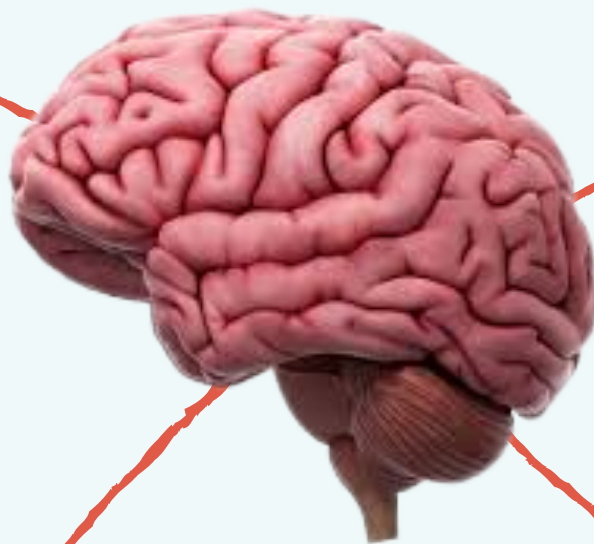


# Nourishing Your Brain

## A GUIDE TO UNDERSTANDING THE ESSENTIAL NUTRITION YOUR BRAIN NEEDS TO OPTIMALLY FUNCTION



Lisa Ann de Garcia, MEd., FDN-P

## WHAT NUTRIENTS ARE NEEDED FOR OPTIMAL BRAIN HEALTH?

Just like a brand new car, your body operates best on clean and high-quality fuel. Your brain is the controller of all your body's systems and utilizes 20% of your body's total energy, so you want to pay especially close attention to the kind of fuel that it receives.

The basic types of nutrients your body needs are:

- Macronutrients – proteins, fats, body minerals, and carbohydrates
- Micronutrients – vitamins, micro-minerals, and trace elements



This guide will explain the role each of these nutrients plays in your body with particular focus on how they affect the health of the brain.

## WHY SHOULD YOU BE WORRIED ABOUT DEFICIENCIES?

If we think of that brand new car, we know what happens if it runs out of gas, or has an oil leak. Or what happens when we give it the wrong kind of gas or oil? The same goes for us, but fortunately our bodies are a bit more forgiving. However, we will eventually pay the price with long-term neglect in the form of chronic disease, neurological disorders, or brain dysfunction.

### Lack of sufficient nutrients in modern food

Today's modern food lack the amount and quality of nutrients as it had in years past. Some of the reasons are the over-use of soil, harvesting of crops before they have ripened, and the introduction of Genetically Modified Food (GMO's). Therefore, it might be naive to assume that tomatoes today, for example, have the same amount of nutrients that they did a century ago.

### Toxins and metals in food

The use of pesticides and herbicides on the soil and during the growing and harvesting process of crops contaminate the food with toxins and heavy metals, which compete for mineral binding sites in the body. For example, lead competes for calcium in the bones, so when the level of calcium is low, or the calcium is out floating around the body where it does not belong wreaking havoc, it leaves the sites wide open for more harmful things, such as lead.



# Nourishing Your Brain

A word on organic. Do your homework. Organic does not necessarily mean that the food is free of chemicals. Food that is certified organic very well may have chemicals used, especially after the harvesting of grains like wheat, commonly sprayed with glyphosate. Farmers just have to use pesticides and chemicals that are on the approved government list.

"Organically grown" is the safest route because the farmers made a commitment to grow and harvest crops using organic methods, such as using compost that does not contain chemicals or synthetic fertilizers, using seeds and seedlings that have not been genetically modified (GMO) and by using companion planting techniques instead of pesticides. So, when concerned about the amounts of chemicals and heavy metals that are getting into your foods, it is critical that we scrutinize the labels, even for "organic" foods, and lean towards locally-grown or trusted food sources.

## Modern Food Choices



Primarily to satisfy a need for convenience, today's modern food supply is predominantly ready-made and processed. That convenience, however, comes at a price. In order for food to stay on the shelves for more than a day or two, it needs to have preservatives added to it. The preserving agents can cause chronic conditions over time. One good example is the use of sulfites in preserved food. Some people are highly reactive to sulfites and it can greatly interfere with the detoxification pathways of the body.

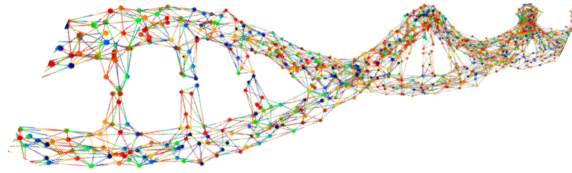
It is hugely important that we learn to analyze the label on the back of foods. You probably shouldn't eat anything you cannot pronounce. Because of the connections to brain disorders, some things you want to absolutely avoid are:

- food colors & flavors ("natural colors/flavors" are not always that natural and can be hidden source of chemicals, so beware).
- food additives
- Sugar substitutes – aspartame, sucralose, Splenda. Substitutes such as sugar alcohols may not be tolerated well by everyone, so be careful. Stevia, Xylitol, and honey are safer choices.
- MSG – Monosodium Glutamate, which unfortunately has about 15 hidden names, such as hydrolyzed plant protein.

Another issue is with fast foods. One of the biggest problems is the use of linoleic acid (LA), a very harmful form of Omega 6 that is in vegetable oils. LA is a very inflammatory form of omega fat and is considered by some to be the cause of most modern day chronic disorders. Since much of fast food is fried, this is a huge problem. LA is found in oils such as corn oil, canola, safflower, sunflower, etc. In the 80's there was a huge media campaign to get fast food establishments to switch from using saturated fats to vegetable oils, giving animal fats a bad name. However, butter, lard, and tallow are not as harmful as they have been made to believe.

# Nourishing Your Brain

## Genetics



Finally, genetics has a role to play in the way we are able to make proteins efficiently with the raw materials that we consume. Sometimes we have been exposed to so many negative things in our environment that our good genes have gotten switched off. However, as we learn from Dr. Lynch's book "Dirty Genes," paying close attention to the foods you eat, the toxins in the environment, and leading a clean lifestyle, those genes can actually get turned back on.

## MACRO-NUTRIENTS

Macronutrients are those that one uses in the largest amounts and are needed for energy, to maintain structure and run the body's systems. Examples are proteins, fats, calcium and phosphorous.

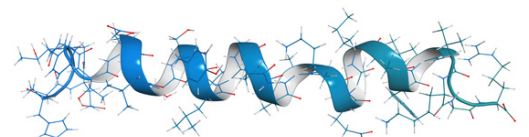
## Amino Acids and Protein



Proteins are made from chain amino acids and are used to make tendons, muscles, and ligaments. Functional groups are attached to the end of the amino acid chain that determine that protein's function. Examples are the hydroxyl group, amine group, and methyl group.

Besides producing body tissue, amino acids are precursors to important brain neurotransmitters, which are molecules that act as chemical messengers by carrying a nerve impulse from one nerve cell to another. The amino acids that essential for this are:

- Tyrosine
  - Precursor to Dopamine and Noradrenaline, involved in mood and stress
- Phenylalanine
  - Precursor to Dopamine which is involved in reward and movement centers in the brain
- Tryptophan
  - Precursor to Serotonin which reduces depression and synchronizes brain function
- Glutamine
  - Precursor to Glutamate which is the major excitatory neurotransmitter (turns on brain activity)
- GABA
  - Primary inhibitory neurotransmitter (turns off brain activity)
- Glycine
  - Inhibitory neurotransmitter (turns off brain activity)





# Nourishing Your Brain

We get the raw amino acids used to make protein from either eating foods or supplements containing raw amino acids, or by breaking down dietary proteins through the digestive process. This requires that one has an adequate amount of stomach acid and pancreatic enzymes to be able to break down those proteins, which many people do not. When there is inflammation in the gut, undigested proteins run the risk of getting into the blood stream and triggering the immune system. Over time this can potentially lead to autoimmunity

## Fatty Acids

Fatty Acids make up the fabric of the cell membrane, hormones and fat deposits. Omega 3 & 6 are called "Essential Fatty Acids" because our body is unable to produce them, therefore they must come from our diet.

One of the main roles of Omega 6 is to cause an inflammatory state, which is sometimes necessary, like when we cut ourselves. The role of Omega 3 is to stop that process before it gets carried away. When we consume high Omega 6 foods on a continuous basis and do not eat foods rich in Omega 3, that inflammation state never has a chance to stop, thus leading to chronic disease. Research shows that in order to prevent or reverse many chronic conditions, such as asthma, a ratio of Omega 6 to 3 of 3:1 or better is optimal. In the US, the average person is sitting at 25:1.



The best fats to consume, especially for brain health, are omega 3 fatty acids. There are 3 kinds of Omega 3 fats: DHA, EPA, and ALA. ALA, found in flaxseed and other nuts and seeds, needs to be converted to EPA and DHA in the body and that conversion process is said to be a bit inefficient. DHA and EPA are found in fatty fish and seaweed. Therefore, if you are not eating a diet rich in fatty fish and/or seaweed, it is necessary to supplement with these compounds. When supplementing, it is best to find a product that has a 2:1 or 3:1 ratio of DHA to EPA for optimal brain health. Most products are reversed, so you have to be diligent with reading labels when making a selection.

# Nourishing Your Brain

## Macro Minerals

Macro minerals are those that are used by our bodies in large amounts and are found naturally in meats, fruits, and vegetables. They are used for both structure and function of our bodies:

- Calcium and phosphorous – primary minerals in bones and skeletal structure
- Potassium, Sulphur, Sodium, Chloride, Calcium, Magnesium, Iodide, Iron – keeps muscles contracting, nerves firing, and blood & hormones working

Sodium, potassium, chloride, calcium, phosphate, and magnesium are all electrolytes. Electrolytes are minerals that carry an electrical charge and can get depleted from the body and need to be replenished. Coconut water is probably one of the best food sources for replenishing electrolytes quickly. It is advisable to avoid sports drinks as they typically contain colors and too much sugar. Sport drinks were designed to replenish the electrolyte balance in athletes. Therefore, they should not be found in a child's sippy cup. I have had dentists tell me how much business they have because children are living off of these drinks.

## Carbohydrates

Carbohydrates, sugars and starches, provide building blocks for functional components as well as the body and brain with glucose, which is converted to energy. In humans, the brain accounts for approximately 2% of the body weight, but it consumes about 20% of glucose-derived energy making it the main consumer of glucose. Loss of stamina can be affected by the utilization of glucose in the brain. Something to note is that our brainstem requires a large amount of glucose to function, so if supplies are low, higher thinking areas of the brain are essentially shut down in order to direct glucose stores to areas that need it most, especially in times of stress.

When it comes to carbohydrates, quality is critical.

- Great source: unprocessed or minimally processed whole grains, vegetables, fruits and beans—delivers vitamins, minerals, fiber, and a host of important phytonutrients.
- Less than optimal sources: white bread, pastries, sodas, and other highly processed or refined foods.



## MICRO-NUTRIENTS

Micro-nutrients, vitamins, micro-minerals, and trace elements, also play a critical role in our health, such as enzyme activation, activation of membrane channels to initiate nerve impulses, and regulating cellular function. Some molecules are composed of these key elements, such as hemoglobin. They are called micro-nutrients because, as opposed to macro-nutrients, our bodies require a small amount of them in order to function.

### vitamins

Vitamins are organic compounds which help regulate bodily activities. Most of them need to come from food sources because our bodies do not produce them or they are produced in small quantities. There are both fat-soluble and water-soluble forms.

#### Fat soluble:

- Vitamins A, D, E, K
- The body stores fat-soluble vitamins in fatty tissue and the liver, and reserves of these vitamins can stay in the body for a period of time to be used when needed.
- Eating fats along with these vitamins help the body absorb them through the intestinal tract. Therefore, it is important that when taking as a supplement to take them with some kind of fat, such as butter on your food.

#### Water soluble:

- B vitamins – super important for general body functions. Many people seem to be deficient, especially with B12, and some of the B vitamins can be easily forgotten about, like riboflavin. B6 and B12 have both been highly researched as important supplements for children with autism spectrum disorders.
- Vitamin C – aids in collagen production, wound healing, and bone formation. It also strengthens blood vessels, supports the immune system, helps the body absorb iron, and acts as an antioxidant.
- Water-soluble vitamins do not stay in the body for long and cannot be stored. They leave the body via the urine. Because of this, people need a more regular supply of water-soluble vitamins than fat-soluble ones.



It is notable that Vitamin D, A, and C can also be quite effective in boosting the immune system to help prevent from getting sick during cold and flu season.



# Nourishing Your Brain

## Micro-minerals

Micro-minerals are present in small amounts (less than 100mg) but essential for our metabolism and energy transactions in the body, for example, manganese, copper, iodine, chromium, selenium, and zinc.

## Trace minerals

Trace minerals are only needed in trace amounts, yet have critical roles in our bodies. Examples are chromium, molybdenum, and selenium. Chromium is important in glucose metabolism. One of many roles of molybdenum is to counteract the ill effects of an overabundance of sulfur, and selenium plays an important role with thyroid function. Trace minerals can be found naturally in Himalayan Pink salt and Celtic sea salt.



An important class of micro-minerals is the co-factors that along with vitamins control enzyme action. Enzymes are made in an inactive form called an apoenzyme and must first join with a micro-mineral cofactor, such as copper, iron, or zinc or a coenzyme such as vitamin B6 to change its shape and making it an active enzyme. Therefore if there is a deficiency in either mineral co-factors or vitamin co-enzymes it would significantly reduce enzyme activity. This is a major reason people feel so tired when they are deficient in B-vitamins that are essential to activate the enzymes needed to turn glucose into energy.

And since enzymes determine how fast and efficiently parts of the body are made or metabolized, these micro-mineral or vitamin deficiencies can interfere with production of molecules and elimination of toxins important to healthy function.



## VITAMIN D - THE SUNSHINE VITAMIN



Vitamin D has gained a lot of popularity in recent years as it is becoming more and more understood. Based on everything I read and listen to, I would say that it is probably one of the most important, if not the most important, nutrient for brain health. Vitamin D deficiency can be quite problematic, up to 85% of people are estimated with having Vitamin D insufficiency. Deficiency, or insufficiency, can greatly depend on where you live since it is synthesized in the skin during exposure to the sun. Those of us stuck indoors or wearing layers of clothing due to cold weather are not getting the necessary sun exposure, making supplementation critical.

Although Vitamin D plays an important role in many body systems, such as bone synthesis and immune support, it is critically important for the brain and nerve health. There are cognitive receptors that are widespread in the brain and modulates the biosynthesis of neurotransmitters and neurotrophic factors. Circulating Vitamin 25OH D crosses the Blood Brain Barrier and enter the glial cells (those responsible for immune response in the brain) and neuronal cells and then converts to 1.25 OH 2D, the active form of Vitamin D. Insufficiency can lead to anxiety and depression and increase the risk of psychosis in children with chromosome 22q11.2 deletion syndrome. Positive roles of Vitamin D on the brain are that it:

- Impacts early life brain development – thus pregnant moms should be taking D3
- Releases nerve growth factor, an essential molecule for the survival of neurons in the cortex and hippocampus (area in charge of short-term memory).
- Is neuroprotective, protects adult brain health, and keeps cognitive function in older adults
- Allows the microglial cells to fight against pathogens in the brain
- Clears amyloid plaques that lead to dementia
- Can be combined with existing treatments for Parkinson's
- Modulates the biosynthesis of neurotransmitters and neurotrophic factors

Vitamin D3 should always be taken with K2. The job of K2 is to shuttle calcium back to the bones and an increase of D3 increases calcification. The ratio of K2 to D3 is estimated to be about 100-200 mcg of Vit K with every 1,000 IU of Vitamin D. Natural sources of Vitamin D are the sun, oily fish, and sheep's wool.

Optimal blood levels of Vitamin D3 are 50-70 ng/ml. Vitamin D3 dose recommendations depend on age and whether or not you are trying to reverse a chronic disorder. These are Dr. Mercola's recommended dosages:

Under 5	35 IU per pound per day
5-10	2500 IU
Adults	5000 IU
Pregnant Women	8000 IU

## ZINC - ONE OF THE BRAIN'S MOST ESSENTIAL MINERAL

Zinc is possibly one of the most important minerals in the body, the second most abundant, and yet one of the most common mineral deficiencies, second to iron, in the world, with an estimated 20-50% of the population affected. In his book *Brain Longevity*, Dr. Khalsa postulates that on most days 90% of Americans fail to meet the RDA requirements for zinc, which would be considerably lower than optimal levels. He suggests that with today's modern food, one would have to eat 2500 calories per day to obtain enough zinc.

Zinc is a co-factor that activates more than 300 enzymes, is part of hundreds of structural proteins in the body, and plays an essential role in the function of metalloproteins, which are major free-radical scavengers and heavy metal detoxifying proteins in the liver. Some of the other things that zinc does is to support and regulate:

- The immune system and control inflammation
- Neuron grown and myelination
- Neurotransmitter release and metabolism
- Fatty Acid metabolism
- Production of digestive enzymes
- Production of detoxification enzymes and molecules in the liver
- Metabolism and transport of hormones

There are several nutrients that enhance zinc's different functions, including selenium, magnesium, manganese, copper, iron, B6, and vitamin C. So, though zinc plays a lot of roles, it doesn't work alone and needs other nutrients to help it out.

### Zinc deficiency

So what would a deficiency in zinc translate to?

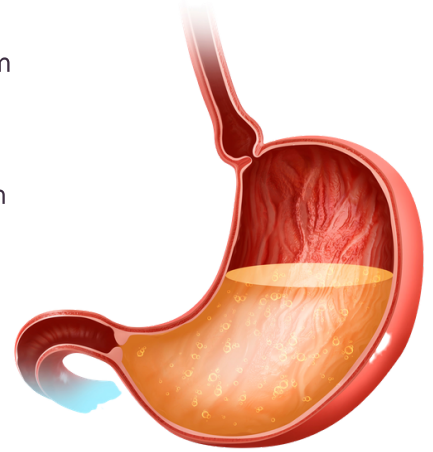
- Cognitive impairment
- Problems with memory
- Dyscalculia (problems with calculations and mathematics)
- ADHD and social anxiety
- Sleep Disorders
- Neuropathy
- Immune dysfunction
- Dermatitis
- Impaired DNA synthesis and repair
- Impaired sense of smell & taste (think of your picky eaters)
- Eating disorders
- Slow growth



# Nourishing Your Brain

## Poor digestion and absorption

Besides a lack of zinc in the food supply, another problem is that the average person has a less than optimal digestive system. In order to properly break down foods into usable parts, one needs to have strong stomach acid and produce enough pancreatic enzymes. Like other nutrients, zinc is released from the food during digestion. Up to 50% of Americans are considered to be hypo-chloric, or have low stomach acid. If this is the case, food parts can be eliminated from the body before even being broken down, thus nutrients such as zinc are not available for absorption in the small intestine. One sign of this would be seeing foods in the stool, such as peas or corn kernels. Another result of not breaking down proteins would be that they can pass through a porous intestinal lining if there is inflammation, something that is more common than not, and then trigger an immune response, potentially leading to autoimmunity if it persists long enough.



## Phytates

Now, even if you are getting the adequate amount of zinc in your diet, and it is being properly separated in the digestive process, there is another villain that can throw a wrench into the situation, and that is phytic acid or phytates.

Phytates are found in plant seeds and serve as the main storage form of phosphorus in the seeds. When seeds sprout, phytate is reduced and the phosphorus released to be used by the young plant. All edible seeds, grains, legumes and nuts contain it in varying quantities, and small amounts are also found in roots and tubers. The issue with phytates is that they bind to iron and zinc which stands to reason why they are the top deficient nutrients in the body, seeing how phytate-containing foods are such a staple in western diets.

There are ways to significantly reduce phytic compounds in foods while preparing them. This can be done by:

- Soaking
- Sprouting
- Fermentation
- A combination of the above



Supposedly, phytates only bind to zinc during meals in which it is consumed but not future meals. So deficiencies would occur most if these foods are being eaten at every meal. However, if eaten alone, they would only bind to the nutrients of that food. Zinc found in meat is said to not bind easily to phytates, so deficiencies are especially problematic among vegetarians.

## Genetic influences on deficiencies

Depending on the alleles that one has, any one individual may be coding for a protein that varies in the ability of the absorption, assimilation, and utilization of zinc from one person to the other. So even if you are getting what appears to be an adequate amount of zinc in the diet, you may only be able to absorb it marginally at best.

One of the most known genetic mutations in relation to zinc deficiency is Kryptopyrroluria, which causes a combined zinc and B6 deficiency and creates negative effects in the body and brain. Charles Krebs, PhD describes it best in his book *Nutrition for the Brain*:

"During normal break down of the heme molecule, a major component of hemoglobin, the prophyrin molecule is broken down into a metabolite that is converted to a water soluble form by conjugation and eliminated in the urine. However, when there is a faulty gene coding for the liver enzyme converting the porphyrin molecule to the water-soluble molecule, hemopyrrole is produced instead and excreted in the urine. Since pyrroles are not normally excreted in urine, a chemical test for pyrroles is used to detect this condition" (p. 65). An Organic Acid Test (OAT) is commonly used to test pyrroluria.



Kryptopyrroles are found together with hemopyrrole in the urine. Kryptopyrrole tends to join with vitamin B6 creating a complex. This complex bonds with a zinc atom and removes zinc as well as vitamin B6 from the body, potentially leading to widespread zinc and B6 deficiency in the body and brain. "Thus for every molecule of heme that is metabolized, people with this genetic fault lose an atom of zinc and a molecule of B6" (Krebs p. 66).

There is not a single gene responsible for this problem, but "different alleles coding for slightly different versions of the pyrrole metabolizing enzymes" (p. 67), leading to a varying range of expression of symptoms. Clinical symptoms associated with chronic kryptopyrroluria are neurological, cognitive, and psychological in nature. The classic symptom that is associated with this is social anxiety. Other complaints might be:

- ADHD
- Memory
- Thinking and perceptual disorders
- depression
- schizophrenia-like symptoms
- Strong up and down emotions
- Poor memory of dreams
- Rheumatological symptoms
- Unspecified autoimmune phenomena



## **Supplementation for zinc deficiencies**

The amount of deficiency will depend on how much is necessary to supplement. Think of our nutrient storage as a reservoir and tank. The reservoir is the general storage our body has of a specific nutrient of which it has to pull from. The tank is the immediate supply to be used by the body. If the tank is low, it has to pull from the reservoir. If the tank (from daily diet) is always low, then it draws from the tank too much, wiping out the stores. The RDA for zinc is 15 mg per day and Dr. Krebs suggests consuming up to 40 to 60 mg per day since memory and functions of the frontal cortex are highly dependent upon adequate levels of zinc.

The kind of zinc to consume is tricky. Zinc comes in different forms, such as gluconate, arginate, picolinate, and glycinate. So it is "chelated" or bound to amino acids. Different forms target slightly different things. Also, because it is not pure zinc, the amount on the label include both the amount of zinc and the amount of the amino acid it is bound to. So, for example, 60 mg of zinc gluconate is 17 mg of zinc and the remainder is the gluconate. This needs to be taken into consideration when dosing your zinc. Some forms of zinc can cause nausea if not taken with food, so that needs to be noted.

Zinc gluconate tends to target the brain best and one naturopath told me that zinc glycinate works nicely too. On the market there are other forms of zinc that claim high absorption, so it is prudent to do a bit of homework when choosing a zinc.

If you want a simple at-home way to determine if you need to take zinc, you can do a tally test. This is a taste test using liquid forms of zinc, Metagenics has a good one. If after sipping a sample of the solution it tastes sweet or nothing, your body needs the zinc. If it tastes bitter, then you don't.

## **HERBS AND NEUTRICEUTICALS**

There are a few herbs that are quite effective at enhancing cognitive function, including memory, that needs mentioning. The most studied herbs in relation to brain health and performance are:

- Ginkgo biloba - enhancing cerebral circulation, memory, and cognitive function, with no known side effects
- Barcopa Monniera - enhances memory, has a protective effect on DNA damage, and improves insomnia with no known side effects
- Ginseng - an adaptogen which helps the body and brain adapt to physiological and psychological stressors. Siberian ginseng is best for cognitive effects



# Nourishing Your Brain

## NUTRIENTS TO MAINTAIN OPTIMUM MENTAL PERFORMANCE

With minor adjustments, the following chart was put together mostly by the work of Charles Krebs, PhD, from his book *Nutrition for the Brain* (p. 149). Charles spent the majority of his career focusing on brain integration and considering what the brain needed to work optimally. Ideally, nutrients would come from foods, but as discussed earlier, there are many factors that prevent our bodies from getting adequate amounts of nutrients from what we eat.

Nutrient		Recommended Daily Dosage	
<b>Vitamins</b>			
Note: Fat soluble vitamins require some dietary fats for adequate absorption			
Vitamin A	Fat Soluable	5,000-25,000IU	
Vitamin B1		50-1000mg	
Vitamin B3		30-200mg	
Vitamin B5		100-1000mg	
Vitamin B6		50-200mg	
Vitamin B12		100-1000mcg	
Folic Acid		200-400mcg	
Vitamin C		500-3000mg	
Vitamin D*	Fat Soluable	35-8,000IU	*Vitamin D should always be taken with vitamin K to shuttle Calcium to bones where it belongs.
Vitamin E	Fat Soluable	100-800mg	
<b>Minerals</b>			
Magnesium		100-300mg	
Calcium		50-250mg	
Selenium		50-100mg	
Iron		10-30mg	
Zinc*		30-50mg*	*There should be a number of different types of zinc to maximize uptake and utilization in the many roles zinc plays both within the brain and the body
Lithium		10-30mg	
<b>Amino Acids</b>			
Glutamine		100-250mg	
Phenylalaine		100-500mg	
Tyrosine		100-1000mg	
Tryptophan*		100-500mg*	*Tryptophan was removed from the market about 10 years ago and now is only available at low doses in many countries
<b>Fatty Acids</b>			
DHA/EPA (3:1 ratio)		250-1000mg	Author's note: Some children with ADHD do better on GLA (Evening Primrose Oil 1300mg) than DHA
<b>Herbs</b>			
Ginko biloba		50-500mg	
Barcopa		20-300mg	
Ginseng		500-1500mg	

If you are interested in high quality supplements at a discount, try out my online dispensary at [Fullscript.com](https://Fullscript.com)

**SHOP NOW**

Would you like to know your child's mineral levels to best support his/her system? Get a Hair Tissue Mineral Analysis and consultation with a customized protocol and recommendations based on the results.



**ORDER NOW**



***Lisa Ann de Garcia, MA, MEd, NBCT, FDN-P***

Founder of Whole Child Learning and Wellness, lives in Lehi, UT and is a Functional Diagnostic Nutrition Practitioner, Certified Autonomic Response Testing Practitioner through the Klinghardt Academy, Blomberg Rhythmic Movement Training Instructor and Licensed Brain Gym® Instructor. As a National Board Certified Teacher, Lisa Ann has nearly 25 years of teaching experience in the US, abroad and at the university level. She has spent most of her career working with children who struggle and one of her three children is on the autism spectrum. In order to support children who struggle and optimal brain health, Lisa Ann realized that the key factor was what was going into the body in the form of nutrition and toxins.



Questions or need support?  
Please contact me...



+ Follow



## REFERENCES

- Arnarson, A. (2018). *Phytic Acid 101*. Retrieved from: <https://www.healthline.com/nutrition/phytic-acid-101> Posted June 28, 2018. Healthline.
- Chan, T.H. (no date). *Carbohydrates: Quality Matters*. Retrieved from: <https://www.hsph.harvard.edu/nutritionsource/carbohydrates/>. Harvard dept. of public health
- Delgado, M. (2014). *Organically Grown vs. Certified Organic*. Retrieved from [https://www.mountainmausremedies.com/blog/organically-grown-vs-certified-organic/#:~:text=Organically%20grown%20means%20that%20farmers,GMO\)%20and%20by%20using%20companion](https://www.mountainmausremedies.com/blog/organically-grown-vs-certified-organic/#:~:text=Organically%20grown%20means%20that%20farmers,GMO)%20and%20by%20using%20companion). Posted on Feb 14th, 2014. Mountain Maus Remedies.
- Jabr, F. (2012). *Does Thinking Hard Really Burn More Calories?* Retrieved from <https://www.scientificamerican.com/article/thinking-hard-calories/>. Posted July 18, 2012.
- Krebs, C. (2006). *Nutrition for the Brain*. Michelle Anderson Publishing, Melbourne.
- Lynch, B. (2018). *Dirty Genes: A breakthrough program to treat the root cause of illness and optimize your health*. Harper One Publishing, New York.
- Mercola, J. *Vitamin D Resource Page*. Retrieved from: <https://www.mercola.com/article/vitamin-d-resources.htm> on March 31, 2021
- Mergenthaler, P., Lindauer, U., Dienel, G. A., and Meisel, A. (2013). *Sugar for the brain: the role of glucose in physiological and pathological brain function*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3900881/#:~:text=In%20the%20adult%20brain%2C%20neurons,delivery%20of%20glucose%20from%20blood>. Trends Neurosci. 2013 Oct; 36(10): 587-597.
- Muacevic, A., and Adler, J. R. (2018) *The Role of Vitamin D in Brain Health: A Mini Literature Review* Cureus 10(7): e2960. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6132681/> Published online 2018 Jul 10. doi: 10.7759/cureus.2960