MOLD AND MYCOTOXINS

AN EVIDENCE-BASED LECTURE

”THE GREAT MASQUARADER OF THE 21ST CENTURY”:

WORLD HEALTH ORGANIZATION

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  Integrative Medicine, A Clinician's Journal.
  Biomedical Journal of Scientific and Technical Research.
  Research in Medical and Engineering Sciences.
- International Journal of Complementary and Alternative Medicine.

OBJECTIVES:

1. UNDERSTAND WHAT IS THE EVIDENCE IN MEDICAL SCIENCE REGARDING MYCOTOXINS.

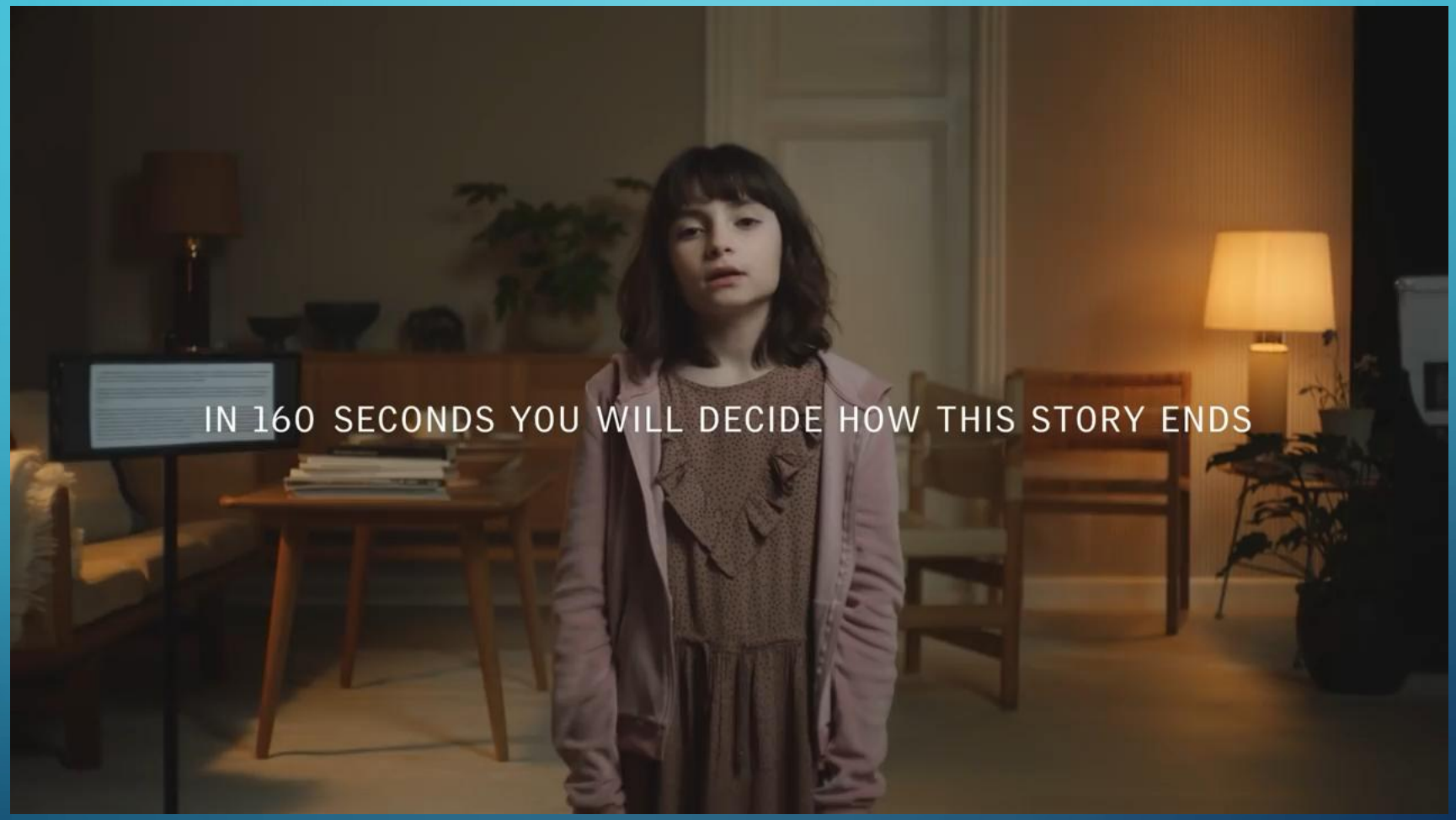
2. UNDERSTAND HOW MYCOTOXINS CAN TRIGGER AUTOIMMUNITY AND THEREFORE MAY REVERSE THE REACTION PROCESS.

3.UNDERSTAND WHAT LACKS MEDICAL AND SCIENTIFIC EVIDENCE REGARDING TESTING AND TREATMENT OF MYCOTOXINS.

THE KEY TO SOLVING MEDICAL PROBLEMS CAUSED BY TOXINS:

1. DETECT
2. REMOVE
3. REPAIR

Dr. Andrew W. Campbell



www.youtube.com/watch?v=ygHU0mQGuJU

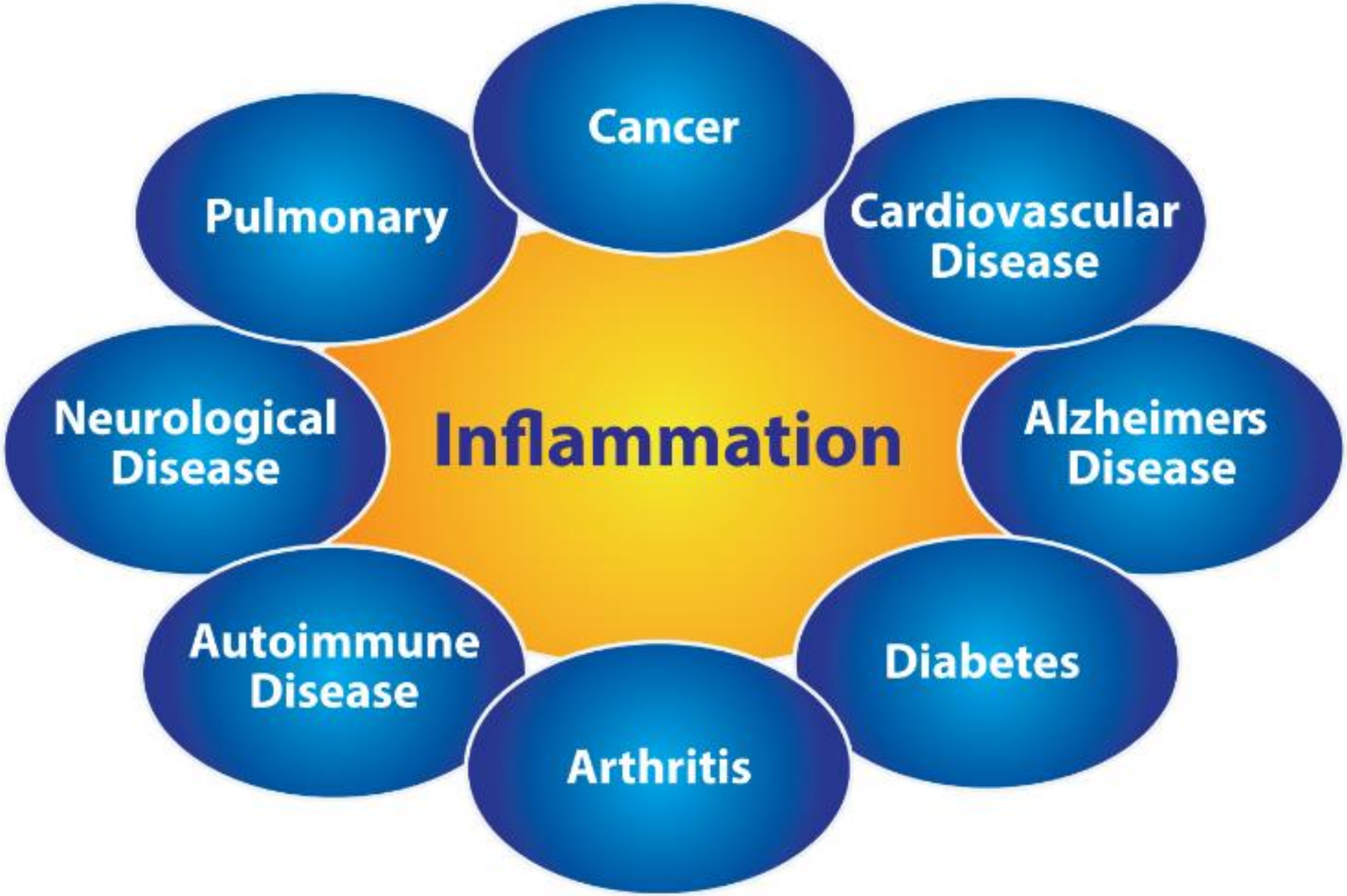
CLIMATE CHANGE, MOLDS AND MYCOTOXINS

- Climate change: unexpected weather in most areas of the planet.
- More hurricanes and floods, rising waters.
- More recently: Louisiana, Texas, Gulf Coast, New York, etc.
- Disasters, damage, and health hazards: mold infested homes, schools, businesses, public buildings.

- Indoor Air Pollution, WHO

MOLDS

- Indoor mold spores induce **persistent changes in inflammatory and immune responses**.
- Chronic exposures to molds induce **chronic inflammation.**


Cancer
Pulmonary
Cardiovascular Disease
Neurological Disease
Inflammation
Alzheimers Disease
Autoimmune Disease
Diabetes
Arthritis

MOLDS AND MYCOTOXINS

- Molds multiply quickly.
- As they multiply, they release spores that carry mycotoxins.

TWO IMPORTANT POINTS: MYCOTOXINS

A mold that produces mycotoxins produces a series of mycotoxins rather than just one mycotoxin.

1 mold = many mycotoxins

If a mold known to produce mycotoxins is present in a home or building, then the mycotoxins it produces are present as well.

MEDICAL AND SCIENTIFIC FACTS

"Spores of toxigenic fungi contain mycotoxins."

"Mycotoxins associated with spores are likely to be absorbed via the respiratory epithelium, and translocated to other sites, producing systemic effects."

Airborne Deteriogens and Pathogens, 1989 by Dr. Lacey.

Canadian Journal of Public Health, 1987 by Drs. Tobin et al.

SIZE MATTERS

- Hair is 100 microns.
- Spores are about 2-4 microns.
- **Mycotoxins are 0.1 microns.**
- Exposure to mycotoxins is mainly by inhalation, dermal absorption; ingestion is minimal.

MYCOTOXINS

Mycotoxins are potent protein synthesis inhibitors.

- Inhibit synthesis of RNA, DNA.
- Form DNA adducts and protein adducts
- Cause oxidative stress
- Cause mitochondrial directed apoptosis.
- Mycotoxin antibodies form adducts that attach to human tissue and trigger autoimmunity.

SYMPTOMS

Fatigue

Numbness and Tingling

Short Term Memory Loss

Headaches

Joint Aches and Pains

Shortness of Breath, Cough

Anxiety and Depression

Mood Swings, Personality Changes

Abdominal Pain and Discomfort

Hair Loss

Tremors

Nosebleeds

Skin Rashes

Chronic sinusitis

Upper Respiratory Symptoms

… Pets get sick too…

HER STORY IN PICTURES

First morning I've woken up with a just about completely flat stomach with no bloating. I'm still dealing with some as the day goes on but nothing compared to what it used to be!!

HER STORY IN PICTURES

This picture is scary, lol.
I look like an addict or something. This was a few weeks after being treated for Lyme and before I knew I had mold issues.

I would never dream a year ago I would be well enough to be taking my girls BY MYSELF for a day at the beach and having energy for all of it.

WHERE DO MYCOTOXINS FIRST AFFECT THE BODY?

- The overwhelming medical and scientific evidence shows that it is the brain and nervous tissues.
- Mycotoxin antibodies bind to human tissue, including neural tissues, such as myelin, triggering demyelination.

EFFECTS OF MYCOTOXINS ON NEUROPSYCHIATRIC SYMPTOMS AND IMMUNE PROCESSES: CLINICAL THERAPEUTICS/VOLUME 40, NUMBER 6, 2018; TUFTS UNIVERSITY

People exposed to molds and mycotoxins present with symptoms affecting multiple organs, including the lungs, musculoskeletal system, as well as the central and peripheral nervous systems. Furthermore, evidence has recently implicated exposure to mycotoxins in the pathogenesis of **autism spectrum disorder**. The effects of mycotoxins can be mediated via different pathways that include the secretion of pro-inflammatory cytokines, especially from mast cells.

Implications:

The information reviewed indicates that exposure to mold and mycotoxins can affect the nervous system, directly or through immune cell activation, thus contributing to neurodevelopmental disorders such as autism spectrum disorder.

AUTISM SPECTRUM DISORDER AND MYCOTOXINS.

- A study of 172 children with ASD with 61 controls; the authors showed significant differences in comparing antibodies to mycotoxins between the two groups, with the ASD group showing elevated serum antibodies to mycotoxins.
- Tufts University School of Medicine studies have found evidence implicating mycotoxins as causing ASD.

AUTISM

8 y.o. boy; parents have gone to numerous pediatricians, pediatric neurologist, naturopaths, etc.

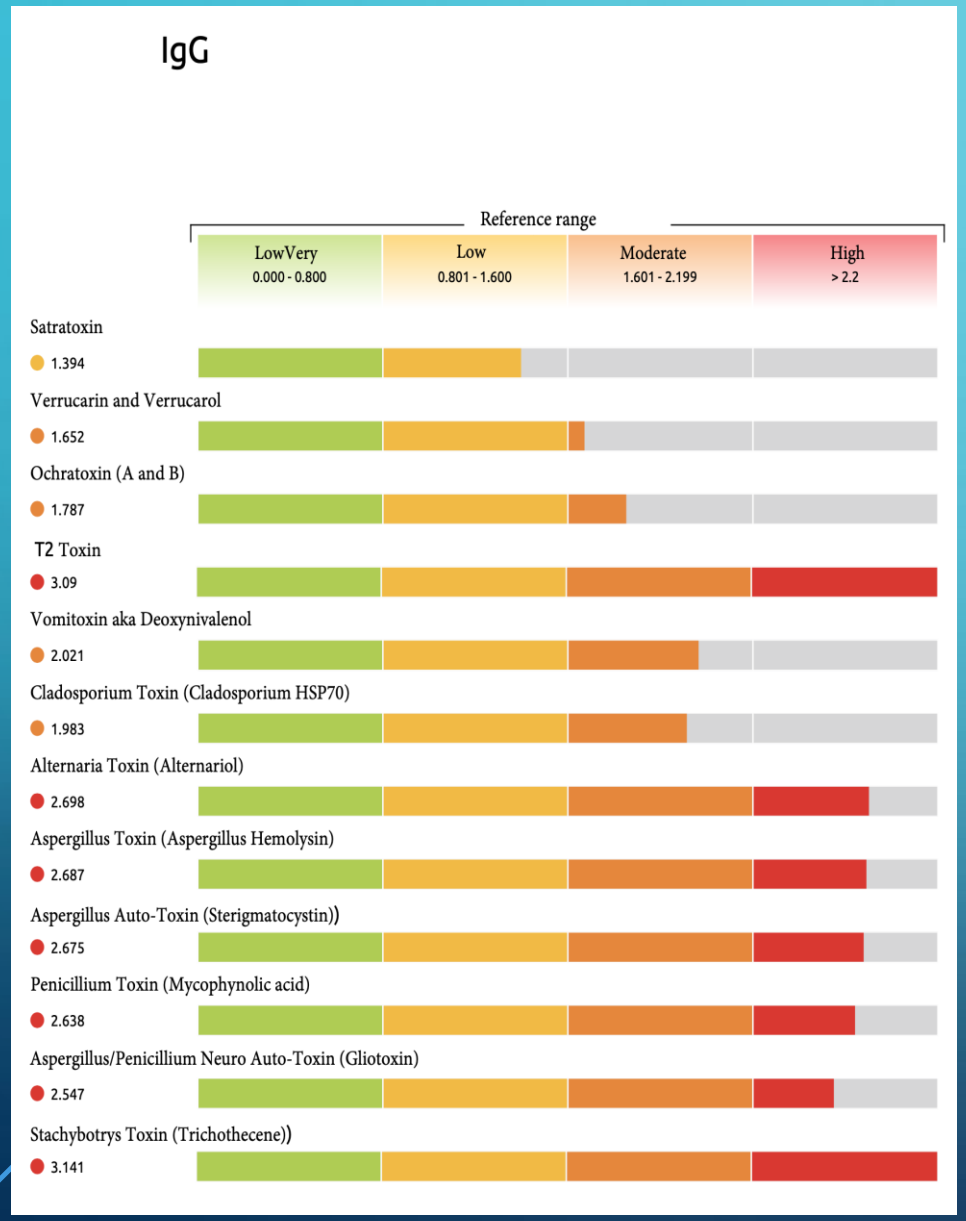
Have used various prescription medications including risperidone, aripiprazole, sertraline, citalopram.

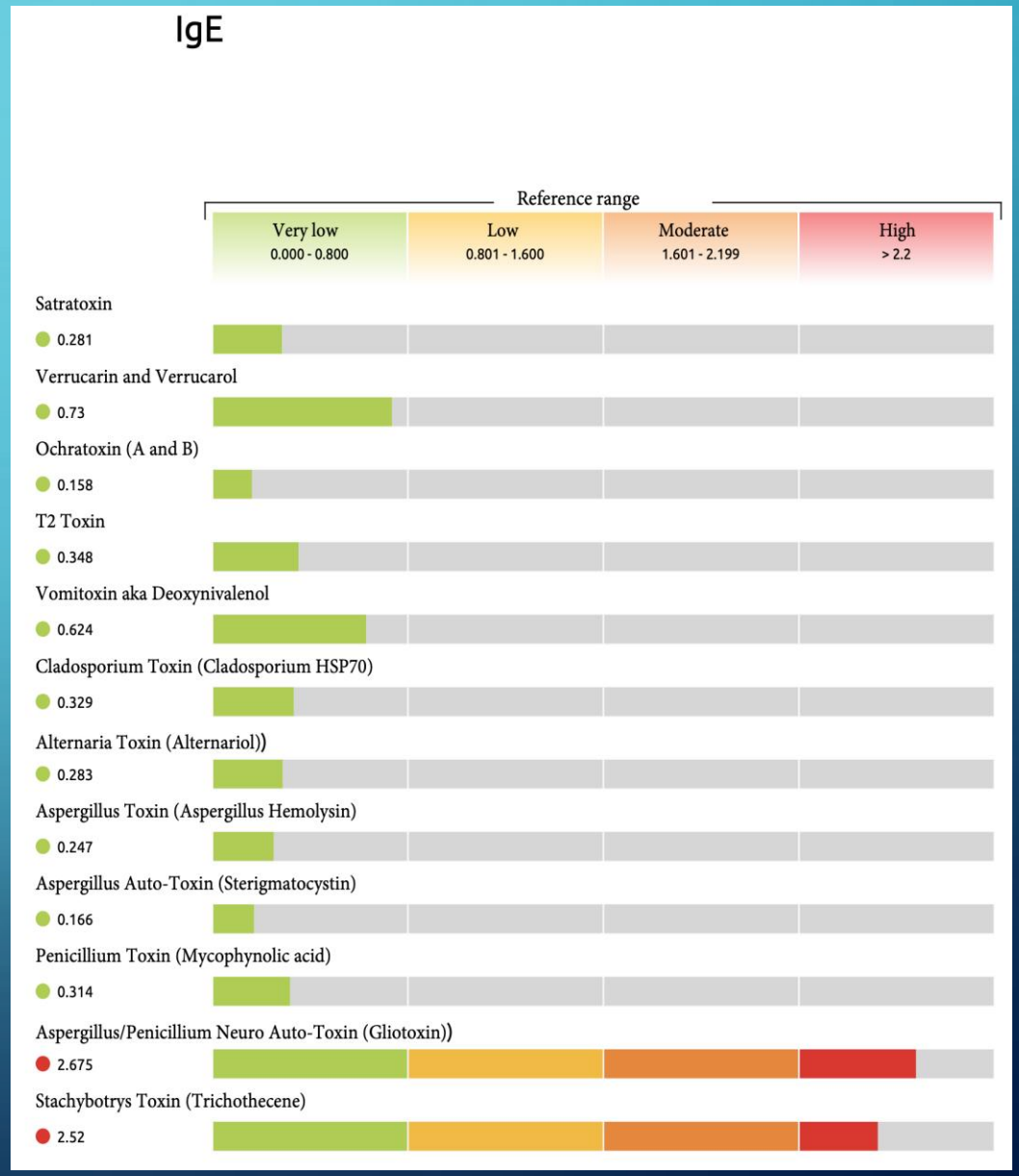
Have tried various behavioral therapist and diets.

Nothing has really helped much, including binders.

There was mold in the home.

MYCOTOXINS BEFORE TREATMENT

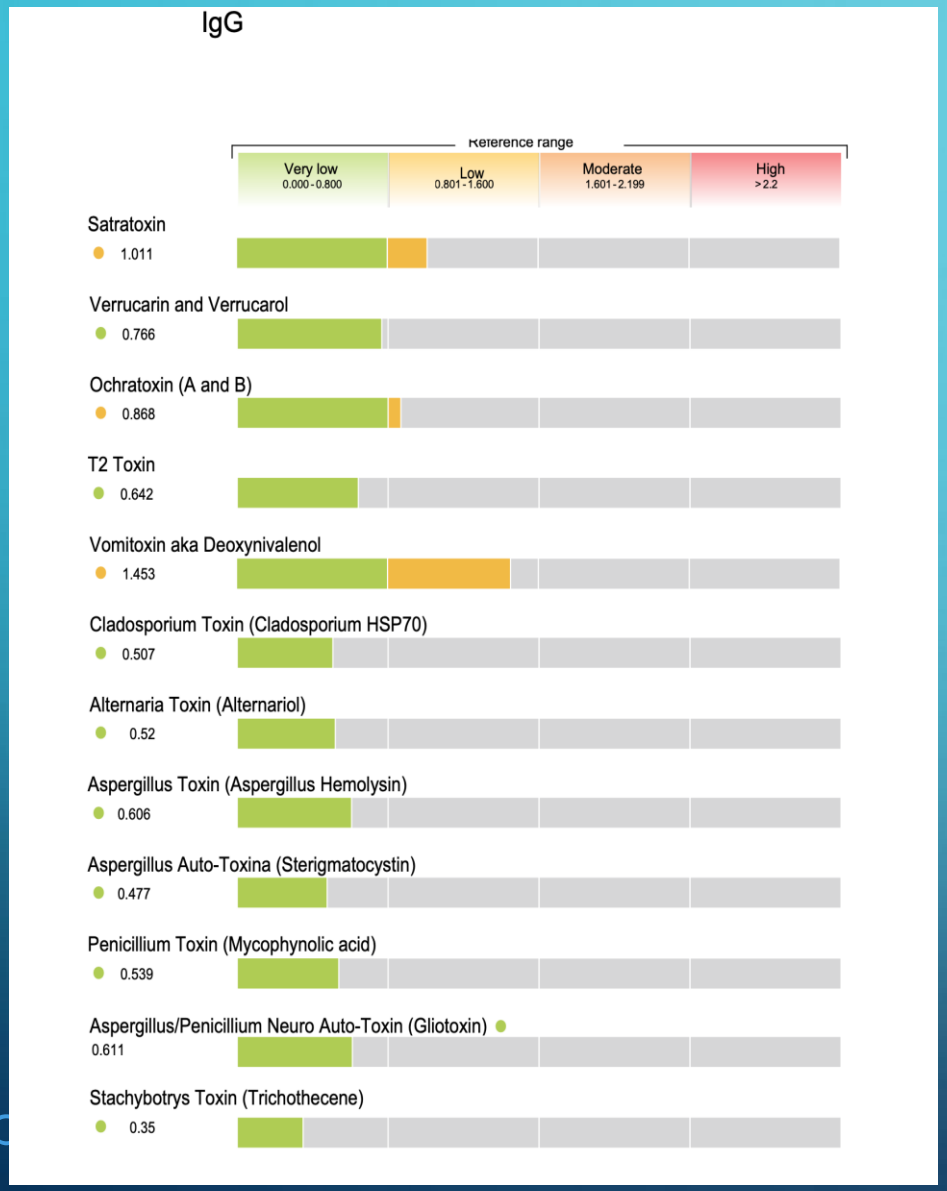


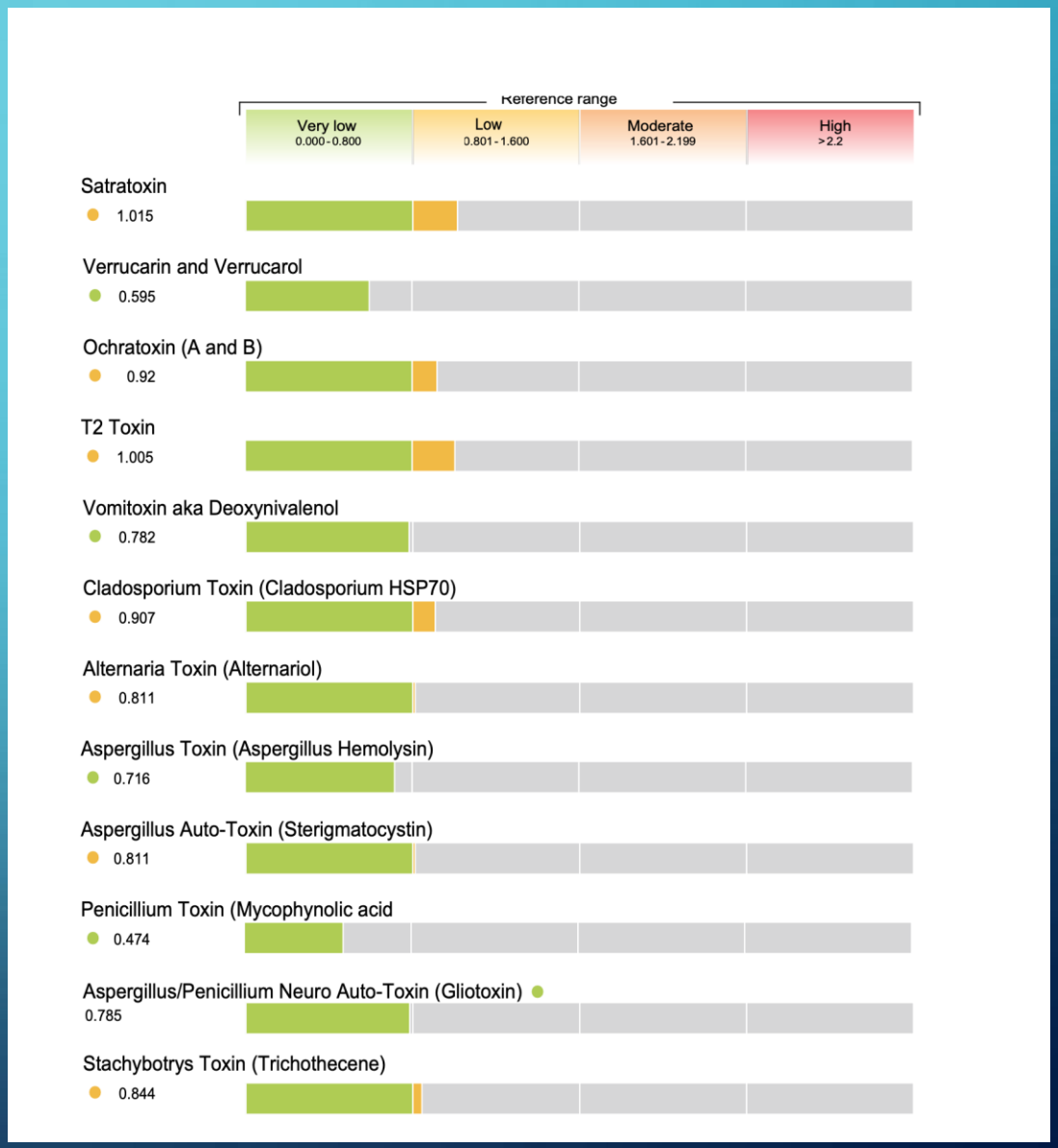


AUTISM

- Parents noticed improvement in all areas starting at 2 months of treatment.
- Sleep was the first to improve followed by:
- Less repetitive movements, less aggressiveness, more sociable, better verbal skills, accepting affection.
- At 6 months, mostly well. Playing with others, etc.

MYCOTOXINS AFTER 7 MONTHS OF TREATMENT





MULTIPLE SCLEROSIS: GLIOTOXIN

- Multiple sclerosis (MS) is one of the most frequent and severe demyelinating neurological diseases, mainly affecting young people, eventually leading to their becoming disabled.
- A 2010 study from Rutgers Medical School stated:“We propose here that fungal toxins are the underlying cause of multiple sclerosis and thus may offer an avenue towards an effective cure.”
- The mycotoxin gliotoxin causes demyelination leading to MS.

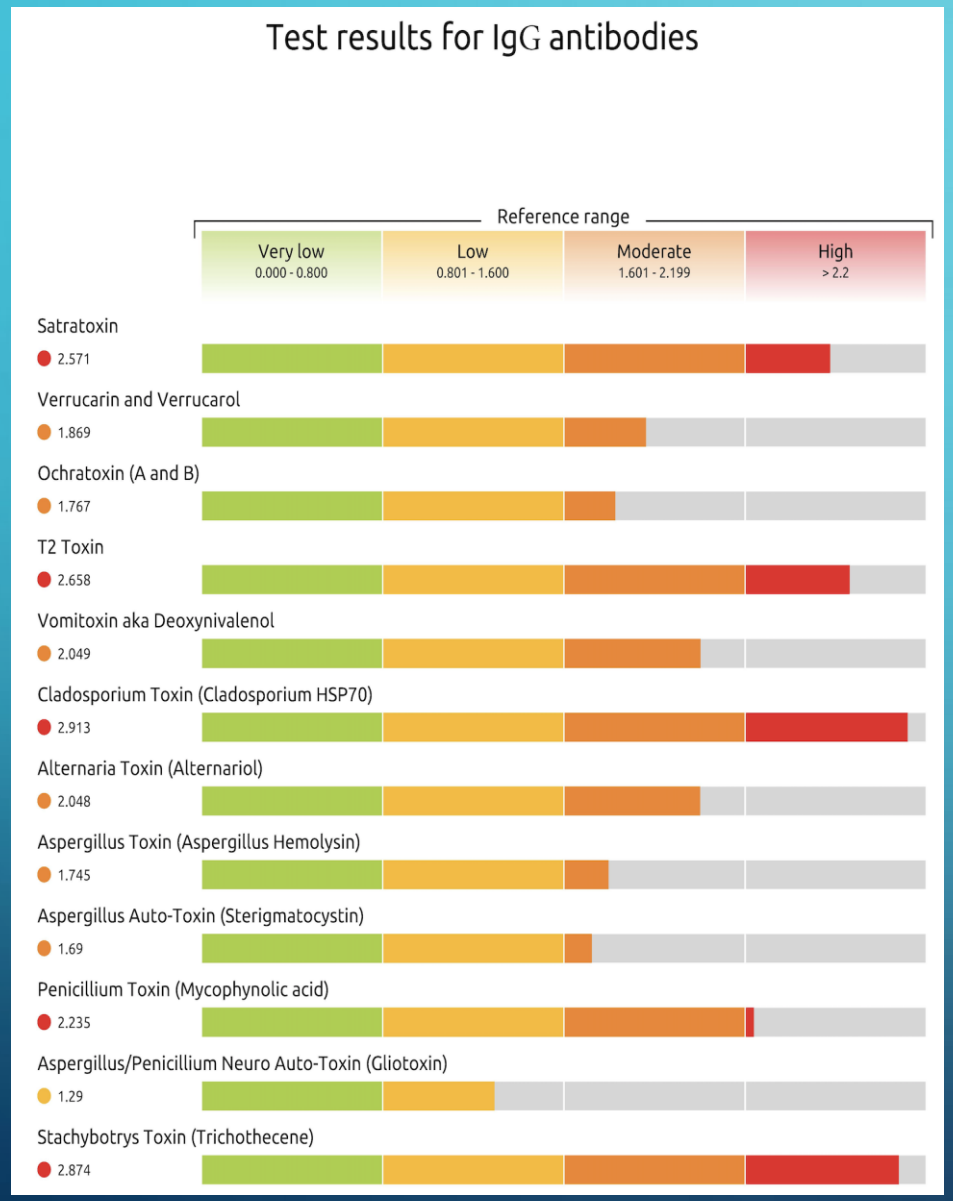
ALZHEIMER'S DISEASE

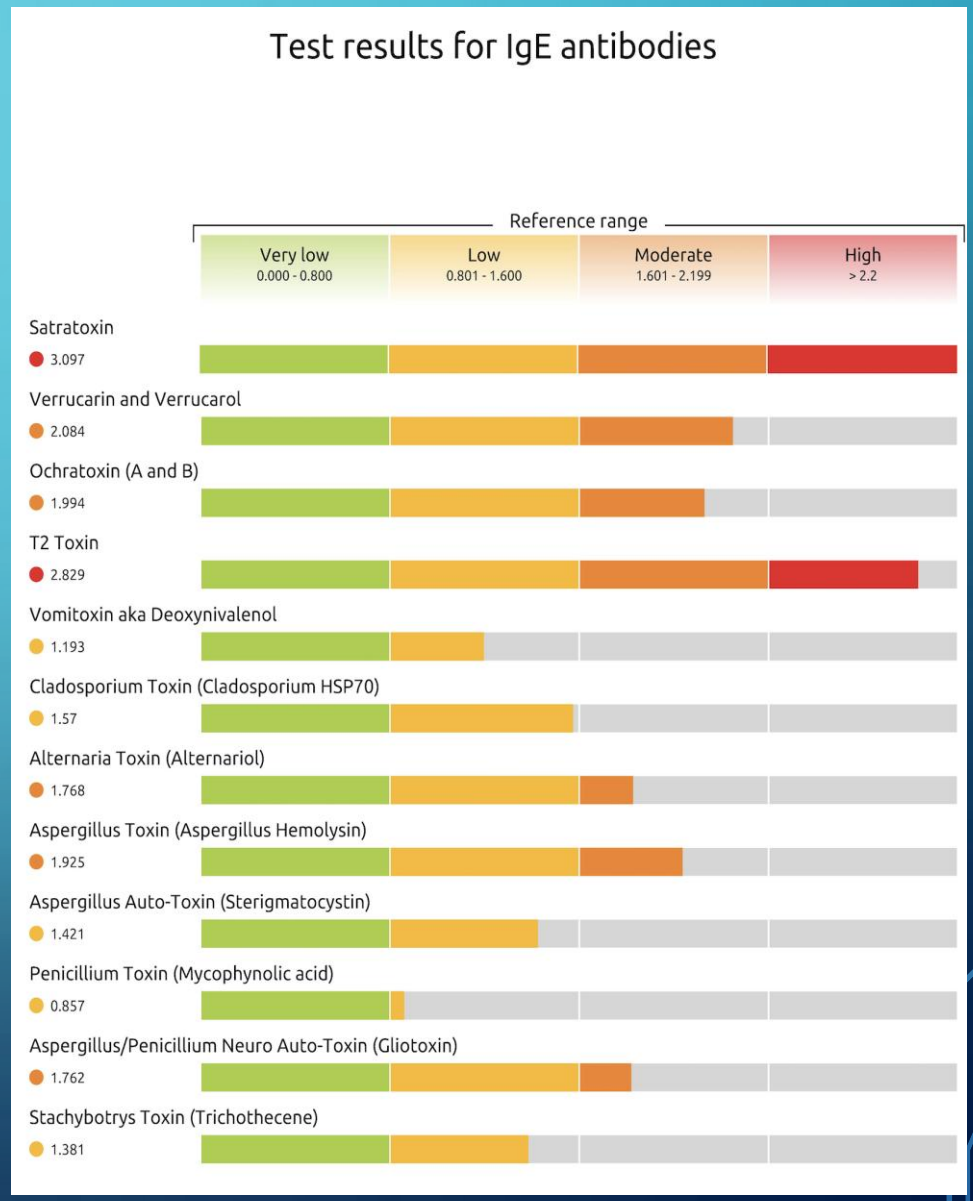
- 76 y.o. Caucasian male: 3 neurologists confirmed he has Alzheimer after a number of test and studies.
- Doesn't know which is his bedroom, doesn't know where his clothes are, can't leave home without getting lost, doesn't recognize friends or relatives, forgets things.
- MRI: mild cortical atrophy

ALZHEIMER'S DISEASE

- MMSE: abnormal
- Neurological: decreased DTR's throughout
- Poor balance, gait unsteady
- Pupils slow to react
- Otherwise physical normal.
- Alzheimer blood screen normal

ALZHEIMER'S DISEASE





ALZHEIMER'S DISEASE: 8 MONTHS LATER

MMSE: almost normal

DTR's normal

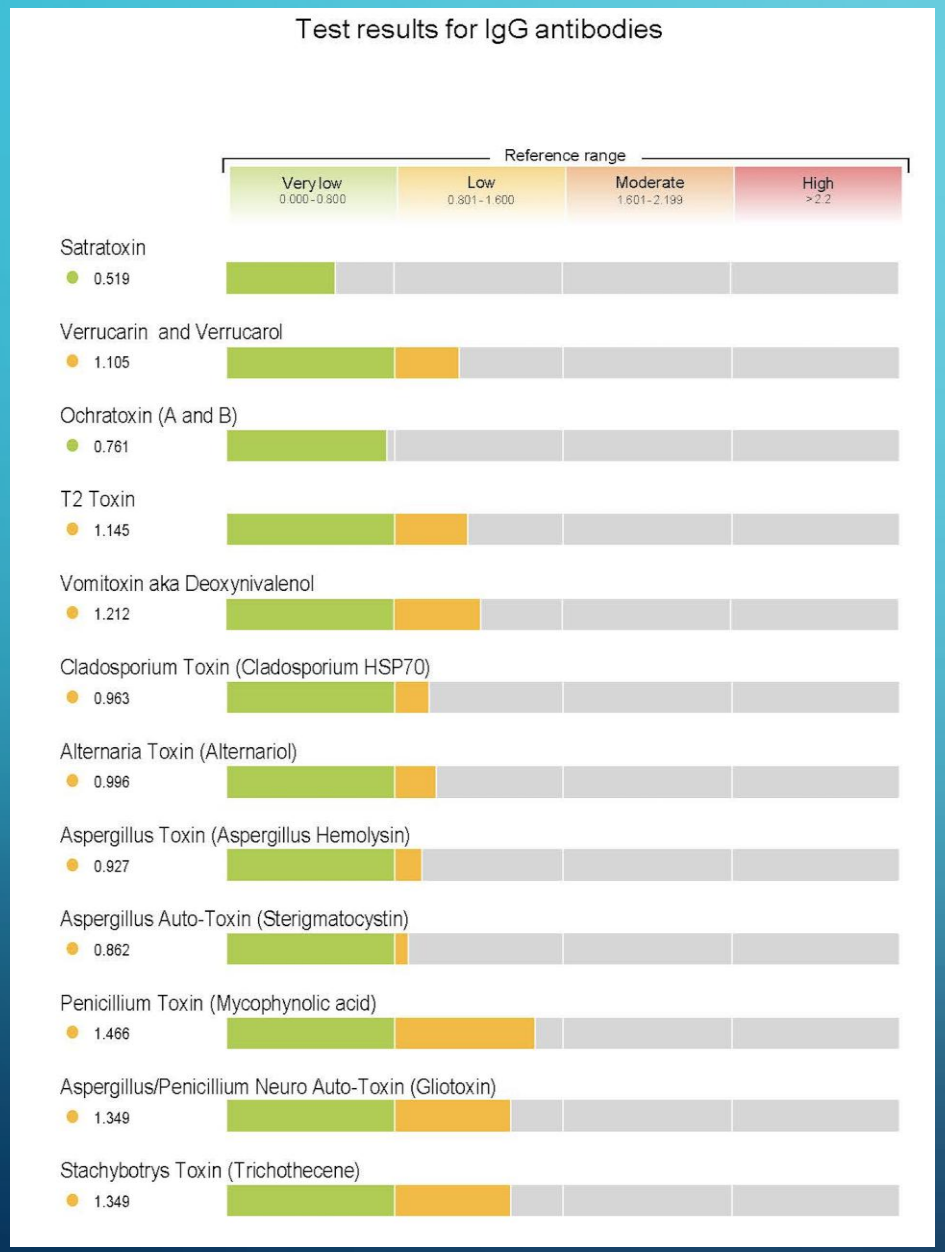
Balance much improved

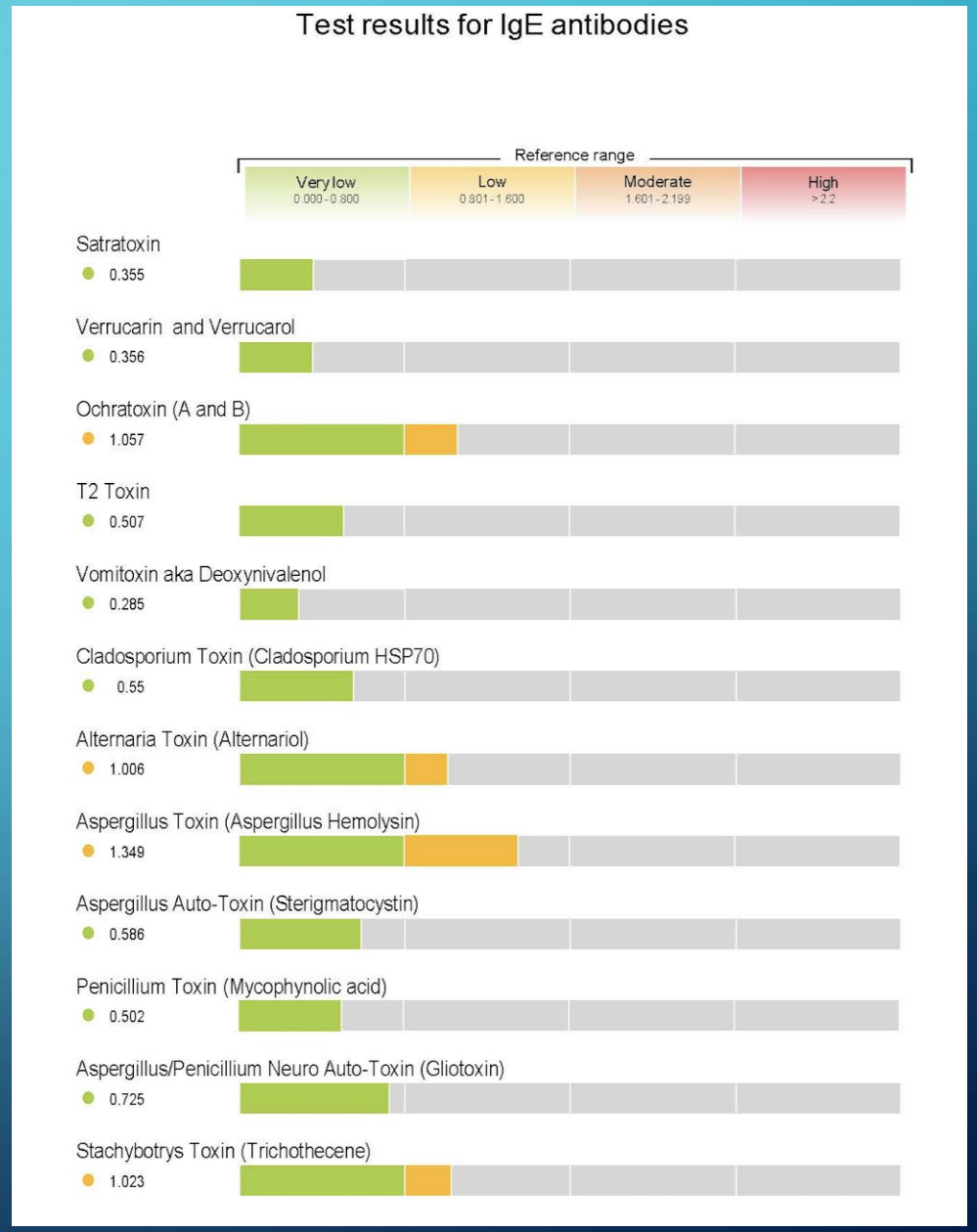
Pupillary reflex normal

Gait normal

Driving now; no more memory issues.

ALZHEIMER'S DISEASE 8 MONTHS LATER





MYCOTOXINS: NEUROTOXICITY

The study population consisted of 119 patients (79 females and 40 males). There were 20 controls.

Data obtained from the NCV studies for motor nerves and sensory nerves. Patients with abnormal findings comprised of 3 groups:

1. Mixed sensory-motor polyneuropathy (55).
2. Motor neuropathy (17).
3. Sensory neuropathy (27).

MYCOTOXINS: NEUROTOXICITY

"High levels of ANA and CNS myelin and PNS myelin autoantibodies were found." The authors conclude that exposure to molds and their associated mycotoxins in water-damaged buildings leads to multiple health problems involving the CNS and the immune system, in addition to pulmonary side effects and allergies. "Exposure to these also initiates inflammatory processes."

OCHRATOXIN AND INFLAMMATION

Ochratoxin depletes zinc

- Even at nanomolecular concentrations it causes cellular apoptosis.
- Increases pro-inflammatory mediator levels: TNF-alpha and IL-6.
- Induces cell cycle arrest on kidney cells and lung fibroblasts.

OCHRATOXIN IN URINE???

- Ochratoxin is absorbed from the stomach and jejunum.
- Albumin binds Ochratoxin with unusual high affinity.
- 99.8% of Ochratoxin is albumin bound.
- Ochratoxin is reabsorbed from practically any part of the nephron by both active transport and by passive diffusion.
- Due to strong albumin binding of Ochratoxin, its elimination by glomerular filtration is negligible.

Koszegi T, Poor M. Ochratoxin A: Molecular Interactions, Mechanisms of Toxicity and Prevention at the Molecular Level. Toxins 2016, 8, 111.

MYCOTOXINS AND AUTOIMMUNITY

Hindawi Publishing Corporation
Autoimmune Diseases
Volume 2014, Article ID 152428, 12 pages
http://dx.doi.org/10.1155/2014/152428

Review Article

Autoimmunity and the Gut

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Received 31 December 2013; Accepted 11 February 2014; Published 13 May 2014

Academic Editor: Aristo Vojdani

LOOK AT HIS RING FINGER AS WELL AS HIS SKIN: PSORIATIC ARTHRITIS.

Psoriatic Arthritis

Psoriatic Arthritis

After 2 months of treatment

Psoriatic Arthritis

At 6 months of treatment

PSORIASIS

PSORIASIS

- 63 yo female; has had multiple infections, respiratory, etc. Rx'd many different antibiotics.
- Lives in home with visible mold growth.
- Was a smoker 1ppd for 20 years; quit 10 years ago.
- Noted lesions a year ago: was Rx'd many creams, immune suppressants, etc.

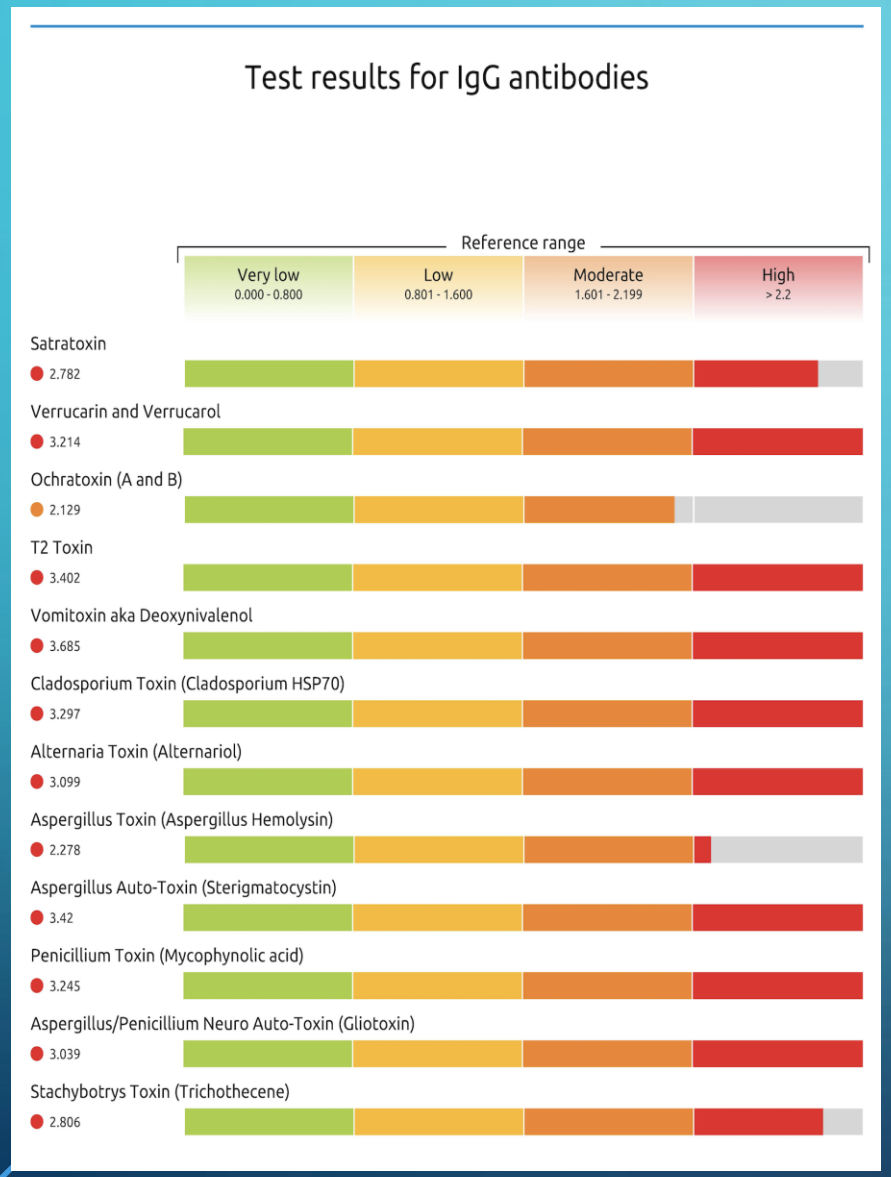
PSORIASIS

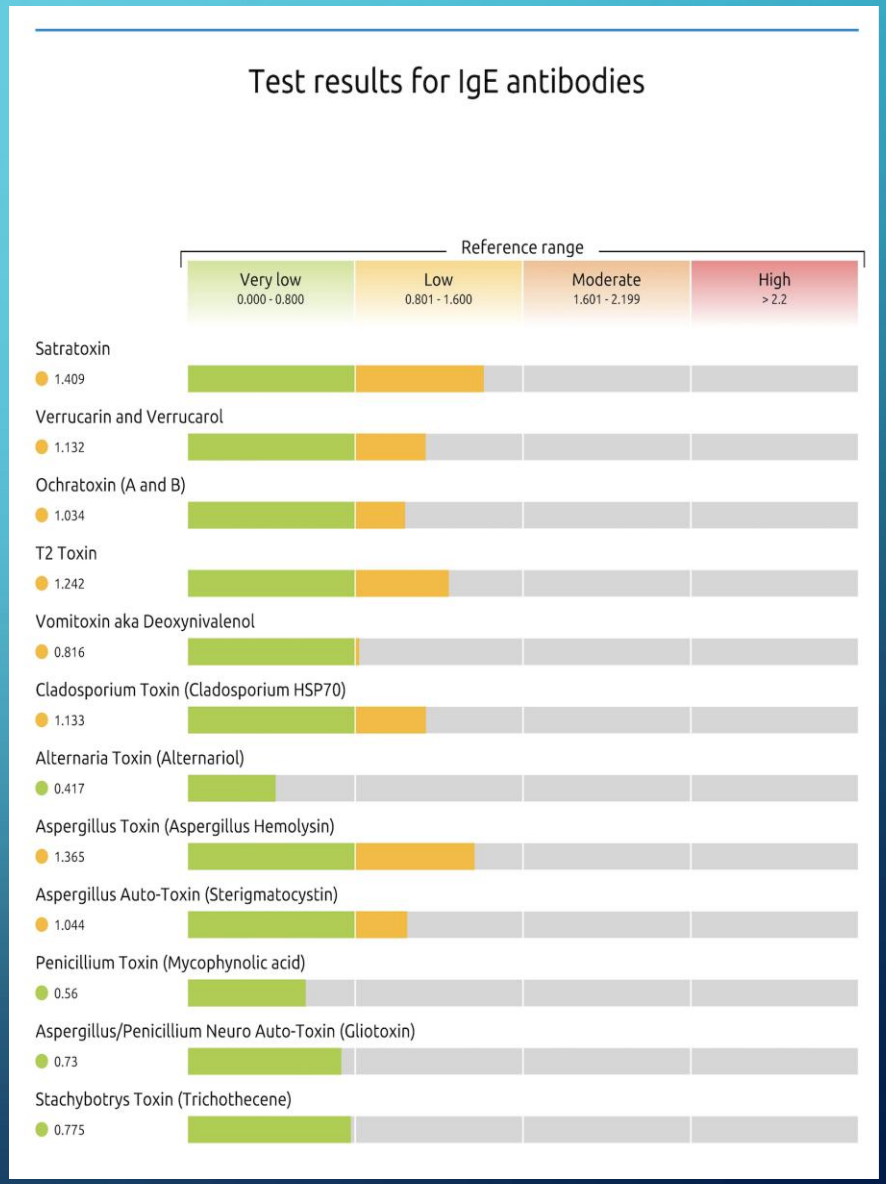
- Symptoms were typical: for the last 3 years she has noted fatigue, short term memory loss, brain fog, sleep disturbance, anxiety, sores that take a long time to heal, recurrent infections, dry eyes and dry mouth, IBS type symptoms, cough, heart palpitations, multiple sensitivities to foods, smells, etc.

PSORIASIS

She moved out of her home and felt slightly better for about 2 weeks, but her symptoms persisted. She had her new home tested and it was normal. She found a doctor who understood molds and mycotoxins and who spoke to me over the phone.

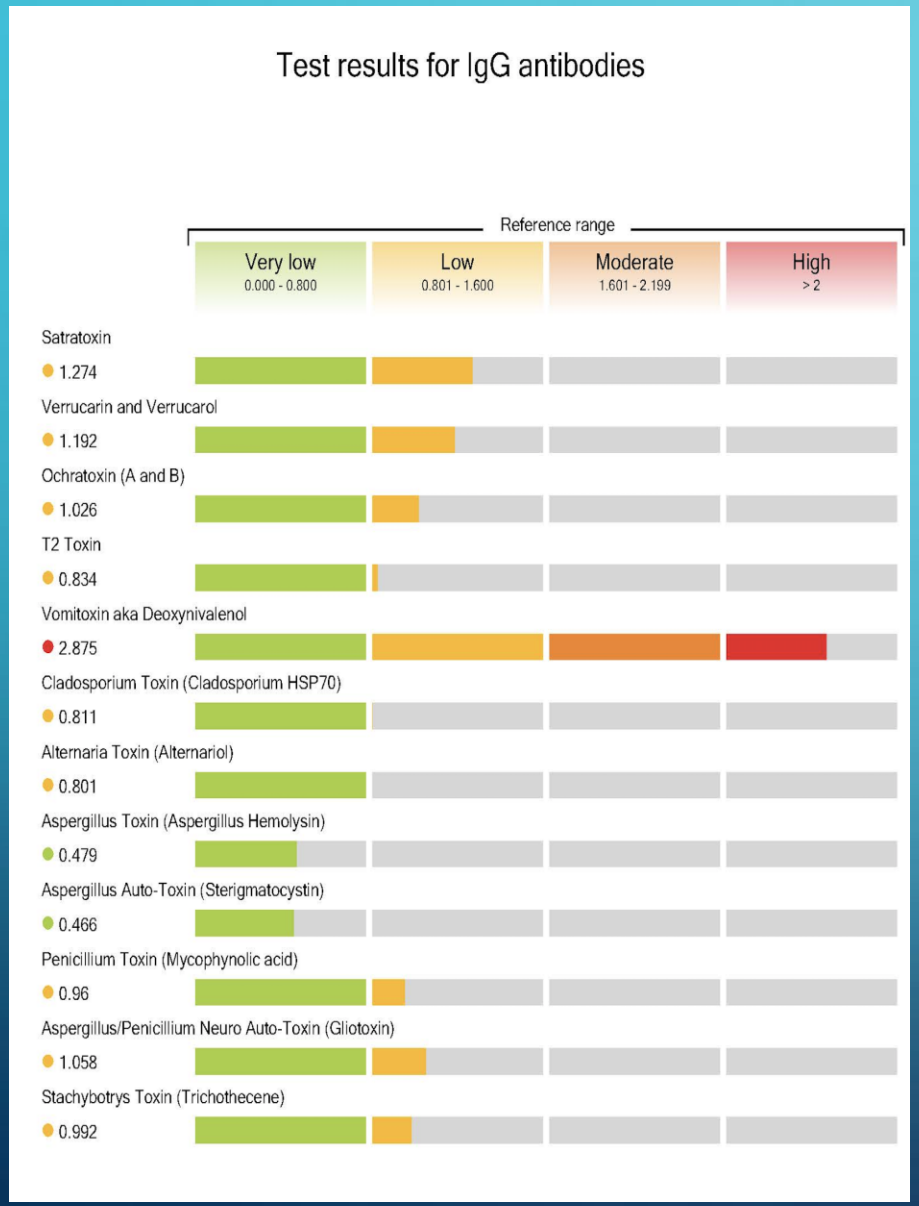
PSORIASIS: BEFORE TREATMENT

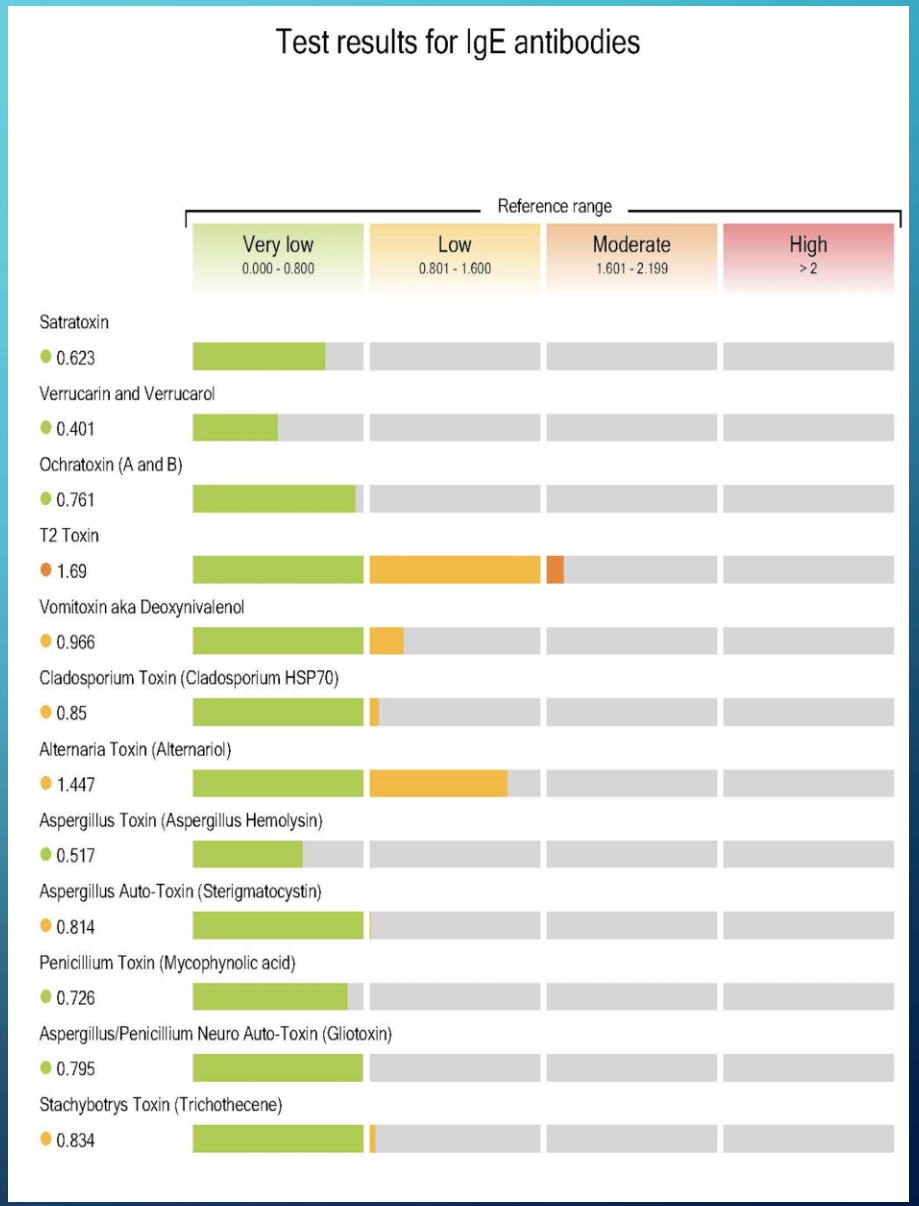




BEFORE AND AFTER

PSORIASIS: AFTER 6 MONTHS TREATMENT





WHAT IS INTERLEUKIN-6?

- IL-6 is a multifunctional cytokine that regulates the immune response, inflammation, hemopoiesis, and the acute response.
- Has an important role in the development of autoimmune diseases.
- Is released by mast cells when stimulated by IgE mycotoxin antibodies.

WHICH MYCOTOXINS CAUSE RELEASE OF IL-6?

Nine mycotoxins:

Satratoxin

Ochatoxin

Alternaria toxin

Aspergillus toxin

Verrucarin and Verrucarol

T-2 toxin

Stachybotrys toxin

Vomitoxin aka Deoxynivanelol

Aspergillus auto-toxin: Stergigamtocystin

MAST CELLS, IL-6 AND MYCOTOXINS

- **Ochratoxin:**
- Significantly increases IL-6
- suppresses N-acetyl cysteine
- increased the susceptibility to Rheumatoid Arthritis
- causes inflammation of the nasal mucosa

MAST CELLS, IL-6 AND MYCOTOXINS

- **Alternaria Toxin**:
- increased secretion of IL-6
- Induces damage to DNA
- **T-2 Toxin:**
- significantly elevated levels of IL-6 in serum
- increased TNF-alpha

MAST CELLS, IL-6 AND MYCOTOXINS

- **Satratoxin:**
- Increase and potentiate the proinflammatory cytokine production of IL-6
- magnifies the innate inflammatory response

MAST CELLS, IL-6 AND MYCOTOXINS

- **Deoxynivalenol (DON) aka Vomitoxin**
- Significantly increased IL-6 production
- Affects bronchial cells directly

MASTOCYTOSIS STUDY (2021)

- **139** patients with mastocytosis: 78 F and 61 M
- Cutaneous problems in 71%
- Gastrointestinal in 48%
- Cardiovascular in 36%
- Musculoskeletal in 27%
- Fatigue in 24%
- Sexual impairment in 24%

SYMPTOMS NOTED IN THIS STUDY

- Flushing
- Pruritus
- Hypotension
- Gastrointestinal complaints
- Irritability
- Headaches
- Sexual impairment

Concentration problems

Memory Loss

Neuropsychiatric pbs

MAST CELL ACTIVATION: BEFORE

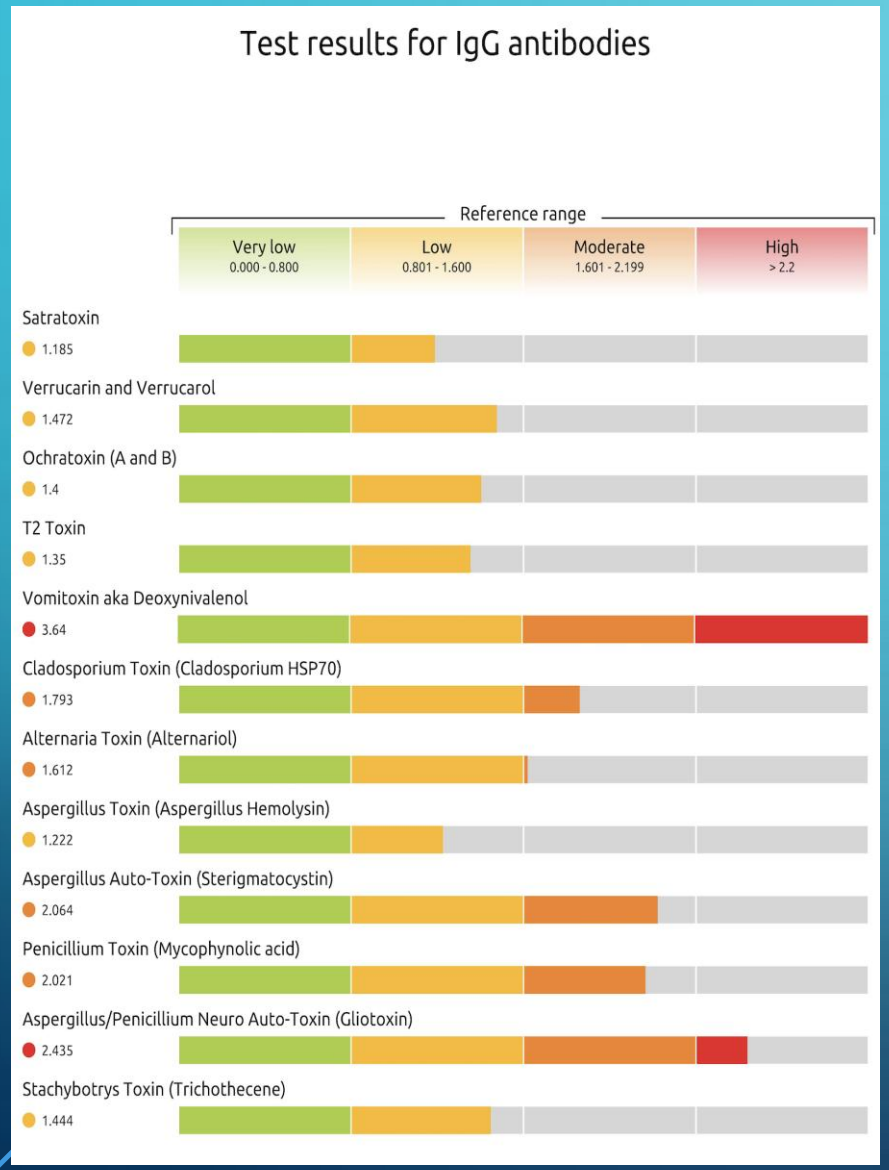
- 28 y.o. with visible mold in home. She is very active, sports, social life, etc. until these skin lesions started 3 months ago. Doesn't want to go out now. Has seen 3 dermatologist who gave her creams and corticosteroids. After one month and no changes, she quit the steroids as she couldn't sleep due to them and other side effects.

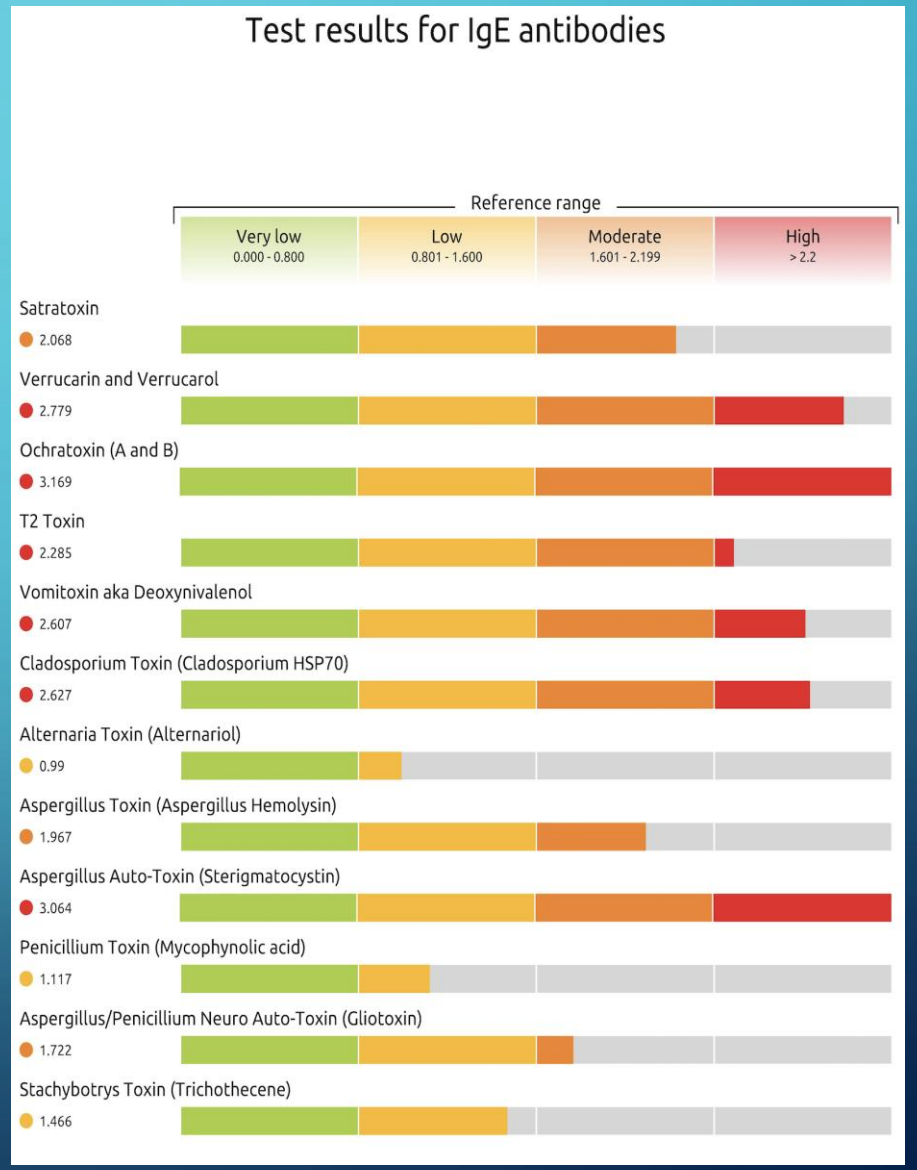
MAST CELL ACTIVATION: BEFORE

- Main symptoms:
- Fatigue
- Nausea
- Pain
- Itching
- Flushing
- GI complaints

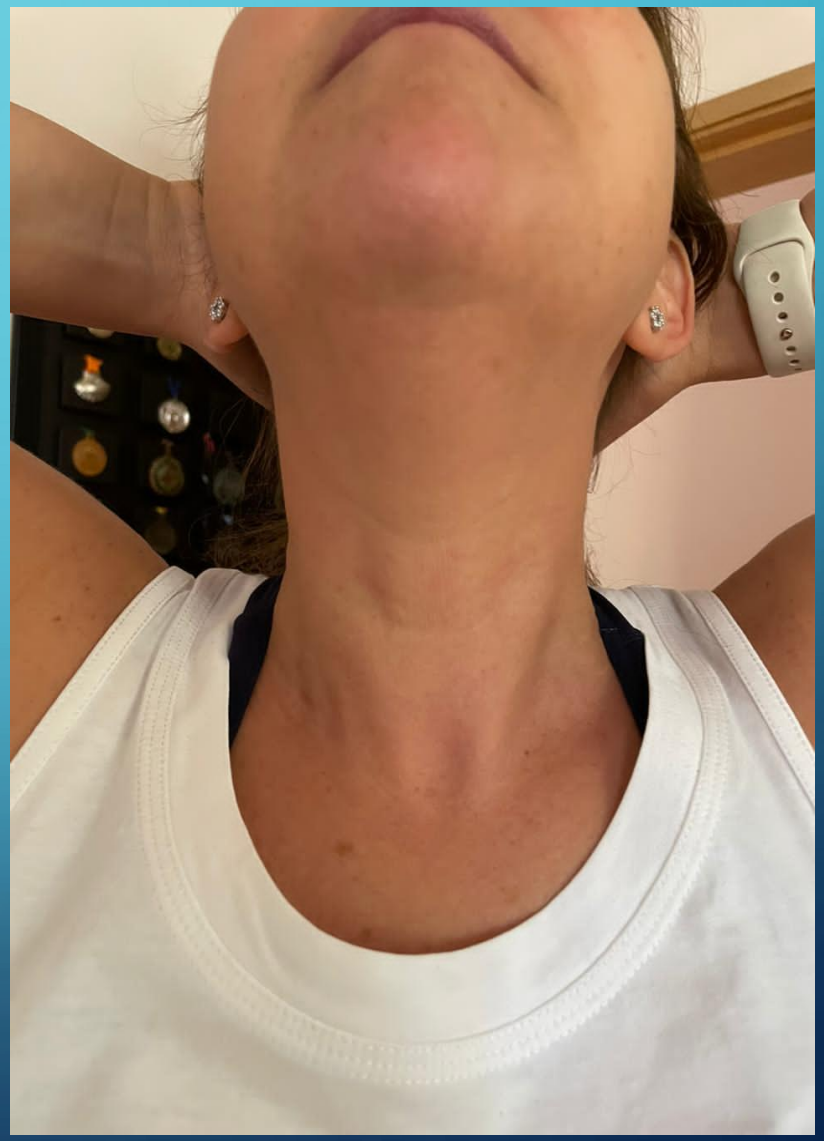
BEFORE

MAST CELL ACTIVATION: BEFORE



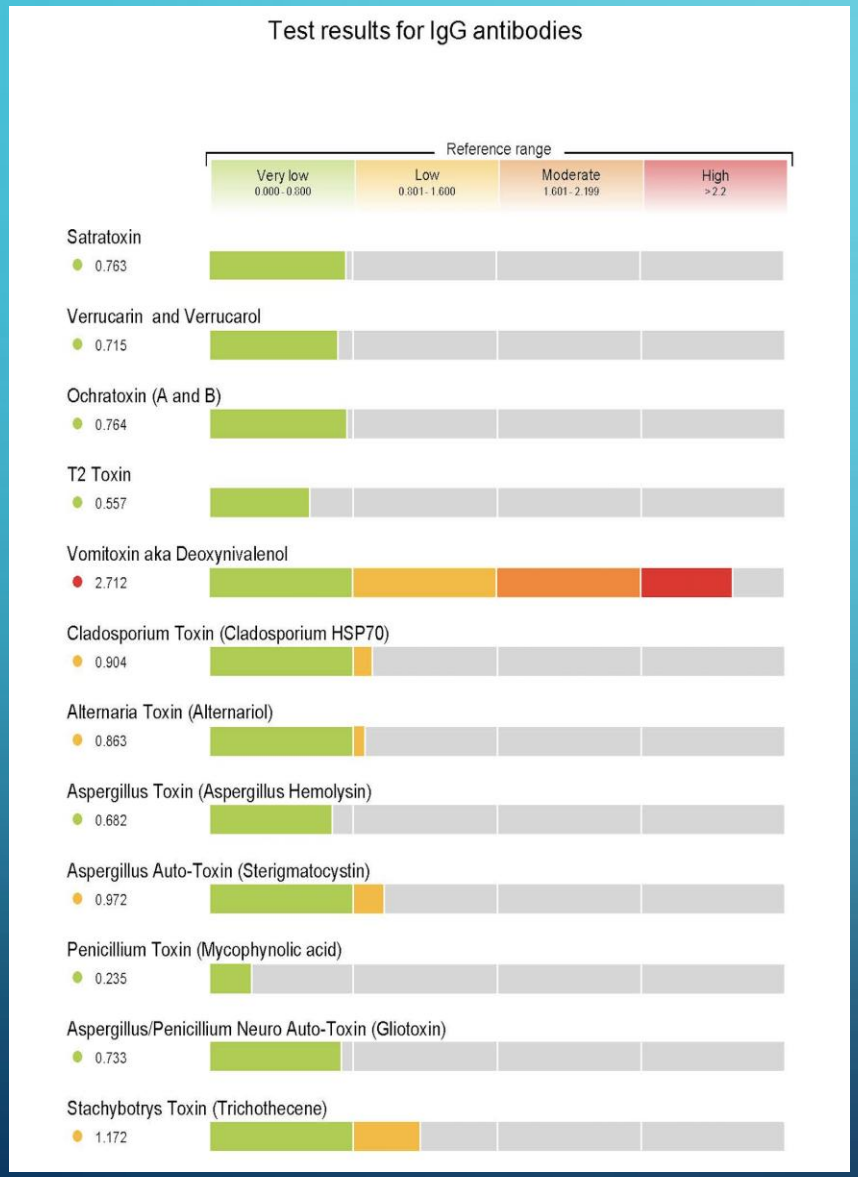


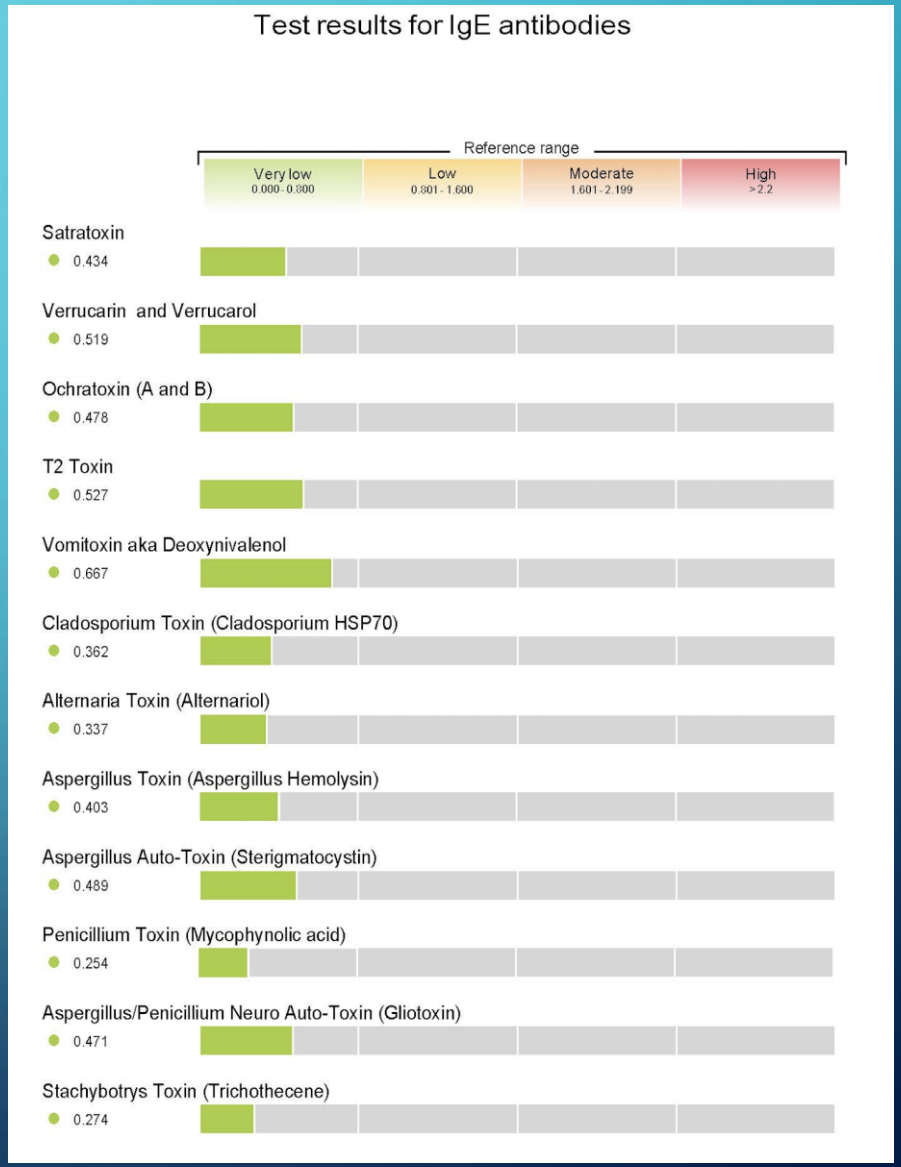
BEFORE AND AFTER



BEFORE AND AFTER

MAST CELL ACTIVATION 3 MONTHS LATER





MYCOTOXINS AND THE MICROBIOME

Mycotoxins can cause the intestinal inflammation and intestinal permeability through the opening of tight junctions.

- This allows the entry of luminal antigens and bacteria that are normally restricted to the gut lumen by the intestinal barrier function.
- This leads to tissue inflammation and invasion of commensal and pathogenic bacteria as observed in Crohn's disease.

UNDERSTANDING ANTIBODIES

There are 4 categories of pathogens:

1. Bacteria
2. Viruses
3. Pathogenic Fungi
4. Parasites

- We develop antibodies to these after an infection/exposure

UNDERSTANDING ANTIBODIES

1. These 4 pathogens are living organisms, have cell walls, etc.
2. Antibodies to these mean past exposure.
3. Toxins are not alive, do not have cell walls, etc.
4. Antibodies to toxins indicate current immune reaction and/or colonization, not exposure sometime in the past.
5. Once the toxins are gone from the body, the antibody reaction fades away.

MYCOTOXINS IN FOOD ARE EXCRETED IN URINE

- Low levels of mycotoxins are found in many foods: cereals, beans, fruits, grape juice, beer, coffee, etc. per the WHO and the United Nations Food and Agricultural Organization.
- For that reason, mycotoxins can be found in the urine in ppb in healthy people.

FOODS AND MYCOTOXINS

- Plant based foods, meat, and dairy products may contain mycotoxins: this is in countries lacking implementation of adequate food safety policies.
- Mainly in rural parts of certain African countries and rural China after harvesting with poor storage.

FOOD MYCOTOXINS ARE NOT A CONCERN

- The amounts of mycotoxins tested in foods have been shown in numerous studies to be below the Tolerable Daily Intake (TDI) set by the FDA, the European Food Safety Authority (EFSA) and the U.N. Food and Agricultural Organization/World Health Organization Joint Expert Committee on Food Additives.

WHY IS URINE TESTING NOT ACCURATE NOR HELPFUL?

- A recent study from July 2021 by Frey et al that showed one to four mycotoxins were found in both pasteurized and unpasteurized milk from cows: 91% of all the milk tested had at least one mycotoxin, and 30% had two to four mycotoxins. However, all the mycotoxin levels were well below TDI, and easily excreted in urine, as are most mycotoxins found in beverages and foods.

ACCORDING TO DR. A. VOJDANI, PHD, MSC, CLS, THE FOLLOWING POINTS SHOULD BE CONSIDERED BEFORE DECIDING TO USE URINE LEVEL OF MYCOTOXINS AS AN INDICATION OF EXPOSURE TO MOLD IN A WATER-DAMAGED BUILDING:

- What is the source of the mycotoxins detected in the urine?
- Why is the detection of mycotoxins in the urine not an indication of neo-antigen formation between mycotoxins and human tissue antigens that play a role in pathophysiology of autoimmune and neuroimmune diseases?
- This is because most of the mycotoxins detected in urine originates from food, and this is why the detection of mycotoxins in urine is not an indication of body burden of mycotoxins and should not be used as biomarkers of exposure to mycotoxins in water-damaged buildings.

MYCOTOXINS AND LYME DISEASE

› Altern Ther Health Med. 2019 Jul;25(4):8-10.

Lyme Disease and Mycotoxicosis: How to Differentiate Between the Two

Andrew W Campbell

PMID: 31202204

TREATMENT

First and foremost:

The first rule of toxicology: get the patient away from the toxin or the toxin away from the patient.

BINDERS

- Animal studies in pigs, rabbits, sheep, broiler chickens, ducks, turkeys, rats, and mice have shown that specified binders may remove mycotoxins under certain precise laboratory conditions in these animals. However, there are no medical or scientific published studies to support their use in humans.

THIS IS A COMMON EMAIL I RECEIVE FROM PATIENTS:

- I have seen over 5 naturopathic doctors. They prescribed herbs, binders, and Cholestyramine. These things just made me feel even worse. Do you know anyone that can help me?

BINDERS INTERFERE WITH THESE MEDICATIONS

- Estrogens and progestins
- Oral diabetes drugs
- Penicillin G
- Phenobarbital
- Spironolactone
- Tetracycline
- Thiazide-type diuretic pills
- Thyroid medication
- Warfarin
- Digitalis

TESTS THAT ARE EITHER SHAM OR NOT HELPFUL

- Neuroquant: this is a test for brain atrophy. It is a test for Alzheimer's disease and brain trauma. SPECT is much useful in clinical medicine.
- MARCoNS: There is no evidence in medicine to support MARCoNS diagnosis and treatment. It is not recognized by medical science.

ANOTHER SHAM TEST FOR MOLDS AND MYCOTOXINS: HLA-DR

- There are some who claim that this genetic testing is significant in patients affected by molds and mycotoxins. It is supposed to affect 25% of the population.
- 25% of 330 million Americans (U.S. Population) = 82.5 million Americans who are supposed to be affected by this.
- There are no published studies relating HLA-DR to anything with molds/mycotoxins.
- There is no research, it is not taught in any medical institution and has no basis in medical science.

ANOTHER SHAM TEST FOR MOLDS AND MYCOTOXINS: HLA-DR

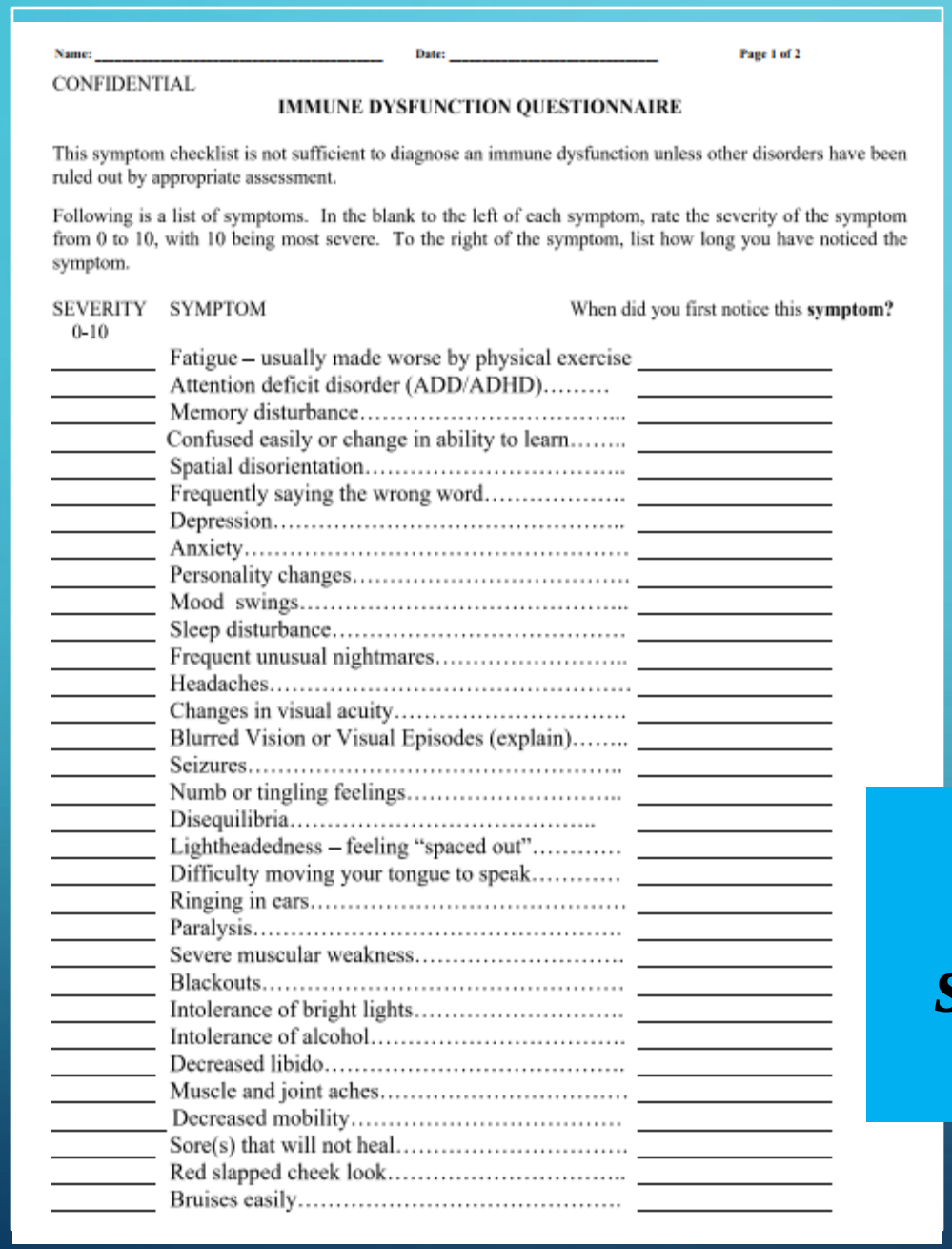
- I present to you another disease that affects 34 million Americans, almost 50 million less.
- It is known throughout the world and is taught in all medical institutions: DIABETES
- Yet this HLA-DR that supposedly affect 50 million more Americans, 82 million, is not studied anywhere and there is nothing in medicine and science linking it to molds/mycotoxins.

OAT TESTING IN URINE: NOT VALID FOR MOLDS

- Organic Acid Test, popularly known as OAT, **measures the levels of organic compounds in urine** that are produced in the body as a part of many vital biochemical pathways. It's used to check for RARE inborn genetic defects of metabolism, most often in newborns. It is a useless test for molds.

TOOLS: USE THE PATIENT QUESTIONNAIRE

- The patient questionnaire is a tool to help guide the clinician.
- It includes the first 2 pages of symptoms commonly found in patients suffering from molds and mycotoxins.
- The patient scores the symptoms from 1-10, 10 being the worse.
- The patient fills in when symptoms first started.



Name: _____ Date: _____ Page 1 of 2

CONFIDENTIAL

IMMUNE DYSFUNCTION QUESTIONNAIRE

This symptom checklist is not sufficient to diagnose an immune dysfunction unless other disorders have been ruled out by appropriate assessment.

Following is a list of symptoms. In the blank to the left of each symptom, rate the severity of the symptom from 0 to 10, with 10 being most severe. To the right of the symptom, list how long you have noticed the symptom.

SEVERITY 0-10	SYMPTOM	When did you first notice this **symptom?**
_____	Fatigue – usually made worse by physical exercise	_____
_____	Attention deficit disorder (ADD/ADHD).....	_____
_____	Memory disturbance.....	_____
_____	Confused easily or change in ability to learn.....	_____
_____	Spatial disorientation.....	_____
_____	Frequently saying the wrong word.....	_____
_____	Depression.....	_____
_____	Anxiety.....	_____
_____	Personality changes.....	_____
_____	Mood swings.....	_____
_____	Sleep disturbance.....	_____
_____	Frequent unusual nightmares.....	_____
_____	Headaches.....	_____
_____	Changes in visual acuity.....	_____
_____	Blurred Vision or Visual Episodes (explain).....	_____
_____	Seizures.....	_____
_____	Numb or tingling feelings.....	_____
_____	Disequilibria.....	_____
_____	Lightheadedness – feeling "spaced out".....	_____
_____	Difficulty moving your tongue to speak.....	_____
_____	Ringing in ears.....	_____
_____	Paralysis.....	_____
_____	Severe muscular weakness.....	_____
_____	Blackouts.....	_____
_____	Intolerance of bright lights.....	_____
_____	Intolerance of alcohol.....	_____
_____	Decreased libido.....	_____
_____	Muscle and joint aches.....	_____
_____	Decreased mobility.....	_____
_____	Sore(s) that will not heal.....	_____
_____	Red slapped cheek look.....	_____
_____	Bruises easily.....	_____

Tools

IMMUNE DYSFUNCTION QUESTIONNAIRE

Page 1

Excellent screening tool

TAKE HOME MESSAGE:

- If you have a patient that has been diagnosed with CFS or fibromyalgia, or has chronic Lyme disease, or who has seen a number of clinicians without relief and continues to be ill, think of molds in the home and/or workplace and mycotoxins.
- Mycotoxin antibodies may give you the answer.

FOR MORE INFORMATION

immunedoctor@gmail.com

- For a copy of the patient questionnaire, and:
- “Mold, Mycotoxins, the Brain, the Gut, and Misconceptions”, Campbell AW, Weinstock L. Alt Ther Health Med. 2022 Mar;28(3)8-12.

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