

Part 2: How Mold and VOCs affect the body and mind.

“[Sick Building Syndrome] describes situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building...Occupants complain of acute discomfort, e.g., headache; eye, nose, or throat irritation; dry cough; dry or itchy skin; dizziness and nausea; difficulty in concentrating; fatigue; and sensitivity to odors...The cause of symptoms is unknown”

Since this statement from the Environmental Protection Agency in the 1990s, there has been a significant increase in studies of the chemical makeup of building materials and how they can affect our health. As you read in our previous post, scientists have been narrowing down the how, the what, the where, the when and the whys of SBS. And the main culprit is **poor indoor air quality**, with dampness being the catalyst.

Whether it's leaky pipes, roof, windows, or improper ventilation, there are many ways water can settle into crevices and begin harmful biological growth and chemical reactions, discreetly, within your home. A 2004 review of studies between 1998 and 2000 by Bornehag et al. “found that dampness in buildings is a risk factor for health effects, and found that it approximately doubles the risk for both children and adults.”

In the right environmental conditions (aka warm and damp), certain varieties of mold release mycotoxins or microbial volatile organic compounds (MVOC) into the air, which are then inhaled, absorbed through the skin and eyes, and through ingestion on food. If the body is continuously exposed to even small amounts of these naturally occurring compounds, they can begin to irritate and wear away at our organs and cause numerous long-term health problems. These are problems not generally associated with an allergic response, including effects on the nervous system, immune system suppression, irritation and bleeding in the intestinal and respiratory tracts, asthma, joint pain, migraine headaches, depression, severe fatigue, reproductive problems and many more.

In addition to direct harm, biological growth can deteriorate and release harmful compounds from common household building materials into our air. Recent studies have shown that dampness alone can also initiate chemical reactions in the air. Since this statement was made by the Institute of Medicine in 2004, more thorough research has focused on indoor chemistry of a typical residence and how it affects the body and mind.

Lorenz et al. (2000) reviewed case studies of health symptoms thought to be caused by chemicals that were emitted when high moisture content was combined with building materials containing plasticizers. When materials were moistened and heated, they measured high emission rates of alcohols, phthalic anhydride and other compounds thought to be irritating.

You may have noticed a significant increase in home products that are labelled as “green” “low-emissions” or “VOC-free.” This is because EPA studies have found levels of about a dozen common organic pollutants to be 2 to 5 times higher inside homes than outside, regardless of whether the homes were located in rural or highly industrial areas. This is largely because compounds found in plasticizers, such as benzenes, formaldehyde and other harmful volatile organic compounds (VOCs), are commonly used in building materials. It's not just the paint on

your walls but also nearly all man-made home surfaces and products that contain solvents or adhesives.

For those with sensitivities or allergies, these compounds can cause immediate irritation in the respiratory tract, eyes and skin. But it's the **long-term, undetected exposure that can lead to more serious health problems** in both atopic and nonatopic individuals. Common household VOCs have been linked to damage of the nervous system, kidney and liver and can also lead to cancer, especially in builders, painters, carpenters who work with these materials every day. The most recent research has begun to see links to inflammation to the digestive tract and a disruption of the healthy microbiome that resides there, which is currently a hot topic of research when it comes to its effects on mental health.

We must also keep in mind that VOCs can naturally occur within the home. Common items such as indoor plants, food, cooking, and personal hygiene products all release VOCs. They may not be harmful on their own, but research by Dr. Richard Corsi's team at the University of Texas has shown that they can react with other pollutants that make their way into your home. With warm air and dampness as a catalyst, these reactions can produce new compounds and particles that can be harmful with long term exposure. (Ex: chlorine bleach + warm water + tomato or beef residue = chloroform!)

So what are we to do? How do we properly care for the air quality in our home? Fortunately, there are ways to minimize, neutralize and flush them out, which we touch on in Part 3.

REFERENCES:

"Damp indoor environments favor microbial growth and house dust mites, standing water supports cockroach and rodent infestations." Executive Summary of "Damp Indoor Spaces and Health" by the National Academics of Sciences, Engineering and Medicine

"Research shows that mold produces mycotoxins under the appropriate environmental conditions. (page 7) Executive Summary of "Damp Indoor Spaces and Health" by the National Academics of Sciences, Engineering and Medicine

"Studies have demonstrated adverse effects, after exposure to specific molds or their products. Such studies have established that exposure to microbial toxins can occur via inhalation and dermal exposure, and through ingestion of contaminated food." (page 7). Executive Summary of "Damp Indoor Spaces and Health" by the National Academics of Sciences, Engineering and Medicine

"Studies of health effects associated with exposure to bacteria and fungi show that respiratory and other effects that resemble allergic responses occur in nonatopic* persons (**non-allergic*). In addition, outcomes not generally associated with an allergic response—including nervous-system effects, suppression of the immune response, hemorrhage in the mucous membranes of the intestinal and respiratory tracts, rheumatoid disease, and loss of appetite—have been reported in people who work or live in buildings that have microbial growth. (page 125) "Damp Indoor Spaces and Health" by the Committee on Damp Indoor Spaces, Health Board on Health Promotion and Disease Prevention, and the Institute of Medicine (2004)

"Mycotoxins are naturally occurring chemicals produced by some types of molds. According to the Food Standards Agency in the UK(1), mycotoxin poisoning has been found to cause numerous health problems in both people and animals, including kidney damage, digestive problems, joint pain and inflammation, migraine headaches, depression, severe fatigue, reproductive problems, and poor immune system functioning." Mold-advisor.com

"Damp indoor environments...excessive moisture may initiate chemical emissions from building materials and furnishings." (page 1) Executive Summary of "Damp Indoor Spaces and Health" by the National Academics of Sciences, Engineering and Medicine

C. G. Bornehag, J. Sundell, S. Bonini et al., "Dampness in buildings as a risk factor for health effects, EURO EXPO: a multidisciplinary review of the literature (1998–2000) on dampness and mite exposure in buildings and health effects," *Indoor Air*, vol. 14, no. 4, pp. 243–257, 2004.

HomeCHEM Youtube Video

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