Mary Ackerley: The Brain on Fire: The role of toxic mold in triggering psychiatric symptoms

Editor's Note: Dr. Mary Ackerley is an integrative psychiatrist who recently obtained certification in the Shoemaker Protocol used to treat biotoxin-associated illness. She did her M.D. at the University of Maryland; her medical residency at Johns Hopkins; her M.D.H. at the American Medical College of Homeopathy; and her undergraduate degree at Harvard University. She practices in Tucson. The following is an edited, slightly shortened transcript of a recent talk she gave to a group of physicians and researchers interested in the health effects of toxic mold.

I get asked all the time, "How did a psychiatrist get interested in mold?" My interest stems from my clinical experience. As an integrative psychiatrist, I attract people who weren't helped by traditional meds. They go to their doctors, they're given some Zoloft or Prozac or Xanax. It doesn't help and often makes them feel worse, so they seek out someone like me, who's willing to work with different methods.

Although people complain of depression and anxiety, I often find that fatigue and muscle and joint pain are the strongest complaints. Those complaints are usually ignored by traditional busy family practitioners because they lump them all together under the heading "depression."

I was doing a CME credit on depression, and the case study was a woman with joint and muscle pain, particularly in the back, fatigue, anxiety and depression. I was supposed to learn to diagnose all these somatic complaints as depression. But in fact, I do the opposite.

Eventually, I began to realize that I was attracting some patients who considered themselves mold patients. They came to me with strange labs and even stranger protocols. I was pretty traditional in looking at it, and I'd say, "I don't know what this stuff means." Then I'd start to work on their depression and anxiety.

I grew up on Long Island on the East coast, and I thought that mold was natural and wasn't a big deal. Every basement smelled moldy, didn't they? But I was kind of curious, and eventually, one of my patients gave me one of Dr. Ritchie Shoemaker's books.

First experience treating mold

One day, a patient that I'd known pretty well for a few years arrived really late for her appointment. She was a woman in her seventies and she was usually pretty well put together. Now, however, she was disheveled and confused. She told me she couldn't even remember how to get to the office, which was very strange. She'd had the same problem with another physician and drove around the block for an hour, yet couldn't remember how to get to his office, which she'd visited several times before.

I was concerned. She'd been seeing me for mild depression and a tremor. I'd recommended some supplements that had been helping with the depression, but the tremor hadn't improved.

She mentioned that over the past few weeks, she'd seen a few other doctors. She had referred herself to an Ear, Nose and Throat specialist because her sinusitis was acting up, and to a dermatologist because she'd developed a strange rash on her shins. She also had some aches and pains.

I was so concerned that I made a note to call her sons to discuss moving her into assisted living.

I asked if anything new was happening. She said the only thing that had changed in her life was that she'd decided to renovate her house. As the walls were being torn out, she smelled mold, and workers had found mold behind several walls. I thought, "Oh, okay, mold. I've heard of this before." Finally it occurred to me that maybe this was a mold patient.

We read Dr. Shoemaker's book *Mold Warriors* together. When we found the list of the symptoms, she said, "Oh, I have ice pick pains" and "I have brain fog, and I've been urinating a lot, and my stomach's been hurting." In fact, she'd made an appointment to see a gastrointestinal specialist to get a workup for stomach pains.

She presented to me with confusion, severe brain fog and increased depression. But she had multiple symptoms and had seen many doctors now. Nobody had been able to help her with anything. We read a little further in Dr. Shoemaker's book, and I said, "Cholestyramine seems pretty innocuous to use, so let's try it." I gave her a prescription for cholestyramine (CSM) and told her to take it three to four times a day.

She came back three weeks later and I saw a different person. It was startling. She was on time for her appointment, looking alert and put together. She was coherent and neatly dressed. The only thing that had changed was adding cholestyramine. I was impressed that something that I was calling pre-dementia had been completely eradicated.

Inflammation and psychiatry

I got more interested in mold and began to read Dr. Shoemaker's work to learn about biotoxin illness. After learning how to do these strange labs, I found that a high percentage of my integrative psychiatric patients had some degree of biotoxin illness. They had haplotypes that meant they were susceptible to becoming ill after mold exposure and/or elevated cytokine levels.

That wasn't anything that I'd ever been taught in medical school or continuing education, or in any of the alternative educational experiences that I'd pursued. I became fascinated and began to explore the evidence-based literature for some explanation.

What I found is that neuroinflammation — which is mediated by a variety of mechanisms including cytokines — is widely documented in the psychiatric literature. Despite that, most clinicians don't know about it.

One fascinating thing I'd like to point out: Dr. Shoemaker has often said that it's about 25% of the population is susceptible to biotoxin-associated illness. When you add up who's been diagnosed with a psychiatric illness, it too adds up to about 25% of the population. Is that a coincidence? Perhaps. But it's a very interesting coincidence to me. Because there's an extensive, robust line of research that neurotransmitter theory alone is insufficient to explain most psychiatric illness, although it does sell SSRIs quite well.

Autoimmune disease, infectious illness and mood disorders

There's some recent research that's been published on inflammation and depression. It's from Denmark, which is considered a homogeneous population. They had access to records of 3 million people.[1]

They found that if you had a diagnosis of either autoimmune disease — which would include things like Hashimoto's or rheumatoid arthritis or Sjogren's — it increased risk of being diagnosed with a mood disorder like depression by 45%. If you'd been hospitalized for some sort of infectious illness, that increased your risk of having mood disorders by 62%. And if you had both of those things happen to you, you doubled the risk of subsequently being diagnosed with a mood illness.

Infections and toxins

Some of the infections and toxins that we know are associated with depression and anxiety are molds. Neurological Lyme is also well known for creating psychiatric complications. There is good evidence that streptococcus infections not treated properly can lead to obsessive-compulsive disorder, also called PANDAS.

Another source of psychiatric illness are encephalopathies like Rocky Mountain Spotted Fever that get into the spinal cord. Later or at the same time, people are diagnosed with psychiatric illnesses, including mania.

Toxoplasmosis is associated with cats. There's a large literature that it's associated with an increase in suicides. It's also increased in schizophrenia. This fascinating research has also been shown to change the personality of people infected with it.

The ways that we can see this leading to an inflammation of the brain would be cytokines such as MMP9 and TGF-beta; vasculitis, which is inflammation of the blood vessels; and microglial activation, which are the immune cells of the brain. Autoimmune disease such as Hashimoto's can lead to an encephalopathy. And then something that we're just going to call excitotoxicity, which is an increase in glutamate in the brain.

Mold and depression

There's one study out on mold and depression that was done in Europe on 6,000 European adults.[2] The researchers tested for mold by looking at the house, and if they saw mold on the walls or they smelled it strongly, they considered that a moldy house. There were no ERMI's or HERTSMI's done.

Surveying people about symptoms of depression, they found that the level of depression in people living in visibly moldy households was about 34-40% higher than for residents in mold-free dwellings. That's a good study in a good journal — good evidence that mold increases the probability of causing the symptoms of depression.

Sickness behavior

If you have a number of somatic complaints that a doctor cannot find any physical basis for — or even if they can find a reason for why you have back pain or other problems — and you have any sort of sad mood or don't want to be out with others, you're going to be diagnosed as depressed or anxious and given an antidepressant.

But what I want to distinguish here is something called “sickness behavior” that’s very similar to what we diagnose now in DSM-5 as depression.[3] It’s well known in the animal literature.

Many of you own a cat. Have you ever had the following experience? You go to feed your cat and you call her. You don’t see her. You look at her food bowl and realize she hasn’t eaten any food in a few days. You start to get worried and look all over the house for the cat. Finally you find her in some closet you even forgot you had, way in the back. You shine the flashlight and see the eyes, and you think, “Oh, there she is.” You reach down to pet her and she hisses and backs away, further back into the corner. You bring her some food or water and she refuses it. You bring some of her little toys that usually make her happy and there’s no response.

What do you do? Do you call the cat psychic, which we have a lot of out here on the West coast? Probably not. You probably do what most people do, which is to call the vet and reach back in there with some gloves to pull her out because she’s probably pretty angry, and put her in a cat cage, and bring her in to the veterinarian to find out what’s wrong.

There’s always something wrong when a cat does that. The cat is exhibiting sickness behavior, which is associated with high cytokines. We measure it in mold illness with MMP9 and TGF-beta and C4a, in particular.

But in people, when we see the same behaviors — loss of appetite, reclusiveness, lack of pleasure in usual things, fatigue, irritability — we label that as depression.

What I find many times when talking to patients who come to me for depression is that they initially came to their doctors complaining of not feeling well, hurting, not wanting to do things, not having energy. And because nobody could find a physical basis looking at things in a very traditional way, these patients were much told, "We don't know what's wrong with you. This is all in your head. I think you'd better see a psychiatrist."

I'm one of those psychiatrists people come to see. It's a bit of a joke around here that when people finally break down and consult a psychiatrist, it's ironic that they find the one psychiatrist who says, "No, this isn't in your head at all. You probably have biotoxin illness."

Cytokines and depression

Let's talk more specifically now about cytokines and depression. They've studied major depression and cytokines. One study found at least 24 reports showing significantly higher concentrations of the inflammatory cytokines in people with depression.[4]

In these studies, they looked at tumor necrosis factor and interleukin-6 levels in depressed subjects. Dr. Shoemaker hasn't found those to be particularly useful or easy to measure because of various technical difficulties, but they are associated with some of the things that he does measure. So there's some of your first evidence that depression seems to be a pro-inflammatory state in many people.

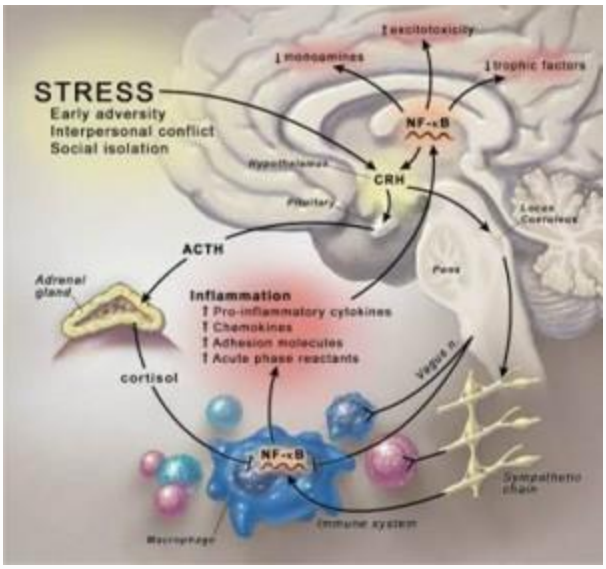
Treatment-resistant depression is the technical term for what people have when they come to see me. After two trials of antidepressants with no response, you're usually considered to be "treatment-resistant." I prefer to call that "incorrectly diagnosed." And then you're referred out for more specific treatment, usually to a psychiatrist.

Here's more evidence that cytokines are associated with treatment-resistant depression.[5] They actually tend to decrease the expression and function of serotonin. Serotonin is one of the neurotransmitters that's popularly associated with depression but is probably not the cause of depression.

Vaccine response

There's another study about depression and immune function.[6] They give adults a vaccine. Those who have been diagnosed as depressed don't respond nearly as well to the vaccine, don't mount the antibody response they're looking for nearly as well as those people who don't have a diagnosis of depression or who have had depression and have been treated successfully. So having depression concurrent with any sort of immune disorder will probably lower your chances of getting treated successfully for the immune disorder as well as for the depression.

Hypothalamic-pituitary axis



Here's some more basic science about what we look for in the brain when we talk about inflammation. This is a diagram of your brain, looking at your hypothalamus and pituitary.

When you look at Dr. Shoemaker's model, he starts with damage in the hypothalamic-pituitary axis. It's that damage that leads to the decrease in hormones that we often see — the decrease in androgens, the decrease in cortisol. Sometimes, as Dr. Shoemaker will say, you'll see an increase in cortisol, which is your body's last fling at trying to correct things before you sink into the decreasing cortisol.

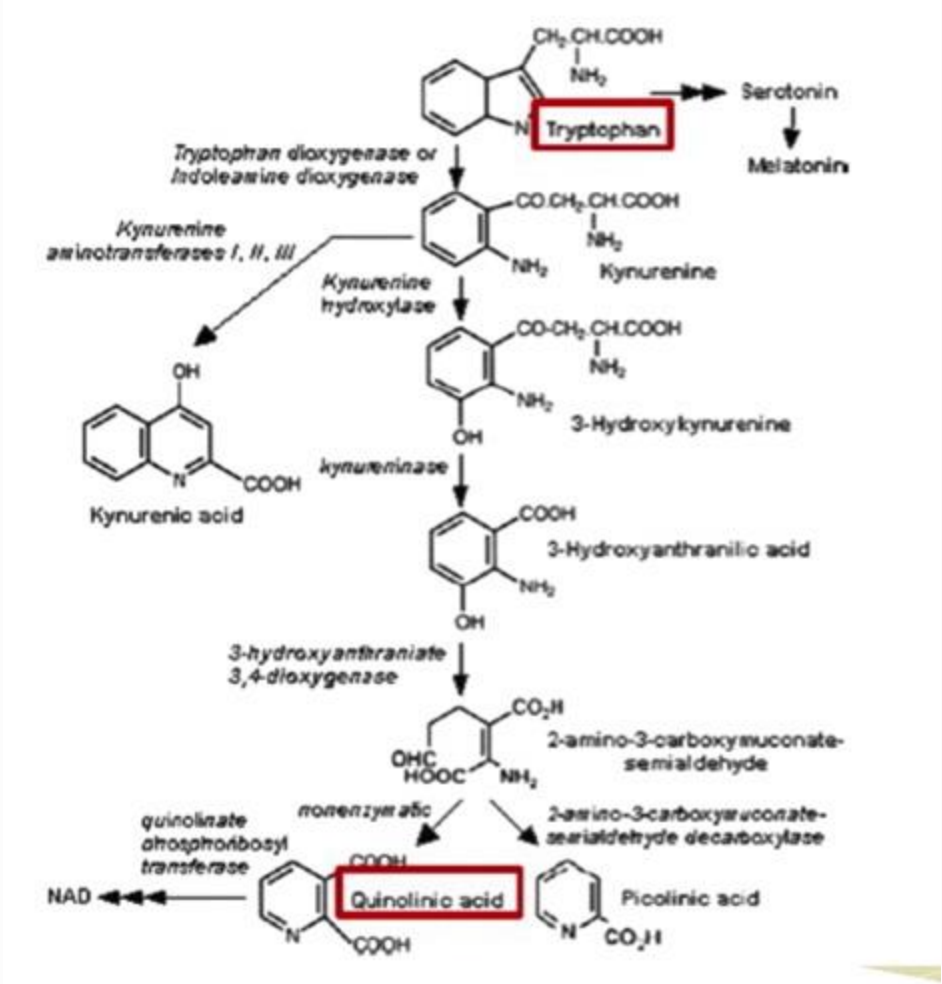
This diagram shows the relationship between cortisol and brain inflammation and the cascade of events that happen subsequent to stress. In this diagram, it's labeled as stress. Stress can be from many different things, such as interpersonal difficulties.

Early adversity is something well studied in psychiatry. Having an abusive childhood is common, more common than anyone would like to think. This leads to changes in our ability to secrete cortisol. This leads to changes in cytokines of something called nuclear factor kappa beta; it flourishes, which increases inflammation in the body.[7] [8]

The inflammation in the body leads to excitotoxicity. That's another word for anxiety, really. It decreases neurotransmitters and also causes depression.

There are several agents that can cause this kind of depression besides stress. Biotoxins are big ones. Others are heavy metals, food allergens and viruses.

Kynurenine pathway



This diagram shows brain secretions causing inflammation, otherwise known as excitotoxicity in the brain. The end result is an increase in depression and anxiety.

This is the kynurenine pathway. It's a little complicated, but what it is showing is that in the presence of cytokines, we have tryptophan, which is the precursor for serotonin. That's the neurotransmitter associated with depression, that all of the SSRI's that are antidepressant agents affect.

Tryptophan is decreased or degraded by something called quinolinic acid, which is highly inflammatory. It's involved in Alzheimer's, Parkinson's, Huntington's, even suicide. It's very potent and is well studied as a cause of inflammation leading to neuropsychiatric symptoms.

Here's a recent study looking at the cerebrospinal fluid obtained through a spinal tap of people who made suicide attempts and survived.[9] They found that there was a significantly increased amount of quinolinic acid in the cerebrospinal fluid of these patients.

One of the reasons this happens is that it antagonizes the glutamatergic pathway. It involves the NMDA receptors, which are highly associated with inflammation, psychosis actually, and probably suicide.

This study concluded that there's a low-grade inflammation in the brain in suicide victims.

I have patients who will walk into moldy places and their first sign that something is wrong is that they start thinking about suicide. I see that fairly frequently.

*This is not just psychological.*There's a state probably of inflammation associated with thinking suicidal thoughts. If you have suicidal thoughts, that's something you need to be talking to someone about, because there are treatments. It's preventable.

Everyone can find reasons why their life is worth living. Knowing that something in the brain is causing that problem sometimes helps people shrug it off and say, "Here come those silly thoughts again. Let me try to figure out what's going on. Maybe I'm being exposed to mold. Maybe I'm not doing my mold treatments the way that I should be."

Leaky brain

Another term for neuroinflammation among alternative integrative doctors is "leaky brain."It's similar to leaky gut in that membranes that are supposed to protect one part of the body don't work and become increasingly permeable, letting in substances that should have stayed outside.

Cytokines have been shown to increase the permeability of the blood-brain barrier membrane. There's several ways they do it. Inflammatory cytokines like IL-1, IL-6 and TNF, MMP9 and TGF-beta; as well as bacterial toxins (lipopolysaccharides, LPS) have all been associated with increasing the permeability of the brain.

When we increase the permeability and we increase the stress response of the hypopituitary axis, these factors probably lead to a breakdown of serotonin in the brain by breaking down tryptophan.

Thyroid hormones

One other thing that often happens is that cytokines decrease the conversion of T4 to T3. T3 is the active component of thyroid. You can take a lot of T4 (which is known as Synthroid), but if your body isn't converting it to T3, you're not going to get the benefits of thyroid hormone.

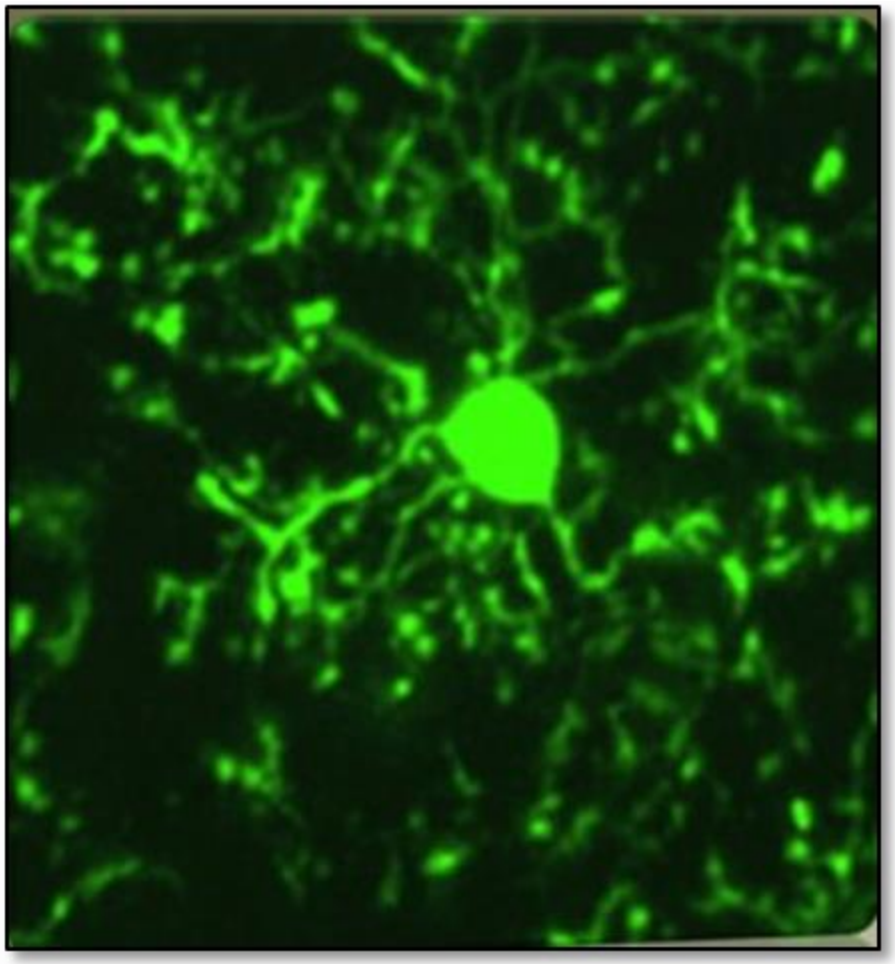
Thyroid hormone is responsible for mood. It's a well-known, standard treatment in psychiatry to add T3 to the treatment regimen of those who have treatment-resistant depression, because it often helps.

People who have treatment-resistant depression may have neuroinflammation and aren't converting their thyroid hormones properly. Adding the T3 that their body needs may be all that's necessary to correct the depression.

Psychosis

Psychosis is associated with neuroinflammation. That literature is increasing.[10] I do see people who are psychotic. I'm not going to say that mold causes manic psychosis or depressed psychosis, but I think it clearly exacerbates existing psychosis. Getting people out of exposure and treating the mold seems to restore normal brain function.

Microglia



This shows a picture of microglia in the brain. In the brain, we have not only neurons, which make our neurotransmitters, we have part of the immune system called microglia. They sort of wrap themselves around the neurons. They are the phagocytes or the macrophages, and they basically eat viruses and bacteria. They play a key role in regard to inflammation in the brain.

Research has shown that the microglia are activated by head injury and that persistent activation is highly associated with neurodegeneration, such as happens with Alzheimer's. It's also associated with bipolar disorder.

Bipolar Disorder

Bipolar is also called manic-depression, with alternating moods of depression and mania. There is evidence that bipolar is an inflammatory condition.[11] I have a few bipolar patients in my practice. One had been treated well for a number of years with traditional medications. He clearly has bipolar, as well as a family history of bipolar. He was exposed to toxic mold, most likely through a flood in the house.

There was a poor remediation. I think we all know about poor remediations here, done quickly through commercial companies. That year, his manias began to get out of control; his meds weren't working anymore. He was hospitalized and given three potent IV's of steroids. I think we all know about steroids and mold; it's not a great idea.

He was finally sent to me by his traditional psychiatrist, saying, "We're really not helping him here, let's try something else." I diagnosed him with biotoxin illness. He has two "dreaded" genes.

I'm not going to tell you that adding mold treatment is a miracle, but it is helping and he's beginning to calm down. It's a slow process, especially after having had so much exposure to steroids. He's probably one of the first people I know who's been hospitalized and was carried to a psychiatric ward carrying a copy of*Surviving Mold*, convinced this is part of his problem.

That's just one story. There are several other patients I've treated, although not quite as dramatically. As we begin to treat the bipolar and the mold illness, they're finding clarity of thought and a release from their symptoms that they haven't had otherwise.

Schizophrenia

There's some really good evidence — probably some of the best evidence in psychiatry — that schizophrenia is associated with some sort of infectious agent and with inflammatory conditions.[12]

In a very large recent study of schizophrenics and antipsychotics, one of the most positive findings they found in the whole study was that almost a quarter of the schizophrenics actually had IgA anti-gliadin antibodies, compared to about 3% of the population. And 5% had high tTG antibodies compared to about 0.8% of the comparison group. Those findings were considered significant enough that I believe that NIH is continuing that study and looking at gluten sensitivity in schizophrenics.

The take home thought here is that if you know anyone with a diagnosis of schizophrenia, getting them off gluten may help. It's not a cure, but it may help. Again, it's another psychiatric illness showing an association with inflammation.

Cognitive impairments

I want to talk about cognitive impairments associated with brain dysfunction and with mold.[13] After fatigue, the most common complaint I hear from people who come to me to be treated for depression and anxiety is, "My brain just doesn't work the way it used to."

There are a number of studies validating that observation. Some studies by psychologists show clear cognitive impairment associated with mold.[14] There's also basic science research showing that mycotoxins excreted by mold are clearly neurotoxic.[15]

Trichothecenes such as are made by Stachybotrys actually kill off olfactory neurons. Perhaps that's one of the reasons that we see Multiple Chemical Sensitivity in so many people with biotoxin-associated illness. T-2 from Fusarium kills normal brain cells indiscriminately.

Ochratoxin, associated with Aspergillus, depletes striatal dopamine, which is highly associated with mood disorders and with movement disorders like Parkinson's. It also depletes the hippocampus, which is where our memory becomes involved. That's good evidence that ochratoxin will be damaging the parts of the brain associated with mood and movement disorders.

Executive functioning

There's another mycotoxin called fumonisin, which also induces neuronal degeneration in the cerebral cortex. That's your executive function. Some of the studies in mold and many clinical reports show that patients with what we finally call moldy brain have a loss of executive control.

Executive functioning is the part of the brain that examines information coming in and listens to the different components of the brain.

There's one part of your brain that's more emotional, saying, "I hate that person, that person is really saying things that bother me, I need to tell them how stupid they are." And then there's the executive part of the brain that computes that and says, "You know, it's true, that person is *not* particularly bright, but if we say that, he's the boss and we're going to get into fights, and we might lose our job, and is it really worth it?"

It computes the possibilities and makes a program to follow what would be the most efficacious way to handle the problem.

In people who lose executive control, you'll often find them blurting out exactly what they think, which can make them appear fairly irritable and angry to the rest of the world. You'll also find them asking questions over and over again. Questions are asked and answered, and then five minutes later, the same question is asked again. (FYI: it's not surprising to find so many of these people with lack of inhibition of executive functions have atrophic/small caudate nuclei. We find this using NeuroQuant, a new technology that details volumetric changes in regions of the brain.)

Some of my first mold patients, particularly men, had been referred to me for anger management.

Losing IQ points

There's another study that's come out in the last couple of years that measured cognitive declines in six-year-olds in Poland.[16] They measured the cognitive function of almost 300 kids living in homes with visible mold. The researcher went in, saw mold on the wall and declared it a moldy home.

They were doing this to test for allergens and asthma, but they did psychological testing and found that after six years, the IQ scores of these Polish children had declined 10 points compared to other children followed at the same time who'd not been exposed to mold. Kids who'd been exposed to mold for three years and then gotten out of those homes showed a decline of about five points.

This is a significant decline in IQ. The median IQ was 120, which is actually higher than it is in the U.S. at 100. Losing 10 points is a lot for anyone.

Neuroplasticity

Now we're going to talk about neuroplasticity — gaining it back when you're removed from mold exposures. Don't panic, because our brains are capable of healing when we remove ourselves from exposure and receive appropriate treatment.

There's some research in the Alzheimer's literature linking Alzheimer's to neuroinflammation. There's a study out recently that analyzed cytokines in Alzheimer's disease.[17] Not only do we have the usual cytokines such as IL-6, tumor necrosis factor and IL-1, which are more commonly measured than some of the things we do in the Shoemaker protocol, but you'll see that TGF-Beta 1 is associated with Alzheimer's disease. In fact, when they examined cerebral spinal fluid, they found higher concentrations of TGF-beta. So that's a more direct association with cytokines associated with mold.

Brain changes

Now we get to one of the studies that Dr. Shoemaker has done, which is what I would call a missing link, showing that brains exposed to mold do show brain damage or brain changes.

This is people with elevated TGF-beta and MMP9. Dr. Shoemaker has shown in the NeuroQuant studies[18]that they have frontal lobe, hippocampus and cerebellum swelling, and shrinkage of the caudate. This correlates somewhat with the basic science that I showed you before where mycotoxins do direct damage to the brain.

The frontal lobes are where we find executive function. That's the part of the brain that says, let's stop and think about the implications of thinking this or doing this. Hippocampus is highly associated with mood. Cerebellum is associated with movement disorders. The caudate is very dopamine rich and is highly associated with moods and feeling good.

Most of you have heard about studies of cocaine or orgasm, which are associated with high concentrations of dopamine. We call it our feel-good neurotransmitter. Nobody really wants to have a decrease in dopamine. Dopamine is also involved in movement disorders like Parkinson's.

Diagnosis

All treatment of biotoxin-associated illness starts with diagnosis. Diagnosis is difficult since we're not routinely taught what's involved in a biotoxin-associated illness. In fact, most doctors still believe that mold isn't really a big deal, that maybe if you're exposed to gross amounts of mold, and you inhale it, and you have asthma or pulmonary problem, *then* we can say that mold has been a problem. But anything else, like fibromyalgia, chronic fatigue, depression or anxiety, traditionally won't be considered to be caused by mold.

However, it's my experience that neuroinflammation is highly present in people with psychiatric complaints, especially people not easily helped by traditional, easily available treatments.

Some of the clues for when you should be considering the diagnosis of biotoxin illness or neuroinflammation are present when the patient has no family history and their age at presentation. If somebody comes to me complaining of symptoms of bipolar but they don't have a family history and it started in their 50s, I'm going to be suspicious that I'm looking at a genetic idiosyncratically caused bipolar. I'm going to be looking for other causes. And the big things that I'm going to be looking for are neurotoxins, primarily mold. Perhaps Lyme. And other cerebral insults, such as an infarction or something like that.

Anxiety disorders and panic disorders don't start in the 50s. Depression starting after menopause, maybe. But I'm happier when I do a diagnosis of depression when the person had depression before and menopause has made it worse, or they have a family history of that illness.

You want to be asking, "Have you been exposed to mold? Have you been bitten by a tick? Did you live in a Lyme endemic area?" Those questions are rarely asked.

Another issue is unusual reactions to medications. I see a lot of patients who are put on something like Zoloft or Celexa and it makes them feel worse. Or they get small amounts of benzodiazepines and feel worse. That's fairly common.

Often in medicine, when people have unusual reactions to medications, they get labeled as histrionic, somaticizing, or hypochondriacal. But to me, those kinds of reactions are clues that we're looking at something different and unusual. And it makes me think about biotoxin-associated illness.

Case study

Here's a case of someone who was brought to me about a year ago with severely agitated depression. She was very reactive during the monsoons. There was some thunder, and she reacted as if a gun had been shot off next to her head. She couldn't stop trembling for about 10 minutes. If she had had insurance or any sort of financial resources, I would've hospitalized her — she was that severely sick. Unfortunately, that wasn't available.

When I took a history, I found out this severe anxiety and depression had started about 2 1/2 years before, around the time of menopause. At that time, she'd also lost her home in California due to the financial crisis, and she'd also found out that her husband had a terminal lung illness.

She'd never been depressed or anxious before; in fact, she'd been quite the opposite. But there was a family history of anxiety and depression. She'd been treated in California by several psychiatrists for hormones and for the psychiatric illness, without any improvement.

She had had severe GI pain. When they investigated, they blamed it on diverticulitis. Surgeons wanted to remove a foot of her colon. The family didn't have the money and the patient didn't want that done, so she refused the surgery. That was interesting to me, because usually when surgeons want to remove a foot of your colon, you don't recover without any problems afterward and then function normally for the next year.

They moved to Arizona to be with family and the husband became his wife's full-time caretaker. He had to be with her day and night, watching her. She felt suicidal. She couldn't function. She'd be up pacing all day, severely anxious and not capable of doing anything else.

I was seen as the last resort, which unfortunately is what happens in integrated psychiatry when meds haven't helped. I ended up changing the psychiatric meds, which led to a partial improvement in the first month or so. The family was happy. But unfortunately, that improvement stalled and I spent the next six months switching meds and adding supplements without much more improvement. We didn't have to hospitalize her, but there was very little quality of life for her or for her husband.

Then again in summer, she worsened considerably. The depression and anxiety became much more unmanageable. She had a colonoscopy that showed no problems — no cancer, no necrosis. That was a little puzzling and interesting to me.

Out of desperation, I started to ask about mold. If people are psychiatrically ill and you start asking about mold, they have a hard time believing it. Sometimes I get a little cautious about bringing it up, because it seems so "out there" to so many people. But after a year of treatment, I started asking her about mold, because mold illness in Arizona is worse in the summer due to our monsoons, swamp coolers and leaking roofs.

The husband remembered that at about the same time his wife became very ill, he'd found extensive black mold in the garage due to a leak in the kitchen sink above. The house was in disrepair because of the financial crisis. He'd done a remediation himself without any precautions before doing a short sale. He felt that the mold had been there for a few years because the house was a fixer-upper.

He got interested because he has an alpha-1-antitrypsin deficiency that can lead to lung problems. He knew that he shouldn't be exposed to mold. He read *Surviving Mold*. He had his wife do the visual

contrast test and she failed. I started her on cholestyramine. Haplotype results showed that she had a mold gene and a low MSH gene.

I saw her a month later. It was the first time she'd ever been able to talk to me without tears or agitation or having to be forced to talk. She was talking freely, talking about her experience. She told me that she was very tired from cholestyramine, but that she'd had waves of feeling herself again.

Interestingly enough, the husband had a CT scan at the VA that showed sarcoidosis and possible fungal balls in his lungs. So he was fairly grateful to have learned about mold, too.

I'm sharing this case just to show that I didn't initially pick up symptoms of mold because the psychiatric presentation was so dramatic that I went immediately to psychiatric meds without talking or thinking about mold. Obviously if I didn't ask about mold, there are very few psychiatrists who would have asked her.

It does now look like this was a contributing factor in her case. The CSM was the first treatment that offered her periods of time when she felt like herself.

I assumed this illness was due to family stressors and the onset of menopause and traumatic life events. I was wrong. I'll point out that her response to SSRI's was typical of the mold patient, in that they made her worse, agitated her more, and really didn't work at all.

Treatment

I'd like to make it obvious. I'm not against using allopathic meds. If somebody is feeling very depressed or anxious, I'm going to do whatever I can do to alleviate suffering. I don't tell people to get off their meds when I diagnose mold illness. I suggest that they work with me to treat it and *gradually* go off meds, so that we don't have any exacerbations of symptoms of depression. The mold treatments that I use — primarily the whole Shoemaker protocol — are easily available.

Fish oil

Another supplement that Dr. Shoemaker recommends highly for inflammation is fish oil. There's a large psychiatric literature that fish oil helps, to the extent that even the American Psychiatric Association endorses the use of fish oil in psychiatric illness. It's safe and effective. Fish oil is not something that you'd think of, but in some studies, a three-month course of fish oil was as effective as drugs in cutting the rate of psychotic illness and schizophrenia, by almost 25%.[19]

You have to understand that in your brain, you have neurons that are your electrical system. Neurons are surrounded by a myelin sheath, which is your insulation for nerve wires. That myelin sheath is a fatty substance that's highly improved by adding the EPA, DHA and other cholines. It's called the phospholipid bilayer cushion. That's what we believe fish oil may be doing.

Fish oil has also been shown to allow serotonin and dopamine, your neurotransmitters, to bind to receptors. It down regulates cortisol, which is very high in stress and is the response from the adrenals before adrenal fatigue sets in. There's no evidence that it decreases cortisol, so don't be afraid to use it if you have low cortisol.

It down-regulates inflammatory cytokines. It actually helps increase thyroid hormone transfer to the brain.

There's a pretty good literature on Omega-3's in bipolar illness. I often find it almost diagnostic when I give people a liquid fish oil, pharmaceutical grade, and people with bipolar illness will guzzle it when they're not feeling well and feel that they can almost regulate their illness by using fish oil.

Diet

Diet is very important. I'm big on the anti-inflammatory diet, meaning anti-inflammatory for the brain.

There's a study that looks at whether Alzheimer's disease can be a form of Type-3 Diabetes. Alzheimer's may be very strongly linked to inflammation from sugars.[20] I recommend a low-sugar diet — low in processed sugars and also low in carbs, because carbs are broken down to simple sugars. It may be Dr. Shoemaker's amylose-free diet, which has you off most grains and amylose.

You can call it the ketogenic diet, one that switches you over from burning carbs to burning fat. That diet has been used for almost 100 years to treat epilepsy in children. It really works. We wouldn't be doing it for 100 years if it didn't. Johns Hopkins is at the forefront of this work.

The ketogenic diet is probably the one that's best for the brain. It's also known as the Paleo diet. The goal is to start eliminating sugars and simple carbs from your diet.

If you want to read a recent book, it would be Dr. Perlmutter's book "Grain Brain" and all of his work on the topic of carbohydrate excess on brain function. You also can look on my blog in the article about "Ketogenic Resources" and then just start to follow all the links about the ketogenic diet.[21]

I'm also a big believer in eliminating food sensitivities, such as gluten and dairy. Again, those contribute to inflammation, including neuroinflammation.

Gluten sensitivity in celiac has been known for a long time to cause something called gluten ataxia, which is progressive balance problems caused by a reaction to gluten. That's just one example that shows how gluten sensitivity can affect the brain.

Initially I tell most people to get off gluten and dairy. Many people do feel better. For others, the benefits may not show for many months. Or they may find that when they start to ingest gluten or dairy again, things get worse. This is a fairly simple trial that everyone suffering from some kind of chronic inflammatory illness should be trying.

Again, I'm mentioning the schizophrenia and the anti-gliadin antibodies, which is pretty impressive actually.

Bipolar illness is linked to epileptic illness. They use the same drugs to treat them and they're effective.

The ketogenic diet is effective in treating epilepsy in children. There are some small studies showing that based on that reasoning, the ketogenic diet might help bipolar brains. It's something I recommend for people with bipolar illness, especially when people are having a hard time trying to control it.

So diet is extremely important. When you have something like Chronic Inflammatory Response Syndrome (CIRS) affecting so many areas of your life, there's no magic bullet. The treatment works, but it can be slow. Doing the diet changes can significantly help decrease inflammation throughout the body.

Supplements

One effective natural substance that you can take is magnesium. Many Americans are deficient. A number of cases have been documented showing rapid recovery from depression when magnesium was supplemented.[22] Magnesium deficiency is linked to an increased risk for stroke. It's linked to glutamate excitability. Magnesium helps decrease glutamate in the brain. Glutamate is highly associated with anxiety. I recommend magnesium for anyone with problems with insomnia or anxiety. For hypertension, it's excellent.

We also use it a lot when people are taking cholestyramine, which is highly constipating. We have patients mix powdered magnesium citrate directly with the cholestyramine and find that solves most people's problems with constipation.

Another effective substance is turmeric. There's one study showing that 1000 mg of turmeric taken over six weeks was as effective as Prozac in depression.[23] [24] To me, since turmeric is highly anti-inflammatory, that's another study suggesting that for many people, depression is a condition of inflammation.

Probiotics are very useful. MSH, which is low in many people, is going to mediate the tight junctions between cells and contribute to leaky gut. There's a strong connection between pathogenic gut,

bacteria and anxiety.[25] I've certainly seen a number of times that adding probiotics can help anxiety and depression.

Vitamin D is highly linked in many studies with depression and anxiety.[26] It is, of course, linked with the immune system. It can improve the immune system and is cancer protective. Levels are easily measured. I think that Dr. Shoemaker showed low Vitamin D levels in patients and that those levels improve with VIP without supplementation.

When I measure low Vitamin D levels, I always encourage people to get on Vitamin D. 5000 units daily is my usual dosage. For people with very low levels, we may go as high as 10,000. With some people, we'll just use 1,000. And yes, even in sunny Tucson. Studies have shown that 70% of people here in Tucson have Vitamin D deficiencies. There's more to Vitamin D than just the sun.

There are a couple of studies linking Vitamin D and depression.

Selfish vs. eudaimonic happiness

There are a number of studies linking happiness — psychological states and behaviors — at the genetic level with inflammation.[27] This research is known of as the field of epigenetics. It's showing that it's possible to alter the expression of inflammation at the genetic level. These are not just psychological changes — it actually showed decreased expression of proteins responsible for inflammation.

Psychological researchers have differentiated between different types of happiness. There's a happiness known as more selfish happiness. You might think of that as coming home, watching a TV program you like, having some alcohol, eating some food, maybe doing something else associated with pleasure. Those things make you happy, but do not necessarily contribute to the meaning of life or help other people. That's considered more selfish happiness. Buying cars or having nice clothing perhaps would be considered more hedonic happiness.

Eudaimonic happiness is associated with having a sense of meaning and purpose in life. That can be different in everybody. That could be taking care of your family or your children. That would certainly be noble purpose. It could be social happiness — being involved in groups and communicating with other people, feeling that your experience helps other people. That would be associated with eudaimonic happiness.

You don't have to be a Mother Teresa; it's having a sense of meaning and purpose to your life. That has been shown to decrease expression of the pro-inflammatory genes and actually increase the expression of genes responsible for killing viruses and bacteria directly. Nobody knows exactly why this happens, but it's probably linked somehow to the survival of the species and to survival of us as a group, as opposed to individual survival.

In my practice, people who have some meaning in their life — who are linked to family or linked to church or linked to work that they feel is meaningful — sometimes do better than people who are isolated and who have lost feeling that what they do matters much in the world.

Other non-pharmacological things that may help with things like neuroplasticity (which means getting your brain to grow new brain cells) or parasympathetic output (which is linked to relaxation) would be mindfulness meditation. There's a lot of research now on the benefits of mindfulness meditation or even mindfulness psychotherapy.[28]

Recovery

In my practice, treating biotoxin illness for several years, I'd say that a large percentage of the patients I see who complain initially about depression and anxiety and insomnia — when we start the appropriate treatments with the Shoemaker protocol, their problems just gradually resolve over 2-4 months. It becomes a non-issue. In fact, sometimes I have to go back to the initial notes and remind people that they first came to me because they were complaining about depression or anxiety.

I'd say that about 30% are going to need more intensive supplemental or allopathic intervention. Again, I'm not opposed at all to using benzodiazepines or SSRI's or stronger meds if they're needed.

I think therapy or support can be very helpful. I often refer people to a psychologist who's familiar with mold illness. Patients find it helpful that they can talk to someone who doesn't think they're crazy when they start talking about their mold treatment or when they link re-exposure to psychiatric symptoms. I hope there are more psychologists or coaches who will be available to do that. It's extremely helpful for people going through this.

There are about 10% of people who I see who have what I'd call intense psychiatric processes, such as severe agitation, depression or psychosis. They may require antipsychotics or even electroconvulsive therapy. Although it sounds severe, when there is severe suicidal ideation or when people aren't eating — when there's a threat to life — that's what needs to be done.

Thank you for letting me share what is for me exciting and interesting information.

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