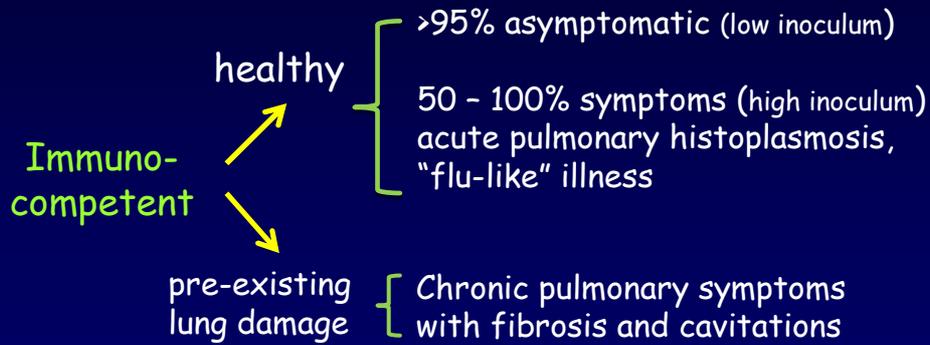
- Has been reported from all continents
- Is endemic in North, Central and South America, Africa, India and Southeast Asia.
- Fungal growth is promoted by the presence of bird or bat droppings in moist soil
- Outdoor activities like cave exploration carry a high risk





## Histoplasmosis

### Clinical presentation



Reactivation after up to 50 years



## Histoplasmosis

### Clinical presentation

Immuno-compromised or extremes of age →

Disseminated infection (via the reticulo-endothelial system)  
nearly all organs affected

Prevalence in HIV-infected in hyperendemic areas before HAART era :  
up to 30%

## Histoplasmosis

### Forms of the disease

CATEGORIES	NOTES
<p><b>Asymptomatic</b></p>	<ul style="list-style-type: none"> <li>• Occurs in 50-90% of infected individuals</li> </ul>
<p><b>Acute &amp; symptomatic</b></p> <p>1.- Self-limited (Flu-like syndrome)</p> <p>2.- Acute Pulmonary</p> <p>3.- Acute Pericarditis</p> <p>4.- Rheumatologic manifestations</p>	<ul style="list-style-type: none"> <li>• It usually goes unrecognized</li> <li>• Diffuse or localized pneumonitis.               <ul style="list-style-type: none"> <li>• "Buckshot" appearance on chest radiograph with subsequent calcification in cases of heavy exposure.</li> </ul> </li> <li>• It may be severe enough to require ventilatory support</li> <li>• Frequently associated with intrathoracic adenopathy</li> <li>• Pericardial fluid is usually sterile</li> <li>• Arthralgias, arthritis, erythema nodosum, and/or erythema multiforme</li> </ul>



## Histoplasmosis

### Symptoms

- Fever, headache, malaise, dry cough, chest pain (sec. to mediastinal lymphadenopathy or pericarditis)
- Arthralgias, erythema nodosum, erythema multiforme
- Pneumonitis on imaging
- Skin lesions
- Retinal lesions
- Complication: massive enlargement of mediastinal lymph nodes, fibrosis



## Histoplasmosis



Acute primary histoplasmosis

### Histoplasmosis Forms of the disease

#### Chronic Pulmonary

*Radiologic presentations include :*

1. a Ghon complex suggestive of tuberculosis,
2. histoplasmoma,
3. and cavitory disease



## Histoplasmosis



Chronic histoplasmosis

### Histoplasmosis Forms of the disease

#### Fibrosing Mediastinitis

- Rare form that produces an intense deposition of fibrotic tissue in the mediastinum encroaching vital structures such as the superior vena cava, esophagus and trachea.

## Disseminated infection

- In the immunocompromised and extremes of age
- Adrenal insufficiency in 10%

## DISSEMINATED HISTOPLASMOSIS: CLINICAL PRESENTATIONS

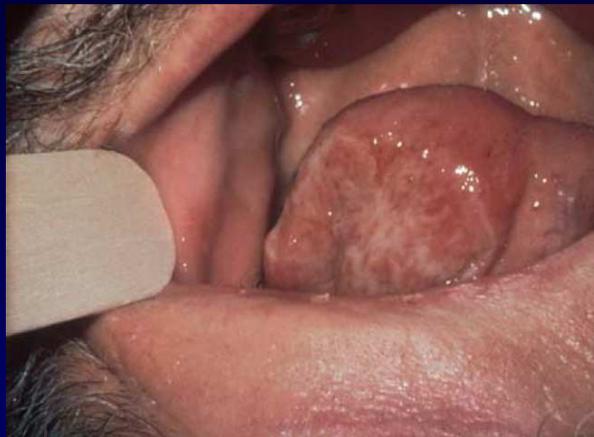
ORGAN INVOLVED	CLINICAL MANIFESTATION
Lymph nodes	Lymphadenitis
Bone Marrow	Anemia , Leukopenia, Thrombocytopenia
Heart	Endocarditis
Adrenal glands	Enlargement without symptoms Addison's disease

## DISSEMINATED HISTOPLASMOSIS: CLINICAL PRESENTATIONS

CNS	Chronic Meningitis	
	Cerebritis	
	Mass	
GI tract	Oral ulcers	
	Small bowel micro and macro ulcers	
Eyes	Uveitis	
	Choroiditis	
Skin	Papular to nodular rash	
Genitourinary tract	Hydronephrosis	
	Bladder ulcers	
	Penile ulcers	
	Prostatitis	



## Histoplasmosis



Tongue ulcer in a pt with disseminated histoplasmosis



## Histoplasmosis



Skin manifestations of disseminated histoplasmosis in an HIV-positive pt



## Histoplasmosis

**Histoplasmosis in Europe:** Report on an epidemiological survey from the ECMM Working Group

- 118 proven or probable cases, from Jan. 1995 - Dec. 1999

Clinical presentation	No of patients
disseminated disease	62
acute pulmonary infection	31
chronic pulmonary infection	6
localized disease	2
Incidental after investigation for lung cancer	17



## Histoplasmosis

### Cases of histoplasmosis in Europe (1995 - 1999)

Country	Retrospective Jan 95 - Dec 97	Prospective Jan 98 - Dec 99	Total
Germany	23	23	46
Italy	14	8	22
UK	10	9	19
France	8	2	10
Belgium	1	5	6
Sweden	5	1	6
Switzerland	0	4	4
Austria	1	1	2
Bulgaria	2	0	2
Turkey	1	0	1
<b>Total</b>	<b>65</b>	<b>53</b>	<b>118</b>

Ashbee et al., Med Mycol. 2008 Feb;46(1):57-65



## Histoplasmosis

Risk factors	No of patients
Traveling endemic area of whom:	106
HIV infection CD4 < 150/ $\mu$ l	45
Exposure to birds, bats, caves	26
Corticosteroids	7
malignancy	2
Recipient infected liver	1
unknown	12

Ashbee et al., Med Mycol. 2008 Feb;46(1):57-65



## Histoplasmosis

- Most patients had travelled to known endemic areas,
- 8 patients (from Italy, Germany and Turkey) had not been outside their countries of origin and hence these cases appear to be autochthonous.
- The observation of autochthonous cases of disease suggests that the endemic area of histoplasmosis is wider than classically reported and supports continued surveillance of the disease throughout Europe.

Ashbee et al., *Med Mycol.* 2008 Feb;46(1):57-65



## Histoplasmosis

Cases of histoplasmosis in Europe (1998- 2006)  
PubMed query

country	No of patients
Netherlands	14
Greece	1
France	4
Spain	24
Austria	3
Italy	5
Belgium	2
Switzerland	1



## Histoplasmosis

### Diagnosis

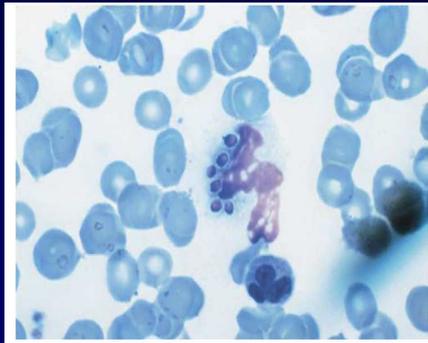
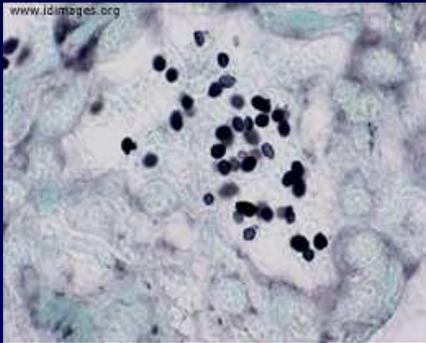
- Isolation from blood (85% positive), BAL, bone marrow or tissues ( "gold standard", disadvantage: time )
- Urine Ag EIA (sens. >92% in dissem.), serum Ag lower sensitivity
- Serology sens. 71% (low sensitivity in immunocompromised)
- Histology (typical budding yeasts in macrophages)
- Pancytopenia and ↑↑↑ LDH → positive predictor
- Real-Time PCR (ITS region of ribosomal DNA), 100% specificity, 77.3% sensitivity → promising
- Histoplasmin skin test: obsolete (insensitive in dissem. Inf.)

## Histoplasmosis Diagnosis

- Isolation from sputum
- Urine antigen (low sensitivity in acute infection, high in disseminated infection)
- Serology
- Stains of peripheral blood or sputum
- Histoplasmin skin test: only for epidemiological studies

## Histoplasmosis

- Stains of the bronchoalveolar lavage



## Histoplasmosis

### Therapy guidelines

Evidence-based guidelines for the management of patients with histoplasmosis were prepared by an **Expert Panel of the Infectious Diseases Society of America**.

These updated guidelines replace the previous treatment guidelines published in 2000: [Wheat et al, Clin Infect Dis 2007; 45:807-25](#)



## Histoplasmosis

### Therapy guidelines

#### Progressive Disseminated Histoplasmosis

**Amphotericin B deoxycholate** (1.0 mg/kg daily for 4-6 weeks) is recommended (AIII).

**Amphotericin B deoxycholate** (1.0 mg/kg daily for 2-4 weeks) followed by **itraconazole** (5.0-10.0 mg/kg daily in 2 divided doses) to complete 3 months of therapy is an alternative (AIII).



## Histoplasmosis

### Therapy guidelines

#### Progressive Disseminated Histoplasmosis

• Longer therapy may be needed for patients with severe disease, immunosuppression, or primary immunodeficiency syndromes (AIII).

• Lifelong suppressive therapy with **itraconazole** (5.0 mg/kg daily, up to 200 mg daily) may be required in immunosuppressed patients if immunosuppression cannot be reversed (AII) and in patients who experience relapse despite receipt of appropriate therapy (CIII).



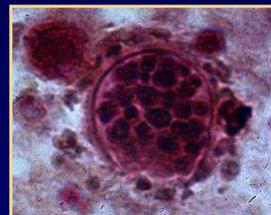
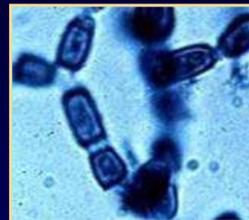
## Coccidioidomycosis History

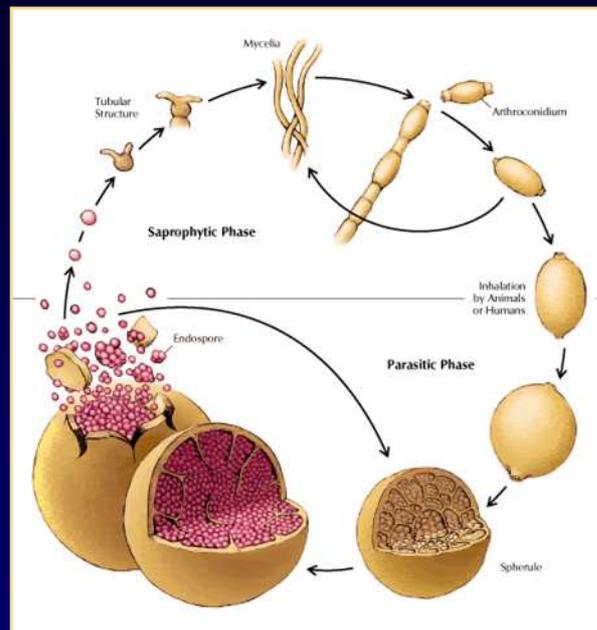
- 1892: First reported as disease
- 1920-1930
  - Soil recognized as reservoir for agent
- 1987
  - CDC adds coccidioidomycosis to annual survey of HIV-associated diseases
- 1991-1995
  - Incidence increases tenfold in San Joaquin Valley, CA



## Coccidioidomycosis

- Dimorphic fungus
  - Saprophytic phase
  - Parasitic phase
- From soil or dust
  - Arthroconidia become airborne, inhaled
  - Transform into spherule and endospore





*Coccidioides immitis*  
Lifecycle phases

## Human Transmission

- Direct inhalation of *C. immitis* spores
  - Present in contaminated soil and dust
  - Only established mode of transmission
- Not person-to-person
- Not animal-to-person
- Increased incidence after disturbance

## Human Transmission

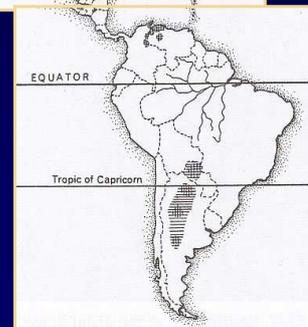
- Natural disturbances
  - Dust storms
  - Earthquakes
- Human disturbances
  - Construction sites
  - Archaeological digs

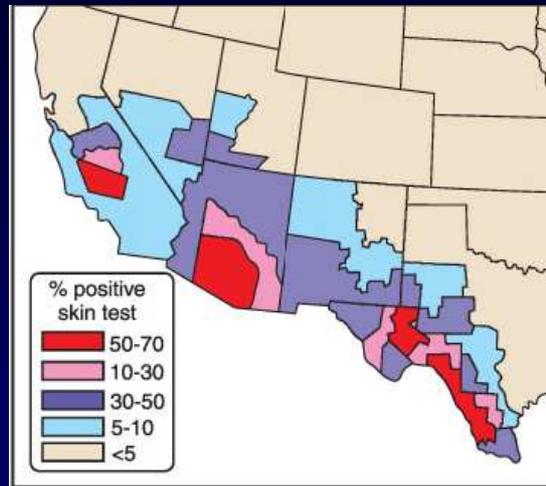


## Coccidioidomycosis

### Geographic Distribution

- Endemic areas
  - Southwestern U.S.
    - New Mexico, Texas, California, Arizona
  - Northern Mexico
  - Central America
  - Argentina
- 10-50% skin test positive





Endemic areas of *Coccidioidomycosis* in the US



## *Coccidioidomycosis*

### Epidemiology

- Endemic in South-Western US, Mexico, S. America
- Inhalation of conidia in arid areas, after sand storms
- In Europe, scattered case reports from pts returning from Arizona, California or Mexico



# Coccidioidomycosis

## Case reports from Europe (PubMed since 1975)

**1:** [Pulmonary Coccidioides nodule in a Swiss patient with chronic lymphatic leukaemia.](#)

Hombach M, Stulz P, Arnold W, Pfyffer GE.  
J Med Microbiol. 2008 Nov;57(Pt 11):1427-30.

**2:** [Coccidioidomycosis: an imported invasive fungal disease in France](#)

Chandesris MO, Hot A, Dannaoui E, Bougnoux ME, Viard JP, Dupont B, Lortholary O.  
Med Mal Infect. 2008 Jun;38(6):336-42. Epub 2008 Feb 14. French.

**3:** [Imported concomitant coccidioidomycosis and histoplasmosis in an HIV-infected Colombian migrant in France.](#)

Pistone T, Lacombe K, Poirot JL, Girard PM, Meynard JL.  
Trans R Soc Trop Med Hyg. 2005 Sep;99(9):712-5.

**4:** [Coccidioidomycosis mimicking lung cancer.](#)

Petrini B, Sköld CM, Bronner U, ElMBERGER G.  
Respiration. 2003 Nov-Dec;70(6):651-4.

**5:** [Coccidioidomycosis as imported atypical pneumonia in Sweden.](#)

Fohlman J, Sjölin J, Bennich H, Chryssanthou E, Von Rosen M, Petrini B.  
Scand J Infect Dis. 2000;32(4):440-1.

**6:** [\[First report of coccidioidomycosis associated with Sweet syndrome\]](#)

Holemans X, Levecque P, Despontin K, Maton JP.  
Presse Med. 2000 Jul 1;29(23):1282-4. French.

**7:** [Coccidioidomycosis in Hungary. The first import case.](#)

Zalatnai A, Zala J, Sándor G.  
Pathol Oncol Res. 1998;4(2):147-51.

**8:** [Bilateral isolated adrenal coccidioidomycosis.](#)

Papadopoulos KI, Castor B, Klingspor L, Dejmek A, Lorén I, Brammert M.  
J Intern Med. 1996 Mar;239(3):275-8.

**9:** [\[Imported pulmonary coccidioidomycosis apropos of an anatomo-clinical study\]](#)

Ferrari R.  
Schweiz Med Wochenschr. 1976 May;106(19):650-6. French.

**10:** [The first two cases of coccidioidomycosis in Finland.](#)

Alanko K, Kahanpää A, Pätäälä J.  
Acta Med Scand. 1975 Sep;198(3):235-40.

**Only 7 cases have been reported in Europe from 1998 – 2008, although an increase in incidence has been reported in the USA for reasons not fully understood.**



# Coccidioidomycosis

- Two forms in humans
  - 60% asymptomatic
    - Only identified with positive skin test
  - 40% mild to severe disease
    - Can be fatal
    - Immuno-compromised persons highly susceptible to serious infection
- Difficult to assess morbidity in animals



## Coccidioidomycosis

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### Clinical Signs: Primary Form

- Incubation period: 1-4 weeks
- Usually subclinical
- Fever, chills, cough, sore throat
- Chest pain
- Nodular lesions
- Nonspecific respiratory symptoms
- Complications less common
  - Pneumonia, pleural effusion



## Coccidioidomycosis

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### Clinical Signs: Disseminate Form

- Severe form of disease
- Weeks to months to years after primary infection
- Symptoms include
  - Low-grade fever, anorexia, weight loss
  - Muscle aches and stiffness, weakness
  - Excessive sweating
  - Widespread focal lesions
- In HIV-infected persons
  - Mucopurulent or bloody sputum



## Coccidioidomycosis



The rash is an immunologic response to the fungus. Most commonly seen in Caucasian women.



The multiple skin lesions have resulted from dissemination from the lungs.



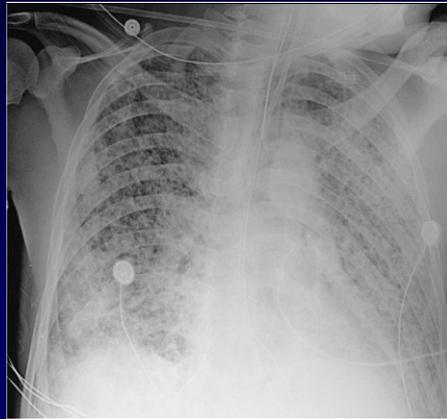
## Coccidioidomycosis



Cavitary Coccidioidomycosis



## Coccidioidomycosis



Severe Coccidioidal pneumonia in HIV-positive pt



## Coccidioidomycosis

### Diagnosis

Direct examination

(helpful but not very sensitive)



Direct microscopy of skin scrapings from a cutaneous lesion mounted in 10% KOH and Parker ink solution showing characteristic endosporulating spherules (sporangia) of *Coccidioides immitis*.

The presence of spherules with endospores is diagnostic.



## Coccidioidomycosis

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### Sampling

- Before collecting or sending any samples, the proper authorities should be contacted
- Samples should only be sent under secure conditions and to authorized laboratories to prevent the spread of the disease



## Coccidioidomycosis

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### Diagnosis

- Differentials
  - Tuberculosis
- Clinical
  - Coccidioidomycosis should be considered
    - In endemic areas
    - Following a dust/soil disturbance
    - With characteristic clinical signs



## Coccidioidomycosis

### Diagnosis

#### Histological stains

more sensitive:  
Grocott- silver

occasionally  
Giemsa, Papanicolau,  
mucicarmine

NO GRAM

Culture at 25°C and  
37°C



Image Courtesy of M. McGinnis  
Copyright © 2000 Doctorfungus Corporation



## Coccidioidomycosis

### Diagnosis

- *C. immitis* spherules visualized in
  - Sputum, pleural fluid, cerebrospinal fluid or exudates from draining lesions
- Complement fixation
  - IgG anticoccidioidal antibodies
    - Titer  $\geq 1:4$  = current or recent infection
    - Titer  $\geq 1:32$  = increased risk of extrapulmonary dissemination
- Skin test of epidemiological value

## Treatment

- **Primary coccidioidomycosis**
  - Treatment generally unnecessary
- **Severe/chronic coccidioidomycosis**
  - Antifungal agents effective
  - Prognosis generally good
- **Disseminate coccidioidomycosis**
  - May require invasive or long-term therapy
  - Prognosis poor to guarded



## Coccidioidomycosis

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### Therapy guidelines

Evidence-based guidelines have been issued by an Expert Panel of the Infectious Diseases Society of America:  
[Galgiani et al, CID 2005;41: 1217-23](#)



## Paracoccidioidomycosis

Caused by *Paracoccidioides brasiliensis*  
(Dimorphic fungus)



Yeast phase



Fungo *P. brasiliensis* com formato de mickey mouse. Grocott, 100X.

Characteristic morphology of budding cells, resembling Mickey mouse

## Paracoccidioidomycoses

- Paracoccidioidomycosis is a chronic granulomatous disease that characteristically produces a **primary pulmonary infection**, often inapparent, and then **disseminates** to form **ulcerative granulomata** of the buccal, nasal and occasionally the gastrointestinal mucosa.
- The disease in its inception and development is similar to blastomycosis and coccidioidomycosis. The only etiological agent, ***Paracoccidioides brasiliensis*** is geographically restricted to areas of South and Central America.



## Paracoccidioidomycosis

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### Epidemiology

- Geographically restricted to Latin America.
- In Europe the disease is very rare and only 11 cases have been reported in the literature since 1979, as infections in travelers to Latin America.



## Paracoccidioidomycosis

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### Epidemiology

PubMed query since 1979

country	No of patients
Spain	6
Netherlands	1
Italy	2
Germany	1
Austria	1
Switzerland	1



## Paracoccidioidomycosis

### Clinical presentation

- Most common manifestation pulmonary, resembles tuberculosis
- All organs and mucous membranes can be affected by lymphatic dissemination
- Long silent period before symptoms appear (6 months to 40 years)
- Rare in children and young adults (5 – 10%)



## Paracoccidioidomycosis

### Clinical presentation



Granulomatous lesion involving the nose following dissemination from the lungs.



## Paracoccidioidomycosis



Mucocutaneous paracoccidioidomycosis showing extensive destruction of facial features. (Courtesy Dr John Rippon, USA).

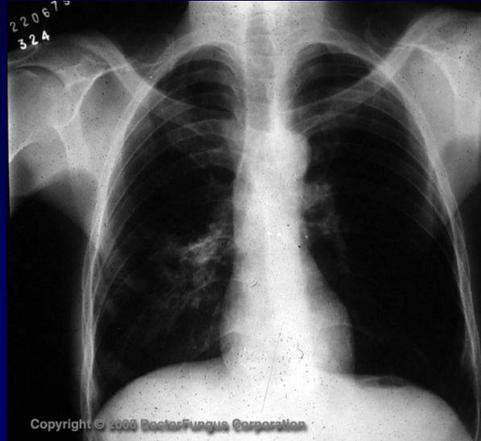
Mucocutaneous paracoccidioidomycosis showing an ulcerated lesion on the lips and loss of teeth.



(Courtesy Dr John Rippon, USA).



## Paracoccidioidomycosis



X-ray of a patient with paracoccidioidomycosis

The diagnosis can be carried out by direct examination of samples revealing the presence of budding yeasts, as well as culture at 25°C and 37°C.

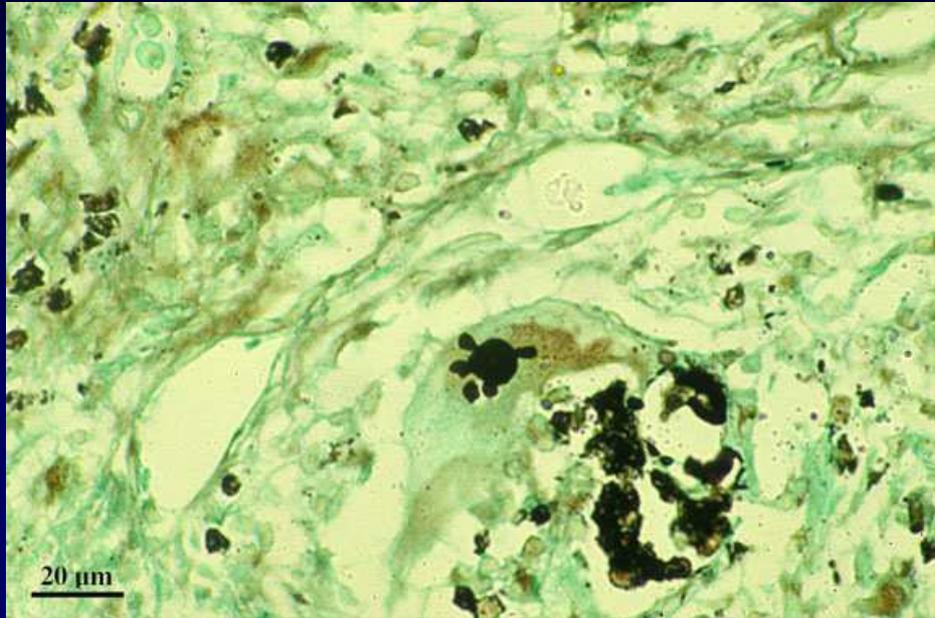


## Paracoccidioidomycosis

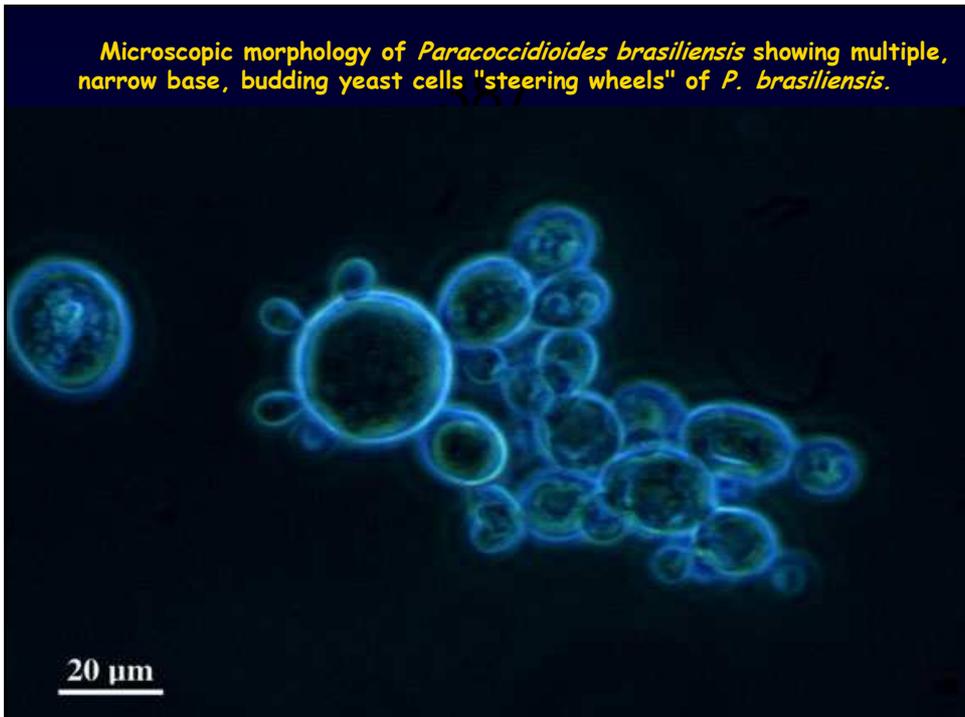
### Diagnosis

- Direct examination of histopathological sections with PAS, H-E and mainly **Grocott** stains revealing the presence of budding yeasts.
- Culture at 25°C and 37°C

Grocott's methenamine silver (GMS) stained lung tissue section showing multiple, narrow base, budding yeast cells "steering wheels" of *P. brasiliensis*.



Microscopic morphology of *Paracoccidioides brasiliensis* showing multiple, narrow base, budding yeast cells "steering wheels" of *P. brasiliensis*.





## Paracoccidioidomycosis

### Therapy

Azole derivatives. **Itraconazole** the drug of choice (<5% relapse)

Sulfamethoxazole-trimethoprim combination

Amphotericin B



## Blastomycosis

Caused by *Blastomyces dermatitidis*  
(Dimorphic fungus)



25°C  
mould



Yeast phase  
KOH preparation



# Blastomycosis

## Epidemiology

Most often in persons living in midwestern, southeastern, and south central United States and the Canadian provinces that border the Great Lakes and the St. Lawrence Seaway.

Recent reports have shown an increase in the incidence of blastomycosis in some of these regions.



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## Endemic areas of Blastomycosis



# Blastomycosis

## Clinical presentation

- From subclinical infection to acute or chronic pneumonia
- A subset of individuals with acute pulmonary blastomycosis can progress to fulminant multilobar pneumonia and ARDS.
- 25%–40% develop extrapulmonary infection manifested by cutaneous, osteoarticular, genitourinary, or CNS disease.
- Disseminated blastomycosis occurs more frequently in immunosuppressed individuals, such as organ transplant recipients and those infected with HIV.

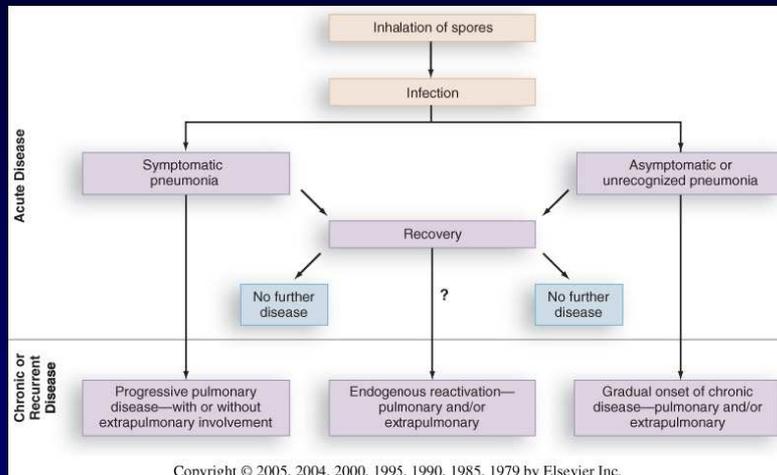


# Blastomycosis

## Case reports from Europe (PubMed since 1976)

- [1: Histopathological evidence of North American blastomycosis in Italy: report of two cases.](#)  
Rivasi F, Nanetti A, Cesinaro AM, Mazzoni A. *APMIS*. 2000 Apr;108(4):273-5.
- [2: Long-term observation of a case of cutaneous blastomycosis in Poland treated with fluconazole.](#)  
Chodorowska G, Lecewicz-Toruń B. *Mycoses*. 1996 Jul-Aug;39(7-8):283-7.
- [3: Pneumonia due to blastomyces dermatitidis in a European renal transplant recipient.](#)  
Winkler S, Stanek G, Hubsch P, Willinger B, Susani S, Rosenkranz AR, Pohanka E. *Nephrol Dial Transplant*. 1996 Jul;11(7):1376-9. Review.
- [4: Blastomycosis in an HIV antibody positive male in the UK.](#)  
Nelson MR, Barton SE, Hawkins DA, Gazzard BG. *Int J STD AIDS*. 1993 May-Jun;4(3):176-7.
- [5: Macroscopic and microscopic characteristics of an African Blastomyces dermatitidis strain.](#)  
Mercantini R, Marsella R, Moretto D, Mercantini P, Balus L, Mastroianni A, Ferraro C. *Mycoses*. 1995 Nov-Dec;38(11-12):477-80.
- [6: Favourable outcome of blastomycosis of the brain stem with fluconazole and flucytosine treatment.](#)  
Taillan B, Ferrari E, Cosnefroy JY, Gari-Toussaint M, Michiels JF, Paquis P, Lefichoux Y, Dujardin P. *Ann Med*. 1992 Feb;24(1):71-2.
- [7: \[North American blastomycosis in an African patient—clinical aspects, therapy, immunologic parameters\]](#)  
Kaben U, Uhlmann H, Westphal HJ, Schütt C, Skierlo P. *Mykosen*. 1985 Dec;28(12):585-94. German.
- [8: North American blastomycosis in Africans.](#)  
Emerson PA, Higgins E, Branfoot A. *Br J Dis Chest*. 1984 Jul;78(3):286-91.
- [9: \[North American blastomycosis and its possible occurrence in Poland\]](#)  
Kowalska M, Hański W, Bieluńska S, Gawkowska-Turczyn M. *Przegl Dermatol*. 1976 Sep-Oct;63(5):641-7. Polish.

# Clinical classification of Blastomycosis



## Blastomycosis

### Clinical presentation

Ulcerated granuloma due to *B. dermatitidis*. (Courtesy of Dr. John Rippon, USA).





## Blastomycosis

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### Clinical presentation



Large verrucous lesion, typical of Blastomycosis



## Blastomycosis

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Osteolytic lesions



## Blastomycosis

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*Blastomyces pneumonia*



## Blastomycosis

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Chronic Blastomycosis, indistinguishable from tuberculosis



## Blastomycosis

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### Therapy

- In the immunocompetent host, acute pulmonary blastomycosis can be mild and self-limited and may not require treatment. However, consideration should be given to treating all infected individuals to prevent extrapulmonary dissemination.
- All persons with moderate to severe pneumonia, disseminated infection, or immunocompromise require antifungal therapy.



## Blastomycosis

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### Therapy

Evidence-based guidelines for the management of patients with histoplasmosis were prepared by an Expert Panel of the Infectious Diseases Society of America.

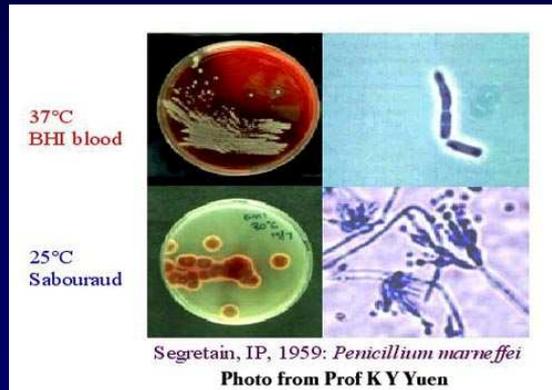
These updated guidelines replace the previous treatment guidelines published in 2000:

[Chapman et al, Clin Infect Dis 2008; 46:1801–12](#)



## Penicillinosi marneffeii

Caused by *Penicillium marneffeii*  
(Dimorphic fungus)



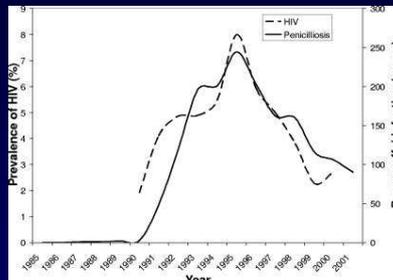
## Penicillinosi marneffeii

### Epidemiology

- Endemic in SE Asia
- Incidence rising due to spread of HIV in region. It is the 3<sup>rd</sup> OI in HIV-infected pts in Northern Thailand
- Presumed association with bamboo rats
- Case reports in Europe of patients from endemic areas (Thailand, China), with HIV co-infection



## Penicilliosis marneffei



Temporal emergence of HIV (antenatal data, 1990 to 2000; UNAIDS/WHO working group report, 2003) and *P. marneffei*-associated penicilliosis (1985 to 2001; Maharaj Hospital, Chiang Mai) for the Chiang Mai region, northern Thailand.

Clin Microbiol Rev. 2006 January; 19(1): 95-110.

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## Case reports of Penicilliosis in Europe

[First case of \*Penicillium marneffei\* fungemia in Greece and strain susceptibility to five licensed systemic antifungal agents and posaconazole.](#)

Filiotou A, Velegraki A, Giannaris M, Pirounaki M, Mitroussia A, Kaloterakis A, Archimandritis A.

Am J Med Sci. 2006 Jul;332(1):43-5.

PMID: 16845242 [PubMed - indexed for MEDLINE]

[Related Articles](#)

[Disseminated \*Penicillium marneffei\* infection in an HIV-positive Italian patient and a review of cases reported outside endemic regions.](#)

Antinori S, Gianelli E, Bonaccorso C, Ridolfo AL, Croce F, Sollima S, Parravicini C.

J Travel Med. 2006 May-Jun;13(3):181-8. Review.

PMID: 16706952 [PubMed - indexed for MEDLINE]

[Related Articles](#)

[Disseminated \*Penicillium marneffei\* sepsis in a HIV-positive Thai woman in Denmark.](#)

Mens H, Højlyng N, Arendrup MC.

Scand J Infect Dis. 2004;36(6-7):507-9.

PMID: 15307585 [PubMed - indexed for MEDLINE]

[Related Articles](#)

[Two imported cases of \*Penicillium marneffei\* infection in Belgium.](#)

Depraetere K, Colebunders R, Ieven M, De Droogh E, Pelgrom Y, Hauben E, Van Marck E, Devroey C.

Acta Clin Belg. 1998 Aug;53(4):255-8.

PMID: 9795445 [PubMed - indexed for MEDLINE]

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## Penicilliosis marneffei

### Clinical presentation

- Low-grade fever, weight loss
- Skin lesions in 60%, typical, umbilicated, molluscum contagiosum-like
- Fungemia in 50%

**Genus:** Penicillium **Species:** marneffei  
**Disease(s):** Penicilliosis marneffei  
**Image Type:** MacroInfection  
**Title:** Cutaneous lesions





## Penicilliosis marneffeii



Courtesy of  
The Geraldine Kaminski Medical Mycology Library  
Provided by: Dr. P. Jones, Sydney, N.S.W  
Produced by: David Ellis and Roland Hermanis  
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Typical papules often with a central necrotic umbilication "Molluscum contagiosum" like lesions caused by *P. marneffeii* in an HIV+ patient.  
(Courtesy Dr. P. Jones, Sydney, N.S.W.).



## Penicilliosis marneffeii

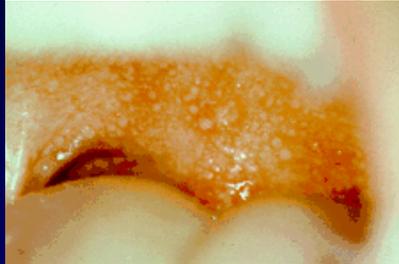


Image Courtesy of: Libero Ajello  
Copyright © 2000 Doctorfungus Corporation

Cutaneous lesions resulted from the dissemination of the fungus from the lungs. The patient's underlying disease is AIDS



## Penicillinoses marneffeii



"Molluscum contagiosum" lesions caused by *P. marneffeii* in the buccal cavity.

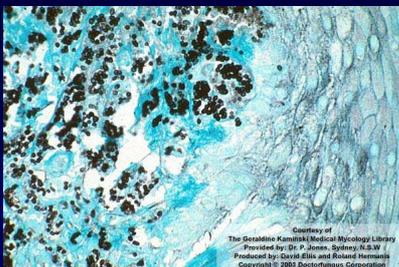


"Molluscum contagiosum" lesions caused by *P. marneffeii* below the eye and on the cornea.

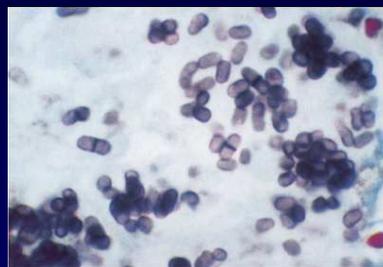


## Penicillinoses marneffeii

### Diagnosis



Methenamine silver (GMS) stained tissue section showing numerous small yeast-like cells of *P. marneffeii* that closely resemble those seen in Histoplasmosis.



*Penicillium marneffeii* in splenic abscess. Transverse septa are noted

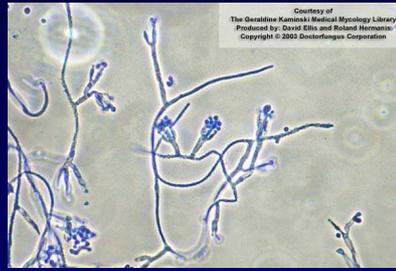


## Penicillinos marneffe

### Diagnosis



Culture of *P. marneffe* showing distinctive red diffusible pigment.



The mold resembles other penicillium species.



## Penicillinos marneffe

### Therapy

Amphotericin B as induction treatment, followed by oral itraconazole or oral itraconazole only + HAART and oral itraconazole as secondary prophylaxis after treatment of penicilliosis.

The prognosis appeared satisfactory with early diagnosis and administration of appropriate antifungal therapy.



## Penicillinoses marneffeii

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### Therapy

Micafungin enhances the efficacy of itraconazole or amphotericin B in vitro and might have a potential role in combination therapy

Immunocompromised patients who have been successfully treated should receive oral itraconazole as a maintenance therapy to prevent relapse.



## Imported systemic mycoses

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### Conclusions

- Given the rarity of imported systemic mycoses, differential diagnosis may be extremely difficult.
- More awareness of these otherwise curable diseases could facilitate diagnosis.
- Early initiation of therapy could prevent considerable morbidity and mortality

# Thank you!

## See you in Greece for the 4<sup>th</sup> Meeting of Trends in Medical Mycology 2009!!!



www.TIMM2009.org

First Announcement



4<sup>th</sup> Trends in Medical Mycology  
18 - 21 October 2009

Hotel Hilton Athens  
Athens, Greece

