

Toxic Molds In Homes And Office Buildings

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In 1984, dozens of employees of a hospital in Quebec, Canada were felled with a mysterious, totally debilitating illness. The affliction struck nurses, orderlies and secretaries alike. They suffered from disabling fatigue, muscle and joint pain, sore throats, and insomnia. Their memories failed, and some became depressed or developed other "psychological" problems. The symptoms appeared much like "mononucleosis," often called the "kissing disease". The epidemic was initially blamed on a virus that causes mononucleosis. However, unlike most people who get "mono," these victims did not get better in a few weeks. Their illness dragged on and on. In fact, ten years after this "epidemic," many of them are still sick and disabled.

In the early 1980's, the members of a family in Chicago developed a chronic mono-like illness without any apparent viral cause. The woman of the house was severely ill, the husband and child mildly ill. The mysterious sickness continued for years, as the family endured every medical test that was available. They were tested for infection by viruses and bacteria and exposure to toxic pesticides. No cause of this chronic illness could be

found. The woman noticed that when she left her house for more than a few days, she felt somewhat better, only to be plunged back into illness when she returned home.

A hospital in Quebec and a house in suburban Chicago. What do they have in common? These are the first two well-documented cases of an insidious and almost completely unknown environmental illness caused by exposure to toxic molds. In the Canadian hospital, the illness was eventually tracked to infestation of the building with the mold "*Stachybotrys atra*." The same mold was found growing inside the heating ducts in the Chicago house.

The Chicago couple was lucky. After the toxic mold was removed from their house, the whole family became healthy again. Many of the employees in the hospital in Quebec were not so fortunate. Indeed, most of them remain ill 10 years later.

This scenario has been quietly repeated across the US. and Canada for the last 5 years. Large outbreaks of fungal poisoning have been reported in office buildings in New York and Atlanta. Several more cases have been reported in homes. Many more cases, dealt

with privately, have not been formally reported in the scientific literature.

In the Bay Area, one case of possible mycotoxin poisoning has received some press. It involves one or more victim(s) in a condominium in Fremont. While the legitimacy of this case has yet to be determined, it would appear that some of this condo complex is infested with the same mold that caused the Quebec and Chicago illnesses, a mold called *Stachybotrys atra*. The symptoms of toxic mold exposure are usually the same: disabling fatigue, various types of severe pain, memory loss, nasal irritation, muddled thinking and depression. The victims have suppressed immune systems, and develop repeated infection with cold viruses, yeast and other opportunistic pathogens. Many of them meet the definition of "Chronic Fatigue Syndrome" and are disabled for years.

Molds belong to the larger group of organisms called Fungi. Fungi are one of the most dominant life forms on earth, making up 25% of the mass of all living organisms. Man harnessed the power of fungi thousands of years ago to raise our

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bread, ferment out beer and wine, and make our cheese. In this century, molds have given us some of our most important drugs, including penicillin.

Unfortunately, not all fungi are so friendly toward man. Some are downright toxic. The best-known examples are the toxic mushrooms. Eat the wrong mushroom, and you will die in days if you do not receive a liver transplant. From medieval times, there have been sporadic reports of bizarre epidemics associated with eating moldy grains and breads. These came to be called ergotism. Indeed, LSD, the prototypical hallucinogenic drug, is derived from a class of fungal toxins.

It is necessary to eat poison mushrooms or moldy grains to suffer these recognized maladies. This is not the case for another group of dangerous fungi. *Stachybotrys atra* and some other molds produce toxic compounds that are concentrated into spores that are released into the air. Occupants unknowingly inhale these spores and become sick. Although there are hundreds of types of mycotoxins, one class of toxins called "trichothecenes" has received considerable attention.

Trichothecenes were responsible for the Quebec

hospital epidemic and the Chicago family illness.

Trichothecene mycotoxins are not ordinary, run-of-the-mill toxic chemicals. They are some of the most potent toxic chemicals known. The United States government considered using trichothecene mycotoxins for biowarfare agents, but determined that they were just too dangerous to produce and handle! Because so little was known about these toxins, the Army funded some research into the health effects of mycotoxins. The US Army funded the work that identified the mycotoxins in the home of the poisoned Chicago family!

Unfortunately, not every country would seem to be so concerned about using mycotoxins in war. "Yellow rain", the purported chemical agent used by Soviet-backed forces in Southeast Asia, may have contained trichothecene mycotoxins. Trichothecene mycotoxins have been implicated as a possible cause of "Gulf War Syndrome", a connection that has never been satisfactorily ruled out.

Trichothecene mycotoxins are so toxic that one of them was tested for its ability to kill cancerous tumors. Like most chemotherapy agents, the mycotoxin made the subjects very ill, with symptoms of fatigue,

nausea, pain and mental disturbance. Unfortunately, this painful treatment did not slow their relentless cancers.

Every house, apartment and office building is a potential battleground in which molds may establish a beachhead and spew forth biowarfare agents. Without warning, the occupants of the building inhale these potent toxins. The result is damage to the immune system and brain. *Stachybotrys atra*, the most notorious mold in this drama, survives on two basic ingredients; water and cellulose. Thus, wet wood, sheet rock, wallpaper, linoleum and carpet can provide a feast for toxin producing microbes. The toxic spores that are produced can persist in a house of office building for months, perhaps years. Dead or alive, the spores are toxic when inhaled.

Mycotoxins suppress the immune system and interfere with the normal working of the brain. Although many parts of the immune system are damaged, the lymphocytes may be the most sensitive. Lymphocytes are the immune cells that serve to "memorize" an invading microbe. Vaccines stimulate lymphocytes. The HIV virus that causes AIDS destroys T-4 lymphocytes. Natural Killer lymphocytes act as the first line of defense against some invading viruses. Mycotoxins can damage all

of these cells.

Mycotoxins also damage the brain. While science has learned a lot about the way in which mycotoxins damage the immune system, very little is known about how they attack the brain. However, the effect of poisoning on the "mind" has been examined on a few occasions. Victims lose the ability to think, remember and reason normally. They become massively fatigued and listless. Many become depressed and riddled with anxiety.

This pattern of neuropsychological symptoms has been described as a "toxic encephalopathy," similar to that caused by massive exposure to solvents or the toxic heavy metal lead. Like toxic encephalopathies caused by industrial exposures, the brain damage caused by mycotoxins may not be reversible in many cases.

This combination of immunological and neurological effects also closely matches the "Chronic Fatigue Syndrome," more accurately called the "Chronic Fatigue Immune Dysfunction Syndrome" (CFIDS). CFIDS, is a very serious illness that strikes about 300,000 Americans every year. Although commonly regarded as a minor illness ("yuppie flu") by the press and medical establishment,

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CFIDS leaves many of its victims completely disabled, unable to work or even take care of themselves.

CFIDS was first brought to the attention of the public as a result of an epidemic in the Lake Tahoe region in 1984. Patients seemed to have a chronic version of mononucleosis, with debilitating fatigue, pain and neurological disturbance. Their immune systems were disturbed as well.

Originally CFIDS was blamed on the Epstein Barr virus, but it soon became apparent that this was not the cause, but rather an effect of the victim's damaged immune systems. The latent Epstein Barr virus is awakened, much as it does in many AIDS victims when their immune system fails. Similarly, the original case of mycotoxicosis described in the Quebec hospital was thought to be mononucleosis, caused by the cytomegalovirus, a virus closely related to the Epstein Barr virus.

Mycotoxins have received little attention because they do not fit the belief systems that health care professionals and government regulators have established. These molds are not infectious, like the fungi that cause Valley Fever in California or Cryptococcus that infects the brains of AIDS patients. They are not particularly potent in causing

allergies. Thus, neither infectious disease specialists nor allergists are remotely interested in these fungi.

Most doctors that specialize in toxic exposure, generally occupational doctors, have never heard of toxic environmental molds. As a result, many poisoned people will not get any diagnosis, or may be told they are "depressed" or neurotic. If they ask the doctor about toxic molds, they will receive a blank stare. If a doctor finds some immunological abnormalities, this still will not result in any diagnosis or lead to any treatment. Many doctors will try to get rid of patients with difficult illnesses, especially in these days of managed care insurance.

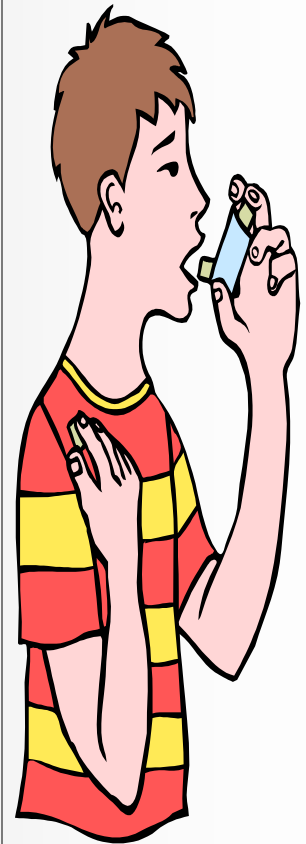
There is one type of mycotoxins that have been studied in some detail. These are the family of toxins called aflatoxins, which are now known to cause liver cancer in humans. These toxins are produced by certain species of the fungus *Aspergillus*, which grows on peanuts, corn and other crops. Farmers and grain handlers are at risk because they inhale toxic spores while handling these agricultural products. While the amount of these toxins in food is subject to regulation, the exposure of these agricultural workers is still largely unregulated and unrecognized. *Aspergillus* can also grow in buildings and release these potent toxins into the

building air.

Although the scientific literature contains rather compelling proof that molds in buildings can cause everything from childhood asthma to adult immune diseases, there is not one federal or state environmental or occupational regulation pertaining specifically to mold inhalation. California OSHA does have one regulation that may help in occupational settings, the "Minimum Ventilation Standard". This requires building owners to inspect and maintain their building ventilation systems. Presumably, this would include the removal of any mold growing in the system. However, this regulation is almost entirely unenforced and unimplemented. The Federal Occupational Safety and Health Administration has proposed a regulation that would indirectly address this issue, but this will not go into effect for years. With the swing to the right in the Congress, it is unlikely that this Federal OSHA indoor air quality standard will ever become law.

The attitude toward toxic molds is very different in our neighbor to the north, Canada. In Canada, the Provincial governments employ "Occupational Mycologists", environmental health professionals who inspect public and private buildings for mold infestation. Canada has official

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mold exposure guidelines, including the requirement for building evacuation if elevated levels of toxic fungi are detected in the air. Tens of millions of dollars have been spent on mold abatement in Canadian buildings, particularly in schools.

In the US, hundreds of millions of dollars were spent on removing asbestos from schools. In contrast to asbestos, where the increased risk to school children is largely hypothetical, the risks of exposing children to mold have been clearly proven over and over again. One Canadian researcher has stated that the adverse effect of mold in homes is second only to the illness-provoking effect of parents second-hand cigarette smoke.

The National Institute of Occupational Safety and Health, a branch of the Centers for Disease Control and Prevention, has suggested that over one-third of "sick-buildings" suffer from infestation with microbes, mostly fungi. However, no formal inspection program or abatement program exists. Where mold is even considered as a basis for a sick building, many indoor mold investigations are carried out without using the proper tools.

Building-related illness clusters consistent with mycotoxicosis have been described in California. The combination of sick

building syndrome and CFIDS was recently investigated in a Sacramento, California school. Although the report briefly mentions that "fungal sampling" had been done, it does not describe the procedure used. Most procedures used for fungal sampling in sick buildings do not detect the most toxic species of mold.

What can you do to protect yourself from accidental exposure to these biowarfare toxins? Where you live, you can do a lot. All fungi require a combination of food and water to thrive. Unfortunately, almost anything can feed toxic molds, including many parts of a home. The key is to keep out the water. Mold cannot live unless water is present.

Water can come from many sources. The most common is leaks; leaks in roofs, pipes, toilets and showers. These sources saturate building materials, and an ideal environment for mold growth results. Another common source of water is accumulated rain under the crawl space in houses and office buildings. Heavy fog condensing on walls is a problem in some areas. Although less of a problem in the Bay Area, condensation from hot, humid air can provide all the water needed to get a mold colony growing inside a wall or ceiling.

Prevent constant wetting of building surfaces. Fix roof leaks promptly. Fix other leaks before mold

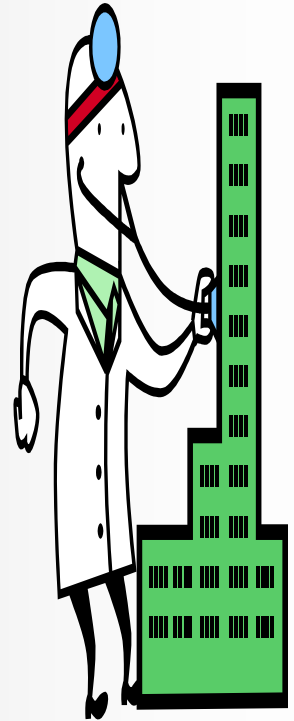
starts to grow and spread toxic spores. Single pane windows are a common source of condensation and mold in the Bay Area. Replace single pane glass with double pane windows when possible. Grade the area around houses, condos and apartments to prevent water from flowing under the crawl space. Ventilate bathrooms, either with a window that is periodically opened, or with a ceiling fan.

Visible mold is positive evidence of a problem. However, it is possible to be seriously poisoned without seeing any visible mold. The Chicago family was poisoned by mold that grew on moist lint in their heating system. The only way to see the mold was to disassemble the ducting.

In your workplace, it is more difficult to find mold problems. Mold can be hiding in the fan room or ventilation ducting or in an area not generally accessible such as a ceiling plenum or crawl space. If your employer is uncooperative, it may be impossible to detect biowarfare at work.

It is possible to have the air and dust tested for toxic fungi or mycotoxins in any building. However, to do this work correctly is quite expensive (many thousands of dollars). While there are several

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consultants that will promise to test for mycotoxigenic molds, many of these will probably use inadequate procedures or equipment.

The most common testing procedure, called "viable spore sampling" detects living spores. Over 90% of the toxic spores may be dead and will be missed by this technique. Further, the procedure used by most consultants is not sensitive to one of the most troublesome molds, *Stachybotrys atra*. Overall, the common sampling techniques miss as much as 99% of highly toxic molds.

Direct detection of toxins in the air or dust is technically possible, but not commercially available. Even if available, any comprehensive test would be prohibitively expensive. Finally, it is almost certain that there are many still-undiscovered mycotoxins that would be missed by chemical analysis.

Perhaps the most promising type of analysis uses cell cultures to detect toxins in air and dust samples. The diluted sample is added to the growing cells, and if they die, there is some toxin present. While this technology holds great promise, it is not available commercially.

The range of illnesses known to be caused by exposure to toxic molds is certain to increase. Besides damaging the immune system and brain, it is known that environmental mycotoxins cause liver and esophageal cancer.

It was recently suggested that multiple sclerosis is caused, in part, by exposure to environmental mycotoxins.

Anecdotal evidence links mycotoxins to another immune disease called "common variable immune deficiency". All of this is in addition to the increase in asthma, bronchitis and other childhood respiratory illnesses that mold cause.

Toxic fungi are not just another "toxic scare of the week." Although no systematic effort has been made to find cases of mycotoxicosis, cases are being reported more and more frequently. Cases have been reported in all climates, ranging from the hot, dry climate of Arizona to the much colder and wetter climate of Quebec. A type of biowarfare is going on, and people are being caught in the crossfire.

