

MOLDS AND CHRONIC ILLNESS

BRAIN DAMAGE FROM MOLD

Symptoms of mold-caused illness include difficulty concentrating, fatigue,^{1 2 3} dizziness,^{1 2} impaired memory,² thinking slowly,² problems following instructions² and headaches.^{1 2}

Many brain functions can be impaired, as documented by testing.^{4 5} These include reaction time, balance, color vision, visual fields, strength (grip), memory, attention span, other cognitive test abnormalities⁴ and electrical conduction in the brain.² These occurred with repeated exposures with increased symptoms.⁴

Brain damage from mold can cause changes that resemble psychologic problems^{2 3 4} such as increased frustration,² difficulty dealing with people,² and symptoms resembling depression.²

Repeated mold exposure can cause impaired memory and other damage to brain function.^{1 2 3 6 7 8} Molds can also release mycotoxins, which can cause brain damage, also called encephalopathy.^{6 7 8}

ASTHMA/REACTIVE AIRWAYS FROM MOLD

Symptomatic repeated mold exposure can cause asthma/asthma-like chronic illness.⁹ Repeated mold exposure increases asthma risk^{10 11 12} Asthma-like changes are found in studies of people with repeated mold exposure.^{13 14}

Persisting reduction of lung function has been documented with repeated exposures to mold.^{4 5} Inflammation has been shown on larger and smaller airways (bronchioles).⁴

Mold in buildings causes chronic worsening of respiratory symptoms and illness,¹⁵ This was documented by a scientific study comparing exposed and nonexposed individuals.¹⁵ Repeated irritation causing asthma-like symptoms is sometimes called reactive airway disease.

Asthma is a chronic inflammatory disorder of the airways.¹⁶ It involves damage to airway lining with scar formation, airway swelling¹⁶ enlargement of the bronchial smooth muscle and excess mucous.¹⁶ Plugging of airways with excess mucous can occur.¹⁶ Airway swelling, muscle enlargement, inflammation and scar formation would all reduce airflow. This causes shortness of breath.

Asthma-like inflammation leads to hyperreactivity of the airways¹⁶ with further airway narrowing when exposed to irritants. This hyperactivity causes symptoms at lower irritant exposure levels, a form of chemical sensitivity. Reduced airflow causes wheezing, breathlessness, chest tightness and cough.¹⁶

SINUS AND OTHER RESPIRATORY SYMPTOMS

Exposure to a variety of types of molds can **cause upper and lower chronic respiratory symptoms.**^{9 13 17 18 19 20 21 22} The most prevalent effects resulting from mold exposure include chronic respiratory irritation and disease.^{9 14 19 20 23}

Chemical irritants are produced by mold.²⁴ This can cause inflammation of sinus and other upper and lower airways.²⁰

EYE IRRITATION

Molds release substances that can cause eye irritation.^{9 14 18 19 21} Repeated mold exposure can lead to chronic eye irritation.^{13 14}

CHEMICAL SENSITIVITY

The irritation effects of repeated mold exposure can lead to chronic increased sensitivity to chemicals.^{25 26 27}

Molds can also induce histamine release by non-IgE mediated mechanisms^{28 29} or other asthma synonyms). This is sometimes referred to as reactive airway disease, which increases sensitivity to chemicals.

IMMUNE/AUTOIMMUNE CHANGES

Autoimmune changes (e.g., Lupus, multiple sclerosis/myelin damage²³ can occur with mold exposure.²³ Impairment of immune cells to divide and form new cells can also occur.²³ Some, but not all persons develop increased immune antibodies, which are “non-allergic” (not IgE) immune reactions against the mold.³⁰ Other changes in lymphocyte immune response are also common with mold illness.³¹

OTHER CHRONIC ILLNESS FROM MOLD

Mold-caused illness can cause **chronic fatigue, chronic aching, chronic headache and chronic gastrointestinal symptoms.**^{25 26 27} These symptoms are sometimes labeled “chronic fatigue syndrome”, “fibromyalgia”, “irritable bowel”, etc.

MYCOTOXINS

Mycotoxins are often highly toxic chemicals produced by specific molds. Some molds do not make “mycotoxins” according to current knowledge.

Stachybotris mycotoxins can cause serious damage to the nerve of smell (olfactory nerve),³² resulting in neurotoxicity,³² brain inflammation³² and reduced sense of smell³² (which reduces the warning system ability to avoid future exposure).

Some mycotoxins resemble chemicals that have been used as chemical warfare agents.³³

Mycotoxins can be measured and if present in significant amount may need to be removed from the body by special substances such as cholestyramine. Patients handle cholestyramine better when their health has otherwise been improved (eliminating exposure and correcting below average nutrient levels as measured through SpectraCell Laboratories).

OTHER CHEMICALS RELEASED BY MOLD

Chemicals released by most mold species are solvent-like neurotoxins: toluene, xylene, styrene,³⁴ ketones^{34 35} as well as aldehydes.^{20 34} (Many of these can go to lipid tissue, some to water based body fluids.)^{24 34}

Aldehydes are a well-known cause of chronic respiratory illness^{24 25 26 27 34} and brain damage.^{34 36} Aldehydes have been associated with illness symptoms including headache, eye and respiratory irritation, sleep disturbance, and increased thirst in workers as well as people with certain consumer products at exposure levels as low as 0.13 ppm.³⁴ Aldehydes in mold can also cause chronic change in immune function with hypersensitivity, immune activation, and increased autoimmune tendency.³⁷

Molds release volatile organic compounds (VOCs) during growth.^{34 35 36 38 39} Material such as adhesives, water protective coatings, oils and other carbon containing material are converted by molds to VOC's.³⁴ In addition, mycotoxins can affect the liver, kidneys, respiratory system and other organs.

Mycotoxins and volatile compounds produced by molds are capable of causing brain damage (neurotoxic effects)^{34 36} as well as chronic fatigue.^{34 36} A large controlled study showed an increase in eye, skin and respiratory irritation, headache and fatigue in persons who were in moldy buildings and buildings with a history of water leakage within the past five years compared to those not in such buildings.³⁹

MOLD PARTICLES CAUSE INFLAMMATION AND DAMAGE

Respiratory

Molds are tiny particles breathed into the lungs. Gases, vapors and other air pollutants cling to particles. Particles then carry these substances into the lungs, where they persist longer, because particles are harder to clear from the lungs. In addition, very small particles cause lung inflammation, damage lung cells, can form lipid peroxides in lung tissue and can cause scarring in the lungs.⁴⁰

Fine particulates deposit in the respiratory tract.^{41 42} The smaller respirable particles (under 2.5 microns), including mold, deposit in the deep lung sacs (alveoli).⁴¹ The inflammation response there can make the lungs more permeable to toxins and other particles and allergens.⁴¹

Particles breathed into the lungs cross the lipid cell membrane of lung cells and accumulate in cell structures known as lipid vesicles.⁴³ Particles can increase the respiratory inflammation marker, exhaled nitric oxide.⁴⁴ Repeated or prolonged increase in nitric oxide can cause chronic illness in many body organs.

Brain and Nerve

Very fine particles inhaled into the nose can travel up into the brain^{45 46} by going up along the nerve of smell (olfactory nerve) into the brain (olfactory bulb),⁴⁵ located next to other brain basic control centers. These very small particles entering the blood stream can impair normal function of the autonomic nervous system.⁴⁰

Hormones

Fine particles can act as a physical stressor, increasing body stress hormone levels.⁴¹ This can damage adrenal glands, other hormones and brain function.

Heart

Release of particles can cause EKG changes in electrocardiogram with reduced blood/oxygen supply to the heart and inflammation.⁴⁷ Exposure to combustion particles and gases causes excess cardiovascular disease risk.^{48 49 50}

Other Organs

When chemical particles are breathed in, they can pass into the blood stream⁴⁰ and be distributed to many other body organs and cells.⁵¹ Chemical particles in those other locations also cause inflammation in those locations and increased production of immune substances. This causes toxicity⁵¹ and increased need for antioxidants due to formation of tissue-damaging substances called free radicals.⁵¹

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