

**News From the ACAAI:**

**Experts Sort Fact From Fiction on Health Effects of Mold**

Nov. 5, 2005 — Distinguishing fact from fiction, leading experts gathered to discuss the most recent scientific evidence on health effects of mold at the Annual Meeting of the American College of Allergy, Asthma and Immunology (ACAAI) in Anaheim.

"Fungi, including molds, are spore-producing organisms that comprise some 25 percent of the earth's biomass and function as decomposers of organic material," said Richard W. Weber, National Jewish Medicine & Research Center in Denver. "Only about 80 of the 1.5 million species of fungi are known to be allergenic.

"The most common fungi found in homes include *Cladosporium*, *Aspergillus*, *Penicillium*, *Alternaria*, basidiospores, *Chaetomium*, *Periconia* and *Stachybotrys*. Indoor levels of airborne fungi are generally below outdoor levels of similar species in a well-constructed home without water damage. We have found 30 percent to 70 percent of recovered indoor spores come from outside sources," Dr. Weber said.

An estimated 10 percent of the U.S. population has fungal sensitivity. In a 1991 study published in *The New England Journal of Medicine*, asthmatics sensitive to *Alternaria* fungi faced a 200-fold risk for respiratory arrest.

"Well-known health effects caused by exposure to fungi include infections, toxins and hypersensitivity diseases including asthma, rhinitis, hypersensitivity pneumonitis and allergic bronchopulmonary aspergillosis (fungal infection of the lungs)," said Robert K. Bush, M.D., University of Wisconsin in Madison.

"Sensitivity to fungi is prevalent in asthmatics, and those who are sensitive are at risk for severe, potentially life-threatening asthma. Increased outdoor fungal spore counts have been associated with increased asthma emergency department visits and hospitalization," Dr. Bush said.

Immunotherapy, or allergy shots, have been effective in several double-blind, placebo-controlled trials in mold sensitive patients.

"Although there are hundreds of thousands of species of fungi, allergen extract availability is limited to a relatively small number of fungi including the two most prevalent outdoor fungi, *Alternaria* and *Cladosporium*," said Harold S. Nelson, M.D., National Jewish Medical and Research Center in Denver. "Immunotherapy should be limited to those patients with documented sensitivity to fungus, whose symptoms occur during periods of high atmospheric exposure to that fungus, and environmental control is not possible."

Toxic mold syndrome or inhalational toxicity continues to cause public concern despite a lack of scientific evidence that supports its existence said Emil J. Bardana, Jr., M.D., Oregon Health & Science University in Portland, Ore.

In a recent study published in *Annals of Allergy, Asthma & Immunology*, the scientific journal of the ACAAI, investigators at the Oregon Health & Science University conducted a retrospective review of 50 individuals who claimed compensation for toxic mold disease, and in every case found alternative medical and/or psychiatric explanations for the claimed illness.

Investigators found only two of the 50 subjects had evidence of mold-related allergic disease attributable to their home or workplace. Seventeen individuals complained of a nonspecific irritant symptoms complex that could not be linked to mold exposure. These symptoms included headache, irritability, cognitive impairment and fatigue.

"Based on our findings, no case definition is possible for so-called 'toxic mold syndrome,'" said Dr. Bardana, co-author of the report. "Fungal contamination of a residence does not necessarily constitute an abnormal exposure. The presence of fungal allergen sensitivity proves prior exposure, but not necessarily a symptomatic state.

"Because molds are encountered both indoors and outdoors, it is almost impossible to determine where the sensitivity arose. Specific toxicity due to inhaled molds, including the role of *Stachybotrys* in building-related illness, has not been scientifically established by any published study," he said.

Mycotoxins are low molecular-weight secondary metabolites produced by more than 350 species of fungi. Those of significant detriment to human and animal health include aflatoxins, trichothecenes, fumonisins and ergot alkaloids.

"Centuries of documented examples of human mycotoxicosis have occurred after ingestion of mycotoxin," said Bryan D. Hardin, Ph.D., of Veritox Inc., in Redmond, Wash. "An estimated 25 percent of the world's crop production is contaminated to some extent with mycotoxins, and its prevalence has led to regulations regarding acceptable levels of contamination."

Other current concerns include:

- In developing nations, where contamination of dietary staples is high, the risk of liver cancer from chronic dietary aflatoxin exposure is elevated by hepatitis infection. Except for mass poisonings, aflatoxicosis in humans has rarely been reported, and is sometimes difficult to recognize.
- Mycotoxins such as T-2 toxin and aflatoxin B1, have been purified and developed for use as biological warfare agents by a number of nations including the USSR/Russia, the United States and Iraq.
- Ergot poisoning in Europe and the United States today is almost exclusively due to excessive ingestion of ergotamine tartrate prescribed for the treatment of migraine.

According to Dr. Hardin, direct skin contact with purified mycotoxin (e.g. T-2 toxin) or heavily contaminated products produce local skin reactions. Other routes of exposure to mycotoxins have not been linked to effects on human health.

"Some people believe that anything with the word 'toxin' in it must be very dangerous," said David D. Fox, Ph.D., Glendale, Calif. "Some individuals tend to

focus on their symptoms and attribute all of their problems to mold exposure, downplaying other causes."

Molds typically cited as causing psychological or cognitive problems are *Stachybotrys chartarum*, *Aspergillus*, *Fusarium* and *Penicillium*. Symptoms of a physical nature may include sleep deprivation, loss of appetite, fatigue, headaches, dizziness, vague aches and pains and respiratory problems. Psychological and cognitive symptoms are also attributed to toxic mold, including irritability, panic, anxiety, poor concentration and confusion.

"It is a normal psychological need to have an explanation for symptoms. Many people show psychological or cognitive symptoms that are exacerbated when their health is potentially threatened. Pre-existing psychological disorders and misinformation from media, friends and even doctors can play a role in causing symptoms," said Dr. Fox

Although indoor mold is prevalent in all homes, there are steps that mold-sensitive individuals can take to control indoor mold contamination.

"The first step toward preventing indoor mold is to stop leaks, minimize condensation, and keep relative humidity low," said Jay M. Portnoy, M.D., Children's Mercy Hospital in Kansas City, Mo. "Dehumidifiers, proper ventilation, and control of air flow and air pressure can help reduce indoor mold growth. Bleach solutions are recommended for removing mold on nonporous surfaces. Porous surfaces may require removal and replacement of materials if mold contamination is extensive."

In a study conducted by Dr. Portnoy and his colleagues published 2001 in *Aerobiologia*, mold spore counts were found to be highest in the laundry room (11,424), bathroom (8,540) and unfinished basement (6,694) in a sampling of 241 rooms.

"If a patient who is sensitive to mold is exposed to substantial mold in their environment, it may be determined that there is evidence of a relationship between mold exposure and symptoms. An environmental assessment may be important if health effects are associated with the home or building and there is structural damage and aesthetic problems, including odor," said Dr. Portnoy.

"We would want to look at the family history of allergic disease and find out if the symptoms are associated with specific activities or events. The history of the home or building, its occupancy and its environmental characteristics would be evaluated. Fungal exposure can be measured by collection and analysis of house dust if validated methods are used," he said.