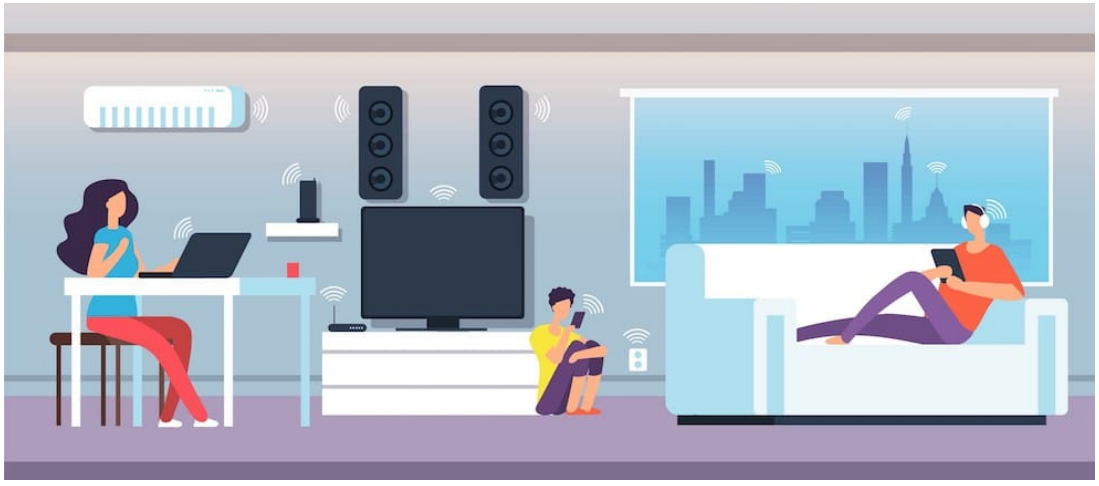
Does Exposure to EMFs Pose a Serious Health Risk?

In AMC's fictional cable TV series *Better Call Saul,* Saul's older brother, Charles Lindbergh "Chuck" McGill, is convinced he suffers from electromagnetic hypersensitivity (EHS) – often described as an "allergy" to electric and magnetic fields. Symptoms include anxiety, depression, headaches, itchy skin, blurred vision, and heart palpitations.

The condition forces Chuck to move to an electricity-free home, using gas lamps for light and foregoing many other modern conveniences. Visitors, including Chuck's younger brother Jimmy, are forced to place their electronic devices in the mailbox and ground themselves to discharge any static electricity before entering his home. Chuck even wraps himself in what Jimmy describes as a "space blanket" to shield himself from any electromagnetic fields (EMFs).



Fast forward to the real world, where the introduction of 5G networks promises to deliver ultrafast data and connectivity to our mobile devices, and Chuck's precautions *seem*fairly sensible – especially when you consider EMF radiation has been implicated

as a possible cause of anxiety, depression, fatigue, and even cancer in humans, along with the deaths of large populations of bees and birds near 5G cell phone towers.

However, the truth about EMFs and their potential for causing illness in humans is far less dramatic. In this post, we separate fact from fiction and present practical precautions for keeping you and your family safe and healthy.

What are EMFs?

Electromagnetic fields (EMFs) are invisible energy waves produced through the motion of electrically charged particles. Sources of EMFs can be divided into two categories:

- **Natural:** Natural sources of EMFs include electrical charges in the atmosphere associated with thunderstorms; magnetic fields created by planets, stars, and moons; radiation from the sun; static electricity; and the body's own electro-chemical reactions.
- **Human-made:** Sources of human-made EMFs include X-rays, power lines (outside and inside homes and businesses), TV and radio station frequency emissions, mobile cell phone towers, and Internet routers.

Diving a little deeper, EMFs can be categorized as ionizing and non-ionizing:

- **Ionizing:** Ionizing EMFs carry enough energy to break bonds between molecules. Sources of ionizing EMFs include radioactive materials, cosmic rays (such as those from the sun), and X-rays.
- **Non-ionizing:** Non-ionizing EMFs do not have enough energy to break molecular bonds. Sources of non-ionizing EMFs include electrical power lines, microwaves, and TV and radio frequency signals.

Ionizing EMFs have a much greater potential than non-ionizing EMFs for negatively impacting health.

Finally, EMFs can be categorized by frequency:

- **Extremely low frequency (ELF):** EMFs with frequencies up to 300 Hz are considered ELFs. Sources of ELFs include the power supply and most electrical appliances in your home.
- **Intermediate frequency (IF):** EMFs with frequencies from 300 Hz to 10 MHz are considered IFs. Sources of IF include computer screens, anti-theft devices, and home and industrial security systems.
- **Radio frequency (RF):** EMFs with frequencies over 10 MHz are considered RFs. Sources of RFs include radio, television, and radar antennas; cellular telephone towers; and microwave ovens. These fields induce currents in the human body, and if the signal is strong enough, they can produce biological effects such as heating and electrical shock. However, RF signals need to be far stronger than those normally occurring to produce these effects.

How dangerous are EMFs?

EMFs have the potential to negatively impact the nervous system and damage cells, which can create or perpetuate common health problems, including poor sleep, abnormal cell growth (cancer), anxiety, depression, fatigue, and pain. However, health effects vary considerably depending on a variety of factors, including the following:

- **A person's sensitivity to EMFs:** Some people are more sensitive than others, as was clearly the case with Chuck on *Better Call Saul*.
- **EMF frequency and amplitude:** Stronger EMFs (higher frequencies and amplitudes) have a greater potential for creating negative health effects. However, most people are

generally exposed the weaker EMFs that have not been proven, so far, to have a negative impact on human health.

- **Distance:** EMFs are strongest closest to the source and weaken with distance.

When it recently weighed in on the question about the dangers associated with EMFs, the World Health Organization (WHO) concluded, “There is no doubt that short-term exposure to very high levels of electromagnetic fields can be harmful to health.” However, “Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health.”

So, to answer the question “How dangerous are EMFs?,” you really

need to look at your exposure and how sensitive you are to EMFs. For example, if you work in or near a server room or battery backup (inverter) room, or you live very close to power lines, your exposure to EMFs may be high enough to cause health issues.

Staying healthy in a toxic world

We are surrounded by power sources, electronic devices, cell phone towers, TV and radio broadcasting stations, and other sources of EMFs in addition to natural EMFs. Even if you move to the country and wrap yourself in a space blanket, you cannot avoid EMFs, which may or may not be the cause of any health issues you have. In addition, in today's world, you are exposed to many other environmental toxins beyond EMFs. The keys to staying healthy are to 1) avoid the bad stuff as much as possible and 2) give your body what it needs to maintain optimum health.

With EMFs specifically, you can reduce your exposure by taking the following sensible precautions:

- Scale down your use of microwave ovens.
- Turn off your Wi-Fi router before bedtime.
- Keep your cell phone on airplane mode as much as possible.
- Limit your use of wireless devices to certain rooms in your home, preferably not the bedrooms.
- Never carry your cell phone or other Internet-enabled device close to your body (for example, in a pocket).
- Use the speaker phone as much as possible to keep the cell phone at a safer distance from your head and body.
- Take outdoor (nature) breaks and leave your electronic devices behind.

When exposed to EMFs, your body must work harder to maintain homeostasis (*i.e., a state of stable equilibrium*), so, in addition to taking the sensible precautions above, make sure

your body has the nutrients it needs to support healthy cells and cellular functions. When you become a patient of our Tampa Functional Medicine practice, BioDesign Wellness Center, we help to ensure you are sufficient in all your vitamins and minerals. For example:

- We use SpectraCell labs to check micro-nutrient levels (vitamins and minerals) and recommend any nutritional supplements necessary to address any deficiencies.
- We also recommend that you:
    - Drink plenty of filtered water
    - Keep your blood sugar under control (we can help with this)
    - Support your nervous system with quality supplements such as phosphtidyserine and choline

Keep in mind, however, that achieving and maintaining optimum health and fitness requires more than addressing potential threats from EMFs. Toxins in foods, beverages, and the air, along with other environmental toxins, may actually pose a greater threat. At BioDesign Wellness, we conduct a thorough initial evaluation and continue to monitor your health and fitness to address any and all conditions that may cause or contribute to illness. Our focus is to provide your body with everything it requires to enable you to achieve your optimal health and fitness.

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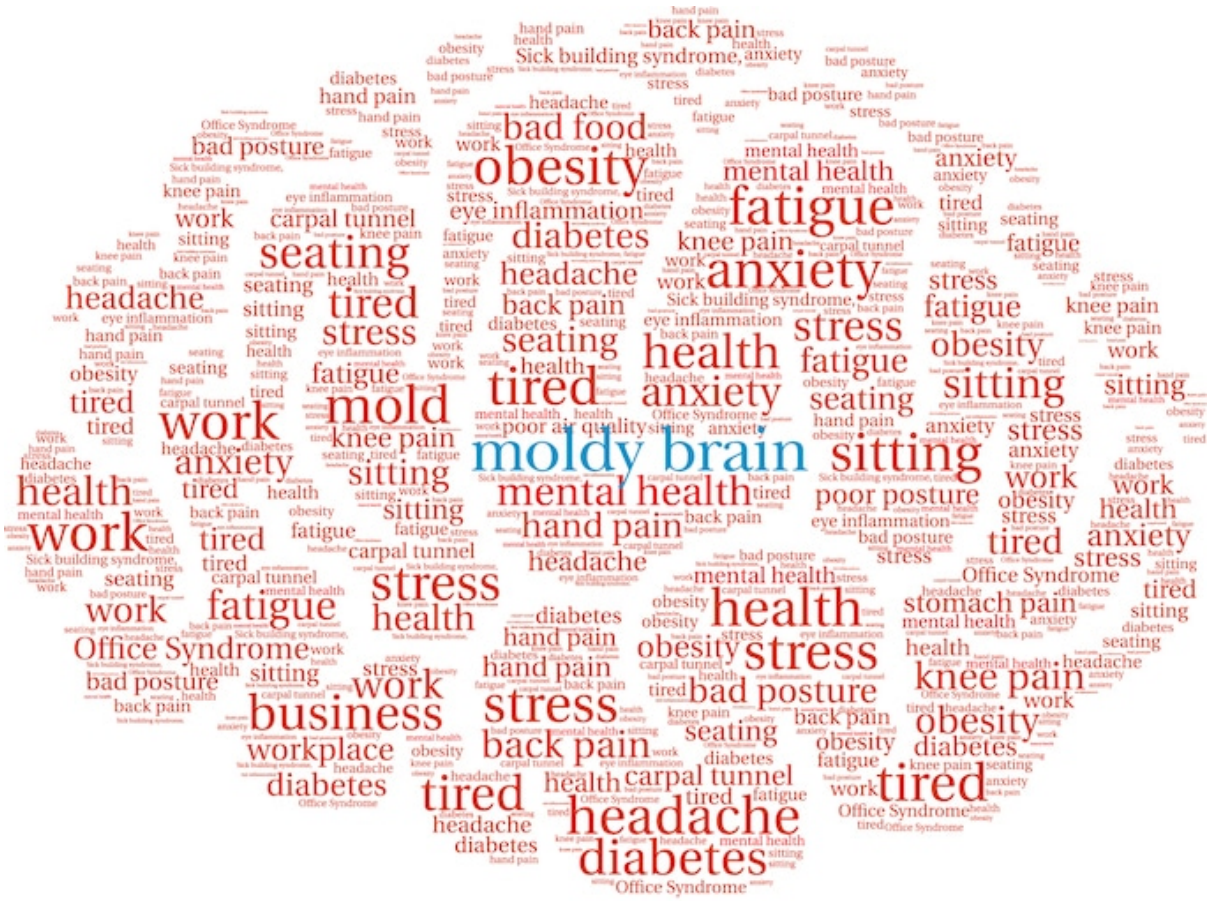
Psychiatric Illness or Moldy Brain?

Many people diagnosed with a mental illness or other psychiatric condition tell similar stories. They visit their primary care physician complaining of anxiety, overwhelming sadness, fatigue, joint or muscle aches and pains, brain fog, and other general symptoms. Their doctor orders a limited series of lab tests, examines the results, and finds "nothing wrong." They are then either given a diagnosis on the spot or referred to a psychiatrist.

Ultimately, they are told they have depression, anxiety, chronic fatigue syndrome, fibromyalgia, or some other diagnosis that doesn't reveal what's really going on or how to cure it. They are sent home with one or more prescriptions for antidepressants, pain relievers, and other medications that, at best, provide only temporary relief. Sometimes the medications provide no relief or even make the condition worse.



The story changes only when a patient is fortunate enough to encounter a doctor who understands the effects of environmental toxins on the brain… a doctor like our own Dr. Matt Lewis, or one like Mary Ackerley, MD – a board certified integrative and holistic physician as well as a classically trained board certified psychiatrist who specializes in the natural treatment of chronic fatigue, mold and biotoxin illness, depression and anxiety. In addition to her education and training as a psychiatrist, Dr. Ackerley (as well as our own Dr. Matt Lewis) has specific training in diagnosing and treating environmentally acquired illness.

(**Editor's note:** *Dr. Lewis and Dr. Ackerley both attended the inaugural ISEAI Conference – **I**nternational **S**ociety for **E**nvironmentally **A**cquired **I**llness –in early-May of this year in Phoenix, Ariz., where Dr. Ackerley was one of the featured*

speakers.)

According to Dr. Shoemaker – a Roswell, NM-based pioneer in mold and biotoxin illness treatment – about 25 percent of the population is susceptible to biotoxins. Coincidentally, as Dr. Ackerley has been known to point out , "When you add up all the psychiatric illnesses that people are exposed to, it's actually about 25 percent of the population that has been diagnosed or is said to have psychiatric illness."

Could it be that depression, anxiety, bipolar disorder, schizophrenia, and other medical conditions that cannot be tested for, such as chronic fatigue syndrome and fibromyalgia, may actually be related to infections or environmental toxins?

Although we here at BioDesign Wellness cannot claim that all of these illnesses and certain others are caused solely by biotoxins, biotoxins seem to contribute significantly. The underlying mechanism seems to be that infections and/or biotoxins cause neuro-inflammation, which may be at the root of numerous brain disorders, including mood disorders (depression and bipolar disorder), schizophrenia, Alzheimer's, and other inflammation-related disorders such as chronic fatigue syndrome and fibromyalgia.

Case Study

To see this in action, it's helpful to review one of Dr. Ackerley's very first case studies showing a connection between biotoxins and psychiatric illnesses:

- A woman in her seventies who was usually "pretty well put together" arrived for an appointment "disheveled and confused." She had trouble remembering how to get to the office. She had referred herself to an ears-nose-and-throat (ENT) doctor because her sinuses were acting up and

had seen a dermatologist for a strange rash on her shins. She was also having aches and pains.
- Dr. Ackerley was so concerned at one point that she made a note about calling the patient's sons to discuss getting her into assisted living.
- At one point, Dr. Ackerley asked if there was anything new happening in her patient's life. Her patient said that the only thing was that she and her husband decided to renovate their home, and all the walls were being torn out. She could smell the mold, and mold had been found behind several walls.
- Dr. Ackerley decided to try her patient on *cholestyramine* – a medication typically prescribed to lower cholesterol but is also effective in binding to biotoxins, so the body can flush them from the system.
- Three weeks later, her patient came back "looking like a different person." She was on time, alert, and "put together." She was coherent and neatly dressed.

The Inflammation-Brain Connection

What fascinates Dr. Ackerley is that so many psychiatric illnesses are related to inflammation. What fascinates us at BioDesign Wellness Center is that so many illnesses, psychiatric and otherwise, are related to inflammation and that the underlying cause is often an infection or an exposure to environmental toxins along with a genetic inability to flush those toxins from the body. (*Approximately 25 percent of the population has one or more genetic anomalies that interfere with the body's ability to detoxify itself*.)

Infections and toxins that are well known for creating psychiatric complications include the following:

- **Lyme disease** (from tick bites).
- **Streptococcus infections** not treated properly, which can

lead to obsessive-compulsive disorder – Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections (PANDAS).

- **Encephalopathies** such as Rocky Mountain Spotted Fever that get into the spinal cord.
- **Toxoplasmosis**, associated with cats, is related to an increase in schizophrenia and in suicides. Toxoplasmosis may even trigger a change in personality.
- **Toxic mold**. A study conducted in Europe found the level of depression in people living in visibly moldy households was about 34 to 40 percent higher than for residents living in mold-free dwellings.

Inflammation in the brain can be initiated by certain infections or by exposure to mold or certain other toxins, producing symptoms characteristic of one or more psychiatric illnesses. A person may even be diagnosed as having a psychiatric illness, even though that is not what is really going on. The root cause is infection or toxins causing inflammation in the brain and possibly throughout the body's central nervous system (CNS). We often see patients here at our Tampa Functional Medicine practice who have been exposed to mold with additional neurological symptoms, including numbness or tingling in the extremities (hands or feet), tremors, fatigue, or migraines.

Cytokines in Depression and Alzheimer's

Several studies provide evidence of a connection between depression and significantly higher concentrations of inflammatory *cytokines*, including tumor necrosis factor and interleukin-6.

Cytokines are various substances – such as interferon, interleukin, and growth factors – that some immune system cells release to trigger responses in other cells. Some cytokines are inflammatory, whereas others are anti-inflammatory. When the

immune system is functioning properly, the two types of cytokines regulate inflammatory responses in the body.

Cytokines also tend to inhibit the expression and function of serotonin – a neurotransmitter that plays a key role in regulating mood. Many antidepressants work by increasing the level of serotonin in the brain, but they do not target the underlying inflammatory responses that negatively impact serotonin expression and function.

Inflammatory cytokines play a role in Alzheimer's disease. At least one study that examined the cerebral spinal fluid in people with Alzheimer's found higher concentrations of the cytokine TGF-beta, which is often found to be elevated in people exposed to and made ill by mold.

Neuro-inflammation = Leaky Brain

Inflammation in the brain is often referred to as "leaky brain" because what happens in the brain is similar to what happens in the gut with leaky gut syndrome – protective membranes become more permeable, allowing substances to pass through that should be blocked. Cytokines increase the permeability of the blood-brain barrier, increasing the stress response in the brain, which is likely to cause a breakdown of tryptophan, an essential building block of serotonin.

Cognitive Impairments Related to Neurotoxins

Dr. Ackerley often sees patients in her practice in Phoenix, Ariz., with symptoms of depression or anxiety who complain of fatigue and then add, "*My brain just doesn't work the way it used to*." We have observed this in our practice in Tampa, as well. Many BioDesign Wellness patients report brain fog, impaired memory, or an inability to think clearly. The root cause of this cognitive decline is often found to be associated

with inflammation triggered by biotoxins found in a water damaged building. In fact:

- Several studies link mold exposure to cognitive impairment, and at least one study shows that mycotoxins excreted by mold are neurotoxic.
- One toxic mold – in particular, Stachybotrys – releases a mycotoxin called Trichothecenes, which kill olfactory neurons.
- Fusarium, a soil fungus, releases the mycotoxin T-2, which indiscriminately kills normal brain cells.
- Some species of Fusarium release the mycotoxin Fumonisin, which induces neuronal degeneration in the cerebral cortex—the part of the brain responsible for executive function. People who suffer from cerebral cortex degeneration may blurt out whatever they are thinking, ask the same questions over and over, have trouble solving problems or making decisions, or appear angry or irritable.
- Aspergillus, a fungus whose spores are present in the air we breathe, produces OchratoxinA (OTA), a naturally occurring foodborne mycotoxin found in a wide variety of agricultural commodities. OTA depletes striatal dopamine; this depletion is highly associated with mood disorders (depression and bipolar) and with movement disorders such as Parkinson's.

A study done in Poland that followed nearly 300 children showed that children living in homes with visible mold experienced a decline of 10 IQ points over six years compared to children who had not been exposed to mold. Children who had been exposed to mold for three years and then moved to homes without mold experienced a decline of five points.

Diagnosis: Is It a Biotoxin Illness or Something Else?

When a patient has symptoms of a mental illness, or brain or psychiatric disorder, one of the first determinations a doctor needs to make is whether the symptoms are related to an underlying infection or biotoxin exposure. Unfortunately, most doctors do not even consider the possibility of infection or biotoxin exposure. They may suspect mold if a patient has sinusitis, asthma, or chronic lung infections, but they don't suspect mold in relation to other conditions, such as depression, bipolar disorder, anxiety, chronic fatigue, or fibromyalgia.

At BioDesign Wellness Center, we are one of the few exceptions. In fact, during our initial examination, we screen patients for tick bites, exposure to mold, and previous infections that may have triggered certain symptoms. We are aware that neuro-inflammation is common among people experiencing depression, anxiety, fatigue, generalized pain, and other symptoms associated with psychiatric disorders.

When a patient experiences symptoms consistent with certain psychiatric conditions and/or chronic fatigue syndrome, fibromyalgia, or other vague diagnoses, we consider biotoxin illness a likely cause or contributing factor, especially under these conditions:

- The patient has no family history of psychiatric illness.
- The age of onset (of symptoms) is over the age of 50.
- Symptoms persist even when the patient is taking the prescribed medication(s).
- The patient has been made to feel like a hypochondriac – that all of their symptoms are "in their head."

Unlike conventional doctors, who are unlikely to consider mold or tick-borne illness, we routinely ask our patients about any exposure they may have had at home, work, or school to visible mold or hidden mold that is common in water damaged buildings.

We also routinely ask about any tick bites the patient may have had in the past and about any exposure to areas where Lyme disease is prevalent – a person may have gotten bitten and not even realized it.

If we suspect a biotoxin-related illness, we then run tests to look for markers that indicate the presence of the biotoxin(s) or the body's reaction to the biotoxin(s).

Treatment for Biotoxin-Related Illnesses

At BioDesign Wellness, we have several treatments protocols for people exposed to water damaged buildings or other sources of biotoxins. We usually start by preparing the body to detox, which accounts for making sure vitamin, mineral and macronutrients are adequately being absorbed and utilized by the body. For some this may require healing the gut or supporting the liver.

The Shoemaker Protocol is a 12-step process for eliminating biotoxins and any infectious agents that are releasing biotoxins into the body. It involves addressing the source of the exposure (*for example, having mold professionally removed from the home*), detoxing with Cholestyramine, eradicating any antibiotic-resistant bacteria (referred to as MARCoNS) from the sinuses, correcting elevated serum anti-gliadin antibodies through avoidance of gluten, correcting androgen hormone levels to support the endocrine system, and several additional steps to improve cell function and reduce inflammation.

Diet plays a key role. People who suffer from biotoxin-related illnesses need to avoid sugar and simple carbohydrates that the body quickly converts to sugar. They also need to avoid gluten. Patients are typically required to adopt a very low-carb diet similar to the ketogenic or paleo diet – whole foods (no processed foods), high fat, moderate protein, and very low in

carbohydrates.

Certain supplements also help to dampen the body's inflammatory response, such as turmeric, high-quality fish oil, magnesium, vitamin D, and probiotics.

Get Help

If you suspect you may be suffering from a biotoxin-related illness or you have been bouncing around from one doctor to another with little or no explanation or relief from your symptoms, we encourage you to schedule an appointment to see a doctor who has experience in diagnosing and treating biotoxin-related illnesses. This is not something you can or should do on your own. You need someone who understands these types of illnesses, knows which lab tests to order and how to interpret the results, and is well trained on the various medications, supplements, diets, and lifestyle adjustments that are most effective in restoring health.

Keep in mind that you won't start feeling better if your doctor cannot identify and treat the underlying cause. If conventional medicine is not delivering the outcomes you desire and deserve, try a different approach – one that focuses on addressing the underlying cause and not just masking the symptoms.

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Preventing and Reversing Dementia and Alzheimer's Disease

What do Rita Hayworth, Perry Como, Norman Rockwell, Rosa Parks, and Sandra Day O'Connor all have in common? Aside from being household names who made their mark on society, each suffered from a diagnosis of *Dementia* and/or Alzheimer's Disease.

Dementia is a syndrome (a symptom cluster), characterized by a decline in cognitive function (thinking and memory), beyond the degree associated with normal aging. Although it affects mostly older people – at least count, 50 million people worldwide – it is not a normal part of aging and is certainly not inevitable. Even better news, for those experiencing cognitive decline and their family members and caregivers, is that dementia can be prevented; and now, based on new research and clinical trials, even reversed with proper interventions when started early enough.

Symptoms of Dementia

Symptoms of dementia are commonly broken down in to the following three stages, as presented by the World Health Organization (WHO):

Early stage:

- Forgetfulness
- Losing track of time
- Becoming lost in familiar places

Middle stage:

- Forgetting events and people’s names
- Becoming lost at home
- Having increasing difficulty with communication
- Needing help with personal care
- Experiencing behavioral changes, including wandering and

repeated questioning

Late stage:

- Becoming unaware of the time and place
- Having difficulty recognizing relatives and friends
- Having an increasing need for assisted self-care
- Having difficulty walking
- Experiencing behavioral changes that may escalate and include aggression

Forms of Dementia

While Alzheimer's is the most common form of dementia (it currently affects an estimated 5.7 million Americans), many other forms of dementia exist, including the following:

- **Creutzfeldt-Jakob disease:** A fatal degenerative brain disorder.
- **Lewy body dementia:** The second most common form of dementia (after Alzheimer's) occurs when protein deposits, called Lewy bodies, form on nerve cells in brain regions involved in thinking, memory, and movement.
- **Frontotemporal dementia:** Any of a diverse group of uncommon disorders that harm the brain's frontal or temporal lobes – areas associated with personality, behavior, and language.
- **Huntington's disease:** A genetic disorder that causes the progressive breakdown of nerve cells in the brain.
- **Posterior cortical atrophy:** The gradual and progressive degeneration of the brain's outer layer.
- **Parkinson's disease:** A progressive nervous system disorder that results in involuntary movement, often tremors.
- **Vascular dementia:** Brain damage caused by impaired blood flow to the brain.
- **Korsakoff syndrome:** Amnesia caused by a vitamin B1

(thiamine) deficiency associated with long-term alcohol abuse.

Causes of Dementia

Although age is the strongest known risk factor for dementia, the syndrome is not a natural consequence of aging. Some research shows a relationship between dementia and certain life-style factors, including the following:

- Physical inactivity
- Obesity
- Unhealthy diet
- Tobacco use
- Alcohol consumption

Research also suggests a connection between dementia and other conditions, such as diabetes and midlife hypertension.

Preventing and Reversing Dementia

People who are suffering cognitive decline for whatever reason will be happy to hear that dementia can be prevented or even reversed with the right interventions, assuming treatment begins early enough. While no single pharmaceutical medication is available to stop or slow the progression of dementia, a combination of diet and lifestyle changes, nutritional supplements, exercise, sleep optimization, and in some cases pharmaceutical medications has been shown to be effective.

Because Alzheimer’s disease is the leading cause of dementia, much of the research on dementia focuses on the causes and treatment of Alzheimer’s. It is important to understand that there are four major types of Alzheimer’s distinguished by their underlying mechanisms:

- Inflammation

- Atrophic or hormonal, caused by hormone or nutrient deficiencies or processing difficulties for vitamin D
- Glycotoxic – a mix of inflammation and insulin resistance, which can be thought of as diabetes of the brain
- Toxic, due to environmental toxins including heavy metals or mold

In addition, some people carry the APOE4 gene, which increases their susceptibility to developing Alzheimer's. However, given appropriate lifestyle modifications and the willingness to understand that Alzheimer's is similar to diabetes, you can avoid or reverse the decline in brain health.

Preventing and reversing cognitive decline starts with testing for genetic susceptibility and understanding your vitamin, hormone, insulin, cortisol, and environmental exposures, and how all this is impacting your body and brain.

Diabetes, heart disease, arthritis, Alzheimer's, and many other chronic illnesses are all inflammatory conditions. They are all connected. Don't think because you have a blood sugar condition you don't have a brain condition, as well; it just takes longer to occur and diagnose.

Functional Medicine's Approach to Treating Dementia

At BioDesign Wellness Center, we practice functional, integrative medicine with a focus on restoring health to all of the body's systems and the interactions among those systems. We understand that the mechanism underlying many chronic health conditions is related to chronic, systemic inflammation. Many of our treatment recommendations center on restoring healthy immune response to reduce inflammation through diet, lifestyle, and nutritional supplements, along with medications when necessary.

The earlier you embrace the functional medicine model of healthcare, the more pain and suffering you can avoid for yourself and your family. Families are crushed when any member suffers from debilitating cognitive decline, but there is hope. We now believe dementia and Alzheimer's can be prevented and even reversed, but early intervention is key. If you notice the early warning signs, please contact us to schedule an initial consultation. Don't wait until it is too late.

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