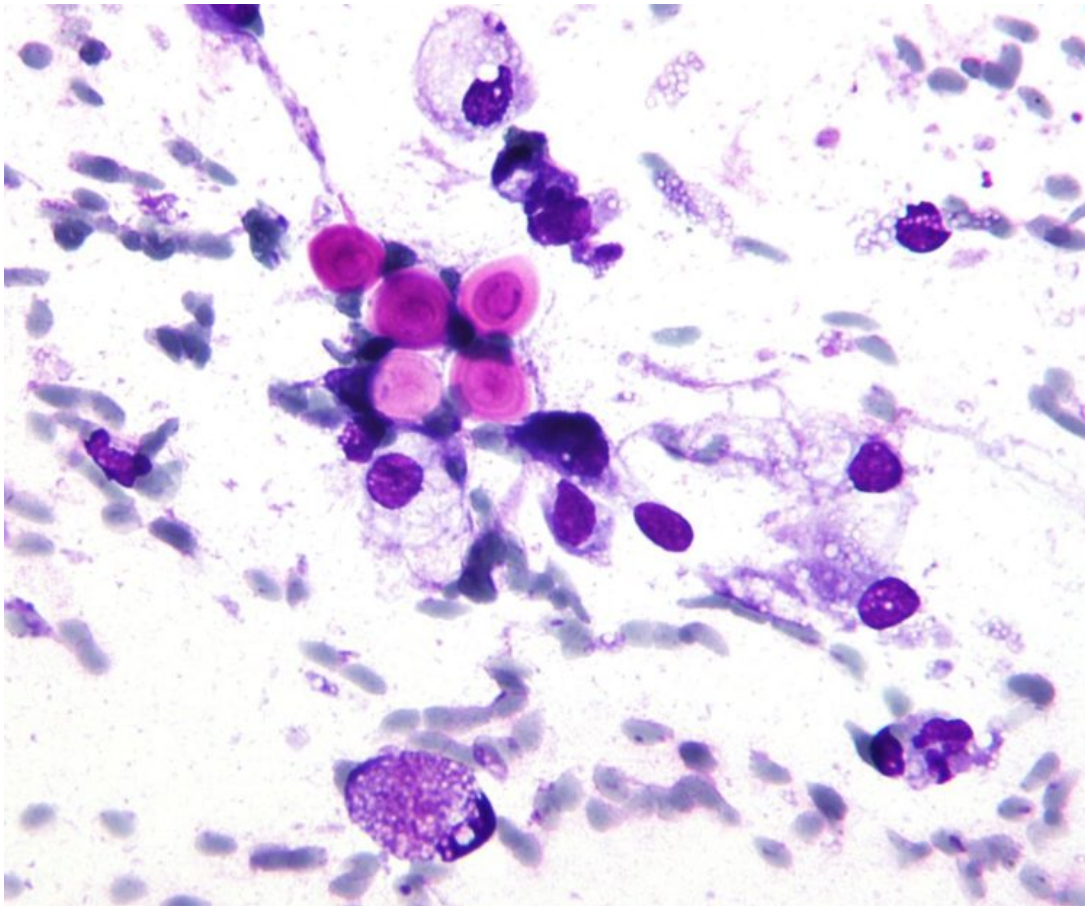


Cryptococcosis — Symptoms and Diagnosis

[See online here](#)

Cryptococcosis is a fungal infection caused by *Cryptococcus neoformans* and *Cryptococcus gattii*. The encapsulated organisms are inhaled and survive in the respiratory tract without causing any harm. However, depending upon the immunity of the individual, it may result in several clinical diseases.

Cryptococcosis is therefore known as an opportunistic infection. Patients with immune deficiency such as HIV, corticosteroid therapy or reticulo-endothelial malignancy may suffer from the additional debilitating effects of the disease.



Overview

Cryptococcosis is an infectious disease that is caused by pathogenic encapsulated yeasts that belong to the genus *Cryptococcus*. The most common causes of cryptococcosis in humans are *Cryptococcus neoformans* and *Cryptococcus gattii*. Cryptococcal meningitis is gaining global importance because of a recent increase in its incidence among patients with AIDS.

Types of Cryptococcosis

Cryptococcosis can be differentiated into **three types**:

- Cutaneous Cryptococcosis
- Pulmonary Cryptococcosis
- Cryptococcal meningitis

Epidemiology of Cryptococcosis

There are **more than 50 species of Cryptococcus**, but the above-mentioned species are the only ones reported to be pathogenic in human beings. The two species have **five serotypes** depending upon the antigenic specificity.

Cryptococcus neoformans has serotypes A, D and AD, while **Cryptococcus gandii** has serotypes B and C. The former is found in the **temperate climatic regions**, while the latter is more abundant in the **tropical and sub-tropical climates**.

Cryptococcus neoformans is found in the **droppings of old pigeons**, while Cryptococcus gandii grows in the **litter surrounding certain species of eucalyptus tree**.

Immunocompromised individuals, such as those suffering from **AIDS**, are frequently infected with Cryptococcus neoformans serotype A. Cryptococcus gandii, for reasons unknown, rarely infects them. The other risk factors for cryptococcosis are summarized below:

- Use of corticosteroid or other immunosuppressive therapies
- Solid organ transplantation
- Sarcoidosis
- History of rheumatoid arthritis or systemic lupus erythematosus
- Chronic liver disease, especially if decompensated
- Idiopathic CD4+ lymphoma
- Diabetes mellitus
- Hypergammaglobulinemia
- Renal failure
- History of peritoneal dialysis

Pathophysiology of Cryptococcosis

Once the organism is **inhaled**, it reaches the **pulmonary alveoli** and survives there with the help of an essential factor **Glucosylceramide synthase** (GCS). Once engulfed by the **macrophages**, this factor is no longer required.

The encapsulated species are, however, resistant to engulfment by the macrophages. The immune response produced includes both **humoral and cell-mediated immunity**. An increase in the number of helper T cells is considered a successful response.

A **cystic lesion** with no inflammatory response or **granuloma formation** is characteristic of Cryptococcosis. **Organ damage** and **extensive tissue distortion** is a feature of end disease. If limited to the airway, these organisms may cause **pneumonia**. **Meningitis** occurs as a result of disseminated infection.

Preexisting conditions such as diabetes mellitus or any other medical condition that can result in immunosuppression puts the patient at an increased risk of acquiring

cryptococcosis. Moreover, the incidence of Cryptococcus meningitis is increased in patients with AIDS.

Up to 95% of cryptococcal infections are caused by Cryptococcus neoformans serotype A. The remaining cases are caused by other Cryptococcus neoformans serotypes or by Cryptococcus gatti.

Diagnosis and Treatment of Cryptococcosis

History is particularly important in the diagnosis of Cryptococcosis.

Immunosuppressive state may point towards it. Investigations such as **pan cultures**, **CT scan brain**, **bronchoscopy**, **chest x-ray** and **CSF analysis** are helpful in making a definite diagnosis.

CT scan shows **diffuse atrophy of the brain** with **cerebral edema** and **focal contrast-enhanced areas**. This differentiates Cryptococcus from other mass-occupying lesions of the brain. The **CSF leucocyte count** may be within normal limits in an AIDS patient whose immune system does not respond appropriately.

Signs and symptoms

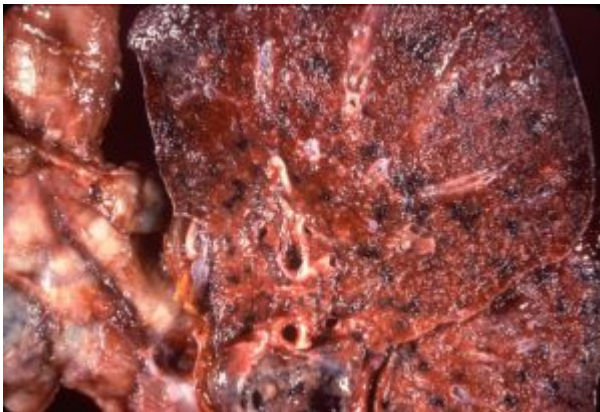


Image: "Gross Pathology of Cryptococcosis." by Yale Rosen from USA - Cryptococcosis Uploaded by CFCF. License: [CC BY-SA 2.0](https://creativecommons.org/licenses/by-sa/2.0/)

Commonly seen are:

- [Cough](#)
- [Headache](#)
- Altered mental state
- Confusion
- Focal neurological defect
- Skin rashes

Pulmonary findings are usually nonspecific to this disease and may not be distinguishable. Similarly, cutaneous lesions do not have any specific findings and may be mistaken for acne, [syphilis](#), [tuberculosis](#), molluscum contagiosum and basal cell carcinoma.

Immune Reconstitution Inflammatory Syndrome

Cryptococcosis has been associated with an abnormal immune response known as immune reconstitution inflammatory syndrome (IRIS). IRIS is more commonly seen in AIDS patient with central nervous system involvement by cryptococcosis and is

associated with significant morbidity and mortality.

The current diagnostic criteria of IRIS in patients with HIV is:

- The onset of symptoms within 12 months after the initiation of antiretroviral therapy
- The recovery of CD4+ count
- New appearance or worsening of any of the following:
 1. New contrast-enhancing lesions on computed tomography or MRI in the brain
 2. Cerebrospinal fluid pleocytosis
 3. Increased intracranial pressure with or without hydrocephalus
 4. The presence of pulmonary nodules, cavities, masses or pleural effusions due to cryptococcosis
 5. Lymphadenopathy, cutaneous cryptococcosis, or involvement of the bone and joints
- Histopathology of one of these lesions show a granulomatous configuration
- Symptoms occur while on antifungal therapy for cryptococcosis
- The above symptoms, clinical, and radiological findings should be associated with a negative culture for *Cryptococcus* “IRIS is an immune dysregulation disorder and not an infectious disease”

Treatment

Antifungal treatment is done if there is any **lung lesion** or the disease has spread. Regular follow-ups for almost one year are carried out. **Amphotericin B**, **Flucytosine** and **Fluconazole** are the drugs of choice in this infection.

References

[Cryptococcosis](#) via medlineplus.gov

[Cryptococcosis](#) via medscape.com

[Cryptococcus \(Cryptococcosis\)](#) via medicinenet.com

[Cryptococcosis](#) via ncbi.nlm.nih.gov

Legal Note: Unless otherwise stated, all rights reserved by Lecturio GmbH. For further legal regulations see our [legal information page](#).