EAR, NOSE & THROAT
ALLIANCE
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Molds

Molds are very small plants that grow indoors and outdoors. They require water and organic material to grow. They thrive in dampness (best when humidity is 65-85%) and darkness. Air currents circulate the molds in small fragments called spores. Most molds release their spores during dry conditions (humidity below 70%). The growth and spore dispearsal of many molds are not as seasonal as that of pollen. Most molds grow indoors as well as outdoors.

The most common indoor molds are Aspergillus, Mucor and Penicillium. They are present in basements and crawl spaces as well as furniture, bedding and stuffed toys throughout the year. Some molds (Aspergillus and Stachybotrys) are also consider to contribute to sick building syndrome. While most molds cause annoying allergic reactions, several species, including Aspergillus, Chaetomium, Cladosporium, Fusarium, Penicillium and Stachybotrys, also produce mycotoxins that are known to cause serious, sometimes deadly, human disease.

It is important to keep this information in perspective. There is always a little mold everywhere - in the air and on many surfaces. There are very few reports that toxigenic molds found inside homes and a causal link between the presence of the toxigenic mold and these conditions has not been proven. The common health concern from molds is hay fever-like allergic reaction. Certain individuals with chronic respiratory disease (chronic obstructive pulmonary disorder, asthma) may experience difficulty breathing. Individuals with immune suppression may be at increased risk for infection from molds.

INDOOR MOLD SPORES

- Mold colonies may not be large or colorful enough to be seen with the naked eye, but mold growth should be suspected in the following locations.
- Areas where musty odors are detected.
- Areas with poor circulation, such as basements, closets and other storage areas: closed-up cabins, summer homes or boat cabins.
- Locations where flooding has occurred, especially on rugs and under paddin, wood floors, baseboards, paperbacked wallboard (gypsum board), wallpaper.
- Sites where constant dampness is a problem: leaky plumbing around toilets, under sinks and dishwashers, leaky roofs, poorly sealed basements, inadequately ventilated bathrooms, poorly vented clothes dryers, refrigerator drip pans, air conditioner or dehumidifier condensate reservoirs.
- Indoor house plants and aquariums.
- Stuffed furniture, pillows, mattresses, old stuffed toys, wool carpets, stored paper products (books, magazines), stored clothing and bedding.
- Anywhere dust or soil accumulate in the home. (Counts can be very high during vacuuming.)

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OUTDOOR MOLD SPORES

High concentrations of outdoor mold spores generally are associated with certain conditions.

- The air is relatively free of mold spores in the northern latitudes during periods of freezing temperatures.
- Increased mold spore concentrations can be found in late summer and fall as annual plants die and decomposing leaves begin to pile beneath trees and shrubs.
- High concentrations of Ascomycetes fungal spores can occur during intermittent rains and for 3 -4 days after a rainstorm.
- High mold spore counts can be found in garden areas, decomposing leaf or plant debris piles and compost piles, as well as during lawn mowing and raking.
- Elevated mold spore counts can be found in agricultural areas, especially during harvest and around barns, silos and baled or stacked hay.
- Mold colonies can grow on the north side of a house, on windows next to outdoor plant debris or on outside walls that covered by or adjacent to growing plants.

Because molds can appear to be everywhere, complete avoidance of their spores is impossible, but taking a few precautions can reduce exposure. Common sense cleaning can control most mold conditions. Severe mold growth may need professional evaluation and remediation.

Aspergillus and penicillium molds on a ceiling tile Two of the most common household molds. They are classified as allergens and irritants and may cause hypersensitivity pneumonitis and dermatitis.

Alternaria

The dark brown spores a common outdoor mold. Found on rotten wood, decaying vegetables (compost), birds nests and soil. It appears as a velvety tuft with long soft hairs and its color ranges from dark olive green to brown. Seen as black spots on tomatoes and potatoes. Spores of Alternaria species are dry and commonly dispersed by air currents and are usually a major component of outdoor air.

Also, a common indoor allergen. Causes mildew on textiles (cotton and wool) and butter. Often found growing on carpets, textiles and horizontal surfaces such as window frames in water-damaged buildings.

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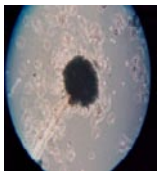
Aspergillus



A hardy, common group of indoor molds - found world-wide, especially in the autumn and winter in the Northern hemisphere. Peaks during hot, humid, rainy weather and in harvest season. It is widespread in the soil and on plants – such as damp grains and hay. It is also considered a common contaminant of food… particularly in canned commercial and home canned foods. Occurs on spoiled foods, such as bacon, chicken, sausage as well as dried fruits as a bluish color and on onions as a black mold. Seen in damp buildings as well as humidifiers and dehumidifiers. Thought to contribute to **sick-building syndrome**. It grows on cloth and leather products. It has a musty odor.

Aspergillus is the most common genus of fungi in our environment with more than 160 different species of mold. Sixteen of these species have been documented as causing human disease. Aspergillosis is now the **2nd most common fungal infection requiring hospitalization** in the United States

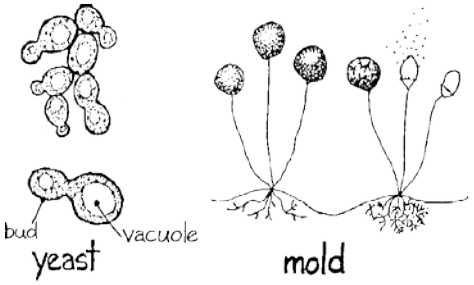
The fungus causes allergic diseases in asthmatics and patients suffering from cystic fibrosis. It takes advantage of people with weak immune systems by growing in their lungs. It can infect the skin. Many species produce mycotoxins which are suspected to be human carcinogens.

Aspergillus fumigatus. The most encountered species causing infection. It is seen abundantly in compost piles. People who handle contaminated material often develop hypersensitivity to the spores of *Aspergillus* and may suffer severe allergic reactions upon exposure.

Aspergillus flavus. The 2nd most encountered fungi in cases of *Aspergillus* infection. It is also known to produce the mycotoxin aflatoxin, one of the most potent carcinogens known to man. Most countries have established levels for aflatoxin in food.

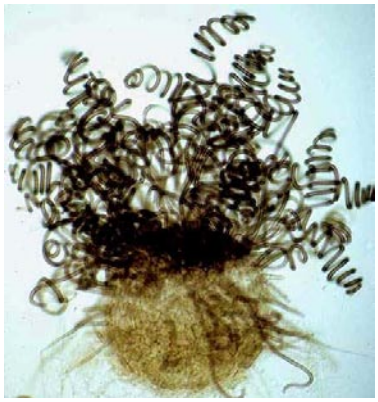
Aspergillus niger. The 3rd most common *Aspergillus* fungi associated with disease and the most common of any *Aspergillus* species in nature due to it's ability to grow on a wide variety of substrates. This species may cause a "fungal ball", which is a condition where the fungus actively proliferates in the human lung, forming a ball. It does so without invading the lung tissue.

Candida



Candida is a yeast that causes mouth, vaginal, intestinal, nail and skin infections- particularly athlete's foot and ear canal infections.

Chaetomium



Commonly found on deteriorating wood products, chaetomium species frequently emits a musty odor and is frequently found on plant compost and cellulose products, such as paper, straw, cloth and cotton. It thrives in water-damaged homes, especially drywall, wallpaper, baseboards, carpets and window frames and other lower cost construction products often used in the United States.

There are many chaetomium species and they are covered by setae, or dark hairs.

This fungus is reported to be an allergen and a toxin. It is a known agent of skin and nail infections in humans and is more rarely a cause of cerebral and systemic infections in immunocompromised individuals. Although chaetomium spores are allergens, the spores are not easily aerosolized and hence exposure to airborne spores may be rather limited. Unlike most other mold pathogens, there is medical evidence to suggest that the chaetomium mycotoxins may predispose people to permanent neurological damage of the myelin sheath. Also, autoimmune diseases have been linked to exposure of this mold… such as lupus and multiple sclerosis. This mold has also been linked to certain forms of cancer by causing permanent DNA damage. Some authorities argue that this common house mold may rank in human health risk only behind aspergillus and Stachybotrys.

Cladosporium

This genus of molds appears dark green on its front, but black on its reverse side with a velvety to powdery texture. One of the most commonly isolated from indoor and outdoor air, Cladosporium species are found on decaying plants, woody plants, food, straw, soil, paint, textiles, and the surface of fiberglass duct liner in the interior of supply ducts. It is common cause of asthma. Chronic cases may develop pulmonary emphysema.

Fusarium

This common soil fungus is widely distributed on grasses and the roots of fruits and vegetables – strawberries, bananas, watermelon and tomatoes. It is often found in humidifiers and has been isolated from water-damaged carpets and a variety of other building materials. Seen as slime in river beds. While most species are more common at tropical and subtropical areas, some inhabit soil in cold climates. Peaks in summer and fall.

As well as being a common contaminant and a well-known plant pathogen (wilt disease), Fusarium species may cause various infections in humans. Human exposure may occur through ingestion of contaminated grains (rice, bean, soybean) and possibly through the inhalation of spores. Fusarium is frequently involved with eye, skin, and nail infections. More uncommonly, it can produce hemorrhagic syndrome which is characterized by nausea, vomiting, diarrhea, dermatitis and extensive internal bleeding.

Several species can produce mycotoxins which target the circulatory, alimentary, skin, and nervous systems.

Helminthosporium
A widespread fungus - associated with grasses, grains, decaying food, soil and textiles. Found in wooded areas, mulch, decaying leaves, cellars and crawl spaces. It is commonly found on celery and rooted vegetables. Celery should be fresh and washed with GSE (Grapefruit seed extract) to kill fungi before consumption. Occurs seasonally in hot weather.

Hormodendrum
One of the most common molds. Found in soil and in large numbers on decaying leaves, straw and vegetation. Grows in cellars, crawl spaces, closets, and bathrooms. Peaks in hot, humid, rainy season.

Mucor

Primarily an indoor mold. This fungus is commonly found but also grows outdoors on decaying fruits and vegetables. It has a fluffy white or gray appearance that resembles cotton candy when it grow on grapes, bread, spoiled meats, animal droppings, old furniture and garbage cans. This mold can infect sinus cavities, lungs, stomach, kidney and joints. It is particularly a problem in people with diabetes, renal failure, extensive burns, intravenous drug use and immunosuppression.

Penicillium

These fungi are commonly found in soil, food, cellulose, grains, paint, carpet, wallpaper, interior fiberglass duct insulation, and decaying vegetation. Penicillium may cause hypersensitivity pneumonitis, asthma, and allergic lung reactions in susceptible individuals.

This fungi has been isolated from patients with eye, ear, lung, heart and urinary infections. Penicillium infections are most commonly exhibited in immunosuppressed individuals.

This fungus has some species that produce mycotoxins. The mycotoxin, known as Ochratoxin A, injures the kidney and may promote cancer. Another mycotoxin Verrucosidin may injure the nervous system. And Penicillic acid is another mycotoxin that may cause kidney and liver damage.

Phoma

This is a common allergen, found on plants and soil, but also found indoors on humid surfaces, particularly painted walls (including the shower) and on a variety of other surfaces including cement, paper, rubber, and butter. Some believe that its effect on indoor environment is minimal because it is not easily airborne.

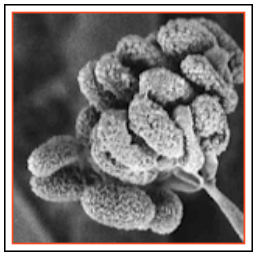
Rhizopus

A fungus frequently isolated from soil, decaying fruit and vegetables, animal feces, and old bread. Seen in garbage cans and refrigerators. Closely related to Mucor. Spores are dispersed in hot, dry weather. Isolated in children's sand boxes. Typically found on sweet potatoes, cold-stored strawberries, peaches, cherries, corn and peanuts.

Rhizopus species are also occasional causes of serious, and often fatal, infections in humans. Rhizopus infections occur in people with diabetes and immunosuppression due to various reasons, such as organ transplantation, renal failure, extensive burns, trauma, and intravenous drug use.

Stachybotrys

Water infiltration with Stachybotrys growth



This slow-growing, black, slimy fungus shares many of the characteristics of the chaetomium species, but may pose a greater health risk. It colonizes cellulose (wood and paper) materials, such as sheet rock, ceiling tiles, insulation and wallpaper that have been wet for several days or more. The mold does not grow on concrete, linoleum or tile.

Chronic exposure to this mold may cause an allergic reaction that is similar to a cold. Symptoms include a sore throat, a chronic cough, headaches, fever, rash, fatigue, sneezing, itching and burning sensations of the eyes and nose. Stachybotrys is suspected to be a primary cause of sick building syndrome. Nonetheless, this mold is rarely found outdoors and is not usually a problem indoors unless the colony is physically disturbed.

There are many molds that produce toxic substances, but generally not a serious problem for humans. However, in the case of this particular mold, where it can become concentrated, it produces toxins that can be inhaled and ingested and suspected to cause serious illness in immunocompromised patients as well as inducing cancer.

What should I do about mold?

Any mold can cause a health effect under the right conditions. While some reports exaggerate the severity of possible health effects, it is important to handle all molds with caution.

Testing for molds is very difficult and expensive, and it cannot determine whether health effects will occur. Due to these uncertainties, it is not recommended to test for molds in most cases. If you can see or smell mold, testing is not necessary; it needs to be cleaned up.

Answers to many common questions are available on
www.doctorfungus.org/mycoses/environ/homeowner_faq.htm

How can I clean moldy surfaces?

It is important to make sure that the source of moisture is stopped before the mold is cleaned up.

If this is not done, the mold will grow again. How you clean up areas contaminated with mold depends on the surface where the mold is growing. A professional should be consulted if large areas (more than 30 square feet) are contaminated with mold. If the surface is non-porous (varnished wood, tile, etc.), you can take the following steps.

1. The surfaces first need to be cleaned with soap.

- Use a non-ammonia soap or detergent in hot water and scrub the entire area affected by the mold. **Never mix bleach with ammonia; the fumes are toxic**.
- Use a stiff brush or cleaning pad on block walls or uneven surfaces.
- Rinse clean with water.

2. The next step is to disinfect the surfaces to help prevent mold from coming back.

- Disinfect the area with a solution of household bleach (½ cup of bleach per gallon of water). Straight bleach will *not* be more effective. When mixing or using the solution, make sure the windows are open.
- For spraying large exterior areas, a garden hose and nozzle can be used.
- Let disinfecting areas dry naturally. This extended time is important to kill all the mold.

How can I reduce my exposure to the mold while cleaning it up?

During the cleanup of molds, many spores may be released into the air. Mold counts in air are typically 10 to 1,000 times higher than background levels during the cleaning and removal of mold-damaged materials. To prevent health effects, there are several ways you can protect yourself while cleaning up the mold.

- Anyone with a chronic illness, such as asthma or emphysema, should *not* do the cleanup.
- Use a HEPA filter respirator purchased from a hardware store to reduce the mold spores you breathe in.
- Wear protective clothing that is easily cleaned or discarded.
- Wear rubber gloves.
- Do not allow family members or bystanders to be present when you are doing the cleanup.
- Work over short time spans and take breaks in a fresh air location.
- Open the windows in your house during and after the cleanup.
- Shut off heat or air conditioning to prevent mold spores from being spread around the home.
- Tightly cover the air return vent if there is one in the affected area.
- Turn on an exhaust fan or place a fan in a window to blow air out of the affected room to the outside (make sure the air is being blown *outside* the home, not into another room).
- Double bag materials before you remove them from the contaminated area.

Source of cleaning information:

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761
217-782-5830
TTY (hearing impaired use only) 800-547-0466

more information about molds:

inspect-ny.com/sickhouse/mold.htm

mold-help.org

sick building syndrome: www.doctorfungus.org/mycoses/environ/sick_building.htm