CHAPTER 21 EXCERPT ONLY
Why Isn’t My Brain Working?

A revolutionary understanding of brain decline and effective strategies to recover your brain’s health

By Datis Kharrazian, DHSc, DC, MS

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INTENDED USE STATEMENT

The content of this book is intended for information purposes only. The medical information in this book is intended as general information only and should not be used in any way to diagnose, treat, cure, or prevent disease. The goal of the book is to present and highlight nutritionally significant information and offer suggestions and protocols for nutritional support and health maintenance.

It is the sole responsibility of the user of this information to comply with all local and federal laws regarding the use of such information, as it relates to the scope and type of the user’s practice.
In this section I will go over the bare-bone basics of what you need to know to get your brain back online.

One of the most common complaints I received after the thyroid book came out was that it was too hard to understand or too difficult to implement. The truth is this material is complex and difficult to understand. I have done my best to distill extremely intricate immune and neurological mechanisms into information people can apply, but I agree it may not be easy to grasp at first, even for practitioners (which is why the good practitioners study the material regularly instead of just showing up at seminars). Throw in poor brain function and it can be downright overwhelming.

Although working with a qualified practitioner is frequently necessary, you must realize the bulk of the work falls on your shoulders. Hippocrates said, “Let food be thy medicine and medicine be thy food.” When it comes to addressing your brain health, your first and most important step—and probably your most difficult—is changing your diet.

Take charge of your brain by taking charge of your diet

If you want your brain to work you have to change your diet. This can make it more difficult to eat out, eat at friends’ houses, grab easy snacks, or eat dirt-cheap. If you are going to complain endlessly, then this program is probably not right for you. Your negative attitude will raise stress levels and inflammatory cytokines. Also, if you are working with a practitioner, he or she will not be able to give you the best care if you derail your progress by eating foods that trigger an inflammatory reaction. If you have an eating disorder, I realize that can make this
difficult. That is a topic for a different book, but every effort counts, and it may be worth getting professional help or group support.

That’s the bad news. The good news is many, many people experience profound improvement on a stricter diet and love following it. Many also experience devastating rebounds through cheats or accidental exposures, which helps compliance. The other good news is, thanks to the Internet, you can find support and friendship from online tribes of people on the same path.

GO GLUTEN-FREE (CHAPTER EIGHT)

At the very least you should adopt a strict gluten-free diet. No food is a more potent trigger of neurological problems and autoimmunity than gluten.

Standard lab testing for gluten is not reliable, as most labs only test for antibodies to alpha gliadin and intestinal transglutaminase (TG2). A more complete screen, such as Cyrex Labs’ Wheat/Gluten Proteome Sensitivity and Autoimmunity Panel Array 3, includes:

- alpha gliadin
- omega gliadin
- gamma gliadin
- deamidated gliadin
- wheat germ agglutinin (WGA)
- glutenormorphin
- prodynorphin
- transglutaminase-2 (TG2)
- transglutaminase-3 (TG3)
- transglutaminase-6 (TG6)

If your brain is not working, a gluten-free diet is your first step toward better brain health.

THE LEAKY GUT DIET (CHAPTER NINE)

In many cases, going gluten-free alone is not enough. Many people, particularly those with autoimmune and neurological issues, have
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• Dairy: milk, cream, cheese, butter, whey. Ghee is OK for many people, but it depends on the individual

• Eggs or foods that contain eggs (such as mayonnaise)

• Soy: soy milk, soy sauce, tofu, tempeh, soy protein, etc.

• Alcohol

• Lectins— a major promoter of leaky gut—found in nuts, beans, soy, potatoes, tomato, eggplant, peppers, peanut oil, peanut butter and soy oil, among others

• Instant coffee: Many brands of instant coffee are contaminated with gluten

• Processed foods

• Canned foods

Foods to eat

You need to give yourself more time to shop and prepare so you always have something on hand to eat or when you go out. For resources visit my website.

• Most vegetables (except tomato, potatoes, and mushrooms): asparagus, spinach, lettuce, broccoli, beets, cauliflower, carrots, celery, artichokes, garlic, onions, zucchini, squash, rhubarb, cucumbers, turnips and watercress, among others.

• Fermented foods: sauerkraut, kimchi, pickled ginger, fermented cucumbers, coconut yogurt, kombucha, etc. You will probably need to make your own or buy one of the few brands that are genuinely fermented and free of sugars or additives.

• Meats: fish, chicken, beef, lamb, organ meats, etc. Best choices are grass-fed and pastured meats from a local farm. Second best is organic. Avoid factory-farmed meats that contain antibiotics and hormones. For a source of good meat near you, contact your local Weston A. Price chapter leader.

• Low-glycemic fruits: apricots, plums, apples, peaches, pears, cherries and berries, to name a few.

• Coconut: coconut oil, coconut butter, coconut milk, coconut cream

• Herbal teas

• Olives and olive oil
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**Food sensitivity panel**
You may also choose to do a food sensitivity panel to confirm whether certain foods are causing an immune reaction. The Cyrex Labs Gluten-Associated Sensitivity and Cross Reactive Foods Array 4 tests for these various food reactions.

**SUPPLEMENTS TO SUPPORT THE LEAKY GUT DIET (CHAPTER NINE)**
This diet is very therapeutic in itself. However, you may want to further support this diet with various nutritional and botanical compounds to tame inflammation and facilitate repair of the gut lining.

**Nutrients to support the gut lining**
- L-glutamine
- Deglycyrrhizinated licorice
- Aloe leaf extract
- Tillandsia
- Marshmallow extract
- MSM
- Gamma oryzanol
- Slippery elm bark
- German chamomile
- Marigold flower extract

**Probiotics**
Probiotics can be an important part of modulating the gut’s immune system and restoring a healthy balance of gut flora.
- Saccharomyces boulardii
- Lactobacillus sporogenes
- DDS-1 Lactobacilli acidophilus
- Arabinogalactan
Detoxing yeast, bacteria, and parasites

Sometimes eradicating yeast and bacterial overgrowths and parasites is a necessary part of restoring gut health. However, it’s also necessary to tread gently in this territory. Too aggressive of a detox makes some people very ill with symptoms of nausea, vomiting, diarrhea, or other effects. Always start slowly and with small doses when taking gut detoxifying compounds.

Yeast and bacterial overgrowth
- Undecylenic acid
- Caprylic acid
- Uva ursi
- Cat’s claw
- Pau d’arco

Parasites
- Wormwood extract
- Olive leaf extract
- Garlic extract
- Black walnut extract

H. pylori and bacterial overgrowth
- Berberine
- Yerba mansa
- Oregano extract

STIMULATE THE VAGUS NERVE (CHAPTER NINE)

We know the health of the gut profoundly impacts brain health and function. Likewise, poor brain function can impact gut function by impairing activity of the vagus nerve, which handles communication between the brain and gut. Symptoms of poor vagal function include poor intestinal motility (constipation), poor digestive enzyme production (bloating, indigestion), floating stool or undigested food in
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stool, and symptoms of poor liver detoxification. You can improve the plasticity and function of the vagus nerve with some simple exercises:

- **Gargling:** Drink several large glasses of water per day and gargle each sip until you finish the glass of water. You should gargle long enough and deep enough to make it a bit challenging. Do this exercise for several weeks to help strengthen the vagal pathways.
- **Sing loudly:** Sing as loud as you can when it's appropriate. This works the muscles in the back of the throat to activate the vagus.
- **Gag:** Lay a tongue blade on the back of your tongue and push down to activate a gag reflex.

Gag reflexes with the tongue depressors are like doing push-ups for the vagus while gargling and singing loudly are like doing sprints. You need to perform them for several weeks to produce change, just as you would with weight training.

**Use a coffee enema for poor motility and to improve vagal plasticity**

In patients with brain degeneration and regular constipation, I encourage them to perform daily coffee enemas. Purchase an enema bag with an anal insert tube and a lubricant such as KY Jelly. Make organic coffee and cool it to room temperature (avoid instant coffee as it may be contaminated with gluten). Fill the enema bag with coffee and lubricate the anal tip of the tube. You will then need to lie on your right side. It is best to perform this in the bathtub in case you spill anything. Insert the tube into your anus and raise the bag with your hand so it is higher than your head. The higher you raise the bag the faster the bag will empty.

Once the coffee has drained from the bag into your intestines try to hold the contents in your bowel for five to 10 minutes. You will have urges to have a bowel movement, but hold the contents as long as you can.
STABILIZE BLOOD SUGAR (CHAPTER FIVE)
Balancing blood sugar is vitally important to brain health. Symptoms of both low blood sugar and high blood sugar are signs your brain may be suffering from damage caused by a blood sugar imbalance.

SYMPTOMS OF BLOOD SUGAR IMBALANCES

Reactive hypoglycemia symptoms (low blood sugar spikes):
- Increased energy after meals
- Craving for sweets between meals
- Irritability if meals are missed
- Dependency on coffee and sugar for energy
- Becoming lightheaded if meals are missed
- Eating to relieve fatigue
- Feeling shaky, jittery, or tremulous
- Feeling agitated and nervous
- Becoming easily upset
- Poor memory, forgetfulness
- Blurred vision

Insulin resistance symptoms (high blood sugar spikes):
- Fatigue after meals
- General fatigue
- Constant hunger
- Craving for sweets not relieved by eating them
- Must have sweets after meals
- Waist girth equal to or larger than hip girth
- Frequent urination
- Increased appetite and thirst
- Difficulty losing weight
- Migrating aches and pains
Stabilizing blood sugar

- Eat a breakfast of high quality protein and fats.
- If you have hypoglycemia, eat a small amount of protein and/or healthy fat every two to three hours.
- Find your carbohydrate tolerance and stick to it. If you feel sleepy or crave sugar after you eat, you have eaten too many carbohydrates. You can also use a glucometer to check your fasting blood glucose, which ideally should be in the mid- to high-80s, and at least between 80–100.
- Never eat high-carb foods without some fiber, fat, or protein. These will slow down the rate at which the glucose is absorbed into the bloodstream and help prevent “insulin shock.”
- Do not eat sweets or starchy foods before bed. This is one of the worst things the hypoglycemic person can do. Your blood sugar will crash during the night, long before your next meal is due. Chances are your adrenals will kick into action, creating restless sleep or that 3 a.m. wake up with anxiety.
- Avoid all fruit juices and carrot juice. These can be more sugary than soda, and will quickly have you crashing.
- Avoid or limit caffeine.
- Eat a well-balanced diet consisting mostly of vegetables, and quality meats and fats.
- Eliminate food allergens and intolerances.

Nutrients to support blood sugar balance

Your diet is the most profound way to stabilize blood sugar. However, certain nutritional compounds can help stabilize hypoglycemia or insulin resistance.

Nutrients to support a healthy response to hypoglycemia (low blood sugar)

- Chromium
- Bovine adrenal gland
- Choline bitartrate
- Bovine liver gland
Nutrients to support a healthy response to insulin resistance (high blood sugar)

- Gymnema sylvestre
- Banaba leaf extract
- Maitake mushroom
- Bitter melon
- Opuntia streptacantha Lemaire
- Guar gum
- Pectin
- Chromium
- Vanadium
- Alpha lipoic acid
- Vitamin E (tocopherols)
- Magnesium
- Biotin
- Zinc
- Inositol
- Niacin
- L-carnitine

Sometimes a person will swing back and forth between insulin resistance and hypoglycemia. In these cases I recommend taking nutritional compounds for insulin resistance with meals, and nutritional compounds for hypoglycemia between meals.
It’s important to work with a qualified health care practitioner so you take the right nutrients and botanicals in the right amounts. Taking the wrong nutrients for your blood sugar condition has the potential to make your condition worse.

**DAMPEN STRESS (CHAPTER SIX)**

If you suffer from the symptoms below, stress may be negatively impacting your brain health:

- Always having projects and things that need to be done
- Never having time for yourself
- Not getting enough sleep or rest
- Not having enough time or motivation to get regular exercise
- Not accomplishing your life’s purpose

Reducing inflammation and dampening the stress response are a couple of ways to address the effects of stress on brain health. This means reducing dietary stressors with the leaky gut diet, managing lifestyle stressors, and addressing health imbalances that contribute to stress.

**Nutritional compounds to help manage stress**

- Phosphatidylserine: Dampens the influence of stress on the brain. You can take it orally, but I prefer liposomal methods of phosphatidylserine delivered through the skin.
- Herbal adrenal adaptogens: Powerful support when chronic stress is a problem. These herbs work on the stress pathways on the brain, particularly in the hippocampus. You can use them individually, but they have a greater synergistic effect when used in combination.
  - Panax ginseng extract
  - Ashwagandha
  - Holy basil extract
  - Rhodiola rosea
  - Eleuthero
One of the most vital nutrients for the brain is oxygen. If you suffer from any of the symptoms below your brain may not be getting optimal amounts of oxygen:

- Low brain endurance and poor focus and concentration
- Must exercise or drink coffee to improve brain function
- Cold hands and feet
- Poor nail health or fungal growth on toes
- Must wear socks at night
- White nail beds instead of bright pink
- Cold tip of nose

Chronic stress, anemia, smoking, low blood pressure, high blood pressure, poor lung function, poor cardiovascular function, and any mechanism that impairs blood vessels, such as diabetes, can impair the flow of blood to the brain.

Nutritional compounds for brain oxygenation

Although these herbal compounds have been shown to dilate cerebral arteries, they do not increase blood pressure; in fact they can do the opposite.

- Feverfew extract
- Butcher’s broom extract
- Ginkgo biloba
- Huperzine
- Vinpocetine

Nitric oxide

Nitric oxide is a chemical-signaling molecule in the body involved with communication in the nervous, immune, and vascular systems. eNOS and nNOS are anti-inflammatory forms of nitric oxide while iNOS is inflammatory and associated with tissue damage from autoimmune disease.
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Raising your heart rate through high-intensity aerobic exercise for at least five minutes in the morning is one way to release anti-inflammatory eNOS. Use good judgment to work within your limits and not harm yourself.

**Nutritional compounds that support nitric oxide modulation**

- ATP (Adenosine 5’-triphosphate)
- Huperzine A
- Xanthinol niacinate
- Alpha-Glycerylphosphorylcholine (Alpha GPC)
- Vinpocetine
- N-acetyl L-carnitine

**Blood pressure**

Both low and high blood pressure can impact the amount of oxygen delivered to your brain. Your blood pressure should be around 120/80. If the first or second number is higher or lower by 10 points, then your blood pressure is abnormal. The greater the amount of deviation from 120/80 the worse it is.

**Low blood pressure**

For patients with low blood pressure I recommend glycyrrhiza, a natural compound from licorice that increases the hormone aldosterone, which helps you retain your sodium and can help raise low blood pressure. Many people can also raise their blood pressure to normal by salting their food, supplementing with licorice root, and managing hypoglycemia.

**High blood pressure**

If you have high blood pressure you must cut salt from your diet, exercise routinely, and reduce your stress. You can also take natural compounds such as magnesium and potassium to help bring your blood pressure down. Supporting nitric oxide modulation may also help reduce your blood pressure.
DAMPEN BRAIN INFLAMMATION (CHAPTER TEN)

Inflammation in the brain doesn’t cause pain, so most people aren’t aware it may be an issue for them. However, it accelerates brain degeneration and is associated with the following symptoms:

• Brain fog
• Unclear thoughts
• Low brain endurance
• Slow and varied mental speeds
• Loss of brain function after trauma
• Brain fatigue and poor mental focus after meals
• Brain fatigue promoted by systemic inflammation
• Brain fatigue promoted by chemicals, scents, and pollutants

Brain inflammation is considered a model for chronic depression and other mood disorders. Because the brain’s immune cells, microglia, have no off switch, inflammation in the brain can continue long after the insult. Factors that cause brain inflammation include:

• Diabetes and high-carbohydrate diets, which lead to the production of glycosylated end products that activate the microglia cells
• Lack of oxygen from poor circulation, lack of exercise, chronic stress response, heart failure, lung disorder, anemia
• Previous head trauma
• Neurological autoimmune reaction
• Dietary gluten for those who are gluten intolerant
• Low brain antioxidant status
• Alcohol and drug abuse
• Environmental pollutants
• Systemic inflammation
• Inflammatory bowel conditions
• Compromised blood-brain barrier
**Leaky brain challenge**

You can perform the Leaky Brain Challenge to determine whether your blood-brain barrier is permeable.

Take 800–1,000 mg of GABA and give yourself a two-to-three hour window to see whether it affects you. It is best to take GABA between 6 p.m. and 9 p.m., so you can sleep it off if it sedates you. If GABA causes relaxation, calming, and sedation, don’t keep taking it regularly or you risk shutting your GABA receptor sites and a retest won’t be accurate.

If the GABA causes anxiety, irritability, or panic this also indicates a permeable blood-brain barrier (for reasons explained in the neurotransmitter section). Eating some protein may help alleviate these symptoms.

Feeling no change after taking GABA is a good sign your blood-brain barrier is intact. GABA should produce no symptoms, as GABA “bounces off” a healthy blood-brain barrier.

**Taming brain inflammation**

The most important steps to reducing brain inflammation are to address food intolerances, blood sugar imbalances, gut infections and inflammation, unmanaged autoimmune disease, poor brain oxygenation, chronic stress, hormonal imbalances and deficiencies, and more.

While addressing these factors you can use flavonoids that have been shown to dampen the microglia cells and brain inflammation. They include:

- Apigenin
- Luteolin
- Baicalein
- Resveratrol
- Rutin
- Catechin
- Curcumin
A common area of autoimmune attack is the brain and the nervous system, which can create diverse symptoms, including weakness, poor brain function, dizziness, burning sensations in the hands and feet, obsessive compulsive disorder, and more. Things to look for include:

- Brain and neurological symptoms with a history or family history of autoimmune disease
- Brain and neurological symptoms at an early age not associated with age-related brain degeneration
- History of celiac disease or gluten sensitivity
- Brain and neurological symptoms and signs with a relapsing and remitting pattern associated with stress, poor sleep, or immune activation

The main clues a person may be suffering from neuroautoimmunity are a history of another autoimmune disease, gluten sensitivity or celiac disease, and symptoms of neurological dysfunction that appear early in life. This includes children and adults under the age of 50, the earliest symptom being autism.

Three stages of autoimmunity

- **Silent autoimmunity**: The immune system is attacking body tissue but does not result in any significant loss of tissue or even symptoms. We can identify silent autoimmunity through elevated tissue antibodies in the blood.

- **Autoimmune reactivity**: The autoimmune reactions have progressed to the point that enough tissue has been destroyed so that signs, symptoms, or loss of function are noticeable. However, the condition is not so advanced as to be labeled an autoimmune disease.

- **Autoimmune disease**: Symptoms and loss of tissue are significant. The loss of tissue is also advanced enough to be identified with imaging studies and other tests, such as nerve conduction studies.
Many people stay in the autoimmune reactivity stage for years without a diagnosis. Some may never develop enough destruction of their nervous system to be diagnosed, yet suffer significant signs and symptoms that impair quality of life. Many eventually progress to various neurological diseases.

**Testing for neurological autoimmunity**

We identify autoimmunity by screening for antibodies against the proteins of various nerve cell structures. Many labs offer tests for neurological tissue antibodies, but I have found that Cyrex Labs does the most complete and sensitive evaluation. Their neurological autoimmunity panel includes:

- **Myelin basic protein antibodies**: autoimmune reactions to the outer covering of nerve cells
- **Asialoganglioside antibodies**: autoimmune reactions to sugar and protein chain clusters on the surface of nerve cells
- **Alpha and beta tubulin antibodies**: autoimmune reactions to proteins found in neurons
- **Synapsin antibodies**: autoimmune reactions to chemical proteins found within nerve cells that regulate nerve cell communication called a synapse
- **Glutamic acid decarboxylase (GAD) antibodies**: autoimmune reactions to the enzyme in the body that produces the inhibitory neurotransmitter GABA
- **Cerebellum antibodies**: autoimmune reactions to a specific part of the brain called the cerebellum involved with balance and muscle movement calibration

**GAD autoimmunity**

GAD autoimmunity is the most common neuroautoimmunity and creates the most specific symptoms because it prevents production of GABA, which is responsible for calming the nervous system. Elevated GAD antibodies are linked to OCD, motion sickness, vertigo, autism, and “stiff man syndrome.”
In addition to avoiding gluten, people with positive GAD antibodies should also avoid foods high in artificial glutamates.

An autoimmune reaction to GAD is more common among those with a gluten intolerance or celiac disease. Gluten intolerance and celiac disease should always be considered in the case of persistent symptoms of poor GABA activity.

**How high are your neurological antibodies?**

Antibody levels typically are not clinically significant because antibodies themselves do not destroy tissue. However, researchers have found neurological antibodies themselves are destructive. This is unique in immunology because it means the antibody count indicates the degree of destruction that may be occurring.

**Managing neurological autoimmunity**

Although there is no cure for autoimmunity it can be modulated, or “tamed” with proper lifestyle, dietary, and nutritional strategies.

You may need to make significant changes to preserve your brain health, such as changing your job, relationship, where you live, or some other important part of life. It is important for you to pay attention to what triggers and dampens your autoimmunity.

**Strategies to dampen autoimmunity**

**Increase opioids:** Natural opioids activate TH-3 cells, which helps dampen autoimmunity. A positive mental attitude, love, appreciation for life, positive self-esteem, and healthy levels of exercise are ways to increase opioids. On the other hand, a negative attitude, violence, poor relationships, and internal mental stress are examples of ways to promote IL-6, which activates TH-17 and promotes autoimmunity.

**Stabilize blood glucose levels:** If you have autoimmunity you cannot let your blood glucose spike or drop sharply. Blood sugar spikes and drops raise IL-6 and TH-17, promoting autoimmunity.

**Avoid gluten:** Gluten is a potent trigger for neurological autoimmunity for many people.
**Improve gut-brain axis:** The health of the brain depends on gut health. Addressing gut inflammation and the gut-brain axis can help manage neurological autoimmunity.

**Nutritional compounds to dampen neurological autoimmunity**

**Vitamin D:** Vitamin D has been shown to increase TH-3 activity, thus dampening autoimmunity. Typical doses of vitamin D for autoimmunity can be anywhere from 5,000 to 10,000 IU per day.

Test your vitamin D levels with a serum 25-hydroxy vitamin D test. Most people with autoimmunity have low levels of vitamin D when tested. Your level should be around 50 ng/mL. Levels above 100 ng/mL may indicate a vitamin D overload.

**Glutathione:** Glutathione preserves and protects neurons against inflammation, supports TH-3 responses, supports regeneration of the blood-brain barrier and the intestinal barrier, and is a natural chelator that can bind to environmental compounds such as heavy metals and pollutants.

Glutathione recycling recycles existing glutathione for reuse and raises glutathione levels inside the cells. Compounds that have been shown to support this mechanism include:

- Cordyceps
- N-acetylcysteine
- Gotu kola
- Milk thistle
- L-glutamine
- Alpha lipoic acid

These are all TH-1 and TH-2 neutral and because they support TH-3, they have the potential to dampen an overactive TH-1 or TH-2 response in autoimmunity.

To boost overall levels of glutathione I use S-acetyl-glutathione, a form that can be absorbed orally. Oral doses can start at 300 mg and per day and go up to several thousand milligrams. However, it is not cheap and the amount used may depend on what you can afford. I suggest using about 1000 mg a day in most cases, although I suggest much higher
doses in certain conditions. I still recommend liposomal glutathione cream for use in localized areas, such as over an inflamed joint or over the thyroid of someone with an autoimmune thyroid condition.

**Resveratrol and curcumin:** Curcumin and resveratrol dampen the two major inflammatory pathways in autoimmunity, TH-17 and NF-kappaB. You have to take high enough amounts of each of these in order to notice an effect. In studies subjects were given up to 400 mg of resveratrol and 800 mg of curcumin daily, however the necessary dose is different for everyone, so don't assume that is the correct dose for you.

**Compounds to support gut repair and brain inflammation:** You may also want to take compounds to support intestinal permeability and dampen brain inflammation, explained in Chapter Nine, the gut-brain axis chapter.

**Supplements to avoid:** Be sure to avoid supplements made with immune-reactive ingredients (often used as fillers), whole-food supplements that may contain gluten, stimulate the TH-1 or TH-2 systems. Botanicals that stimulate TH-1 include echinacea, astragalus, lemon balm (*melissa officinalis*), and maitake mushrooms. Botanicals that stimulate TH-2 include pine bark extract, grape seed extract, green tea extract, acai berry extract, and Pycnogenol®. These are antioxidant compounds with immune activating properties; however, most flavonoids and nutritional antioxidants do not stimulate immunity.

**NEUROTRANSMITTER SUPPORT (CHAPTER TWELVE)**

Although neurotransmitter support can often promote brain health, it should not be viewed as a one-size-fits-all approach that will work for everyone or every condition.

**Dosing neurotransmitter support**

Supporting neurotransmitter activity is dependent on symptoms, not body size. Gradually increase your dose until you notice an improvement. Once you no longer feel any improvement, go back the previous dose at which you felt improvement. How often you take support also varies with the individual.
What if you crash and burn on neurotransmitter support?

If supporting neurotransmitter activity causes intense fatigue or other symptoms it may mean the neurons are too close to threshold. In these cases, use even less while addressing such issues as brain inflammation and oxygenation.

**SUPPORT ACETYLCHOLINE (CHAPTER THIRTEEN)**

**Symptoms of impaired acetylcholine activity include:**

- Loss of visual and photographic memory
- Loss of verbal memory
- Memory lapses
- Impaired creativity
- Diminished comprehension
- Difficulty calculating numbers
- Difficulty recognizing objects and faces
- Slowness of mental responsiveness
- Difficulty with directions and spatial orientation

Foods that impact acetylcholine activity are high in natural fats, particularly animal fats (processed vegetable oils are not beneficial to acetylcholine activity).

**Foods rich in choline include:**

- Liver and organ meats
- Egg yolk
- Beef
- Tofu
- Nuts
- Cream
- Milk with fat (not non-fat or skim milk)
- Fatty cheeses
Nutritional compounds that support acetylcholine activity:
- Alpha-GPC
- Huperzine A (from a standardized extract of *Huperzi serrate*)
- N-acetyl L-carnitine hydrocholride
- Pantothenic acid (as calcium pentothenate)

SUPPORT SEROTONIN ACTIVITY (CHAPTER FOURTEEN)

Symptoms of impaired serotonin activity:
- Loss of pleasure in hobbies and interests
- Feelings of inner rage and anger
- Feelings of depression
- Difficulty finding joy from life pleasures
- Depression when it is cloudy or when there is lack of sunlight
- Loss of enthusiasm for favorite activities
- Not enjoying favorite foods
- Not enjoying friendships and relationships
- Unable to fall into deep restful sleep

Estrogen and serotonin
Estrogen increases serotonin activity in the brain. With symptoms of high serotonin, excess estrogen should be considered. Likewise, low estrogen levels can cause symptoms of low serotonin activity and deficiency.

Nutritional compounds that support serotonin activity:
The following botanicals to increase receptor site sensitivity, ensure the breakdown of used serotonin, and provide necessary cofactors for serotonin production:
- 5-HP
- Tryptophan
- St. John’s wort
- SAMe
- P-5-P
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- Niacinamide
- Magnesium citrate
- Methyl B12
- Folic acid

A serotonin-healthy diet

Although certain foods are rich in tryptophan, most Americans, with the exception perhaps of poorly practicing vegans or junk-food vegetarians, eat enough protein-rich foods to supply precursors for all their amino acids, including serotonin. The bigger issue is general brain health, stress, and blood sugar imbalances, which affect how well the brain is able to uptake and use serotonin precursors.

SUPPORT GABA (CHAPTER FIFTEEN)

Symptoms associated with GABA imbalances:
- Feelings of anxiousness or panic for no reason
- Feelings of dread
- Feelings of inner tension and inner excitability
- Feelings of being overwhelmed for no reason
- Restless mind
- Difficulty turning your mind off when you want to relax
- Disorganized attention
- Worry about things you never had thought of before

Nutritional compounds that support GABA activity:
- Valerian root
- Lithium orotate
- Passion flower extract
- L-theanine
- Taurine
- P-5-P, magnesium, zinc, manganese
Autoimmune GABA disorder

Gluten intolerance, celiac disease, and autoimmune diseases can trigger an autoimmune reaction against the enzyme GAD, which is responsible for making GABA. People with a GAD autoimmunity are also more prone to gluten ataxia, a form of gluten intolerance that manifests in the brain. As with Type I diabetes, positive GAD antibodies are an early screening tool for gluten ataxia.

People with positive GAD antibodies should avoid eating gluten and foods high in artificial glutamates, such as MSG. Many people with GAD autoimmunity can react to foods high in glutamates with extreme anxiety, nervousness, migraines, and more.

This mechanism should be considered when people have an autoimmune disease and symptoms of poor GABA activity, especially if those symptoms have been happening for a long time.

Genetic GABA conversion disorder—alpha-ketoglutaric acid challenge

Some people have a genetic disorder that impacts the production of GABA, thus causing increased anxiety. This is a consideration for someone who has had lifelong GABA deficiency symptoms or a history of anxiety in the family.

How do you know if a GABA deficiency is genetic? Take 3,000 to 4,000 mg of alpha-ketoglutaric acid. For someone with no genetic GABA abnormality, taking this supplement will not produce much in the way of symptoms, perhaps a slight energy increase. For the person with the genetic disorder, however, this surge of glutamates combined with the genetic inability to convert them to GABA will cause symptoms of excitability, nervousness, anxiety, and other GABA-deficiency symptoms. For this person, taking GABA support on a regular, lifelong basis may be helpful.

SUPPORT DOPAMINE (CHAPTER SIXTEEN)

Symptoms of low dopamine:

- Inability to self-motivate
- Inability to start or finish tasks
- Feelings of worthlessness
- Feelings of hopelessness
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- Lose temper for minor reasons
- Inability to handle stress
- Anger and aggression while under stress
- Desire to isolate oneself from others
- Unexplained lack of concern for family and friends

**Nutritional compounds that support dopamine activity**
- Mucuna pruriens
- Beta-phenylethylamine (PEA)
- Blueberry extract, selenium, alpha lipoic acid, N-acetylcysteine
- D, L-Phenylalanine (DLPA)
- N-acetyl L-tyrosine
- Vitamin B6—P-5-P

**Dopamine and hormones**
A common presentation of low dopamine is heavy menstrual cycles in women or low testosterone in men, as well as low libido, erectile dysfunction, and an inability to gain muscle mass. Depression may also be a symptom. Dopamine stimulates luteinizing hormone (LH), a hormone that triggers the release of progesterone in women and testosterone in men. When I see low LH and low progesterone in women and low testosterone in men I always look for dopamine symptoms.

**Dopamine and compliance with a protocol**
A dopamine-deficient person tends to be non-compliant, which is problematic when there is a need to transition into a new diet or lifestyle change. Although underlying issues most likely drive a dopamine deficiency, I may start with dopamine support right away with these patients to boost their motivation so they can follow through with the rest of the protocol. I ask the spouse or another family member to create a strict schedule of when they need to take their dopamine nutritional compounds, leaving as little as possible to their own direction.
ADDRESS HORMONAL IMBALANCES (CHAPTER SEVENTEEN)

Symptoms of hormone imbalance in men (any age):
- Low libido
- Fluctuations in mood, brain function, and focus
- Loss of muscle mass
- Sweating attacks (hot flashes in men)

Symptoms of hormone imbalance in perimenopause:
- Alternating menstrual cycle lengths
- Hot flushes and spontaneous sweating
- Fluctuations in mood, brain function, and focus

Symptoms of hormone imbalance in menopause:
- Vaginal dryness, itching, or pain
- Deterioration in mood, brain function, and focus
- Loss of bone density
- Mental fogginess after perimenopause

When hormones become imbalanced you lose neurotransmitter activity, which affects how you feel, function, and view your life. Hormonal imbalances significantly impact brain inflammation and degeneration and considerably speed aging of the brain.

Hormones and neurotransmitters

Poor neurotransmitter activity may stem from a hormonal imbalance. For instance, simply upping nutritional compounds to boost serotonin activity won’t go the distance in an estrogen-deficient woman.
- Estrogen impacts serotonin receptors in men and women
- Progesterone impacts GABA receptors in men and women
- Estrogen impacts dopamine receptors in women
- Testosterone impacts dopamine receptors in men
- Estrogen impacts acetylcholine receptors in women
- Testosterone impacts acetylcholine receptors in men
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- Thyroid hormones impact all neurotransmitter receptors in men and women

**Hormones and brain function and inflammation**

Healthy hormone levels have been shown to facilitate neuron branching and plasticity, dampen brain inflammation, slow degeneration, and play a role in neuronal migration, the movement of neurons from one place to another to participate in activity and repair.

**Blood sugar and hormones**

Hormone replacement therapy can create dangerously high levels of hormones that can cause a host of other problems, such as receptor site resistance and poor communication between the brain and the hormone glands. It’s better to first address the root cause of the hormonal imbalances, which the majority of the time is a blood sugar imbalance from a high carbohydrate diet.

**High estrogen in men**

A high-carbohydrate diet creates insulin surges that increase the enzyme aromatase in men. Found in body fat, aromatase converts testosterone to estradiol, a form of estrogen. The excess estradiol causes insulin resistance in a vicious cycle. Testosterone creams can increase the production of estrogen. These men may develop breasts or hips, cry easily, and experience changes in their motivation, drive, and personality.

**High testosterone in women**

In women insulin surges from high-carb diets increase the enzyme 17,20 lyase, which increases testosterone production. Excess testosterone causes insulin resistance in a vicious cycle. Common symptoms include PCOS, excess facial hair, and thinning hair on the scalp. The high testosterone also knocks estrogen and progesterone levels out of balance, affecting neurotransmitter activity in the brain and as a result drive, motivation, and personality.

**Cholesterol and hormones**

Hormone production depends on adequate cholesterol. This is a concern today as the trend in cardiology is to push cholesterol levels
below 100. In functional medicine we believe cholesterol under 150 is too low for healthy hormone, brain, and immune function. Clinically we see depression and poor cognition and memory develop in patients with low cholesterol.

**Adrenal stress and hormones**
Microglia cells use DHEA to make testosterone and estrogen. DHEA is made throughout the body, including by the adrenal glands, the liver, the testes, and the ovaries. However, the majority of DHEA comes from the adrenal glands. Many people suffer from low DHEA due to chronic stress. Although DHEA is necessary, supplementing with DHEA is only recommended for a short period of time and when lab testing shows chronic adrenal fatigue. Unnecessarily supplementing with DHEA can exacerbate the conversion of testosterone to estrogen in men and the production of testosterone in women.

**Pregnenolone steal**
Pregnenolone is a substance the endocrine system and the brain use to make hormones. In pregnenolone steal, the body “steals” pregnenolone from cholesterol to make more cortisol instead of sex hormones because the adrenals are fatiguing. This mechanism commonly underlies PMS, infertility, male menopause, and PCOS. A blood sugar imbalance is the most common cause of pregnenolone steal.

Low cholesterol, chronic stress, blood sugar imbalances, low DHEA, and pregnenolone steal are factors that impact hormone balance. Functions that suffer as a consequence include neuronal transmission, myelination (the protective coating glia cells offer to neurons), synaptic activity, neuronal repair, and neuronal migration (the movement of neurons to areas where they’re needed for activity or repair).

**Estrogen and the brain**
Studies have shown estrogen to be very protective of the brain. Estrogen that declines too steeply or rapidly can cause depression and loss of some cognitive function, such as spatial memory, and fine motor skills. These factors are behind many menopausal symptoms, including

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irritability, brain fog, forgetfulness, depression, fatigue, anxiety, stress, insomnia, and a worsening of existing conditions.

Hormone replacement therapy has risks and I believe the underlying mechanism of the imbalance or deficiency should be investigated first. Also, estrogen replacement therapy has not been shown to be protective of the brain in menstruating women. However, for postmenopausal women or women going through menopause who have steep dips in estrogen or chronically low estrogen, hormone replacement therapy can be very protective of the brain.

**Progesterone and the brain**

Progesterone deficiency in women can result in compromised GABA and dopamine activity. Progesterone also dampens microglia cells. Administering progesterone to a man or woman who has just suffered from a head injury or stroke helps with the repair process in the brain and remyelination of nerves (myelin is a protective nerve coating).

**Testosterone and the brain**

Testosterone is essential for healthy function of the male brain. Symptoms of testosterone deficiency include loss of cognitive function, memory problems, and the progression of dementia in Alzheimer’s disease. Less advanced symptoms include depression, lack of drive or motivation, and general “grumpiness.”

Because testosterone influences dopamine activity, testosterone deficiency can increase the risk of Parkinson’s disease in a man. Testosterone also influences the activity of acetylcholine and a deficiency can increase the risk of dementia and Alzheimer’s disease. Research shows low testosterone increases the secretion of beta amyloid protein, which contributes to Alzheimer’s disease.

**Hypothyroidism and the brain**

The most common symptoms among those with low thyroid function are depression, fatigue, and brain fog. Thyroid function affects brain plasticity, neurotransmitter activity, and general brain function. Thyroid hormones also play a vital role in dampening brain inflammation.

Good synapses for serotonin, dopamine, GABA, and acetylcholine all depend on healthy thyroid function. In fact, many of the neurological
symptoms that accompany an unmanaged thyroid condition, such as depression or loss of memory, can be traced back to a breakdown in the neurotransmitter-thyroid connection.

Hashimoto's encephalopathy (HE) is perhaps a worst-case scenario for people with Hashimoto's. Also known as autoimmune dementia, HE is an autoimmune inflammatory brain disorder that causes memory loss and other dementia-like symptoms. HE is suspected when an individual presents with both high TPO antibodies and symptoms of dementia or other neurological disorders. However, because 20 percent of the older population, especially women, may have TPO antibodies, and because myriad other factors can cause neurological symptoms, a practitioner should exercise caution in diagnosing HE.

An unmanaged thyroid condition may accelerate brain degeneration, which is why it is important to appropriately manage hypothyroidism and Hashimoto’s, an autoimmune thyroid condition. Simply taking thyroid hormones does nothing to address a deteriorating thyroid condition caused by Hashimoto’s, which is responsible for 90 percent of hypothyroid cases in the United States. Nor does it address other causes for the failure of thyroid function, such as chronic stress, high testosterone in women, or environmental toxicity. As explained in my thyroid book, the underlying cause of poor thyroid function should always be addressed to prevent further decline in brain health.

**HOW TO GET MORE OUT OF ACUPUNCTURE, CHIROPRACTIC CARE, MASSAGE, AND OTHER FORMS OF BODY WORK AND ALTERNATIVE CARE (CHAPTER EIGHTEEN)**

Music, yoga, massage, acupuncture, chiropractic spinal manipulation, aromatherapy, and other therapies stimulate the brain. Both practitioners and patients have seen improvements in immune strength, mood, energy, digestion, hormone regulation, and more through the use of various therapies.

But whether any therapy will positively impact the brain depends on its pre-existing state. Poor diets, hormonal imbalances, autoimmunity, brain inflammation, environmental pollutants, and other factors degenerate the brain and alter its chemistry. As a result, such therapies may not work well because the brain cannot respond significantly
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enough to affect health. Or the brain may be so degenerated and prone to being overwhelmed that one of these sensory stimulating treatments may fatigue the brain and make the person feel worse.

ESSENTIAL FATTY ACIDS FOR GOOD BRAIN HEALTH (CHAPTER NINETEEN)

Symptoms and signs associated with essential fatty acid deficiency:

- Poor brain function
- Limited consumption of fatty fish, raw nuts and seeds, uncooked olive oil, or avocados
- Regular consumption of fried foods
- Painful joints; chronic pain and inflammation
- Occasional consumption of processed foods with partially hydrogenated fats
- Dry or unhealthy skin
- Dandruff
- Hormone imbalances

Processed vegetable oils and hydrogenated fats can make the membranes of your nerve cells rigid and unresponsive, leading to improper neuron function, brain inflammation and degeneration, and symptoms of poor brain function.

Essential fatty acids (EFAs), on the other hand, are critical for healthy brain function.

Recommended omega-6 to omega-3 ratio

Our hunter-gatherer ancestors ate about a 1:1 ratio of omega-6 to omega-3 fats. Today the average American eats a ratio of as high as 25:1 due largely to sunflower, cottonseed, soybean, sesame, and canola oils in processed foods. This imbalance creates a very inflammatory environment that plays a role in many chronic conditions. Researchers recommend a ratio of omega-6 to omega-3 that ranges from 1:1 to 4:1.
How much EFAs to take

Healthy dietary intake of omega 3 is 3,500 mg for a person eating 2,000 calories per day. If you eat 3,000 calories you should take at least 5,250 mg of omega-3 oils daily. The average EFA capsule is only 1,000 mg. That means if you are eating 3,000 calories a day you should take at least 5 to 6 capsules of fish oil a day to support cardiovascular and brain health and reduce the risk of disease.

EPA and DHA

If your goal is mainly to dampen inflammation, then regular fish oil or a fish oil with concentrated EPA is appropriate. However, if your goal is to positively impact the chemical status of your brain, then consider a fish oil with a high concentration of DHA.

I have found individuals with neurochemical imbalances such as depression, mood swings, bipolar reactions, or poor memory derive more benefit when ratios of DHA to EPA are greater than 1:1. I personally like to use ratios greater than 10:1 or 20:1 of DHA to EPA.

TOXINS AND THE BRAIN (CHAPTER TWENTY)

Symptoms of loss of chemical tolerance:

• Intolerance to smells
• Intolerance to jewelry
• Intolerance to shampoo, lotions, detergents, etc.
• Multiple food sensitivities
• Constant skin outbreaks

The issue isn't how many toxins are in your system but whether your immune system reacts to them. This is the mechanism behind chemical intolerance, multiple chemical sensitivities, and toxin-induced brain degeneration mechanisms that are becoming so common today.
Factors that cause loss of chemical tolerance include:

- Poor glutathione activity
- Breakdown of immune barriers
- Poor regulatory T-cell function
- Chronic inflammation

When we suffer from leaky gut, chronic inflammation, hormonal imbalances, chronic stress, and so on, we are just one major stress event away from falling apart. It can be an IRS audit, a divorce, a lawsuit, a car accident, or other trauma. It's important to maintain your immune health and shore up your defenses so you are better able to withstand the chemical assaults and occasional crises life delivers.

Do not chelate if you have loss of chemical tolerance

Research has shown chelation pulls heavy metals out of body tissue and redistributes them so they make their way into the brain, promoting toxicity, inflammation, neurodegeneration, and sometimes serious side effects. Chelation must not be undertaken until a person demonstrates immune barrier integrity and glutathione status is restored.

Testing for loss of chemical tolerance

We can test for loss of chemical tolerance by measuring antibodies to environmental chemicals. Positive antibodies indicate an overzealous immune reaction to environmental chemicals and thus loss of chemical tolerance. Do not confuse testing for antibodies to chemicals with tests that measure the quantity of chemicals and heavy metals as shown in urine, hair, stool, or with a DMPS challenge.

Cyrex Array 11 Chemical Immune Reactivity Screen:

- Aflatoxin antibodies
- Formaldehyde antibodies
- Trimellitic and phthalic anhydride antibodies
- Isocyanate antibodies
- Benzene antibodies
- Bisphenol-A antibodies
• Tetrabromobisphenol-A antibodies
• Tetrachloroethylene antibodies
• Mercury and heavy metals antibodies

Managing loss of chemical tolerance
We can improve chemical tolerance and protect the brain by supporting the immune barriers, immune regulation, and inflammation. All of these systems are talked about throughout the book.
• Glutathione levels and recycling
• Immune barrier health (gut, blood-brain barrier, and lungs)
• Immune balancing through regulatory T-cell support
• Inflammation in the body and brain

The liver’s role in chemical tolerance
Although the liver cannot metabolize heavy metals or many environmental compounds, it still plays a role in chemical tolerance. If liver function becomes compromised it can increase your toxic load and your chemical intolerance. Likewise, toxic exposures and inflammation can hinder liver metabolic function.

Symptoms of poor liver detoxification:
• Acne and unhealthy skin
• Bloating
• Swelling
• Hormone imbalances
• Weight gain
• Poor bowel function

When a person’s liver Phase II pathway is hindered, two different possibilities exist. One is that an already inflammatory compound, such as an environmental toxin, is made more inflammatory in Phase I. Because a hindered Phase II pathway is not capable of completing the job, this more toxic compound goes back into circulation, where it may activate the immune system and inflammation. The second possibility is
that formerly inactive (inactive means it does not react with the immune system) compounds are metabolized into immune reactive compounds.

**Nutrients to support healthy liver detoxification**

*Phase I and Phase II support:* The compounds that support these pathways are milk thistle seed extract, dandelion root extract, gotu kola extract, panax ginseng, L-glutathione, glycine, N-acetylcysteine, and DL-methionine. In addition to supporting Phase I and Phase II, these compounds also support blood flow and cell growth in the liver.

*Phase II methylation support:* Methylation is a Phase II detox pathway also important for healthy brain function. Nutrients that support methylation include choline, trimethylglycine, MSM, beet root, and betaine HCl. These nutrients also support homocysteine metabolism (for an anti-inflammatory effect) and healthy bile synthesis and metabolism.

*Bile support:* These nutrients support healthy bile synthesis and elimination, to help remove metabolized toxins from the body. They include dandelion root extract, milk thistle seed extract, ginger root, phosphatidylcholine, and taurine.

*Detoxification and glutathione support:* These nutrients not only support liver detoxification, they also support glutathione levels and recycling, which I talked about earlier in the chapter. They include N-acetylcysteine, cordyceps extract, gotu kola extract, milk thistle seed extract, L-glutamine, and alpha lipoic acid.

**When brain function affects liver function**

For people with poor vagal tone, doing exercises that stimulate the vagus nerve can help neurologically activate or reboot liver function. This includes vigorous gargling, singing loudly, or engaging the gag reflex, techniques I describe in more detail in Chapter Nine. Symptoms of insufficient vagal tone include poor intestinal motility (constipation), poor digestive enzyme production (bloating, indigestion), floating stool or undigested food in stool, and symptoms of poor liver detoxification.

The liver also requires dopamine to detoxify properly. Sometimes supporting dopamine can make a huge impact on liver function. Symptoms of low dopamine activity (Chapter Sixteen) include depressed thoughts,
poor motivation, becoming easily angered, slow movements and thoughts, and poor ability to either start or finish tasks.

**IN CONCLUSION: THE BRAIN HEALTH ATTITUDE AND APPROACH**

This book is not about “fixing” or “curing” your brain or chronic health problems. Please be wary of health care practitioners who make such claims. It is also not a definitive source of information—research is continually evolving.

We have learned many new things about how to manage chronic conditions since my thyroid book was published in early 2010, and will surely learn much more in the years to come. My books are merely stopping points along the way, adding to an ever-growing pool of health awareness. This book is also not anti-medicine. Do not doggedly refuse medical treatment that could improve your quality of life or prevent a worsening of your health.

Instead, this book is about is exploring the underlying causes of why your brain isn’t working, why you have a chronic health problem, or why you don’t feel as good as you once did. Far too many people—thousands—have contacted us to say their doctors brush them off, tell them they have depression, or say their lab tests and exams are normal and they’re fine. All of these patients are clearly suffering and not functioning well. Just because medicine does not have a diagnosis or a cure for your condition does not mean it doesn’t exist!

Many important topics were not included in this book, and your investigations may need to delve into those areas. However, I endeavored to share new information, the result of years of exhaustive research and clinical application, that has helped many patients with “mysterious” and chronic conditions. Although we have many success stories, there are also those patients for whom little could be done. We have much yet to learn. However, I have found when a person knows *why* they are losing function or having symptoms, this can provide an enormous sense of relief. The mind needs something to wrap itself around in order to make sense of the chaos.

It is my sincerest hope the information in this book has helped you or a loved one feel and function better or at least make sense of your condition. You are not crazy, making it up, or suffering from an
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anti-depressant deficiency. We are experiencing a critical lack of aware-
ness and care for the explosion of chronic neurological and autoimmune
cases—the “mystery” conditions—in our population today. Medicine
is in desperate need of a revolution to address this population and it
can only come from one place: you. Our health care model needs an
educated and empowered populace to govern their own health and
expect more from their doctors, an advance that will benefit both
patients and doctors.

It is my sincerest hope I have helped you become one of those people,
and that you in turn will help practitioners like myself continue to learn
and grow so we can serve you better.