

BRAIN HEALTH

Facts:

- The brain is the control center for the body and is **our most powerful organ**. The brain has many distinct regions, each of which is responsible for different functions (for example, the hippocampus is the center of memory & learning & links emotions and behavior, judgment and movement; the cerebral neocortex controls conscious thought; the cerebellum controls balance and coordination and the brain stem connects the brain to the spinal cord). When cells in a particular region are damaged or imbalanced, that region cannot carry out its functions normally.
- **Brain chemistry** is impacted by hereditary, age, sickness, accidents and the unknown. Brain cells that do the thinking (neurons) communicate with each other using chemical neurotransmitters. The most common neurotransmitters are: dopamine (regulates desire), norepinephrine, epinephrine (adrenaline), histamine, serotonin (feelings of hope) and acetylcholine.
- Mood disorders, bipolar disorder and **depression** are related to neurotransmitter imbalances. The goal of drug treatment is to improve these imbalances.
- **Anxiety disorders** cluster around excessive, irrational feelings of fear and dread. Both short & long term stress releases powerful fight-or-flight stress hormones (adrenaline; cortisol) in the body. When cortisol levels are too high for too long one experiences fatigue, bad moods & weakness. Stress hormones also weaken blood vessels. Chronic psychological stress **speeds up the normal aging of a persons' cells**.
- **Dementia** is a general term (not a disease) for a decline in mental ability (memory or other thinking skills) severe enough to interfere with daily life. **Alzheimer's disease** is a subset of dementia and accounts for 60-80 percent of reported cases. **Vascular dementia**, which occurs after a stroke, is the second most common dementia type. While some conditions that cause symptoms of dementia are reversible like thyroid problems, depression, medication side effects, excessive use of alcohol and vitamin/mineral deficiencies, **most dementia's are progressive**, meaning symptoms start out slowly and gradually get worse. Dementia is caused by damage to brain cells. The damage interferes with the ability of brain cells to communicate with each other and causes brain cells to die prematurely. In Alzheimer's disease, high levels of certain proteins inside and outside of brain cells (hippocampus region first to be damaged) make it hard for brain cells to communicate with each other (levels of the neurotransmitter acetylcholine, in particular, drop sharply)
- **Essential tremor** is a brain condition that causes tremors: uncontrollable shaky movements of the hands, limbs, head or voice. It is usually mild and is very common, often running in families. It usually starts later in life, but when it runs in families it can start in young adulthood
- **Parkinson's disease** is a serious neurological condition that causes tremor and often severe difficulty with walking and most movements of the arms and hands, and can be accompanied by dementia

BRAIN SUPPLEMENTS

While there are many drugs that are used to balance neurotransmitters, improve blood flow to the brain or improve memory loss, the most active areas of brain research today centers around non-drug therapies including cardiovascular health (don't smoke, monitor blood pressure, cholesterol & blood sugar & maintain a healthy

weight), diet, physical fitness (increases blood and oxygen to the brain) and brain supplements.

Brain and vitamin/mineral supplements, in particular, hold great promise for helping to restore neurotransmitters to balanced levels for challenges like depression, anxiety, ADD/ADHD, headache, migraines, memory, focus and chronic pain.

VITAMIN AND MINERALS

It is highly recommended that one first has a lab test completed to determine any nutritional deficiencies. While a daily high-quality multi-vitamin is recommended (powder better than capsule/tablet), it is critical that **magnesium** levels are adequate and that any deficiencies are corrected. In addition, it is recommended to supplement with **Vitamin B6** (100 mg. daily), **Vitamin B12** (5,000 mcg. once daily/best under the tongue), Folic Acid (one mg. daily), Vitamin D (2,000 IU's once daily) and Fish Oil/Omega-3 (1,000 mg. three times a day).

N-acetyl L-Tyrosine & L-Phenylalanine:

These two amino acids provide a natural option to increase the catecholamine's neurotransmitters (dopamine, epinephrine & norepinephrine) which promote energy, alertness, and a general sense of optimism. Unlike caffeine which can have negative side effects, these substances temporarily enhance mood, energy, and cognition by increasing catecholamine synthesis in the brain. A **test to determine your levels** of catecholamines via a urine or blood sample can be ordered by your doctor.

- **Tyrosine** is a **non-essential amino acid**, meaning that it can either be obtained through your diet, or it can be naturally synthesized in your body as it is needed. N-acetyl L- Tyrosine is a synthetically altered form of tyrosine that contains acetic acid, which increases tyrosine's availability and absorption into your blood stream.
- **L-Phenylalanine** is an **essential amino acid** that converts into tyrosine. It must be obtained through the diet or supplementation. Take L-Phenylalanine on an empty stomach (at least 30 minutes or more especially if **eating proteins**) and take with Vitamin B6, Vitamin C, mineral co-factors & omega-3 fatty acid to further maximize absorption. Experiment with your daily dosage of L-Phenylalanine or L-Tyrosine (between 500mg. -1,500 mg.) with few fears of adverse side effects. Too much dosage and you may feel jittery or agitated.

For anyone experiencing depression, chronic fatigue, or mood swings, it's important to correctly identify what specific neurotransmitters you are low in. For example, patients with “black cloud “or dark depression are probably low in serotonin and would not be helped by these supplements (in fact, high daily doses could actually negatively affect serotonin levels). Patients with “Feeling the Blahs” depression are probably low in norepinephrine and may be helped.

Tyrosine is also a precursor for the production of melanin which is the pigment that makes your skin darker after sun exposure and regulates your sleep cycle.

L-Tryptophan:

L-tryptophan is an essential amino acid (body can't make it; must be acquired from food) that is naturally found in animal and plant proteins. After absorbing L-tryptophan from food, our bodies convert it to 5-HTP, and then to the neurotransmitter serotonin. It also causes blood vessels to narrow. Changes of serotonin in the brain can alter mood.

5-HTTP:

5-HTP is a chemical by-product of the protein building block L-tryptophan and is produced commercially from the seeds of an African plant.

5-HTP works in the brain and central nervous system by increasing the production of the neurotransmitter serotonin. Serotonin can affect sleep, appetite, temperature, sexual behavior, and pain sensation.

5-HTP is used for many health challenges including depression, insomnia, obesity, anxiety, PMS, ADHD, migraine and tension-type headaches & along with prescription drugs used to treat seizure disorders and Parkinson's disease.

Acetyl L-Carnitine (ALCAR):

Acetyl L-Carnitine is a well-researched nutritional supplement. It is synthesized to provide a more bioavailable form of L-carnitine, which is a derivative of the amino acid lysine. L-carnitine is made naturally in the body by the liver and kidneys, and then transported to other tissues such as the brain and heart.

Because L-carnitine is involved to cellular metabolism, it can increase energy production in cells, and thereby may generally boost physical and mental energy. As a supplement, L-carnitine is often used to help improve memory and is being studied as an adjunct treatment for Alzheimer's disease. It also made help with depression, may be useful in the treatment of Parkinson's disease, stroke and daily supplementation may have a protective effect on the central nervous system and may benefit the heart.

Recommended daily dosage for adults is 500 to 1,500 mg. Children should not take Acetyl L-Carnitine. The principal dietary source of acetyl L-carnitine is red meat, in particular mutton.

GABA:

Gamma-Amino Butyric acid (GABA) is an amino acid which acts as a neurotransmitter in the central nervous system. It inhibits nerve transmission in the brain, calming nervous activity. As a supplement it is sold and promoted as a **natural tranquilizer (800mg.'s daily recommended dosage)**. In order for GABA as a supplement to be effective, it must pass the blood brain barrier to be effective. While evidence of effectiveness will be determined by the patient, there is little hard evidence that it does reach the brain and it may serve more as a safe placebo.

Patients who are over anxious or who complain of insomnia due to “too many thoughts which I can't shut off” could best be helped by GABA supplementation.

Huperzine A:

Derived from the Chinese club moss plant and used for centuries in Chinese medicine, Huperzine A supports healthy **acetylcholine** levels in the brain, which are critical for normal memory function and overall brain and cognitive health. Recommended daily dosage of 100 mcg. 2-3 times a day.

Phosphatidylserine (PS):

PS is an essential **phospholipid** derived from the soybean. PS is one of 5 phospholipids that help make up the exterior of cells (membranes). PS directly enhances communication between the brain cells.

As the brain ages, phospholipids levels (along with most other brain chemistry) steadily decline which leads to declining cognitive performances. According to researchers and the marketers of PS products, PS holds great promise in helping cells in the brain transfer information with greater frequency and speed. A 100 mg. dose of PS taken three times a day is recommended as prevention against cognitive decline and the risk of dementia. The same daily dosage is recommended to significantly reduce symptoms of Alzheimer's disease in as little as 12 weeks.

A minimum daily dosage of 100mg. of PS is also recommended to help reduce stress, for ADHD in children, improved concentration and student performance and depression in both adults and children.

Prevagen (Apoaequonin):

A new heavily marketed product called Prevagen claims that a protein called Apoaequonin helps with mild memory problems associated with aging. Originally discovered in jellyfish, the protein is now made from a vegetable-based process. Recommended daily dosage is one capsule (10 mg. of Apoaequorin) in the morning with or without food. Improved memory anticipated within 90 days.

The theory behind Apoaequonin's action is that the jellyfish protein or amino acid assists with calcium homeostasis or the process of maintaining **low levels of cytosolic calcium**. When the level of cytosolic calcium increases, it causes a diminished performance of the neuron cells which results in memory problems.

Cocoa Flavonols (chocolate):

Research has shown that certain compounds in chocolate, called cocoa flavonols, may protect brain function. Taken daily in high doses (500-1000 mg.) seniors, in particular, demonstrated improved thinking skills with a problem known as mild cognitive impairment.

Flavonols are abundant in cacao beans which is used to make cocoa powder and chocolate. Dark chocolate is best and three ounces contains from 100 to 2,000 mg.'s of flavonols. The best way to cocoa flavonols is through dark cocoa powder mixed with a very little bit of added sugar and low-fat milk.

Turmeric & Curcumin:

Turmeric has long been used as a traditional medicine, spice and natural coloring agent for thousands of years. In the past 15 years, nearly 6,500 scientific papers have been published on the therapeutic properties of turmeric and curcumin, its most active constituent (strong natural anti-inflammatory agent). Curcumin, in particular, is recommended for improved cognitive function, performance and mood (300-400 mg. daily; results in 30 days). To enhance curcumin's absorption into the bloodstream, it is recommended that it be taken along with black pepper (Piperine 5 mg. capsules)

Alpha-Lipoic Acid (ALA):

Alpha-lipoic acid is a synthetic version of lipoic acid, a naturally occurring compound produced in the body and synthesized by both plants and animals. ALA is a powerful antioxidant that is vital to cellular energy production and that helps to neutralize the damage caused by free radicals (destroys cells/aging process).

As a dietary supplement, alpha-lipoic acid benefits include helping increase insulin sensitivity and helping to

address metabolic syndrome. In addition, ALA works with other antioxidants to help neutralize free radicals and reduce cellular damage. ALA also acts as a synergist with B vitamins to help in the production of energy from the proteins, carbohydrates and fats consumed through foods. Researchers have investigated the use of ALA in the treatment of **diabetic neuropathy, liver ailments and glaucoma.**

ALA also holds great promise to improve memory via its protective effects on brain and nerve tissue.

Daily doses of ALA up to 600 mg. per day appear to be well tolerated for all conditions. ALA may cause some stomach distress so taking it with food is advised.

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