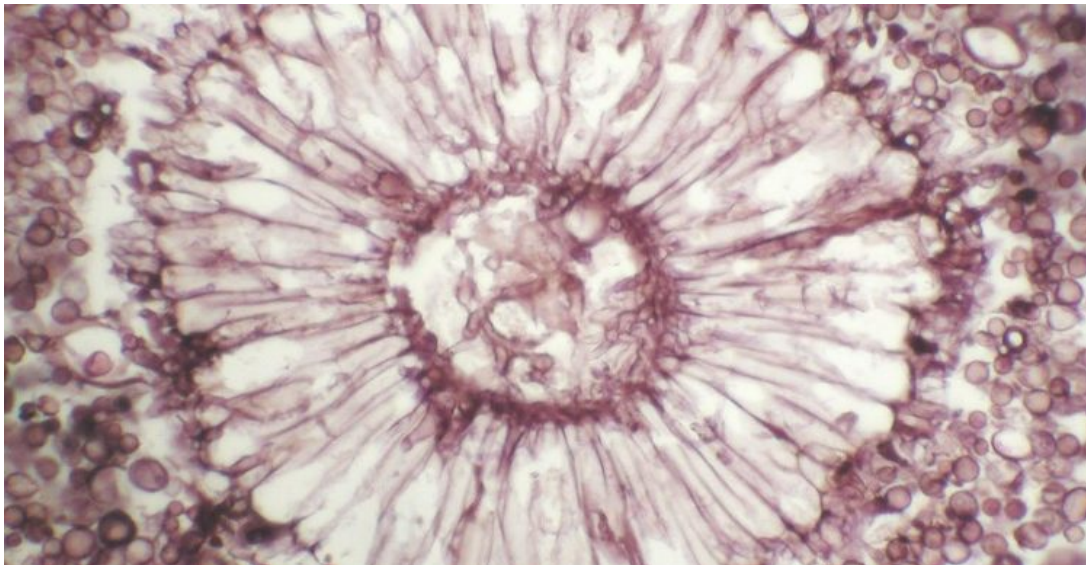


Aspergillosis — Symptoms and Treatment

[See online here](#)

Aspergillosis is an opportunistic fungal infection caused by a fungus known as *Aspergillus fumigatus*. As the organism is opportunistic, *Aspergillus* causes disease primarily in immunocompromised patients, such as those going through transplantation, chemotherapy, or leukemia.



Overview

In the majority of cases, aspergillosis occurs in people with an underlying illness such as [tuberculosis](#) or [chronic obstructive pulmonary disease \(COPD\)](#) and clinically manifests as aspergilloma or chronic pulmonary aspergillosis (CPA). Aspergillosis can also cause sinusitis, ear infection (otomycosis), eye infection (keratitis), or nail infection.

Humans inhale thousands of spores daily, but do not develop the disease due to a competent immune system. *Aspergillus* grows on plants, soil, household dust, and food items. There are about 180 different species of the fungus, 40 of which can cause disease in humans according to the CDC.

Growth and Distribution

Aspergillus species especially grow where sugar and salt are abundant and are highly aerobic, growing where oxygen concentration is high. *Aspergillus* also grow on carbon-rich substrates such as monosaccharides and disaccharides and grow on starch-rich food such as bread and potatoes. Notably, some species exhibit oligotrophy, growing in environments without nutrition.

Aspergillosis Statistics

Aspergillosis is not reported in the United States, making it difficult to determine the exact number of cases. The disease likely affects 15% of patients with [cystic fibrosis](#) and 2.5% of those with [asthma](#).

Reproduction

Reproduction of aspergillus takes place through 3 processes:

- Vegetative reproduction, which occurs through fragmentation
- Asexual reproduction, which takes place in favorable conditions
- Sexual reproduction which also takes place in favorable conditions in which male organs called the antheridium and female organs called the ascogonium develop

Mode of Transmission

Transmission of aspergillus occurs through inhalation of conidia (the spore form) in the air, showering in contaminated water containing conidia, or nosocomial infection (through hospital bed sheets and fabrics); person-to-person transmission is rare.

Symptoms of Aspergillosis



Invasive pulmonary aspergillosis – fever, chest pain, cough, dyspnea

Image by Lecturio

General symptoms

If aspergillosis becomes invasive, it may cause the patient to [cough-up blood](#), experience fever, chest pain, and difficulty breathing. Aspergillosis may also cause [wheezing](#), fatigue, and weight loss. Aspergillus can appear as a mass, known as a fungus ball, when observed under x-ray and cause disseminated infection leading to end-organ failures, such as kidney and [liver failure](#).

Allergic bronchopulmonary aspergillosis

Allergic bronchopulmonary aspergillosis is caused by an allergic reaction to aspergillus, resulting in inflammation in the lungs. The symptoms are usually rusty or brown colored sputum, shortness of breath, and in rare cases, fever.

Ear infection

Aspergillosis may cause itching and fluid discharge leading to overnight pillow staining as well as pain. Due to debris accumulation in the external auditory meatus, aspergillosis can cause a feeling of blockage of the ear. There is markedly higher itching and discharge compared to bacterial ear infection and may present with a red lining of the epidermis and tympanic cavity. Aspergillus can cause perforation, also known as a ruptured eardrum. There may also be a greenish or black fuzzy growth on the debris in the ear canal. Blockage of the ear canal may cause mild conductive deafness. In diabetic patients, *Aspergillus* may even erode the adjacent bones, such as the mastoid bone, and can even disseminate into the brain.

Aspergillus sinusitis

Aspergillus sinusitis may cause congestion, runny or stuffy nose, decreased sense of smell, and sometimes headache.

Diagnosis of Aspergillosis

- **Chest X-ray and CT:** A fungus ball may be visible on a chest X-ray. A halo sign can be observed which is a region of ground glass attenuation around a pulmonary nodule. A crescent sign may also be visible which is a lung cavity filled with air and has a round radio-opaque mass.
- **Hematologic:** Galactomannan test.
- **Microscopic:** The fungus can be identified by silver stains, e.g., methenamine-silver stain. *Aspergillus* has septate hyphae which branch at acute angles of 45 degrees. The hyphae have dichotomous branching.

Treatment of Aspergillosis

For less severe and non-invasive forms of aspergillosis, oral steroids are given for 7-8 months along with itraconazole which increases the efficacy of steroids allowing less dose to be administered.

For invasive bronchopulmonary aspergillosis, voriconazole, and amphotericin B can be given. In some cases, surgical debridement and removal of aspergillomas are recommended.

For ear infections, drying and careful removal of the debris is done. Flucytosine (10%), clotrimazole cream, and econazole cream (1%) are also suggested treatments for an ear infection.

Prevention of Aspergillosis

Posaconazole is used prophylactically in immunocompromised patients. Infection control and reduction of exposure and treatment of the infected person is ultimately the most

effective way to prevent Aspergillosis.

Additional information not related to humans: Infection in animals: aspergillus
Aspergillus infection in animals can cause infections in birds and ducks which are fatal. In
dogs, aspergillus causes infection of the nasal passages.

References

[Global burden of chronic pulmonary aspergillosis complicating sarcoidosis](#) via
era.ersjournals.com

[Pulmonary aspergillosis](#) via mediconotebook.com

[Risk Factors for Invasive Pulmonary Aspergillosis and Hospital Mortality in Acute-On-
Chronic Liver Failure Patients: A Retrospective-Cohort Study](#) via medsci.org

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