

LYME BRAIN

WHAT TO DO WHEN
YOU'RE GOING CRAZY



DR. KEVIN CONNERS

Lyme Brain

What to do when you're 'going crazy'

Section 3

Dr. Kevin Conners

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Chapter Three

So what's Wrong?



Inflammation is the enemy of the Brain

Lyme infections that cross the blood-brain barrier cause an immune response in an attempt to kill the pathogen. If that wasn't bad enough, the details described numerous times of Lyme eluding destruction to have the immune B cells create antibodies against your own neural cells leaves the patient in dire straits. Every time the immune system fires, for ANY reason (a common cold, a food-borne pathogen) the first thing that will be destroyed is that which you have antibodies against. Namely, every flare of the immune system kills brain cells!

This is why people with antibodies to ANY self-tissue should avoid immune stimulants. Whether you have MS or Hashimotos, RA or Lyme, adding

immune stimulants may seem wise to help kill the enemy but once you have self-antibodies, the immune system thinks the enemy is YOU.

Well, this kinda stinks! How in the heck are you going to kill the pathogen if you can't even use your own immune system? So goes the age-old question that I spend an entire book (see "The 3 Phases of Lyme") telling you that you MUST use other means. Below is a link to describe my protocols for Phase 3 Lyme and all other autoimmune disorders:

<http://connersclinic.com/lyme-determining-your-phase/>

Lyme plus Stress equals WORSE Brain

Normal stress relies on two key hormones: *adrenaline* (*epinephrine*) and *cortisol*. Very simply stated, adrenaline works in the short term, while cortisol has large momentum and works in the long term. I say 'normal' because the 'stress response' IS normal; it is a necessary physiologic response to a stimulus, either real or perceived. Yes, the stress response can also be activated if your brain *perceives* danger or any kind of threat, whether real or imagined.

Normally, a stressor triggers the release of adrenaline from your adrenal glands into the bloodstream to prepare the body for action. As a result, your heart beats faster, you begin to sweat, your breath becomes shallower, you shunt blood from your organs to your extremities, and your senses become more acute, all to prepare to run or flee. This is the so-called *fight or flight* response to the stressor, and they are wonderful, necessary and short-term.

This is the key point: stress responses are supposed to be short-term responses to immediate danger as a protective measure to avoid calamity. The problem lies in that we live in a world where lions and bears are attacking us constantly! The lion of getting the kids to school, completing a project, pleasing the boss, and meeting ever-pressing deadlines coupled

with the bears of financial pressures and keeping up with the Joneses have never been more apparent than today's modern society. What was created to be an infrequent response to life-or-death situations has become daily survival in the concrete jungle of life.

In the chronic stress response, the Sympathetic nervous system is hyper-triggered causing blood pressures to rise, and all bodily functions deemed unnecessary for imminent survival to suppress. Brain function is impaired, inflammation increases; there is no need for a sex-drive, detoxification, or bowel function if a bear is chasing you, you just need enough blood to your legs to outrun your friend.

The effect of the stress hormones on the brain is survival oriented. The initial surge of adrenaline can make you feel good, hence, why some "Type 1" individuals are addicted to stress. Just as your levels of adrenaline start coming down, so rises the amount of cortisol flowing through your veins.

“All my life, I always wanted to be somebody. Now I see that I should have been more specific.”
-Lily Tomlin

Moreover, cortisol has a much larger momentum and enduring response than adrenaline, which means that even though it builds up slowly, it also takes a long time to go back to normal. Worse, should you continually engage adrenal stimulation, your levels of cortisol also increase.

Note: Cortisol stimulates dopamine release in the brain and the two functions together to produce the stated results. See later where I tell you about the COMT gene and defects in it that keep excessive amounts of dopamine in the brain mimicking the same symptoms of excess cortisol.

The combination of the rise of cortisol and the decrease of adrenaline, come the nasty side effects of the stress hormones. It is during this time in the cycle you can feel worse, energy tumbles, anxious, and you may begin to have negative thoughts. You only feel the negative effects of stress as your body is *stressing down* and progressing towards a more relaxed state. When you are building up on adrenaline, in effect *stressing up*, you might

even be feeling good – this can be addictive (the *adrenaline rush* and the consequent *adrenaline crash*).

Cortisol then, gets the bad reputation as being the stress hormone with all the negative effects. In reality, cortisol plays some very important parts in homeostasis, energy production and blood sugar regulation. Prolonged cortisol production is the problem as it throws the glucose balance off in the brain (its primary food source) and leads to inflammation through a pathway called a TH17 response.

In the very early stages, a chronic stress response will not produce many noticeable brain symptoms. Functional Medicine lab testing reveals an adrenal stress response that is “out of whack”, a HRV test will reveal a Sympathetic spike, a Neurological Exam will show obvious signs, a “Brain Map” with a functional EEG will reveal asymmetry, and a Kinesiology Exam may reveal hormone imbalances long before symptoms drive a patient to see a physician.

Subjectively, you will eventually begin to feel a bit down and tired, especially during those periods when you are *crashing down* from the adrenaline, but most people would still not say that they feel depressed. Also, you would start sleeping a bit less than usual, having difficulty sleeping and possible waking at night and having a harder time getting back to sleep or just not feeling quite as fresh when you wake up.

Over time, more damage to neurons continues. Stress starts to take its toll as the amount of stress hormones increase. This is largely person-dependent, but most people start having problems with their digestive system, headaches, toxicity issues due to suppressed pathways, sexual dysfunction, poor sleep and having more frequent dreams. Since stress depresses the immune system, people also tend to fall sick with infections more often.

The bottom line is that prolonged stress damages neuronal pathways that may lead to depression and anxiety disorders; but it is a problem in the brain. Depression, anxiety, panic attacks, hyperventilation, bouts of psychosis, etc. are frontal lobe issues. As the insidious buildup of

inflammation disables the communication between the prefrontal cortex deeper brain centers, the deeper centers lose their CEO. The prefrontal cortex is the parent, the boss, the executive that is supposed to calm the instinctual centers lying in the archeocortex. Raw emotions stored in the amygdala, hormone balance supplied by the hippocampus and impulsive behavior from the midbrain left on their own without the parenting of the prefrontal cortex can be disastrous.

But since Lyme patients never encounter stress, the previous section is mute. ;)

Physiology of Depression, Anxiety, OCD, Panic Attacks...

- Neuron death in the hippocampus has been implicated
- Neurogenesis (the birth of new neurons) may be necessary for recovery
- Neurogenesis happens continuously in the healthy adult brain with proper stimulation and fuel
- Most antidepressants require about 2-3 weeks to have an effect and do nothing for neurogenesis (re-growth of damaged pathways)
- Stress may diminish neurogenesis
- People under stress may sleep less than usual, produce less IGF (growth factors for healing), increase brain inflammation, and increase rate of neuronal degeneration
- Stress and brain inflammation speeds aging

At least certain parts of the brain continuously renew themselves; this is what is called neuroplasticity. Sleep seems to be fundamental for this renewal process---perhaps the greatest amount of neurogenesis happens during sleep.

Lyme plus bad diet - Artificial Sweeteners

A poor-choice diet filled with GMOs, chemical preservatives, flavorings, MSG, and additives bring along their own inflammation to the brain. However, artificial sweeteners are so damaging to the brain that they deserve their own section, maybe even an entire book. I have long preached to my patients that I'd rather have them eat sugar (yes, even my cancer patients) than eat artificial sweeteners. Aspartame is possibly the most common of these deadly additives so we'll discuss it here.

An Aspartame molecule is essentially made up of three different components: two natural amino acids (aspartic acid and phenylalanine), and a methyl ester bond, which includes Methanol. The methanol is released from the aspartame compound within hours of consumption and begins traveling through the body via the blood. Once the methyl ester bond is broken, it liberates methyl alcohol or methanol (wood alcohol). The problem with methanol is that it is a toxin that easily passes through your blood-brain barrier and is converted into formaldehyde.

Formaldehyde is dangerous poison that is causing the brain damage. While many animals are able to detoxify methanol in the body, humans do not have this capability. Formaldehyde is a serious neurotoxin and carcinogen. According to the EPA, Methanol is considered a 'cumulative poison' which means it accumulates in the body over time because the liver cannot excrete it. The more you consume over time the more poisoning takes place.

Methanol itself is a toxin that destroys the specialized astrocytes that form the myelin sheath covering the nerves in the brain. When this nerve insulation is removed, nerve signals fail. This causes the demyelinating symptoms that are commonly seen in diseases like Phase 3 Lyme, MS, ALS as well as migraines that can include bizarre and inconsistent visual field disruptions, strange upper motor neuron findings and peripheral neuralgias and degeneration.

The EPA has accepted that a limit of consumption of 7.8 mg/day is acceptable. But considering it took the appointment of Donald Rumsfeld,

former board member of the drug company that manufactured Aspartame, to Ronald Reagan's cabinet for the FDA to immediately approve it for use in food (the very same day Rumsfeld was sworn in), one might want to check the research.

According to Woodrow Monte, Ph.D., R.D., director of the Food Science and Nutrition Laboratory at Arizona State University:

“When diet sodas and soft drinks, sweetened with aspartame, are used to replace fluid loss during exercise and physical exertion in hot climates, the intake of methanol can exceed 250 mg/day or 32 times the Environmental Protection Agency's recommended limit of consumption for this cumulative toxin.”

Further, he states that due to the lack of a couple of key enzymes, humans are many times more sensitive to the toxic effects of methanol than animals. Therefore, tests of aspartame or methanol on animals do not accurately reflect the danger for humans.

“There are no human or mammalian studies to evaluate the possible mutagenic, teratogenic, or carcinogenic effects of chronic administration of methyl alcohol,” he said.

How can you know you are getting too much Methanol? You may experience headaches, ear buzzing, dizziness, nausea, gastrointestinal disturbances, weakness, vertigo, chills, memory lapses, numbness and shooting pains in the extremities, behavioral disturbances, and neuritis. Another very well known sign of methanol poisoning is vision problems.

It gets worse. One of the amino acids in aspartame, aspartic acid is capable of crossing your blood-brain barrier. Aspartic acid taken in its free form (unbound to other amino acids in whole proteins) significantly raises the blood plasma level of aspartate and glutamate. Easily crossing the blood-brain barrier, aspartate or glutamate kill certain neurons by allowing the influx of too much calcium into the cells. This influx triggers excessive amounts of free radicals, destroying cells. The neural cell damage that can be caused by excessive aspartate and glutamate is why they are referred

to as "excitotoxins." They "excite" or stimulate the neural cells to death. There it attacks your brain cells, creating a form of cellular overstimulation called excitotoxicity, which can lead to cell death.

Artificial sweeteners may just be the single worst things that one can consume legally. They have been linked to every chronic neurological illness including: Multiple sclerosis (MS), ALS, hormonal problems, memory loss, epilepsy, hearing loss, Alzheimer's, dementia, brain lesions, and neuroendocrine disorders.

Excitotoxins

Excitotoxins are a group of chemicals that when ingested, damage the neurons. The most well known excitotoxin would probably be MSG, an additive that enhances the flavor of food. Excitotoxicity occurs when receptors for the excitatory neurotransmitter glutamate are over-activated. Dr. Russell Blaylock, MD, author of the book "Excitotoxins - the

Here's what you need to keep in mind. You no longer have yesterday. You do not yet have tomorrow. You have only today. This is the day the Lord has made. Live in it.
-Max Lucado

taste that kills" states that excitotoxicity may be involved in spinal cord injury, stroke, traumatic brain injury, hearing loss (through noise overexposure or to toxicity) and in neurodegenerative diseases of the

brain) such as multiple sclerosis, Alzheimer's disease, amyotrophic lateral sclerosis (ALS), and Parkinson's disease.

Excitotoxins are food additives that food producers use to stimulate taste centers in the brain for the purpose of creating an addiction (or at least an increased desire) for the product. Candy, snack food (Doritos have 4 different excitotoxins in its ingredients), Oriental dishes, and prepared meals are notorious for adding excitotoxins to stimulate the brain to desire more. It's legal and considered 'good business practice' by food manufacturers as sales increase.

An interesting article published in the Journal of Neurotoxicology entitled, Excitotoxins in foods, Olney JW, Department of Psychiatry, Washington University School of Medicine, stated, "Evidence is reviewed pertaining to

excitatory neurotoxins (excitotoxins) encountered in human food supply. The most frequently encountered food excitotoxin is glutamate (Glu) which is commercially added to many foods despite evidence that it can freely penetrate certain brain regions and rapidly destroy neurons by hyper-activating the NMDA subtype of Glu receptor. Hypersensitivity of NMDA receptors during development makes the immature nervous system especially sensitive to Glu excitotoxicity. On the other hand, elderly consumers are particularly sensitive to domoic acid, a powerful excitotoxic Glu analog that activates both NMDA and non-NMDA receptors. A high content of domoic acid in shell fish caused a recent food poisoning incident that killed some elderly victims and caused brain damage and memory impairment in others. Neurolathyrism is a crippling neurodegenerative condition associated with ingestion of a legume that naturally contains BOAA, an excitotoxic Glu analog that hyper-activates non-NMDA receptors. Thus, the human food supply is a source of excitotoxins that can damage the brain by one type of mechanism to which immature consumers are hyper-vulnerable, or by other mechanisms to which adult and elderly consumers are peculiarly sensitive.”

Names of ingredients in foods that are excitotoxic:

Glutamic acid
Glutamate
Monosodium glutamate
Monopotassium glutamate
Calcium glutamate
Monoammonium glutamate
Magnesium glutamate
Natrium glutamate
Yeast extract
Anything “hydrolyzed”
Any “hydrolyzed protein”
Calcium caseinate,
Sodium caseinate

Ninety-five percent of processed foods contain MSG, and, in the late 1950s, it was even added to baby food. Manufacturers say they have

voluntarily taken it out of the baby food, but they didn't really remove it; they just called it "hydrolyzed protein" instead.

An excellent book, *Excitotoxins*, by Russell Blaylock, describes how nerve cells either disintegrate or shrivel up in the presence of free glutamic acid if it gets past the blood-brain barrier. The glutamates in MSG are absorbed directly from the mouth to the brain. Some investigators believe that the great increase in violence in this country starting in 1960 is due to the increased use of MSG beginning in the late 1950s, particularly as it was added to baby foods."

Remember: By food industry definition, all MSG is "naturally occurring." "Natural" doesn't mean "safe." "Natural" only means that the ingredient started out in nature, like arsenic and hydrochloric acid.

When you eat real, whole foods, you automatically avoid MSG, aspartame and other excitotoxins. No need to memorize the whole list of different food additives, simply skip the processed junk and EAT REAL FOOD!"

The best advice is to eat food as close to the way God originally created it!

The Immune System and Antigen Responses

Autoimmune diseases in general are commonly overlooked in both traditional medicine and alternative healthcare. This is at least in part due to the fact that neither traditional medicine nor the alternative model of care has had much, if any, success in treating them. If we look at the traditional model of care, we find that complete immune suppression is the treatment of choice; its success rate is horrible and the patient is often killed by the medications meant to help them. Alternative solutions have fared better only as far as they didn't kill the patient.

Success is too often measured by the suppression of symptoms not correcting the cause that is producing an effect. The patient population seems to be okay with this model: Give my symptoms a name and then drug them into oblivion. Unfortunately, most chronic Lyme sufferers have already discovered that this type of mentality is leading us down the road of destruction. The question autoimmune diseased patients really need to

ask is why they became sick in the first place; Lyme patients already know but then fail to treat it as an autoimmune disorder.

We cannot be satisfied with symptom suppression while ignoring the cause; we must never settle for a treatment that does not address the reason the disease exists; and we must become our own advocates, studying and demanding that our healthcare practitioner 'proves' their cure with logical understanding of the process itself.

The autoimmune response is an inflammatory response, which produces chemicals called cytokines, part of the body's natural defense system against outside invaders. The body's immune system may be separated

"Thimerosal is the preservative in immunization shots, so anytime you get an immunization shot you are undergoing the same procedure that in the University Lab we used to give animals auto-immune disease---give a little tiny injection of mercury. And when you get an immunization shot you are getting a little tiny dose of mercury there."---
Hal Huggins DDS

into a Th1 and a Th2 response. The Th1 response may be thought of as the police force, the body's initial strike force against an invader or what is called an antigen. When an antigen is present, the Th1 system fires and kills the virus; should the bug be of a nasty persuasion and strong enough to resist the Th1 response, the Th2 (B cell) system kicks in, creates antibodies against the virus, tagging them so appropriate white blood cells can finish them off. Phase 3 Lyme patients have

this process stuck in the 'on' position, having made antibodies to self-tissue, and every time the immune system revs-up, it destroys the tissue where the antigen is recognized. In the case of Lyme causing inflammation in the brain, it is equivalent to one's brain literally being on fire!

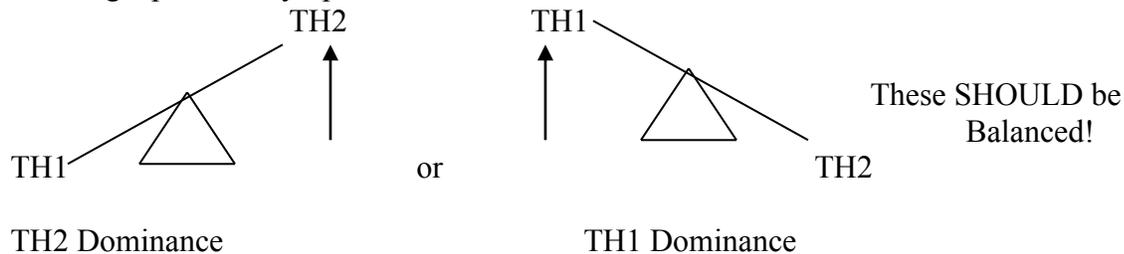
My opinion is that all chronic health patients should be tested for autoimmune disease and Lyme patients MUST be tested to see if they are in Phase 3. If the testing reveals such any self-antibodies, the battle is to figure out a way to dampen their immune activity. That is why it's necessary to do all the testing and select the most sensitive tests. "My doctor already tested me for gluten and he said it's not positive..." "But I had a H. pylori test already..." "My Lyme test was negative..." The blood test for Lyme, gluten and H pylori are highly unreliable and reveal a lot of false negatives.

However, testing for self-antibodies is relatively easy. Cyrex Labs has their Array 10 that measures more than enough tissue antibody levels to prove or disprove my point. See my webpage below for a simple, free questionnaire to complete if cost is an issue for you:

<http://connersclinic.com/lyme-determining-your-phase/>

TH1 and TH2 Balancing

There are 2 parts of your immune system, the TH1 and TH2 response. When a person is Auto-Immune, one of these systems is “hyper-firing” or Dominant. Balancing this system goes far in reducing a patient’s symptoms:



There are specific dietary changes and supplements that can help and hinder the above response:
NOTE: ALL AI cases need Vitamin D, Glutathione, and Omega 3 fish oils +

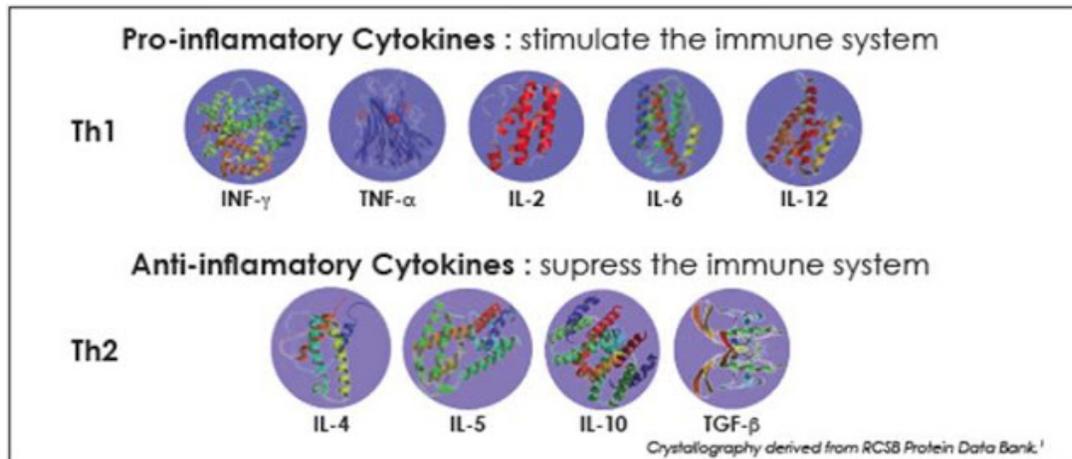
Things that stimulate the TH1 response: (Take these if you are TH2 Dominant)

- Echinacea
- Goldenseal
- Garlic
- Vitamin C
- Any “Immune stimulants”
- Licorice root (Glycyrrhiza)
- Astragalus
- Eleuthero root
- Pau D’Arco
- Cat’s Claw
- Beta-glucans, Maitake, Reishi and most other mushrooms
- Lemon Balm (Melissa officinalis)

Things that stimulate the TH2 response: (Take these if you are TH1 Dominant)

- Caffeine
- Green Tea (though it decreases IL-6 and is therefore beneficial)
- Grape Seed Extract
- Herbal barks (Cramp Bark, Pine Bark, and White Willow Bark)
- Lycopene
- Resveratrol
- Pycnogenol

Therefore, if a patient is TH1 Dominant, they should AVOID TH1 Stimulants and TAKE TH2 Stimulants



Lyme and strange co-infections - yeast, fungus and mold

Yeasts are single-cell living organisms that are neither animal nor vegetable. They live on the surfaces of all living things, including fruits, vegetables, grains and your skin. They're part of the "microflora" which contributes in various ways to the health of their host with which they normally have a symbiotic relationship. Yeast itself is nutritious and small amounts of yeast gives bread its good yeasty taste. Yeast is a kind of fungus. Mildew, mold, mushrooms, monilia and candida are all names that are used to describe different types of yeast.

Candida albicans is normal in human flora and usually harmless living on the inner warm creases and crevices of the digestive tract and vagina. When your immune system is strong, candida yeasts cause no problems. But when you take broad-spectrum antibiotics for such conditions as acne, respiratory infections or cystitis (bladder infection), these drugs knock out friendly germs while they're knocking out enemies. Even overgrowth usually does not produce difficulty in a healthy child with a properly functioning brain and immune system. However, chronic use of antibiotics provides a less than optimum environment for both bacteria normally present and necessary for effective digestion and leads to mutant forms of the organisms.

Normal bacteria not only aid in digestion, but also create a certain pH of the intestine that helps suppress the growth of pathogens. When the bacteria

are suppressed, the yeast can grow unchecked and *Candida albicans* is therefore thought to play a role in a number of health problems. These include recurrent infection, fatigue, irritability, hyperactivity, and other neurological symptoms, like short attention span, brain fog, and depression. It is also possible that some of these symptoms will also reflect a decrease in brain activation, especially of the left hemisphere that may be the prime cause of or be associated with other diseases or disorders co-existing with the yeast infection.

Valley Fever (Coccidioidomycosis [kok-sid-e-oy-do-my-co-sis] or "cocci" for short) is an infection of the lungs caused by a fungus that grows in the soil in the southern and central portions of California and the portions of Nevada, Arizona, New Mexico, Texas, and Utah. Valley Fever is also found in parts of Mexico, Central and South America.

Forty percent of people who are infected will develop symptoms such as cough, fever, exhaustion, rash, chest pain, night sweats, joint pain, muscle aches, headaches, weight loss, and lack of appetite. Some symptoms can last for weeks or even months and it can become chronic, lasting years and affecting neural centers, in a small percentage of people. Some people may develop severe disease infection outside the lungs or chronic symptoms. Certain groups of people are at higher risk of developing severe disease. In 2012, 12,920 cases of Valley Fever were reported to the Arizona Department of Health Services.

Mold is a nasty toxin in the body. In my experience, it's as hard to get rid of as chronic Lyme. The trichothecene mycotoxins produced by toxic black mold are neurotoxic. This means they can kill neurons in the brain and impair a person's mental ability. They also cause nervous disorders such as tremors and can cause personality changes such as mood swings and irritability.

Mold expert Dr. Jack Thrasher, estimates that as many as 40 percent of American schools and 25 percent of homes have mold infestations, unbeknownst to the people occupying those buildings. It follows that adverse health effects of mold may be reaching pandemic levels. Growing right along with mold are what are called "gram negative" and "gram positive" bacteria. Just like mold, they require moisture and organic material to thrive and are often found growing in the same places as mold, and the synergistic action between mold and bacteria further worsen

inflammatory health conditions. Oftentimes, bacterial infections occur alongside fungal infections and make treatment more complicated.

According to Dr. Mercola, "Everyone is potentially at risk for toxic mold exposure, regardless of your geographic region, climate, socioeconomic status, race, age or gender. As with most other medical challenges, knowledge is your most powerful weapon. Scientific research has been emerging that connects mold exposure with various health conditions for which the causes were previously unknown. For example, in 2010, Fisk et al published a meta-analysis showing a substantially significant association between residential dampness and mold with respiratory infections and bronchitis."

A toxic exposure often impairs brain function but more importantly, it is usually exposure over time (prolonged, chronic and often unknown contact) that causes the greatest problem. Symptoms are varied and often unidentified. It's easy for someone to feel "crazy" rather than injured. An article titled "Psychological, Neuropsychological, and Electrocortical Effects of Mixed Mold Exposure" explains some of the implications of a toxic mold exposure.

The study stated, "The pattern of deficits commonly seen in mild traumatic brain injury is very similar to that found in mold-exposed individuals. This phenomenon--clinically referred to as 'brain fog'--is also common in individuals who suffer from multiple chemical sensitivities. Patients reported a loss of their sense of self, of their usual ways of doing things, and even of their personality. They were painfully aware of their deficits and were constantly frustrated by their loss of cognitive efficiency and frequent mistakes. This can be understood as a disturbance or dysfunction of the frontal cortical areas, as implicated in the QEEG findings and the relationship of exposure data to test performance in this study."

"Patients--including multiple family members--exposed to toxic molds reported moderate to severe levels of psychological distress related to the development of a wide range of physical, cognitive, and emotional symptoms. Problems included the frustration of trying to find knowledgeable and appropriate medical care, interference with social and work life, temporary or permanent abandonment of homes and possessions, financial stress, and anxiety and helplessness as a result of continuing poor health. Most of these patients, in absence of any significant

premorbid psychiatric problems, could be diagnosed as suffering from acute stress, adjustment disorder, or post-traumatic stress."

Heavy Metal and other Environmental Toxins

One could say that nearly every Lyme patient has accompanying heavy metal toxicity; usually it's mercury. This is why I have placed a heavy metal homeopathic detox in my Protocol #4; it is just so prevalent.

There are many heavy metals in our environment both naturally and from pollution. The term "heavy metal" applies to a group of metals with similar chemical properties. Some of these, including copper, iron and zinc, play important roles in our bodies. Others have no known benefit for health.

Examples of these are lead, which is found in paint in old homes as well as many other sources; arsenic, which can be found in well water and wood products; and mercury, which can build up in fish that we eat.

See more about heavy metal and other toxicity at the link below:

<http://connersclinic.com/common-causes-toxins/>

Remarks

Regardless of what you choose about healthcare, I pray that you make wise, rational decisions based on facts (though often hidden) and not fear. You need to take responsibility and not hand it over to any practitioner, conventional or alternative. Get advice from many, weigh it all against their biases, and pray for peace about your decisions.

Kevin Conners, Pastoral Medical Association, Fellowship in Integrative Cancer Therapy and Fellowship in Anti-Aging, Regenerative and Functional Medicine, both through the American Academy of Anti-Aging Medicine.

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