Brain Health

The human brain is a miraculous creation and the most complex organ in the human body. With nearly 100 billion neurons (nerve or brain cells) and about 100,000 miles of blood vessels, your brain is involved in everything you do. It influences how you think, how you feel, how you act and how you get along with yourself and others. Your brain also determines your personality, character and intelligence and is involved in every decision that you make.[1]

When the brain is healthy, you have a greater capacity to ward of illnesses such as dementia and Alzheimer's. But illnesses such as diabetes, high blood pressure and cardiovascular disease, and obesity can hurt the brain, thereby increasing your chances of developing a brain-related disorder.[2] That's why lifestyle has such a profound impact on your brain health. Simply stated, what you eat and drink, how much you exercise, how well you sleep, the way you socialize, and how you manage stress are all critically important to brain health.[3]

There is a reason why Cleveland Clinic calls exercise, food and nutrition, medical health, sleep and relaxation, mental fitness and social interaction the 6 Pillars of Brain Health.[4] Let's take a closer look.

1. **Exercise.** A recent study, published in *Neurology*, found that women with high cardiovascular fitness, or high stamina, had an 88% lower risk of dementia than women who were moderately fit.[5] Exercise improves blood flow and memory; it stimulates chemical changes in the brain that enhance learning, mood and thinking; so stay fit![6]
2. **Food and Nutrition.** As we grow older, our brain is exposed to more harmful stress due to lifestyle and environmental factors, resulting in a process called oxidation, which damages brain cells. Eat Mediterranean style and mostly plant foods, especially the ones that are **high in antioxidants**; these ward off the harmful effects of oxidation in the brain.
3. **Get Help to Stay Healthy.** Risks such as hypertension, diabetes, obesity, depression, head trauma, higher cholesterol, and smoking all increase the risk of dementia. Seek help to reduce these risks and live the healthy life that you are meant to live.
4. **Sleep and Rest.** Sleep energizes; it improves mood and immunity, and may reduce buildup in the brain of an abnormal protein called beta-amyloid plaque, which is associated with Alzheimer's disease. Rest is a conscious, deliberate slowing down, which allows the nervous system to relax. Activities like meditation, yoga, and other mindfulness practices may help to preserve brain health. Stay positive. Be happy. (See p. X for more about sleep support.)
5. **Mental Fitness.** Your brain, just like your body, needs exercise to remain healthy. When you continue to learn, embrace new activities and hobbies, and develop new skills and interests, you are building and improving your brain reserve, which helps your brain adapt and respond to changes and resist damage.

6. **Social Interaction.** Staying connected to others can protect you against memory loss. Spending time with others, engaging in stimulating conversation, and connecting with family and friends can prevent memory decline.

Top Brain Foods (Foods with high levels of antioxidants)[7]:

1. **Berries of all kinds** … goji berries, wild blueberries, elderberries, blackberries, cranberries, blueberries, strawberries, raspberries. Eat 'em all up!
2. **Dark chocolate** … go easy on this one, and if you do eat it, find the non-dairy kinds.
3. **Walnuts** … interesting that walnuts are shaped like a brain, isn't it? This top nut for brain health has a significantly high concentration of DHA, a type of Omega-3 fatty acid, which has been shown to protect brain health in newborns, improve cognitive performance in adults, and prevent or ameliorate age-related cognitive decline. Just a quarter cup of walnuts provides nearly 100% of the recommended daily intake of DHA.[8]
4. **Artichokes (boiled or steamed)** … Artichokes have some of the highest levels of antioxidants and fiber for a vegetable: Not only do they contain polyphenols, which are disease-fighting compounds, they are also rich in chlorogenic acid – an antioxidant that may reduce the risk of certain cancers, type 2 diabetes and heart disease.[9] Artichokes also contain vitamins C (an antioxidant) and K, magnesium, potassium, and folate, and are known to improve heart and liver health.[10]
5. **Kidney beans (and small red beans)** … In addition to being a rich source of the antioxidant manganese, kidney beans are great source of cholesterol-lowering fiber and high in folate and copper (another antioxidant).[11] Small red beans contain phenolic antioxidants, which are shown to lower cholesterol, blood sugars and the risk of breast cancer.[12]
6. **Cilantro** … As an herb, cilantro is a powerhouse. Cilantro (along with basil) contains the highest levels of the carotenoids – beta-carotene and beta-cryptoxanthin – as well as lutein and zeaxanthin, all antioxidants.[13] Plus, it is anti-inflammatory, anti-cancer, and a natural detoxifier to boot![14]
7. **Prunes (Dried Black Plums)** … Black plums have high oxidant levels, but prunes carry twice as many! Prunes are also a great source of potassium and numerous vitamins, and minerals such as iron, which helps make healthy red bloods cells, and boron, which strengthens bones and muscles. They are also great for lowering cholesterol and blood pressure.[15]
8. **Raisins (and Red Grapes)** … For the same reason as prunes, raisins pack three times the antioxidant power of red grapes, but both are a great source of phenolic antioxidants, which are
9. **Spices!** … Spices have some of the highest antioxidant levels that you will want to add them to everything. Seek out these top contributors for added antioxidant punch: clove, oregano, rosemary, mint, thyme, cinnamon, turmeric, vanilla bean, allspice, marjoram, parsley, nutmeg, and basil.[16]

What are Polyphenols? And why are they important?

Polyphenols are a large class of chemical compounds found in plants that give plants their color (anthocyanins) and help defend them against attack by insects. There are more than 8,000 polyphenolic compounds in nature, and many are powerful antioxidants that can neutralize free radicals, reduce

inflammation and the risk of coronary artery disease, and slow the growth of tumors.[17] Polyphenols also have anti-diabetic and anti-aging effects while also protecting the brain tissues from oxidative stress and damage.[18] One study found a link between high polyphenol consumption and a 30 percent decrease in mortality in elderly adults.[19] They have also been shown to improve lung function, prevent the loss of bone mineral density, protect the skin from UV damage, and have anti-viral actions.[20]

Nutrition Catherine Saxelby says that basically anything that makes your mouth pucker – red wine, black tea, extra-virgin olive oil, and herbs such as rosemary, thyme, paprika, etc. – contain polyphenols.[21] But so do many fruits and vegetables. The key to longevity, say nutritionists, is to eat a diet rich in plant foods and to consume them at every meal, as polyphenols don't tend to survive in the body for too long.[22]

Common antioxidants and related plant food sources: [23]
Allium sulphur compounds: Leeks, onions, garlic
Anthocyanins: Eggplant, grapes, berries, and cherries
Beta carotene: Pumpkin, mangoes, apricots, carrots, spinach, parsley
Catechins: Red wine, tea
Copper: Seeds (sesame, sunflower), nuts, beans (soy, garbanzo) and legumes (lentils)[24]
Cryptoxanthins: Red peppers, pumpkin, mangoes
Flavonoids: Tea, green tea, red wine, citrus fruits, onion, apples
Indoles: Cruciferous vegetables such as broccoli, cabbage, kale and cauliflower
Lignans: Sesame seeds, bran, whole grains, vegetables
Lutein: Corn, leafy greens (such as spinach)
Lycopene: Tomatoes, pink grapefruit, watermelon
Manganese: Whole grains, nuts, leafy vegetables, teas[25]
Selenium: Nuts (Brazil, cashew), whole grains, spinach, beans and legumes (lentils)[26]
Vitamin C: Oranges, berries, kiwi fruit, mangoes, broccoli, spinach, peppers
Vitamin E: Nuts, avocados, seeds, whole grains
Zinc: Beans (kidney), legumes (chickpea), oatmeal, nuts (almond, cashew)[27]
Zeaxanthin: green leafy vegetables, peas, yellow summer squash, cruciferous vegetables

While eating a whole-food, mostly plant-based diet will significantly improve your chances for maintaining good brain health and general health for life, intelligent supplementation may also be helpful for achieving your health goals. Here are the supplements that I recommend to clients who wish to optimize brain health.

Antioxidant Supplements

While it's always ideal, and generally more beneficial, to get antioxidants and other nutrients directly from real whole-food sources, certain types of nutrients may also be helpful when consumed in supplement form.

Glutathione

Mark Hyman, MD calls glutathione "the mother of all antioxidants," and for good reason: It is considered the body's most important antioxidant because it's found within the cells and helps boost activities of other antioxidants or vitamins.[28,29] It is also crucial for detoxifying environmental toxins from our body.

What are the health benefits of glutathione? It …[30,31]

- Promotes T-cell function, which is critical for a strong immune system
- Reduces oxidative stress
- Decreases cell damage in alcoholic and non-alcoholic fatty liver disease
- Improves insulin resistance in older individuals
- Protects from environmental toxins
- Discourages cancer progression

As it turns out, many people are deficient in glutathione: Poor diet, stress, illness, infection, injuries, over use of antibiotics, genetically modified foods, artificial sweeteners, and radiation therapy all deplete this valuable antioxidant. This is particularly so if you are lacking one of the important genes (GSTM1, GSTP1, and others) crucial to making and recycling glutathione. Dr. Hyman claims that nearly one-half of the US population now has limited capacity to eliminate toxins and that nearly all of his very sick patients are missing this function.[32] Also, because glutathione levels naturally begin to dip around age 45, many people find themselves dangerously low in this important molecule in mid to later years.

Tips for Optimizing Glutathione Levels[33]

- **Consume sulfur-rich foods.** The main ones in the diet are garlic, onions and the cruciferous vegetables (broccoli, kale, collards, cabbage, cauliflower, watercress, etc.).
- **Exercise.** It boosts your glutathione levels, helping to strengthen your immune system, improve detoxification and enhance your body's own antioxidant defenses.
- **Take glutathione supporting supplements:** The production and recycling of glutathione in the body requires many different nutrients, which need to be taken consistently to boost glutathione.

    - **N-acetyl-cysteine (NAC).** NAC has been used for years to help treat asthma, bronchitis, and other respiratory diseases and is remarkable in its ability to dissolve mucus.[34] NAC also modulates levels of the important neurotransmitter glutamate in the brain. Because glutathione depletion and abnormal glutamate neurotransmission have been found in a number of mental health conditions and nervous system disorders, NAC is thought to be helpful for reversing mental health conditions and even reducing withdrawal symptoms related to addiction.[35] Research also now indicates that NAC can inhibit growth and block the metastasis of prostate cancer.[36] Lastly, taking NAC during the winter months may help prevent and treat flu-like symptoms.[37]

- **Alpha Lipoic Acid (ALA).** Like glutathione, this naturally occurring compound that's made in the body serves vital functions at the cellular level. ALA is involved in energy production, blood sugar control, brain, heart, musculoskeletal and immune health[38], and detoxification, and healthy people produce all that they need. But given all the stresses we are under, it's easy to become depleted. ALA is a must for people with type 2 diabetes, as it is known to increase the permeability of cell membranes, which allows more glucose to enter the cell.[39] And positive results were achieved in a very short time frame – after only four weeks of supplementation![40] Alpha lipoic acid is also known to significantly improve symptoms of diabetic neuropathy.[41] In its work to preserve brain function, ALA taken daily for roughly a year resulted in the stabilization of cognitive function in one group of people with Alzheimer's and related dementias.[42]

- **Methylation nutrients (folate (the naturally-occurring form of B9) and vitamins B6 and B12).** These B-vitamins are perhaps the most critical for keeping the body producing glutathione. Methylation, which is the process by which our body removes toxins) and the production and recycling of glutathione are the two most important biochemical functions in your body. (See more about the crucial function of methylation on p. X of this brochure.) Take folate (especially in its active form of *5 methyltetrahydrofolate (5MTHF)*) not *folic acid*, which is the synthetic version of B9[43]. Also, take B6 (in its active form of *P5P*) and B12 (in its active form of *methylcobalamin*).

  Studies show that 5-MTHF achieves higher blood levels of *active folate* than taking the synthetic version. This directly translates into lower *homocysteine* – a toxic amino acid that should be kept to a minimum in the body. As reported by Life Extension, a high homocysteine level is an *independent* risk factor for cardiovascular diseases including atherosclerosis, heart attack, stroke, and peripheral vascular disease. (Read more about homocysteine in the Inflammation section on p. X.

  The "active," also known as "metabolically active" or "bioavailable," forms of these vitamins means that the body can use them as taken without having to "process" them further. Most supplements and especially synthetic ones must be broken down by the body through the process of enzymatic action in order to be used. The problem is: What happens if we are deficient in a needed enzyme? Some people are born with enzyme deficiencies and most of us experience some decline in them as we age. So, metabolically active substances are generally more easily assimilated.

- **Selenium.** In addition to being a powerful antioxidant, this important mineral helps the body recycle and produce more glutathione. Selenium is also directly linked to improved cognitive function; in fact, the Mediterranean diet, which is rich in high-selenium foods like seafood and nuts, has been associated with a lower risk of developing Alzheimer's disease.[44] Beyond these benefits, selenium is also linked to a reduction in asthma-related symptoms, lower levels of inflammation in the body, which lead to decreased risk for heart disease and certain cancers, optimum adrenal and thyroid function, and improved immunity. It may also play an important role in warding off viruses.[45]

Guess What? Of all the foods on planet Earth, Brazil nuts have the highest amount of selenium; just one Brazil nut provides 137% of the RDI![46] Other food sources include certain types of fish (Halibut, Yellowfin tuna), shitake mushrooms, sunflower seeds, chicken, eggs and sardines.[47]

- **Vitamins C and E** (in the form of mixed tocopherols) work together synergistically to recycle glutathione. Best food sources for vitamin C are colorful fruits, such as strawberries, bell peppers, oranges, grapefruits, and mangoes and vegetables such as kale, Brussels sprouts and broccoli. Best food sources for vitamin E are almonds, spinach, sweet potato, avocado, wheat germ, sunflower seeds, butternut squash, trout, and olive oil.

- **Milk thistle (silymarin)** is a powerhouse herb that has long been used to support liver function by defending the liver form known toxins and reverse liver disease. It also contains preventive effects against age-related diseases, including atherosclerosis, cancer, neurodegenerative disease, and diabetes.[48] Milk thistle helps directly boost glutathione levels in the liver, which helps cells recover more quickly from oxidative stress.[49]

In addition to glutathione, and the supplements that support glutathione production, consider these other excellent and proven supplements for optimal brain function:

Quercetin

Quercetin is an excellent addition to a "broad-based anti-aging strategy."[50] Not only does quercetin protect the brain, it also helps to manage a number of inflammatory health problems, such as heart disease and blood vessel problems, allergies, infections, chronic fatigue, metabolic syndrome, and symptoms related to autoimmune disorders like arthritis.

Specific to the brain, however, studies show that quercetin's antioxidant properties may reduce toxicity of the dangerous and abnormal amyloid-beta proteins that accumulate in the brain[51] – the ones that eventually produce symptoms of memory loss and dementia. Among the best news about quercetin is that it has been found to activate the brain's powerful natural antioxidant defense system (called Nrf2), which supports the production of glutathione while preventing brain cell death.[52]

Top food sources of quercetin are black grapes, red raspberries, nectarines, broccoli, red onion, black tea (infused), and red wine.[53]

Lutein

Lutein is one of the most prevalent carotenoids (antioxidants) in nature and in the human diet. Interestingly, both lutein and zeaxanthin (another carotenoid) are found in high concentrations in the retina of the eye and incredibly important for lifelong eye health. Now scientists suspect that Lutein that lutein may directly impact brain function.[54] According to Dr. Axe, nutrition expert, food sources of lutein seem to be generally more effective and safer than supplements and notes that there is some evidence that people who obtain more lutein from their diets experience lower rates of breast, colon, cervical and lung cancers.[55]

Best food sources of Lutein are dark leafy greens (kale, spinach, Swiss chard, mustard greens, turnip greens, and collards), green peas, summer squash, pumpkin, Brussels sprouts, broccoli, asparagus, lettuce, carrots, and pistachios.[56]

Resveratrol

Resveratrol is a plant compound that acts like an antioxidant.[57] Found in red grapes, including small amounts in red wine, cocoa (dark chocolate), and dark berries, such as lingonberries, blueberries, mulberries and bilberries, resveratrol is known to boost memory and help with intestinal and colon cancers, lung cancer, and Alzheimer's disease. Specifically, a study conducted at the Max Planck Institute in Germany demonstrated improved memory and brain function in elderly people.[58] Also, recently, researchers at Georgia State University found that resveratrol may also help suppress inflammation in the body.[59] By the way, most of the studies conducted on resveratrol in humans focused on supplemental forms of the compound, in concentrations higher than those that any of us could get through food.[60]

Astaxanthin

Astaxanthin is found in wild-caught salmon and krill and offers tremendous protection for the entire body, including the brain, the eyes and kidneys, and heart. It is also known to improve fertility, reduce inflammation, and decrease the risk for many types of cancer while remediating UV damage and radiation and symptoms of neurodegenerative diseases. As it relates to brain health, astaxanthin studies show that supplementing with astaxanthin-rich Haematococcus pluvialis extract lead to improvements in cognitive function in older individuals who complained of age-related forgetfulness.[61] Furthermore, scientists now believe astaxanthin could help prevent dementia, including Alzheimer's.[62] Astaxanthin is found in salmon, lobster, crab and crawfish, as well as in krill oil and algae.[63]

Chlorophyll

Chlorophyll is very helpful for detoxification and linked to natural cancer prevention, blocking carcinogenic effects within the body, and protecting DNA from damage caused by toxins or stress. It's found in things like spirulina, leafy green veggies, certain powdered green juices and blue-green algae.

Other "Supplements" that Support Brain Health

While we might not think of essential oils as being "supplements," they do possess qualities that can help with healing.[64] Consider these options for improved brain function.

Lavender Essential Oil

Lavender is already proven to combat issues like depression, including postpartum depression, stress, anxiety, insomnia, and headaches, but various studies have determined that it can help also treat post-traumatic stress disorder (PTSD) and pain conditions.[65] Inhaling the scent of lavender is also shown to significantly decrease blood pressure, heart rate, and skin temperature while reducing agitation in people with severe dementia.[66,67] Lavender oil reduces inflammation and helps the body in many ways, such as producing important antioxidant enzymes – especially glutathione, catalase and superoxide dismutase.[68] Lavender can be directly inhaled, used in massage oil, or sprayed on linens.

Frankincense Essential Oil

Frankincense oil has been clinically shown to be a vital treatment for various forms of cancer, including breast, brain, colon and prostate cancers.[69] It has also been shown to help with digestive inflammatory diseases, oral health concerns, cold and respiratory disorders, and uterine health. Frankincense has also been shown to be effective in helping arthritis and Rheumatoid arthritis by in inhibiting production of inflammatory molecules.[70] When it comes to brain health, several studies found that sesquiterpenes, a natural compound found Frankincense, can increase levels of oxygen in the brain by up to 28 percent.[71] Therefore, frankincense shows great promise in the treatment of Traumatic Brain Injury (TBI). Research also suggests that frankincense oil can be used to improve memory and learning functions.[72] Rub frankincense essential oil on your body (neck area) three times daily, and take three drops internally in eight ounces of water three times daily as part of a natural prevention plan.

Top Supplements for Mood and Depression[73]

While much of our discussion to this point has been related to brain health throughout life, there are periods where individuals can struggle with mood issues and depression. Changes in life, including getting married, having a baby, switching careers, and loss, can challenge the best of us to feel good, day-to-day. If you find yourself feeling irritable or struggling to feel inspired, check to make sure you are getting adequate amounts of these nutrients. Balancing a few deficiencies can make the biggest difference. Call us today to book your appointment; your mental health is worth everything!

1. Omega-3 Fatty Acids. This is a crucial supplement. Take your Omega-3s; everyone needs them!
2. Probiotics. Our gut is in constant communication with our brain, sending it information that most definitely affects our mood.
3. Vitamin B-12. Dr. Hyman writes, "…More than one-quarter of all severe depression can be cured with B-12 shots." B-vitamins are essential for health.

4**. SAM-e (S-adenosylmethionine).** A 2002 review by the U.S. Agency for Healthcare Research and Quality found that SAM-e was more effective than a placebo and equally as effective as antidepressants.
5. Turmeric (Curcuma longa). David Perlmutter, author of "Grain Brain," claims that turmeric is your brain's best friend because of its ability to activate genes to produce antioxidants, which then protect our mitochondria, the tiny organelles in our cells that generate chemical energy in the form of ATP (adenosine triphosphate).
6. Vitamin D. Author Therese Borchard says that "a deficiency in vitamin D will feel very much like depression." Lots of studies have found a close association between depression (or increased odds for depression) and vitamin D deficiencies. Remember, more than three-quarters of U.S. teens and adults are deficient, according to a 2009 study published in the Archives of Internal Medicine. Everyone should take Vitamin D!
7. Vitamin C. I've written about vitamin C above; it's a crucial antioxidant for brain health, so eat your fruits and vegetables!
8. Amino Acids. A group of amino acids, called the aromatic amino acids (tryptophan, tyrosine, phenylalanine), are the biosynthetic precursors for the neurotransmitters serotonin, dopamine, and norepinephrine – the "feel good" hormones.[74]
9. Magnesium. Up to half of Americans today don't get enough of magnesium because stress, caffeine, sugar and alcohol. Up your intake of seeds (pumpkin, sesame, sunflower), dark leafy greens, and beans.[75]
10. GABA. Most of the anti-anxiety medications today (Valium, Xanax, Ativan) act on the GABA (Gamma-aminobutyric acid) pathways to calm and relax the nervous system. GABA is known as the "anti-anxiety" neurotransmitter.
11. L-Theanine. This amino acid derivative found in green tea, has long been known to trigger the release in the brain of gamma-aminobutyric acid, or GABA.[76]
12. Melatonin. Sleep is crucial for mood regulation and anyone who has ever experienced insomnia knows about melatonin. It helps us get to sleep but also regulates the sleep-wake cycle.

If you are struggling with mood issues or depression, make sure to include the following important life activities:[77],[78]

- Get a checkup, including a complete blood panel; your mood or depression can be linked to health concerns and nutrient deficiencies.
- If you are taking medications, check their side-effects and consult with your doctor about effective alternatives to medications.
- Get plenty of sleep; it is crucial for feeling good.
- Exercise – every day, if possible! Exercise boosts our feel-good hormones and supports better sleep. It's even better if you can exercise in nature.
- Spend time in nature; take in some sun. Sunlight increases levels of vitamin D, which boosts mood.
- Eat really well. Many issues of mood and depression can be cured by adopting a whole-food, mostly plant-based diet full of antioxidant-rich fruits and vegetables.

- De-stress. Make sure to take time every day to relax. Choose activities that get you away from your normal mindset.
- Stay connected. Call up a friend, visit a family member, or choose some other activity like taking an art class, participating in a community event, or volunteering. Social connection improves our mood.
- Practice mindfulness. Research has shown that Mindfulness-Based Cognitive Therapy (MBCT) can decrease the risk of future clinical depression in people who have already been depressed several times by 50%! Its effects seem comparable to antidepressant medications.

It is worth paying attention to your brain! Keep it healthy by eating a predominantly antioxidant-rich plant-based diet, exercising, practicing mindfulness, and utilizing intelligent supplementation to boost antioxidant and nutrient activity.

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