

## Dangers In Our Home Mold and More

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#### Mold:

Molds that grow indoors usually have no natural elements to hinder their growth. All mold needs to thrive is water and a food source. Cellulose is the main meal that this fungi needs. It can be found in wood, paper, tile glue, rugs, and on or in many other items. Mold is commonly found in or on sheetrock as it is wrapped in paper; just add a little dampness and it serves as a fantastic media for mold to thrive. It also can be located growing in HVAC systems, behind walls, on furniture, under the floor or rug, clothing, dehumidifiers, mattresses, and other common places. It also can be stealth and just because you do not see or smell it does not mean it is not there. Keeping the indoor humidity at or below 37% is generally recommended to help avoid mold growth.

Human health can be affected by the way mold functions. Molds release spores and shed particulates. Located on this microscopic matter is an array of chemical toxins. The following types of toxins are specie dependent: Stachybotry's produces Satratoxins (F, G, H) as well as, Spirocyclic Drimanes, Roridin, Hydroxyroridin E, Verrucaridin J, Trichodermin, Dolabellanes, Altrones B & C, & Stahybotrylactams. These have been confirmed to cause protein synthesis inhibition, neurotoxicity (brain toxicity), cytotoxicity (cell toxicity), & immune toxicity (immune cell depression & damage) (Gray et al 2003; Thrasher and Crawley, 2009). These occurrences may lead to intestinal, neurological, central nervous system, pulmonary, soft tissue, bone, and a whole host of other biological system destruction. Other species that are found and cause damage to name a few are: Aspergillus, Penicillium, Fusarium, Chaetomium, Fusarium, and Cladosporium. Some of the toxins associated with these species and their specific subspecies are: Aflatoxins, Ochratoxins, Sterigmatocystin, Chaetoglobosum A & C, & Patulin (found also in corn). Mycotoxins have been shown to reduce blood flow to areas of the brain and can also be linked to CNS & organ damage, not to mention various cancers (Crago et al 2003, Etzel, 2006).

There are numerous symptoms & conditions that have been associated with mold. Fatigue, runny stuffy nose, sleeplessness, rapid weight gain or loss, hair loss, dry skin, asthma, COPD, Hypersensitivity Pneumonitis, chronic pain, numbness, leaky gut, blurred vision, behavioral changes, rage, tooth issues, insulin resistance, IBS, fibromyalgia, chemical sensitivity (Toxic Encephalopathy), constipation and or diarrhea, abdominal cramps, nausea, heart failure, and this list also goes on. (Shoemaker, 2005). Mycotoxins send the immune system into overdrive, which leads to inflammatory conditions. In most cases, individuals who are being affected by mold suffer many of these symptoms as well as their pets. Children 11 and under, are more susceptible as their immune systems are still at a very early stage of development. Recent research revealed that SIDS may be caused by mold growth in mattresses (Sprott, 2009, Sheppard, 2004). Mold can accumulate from spilled juices, milk, and urine as well as from exposure in a structure, which already has a mold problem. Used mattresses obtained due to affordability or given by family can also contain mold and it's mycotoxins. Baby mattresses are at times considered family air looms and can be used repeatedly. Mycotoxins can be dangerous enough! However, these toxins can also be combined with other hazardous chemicals used as fire retardants. This will be addressed later in this paper.

If you or someone you know suspects they have a mold problem, they should consult a physician who is properly educated & trained to recognize, diagnose and treat mycotoxicosis (mold toxicity) and get qualified professionals to test and remediate the mold. The person testing should never be the person hired to remediate as this serves as a conflict of interest. Sources where trained professionals can be located to mention a few are the Indoor Air Quality Association (IAQA) and/or The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE). Some toxicologists are also very knowledgeable and often will perform in depth stage testing and can offer medical evaluations as well.

#### Bacteria:

Dampness & moisture also invites other dangerous microorganisms that produce toxins such as bacteria. Commonly found inside structures with moisture issues are both gram positive & negative bacteria. Gram positive bacteria are potentially pathogenic and can also lead to cytokine inflammatory responses, which may cause serious health conditions. (Thrasher and Crawley, 2009) Actinobacteria such as Streptomyces, Nocardia and Mycobacterium are some of the genera. Some bacteria can affect the mitochondria (cells power plant, where your DNA is located). Species such as *Bacillus simplex* can produce Surfactin and peptides that can also affect cell membranes. Streptomyces species are also the source of antibiotics and chemotherapeutic drugs.

Gram negative bacteria such E. coli, Enterobacter, Pseudomonas, Caulobacter, and Argobacterium, can be very infectious as they produce LPS (lipopolysaccharide), which is an Endotoxin. Staphylococci are another species and in many mold patients, antibiotic resistant **Staph** (Shoemaker, 2005) has been found often in nasal swabs. These bacteria have been found in carpeting, vents, humidifiers, drywall, etc. detected in culture samplings taken from environmental testing.

It is important to note that some species of bacteria are known to work synergistically with the effects of mold fungi. There are many other species of both plus other microorganisms that can inhabit our domains if not properly maintained. Proper maintenance, prevention, and if need be testing and remediation is key to protecting you and your loved ones health.

#### Protozoa:

Single celled organisms, which have also been found inside damp building structures, can actually have an impact on the survival and growth of mold and bacteria and visa versa. There have been a few studies which looked at the Amoeba's affect on the microorganisms and their effect on human health. It was found that fungi and bacteria profited from its presence. On the other hand, species of Streptomyces californicus, Stachybotry's chartarum, and Bacillus cereus had a negative impact on the amoeba. (Yli-Pirila et al 2006)

In health studies mouse models were used to observe immune responses. When the amoeba was introduced and co-cultured with both bacteria and fungi separately, cytotoxicity of the bacteria and fungi used, increased. Increase in the amounts by two orders in the production of the cytokine IL6 (interleukin 6) and TNF-A (tumor necrosis factor alpha) was four times higher. The macrophages also produced nitric oxide (NO) ten times higher then the cultures that did not contain the amoeba. (Yli-Pirila et al 2007) Nitric oxide is one of the elements that have been shown to be linked with chemical hypersensitivity and weakening of the **Brain Blood Barrier (BBB)**. This is known as the NO-OH-NO theory. This theory reveals that NMDA receptors located in the brain become over active due to chemical exposure and produce nitric oxide. Nitric oxide (NO) is then oxidized to peroxyxynitrate. (OH). The "OH" interferes with ATP production, which makes the cells containing the NMDA receptors more sensitive to stimulation form the "NO". "OH" also leads to breaking down the BBB. The increased Nitric oxide diffuses back to the NMDA receptors causing the enzymes glutamate and aspartate to produce more nitric oxide (NO). Thus **"NO", "OH", "NO"**, (Pall, 2007). It is plausible this may be applied to all toxic chemical exposures.