

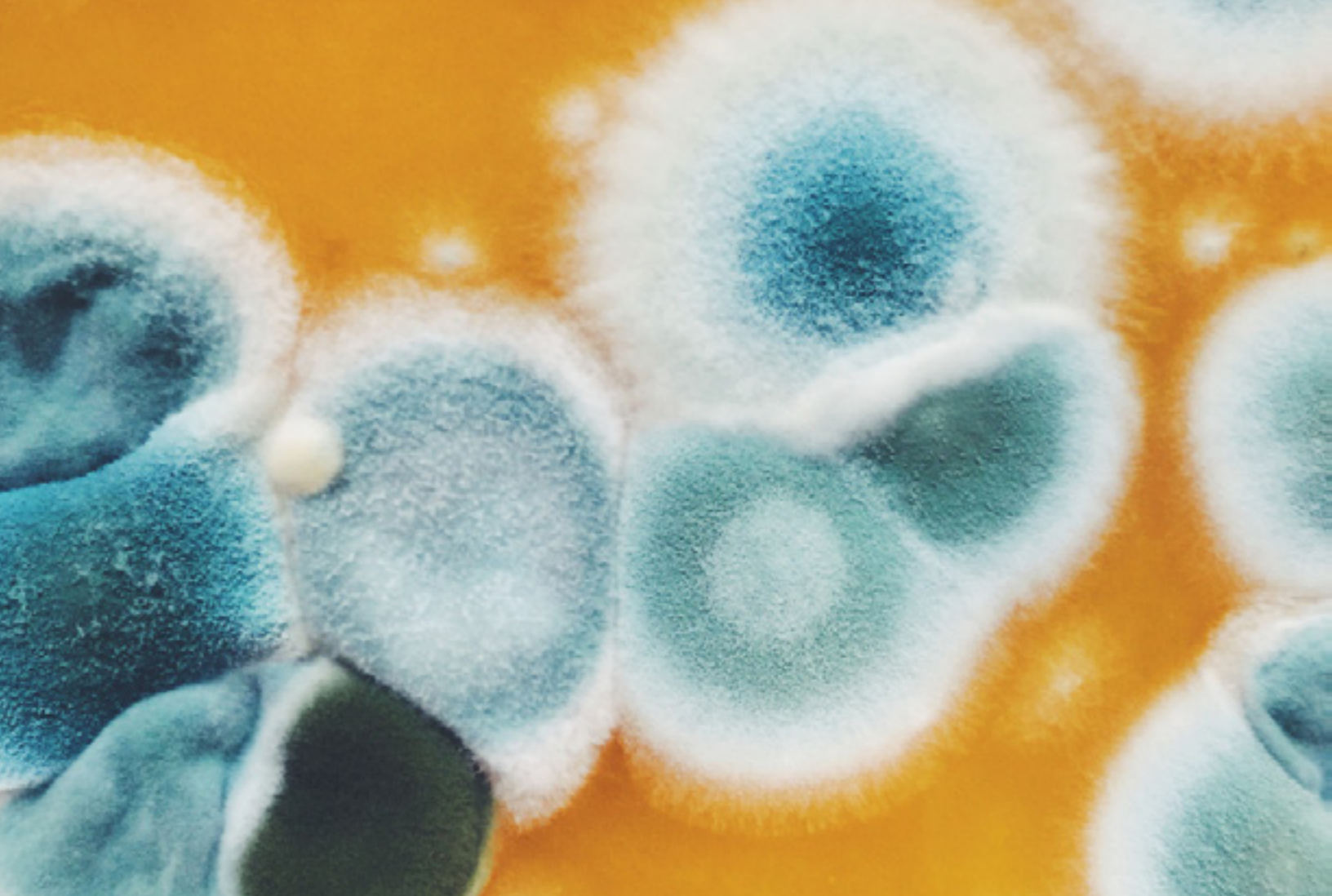
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Molds and Environmental Toxins





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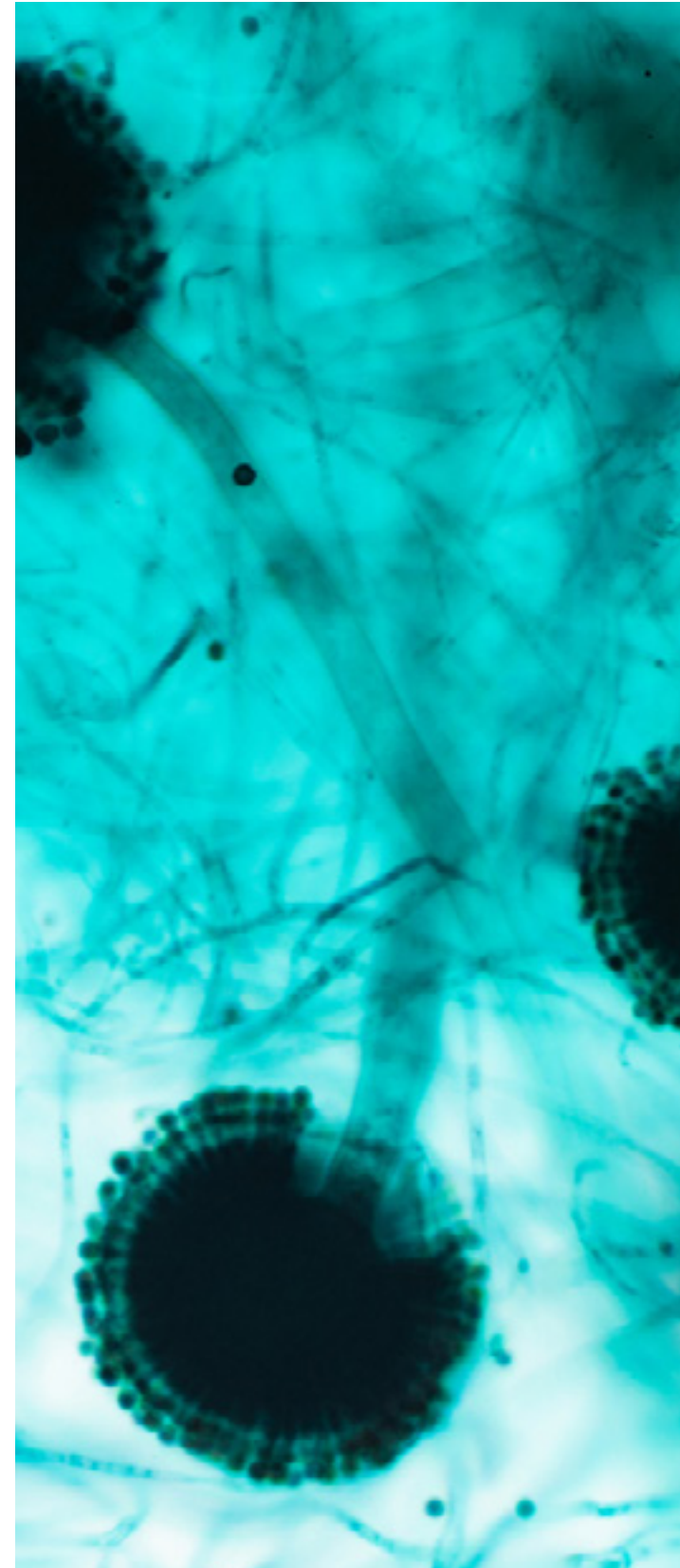
Mold and Chronic Fatigue

By Chantal Ann Dumas, ND

Fatigue can be defined as an overwhelming sense of tiredness, lack of energy and feeling of exhaustion.¹ As a symptom, fatigue is non-specific, and it is a common feature of a wide variety of conditions, but it is the defining feature of the chronic fatigue syndrome (CFS).²



Although no single etiology has been confirmed to fully explain CFS/ME, the immunological pattern of CFS patients gleaned from various studies indicates that the immune system is chronically activated.³ There appears to be a remarkable interplay between CFS and mold exposure.



The CFS-Myco toxins Connection

Over the past 20 years, mold and mycotoxin-induced illness (MMII) have been gaining more traction and exposure to mycotoxin producing mold has been recognized as a significant health risk.⁴ Mycotoxins are the toxic secondary metabolites, or by-products, from fungi which can cause diseases and death in humans and animals.⁵ Amongst the various conditions linked to molds, patients with mycotoxin exposure in water damaged buildings frequently share similar clinical features with CFS patients.⁶ In a study published in 2013, 93% of CFS patients were found to have at least one mycotoxin in their urine, and nearly 30% had more than one mycotoxin present in their urine.⁷

Understanding the Pathophysiology of Mold

Mold and mycotoxin exposure can cause fatigue in numerous ways. We will review some of the mechanisms behind mold illness and chronic fatigue.

Nutritional Immunity and Nutritional Deficiencies

Iron, zinc and other vital nutrients' bioavailability may also be hindered by what is referred to as 'Nutritional Immunity'. This is a process by which a host organism sequesters trace minerals in an effort to limit pathogenicity during infection.⁸ Pathogens (e.g., fungi, gram-negative and gram-positive bacteria and viruses) must acquire trace minerals to replicate and cause disease.⁹ For example, when the host is faced with a fungal infection, extracellular zinc is sequestered by various means. Several mycotoxins have been implicated with zinc absorption, concentration and deficiencies.¹⁰

Mitochondrial Dysfunction

Mitochondria are responsible for production of cellular energy so they can be a source of fatigue when their function is reduced. Several diseases and conditions are also associated with dysfunction of the mitochondrion, including fatiguing illnesses such as CFS.¹¹ Mitochondrial dysfunction is characterized by losing efficiency in the electron transport chain (ETC) and reductions in the synthesis of high energy molecules mainly adenosine-5'-triphosphate (ATP). Mycotoxins are known disruptors of mitochondrial function. In vivo and in vitro studies have demonstrated that mycotoxins cause mitochondrial

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B12 and folate. Decreased oxygenation may occur due to mycotoxins sequestering iron, and thus preventing its use by the body.¹⁵ Iron deficiency is often implicated in fatigue and the first factor to be considered when fatigue is initially reported. Without adequate iron available, the body is having trouble carrying the oxygen to cells, so fatigue is one of the most common signs of iron deficiency.

Hypoferremia may also be the result of the nutritional Immunity process. During infection, neutrophils secrete lactoferrin - a structurally related iron binding glycoprotein - to scavenge extracellular iron. These proteins limit the availability of free iron, thus affecting the ability of invading pathogens to replicate and cause disease.¹⁶ Additionally, the decreased hemoglobin may be the result of mycotoxin-induced vitamin B12 or folate deficiency.¹⁷

Methylation Cycle Abnormalities

Vitamins B12 and folate are also crucial for the methylation cycle to occur. The methylation cycle is a series of chemical changes that occur in the body, the primary purpose of which is to regulate neurotransmitters, regulate genetic repair and expression and generate energy rich molecules such as ATP. Several clinicians established correlations between sub-optimal functioning of the methylation cycle, leading to what has been coined the 'Methylation hypothesis'. A study published in the Clinical Epigenetics Journal in November 2020 supported that hypothesis by showing major differences in the DNA methylation patterns of ME/CFS patients that clearly distinguished them from the healthy controls.¹⁸

Conclusion

The connection between mold and mycotoxin exposure and CFS is complex. To the factors already explained, we could add compromised gut health and neurotransmitters imbalances. Mycotoxins cause both structural and functional changes in the gut.¹⁹ They can also cross the blood-brain barrier, where they may interfere directly with neurotransmitter production and function.²⁰ If you are suffering from CFS and suspect that you have been exposed to mold and mycotoxin, consult a qualified clinician. If your suspicions are confirmed, measures must be taken to eradicate infection.

dysfunction.¹² They exert their detrimental effects through the production of free radicals and the resulting oxidative stress creates dysfunction at various sites of the mitochondria.¹³

Nutritional deficiencies can further exacerbate mitochondrial dysfunction. For example, zinc is required for proper mitochondrial functioning but as we saw, it is also needed for fungal survival and mycotoxin production.¹⁴ Keeping zinc sequestered translates into less bioavailable zinc, thus potentially interfering with mitochondrial function.

Decreased Oxygenation

Oxygenation is dependent upon hemoglobin health, which is in turn impacted by the nutrients iron,

Common sources of moisture ²¹



Mold problems can usually be seen or smelled so the best way to find mold is to examine areas for visible signs of their growth and water staining or follow the smell. It may be necessary to look behind and underneath surfaces, such as carpets, wallpaper, cabinets, and walls.

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Reproduction and Environmental Toxins

By Sarah Zadek, ND

The presence of chemical agents in our everyday items is virtually unavoidable. From cosmetics and body lotions to vinyl flooring and food packaging, and even the coating on nonstick cookware, we are exposed to chemicals that can interrupt the normal functioning of our body. Studies are now showing that chemicals such as bisphenol A (BPA), phthalates and pesticides are linked to reproductive toxicity.

We call these “endocrine disrupting chemicals” when they interfere with the function of hormones, typically by interfering with hormone production, the metabolism of hormones or binding to or affecting hormone receptors throughout the body. These actions can have detrimental effects on fertility including decreasing sperm concentrations and quality in men and increasing the risk of disrupted menstrual cycles, decreased antral follicle count and miscarriage in women.

Bisphenol A (BPA)

BPA is a chemical compound used in various home and food products including food can linings,

plastic food and beverage containers, cigarette filters and plastic toys. It’s also found in the thermal paper of receipts and printing inks. BPA exposure most commonly occurs through the ingestion of food or beverages as it easily transfers or leaches into water or food that it comes into contact with. However, it can also be absorbed through the skin on contact.^{1,2}

Once in the body, BPA can travel throughout different systems and fluids including ovarian follicular fluid, breast milk blood and plasma and, in doing so, can interact with different hormone receptors.²

Although, common as it is, its use is being called into question due to its known toxic effects on hormones and reproduction.³ Specifically, exposure to BPA in pregnancy can alter the development of fetal organ systems and can even accelerate the onset of puberty.³ This may also be in part due to a decreased capacity of the fetus to detoxify and eliminate these compounds due to immature liver function.³

The highest risk appears to be in the general public that consumes canned foods and sodas and those



that drink from plastic water bottles, as well as people working as cashiers (due to the constant exposure to receipt paper).³ BPA on thermal receipt paper can be transferred from receipts to the skin and can persist there even after hand washing.²

Effects of BPA on Male Reproduction

Reproductive effects of BPA include decreased semen and sperm quality, and increased sperm DNA damage.² Associations have also been made between BPA exposure and reduced libido and difficulties with achieving erection or ejaculation.²

Effects of BPA on Female Reproduction

In women, epidemiological studies show that BPA levels in blood serum are associated with recurrent miscarriage.¹ Higher levels have also been found in women with PCOS compared to those without PCOS.¹ Epidemiological research has also found associations in women between BPA exposure and disrupted menstrual cycles, fewer antral follicles, endometriosis, uterine fibroids, and overall poor fertility outcomes.²

Pesticides

Pesticide chemicals include insecticides, fungicides, herbicides and rodenticides. These chemicals, including organochlorines such as DDT, can affect a variety of reproductive tissues and their function.⁴

In animal studies, the ingestion of organochlorine pesticides has led to increased formation of cystic ovaries, inhibition of follicle growth and decreased egg viability.⁴ Pesticides can also change the way reproductive hormones are produced and metabolized. For example, in one study, higher serum DDT levels in women were associated with low luteal progesterone and disrupted menstrual cycles (shorter luteal phases).⁴

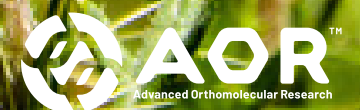
Pesticides have also been linked to miscarriage or preterm birth, PCOS, endometriosis and uterine fibroids.²

Phthalates

Phthalates are a group of man made chemicals (as all of these are) used in food processing and packaging, as well as in personal body products, cosmetics, perfumes and fragranced products, mosquito repellants and nail polish. In female animal studies, exposure to phthalates such as

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DEHP used in flexible vinyl plastics such as medical devices, food packaging and flooring, has been linked to ovarian toxicity including decreased ovulation, and tissue changes within the ovaries.⁵ These metabolites have been shown to disrupt the production of ovarian hormones (including estradiol and progesterone), and it's suggested from human female studies that increased concentrations of phthalate metabolites may be linked to an increased risk of endometriosis.⁵

Phthalates, unlike PCBs, have very short half-lives (hours to days) and are excreted from the body via urine and feces, though recent studies have also found phthalates and their metabolites in human breast milk and cord blood.¹

In one Italian study of 84 newborn infants, phthalate (MEHP) in cord blood was associated with a shorter gestational age at birth.¹ In another infant study, increased phthalate concentrations in breast milk led to lower testosterone levels in three month old male infants.¹ Other studies have reported incomplete testicular descent, reduced penile size, and in childhood, associations have been found with premature breast development (younger than eight years of age), and an increase in rhinitis, eczema and asthma.¹

In adults, much of our acquired knowledge from studies comes from the effect that phthalates have on male reproduction, specifically semen quality. Past investigations have found phthalate concentrations to be inversely related to sperm concentration.¹ More recently, concentrations of phthalates and their metabolites have been linked to increased sperm DNA damage, and decreased sperm motility and testosterone levels.¹

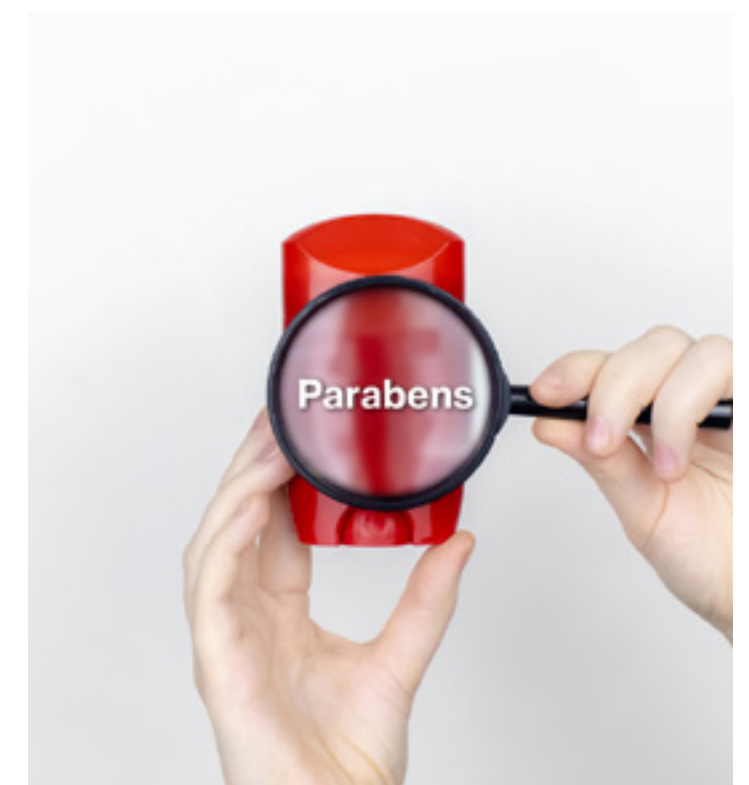
Parabens

Most commonly found in personal care products, parabens are chemicals used as antimicrobial preservatives, though they can also be found in house dust. In one human study, urine paraben concentrations were associated with lower antral follicle counts (i.e., lower ovarian reserve), and in another study an association was found between female university students with higher urinary paraben levels and shortened menstrual cycles.⁴

In pregnancy, paraben concentrations have been associated with an increased risk of preterm birth, low birth weight and length.⁴

Being exposed to these types of chemicals in our everyday lives is almost unavoidable but limiting exposure when it's in our control may reduce the risk of reproductive dysfunction.

The bioaccumulation of these compounds in our bodies is common and each individual will have their own combination of genetic polymorphisms that determine the functioning of detoxification pathways in the liver. We must rely on our ability to reduce exposure when possible, and most certainly during pregnancy. Avoid handling receipt paper, drinking from plastic water bottles and eating foods from cans lined with BPA. In the meantime, we await changes in regulation and legislation to decrease or even prevent the use of these chemicals in our products.



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Biotoxins and Inflammation

By Cassy Price

Do you have chronic symptoms such as fatigue, pain, or brain fog? If so, it may be the result of biotoxin exposure. Biotoxins are substances which are both toxic and have a biological origin. They come in many forms and can be produced by nearly every type of living organism. There are mycotoxins (made by fungi), zootoxins (made by animals) and phytotoxins (made by plants). This article will focus primarily on the effects of mycotoxins on the body.

There are upward of around 300,000 species of fungi. Some fungi are beneficial, like edible mushrooms or the beneficial yeast in our digestive system. Others, such as *Aspergillus* and *Fusarium* genera, present a common threat to both agriculture and the health of individuals.

The Inflammatory Response

Inflammation is part of the body's natural defense mechanism. It is the process by which the immune system recognizes and removes harmful and foreign stimuli and begins the healing process. Inflammation can be acute or chronic. When you have chronic inflammation, your body's inflammatory response can eventually start damaging healthy cells, tissues, and organs. Chronic Inflammatory Response Syndrome (CIRS) is a condition with a wide range of symptoms triggered by inflammation resulting from biotoxin exposure, most commonly mycotoxins. The ongoing inflammation that occurs with CIRS often results in a myriad of additional conditions if left untreated.

Case Studies

One example is shown in a 2012 study that found infants and young children exposed to mold in the home had an increased risk of developing asthma by the age of seven. The research examined 289 homes and 36 types of mold.¹ Mold toxicity is primarily caused by mycotoxins. The adverse health effects of mycotoxins range from acute poisoning to long-term effects such as

immune deficiency and cancer. Mycotoxins can enter the body through the lungs, skin, or digestive tract and can affect any system in the body.

Another study found that people affected by CIRS experienced:

- Brain inflammation in the hippocampus, the area of the brain that governs memory, learning, and the sleep-wake cycle
- Decreased neurogenesis, or the formation of new brain cells
- Impaired memory
- Increased sensitivity to pain
- Increased anxiety

Researchers link mold-triggered immune activation with these symptoms in the brain and the body, concluding that mold causes symptoms and illness through its inflammatory effects.²

People who are immunosuppressed are more susceptible to toxicity when exposed to mycotoxins. However, with high enough cumulative exposure to mycotoxins, everyone can get sick. Genetics, nutritional deficiencies, accumulation of other environmental toxins, age, and high stress levels are all factors that can weaken the immune system, increase inflammation within the body, and in turn impact how fast you get sick from biotoxins.

If you believe you may be suffering from CIRS, it is recommended to consult a health care professional and adopt lifestyle changes that will help to reduce inflammation within the body.

Tips to Reduce Inflammation

- Reduce or eliminate inflammatory foods in your diet, such as sugar, red meat and trans fats
- Limit or avoid simple carbohydrates
- Exercise for 30 to 45 minutes daily
- Include antioxidant rich foods in your diet
- Get enough sleep
- Reduce stress through meditation, yoga, breathing techniques or other modalities

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Signs and Symptoms of Mold Exposure

By Krista Powell

Mold is everywhere. There are countless species found in indoor and outdoor spaces. Many are totally harmless varieties, but several can be detrimental to your health. As mold can often hide beneath the surface of walls, under carpets, in attics or other areas, people may experience symptoms without knowing the cause.

Mold spores can grow in many environments, but they thrive in damp conditions. Any area with excess moisture can create a breeding ground. Active mold growth breaks down the material it feeds on and can diminish structural integrity. It can have serious effects on health as well, from allergies to respiratory issues to infections.

If you are experiencing symptoms and you are unable to pinpoint the cause, it might be worth exploring the possibility of mold exposure. A relatively mild mold allergy can induce:

- runny nose
- sore throat
- dry cough
- skin rashes
- red or watery eyes
- sinusitis
- wheezing

These symptoms should clear up once the mold is removed or once you are no longer in the moldy environment.

Severe mold allergies increase the risk for development of asthma and other respiratory conditions. One study, conducted in 2012, found that infants and young children exposed to mold in the home had an increased risk of developing asthma by the age of seven. The study surveyed 289 homes and 36 types of mold.¹ There have been several other studies²⁻⁵ conducted that substantiate the connection between damp spaces, indoor mold, and respiratory illnesses.

Black mold, sometimes referred to as toxic mold, may cause severe health problems due to the release of mycotoxins. While mold may be present without producing toxins, some research suggests that mycotoxins from *Stachybotrys chartarum* have a link to serious health problems like mycotoxicosis, or mold poisoning.⁶ Prolonged exposure to mold infested buildings has been known to produce a wide range of symptoms.⁷⁻¹⁰

Physical:

- Muscular aches and pains
- Fatigue
- Nosebleeds
- Headaches

Respiratory:

- Bronchitis
- Asthma
- Chest infections

Cognitive:

- Memory loss
- Changes in mood
- Diminished reaction time
- Learning impairments

While many of these symptoms may only occur in extreme circumstances after extensive mold exposure, it is good to be aware of the risks mold may present. If you are experiencing any unexplained physical complaints or if you think your home or workplace may have mold, act quickly to safely remove the mold or yourself from the location. Speak to your health care practitioner about next steps to heal and protect yourself from mold and mycotoxins.

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Detoxing Your Body From Mold Exposure

By Brady Bateman

Household mold is far more common than you may think and at some point in our lives, almost all of us will be exposed to some form of mold in our homes.



According to Health Canada, the word mold is a common term referring to any fungi that can grow on building materials in homes or other buildings. Mold growth is exacerbated in damp conditions and can often be easily overlooked or go unnoticed.

Humidity is the key cause of mold growth, meaning that most often mold will develop within bathrooms and kitchens, and is more prevalent in older homes.

What Does Mold Exposure Cause?

Depending on the severity of the exposure, the type of mold and your immune system's response, mold exposure can affect people in very different ways.

Low levels of exposure to common mold within your home may not cause any signs or symptoms at all. Certain individuals' immune systems may be more susceptible to mold exposure, with some people being directly allergic.

If you have a mold allergy, your immune system overreacts when you breathe in mold spores. A mold allergy can make you cough, make your eyes itch and cause other symptoms that make you miserable. In some people, mold allergy is linked to asthma and exposure causes restricted breathing and other airway symptoms.

If you have a mold allergy, the best defense is to reduce your exposure to the types of mold that cause your reaction. Medications and supplementation may help keep mold allergy reactions under control.

Detoxing After Mold Exposure

If you believe you have been exposed to mold there is no need to panic. Unless inflated by another condition, mold exposure typically will not carry any severe symptoms.

If you have found mold in your home the first step that can be taken is to address the root cause of the mold growth. Ensure that all plumbing is sealed and draining correctly, fans in high humidity areas are working properly and your home is properly sealed to prevent outside water from entering areas like your basement or attic.

The Environmental Protection Agency (EPA) suggests that if your moldy area is greater than about three square feet, you should get a qualified mold remediation company to handle the removal.

For smaller areas, you can do the job yourself, if you follow some simple rules:

- Make sure all leaks and water incursion are fixed. Dry the area completely.
- To avoid getting mold or mold spores in your lungs, wear an N-95 respirator. These are available at hardware stores and online. They will help trap spores in a disposable cartridge, so you can eliminate them safely.
- Wear long gloves, especially if using bleach and water to destroy mold
- Wear goggles to avoid getting bleach – or mold spores – in your eyes
- Scrub mold with detergent and water, and dry completely
- Throw away porous or absorbent materials like carpets if they're moldy
- Always make sure everything is completely dry once you've scrubbed off the mold. Never paint, caulk, or otherwise cover any area that's been mold-infested until it is bone-dry.

If you are experiencing the symptoms of mold toxicity and have confirmed exposure to mold within your home, you'll want to treat the exposure as quickly and naturally as possible to prevent further, more serious side effects from developing.

A few natural treatments that give good results include the following:



Activated Charcoal

Activated charcoal has been used by the medical community for years to rid patients of poisons and toxic substances gently and easily. Studies show that activated charcoal is successful in treating patients with mold-related toxicity symptoms.



Probiotics

Probiotics are a wonderful, natural way to detox your body from toxic mold – and they're good for you, even if you don't have a mold issue. Studies show many strains of probiotics directly attack mycotoxins and remove them safely from your system. Probiotics come in capsules, liquids, and are present in many fermented foods.



Diet and Exercise

If you have low level mold exposure, it's important to maintain a healthy regiment of diet, proper exercise and natural health products. Although these mechanisms may not directly address the mold exposure, they will help to ensure that you are in the best possible condition to deal with the exposure.

The Healing Process

Everyone's body is different and we each react to outside stimuli and exposures differently. If you have health concerns related to mold exposure, make sure you speak with a health care practitioner to discuss the best course of action for you and your body to properly deal with the exposure.



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